APPLICATION FOR:
NYSDEC
PROTECTION OF WATERS PERMIT
TIDAL WETLANDS PERMIT
WATER QUALITY CERTIFICATE
And
USACE
SECTION 404/10 INDIVIDUAL PERMIT

FOR:

GOVERNOR'S OFFICE OF STORM RECOVERY (GOSR)
LIVING WITH THE BAY PROGRAM
LISTER PARK PROJECT

Village of Rockville Centre
Nassau County, New York

April 14, 2020

APPLICANT:

Village of Rockville Centre
PO Box 950
Rockville Centre, New York 11571

PREPARED FOR:

Governor's Office of Storm Recovery
25 Beaver Street
New York, New York 10004

Tetra Tech
5 Hanover Square
New York, New York 10004

PREPARED BY:

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SECTION 1
Village of Rockville Centre
Governor's Office of Storm Recovery (GOSR)
Lister Park Project
Village of Rockville Centre
Nassau County, New York
ASGECI Project #4357

JOINT APPLICATION FORM

NEW YORK STATE | Department of Environmental Conservation | Office of General Services | Department of State

US Army Corps of Engineers

JOINT APPLICATION FORM

For Permits for activities 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 ☑ Check here to confirm you sent this form to NYSDEC.

Check all permits that apply:

- ☐ Stream Disturbance
- ☑ Excavation and Fill in Navigable Waters
- ☐ Docks, Moorings or Platforms
- ☐ Dams and Impoundment Structures
- ☑ 401 Water Quality Certification
- ☐ Freshwater Wetlands
- ☑ Tidal Wetlands
- ☐ Wild, Scenic and Recreational Rivers
- ☐ Coastal Erosion Management
- ☐ Water Withdrawal
- ☐ Long Island Well
- ☐ Incidental Take of Endangered / Threatened Species

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

Check all permits that apply: ☑ Section 404 Clean Water Act ☑ Section 10 Rivers and Harbors Act

Is the project Federally funded? ☑ Yes ☐ No

If yes, name of Federal Agency: United States Department of Housing and Urban Development

General Permit Type(s), if known: Individual Permit

Preconstruction Notification: ☑ Yes ☐ No

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

Check all permits that apply:

☑ State Owned Lands Under Water

☐ Utility Easement (pipelines, conduits, cables, etc.) ☐ Docks, Moorings or Platforms

>NYS Department of State ☑ Check here to confirm you sent this form to NYSDOS.

Check if this applies: ☑ Coastal Consistency Concurrence

2. **Name of Applicant**

Village of Rockville Centre

Taxpayer ID (if applicant is NOT an individual)

Mailing Address

Post Office / City: Rockville Centre

State: NY

Zip: 11571

Telephone: 516-678-9246

Email:

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

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

Mailing Address

Post Office / City

State

Zip

Telephone

Email

For Agency Use Only	Agency Application Number:

4. **Name of Contact / Agent**

Amy S. Greene Env. Consultants, Inc.

Mailing Address	Post Office / City	State	Zip
4 Walter Foran Blvd | Suite 209	Flemington	NJ	08822

Telephone 908-788-9676 Email susan.quackenbush@davey.com

5. **Project / Facility Name**

Living With The Bay Lister Park Improvements

Property Tax Map Section / Block / Lot Number:

See Section 2.2 Existing Conditions

Project Street Address, if applicable	Post Office / City	State	Zip
Village DPW Yard; Bligh Field; Centennial Field; Lister Park; and Tighe Field. See Section 2.2. Existing Conditions.	Rockville Centre	NY	11571

Provide directions and distances to roads, intersections, bridges and bodies of water

From Sunrise Highway, turn south onto Ocean Avenue and make first left onto Merton Avenue. Centennial Field will be at the end of Merton Avenue.

☐ Town ☑ Village ☐ City

County	Stream/Waterbody Name
Nassau	Mill River

Rockville Centre

Project Location Coordinates: Enter Latitude and Longitude in degrees, minutes, seconds:

Latitude: 40 ° 39 ' 17.08 " Longitude: -73 ° 39 ' 16.63 "

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:

To implement flood protection, erosion control, stormwater mitigation, habitat enhancement, water quality, and waterfront access improvements along Mill River

b. Description of current site conditions:

The site is developed with the Rockville Centre DPW storage yard and existing public parks known as: Tighe Field, Lister Park, Centennial Field and Bligh Field. The public parks contain typical features such as maintained lawn, parking areas and recreational amenities. The edges of Mill River contain natural vegetation along somewhat eroded banks.

c. Proposed site changes:

Construction of a bioretention basins, installation of living shorelines, replacement of existing parking lot, installation of backflow preventers on existing outfalls into Mill River, replacement of existing overlook, Construction of drainage outlets, construction of greenway, and construction of berm and knee walls.

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.):

Bioretention basins, living shorelines, repaving of parking lot, porous asphalt for greenway, construction of berm and knee walls. See Project Description for further information.

e. Area of excavation or dredging, volume of material to be removed, location of dredged material placement:

No dredging is proposed as part of the project improvements. Stripped topsoil will be stockpiled in areas as directed by the Owner's representative. Sediment collected by erosion control measures will be disposed of by spreading on-site or hauled off-site if determined to be unsuitable for fill.

f. Is tree cutting or clearing proposed? ☑ Yes If Yes, explain below. ☐ No

Timing of the proposed cutting or clearing (month/year): Fall 2020 - Spring 2021

Number of trees to be cut: 103 Acreage of trees to be cleared:

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

To limit impacts, a limited amount of heavy machinery will be utilized. Small backhoes, bulldozers, and asphalt paving construction equipment will be used to assist in the excavation and construction of improvements proposed as part of the project. Dump trucks will also be used to haul off excess material and bring in proposed clean fill as required. Additionally, concrete trucks will be required for the cast-in-place concrete wall construction along S Park Ave, west of Riverside Road.

h. Describe the planned sequence of activities:

Work is scheduled to commence in Fall 2020. Once mobilized, the Contractor will begin demolition work and construct porous asphalt greenway with the lighting, landscaping, and in-kind overlook replacement. The Contractor will construct the flood protection measures along Riverside Drive (concrete walls, berm, passive floodbreaks). The Contractor will construct last the proposed bioretention basins, drainage and living shorelines.

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

Pollution control methods being proposed are typical erosion control methods in compliance with New York State Erosion Control Standards. Inlet filters will be installed in existing catch basins to prevent construction sediment and debris from entering the existing storm water system and discharging into water bodies. See Section 9 - Permit Plans. SPDES Phase II General Permit for Storm Water Discharges reports to be maintained by Contractor.

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

Silt fencing will be employed to prevent sediment and debris from discharging off site as part of stormwater runoff. Stone construction entrance pads will be utilized to wash down vehicles and prevent construction sediment and debris from being tracked on roadways. See Section 9 - Permit Plans.

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

Regulated areas were avoided as much as possible. However, minor impacts to regulated areas could not be completely avoided. See Section 2.9 of the application for further information relative to the alternatives analysis.

l. Proposed use: ☐ Private ☑ Public ☐ Commercial

m. Proposed Start Date: Fall 2020 Estimated Completion Date: Fall 2021

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

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

Public land owned by the Village of Rockville Centre.

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

NYSDOS F-2018-0495(FA)

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

☑ Yes If Yes, list below. ☐ No

USACE Section 404 and Section 10 approvals: Individual Permit.

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

Kathleen M. Murray Digitally signed by Kathleen M. Murray Date: 2020.04.07 12:16:39 -04'00'

Date: 4/7/2020

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

Printed Name: Kathleen M. Murray

Title: Village Administrator

Signature of Owner (if different than Applicant)

Date:

Printed Name:

Title:

Signature of Contact / Agent

S Quackenbush

Date: 5/5/2020

Printed Name: Susan Quackenbush

Title: Department Manager

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:

SECTION 2
Village of Rockville Centre
Governor's Office of Storm Recovery (GOSR)
Lister Park Project
Village of Rockville Centre
Nassau County, New York
ASGECI Project #4357

PROJECT DESCRIPTION

2.1 INTRODUCTION

On behalf of the project proponent, Governor's Office of Storm Recovery (GOSR), and applicant, Village of Rockville Centre (Village), the following is presented for the Lister Park Project in accordance with the following requested approvals:

- Section 608 Protection of Waters (Article 15)
- Section 661 Tidal Wetlands Permit (Article 25)
- Water Quality Certification
- USACE Section 404/10 Individual Permit

The Mill River watershed, located in southwest Nassau County, is a microcosm of New York's Long Island. The river winds through several communities, buried in pipes and traveling through freshwater lakes, before finally entering Hewlett Bay through a narrow estuary. Although urbanized, the Mill River supports a variety of wildlife and serves as a water access point for local residents. In response to the devastation of Hurricane Sandy, the US Department of Housing and Urban Development's (HUD's) Rebuild by Design (RBD) program awarded funding to New York State through the Living with the Bay (LWTB) proposal, which promoted a watershed approach to protect and enhance this diverse area. To advance this proposal, a Resiliency Strategy was developed to identify and evaluate projects across approximately 10,000 acres making up the program area.

The purpose of the LWTB Resiliency Strategy is to identify a plan for the RBD LWTB program to help GOSR administer the HUD Community Development Block Grant-Disaster Recovery (CDBG-DR) funds. More specifically, it is to increase community resilience by mitigating local risk from tidal and stormwater flooding, while incorporating environmental co-benefits such as water quality improvements, ecological restoration, and aquifer recharge.

The Lister Park Project is one (1) of the projects identified in the program which qualifies to meet the goals of the program such as flood mitigation, restoring environmental health and water quality, and creating and improving waterfront access.

The subject site contains New York State Department of Environmental Conservation (NYSDEC) mapped tidal wetlands and the associated adjacent area which are proposed to be impacted by proposed activities. Work involves filling of a tidal navigable water required to install rock sills to accommodate the living shoreline design necessitating the need for a Protection of Waters permit. However, the purpose of the project is to improve the habitat within the Project Area, and the majority of activities proposed within regulated areas will result

in a net benefit of wetland functions and values through the proposed planting of native vegetation. Lastly, proposed activities do not qualify for a "blanket" State Water Quality Certificate; therefore, an individual request for same is made herein.

GOSR, acting under the auspices of the New York State Homes and Community Renewal's (NYSHCR) Housing Trust Fund Corporation (HTFC), on behalf of the U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant for Disaster Recovery (CDBG-DR), is preparing an environmental review for RBD LWTB program. GOSR is acting as the responsible entity and HUD's non-federal representative for the purposes of conducting informal consultations. Outlines of some of these consultations are presented below.

GOSR, acting as lead agency and project proponent, is conducting the SEQR/NEPA review of the project. Since GOSR has completed this process, the Environmental Assessment Forms are not provided in this application.

2.2 EXISTING CONDITIONS

The subject site is situated within a residential setting and comprises the existing Village Department of Public Works (DPW) storage yard and three public parks known as Bligh Field, Centennial Field, Lister Park and Tighe Field. The site is bounded by Merrick Road to the north and East Rockaway High School to the south and by residential development to the east and west. The DPW storage yard contains an open area in the center used for leaf disposal with overgrown areas along Mill River. Bligh Field is located north of the DPW yard and contains two (2) baseball fields, an asphalt walkway (greenway) along Mill River and a paved parking lot. Bligh Field is bounded by South Park Avenue to the north. Moving north, Centennial Field contains two (2) baseball fields, a paved parking lot, playground, Rockville Centre Auxiliary Police Building and basketball courts. Lister Park is located north of Centennial Park and comprises a baseball field, paved parking lot and the existing greenway. Lister Park is bounded by Merrick Road to the north. Tighe Field is located across Mill River and is bounded by Merrick Road to the north and South Village Avenue and contains a soccer field.

The property tax map information for these parcels of land is as follows:

Section 38; Blocks F, T, 136, 432, 452; Lots 39, 50B, 231, 26, 307.

Mill River is a navigable, tidal watercourse which is mapped by the New York State Department of Environmental Conservation (NYSDEC) as a Littoral Zone (LZ) tidal wetland category (Sheet #612-500). Mill River is classified by NYSDEC as an SC (marine waters) which contains a best usage for fishing (6 NYCRR Section 885-176). A small area at the southern tip of the DPW yard is mapped a by NYSDEC as Coastal Fresh Marsh (FM).

An onsite wetland delineation was completed by Tetra Tech on July 19, 20 and 25, 2017 and is shown on the submitted drawings. Onsite wetlands are regulated tidal wetlands which are shown on the appropriate tidal wetlands index sheet; therefore, a regulated Adjacent Area (AA) is applicable to the upland portion of the site. See Section 7 for the Wetland Delineation Report.

The project area comprises the following regulated resources based on the onsite wetland delineation and plotting of the mean high and mean low water lines:

- Vegetated Tidal Wetlands (IM)
- Unvegetated Tidal Wetland (LZ – open water)
- Vegetated Nontidal Wetlands (HM)
- Adjacent Area

Cultural Resources

GOSR reached out to the New York Office of Parks, Recreation and Historic Preservation (OPRHP) to determine if any of the Project areas are in archaeologically sensitive areas. The OPRHP's opinion was that the proposed work associated with the Project has the potential to encounter intact soils at archaeologically sensitive areas and recommended a Phase 1A archaeological survey be conducted. The Phase 1A archaeological survey is designed to identify previously recorded archaeological sites and other cultural resources within or near a project and assess the archaeological sensitivity of a project area.

The results of the Phase 1A archaeological survey indicated that there is a potential for historic resources to be present within the Project area, and as such, a Phase 1B archaeological survey is required and is in the process of being performed.

Threatened and Endangered Species

During an initial site reconnaissance, conducted on July 13, 2017 by Tetra Tech, an osprey (*Pandion haliaetus*) was observed flying over the Mill River in the vicinity of the Municipal DPW Yard property. The species is listed by the NYSDEC as a species of special concern. No associated nests were observed at the site. See Section 6 for the NY Natural Heritage Program Letter.

The federally listed threatened northern long-eared bat, piping plover, red knot, and seabeach amaranth; the federally listed endangered roseate tern and sandplain gerardia were not observed during the wetland delineation effort. Suitable habitat for these listed wildlife and plant species was not prevalent at the site. Trees with exfoliating bark or snags (i.e., northern long-eared bat summer roosting habitat) were not in abundance. Due to the disturbed nature of the site and the surrounding urban environment, the presence of listed species at the Site is anticipated to be minimal.

GOSR initiated consultation with US Fish and Wildlife Service (USFWS) on May 9, 2018. According to USFWS IPaC Official Species Lists, accessed March 23-27, 2018, there are four threatened species (northern long-eared bat, piping plover, red knot, and seabeach amaranth) and two endangered species (roseate tern and sandplain gerardia) know to occur in Nassau County. GOSR has determined that the proposed project will have no effect on piping plover, red knot, seabeach amaranth, roseate tern and sandplain gerardia. The proposed action may affect Northern long-eared bat due to tree cutting. GOSR indicated that a seasonal timing restriction on tree cutting between November 1 through March 31 of each year to minimize impacts.

GOSR contacted the New York Natural Heritage Program (NYNHP) and they indicated documented occurrences of two imperiled dragonfly species within project area: seaside dragonlet (*Erythrodiplax berenice)* and Ramber's fortktail (*Ischnura ramburii).* ASGECI obtained an updated NHP letter. See Section 6.

Project activities proposed at Lister Park include implementing living shoreline improvements to mitigate shoreline erosion and enhance habitat restoration and creation that would be beneficial to dragonfly species. Further, although mostly found near ponds and streams, these species are very skilled fliers. During construction, seaside dragonlet and Rambur's Forktail may be displaced but can fly many miles from where they live near the water. These species are expected to return to the project site following wetland enhancement.

2.3 PROJECT DESCRIPTION

Proposed project activities include the following elements:

- installation of living shoreline bank stabilization;
- construction of a bioretention basin at Tighe Park;
- reconstruction and repaving of existing parking lot and bioretention basin at Centennial Field;
- replacement of overlook at Bligh Park;
- construction of porous asphalt greenway at Bligh Field;
- construction of earthen berm for flood protection at Bligh Field;
- construction of knee walls for flood protection at Bligh Field/Riverside Road;

Each of these proposed design elements are discussed in further detail below in subsequent sections of this application. See Section 9 – Permit Plans for more details regarding proposed activities and enhancements.

2.4 PURPOSE AND NEED

The purpose and need for this project are to implement flood protection, erosion control, stormwater mitigation, habitat enhancement, water quality, and waterfront access improvements along Mill River.

2.5 USE GUIDELINES

The following presents an analysis of proposed activities relative to the Use Guidelines enumerated in NYCRR 661.5.

Installation of Living Shoreline Bank Stabilization

The installation of living shoreline to provide bank stabilization and enhance habitat along Mill River will be conducted along a large majority of the project area. Approximately 15,711 square feet of living shoreline will be constructed along approximately 3,550 linear feet of the existing river bank within the project area. Installation of living shorelines involves soils excavation, filling and grading, placement of rock sills for protection and installing plantings. These activities will occur both above and below the mean high water (MHW) elevation; therefore, resulting in impacts to wetlands and the adjacent area. The purpose of the living shoreline is to prevent erosion and enhance habitat quality.

Applicable use guidelines consider this use, specifically establish plantings, as generally compatible – permit required (GCp) within the LZ and not requiring a permit within the AA (Item #9). Grading, excavation and filling are considered to be a permit required activity.

This proposed activity will result in the disturbance of 6,805 SF of existing wetland and 15,102 SF of existing adjacent wetland areas.

The implementation of living shorelines will result in the following habitat improvements or modifications:

Area of Wetland Plantings Proposed:	26,554 SF
Area of New Wetland Created:	19,749 SF
Un-vegetated/invasive Adjacent Area to be planted with natives:	15,627 SF
Adjacent Area: Mitigation provided:	525 SF

As seen above, the ultimate result of the proposed living shoreline design and construction is a net benefit of wetland functions and values.

Construction of a Bioretention Basin at Tighe Park

Tighe Park presents an opportunity to increase stormwater quality prior to runoff release to the Mill River. Proposed bioretention basins (i.e. green infrastructure) will incorporate elements that will capture and treat the Water Quality Volume as defined by the New York State Department of Conservation (DEC) from the contributing drainage areas prior to release to the Mill River. Given the fact that the Mill River is tidally influenced, DEC does not require quantity management of stormwater runoff. The proposed bioretention basin at Tighe Park will provide water quality treatment for the parking lot prior to release to the Mill River. The entire parking lot currently slopes towards the proposed bioretention basins on its west side; therefore, no regrading has been proposed within the parking lot area. The bioretention basin was sized to provide enough storage equivalent to the water quality volume generated by the parking lot drainage area in accordance with the New York State Stormwater Design Manual Latest Edition.

