



**BUFFALO CORPORATE CENTER**

368 Pleasant View Drive

Lancaster, New York 14086

Tel: (716) 684-8060, Fax: (716) 684-0844

June 4, 2020

NYS Department of State, Division of Coastal Resources  
ATTN: Consistency Review Unit  
One Commerce Plaza, Suite 1010, Washington Avenue  
Albany, New York 12231

**Re: Notification for Joint Permit Application – Buckhorn Island Shoreline Habitat Restoration**

To Whom It May Concern:

The New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) is proposing to sponsor work along and within the Niagara River at Buckhorn Island State Park. NYSOPRHP is submitting this notification for work proposed under a Joint Permit Application as part of the Buckhorn Island Shoreline Habitat Enhancement (Project), and requests a coastal consistency review from the New York State Department of State (NYSDOS). With this submittal, we are providing a completed Joint Permit Application, figures of the proposed Project Area (Appendix A), Project Plans (Appendix B), Site Photographs (Appendix C), Planting Plan and Summary Table (Appendix D), Sediment Sampling Methods and Results (Appendix E), State Coastal Zone and Local Waterfront Redevelopment Program Analyses (Appendix F), Water Level Survey (Appendix G), Agency Consultation (Appendix H), and the Full Environmental Assessment Form (Appendix I).

The purpose of the work is to enhance aquatic habitat, including coastal and in-river wetland systems, and riparian habitat within the Project Area to increase the net quantity, quality, and productivity of the aquatic ecosystem. The Project will address the degradation and loss of nearshore, shoreline, and riparian areas through locating of nearshore design features to protect specific areas of eroding riverbank, protect planted emergent areas, encourage the natural recruitment and ultimate establishment of coastal wetland habitat, and to mimic features that occur naturally.

Project activities include:

- Installing discontinuous large and small rock sills, rock reefs with locked logs, and one flat stone mini weir;
- Installing cabled log pyramids, single cabled logs, cabled log piles, root wads, and leaner trees; and
- Planting emergent and riparian vegetation in designated planting zones, along the shoreline, and localized grading to establish gradual slopes.

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Taken in concert, these nearshore and shoreline design features will dissipate wave energy and higher flows away from the shoreline, protect existing eroded areas, and also encourage the natural recruitment and establishment, and future expansion, of coastal wetland habitat in nearshore areas by increasing localized sediment capture to support emergent wetland growth along the shoreline.

If you have any questions regarding this correspondence or require additional Project information, please do not hesitate to contact me at (440) 823-1677 or by e-mail at kevans@ene.com. Thank you for your attention to this Project.

Sincerely,

ECOLOGY AND ENVIRONMENT ENGINEERING AND GEOLOGY, P.C.

A handwritten signature in black ink, appearing to read "Katie Evans", is written over a light gray rectangular background.

Katie Evans

Enclosures:

Joint Application for Permit and Supplemental Information

**Joint Application for Permit  
to the  
New York State Department of State  
for the  
Buckhorn Shoreline  
Habitat Enhancement Project**

**Buckhorn Island State Park, New York**

June 2020



**Joint Application for Permit**

**Buckhorn Island Shoreline Habitat  
Enhancement Project  
Buckhorn Island State Park  
Town of Grand Island  
Erie County, New York**

**June 2020**

**Prepared for:**

**NYS OFFICE OF PARKS, RECREATION, AND HISTORIC PRESERVATION  
Niagara Region  
3160 DeVeaux Woods Drive  
Niagara Falls, NY 14305**

**Prepared by:**

**ECOLOGY AND ENVIRONMENT ENGINEERING AND GEOLOGY, P.C.  
368 Pleasant View Drive  
Lancaster, New York 14086**

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## List of Abbreviations and Acronyms

AOC	Area of Concern
Agreement	Great Lakes Water Quality Agreement
BISP	Buckhorn Island State Park
BUI	beneficial use impairment
E & E	Ecology and Environment Engineering and Geology, P.C., in association with Ecology and Environment, Inc., member of WSP
EV	emergent vegetation
ft/s	feet per second
GLFER	Great Lakes Fishery and Ecosystem Restoration
HUC	Hydrologic Unit Code
I-190	Interstate 190
NAVD	North American Vertical Datum
NYSDEC	New York State Department of Environmental Conservation
NYSDOS	New York State Department of State
NYSDOT	New York State Department of Transportation
NYSOPRHP	New York State Office of Parks, Recreation, and Historic Preservation
OHWM	ordinary high water mark
Plan	Preliminary Habitat Restoration Plan
Project	Buckhorn Island Shoreline Habitat Enhancement Project
SAV	submerged aquatic vegetation
SSURGO	U.S. Department of Agriculture Soil Survey Geographic database
USACE	U.S. Army Corps of Engineers

# 1

## Permit Application

### 1.1 Joint Application for Permit



JOINT APPLICATION FORM

For Permits for activities affecting streams, waterways, waterbodies, wetlands, coastal areas, sources of water, and endangered and threatened species.

You must separately apply for and obtain Permits from each involved agency before starting work. Please read all instructions.

1. Applications To:

>NYS Department of Environmental Conservation [checked] Check here to confirm you sent this form to NYSDEC.

- Check all permits that apply: [ ] Stream Disturbance, [ ] Dams and Impoundment Structures, [ ] Tidal Wetlands, [ ] Water Withdrawal, [checked] Excavation and Fill in Navigable Waters, [checked] 401 Water Quality Certification, [ ] Wild, Scenic and Recreational Rivers, [ ] Long Island Well, [ ] Docks, Moorings or Platforms, [checked] Freshwater Wetlands, [ ] Coastal Erosion Management, [ ] Incidental Take of Endangered / Threatened Species

>US Army Corps of Engineers [checked] Check here to confirm you sent this form to USACE.

- Check all permits that apply: [checked] Section 404 Clean Water Act, [checked] Section 10 Rivers and Harbors Act
Is the project Federally funded? [checked] Yes [ ] No
If yes, name of Federal Agency: USEPA - GLNPO
General Permit Type(s), if known:
Preconstruction Notification: [ ] Yes [ ] No

>NYS Office of General Services [checked] Check here to confirm you sent this form to NYSOGS.

- Check all permits that apply: [checked] State Owned Lands Under Water, [ ] Utility Easement (pipelines, conduits, cables, etc.), [ ] Docks, Moorings or Platforms

>NYS Department of State [checked] Check here to confirm you sent this form to NYSDOS.

- Check if this applies: [checked] Coastal Consistency Concurrence

2. Name of Applicant

NYS Parks, Recreation, and Historic Preservation
Mailing Address: 3160 De Veaux Woods Drive
Post Office / City: Niagara Falls, State: NY, Zip: 14305
Telephone: (716) 299-0811, Email: john.honan@parks.ny.gov
Applicant Must be (check all that apply): [checked] Owner, [checked] Operator, [ ] Lessee

3. Name of Property Owner (if different than Applicant)

Same as Applicant
Mailing Address:
Post Office / City:
State:
Zip:
Telephone:
Email:

For Agency Use Only Agency Application Number:

**4. Name of Contact / Agent**  
 Virginia L. Ursitti, QEP

Mailing Address: NYS Office of Parks, Recreation and Historic Preservation  
 3160 De Veaux Woods Drive

Post Office / City: Niagara Falls State: NY Zip: 14305

Telephone: (716) 299-0833 Email: virginia.ursitti@parks.ny.gov

**5. Project / Facility Name**  
 Buckhorn Island Shoreline Habitat Enhancement

Property Tax Map Section / Block / Lot Number: N/A

Project Street Address, if applicable: Buckhorn Island State Park

Post Office / City: Grand Island State: NY Zip: 14072

Provide directions and distances to roads, intersections, bridges and bodies of water:  
 See attached supporting information, Section 1.2 Additional Responses.

Town  Village  City County: Erie Stream/Waterbody Name: Niagara River

Project Location Coordinates: Enter Latitude and Longitude in degrees, minutes, seconds:  
 Latitude: 43° 3' 48.88" Longitude: 78° 59' 7.80"

**6. Project Description:** Provide the following information about your project. Continue each response and provide any additional information on other pages. **Attach plans on separate pages.**

a. Purpose of the proposed project:  
 The Project's purpose is to enhance aquatic, including coastal and in-river wetland systems, and riparian habitat within the Project Area to increase the net quantity, quality, and productivity of the aquatic ecosystem. The need for this proposed action is evidenced by the degradation and loss of nearshore, shoreline, and riparian areas, due to riverbank/shoreline erosion caused by waves, and occasional high-flow velocities and ice scour.

b. Description of current site conditions:  
 See attached supporting information, Section 1.2 Additional Responses for JPA Form, Site Description.

c. Proposed site changes:  
 The Project will install discontinuous large and small rock sills, rock reefs with locked logs, one flat stone mini weir, cabled log pyramids, single cabled logs, cabled log piles, root wads, leaner trees, and will plant emergent, riparian, and upland vegetation in designated planting zones along and above the shoreline with localized grading to establish gradual slopes. See attached supporting info. in Section 2.3, and Appendix B Project Plans.

d. Type of structures and fill materials to be installed, and quantity of materials to be used (e.g., square feet of coverage, cubic yards of fill material, structures below ordinary/mean high water, etc.):  
 Rock sills, rock reefs, and mini weir will comprise 612.5 CY of fill cabled log pyramids, cabled logs, root wads, and leaner trees will comprise 163.7 CY of fill; shoreline grading areas will comprise 564 CY of fill. Total permanent fill = 1348 CY. Access roads will comprise 15 CY of temporary fill and 43 CY permanent fill. All numbers are below OHWM. A breakout of fill is provided in Section 2.5. Also refer to Section 2.3 Project Construction.

e. Area of excavation or dredging, volume of material to be removed, location of dredged material placement:  
 No dredging will occur. A total of 3.9 CY of soil will be excavated for the root wads, including those used for the leaner trees. A total of 514 CY will be excavated at shoreline grading areas. Total excavation= 517.9 CY. A breakout of excavation is provided in Section 2.5. Also refer to Section 2.3 Project Construction and Appendix B Project Plans for additional details.

f. Is tree cutting or clearing proposed?  Yes If Yes, explain below.  No  
 Timing of the proposed cutting or clearing (month/year): September/October 2020  
 Number of trees to be cut: 115 Acreage of trees to be cleared:

g. Work methods and type of equipment to be used:

Features that are adjacent to access paths will be installed using a crane from the shoreline. The rest of the features will be installed using an excavator or crane from the water or from a barge for features in deeper waters. All shoreline grading will be completed using an excavator. Planting will be accomplished largely by hand, with the aid of small all terrain vehicles or pontoon boats, where applicable. See supporting info. in Section 2.3.

h. Describe the planned sequence of activities:

Construction of rock and log features and shoreline grading will begin in late September 2020 followed by planting in summer 2021. See attached supporting information, Section 2.3 Project Construction.

i. Pollution control methods and other actions proposed to mitigate environmental impacts:

Turbidity curtains, silt fences, and erosion and sediment control measures will be implemented. In-water work will be done outside of fish spawning window (April 15 - June 30). Planting will take place after peak nesting season which concludes August 1. See attached supporting information, Sections 2.3 Project Construction and 2.5 Potential Project Impacts and Mitigation Measures.

j. Erosion and silt control methods that will be used to prevent water quality impacts:

Turbidity curtains, silt fences, and erosion and sediment control measures will be implemented. See attached supporting information, Section 2.5 Potential Project Impacts and Mitigation Measures.

k. Alternatives considered to avoid regulated areas. If no feasible alternatives exist, explain how the project will minimize impacts:

See attached supporting information, Section 3.1 Alternatives Analysis.

l. Proposed use:  Private  Public  Commercial

m. Proposed Start Date:  Estimated Completion Date:

n. Has work begun on project?  Yes If Yes, explain below.  No

Fall 2020 will consist of the construction activities associated with the installation of rock and log features and shoreline grading. Planting of aquatic vegetation will take place in the summer 2021. See Sections 2.3 and 2.5 of supporting materials.

o. Will project occupy Federal, State, or Municipal Land?  Yes If Yes, explain below.  No

New York State Parks, Office of Recreation and Historic Preservation owns the land.

p. List any previous DEC, USACE, OGS or DOS Permit / Application numbers for activities at this location:

None

q. Will this project require additional Federal, State, or Local authorizations, including zoning changes?

Yes If Yes, list below.  No

See supporting information immediately following this form in Section 1.2, Table 1.

**7. Signatures.**

Applicant and Owner (If different) must sign the application.

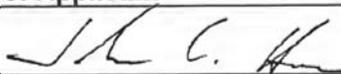
Append additional pages of this Signature section if there are multiple Applicants, Owners or Contact/Agents.

I hereby affirm that information provided on this form and all attachments submitted herewith is true to the best of my knowledge and belief.

Permission to Inspect - I hereby consent to Agency inspection of the project site and adjacent property areas. Agency staff may enter the property without notice between 7:00 am and 7:00 pm, Monday - Friday. Inspection may occur without the owner, applicant or agent present. If the property is posted with "keep out" signs or fenced with an unlocked gate, Agency staff may still enter the property. Agency staff may take measurements, analyze site physical characteristics, take soil and vegetation samples, sketch and photograph the site. I understand that failure to give this consent may result in denial of the permit(s) sought by this application.

False statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the NYS Penal Law. Further, the applicant accepts full responsibility for all damage, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and agrees to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from said project. In addition, Federal Law, 18 U.S.C., Section 1001 provides for a fine of not more than \$10,000 or imprisonment for not more than 5 years, or both where an applicant knowingly and willingly falsifies, conceals, or covers up a material fact; or knowingly makes or uses a false, fictitious or fraudulent statement.

**Signature of Applicant**



Date

6/2/20

Applicant Must be (check all that apply):  Owner  Operator  Lessee

Printed Name

John C. Honan, P.E.

Title

Capital Facilities Mgr, Western District

**Signature of Owner (if different than Applicant)**

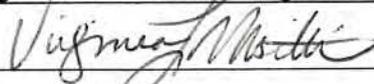
Same

Date

Printed Name

Title

**Signature of Contact / Agent**



Date

5/29/2020

Printed Name

Virginia L. Ursitti, QEP

Title

Project Manager, Niagara River Restoration

**For Agency Use Only**

**DETERMINATION OF NO PERMIT REQUIRED**

Agency Application Number

(Agency Name) has determined that No Permit is required from this Agency for the project described in this application.

Agency Representative:

Printed Name

Title

Signature

Date

## 1.2 Additional Responses for Joint Application Form 08/16

### **Box 5 Provide Directions and Distances to Roads, Intersections, Bridges and Bodies of Water**

Buckhorn Island State Park (BISP) is located at the northwestern tip of Grand Island in Erie County, New York (see Appendix A, Figure 1). The Buckhorn Island Shoreline Habitat Enhancement Project (Project) Area is adjacent to the West River Branch of the Niagara River and within the BISP. The Project Area is accessible by truck and passenger vehicle via two separate routes. Trucks may access the Project Area through an access route originating at a gate that is located west of Interstate 190 (I-190) South, and south of the North Grand Island Bridge (see Appendix A, Figure 2). The access gate is approximately 0.2 miles from the Project Area.

Passenger vehicles may access the site from the New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP) access road off East-West Park Road, which is located approximately 0.7 miles south of the Project Area staging area. From I-190 South, take exit 20 A for West River Parkway. Continue for 0.2 miles before making a sharp left onto East-West Park Road. Continue on East-West Park Road for 0.3 miles, then turn left onto the NYSOPRHP access road. Continue on the NYSOPRHP access road for approximately 0.7 miles and proceed under the I-190 highway bridge. The NYSOPRHP access road will reach the alternate access route leading to the Project Area.

### **Box 6b Project Description – Current Site Conditions**

The BISP is an 895-acre park comprised of wetland, meadow, and woodland habitats. The BISP contains one of the two largest remaining emergent wetlands in the Niagara River corridor as well as relatively rare meadow habitats that were once abundant along the Niagara River. Within the Project site, nearshore, shoreline, and riparian areas have been degraded by riverbank erosion; lack of emergent wetland habitat; and establishment of invasive plant species.

#### **Vegetation**

The BISP and Project site include open water, palustrine emergent marsh, palustrine scrub-shrub, wet meadow, palustrine forested, and upland forested habitats. The wetlands adjacent to the Project site are the largest remaining emergent marsh in the Niagara River and are designated as a Significant Coastal Fish and Wildlife Habitat by the New York State Department of State (NYSDOS). The littoral zone of the Project site is characterized by patches of submerged aquatic vegetation (SAV) and bare soil. Emergent vegetation (EV) has not become established in the area due to scour from wind- and boat-induced waves as well as ice scour. The shoreline is characterized by stone and rock armoring, eroded steep and shallow banks, as well as shallow sloped soils. Much of the shoreline is vegetated with herbaceous vegetation, shrubs, saplings, and trees, though a small portion borders the paved portion of the walking trail located in the upland area of the Project.

The Project site contains a number of invasive species that have colonized and modified the native vegetation community composition and structure of the forest and shrub communities. During 2014 and 2015 site visits, field staff identified and mapped invasive species within the Project Area. Invasive species include, but are not limited to cattail (i.e., narrow-leaf and possibly a hybridized species), common buckthorn (*Rhamnus cathartica*), glossy buckthorn (*Rhamnus frangula*), European black alder (*Alnus glutinosa*), European privet (*Ligustrum vulgare*), honeysuckle (*Lonicera* sp.), multiflora rose (*Rosa multiflora*), purple loosestrife (*Lythrum salicaria*), and mugwort (*Artemisia vulgaris*). These invasive species represent sources for further expansion of invasive plant communities within the BISP.

### **Soils**

The Project Area consists of six mapped U.S. Department of Agriculture Soil Survey Geographic database (SSURGO) soil unit types. Most of the site consists of open water at 62.8% (16.8 acres). Haplaquolls, ponded soils are the next most dominant soil type at 12.5% (3.3 acres); Udorthents, smoothed then comprising 8% (2.1 acres) of the site; Raynham silt loam at 7.3% (1.9 acres); Galen very fine sandy loam at 6.9% (1.8 acres); Canandaigua silt loam comprising 1.9% (0.5 acres); and Lamson very fine sandy loam at 0.6% (0.1 acres) of the site (USDA 2020). Descriptions of these soil types are provided below.

- **Haplaquolls, ponded (Hn):** Approximately 12.5% (3.3 acres) of the Project site is mapped as Haplaquolls, ponded soils in SSURGO. These soils are typical of freshwater marshes and consist of very poorly drained fine sandy loam inundated with shallow water 5 to 10 inches deep most of the year. These soils often border open bodies of water, and have shallow slopes ranging from 0 to less than 1%.
- **Udorthents, smoothed (Uc):** Approximately 8% (2.1 acres) of the Project site is mapped as Udorthents, smoothed soils in the SSURGO database. These soils are characterized by moderately well drained soils with slopes that vary from 0 to 15%.
- **Raynham silt loam (RaA):** Approximately 7.3% (1.9 acres) of the Project site is mapped as Raynham silt loam soils in SSURGO. These soils consist of very deep, poorly drained soils resulting from glacial deposits when present in freshwater areas. These soils are generally saturated near the surface and have slopes varying from 0 to 12%.
- **Galen very fine sandy loam (GaB):** Approximately 6.9% (1.8 acres) of the Project site is mapped as Galen very fine sandy loam soils in the SSURGO database. Galen soils were formed in sandy deposits and are moderately well drained with a low potential for surface runoff. Slopes of these soils range from 0 to 8%.

- **Canandaigua silt loam (Cc):** Approximately 1.9% (0.5 acres) of the Project site is mapped as Canandaigua silt loam soils in SSURGO. These soils occur on lowland lake plains comprised of silty glacial deposits and are poorly drained. Slopes vary from 0 to 3%.
- **Lamson very fine sandy loam (Lc):** Approximately 0.6% (0.1 acres) of the Project site is mapped as Lamson very fine sandy loam in SSURGO. The Lamson series consists of very deep, poorly drained and very poorly drained soils formed in glacio-fluvial, glacio-lacustrine and deltaic deposits. Slope ranges from 0 to 3% but is mostly less than 2%.

In addition to the data provided by SSURGO, some data were obtained from the geotechnical analysis, which completed eight offshore borings and two land borings in winter and spring 2018. The offshore borings could be generally grouped into three categories, as described below (see Appendix E).

- Three of the offshore borings (BISP-01, BISP-03, and BISP-07) were generally comprised of compacted soils primarily consisting of sand, silt and gravel, and some clay in the heavily compacted portions of the borings.
- Four of the offshore borings (BISP-02, BISP-04, BISP-05, and BISP-06) were generally comprised of soft clay with silt and sand in varying proportions. BISP-05 and BISP-06 both had stiff sandy, gravelly clay underlying the soft clay, with sand and silt glacial till at further depths.
- One final offshore boring (BISP-08) was comprised of very loose river deposits of silty sand, with clay and sand at medium stiffness at further depths.

Two land borings (BISP-09 and BISP-10) varied throughout their depth in stiffness and soil material. Both had sand and gravel at the surface, with sandy silt occasionally mixed with organic material, then silty sand with mixtures of gravel, clay and organic material at further depths. A soft clay layer was found beneath the silty sand layer in one of the upland borings (BISP-09).

### **Hydrology**

The Project Area is located within the Niagara River watershed and sub-watershed (Hydrologic Unit Code [HUC] 10: 0412010406). The Niagara River watershed encompasses 903,305 acres of land and 3,193 miles of surface waters, and drains into the Niagara River, connecting Lake Erie and Lake Ontario (Buffalo Niagara Waterkeeper 2019). The Niagara River is the only surface water body (e.g., ponds, streams, lakes) within the Project site, though Woods Creek is immediately adjacent to the Project site. Woods Creek (HUC 12: 041201040602) is approximately 1.3 miles long and drains the eastern half of the Buckhorn Island Wetlands.

The Project Area is located adjacent to the largest coastal wetland complex in Western New York, the Buckhorn Island Wetlands. A portion of one NYSDEC-mapped wetland, TW-19, is also mapped within the Project Area; approximately

0.07 acres of that wetland overlap with the Project Area. Approximately 3.1 acres of the Project Area within the 100-foot adjacent area of NYSDEC wetland TW-19.

### **Shoreline and Nearshore Geomorphology**

Within the Buckhorn Island shoreline and nearshore Project Area, and in many similar nearshore areas of the East Branch of the upper Niagara River, the littoral zone of the channel is formed by a shallow submerged terrace feature that is found proximate, and parallel, to the shoreline. This terrace feature is 350 to 450 feet wide and precedes the approach to the shoreline. In the Project Area, this submerged terrace has a gradual negative slope trending perpendicular and away from the shoreline along the extent of the Project Area. Water depths range from a few inches near the banks to approximately 3 to 5 feet over the deepest areas of the terrace feature, with water depths increasing abruptly toward the thalweg of the river. The nearshore littoral zone of the Niagara River is a high-energy location along some parts of the river. The nearshore area along that occurs in the Project Area is subjected to wave energy from prevailing winds, waves from boats, higher than normal river stages in 2015, and ice scour. These forces have contributed to bank erosion in some portions of the Project Area. Based on observation during site visits, there is light to heavy erosion of the shoreline for much of its length. In most areas, the eroded banks had an escarpment height of 1 foot, but in some other areas the erosional escarpments varied between 4 and 6 feet tall.

### **Mussels**

Mussel surveys conducted in August 2018 at the BISP within the Project Area identified nine species of mussels (Riveredge Environmental, Inc. 2018). None of these nine species are designated as a state or federally-listed threatened or endangered species. Four of the mussel species are listed as Species of Greatest Conservation Need and two are listed as high priority (NYSDEC 2015). The survey consisted of 311 survey cells (40-foot by 40-foot). The nine species of mussels are represented by 294 live individuals. The mussel community was dominated by *Fusconaia flava* (N=197, 67.0%) followed by *Pleurobema sintoxia* (N=53, 18.0%) and *Lampsilis siliquoidea* (N=18, 6.1%). Combined these three species made up 91.1% of all mussels encountered.

### **Box 6f Project Description – Tree Cutting/Clearing**

Up to nine trees less than 3 inches diameter at breast height may be taken, if necessary, to clear the short temporary access paths to the shoreline. However, paths will be chosen to avoid all trees greater than 3 inches diameter at breast height wherever possible. Large diameter live trees will not be cut. Along the haul route, only minor clearing of shrubs, branches, and/or dead fallen trees/limbs will be necessary. Clearing activities will take place in the fall of 2020 (October/November), and it is not anticipated that there will be any restrictions on those activities. Clearing to avoid impacts on the northern long-eared bat (*Myotis septentrionalis*) is restricted to November 1 through March 31; however, there is no documented summer or winter habitat on Grand Island, and the BISP is over

22 miles from known hibernacula. Additionally, 115 ash trees have been identified by NYSOPRHP staff as dead or dying within the Project work limits. Immediately prior to the start of construction, the specific locations of these trees will be marked for removal by NYSOPRHP staff. The removed trees meet the design requirements for use in two or three of the cabled log pile formations.

### Box 6q – Required Permits

The federal and state entities and the environmental permits, consultations, and clearances that may be required for approval to construct and operate the Project are identified in Table 1-1.

**Table 1-1 Required Agency Permits and Approvals for the Project**

Agency	Permits/Reviews	Permit/Approval Status
<b>Federal</b>		
U.S. Army Corps of Engineers	Section 404 Clean Water Act/Section 10 Rivers and Harbors Act	Joint permit application scheduled for submittal in May 2020.
<b>State</b>		
New York State Department of Environmental Conservation	Section 401 Clean Water Act Water Quality Certificate	Joint permit application scheduled for submittal in May 2020.
New York State Department of Environmental Conservation	Article 24: Freshwater Wetlands Permit	Joint permit application scheduled for submittal in May 2020.
New York State Department of Environmental Conservation	State Environmental Quality Review Full Environmental Assessment Form	Joint permit application scheduled for submittal in May 2020.
New York Natural Heritage Program	Project Screening	Completed May 2020.
New York State Historic Preservation Office (SHPO)	New York State Historic Preservation Act Review	Completed May 2020.
New York State Department of State	Coastal Consistency Concurrence	Joint permit application scheduled for submittal in May 2020.
New York State Office of General Services	State Owned Lands Underwater	Joint permit application scheduled for submittal in May 2020.

### Required Attachments to Joint Application Form

The following required attachments to the Joint Application form are provided with this application:

- Project Figures (Appendix A);
- Project Plans (Appendix B);

- Site Photographs (Appendix C);
- Planting Plan and Summary Table (Appendix D);
- Sediment Sampling Methods and Results (Appendix E);
- State Coastal Zone and LWRP Analysis (Appendix F);
- Water Level Survey (Appendix G);
- Agency Consultation (Appendix H); and
- Full Environmental Assessment Form (Appendix I).

# 2

## Project Overview

### Background Information

Grand Island is a large, naturally occurring, riverine island within the Niagara River corridor. The BISP is located on the northern, downstream end of Grand Island. The BISP, which is bisected by I-190 and the North Grand Island Bridge, extends southward to East-West Park Road. The park is bordered on the north by the east branch of the Niagara River and on the west by the west branch of the Niagara River. New York State purchased the area south of Burnt Ship Creek and Buckhorn Island in the 1930s to form the park (Robinson 2015).

The BISP comprises 895 acres of wetland, meadow, woodland habitats, and open water. It contains one of the two largest remaining emergent wetlands in the Niagara River corridor, as well as relatively rare wet meadow habitats that were once abundant along the Niagara River. A portion of the park is designated by New York State as a Bird Conservation Area and by the Audubon Society as an Important Bird Area. The park is used by large numbers of waterfowl, gulls, and migratory songbirds. In 1987, the NYSDOS Office of Planning and Development listed the park as a “Significant Coastal Fish & Wildlife Habitat,” as recommended by the New York State Department of Environmental Conservation (NYSDEC). The park also provides nesting habitat for several state-listed threatened avian species. It is open year-round from dawn to dusk; public uses include hiking, biking, birdwatching, fishing, kayaking, canoeing, and cross-country skiing.

The 26.5-acre proposed Project Area is located along the northern boundary of the park. It comprises the nearshore and shoreline areas from the west branch of the Niagara River, east past Woods Creek and south of Grass Island (see Appendix A, Figures 1 and 2).

The nearshore area of the overall Project Area provides ecological value due to the presence of SAV, mussel species, and the habitat it provides for young-of-the-year fish. Within the Buckhorn Island Shoreline and nearshore Project Area, and in many similar nearshore areas of the East Branch of the upper Niagara River, the littoral zone of the channel is formed by a shallow submerged terrace feature that is found proximate, and parallel, to the shoreline. The littoral zone of the Project Area is characterized by patches of SAV and bare soil. Mussel surveys conducted in August 2018 at the BISP within the Project Area and adjacent sites fronting the Niagara River identified nine species of mussels. Four of the mussel

species are listed as Species of Greatest Conservation Need and two are listed as high priority (NYSDEC 2015). The Project Area provides habitat for a range of fish species, including muskellunge (*Esox masquinongy*), northern pike (*Esox Lucius*), walleye (*Sander vitreus*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), carp (*Cyprinus carpio*), brown bullhead (*Ameirus nebulosus*), yellow perch (*Perca flavescens*), and white sucker (*Catostomus commersonii*).

Within the Project Area, nearshore, shoreline, and riparian areas have been degraded by riverbank and shoreline erosion resulting from high wave energy from waves and boats and ice scour, a disturbed and simplified riparian zone, and lack of in-water habitat structure for fish and other wildlife/organisms. The rate of erosion over the past few years has accelerated, based on visual observations within the Project Area since late 2017. There are areas within the Project Area that have lost large mature native trees and large sections of bank line due to tree loss and erosion. Thus, this Project focuses on the use of nearshore structures to provide additional protection and establishes new EV areas that will support energy dissipation in the future, enhance habitat diversity and productivity, and facilitate the expansion of coastal wetland habitat.

**Previous Efforts Related to this Project.** In 2016, a Preliminary Habitat Restoration Plan (Plan) for the Niagara River Area of Concern (AOC) Great Lakes Fishery and Ecosystem Restoration (GLFER) Program, BISP, was prepared on behalf of the U.S. Army Corps of Engineers (USACE) - Buffalo District. The Plan focused on aquatic ecosystem concepts/features for the nearshore, top of the riverbank, and riparian areas within a section of the BISP located upstream of Woods Creek, to address bank erosion, dissipate wave energy directed at the riverbanks from wind and boat generated wakes, and to create additional near-shore channel substrate. The preliminary restoration design concepts included: 1) nearshore structures comprised of rock barrier reefs and contoured rock sills; 2) bank reshaping in the form of rearranging riprap and hard material from the armored banks and the creation of pockets for restorative planting; 3) toe-slope bank protection using logs and existing rocks; 4) plantings in the protected near-shore, shallow emergent zone; 5) excavation of two shallow depressions along the left descending bank of Woods Creek; and 6) invasive species treatment and removal.

The purpose of the Plan was to present and evaluate site-specific data and regional information to ascertain whether study efforts and the designed restoration ecological outputs were likely to provide desired ecosystem benefits to support additional Project planning and, ultimately, Project implementation. This evaluation was based on a preliminary appraisal of federal interest, estimated costs, potential benefits, and possible environmental impacts and regulatory issues associated with each proposed design concept.

The Plan constituted an initial examination of potential ecosystem restoration measures to initiate improvements to aquatic habitat function and increase the net quantity and quality of the aquatic ecosystem within the Project Area. As a result of the stakeholder engagement portion of the planning process, it was determined that the Buckhorn Island Shoreline Project, as outlined in the Plan, would not be carried forward to a feasibility study through the GLFER process. Instead, the NYSOPRHP determined that it would complete the planning process, selecting a subset of the design elements presented in the Plan, and expand the overall Project Area, and would implement the Buckhorn Island Shoreline Project with some refinement.

The GLFER's efforts addressed a project area that included a riverine and shoreline area along the Niagara River and another area along the left descending bank of Woods Creek, totaling 6.5 acres and approximately 1,200 linear feet. That area was modified and substantially enlarged for this Project, to a total of 26.5 acres and 8,250 linear feet, due to the desire of stakeholders to expand the Project Area for aquatic habitat enhancement to include the shoreline downstream of the confluence of Woods Creek to the I-190 North Grand Island Bridge. The GLFER's design included aquatic invasive species control activities; aquatic invasive species control is not part of the current Project.

**Great Lakes Areas of Concern and Beneficial Use Impairments.** On a broader scale, the current Project will directly contribute to the beneficial use impairment (BUI) removal process within the Niagara River AOC. The Project Area is located within the Niagara River AOC. Under the Great Lakes Water Quality Agreement (Agreement), first signed in 1972 and renewed in 1978, the United States and Canada committed to restoring and maintaining the chemical, physical, and biological integrity of the Great Lakes basin ecosystem. The Agreement was amended in 1987 to include strengthened provisions for addressing contamination and pollution. The 1987 protocol defined Great Lakes AOCs as severely degraded geographic areas within the Great Lakes basin and specifically as "geographic areas that fail to meet the general or specific objectives of the Agreement where such failure has caused or is likely to cause impairment of beneficial use of the area's ability to support aquatic life." The Agreement defined 14 BUIs for the AOCs, which range from restrictions on fish and wildlife consumption to restrictions on dredging activities and degradation of benthos.

The Niagara River currently has the following listed BUIs:

- Restrictions on Fish and Wildlife Consumption;
- Degradation of Fish and Wildlife Populations;
- Bird or Animal Deformities or Reproductive Problems;
- Degradation of Benthos;
- Restriction on Dredging Activities; and
- Loss of Fish and Wildlife Habitat.

Through the proposed habitat enhancement activities described in Sections 2, the proposed Project will support the BUI removal process within the Niagara River AOC, specifically as it relates to the “Loss of Fish and Wildlife Habitat” BUIs. The proposed activities—specifically, the addition of nearshore, in-water structures (e.g., rock sills, cabled logs, root wads, etc.) and plantings—will directly address several delisting criteria, including protection of existing natural shoreline, which includes nearshore beds of aquatic vegetation. The AOC’s Niagara River Remedial Advisory Committee’s Loss of Habitat Working Group supports the implementation of this Project as it directly contributes to the removal of the Loss of Fish and Wildlife Habitat BUI. The Working Group has identified the protection and restoration of coastal wetlands as a primary need for Niagara River habitat (Filipski 2016).

### **2.1 Purpose and Need for Proposed Work**

The Project’s primary purpose is to enhance aquatic habitat, including coastal and in-river wetland systems, and riparian habitat within the Project Area to increase the net quantity, quality, and productivity of the aquatic ecosystem. The need for this proposed action is evidenced by the degradation and loss of nearshore, shoreline, and riparian areas, due to riverbank and shoreline erosion resulting from high wave energy from waves and boats and occasional high-flow velocities and ice scour. Due to the ongoing erosion and disturbance, there is a simplified riparian zone and lack of in-water habitat structure for fish and other wildlife/organisms.

Large single rock sills and cabled log pyramids will be placed to dissipate wave energy from impacting the shoreline, while preserving the nearshore substrate and water flow patterns to protect young-of-the-year fish habitat that is currently being destroyed by erosion. Additionally, to protect areas that have already been eroded along the shoreline, a flat stone mini weir, small single rock sills, cabled logs, and EV plantings will be placed directly along the shoreline. These cabled logs, rock sills, and plantings will also serve an additional benefit as refuge/spawning areas for various fish species and will increase the diversity of substrate. Further, the cabled logs, small rock reefs with locked logs, and root wads will enhance aquatic habitat by providing structure in the waterway. Lastly, leaner trees will be installed at the shoreline and will be designed to provide shade and habitat for fish and other wildlife. Taken in concert, these nearshore and shoreline design features will also encourage the natural recruitment and establishment, and future expansion, of coastal wetland habitat in nearshore areas by increasing localized sediment capture to support emergent wetland growth along the shoreline.

Project activities are described in the following subsections.

## 2.2 Project Description

The proposed Project includes the following elements:

- 1) Installing discontinuous large and small rock sills, rock reefs with locked logs, and one flat stone mini weir;
- 2) Installing cabled log pyramids, single cabled logs, cabled log piles, root wads, and leaner trees; and
- 3) Planting emergent and riparian vegetation in designated planting zones, along the shoreline, and localized grading to establish gradual slopes.

Four planting zones (i.e., deep EV, shallow EV, riparian vegetation, and upland vegetation) will be created along and within the Niagara River. These zones are described below:

- Deep Emergent Planting Area (elevation 560 to 562 feet North American Vertical Datum [NAVD]). This planting zone will consist of deep-water aquatic vegetation planted in bags.
- Shallow Emergent Planting Area (elevation 562 to 563 feet NAVD). This planting zone will consist of shallow-water aquatic vegetation planted in bags.
- Riparian Planting Area (elevation 563 to 567 feet NAVD). This planting zone will be subdivided into lower riparian (elevation 563 to 565 feet NAVD) and upper riparian (elevation 565 to 567 feet NAVD) zones consisting of grasses and shrubs.
- Upland Planting Area (elevation greater than 567 feet NAVD). This planting zone will consist of various shrubs and tree species.

Collectively, these features will protect the shoreline, encourage sediment capture and the establishment of EV and SAV, and increase habitat diversity for fish, waterfowl, and other wildlife. Each of the elements identified above is discussed in detail below.

## 2.3 Project Construction

### 2.3.1 Project Area Access and Staging

Locations of the work limits, materials and equipment staging areas, and access roads/paths have been identified and are shown on the Project plans in Appendix B, as well as on Figure 2 in Appendix A. The contractor will be required to minimize any work outside those areas, and any work outside those areas will require prior approval. The work limits illustrated on Figure 2 exclude areas denoted as “no equipment use areas.” The existing pedestrian path and haul route that transect the northern extent of the park will be utilized for Project construction access, as described below.

A total of eight work access zones within the Project Area have been established to guide contractor access along the length of the Project Area. These are based on temporary access paths and locations where the existing pedestrian path approaches the shoreline (see Appendix A, Figure 3). The largest of these access zones is 4.7 acres, which begins approximately 800 feet east of the Grand Island Bridge and is inclusive of a temporary access path which provides access to that zone (see Table 2-1). The contractor will access one area and complete all work within that area before moving to another area. Access to the work zones will be directly from the pedestrian path adjacent to the shoreline for features east of Woods Creek, from four temporary access paths leading from the existing haul route between Woods Creek and I-190, and from two temporary access paths and an area where the existing haul route is adjacent to the shoreline between I-190 and the western end of the Project Area. The existing pedestrian path is comprised of crushed asphalt, and the haul route is comprised of dirt and stone between Woods Creek and I-190, and pavement and stone between I-190 and the western end of the Project. Both sections of the route are at elevations above nearby wetlands and riparian areas. Along this route, only minor clearing of shrubs, branches, and/or dead fallen trees/limbs will be necessary. During construction, these paths will be temporarily blocked off to prevent pedestrians from entering the work zones.

**Table 2-1 Work Access Zones**

<b>Work Access Zone<sup>1</sup></b>	<b>Acreage</b>
1 (Station 80+00 to 82+50)	0.5
2 (Station 67+00 to 80+50)	4.7
3 (Station 60+00 to 70+00)	2.3
4 (Station 47+00 to 53+50)	0.8
5 (Station 36+00 to 45+50)	4.1
6 (Station 23+50 to 35+50)	4.3
7 (Station 16+25 to 23+50)	2.5
8 (Station 00+00 to 16+00)	3.6
<b>Total</b>	<b>22.7</b>

Note:

1. Work access zones are listed from upstream to downstream. The station numbers correspond to those included on the drawings in Appendix B.

The access road locations are identified on the Project plans in Appendix B. All temporary access paths will be 12 feet wide, unless a wider road is needed and is approved by NYSOPRHP. Wooden marsh mats will be temporarily placed on the surface to provide equipment support while distributing the weight of the equipment to minimize impacts to surface soils. This will result in approximately 15 cubic yards of temporary fill below the ordinary high water mark (OHWM). The temporary access paths are located outside wetland TW-19 and its 100-foot adjacent area, with the exception of the western-most access path where approximately 64 feet overlap with the 100-foot adjacent area. Approximately 20 cubic yards of temporary fill over an area of 768 square feet will be located within the 100-foot adjacent area of wetland TW-19 along this temporary access path.

The mats will be placed along each access path that extends from the existing haul route to work access zones during construction. After completion of the work in a specific work area, the mats will be removed and the area will be restored to pre-existing conditions. These areas will be seeded and planted with native trees and shrubs in accordance with the planting plan.

After construction is complete, the existing haul route will be restored to a maximum width of 8 feet. Low areas within the limits of the path will be graded, filter fabric placed within the limits of the path, and filled with No. 2 stone and a 2-inch cap layer of crusher run stone placed to existing grade. Areas disturbed during construction beyond the 8-foot limits of the trail would be filled with topsoil to grade and seeded with an annual rye (for quick establishment) and also an appropriate wooded seed mix (for long-term) as specified in the planting plan. Currently 18 areas of the combined length of the existing haul route, measuring approximately 1,200 feet, have been identified as likely to require repair; however, only approximately 205 linear feet are below the OHWM. These areas already exhibit muddy conditions which have resulted in pedestrians going around the wet zones and damaging adjacent woodland areas. Approximately 43 cubic yards of permanent fill will result below the OHWM, and 83 cubic yards of permanent fill will occur in the 100-foot adjacent area over, covering an area of 3,192 square feet.

Two staging areas will be established on-site, as shown on the Project plans in Appendix B, Sheets C-12 and C-15. The staging area east of Woods Creek will only be used for material to be installed in that area. As indicated on Figure 2 in Appendix A, that staging area is located within the 100-foot adjacent area of wetland TW-19, but it is a previously disturbed area comprised of crushed asphalt. The other staging area, located immediately west of I-190, will be used for the majority of the materials brought to the site.

### **2.3.2 Rock Sills, Rock Reefs with Locked Logs, and Mini Weir**

#### **Materials, Siting and Design**

Both large and small discontinuous rock sills will be placed along most of the shoreline within the Project Area to dissipate wave energy and higher flows away from the shoreline. New York State Department of Transportation (NYSDOT) heavy stone will be used for the large and small rock sills. Heavy stone placed for large sills will have a 3-foot nominal diameter, and heavy stone placed for small rock sills will have a 1.5-foot nominal diameter. The minimum distance between the rock sills will be equivalent to the nominal diameter of the rock sill, and the maximum distance will be 6 inches greater than the nominal diameter. Rock sills will be oriented and sized to allow some flow between deeper waters and shallow shoreline waters in the river. Their use is intended to protect the existing shoreline and encourage the establishment, restoration, and expansion of coastal wetlands over time.

Single rock sills were chosen for the design over tall rock reefs, as they appropriately address the lesser wave forces being applied to the shoreline within the Project Area and the limited larger waves that other locations along the Grand Island shoreline experience. Shoreline protection for this Project is focused on addressing smaller recurring wave patterns while also encouraging wetland recruitment without overbuilding and use of excessive fill. Compared to the larger rock reefs, rock sill placement is much more adaptable as rock sills can be easily moved, removed, added, or otherwise maintained, if corrective or repair actions are required. Single stone sills increase the capabilities for implementing adaptive management measures, if needed, over time.

Three rock reefs with locked logs will be placed at the westernmost portion of the Project Area where erosion is already occurring to provide shoreline protection by dissipating waves and to provide habitat around the reefs and the submerged logs and root balls. The reefs will be constructed of NYSDOT medium stone fill, root wads, and geotextile (Mirafi FW500 or an approved equal product) base. The root wads used in the reefs will be live eastern red cedar (*Juniperus virginiana*), eastern hemlock (*Tsuga canadensis*), or white oak (*Quercus alba*) logs, or an alternate species approved by the Construction Manager.

One flat stone mini weir will be placed just downstream of Woods Creek to enhance sediment accretion on the downstream side, and create small depressions on the upstream side, allowing pioneer EV species to come in and provide refuge for fish specifically in the vicinity of Woods Creek and create different water depth habitats in the nearshore (see Sheet C-12 in Appendix B). The intent of this weir is to mimic observed trees that have fallen into the river and the existing stone weir created by an old dock foundation further west in the Project Area. It will be comprised of NYSDOT heavy stone with a height, width, and length of 2 feet.

Two large rock sills, the flat stone mini weir, and one small rock sill are located within the NYSDEC 100-foot adjacent area east of Woods Creek. The small rock sill is designed to protect an area where the pedestrian path is eroding into the Niagara River, and the other features are located in areas of little to no SAV coverage. Parts of small rock sill (SRS)-15 and SRS-16 two small rock sills, are located within the 100-foot adjacent area west of I-190 where there was partial SAV coverage recorded by Riveredge Environmental, Inc. (2018). The shoreline is eroded in this area which has created a 1- to 2-foot drop in this area directly along the existing pedestrian path. The rock sills and mini weir are designed to protect the shoreline from further erosion, protect the existing path, and, therefore, the public using this path. The other alternative would be to move the existing path further away from the shoreline, which would then require this path to intrude further into the 100-foot buffer area and the adjacent wetland area.

The siting of nearshore structures has been done intentionally to address areas of greater erosion. Each of the design features discussed above were also sited taking into account SAV coverage and available data regarding mussel density within

the Project Area. SAV bed density data compiled by Riveredge Environmental, Inc. (2018) during their mussel survey in the summer of 2018 were plotted on the design plans in order to avoid locations where mussels were found and those areas that had higher concentrations of SAV. In consultation with NYSOPRHP staff, in-water “no equipment use areas” are designated to protect SAV beds with a density of greater than 50%. In these areas, shoreline structures are excluded or will be placed in locations to protect the higher-density SAV beds. The no equipment use areas also take into account areas of higher mussel abundance.

### **Installation**

The shoreline will be accessed using the temporary access paths described above in Section 2.3.1 and illustrated on the drawings in Appendix B.

No excavation will be required for the installation of the rock sills or the flat stone weir. Rock sill stones will be pushed/placed into the river bottom so that a minimum of 6 inches of the stone height is embedded in the existing in-water sediment. The flat stone weir and rock sills adjacent to shore will be installed in the same manner, with force applied to the top of the flat stone mini weir or rock sills to embed the features in areas where the sediment is not soft.

The area proposed for the three reefs will be cleared of driftwood, stumps, organic material, etc., to create a stable surface. No excavation is anticipated other than that required to clear the area of rocks and other debris to provide a suitable subgrade for the installation of the filter fabric prior to reef placement. Geotextile will be placed on the channel bed at the locations of the proposed rock reefs.

Rock sills, mini weir, and rock reefs that are in areas where access paths are adjacent to the shoreline (east of Woods Creek and west of I-190) will be installed using a crane from the access path or shoreline. For the remaining features that are not adjacent to the access paths, but located within the nearshore, installation of these features will be completed using excavators or cranes from the shoreline or within the water. Features located in deeper waters will be installed using a barge-mounted crane or excavator.

Installation of the rock sills, mini weir, and rock reefs will result in a total fill volume of 612.5 cubic yards below the OHWM. Of that total, 72.5 cubic yards over an area of 681 square feet will be located in the 100-foot adjacent area of wetland TW-19.

### **2.3.3 Cabled Log Pyramids, Root Wads, and Leaner Trees**

#### **Materials, Siting, and Design**

Along the shoreline, there are fallen trees and logs that have re-sprouted. These features increase habitat structure and diversity, and support in dissipating and reducing wave energy as it approaches the shoreline and riverbanks and create habitat for fish cover, resting, foraging, and spawning. These structures will also contribute to local sediment capture which will, in turn, provide rooting substrate

for EV. The in-water design features mimic these existing structures. Specifically, the cabled log features are designed to mimic log structures that are naturally embedded in a few locations along the shoreline and those located within the shallow water areas of the river shelf area. In the Project Area, this type of feature was observed to provide habitat structure and sediment capture and deposition.

Cabled log pyramids are located furthest from the shoreline in the design, mimicking a fallen tree that has been in the area since May 2015 or earlier (based on Google Earth imagery), located between the proposed cabled logs, CLPYR-13 and CLPYR-14, shown on the Project plans in Appendix C (Sheet C-16). These are alternated with the large discontinuous rock sills between Woods Creek and I-190 and are used on their own in the vicinity of the existing fallen tree located offshore. The cabled log pyramids are designed to dissipate and reduce wave energy, and create habitat and protected areas for SAV growth in deeper waters, with water depths of 1.5 to 2.5 feet, depending on bathymetry.

Single cabled logs and root wads are located along the nearshore, with the purpose of creating nearshore habitat. The root wads and perpendicular single cabled logs are also designed to create a small variation in water depth surrounding each structure as a result of sediment accretion on the downstream side and creation of small depressions on the upstream side. Single cabled logs that are arranged into an arc enclosing a small area along the shoreline are designed for additional erosion protection and are located in areas where shoreline erosion was observed.

Leaner trees are located in the areas to be graded, at the end of access roads, and near the root wads at the western end of the Project Area. These are designed to provide shade and habitat for fish and other wildlife. The leaner trees also serve a secondary purpose of providing root structure to freshly graded slopes to prevent future erosion.

Three cabled log circles are located within the NYSDEC 100-foot adjacent area east of Woods Creek. All three of these areas are designed to protect an area where the pedestrian path is eroding into the Niagara River. Two cabled logs, a leaner tree, and a root wad are located within the 100-foot adjacent area west of I-190 where there was partial SAV coverage recorded by Riveredge Environmental, Inc. (2018). The shoreline is eroded, creating a 1- to 2-foot drop in the area directly along the existing pedestrian path. The cabled logs, leaner tree, and root wads are designed to protect the shoreline from further erosion, protect the existing path, and, therefore, protect the public using this path.

Cabled log pyramids, single cabled logs, and root wads will be comprised of sound, live eastern red cedar, eastern hemlock, or white oak logs, or an alternate species approved by the Construction Manager. Additionally, as discussed in Section 2.5, 115 ash (*Fraxinus* spp.) have been identified by NYSOPRHP staff as dead or dying within the Project work limits. These will be removed prior to the start of construction for use in two or three of the log pile formations. Cabled logs

will be 20 feet in length and a minimum of 6 inches in diameter. Single cabled logs will be 20 to 22 feet in length and 12 to 14 inches in diameter. Similarly, the root wads will be 20 to 22 feet in length, with a diameter of 12 to 14 inches, including the root ball. The cabled log pyramids and single cabled logs will be anchored with Duckbill anchors (Model 138) rated to hold 5,000 pounds in normal soil. Galvanized aircraft cable will be used to tie the logs together.

Leaner trees will be sound, live black willow (*Salix nigra*) trees. If black willow is not available, silver maple (*Acer saccharinum*) will be used for trees planted at an elevation of 562 feet or above, and peachleaf willow (*Salix amygdaloides*) or sandbar willow (*Salix interior*) may be used for trees planted at elevation 562 feet or below.

### **Installation**

The shoreline will be accessed using the temporary access paths described above in Section 2.3.1.

Installation of the cabled logs will not require excavation. The logs will be anchored to the riverbank and riverbed using a minimum of two cables per log, except in the case of cabled log piles. Cabled log piles constructed with two logs will use a minimum of two cables with anchors and cabled log piles with three logs will use a minimum of six cables. All cabled log piles will be constructed using a ¾-inch stainless steel bolt to connect the logs at each vertex.

To place the root wad trunk, a small area with a depth of 4 feet and a minimum length of 12 feet will be excavated. Following excavation, the root wad trunk will be placed flat on the soil surface and the excavated soil will be mixed with NYSDOT medium stone and replaced above the root wad trunk.

Soil will be excavated to facilitate the placement of the root ball of the leaner tree, such that the root ball is buried below the existing ground surface; all of the excavated soil will be placed around the root ball. Three NYSDOT heavy stones will be used for the construction of each leaner tree. One will be keyed into the existing river bottom so that 6 to 8 inches of the stone height is embedded in the existing sediment. Any excavated material will be placed on the landward side of the placed stone. Additionally, two NYSDOT heavy stones will be placed on the sediment surface on each side of the leaner tree trunk.

Cabled log pyramids, single cabled logs, and root wads that are in areas where access paths are adjacent to the shoreline (east of Woods Creek and west of I-190) will be installed using a crane from the access path or shoreline. For the remaining features that are not adjacent to the access paths, but located within the nearshore or shoreline, installation of these features will be completed using excavators or cranes from the shoreline or within the water. Features located in deeper waters will be installed using a barge-mounted crane or excavator.

In total, installation of the cabled log pyramids, cabled logs, root wads, and leaner trees will result in a total of 163.7 cubic yards of fill below the OHWM. Of this total, approximately 12.7 cubic yards will be placed in the 100-foot adjacent area of wetland TW-19 in an area of 391 square feet. 1.2 cubic yards will be excavated within the 100-foot adjacent area of wetland TW-19 in a 17-square-foot area. No other features require excavation.

### **2.3.4 Plantings and Grading/Excavation**

#### **Materials, Siting, and Design**

The design takes a proactive approach through the inclusion of a planting plan, as there are ecological benefits to be realized from planting, including inhibiting invasive species, creating a more diverse plant community, increasing bank and riparian zone stability, and restoring/enhancing fish and wildlife habitat. The planted areas will act as “starter” or “test” plots in currently unvegetated areas. Over time, the planted areas will provide a seed source to allow adjacent areas to repopulate naturally through successful recruitment. Thus, these ecological benefits can be realized over the long term.

As indicated in Section 2.2, four planting zones (i.e., deep EV, shallow EV, riparian vegetation, and upland vegetation) will be created along and within the Niagara River. A range of plants have been selected for the Project Area (see Appendix D). Plantings were carefully chosen based on the range and depth of water within each planting zone. Planting locations were targeted based upon their lack of habitat structure and vegetation; however, the final planting locations will be determined in the field by the NYSOPRHP and the Engineer following installation of the rock sills, rock reefs, mini weir, root wads, and cabled logs; locations will be informed by their likelihood of facilitating plant survival.

Table 2-2 provides a summary of the area to be planted within each of the planting zones.

**Table 2-2 Summary of Planting Zones**

<b>Planting Zone</b>	<b>Area (square feet)</b>
Upland	6,282
Upper Riparian	7,990
Lower Riparian	23,371
Shallow Emergent	56,295
Deep Emergent	68,481
<b>Total</b>	<b>162,419</b>

For the deep and shallow emergent planting zones, planting bags will be placed with 2 feet of spacing between bags. Bags with plants of the same species will be placed near one another in groups of three to five bags.

Coir logs will be placed at the base of the slopes that will be graded (elevation 563 feet NAVD) and coir mattresses will be located upslope of the coir logs for the lower and upper riparian areas (elevation 563 to 567 feet NAVD).