This activity will occur or outside of the AA because its limits are truncated by an existing asphalt walkway located closer to Mill River.

Reconstruction and Repaving of Existing Parking Lot and Bioretention Basin at Centennial Field

Initial re-grading of the Centennial Park parking lot was recommended to eliminate the current "bird baths" and ponding that occurs. In addition, a bioretention basin is proposed to provide water quality treatment from the parking lot prior to release to the Mill River. The entire parking currently slopes towards the proposed bioretention basin on the north end. The existing inlet at the low point of the parking lot would be removed and replaced with an overflow inlet in the bioretention basin for larger storm events for conveyance to the Mill River. The bioretention basin was sized to provide enough storage equivalent to the water quality volume generated by the parking lot drainage area.

This activity will occur or outside of the AA because its limits are truncated by an existing asphalt walkway located closer to Mill River.

Replacement of Overlook at Bligh Park

The existing overlook located at Bligh Field near the parking lot will be reconstructed to provide visual access to the waterfront. The overlook will be accessible from the new greenway and parking lot to remain. The overlook sits on top of an existing stormwater outfall pipe which will be fitted with a backflow prevention device. This activity will occur within the LZ and AA but will not result in a loss of resource since it is an in-kind replacement.

Applicable use guidelines consider this use as generally compatible – permit required (GCp) within the LZ and AA (Item #24).

Construction of Porous Asphalt Greenway at Bligh Field

An existing greenway commences at Lister Park and heads south towards South Park Avenue varies in elevation from approximately 5 to 13 feet. The greenway is to be extended for approximately 670 linear feet south of South Park Avenue and it is proposed to continue to meet the project goals of increased waterfront access and greenway connectivity. The greenway alignment will follow existing contours to minimize cut and fill quantities. The greenway will have a maximum width of 10 feet and surrounding grades slopes will be constructed to match existing grades. The greenway will follow the east edge of Bligh Field until it turns west down the southern edge of the Bligh Field parking lot and connects to Riverside Road.

The proposed greenway will be comprised of porous asphalt underlain with a choker course of stone and a filter layer of stone. Additionally, drainage relief pipes will be provided at low points along the Greenway to provide positive drainage. The porous asphalt will provide the water quality benefit required per the New York State Stormwater Management Design Manual.

This activity will occur within AA and will result in a loss of resource in the amount of 6,804 SF.

Since construction of this walking trail involves material alteration of the land, it does not fit under the land use guideline Item # 8 for establishing walking trails, and therefore defaults to Item #57 permit required (P) activity within the AA.

Adjacent area mitigation for this activity is provided in the net benefit gain achieved under the proposed planting where none or invasive species exist within adjacent areas, in the amount of 15,627 SF.

Construction of Earthen Berm for Flood Protection at Bligh Field

An elevated berm is proposed along the west side of Bligh Field between South Park Avenue and Mill River Avenue to provide flood protection to homes located on Riverside Road within the FEMA delineated ZONE AE. The berm will be graded out so that the top of the berm will be at elevation 9 (approximately two to three feet high) which is the base flood elevation in the area.

This activity will occur within AA which is currently developed with recreation fields and comprises maintained lawn. Nevertheless, this activity will result in a loss of resource in the amount of 5,240 SF.

Applicable use guidelines consider this use as generally compatible – permit required (GCp) within the AA (Item #32).

Adjacent area mitigation for this activity is provided in the net benefit gain achieved under the living shoreline design in the amount of 15,627 sf.

Construction of Knee Walls for Flood Protection at Bligh Field/Riverside Road

A knee wall is proposed along the west side of Bligh Field parking lot to provide flood protection to homes located on Riverside Road within the FEMA delineated ZONE AE. Homes located in such zone are susceptible to flooding as a result of the 100-year storm event and the use of a wall reduces the footprint of flood protection infrastructure when compared to a berm or levee. The proposed wall is to be cast-in-place concrete and its design will address required bearing capacity, sliding and overturning stability concerns. The knee-wall alignment at the Riverside Road and Bligh Field parking lot crossings is to be complemented floodbreak panels to allow continued access during non-flood time periods.

This activity will occur outside of the AA because it will occur in an existing parking lot.

In summary, proposed activities associated with the LWTB program are generally compatible with the preservation, protection, and enhancement of wetland functions and values, and in fact result in a net benefit of wetland and adjacent area functions and values.

Impacts to Waters of the US

The proposed action will result in permanent impacts to tidal open waters (for installation of stone bank stabilization. Other impacts are related to shoreline plantings, bulkhead maintenance and invasive species eradication. Permanent impacts involve the placement of stone material into a non-wetland tidal water of the US for purposes of bank stabilization.

Table 1
Summary of Impacts*

IMPACT TYPE	PERMANENT	TEMPORARY	TOTAL
Tidal Wetland	535	6,270	6,805
Non-wetland Tidal Water	6,032	18,534	24,566
TOTAL	6,567	24,804	31,371

** Units in square feet (sf)*

2.6 DEVELOPMENT RESTRICTIONS

The following compliance of the applicable eight (8) development restrictions is presented in accordance with NYCRR Part 661.6.

All development restrictions relating to building setbacks are not applicable since no new buildings are proposed (Development Restriction Items #1, #5 and #6).

This project does not involve the installation of any type of individual sewage disposal system. The site will not be connected to a public sanitary sewer or water system. Therefore, development restrictions relating to sewage disposal are not applicable (Development Restriction Items #2 and #3.

The project includes the construction of hard surfaces for the greenway at Bligh Field; however, it will comprise porous asphalt. The subject property is identified as Section 38, Block A, Lot 34. The addition of 6,282 sf of porous asphalt for the greenway will result in approximately 10% of coverage. Therefore, the project is in compliance with Development Restriction #4.

The proposed greenway will be constructed within 75 feet of the LZ tidal wetland category. Therefore, a variance to strict compliance with Development Standard #7 is requested herein. See Section 2.7 below for further information regarding the variance request.

Lastly, the proposed project will not result in any significant increase in surface run off to the adjacent wetlands and Mill River. In fact, the project is designed to help mitigate and control stormwater runoff.

In summary, the proposed project is in compliance with the following Development Restriction:

Development Restrictions #1, #2, #3, #4, #5, #6 and #8 and a variance is not required.

However, the proposed project is not in compliance with the following:

Development Restriction #7 and a variance is required and requested herein.

2.7 VARIANCE

The proposed greenway will be constructed within 75 feet of a tidal wetland (LZ). A large majority of the greenway will be constructed within existing developed or otherwise disturbed areas, such as maintained lawn (i.e. athletic field), while some will impact more naturally vegetated areas along Mill River. Therefore, potential negative impacts to the tidal wetland relative to marine food production, wildlife habitat, flood and hurricane and storm control, recreation, education, cleansing of ecosystems, absorption of silt and organic material, research, or open space and aesthetic appreciation are not anticipated. The use of porous asphalt reduces negative impacts and the greenway is expected to enhance recreation, education and open space and aesthetic appreciation values.

The proposed Greenway along the Mill River will provide greater public access to the waterfront for the Living with the Bay community, which achieves the Project's goal of enhancing waterfront access, and providing connectivity along the Mill waterfront to existing pathways. In addition, this Project will support GOSR's LWTB Program goal of Public Education by offering educational opportunities with the Project access improvements. Although the proposed Greenway is seen as a hard surface the Greenway will be comprised of porous asphalt underlaid with a course of stone and filter layer of stone. This will provide the water quality benefit required per the New York State Stormwater Management Design Manual and sized for the water quality volume.

2.8 STANDARDS FOR ISSUANCE

In accordance with NYCRR 661.9, the following analysis of applicable overall standards for work in both the tidal wetland and its adjacent area is provided for the proposed project.

The first standard relates to preservation and protection of the tidal wetland as it relates to potential adverse impacts upon the affected tidal wetland and adjoining wetlands upon marine food production, wildlife habitat, flood and hurricane storm control, cleansing ecosystems, absorption of silt and organic material, recreation, education, research, open space and aesthetic appreciation.

As noted above in Section 2.7 Variance, these listed values are not expected to be adversely impacted by construction of the greenway. Living shorelines will help enhance existing wetland functions and values by controlling erosion and improving vegetation diversity.

The above-listed attributes of tidal wetlands are indeed important to the overall ecosystem, as well as provide positive social and economic benefits. There will be no net loss of wetland functions and values, and in fact, there may be a net gain in wetland functions and values relative to this specific activity. **COMPATIBLE.**

The second standard relates to compatibility with the public health and welfare. The proposed project is not expected to be incompatible with public health and safety requirements due to the inherent nature of the undertaking. In fact, the goal of flood alleviation to the LWTB community enhances public health and safety. **COMPATIBLE**.

The third standard relates to the project's reasonable and necessary undertaking. The proposed project is certainly reasonable and necessary as it relates to the goals, objectives and mission of the LWTB program. **COMPATIBLE**.

The fourth standard compares the proposed project to development restrictions contained in section NYCRR 661.6. As outlined herein, the project is in compliance with seven (7) of the eight (8) development restrictions and a variance is not required. However, a variance is required and requested for one (1) development restriction (See Section 2.7 Variance) **COMPATIBLE**.

The fifth and final standard compares the proposed project to the use guidelines contained in section NYCRR 661.5. As demonstrated herein, the proposed project is not incompatible with the use guidelines. **COMPATIBLE**.

2.9 ALTERNATIVES ANALYSIS

In 2017, GOSR issued a Summary Report for Resiliency Strategy for the LWTB program whereby projects were identified, screened and evaluated against the purpose and need of the program. The framework of the LWTB Resiliency Strategy was comprised of 35 potential projects organized to collectively address the program's goals across the program area. The ERHS/Lister Park Project is identified as Project M in the report and is scored as the fifth (5th) highest priority project. Therefore, this project is part of a process that has undergone significant technical review, analysis as well as public comment periods.

The no build alternative will result in the site remaining in its current condition as public parks and surrounding developments with continued flooding issues and problems plaguing the community. This is not the objective of the LWTB program.

The build alternative includes site design as proposed in this application. Potential adverse impacts related to providing bank stabilization and erosion control are minimized by implementing living shoreline techniques.

The proposed alignment of the greenway utilizes developed and disturbed areas (AA) as much as possible which minimizes impacts and keeps the greenway out of the existing athletic fields which are an extremely important and critical component of the community. The width of the greenway is the minimum required to comply with all applicable standards and fencing is needed for safety reasons.

2.10 MITIGATION STATEMENT

The overall project will result in the loss of tidal wetlands (2,215 sf) and adjacent area (11,532 sf) for installation of rock sills and lining, and a loss of adjacent area (6,282 sf) for construction of a porous asphalt greenway, as well as a loss of adjacent area (5,250 sf) for the construction of an earthen berm for flood protection.

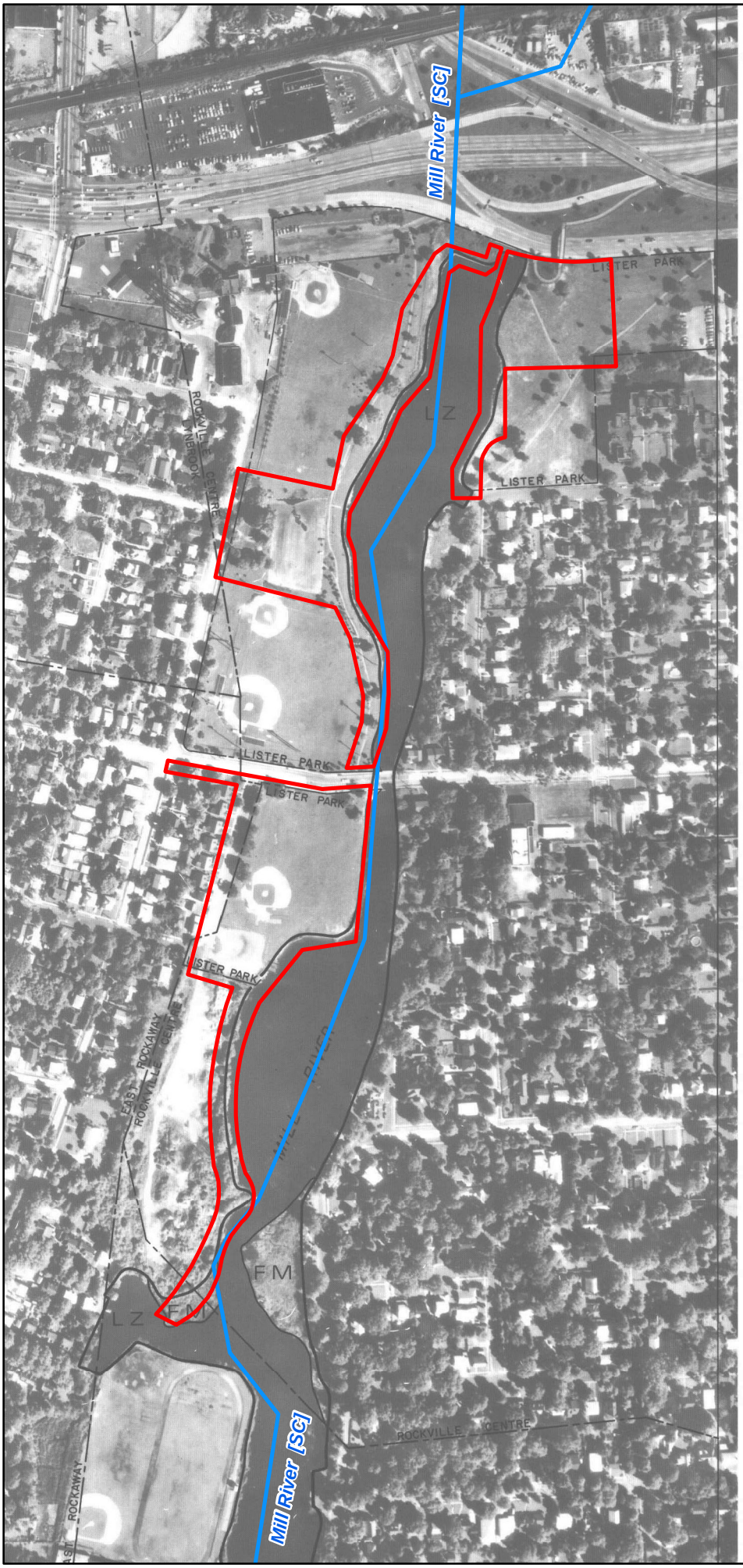
Implementation of the living shoreline project is inherently designed to enhance habitat quality and diversity of the wetlands and adjacent area. Therefore, compensatory mitigation for permanent losses are provided by living shorelines. A total of 12,113 sf of adjacent area and 15,711 sf of tidal wetland will be enhanced, which exceeds the losses associated with the project.

In accordance with the proceedings of a pre-application meeting held at the NYSDEC Region 1 office on January 29, 2019, the significant net benefit of wetland and adjacent area functions and values realized at Lister Park can be used to offset adverse impacts and habitat loss at the East Rockaway High School Project. See Section 8 for the Pre-Application Meeting Minutes. Both of these projects are related and part of the LWTB program and are separated by approximately 175 feet at their closest points.

SECTION 3
Village of Rockville Centre
Governor's Office of Storm Recovery (GOSR)
Lister Park Project
Village of Rockville Centre
Nassau County, New York
ASGECI Project #4357

SITE FIGURES

Figure 1 Site Location Map
Figure 2 USGS Topographic Map
Figure 3 SSURGO Soils Map
Figure 4 NYSDEC Tidal Wetlands and Stream Classification Map



Legend

Project Area

Stream (with classification)

Water Quality Classifications

C - The best usage of Class C waters is fishing. These waters shall be suitable for fish propagation and survival.

WETLANDS CATEGORIES :

IM	Intertidal Marsh
HM	High Marsh or Salt Meadow
FM	Coastal Fresh Marsh
SM	Coastal Shoals, Bars and Mudflats
FC	Formerly Connected Tidal Wetlands
ds	Dredge Spoil
LZ	Littoral Zone

Areas adjacent to tidal wetlands

Landward extent of tidal wetlands

Wetlands category boundaries

POLITICAL BOUNDARIES:

State

County

Town or City

Incorporated Village

Park or Reservation

Approximate location of political boundary lines based on New York State Department of Transportation 7.5 minute planimetric maps.

Source:
1974 Tidal Wetland Boundary Map Images (NYSDEC), digital renditions of the official 1974 tidal wetlands inventory maps, New York State Department of Environmental Conservation, Division of Marine Resources, Bureau of Marine Habitat, published October 2004.
Water Quality Classifications (WQC) - NYS (NYSDEC), NYS Department of Enviromental Conservation, Division of Water, Bureau of Flood Protection and Dam Safety, NYSDEC, Albany, New York, April 2013.

N
W E
S

Figure 4
NYSDEC Tidal Wetlands
and Stream Classification Map

Governor's Office of Storm Recovery
Living with the Bay
Lister Park Project
Village of Rockville Centre
Nassau County, New York

ASGECI Project # 4357

400
Feet

AMY S. GREENE ENVIRONMENTAL CONSULTANTS

SECTION 5
Village of Rockville Centre
Governor's Office of Storm Recovery (GOSR)
Lister Park Project
Village of Rockville Centre
Nassau County, New York
ASGECI Project #4357

NEW YORK STATE DEPARTMENT OF STATE
FEDERAL CONSISTENCY ASSESSMENT FORM

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: Village of Rockville Centre
2. Address: PO Box 950, Rockville Centre, NY 11571
3. Telephone: Area Code ( ) 516-678-9246

B. **PROPOSED ACTIVITY:**

1. Brief description of activity:

Living shorelines, proposed porous asphalt greenway, overlook replacement in-kind, bioretention basins (green infrastructure), flood protection berm and knee wall, and parking lot reconstruction.

2. Purpose of activity:

Goals for this project include providing flood protection, enhancing waterfront access and habitat, and providing connectivity along the Mill River waterfront.