In addition to the plantings, there are two areas identified for excavation along the shoreline (see Appendix B, Sheets P-1 and P-2). The first is located approximately 240 feet downstream of Woods Creek, and the second is located approximately 1,200 feet upstream of the I-190 bridge. In these areas of high and steep banks, the shoreline will be graded to achieve a more gradual slope. It will also alleviate the continued erosion of these areas that increases sedimentation in downstream areas. Based on the 2017 site survey, the first area requires 514 cubic yards of cut and 36 cubic yards of fill. Cut material will be used for the fill areas associated with this grading area. The remaining cut material will be used for the fill required for the second grading area, which requires approximately 528 cubic yards of fill.

Actual cut and fill volumes may vary due to a loss of a willow tree in the vicinity of the first grading area that fell into the river since the site survey was completed. As such, the grades shown on the plans may not reflect current conditions, and volumes may be different than what was calculated due to the conditions of the riverbanks at the time of construction. Soil that is excavated from the cut area is to be used as fill for the fill area in its entirety. Therefore, the final grades shown in the drawings may not be fully met. The contractor is responsible for handling the soil during this process including compliance with the Storm Water Pollution Prevention Plan if temporarily stockpiling the soil before reuse. Temporary stocking locations will require approval by the Construction Manager prior to implementation. The intent of these grading areas is to use all material excavated on-site to prevent further erosion of these locations in the future. After grading, these areas will be planted with a range of emergent and riparian vegetation, as indicated on the above-referenced drawings.

### **Installation**

Planting will be accomplished largely by hand, with the aid of small vehicles (all-terrain vehicles) or pontoon boats, where applicable. For the deep emergent and shallow emergent planting zones, planting bags will be placed with 2 feet of spacing between bags, and bags with the plants of the same species will be placed near each other in groups of three to five bags. In the shallow emergent zone, coir logs will be placed at the base of the slopes where grading will occur, and the coir mattresses will be located upslope of the coir logs in the lower and upper riparian zones to provide temporary stabilization of riverbanks until plantings are fully established. Grading of shoreline areas will be completed using an excavator.

## **2.4 Hydrology/Hydraulic Analysis**

The larger upstream-to-downstream flow characteristics in the nearshore area are not expected to change as a result of implementing this Project. Modeled estimates of existing velocities along the nearshore shelf range from 0.07 to 1.71 feet per second (ft/s) depending on the location and flow event. The modeled

peak velocity throughout the Project reach during the one-year event is 1.1 ft/s, while the 10-year peak velocity is 1.71 ft/s. The chosen locations and orientation of structures are neither designed nor expected to change nearshore flow velocities. The low velocities are not expected to generate scour.

## 2.5 Potential Project Impacts and Mitigation Measures

A total of 1,348 cubic yards of fill below the OHWM will result from all Project components, excluding fill associated with the temporary access paths and haul route. Approximately 74.2 cubic yards of the 1,348 total cubic yards will be located within the 100-foot adjacent area of wetland TW-19. A total of 517.9 cubic yards of excavation will occur below the OHWM; of that, 1.2 cubic yards will be excavated within the 100-foot adjacent area. A summary of impacts resulting from all Project components is provided in Table 2-3.

With respect to access roads, the temporary access paths will result in a total of 15 cubic yards of fill below the OHWM, and 20 cubic yards of fill within the 100-foot adjacent area of wetland TW-19 in an area of 768 square feet. The post-construction repair of low areas along the haul route will result in 43 cubic yards of fill below the OWHM, and 83 cubic yards of fill within the 100-foot adjacent area of wetlands TW-19 in an area of 3,192 square feet. These represent permanent impacts.

**Table 2-3 Summary of Impacts**

Project Feature	Fill <sup>1</sup>	Excavation	Wetland TW-19 100-foot Adjacent Area <sup>2</sup>			
			Fill <sup>2</sup> (cubic yards)	Excavation <sup>3</sup> (cubic yards)	Fill (square feet)	Excavation (square feet)
Rock Sills	568	N/A	65	N/A	587	N/A
Rock Reefs	37	N/A	0	N/A	0	N/A
Mini Rock Weir	7.5	N/A	7.5	N/A	94	N/A
Cabled Logs	24	N/A	10	N/A	340	N/A
Cabled Log Pyramids	129	N/A	0	N/A	0	N/A
Root Wads	3.5	1.8	1.7	0.9	24	12
Leaner Trees	7.2	2.1	1	0.3	27	5
Shoreline Grading Areas	564	514	N/A	N/A	N/A	N/A
<b>Total (Permanent)</b>	<b>1,348</b>	<b>517.9</b>	<b>74.2</b>	<b>1.2</b>	<b>1,072</b>	<b>17</b>
Temporary Access Path	15 <sup>4</sup>	N/A	20 <sup>1</sup>	N/A	768	N/A
<b>Total (Temporary)</b>	<b>15</b>	<b>N/A</b>	<b>20</b>	<b>N/A</b>	<b>768</b>	<b>N/A</b>

**Table 2-3 Summary of Impacts**

Project Feature	Fill <sup>1</sup>	Excavation	Wetland TW-19 100-foot Adjacent Area <sup>2</sup>			
			Fill <sup>2</sup> (cubic yards)	Excavation <sup>3</sup> (cubic yards)	Fill (square feet)	Excavation (square feet)
Haul Route <sup>5</sup>	43	N/A	83	N/A	3,192	N/A
<b>Total (Permanent)</b>	<b>43</b>	<b>N/A</b>	<b>83</b>	<b>N/A</b>	<b>3,192</b>	<b>N/A</b>

Notes:

<sup>1</sup> Fill refers to quantities below the OHWM.

<sup>2</sup> The Project Area does not overlap with wetland TW-19; therefore, impacts are limited to its 100-foot adjacent area.

<sup>3</sup> Wetland TW-19 100-foot adjacent area impacts are a subset of the total fill and excavation quantities in columns two and three.

<sup>4</sup> This is temporary fill located along the temporary access paths; they will be restored to pre-existing conditions following construction.

<sup>5</sup> Fill totals for the haul route represent permanent fill as described in Section 2.3.1.

Each Project construction activity will employ the appropriate pollution control methods and mitigation measures. To prevent impacts on water quality, any materials deployed will be free of contaminants and cleaned to remove fine sediments. The contractor will implement appropriate measures during construction activities associated with the installation of the rock sills, rock reefs, mini weir, cabled logs, and root wads. Measures will include installation of turbidity curtains during in-water or restoration activities. The contractor will also implement appropriate erosion and sediment control measures in accordance with the Project's Storm Water Pollution Prevention Plan. Erosion and sediment control measures will be installed during mobilization, and kept in place and maintained until Project completion.

As indicated on the design drawings included in Appendix B, turbidity curtains will be placed along the two areas of shoreline grading and near the area identified for placement of the three rock reefs. Silt fencing will be installed along the access roads and staging areas.

Protection zones are shown on the plan sheets and will be marked in the field identified within the Project Area prior to the start of construction. These include areas surrounding southern blue flag (*Iris virginica*) individuals, a state-listed endangered species, as well as larger, no equipment use areas. The protection zones for the southern blue flag will be defined by a 5-foot-diameter circle concentric with the individual plant. The no equipment use areas were established to be protective of both higher-density SAV areas, as well as areas with a greater abundance of mussel species.

As indicated in Section 2.3.2, higher-density SAV areas were mapped during the design phase in order to avoid those areas when siting of nearshore structures. In consultation with NYSOPRHP staff, in-water no equipment use areas were

designated to protect SAV beds with a density of greater than 50%; these areas are not included in the total Project Area acreage of 26.5 acres. In these areas, shoreline structures were excluded or will be placed from the shoreline to protect these SAV beds. As a result, impacts on SAV have been minimized by the design and only temporary, minimal impacts on aquatic vegetation will occur.

Aquatic vegetation temporarily impacted by construction will be augmented throughout the Project Area, as approximately 124,776 square feet (2.9 acres) of the Project Area will be planted with aquatic vegetation following construction activities in the designated deep water and shallow water emergent planting zones. To protect the deep water emergent and shallow emergent planting zones, goose and carp fences will be used to enclose each planted area for a period of two years until plant material is established. The goose and carp fences will be removed seasonally, between November 1 and April 1, to avoid ice damage. Fencing will be installed such that it does not fence off currently vegetated areas. No overhead protection or flagging will be used because these areas are small and should not be affected by water-landing waterfowl.

The NYSOPRHP will develop a mussel relocation plan prior to the start of construction, which will guide the relocation of mussels that are located within the proposed limits of disturbance.

Due to the presence of the silver maple-ash swamp, a designated Significant Natural Community, throughout much of the northern portion of the BISP, tree removal will be minimized in this forested area. An existing pedestrian path will be used as a temporary access road. A portion of this path (from the trailhead along East River Road to Woods Creek) is comprised of crushed asphalt. The majority of the path is compressed soil and vegetation. In addition to the temporary access roads, one existing haul route will be used. Along this route, only minor clearing of shrubs, branches, and/or dead fallen trees/limbs will be necessary. Clearing activities will take place in the fall of 2020 (October/November), and it is not anticipated that there will be any restrictions on those activities. Clearing to avoid impacts on the northern long-eared bat (*Myotis septentrionalis*) is restricted to November 1 through March 31; however, there is no documented summer or winter habitat on Grand Island, and the BISP is over 22 miles from known hibernacula.

Additionally, 115 ash trees have been identified by NYSOPRHP staff as dead or dying within the Project work limits. Immediately prior to the start of construction, the specific locations of these trees will be marked for removal by NYSOPRHP staff. The removed trees meet the design requirements for use in two or three of the cabled log pile formations. Where these ash trees are removed, new trees will be planted at a ratio of three new trees to one removed tree. This will result in the addition of 345 healthy and native trees to the BISP.

All Project activities within the Project Area will comply with all applicable rare, threatened, and endangered species regulations. In-water work will be performed

outside of the fish spawning window of April 15 through June 30 and the peak nesting season of June 1 through August 1, as discussed with NYSDEC. Construction of the rock sills, rock reefs with locked logs, mini weir, rock sills, and root wads will begin in late September 2020 and will continue through the end of January 2021. Aquatic vegetation will be planted in 2021 after the peak nesting season, which concludes by July 30.

In conclusion, the cumulative effects of the nearshore structures will achieve the restoration objectives for this Project, including attenuation of wave energy and creation of aquatic and wetland habitat. These long-term beneficial effects outweigh short-term construction disturbance.

## **2.6 Operation and Maintenance**

In conjunction with the construction of this Project, baseline monitoring will establish conditions before and after habitat enhancement activities. The baseline conditions will be used to assess the success of Project enhancement activities over time.

The details of the monitoring plan have not yet been fully developed and vetted, but it may entail monitoring similar to that being conducted through the Great Lakes Coastal Wetland Monitoring Program. The frequency and level of sampling will ultimately depend, in part, upon future funding. Monitoring may be completed periodically by NYSOPRHP personnel and/or a local university or other entities. Monitoring will employ the use of metrics to evaluate Project progress over time by making comparisons back to baseline conditions.

Potential metrics could include:

- Fish and wildlife use of the area for spawning, nesting, and foraging;
- Seasonal bird use (migratory, breeding, and overwintering);
- Water circulation and flow;
- Emergent plant community species composition and presence/absence across the Project Area;
- SAV community species composition and presence/absence across the Project Area; and
- Surface sediment type.

# 3

## Project Justification

### 3.1 Alternatives Analysis

A number of design alternatives were considered during the design review process, including the No Action Alternative and various different action alternatives. One of the action alternatives was evaluated as part of the GLFER feasibility study and is described in detail below, along with additional action alternatives developed during the current Project's design process. During the GLFER process and continuing into the current Project's design process, four total stakeholder/regulatory agency review meetings were held. These meetings resulted in revisions to the various alternatives, also discussed below.

#### 3.1.1 No-Action Alternative

Under this alternative, the habitat enhancement design for the Buckhorn Island Shoreline would not be constructed to provide protection of the shoreline in the future. The potential benefits arising from the proposed habitat enhancement design would not be realized. High wave energy from waves and boats and occasional high-flow velocities and ice scour would continue to erode the shoreline, resulting in further loss and degradation of the nearshore, shoreline, and riparian areas, and a continued lack of in-water habitat structure for fish and wildlife. In brief, the No Action Alternative would allow continued degradation of the Niagara River shoreline, riverine, and riparian habitats and would not support the removal of the Loss of Fish and Wildlife Habitat BUI in the Niagara River AOC.

#### 3.1.2 Action Alternatives

Numerous design iterations were reviewed and commented upon by NYSOPRHP staff and the various Project stakeholders during the review process, including those developed as part of the GLFER feasibility study. The following is a summary of those conceptual designs and stakeholder concerns/comments.

##### 3.1.2.1 Initial GLFER Alternative

Initially during the GLFER process, Ecology and Environment Engineering and Geology, P.C., in association with Ecology and Environment, Inc., member of WSP (hereafter collectively referred to as E & E) developed and presented one conceptual design to the Niagara River AOC habitat committee for review and comment. This design (see Figure 3-1) introduced the initial concepts of hard protection structures along the initial 1,500 feet of shoreline upstream of Woods Creek. These hard structures consisted of larger offshore rock reefs and a series of

smaller circular rock sills (smiles) closer to shore where serious shoreline erosion occurred. In addition to dissipating wave energy directed at riverbanks, these features would promote and enhance sediment deposition and would promote the establishment of native EV and SAV communities along the shoreline and enhance nearshore aquatic habitat. The original conceptual design also included an internal wetland area for invasive species treatment and eradication.

The rock reef concept was generally accepted as a protection feature by the committee in lieu of additional hardening of the shoreline in the immediate bank erosion areas. During the meeting, the idea of expanding the extent of the Project to include an additional 7,175 linear feet of shoreline downstream of Woods Creek was discussed and promoted. During these discussions, the inland invasive area was removed from the design because the committee agreed this work was not consistent with the intent of the program of shoreline habitat improvements goals.

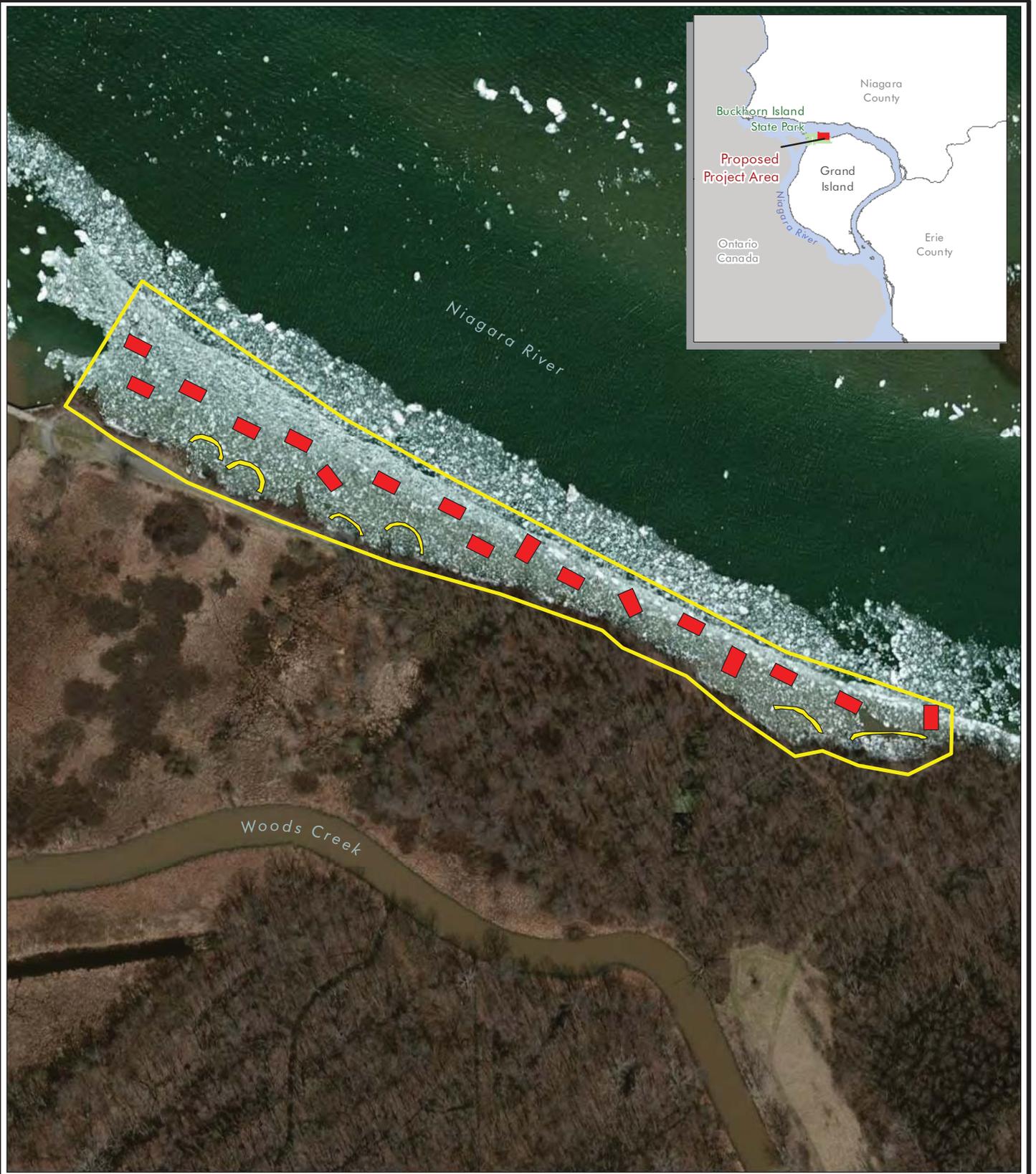
### **3.1.2.2 GLRI Grant Application Design Submission**

Prior to the start of the actual design process, the NYSOPRHP submitted a grant application to the U.S. Environmental Protection Agency for funding four habitat enhancement projects on the Niagara River on NYSOPRHP property, including this Project at the BISP. During the application process the extent of the habitat enhancement of park shoreline was expanded by the NYSOPRHP staff to a total 9,200 feet of shoreline. This new linear expansion includes the entire northern shoreline of the BISP.

With the expansion of the Project, the GLRI grant application proposed the construction of the following based on the conceptual design presented in the GLFER report:

- Installation of 85 small rock barrier reefs;
- Installation of 30 contoured rock sills;
- Rearrangement of riprap and material from armored banks;
- Toe-slope bank protection using logs and existing rocks;
- Pocket plantings along the bank and in areas of invasive species treatment and removal;
- Plantings in the protected nearshore, shallow emergent zone (between the rock sills and the shoreline); and
- Chemical treatment and mechanical removal of invasive species within the Project Area where encountered.

In total, the project proposed in the GLRI grant was anticipated to create and enhance approximately 18.5 acres of riparian and aquatic habitat.



- KEY:
-  Buckhorn Project Area
  -  Semi-Circular Sill Structures
  -  Proposed Submerged Reef Structures

Figure 3-1  
Buckhorn Island State Park Shoreline  
Proposed Near Shore Engineered Rock Reef Structures  
Erie County, New York



After the award of the grant, the current Project's design process was initiated. The following sections discuss the evolution of the design from 30% through the final design.

### **3.1.2.3 30% Design**

In general, the 30% design provided for the following habitat concepts:

- Curved rock smiles along the shoreline, spaced for wildlife movement (e.g., turtles, fish, ducks, invertebrates) and planted for shoreline protection and emergent habitat creation;
- Discontinuous rock sills and cabled log pyramids farther out to break up waves;
- Flat stones as bendway weirs perpendicular to the shore to break up wave action and redirect flow away from the shoreline;
- Cabled logs placed perpendicular to the shore to provide additional stability by holding substrate in place and to serve as basking logs for turtles;
- Cabled logs in smiles or parallel to the shoreline;
- Areas where the top of the bank will be cut and fill will be placed to create a shallower slope, with cabled logs and plantings at the bottom of the slope;
- Cut and fill areas are limited to where there is significant bank erosion and where a reconnection to the riparian zone is needed; and
- Trees for the cabled logs will likely come from old ash trees within the BISP as requested by NYSOPRHP staff.

This design also substituted large rock sills for the small rock reefs. This change was made because the hydraulic and hydrology analysis indicated that the design did not need the larger, more robust structures as reefs in order to reduce wave action on the shoreline structures. It was also made in order to reduce the amount of fill placed in the Niagara River, which had been a permitting issue raised by the regulatory agencies. Table 3-1 provides a summary of the features proposed as part of the 30% design. For the 30% design, quantities for total fill and overall disturbed area were not available, as the design was conceptual in nature. No SAV/EV would be enhanced and/or planted.

Agency comments on the 30% design included the need to minimize fill and regrading; focus on offshore structures and a reconnection with the riparian area and scrub/shrub areas in the park; segment offshore sills using singular stones with gaps to allow for wildlife passing and for water flushing; and to consider planting EV in clusters instead of large areas to evaluate propagation success without having to plant as much.

#### **3.1.2.4 60% Design**

As a result of comments received during the review of the 30% design package the following design changes were made:

- Reduced the number of large rock sills by three and reduced the number of small rock sills by one;
- Reduced the number of rock reefs with locked logs by two;
- Re-drew contours in steep bank area for grading;
- Deleted grading area near Station 39+50;
- Added more offshore cabled log pyramid protection; and
- Moved rootwads farther into the bank.

In addition to the revisions noted above, work restriction areas were added to the design to exclude areas of higher abundance of mussel species. As a result of these changes, approximately 101,713 square feet of SAV/EV enhancement and/or planting was added to the design (see Table 3-1). Under the 60% design, total fill equated to 950.6 cubic yards and the overall disturbed area was 24.2 acres.

This revised design was reviewed and commented on by the NYSOPRHP. There was overall agreement on the design, with the exception of adding additional space between the rock reefs at the westernmost end of the Project Area and the shoreline to accommodate a possible future project to make a connection between the east and west channels of the Niagara River, and the need to understand the benefits and alignment of the perpendicular weirs. With respect to the weirs, concerns were raised regarding the need to preserve flow along the shoreline for the benefits it provides to the nearshore habitat and freshwater mussels, and the need to minimize construction disturbance on the riverbed and shoreline. After additional discussions, the NYSOPRHP was in favor of installing primarily log perpendicular weirs in areas where other construction will already occur, such as shoreline grading and in areas close to the temporary access paths from the trail to the shoreline.

#### **3.1.2.5 90% Design**

In response to comments that were offered on the 60% design, the following changes were made to the 90% design drawings:

- The length of the flat stone weir, perpendicular to the shoreline were reduced by half to a length of 20 feet;
- Perpendicular cabled logs were either shortened to only one log length or were removed from the design to address NYSOPRHP and agency comments;
- Additional “No equipment” areas were added to address areas of high mussel densities;

- Planting areas were more clearly defined in terms of depth of planting for the different zones; and
- The six small rock reefs were removed from the design.

As a result of these changes, between the 60% and 90% designs, the total fill was reduced by approximately 320 cubic yards and the overall disturbed area was reduced by 0.2 acres (see Table 3-1).

#### **3.1.2.6 100% Design**

Based on NYSDEC comments on the 90% design, additional changes were made for the 100% design. NYSDEC's comments are summarized below:

- Single-stone structures have not been demonstrated to mitigate wave energy – modify the design to focus on the creation of off-shore, segmented rock berms designed to be resilient under all expected forces and conditions with a top elevation of at least 1.5 feet above the design water level as the primary wave attenuation system;
- Segmented rock berms should be aligned in a manner that does not deflect channel flow away from the shoreline (protected interior). These berms should also be sited as to not displace significant existing SAV beds;
- Alignment of the offshore structures should be considered carefully to maximize protection, with the cabled log pyramids as a secondary wave protection layer (instead of primary protection in sections) inside of rock reefs/barriers. These cabled logs would have the additional benefit of serving as refuge/spawning areas for various fish species;
- Remove all structural elements at the shoreline to preserve the near nearshore substrate and water flow patterns to protect mussel beds and young of the year fish habitat. E & E expects that the abundance of dead and dying ash trees along the shoreline will provide a natural source of structure in the nearshore area without the associated impacts of heavy construction on the riverbed;
- Revegetation plans should be developed after a period of monitoring to determine the extent of natural regeneration experienced post-construction of wave attenuation system, therefore, planting plans should be removed;
- The construction will take place by marine construction equipment and vessels, therefore, access roads depicted in plans should be removed. Removing the shoreline structures/plantings will allow for the removal of (most) access paths in the Wetland Adjacent Area and will assist in meeting permitting requirements. Pursuant to Part 663.5(e)(2), the Project must minimize degradation to Wetland TW-19 and its regulated 100-foot adjacent area. Therefore, any efforts to reduce or remove the access paths would help in meeting permit issuing standards; and
- The concept of large areas designated as locations for various wood structure features was supported for design and implementation.

The Design Team studied NYSDEC's comments closely and integrated changes to design where there would be benefits to the ecological enhancement within and protection of, nearshore and shoreline habitats while still maintaining functional integrity in support of the overall goals of this Project, and to reduce the amount of "fill" placed in the river. The analyses contributing to design have been supported by field sampling, such as river flow monitoring and field reconnaissance along the entire Project Area on numerous occasions, in different seasons. Due to the engineering evaluations, not all comments led to design changes.

For instance the Design Team used single rock sills because they will function similar to breakwater structures and allow continued circulation along the shoreline. This will result in less fill added to the river compared to larger rock reef/berm structures suggested by others. Fill (rock) from the construction of rock reef structures is estimated to be approximately 4,800 cubic yards of rock. Rock sills are included in this design to be viable "lower fill" alternatives to rock reefs, while still providing a similar wave attenuation basis. The volume of fill for the large rock sills is approximately 322 cubic yards.

Additionally, it is noted that wave forces experienced along the Buckhorn shoreline are significantly different from that of the other Niagara River restoration/enhancement project locations due to the physical structure of the shoreline in this reach and the distance away from the thalweg. For much of the Project Area, a wide and shallow bench exists that is 350 to 450 feet wide and precedes the approach to the shoreline compared to the deeper offshore waters that occur at either Grass Island or East River Marsh project locations. Additionally, the forces on the shoreline from public use of the navigational channel and incidents of boat traffic to the Project Area are also somewhat lower compared to other locations along the river. Further, the fetch distance for wind-generated wave setup considerably limits larger waves that other locations experience, given the south/west dominant wind direction. While there is a clear need for shoreline protection at this site, the design addresses the smaller, recurring wave patterns. The single rock sills will provide the needed protection and will also encourage wetland recruitment without "overbuilding."

Based on the comments listed above, the 100% design was finalized with the incorporation of the following elements:

- Additional perpendicular cabled logs were removed from the design to address the concern regarding restricting flow along the shoreline;
- Additional "no equipment" areas were added to protect areas of established SAV and other areas that had been determined to have elevated mussel populations;
- Access path construction was revised to require wood marsh mats in lieu of stone. Path width was also reduced from 18 feet to 12 feet;

- A line of small rock sills was removed;
- The size of one of the planting area was reduced;
- The orientation of the cabled log pyramid at Station 50+00 was changed to be more parallel to the shoreline;
- High bank regrading at Station 62+50 was removed; and
- One rock reef with locked logs was eliminated and the remaining two features were placed upstream to avoid a high density of SAV.

As a result of these changes, between the 90% and the 100% designs, overall fill increased slightly (approximately 15 cubic yards), the overall disturbed area was reduced by approximately 1.3 acres, and the area to be planted with SAV/EV increased by approximately 23,063 square feet (see Table 3-1).

**Table 3-1 Summary Comparison of Alternatives**

Component	Alternatives				
	GLFER	30% Design	60% Design	90% Design	100% Design
Fill (cy)	not listed <sup>1</sup>	not listed <sup>1</sup>	950.59	630.4	645.98 <sup>2</sup>
Overall disturbed area (sf)	not listed <sup>1</sup>	not listed <sup>1</sup>	24.20	24.02	22.70
SAV/EV Area (sf) enhanced and/or planted	0	0	101,713	101,713	124,776
Large Rock Sills (ea.)	0	21	18	18	18
Small Rock Sills (ea.)	60	19	18	16	14
Armored River Bank (lf)	4,000	0	0	0	126
Perpendicular Cabled Logs (ea.)	0	36	35	15	13
Shoreline Cabled Logs (ea.)	0	6	6	6	5
Cabled Log Pyramids (ea.)	0	13	15	15	15
Flat Stone Mini Weirs (ea.)	0	4	4	4	1
Signpost (ea.)	0	0	12	12	12
Rock Reefs with Locked Logs (ea.)	0	5	3	3	3
Rock Reefs (ea.)	55	6	6	0	0
Rootwads (ea.)	250	2	2	2	2
Leaner Trees (ea.)	0	2	2	7	7
Access Paths (ea.)	10	6	6	6	6

Notes:

1. Quantities for fill and disturbed area are not listed because these designs were conceptual in nature.
2. The fill total for the 100% design as listed here differs from what is included in Section 2.5 because grading areas were excluded from Table 3-1.

Key:

- cy = cubic yard
- ea. = each
- GLFER = Great Lakes Fishery and Ecosystem Restoration
- lf = linear feet
- SAV/EV = submerged aquatic vegetation/ emergent vegetation
- sf = square feet

### **3.2 Adjacent Property Owners**

The NYSOPRHP owns the land (the Park) within and adjacent to the Project Area.

### **3.3 Coastal Zone Consistency**

Concurrent with the submittal of this joint application, the NYSOPRHP is filing an assessment of the proposed Project's consistency with the New York State Coastal Management Plan with the NYSDOS. The NYSOPRHP is submitting a Coastal Zone Consistency Analysis with state and LWRP policies, which is included in Appendix F of this application.

# 4

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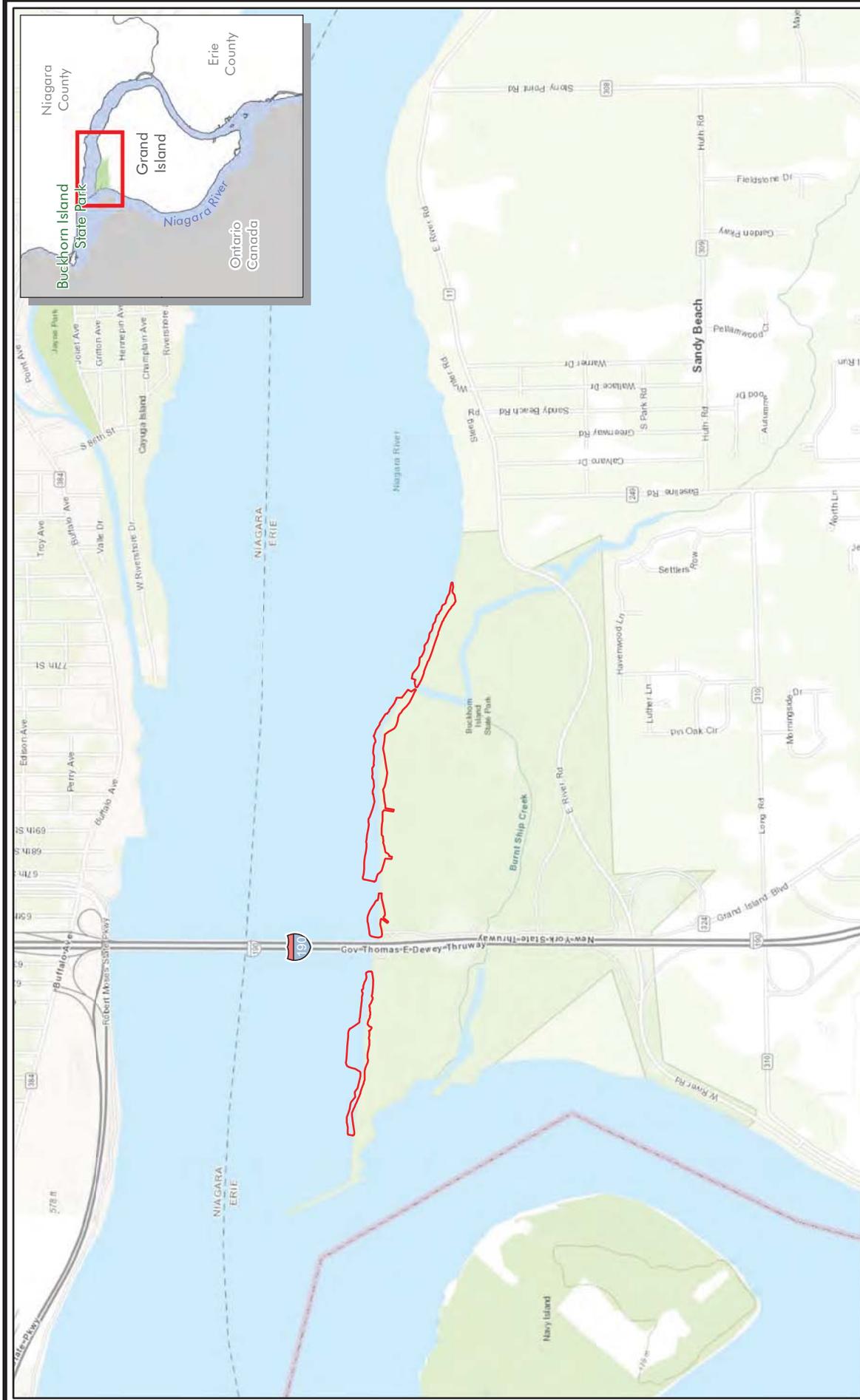
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# A

## Project Figures

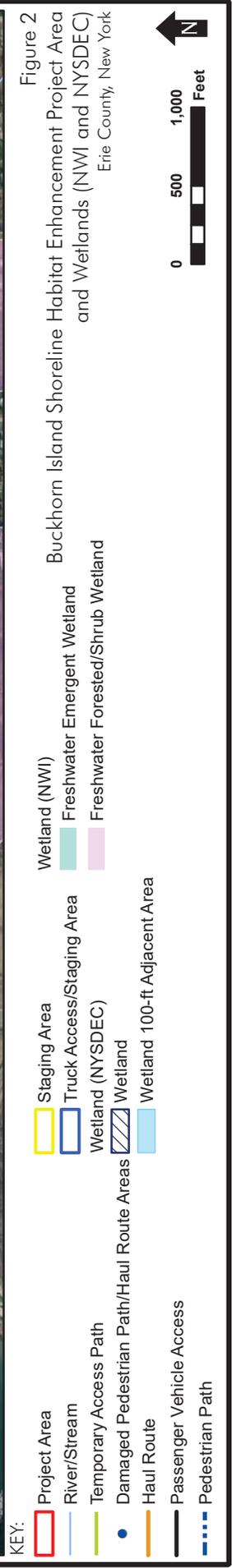


KEY:

-  Project Area/ Limit of Work
-  County Boundary
-  International Boundary

Figure 1  
Buckhorn Island Shoreline Habitat Enhancement  
Project Location Map  
Erie County, New York







- KEY:
- Project Area
  - Work Area
  - 67+00 to 80+50
  - 80+00 to 82+50
  - Temporary Access Path
  - Haul Route
  - Wetland (NYSDEC)
  - Wetland (NYSDEC) 100-ft Adjacent Area

Figure 3, Map 1 of 6  
Buckhorn Island Shoreline Habitat Enhancement Project Area  
and Work Access Zones  
Erie County, New York





KEY:

- ▭ Project Area
- ▭ Temporary Access Path
- ▭ Haul Route
- ▨ Work Area
- ▨ Wetland (NYSDEC)
- ▨ Wetland (NYSDEC) 100-ft Adjacent Area
- ▨ 67+00 to 80+50
- ▨ 60+00 to 70+00

Figure 3, Map 2 of 6  
Buckhorn Island Shoreline Habitat Enhancement Project Area  
and Work Access Zones  
Erie County, New York





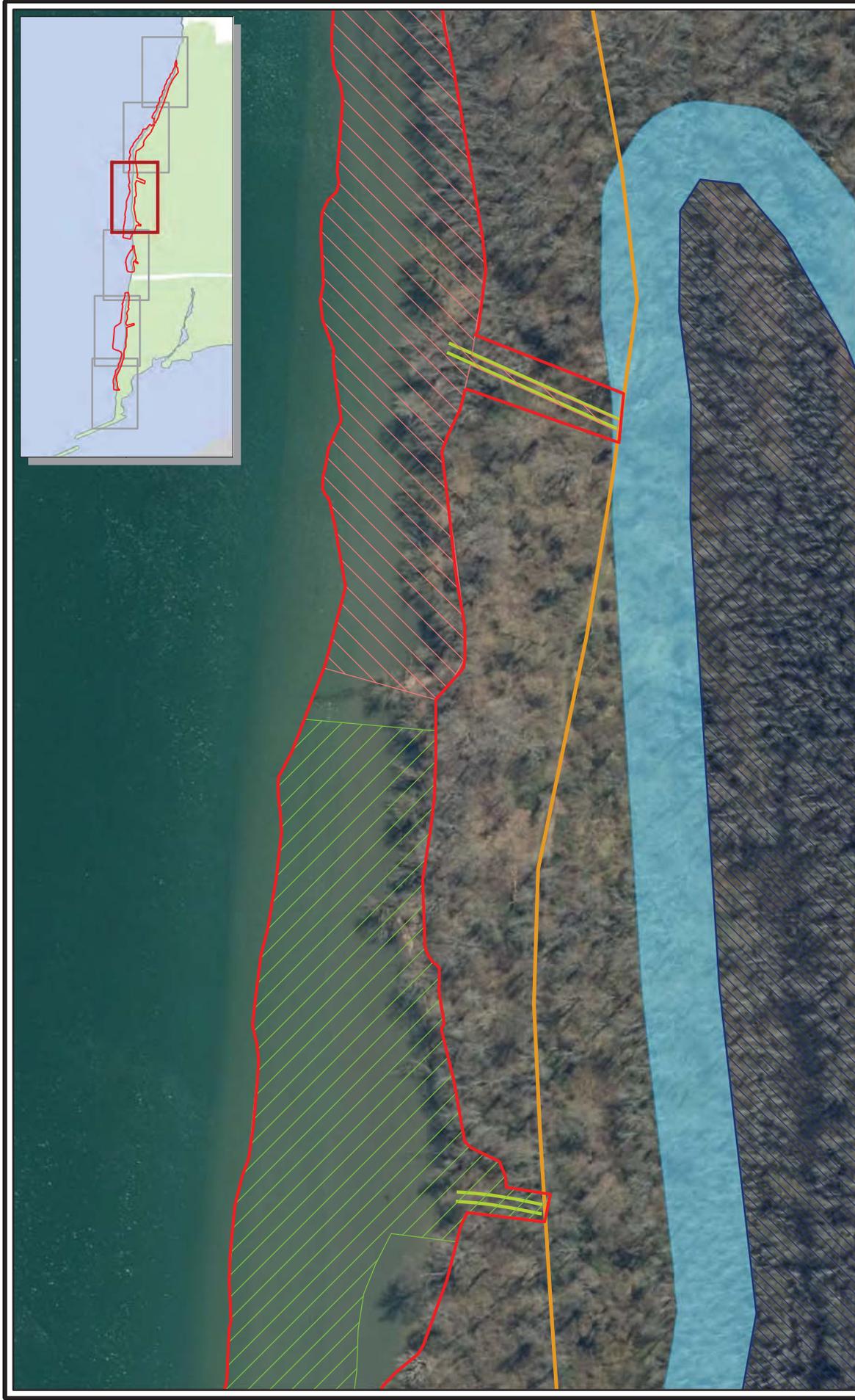
**KEY:**

- Project Area
- Work Area
- 36+00 to 45+50
- 47+00 to 53+50
- 60+00 to 70+00
- Temporary Access Path
- Haul Route
- Passenger Vehicle Access
- Wetland (NYSDEC)
- Wetland (NYSDEC) 100-ft Adjacent Area

**Figure 3, Map 3 of 6**  
**Buckhorn Island Shoreline Habitat Enhancement Project Area**  
**and Work Access Zones**  
 Erie County, New York

0 100 200 Feet

N



- KEY:
- Project Area
  - Work Area
  - 23+50 to 35+50
  - 36+00 to 45+50
  - Temporary Access Path
  - Haul Route
  - Wetland (NYSDEC)
  - Wetland (NYSDEC) 100-ft Adjacent Area

Figure 3, Map 4 of 6  
Buckhorn Island Shoreline Habitat Enhancement Project Area  
and Work Access Zones  
Erie County, New York





- KEY:**
- Project Area
  - Work Area
  - 00+00 to 16+00
  - 16+25 to 23+50
  - 23+50 to 35+50
  - Temporary Access Path
  - Haul Route
  - Pedestrian Path
  - River/Stream
  - Wetland (NYSDEC)
  - Wetland (NYSDEC) 100-ft Adjacent Area

Figure 3, Map 5 of 6  
 Buckhorn Island Shoreline Habitat Enhancement Project Area  
 and Work Access Zones  
 Erie County, New York



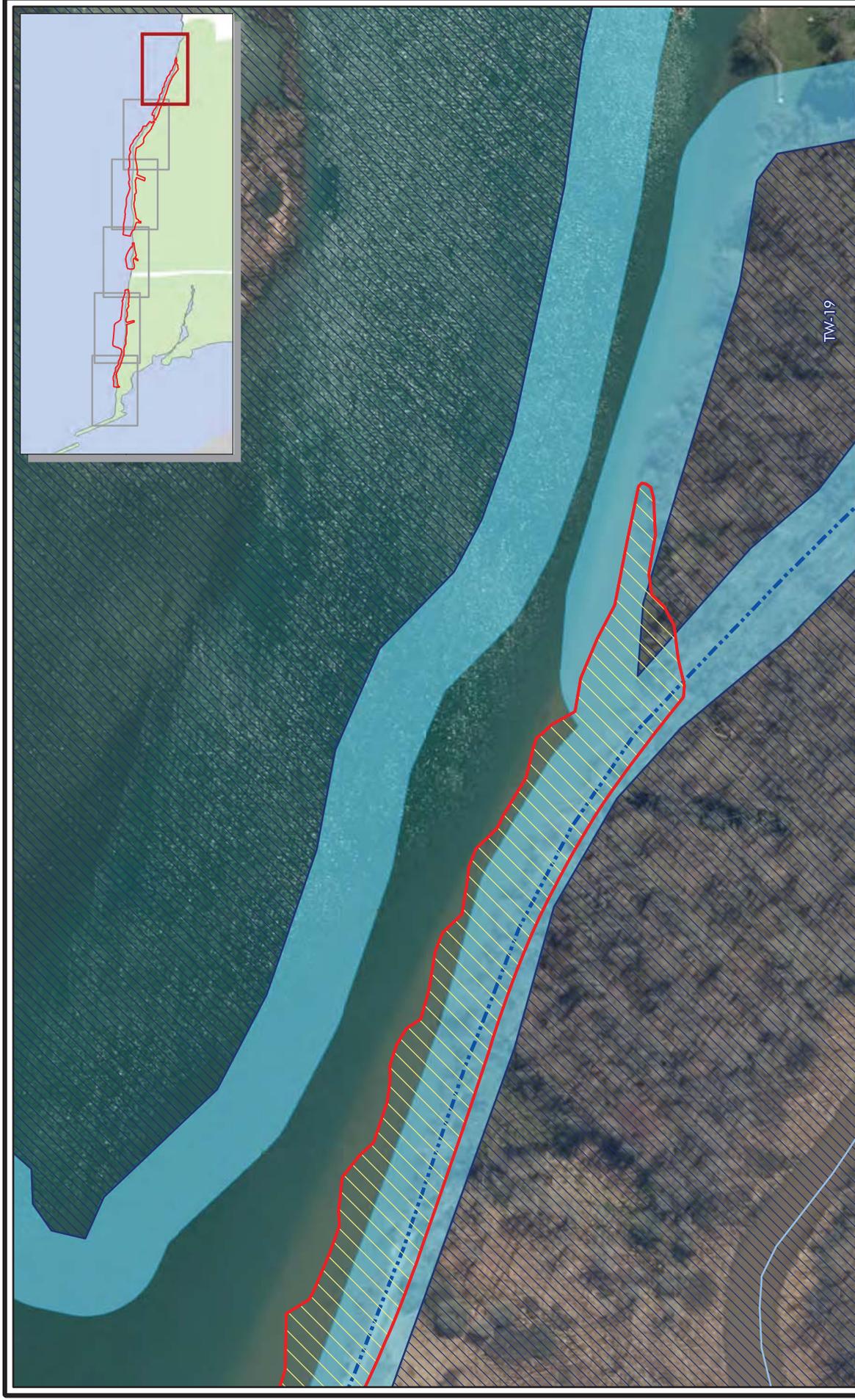


Figure 3, Map 6 of 6  
Buckhorn Island Shoreline Habitat Enhancement Project Area  
and Work Access Zones  
Erie County, New York



- KEY:
- Project Area
  - Work Area
  - Wetland (NYSDEC)
  - Wetland (NYSDEC) 100-ft Adjacent Area
  - 00+00 to 16+00
  - Pedestrian Path
  - River/Stream

# B

## Project Plans

# BUCKHORN ISLAND AND SHORELINE - HABITAT ENHANCEMENT DESIGN

CONTRACT No. D005528  
GRAND ISLAND, NEW YORK

## ISSUED FOR PERMITTING

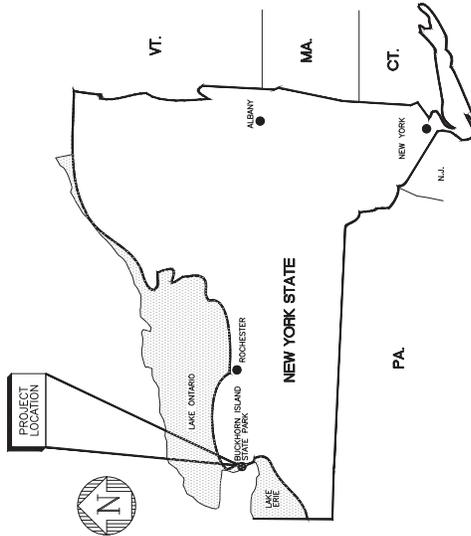


GOVERNOR - ANDREW CUOMO  
COMMISSIONER - ERIK KILLESEID  
DIRECTOR OF WESTERN REGION - MARK MISTRETTA

Prepared For:

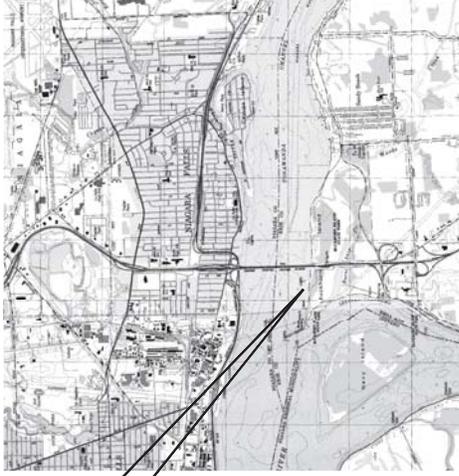
**NEW YORK STATE OFFICE OF  
PARKS, RECREATION,  
AND HISTORIC PRESERVATION**

BUCKHORN ISLAND STATE PARK  
EAST RIVER ROAD  
GRAND ISLAND, NY 14072



**VICINITY MAP**  
NOT TO SCALE

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**SITE LOCATION MAP**  
NOT TO SCALE

SOURCE: USGS

DWG. NO.	REV.	TITLE
G-1	F	TITLE SHEET, VICINITY MAP, SITE LOCATION MAP AND LIST OF DRAWINGS
C-2	F	GENERAL NOTES, LEGEND AND ABBREVIATIONS
K-1	F	KEY PLAN
C-1	F	EXISTING SITE PLAN 1
C-2	F	EXISTING SITE PLAN 2
C-3	F	EXISTING SITE PLAN 3
C-4	F	EXISTING SITE PLAN 4
C-5	F	EXISTING SITE PLAN 5
C-6	F	EXISTING SITE PLAN 6
C-7	F	EXISTING SITE PLAN 7
C-8	F	EXISTING SITE PLAN 8
C-9	F	EXISTING SITE PLAN 9
C-10	F	PROPOSED DESIGN AND PLANTING PLAN 1
C-11	F	PROPOSED DESIGN AND PLANTING PLAN 2
C-12	F	PROPOSED DESIGN AND PLANTING PLAN 3
C-13	F	PROPOSED DESIGN AND PLANTING PLAN 4
C-14	F	PROPOSED DESIGN AND PLANTING PLAN 5
C-15	F	PROPOSED DESIGN AND PLANTING PLAN 6
C-16	F	PROPOSED DESIGN AND PLANTING PLAN 7
C-17	F	PROPOSED DESIGN AND PLANTING PLAN 8
C-18	F	PROPOSED DESIGN AND PLANTING PLAN 9
P-1	D	FINAL GRADING AND PLANTING AREA 1
P-2	D	FINAL GRADING AND PLANTING AREA 2
C-19	F	FEATURE INSTALLATION COORDINATES
S-1	D	SECTIONS
D-1	F	DETAILS 1
D-2	F	DETAILS 2
D-3	F	DETAILS 3
D-4	C	DETAILS 4

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CONTRACT: **D005528**

BUCKHORN ISLAND SHORELINE -  
HABITAT ENHANCEMENT DESIGN

LOCATION: BUCKHORN ISLAND STATE PARK  
Grand Island, New York

THIS OFFICE OF PARKS, RECREATION  
AND HISTORIC PRESERVATION

ISSUED FOR  
PERMITTING  
MAY 2020

F	05-20-2020	ISSUED FOR PERMITTING
E	05-15-2020	ISSUED SHEET FOR PERMITTING
D	11-10-19	ISSUED SHEET FOR PERMITTING
MARK	DATE	DESCRIPTION
PROJECT NUMBER:	1709413.0011	
DESIGNED BY:	REBECCA AMPERSKI, P.E.	
DRAWN BY:	KEVIN KOWERSKI, P.E.	
CHECKED BY:	GREGORY P. SUTTON, P.E.	
APPROVED:	DAVID P. ALBERS, P.E.	

SHEET TITLE:  
**TITLE SHEET, SITE  
VICINITY MAP, SITE  
LOCATION MAP  
AND LIST OF  
DRAWINGS**

DRAWING NUMBER:  
**G-1**

SHEET **1** OF **29**





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TITLE: **BUCKHORN ISLAND SHORELINE HABITAT ENHANCEMENT DESIGN**

LOCATION: **BUCKHORN ISLAND STATE PARK  
Grand Island, New York**

OWNER: **OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION**

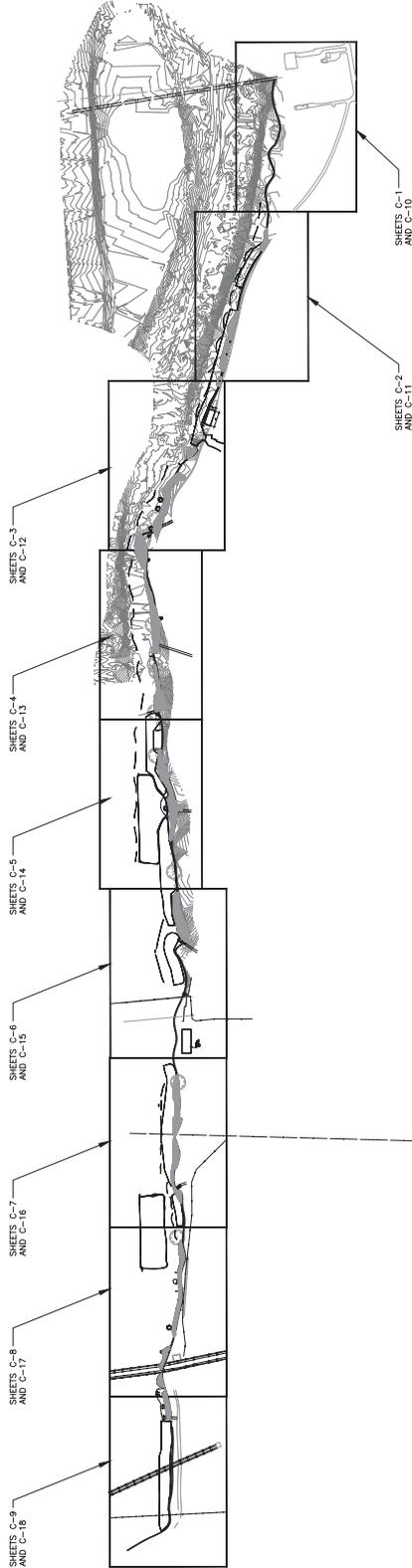
**ISSUED FOR PERMITTING  
MAY 2020**

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E	5-19-2020	ISSUED BENT FOR PERMITTING
D	11-16-19	ISSUED FOR PERMITTING
DATE		DESCRIPTION
PROJECT NUMBER:	1709413.0011	
DESIGNED BY:	REBECCA KAMPERT	
DRAWN BY:	KEVIN KRASNEROW, J.E.	
CHECKED BY:	GREGORY A. SUTTON, P.E.	
APPROVED:	DAVID P. ALBERS, P.E.	

SHEET TITLE: **KEY PLAN**

DRAWING NUMBER: **K-1**

SHEET **3** OF **29**



**KEY PLAN**  
SCALE: 1" = 400'-0"

**ISSUED FOR PERMITTING**

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TITLE: **BUCKHORN ISLAND SHORELINE HABITAT ENHANCEMENT DESIGN**

LOCATION: **BUCKHORN ISLAND STATE PARK  
Grand Island, New York**

DEPT: **OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION**

**ISSUED FOR PERMITTING  
MAY 2020**

F	5-19-2020	ISSUED FOR PERMITTING
E	5-19-2020	ISSUED DATE FOR PERMITTING
D	11-18-19	ISSUED FOR PERMITTING
DATE		DESCRIPTION
PROJECT NUMBER	1709413.0011	
DESIGNED BY	REBECCA KAMPERT	
DRAWN BY	KEVIN WAGNER	
CHECKED BY	GREGORY A. SUTTON, P.E.	
APPROVED	DAVID P. ALBERS, P.E.	