3. Location of activity:

Nassau	Rockville Centre	S. Park Avenue
County	City, Town, or (Village)	Street or Site Description

4. Type of federal permit/license required: USACE Section 404/10 Individual Permit/HUD

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:

F-2018-0495(FA) NYSDOS

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)		✔
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)		✔
c. Revitalization/redevelopment of a deteriorated or underutilized waterfront site? (1)		✔
d. Reduction of existing or potential public access to or along coastal waters? (19, 20)		✔
e. Adverse effect upon the commercial or recreational use of coastal fish resources? (9,10)		✔
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)		✔
g. Siting of a facility essential to the generation or transmission of energy? (27)		✔
h. Mining, excavation, or dredging activities, or the placement of dredged or fill material in coastal waters? (15, 35)		✔
i. Discharge of toxics, hazardous substances or other pollutants into coastal waters? (8, 15, 35)		✔
j. Draining of stormwater runoff or sewer overflows into coastal waters? (33)		✔
k. Transport, storage, treatment, or disposal of solid wastes or hazardous materials? (36, 39)		✔
l. Adverse effect upon land or water uses within the State's small harbors? (4)		✔

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)	✔	
b. Federally designated flood and/or state designated erosion hazard area? (11, 12, 17)	✔	
c. State designated significant fish and/or wildlife habitat? (7)		✔
d. State designated significant scenic resource or area? (24)		✔
e. State designated important agricultural lands? (26)		✔
f. Beach, dune or Barrier Island? (12)		✔
g. Major ports of Albany, Buffalo, Ogdensburg, Oswego or New York? (3)		✔
h. State, county, or local park? (19, 20)	✔	
i. Historic resource listed on the National or State Register of Historic Places? (23)		✔

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

4. Will the proposed activity occur within and/or affect an area covered by a State-approved local waterfront revitalization program, or State-approved regional coastal management program? (see policies in 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: Village of Rockville Centre

Address: P.O. Box 950, Rockville Centre, NY 11571-0950

Telephone: Area Code ( ) 516-678-9300

Applicant/Agent's Signature: Kathleen M. Murray Digitally signed by Kathleen M. Murray Date: 2020.04.07 12:16:39 -04'00' Date: 4/7/2020

F. **SUBMISSION REQUIREMENTS**

1. The applicant or agent shall submit the following documents to the **New York State Department of State, Office of Planning and Development, Attn: Consistency Review Unit, One Commerce Plaza-Suite 1010, 99 Washington Avenue, 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.

SECTION 6
Village of Rockville Centre
Governor's Office of Storm Recovery (GOSR)
Lister Park Project
Village of Rockville Centre
Nassau County, New York
ASGECI Project #4357

USACE ENVIRONMENTAL QUESTIONAIRE

ENVIRONMENTAL QUESTIONNAIRE

This is intended to supplement ENG Form 4345, Application for Department of the Army Permit, or the Joint Application for Permit used in the State of New York. Please provide complete answers to all questions below which are relevant to your project. Any answers may be continued on separate sheet(s) of paper to be attached to this form.

PRIVACY ACT STATEMENT

The purpose of this form is to provide the Corps of Engineers with basic information regarding your project. This information will be used to facilitate evaluation of your permit application and for public dissemination as required by regulation. Failure to provide complete information may result in your application being declared incomplete for processing, thereby delaying processing of your application.

GENERAL--APPLICABLE TO ALL PROJECTS

1. Explain the need for, and purpose of, the proposed work.

The purpose and need for this project are to implement flood protection, erosion control,stormwater mitigation, habitat enhancement, water quality, and waterfront access improvements along Mill River

2. Provide the names and addresses of property owners adjacent to your work site (if not shown on the application form or project drawings).

See attachment

(Please note that depending upon the nature and extent of your project, you may be requested to provide the names and addresses of additional property owners proximate to your project site to ensure proper coordination.)

3. Photographs of the project site should be submitted. For projects in tidal areas, photographs of the waterway vicinity should be taken at low tide. Using a separate copy of your plan view, indicate the location and direction of each photograph as well as the date and time at which the photograph was taken. Provide a sufficient number of photographs so as to provide a clear understanding of conditions on and proximate to your project site.

4. Provide a copy of any environmental impact statement, or any other environmental report which was prepared for your project.

5. Provide a thorough discussion of alternatives to your proposal. This discussion should include, but not necessarily be limited to, the "no action" alternative and alternative(s) resulting in less disturbance to waters of the United States. For filling projects in waters of the United States, including wetlands, your alternatives discussion should demonstrate that there are no practicable alternatives to your proposed filling and that your project meets with current mitigation policy (i.e. avoidance, minimization and compensation).

The no build alternative will result in the site remaining in its current condition as a DPW yard/public parks with continued flooding issues and problems plaguing the community. This is not the objective of the LWTB program. The build alternative includes site design as proposed in this application. Potential adverse impacts related to bank stabilization are minimized through the use of living shorelines instead of hard surfaces.

DREDGING PROJECTS N/A

Answer the following if your project involves dredging.

1. Indicate the estimated volume of material to be dredged and the depth (below mean low water) to which dredging would occur. Would there be overdepth dredging?

2. You can apply for a ten-year permit for maintenance dredging. If you wish to apply for a ten-year permit, please provide the number of additional dredging events during the ten-year life of the permit and the amount of material to be removed during future events.

3. Indicate of your drawings the dewatering area (if applicable) and disposal site for the dredged material (except landfill sites). Submit a sufficient number of photographs of the dewatering and disposal sites as applicable so as to provide a clear indication of existing conditions. For ten-year maintenance dredging permits, indicate the dewatering/disposal sites for future dredging events, if known.

4. Describe the method of dredging (i.e. clamshell, dragline, etc.) and the expected duration of dredging.

5. Indicate the physical nature of the material to be dredged (i.e. sand, silt, clay, etc.) and provide estimated percentages of the various constituents if available. For beach nourishment projects, grain size analysis data is required.

6. Describe the method of dredged material containment (i.e. hay bales, embankment, bulkhead, etc.) and whether return flow from the dewatering/disposal site would reenter any waterway. Also indicate if there would be any barge overflow.

MOORING FACILITIES N/A

Answer the following if your project includes the construction or rehabilitation of recreational mooring facilities.

1. It is generally recommended that any fixed piers and walk ramps be limited to four feet in width, and that floats be limited to eight feet in width and rest at least two feet above the waterway bottom at mean low water. Terminal floats at private, non-commercial facilities should be limited to 20 feet in length. If you do not believe your proposal can meet with these recommendations, please provide the reason(s).

2. Using your plan view, show to scale the location(s), position(s) and size(s) (including length, beam and draft) of vessel(s) to be moored at the proposed facility, including those of transient vessel(s) if known.

3. For commercial mooring sites such as marinas, indicate the capacity of the facility and indicate on the plan view the location(s) of any proposed fueling and/or sewage pumpout facilities. If pumpout facilities are not planned, please discuss the rationale below and indicate the distance to the nearest available pumpout station.

4. Indicate on your plan view the distance to adjacent marine structures, if any are proximate and show the locations and dimensions of such structures.

5. Discuss the need for wave protection at the proposed facility. Please be advised that if a permit is issued, you would be required to recognize that the mooring facility may be subject to wave action from wakes of passing vessels, whose operations would not be required to be modified. Issuance of a permit would not relieve you of ensuring the integrity of the authorized structure(s) and the United States would not be held responsible for damages to the structure(s) and vessel(s) moored thereto from wakes from passing vessels.

BULKHEADING/BANK STABILIZATION/FILLING ACTIVITIES N/A

Answer the following if your project includes construction of bulkheading (also retaining walls and seawalls) with backfill, filling of waters/wetlands, or any other bank stabilization fills such as riprap, revetments, gabions, etc.

1. Indicate the total volume of fill (including backfill behind a structure such as a bulkhead) as well as the volume of fill to be placed into waters of the United States. The amount of fill in waters of the United States can be determined by calculating the amount of fill to be placed below the plane of spring high tide in tidal areas and below ordinary high water in non-tidal areas.

\
Permanent impacts involve the placement of stone material into a non-wetland tidal water of the US for purposes of bank stabilization. This will result in approx. 349.89 cubic yards of fill

2. Indicate the source(s) and type(s) of fill material.

All fill material will be obtained from an appropriate upland source, and be free of toxic pollutants.

3. Indicate the method of fill placement (i.e. by hand, bulldozer, crane, etc.). Would any temporary fills be required in waterways or wetlands to provide access for construction equipment? If so, please indicate the area of such waters and/or wetlands to be filled, and show on the plan and sectional views.

The foregoing requests basic information on the most common types of projects requiring Department of the Army permits. It is intended to obviate or reduce the need for requesting additional information; however, additional information may be requested above and beyond what is requested in this form.

See enclosed plans for construction methods.

Please feel free to add any additional information regarding your project which you believe may facilitate our review.

N

0 175 350 700

SCALE: 1"=350'

APPLICANT: TETRA TECH	TETRA TECH	GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY	PROJ: 200-89763-18003
WATERWAY: MILL RIVER	www.tetratech.com	LISTER PARK PROJECT	DATE: 02/14/2020
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY	5 HANOVER SQUARE, SUITE 1003 NEW YORK, NY 10004 PHONE: (646)576-4034	LIVING SHORELINE OVERALL PLAN	DESN: ES
COUNTY: NASSAU COUNTY, NEW YORK			FIGURE 1
NUMBER OF SHEETS: 1 OF 30			

Bar Measures 1 inch

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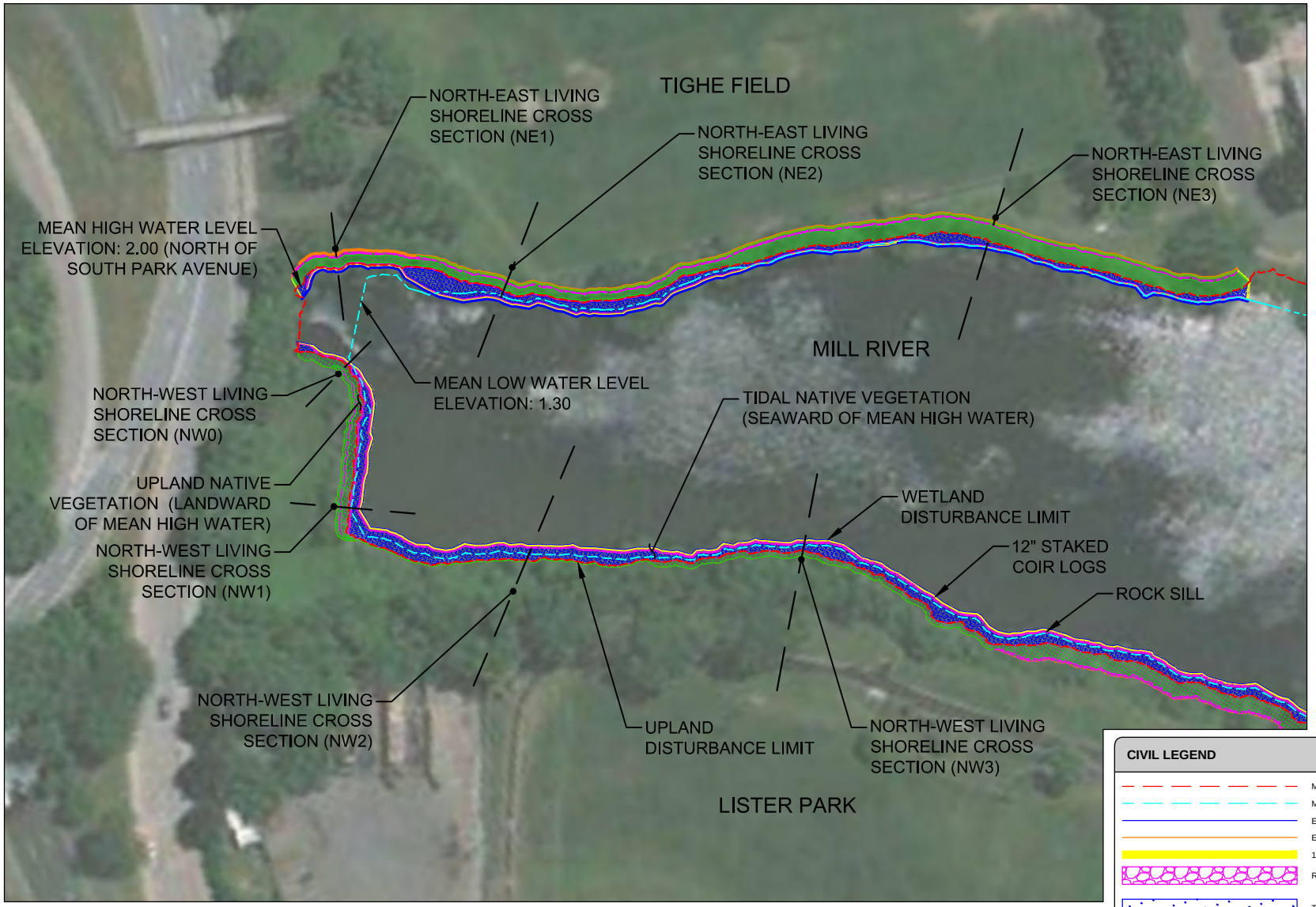

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APPLICANT: TETRA TECH	
WATERWAY: MILL RIVER	
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY	
COUNTY: NASSAU COUNTY, NEW YORK	
NUMBER OF SHEETS: 2 OF 30	

TETRA TECH
www.tetratech.com
5 HANOVER SQUARE, SUITE 1003
NEW YORK, NY 10004
PHONE: (646)576-4034

GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY

LISTER PARK PROJECT

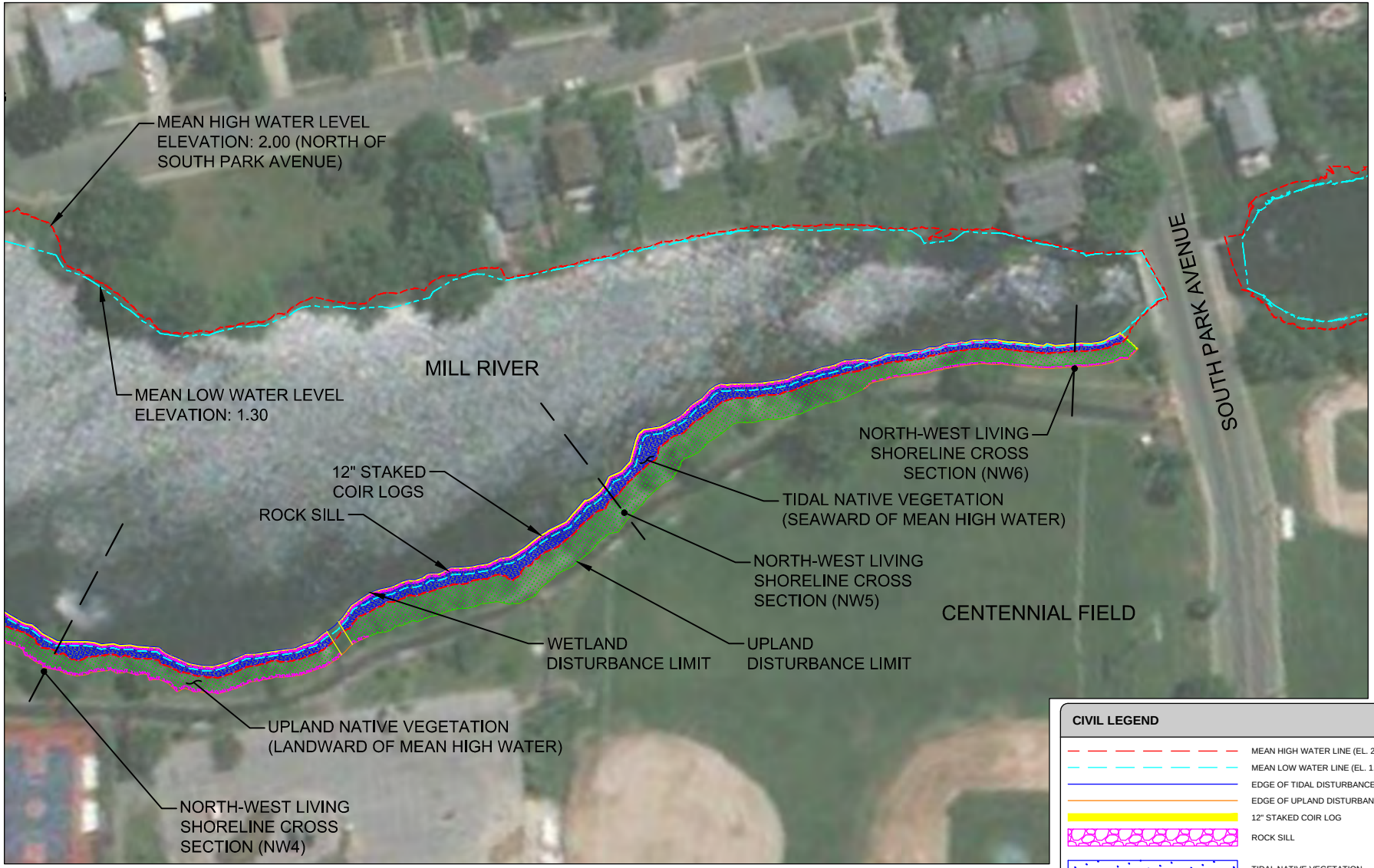
LIVING SHORELINE PLAN VIEW - NORTH

PROJ:	200-89763-18003
DATE:	02/14/2020
DESN:	ES

FIGURE 2A

Copyright: Tetra Tech

Bar Measures 1 inch



APPLICANT: TETRA TECH	TETRA TECH www.tetratech.com 5 HANOVER SQUARE, SUITE 1003 NEW YORK, NY 10004 PHONE: (646)576-4034	GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY	PROJ: 200-89763-18003
WATERWAY: MILL RIVER		LISTER PARK PROJECT	DATE: 02/14/2020
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY			DESN: ES
COUNTY: NASSAU COUNTY, NEW YORK		LIVING SHORELINE PLAN VIEW - NORTH	FIGURE 2B
NUMBER OF SHEETS: 3 OF 30			