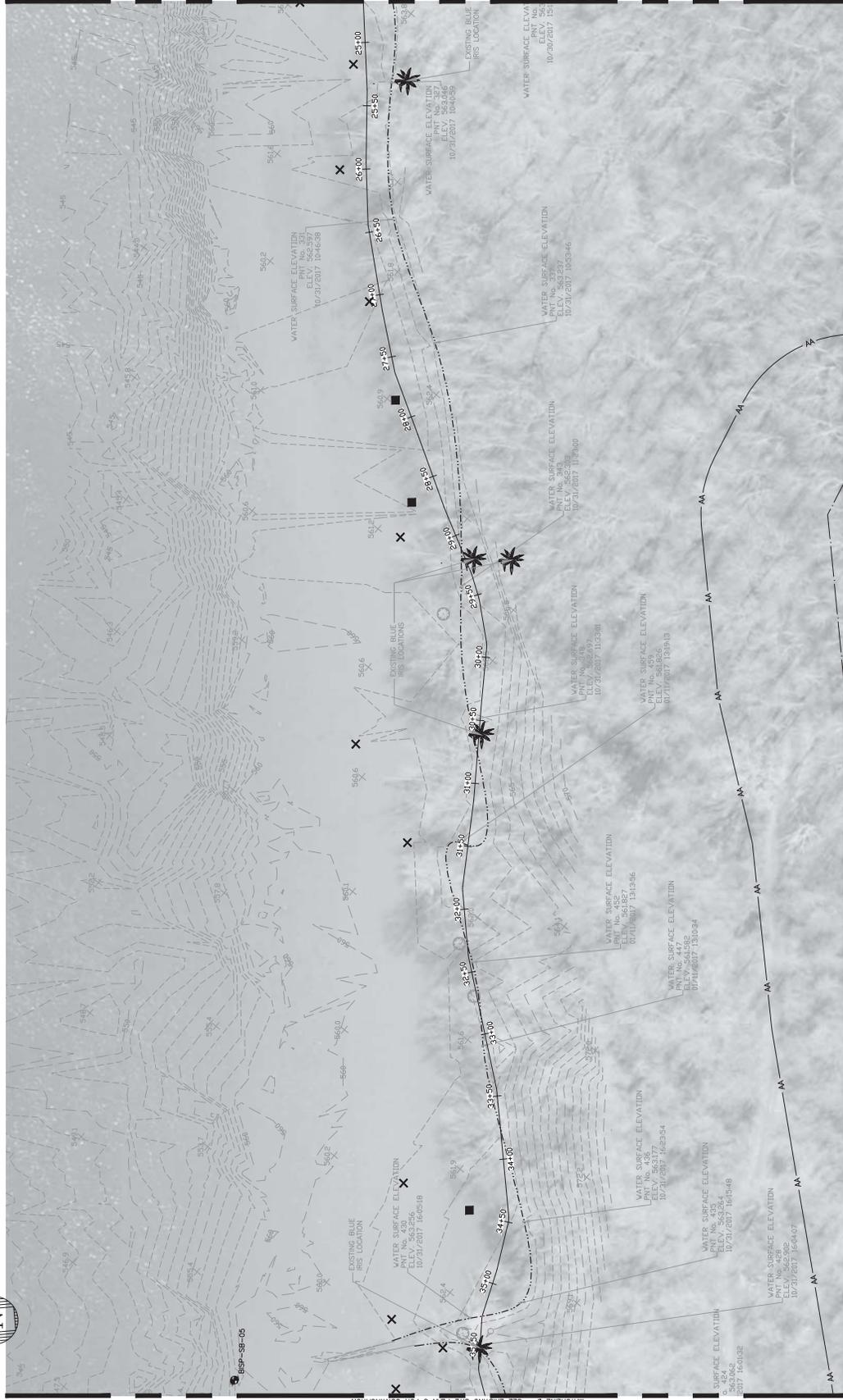
SHEET TITLE:  
**EXISTING SITE PLAN 2**

DRAWING NUMBER: **C-2**

SHEET **5** OF **29**







**MUSSEL ABUNDANCE LEGEND**

- X 1 4-6
- 2 7-11
- 3

**EXISTING SITE PLAN 4**  
SCALE: 1" = 40'-0"

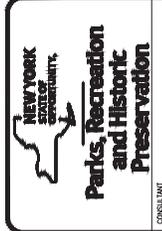


**ISSUED FOR PERMITTING**

**NOTE**  
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**MUSSEL ABUNDANCE NOTES**

1. MUSSEL ABUNDANCE DATA WAS COLLECTED BY RIVEREDGE ENVIRONMENTAL, INC. ON FOUR FIELD SURVEYS IN 2016 AND 2017. THE RESULTS OF THE BUCKHORN ISLAND STATE PARK MUSSEL SURVEY, NAGARA RIVER, NEW YORK, ISSUED BY RIVEREDGE ENVIRONMENTAL, INC. IN SEPTEMBER 2016.
2. ONLY SURVEY LOCATIONS WHERE MUSSELS WERE FOUND ARE SHOWN ON THE DRAWINGS.
3. MUSSEL ABUNDANCE VALUES INDICATE THE NUMBER OF MUSSELS FOUND IN A 40 BY 40 SURVEY CELL. LOCATIONS MARKED ON THE DRAWINGS INDICATE THE CENTROID OF EACH SURVEY CELL.



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D005528  
BUCKHORN ISLAND SHORELINE  
HABITAT ENHANCEMENT DESIGN  
LOCATION:  
BUCKHORN ISLAND STATE PARK  
Grand Island, New York

**DESIGNED BY:** OFFICE OF PARKS, RECREATION  
AND HISTORIC PRESERVATION

**ISSUED FOR PERMITTING**  
MAY 2020

REV.	DATE	ISSUED FOR PERMITTING	ISSUED FOR PERMITTING
F	5-19-2020	ISSUED FOR PERMITTING	
E	5-19-2020	ISSUED FOR PERMITTING	
D	11-18-19	ISSUED FOR PERMITTING	
MARK	DATE	DESCRIPTION	
PROJECT NUMBER:	1709413.0011		
DESIGNED BY:	REBECCA KAMPERT		
DRAWN BY:	GREGORY A. SUTTON, P.E.		
CHECKED BY:	DAVID P. ALBERS, P.E.		
APPROVED:			

SHEET TITLE:  
**EXISTING SITE PLAN 4**  
DRAWING NUMBER:  
C-4  
SHEET 7 OF 29



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TITLE: **BUCKHORN ISLAND SHORELINE HABITAT ENHANCEMENT DESIGN**

LOCATION: **BUCKHORN ISLAND STATE PARK  
Grand Island, New York**

DEPARTMENT: **OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION**

ISSUED FOR PERMITTING  
MAY 2020

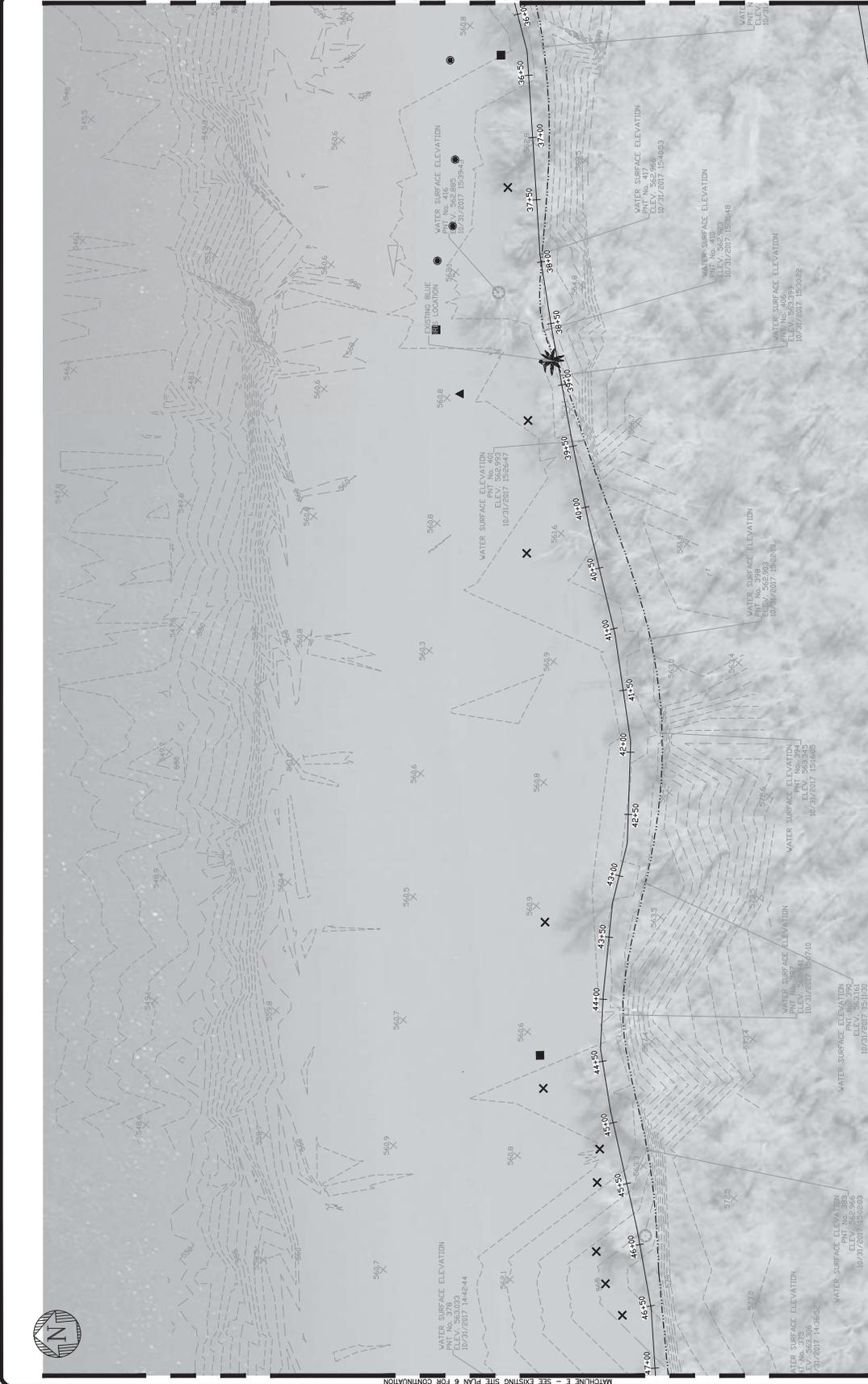
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E	5-19-2020	ISSUED BENT FOR PERMITTING
D	11-16-19	ISSUED FOR PERMITTING
C	11-16-19	ISSUED FOR PERMITTING
PROJECT NUMBER:	1709413.0011	
DESIGNED BY:	REBECCA KAMPERT	
DRAWN BY:	KEVIN WAGNER JR.	
CHECKED BY:	GREGORY A. SUTTON, P.E.	
APPROVED:	DAVID P. ALBERS, P.E.	

## ISSUED FOR PERMITTING

EXISTING SITE PLAN 5

DRAWING NUMBER: **C-5**

SHEET **8** OF **29**



## MUSSEL ABUNDANCE LEGEND

- X 1 4-6
- 2 7-11

## MUSSEL ABUNDANCE NOTES

- MUSSEL ABUNDANCE DATA WAS COLLECTED BY RIVERDEE ENVIRONMENTAL, INC. ON FOUR FIELD SURVEY CELLS AT BUCKHORN ISLAND STATE PARK MUSSEL SURVEY, NIAGARA RIVER, NEW YORK ISSUED BY RIVERDEE ENVIRONMENTAL, INC. IN SEPTEMBER 2018.
- ONLY SURVEY LOCATIONS WHERE MUSSELS WERE FOUND ARE SHOWN ON THE DRAWINGS.
- MUSSEL ABUNDANCE VALUES INDICATE THE NUMBER OF MUSSELS FOUND IN A 40 BY 40 SURVEY CELL. LOCATIONS MARKED ON THE DRAWINGS INDICATE THE CENTROID OF EACH SURVEY CELL.

## EXISTING SITE PLAN 5

SCALE: 1" = 40'-0"



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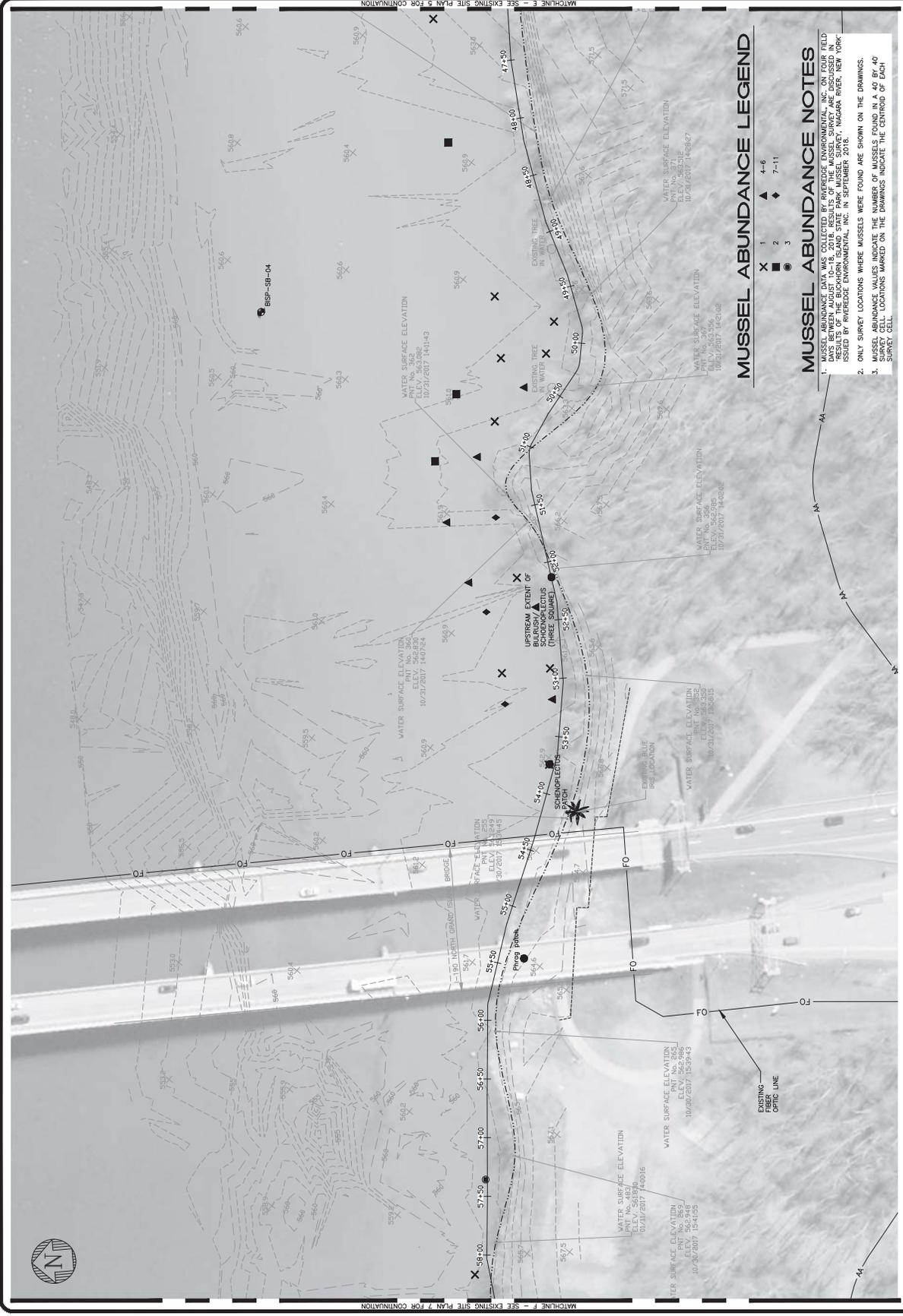
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BUCKHORN ISLAND SHORELINE  
HABITAT ENHANCEMENT DESIGN  
LOCATION:  
BUCKHORN ISLAND STATE PARK  
Grand Island, New York  
**WORKS:**  
OFFICE OF PARKS, RECREATION  
AND HISTORIC PRESERVATION

**ISSUED FOR PERMITTING MAY 2020**

F	5-19-2020	ISSUED FOR PERMITTING
E	5-19-2020	ISSUED BMT FOR PERMITTING
D	11-16-19	ISSUED FOR PERMITTING
MARK	DATE	DESCRIPTION
PROJECT NUMBER:	1709413.0011	
DESIGNED BY:	REBECCA KAMPERT	
DRAWN BY:	KEVIN WAGNER	
CHECKED BY:	GEORGY F. SUTTOR, P.E.	
APPROVED:	DAVID P. ALBERS, P.E.	

**SHEET TITLE:**  
**EXISTING SITE PLAN 6**  
DRAWING NUMBER:  
**C-6**  
SHEET **9** OF **29**



**MUSCHEL ABUNDANCE LEGEND**

- X 1
- 2
- ▲ 3
- ▲ 4-6
- ◆ 7-11

**MUSCHEL ABUNDANCE NOTES**

1. MUSCHEL ABUNDANCE DATA WAS COLLECTED BY RIVERDEE ENVIRONMENTAL, INC. ON FOUR FIELD SURVEYS IN AUGUST, SEPTEMBER, AND OCTOBER 2018. SURVEY POINTS WERE IDENTIFIED BY RIVERDEE ENVIRONMENTAL, INC. IN SEPTEMBER 2018.
2. ONLY SURVEY LOCATIONS WHERE MUSCHEL WERE FOUND ARE SHOWN ON THE DRAWINGS.
3. MUSCHEL ABUNDANCE VALUES INDICATE THE NUMBER OF MUSCHEL FOUND IN A 40 BY 40 SURVEY CELL. LOCATIONS MARKED ON THE DRAWINGS INDICATE THE CENTROID OF EACH SURVEY CELL.

**ISSUED FOR PERMITTING**

**EXISTING SITE PLAN 6**  
SCALE: 1" = 40'-0"

SCALE IN FEET  
0 40 80 120

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CONTRACT: **D005528**  
TITLE: **BUCKHORN ISLAND SHORELINE HABITAT ENHANCEMENT DESIGN**  
LOCATION: **BUCKHORN ISLAND STATE PARK**  
Grand Island, New York

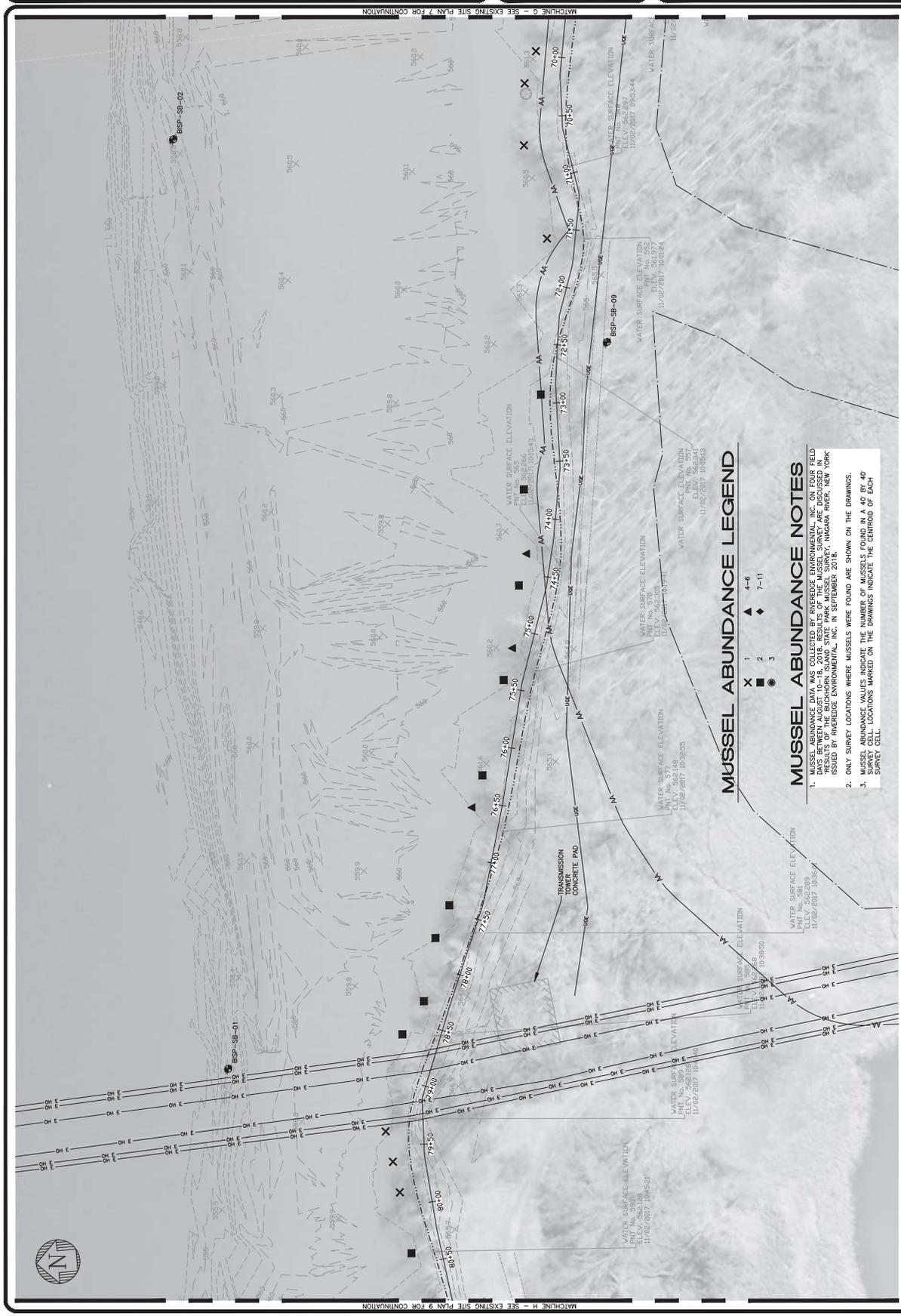
DESIGNED BY: **OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION**

**ISSUED FOR PERMITTING**  
**MAY 2020**

MARK	DATE	DESCRIPTION
F	5-19-2020	ISSUED FOR PERMITTING
E	5-19-2020	ISSUED DATE FOR PERMITTING
D	11-16-19	ISSUED FOR PERMITTING
W		WORK
PROJECT NUMBER:	1009413.0011	
DESIGNED BY:	REBECCA AMPTON	
DRAWN BY:	KEVIN WAGNER	
CHECKED BY:	GREGORY A. SUTTON, P.E.	
APPROVED:	DAVID P. ALBERS, P.E.	

SHEET TITLE:  
**EXISTING SITE PLAN 8**

DRAWING NUMBER: **C-8**  
SHEET **11** OF **29**



**ISSUED FOR PERMITTING**

**EXISTING SITE PLAN 8**

SCALE IN FEET  
0 40 80 120

SCALE: 1" = 40'-0"

IT IS A VIOLATION OF NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW TO ALTER THIS DOCUMENT BY MAKING CHANGES WITHOUT OBTAINING THE SIGNATURE OF THE DESIGNER.



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**CONTRACT:**  
D005528

**TITLE:**  
BUCKHORN ISLAND SHORELINE  
HABITAT ENHANCEMENT DESIGN

**LOCATION:**  
BUCKHORN ISLAND STATE PARK  
Grand Island, New York

**AGENCY:**  
OFFICE OF PARKS, RECREATION  
AND HISTORIC PRESERVATION

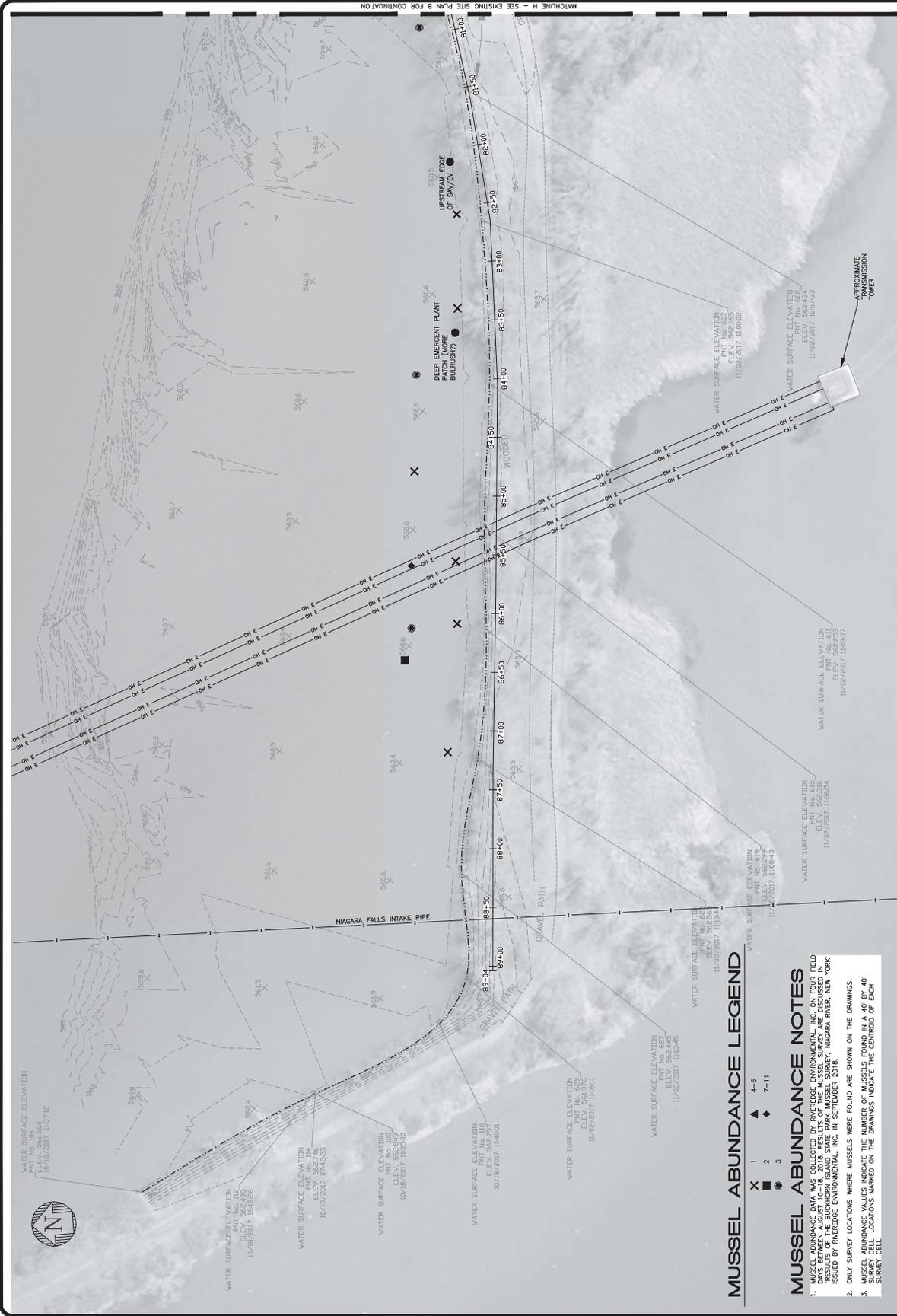
ISSUED FOR  
PERMITTING  
MAY 2020

MARK	DATE	DESCRIPTION
F	5-19-2020	ISSUED FOR PERMITTING
E	5-19-2020	ISSUED FOR PERMITTING
D	11-16-19	ISSUED FOR PERMITTING
PROJECT NUMBER:	1009413.0011	
DESIGNED BY:	REBECCA KAMPERT	
DRAWN BY:	JENIN WAGNER, JLL	
CHECKED BY:	GREGORY A. SUTTON, P.E.	
APPROVED:	DAVID P. ALBERS, P.E.	

**SHEET TITLE:**  
EXISTING  
SITE  
PLAN 9

DRAWING NUMBER: C-9

SHEET 12 OF 29



ISSUED FOR PERMITTING

EXISTING SITE PLAN 9  
SCALE: 1" = 40'-0"

SCALE IN FEET  
0 40 80 120

NOTE  
1. AERIAL IMAGERY SHOWN IS FROM ERIE COUNTY (2017).

**MUSSEL ABUNDANCE LEGEND**

- X 1
- 2
- 3
- ▲ 4-6
- ◆ 7-11

**MUSSEL ABUNDANCE NOTES**

1. MUSSEL ABUNDANCE DATA WAS COLLECTED BY RIVEREDGE ENVIRONMENTAL, INC. ON FOUR FIELD DAYS BETWEEN AUGUST 18-20, 2018. RESULTS FROM THIS SURVEY ARE DISCUSSED IN THE REPORT ISSUED BY RIVEREDGE ENVIRONMENTAL, INC. IN SEPTEMBER 2018.
2. ONLY SURVEY LOCATIONS WHERE MUSSELS WERE FOUND ARE SHOWN ON THE DRAWINGS.
3. MUSSEL ABUNDANCE VALUES INDICATE THE NUMBER OF MUSSELS FOUND IN A 40 BY 40 SURVEY CELL. LOCATIONS MARKED ON THE DRAWINGS INDICATE THE CENTROID OF EACH SURVEY CELL.

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**CONTRACT:** D005528  
**TITLE:** BUCKHORN ISLAND SHORELINE HABITAT ENHANCEMENT DESIGN  
**LOCATION:** BUCKHORN ISLAND STATE PARK  
Grand Island, New York  
**OWNER:** OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION

**ISSUED FOR PERMITTING MAY 2020**

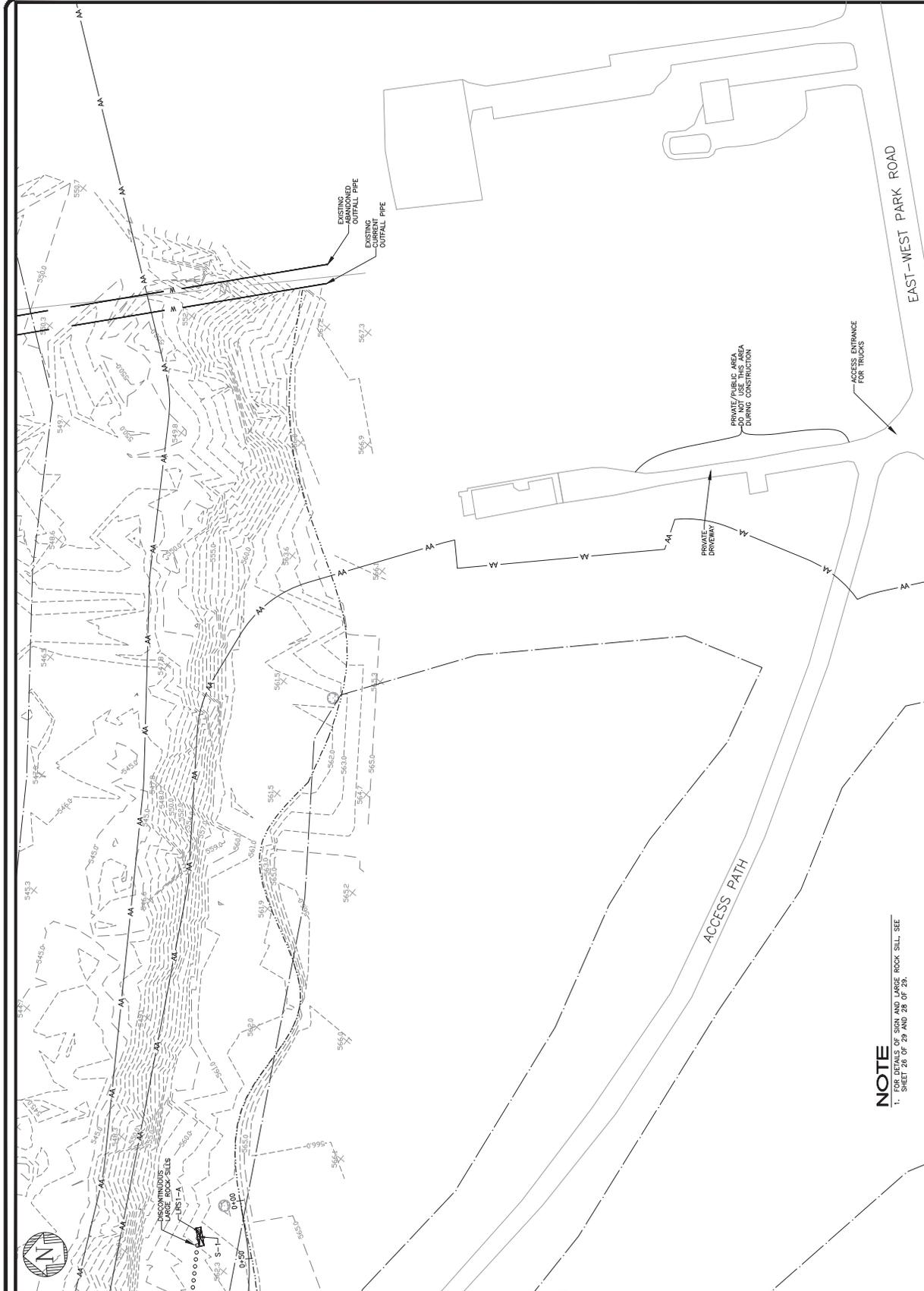
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**DESIGNED BY:** REBECCA KAMPERT  
**DRAWN BY:** GREGORY A. SUTTON, P.E.  
**CHECKED BY:** GREGORY A. SUTTON, P.E.  
**APPROVED:** DAVID P. ALBERS, P.E.

**PROJECT NUMBER:** 1709413.0011  
**ISSUED FOR PERMITTING**

**PROPOSED DESIGN AND PLANTING PLAN 1**

DRAWING NUMBER: C-10  
SHEET 13 OF 29



**ISSUED FOR PERMITTING**

**PROPOSED DESIGN AND PLANTING PLAN 1**

**SCALE: 1" = 40'-0"**

**IT IS A VIOLATION OF NEW YORK STATE ENGINEERING LAW TO ALTER THIS DOCUMENT IN ANY MANNER WITHOUT OBTAINING THE SIGNATURE OF THE ORIGINAL DESIGNER.**



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CONTRACT: **D005528**

TITLE: **BUCKHORN ISLAND SHORELINE  
HABITAT ENHANCEMENT DESIGN**

LOCATION: **BUCKHORN ISLAND STATE PARK  
Grand Island, New York**

AGENCY: **OFFICE OF PARKS, RECREATION  
AND HISTORIC PRESERVATION**

ISSUED FOR  
PERMITTING  
MAY 2020

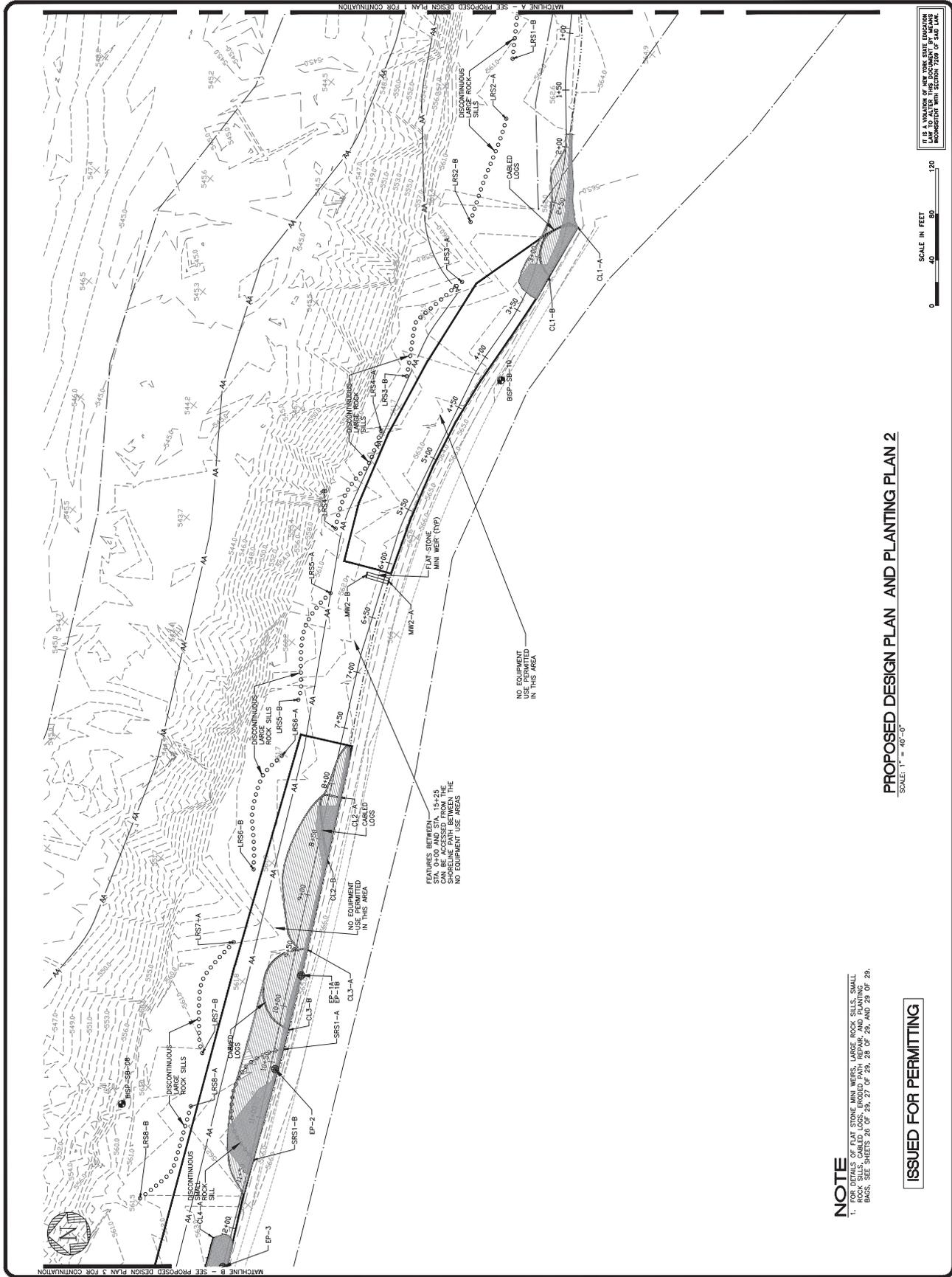
F	5-19-2020	ISSUED FOR PERMITTING
E	5-19-2020	ISSUED PERMITS FOR PERMITTING
D	1-15-19	ISSUED FOR PERMITTING
DATE		DESCRIPTION
PROJECT NUMBER	1709413.0011	
DESIGNED BY:	REBECCA AMPHRETT	
DRAWN BY:	KEVIN WALKERSON	
CHECKED BY:	GREGORY A. SUTTON, P.E.	
APPROVED:	DAVID P. ALBERS, P.E.	

SHEET TITLE:  
**PROPOSED DESIGN AND  
PLANTING PLAN 2**

DRAWING NUMBER:

C-11

SHEET 14 OF 29

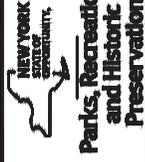


PROPOSED DESIGN PLAN AND PLANTING PLAN 2  
SCALE: 1" = 40'-0"

ISSUED FOR PERMITTING

**NOTE**  
1. FOR DETAILS OF FLAT STONE MINI WEIRS, LARGE ROCK SILLS, SMALL ROCK SILLS, CABLE LOGS, ERODED PATH REPAIR, AND PLANTING BAGS, SEE SHEETS 26 OF 29, 27 OF 29, 28 OF 29, AND 29 OF 29.

IT IS A VIOLATION OF NEW YORK STATE ENGINEERING LAW TO ALTER THIS DOCUMENT OR ANY INFORMATION CONTAINED THEREIN WITHOUT THE WRITTEN PERMISSION OF THE ARCHITECT.



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PROFESSIONAL ARCHITECT FOR AN ARCHITECT  
FOR A LANDSCAPE ARCHITECT IS A VIOLATION OF THE  
AND IS A CLASS 'A' MISDEMEANOR.

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TITLE: **BUCKHORN ISLAND SHORELINE  
HABITAT ENHANCEMENT DESIGN**

LOCATION: **BUCKHORN ISLAND STATE PARK  
Grand Island, New York**

WORKS: **OFFICE OF PARKS, RECREATION  
AND HISTORIC PRESERVATION**

ISSUED FOR  
PERMITTING  
MAY 2020

F	5-29-2020	ISSUED FOR PERMITTING
E	5-19-2020	ISSUED FOR PERMITTING
D	11-16-19	ISSUED FOR PERMITTING
WORK		DESCRIPTION
PROJECT NUMBER:	1709413.0011	
DESIGNED BY:	REBECCA AMPERTON	
DRAWN BY:	KEVIN WAGNER	
CHECKED BY:	GREGORY F. SUTTON, P.E.	
APPROVED:	DAVID P. ALBERS, P.E.	

**PROPOSED  
DESIGN AND  
PLANTING PLAN 3**

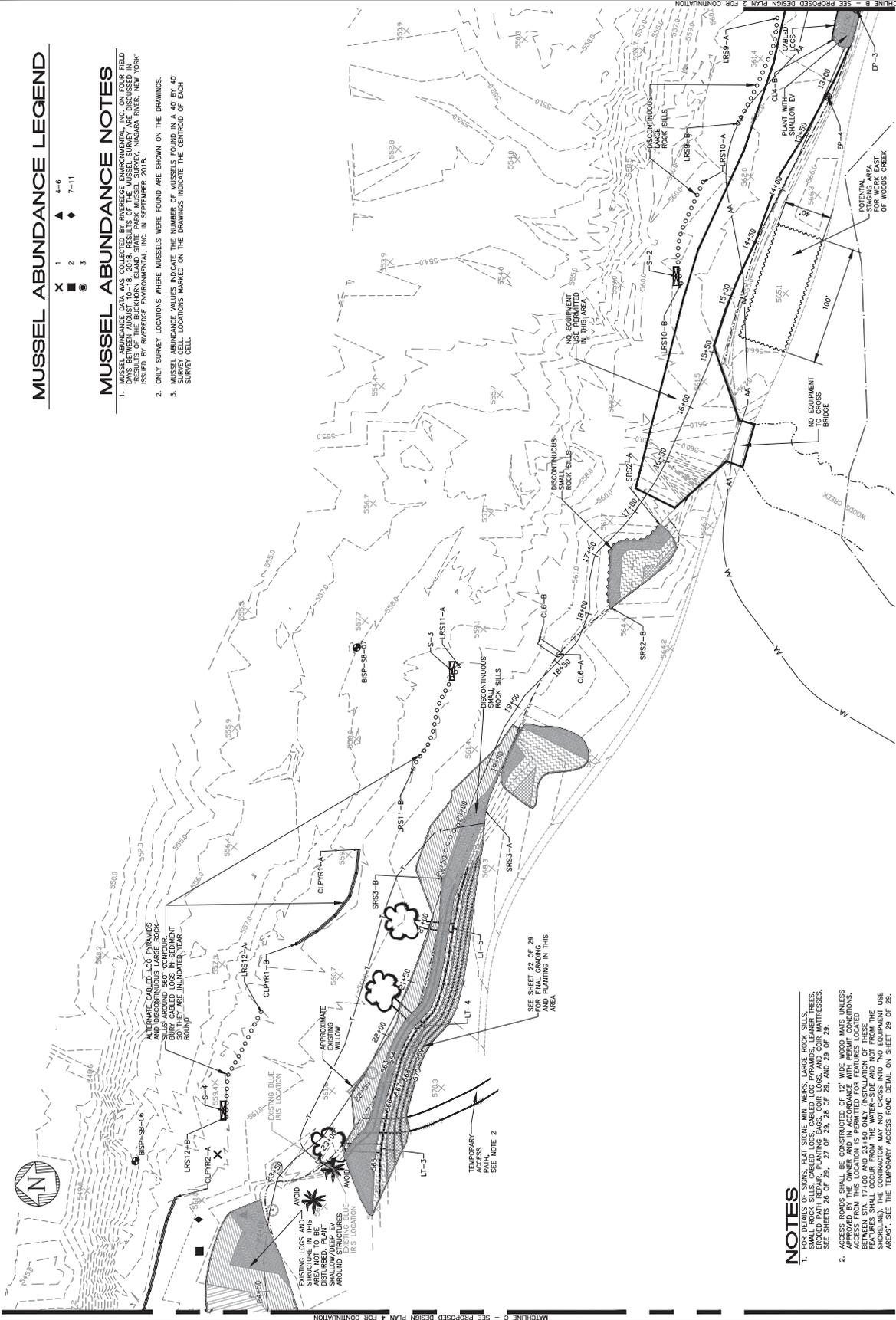
DRAWING NUMBER: **C-12**  
SHEET **15** OF **29**

**MUSSEL ABUNDANCE LEGEND**

- X 1 4-6
- 2 4-6
- 3 7-11

**MUSSEL ABUNDANCE NOTES**

1. MUSSEL ABUNDANCE VALUES WERE OBTAINED FROM FIELD SURVEYS CONDUCTED IN 2016 AND 2017. THESE RESULTS WILL BE MAINTAINED IN THIS DOCUMENTATION. THE RESULTS OF THE BUCKHORN ISLAND STATE PARK MUSSEL SURVEY, NIAGARA RIVER, NEW YORK, ISSUED BY INTERSE ENVIRONMENTAL, INC. IN SEPTEMBER 2016.
2. ONLY SURVEY LOCATIONS WHERE MUSSELS WERE FOUND ARE SHOWN ON THE DRAWINGS.
3. MUSSEL ABUNDANCE VALUES INDICATE THE NUMBER OF MUSSELS FOUND IN A 40 BY 40 SURVEY CELL. LOCATIONS MARKED ON THE DRAWINGS INDICATE THE CENTROID OF EACH SURVEY CELL.



**PROPOSED DESIGN PLAN AND PLANTING PLAN 3**

SCALE: 1" = 40'-0"

**NOTES**

1. ALL ROCK SILLS, CABLED LOGS, AND PLANTING AREAS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND DETAILS SHOWN ON SHEETS 20 OF 29, 21 OF 29, 26 OF 29, AND 29 OF 29.
2. ALL ROCK SILLS, CABLED LOGS, AND PLANTING AREAS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND DETAILS SHOWN ON SHEETS 20 OF 29, 21 OF 29, 26 OF 29, AND 29 OF 29.

**ISSUED FOR PERMITTING**

SEE SHEET 20 OF 29 FOR FINAL GRADING AND PLANTING IN THIS AREA

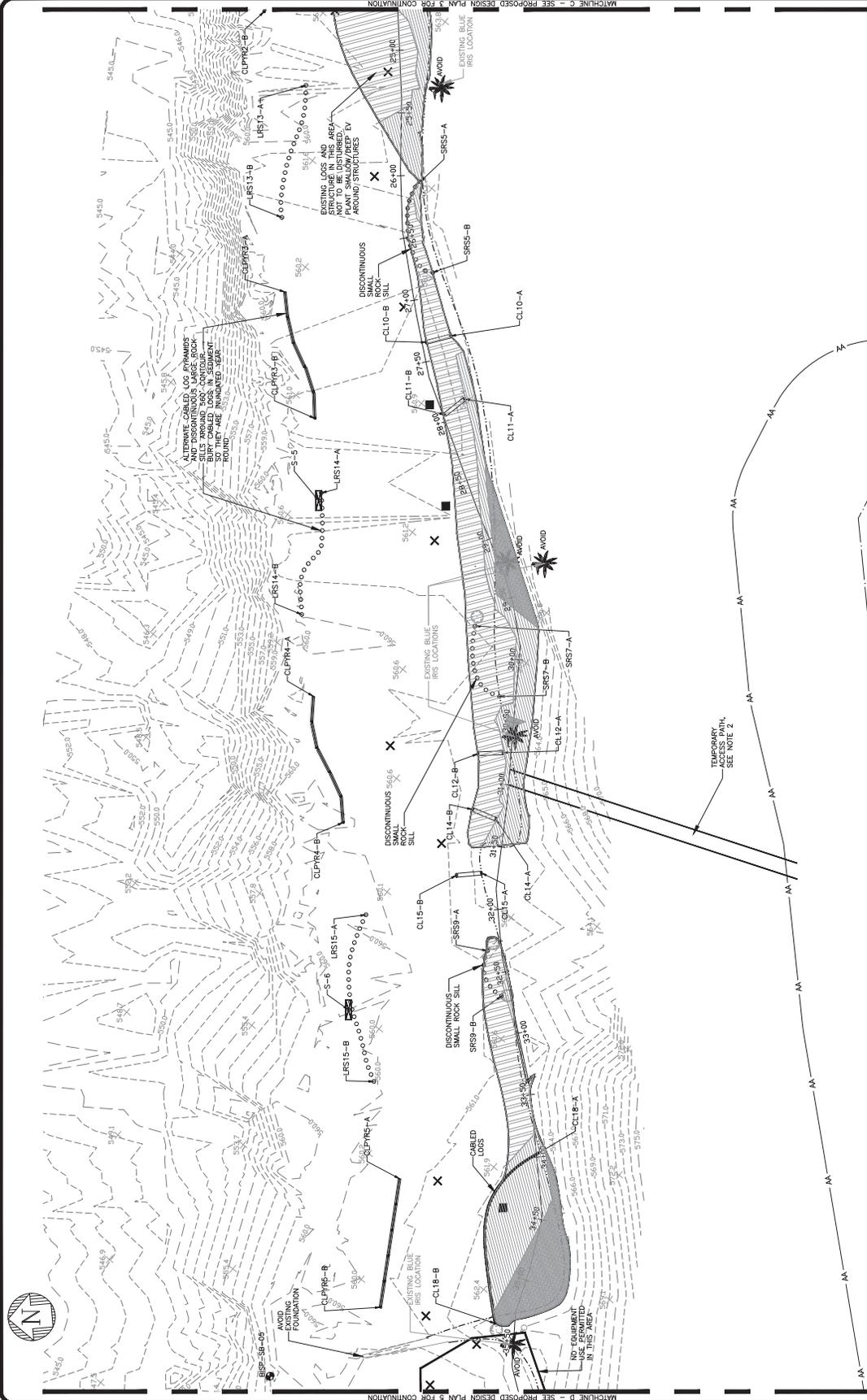
SEE NOTE 2

SEE SHEET 20 OF 29 FOR FINAL GRADING AND PLANTING IN THIS AREA

SEE NOTE 2

SEE SHEET 20 OF 29 FOR FINAL GRADING AND PLANTING IN THIS AREA

SEE NOTE 2



**NOTES**

1. FOR DETAILS OF SILLS, LARGE ROCK SILLS, SMALL ROCK SILLS, SEE SHEETS 28 OF 29, 27 OF 29, 26 OF 29, AND 20 OF 29.
2. ACCESS ROADS SHALL BE CONSTRUCTED OF 12" WIDE MARSH MATS UNLESS APPROVED BY THE OWNER AND IN ACCORDANCE WITH PERMIT LOCATION BETWEEN SRS5-A AND SRS7-A. ACCESS SHALL BE AS CALLOUTED WITH SENSITIVE HABITAT. ACCESS FROM THIS LOCATION IS PERMITTED FOR INSTALLATION OF THESE FEATURES SHALL OCCUR FROM THE WATER-SIDE AND NOT FROM THE SHOULDER. THE CONTRACTOR MAY USE EQUIPMENT IN THIS AREA. SEE THE TEMPORARY ACCESS ROAD DETAILS ON SHEET 29 OF 29.

**ISSUED FOR PERMITTING**

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**MUSSEL ABUNDANCE LEGEND**

SCALE: 1" = 40'-0"

1 2 3 4-6 7-11

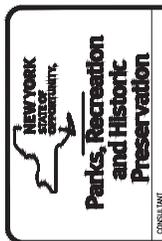
X 1 2 3

**MUSSEL ABUNDANCE NOTES**

1. MUSSEL ABUNDANCE DATA WAS COLLECTED BY RIVERDE ENVIRONMENTAL, INC. ON FOUR FIELD SURVEYS IN SEPTEMBER 2016. THE RESULTS OF THE BUCKHORN ISLAND STATE PARK MUSSEL SURVEY, NIAGARA RIVER, NEW YORK, ISSUED BY RIVERDE ENVIRONMENTAL, INC. IN SEPTEMBER 2016.
2. ONLY SURVEY LOCATIONS WHERE MUSSELS WERE FOUND ARE SHOWN ON THE DRAWINGS.
3. MUSSEL ABUNDANCE VALUES INDICATE THE NUMBER OF MUSSELS FOUND IN A 40 BY 40 SURVEY CELL. LOCATIONS MARKED ON THE DRAWINGS INDICATE THE CENTROID OF EACH SURVEY CELL.

**PROPOSED DESIGN PLAN AND PLANTING PLAN 4**

**MUSSEL ABUNDANCE LEGEND**



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CONTRACT: **D005528**  
TITLE: **BUCKHORN ISLAND SHORELINE HABITAT ENHANCEMENT DESIGN**  
LOCATION: **BUCKHORN ISLAND STATE PARK Grand Island, New York**

DESIGNED BY: **REBECCA KAMPERT, P.E.**  
CHECKED BY: **DAVID P. ADLERS, P.E.**

ISSUED FOR PERMITTING  
MAY 2020

NO.	DATE	DESCRIPTION
1	5-29-2020	ISSUED FOR PERMITTING
2	5-19-2020	ISSUED BENT FOR PERMITTING
3	11-16-19	ISSUED FOR PERMITTING
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PROJECT NUMBER: **1709413.0011**  
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CHECKED BY: **DAVID P. ADLERS, P.E.**

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# Parks, Recreation and Historic Preservation

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engineering and  
geology, p.c.



### WARNING:

THE SEAL OF THE REGISTERED PROFESSIONAL ENGINEER IS A LEGAL REQUIREMENT FOR AN ARCHITECT, PROFESSIONAL LANDSCAPE ARCHITECT, PROFESSIONAL ENGINEER, PROFESSIONAL SURVEYOR, PROFESSIONAL LANDSCAPE ARCHITECT, IS A VIOLATION OF THE PROFESSIONAL ENGINEERING LAW AND IS A CLASS 'A' MISDEMEANOR.

CONTRACT: **D005528**

TITLE: **BUCKHORN ISLAND SHORELINE HABITAT ENHANCEMENT DESIGN**

LOCATION: **BUCKHORN ISLAND STATE PARK  
Grand Island, New York**

DEPARTMENT: **OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION**

ISSUED FOR PERMITTING  
MAY 2020

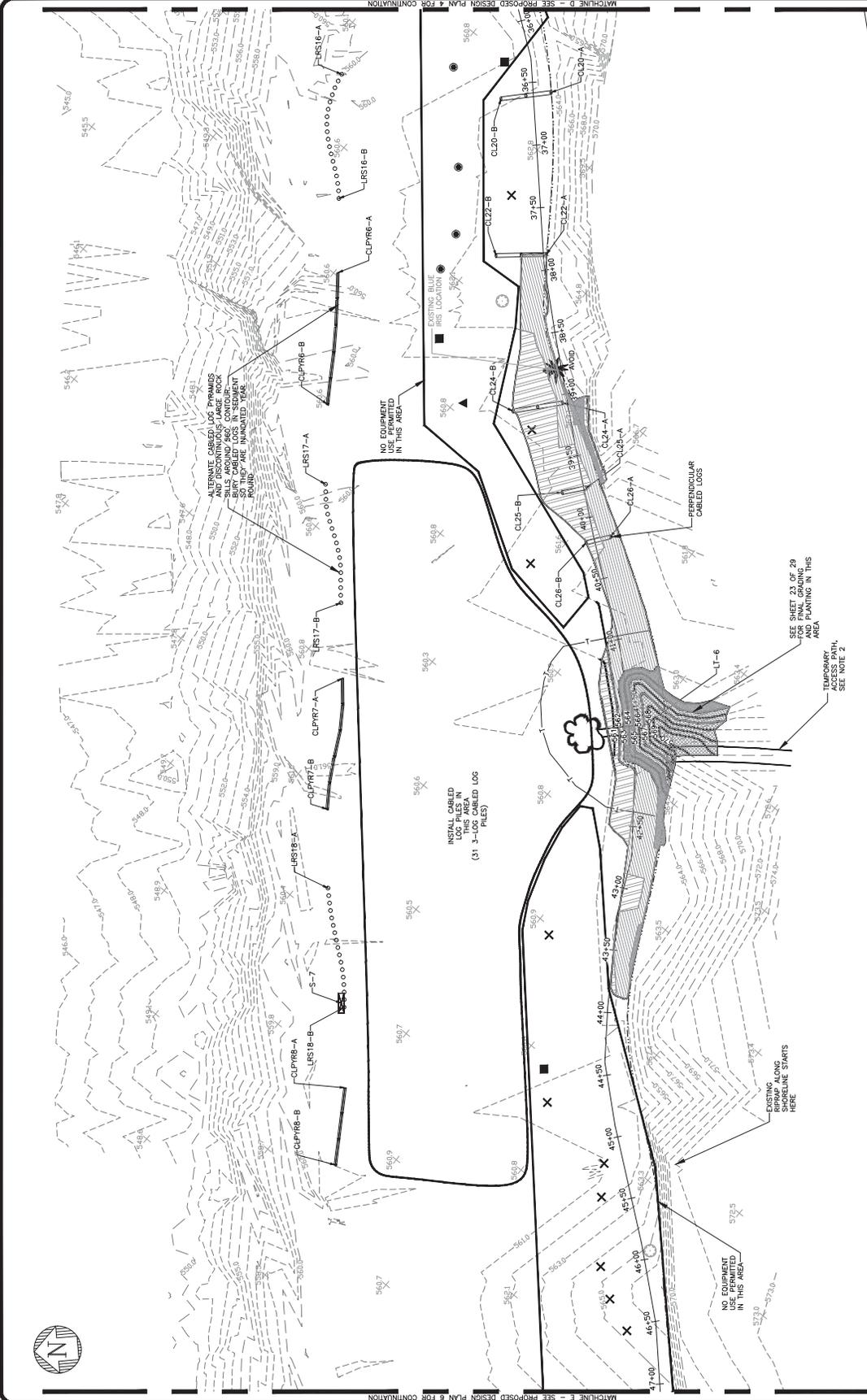
F	5-20-2020	ISSUED FOR PERMITTING
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D	11-18-19	ISSUED FOR PERMITTING
MARK	DATE	DESCRIPTION
PROJECT NUMBER:	1709413.0011	
DESIGNED BY:	REBECCA HAMPTON	
DRAWN BY:	KEVIN WAGNER	
CHECKED BY:	GREGORY F. SUTTON, P.E.	
APPROVED:	DAVID P. ADLERS, P.E.	

SHEET TITLE:

**PROPOSED DESIGN AND PLANTING PLAN 5**

DRAWING NUMBER: **C-14**

SHEET **17** OF **29**



## MUSSEL ABUNDANCE LEGEND

- X 1 4-6
- 2 7-11

## PROPOSED DESIGN PLAN AND PLANTING PLAN 5

SCALE: 1" = 40'-0"

SCALE IN FEET 0 40 80 120

TI IS A VIOLATION OF NEW YORK STATE LAWS AND REGULATIONS UNLESS INDICATED WITH SECTION 2009 OF LAW 10

## ISSUED FOR PERMITTING

## MUSSEL ABUNDANCE NOTES

- MUSSEL ABUNDANCE DATA WAS COLLECTED BY RIVERDEE ENVIRONMENTAL, INC. ON FOUR FIELD SURVEY CELLS (CL20-A, CL20-B, CL22-A, CL22-B) AT BUCKHORN ISLAND STATE PARK MUSSEL SURVEY, NIAGARA RIVER, NEW YORK, IN SEPTEMBER 2018.
- ONLY SURVEY LOCATIONS WHERE MUSSELS WERE FOUND ARE SHOWN ON THE DRAWINGS.
- MUSSEL ABUNDANCE VALUES INDICATE THE NUMBER OF MUSSELS FOUND IN A 40 BY 40 SURVEY CELL. LOCATIONS MARKED ON THE DRAWINGS INDICATE THE CENTROID OF EACH SURVEY CELL.

## NOTES

- FOR DETAILS OF SON, CABLED LOSS, CABLED LOG PYRAMIDS, LARGE LOGS, AND COIR MATS, SEE SHEETS 26 OF 29, AND 27 OF 29.
- ACCESS ROADS SHALL BE CONSTRUCTED OF 12" WIDE MARSH MATS BETWEEN SHEETS 26 AND 27. ACCESS FROM THIS LOCATION IS PERMITTED FOR PERMITTING PURPOSES ONLY. ACCESS SHALL BE LIMITED TO THE WATER-SIDE AND NOT FROM THE SHORELINE. THE CONTRACTOR MAY ACCESS FROM DRAIN ON SHEET 28 OF 29.

## PROPOSED DESIGN PLAN AND PLANTING PLAN 5

- NO EQUIPMENT TO BE STORED IN THIS AREA.
- EXISTING RIPRAP ALONG SHORELINE STARTS HERE.
- TEMPORARY AREA.
- SEE SHEET 23 OF 29 FOR FINAL GRADING AND PLANTING IN THIS AREA.
- SEE NOTE 2.

SCALE: 1" = 40'-0"



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engineering and  
geology, p.c.**



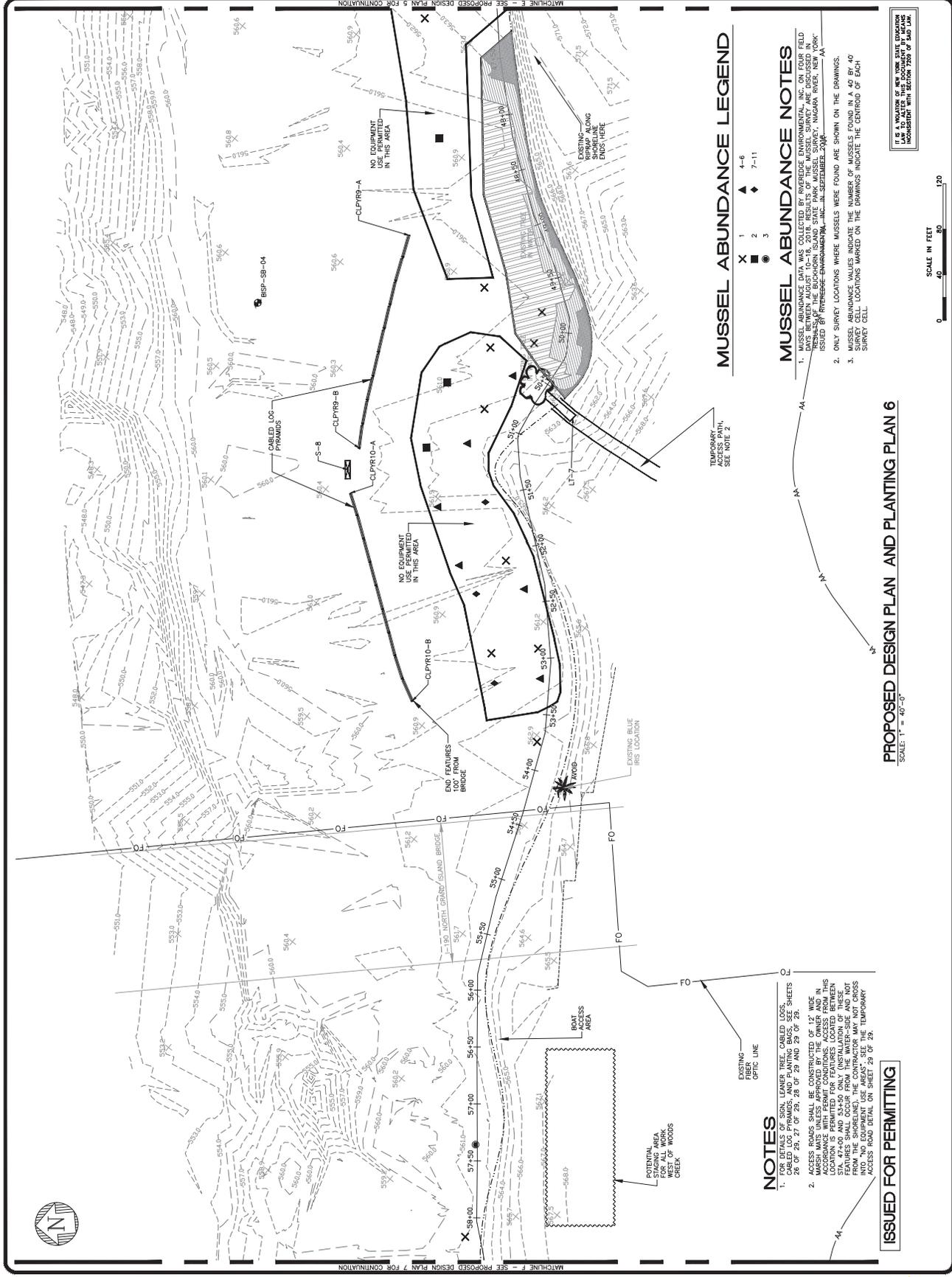
**WARNING:**  
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**CONTRACT:**  
**D005528**  
BUCKHORN ISLAND SHORELINE  
HABITAT ENHANCEMENT DESIGN  
LOCATION: BUCKHORN ISLAND STATE PARK  
Grand Island, New York  
OWNER: OFFICE OF PARKS, RECREATION  
AND HISTORIC PRESERVATION

**ISSUED FOR  
PERMITTING  
MAY 2020**

NO.	DATE	DESCRIPTION
1	5-29-2020	ISSUED FOR PERMITTING
2	5-19-2020	ISSUED BASK FOR PERMITTING
3	1-15-19	ISSUED FOR PERMITTING
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**PROPOSED  
DESIGN AND  
PLANTING PLAN # 6**  
DRAWING NUMBER: C-15  
SHEET 18 OF 29



**MUSSEL ABUNDANCE LEGEND**

- X 1 4-6
- 2 7-11
- 3

**MUSSEL ABUNDANCE NOTES**

1. MUSSEL ABUNDANCE DATA WAS COLLECTED BY RIVERIDE ENVIRONMENTAL, INC. ON FOUR FIELD SURVEYS IN 2019. THE SURVEYS WERE CONDUCTED AT THE BUCKHORN ISLAND STATE PARK, MUSSEL SURVEY, NIAGARA RIVER, NEW YORK. ISSUED BY RIVERIDE-ENVIRONMENTAL, INC. IN SEPTEMBER 2019.
2. ONLY SURVEY LOCATIONS WHERE MUSSELS WERE FOUND ARE SHOWN ON THE DRAWINGS.
3. MUSSEL ABUNDANCE VALUES INDICATE THE NUMBER OF MUSSELS FOUND IN A 40 BY 40 SURVEY CELL. LOCATIONS MARKED ON THE DRAWINGS INDICATE THE CENTROID OF EACH SURVEY CELL.

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**PROPOSED DESIGN PLAN AND PLANTING PLAN # 6**  
SCALE: 1" = 40'-0"



**NOTES**

1. FOR DETAILS OF SIGNAL, LEANER TREE, CABLED LOGS, CABLED LOG FRAMINGS, AND PLANTING BASIS, SEE SHEETS 26 OF 29, 27 OF 29, 28 OF 29 AND 29 OF 29.
2. ACCESS ROADS SHALL BE CONSTRUCTED ON THE WEST SIDE OF THE BRAT ACCESS AREA. ACCESS FROM THIS AREA TO THE BRAT ACCESS AREA SHALL BE THROUGH STA. 47+00 AND 53+50 ONLY (INSTALLATION OF THESE FEATURES SHALL OCCUR FROM THE WATER-SIDE AND NOT THE LAND-SIDE). 'NO EQUIPMENT USE AREAS' SHALL BE INSTALLED INTO 'NO EQUIPMENT USE AREAS'. SEE THE TEMPORARY ACCESS ROAD DETAIL ON SHEET 29 OF 29.

**ISSUED FOR PERMITTING**



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**CONTRACT:**  
D005528  
BUCKHORN ISLAND SHORELINE  
HABITAT ENHANCEMENT DESIGN  
LOCATION: BUCKHORN ISLAND STATE PARK  
Grand Island, New York

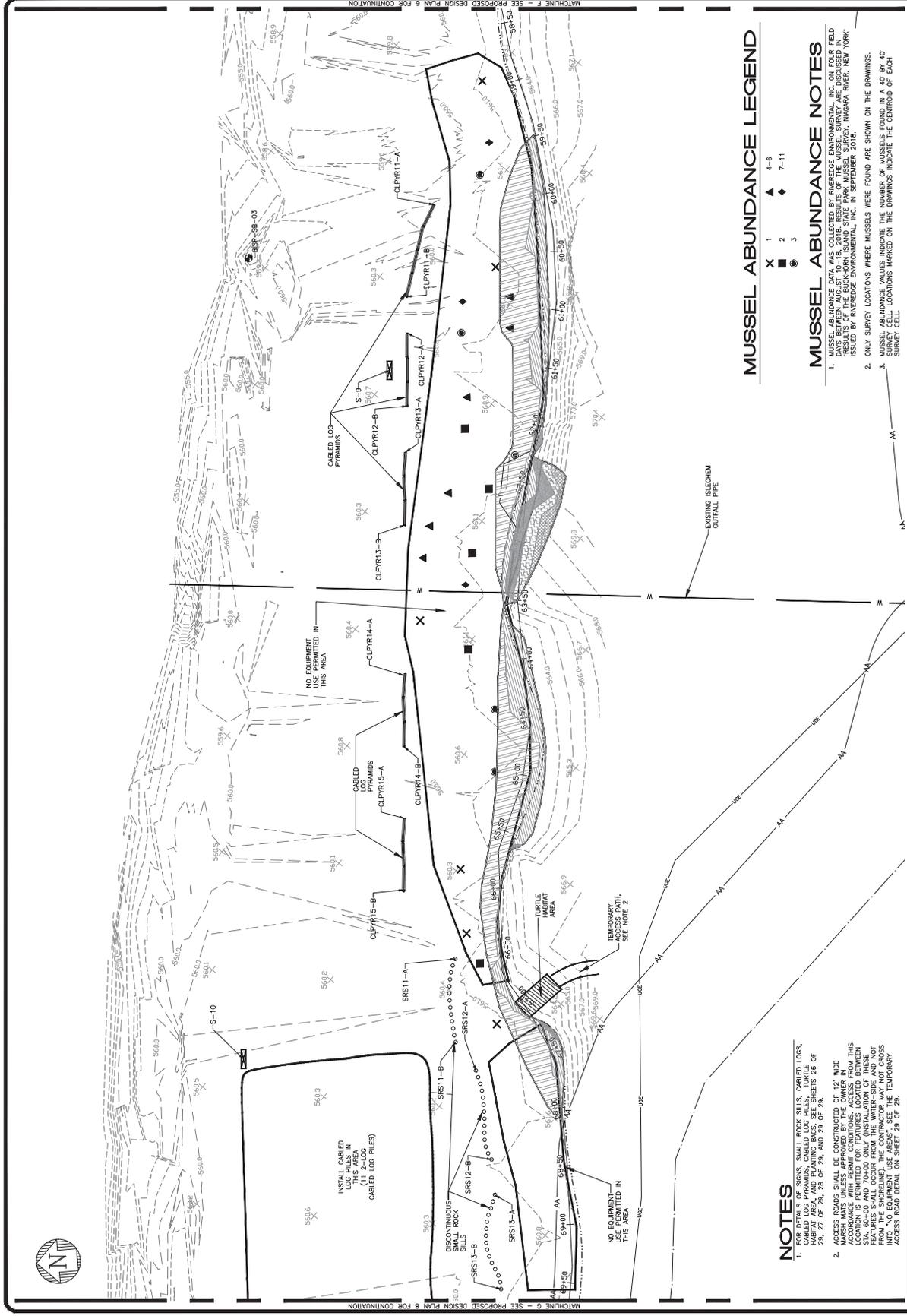
**ENGINEER:**  
OFFICE OF PARKS, RECREATION  
AND HISTORIC PRESERVATION

**ISSUED FOR PERMITTING**  
MAY 2020

MARK	DATE	DESCRIPTION
F	5-29-2020	ISSUED FOR PERMITTING
E	5-19-2020	ISSUED SHIRT FOR PERMITTING
D	1-15-19	ISSUED FOR PERMITTING
MARK	DATE	DESCRIPTION
PROJECT NUMBER:	1709413.0011	
DESIGNED BY:	REBECCA AMPTON	
DRAWN BY:	KEVIN WAGNER	
CHECKED BY:	GREGORY A. SUTTON, P.E.	
APPROVED:	DAVID P. ADERS, P.E.	

**PROPOSED DESIGN AND PLANTING PLAN 7**

DRAWING NUMBER: C-16  
SHEET 19 OF 29





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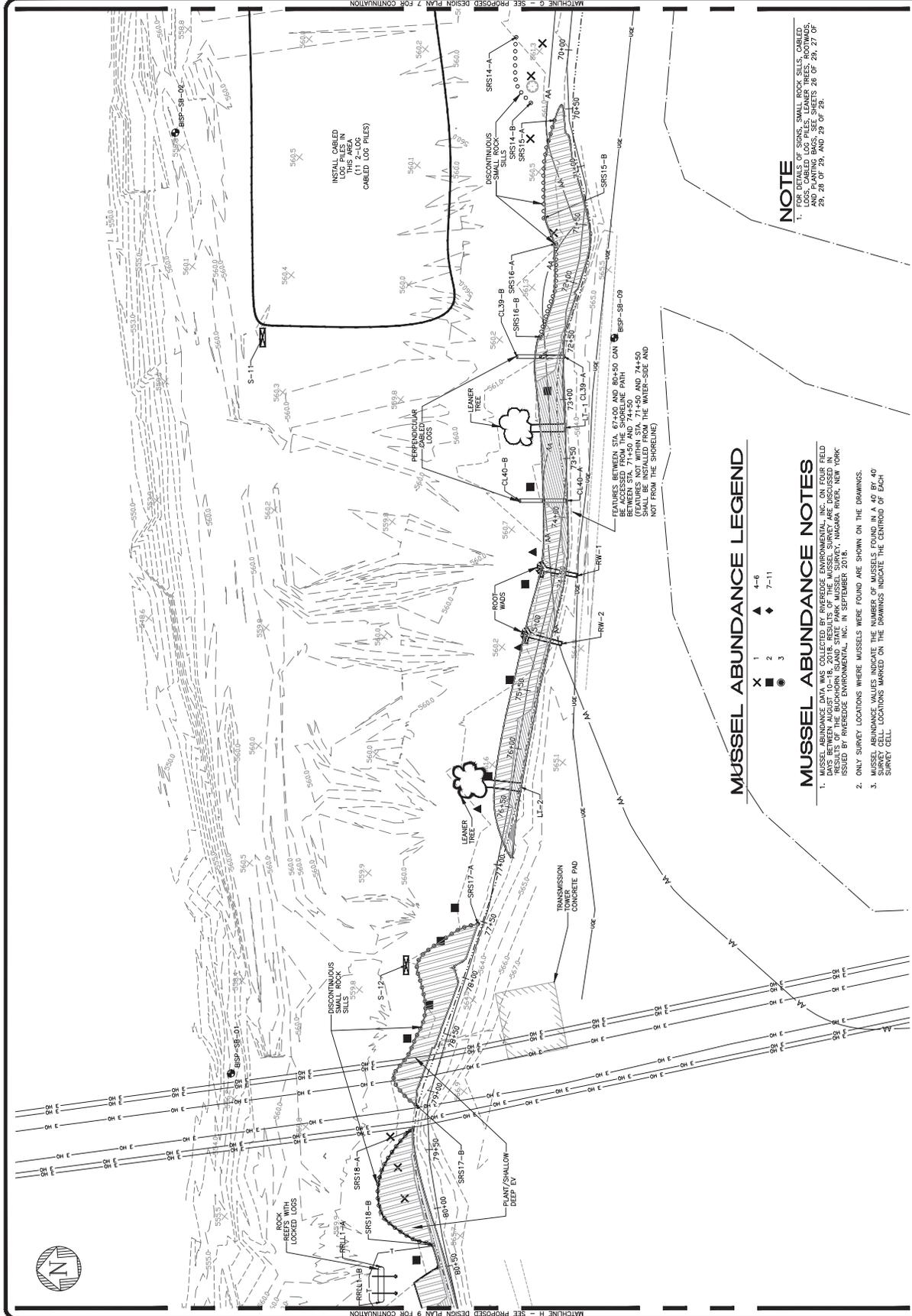
**CONTRACT:**  
D005528  
**TITLE:**  
BUCKHORN ISLAND SHORELINE  
HABITAT ENHANCEMENT DESIGN  
**LOCATION:**  
BUCKHORN ISLAND STATE PARK  
Grand Island, New York

**ISSUED FOR PERMITTING**  
MAY 2020

NO.	DATE	DESCRIPTION
1	5-19-2020	ISSUED FOR PERMITTING
2	5-19-2020	ISSUED FOR PERMITTING
3	11-15-19	ISSUED FOR PERMITTING
4	11-15-19	ISSUED FOR PERMITTING
5	11-15-19	ISSUED FOR PERMITTING

**PROJECT NUMBER:** 1709413.0011  
**DESIGNED BY:** REBECCA AMPERT  
**DRAWN BY:** KEVIN WAGNER  
**CHECKED BY:** GREGORY A. SUTTON, P.E.  
**APPROVED:** DAVID P. ALBERS, P.E.

**PROPOSED DESIGN AND PLANTING PLAN 8**  
DRAWING NUMBER: C-17  
SHEET 20 OF 29



**MUSSEL ABUNDANCE LEGEND**

- X 1
- 2
- 3
- 4-6
- 7-11

**MUSSEL ABUNDANCE NOTES**

- MUSSEL ABUNDANCE DATA WAS COLLECTED BY RIVEREDGE ENVIRONMENTAL, INC. ON FOUR FIELD DATES BETWEEN AUGUST 10-18, 2018. RESULTS OF THE MUSSEL SURVEY ARE DISCUSSED IN THE REPORT TITLED "MUSSEL ABUNDANCE SURVEY, GRAND ISLAND STATE PARK, NEW YORK" ISSUED BY RIVEREDGE ENVIRONMENTAL, INC. IN SEPTEMBER, 2018.
- ONLY SURVEY LOCATIONS WHERE MUSSELS WERE FOUND ARE SHOWN ON THE DRAWINGS.
- MUSSEL ABUNDANCE VALUES INDICATE THE NUMBER OF MUSSELS FOUND IN A 40 BY 40 SURVEY CELL. LOCATIONS MARKED ON THE DRAWINGS INDICATE THE CENTROID OF EACH SURVEY CELL.

**NOTE**  
FOR DETAILS OF SILLS, SMALL ROCK SILLS, CABLED LOGS, CABLED LOG PILES, LENER TREES, ROOTWADS, PERPENDICULAR LOGS, SEE SHEETS 26 OF 29, 27 OF 29, 28 OF 29, AND 29 OF 29.

**PROPOSED DESIGN PLAN AND PLANTING PLAN 8**  
SCALE: 1" = 40'-0"

SCALE IN FEET  
0 40 80 120

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**ISSUED FOR PERMITTING**



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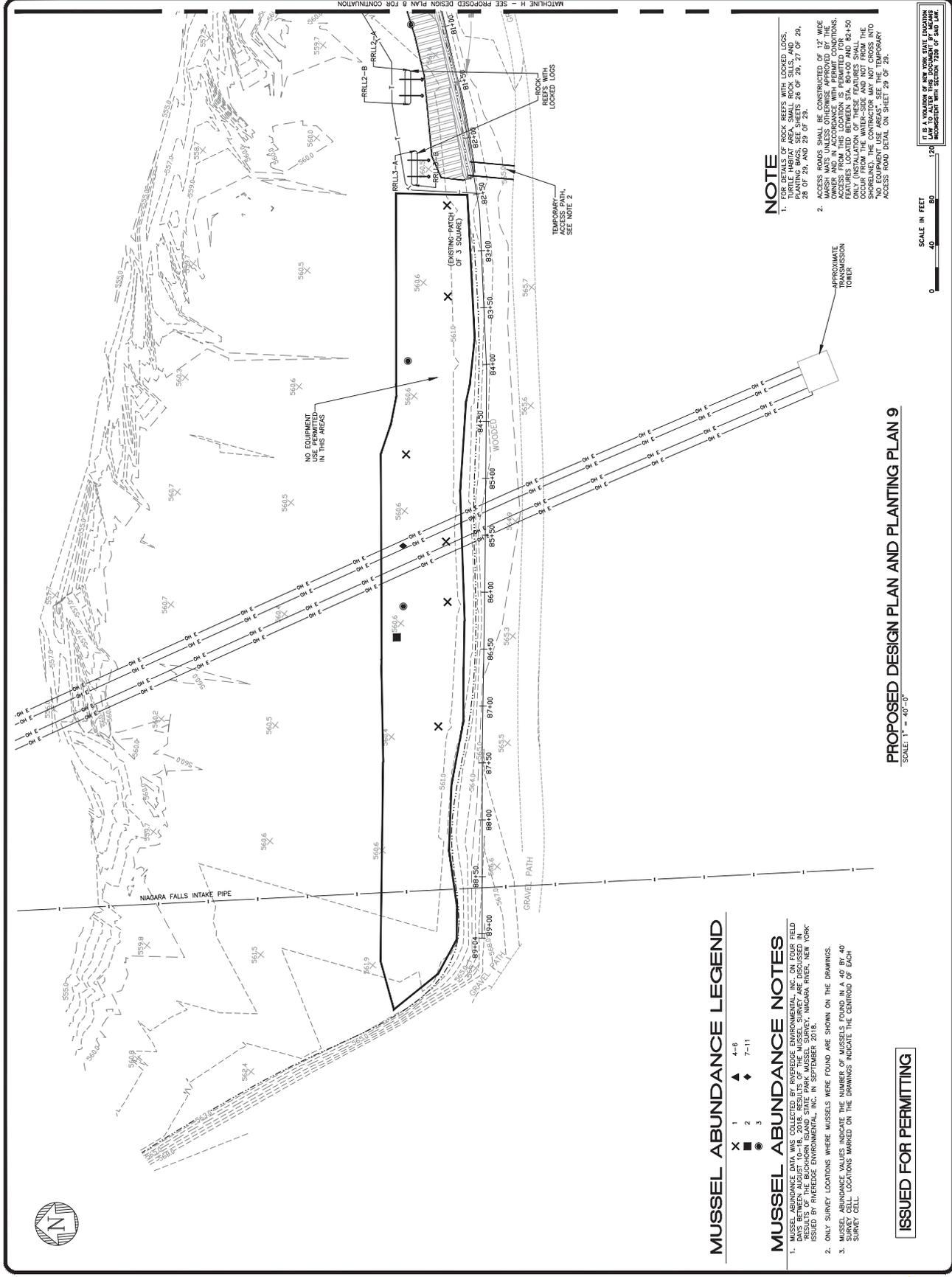
**CONTRACT:** D005528  
**TITLE:** BUCKHORN ISLAND SHORELINE HABITAT ENHANCEMENT DESIGN  
**LOCATION:** BUCKHORN ISLAND STATE PARK Grand Island, New York  
**AGENCY:** OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION

**ISSUED FOR PERMITTING**  
**MAY 2020**

DATE	ISSUED FOR PERMITTING
5-29-2020	ISSUED FOR PERMITTING
5-19-2020	ISSUED FOR PERMITTING
11-15-19	ISSUED FOR PERMITTING
DATE	DESCRIPTION
1709413.0011	
DESIGNED BY:	REBECCA KAMPERT
DRAWN BY:	KEVIN WAGNER
CHECKED BY:	GREGORY A. SUTTON, P.E.
APPROVED:	DAVID P. ALBERS, P.E.

**PROPOSED DESIGN AND PLANTING PLAN 9**

DRAWING NUMBER: C-18  
SHEET 21 OF 29



**NOTE**

- FOR DETAILS OF ROCK REEFS WITH LOCKED LOGS, TURTLE HABITAT AREA, SMALL ROCK ISLANDS, AND ACCESS ROADS, SEE DRAWING SET 26 OF 29, 27 OF 29, 28 OF 29, AND 29 OF 29.
- ACCESS ROADS SHALL BE CONSTRUCTED OF 12" WIDE MARSH MATS UNLESS OTHERWISE APPROVED BY THE OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION. ACCESS FROM THIS LOCATION IS PERMITTED FOR FEATURES LOCATED BETWEEN STA. 80+00 AND 82+50 OCCUR FROM THE WATER-SIDE AND NOT FROM THE SHORELINE. THE CONTRACTOR MAY NOT CROSS INTO THE SHORELINE FROM THE WATER-SIDE. SEE DRAWING ACCESS ROAD DETAIL ON SHEET 29 OF 29.

IT IS A VIOLATION OF NEW YORK STATE LAW TO ALTER THIS DOCUMENT BY ANY MEANS WITHOUT NOTICE FROM THE DESIGNER.

SCALE IN FEET  
0 40 80 120

**PROPOSED DESIGN PLAN AND PLANTING PLAN 9**  
SCALE: 1" = 40'-0"

**MUSSEL ABUNDANCE LEGEND**

- X 1
- 2
- 3
- 4-6
- 7-11

**MUSSEL ABUNDANCE NOTES**

- MUSSEL ABUNDANCE DATA WAS COLLECTED BY RIVERDESE ENVIRONMENTAL, INC. ON FOUR FIELD DAYS BETWEEN AUGUST 18, 2018 AND SEPTEMBER 11, 2018. MUSSEL SURVEY ARE DISCUSSED IN THE REPORT, "MUSSEL ABUNDANCE SURVEY AT BUCKHORN ISLAND STATE PARK, GRAND ISLAND, NEW YORK" ISSUED BY RIVERDESE ENVIRONMENTAL, INC. IN SEPTEMBER 2018.
- ONLY SURVEY LOCATIONS WHERE MUSSELS WERE FOUND ARE SHOWN ON THE DRAWINGS.
- MUSSEL ABUNDANCE VALUES INDICATE THE NUMBER OF MUSSELS FOUND IN A 40 BY 40 SURVEY CELL. LOCATIONS MARKED ON THE DRAWINGS INDICATE THE CENTROID OF EACH SURVEY CELL.

**ISSUED FOR PERMITTING**



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CONTRACT: **D005528**

TITLE: **BUCKHORN ISLAND SHORELINE HABITAT ENHANCEMENT DESIGN**

LOCATION: **BUCKHORN ISLAND STATE PARK  
Grand Island, New York**

DATE: **OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION**

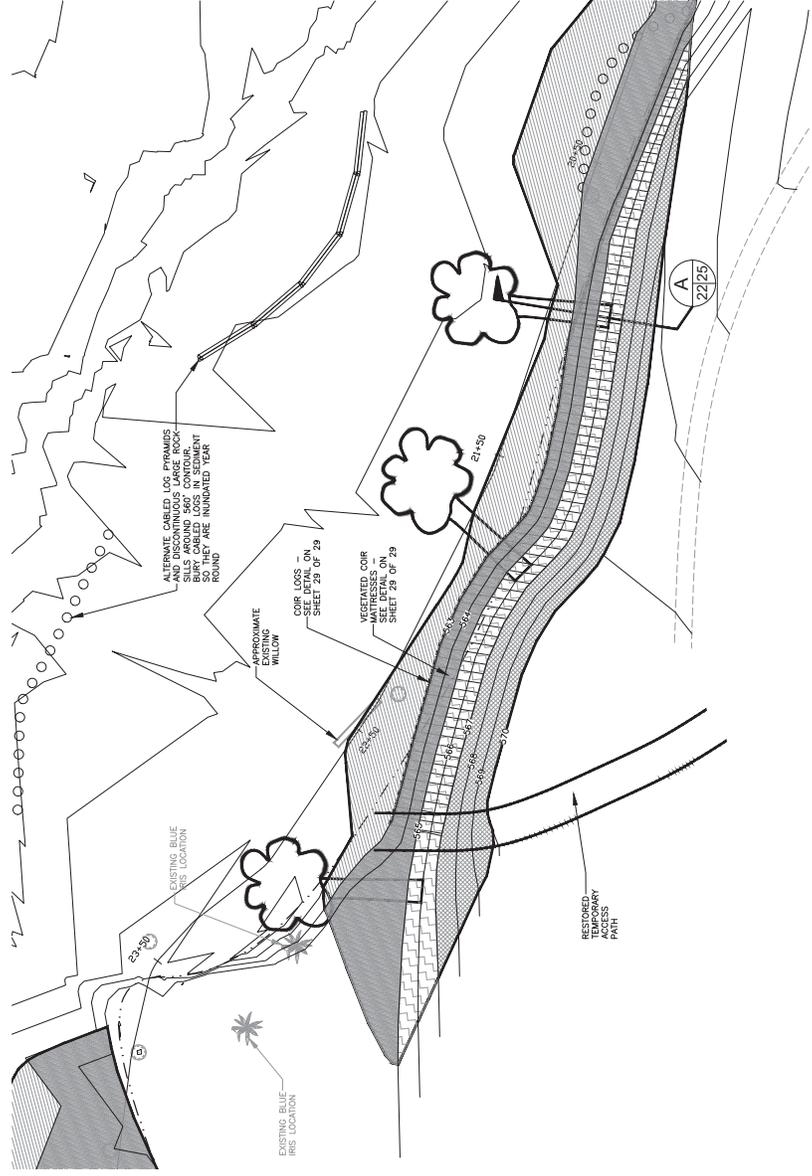
**ISSUED FOR PERMITTING  
MAY 2020**

REV	DATE	DESCRIPTION
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2	5-19-2020	ISSUED FOR PERMITTING
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99	5-19-2020	ISSUED FOR PERMITTING
100	5-19-2020	ISSUED FOR PERMITTING

DESIGNED BY: **REBECCA KAMPERT**  
DRAWN BY: **KEVIN WALKER**  
CHECKED BY: **GREGORY A. SUTTON, P.E.**  
APPROVED: **DAVID P. ALBERTS, P.E.**

SHEET TITLE: **FINAL GRADING AND PLANTING PLAN 1**

DRAWING NUMBER: **P-1**  
SHEET **22** OF **29**



## FINAL GRADING AND PLANTING PLAN 1

SCALE: 1" = 20'-0"

### NOTE

1. FOR DETAILS OF COR LOGS, COR MATRESSES, AND PLANTING BAGS, SEE SHEET 29 OF 29.

**ISSUED FOR PERMITTING**

SCALE IN FEET  
0 20 40 60

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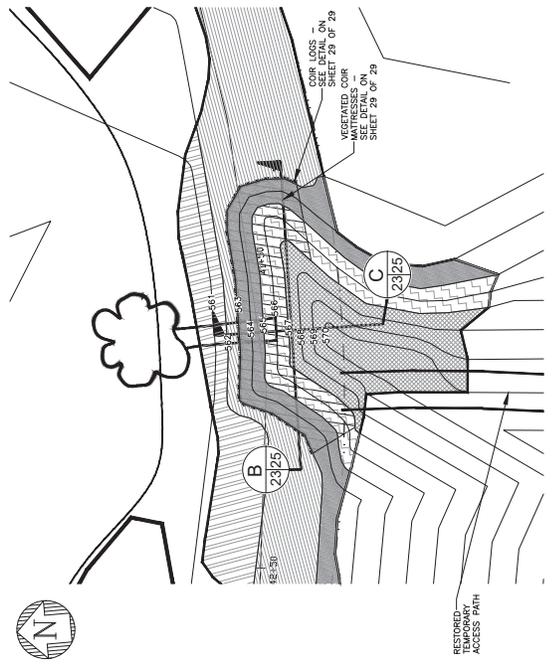
CONTRACT: **D005528**  
TITLE: BUCKHORN ISLAND SHORELINE HABITAT ENHANCEMENT DESIGN  
LOCATION: BUCKHORN ISLAND STATE PARK  
Grand Island, New York  
AGENCY: OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION

ISSUED FOR PERMITTING  
MAY 2020

REV	DATE	DESCRIPTION
D	5-20-2020	ISSUED FOR PERMITTING
C	5-19-2020	ISSUED BENT FOR PERMITTING
B	1-15-19	ISSUED FOR PERMITTING
A		DESCRIPTION

PROJECT NUMBER: 1709413.0011  
DESIGNED BY: REBECCA KAMPERT  
DRAWN BY: KEVIN WALKERSON  
CHECKED BY: GREGORY A. SUTTON, P.E.  
APPROVED: DAVID P. ALBERTS, P.E.

SHEET TITLE:  
**FINAL GRADING AND PLANTING AREA 2**  
DRAWING NUMBER:  
P-2  
SHEET 23 OF 29



**FINAL GRADING AND PLANTING AREA 2**  
SCALE: 1" = 20'-0"

**NOTE**  
1. FOR DETAILS OF COIR LOSS, COIR MATRESSES, AND PLANTING BAGS, SEE SHEET 29 OF 29.

**ISSUED FOR PERMITTING**



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**CONTRACT:**  
**D005528**

**TITLE:**  
BUCKHORN ISLAND SHORELINE  
HABITAT ENHANCEMENT DESIGN

**LOCATION:**  
BUCKHORN ISLAND STATE PARK  
Grand Island, New York

**AGENCY:**  
OFFICE OF PARKS, RECREATION  
AND HISTORIC PRESERVATION

**ISSUED FOR PERMITTING**  
**MAY 2020**

F	5-19-2020	ISSUED FOR PERMITTING
E	5-19-2020	ISSUED BAKT FOR PERMITTING
D	1-15-19	ISSUED FOR PERMITTING
MARK	DATE	DESCRIPTION
PROJECT NUMBER:	1709413.0011	
DESIGNED BY:	REBECCA AMPHRETT	
DRAWN BY:	KEVIN WALKERSON	
CHECKED BY:	GREGORY A. SUTTON, P.E.	
APPROVED:	DAVID P. ALBERS, P.E.	

**SHEET TITLE:**  
**FEATURE INSTALLATION  
COORDINATES**

DRAWING NUMBER:  
**C-19**

SHEET  
**24** OF  
**29**

## FEATURE COORDINATE POINTS

Point Name	Northing	Easting
RRLL1-A	1116964.44	1038945.41
RRLL1-B	1116962.57	1038915.58
RRLL2-A	1116938.54	1038865.58
RRLL2-B	1116941.67	1038825.74
RRLL3-A	1116940.22	1038794.36
RRLL3-B	1116943.36	1038754.52

Point Name	Northing	Easting
RW-1	1116737.89	1037910.41
RW-2	1116757.11	1037454.45

Point Name	Northing	Easting
L1-1	1116734.76	1037635.19
L1-2	1116803.93	1037337.05
L1-3	1116376.09	1042521.03
L1-4	1116332.84	1042602.12
L1-5	1116296.23	1042690.74
L1-6	1116495.54	1042070.99
L1-7	1116479.35	1039816.86

Point Name	Northing	Easting	LENGTH (FEET)	DEPTH (FEET)
EP-1A	1116781.16	1043683.43	6	3
EP-1B	1116781.16	1043683.43	3.5	3.5
EP-2	1115819.51	1043564.04	30	2
EP-3	1115876.35	1043436.14	33.5	3
EP-4	1115908.17	1043385.47	53	3

\* APPROXIMATE DIMENSION

Point Name	Northing	Easting
S-1	1115492.14	1044533.59
S-2	1116051.40	1043227.83
S-3	1116074.36	1042915.92
S-4	1116050.33	1042666.93
S-5	1116089.03	1042010.99
S-6	1116607.79	1041605.09
S-7	1116282.02	1040515.96
S-8	1116860.57	1039792.80
S-9	1116796.128	1039793.13
S-10	1116698.23	1039222.35
S-11	1116981.88	1037739.04
S-12	1116611.64	1037197.33

Point Name	Northing	Easting
MW2-A	1115687.8	1044019.68
MW2-B	1115687.4	1044027.17

Point Name	Northing	Easting
LP1R1-A	1116700.06	1040773.19
LP1R1-B	1116700.06	1040773.19
LP1R2-A	1116722.08	1040670.85
LP1R2-B	1116722.08	1040670.85
LP1R3-A	1116746.12	1040384.31
LP1R3-B	1116746.12	1040384.31
LP1R4-A	1116656.67	1039991.71
LP1R4-B	1116656.67	1039991.71
LP1R5-A	1116803.33	1039771.86
LP1R5-B	1116803.33	1039771.86
LP1R6-A	1116645.40	1039564.63
LP1R6-B	1116645.40	1039564.63
LP1R7-A	1116705.72	1039292.56
LP1R7-B	1116705.72	1039292.56
LP1R8-A	1116740.10	1038945.09
LP1R8-B	1116740.10	1038945.09
LP1R9-A	1116749.49	1038761.21
LP1R9-B	1116749.49	1038761.21
LP1R10-A	1116754.82	1038722.52
LP1R10-B	1116754.82	1038722.52
LP1R11-A	1116762.22	1038660.55
LP1R11-B	1116762.22	1038660.55
LP1R12-A	1116784.43	1038472.30
LP1R12-B	1116784.43	1038472.30
LP1R13-A	1116795.34	1038351.52
LP1R13-B	1116795.34	1038351.52

Point Name	Northing	Easting
CL1-A	1115471.71	1044311.94
CL1-B	1115508.3	1043262.53
CL2-A	1115710.0	1043835.16
CL2-B	1115719.9	1043782.44
CL3-A	1115737.3	1043705.58
CL3-B	1115737.3	1043705.58
CL4-A	1115681.2	1043462.38
CL4-B	1115681.2	1043462.38
CL5-A	1116183.4	1042920.48
CL5-B	1116183.4	1042920.48
CL6-A	1116470.9	1042130.40
CL6-B	1116470.9	1042130.40
CL7-A	1116466.0	1042127.39
CL7-B	1116466.0	1042127.39
CL8-A	1116462.0	1042086.33
CL8-B	1116462.0	1042086.33
CL9-A	1116750.4	1038191.93
CL9-B	1116750.4	1038191.93
CL10-A	1116745.4	1038094.55
CL10-B	1116745.4	1038094.55
CL11-A	1116491.2	1041752.47
CL11-B	1116491.2	1041752.47
CL12-A	1116511.2	1041702.61
CL12-B	1116511.2	1041702.61
CL13-A	1116517.8	1041344.47
CL13-B	1116517.8	1041344.47
CL14-A	1116526.4	1041219.05
CL14-B	1116526.4	1041219.05
CL15-A	1116503.4	1041092.08
CL15-B	1116503.4	1041092.08
CL16-A	1116530.0	1040973.17
CL16-B	1116530.0	1040973.17
CL17-A	1116542.9	1040707.63
CL17-B	1116542.9	1040707.63
CL18-A	1116460.8	1040040.01
CL18-B	1116460.8	1040040.01
CL19-A	1116476.1	1040022.05
CL19-B	1116476.1	1040022.05
CL20-A	1116456.9	1040060.32
CL20-B	1116456.9	1040060.32
CL21-A	1116729.5	1037684.27
CL21-B	1116729.5	1037684.27
CL22-A	1116736.3	1037700.38
CL22-B	1116736.3	1037700.38
CL23-A	1116736.3	1037574.67
CL23-B	1116736.3	1037574.67
CL24-A	1116726.1	1040512.50
CL24-B	1116726.1	1040512.50

Point Name	Northing	Easting
SR1-A	1115803.3	1043620.53
SR1-B	1115840.4	1043526.64
SR2-A	1116087.0	1043020.47
SR2-B	1116335.4	1042956.07
SR3-A	1116259.2	1042796.05
SR3-B	1116300.5	1042742.25
SR4-A	1116482.1	1042251.13
SR4-B	1116479.8	1041862.13
SR5-A	1116475.7	1041866.60
SR5-B	1116462.2	1041864.66
SR6-A	1116482.9	1041640.27
SR6-B	1116485.5	1041603.32
SR7-A	1116757.9	1038268.33
SR7-B	1116784.9	1038217.76
SR8-A	1116750.4	1038191.93
SR8-B	1116744.9	1038115.08
SR9-A	1116745.4	1038094.55
SR9-B	1116748.5	1038064.36
SR10-A	1116741.6	1037969.89
SR10-B	1116735.1	1037930.04
SR11-A	1116767.7	1037896.10
SR11-B	1116734.4	1037814.88
SR12-A	1116748.1	1037775.06
SR12-B	1116852.4	1037225.77
SR13-A	1116821.0	1037078.94
SR13-B	1116827.6	1037057.66
SR14-A	1116811.8	1041922.14
SR14-B	1116860.7	1041678.91
SR15-A	1116603.3	1041546.21
SR15-B	1116625.2	1041153.67
SR16-A	1116672.2	1040928.39
SR16-B	1116694.8	1040833.13
SR17-A	1116728.9	1040608.20
SR17-B	1116726.1	1040512.50

Point Name	Northing	Easting
LP2R1-A	1116700.06	1040773.19
LP2R1-B	1116700.06	1040773.19
LP2R2-A	1116722.08	1040670.85
LP2R2-B	1116722.08	1040670.85
LP2R3-A	1116746.12	1040384.31
LP2R3-B	1116746.12	1040384.31
LP2R4-A	1116656.67	1039991.71
LP2R4-B	1116656.67	1039991.71
LP2R5-A	1116803.33	1039771.86
LP2R5-B	1116803.33	1039771.86
LP2R6-A	1116645.40	1039564.63
LP2R6-B	1116645.40	1039564.63
LP2R7-A	1116705.72	1039292.56
LP2R7-B	1116705.72	1039292.56
LP2R8-A	1116740.10	1038945.09
LP2R8-B	1116740.10	1038945.09
LP2R9-A	1116749.49	1038761.21
LP2R9-B	1116749.49	1038761.21
LP2R10-A	1116754.82	1038722.52
LP2R10-B	1116754.82	1038722.52
LP2R11-A	1116762.22	1038660.55
LP2R11-B	1116762.22	1038660.55
LP2R12-A	1116784.43	1038472.30
LP2R12-B	1116784.43	1038472.30
LP2R13-A	1116795.34	1038351.52
LP2R13-B	1116795.34	1038351.52

Point Name	Northing	Easting
US1-A	1115492.14	1044568.29
US1-B	1115512.6	1044461.35
US2-A	1115523.6	104412.55
US2-B	1115584.1	104432.61
US3-A	1115571.1	104427.02
US3-B	1115641.6	104415.33
US4-A	1115702.0	104070.34
US4-B	1115720.6	104014.51
US5-A	1115788.5	104294.44
US5-B	1115778.0	104387.01
US6-A	1115813.0	104376.47
US6-B	1115874.1	104362.71
US7-A	1115897.7	104357.93
US7-B	1115942.4	104350.61
US8-A	1115943.6	104332.76
US8-B	1115986.1	104320.66
US9-A	1116020.2	104304.58
US9-B	1116047.5	104227.33
US10-A	1116267.8	104291.48
US10-B	1116315.6	104283.29
US11-A	1116503.4	104256.91
US11-B	1116544.4	104246.50
US12-A	1116544.4	104236.32
US12-B	1116586.2	104201.678
US13-A	1116611.8	1041922.14
US13-B	1116586.0	1041678.91
US14-A	1116603.3	1041546.21
US14-B	1116625.2	1041153.67
US15-A	1116672.2	1040928.39
US15-B	1116694.8	1040833.13
US16-A	1116728.9	1040608.20
US16-B	1116726.1	1040512.50

Point Name	Northing	Easting
LP3R1-A	1116700.06	1040773.19
LP3R1-B	1116700.06	1040773.19
LP3R2-A	1116722.08	1040670.85
LP3R2-B	1116722.08	1040670.85
LP3R3-A	1116746.12	1040384.31
LP3R3-B	1116746.12	1040384.31







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**CONTRACT:**  
**D005528**  
BUCKHORN ISLAND SHORELINE  
HABITAT ENHANCEMENT DESIGN  
LOCATION: BUCKHORN ISLAND STATE PARK  
Grand Island, New York

**OFFICE OF PARKS, RECREATION  
AND HISTORIC PRESERVATION**

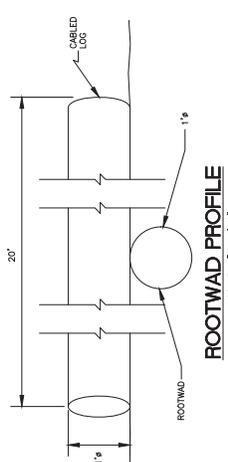
**ISSUED FOR  
PERMITTING  
MAY 2020**

F	E	D	MARK	PROJECT NUMBER
5-20-2020	5-15-2020	11-10-19	DATE	1709413.0011
ISSUED FOR PERMITTING	ISSUED SHMT FOR PERMITTING	ISSUED FOR PERMITTING	DATE	DESCRIPTION

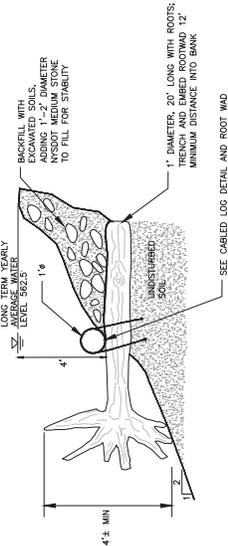
DESIGNED BY: REBECCA KAMPERT  
DRAWN BY: KEVIN KANEKUN  
CHECKED BY: GREGORY P. SUTTON, P.E.  
APPROVED: DAVID P. ALBERS, P.E.

**DETAILS 2**

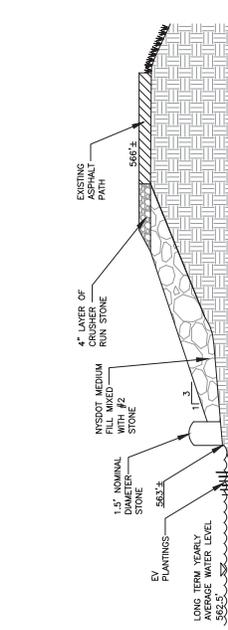
DRAWING NUMBER: **D-2**  
SHEET **27** OF **29**



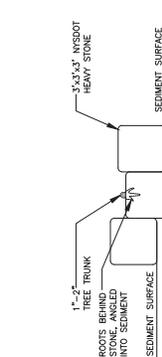
**ROOTWAD PROFILE**  
SCALE: 1" = 1'-0"



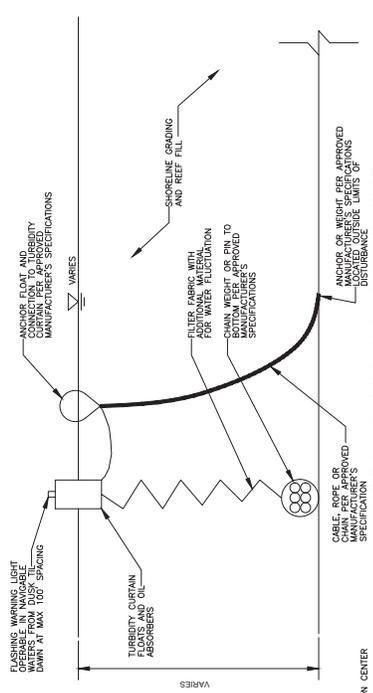
**ROOTWAD**  
NOT TO SCALE



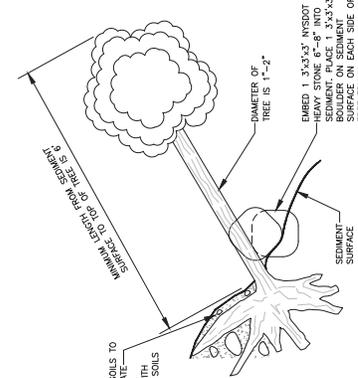
**ERODED PATH REPAIR**  
NOT TO SCALE



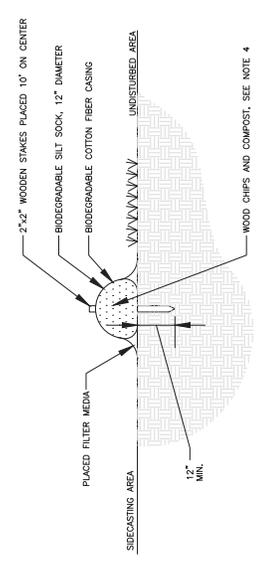
**LEANER TREE - PROFILE VIEW**  
SCALE: 1/4" = 1'-0"



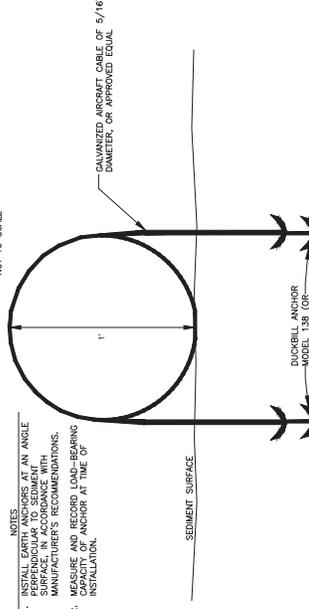
**TYPICAL TURBIDITY CURTAIN SECTION**  
NOT TO SCALE



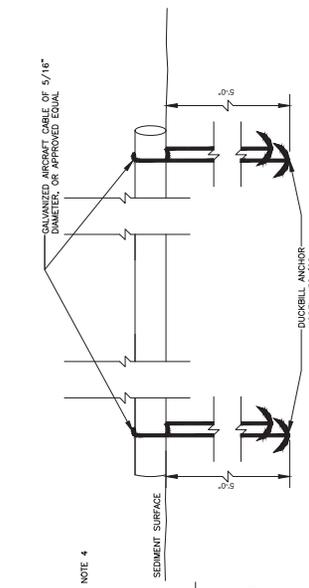
**LEANER TREE**  
NOT TO SCALE



**BIODEGRADABLE SILT SOCK**  
NOT TO SCALE



**CABLED LOG SIDE VIEW**  
NOT TO SCALE



**CABLED LOG PROFILE VIEW**  
SCALE: 1" = 1'-0"

- BIODEGRADABLE SILT SOCK NOTES**
1. TRAFFIC SHALL NOT BE PERMITTED TO CROSS BIODEGRADABLE SILT SOCKS.
  2. BIODEGRADABLE SILT SOCKS SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
  3. BIODEGRADABLE SILT SOCKS SHALL BE PLACED AS INDICATED IN THE STORMWATER POLLUTION PREVENTION PLAN.
  4. INWELL SHALL MEET THE STANDARDS LISTED IN SECTION 5.3.7 OF THE 2016 NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL, AND BE FREE OF INVASIVE SPECIES.