Bar Measures 1 inch

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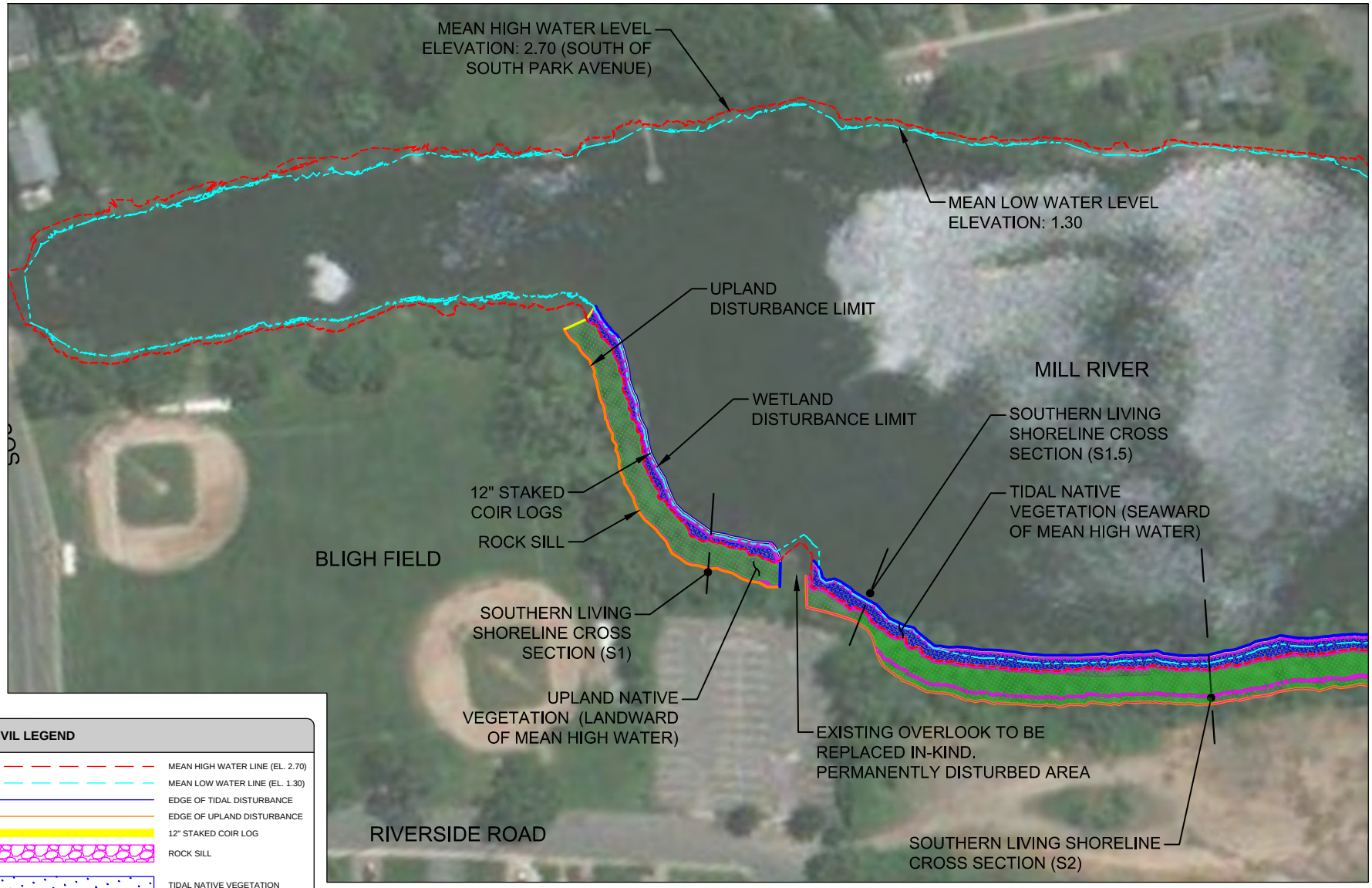

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APPLICANT: TETRA TECH	
WATERWAY: MILL RIVER	
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY	
COUNTY: NASSAU COUNTY, NEW YORK	
NUMBER OF SHEETS: 4 OF 30	

TETRA TECH
www.tetratech.com
5 HANOVER SQUARE, SUITE 1003
NEW YORK, NY 10004
PHONE: (646)576-4034

GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY

LISTER PARK PROJECT

LIVING SHORELINE
PLAN VIEW - SOUTH

PROJ:	200-89763-18003
DATE:	02/14/2020
DESN:	ES

FIGURE 3A

Bar Measures 1 inch

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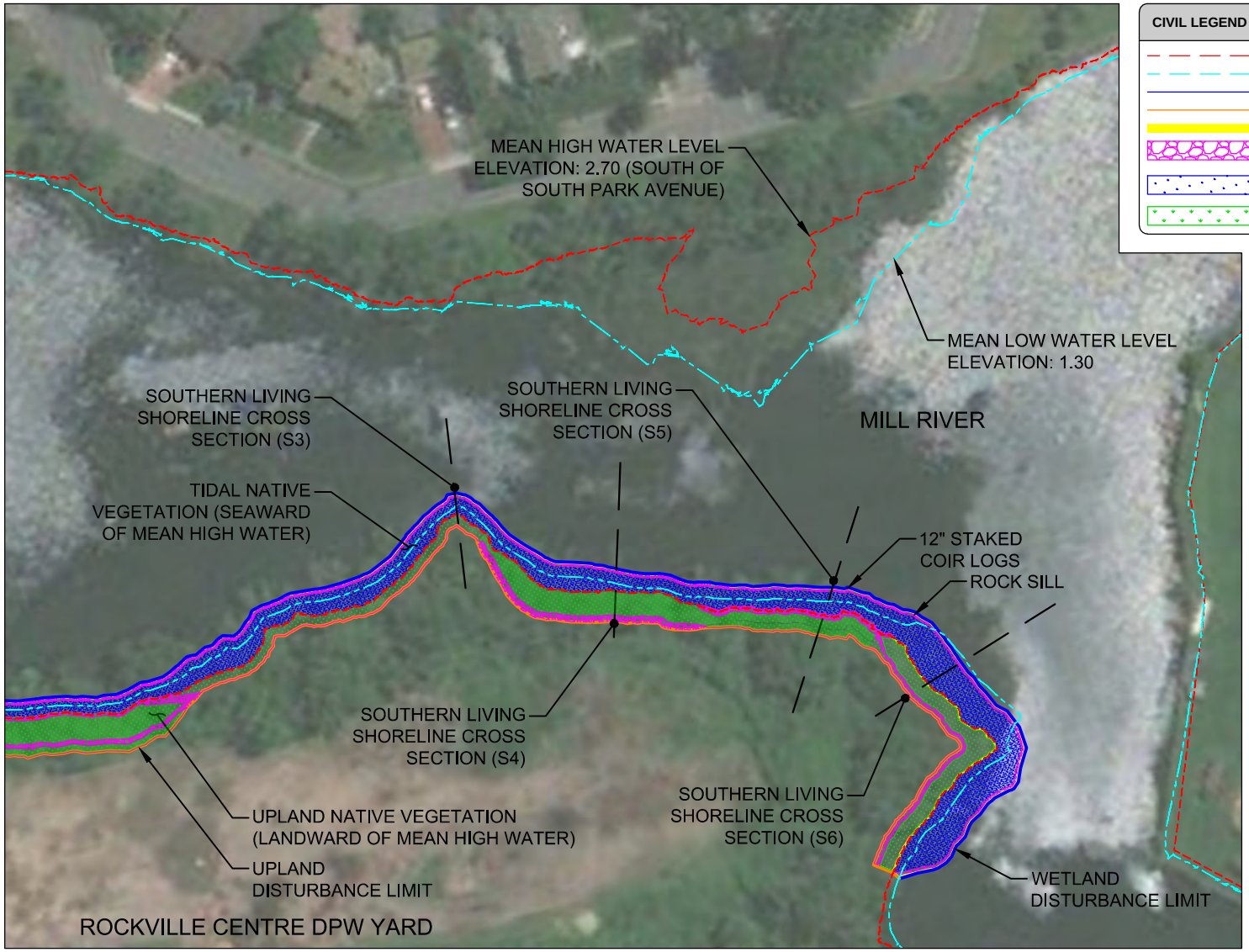

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APPLICANT: TETRA TECH	TETRA TECH	GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY	PROJ: 200-89763-18003
WATERWAY: MILL RIVER	www.tetratech.com	LISTER PARK PROJECT	DATE: 02/14/2020
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY	5 HANOVER SQUARE, SUITE 1003 NEW YORK, NY 10004 PHONE: (646)576-4034	LIVING SHORELINE PLAN VIEW - SOUTH	DESN: ES
COUNTY: NASSAU COUNTY, NEW YORK			FIGURE 3B
NUMBER OF SHEETS: 5 OF 30			

Bar Measures 1 inch

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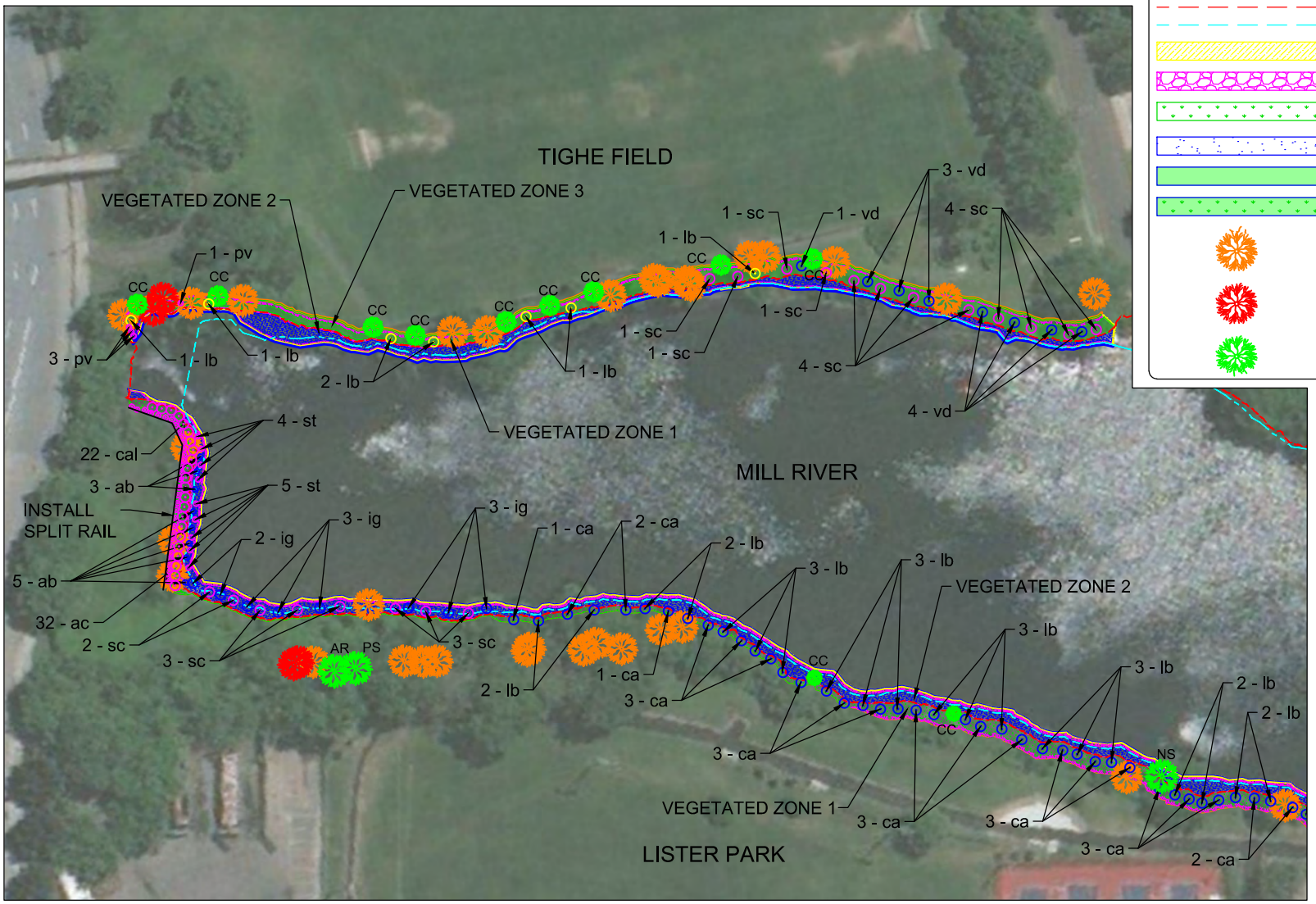

NOTE:
1. REFER TO FIGURE 4C FOR PLANTING SCHEDULE

APPLICANT: TETRA TECH	TETRA TECH www.tetratech.com	GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY	PROJ: 200-89763-18003
WATERWAY: MILL RIVER		LISTER PARK PROJECT	DATE: 02/14/2020
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY	5 HANOVER SQUARE, SUITE 1003 NEW YORK, NY 10004 PHONE: (646)576-4034	LIVING SHORELINE LANDSCAPE PLAN - NORTH	DESN: ES
COUNTY: NASSAU COUNTY, NEW YORK			FIGURE 4A
NUMBER OF SHEETS: 6 OF 30			

Bar Measures 1 inch

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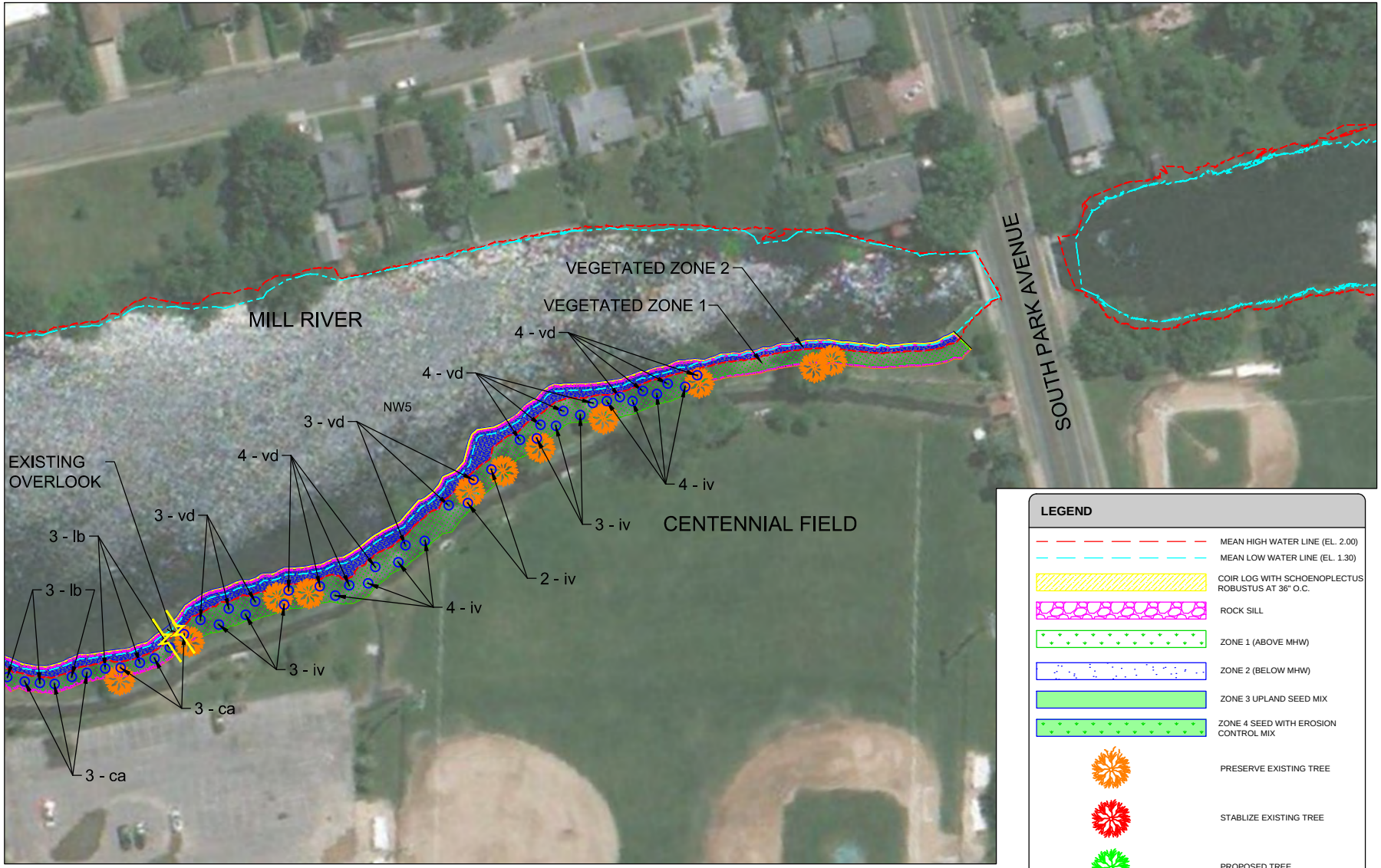

NOTE:
1. REFER TO FIGURE 4C FOR PLANTING SCHEDULE - NORTH

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APPLICANT: TETRA TECH	
WATERWAY: MILL RIVER	
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY	
COUNTY: NASSAU COUNTY, NEW YORK	
NUMBER OF SHEETS: 7 OF 30	

TETRA TECH
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GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY

LISTER PARK PROJECT

LIVING SHORELINE LANDSCAPE PLAN - NORTH

PROJ:	200-89763-18003
DATE:	02/14/2020
DESN:	ES

FIGURE 4B

Bar Measures 1 inch

Copyright: Tetra Tech

PLANTING SCHEDULE - NORTH

Symbol	Quantity	Key	Scientific Name	Common Name	Size	Spacing	Condition	Notes
	Large Trees							
	1	NS	Nyssa sylvatica	Black Gum	3"-3-1/2" cal.	See Plan	B&B	Strong central leader
	1	AR	Acer rubrum 'Red Sunset'	Red Maple	3"-3-1/2" cal.	See Plan	B&B	Strong central leader
	1	PS	Prunus serotina	Black Cherry	12'-14'	See Plan	B&B	Strong central leader
	Small Trees							
	11	CC	Cercis canadensis	Redbud	8'-10' ht	See Plan	B&B	Full
	Shrubs							
	27	ca	Cornus ammomum	Silky Dogwood	3 Gallon	See Plan	Container	Full
	22	cal	Clethra alnifolia	Coastal Sweetpepperbush	3 Gallon	See Plan	Container	Full
	8	ig	Ilex glabra	Inkberry	3 Gallon	See Plan	Container	Full
	17	iv	Ilex verticillata	Winterberry	3 Gallon	See Plan	Container	Full
	32	lb	Lindera benzoin	Spicebush	3 Gallon	See Plan	Container	Full
	20	sc	Sambuca canadensis	Elderberry	3 Gallon	See Plan	Container	Full
	26	vd	Viburnum dentatum	Arrowwood Viburnum	3 Gallon	See Plan	Container	Full
	Herbs/Grasses							
	9	st	Schoenoplectus tabernaemontani	Soft-stem Bulrush	Plug	See Plan	Container	Full
	8	ab	Ammophila breviligulata (fern)	Cape' American Beachgrass	Plug	See Plan	Container	Full
	32	ac	Aquilegia canadensis	Red columbine	Quart	See Plan	Container	Full
	782	sr	Schoenoplectus robustus	Saltmarsh Bulrush	Plug	See Plan	Container	Full
	4	pv	Panicum virgatum	Switchgrass	Plug	36" O.C.	Container	Full
	Zone 1 (above MHW) Plugs 36" O.C. Equal mix of the following:							
			Amophila brevigulata fern	Cape' American Beachgrass		See Plan		
			Panicum virgatum	Switchgrass		See Plan		
			Solidago sempervirens	Seaside Goldenrod		See Plan		
	Zone 2 (below MHW) Plugs 36" O.C. Equal mix of the following:							
			Iris versicolor	Blueflag Iris		See Plan		
			Juncus roemerians	Needlerush		See Plan		
			Schoenoplectus robustus	Saltmarsh Bulrush		See Plan		
	Zone 3 Upland Seed Mix							
			Bromus inermis	Smooth Bromegrass		See Plan		
			Medicago sativa	Alfalfa		See Plan		