**ISSUED FOR PERMITTING**



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**WARNING:**  
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**CONTRACT:**  
**D005528**  
BUCKHORN ISLAND SHORELINE  
HABITAT ENHANCEMENT DESIGN

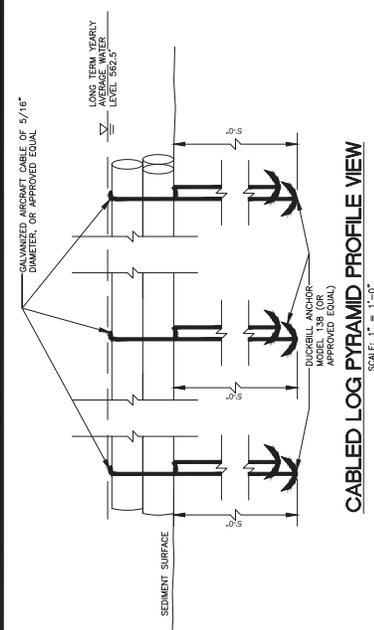
**LOCATION:**  
BUCKHORN ISLAND STATE PARK  
Grand Island, New York

**THIS  
OFFICE OF PARKS, RECREATION  
AND HISTORIC PRESERVATION**

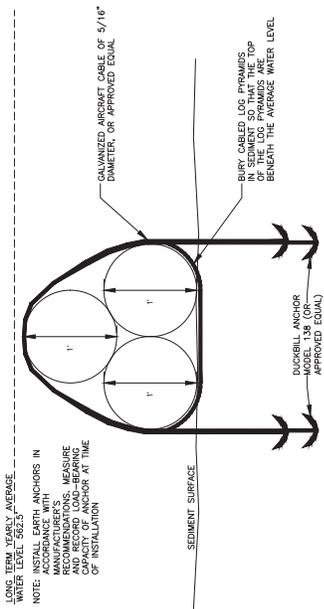
F	6-20-2020	ISSUED FOR PERMITTING
E	5-15-2020	ISSUED SHEET FOR PERMITTING
D	11-10-19	ISSUED SHEET FOR PERMITTING
DATE	1709413.0011	DESCRIPTION
PROJECT NUMBER	1709413.0011	
DESIGNED BY:	REBECCA KAMPERT R.E.	
CHECKED BY:	GREGORY P. SUTTON, P.E.	
APPROVED:	DAVID P. ALBERS, P.E.	

**SHEET TITLE:**  
**DETAILS 3**

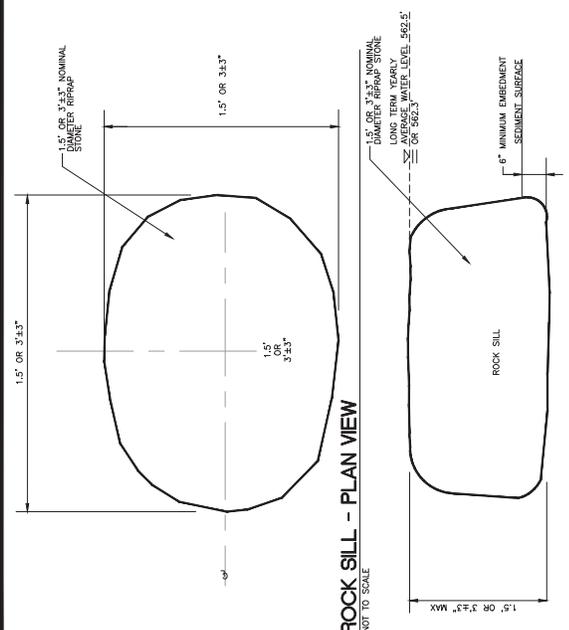
**DRAWING NUMBER:**  
**D-3**  
**SHEET 28 OF 29**



**CABLED LOG PYRAMID PROFILE VIEW**  
SCALE: 1" = 1'-0"



**CABLED LOG PYRAMID SIDE VIEW**  
NOT TO SCALE

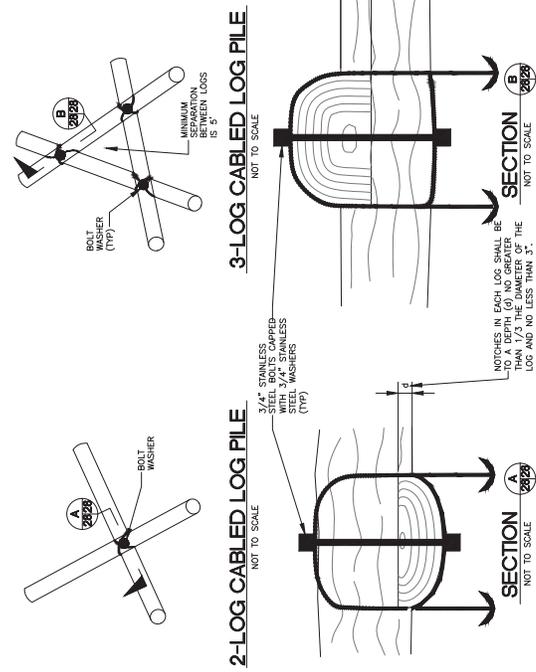


**ROCK SILL - PLAN VIEW**  
NOT TO SCALE

**ROCK SILL - SECTION**  
NOT TO SCALE

**ROCK SILL NOTES**  
THE MINIMUM DISTANCE BETWEEN ROCK SILLS SHOULD BE OF EQUIVALENT TO THE NOMINAL DIAMETER OF THE ROCK SILL. THE MAXIMUM DISTANCE BETWEEN ROCK SILLS IS 6\"/>

1. THE MINIMUM DISTANCE BETWEEN ROCK SILLS IS 6\"/>
2. THE NOMINAL DIAMETER FOR LARGE ROCK SILLS SHALL BE 3\"/>



**3-LOG CABLED LOG PILE**  
NOT TO SCALE

**2-LOG CABLED LOG PILE**  
NOT TO SCALE

1. EACH PILE MAY CONTAIN 2-3 LOGS. LOG LENGTH SHALL BE 20' +/- 6\"/>
2. LOGS SHALL BE NOTCHED 1/2\"/>
3. AT A MINIMUM, CABLES MUST BE PLACED WHERE LOGS OVERLAP.
4. NO MORE THAN 2 LOGS MAY OVERLAP AT ANY VERTEX OF THE LOG PILE.
5. LOG PILES SHALL FOLLOW EITHER BESSON OPTION SHOWN HERE UNLESS OTHERWISE APPROVED BY THE ENGINEER OR INSPECTOR.
6. BOTH ENDS OVER THE SEDIMENT SURFACE AS LOGS REMAIN IN CONTACT WITH EACH OTHER AND THE SEDIMENT SURFACE.
7. MINIMUM SPACING OF 30' BETWEEN ENDS OF LOGS IN LOG PILES IS REQUIRED.

**CABLED LOG PILE NOTES**

**ISSUED FOR PERMITTING**



**WARNING:**  
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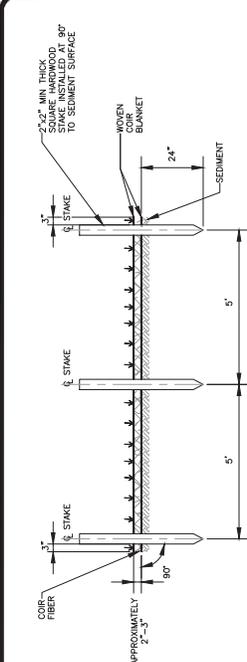
CONTRACT: **D005528**  
BUCKHORN ISLAND SHORELINE  
HABITAT ENHANCEMENT DESIGN  
LOCATION: BUCKHORN ISLAND STATE PARK  
Grand Island, New York  
THIS OFFICE OF PARKS, RECREATION  
AND HISTORIC PRESERVATION

ISSUED FOR PERMITTING  
MAY 2020

MARK	DATE	DESCRIPTION
C	5-20-2020	ISSUED FOR PERMITTING
B	5-15-2020	ISSUED SHEET FOR PERMITTING
A	11-10-19	ISSUED FOR PERMITTING

PROJECT NUMBER: 1709413.0011  
DESIGNED BY: REBECCA KAMPERSKI, P.E.  
DRAWN BY: KEVIN KANEVSKI, P.E.  
CHECKED BY: GREGORY P. SUTTON, P.E.  
APPROVED: DAVID P. ALBERS, P.E.

SHEET TITLE: **DETAILS 4**  
DRAWING NUMBER: **D-4**  
SHEET **29** OF **29**



**VEGETATED COIR MATRESSES - PROFILE VIEW**  
SCALE: 1/2" = 1'-0"

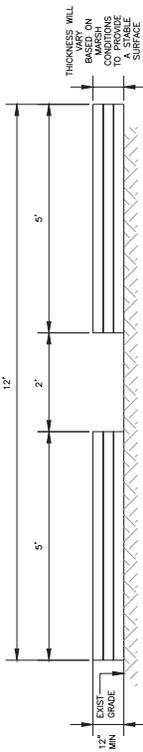
**VEGETATED COIR MATRESSES NOTES**

1. VEGETATED COIR MATRESSES MUST BE IN CONTACT WITH THE SOIL/SEDIMENT.
2. LAY MATS LOOSELY, DO NOT STRETCH THE MATS.
3. CENTERS STAKE PLACED IN MATRESS OVERLAP SO A MINIMUM OF 2" OF MATRESS IS ON EITHER SIDE OF THE STAKE.

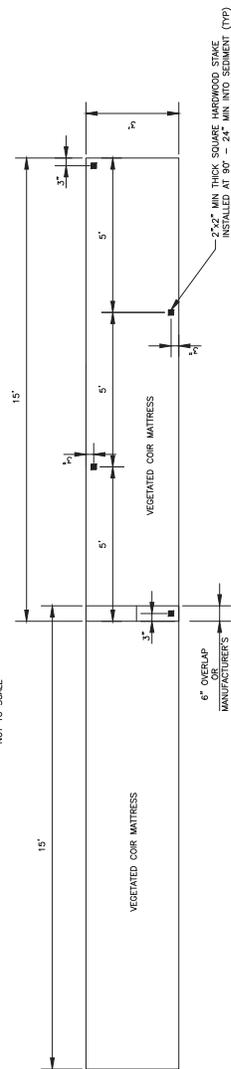
**TEMPORARY ACCESS ROAD NOTES**

1. TIMBER MATING SHALL BE MATRIX @ CRANE MATS, OR ENGINEER APPROVED EQUIVALENT.
2. TIMBER MATING TO BE DONE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
3. RESTORE DISTURBED AREA AFTER TIMBER MATING REMOVAL.
4. PLACE BRUSH CONTROL MEASURES AT A DISTANCE OF ONE FOOT FROM EITHER SIDE OF THE TIMBER MATING.

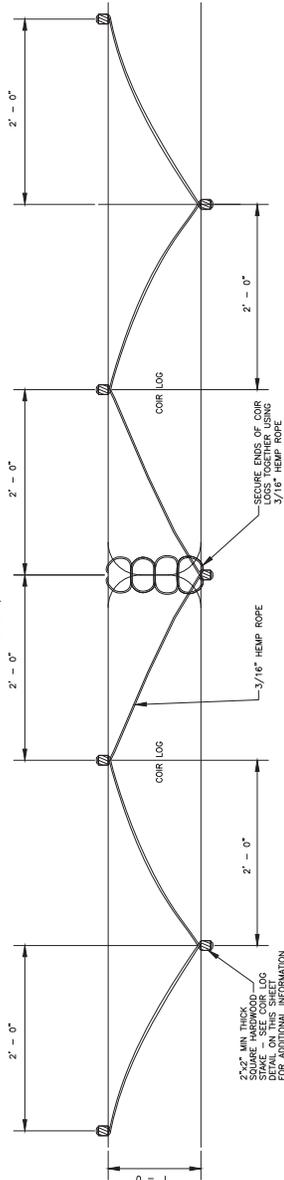
**TEMPORARY ACCESS ROAD PLAN**  
NOT TO SCALE



**TEMPORARY ACCESS ROAD SECTION**  
NOT TO SCALE



**VEGETATED COIR MATRESSES - PLAN VIEW**  
SCALE: 1/2" = 1'-0"



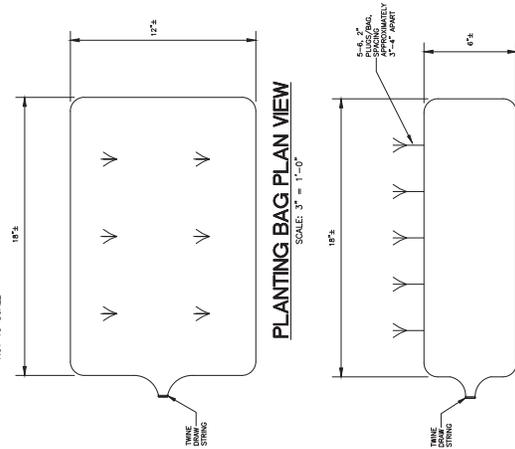
**COIR LOG - PLAN VIEW**  
SCALE: 1 1/2" = 1'-0"

**ISSUED FOR PERMITTING**

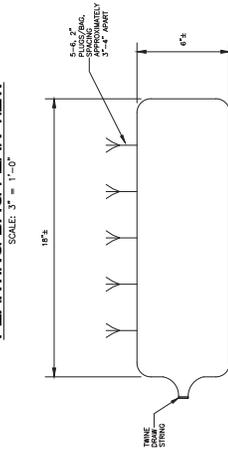
**NOTE**

1. PLACE PLANTING BAGS ACCORDING TO REQUIREMENTS LISTED IN SPECIFICATION SECTION 32 33 00 - PLANTS.
2. PLACE BAGS WITH 2 LEEF OF SPACING BETWEEN BAGS. PLACE BAGS WITH PLANTS OF THE SAME SPECIES TOGETHER IN GROUPS OF 3-5 BAGS.

**PLANTING BAG SECTION VIEW**  
SCALE: 3" = 1'-0"



**PLANTING BAG PLAN VIEW**  
SCALE: 3" = 1'-0"



# C

## Site Photographs

**C. Site Photographs**



**Photo 1** Eroded Pedestrian Path (October 26, 2015).



**Photo 2** Eroded shoreline in the vicinity of Station 21+00 (February 13, 2018).



**Photo 3** Eroded shoreline in the vicinity of Station 42+00. (October 4, 2017).



**Photo 4** Schenoplectus/Bulrush Patch in the vicinity of Stations 52+00 to 54+00 (October 4, 2017).

## C. Site Photographs



**Photo 5** Existing pocket beach in the vicinity of Station 62+50 (November 3, 2017).



**Photo 6** Existing fallen trees within the river, looking west (October 4, 2017).



**Photo 7** Western end of Buckhorn Shoreline (October 4, 2017).



**Photo 8** Shoreline Ice at the eastern end of Buckhorn Shoreline (February 22, 2018).

## Haul Road Photographs



**Photo Point 01** Approximate length of 103 feet, photo looking eastward



**Photo Point 02** Approximate length of 49.5 feet, photo looking eastward



**Photo Point 03** Approximate length of 18.5 feet, photo looking eastward



**Photo Point 04** Approximate length of 26 feet, photo looking eastward

## Haul Road Photographs



**Photo Point 05** Approximate length of 151 feet, photo looking eastward



**Photo Point 06** Approximate length of 29 feet, photo looking eastward



**Photo Point 07** Approximate length of 40 feet, photo looking eastward



**Photo Point 08** Approximate length of 63 feet, photo looking eastward

## Haul Road Photographs



**Photo Point 09** Approximate length of 44 feet, photo looking westward



**Photo Point 10** Approximate length of 165 feet, photo looking westward



**Photo Point 11** Approximate length of 165 feet, photo looking eastward



**Photo Point 12** Approximate length of 128 feet, photo looking eastward

**Haul Road Photographs**



**Photo Point 13** Approximate length of 52 feet, photo looking westward



**Photo Point 14** Approximate length of 40 feet, photo looking westward



**Photo Point 15** Approximate length of 43 feet, photo looking eastward



**Photo Point 16** Approximate length of 71 feet, photo looking westward

## Haul Road Photographs



**Photo Point 17** Approximate length of 49.5 feet, photo looking eastward

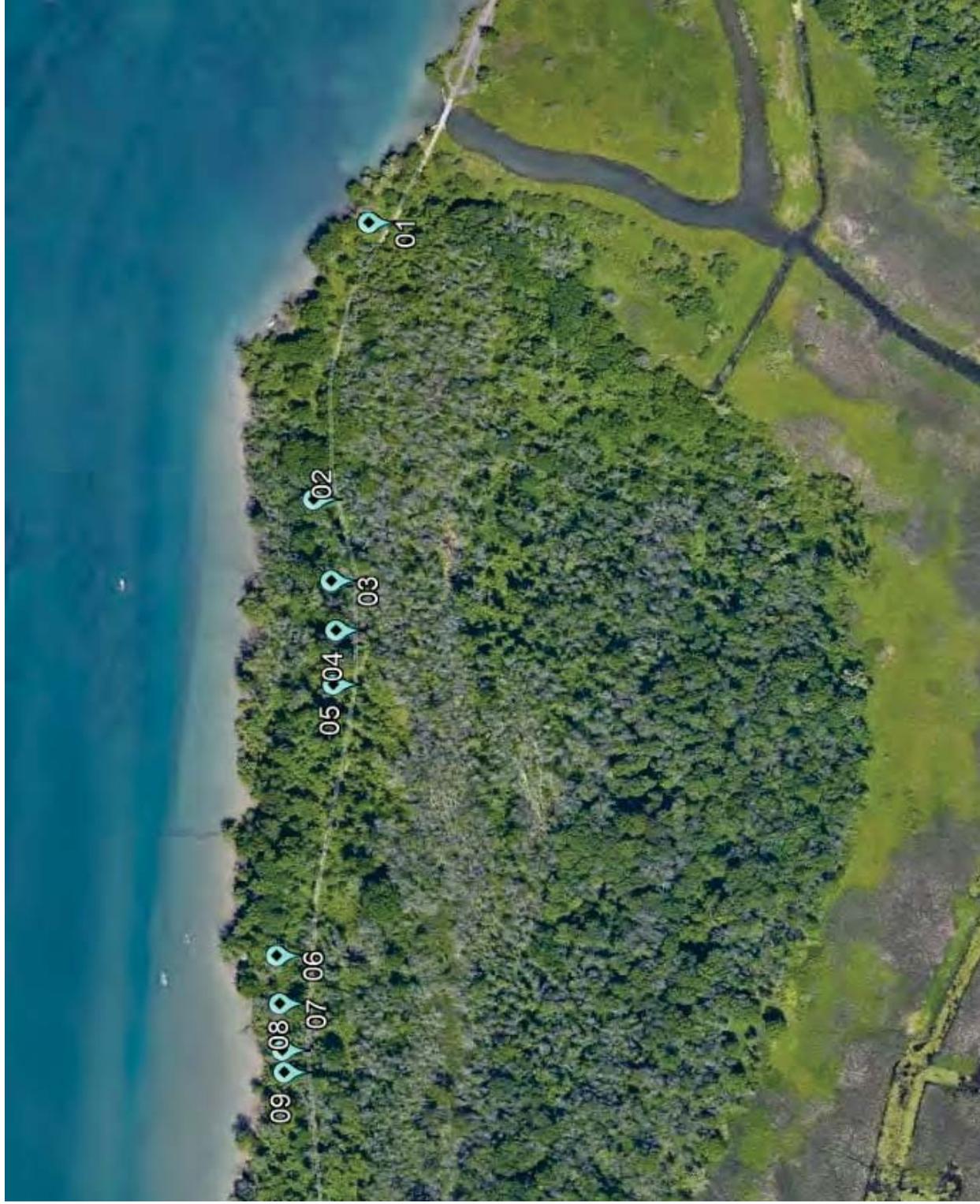


**Photo Point 18** Approximate length of 24 feet, photo looking eastward



**Photo Point 19** Approximate length of 61 feet, photo looking eastward

## Haul Road Photographs



## Haul Road Photographs



# D

## Planting Plan and Summary Table

## SECTION 329300 – PLANTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes:
  - 1. Herbaceous plants and emergent/submerged plants.
- B. Related Requirements:
  - 1. Section 329200 “Turf and Grasses” for seeding and maintenance.

#### 1.3 UNIT PRICES

- A. Work of this Section is affected by unit prices specified in Section 012200 “Unit Prices.”
- B. Unit prices apply to additions to and deletions from the Work as authorized by Change Orders.

#### 1.4 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with a ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.
- C. Planting Bag: Burlap bags filled with a soil mixture and sealed, containing 5-6 emergent or submerged plant individuals that have been pre-grown off-site and are ready for planting.
- D. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.
- E. DBH: Diameter at breast height, as measured on a tree trunk.
- F. Finish Grade: Elevation of finished surface of planting soil.

- G. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- H. Planting Area: Areas to be planted.
- I. Planting Soil: A specific mix of soil and material types that are used as backfill and a planting medium in the planting troughs. For this project, planting soil refers to CU-Structural Soil®, or an approved equal. Planting soil shall be free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- J. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- K. Root Flare: Also called “trunk flare.” The area at the base of the plant’s stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- L. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
- M. Subgrade: The surface or elevation of subsoil.
- N. Coir Logs: Coir fabric woven into a tube shape, sometimes filled with straw, coconut fiber or other biodegradable material.
- O. Vegetated Coir Mattresses: Coir fabric woven into a mat, sometimes using with straw, coconut fiber or other biodegradable material, planted with aquatic vegetation.

## 1.5 COORDINATION

- A. Coordination with grasses seeding: Plant trees, shrubs, and other plants after finish grades are established and before seeding unless otherwise indicated.
  - 1. When planting trees, shrubs, and other plants after seeding in the area, protect seeded areas, and promptly repair damage caused by planting operations.

## 1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
  - 2. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.
  - 3. Vegetated Coir Mattresses: Include product specifications and installation instructions, as well as quantities, sizes, quality, and sources of plant materials.

## 1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
- B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
  - 1. Manufacturer's certified analysis of standard products.
  - 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

## 1.8 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of plants.
- B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.
- C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
  - 1. Container No. 1-7 Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches (150 mm) above the root flare for trees up to 4-inch (100-mm) caliper size, and 12 inches (300 mm) above the root flare for larger sizes.
  - 2. Other Plants: Measure with stems, petioles, and foliage in their normal position.
- D. Plant Material Observation: Owner or Construction Manager may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Owner or Construction Manager may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and may reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

## 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
- B. Handle planting stock by root ball.
- C. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

- D. Transport nursery stock to the work site in covered vehicles. Do not expose plants to cold, excessive heat or drying during transport. Carefully unload plants at the work area and place in a shaded area protected from wind. Water plants and maintain in healthy condition until the time of installation. Transport plants to the work area and install immediately. Damaged, wilted, diseased or dead nursery stock will not be accepted and will be immediately replaced at no expense by the Contractor at no expense to the Owner.
- E. Deliver trees, shrubs, and herbaceous plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set plants, shrubs, and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
- F. If not installed immediately upon delivery, vegetated coir mattresses shall be unrolled, staged in a shaded area, and kept moist at all times.
- G. To avoid introduction and spread of invasive species, all equipment used in planting must be thoroughly cleaned before and after use.

#### 1.10 FIELD CONDITIONS

- A. Planting Restrictions: Plant during one of the following periods, preferably during the spring planting period. If it is not feasible to plant during one of these periods, an alternate planting window may be approved by the Engineer or Owner. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
  - 1. Container Plants, Plugs, and Planting Bags
    - a. Spring Planting: June 1 through June 30.
    - b. Growing Season Planting: July 1 through September 15.
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.
- C. Fish and Wildlife Restrictions: Plantings shall not take place during the fish spawning season of April 15 through June 30, peak nesting season of June 1 through August 1.

#### 1.11 WARRANTY

- A. Special Warranty: The Contractor agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period of one year.
  - 1. Failures include, but are not limited to, the following:
    - a. Death and unsatisfactory growth.
    - b. Structural failures including plantings falling or blowing over, loss of coir log or loss of coir mattress
    - c. Faulty performance of tree stabilization.

- d. Faulty installation or dislodgment of planting bags.
2. Warranty Period: 12 months from date of planting completion.
  3. Include the following remedial actions as a minimum:
    - a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
    - b. Replace lost coir log(s) and/or coir mattress(es).
    - c. Replace lost or dislodged planting bags.
    - d. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
    - e. A limit of one replacement of each plant is required except for losses or replacements due to failure to comply with requirements.
    - f. Provide extended warranty for period equal to original warranty period, for replaced plant material.

## PART 2 - PRODUCTS

### 2.1 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Table 1 below and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Plants shall be ordered far enough in advance to ensure availability. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
  1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk (“included bark”); crossing trunks; cut-off limbs more than 3/4 inch (19 mm) in diameter; or with stem girdling roots are unacceptable.
  2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery. Plants must be delivered from within 250 miles of the Project and shall be from a nursery specializing in native wetland plants.
- B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Owner, with a proportionate increase in size of roots or balls.
- C. Plants shall be placed in the correct zones as indicated on the Project Drawings, at the densities indicated on the plan and in Table 1 of this specification. Spacing between individual plants can be variable and field-determined. As a rule of thumb, like species should be clumped into groups of three to five units. The objective is to achieve a heterogeneous pattern with respect to densities and species within the zones specified in the planting plan.
- D. Wildlife deterrence identified in the Project Drawings shall be installed immediately after plantings are installed.

- E. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant.

**Table 1: Buckhorn Island Shoreline Marsh Planting List**

Species Name		Quantity/Density
<b>Deep Emergent Vegetation – Planting Bags (1-3 feet underwater)</b>		
<i>Sagittaria latifolia</i>	Duck Potato	1 bag/5-6 SF
<i>Sagittaria rigida</i>	Deep Water Duck Potato	
<i>Carex lacustris</i>	Lake Sedge	
<i>Schoenoplectus acutus</i>	Hard Stem Bulrush	
<i>Polygonum amphibium</i>	Water Smartweed	
<i>Nuphar advena</i>	Spatterdock	
<b>Shallow Emergent Vegetation – Planting Bags (0-1 feet underwater)</b>		
<i>Spartina pectinata</i>	Prairie Cordgrass	1 bag/5-6 SF
<i>Pontederia cordata</i>	Pickernelweed	
<i>Schoenoplectus pungens</i>	Common Three Square	
<i>Peltandra virginica</i>	Arrow Arum	
<i>Eleocharis quadrangulata</i>	Square Stemmed Spikerush	
<i>Schoenoplectus tabernaemontani</i>	Soft Stem Bulrush	
<i>Bolboschoenus fluviatilis</i>	River Bulrush	
<i>Dulichium arundinaceum</i>	Three Sided Sedge	
<i>Alisma plantago-aquatica</i>	Water Plantain	
<i>Zizania aquatica</i>	Wild Rice	
<i>Juncus effusus</i>	Soft Rush	
<i>Carex stricta</i>	Tussock Sedge	
<i>Sparganium eurycarpum</i>	Great Bur Reed	
<b>Lower Riparian Containerized Plugs (0-2 feet above water)</b>		
<i>Verbena hastata</i>	Blue Vervian	1 cluster of 3 plugs/9 SF
<i>Calamagrostis canadensis</i>	Canada Bluejoint	
<i>Panicum clandestinum</i>	Deertongue*	
<i>Tripsacum dactyloides</i>	Eastern Gammagrass*	
<i>Symphotrichum novae-angliae</i>	New England Aster*	
<i>Spartina pectinata</i>	Prairie Cordgrass	
<i>Juncus effusus</i>	Soft Rush	
<i>Panicum virgatum</i>	Switchgrass*	
<b>Shrubs – Live Stakes (0-2 feet above water)</b>		
<i>Cornus sericea</i>	Redosier Dogwood	1 stake/4 SF
<i>C. amomum</i>	Silky Dogwood	
<i>Cephalanthus occidentalis</i>	Buttonbush	
<b>Upper Riparian Shrubs – No. 1 Container Grown (2-4 feet above water)</b>		
<i>Cephalanthus occidentalis</i>	Buttonbush	1 container/9 SF
<i>Cornus amomum</i>	Silky Dogwood	
<i>Physocarpus opulifolius</i>	Common Ninebark	1 container/12 SF
<i>Rosa palustris</i>	Swamp Rose	
<b>Upland Shrubs - No. 1 Container Grown (4 plus feet above water)</b>		
<i>Prunus pumila var. depressa</i>	Catskill Dwarf Sand Cherry	1 container/9 SF
<i>Rubus allegheniensis</i>	Allegheny Blackberry	

**Table 1: Buckhorn Island Shoreline Marsh Planting List**

Species Name		Quantity/Density
<i>Cornus alternifolia</i>	Pagoda Dogwood	1 container/9 SF
<i>Amelanchier canadensis</i>	Serviceberry	
<i>Amelanchier stolonifera</i>	Running Serviceberry	
<b>Trees – No. 5-7 Container Grown (4 feet plus above water)</b>		
<i>Acer rubrum</i>	Red Maple	1 container/400 SF in upland areas; 1 container/20 SF in restored temporary access road areas
<i>A. saccharinum</i>	Silver Maple	
<i>Quercus palustris</i>	Pin Oak	
<i>Q. rubra</i>	Red Oak	
<i>Platanus occidentalis</i>	Sycamore	
<i>Tilia americana</i>	Basswood	
<i>Zanthoxylum americanum</i>	Prickly Ash	

\*These plugs may also be used in the Upper Riparian areas.

## 2.2 PLANTING SOIL

- A. Use only approved fill materials that have been excavated for the purpose of installing plant material, or supplied as planting soil from external sources.

## 2.3 MISCELLANEOUS PRODUCTS

- A. Water: Water for irrigation, soaking of plants and cuttings, and dust control shall be the responsibility of the Contractor. Water shall be clean, free of contaminants, have a turbidity of less than 20 nephelometric turbidity units (NTUs), and a pH within 5.5 to 8.5.
- B. Browse Protection: Install browse protection around the plants. This shall consist of the following:
  1. For in-water plant protection, zip-tie snow fence to stakes at the sediment surface, half the height of the stake and at the water surface around the outside edge of the planting area. Stakes shall be placed at a 10-foot maximum spacing throughout the planting area and along the outside edge, in a rectangular grid pattern, with twine connecting the stakes diagonally at the water surface. This is identified in the Contract Drawings as “Goose and Carp Fence.”
  2. For tree and shrub protection above the water surface, surround the tree or shrub with welded wire with a maximum opening size of 4 inches by 4 inches, at a minimum height of 4 feet.

## 2.4 COIR MATTRESSES

- A. Coir mattresses shall be rectangular in shape with a width of 3 feet and length of 15 feet.
- B. Coir mattresses shall be planted with riparian plugs.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.
  - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, oils, gasoline, diesel fuel, paint thinner, or turpentine has been deposited in soil within a planting area.
  - 2. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.
  - 3. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
  - 4. Uniformly moisten excessively dry soil that is not workable or is dusty.
- B. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination and replace with new planting soil.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Care shall be taken to avoid invasive species introduction by cleaning equipment prior to entering an exiting the site.

### 3.2 PREPARATION

- A. Protect existing plants from damage caused by planting operations as much as practical.
- B. Replace any damaged existing plants with new plants designated for the planting zone.
- C. Lay out of individual tree, shrub, and plant locations will be provided by Owner or Owner's representative. Contractor shall stake locations according to Owner's layout, outline areas, adjust locations when requested, and obtain Owner's acceptance of staked layout before excavating or planting. Make minor adjustments as required.

### 3.3 PLANTING BAGS

- A. Planting bags shall be 12 inches wide by 18 inches long and made of untreated burlap with a fabric weight of 10 ounces per square yard.
- B. Substrate used in the planting bags shall be equal parts pea gravel, sand and peat moss. After the bag is filled, the open end shall be closed with twine.
- C. Each bag shall be planted with 5-6 plugs with approximately 3-4 inches between each plug. Plugs shall be grown in planting bags, off-site, for 6-8 weeks.
- D. Planting bags shall be installed in specific zones identified on Project Drawings.

- E. As a rule of thumb, like species should be clumped into groups of three to five bags. All bags should be installed a minimum of 2 feet apart. The objective is to achieve a heterogeneous pattern with respect to densities and species within the specified zones.

### 3.4 EXCAVATION FOR PLUGS

- A. Planting Pits: Excavate circular planting pits.
  - 1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that the plugs will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
  - 2. Excavate at least 12 inches (300 mm) wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
  - 3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
  - 4. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
  - 5. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent hardscapes, or other new or existing improvements.
  - 6. Maintain supervision of excavations during working hours.
  - 7. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
- B. Backfill Soil: Subsoil and topsoil removed from excavations may be used as backfill soil unless otherwise indicated.
- C. Obstructions: Notify Owner or Engineer if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

### 3.5 PLUG PLANTING

- A. After placing some backfill around the plugs to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
- B. Plants shall be installed in specific zones; the exact locations of plugs within a particular zone are not specified as long as the overall densities are achieved.
- C. Spacing between the individual plants can be variable and field determined. As a rule of thumb, like species should be clumped into groups of three to five units. The objective is to achieve a heterogeneous pattern with respect to densities and species within the specified zones.
- D. Backfill around the roots in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
- E. Continue backfilling process. Water again after placing and tamping final layer of soil.

- F. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

### 3.6 EXCAVATION FOR TREES AND SHRUBS

- A. Planting Pits and Trenches: Excavate circular planting pits.
  - 1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
  - 2. Excavate approximately three times as wide as ball diameter for balled and burlapped and container-grown stock.
  - 3. Excavate at least 12 inches (300 mm) wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
  - 4. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
  - 5. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
  - 6. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent hardscapes, or other new or existing improvements.
  - 7. Maintain supervision of excavations during working hours.
  - 8. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
- B. Backfill Soil: Subsoil and topsoil removed from excavations may be used as backfill soil unless otherwise indicated.
- C. Obstructions: Notify Engineer if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

### 3.7 TREE AND SHRUB PLANTING

- A. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- B. Balled and Burlapped Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch (25 mm) above adjacent finish grades.
  - 1. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
  - 2. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
  - 3. Continue backfilling process. Water again after placing and tamping final layer of soil.

- C. Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch (25 mm) above adjacent finish grades.
  - 1. Carefully remove root ball from container without damaging root ball or plant.
  - 2. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
  - 3. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.
- E. Restoration Planting: Plant two new container-grown trees to replace each tree of DBH greater than 6 inches removed during construction.

### 3.8 COIR LOGS

- A. Coir logs shall be placed on areas that are smooth, free from rocks, sticks, and existing vegetation.
- B. Coir logs shall be keyed 3 inches into the underlying sediment.
- C. Drive alternately placed hardwood stakes into the ground at a 90-degree angle the ground surface until the top of the stake is approximately 6 inches above the logs. Stakes shall be buried a minimum of 24 inches into the sediment and spaced a maximum of 4 feet apart.
- D. Notch hardwood stakes approximately 2 inches below the top of the coir log, deep enough to fit a 3/16-inch hemp rope or approved equivalent. Criss-cross the rope over the top of the coir log, then drive stakes down until the rope is tight against the coir log.
- E. Adjacent logs shall be secured with 3/16-inch hemp rope or approved equivalent.

### 3.9 VEGETATED COIR MATTRESS

- A. Coir mattress shall be placed on areas that are smooth, free from rocks, sticks, and existing vegetation.
- B. Unroll coir mattresses continuously in one line in installation area. Mattresses shall not be stretched and shall be laid loosely, overlapping 6 inches on each end, or per manufacturer's specifications.
- C. Securely anchor the mattresses with hardwood stakes installed at a 90-degree angle. Mattresses shall be anchored so all parts of the mattress are in direct contact with the sediment. Stakes shall be buried a minimum of 24 inches into the sediment.

### 3.10 PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.

- B. Do not apply pruning paint to wounds.

### 3.11 PLANT MAINTENANCE

- A. Install Goose and Carp fence around all plant species to protect from browsing. Use a 2-inch by 2-inch wood stake as staking material and snow fence as fence mesh material. All substitutions shall be approved by the Engineer or Owner. The Goose and Carp fence shall be installed at all planting areas the same day the plants are set in the ground. The Contractor is responsible for protecting the plants from browsing prior to setting the plants in the ground. Goose and Carp fence shall remain in place until two years after the Final Completion Inspection, or until plant material is established, whichever is longer. Goose and Carp fence shall be removed seasonally from November 1 to April 1 below the average water level (562.5 feet NAVD88) to avoid damage from ice.
- B. Install a 5-foot Tubex Combitube on all riparian plant species to protect from browsing. Use a 6-foot, 3/4-inch-diameter rebar rod as staking material. All substitutions shall be approved by the Owner or Construction Manager. Refer to vendor's recommendations for installation. The protectors shall be installed on all plants the same day the plants are set in the ground. The Contractor is responsible for the safety of the plants from browsing prior to setting the plants in the ground.
- C. Maintain plantings by pruning, cultivating, watering, weeding, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.
- D. Watering shall occur as needed to keep the plants in healthy condition during the one-year warranty period.
- E. Fill in, as necessary, soil subsidence that may occur because of settling or other processes.
- F. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

### 3.12 REPAIR AND REPLACEMENT

- A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by Owner.
  - 1. Submit details of proposed pruning and repairs.
  - 2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.
  - 3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Owner.
- B. Remove and replace trees that are more than 25 percent dead or in an unhealthy condition before the end of the warranty period or are damaged during construction operations that Owner determines are incapable of restoring to normal growth pattern.

3.13 SATISFACTORY GROWTH

- A. Planted area installations shall meet the following criteria as determined by Engineer, Owner, and/or Construction Manager:
  - 1. Satisfactory Growth: A minimum of 80% of installed plant material is alive and viable at the end of the warranty period, or as long as necessary to meet this requirement.
- B. Use specified materials to reestablish planted area that does not comply with requirements and continue maintenance until growth is satisfactory.

3.14 MAINTENANCE SERVICE DURING WARRANTY PERIOD

- A. Maintenance Service for Plugs: The Contractor/landscape Installer shall provide maintenance by skilled employees during the warranty period. Maintain as required in “Plant Maintenance” Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
  - 1. Maintenance Period: 12 months from date of planting completion.
- B. Maintenance Service for Ground Cover Other Plants, and Trees: The Contractor shall provide maintenance by skilled employees during the warranty period. Maintain as required in “Plant Maintenance” Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
  - 1. Maintenance Period: 12 months from date of planting completion.

3.15 CLEAN-UP

- A. All non-vegetative waste materials shall be disposed of off-site at an approved landfill or recycling center. Excess foliage and vegetation from native vegetation plants shall be grouped and placed inland at a location outside at the top of the bank to be used as habitat for terrestrial wildlife. The site shall be restored to preexisting conditions to the extent reasonably possible and to the satisfaction of the Engineer, Owner, and/or Construction Manager.

END OF SECTION 329300

## Appendix D – Planting List and Associated Depths

**Table 1 Planting List and Associated Depths for Buckhorn Island Habitat Enhancement Project**

Common Name	Latin Name	Elevations (feet NAVD88)	Water Depth <sup>1</sup> (compared to average level)	Methodology
<b>Deep Emergent (68,481 square feet/1.6 acres)</b>				
Duck Potato	<i>Sagittaria latifolia</i>	560-562	1-3 feet below	Planting bags
Deep Water Duck Potato	<i>Sagittaria rigida</i>	560-562	1-3 feet below	Planting bags
Lake Sedge	<i>Carex lacustris</i>	560-562	1-3 feet below	Planting bags
Hard Stem Bulrush	<i>Schoenoplectus acutus</i>	560-562	1-3 feet below	Planting bags
Water Smartweed	<i>Polygonum amphibium</i>	560-562	1-3 feet below	Planting bags
Spatterdock	<i>Nuphar advena</i>	560-562	1-3 feet below	Planting bags
<b>Shallow Emergent Vegetation (56,295 square feet/1.3 acres)</b>				
Prairie Cordgrass	<i>Spartina pectinata</i>	562-563	0-1 feet below	Planting bags/coir logs
Pickernelweed	<i>Pontederia cordata</i>	562-563	0-1 feet below	Planting bags/coir logs
Common Three Square	<i>Schoenoplectus pungens</i>	562-563	0-1 feet below	Planting bags/coir logs
Arrow Arum	<i>Peltandra virginica</i>	562-563	0-1 feet below	Planting bags/coir logs
Square Stemmed Spikerush	<i>Eleocharis quadrangulata</i>	562-563	0-1 feet below	Planting bags/coir logs
Soft Stem Bulrush	<i>Schoenoplectus tabernaemontani</i>	562-563	0-1 feet below	Planting bags/coir logs
River Bulrush	<i>Bolboschoenus fluviatilis</i>	562-563	0-1 feet below	Planting bags/coir logs
Three-Sided Sedge	<i>Dulichium arundinaceum</i>	562-563	0-1 feet below	Planting bags/coir logs
Water Plantain	<i>Alisma plantago-aquatica</i>	562-563	0-1 feet below	Planting bags/coir logs
Wild Rice	<i>Zizania aquatica</i>	562-563	0-1 feet below	Planting bags/coir logs
Soft Rush	<i>Juncus effusus</i>	562-563	0-1 feet below	Planting bags/coir logs
Tussock Sedge	<i>Carex stricta</i>	562-563	0-1 feet below	Planting bags/coir logs
Great Bur Reed	<i>Sparganium eurycarpum</i>	562-563	0-1 feet below	Planting bags/coir logs
<b>Lower Riparian (23,371 square feet/0.54 acre)</b>				
Blue Vervian	<i>Verbena hastata</i>	563-565	0-2 feet above	Coir mattress/plugs

**Table 1 Planting List and Associated Depths for Buckhorn Island Habitat Enhancement Project**

Common Name	Latin Name	Elevations (feet NAVD88)	Water Depth <sup>1</sup> (compared to average level)	Methodology
Canada Bluejoint	<i>Calamagrostis canadensis</i>	563-565	0-2 feet above	Coir mattress/plugs
Deertongue	<i>Panicum clandestinum</i>	563-565	0-2 feet above	Coir mattress/plugs
Eastern Gammagrass	<i>Tripsacum dactyloides</i>	563-565	0-2 feet above	Coir mattress/plugs
New England Aster	<i>Symphotrichum novae-angliae</i>	563-565	0-2 feet above	Coir mattress/plugs
Prairie Cordgrass	<i>Spartina pectinata</i>	563-565	0-2 feet above	Coir mattress/plugs
Soft Rush	<i>Juncus effusus</i>	563-565	0-2 feet above	Coir mattress/plugs
Switchgrass	<i>Panicum virgatum</i>	563-565	0-2 feet above	Coir mattress/plugs
Buttonbush	<i>Cephalanthus occidentalis</i>	563-565	0-2 feet above	Coir mattress/container
Redosier Dogwood	<i>Cornus sericea</i>	563-565	0-2 feet above	Coir mattress/container
Silky Dogwood	<i>Cornus amomum</i>	563-565	0-2 feet above	Coir mattress/container
<b>Upland Riparian (7,990 square feet/0.18 acre)</b>				
Butterfly Milkweed	<i>Asclepias Tuberosa</i>	565-567	2-4 feet above	Coir mattress/plugs
Indiangrass	<i>Schizachyrium Scoparium</i>	565-567	2-4 feet above	Coir mattress/plugs
Little Bluestem	<i>Solidago Rigida</i>	565-567	2-4 feet above	Coir mattress/plugs
Virginia Creeper	<i>Parthenocissus Quinquefolia</i>	565-567	2-4 feet above	Coir mattress/plugs
Wild Bergamot	<i>Monarda Fistulosa</i>	565-567	2-4 feet above	Coir mattress/plugs
Buttonbush	<i>Cephalanthus occidentalis</i>	565-567	2-4 feet above	Coir mattress/container
Silky Dogwood	<i>Cornus amomum</i>	565-567	2-4 feet above	Coir mattress/container
Common Ninebark	<i>Physocarpus opulifolius</i>	565-567	2-4 feet above	Coir mattress/container
Swamp Rose	<i>Rosa palustris</i>	565-567	2-4 feet above	Coir mattress/container
<b>Upland (6,282 square feet/0.14 acre)</b>				
Catskill Dwarf Sand Cherry	<i>Prunus pumila var. depressa</i>	567 and above	4+ feet above	Containers
Allegheny Blackberry	<i>Rubus allegheniensis</i>	567 and above	4+ feet above	Containers
Pagoda Dogwood	<i>Cornus alternifolia</i>	567 and above	4+ feet above	Containers

**Table 1 Planting List and Associated Depths for Buckhorn Island Habitat Enhancement Project**

Common Name	Latin Name	Elevations (feet NAVD88)	Water Depth <sup>1</sup> (compared to average level)	Methodology
Serviceberry	<i>Amelanchier canadensis</i>	567 and above	4+ feet above	Containers
Running Serviceberry	<i>Amelanchier stolonifera</i>	567 and above	4+ feet above	Containers
Red Maple	<i>Acer rubrum</i>	567 and above	4+ feet above	Containers
Silver Maple	<i>A. saccharinum</i>	567 and above	4+ feet above	Containers
Pin Oak	<i>Quercus palustris</i>	567 and above	4+ feet above	Containers
Red Oak	<i>Q. rubra</i>	567 and above	4+ feet above	Containers
Eastern Cottonwood	<i>Populus deltoides</i>	567 and above	4+ feet above	Containers
Sycamore	<i>Platanus occidentalis</i>	567 and above	4+ feet above	Containers
Basswood	<i>Tilia americana</i>	567 and above	4+ feet above	Containers
Prickly Ash	<i>Zanthoxylum americanum</i>	567 and above	4+ feet above	Containers
Black Willow	<i>Salix nigra</i>	567 and above	4+ feet above	Containers

**Notes:**

<sup>1</sup>Average water level is 562.5 feet NAVD88.

# E

## Sediment Sampling Methods and Results



# ATLANTIC TESTING LABORATORIES

**WBE certified company**

**Canton**  
6431 U.S. Highway 11  
P.O. Box 29  
Canton, NY 13617  
315-386-4578 (T)  
atlantictesting.com

June 4, 2018

Ecology and Environment Engineering, P.C.  
368 Pleasant View Drive  
Lancaster, New York 14086

Telephone: 716-684-8060  
E-mail: [gsutton@ene.com](mailto:gsutton@ene.com)

Attn: Mr. Greg Sutton, PE

Re: Subsurface Investigation Services  
Buckhorn Island State Park  
Shoreline Restoration Project  
Grand Island, Erie County, New York  
MSA No. 1709413  
ATL Report No. CD4332D-01-04-18

Ladies/Gentlemen:

At the request of Mr. Greg Sutton representing Ecology & Environment Engineering, P.C. (ENE), and in accordance with our proposal (ATL File No. CD998-445-03-17, dated March 17, 2017), Atlantic Testing Laboratories, Limited (ATL) performed a subsurface investigation for the referenced project. The subsurface investigation was performed between the dates of December 20, 2017 and May 1, 2018.

The boring locations were selected by representatives of ENE and staked in the field by representatives of ATL based on the provided GPS information. The boring surface elevations were not determined during this subsurface investigation. The **Site Location** and **Boring Location Plans**, are included in **Appendix A** and **B**, respectively.

Eight (8) soil borings were completed utilizing a barge-mounted drill rig, 4-inch inside diameter flush-joint casing, and a tri-cone roller bit using water as the drilling fluid, below the water surface of the Niagara River. Two (2) soil borings were completed utilizing a trailer-mounted drill rig, 4-inch inside diameter flush-joint casing, and a tri-cone roller bit using water as the drilling fluid. Soil sampling and standard penetration testing was performed within each soil boring utilizing a 2-inch outside diameter split spoon sampler and automatic drop hammer in accordance with ASTM D 1586. Soil sampling was generally performed continuously, from the mudline or ground surface, to boring termination at depths ranging from 15.6 to 16 feet (19.5 to 25.8 feet below the water surface in soil borings BISP-01 through BISP-08) below the surface.

The soil samples were classified in the laboratory by an engineering technician in general accordance with the Burmister Soil Classification System. The split spoon sampler does not recover particles larger than 1 $\frac{3}{8}$ -inch in nominal dimension; therefore, the soil classifications may not be representative of the entire soil matrix. The laboratory classifications and the field standard penetration test results are presented on the **Subsurface Investigation Logs** included in **Appendix C**.

The water-based soil borings (BISP-01 through BISP-08) performed along the northern shoreline of Buckhorn Island State Park encountered approximately 2.5 to 9.8 feet of water above the mudline. Below the mudline, the soil borings generally encountered three distinct soil profiles.

Soil borings BISP-01, BISP-03 and BISP-07 generally encountered till and till moraine-type soils comprised of medium compact (N values 10 to 30) to very compact (N values greater than 50) sandy gravel with silt, and silty sand with gravel, or hard (N values greater than 30) sandy silt with varying proportions of gravel and clay that extended to boring termination at depths ranging from 19.1 to 25.8 feet below the water surface.

Soil borings BISP-02, and BISP-04 through BISP-06 generally encountered lacustrine deposits of very soft (N values less than 2) to soft (N values 2 to 4) clay with varying proportions of silt and sand that extended to boring termination in soil borings BISP-02 and BISP-04 at depths of 19.5 and 18.5 feet, respectively, below the water surface, and to a depth of 17 feet in soil borings BISP-05 and BISP-06. Underlying the very soft clay, soil borings BISP-05 and BISP-06 encountered stiff (N values 9 to 16) sandy, gravelly clay that extended to boring termination at a depth of 19.5 feet in soil boring BISP-05 and to a depth of 18 feet in soil boring BISP-06, underlain by glacial till comprised of very compact sand and silt with varying proportions of gravel that extended to boring termination at a depth of 22 feet below the water surface.

Soil boring BISP-08 generally encountered river deposits of very loose (N values less than 4) to loose (N values 4 to 10) silty sand that extended to a depth of 14 feet below the mudline, underlain by medium stiff clay and sand that extended to a depth of 16 feet below the mudline.

The land-based soil borings (BISP-09 and BISP-10) advanced along the existing northern pedestrian trail generally encountered a surficial layer of sand and gravel subbase, underlain by soft to very stiff sandy silt with varying proportions of organic material that extended to a depth of 8 feet below the surface. Underlying the sandy silt, the soil borings generally encountered a very loose to loose silty sand with varying proportions of gravel, clay, and organic material that extended to a depth of approximately 12 feet in soil boring BISP-09 and to termination at a depth of 16 feet in soil boring BISP-10. Underlying the silty sand, soil boring BISP-09 encountered very soft clay that extended to boring termination at a depth of 16 feet below the surface.

Groundwater measurements were performed during the subsurface investigation through cased and open boreholes at soil boring locations BISP-09 and BISP-10. The soil samples were also classified for coloration and relative moisture conditions.

Freestanding water was recorded in the land-based borings at depths ranging from approximately 0.3 and 0.9 feet below the surface during borehole advancement; however, the water readings were affected by water utilized to advance the boreholes.

Since the boreholes were backfilled immediately upon completion of advancement, groundwater readings did not likely have sufficient time to stabilize.

Select soil samples were submitted to ATL's geotechnical laboratory for physical analyses. Water Content Determination of Soil (ASTM D 2216), Particle Size Analysis without Hydrometer (ASTM D 422), Atterberg Limits Determination (ASTM D4318) were performed on ten (10) soil samples. Additionally, an Organic Content Determination (ASTM D 2974) was performed on two (2) soil samples. The test results are presented on the subsurface investigation logs and included in **Appendix D, Laboratory Test Reports**.

The soil samples obtained during this investigation will be retained for a period of 6 months and subsequently discarded, unless otherwise instructed.

Please contact our office should you have any questions or comments on this information, or if we may be of further service. We look forward to our continued association to obtain a successful completion of this project.