APPLICANT: TETRA TECH
WATERWAY: MILL RIVER
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY
COUNTY: NASSAU COUNTY, NEW YORK
NUMBER OF SHEETS: 8 OF 30

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GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY

LISTER PARK PROJECT

LIVING SHORELINE
PLANTING SCHEDULE - NORTH

PROJ: 200-89763-18003
DATE: 02/14/2020
DESN: ES

FIGURE 4C

Bar Measures 1 inch

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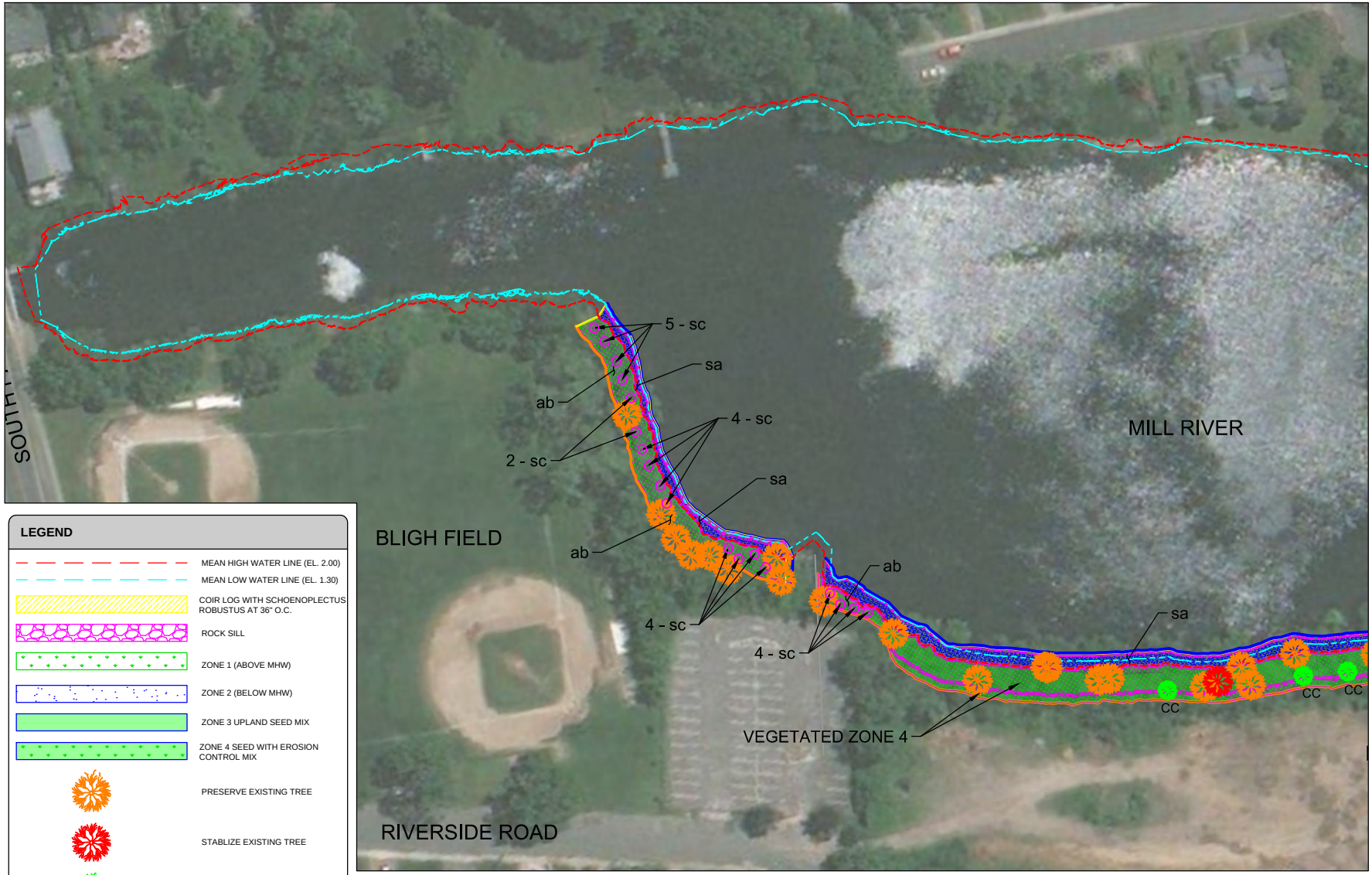

NOTE:
1. REFER TO FIGURE 5C FOR PLANTING SCHEDULE

N

0 50 100 200
SCALE: 1"=100'

APPLICANT: TETRA TECH	TETRA TECH	GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY	PROJ: 200-89763-18003
WATERWAY: MILL RIVER	www.tetratech.com	LISTER PARK PROJECT	DATE: 02/14/2020
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY	5 HANOVER SQUARE, SUITE 1003 NEW YORK, NY 10004 PHONE: (646)576-4034	LIVING SHORELINE LANDSCAPE PLAN - SOUTH	DESN: ES
COUNTY: NASSAU COUNTY, NEW YORK			FIGURE 5A
NUMBER OF SHEETS: 9 OF 30			

Bar Measures 1 inch

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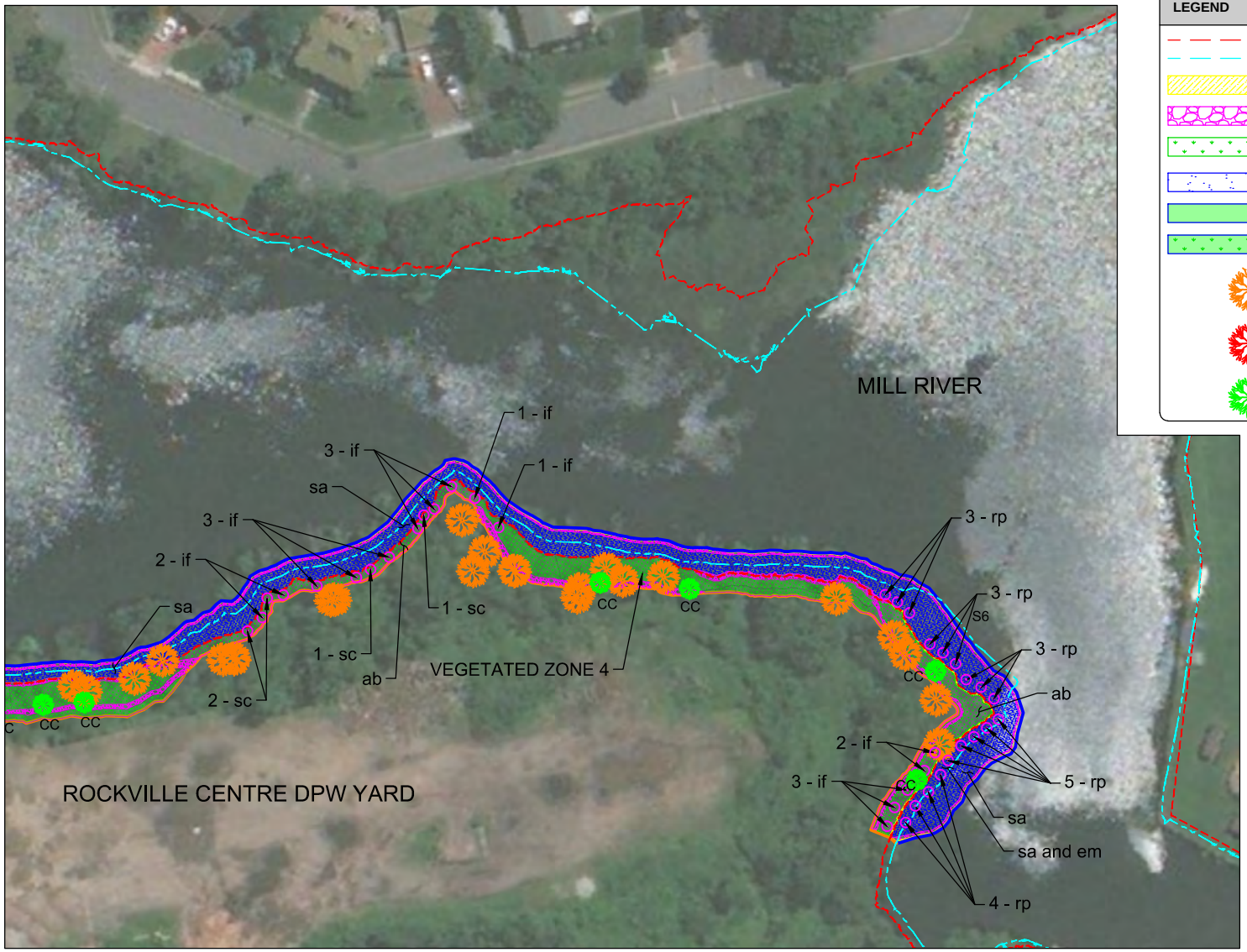
Copyright: Tetra Tech



LEGEND

- MEAN HIGH WATER LINE (EL. 2.00)
- MEAN LOW WATER LINE (EL. 1.30)
- COIR LOG WITH SCHOENOPLECTUS ROBUSTUS AT 36" O.C.
- ROCK SILL
- ZONE 1 (ABOVE MHW)
- ZONE 2 (BELOW MHW)
- ZONE 3 UPLAND SEED MIX
- ZONE 4 SEED WITH EROSION CONTROL MIX
- PRESERVE EXISTING TREE
- STABLIZE EXISTING TREE
- PROPOSED TREE

NOTE:
1. REFER TO FIGURE 5C FOR PLANTING SCHEDULE

N

0 50 100 200
SCALE: 1"=100'

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APPLICANT: TETRA TECH	
WATERWAY: MILL RIVER	
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY	
COUNTY: NASSAU COUNTY, NEW YORK	
NUMBER OF SHEETS: 10 OF 30	

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GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY

LISTER PARK PROJECT

LIVING SHORELINE LANDSCAPE PLAN - SOUTH

PROJ:	200-89763-18003
DATE:	02/14/2020
DESN:	ES

FIGURE 5B

Bar Measures 1 inch

Copyright: Tetra Tech

PLANTING SCHEDULE - SOUTH

Symbol	Quantity	Key	Scientific Name	Common Name	Size	Spacing	Condition	Notes
	Small Trees							
	9	CC	Cercis canadensis	Redbud	8'-10' ht	See Plan	B&B	Full
	Shrubs							
	18	rp	Rosa palustris	Swamp Rose	3 Gallon	See Plan	Container	Full
	23	sc	Sambuca canadensis	Elderberry	3 Gallon	See Plan	Container	Full
	15	if	Iva frutescens	High Tide Bush	2 Gallon	See Plan	Container	Full
	Herbs/Grasses							
	*	sa	Spartina alterniflora	Bayshore Smooth Cordgrass	1 Gallon	5' O.C.	Container	Full
	*	ab	Ammophila breviligulata (fern)	Cape' American Beachgrass	Plug	18" O.C.	Container	Full
	*	em	Eupatorium maculatum	Spotted Joe Pye Weed	Plug	24" O.C.	Container	Full
	564	sr	Schoenoplectus robustus	Saltmarsh Bulrush	Plug	See Plan	Container	Full
	Steep Embankments							
	Zone 4	Seed with Erosion Control Mix (Refer to Specifications)						

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APPLICANT: TETRA TECH
WATERWAY: MILL RIVER
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY
COUNTY: NASSAU COUNTY, NEW YORK
NUMBER OF SHEETS: 11 OF 30

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GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY
LISTER PARK PROJECT

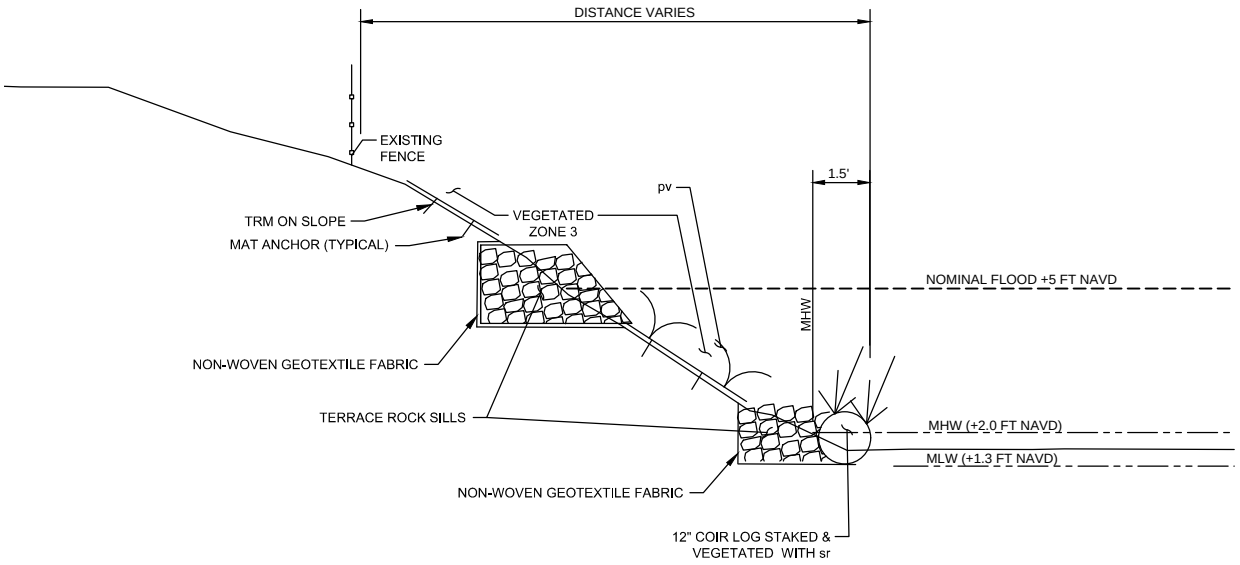
LIVING SHORELINE
PLANTING SCHEDULE - SOUTH

PROJ: 200-89763-18003
DATE: 02/14/2020
DESN: ES

FIGURE 5C

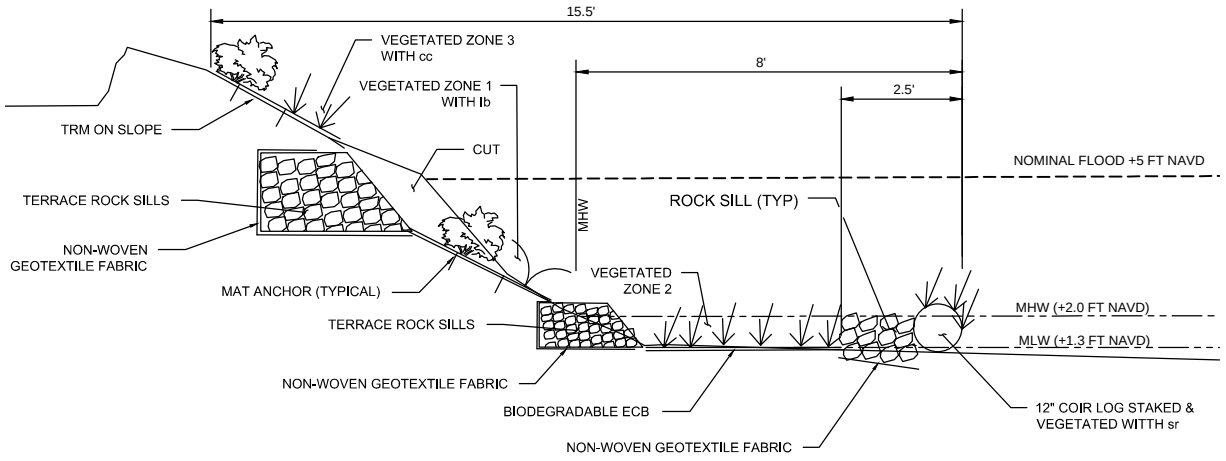
Copyright: Tetra Tech

Bar Measures 1 inch



NE1 - NORTH-EAST LIVING SHORELINE CROSS SECTION

SCALE: NTS



NE2 - NORTH-EAST LIVING SHORELINE CROSS SECTION

SCALE: NTS

APPLICANT: TETRA TECH
WATERWAY: MILL RIVER
TOWNSHIP: VILLAGE OF ROCKVILLE CENTER, NY
COUNTY: NASSAU COUNTY, NEW YORK
NUMBER OF SHEETS: 12 OF 30

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GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY

LISTER PARK PROJECT

LIVING SHORELINE
NORTHERN CROSS-SECTIONS

PROJ:	200-89763-18003
DATE:	02/14/2020
DESN:	ES

FIGURE 6A

Bar Measures 1 inch

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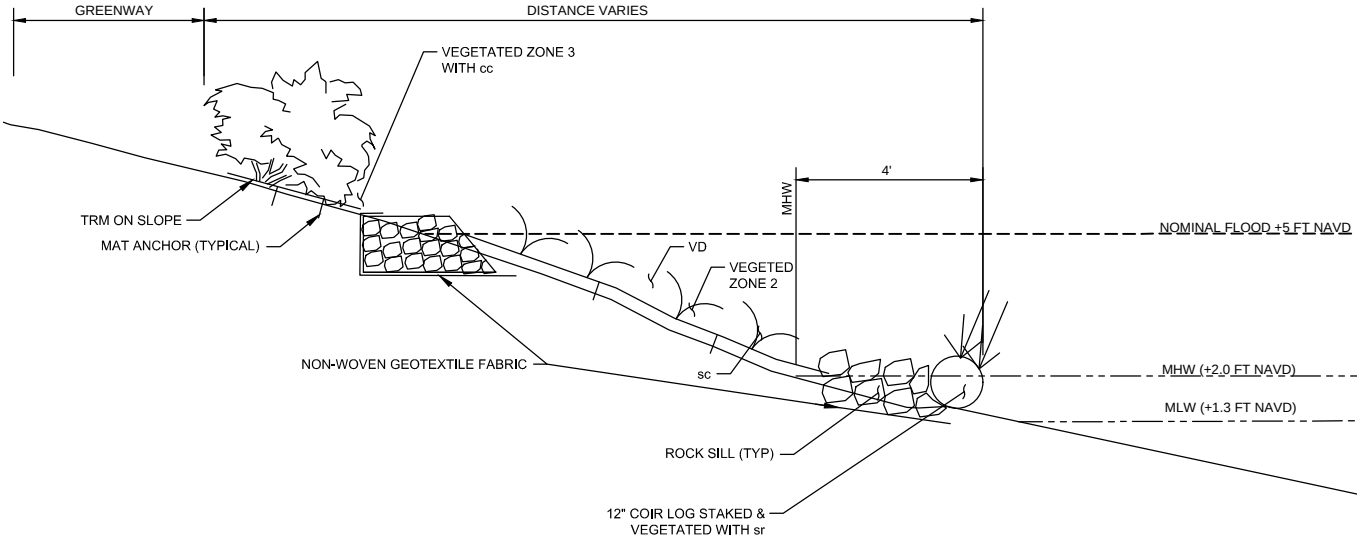
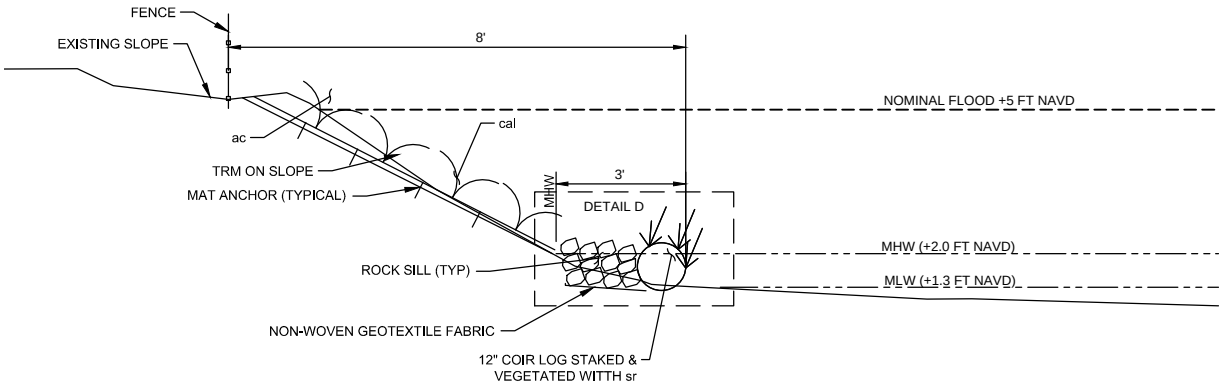