Sincerely,  
*ATLANTIC TESTING LABORATORIES, Limited*



Matthew T. Trodler, IE  
Project Manager

MTT/BTB/mtt

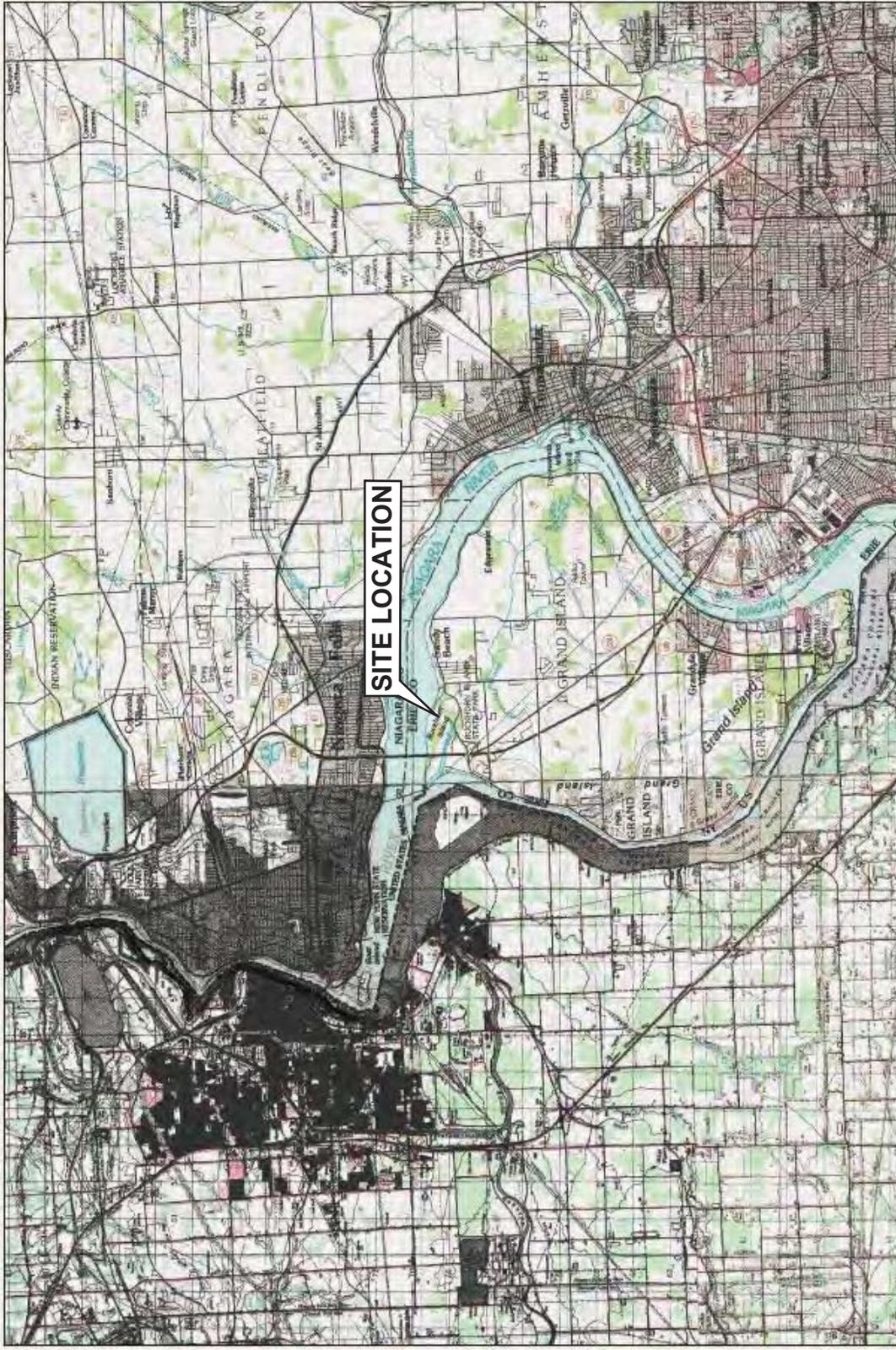
Enclosures

cc: Ms. Rebecca Meissner  
Mr. Preetam Kuchikulla

ENE  
ENE

[rmeissner@ene.com](mailto:rmeissner@ene.com)  
[pkuchikulla@ene.com](mailto:pkuchikulla@ene.com)

APPENDIX A  
SITE LOCATION PLAN



Map provided by MyTopo.com

**SITE LOCATION PLAN**

NYS Office of Parks, Recreation,  
and Historic Preservation  
Buckhorn Island State Park  
Shoreline Restoration Project  
Town of Grand Island, Erie County, New York

Drawn by:  
**MTT**

Scale:  
**NTS**

Project No.:  
**CD4332**

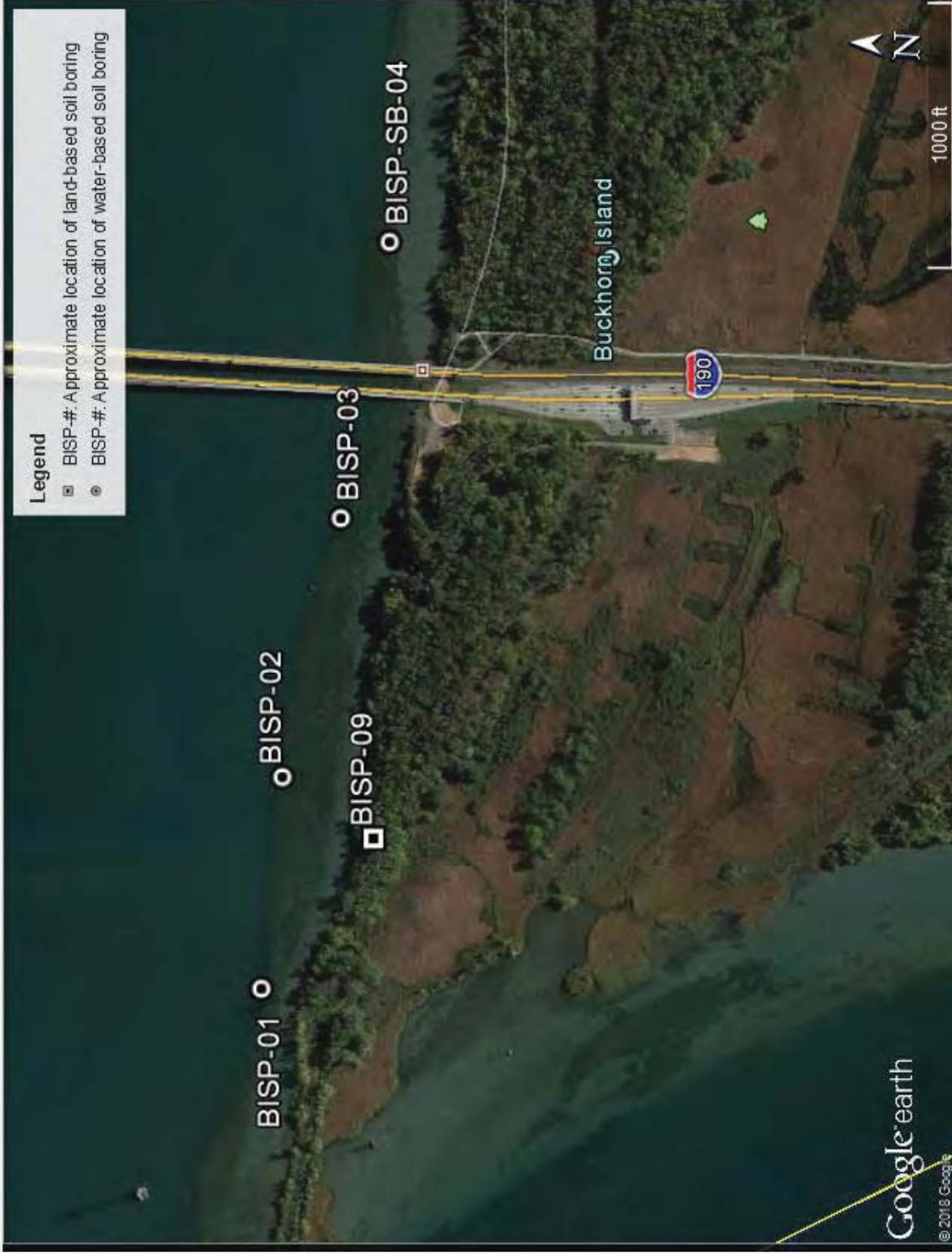
Date:  
**April 2018**



**ATLANTIC TESTING LABORATORIES, Limited**

- Albany, NY
- Binghamton, NY
- Canton, NY
- Elmira, NY
- Plattsburgh, NY
- Poughkeepsie, NY
- Syracuse, NY
- Rochester, NY
- Utica, NY
- Watertown, NY

APPENDIX B  
BORING LOCATION PLANS



**BORING LOCATION PLAN (1 of 2)**

NYS Office of Parks, Recreation,  
and Historic Preservation  
Buckhorn Island State Park  
Shoreline Restoration Project  
Town of Grand Island, Erie County, New York

Drawn by:  
**MTT**



**ATLANTIC TESTING LABORATORIES, Limited**

Albany, NY      Binghamton, NY      Canton, NY      Elmira, NY      Plattsburgh, NY  
Poughkeepsie, NY      Syracuse, NY      Rochester, NY      Utica, NY      Watertown, NY

Project No.:  
**CD4332**

Date:  
**April 2018**

Scale:  
**NTS**



<b>BORING LOCATION PLAN (2 of 2)</b> NYS Office of Parks, Recreation, and Historic Preservation Buckhorn Island State Park Shoreline Restoration Project Town of Grand Island, Erie County, New York	Drawn by: <b>MTT</b>	Scale: <b>NTS</b>	Project No.: <b>CD4332</b>	Date: <b>April 2018</b>										
<p style="text-align: center;"><b>atl</b></p> <p style="text-align: center;"><b>ATLANTIC TESTING LABORATORIES, Limited</b></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 20%;">Albany, NY</td> <td style="width: 20%;">Binghamton, NY</td> <td style="width: 20%;">Canton, NY</td> <td style="width: 20%;">Elmira, NY</td> <td style="width: 20%;">Plattsburgh, NY</td> </tr> <tr> <td>Poughkeepsie, NY</td> <td>Syracuse, NY</td> <td>Rochester, NY</td> <td>Utica, NY</td> <td>Watertown, NY</td> </tr> </table>					Albany, NY	Binghamton, NY	Canton, NY	Elmira, NY	Plattsburgh, NY	Poughkeepsie, NY	Syracuse, NY	Rochester, NY	Utica, NY	Watertown, NY
Albany, NY	Binghamton, NY	Canton, NY	Elmira, NY	Plattsburgh, NY										
Poughkeepsie, NY	Syracuse, NY	Rochester, NY	Utica, NY	Watertown, NY										

APPENDIX C  
SUBSURFACE INVESTIGATION LOGS

**ATLANTIC TESTING LABORATORIES, Limited**

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Buckhorn Island Shoreline Habitat Restoration Site  
Grand Island, New York

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**ATLANTIC TESTING LABORATORIES, Limited**

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DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE		SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL	RECOVERY (inches)
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**ATLANTIC TESTING LABORATORIES, Limited**

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< 85M^ 2+,) 5[ See Boring Location Plan

S& 2,[ Subsurface Investigation

Buckhorn Island Shoreline Habitat Restoration Site

Grand Island, New York

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DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE		SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL	Recovery (Inches)
			From	To					
1								\$%8( ) +,-.A - %/ A A +,-. &A 34* 56 QUA -,	
Q							Q8J		
T	G	I	Q8J	U8J	==	I I Q	T8J	D & LA0S-> @A3 A BC A+ ,4&,-. JA5; %&:,)2N	#
U	A		U8J	"8J	==	VW I I I		< & 15): / ; D & L GBSH A 5. A = B C 2- A O A \$> ? A : +,4&+ . J %& ,)2N	T
X	V				==	V9 V WYAZ		=) 38' )3A+,4&,-. JA@+,)2N	T
"	D				==	VWY TZ		=) 38' )3A+,4&,-. JA@+,)2N	T
A		Q	"8J	78J	==	V9 V WYAZ		9-..): / ; < & 15) GBSH A +,4&+ . J %& ,)2N	T
7					==	VWY TZ		=) 38' )3A+,4&,-. JA@+,)2N	T
#		T	78J	U8J	==	VWY TZ		=) 38' )3A+,4&,-. JA@+,)2N	T
!!					==	V9 V WYAZ		=) 38' )3A+,4&,-. JA@+,)2N	T
!		U	U8J	Q8J	==	V9 V WYAZ		=) 38' )3A+,4&,-. JA@+,)2N	T
IQ					==	VWY TZ		=) 38' )3A+,4&,-. JA@+,)2N	T
IT	X		Q8J	U8J	==	VWY TZ		=) 38' )3A+,4&,-. JA@+,)2N	T
IU					==	V9 Y Z V WY Z		=) 38' )3A+,4&,-. JA@+,)2N	T
IX	"		U8J	"8J	==	V9 Y Z V WY Z		=) 38' )3A+,4&,-. JA@+,)2N	T
!"					==	VWY TZ		=) 38' )3A+,4&,-. JA@+,)2N	T
!A	A		"8J	U8J	==	VWY TZ		=) 38' )3A+,4&,-. JA@+,)2N	T
!7					==	VWY TZ	!78U		
#					==	VWY TZ			
!					==	VWY TZ		< ' 85M^ ,& )5+,-. A+ A 78U A O- ,A O & A ,%A O A +,-. 8	
!					==	VWY TZ		> ' ,-[	
Q					==	VWY TZ		! 8 A A O A O A + 8 M A ?- 2 _ A , A b 4. 35- A A U B A O-	
T					==	VWY TZ			
U					==	VWY TZ			

S C B B O D I A > F A A G 7 T Q Q A B O B O D H A A E > E A G O b F > C : A D S > ? A A = B S > ? J A > H B S c A A A G E T # A 8 D C A A U Y H E

== %&A%5 A+\* %3  
 v 9' 2\_ & &  
 =W ]5): .4&- A+\* %&A=/-3' LA O A ^-N  
 F: ,) +,-. D & 45. 1+,-. &

? 83& [ Brad Perry; Kyle Holloway  
 A5% 2,' &

**ATLANTIC TESTING LABORATORIES, Limited**

=4^: 48+2- Å5K: ,)M+) 5

G3)5,[ Ecology & Environment Engineering, PC  
 S&v-2,[ Subsurface Investigation  
Buckhorn Island Shoreline Habitat Restoration Site  
Grand Island, New York

9- % &A>§ CD4332E-01-05-18  
 < 85MÅ' 2+.) 5[ See Boring Location Plan

< 85MÅ' § BISP-3 =/-, 1 '0 1

=,+&Å' +-[ 12/20/2017 P5): / Å' +,-[ 12/20/2017

G"& .)5+,-: =+\*%3 &MÅ\*\* - &  
 >' &/)5M 1116870.455 V- )M ,[ 140 3^8  
 F+: ,)5M 1038900.739 P+33[ 30 )58

D&4 5. 1+,-&Å^: -&K+.)5 :  
 ?+,- C)\* - ?- %/ G+):5M

WÅ\*\* - &CL% [ Automatic

D&45. ÅF3 K§ HW (4") Casing

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE		SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL	Recovery (Inches)
			From	To					
I									
Q									
T									
U									
X									
"	G	I	X&I	Å&I	==	VWVY ÅZ	X&I		
Ä	A		Ä&I	I#8U	==	IT T# T	Ä&I		IT
7	v				==	U" QT " I7			
#	D		Q	I#8U	I8U	==	U" QT " I7		
!!					==	7 QÄ TU U#	!8U		
!					==	7 QÄ TU U#	!8U		
IQ			T	I8U	IT8U	==	7 QÄ TU U#		IX
IT					==	TT QX 7 U#YZ	!T8U		
IU			U	IT8U	IX8U	==	TT QX 7 U#YZ		IT
IX					==	II IQ I7 QU			
"	X		IX8U	IÄ8U	==	II IQ I7 QU			II
IÄ					==	T# T U#YZ			
I7			"	IÄ8U	#8U	==	T# T U#YZ		I
#					==	IQ QU I7 IU			
!			Ä	#8U	8U	==	IQ QU I7 IU		I
Q							8U		
T									
U									

\$ CB5BDDI Ä>FÄÄG7TQQ &BODHÄÄ E>EA9O=BF > C:ÄD\$->ÄÄ=BS->?JÄ>H8I5cÄÄ&BT.#Ä8D: CÄUUYÄ

== =%Ä%5 Ä+\* %3  
 v 9' 2\_ &  
 =W ]5):.4&- Ä=+\* %Ä=/-3'LÄ4-N  
 F: J +,-. Ä&45. 1+,- &

? &3& [ Brad Perry; Kyle Holloway  
 A5% 2, § \_\_\_\_\_

**ATLANTIC TESTING LABORATORIES, Limited**

=4^: 48+2- 5K: ,)M+) 5

9- % &A>8

CD4332E-01-05-18

G3)5,[ Ecology & Environment Engineering, PC

< 85M8' 2+,) 5[ See Boring Location Plan

S& 2-[ Subsurface Investigation

Buckhorn Island Shoreline Habitat Restoration Site

Grand Island, New York

=,+&A+,-[ 12/21/2017 P5): / A+,-[ 12/21/2017

< 85M8' 8 BISP-4 =/-, 1 '0 1

D& 5. 1+,-&A^: -&K+,)5 :

?+,- C)\* - ?- %/ G+;)5M

G\* & .)5+,- :

=+\*%3 &WA\*\* - &

> ' & /)5M 1116743.734

V- )M ,[ 140 3^ 8

F+: ,)M 1039946.544

P+33[ 30 )58

WA\*\* - &CL% [ Automatic

D& 45. A3 K8

< ' 85M8\$ K+52- A^L[

HW (4") Casing

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE		SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL	Recovery (Inches)
			From	To					
1								\$%8( ) +,-,A - %/ A0A +,-&A^34* 56 8U0 -,	
Q	G	I	8U	T&I	==	VWY Z	8U	D& L); / ;< & 15GBSH@A3A-BC@A2A0A?AI: +,4&,-. JA9%, )2N	T
T	-						T&I		
U	A		T&I	X&I	==	VW I		D& L); / ;< & 15GBSH@A2A-BC@A2A^* 0A\$?AI: +,4&,-. J %: ,)2N A0A0T8 RAA85 # JAB6TUA85 U	T
X	v							9- ..) : / ;< & '15GBSHA +,4&+ . JA8%, )2N	T
"		Q	X&I	A&I	==	VW I I I			
A									
7		T	A&I	I#8U	==	VWY TZ		=) (388' )3A+,4&,-. JA8+,)2N	T
#									
!!		U	I#8U	I 8 U	==	VWY TZ		=) (388' )3A+,4&,-. JA8+,)2N	T
!								V +,-, 88, 488A^: - &K. A / )5A 833A )5M0 331 )5MA. K+52- * - 5,	
IQ		X	I 8 U	IT8U	==	VWY TZ		' A^ - %/ A0A#8U0-8	T
IT								=) (388' )3A+,4&,-. JA8+,)2N	T
IU		"	IT8U	IX8U	==	V9 Y Z V WY Z		=) (388' )3A+,4&,-. JA8+,)2N	T
IX									
I"		A	IX8U	I A8U	==	VWY TZ		=) (388' )3A+,4&,-. JA8+,)2N	T
IA							I A8U		
17									
#								< ' 85MA, & )5+,-. A+AI A8U0- A0& A,%A0A+, -8	
!								> ' ,-[	
Q								! 8AA0A0A+8A A? - 2 A, Ab4. 35- A8A#A0-	
T									
U									

\$ CBEBDDI A>FAAG7TQQ 880BODH8A > EA908bf > C:AD8\$>?AA=8\$>?JA>H88cAA88T.#A8D CAUUY8

== %8A%5 A+\* %8  
 v 9' 2 8 &  
 =W ]5): 48- A+\* %8A=/-3^L04^-N  
 F: ,) +,-. A& 45. 1+,- &

? 838 [ Brad Perry; Kyle Holloway  
 A5% 2, 8

**ATLANTIC TESTING LABORATORIES, Limited**

=4^: 480+2- 75K: ,)M+) 5

G3)5,[ Ecology & Environment Engineering, PC  
 S& 2-[ Subsurface Investigation  
Buckhorn Island Shoreline Habitat Restoration Site  
Grand Island, New York

9- % &A>8 CD4332E-01-05-18  
 < 85M8' 2+,) 5[ See Boring Location Plan

< 85M8' 8 BISP-5 =/ -, 1 '0 1

=,+&A+,-[ 12/21/2017 P5): / A+,-[ 12/21/2017

G\* & .)5+,-: =+\*%3 &WA\*\* &  
 > ' & /)5M 1116700.459 V- )M,[ 140 3^8

D&4 5. 1+,-&O^: -&K+,)5 :  
 ?+,- C)\* - ?- %/ G+;)5M

F+: ,)5M 1041321.359 P+33[ 30 )58

WA\*\* &CL% [ Automatic

D&45. AF3 K8 HW (4") Casing  
 < ' 85M8\$ K+52- A+L[

\$ CBIBODI A>FAAG7TQQ 80BODH8 A> EA9O>bf > C:AD8>?AA=BS>?JA>H8IScAA8BT.#A8D: CAUUY8

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE		SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL	Recovery (Inches)
			From	To					
1								\$%8( ) +,-.A - %/ AOA +,-&A'34* 56CUA -,	
Q							Q8		
T	G	I	Q8	U8	==	V9 Y Z I I	T8	D&L: / ; < & 15AGBSH@A+A0A?@A3 A BCA+ ,4&,-. JA%,)2N	#
U	A		U8	"8U	==	VWY TZ		D&L: / ; < & 15AGBSH@A)3 A BCA+ ,4&,-. JA%,)2N	T
X	V				==	VWY TZ		9-.. ) / ; < & 15AGBSH@' * - A BCA+ ,4&+ . JA% .)2N A SA QU8R SB6 ! JAB6TQA8	T
"	D				==	VWY TZ		=) 388' )3A+ ,4&,-. JA%,)2N	T
A		Q	"8U	78U	==	VWY TZ		=) 388' )3A+ ,4&,-. JA%,)2N	T
7					==	VWY TZ		=) 388' )3A+ ,4&,-. JA%,)2N	T
#		T	78U	U8.U	==	VWY TZ	"8 #	=) 388' )3A+ ,4&,-. JA%,)2N	T
!!					==	VWY TZ		=) 388' )3A+ ,4&,-. JA%,)2N	T
!		U	U8.U	U8U	==	VWY TZ		=) 388' )3A+ ,4&,-. JA%,)2N	T
IQ					==	VWY TZ		=) 388' )3A+ ,4&,-. JA%,)2N	T
IT		X	U8U	U8U	==	VWY TZ		=) 388' )3A+ ,4&,-. JA%,)2N	T
U					==	VWY TZ		=) 388' )3A+ ,4&,-. JA%,)2N	T
IX		"	U8U	"8.U	==	VWY AZ U			
!"					==	VWY TZ			
IA		A	"8.U	U78U	==	T T X I"	!78U	9-.. ) / ; < & 15AGBSH@A' - A* 0A\$>?@A& A A D\$ EFB@A& = BCA+ ,4&,-. JA%,)2N	#
17					==	VWY TZ			
#					==	VWY TZ			
!					==	VWY TZ		< ' 85M8, & )5+,-. A+ A78UA0- ,A0& A, %AOA+,- 88	
Q					==	VWY TZ		> ' ,-[	
T					==	VWY TZ		! 8AA@A'0A+8M A?2 _A,Ab4. 35- AUB#A0-	
U					==	VWY TZ			

== %8A%5 A+\* %3  
 v 9' 2\_8 &  
 =W ]5): ,48- A+\* %8A=/-3'LAD^N  
 F: ,) +,-. D&45. 1+,- &

?838 [ Brad Perry; Kyle Holloway  
 A5% 2' 8





**ATLANTIC TESTING LABORATORIES, Limited**

=4^: 48+2- 5K: ,)M+) 5

G3)5,[ Ecology & Environment Engineering, PC  
 S& 2,[ Subsurface Investigation  
Buckhorn Island Shoreline Habitat Restoration Site  
Grand Island, New York

9- % &A>8 CD4332E-01-05-18  
 < 85M 2+,) 5[ See Boring Location Plan

< 85M 8 BISP-7 =/ -, 1 '0 1

=,+&A +,-[ 12/21/2017 P5): / A +,-[ 12/22/2017  
 D& 5. 1+,-&A^: -&K+,)5 :  
 ?+,- C)\* - ?- %/ G+):5M

G"& .)5+,-: =+\*%3 &M+\*- &  
 > ' &/)5M 1116352.264 V- )M,[ 140 3^8

F+: ,)M 1042944.02 P+33[ 30 )58

W+\*- &CL% [ Automatic

D& 45. AF3 K8 HW (4") Casing  
 < ' 85M \$ K+52- A L[

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE		SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL	Recovery (Inches)
			From	To					
1									
Q									
T	G	I	Q8I	U8I	==	IX U X 7	Q8I	<& 15A=BC@A3A* 0A\$>?@A+2 A AD\$ EFB@A2 AGSH1 - ,J K & LA3)M3L2+ ,)2N	IA
U	A		U8I	"8U	==	# QQ QX QU		9- ..) / ; <& 15A=BC@A3A* 0A\$>?@A+2 A AD\$ EFB@A2 GB\$H1 - ,J K & LA3)M3L2+ ,)2N GO < BF P & M - 5 ;	IA
X	V		"8U	78U	==	IQ " QQ QZ		9- ..) / ; <& 15A=BC@A* - A* 0A\$>?@A+2 A AD\$ EFB@A2 GB\$H1 - ,J K & LA3)M3L2+ ,)2N A ACR ASB6 ! JBB6 ! A 5A"	IA
"							!!8 U	9- ..) / ; <& 15A=BC@A* - A* 0A\$>?@A+2 A AD\$ EFB@A2 GB\$H1 : +,4&,- . J K & LA3)M3L2+ ,)2N	IA
A			Q	"8U	78U	==		9- ..) / ; <& 15A=BC@A3A* 0A\$>?@A+2 A GB\$H@A2A D9 \$EFBA1 - ,JA)M ,3A% .)2N	IX
7			T	78U	!!8 U	==		9- ..) / ; <& 15A=BC@A3A* 0A\$>?@A+2 A GB\$H@A2A 0 D9 \$EFBA1 : +,4&,- . JA3)M3L2+ ,)2N	"
#								=) 3-8' )A1 - ,JA)M ,3A% .)2N	IA
!!			U	!!8 U	IQ8U	==		9- ..) / ; <& 15A=BC@A* - A* 0A\$>?@A+2 A GB\$H@A2A D9 \$EFBA1 - ,JA)M ,3A% .)2N	#
!							!78!	< ' 85M A ,& )5+,- . A+78 A0- ,A0 & A ,%A0A4,- &	
IQ								> ' .-:[	
IT	X		IQ8U	!!8U	==	X U#YZ		!8AA@A'0A*8M A?2 A ,Ab4. 35- AUB#A0-	
U									
IX			"	!!8U	!!8U	==			
"									
IA			A	!!8U	!78U	==			
17									
#									
!									
Q									
T									
U									

\$ CB\$BOD I A>FAAG7TQQ &BODH4& E> EA9O>BF > C:AD\$>?AA=BS>?JA>H8I5cA&A&BT.#A8D CA&UY8

== =%A%5 A+\* %3  
 v 9' 2 A &  
 =W ]5): .4&- A=+\* %A=/-3'LA4\*-N  
 F. J +,- . A& 45. 1+,- &

? 83& [ Brad Perry; Kyle Holloway  
 A5% 2, 8

**ATLANTIC TESTING LABORATORIES, Limited**

=4^: 48+2- 5K: ,M+) 5

G3)5,[ Ecology & Environment Engineering, PC  
 S& 2,[ Subsurface Investigation  
Buckhorn Island Shoreline Habitat Restoration Site  
Grand Island, New York

9- % &A>8 CD4332E-01-05-18  
 < 85M 2+,) 5[ See Boring Location Plan

< 85M 8 BISP-8 =/ -, 1 0 1

=,+&A+,-[ 12/22/2017 P5): / A+,-[ 12/22/2017  
 D& 4. 1+,-8^O^: -&K+,)5 :  
 ?+,- C)\* - ?- %/ G+;)5M

G\* & .)5+,- : =+\*%3 &WA\*\* - &  
 > ' &/)5M 1115949.505 V- )M,[ 140 3^8

F+: ,)M 1043587.724 P+33[ 30 )58

WA\*\* - &CL% [ Automatic

D& 45. AF3 K8 HW (4") Casing  
 < ' 85M \$ K+52- A^L[

\$ CBIBODI A>FAAG7TQQ 8D BODH A > EA9O=bf > C:ADJ\$>?AA=BS\$>?JA>H8IScAA8GT.#A8D CAUUYE

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE		SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL	Recovery (Inches)
			From	To					
1	G	!	#8	8#	==	VWY Z	D&L); /;<&1 5A 0F\$>? @* -A=BC@2-AO9 DS>AG	IX	
Q	A		8#	T#	==	VWY Z Q	b \$CF9A\$BAI+,4&,-. JA55;%@-.)2N	IQ	
T	V	Q	T#	X#	==	VWY Z	=) 38' )3A+,4&,-. JA' 5;%@+.)2N	Q	
U	D						S&S		
X		T	X#	A#	==	VW Q Q	=) 38' )3A+,4&,-. JA' 5;%@+.)2N		
A		U	A#	!#8#	==	VW ! ! Q	D&L); /;<&15A* 0A\$>? @A;2 -A=BCA1 - ,JA55;%@-.)2N	I#	
7							>O A9FGOEF9H	#	
#		X	!#8#	!8#	==	VWY Z Q U	D&L); /;<&15A* 0A\$>? @A;2 -A=BCA1 - ,JA55;%@-.)2N	X	
!!		"	!8#	!T8#	==	VW ! !			
!Q									
IT		A	IT8#	IX8#	==	VWY Z U	9- . .) /;<&15AGBH @A+A2*0A\$>? @A;3 A 0A\$ EFB A1 - ,JA55;%@-.)2N	A	
IU									
IX									
I"							< ' 85M & )5+,-. A.AX#A, A-31 A 4. 35-8		
IA									
17									
#									
!									
Q									
T									
U									

**ATLANTIC TESTING LABORATORIES, Limited**

=4^: 480+2- Å5K: ,)M+) 5

G3)5,[ Ecology & Environment Engineering, PC  
 S& 2,[ Subsurface Investigation  
Buckhorn Island Shoreline Habitat Restoration Site  
Grand Island, New York

9- % &Å>§ CD4332E-01-05-18

< 85MÅ 2+,) 5[ See Boring Location Plan

< 85MÅ ' § BISP-9 =/-, 1 0 1

=,+&Å +,-[ 4/30/2018 P5): / Å +,-[ 4/30/2018

G\* & .)5+,- : =+\*%3 &MÅ\*\* &  
 > ' &/)5M 1116685.598 V- )M,[ 140 3^8  
 F+: ,)M 1037707.543 P+33[ 30 )58

D&4 5. 1+,-8Å^O: -&K+,)5 :  
 ?+,- C)\* - ?- %/ G+):5M  
4/30/2018 PM \*0.7' 6.0'  
4/30/2018 PM \*0.9' 14.0'  
4/30/2018 PM \*0.5' CAVED

WÅ\*\* &ÅCL% [ Automatic

D&45. ÅF3 K§ HW (4") Casing  
 < 85MÅ\$ K+52- Å^L[

**Borehole caved at 10.0 feet.**  
 \*May be affected by water utilized to advance the

borehole.

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE		SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL	Recovery (Inches)
			From	To					
1	G	!	#8	8#	==	Å !Q 7	8#	<& 15Å* 0Å\$>?@Å+ Å*0Å\$ EFB@Å& Å-BCÅ' ), J 5' 5;%§ ,)2N	!!
Q	A	V	8#	T#	==	!# !# !! !!	8#	D& LÅ-BC@' * - Å* 0Å\$>?Å! * ' ), JÅ55;%@:,)2N	!T
T	D	Q	T#	X#	==	!# " T Q	8#	D& L): / ; & 15Å-BC@Å+Å Å! Å\$>?@Å+ Å*0Å\$>?@Å+ Å*0Å\$>AGÅ!\$CF9Å\$B ! & ' ,Å+ Å! - ,JÅ55;%@:,)2N	!
U		T	X#	Å#	==	Q Q "	8#	D& L): / ; & 15Å! Å\$>?@Å+ Å-BCÅ1 - ,JÅ55;%@:,)2N Å Å'8 XR SB6>S.Å!B6>S.JÅ!B>S	#
Ä		U	Å#	!#8#	==	! Q U	!#8#	D& LÅ*0Å\$>?@Å+ Å-BC@Å& Å Å! Å\$ EFBÅ: +,4&,-. J 5' 5;%§ ,)2N	!U
7		X	!#8#	!8#	==	T ! ! !	!8#	>O Å9FGOE9 H	#
#		"	!8#	!T8#	==	VWY Z ! !	!8#	<& 15ÅGB\$HÅ! - ,JÅ%:,)2N	T
!1		Ä	!T8#	!X8#	==	V9 V WY Z !	!X8#	<& 15ÅGB\$HÅ! - ,JÅ%:,)2N	T
!2								<' 85MÅ, & )5+,-. Å+ÅX#Å0-,8	
!3								> ' ,-[ !8ÅÅ& / ' 3 Å+2_033-Å )/ Å5:,- Å' )38	

S CB;BOD! Å>FÅÅG;7TQQ ÅBDBODHÅ Å > EA9O=bf > C;ÅD\$>?ÅÅ=BS\$>?JÅ>H8!\$cÅÅÅBET.#Å8D; CÅÅUYÅ

== %Å%5 Å+\* %3  
 v 9' 2 Å &  
 =W ]5): Å&- Å+\* %ÅÅ=-3'ÅDÅ-N  
 F: J +,-. Å&45. 1+,- &

? Å3& [ Brad Perry; Jeff Donovan  
 Å5% 2' § \_\_\_\_\_

**ATLANTIC TESTING LABORATORIES, Limited**

=4^: 480+2- 75K: ,)M+) 5

G3)5,[ Ecology & Environment Engineering, PC  
 S& 1-2,[ Subsurface Investigation  
Buckhorn Island Shoreline Habitat Restoration Site  
Grand Island, New York

9- % &A>8 CD4332E-01-05-18

< 85M8' 2+.) 5[ See Boring Location Plan

< 85M8' 8 BISP-10 =/-, 1 '0 1

=,+&A+,-[ 5/1/2018 P5): / A+,-[ 5/1/2018

D& 4 5. 1+,-&A^: -&K+.)5 :

G\* & .)5+,- : =+\*%3 &WA\*\* - &  
 > ' &/ )5M 1115552.079 V- )M,[ 140 3^ 8

?+,- C)\* - ?- %/ G+.)5M

F+: ,)M 1044184.577 P+33[ 30 )58

5/1/2018 AM \*0.5' 6.0'

5/1/2018 AM \*0.8' 14.0'

5/1/2018 AM \*0.3' CAVED

WA\*\* - &CL%[ Automatic

D& 45. A73 K8 < 85M8' K+52- A+L[

**Borehole caved at 7.5 feet.**

HW (4") Casing

**\*May be affected by water utilized to advance the**

**borehole.**

DEPTH	METHOD OF ADVANCE	SAMPLE NO.	DEPTH OF SAMPLE		SAMPLE TYPE	BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER	DEPTH OF CHANGE	CLASSIFICATION OF MATERIAL	Recovery (Inches)
			From	To					
1	G	!	8#	8#	==	T !! 7 U	8#	< & 15A* 0A\$>?@A+ A*0A\$ EFB@A3A-BCA1' ) ,JA55;9@-.)2N	17
Q	A		8#	T#	==	U U X X	T#	D& LA=BC@33 A A\$>?@A+ A*0A\$ EFB@A3A-BCA1' ) ,JA55;9@-.)2N	!
T	V							b \$CF9\$BA: / - 38AM - 5; M* ' ) ,JA- &A3)M3LA3+.)2N	
U	D	Q	T#	X#	==	T ! !	A#	D& LA=BC@' * - A* 0A\$>?A11- ,JA55;9@-.)2N A A XQR	!X
X								SB6>S.AB6>S.JA\$>S	
"		T	X#	A#	==	! !		D& LA=BC@' * - A* 0A\$>?@A+ A*0A\$ EFB@A3A-BCA1' ) ,JA55;9@-.)2N	!T
A								/ +)JA- 2' * % :)5MAKM ,+) 5MA- ,JA55;9@-.)2N	
7		U	A#	!#8#	==	! ! ! !		D& LA*0A\$>?@A+ A*0A\$ EFB@A3A-BCA1' ) ,JA55;9@-.)2N	
#								b \$CF9\$BA& ' A+)&M1- ,JA* . - &- 3A%: ,)2N	
!!		X	!#8#	!8#	==	!		D& LA*0A\$>?@A+ A*0A\$ EFB@A3A-BCA1' ) ,JA55;9@-.)2N	7
!								I& ' ,A+&JA- 2' * % :)5MAKM ,+) 5MA- ,JA3)M3LA3+.)2N	
IQ		"	!8#	!T8#	==	VWYZ Q		QQR	
IT								D& LA*0A\$>?@A+ A*0A\$ EFB@A3A-BCA1' ) ,JA55;9@-.)2N	17
IU		A	!T8#	!X8#	==	VW ! Q		b \$CF9\$BAI - 2' * % :)5MAKM ,+) 5MA- ,JA&LA: M ,3A%: ,)2N	
IX								D& LA*0A\$>?@A+ A*0A\$ EFB@A3A-BCA1' ) ,JA55;9@-.)2N	
I"								I. - 2' * % :)5MAKM ,+) 5MA: +,4&- . JA3)M3LA3+.)2N	
IA								< 85MA- & )5+,-. A+AX#A0-8	
17								> ' ,-[	
#								!8AA& / ' 3 A+2_033-A )/ A5: )- A' )38	
!									
Q									
T									
U									

== %A%5 A+\* %3  
 v 9' 2\_ &  
 =W ]5): ,4&- A+\* %A= / -3'LA4'-N  
 F: ,) +,-. A& 45. 1+,- &

? 83& [ Brad Perry; Jeff Donovan  
 A5% 2, 8 [ \_\_\_\_\_

\$ CB\$BODI A>FAAG:7TQQ &BODH&A> EA9O=bf > C:ADJ\$>AA=BS>?JA>H8IScAA&BT.#A8D CAUUY&

APPENDIX D  
LABORATORY TEST RESULTS



# ATLANTIC TESTING LABORATORIES

WBE certified company

LABORATORY DETERMINATION OF MOISTURE CONTENT OF SOILS  
ASTM D 2216

PROJECT INFORMATION

Client: Ecology & Environment Engineering, PC      ATL Report No.: CD4332SL-01-05-18  
Project: Buckhorn Island State Park - Shoreline Habitat      Report Date: May 24, 2018  
Restoration Project, Grand Island, New York      Date Received: May 17, 2018

TEST DATA

Boring No.	Sample No.	Depth (ft)	Moisture Content (%)
BISP-01	S-5 <sup>1</sup>	17.8-19.8	12.3
BISP-02	S-3	7.5-9.5	34.8
BISP-03	S-3 <sup>1</sup>	10.5-12.5	5.1
BISP-04	S-2 <sup>1</sup>	4.5-6.5	34.1
BISP-05	S-3	7.5-9.5	35.8
BISP-06	S-2 <sup>1</sup>	8-10	35.8
BISP-07	S-3 <sup>1</sup>	7.5-9.5	8.3
BISP-08	S-2	2-4	29.6
BISP-09	S-4	6-8	27.6
BISP-10	S-3	4-6	26.3

REMARKS

1. Sample mass was less than the minimum mass outlined in the referenced test method.

Reviewed By:

Judith Ames

Date:

5/24/18



## Particle Size Distribution Report

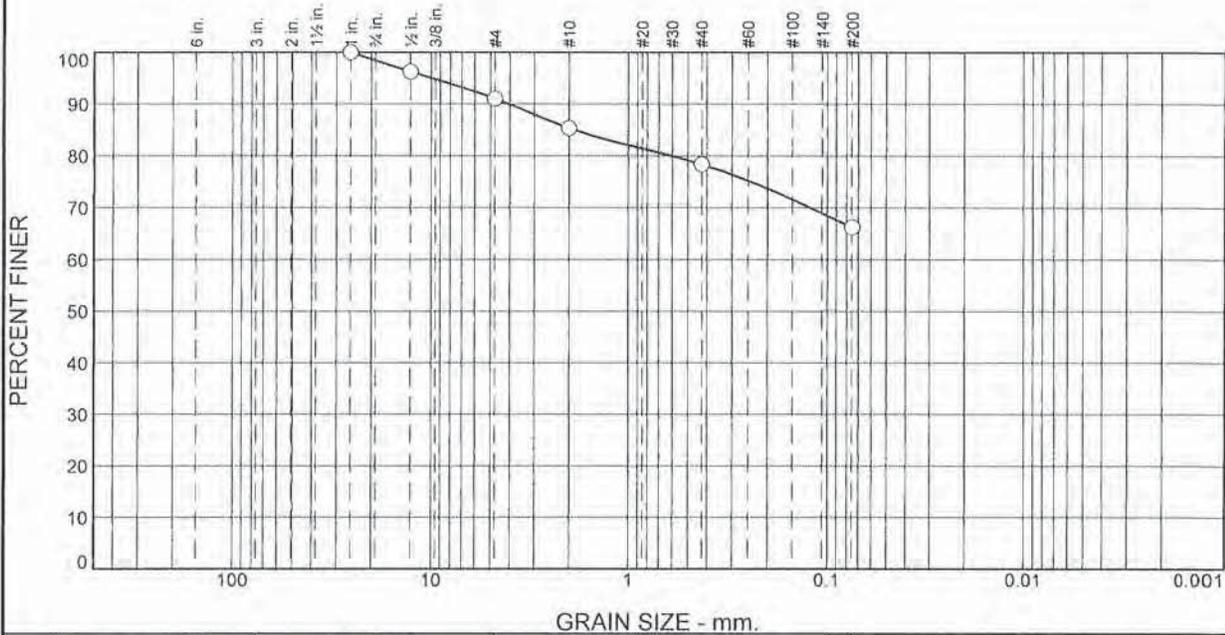
**Project:** Buckhorn Island St Park Shoreline Habitat Restoration **Report No.:** CD4332SL-01-05-18

**Client:** Ecology & Environment Engineering, PC

**Date:** 05/24/18

**Sample No:** BISP-01, S-5 **Source of Sample:** Boring Sample  
**Location:** In-place

**Elev./Depth:** 17.8-19.8'



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	2	7	6	7	12	66	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
1"	100		
1/2"	96		
#4	91		
#10	85		
#40	78		
#200	66		

**Soil Description**  
 Reddish-Brown SILT; some cmf+ SAND; trace CLAY

**Atterberg Limits**  
 PL= 18      LL= 22      PI= 4

**Coefficients**  
 D<sub>85</sub>= 1.8809      D<sub>60</sub>=      D<sub>50</sub>=  
 D<sub>30</sub>=      D<sub>15</sub>=      D<sub>10</sub>=  
 C<sub>u</sub>=      C<sub>c</sub>=

**Classification**  
 USCS= CL-ML      AASHTO= A-4(0)

**Remarks**  
 Moisture Content = 12.3%

\* (no specification provided)

Reviewed by: Judy Amos

Date: 5/24/18



## Particle Size Distribution Report

**Project:** Buckhorn Island St Park Shoreline Habitat Restoration **Report No.:** CD4332SL-01-05-18

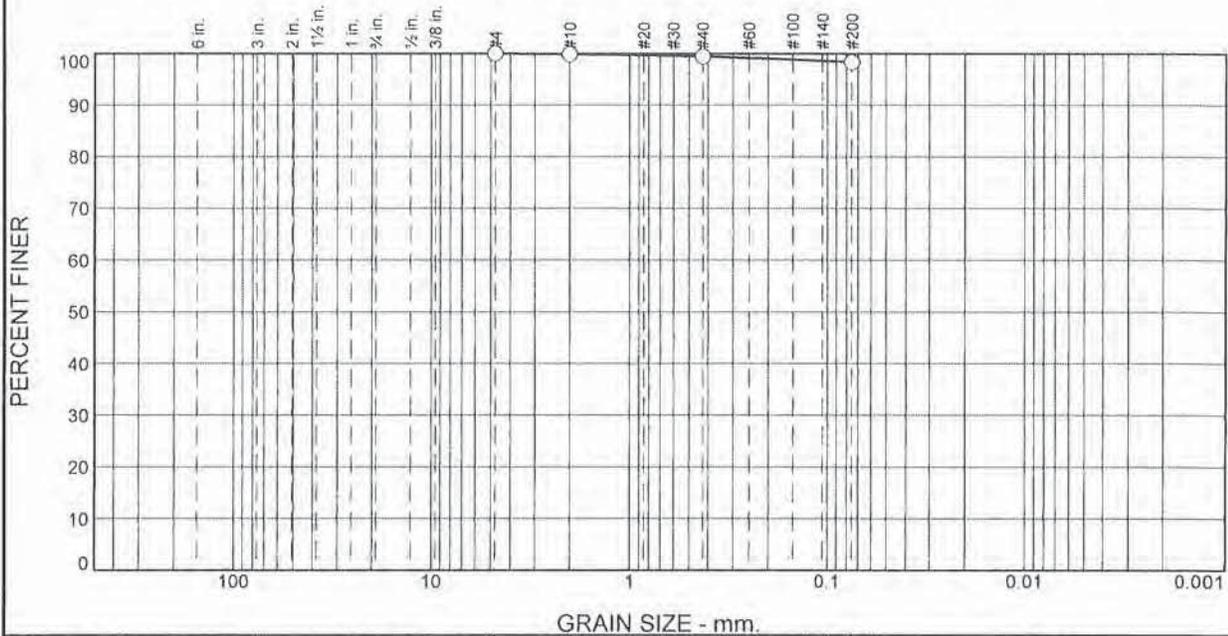
**Client:** Ecology & Environment Engineering, PC

**Date:** 05/24/18

**Sample No:** BISP-02, S-3 **Source of Sample:** Boring Sample

**Location:** In-place

**Elev./Depth:** 7.5-9.5'



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	1	1	98	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
#4	100		
#10	100		
#40	99		
#200	98		

**Soil Description**  
Brownish-Grey CLAY; and SILT; trace mf SAND

**Atterberg Limits**  
PL= 21      LL= 45      PI= 24

**Coefficients**  
D<sub>85</sub>=      D<sub>60</sub>=      D<sub>50</sub>=  
D<sub>30</sub>=      D<sub>15</sub>=      D<sub>10</sub>=  
C<sub>u</sub>=      C<sub>c</sub>=

**Classification**  
USCS= CL      AASHTO= A-7-6(26)

**Remarks**  
Moisture Content = 34.8%

\* (no specification provided)

Reviewed by: Judy Ames

Date: 5/24/18



## Particle Size Distribution Report

**Project:** Buckhorn Island St Park Shoreline Habitat Restoration **Report No.:** CD4332SL-01-05-18

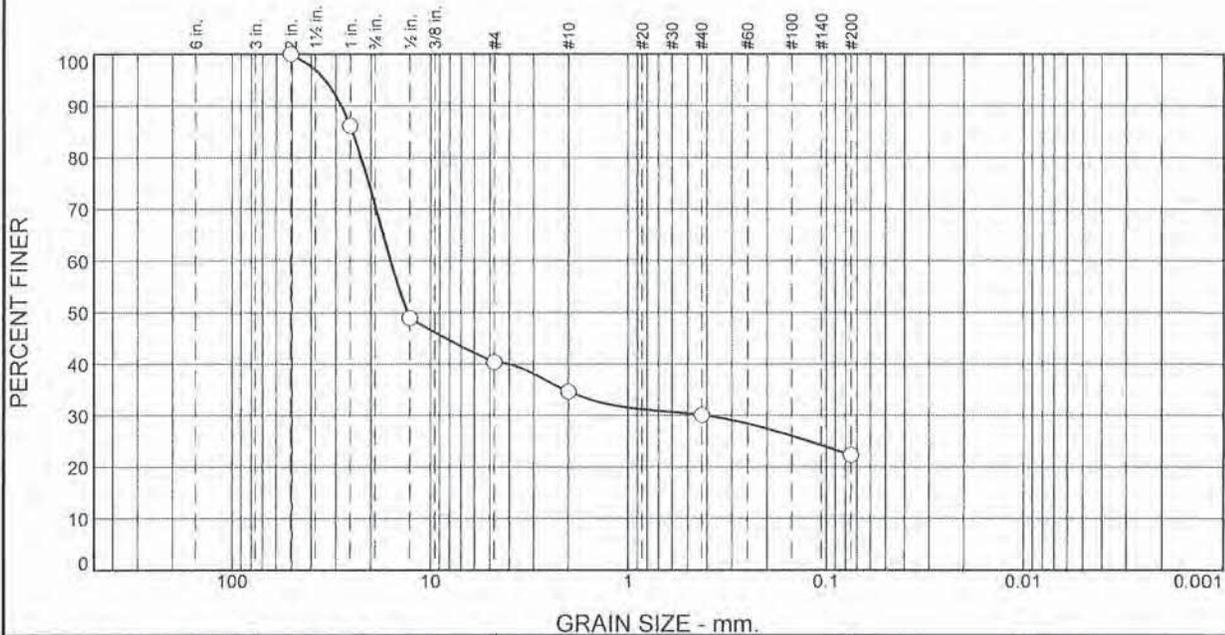
**Client:** Ecology & Environment Engineering, PC

**Date:** 05/24/18

**Sample No:** BISP-03, S-3 **Source of Sample:** Boring Sample

**Location:** In-place

**Elev./Depth:** 10.5-12.5'



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	29	31	5	5	8	22	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
2"	100		
1"	86		
1/2"	49		
#4	40		
#10	35		
#40	30		
#200	22		

**Soil Description**  
 Reddish-Brown cm+f GRAVEL; some SILT; little cmf SAND

**Atterberg Limits**  
 PL= 11      LL= 16      PI= 5

**Coefficients**  
 D<sub>85</sub>= 24.7585      D<sub>60</sub>= 15.8722      D<sub>50</sub>= 13.0345  
 D<sub>30</sub>= 0.4107      D<sub>15</sub>=      D<sub>10</sub>=  
 C<sub>u</sub>=      C<sub>c</sub>=

**Classification**  
 USCS= GC-GM      AASHTO= A-1-b

**Remarks**  
 Moisture Content = 5.1%

\* (no specification provided)

Figure

Reviewed by: Judith Ames

Date: 5/24/18



## Particle Size Distribution Report

**Project:** Buckhorn Island St Park Shoreline Habitat Restoration **Report No.:** CD4332SL-01-05-18

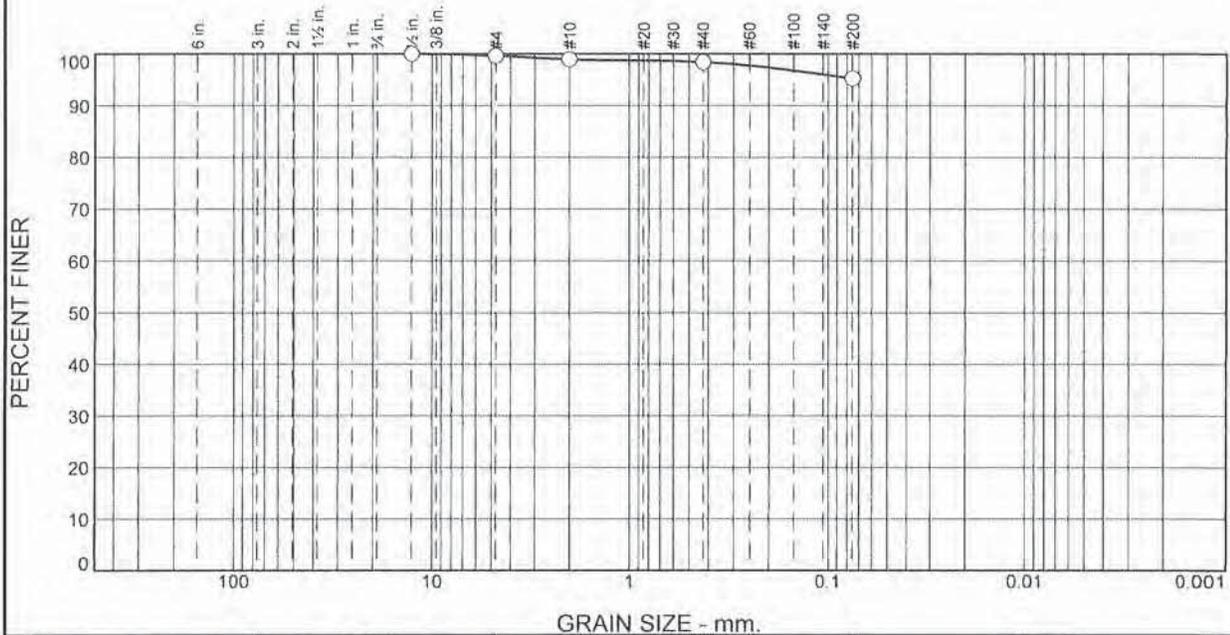
**Client:** Ecology & Environment Engineering, PC

**Date:** 05/24/18

**Sample No:** BISP-04, S-2 **Source of Sample:** Boring Sample

**Location:** In-place

**Elev./Depth:** 4.5-6.5'



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	1	1	3	95	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
1/2"	100		
#4	100		
#10	99		
#40	98		
#200	95		

**Soil Description**  
Greyish-Brown CLAY; trace SILT; trace cmf SAND

**Atterberg Limits**  
PL= 20      LL= 45      PI= 25

**Coefficients**  
D<sub>85</sub>=      D<sub>60</sub>=      D<sub>50</sub>=  
D<sub>30</sub>=      D<sub>15</sub>=      D<sub>10</sub>=  
C<sub>u</sub>=      C<sub>c</sub>=

**Classification**  
USCS= CL      AASHTO= A-7-6(26)

**Remarks**  
Moisture Content = 34.1%

\* (no specification provided)

ATLANTIC TESTING LABORATORIES, LIMITED

Figure

Reviewed by: Judith Ames

Date: 5/24/18



## Particle Size Distribution Report

**Project:** Buckhorn Island St Park Shoreline Habitat Restoration **Report No.:** CD4332SL-01-05-18

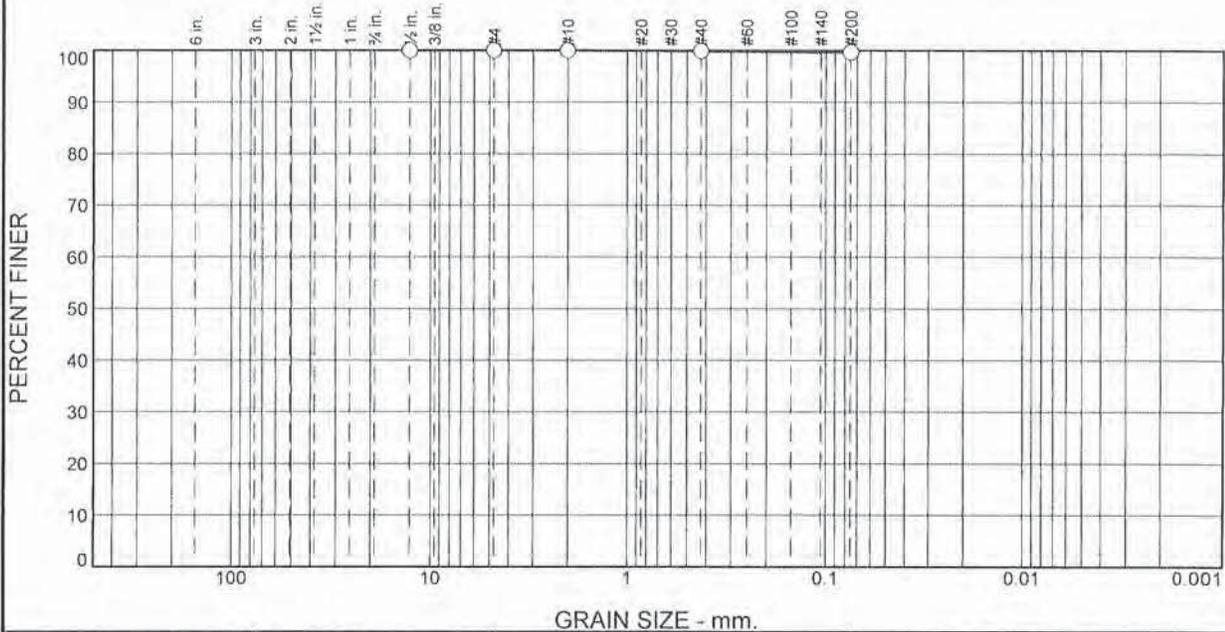
**Client:** Ecology & Environment Engineering, PC

**Date:** 05/24/18

**Sample No:** BISP-05, S-3 **Source of Sample:** Boring Sample

**Location:** In-place

**Elev./Depth:** 7.5-9.5'



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	0	100	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
1/2"	100		
#4	100		
#10	100		
#40	100		
#200	100		

**Soil Description**  
 Reddish-Brown CLAY; some SILT

**Atterberg Limits**  
 PL= 21      LL= 43      PI= 22

**Coefficients**  
 D<sub>85</sub>=      D<sub>60</sub>=      D<sub>50</sub>=  
 D<sub>30</sub>=      D<sub>15</sub>=      D<sub>10</sub>=  
 C<sub>u</sub>=      C<sub>c</sub>=

**Classification**  
 USCS= CL      AASHTO= A-7-6(24)

**Remarks**  
 Moisture Content = 35.8%

\* (no specification provided)

Reviewed by: Judith Ames

Date: 5/24/18



## Particle Size Distribution Report

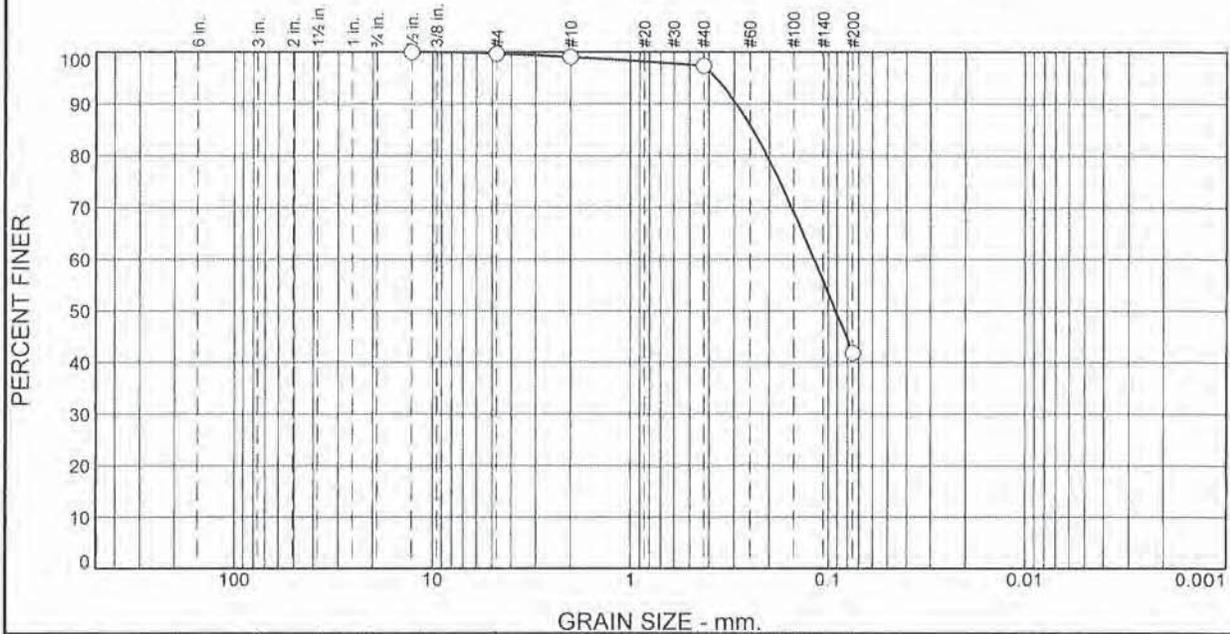
**Project:** Buckhorn Island St Park Shoreline Habitat Restoration **Report No.:** CD4332SL-01-05-18

**Client:** Ecology & Environment Engineering, PC

**Date:** 05/24/18

**Sample No:** BISP-06, S-2 **Source of Sample:** Boring Sample  
**Location:** In-place

**Elev./Depth:** 8-10'



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	1	2	55	42	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
1/2"	100		
#4	100		
#10	99		
#40	97		
#200	42		

**Soil Description**  
 Greyish-Brown cmf+ SAND; and SILT; trace ORGANIC MATERIAL

**Atterberg Limits**  
 PL= NP      LL= NP      PI= NP

**Coefficients**  
 D<sub>85</sub>= 0.2424      D<sub>60</sub>= 0.1179      D<sub>50</sub>= 0.0917  
 D<sub>30</sub>=              D<sub>15</sub>=              D<sub>10</sub>=  
 C<sub>u</sub>=              C<sub>c</sub>=

**Classification**  
 USCS= SM      AASHTO= A-4(0)

**Remarks**  
 Moisture Content = 35.8%

\* (no specification provided)

Reviewed by: Judith Corrales

Date: 5/24/18



## Particle Size Distribution Report

**Project:** Buckhorn Island St Park Shoreline Habitat Restoration **Report No.:** CD4332SL-01-05-18

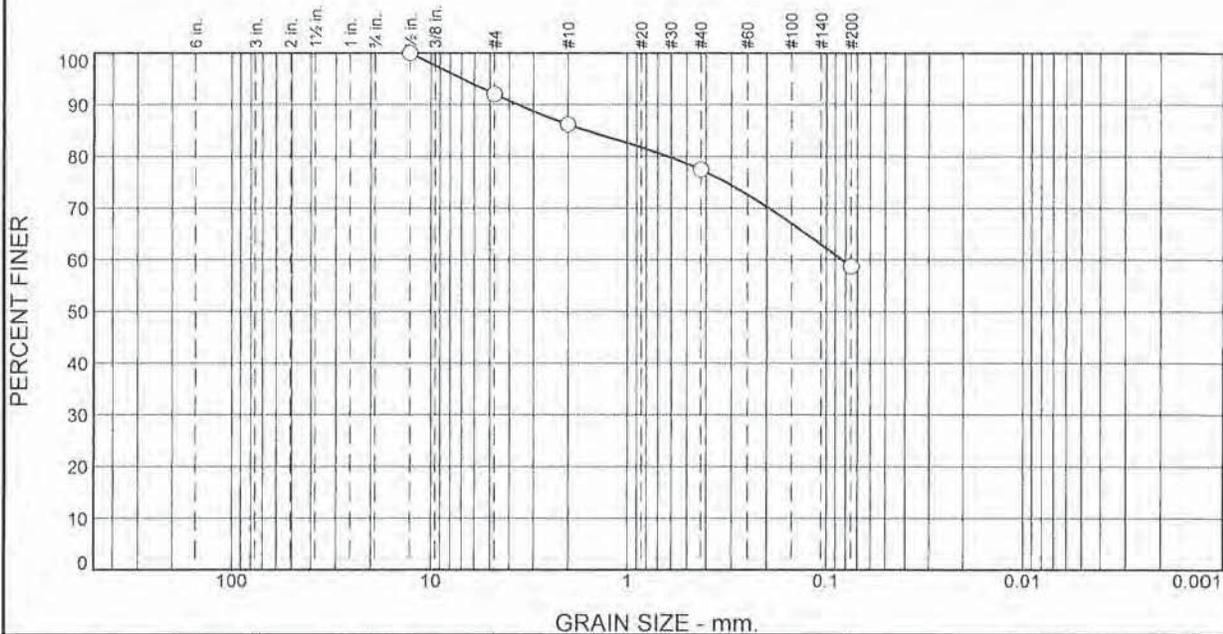
**Client:** Ecology & Environment Engineering, PC

**Date:** 05/24/18

**Sample No:** BISP-07, S-3 **Source of Sample:** Boring Sample

**Location:** In-place

**Elev./Depth:** 7.5-9.5'



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	8	6	9	18	59	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
1/2"	100		
#4	92		
#10	86		
#40	77		
#200	59		

**Soil Description**  
 Reddish-Brown SILT; some cmf SAND; trace f GRAVEL; trace CLAY

**Atterberg Limits**  
 PL= 11      LL= 18      PI= 7

**Coefficients**  
 D<sub>85</sub>= 1.6055      D<sub>60</sub>= 0.0832      D<sub>50</sub>=  
 D<sub>30</sub>=                      D<sub>15</sub>=                      D<sub>10</sub>=  
 C<sub>u</sub>=                      C<sub>c</sub>=

**Classification**  
 USCS= CL-ML      AASHTO= A-4(1)

**Remarks**  
 Moisture Content = 8.3%

\* (no specification provided)

Reviewed by: Judge Amos

Date: 5/24/18



## Particle Size Distribution Report

**Project:** Buckhorn Island St Park Shoreline Habitat Restoration **Report No.:** CD4332SL-01-05-18

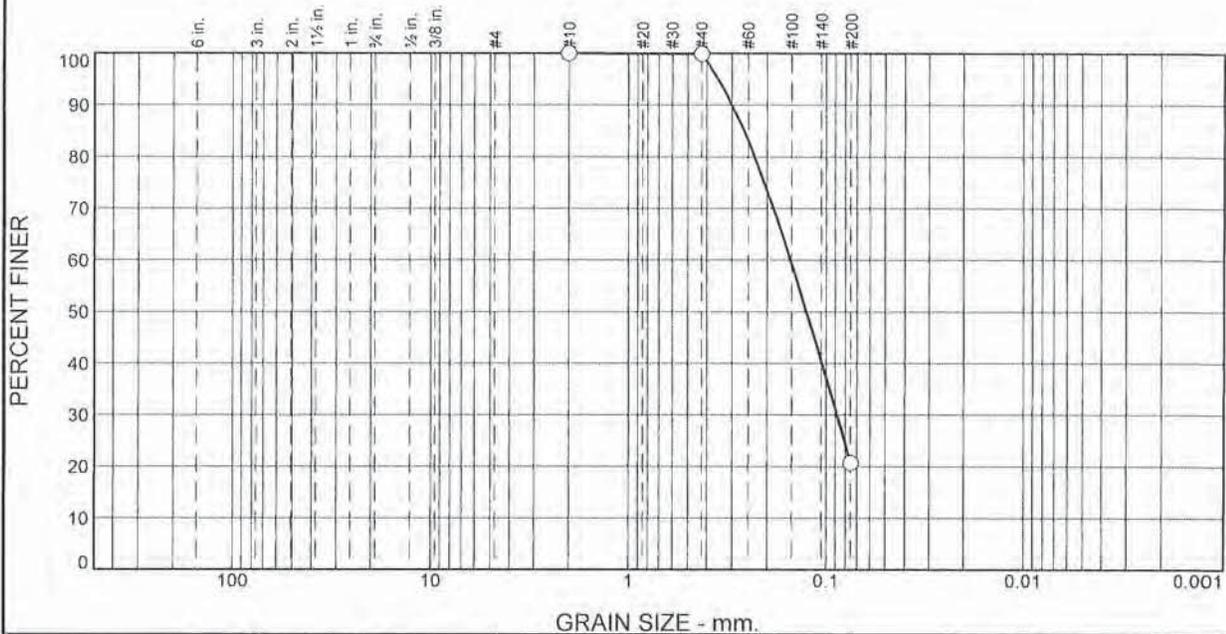
**Client:** Ecology & Environment Engineering, PC

**Date:** 05/24/18

**Sample No:** BISP-08, S-2 **Source of Sample:** Boring Sample

**Location:** In-place

**Elev./Depth:** 2-4'



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	79	21	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
#10	100		
#40	100		
#200	21		

**Soil Description**  
 Greyish-Brown f SAND; some SILT; trace ORGANIC MATERIAL

**Atterberg Limits**  
 PL= NP      LL= NP      PI= NP

**Coefficients**  
 D<sub>85</sub>= 0.2619      D<sub>60</sub>= 0.1519      D<sub>50</sub>= 0.1258  
 D<sub>30</sub>= 0.0881      D<sub>15</sub>=              D<sub>10</sub>=  
 C<sub>u</sub>=              C<sub>c</sub>=

**Classification**  
 USCS= SM      AASHTO= A-2-4(0)

**Remarks**  
 Moisture Content = 29.6%

\* (no specification provided)

Figure

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: Judith Ames

Date: 5/24/18



## Particle Size Distribution Report

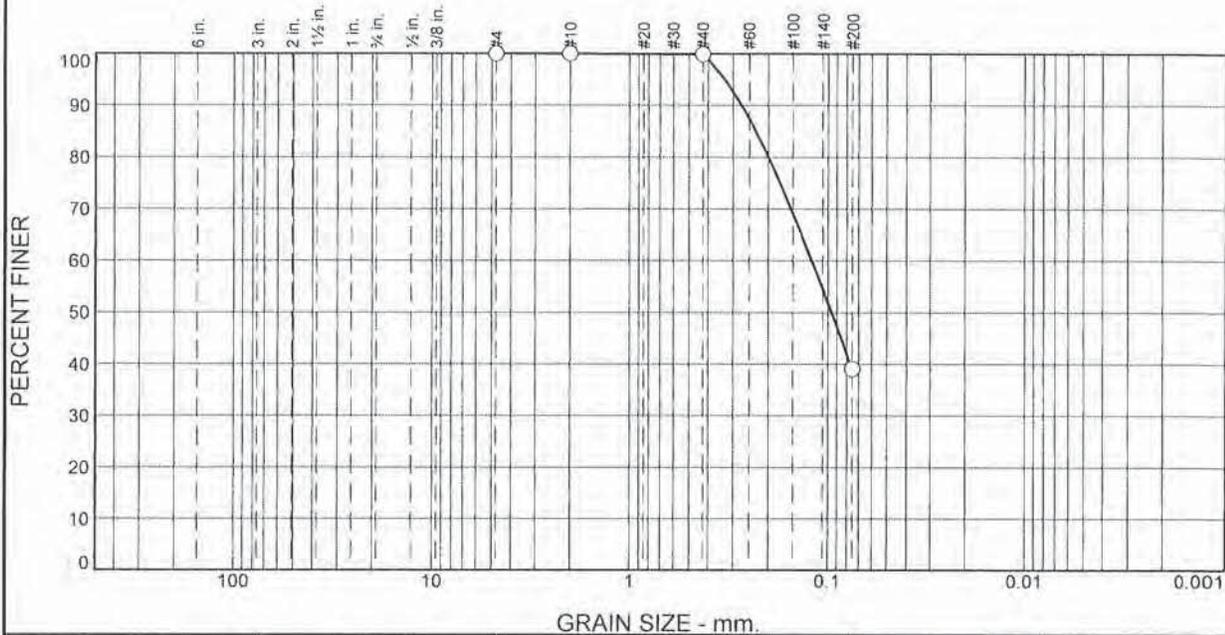
**Project:** Buckhorn Island St Park Shoreline Habitat Restoration **Report No.:** CD4332SL-01-05-18

**Client:** Ecology & Environment Engineering, PC

**Date:** 05/24/18

**Sample No:** BISP-09, S-4 **Source of Sample:** Boring Sample  
**Location:** In-place

**Elev./Depth:** 6-8'



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	61	39	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
#4	100		
#10	100		
#40	100		
#200	39		

**Soil Description**  
 Greyish-Brown f SAND; and SILT

**Atterberg Limits**  
 PL= NP      LL= NP      PI= NP

**Coefficients**  
 D<sub>85</sub>= 0.2311      D<sub>60</sub>= 0.1204      D<sub>50</sub>= 0.0957  
 D<sub>30</sub>=              D<sub>15</sub>=              D<sub>10</sub>=  
 C<sub>u</sub>=              C<sub>c</sub>=

**Classification**  
 USCS= SM      AASHTO= A-4(0)

**Remarks**  
 Moisture Content = 27.6%

\* (no specification provided)

Figure

Reviewed by: Judith Ames

Date: 5/24/18



## Particle Size Distribution Report

**Project:** Buckhorn Island St Park Shoreline Habitat Restoration **Report No.:** CD4332SL-01-05-18

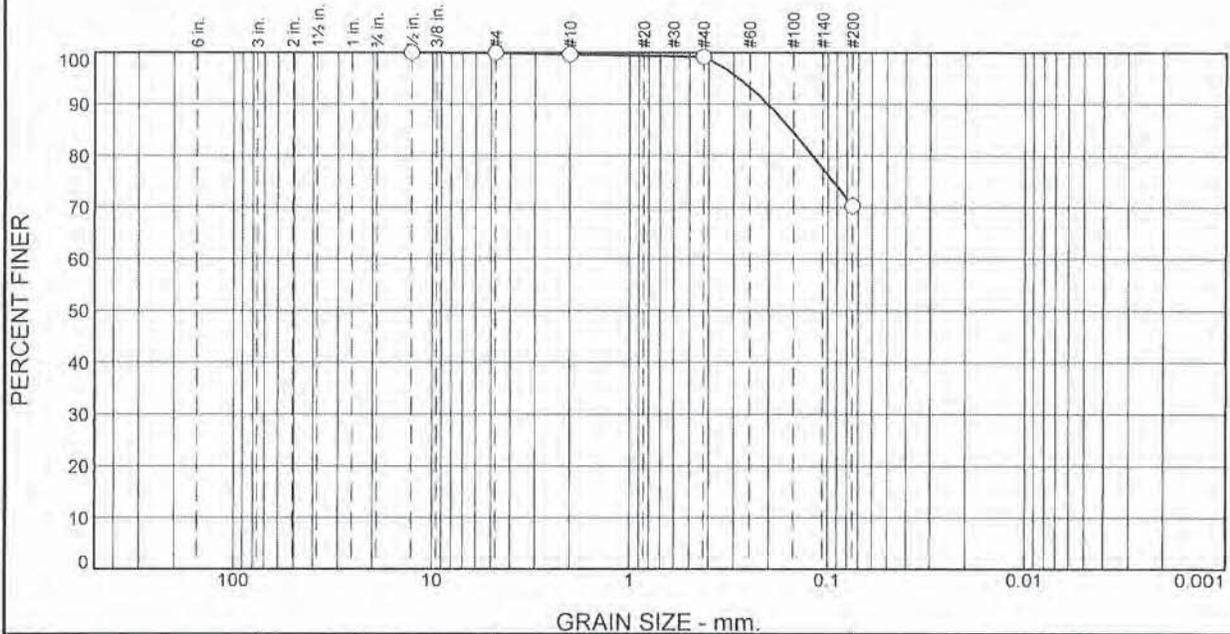
**Client:** Ecology & Environment Engineering, PC

**Date:** 05/24/18

**Sample No:** BISP-10, S-3 **Source of Sample:** Boring Sample

**Location:** In-place

**Elev./Depth:** 4-6'



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	1	29	70	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
1/2"	100		
#4	100		
#10	100		
#40	99		
#200	70		

**Soil Description**  
Grey SILT; some mf+ SAND

**Atterberg Limits**  
PL= NP      LL= NP      PI= NP

**Coefficients**  
D<sub>85</sub>= 0.1535      D<sub>60</sub>=      D<sub>50</sub>=  
D<sub>30</sub>=      D<sub>15</sub>=      D<sub>10</sub>=  
C<sub>u</sub>=      C<sub>c</sub>=

**Classification**  
USCS= ML      AASHTO= A-4(0)

**Remarks**  
Moisture Content = 26.3%

\* (no specification provided)

Reviewed by: Judy Ames

Date: 5/24/18



# ATLANTIC TESTING LABORATORIES

WBE certified company

## LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOIL ASTM D 4318

Page 1 of 2

### PROJECT INFORMATION

<b>Client:</b>	Ecology & Environment Engineering, PC	<b>ATL Report No.:</b>	CD4332SL-01-05-18
<b>Project:</b>	Buckhorn Island State Park - Shoreline Habitat Restoration Project, Grand Island, NY	<b>Report Date:</b>	May 24, 2018
		<b>Date Received:</b>	May 17, 2018

### TEST DATA

Boring No.	Sample No.	LL	PL	PI
BISP-01	S-5	22	18	4
BISP-02	S-3	NP	NP	NP
BISP-03	S-3	16	11	5
BISP-04	S-2	45	20	25
BISP-05	S-3	43	21	22
BISP-06	S-2	NP	NP	NP
BISP-07	S-3	18	11	7
BISP-08	S-2	NP	NP	NP
BISP-09	S-4	NP	NP	NP
BISP-10	S-3	NP	NP	NP

### SAMPLE INFORMATION

Boring No.	Sample No.	Maximum Grain Size (mm)	Estimated Amount of Sample Retained on No. 40 Sieve (%)	As Received Moisture Content (%)
BISP-01	S-5	25	22	12.3
BISP-02	S-3	4.75	0	34.8
BISP-03	S-3	50	70	5.1
BISP-04	S-2	12.5	2	34.1
BISP-05	S-3	2	0	35.8
BISP-06	S-2	12.5	3	35.8
BISP-07	S-3	12.5	22	8.3
BISP-08	S-2	2	0	29.6
BISP-09	S-4	2	0	27.6
BISP-10	S-3	12.5	1	26.3

**PREPARATION INFORMATION**

Boring No.	Sample No.	Preparation	Method of Removing Oversized Material
BISP-01	S-5	Air Dry	Pulverizing and Screening
BISP-02	S-3	Air Dry	Not Necessary
BISP-03	S-3	Air Dry	Pulverizing and Screening
BISP-04	S-2	Air Dry	Pulverizing and Screening
BISP-05	S-3	Air Dry	Not Necessary
BISP-06	S-2	Air Dry	Pulverizing and Screening
BISP-07	S-3	Air Dry	Pulverizing and Screening
BISP-08	S-2	Air Dry	Not Necessary
BISP-09	S-4	Air Dry	Not Necessary
BISP-10	S-3	Air Dry	Pulverizing and Screening

**EQUIPMENT INFORMATION**

Liquid Limit Procedure:	Multipoint - Method A	<input checked="" type="checkbox"/>	Single Point - Method B	<input type="checkbox"/>
Liquid Limit Apparatus:	Manual	<input checked="" type="checkbox"/>	Motor Driven	<input type="checkbox"/>
Liquid Limit Grooving Tool Material:	Plastic	<input checked="" type="checkbox"/>	Metal	<input type="checkbox"/>
Liquid Limit Grooving Tool Shape:	Flat	<input checked="" type="checkbox"/>	Curved (AASHTO Only)	<input type="checkbox"/>
Plastic Limit:	Hand Rolled	<input checked="" type="checkbox"/>	Mechanical Rolling Device	<input type="checkbox"/>

Reviewed By: Judith Ames

Date: 5/24/18



# ATLANTIC TESTING LABORATORIES

WBE certified company

## PERCENT ORGANICS, ASH CONTENT, AND MOISTURE CONTENT

ASTM D 2974

### PROJECT INFORMATION

**Client:** Ecology & Environment Engineering, PC      **ATL Report No.:** CD4332SL-01-05-18  
**Project:** Buck Island State Park - Shoreline Habitat      **Report Date:** May 24, 2018  
Restoration Project, Grand Island, NY      **Date Received:** May 17, 2018

### TEST DATA

Boring No.	Sample No.	Organics (%)	Oven Drying Temperature (°C)	Ash (%)	Moisture (%)	Test Method	Furnace Temperature (°C)
BISP-06	S-2	7.6	105	92.4	35.8	A	400
BISP-10	S-6	3.3	105	96.7	--	A	400

Reviewed By: Judith Ames

Date: 5/24/18

# F

## State Coastal Zone and LWRP Analysis

NEW YORK STATE DEPARTMENT OF STATE  
COASTAL MANAGEMENT PROGRAM

Federal Consistency Assessment Form

An applicant, seeking a permit, license, waiver, certification or similar type of approval from a federal agency which is subject to the New York State Coastal Management Program (CMP), shall complete this assessment form for any proposed activity that will occur within and/or directly affect the State's Coastal Area. This form is intended to assist an applicant in certifying that the proposed activity is consistent with New York State's CMP as required by U.S. Department of Commerce regulations (15 CFR 930.57). It should be completed at the time when the federal application is prepared. The Department of State will use the completed form and accompanying information in its review of the applicant's certification of consistency.

A. APPLICANT (please print)

1. Name: NYS Office of Parks, Recreation and Historic Preservation - John Honan
2. Address: 3160 De Veaux Woods Drive, Niagara Falls, NY 12305
3. Telephone: Area Code (716) 299-0811

B. PROPOSED ACTIVITY

1. Brief description of activity:

The Project will install discontinuous large and small rock sills, rock reefs with locked logs, two flat stone mini weirs, cabled log pyramids, single cabled logs, cabled log piles, root wads, leaner trees, and will plant emergent, riparian, and upland vegetation in designated planting zones along and above the shoreline with localized grading to establish gradual slopes.

2. Purpose of activity:

The Project's primary purpose is to enhance aquatic, including coastal and in river wetland systems, and riparian habitat within the Project Area to increase the net quantity, quality, and productivity of the aquatic ecosystem.

3. Location of activity:

<u>Erie</u>	<u>Grand Island</u>	<u>Niagara River</u>
County	City, Town, or Village	Street or Site Description

4. Type of federal permit/license required: Clean Water Act Section 404, Section 10 Rivers & Harbors

5. Federal application number, if known: \_\_\_\_\_

6. If a state permit/license was issued or is required for the proposed activity, identify the state agency and provide the application or permit number, if known:

DEC: Freshwater Wetlands Permit, 401 WQC, Article 15; DOS: Coastal Consistency

C. COASTAL ASSESSMENT Check either "YES" or "NO" for each of these questions. The numbers following each question refer to the policies described in the CMP document (see footnote on page 2) which may be affected by the proposed activity.

1. Will the proposed activity result in any of the following: YES / NO
- |  |                                     |                                     |
|--|-------------------------------------|-------------------------------------|
| a. Large physical change to a site within the coastal area which will require the preparation of an environmental impact statement? (11, 22, 25, 32, 37, 38, 41, 43) . . . . . | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| b. Physical alteration of more than two acres of land along the shoreline, land under water or coastal waters? (2, 11, 12, 20, 28, 35, 44) . . . . .                           | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| c. Revitalization/redevelopment of a deteriorated or underutilized waterfront site? (1) . . . . .  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| d. Reduction of existing or potential public access to or along coastal waters? (19, 20) . . . . .   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| e. Adverse effect upon the commercial or recreational use of coastal fish resources? (9,10) . . . . .  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| f. Siting of a facility essential to the exploration, development and production of energy resources in coastal waters or on the Outer Continental Shelf? (29) . . . . .       | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| g. Siting of a facility essential to the generation or transmission of energy? (27) . . . . .  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| h. Mining, excavation, or dredging activities, or the placement of dredged or fill material in coastal waters? (15, 35) . . . . .  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| i. Discharge of toxics, hazardous substances or other pollutants into coastal waters? (8, 15, 35) . . . . .  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| j. Draining of stormwater runoff or sewer overflows into coastal waters? (33) . . . . .  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| k. Transport, storage, treatment, or disposal of solid wastes or hazardous materials? (36, 39) . . . . .   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| l. Adverse effect upon land or water uses within the State's small harbors? (4) . . . . .  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

2. Will the proposed activity affect or be located in, on, or adjacent to any of the following: YES / NO
- |  |                                     |                                     |
|--|-------------------------------------|-------------------------------------|
| a. State designated freshwater or tidal wetland? (44) . . . . .                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| b. Federally designated flood and/or state designated erosion hazard area? (11, 12, 17,) . . . . . | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| c. State designated significant fish and/or wildlife habitat? (7) . . . . .                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| d. State designated significant scenic resource or area? (24) . . . . .                            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| e. State designated important agricultural lands? (26) . . . . .                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| f. Beach, dune or barrier island? (12) . . . . .   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| g. Major ports of Albany, Buffalo, Ogdensburg, Oswego or New York? (3) . . . . .                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| h. State, county, or local park? (19, 20) . . . . .  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| i. Historic resource listed on the National or State Register of Historic Places? (23) . . . . .   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

3. Will the proposed activity require any of the following: YES / NO
- |  |                                     |                                     |
|--|-------------------------------------|-------------------------------------|
| a. Waterfront site? (2, 21, 22) . . . . .  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| b. Provision of new public services or infrastructure in undeveloped or sparsely populated sections of the coastal area? (5) . . . . . | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c. Construction or reconstruction of a flood or erosion control structure? (13, 14, 16) . . . . .                                      | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| d. State water quality permit or certification? (30, 38, 40) . . . . .   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| e. State air quality permit or certification? (41, 43) . . . . .   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

4. Will the proposed activity occur within and/or affect an area covered by a State approved local waterfront revitalization program? (see policies in local program document) . . . . .

D. ADDITIONAL STEPS

1. If all of the questions in Section C are answered "NO", then the applicant or agency shall complete Section E and submit the documentation required by Section F.
2. If any of the questions in Section C are answered "YES", then the applicant or agent is advised to consult the CMP, or where appropriate, the local waterfront revitalization program document\*. The proposed activity must be analyzed in more detail with respect to the applicable state or local coastal policies. On a separate page(s), the applicant or agent shall: (a) identify, by their policy numbers, which coastal policies are affected by the activity, (b) briefly assess the effects of the activity upon the policy; and, (c) state how the activity is consistent with each policy. Following the completion of this written assessment, the applicant or agency shall complete Section E and submit the documentation required by Section F.

E. CERTIFICATION

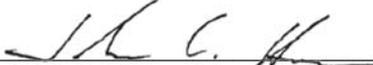
The applicant or agent must certify that the proposed activity is consistent with the State's CMP or the approved local waterfront revitalization program, as appropriate. If this certification cannot be made, the proposed activity shall not be undertaken. If this certification can be made, complete this Section.

"The proposed activity complies with New York State's approved Coastal Management Program, or with the applicable approved local waterfront revitalization program, and will be conducted in a manner consistent with such program."

Applicant/Agent's Name: John Honan, NYS Parks, Recreation and Historic Preservation

Address: 3160 De Veaux Woods Drive, Niagara Falls, NY 14305

Telephone: Area Code (716 ) 299-0811

Applicant/Agent's Signature:  Date: 6/2/20

F. SUBMISSION REQUIREMENTS

1. The applicant or agent shall submit the following documents to the **New York State Department of State, Office of Coastal, Local Government and Community Sustainability, Attn: Consistency Review Unit, 1 Commerce Plaza, 99 Washington Avenue - Suite 1010, Albany, New York 12231.**

- a. Copy of original signed form.
- b. Copy of the completed federal agency application.
- c. Other available information which would support the certification of consistency.

2. The applicant or agent shall also submit a copy of this completed form along with his/her application to the federal agency.

3. If there are any questions regarding the submission of this form, contact the Department of State at (518) 474-6000.

\*These state and local documents are available for inspection at the offices of many federal agencies, Department of environmental Conservation and Department of State regional offices, and the appropriate regional and county planning agencies. Local program documents are also available for inspection at the offices of the appropriate local government.

**New York State Department of State (NYS DOS) – Federal Consistency Assessment Form Supplemental Policy Analysis**

**Enclosure 1 – Applicable Policy Compliance**

The following responses are presented for those questions from Section C of the Federal Consistency Assessment for which “Yes” was indicated.

**1. Will the proposed activity result in any of the following?**

**b. Physical alteration of more than two acres of land along the shoreline, land under water or coastal waters? (2, 11, 12, 20, 28, 35, 44)?**

***Policy 2: Facilitate the siting of water dependent uses and facilities on or adjacent to coastal waters.***

Response: The proposed activity would not involve the siting of water-dependent uses or facilities.

Therefore, the proposed activity would be fully consistent with this policy.

***Policy 11: Buildings and other structures will be sited in the coastal area so as to minimize damage to property and the endangering of human lives caused by flooding and erosion.***

Response: The proposed Project Area is located within a 100-year flood hazard area (Zone A); however, no buildings or structures would be constructed as part of the proposed activity. As such, the existing flood risk, which is due to the site’s location within the Niagara River, would not be increased through the implementation of the proposed activity.

Therefore, the proposed activity would have no effect on this policy and would be fully consistent.

***Policy 12: Activities or development in the coastal area will be undertaken so as to minimize damage to natural resources and property from flooding and erosion by protecting natural protective features including beaches, dunes, barrier islands, and bluffs.***

Response: No natural protective features are located in the Project Area. The Project would address the degradation and loss of nearshore, shoreline, and riparian areas through locating of nearshore design features to protect specific areas of eroding riverbank, protect planted emergent areas, encourage the natural recruitment and ultimate establishment of coastal wetland habitat, and to mimic features that occur naturally. Large single-rock sills and cabled log pyramids would be placed to dissipate wave energy from impacting the shoreline, while preserving the nearshore substrate and water flow patterns to protect young-of-the-year fish habitat that is currently being destroyed by erosion. Additionally, to protect areas that have already been eroded along the shoreline, a flat stone mini weir, small single-rock sills, cabled logs, and emergent vegetation plantings would be placed directly along the shoreline. These cabled logs, rock sills, and plantings would also serve an additional benefit as refuge/spawning areas for various fish species and would increase the diversity of substrate. Further, the cabled logs, small rock reefs with locked logs, and root wads would enhance aquatic habitat by providing structure in the waterway. Lastly, leaner trees would be installed at the shoreline and would be designed to provide shade and habitat for fish and other wildlife. Taken in concert, these nearshore and shoreline design features would also encourage the natural recruitment and establishment, and future expansion, of coastal wetland habitat in nearshore areas by increasing localized sediment capture to support

emergent wetland growth along the shoreline. Therefore, the proposed activity would be fully consistent with this policy.

***Policy 20: Access to the publicly owned foreshore and to lands immediately adjacent to the foreshore or the water's edge that are publicly owned shall be provided, and it shall be provided in a manner compatible with adjoining uses.***

Response: The proposed activity would take place within and adjacent to Buckhorn Island State Park (BISP). Existing park roads and a pedestrian trail would temporarily be used for construction access. Additionally, six temporary access paths would be used to provide access to the work zones from the existing haul route (see Appendix A, Figure 3). There would be two staging areas on-site, as shown on the Project plans in Appendix B, Sheets C-12 and C-15. The staging area east of Woods Creek would only be used for material to be installed in that area. As indicated on Figure 2 in Appendix A, that staging area is located within the 100-foot adjacent area of wetland TW-19, but it is a previously disturbed area comprised of crushed asphalt. The other staging area, located immediately west of Interstate (I-) 190, would be used for the majority of the materials brought to the site. During construction, the existing haul route and pedestrian path would be temporarily blocked off to prevent pedestrians from entering the work zones. However, the remaining trails and paths within the park would be open to the public. Therefore, the proposed activity would be fully consistent with this policy.

***Policy 28: Ice management practices shall not interfere with the production of hydroelectric power, damage significant fish and wildlife and their habitats, or increase shoreline erosion or flooding.***

Response: The proposed activity would not involve ice management practices. Therefore, the proposed activity would have no effect on this policy and would be fully consistent.

***Policy 35: Dredging and filling in coastal waters and disposal of dredged material will be undertaken in a manner that meets existing state dredging permit requirements; and protects significant fish and wildlife habitats, scenic resources, natural protective features, important agricultural lands, and wetlands.***

Response: Installation of the rock sills, mini weir, and rock reefs would result in a total fill volume of 612.5 cubic yards. Of that total, 72.5 cubic yards would be located in the 100-foot adjacent area of wetland TW-19. No excavation would be required for the installation of the rock sills or the flat stone weirs other than that required to clear the area of rocks and other debris to provide a suitable subgrade for the installation of the filter fabric prior to reef placement. Rock sill stones would be pushed/placed into the river bottom so that a minimum of 6 inches of the stone height is embedded in the existing in-water sediment. The flat stone weirs and rock sills adjacent to shore would be installed in the same manner, with force applied to the top of the flat stone mini weirs or rock sills to embed the features in areas where the sediment is not soft.

In total, installation of the cabled log pyramids, cabled logs, root wads, and leaner trees would result in a total of 163.7 cubic yards of fill. Of this total, approximately 12.7 cubic yards would be placed in the 100-foot adjacent area of wetland TW-19. In total, 1.2 cubic yards would be excavated within the 100-foot adjacent area of wetland TW-19. To place the root wad trunk, a small area with a depth of 4 feet and a minimum length of 12 feet would be excavated. Following excavation, the root wad trunk would be placed flat on the soil surface and the excavated soil will be mixed with New York State

Department of Transportation medium stone and replaced above the root wad trunk. No other features require excavation.

The contractor would implement appropriate measures during construction activities associated with the installation of the rock and log features. Measures would include installation of turbidity curtains during in-water or restoration activities. As indicated on the design drawings included in Appendix B, turbidity curtains will be placed along the two areas of shoreline grading and near the area identified for placement of the three rock reefs. Silt fencing would be installed along the access roads and staging areas. The contractor would also implement appropriate erosion and sediment control measures in accordance with the Stormwater Pollution Prevention Plan (SWPPP) for the Project. Erosion and sediment control measures would be installed during mobilization and kept in place and maintained until project completion.

Project features that are in areas where access paths are adjacent to the shoreline (east of Woods Creek and west of I-190) would be installed using a crane staged within the access path. For the remaining features that are not adjacent to the access paths, but located within the nearshore or shoreline, installation of these features would be completed using excavators or cranes from the shoreline or within the water. Features that are located in deeper waters would be installed using a barge-mounted crane or excavator.

To prevent potential adverse impacts on water quality, all materials deployed would be free of contaminants and cleaned to remove fine sediments. All construction activities would be completed in accordance with federal and state permit requirements and conditions. Lastly, all Project activities within the Project Area would comply with all applicable rare, threatened, and endangered species regulations. In-water work would be performed outside of the fish spawning window of April 15 through June 30 and the migratory bird period from August 20 through September 20, as discussed with the New York State Department of Environmental Conservation (NYSDEC). Construction of the rock sills, rock reefs with locked logs, mini weirs, rock sills, and root wads would begin in mid-October 2020 and would continue through the end of December. Aquatic vegetation would be planted in 2021 after the peak nesting season, which concludes by July 30.

Therefore, the proposed activity would be fully consistent with this policy.

***Policy 44: Preserve and protect tidal and freshwater wetlands and preserve the benefits derived from these areas.***

Response: Much of BISP is designated as a NYSDEC wetland, wetland TW-19. No Project activities would take place within wetland TW-19; however, temporary access roads and several Project features would be located within its 100-foot adjacent area. Two large rock sills, the flat stone mini weir, and one small rock sill would be located within the NYSDEC 100-foot adjacent area east of Woods Creek. The latter is designed to protect an area where the pedestrian path is eroding into the Niagara River, and the former features are in areas of little-to-no submerged aquatic vegetation (SAV) coverage. Parts of two small rock sills, are located within the 100-foot adjacent area west of I-190 where there was partial SAV coverage recorded by Riveredge Environmental. The shoreline is eroded in this area which has created a 1- to 2-foot drop in this area directly along the existing pedestrian path. These features are designed to protect the shoreline from further erosion, protect the existing path, and, therefore, the public using this path.

Two staging areas would be used for the Project and both would be located in upland areas along the shoreline. One would be located just east of Woods Creek within an existing disturbed area with some crushed asphalt. This staging area is within the 100-foot adjacent area of NYSDEC wetland TW-19, but it is a previously disturbed area comprised of crushed asphalt.

Two large rock sills, the flat stone mini weir, and one small rock sill are located within the NYSDEC 100-foot adjacent area east of Woods Creek. The latter is designed to protect an area where the pedestrian path is eroding into the Niagara River, and the former features are located in areas of little to no SAV coverage. Parts of SRS-15 and SRS-16, two small rock sills, are located within the 100-foot adjacent area west of I-190. A total of 72.5 cubic yards of fill associated with rock sills and mini rock weir would be located in the 100-foot adjacent area of wetland TW-19. Additionally, three cabled log circles are located within the NYSDEC 100-foot adjacent area east of Woods Creek. All three of these areas are designed to protect an area where the pedestrian path is eroding into the Niagara River. Two cabled logs, a leaner tree, and a root wad are located within the 100-foot adjacent area west of I-190. The shoreline is eroded, creating a 1- to 2-foot drop in the area directly along the existing pedestrian path; these features are designed to protect the shoreline from further erosion, protect the existing path, and, therefore, protect the public using this path. Approximately 12.7 cubic yards of fill resulting from the cabled logs, root wads, and leaner trees would be placed in the 100-foot adjacent area of wetland TW-19. A total of 1.2 cubic yards will be excavated within the 100-foot adjacent area of wetland TW-19.

Additionally, approximately 20 cubic yards of temporary fill in the form of marsh mats would be located within the 100-foot adjacent area where approximately 64 linear feet of one of the temporary access paths intersects with the 100-foot adjacent area. Following construction, the mats would be removed and the area would be restored to pre-existing conditions. These areas would be seeded and planted with native trees and shrubs in accordance with the planting plan. After construction is complete, the existing haul route would be restored to a maximum width of eight feet. Low areas within the limits of the path would be graded, filter fabric placed within the limits of the path, and filled with No. 2 stone and a two-inch cap layer of crusher run stone placed to existing grade. This would result in the placement of 83 cubic yards of permanent fill within the 100-foot adjacent area of wetland TW-19. Areas damaged during construction beyond the 8-foot limits of the trail would be filled with top-soil to grade and seeded with an annual rye (for quick establishment) and also an appropriate wooded seed mix (for long-term) as specified in the planting plan.

Taken in concert, these nearshore and shoreline design features would encourage the natural recruitment and establishment, and future expansion, of coastal wetland habitat in nearshore areas by increasing localized sediment capture to support emergent wetland growth along the shoreline. Planting of emergent plant material will also expand these areas.

Based on the above, the proposed activity would be fully consistent with this policy.

**h. Mining, excavation, or dredging activities, or the placement of dredged or fill material in coastal waters? (15, 35)**

***Policy 15: Mining, excavation or dredging in coastal waters shall not significantly interfere with the natural coastal processes which supply beach materials to land adjacent to such waters and shall be undertaken in a manner which will not cause an increase in erosion of such land.***

Response: The proposed activity would not interfere with the natural coastal processes that supply beach materials to the Niagara River shoreline and would not result in an increase in shoreline erosion, and, in fact, would reduce such erosion. Large single rock sills and cabled log pyramids would be placed to dissipate wave energy from impacting the shoreline, while preserving the nearshore substrate and water flow patterns to protect young of the year fish habitat that is currently being destroyed by erosion. Additionally, to protect areas that have already been eroded along the shoreline, a flat stone mini weirs, small single rock sills, cabled logs, and emergent vegetation plantings would be placed directly along the shoreline. Excavation would be required in two areas along the shoreline where the shoreline, comprised of high and steep banks, would be graded to achieve a more gradual slope. It would also alleviate the continuing erosion of these areas which increases sedimentation in downstream areas. A total of 514 cubic yards would be excavated to create the more gradual slopes. The first area is located approximately 240 feet downstream of Woods Creek, and the second is located approximately 1,200 feet upstream of the I-190 bridge. As indicated on the design drawings included in Appendix B, turbidity curtains will be placed along the two areas of shoreline grading and near the area identified for placement of the three rock reefs.

Additionally, minor excavation would be needed to install the root wads by creating a small area with a depth of 4 feet, and to place the root ball of the leaner trees. A total of 3.9 cubic yards of soil will be excavated for the root wads, including those used for the leaner trees; 1.2 cubic yards will be excavated within the 100-foot adjacent area of wetland TW-19.

Therefore, the proposed activity would be fully consistent with this policy.

***Policy 35: Dredging and filling in coastal waters and disposal of dredged material will be undertaken in a manner that meets existing state dredging permit requirements; and protects significant fish and wildlife habitats, scenic resources, natural protective features, important agricultural lands, and wetlands.***

Response: Please refer to the response provided under number 1(b) above.

**2. Will the proposed activity affect or be located in, on, or adjacent to any of the following:**

**a. State-designated freshwater or tidal wetland? (44)**

***Policy 44: Preserve and protect tidal and freshwater wetlands and preserve the benefits derived from these areas.***

Response: Please refer to the response provided under number 1(b) above.

**b. Federally designated flood and/or state-designated erosion hazard area? (11, 12, 17)**

***Policy 11: Buildings and other structures will be sited in the coastal area so as to minimize damage to property and the endangering of human lives caused by flooding and erosion.***

Response: Please refer to the response provided under number 1(b) above.

***Policy 12: Activities or development in the coastal area will be undertaken so as to minimize damage to natural resources and property from flooding and erosion by protecting natural protective features including beaches, dunes, barrier islands, and bluffs.***

Response: Please refer to the response provided under number 1(b) above.

***Policy 17: Non-structural measures to minimize damage to natural resources and property from flooding and erosion shall be used whenever possible.***

Response: The proposed activity utilizes non-structural measures to address the erosion currently occurring along the Niagara River shoreline within the Project Area. No shoreline hardening would occur as a result of the proposed activity. Instead, rock sills, mini stone weirs, and cabled logs would be used to dissipate wave energy and higher flows away from the shoreline. Additionally, to protect areas that have already been eroded along the shoreline, flat stone mini weirs, small rock reefs, cabled logs, and emergent vegetation plantings would be placed directly along the shoreline to offer further protection.

Therefore, the proposed activity would be fully consistent with this policy.

**c. State designated significant fish and/or wildlife habitat? (7)**

***Policy 7: Significant coastal fish and wildlife habitats will be protected, preserved, and, where practical, restored so as to maintain their viability as habitats.***

Response: The proposed activity would be located just north-northwest of the Buckhorn Island Wetlands Significant Coastal Fish and Wildlife Habitat (SCFWH), which comprises the majority of BISP. However, access roads would be located within the Buckhorn Island Wetlands SCFWH. With the exception of six temporary access paths, existing BISP roads and a pedestrian trail would be used for construction access and would not require any alteration to facilitate access. All temporary access paths would be 12 feet wide, unless a wider road is needed and is approved by the New York State Office of Parks, Recreation and Historic Preservation. Wooden marsh mats or stone would be temporarily placed on the surface to provide equipment support along each access path that extends from the existing haul route to the work access zones during construction. This would result in approximately 15 cubic yards of temporary fill. These areas would be restored to existing conditions following construction. All temporary access paths are located outside wetland TW 19 and its 100-foot adjacent area, with the exception of the western-most access path where approximately 64 feet overlap with the 100-foot adjacent area. Approximately 20 cubic yards of temporary fill will be located within the 100-foot adjacent area of wetland TW-19 along this temporary access path. After completion of the work in a specific work area, the mats will be removed and the area will be restored to pre-existing conditions. These areas will be seeded and planted with native trees and shrubs in accordance with the planting plan.

Portions of the Project Area and portions of the existing haul route and existing pedestrian path to be used for access would be located within the adjacent area of NYSDEC TW-19 (refer to Appendix A, Figure 2). The existing pedestrian path is comprised of crushed asphalt, and the haul route is comprised of compacted dirt and stone between Woods Creek and I-190 and pavement and stone between I-190 and the western end of the Project. After construction is complete, the existing haul route would be restored to a maximum width of eight feet. Low areas within the limits of the path would be graded, filter fabric placed within the limits of the path, and filled with No. 2 stone and a two-inch cap layer of crusher run stone placed to existing grade. Areas damaged during construction beyond the 8-foot limits of the trail would be filled with top-soil to grade and seeded with an annual rye (for quick establishment) and also an appropriate wooded seed mix (for long-term) as specified in the planting plan. Approximately 43

cubic yards of permanent fill will result below the OHWM, and 83 cubic yards of permanent fill will occur in the 100-foot adjacent area. Two staging areas would be used for the Project and both would be located in upland areas along the shoreline. One would be located just east of Woods Creek within an existing disturbed area with some crushed asphalt. This staging area is within the 100-foot adjacent area of NYSDEC wetland TW-19, but it is a previously disturbed area comprised of crushed asphalt. The other staging area, located immediately west of I-190, will be used for the majority of the materials brought to the site and is outside of the wetland TW-19 100-foot adjacent area.

Two large rock sills, the flat stone mini weir, and one small rock sill are located within the NYSDEC 100-foot adjacent area east of Woods Creek. The latter is designed to protect an area where the pedestrian path is eroding into the Niagara River, and the former features are located in areas of little to no SAV coverage. Parts of SRS-15 and SRS-16, two small rock sills, are located within the 100-foot adjacent area west of I-190. A total of 72.5 cubic yards of fill associated with rock sills and mini rock weir would be located in the 100-foot adjacent area of wetland TW-19. Additionally, three cabled log circles are located within the NYSDEC 100-foot adjacent area east of Woods Creek. All three of these areas are designed to protect an area where the pedestrian path is eroding into the Niagara River. Two cabled logs, a leaner tree, and a root wad are located within the 100-foot adjacent area west of I-190. The shoreline is eroded, creating a 1- to 2-foot drop in the area directly along the existing pedestrian path; these features are designed to protect the shoreline from further erosion, protect the existing path, and, therefore, protect the public using this path. Approximately 12.7 cubic yards of fill resulting from the cabled logs, root wads, and leaner trees would be placed in the 100-foot adjacent area of wetland TW-19. A total of 1.2 cubic yards will be excavated within the 100-foot adjacent area of wetland TW-19.

Locations of the work limits, materials and equipment staging area, and access roads have been identified and are shown on the Project plans in Appendix B as well as on Figure 2 in Appendix A. The contractor would be required to minimize any work outside those areas, and any work outside those areas would require prior approval.

Silt fencing would be installed along the access roads and staging areas. The contractor would also implement appropriate erosion and sediment control measures in accordance with the SWPPP for the Project. Erosion and sediment control measures would be installed during mobilization and kept in place and maintained until project completion. These measures would protect the Buckhorn Island Wetlands SCFWH.

Therefore, the proposed activity would be fully consistent with this policy.

#### **h. State, county, or local park? (19, 20)**

***Policy 19: Protect, maintain, and increase the level and types of access to public water-related recreation resources and facilities.***

Response: Please refer to the response provided for Policy 20 under number 1(b) above.

***Policy 20: Access to the publicly owned foreshore and to lands immediately adjacent to the foreshore or the water's edge that are publicly owned shall be provided and it shall be provided in a manner compatible with adjoining uses.***

Response: Please refer to the response provided under number 1(b) above.

### **3. Will the proposed activity require any of the following:**

#### **d. State water quality permit or certification? (30, 38, 40)**

***Policy 30: Municipal, industrial, and commercial discharge of pollutants, including but not limited to, toxic and hazardous substances, into coastal waters will conform to state and national water quality standards.***

Response: The proposed activity would not involve municipal, industrial, or commercial discharge of pollutants. Therefore, the proposed activity would have no effect on this policy and would be fully consistent.

***Policy 38: The quality and quantity of surface water and groundwater supplies will be conserved and protected, particularly where such waters constitute the primary or sole source of water supply.***

Response: No publicly available mapped groundwater resources (i.e., primary/confined/unconfined aquifers) or any municipal or private well withdrawals exist within the proposed Project Area. The Town of Grand Island obtains its water from the west branch of the Niagara River and from the Niagara County Water District, which also sources its water from the west branch (Town of Grand Island 2016; Niagara County Water District 2017). The proposed activity would occur in the east branch of the Niagara River.

To preclude surface water quality impacts, each Project activity would apply the appropriate pollution control methods and mitigation activities. To prevent impacts on water quality, any materials deployed would be free of contaminants and cleaned to remove fine sediments. The contractor would implement appropriate measures during construction activities associated with the installation of the rock sills, rocks reefs, mini weirs, cabled logs, and root wads. Measures would include installation of turbidity curtains during any in-water or restoration activities, specifically those pertaining to shoreline grading and near the area identified for the placement of the three rock reefs. Silt fencing would be installed along the access roads and staging areas. The contractor would also implement appropriate erosion and sediment control measures in accordance with the SWPPP for the Project. Erosion and sediment control measures would be installed during mobilization and kept in place and maintained until project completion.

The proposed activity would not affect the quality and quantity of surface water.

Based on the above, the proposed activity would be fully consistent with this policy.

***Policy 40: Effluent discharged from major steam electric generating and industrial facilities into coastal waters will not be unduly injurious to fish and wildlife and shall conform to state water quality standards.***

Response: The proposed activity would not include any major steam electric generating and industrial facilities; therefore, it would have no effect on this policy and would be fully consistent.

### **References**

New York State Department of State (NYS DOS). 2017. State Coastal Policies. June 2017.

<https://www.dos.ny.gov/opd/programs/pdfs/CoastalPolicies.pdf>.

Niagara County Water District. 2017. Annual Drinking Water Quality Report for 2017 Niagara County Water District. Available at:

<http://www.niagaracounty.com/Portals/0/docs/Water/2017%20NCWD%20Annual%20Water%20Quality%20Report.pdf?ver=2018-04-09-112139-420>.

Town of Grand Island. 2016. Annual Drinking Water Quality Report for 2016 Town of Grand Island.

Available at:

<http://www.niagaracounty.com/Portals/0/docs/Water/2017%20NCWD%20Annual%20Water%20Quality%20Report.pdf?ver=2018-04-09-112139-420>.



3. Will the proposed activity involve or result in any of the following:

- (a) Physical alteration of two (2) acres or more of land along the shoreline, land under water or coastal waters? . . . .   X     X
- (b) Physical alteration of five (5) acres or more of land located elsewhere in the coastal area? . . . . .   —     X
- (c) Expansion of existing public services of infrastructure in undeveloped or low density areas of the coastal area? . . . . .   —     X
- (d) Energy facility not subject to Article VII or VIII of the Public Service Law? . . . . .   —     X
- (e) Mining, excavation, filling or dredging in coastal waters? . . . . .   X     X
- (f) Reduction of existing or potential public access to or along the shore? . . . . .   —     X
- (g) Sale or change in use of state-owned lands located on the shoreline or under water? . . . . .   —     X
- (h) Development within a designated flood or erosion hazard area? . . . . .   X     —
- (i) Development on a beach, dune, barrier island or other natural feature that provides protection against flooding or erosion? . . . . .   —     X

4. Will the proposed action be located in or have a significant effect upon an area included in an approved Local Waterfront Revitalization Program? . . . . .   X     —  

D. SUBMISSION REQUIREMENTS

If any question in Section C is answered "Yes", AND either of the following two conditions is met:

Section B.1(a) or B.1(b) is checked; or  
Section B.1(c) is checked AND B.5 is answered "Yes",

THEN a copy of this completed Coastal Assessment Form shall be submitted to:

New York State Department of State  
Office of Coastal, Local Government and Community Sustainability  
One Commerce Plaza  
99 Washington Avenue, Suite 1010  
Albany, New York 12231-0001

If assistance or further information is needed to complete this form, please call the Department of State at (518) 474-6000.

E. REMARKS OR ADDITIONAL INFORMATION

Preparer's Name: Evyn L. Iacovitti  
(Please print)

Title: Environmental Analyst 1 Agency: NYS Office of Parks, Recreation and Historic Preservation

Telephone Number: ( 716 ) 299-0807 Date: 5/21/2020

## **Enclosure 1 – Consistency with Town of Grand Island Local Waterfront Redevelopment Program (LWRP) Policies**

Applicable policies from the Town of Grand Island LWRP are identified and discussed below.