NE3 - NORTH-EAST LIVING SHORELINE CROSS SECTION

SCALE: NTS



NW0 - NORTH-WEST LIVING SHORELINE CROSS SECTION

SCALE: NTS

APPLICANT: TETRA TECH
WATERWAY: MILL RIVER
TOWNSHIP: VILLAGE OF ROCKVILLE CENTER, NY
COUNTY: NASSAU COUNTY, NEW YORK
NUMBER OF SHEETS: 13 OF 30

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GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY

LISTER PARK PROJECT

LIVING SHORELINE
NORTHERN CROSS-SECTIONS

PROJ:	200-89763-18003
DATE:	02/14/2020
DESN:	ES

FIGURE 6B

Bar Measures 1 inch

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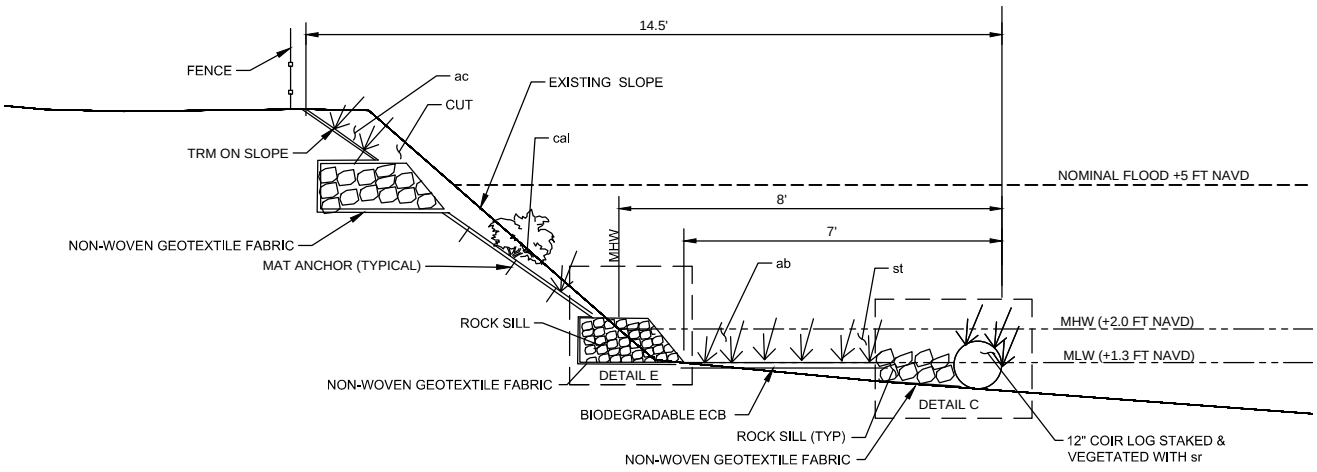
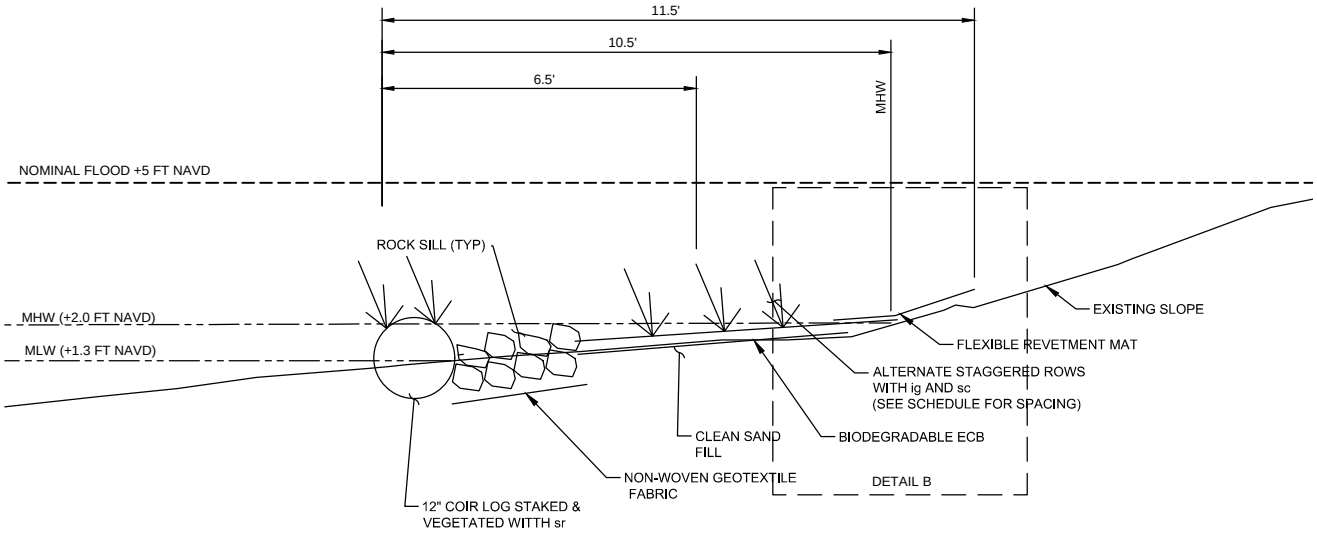


NW1 - NORTH-WEST LIVING SHORELINE CROSS SECTION

SCALE: NTS



NW2 - NORTH-WEST LIVING SHORELINE CROSS SECTION

SCALE: NTS

APPLICANT: TETRA TECH
WATERWAY: MILL RIVER
TOWNSHIP: VILLAGE OF ROCKVILLE CENTER, NY
COUNTY: NASSAU COUNTY, NEW YORK
NUMBER OF SHEETS: 14 OF 30

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GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY

LISTER PARK PROJECT

LIVING SHORELINE
NORTHERN CROSS-SECTIONS

PROJ:	200-89763-18003
DATE:	02/14/2020
DESN:	ES

FIGURE 6C

Bar Measures 1 inch

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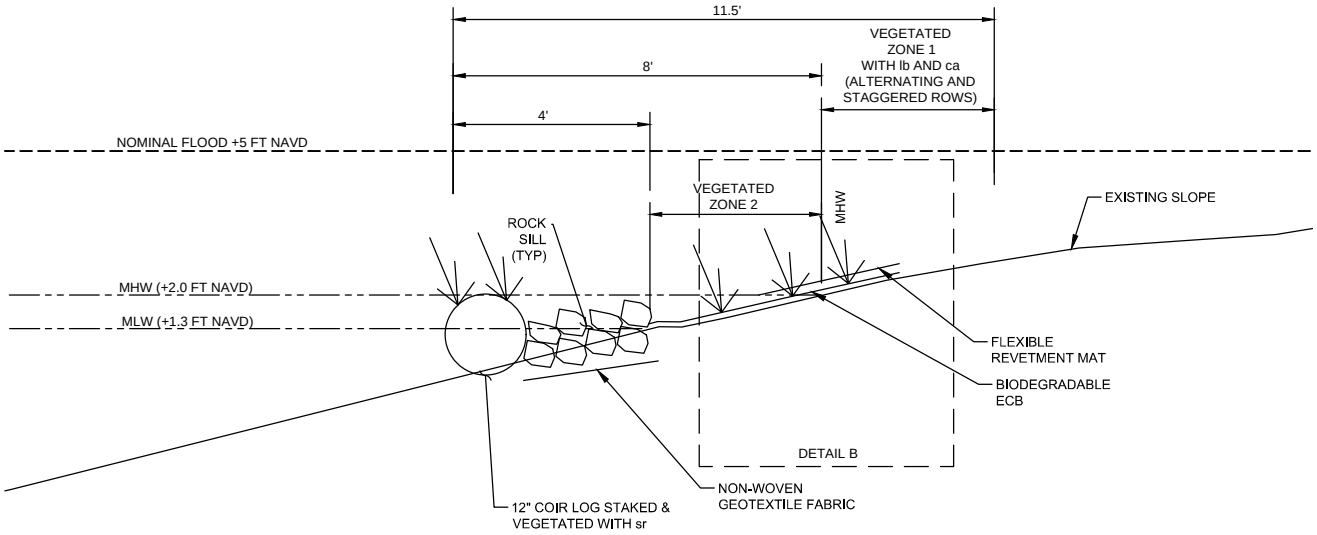
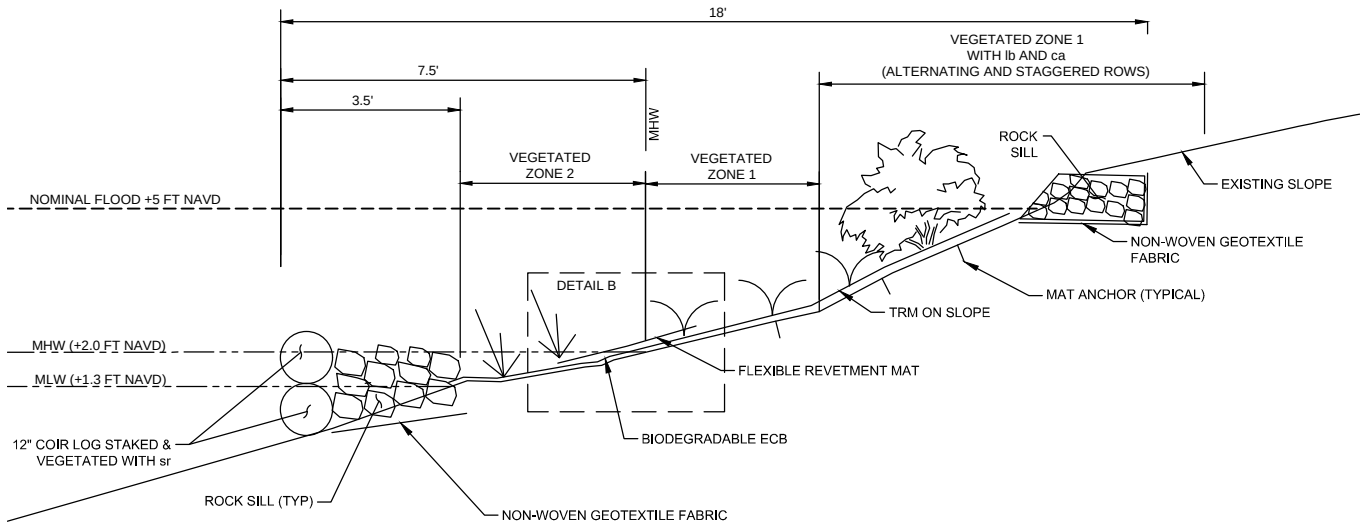


NW3 NORTH-WEST LIVING SHORELINE CROSS SECTION

SCALE: NTS



NW4 NORTH-WEST LIVING SHORELINE CROSS SECTION

SCALE: NTS

APPLICANT: TETRA TECH
WATERWAY: MILL RIVER
TOWNSHIP: VILLAGE OF ROCKVILLE CENTER, NY
COUNTY: NASSAU COUNTY, NEW YORK
NUMBER OF SHEETS: 15 OF 30

0 2 4 8

SCALE: 1"=4'

TETRA TECH
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GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY

LISTER PARK PROJECT

LIVING SHORELINE
NORTHERN CROSS-SECTIONS

PROJ:	200-89763-18003
DATE:	02/14/2020
DESN:	ES

FIGURE 6D

Bar Measures 1 inch

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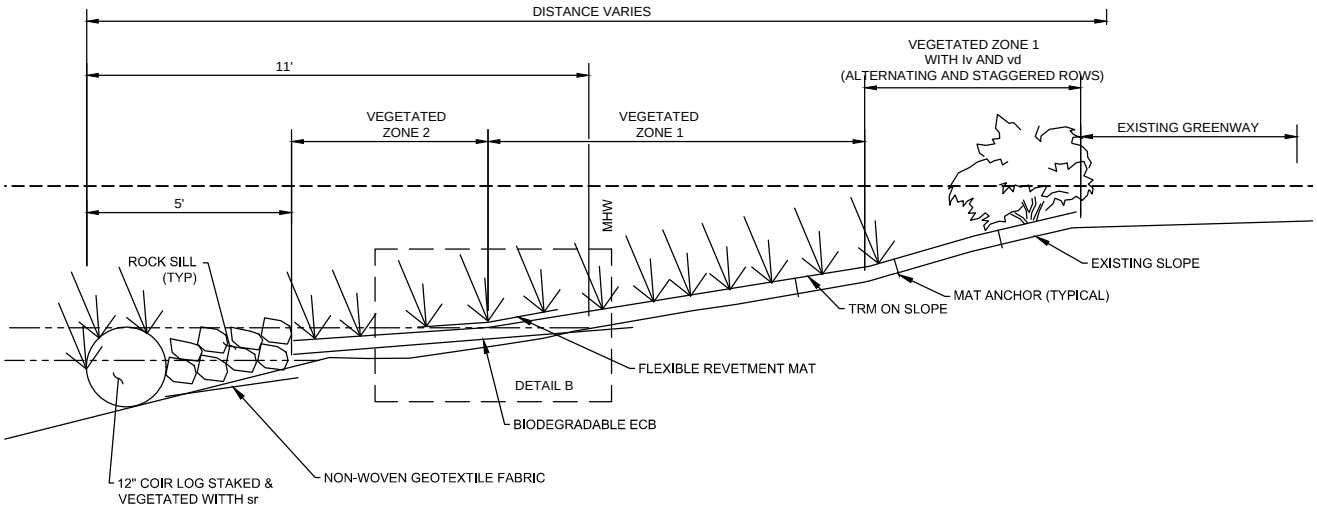
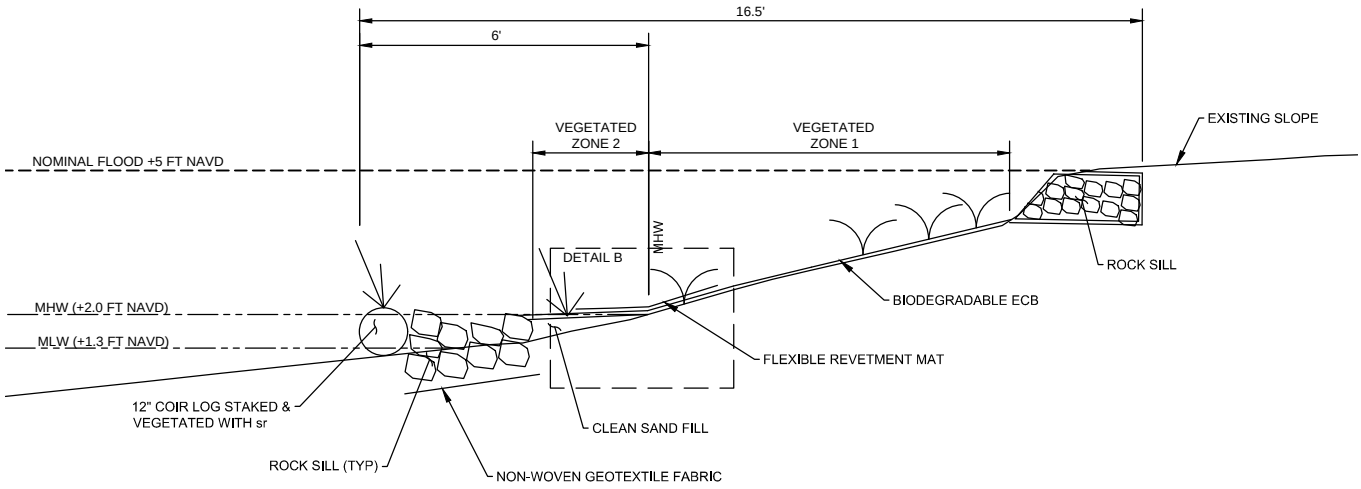


NW5 NORTH-WEST LIVING SHORELINE CROSS SECTION

SCALE: NTS



NW6 NORTH-WEST LIVING SHORELINE CROSS SECTION

SCALE: NTS

APPLICANT: TETRA TECH
WATERWAY: MILL RIVER
TOWNSHIP: VILLAGE OF ROCKVILLE CENTER, NY
COUNTY: NASSAU COUNTY, NEW YORK
NUMBER OF SHEETS: 16 OF 30

0 2 4 8

SCALE: 1"=4'

TETRA TECH
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NEW YORK, NY 10004
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GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY

LISTER PARK PROJECT

LIVING SHORELINE
NORTHERN CROSS-SECTIONS

PROJ:	200-89763-18003
DATE:	02/14/2020
DESN:	ES

FIGURE 6E

Bar Measures 1 inch

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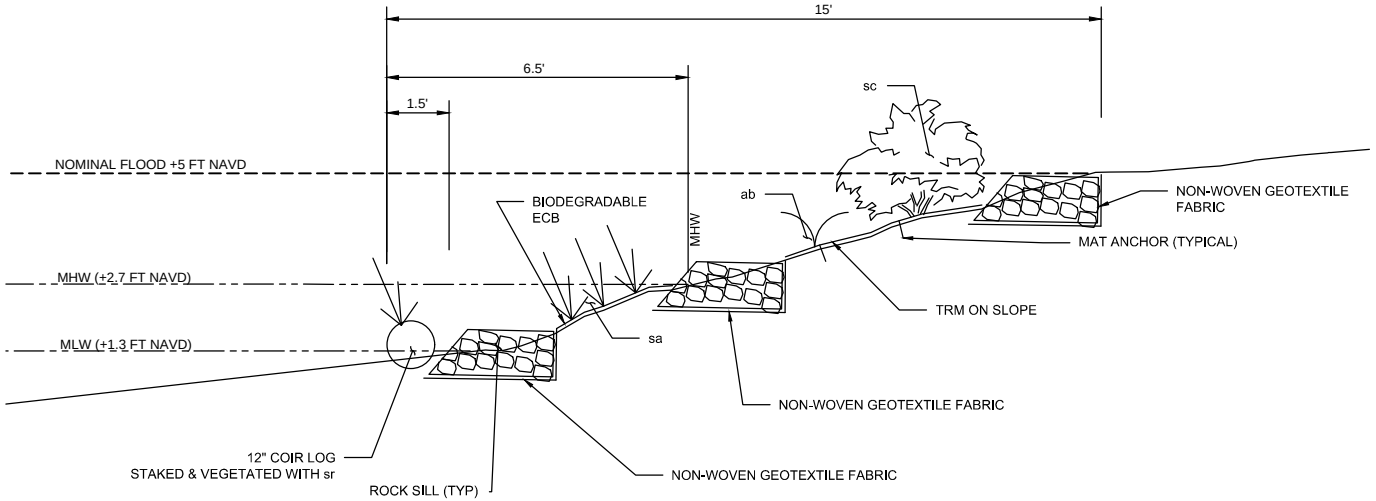

S1 — SOUTHERN LIVING SHORELINE CROSS SECTION

SCALE: NTS

APPLICANT: TETRA TECH	TETRA TECH	GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY	PROJ: 200-89763-18003
WATERWAY: MILL RIVER	www.tetratech.com	LISTER PARK PROJECT	DATE: 02/14/2020
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY	5 HANOVER SQUARE, SUITE 1003 NEW YORK, NY 10004 PHONE: (646)576-4034	LIVING SHORELINE SOUTHERN CROSS-SECTIONS	DESN: ES
COUNTY: NASSAU COUNTY, NEW YORK			FIGURE 7A
NUMBER OF SHEETS: 17 OF 30			

Bar Measures 1 inch

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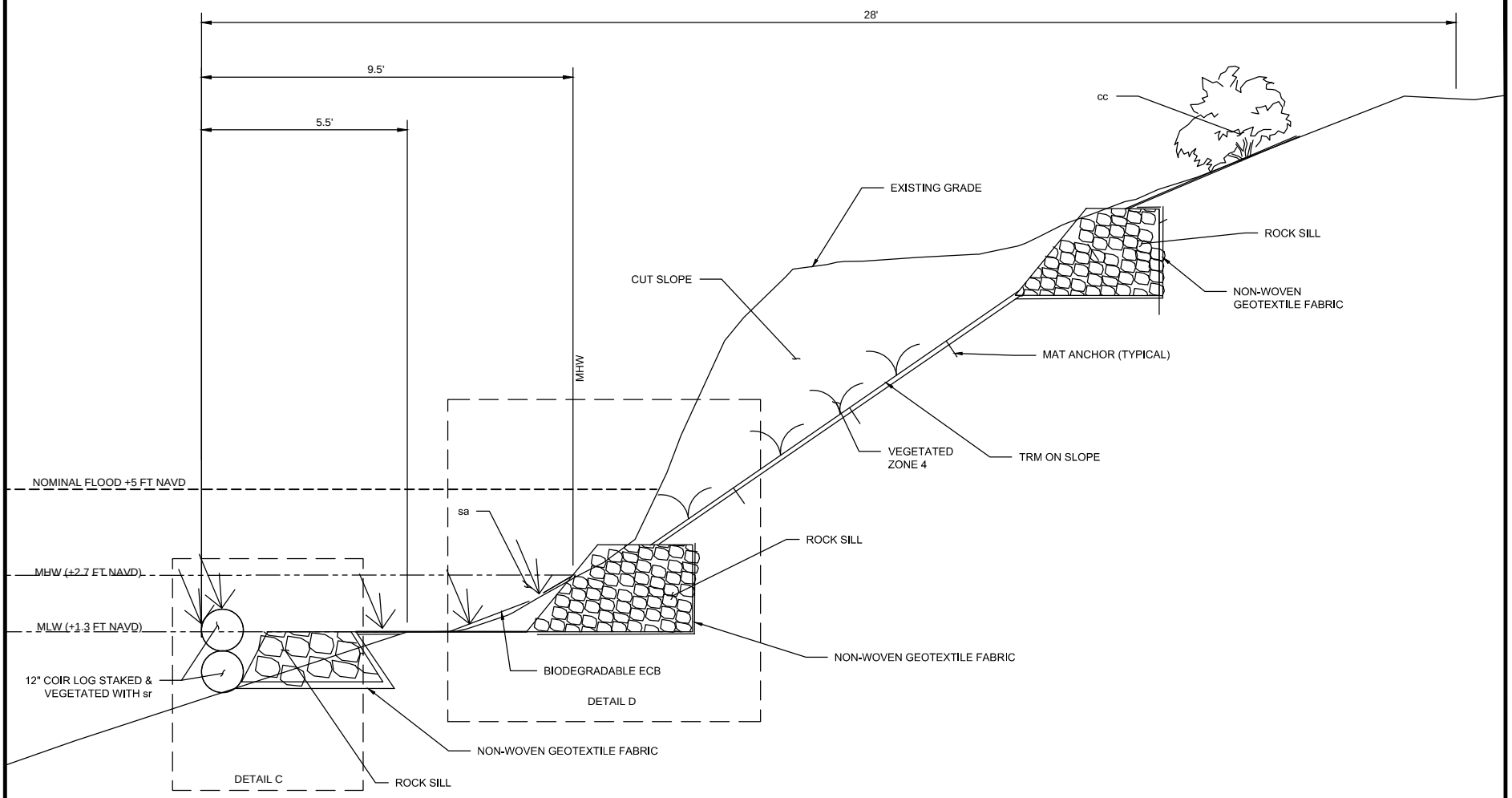

S2
-
SOUTHERN LIVING SHORELINE CROSS SECTION
SCALE: NTS

APPLICANT: TETRA TECH	TETRA TECH	GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY	PROJ: 200-89763-18003
WATERWAY: MILL RIVER	www.tetratech.com	LISTER PARK PROJECT	DATE: 02/14/2020
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY	5 HANOVER SQUARE, SUITE 1003 NEW YORK, NY 10004 PHONE: (646)576-4034	LIVING SHORELINE SOUTHERN CROSS-SECTIONS	DESN: ES
COUNTY: NASSAU COUNTY, NEW YORK			FIGURE 7B
NUMBER OF SHEETS: 18 OF 30			

Bar Measures 1 inch

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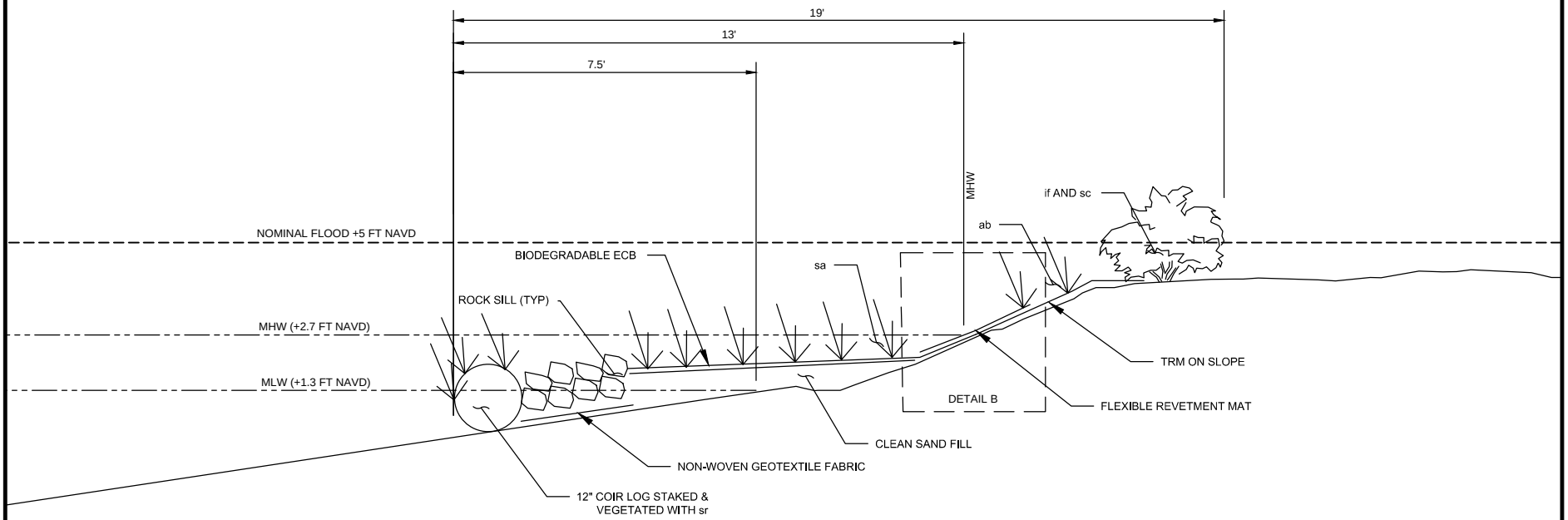

S3

SOUTHERN LIVING SHORELINE CROSS SECTION

SCALE: NTS

APPLICANT: TETRA TECH	TETRA TECH	GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY	PROJ: 200-89763-18003
WATERWAY: MILL RIVER	www.tetratech.com	LISTER PARK PROJECT	DATE: 02/14/2020
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY	5 HANOVER SQUARE, SUITE 1003 NEW YORK, NY 10004 PHONE: (646)576-4034	LIVING SHORELINE SOUTHERN CROSS-SECTIONS	DESN: ES
COUNTY: NASSAU COUNTY, NEW YORK			FIGURE 7C
NUMBER OF SHEETS: 19 OF 30			

Bar Measures 1 inch

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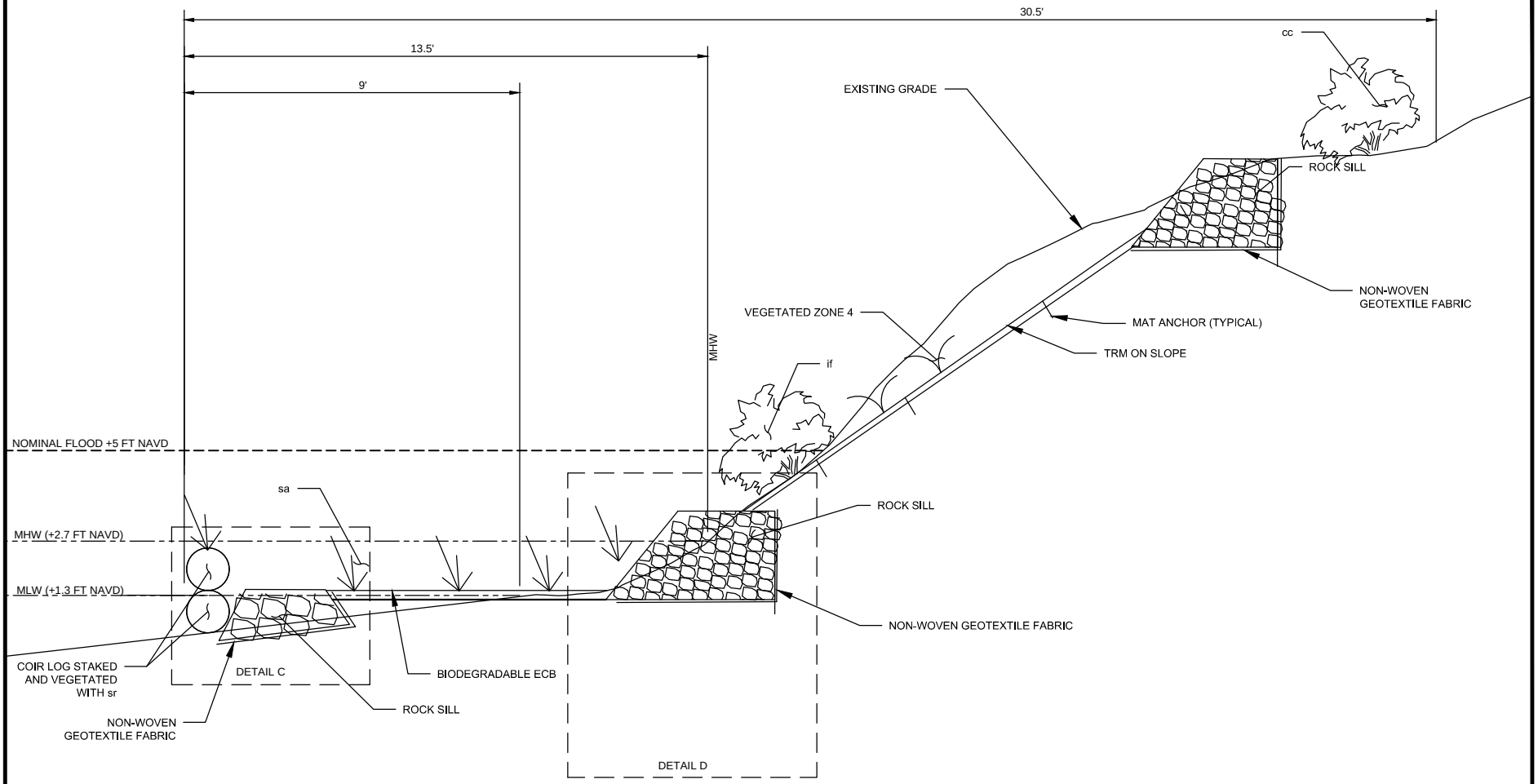
Copyright: Tetra Tech



S4 / - SOUTHERN LIVING SHORELINE CROSS SECTION

SCALE: NTS

APPLICANT: TETRA TECH	TETRA TECH	GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY	PROJ: 200-89763-18003
WATERWAY: MILL RIVER	www.tetratech.com	LISTER PARK PROJECT	DATE: 02/14/2020
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY	5 HANOVER SQUARE, SUITE 1003 NEW YORK, NY 10004 PHONE: (646)576-4034	LIVING SHORELINE SOUTHERN CROSS-SECTIONS	DESN: ES
COUNTY: NASSAU COUNTY, NEW YORK			FIGURE 7D
NUMBER OF SHEETS: 20 OF 30			

Bar Measures 1 inch

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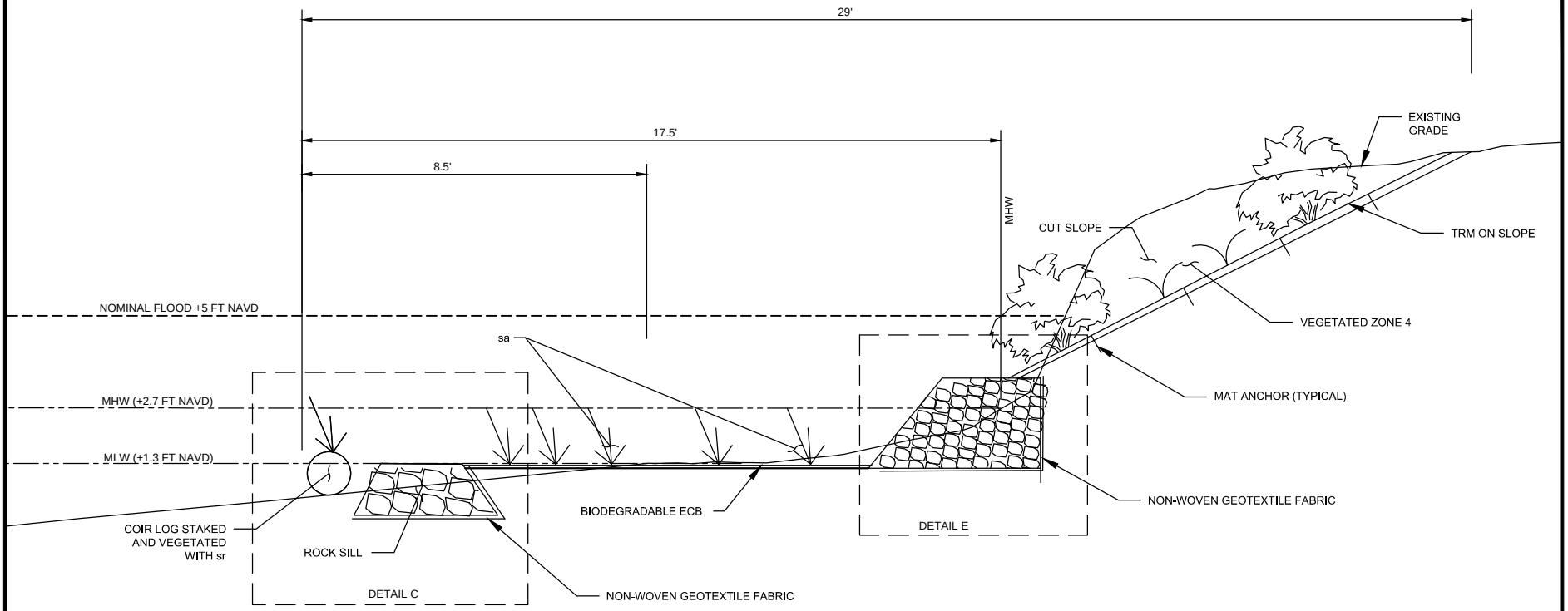

S5 / - SOUTHERN LIVING SHORELINE CROSS SECTION

SCALE: NTS

APPLICANT: TETRA TECH	TETRA TECH	GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY	PROJ: 200-89763-18003
WATERWAY: MILL RIVER	www.tetratech.com	LISTER PARK PROJECT	DATE: 02/14/2020
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY	5 HANOVER SQUARE, SUITE 1003 NEW YORK, NY 10004 PHONE: (646)576-4034	LIVING SHORELINE SOUTHERN CROSS-SECTIONS	DESN: ES
COUNTY: NASSAU COUNTY, NEW YORK			FIGURE 7E
NUMBER OF SHEETS: 21 OF 30			