***Policy 7: Significant coastal fish and wildlife habitats, as identified on the coastal area map, shall be protected, preserved, and, where practical, restored so as to maintain their viability as habitats.***

***Policy 7B: The Buckhorn Island Wetlands Habitat shall be protected, preserved, and, if necessary and practical, restored so as to maintain its viability as a habitat.***

Response: The proposed activity would be located just north-northwest of the Buckhorn Island Wetlands Significant Coastal Fish and Wildlife Habitat (SCFWH), which comprises the majority of Buckhorn Island State Park (BISP). However, access roads would be located within the Buckhorn Island Wetlands SCFWH. With the exception of six temporary access paths, existing BISP roads and a pedestrian trail would be used for construction access and would not require any alteration to facilitate access. All temporary access paths will be 12 feet wide, unless a wider road is needed and is approved by the New York State Department of State (NYS DOS). Wooden marsh mats or stone will be temporarily placed on the surface to provide equipment support, along each access path that extends from the existing haul route to the work access zones during construction. This would result in approximately 15 cubic yards of temporary fill. These areas would be restored to existing conditions following construction. All temporary access paths are located outside wetland TW 19 and its 100-foot adjacent area, with the exception of the western-most access path where approximately 64 feet overlap with the 100-foot adjacent area. Approximately 20 cubic yards of temporary fill will be located within the 100-foot adjacent area of wetland TW-19 along this temporary access path. After completion of the work in a specific work area, the mats will be removed and the area will be restored to pre-existing conditions. These areas will be seeded and planted with native trees and shrubs in accordance with the planting plan.

Portions of the Project Area and portions of the existing haul route and existing pedestrian path to be used for access would be located within the adjacent area of New York State Department of Environmental Conservation (NYS DEC) wetland TW-19 (refer to Attachment A, Figure 2). The existing pedestrian path is comprised of crushed asphalt, and the haul route is comprised of compacted dirt and stone between Woods Creek and Interstate (I-) 190 and pavement and stone between I-190 and the western end of the Project. After construction is complete, the existing haul route would be restored to a maximum width of eight feet. Low areas within the limits of the path would be graded, filter fabric placed within the limits of the path, and filled with No. 2 stone and a two-inch cap layer of crusher run stone placed to existing grade. Approximately 43 cubic yards of permanent fill will result below the OHWM, and 83 cubic yards of permanent fill will occur in the 100-foot adjacent area. Areas damaged during construction beyond the 8-foot limits of the trail would be filled with top-soil to grade and seeded with an annual rye (for quick establishment) and also an appropriate wooded seed mix (for long-term) as specified in the planting plan.

Two staging areas would be used for the Project and both would be located in upland areas along the shoreline. One would be located just east of Woods Creek within an existing disturbed area with some crushed asphalt. This staging area is within the 100-foot adjacent area of NYS DEC wetland TW-19, but it is a previously disturbed area comprised of crushed asphalt. The other staging area, located immediately

west of I-190, will be used for the majority of the materials brought to the site and is outside of the wetland TW-19 100-foot adjacent area.

Two large rock sills, the flat stone mini weir, and one small rock sill are located within the NYSDEC 100-foot adjacent area east of Woods Creek. The latter is designed to protect an area where the pedestrian path is eroding into the Niagara River, and the former features are located in areas of little to no submerged aquatic vegetation (SAV) coverage. Parts of SRS-15 and SRS-16, two small rock sills, are located within the 100-foot adjacent area west of I-190. A total of 72.5 cubic yards of fill associated with rock sills and mini rock weir would be located in the 100-foot adjacent area of wetland TW-19. Additionally, three cabled log circles are located within the NYSDEC 100-foot adjacent area east of Woods Creek. All three of these areas are designed to protect an area where the pedestrian path is eroding into the Niagara River. Two cabled logs, a leaner tree, and a root wad are located within the 100-foot adjacent area west of I-190. The shoreline is eroded, creating a 1- to 2-foot drop in the area directly along the existing pedestrian path; these features are designed to protect the shoreline from further erosion, protect the existing path, and, therefore, protect the public using this path. Approximately 12.7 cubic yards of fill resulting from the cabled logs, root wads, and leaner trees would be placed in the 100-foot adjacent area of wetland TW-19. A total of 1.2 cubic yards will be excavated within the 100-foot adjacent area of wetland TW-19.

Locations of the work limits, materials and equipment staging area, and access roads have been identified and are shown on the Project plans in Attachment C as well as on Figure 2 in Attachment A. The contractor would be required to minimize any work outside those areas, and any work outside those areas would require prior approval.

Silt fencing would be installed along the access roads and staging areas. The contractor would also implement appropriate erosion and sediment control measures in accordance with the SWPPP for the Project. Erosion and sediment control measures would be installed during mobilization and kept in place and maintained until project completion. These measures would protect the Buckhorn Island Wetlands SCFWH.

Therefore, the proposed activity would be fully consistent with this policy.

***Policy 15: Mining, excavation or dredging in coastal water shall not significantly interfere with the natural coastal processes which supply beach materials to land adjacent to such waters and shall be undertaken in a manner which will not cause an increase in erosion of such land.***

Response: The proposed activity would not interfere with the natural coastal processes that supply beach materials to the Niagara River shoreline and would not result in an increase in shoreline erosion, and, in fact, would reduce such erosion. Large single rock sills and cabled log pyramids would be placed to dissipate wave energy from impacting the shoreline, while preserving the nearshore substrate and water flow patterns to protect young of the year fish habitat that is currently being destroyed by erosion. Additionally, to protect areas that have already been eroded along the shoreline, a flat stone mini weir, small single rock sills, cabled logs, and emergent vegetation plantings would be placed directly along the shoreline. Excavation would be required in two areas along the shoreline where the shoreline, comprised of high and steep banks, would be graded to achieve a more gradual slope. It would also alleviate the continuing erosion of these areas which increases sedimentation in downstream areas. A total of 514 cubic yards would be excavated to create the more gradual slopes. The first area is located

approximately 240 feet downstream of Woods Creek, and the second is located approximately 1,200 feet upstream of the I-190 bridge. As indicated on the design drawings included in Attachment C, turbidity curtains will be placed along the two areas of shoreline grading and near the area identified for placement of the three rock reefs.

Additionally, minor excavation would be needed to install the root wads by creating a small area with a depth of 4 feet, and to place the root ball of the leaner trees. A total of 3.9 cubic yards of soil will be excavated for the root wads, including those used for the leaner trees; 1.2 cubic yards will be excavated within the 100-foot adjacent area of wetland TW-19.

Therefore, the proposed activity would be fully consistent with this policy.

***Policy 17: Whenever possible, use non-structural measures to minimize damage to natural resources and property from flooding and erosion. Such measures shall include: (i) the set back of buildings and structures; (ii) the planting of vegetation and installation of sand fencing and draining; (iii) the reshaping of bluffs; and (iv) the flood-proofing of buildings or their elevation above the base flood level.***

Response: The proposed activity utilizes non-structural measures to address the erosion currently occurring along the Niagara River shoreline within the Project Area. No shoreline hardening would occur as a result of the proposed activity. Instead, rock sills, mini stone weir, and cabled logs would be used to dissipate wave energy and higher flows away from the shoreline. Additionally, to protect areas that have already been eroded along the shoreline, flat stone mini weir, small rock reefs, cabled logs, and emergent vegetation plantings would be placed directly along the shoreline to offer further protection.

Therefore, the proposed activity would be fully consistent with this policy.

***Policy 19: Protect, maintain, and increase the level and types of access to public, water-related recreation resources and facilities so that these resources and facilities may be fully utilized by all the public in accordance with reasonably anticipated public recreation needs and the protection of historic and natural resources. In providing such access, priority shall be given to public beaches, boating facilities, fishing areas and waterfront parks.***

Response: The proposed activity would take place within and adjacent to BISP. Existing park roads and a pedestrian trail would temporarily be used for construction access. Additionally, six temporary access paths would be used to provide access to the work zones from the existing haul route (see Attachment A, Figure 3). There would be two staging areas on site, as shown on the Project plans in Attachment C, Sheets C-12 and C-15. The staging area east of Woods Creek would only be used for material to be installed in that area. As indicated on Figure 2 in Attachment A, that staging area is located within the 100-foot adjacent area of wetland TW-19, but it is a previously disturbed area comprised of crushed asphalt. The other staging area, located immediately west of I-190, would be used for the majority of the materials brought to the site. During construction, the existing haul route and pedestrian path would be temporarily blocked off to prevent pedestrians from entering the work zones. However, the remaining trails and paths within the park would be open to the public. Therefore, the proposed activity would be fully consistent with this policy.

***Policy 38: The quality and quantity of surface water and groundwater supplies will be conserved and protected, particularly where such waters constitute the primary or sole source of water supply.***

Response: No publicly available mapped groundwater resources (i.e., primary/confined/unconfined aquifers) or any municipal or private well withdrawals exist within the proposed Project Area. The Town of Grand Island obtains its water from the west branch of the Niagara River and from the Niagara County Water District, which also sources its water from the west branch (Town of Grand Island 2016; Niagara County Water District 2017). The proposed activity would occur in the east branch of the Niagara River.

To preclude surface water quality impacts, each Project activity would apply the appropriate pollution control methods and mitigation activities. To prevent impacts on water quality, any materials deployed would be free of contaminants and cleaned to remove fine sediments. The contractor would implement appropriate measures during construction activities associated with the installation of the rock sills, rocks reefs, mini weir, cabled logs, and root wads. Measures would include installation of turbidity curtains during any in-water or restoration activities, specifically those pertaining to shoreline grading and near the area identified for the placement of the three rock reefs. Silt fencing would be installed along the access roads and staging area. The contractor would also implement appropriate erosion and sediment control measures in accordance with the Storm Water Pollution Prevention Plan (SWPPP) for the Project. Erosion and sediment control measures would be installed during mobilization and kept in place and maintained until project completion.

The proposed activity would not affect the quality and quantity of surface water.

Based on the above, the proposed activity would be fully consistent with this policy.

***Policy 44: Preserve and protect tidal and freshwater wetlands and preserve the benefits derived from these areas.***

Response: Much of BISP is designated as a NYSDEC wetland, wetland TW-19. No Project activities would take place within wetland TW-19; however, temporary access roads and several Project features would be located within its 100-foot adjacent area. Two large rock sills, the flat stone mini weir, and one small rock sill would be located within the NYSDEC 100-foot adjacent area east of Woods Creek. The latter is designed to protect an area where the pedestrian path is eroding into the Niagara River, and the former features are located in areas of little to no SAV coverage. Parts of two small rock sills are located within the 100-foot adjacent area west of I-190 where there was partial SAV coverage recorded by Riveredge Environmental. The shoreline is eroded in this area which has created a 1- to 2-foot drop in this area directly along the existing pedestrian path. These features are designed to protect the shoreline from further erosion, protect the existing path, and, therefore, the public using this path.

Two staging areas would be used for the Project and both would be located in upland areas along the shoreline. One would be located just east of Woods Creek within an existing disturbed area with some crushed asphalt. This staging area is within the 100-foot adjacent area of NYSDEC wetland TW-19, but it is a previously disturbed area comprised of crushed asphalt.

Two large rock sills, the flat stone mini weir, and one small rock sill are located within the NYSDEC 100-foot adjacent area east of Woods Creek. The latter is designed to protect an area where the pedestrian path is eroding into the Niagara River, and the former features are located in areas of little to no SAV coverage. Parts of SRS-15 and SRS-16, two small rock sills, are located within the 100-foot adjacent area west of I-190. A total of 72.5 cubic yards of fill associated with rock sills and mini rock weir

would be located in the 100-foot adjacent area of wetland TW-19. Additionally, three cabled log circles are located within the NYSDEC 100-foot adjacent area east of Woods Creek. All three of these areas are designed to protect an area where the pedestrian path is eroding into the Niagara River. Two cabled logs, a leaner tree, and a root wad are located within the 100-foot adjacent area west of I-190. The shoreline is eroded, creating a 1- to 2-foot drop in the area directly along the existing pedestrian path; these features are designed to protect the shoreline from further erosion, protect the existing path, and, therefore, protect the public using this path. Approximately 12.7 cubic yards of fill resulting from the cabled logs, root wads, and leaner trees would be placed in the 100-foot adjacent area of wetland TW-19. A total of 1.2 cubic yards will be excavated within the 100-foot adjacent area of wetland TW-19.

Additionally, approximately 20 cubic yards of temporary fill in the form of marsh mats would be located within the 100-foot adjacent area where approximately 64 linear feet of one of the temporary access paths intersects with the 100-foot adjacent area. Following construction, the mats would be removed and the area would be restored to pre-existing conditions. These areas would be seeded and planted with native trees and shrubs in accordance with the planting plan. After construction is complete, the existing haul route would be restored to a maximum width of eight feet. Low areas within the limits of the path would be graded, filter fabric placed within the limits of the path, and filled with No. 2 stone and a two-inch cap layer of crusher run stone placed to existing grade. Approximately 43 cubic yards of permanent fill will result below the OHWM, and 83 cubic yards of permanent fill will occur in the 100-foot adjacent area. Areas damaged during construction beyond the 8-foot limits of the trail would be filled with top-soil to grade and seeded with an annual rye (for quick establishment) and also an appropriate wooded seed mix (for long-term) as specified in the planting plan.

Taken in concert, these nearshore and shoreline design features would encourage the natural recruitment and establishment and future expansion of coastal wetland habitat in nearshore areas by increasing localized sediment capture to support emergent wetland growth along the shoreline. Planting of emergent plant material will also expand these areas.

Based on the above, the proposed activity would be fully consistent with this policy.

## References

New York State Department of State (NYS DOS). 2017. State Coastal Policies. June 2017.

<https://www.dos.ny.gov/opd/programs/pdfs/CoastalPolicies.pdf>.

Niagara County Water District. 2017. Annual Drinking Water Quality Report for 2017 Niagara County Water District. Available at:

<http://www.niagaracounty.com/Portals/0/docs/Water/2017%20NCWD%20Annual%20Water%20Quality%20Report.pdf?ver=2018-04-09-112139-420>.

Town of Grand Island. 2016. Annual Drinking Water Quality Report for 2016 Town of Grand Island.

Available at:

<http://www.niagaracounty.com/Portals/0/docs/Water/2017%20NCWD%20Annual%20Water%20Quality%20Report.pdf?ver=2018-04-09-112139-420>.

**G**

**Water Level Survey**





# Agency Consultation



**Parks, Recreation,  
and Historic Preservation**

**ANDREW M. CUOMO**  
Governor

**ERIK KULLESEID**  
Commissioner

May 26, 2020

Virginia Ursitti  
Niagara River Restoration Project Manager  
3160 DeVeaux Woods Drive  
Niagara Falls, NY 14305

Re: OPRHP  
Buckhorn Island Shoreline Habitat Enhancement Project  
Town of Grand Island, Niagara County, NY  
19PR06050

Dear Virginia Ursitti:

Thank you for continuing to consult with the Division for Historic Preservation (DHP). We have reviewed the project information in accordance with the New York State Historic Preservation Act of 1980 (Section 14.09 of the New York Parks, Recreation and Historic Preservation Law) and OPRHP Intra-Agency Protocol HP-PCD-001. These comments are those of the DHP and relate only to Historic/ Cultural resources.

We are in receipt of the following project information:

- Proposed Design Plan 4, Drawing C-13, Issued Draft for Permitting (Ecology and Environment, Inc.; 5/1/2020)

The updated site plan indicates that the proposed work will avoid the National Register-eligible Buckhorn Island Boat Slip Historic Site (02914.000123). Based on this review, it is the DHP's opinion that this project will have No Adverse Impact upon cultural resources in or eligible for inclusion in the State and National Register of Historic Places.

If you have any questions concerning archaeology, please do not hesitate to contact me at [andrew.farry@parks.ny.gov](mailto:andrew.farry@parks.ny.gov).

Sincerely,

Andrew Farry, Ph.D.  
Scientist/Archaeology

Cc: David Spiering

**From:** Lundgren, Julie (PARKS) <[Julie.Lundgren@parks.ny.gov](mailto:Julie.Lundgren@parks.ny.gov)>  
**Sent:** Friday, May 08, 2020 3:52 PM  
**To:** Iacovitti, Evyn (PARKS) <[Evyn.Iacovitti@parks.ny.gov](mailto:Evyn.Iacovitti@parks.ny.gov)>  
**Subject:** Re: Mussel relocation for BUCKHORN SHORELINE PROJECT

Evyn

Thanks for forwarding this email string. That is really exciting that higher success rates for mussel relocation are possible. I am more than happy to defer to Lee's expertise on the shoreline project at Buckhorn. I did not have a chance to read through the other documents you sent, but I trust in the expertise of Dave, Aaron and Lee in reviewing that and pointing out any potential impacts and concerns. I know that many different people have been involved in the development of this project and it is focused on protecting the park and providing habitat so I am confident that it is a good balance. Our NYNHP parks partnership team will pass on further comment of this.

If this shoreline project does involve relocation of native mussels, there should be a plan to track mussels collected, where they were moved to (and how many and what species) and a follow-up sampling to determine rate of survival. Lee would know more about this. I do not know if that can be done within the timeframe of the shoreline grant, but there should be some way to identify rough cost and lead on that measure.

In areas where mussel moving not being done but that might be impacted by the project, a more general sampling to see if mussels or at least rare species are still present would be a good recommendation but not an essential part of the grant project itself. Updates in 5 or 10 years at most would be good and could be spot samples rather than the detailed full survey that Lee conducted.

Again, Lee and Dave can probably describe this more eloquently. It is standard monitoring to be accountable on the impacts of the project to rare species and ideally some tracking of the success of relocation for both rare and common mussel species.

Julie

Julie A. Lundgren, State Parks Ecologist  
NY Natural Heritage Program of SUNY College of Environmental Science and Forestry, Albany NY  
[julie.lundgren@parks.ny.gov](mailto:julie.lundgren@parks.ny.gov) or [jalundgr@esf.edu](mailto:jalundgr@esf.edu)

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# Full Environmental Assessment Form

**Full Environmental Assessment Form**  
**Part 1 - Project and Setting**

\*Updated form\*

**Instructions for Completing Part 1**

**Part 1 is to be completed by the applicant or project sponsor.** Responses become part of the application for approval or funding, are subject to public review, and may be subject to further verification.

Complete Part 1 based on information currently available. If additional research or investigation would be needed to fully respond to any item, please answer as thoroughly as possible based on current information; indicate whether missing information does not exist, or is not reasonably available to the sponsor; and, when possible, generally describe work or studies which would be necessary to update or fully develop that information.

Applicants/sponsors must complete all items in Sections A & B. In Sections C, D & E, most items contain an initial question that must be answered either “Yes” or “No”. If the answer to the initial question is “Yes”, complete the sub-questions that follow. If the answer to the initial question is “No”, proceed to the next question. Section F allows the project sponsor to identify and attach any additional information. Section G requires the name and signature of the applicant or project sponsor to verify that the information contained in Part 1 is accurate and complete.

**A. Project and Applicant/Sponsor Information.**

Name of Action or Project: Buckhorn Island Shoreline Habitat Enhancement		
Project Location (describe, and attach a general location map): 26.5-acre project area in the northern portion of Buckhorn Island State Park, along the Niagara River shoreline (see Figure 1, Attachment A)		
Brief Description of Proposed Action (include purpose or need): The project includes the following: 1) installing discontinuous large and small rock sills, rock reefs with locked logs, and one flat stone mini weir; 2) installing cabled log pyramids, single cabled logs, cabled log piles, root wads, and leaner trees; and 3) planting emergent, and riparian vegetation in designated planting zones, along the shoreline and localized grading to establish gradual slopes for shoreline stability.  The purpose of the project is to enhance aquatic habitat, coastal, and in-river wetland systems, and riparian habitat to increase the net quantity and quality of the aquatic ecosystem within the project area. The need for this proposed action is evidenced by the degradation and loss of nearshore, shoreline, and riparian areas due to riverbank and shoreline erosion resulting from high wave energy from waves and boats and occasional high flow velocities and ice scour. As a result, there is a simplified riparian zone and lack of in-water habitat structure for fish and other wildlife/organisms.		
Name of Applicant/Sponsor: New York State Office of Parks, Recreation and Historic Preservation	Telephone: E-Mail:	
Address: 3160 DeVeaux Woods Drive		
City/PO: Niagara Falls	State: New York	Zip Code: 14305
Project Contact (if not same as sponsor; give name and title/role): Virginia L. Ursitti, QEP - Project Manager	Telephone: (716) 299-0833 E-Mail: virginia.ursitti@parks.ny.gov	
Address:		
City/PO:	State:	Zip Code:
Property Owner (if not same as sponsor): same	Telephone: E-Mail:	
Address:		
City/PO:	State:	Zip Code:

**B. Government Approvals**

<b>B. Government Approvals, Funding, or Sponsorship.</b> (“Funding” includes grants, loans, tax relief, and any other forms of financial assistance.)		
<b>Government Entity</b>	<b>If Yes: Identify Agency and Approval(s) Required</b>	<b>Application Date (Actual or projected)</b>
a. City Counsel, Town Board, <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No or Village Board of Trustees		
b. City, Town or Village Planning Board or Commission <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
c. City, Town or Village Zoning Board of Appeals <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
d. Other local agencies <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Grand Island LWRP	May 2020
e. County agencies <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
f. Regional agencies <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
g. State agencies <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	DEC: Freshwater Wetlands, Section 401 WQC; DOS: Coastal consistency; OGS: submerged land	May 2020
h. Federal agencies <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	USACE Buffalo - Section 404 and Section 10	May 2020
i. Coastal Resources.		
i. Is the project site within a Coastal Area, or the waterfront area of a Designated Inland Waterway?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
ii. Is the project site located in a community with an approved Local Waterfront Revitalization Program?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
iii. Is the project site within a Coastal Erosion Hazard Area?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

**C. Planning and Zoning**

<b>C.1. Planning and zoning actions.</b>	
Will administrative or legislative adoption, or amendment of a plan, local law, ordinance, rule or regulation be the only approval(s) which must be granted to enable the proposed action to proceed?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<ul style="list-style-type: none"> <li>• <b>If Yes</b>, complete sections C, F and G.</li> <li>• <b>If No</b>, proceed to question C.2 and complete all remaining sections and questions in Part 1</li> </ul>	
<b>C.2. Adopted land use plans.</b>	
a. Do any municipally- adopted (city, town, village or county) comprehensive land use plan(s) include the site where the proposed action would be located?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If Yes, does the comprehensive plan include specific recommendations for the site where the proposed action would be located?	<input type="checkbox"/> Yes <input type="checkbox"/> No
b. Is the site of the proposed action within any local or regional special planning district (for example: Greenway; Brownfield Opportunity Area (BOA); designated State or Federal heritage area; watershed management plan; or other?)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
If Yes, identify the plan(s):	
New York Western Erie Canal Heritage Area _____	
_____	
_____	
c. Is the proposed action located wholly or partially within an area listed in an adopted municipal open space plan, or an adopted municipal farmland protection plan?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If Yes, identify the plan(s):	
_____	
_____	
_____	

**C.3. Zoning**

a. Is the site of the proposed action located in a municipality with an adopted zoning law or ordinance.  Yes  No  
If Yes, what is the zoning classification(s) including any applicable overlay district?  
Open space

b. Is the use permitted or allowed by a special or conditional use permit?  Yes  No

c. Is a zoning change requested as part of the proposed action?  Yes  No  
If Yes,  
i. What is the proposed new zoning for the site? \_\_\_\_\_

**C.4. Existing community services.**

a. In what school district is the project site located? Grand Island School District

b. What police or other public protection forces serve the project site?  
NYS Park Police, NYS Troopers, Erie County Police Department

c. Which fire protection and emergency medical services serve the project site?  
Grand Island Fire Department, Erie County Fire Safety Division, Erie County Division of Emergency Medical Services, NYS Parks

d. What parks serve the project site?  
Buckhorn Island State Park

**D. Project Details**

**D.1. Proposed and Potential Development**

a. What is the general nature of the proposed action (e.g., residential, industrial, commercial, recreational; if mixed, include all components)? Habitat enhancement

b. a. Total acreage of the site of the proposed action? \_\_\_\_\_ 26.5 acres  
b. Total acreage to be physically disturbed? \_\_\_\_\_ 23.3 acres  
c. Total acreage (project site and any contiguous properties) owned or controlled by the applicant or project sponsor? \_\_\_\_\_ 895 acres

c. Is the proposed action an expansion of an existing project or use?  Yes  No  
i. If Yes, what is the approximate percentage of the proposed expansion and identify the units (e.g., acres, miles, housing units, square feet)? % \_\_\_\_\_ Units: \_\_\_\_\_

d. Is the proposed action a subdivision, or does it include a subdivision?  Yes  No  
If Yes,  
i. Purpose or type of subdivision? (e.g., residential, industrial, commercial; if mixed, specify types) \_\_\_\_\_  
ii. Is a cluster/conservation layout proposed?  Yes  No  
iii. Number of lots proposed? \_\_\_\_\_  
iv. Minimum and maximum proposed lot sizes? Minimum \_\_\_\_\_ Maximum \_\_\_\_\_

e. Will the proposed action be constructed in multiple phases?  Yes  No  
i. If No, anticipated period of construction: \_\_\_\_\_ months  
ii. If Yes:  
• Total number of phases anticipated \_\_\_\_\_ 2  
• Anticipated commencement date of phase 1 (including demolition) \_\_\_\_\_ Sept. month \_\_\_\_\_ 2020 year  
• Anticipated completion date of final phase \_\_\_\_\_ Aug month \_\_\_\_\_ 2021 year  
• Generally describe connections or relationships among phases, including any contingencies where progress of one phase may determine timing or duration of future phases: \_\_\_\_\_

In Fall 2020, rock sills, rock reefs, mini stone weir, cabled logs, single cabled logs, and root wads will be installed. This phase of construction will be completed by late Jan. 2021. Planting of aquatic, riparian, and upland vegetation will occur in spring of 2021. See Att B, Section 1.6.

f. Does the project include new residential uses?  Yes  No  
 If Yes, show numbers of units proposed.

	<u>One Family</u>	<u>Two Family</u>	<u>Three Family</u>	<u>Multiple Family (four or more)</u>
Initial Phase	_____	_____	_____	_____
At completion	_____	_____	_____	_____
of all phases	_____	_____	_____	_____

g. Does the proposed action include new non-residential construction (including expansions)?  Yes  No  
 If Yes,

i. Total number of structures \_\_\_\_\_

ii. Dimensions (in feet) of largest proposed structure: \_\_\_\_\_ height; \_\_\_\_\_ width; and \_\_\_\_\_ length

iii. Approximate extent of building space to be heated or cooled: \_\_\_\_\_ square feet

h. Does the proposed action include construction or other activities that will result in the impoundment of any liquids, such as creation of a water supply, reservoir, pond, lake, waste lagoon or other storage?  Yes  No  
 If Yes,

i. Purpose of the impoundment: \_\_\_\_\_

ii. If a water impoundment, the principal source of the water:  Ground water  Surface water streams  Other specify: \_\_\_\_\_

iii. If other than water, identify the type of impounded/contained liquids and their source. \_\_\_\_\_

iv. Approximate size of the proposed impoundment. Volume: \_\_\_\_\_ million gallons; surface area: \_\_\_\_\_ acres

v. Dimensions of the proposed dam or impounding structure: \_\_\_\_\_ height; \_\_\_\_\_ length

vi. Construction method/materials for the proposed dam or impounding structure (e.g., earth fill, rock, wood, concrete): \_\_\_\_\_

**D.2. Project Operations**

a. Does the proposed action include any excavation, mining, or dredging, during construction, operations, or both?  Yes  No  
 (Not including general site preparation, grading or installation of utilities or foundations where all excavated materials will remain onsite)  
 If Yes:

i. What is the purpose of the excavation or dredging? \_\_\_\_\_

ii. How much material (including rock, earth, sediments, etc.) is proposed to be removed from the site?

- Volume (specify tons or cubic yards): \_\_\_\_\_
- Over what duration of time? \_\_\_\_\_

iii. Describe nature and characteristics of materials to be excavated or dredged, and plans to use, manage or dispose of them. \_\_\_\_\_

iv. Will there be onsite dewatering or processing of excavated materials?  Yes  No  
 If yes, describe. \_\_\_\_\_

v. What is the total area to be dredged or excavated? \_\_\_\_\_ acres

vi. What is the maximum area to be worked at any one time? \_\_\_\_\_ acres

vii. What would be the maximum depth of excavation or dredging? \_\_\_\_\_ feet

viii. Will the excavation require blasting?  Yes  No

ix. Summarize site reclamation goals and plan: \_\_\_\_\_

b. Would the proposed action cause or result in alteration of, increase or decrease in size of, or encroachment into any existing wetland, waterbody, shoreline, beach or adjacent area?  Yes  No  
 If Yes:

i. Identify the wetland or waterbody which would be affected (by name, water index number, wetland map number or geographic description): Niagara River and the adjacent area of NYSDEC Wetland TW-19. Refer to Attachment B, Section 1.4 for a detailed discussion regarding the encroachment into these resources.

*ii.* Describe how the proposed action would affect that waterbody or wetland, e.g. excavation, fill, placement of structures, or alteration of channels, banks and shorelines. Indicate extent of activities, alterations and additions in square feet or acres:  
Total perm fill from project features = 1,348 cy below OHWM and 74.2 cy within 100-foot adjacent area of TW-19. Perm fill associated with haul route = 43 cy below OHWM and 83 cy within 100-foot adjacent area. Temp fill from temp access paths = 15 cy below OHWM and 20 cy within 100' adjacent area. Total excavation = 517.9 cy, and 1.2 cy within 100' adjacent area of TW-19. Total planting area = 3.7 acres. Refer to Attachment B, Sections 1.4 and 1.6 for additional information.

*iii.* Will the proposed action cause or result in disturbance to bottom sediments?  Yes  No  
 If Yes, describe: Reef installation and placement of rock sills, mini weir, cabled logs, root wads and leaner trees.

*iv.* Will the proposed action cause or result in the destruction or removal of aquatic vegetation?  Yes  No  
 If Yes:

- acres of aquatic vegetation proposed to be removed: \_\_\_\_\_
- expected acreage of aquatic vegetation remaining after project completion: \_\_\_\_\_
- purpose of proposed removal (e.g. beach clearing, invasive species control, boat access): \_\_\_\_\_
- proposed method of plant removal: \_\_\_\_\_
- if chemical/herbicide treatment will be used, specify product(s): \_\_\_\_\_

*v.* Describe any proposed reclamation/mitigation following disturbance: \_\_\_\_\_  
 Refer to Attachment B, Section 1.4 of the supporting materials.

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*c.* Will the proposed action use, or create a new demand for water?  Yes  No  
 If Yes:

*i.* Total anticipated water usage/demand per day: \_\_\_\_\_ gallons/day

*ii.* Will the proposed action obtain water from an existing public water supply?  Yes  No  
 If Yes:

- Name of district or service area: \_\_\_\_\_
- Does the existing public water supply have capacity to serve the proposal?  Yes  No
- Is the project site in the existing district?  Yes  No
- Is expansion of the district needed?  Yes  No
- Do existing lines serve the project site?  Yes  No

*iii.* Will line extension within an existing district be necessary to supply the project?  Yes  No  
 If Yes:

- Describe extensions or capacity expansions proposed to serve this project: \_\_\_\_\_
- Source(s) of supply for the district: \_\_\_\_\_

*iv.* Is a new water supply district or service area proposed to be formed to serve the project site?  Yes  No  
 If, Yes:

- Applicant/sponsor for new district: \_\_\_\_\_
- Date application submitted or anticipated: \_\_\_\_\_
- Proposed source(s) of supply for new district: \_\_\_\_\_

*v.* If a public water supply will not be used, describe plans to provide water supply for the project: \_\_\_\_\_

*vi.* If water supply will be from wells (public or private), what is the maximum pumping capacity: \_\_\_\_\_ gallons/minute.

---

*d.* Will the proposed action generate liquid wastes?  Yes  No  
 If Yes:

*i.* Total anticipated liquid waste generation per day: \_\_\_\_\_ gallons/day

*ii.* Nature of liquid wastes to be generated (e.g., sanitary wastewater, industrial; if combination, describe all components and approximate volumes or proportions of each): \_\_\_\_\_

*iii.* Will the proposed action use any existing public wastewater treatment facilities?  Yes  No  
 If Yes:

- Name of wastewater treatment plant to be used: \_\_\_\_\_
- Name of district: \_\_\_\_\_
- Does the existing wastewater treatment plant have capacity to serve the project?  Yes  No
- Is the project site in the existing district?  Yes  No
- Is expansion of the district needed?  Yes  No

• Do existing sewer lines serve the project site?  Yes  No  
 • Will a line extension within an existing district be necessary to serve the project?  Yes  No  
 If Yes:  
 • Describe extensions or capacity expansions proposed to serve this project: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

iv. Will a new wastewater (sewage) treatment district be formed to serve the project site?  Yes  No  
 If Yes:  
 • Applicant/sponsor for new district: \_\_\_\_\_  
 • Date application submitted or anticipated: \_\_\_\_\_  
 • What is the receiving water for the wastewater discharge? \_\_\_\_\_

v. If public facilities will not be used, describe plans to provide wastewater treatment for the project, including specifying proposed receiving water (name and classification if surface discharge or describe subsurface disposal plans):  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

vi. Describe any plans or designs to capture, recycle or reuse liquid waste: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

e. Will the proposed action disturb more than one acre and create stormwater runoff, either from new point sources (i.e. ditches, pipes, swales, curbs, gutters or other concentrated flows of stormwater) or non-point source (i.e. sheet flow) during construction or post construction?  Yes  No  
 If Yes:  
 i. How much impervious surface will the project create in relation to total size of project parcel?  
 \_\_\_\_\_ Square feet or \_\_\_\_\_ acres (impervious surface)  
 \_\_\_\_\_ Square feet or \_\_\_\_\_ acres (parcel size)  
 ii. Describe types of new point sources. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

iii. Where will the stormwater runoff be directed (i.e. on-site stormwater management facility/structures, adjacent properties, groundwater, on-site surface water or off-site surface waters)?  
 \_\_\_\_\_  
 \_\_\_\_\_  
 • If to surface waters, identify receiving water bodies or wetlands: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

• Will stormwater runoff flow to adjacent properties?  Yes  No

iv. Does the proposed plan minimize impervious surfaces, use pervious materials or collect and re-use stormwater?  Yes  No

f. Does the proposed action include, or will it use on-site, one or more sources of air emissions, including fuel combustion, waste incineration, or other processes or operations?  Yes  No  
 If Yes, identify:  
 i. Mobile sources during project operations (e.g., heavy equipment, fleet or delivery vehicles)  
 Heavy equipment during construction \_\_\_\_\_  
 ii. Stationary sources during construction (e.g., power generation, structural heating, batch plant, crushers)  
 N/A \_\_\_\_\_  
 iii. Stationary sources during operations (e.g., process emissions, large boilers, electric generation)  
 N/A \_\_\_\_\_

g. Will any air emission sources named in D.2.f (above), require a NY State Air Registration, Air Facility Permit, or Federal Clean Air Act Title IV or Title V Permit?  Yes  No  
 If Yes:  
 i. Is the project site located in an Air quality non-attainment area? (Area routinely or periodically fails to meet ambient air quality standards for all or some parts of the year)  Yes  No  
 ii. In addition to emissions as calculated in the application, the project will generate:  
 • \_\_\_\_\_ Tons/year (short tons) of Carbon Dioxide (CO<sub>2</sub>)  
 • \_\_\_\_\_ Tons/year (short tons) of Nitrous Oxide (N<sub>2</sub>O)  
 • \_\_\_\_\_ Tons/year (short tons) of Perfluorocarbons (PFCs)  
 • \_\_\_\_\_ Tons/year (short tons) of Sulfur Hexafluoride (SF<sub>6</sub>)  
 • \_\_\_\_\_ Tons/year (short tons) of Carbon Dioxide equivalent of Hydroflouorocarbons (HFCs)  
 • \_\_\_\_\_ Tons/year (short tons) of Hazardous Air Pollutants (HAPs)

h. Will the proposed action generate or emit methane (including, but not limited to, sewage treatment plants, landfills, composting facilities)?  Yes  No

If Yes:

i. Estimate methane generation in tons/year (metric): \_\_\_\_\_

ii. Describe any methane capture, control or elimination measures included in project design (e.g., combustion to generate heat or electricity, flaring): \_\_\_\_\_

---

i. Will the proposed action result in the release of air pollutants from open-air operations or processes, such as quarry or landfill operations?  Yes  No

If Yes: Describe operations and nature of emissions (e.g., diesel exhaust, rock particulates/dust): \_\_\_\_\_

---

j. Will the proposed action result in a substantial increase in traffic above present levels or generate substantial new demand for transportation facilities or services?  Yes  No

If Yes:

i. When is the peak traffic expected (Check all that apply):  Morning  Evening  Weekend  
 Randomly between hours of \_\_\_\_\_ to \_\_\_\_\_.

ii. For commercial activities only, projected number of truck trips/day and type (e.g., semi trailers and dump trucks): \_\_\_\_\_

iii. Parking spaces: Existing \_\_\_\_\_ Proposed \_\_\_\_\_ Net increase/decrease \_\_\_\_\_

iv. Does the proposed action include any shared use parking?  Yes  No

v. If the proposed action includes any modification of existing roads, creation of new roads or change in existing access, describe: \_\_\_\_\_

vi. Are public/private transportation service(s) or facilities available within 1/2 mile of the proposed site?  Yes  No

vii. Will the proposed action include access to public transportation or accommodations for use of hybrid, electric or other alternative fueled vehicles?  Yes  No

viii. Will the proposed action include plans for pedestrian or bicycle accommodations for connections to existing pedestrian or bicycle routes?  Yes  No

---

k. Will the proposed action (for commercial or industrial projects only) generate new or additional demand for energy?  Yes  No

If Yes:

i. Estimate annual electricity demand during operation of the proposed action: \_\_\_\_\_

ii. Anticipated sources/suppliers of electricity for the project (e.g., on-site combustion, on-site renewable, via grid/local utility, or other): \_\_\_\_\_

iii. Will the proposed action require a new, or an upgrade, to an existing substation?  Yes  No

---

l. Hours of operation. Answer all items which apply.

<p>i. During Construction:</p> <ul style="list-style-type: none"> <li>• Monday - Friday: _____ 0700-1700 _____</li> <li>• Saturday: _____ N/A _____</li> <li>• Sunday: _____ N/A _____</li> <li>• Holidays: _____ TBD _____</li> </ul>	<p>ii. During Operations:</p> <ul style="list-style-type: none"> <li>• Monday - Friday: _____ N/A _____</li> <li>• Saturday: _____ N/A _____</li> <li>• Sunday: _____ N/A _____</li> <li>• Holidays: _____ N/A _____</li> </ul>
--	---

m. Will the proposed action produce noise that will exceed existing ambient noise levels during construction, operation, or both?  Yes  No  
 If yes:  
 i. Provide details including sources, time of day and duration:  
Heavy equipment (e.g., excavator) will only be operational during daylight hours only during construction. There will be no change to noise levels after completion of the proposed action.

ii. Will the proposed action remove existing natural barriers that could act as a noise barrier or screen?  Yes  No  
 Describe: \_\_\_\_\_

---

n. Will the proposed action have outdoor lighting?  Yes  No  
 If yes:  
 i. Describe source(s), location(s), height of fixture(s), direction/aim, and proximity to nearest occupied structures:  
 \_\_\_\_\_

ii. Will proposed action remove existing natural barriers that could act as a light barrier or screen?  Yes  No  
 Describe: \_\_\_\_\_

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o. Does the proposed action have the potential to produce odors for more than one hour per day?  Yes  No  
 If Yes, describe possible sources, potential frequency and duration of odor emissions, and proximity to nearest occupied structures: \_\_\_\_\_

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p. Will the proposed action include any bulk storage of petroleum (combined capacity of over 1,100 gallons) or chemical products 185 gallons in above ground storage or any amount in underground storage?  Yes  No  
 If Yes:  
 i. Product(s) to be stored \_\_\_\_\_  
 ii. Volume(s) \_\_\_\_\_ per unit time \_\_\_\_\_ (e.g., month, year)  
 iii. Generally, describe the proposed storage facilities: \_\_\_\_\_

---

q. Will the proposed action (commercial, industrial and recreational projects only) use pesticides (i.e., herbicides, insecticides) during construction or operation?  Yes  No  
 If Yes:  
 i. Describe proposed treatment(s):  
 \_\_\_\_\_

ii. Will the proposed action use Integrated Pest Management Practices?  Yes  No

---

r. Will the proposed action (commercial or industrial projects only) involve or require the management or disposal of solid waste (excluding hazardous materials)?  Yes  No  
 If Yes:  
 i. Describe any solid waste(s) to be generated during construction or operation of the facility:  
 • Construction: \_\_\_\_\_ tons per \_\_\_\_\_ (unit of time)  
 • Operation : \_\_\_\_\_ tons per \_\_\_\_\_ (unit of time)  
 ii. Describe any proposals for on-site minimization, recycling or reuse of materials to avoid disposal as solid waste:  
 • Construction: \_\_\_\_\_  
 • Operation: \_\_\_\_\_

iii. Proposed disposal methods/facilities for solid waste generated on-site:  
 • Construction: \_\_\_\_\_  
 • Operation: \_\_\_\_\_

s. Does the proposed action include construction or modification of a solid waste management facility?  Yes  No  
 If Yes:  
 i. Type of management or handling of waste proposed for the site (e.g., recycling or transfer station, composting, landfill, or other disposal activities): \_\_\_\_\_  
 ii. Anticipated rate of disposal/processing:  
 • \_\_\_\_\_ Tons/month, if transfer or other non-combustion/thermal treatment, or  
 • \_\_\_\_\_ Tons/hour, if combustion or thermal treatment  
 iii. If landfill, anticipated site life: \_\_\_\_\_ years

t. Will the proposed action at the site involve the commercial generation, treatment, storage, or disposal of hazardous waste?  Yes  No  
 If Yes:  
 i. Name(s) of all hazardous wastes or constituents to be generated, handled or managed at facility: \_\_\_\_\_  
 \_\_\_\_\_  
 ii. Generally describe processes or activities involving hazardous wastes or constituents: \_\_\_\_\_  
 \_\_\_\_\_  
 iii. Specify amount to be handled or generated \_\_\_\_\_ tons/month  
 iv. Describe any proposals for on-site minimization, recycling or reuse of hazardous constituents: \_\_\_\_\_  
 \_\_\_\_\_  
 v. Will any hazardous wastes be disposed at an existing offsite hazardous waste facility?  Yes  No  
 If Yes: provide name and location of facility: \_\_\_\_\_  
 \_\_\_\_\_  
 If No: describe proposed management of any hazardous wastes which will not be sent to a hazardous waste facility:  
 \_\_\_\_\_  
 \_\_\_\_\_

**E. Site and Setting of Proposed Action**

**E.1. Land uses on and surrounding the project site**

a. Existing land uses.  
 i. Check all uses that occur on, adjoining and near the project site.  
 Urban  Industrial  Commercial  Residential (suburban)  Rural (non-farm)  
 Forest  Agriculture  Aquatic  Other (specify): Public New York State park  
 ii. If mix of uses, generally describe:  
 \_\_\_\_\_  
 \_\_\_\_\_

b. Land uses and covertypes on the project site.

Land use or Covertypes	Current Acreage	Acreage After Project Completion	Change (Acres +/-)
• Roads, buildings, and other paved or impervious surfaces	N/A	N/A	N/A
• Forested	3.3	N/A	N/A
• Meadows, grasslands or brushlands (non-agricultural, including abandoned agricultural)	N/A	N/A	N/A
• Agricultural (includes active orchards, field, greenhouse etc.)	N/A	N/A	N/A
• Surface water features (lakes, ponds, streams, rivers, etc.)	21.2	N/A	N/A
• Wetlands (freshwater or tidal)	N/A	N/A	N/A
• Non-vegetated (bare rock, earth or fill)	2	0.14	+0.14
• Other Describe: _____ _____			

c. Is the project site presently used by members of the community for public recreation?  Yes  No  
i. If Yes: explain: The project site is currently used for public recreation as part of Buckhorn Island State Park.

d. Are there any facilities serving children, the elderly, people with disabilities (e.g., schools, hospitals, licensed day care centers, or group homes) within 1500 feet of the project site?  Yes  No  
If Yes,  
i. Identify Facilities:  
\_\_\_\_\_

e. Does the project site contain an existing dam?  Yes  No  
If Yes:  
i. Dimensions of the dam and impoundment:  
• Dam height: \_\_\_\_\_ feet  
• Dam length: \_\_\_\_\_ feet  
• Surface area: \_\_\_\_\_ acres  
• Volume impounded: \_\_\_\_\_ gallons OR acre-feet  
ii. Dam's existing hazard classification: \_\_\_\_\_  
iii. Provide date and summarize results of last inspection:  
\_\_\_\_\_

f. Has the project site ever been used as a municipal, commercial or industrial solid waste management facility, or does the project site adjoin property which is now, or was at one time, used as a solid waste management facility?  Yes  No  
If Yes:  
i. Has the facility been formally closed?  Yes  No  
• If yes, cite sources/documentation: \_\_\_\_\_  
ii. Describe the location of the project site relative to the boundaries of the solid waste management facility:  
\_\_\_\_\_  
iii. Describe any development constraints due to the prior solid waste activities: \_\_\_\_\_

g. Have hazardous wastes been generated, treated and/or disposed of at the site, or does the project site adjoin property which is now or was at one time used to commercially treat, store and/or dispose of hazardous waste?  Yes  No  
If Yes:  
i. Describe waste(s) handled and waste management activities, including approximate time when activities occurred:  
\_\_\_\_\_

h. Potential contamination history. Has there been a reported spill at the proposed project site, or have any remedial actions been conducted at or adjacent to the proposed site?  Yes  No  
If Yes:  
i. Is any portion of the site listed on the NYSDEC Spills Incidents database or Environmental Site Remediation database? Check all that apply:  Yes  No  
 Yes – Spills Incidents database Provide DEC ID number(s): \_\_\_\_\_  
 Yes – Environmental Site Remediation database Provide DEC ID number(s): \_\_\_\_\_  
 Neither database  
ii. If site has been subject of RCRA corrective activities, describe control measures: \_\_\_\_\_  
iii. Is the project within 2000 feet of any site in the NYSDEC Environmental Site Remediation database?  Yes  No  
If yes, provide DEC ID number(s): \_\_\_\_\_  
iv. If yes to (i), (ii) or (iii) above, describe current status of site(s): \_\_\_\_\_

v. Is the project site subject to an institutional control limiting property uses?  Yes  No

- If yes, DEC site ID number: \_\_\_\_\_
- Describe the type of institutional control (e.g., deed restriction or easement): \_\_\_\_\_
- Describe any use limitations: \_\_\_\_\_
- Describe any engineering controls: \_\_\_\_\_
- Will the project affect the institutional or engineering controls in place?  Yes  No
- Explain: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

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**E.2. Natural Resources On or Near Project Site**

a. What is the average depth to bedrock on the project site? \_\_\_\_\_ unknown feet

b. Are there bedrock outcroppings on the project site?  Yes  No  
 If Yes, what proportion of the site is comprised of bedrock outcroppings? \_\_\_\_\_ %

c. Predominant soil type(s) present on project site:

Water	_____	62 %
Haplaquolls, ponded	_____	13 %
_____	_____	_____ %

d. What is the average depth to the water table on the project site? Average: \_\_\_\_\_ > 130 feet

e. Drainage status of project site soils:  Well Drained: \_\_\_\_\_ % of site  
 Moderately Well Drained: 6.6 % of site  
 Poorly Drained 22.9 % of site

f. Approximate proportion of proposed action site with slopes:  0-10%: 100 % of site  
 10-15%: \_\_\_\_\_ % of site  
 15% or greater: \_\_\_\_\_ % of site

g. Are there any unique geologic features on the project site?  Yes  No  
 If Yes, describe: \_\_\_\_\_  
 \_\_\_\_\_

h. Surface water features.

i. Does any portion of the project site contain wetlands or other waterbodies (including streams, rivers, ponds or lakes)?  Yes  No

ii. Do any wetlands or other waterbodies adjoin the project site?  Yes  No  
 If Yes to either *i* or *ii*, continue. If No, skip to E.2.i.

iii. Are any of the wetlands or waterbodies within or adjoining the project site regulated by any federal, state or local agency?  Yes  No

iv. For each identified regulated wetland and waterbody on the project site, provide the following information:

- Streams: Name 837-120 Classification B
- Lakes or Ponds: Name 837-1 Classification A-S
- Wetlands: Name Federal Waters, Federal Waters, Federal Waters... Approximate Size \_\_\_\_\_
- Wetland No. (if regulated by DEC) \_\_\_\_\_

v. Are any of the above water bodies listed in the most recent compilation of NYS water quality-impaired waterbodies?  Yes  No  
 If yes, name of impaired water body/bodies and basis for listing as impaired: \_\_\_\_\_  
 \_\_\_\_\_

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i. Is the project site in a designated Floodway?  Yes  No

j. Is the project site in the 100-year Floodplain?  Yes  No

k. Is the project site in the 500-year Floodplain?  Yes  No

l. Is the project site located over, or immediately adjoining, a primary, principal or sole source aquifer?  Yes  No  
 If Yes:  
 i. Name of aquifer: \_\_\_\_\_

<p>m. Identify the predominant wildlife species that occupy or use the project site:</p>		
Beaver _____	American toad _____	Red-winged blackbird _____
Northern pike _____	White-tailed deer _____	Purple martin _____
Muskrat _____	Green-backed heron _____	Turtles _____
<p>n. Does the project site contain a designated significant natural community? <span style="float: right;"><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</span></p> <p>If Yes:</p> <p style="margin-left: 20px;">i. Describe the habitat/community (composition, function, and basis for designation): _____</p> <p>Deep Emergent Marsh, Silver Maple-Ash Swamp</p> <p style="margin-left: 20px;">ii. Source(s) of description or evaluation: <u>EAF mapper</u></p> <p style="margin-left: 20px;">iii. Extent of community/habitat:</p> <ul style="list-style-type: none"> <li>• Currently: _____ 144.0, 290.7 acres</li> <li>• Following completion of project as proposed: _____ 144.0, 290.7 acres</li> <li>• Gain or loss (indicate + or -): _____ N/A acres</li> </ul>		
<p>o. Does project site contain any species of plant or animal that is listed by the federal government or NYS as endangered or threatened, or does it contain any areas identified as habitat for an endangered or threatened species? <span style="float: right;"><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</span></p> <p>If Yes:</p> <p style="margin-left: 20px;">i. Species and listing (endangered or threatened): _____</p> <p>Big shellbark hickory (state-threatened), least bittern (state-threatened), pied-billed grebe (state-threatened), sedge wren (state-threatened), common tern (state-threatened), peregrine falcon (state-endangered), and northern harrier (state-threatened)</p>		
<p>p. Does the project site contain any species of plant or animal that is listed by NYS as rare, or as a species of special concern? <span style="float: right;"><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</span></p> <p>If Yes:</p> <p style="margin-left: 20px;">i. Species and listing: _____</p>		
<p>q. Is the project site or adjoining area currently used for hunting, trapping, fishing or shell fishing? <span style="float: right;"><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</span></p> <p>If yes, give a brief description of how the proposed action may affect that use: _____</p> <p>Fishing occurs within the park. Proposed action would increase the amount of emergent vegetation and provide other improvements to fish habitat.</p>		
<p><b>E.3. Designated Public Resources On or Near Project Site</b></p>		
<p>a. Is the project site, or any portion of it, located in a designated agricultural district certified pursuant to Agriculture and Markets Law, Article 25-AA, Section 303 and 304? <span style="float: right;"><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</span></p> <p>If Yes, provide county plus district name/number: _____</p>		
<p>b. Are agricultural lands consisting of highly productive soils present? <span style="float: right;"><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</span></p> <p style="margin-left: 20px;">i. If Yes: acreage(s) on project site? _____</p> <p style="margin-left: 20px;">ii. Source(s) of soil rating(s): _____</p>		
<p>c. Does the project site contain all or part of, or is it substantially contiguous to, a registered National Natural Landmark? <span style="float: right;"><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</span></p> <p>If Yes:</p> <p style="margin-left: 20px;">i. Nature of the natural landmark: <input type="checkbox"/> Biological Community <input type="checkbox"/> Geological Feature</p> <p style="margin-left: 20px;">ii. Provide brief description of landmark, including values behind designation and approximate size/extent: _____</p> <p>_____</p> <p>_____</p>		
<p>d. Is the project site located in or does it adjoin a state listed Critical Environmental Area? <span style="float: right;"><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</span></p> <p>If Yes:</p> <p style="margin-left: 20px;">i. CEA name: _____</p> <p style="margin-left: 20px;">ii. Basis for designation: _____</p> <p style="margin-left: 20px;">iii. Designating agency and date: _____</p>		

e. Does the project site contain, or is it substantially contiguous to, a building, archaeological site, or district which is listed on the National or State Register of Historic Places, or that has been determined by the Commissioner of the NYS Office of Parks, Recreation and Historic Preservation to be eligible for listing on the State Register of Historic Places?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
If Yes:		
<i>i.</i> Nature of historic/archaeological resource: <input checked="" type="checkbox"/> Archaeological Site <input checked="" type="checkbox"/> Historic Building or District		
<i>ii.</i> Name: <u>Buckhorn Island Boat Slip Historic Site (02914.000123)</u>		
<i>iii.</i> Brief description of attributes on which listing is based:		
Multicomponent archaeological site; unknown prehistoric cultural affiliation; historic materials date to the late 19th and early 20th centuries		
f. Is the project site, or any portion of it, located in or adjacent to an area designated as sensitive for archaeological sites on the NY State Historic Preservation Office (SHPO) archaeological site inventory?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
g. Have additional archaeological or historic site(s) or resources been identified on the project site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
If Yes:		
<i>i.</i> Describe possible resource(s): _____		
<i>ii.</i> Basis for identification: _____		
h. Is the project site within five miles of any officially designated and publicly accessible federal, state, or local scenic or aesthetic resource?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
If Yes:		
<i>i.</i> Identify resource: <u>Great Lakes Seaway Trail</u>		
<i>ii.</i> Nature of, or basis for, designation (e.g., established highway overlook, state or local park, state historic trail or scenic byway, etc.): <u>National Scenic Byway</u>		
<i>iii.</i> Distance between project and resource: _____ <u>0.75</u> miles.		
i. Is the project site located within a designated river corridor under the Wild, Scenic and Recreational Rivers Program 6 NYCRR 666?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
If Yes:		
<i>i.</i> Identify the name of the river and its designation: _____		
<i>ii.</i> Is the activity consistent with development restrictions contained in 6NYCRR Part 666?		<input type="checkbox"/> Yes <input type="checkbox"/> No

**F. Additional Information**

Attach any additional information which may be needed to clarify your project.

If you have identified any adverse impacts which could be associated with your proposal, please describe those impacts plus any measures which you propose to avoid or minimize them.

**G. Verification**

I certify that the information provided is true to the best of my knowledge.

Applicant/Sponsor Name John C. Honan, P.E. Date \_\_\_\_\_

Signature \_\_\_\_\_ Title Regional Capital Facilities Manager 2