Bar Measures 1 inch

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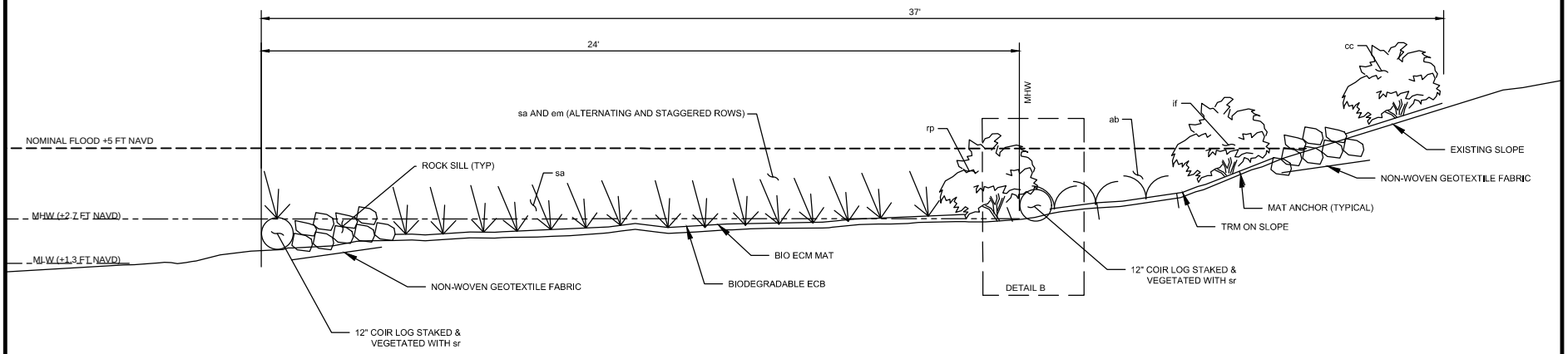


S6
-

SOUTHERN LIVING SHORELINE CROSS SECTION

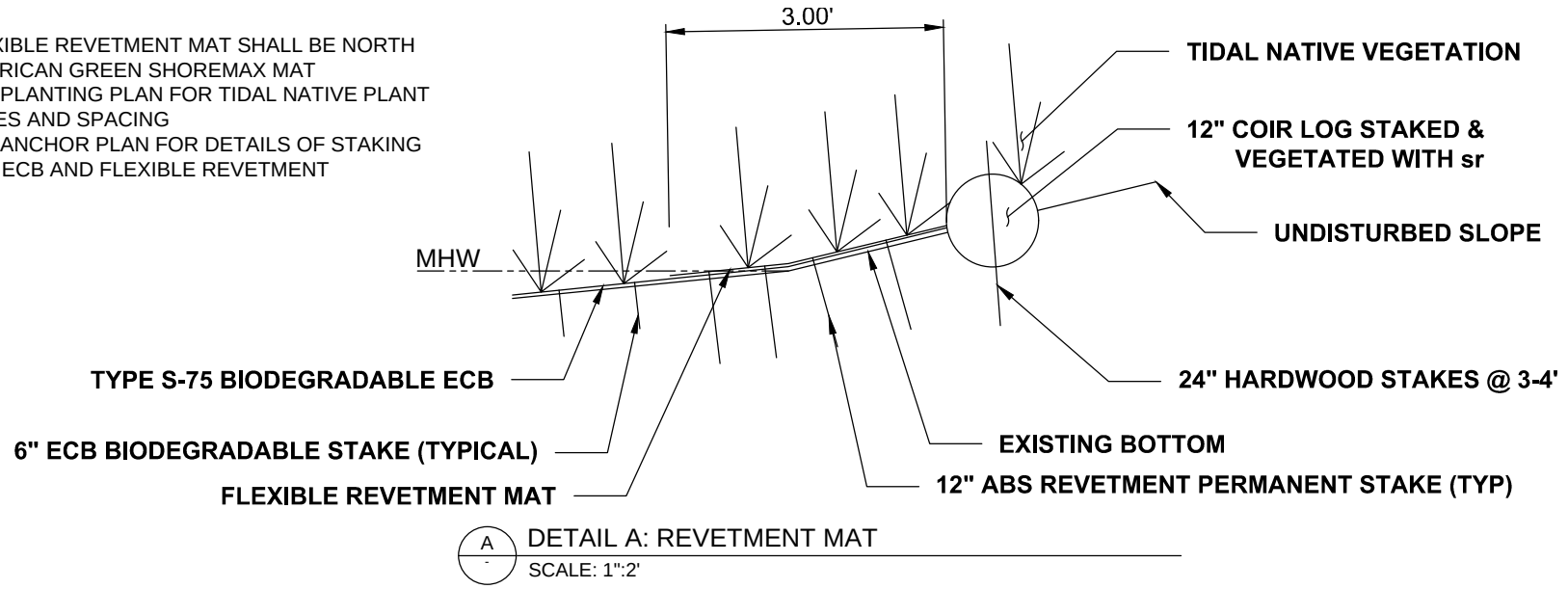
SCALE: NTS

APPLICANT: TETRA TECH	TETRA TECH www.tetratech.com 5 HANOVER SQUARE, SUITE 1003 NEW YORK, NY 10004 PHONE: (646)576-4034	GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY	PROJ: 200-89763-18003
WATERWAY: MILL RIVER		LISTER PARK PROJECT	DATE: 02/14/2020
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY			DESN: ES
COUNTY: NASSAU COUNTY, NEW YORK		LIVING SHORELINE SOUTHERN CROSS-SECTIONS	FIGURE 7F
NUMBER OF SHEETS: 22 OF 30			

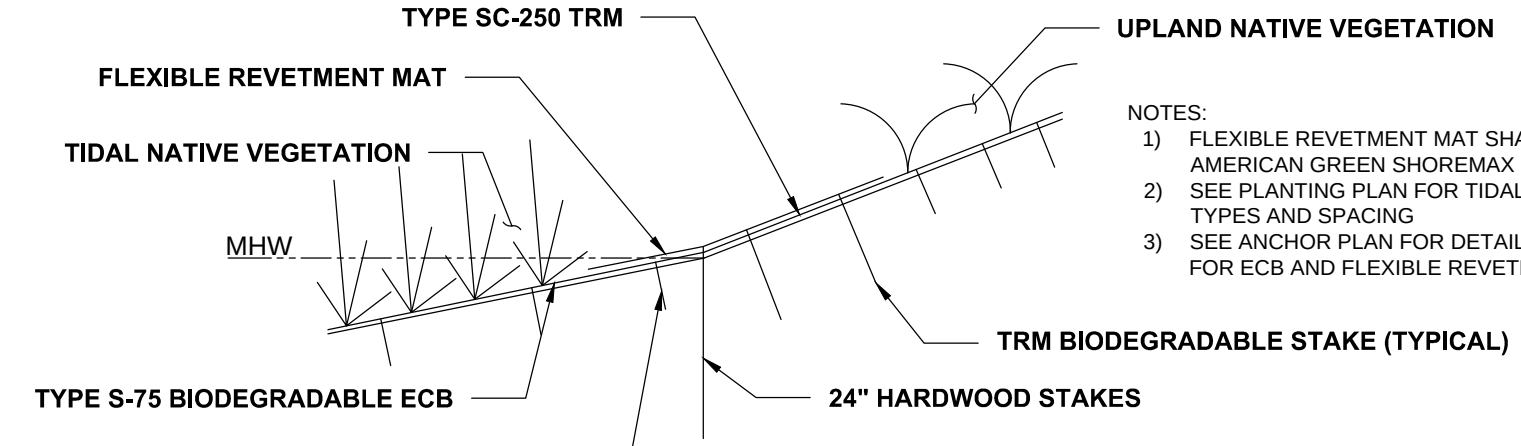
Copyright: Tetra Tech

Bar Measures 1 inch

NOTES:
1) FLEXIBLE REVETMENT MAT SHALL BE NORTH AMERICAN GREEN SHOREMAX MAT
2) SEE PLANTING PLAN FOR TIDAL NATIVE PLANT TYPES AND SPACING
3) SEE ANCHOR PLAN FOR DETAILS OF STAKING FOR ECB AND FLEXIBLE REVETMENT



A - DETAIL A: REVETMENT MAT
SCALE: 1":2'



NOTES:
1) FLEXIBLE REVETMENT MAT SHALL BE NORTH AMERICAN GREEN SHOREMAX MAT
2) SEE PLANTING PLAN FOR TIDAL NATIVE PLANT TYPES AND SPACING
3) SEE ANCHOR PLAN FOR DETAILS OF STAKING FOR ECB AND FLEXIBLE REVETMENT

B - DETAIL B: REVETMENT MAT
SCALE: 1":2'

0 1 2 4
SCALE: 1"=2'

APPLICANT: TETRA TECH	TETRA TECH	GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY	PROJ: 200-89763-18003
WATERWAY: MILL RIVER	www.tetratech.com	LISTER PARK PROJECT	DATE: 02/14/2020
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY	5 HANOVER SQUARE, SUITE 1003 NEW YORK, NY 10004 PHONE: (646)576-4034	LIVING SHORELINE DETAIL SECTIONS	DESN: ES
COUNTY: NASSAU COUNTY, NEW YORK			FIGURE 8A
NUMBER OF SHEETS: 23 OF 30			

Bar Measures 1 inch

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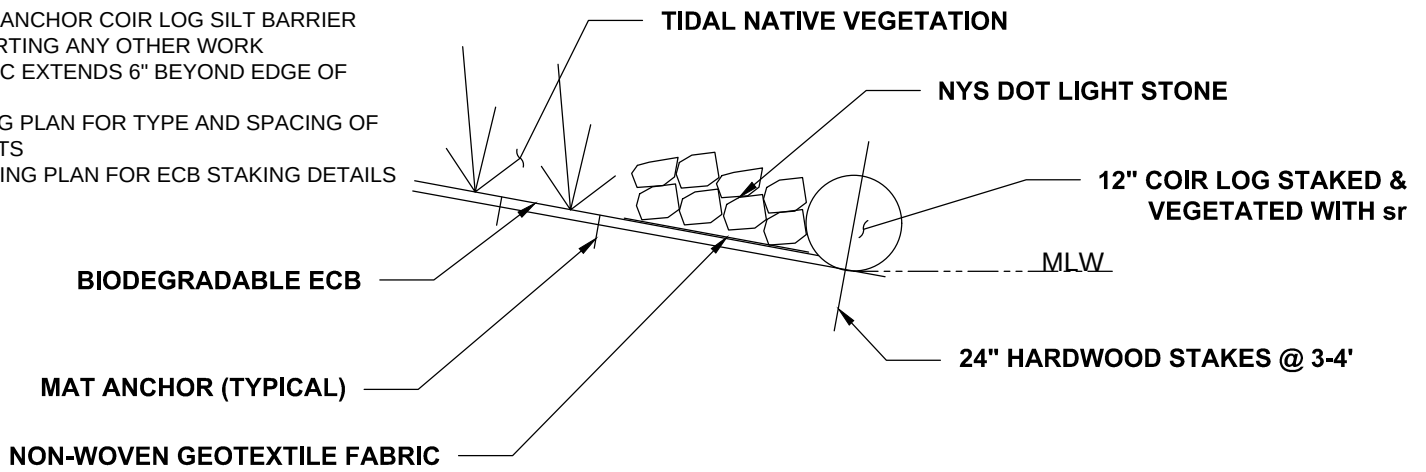
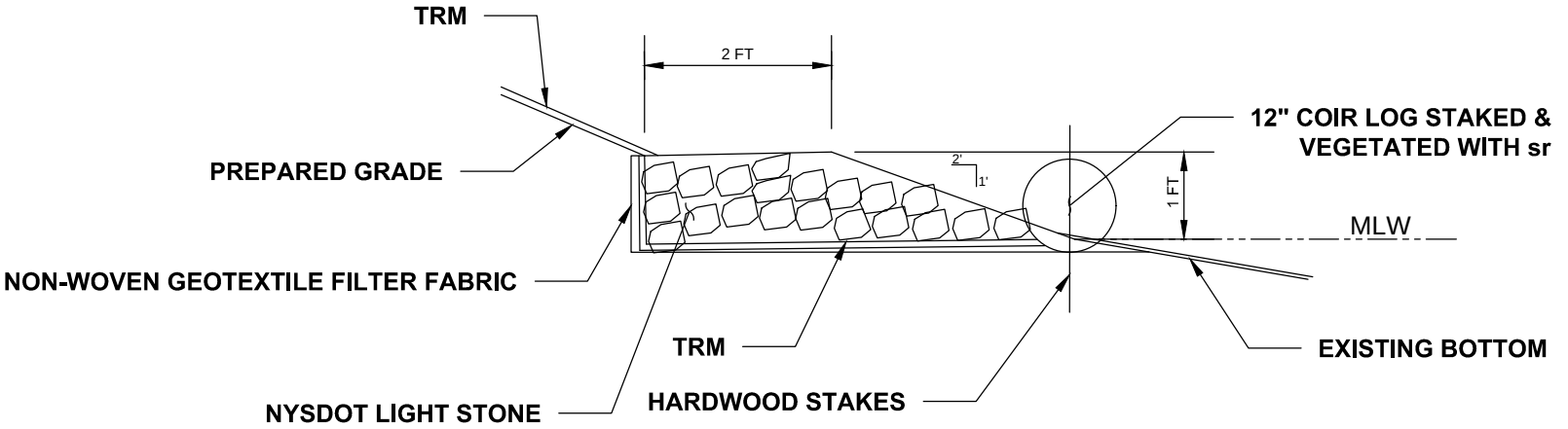
NOTES:

1) LOCATE AND ANCHOR COIR LOG SILT BARRIER BEFORE STARTING ANY OTHER WORK
2) FILTER FABRIC EXTENDS 6" BEYOND EDGE OF STONE
3) SEE PLANTING PLAN FOR TYPE AND SPACING OF MARSH PLANTS
4) SEE ANCHORING PLAN FOR ECB STAKING DETAILS



C - DETAIL C: SILT BARRIER AT CREATED WETLANDS
SCALE: 1":2'



D - DETAIL D: STONE SILL
SCALE: 1":2'

0 1 2 4
SCALE: 1"=2'

APPLICANT: TETRA TECH	TETRA TECH	GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY	PROJ: 200-89763-18003
WATERWAY: MILL RIVER	www.tetratech.com	LISTER PARK PROJECT	DATE: 02/14/2020
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY	5 HANOVER SQUARE, SUITE 1003 NEW YORK, NY 10004 PHONE: (646)576-4034	LIVING SHORELINE DETAIL SECTIONS	DESN: ES
COUNTY: NASSAU COUNTY, NEW YORK			FIGURE 8B
NUMBER OF SHEETS: 24 OF 30			

Bar Measures 1 inch

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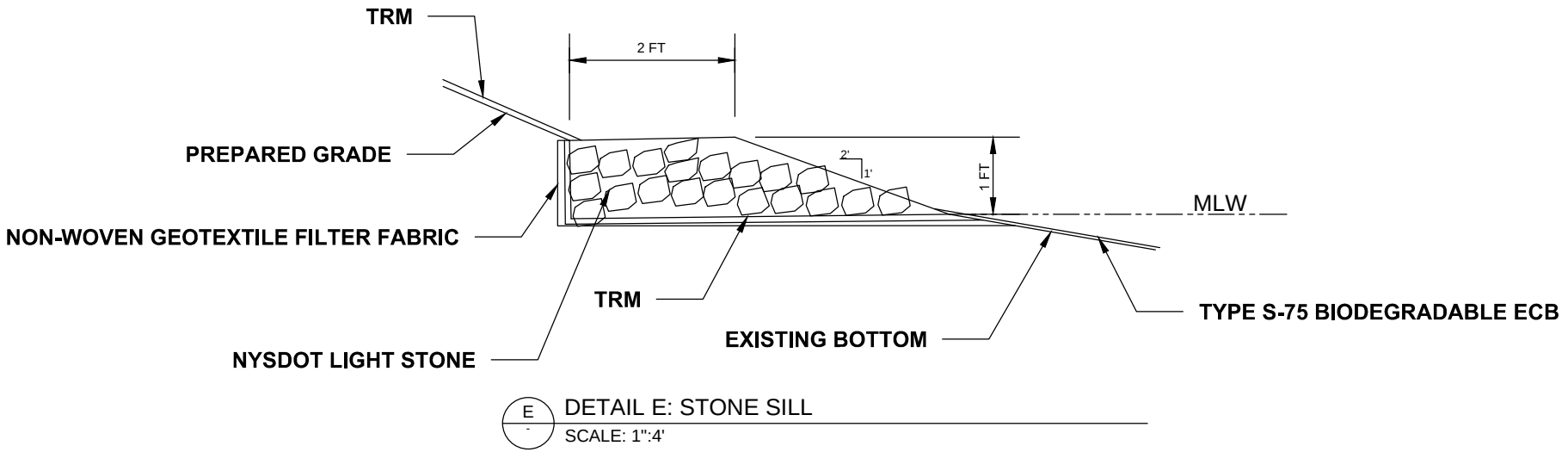
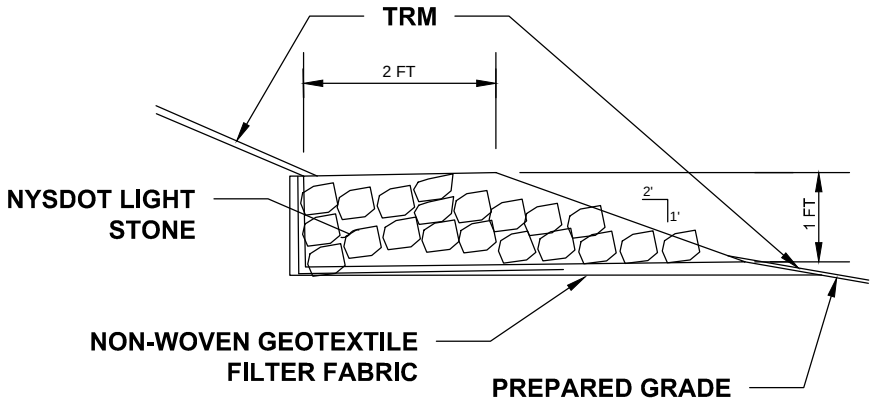


E — DETAIL E: STONE SILL

SCALE: 1":4'



TYP — STONE SILL ON SLOPE TYP. SECTION

SCALE: 1":4'

0 1 2 4

SCALE: 1"=2'

APPLICANT: TETRA TECH	TETRA TECH	GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY	PROJ: 200-89763-18003
WATERWAY: MILL RIVER	www.tetratech.com	LISTER PARK PROJECT	DATE: 02/14/2020
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY	5 HANOVER SQUARE, SUITE 1003 NEW YORK, NY 10004 PHONE: (646)576-4034	LIVING SHORELINE DETAIL SECTIONS	DESN: ES
COUNTY: NASSAU COUNTY, NEW YORK			FIGURE 8C
NUMBER OF SHEETS: 25 OF 30			

Bar Measures 1 inch

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NOTES:

1. THE TOPOGRAPHIC AND BOUNDARY INFORMATION WAS OBTAINED FROM A SURVEY PREPARED BY GAYRON de BRUIN, DATED NOVEMBER 27, 2018.
2. THE VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 1988.
3. THE WETLAND BOUNDARY WAS DETERMINED AS PER THE EAST ROCKAWAY HIGH SCHOOL/LISTER PARK PROJECT M WETLAND DELINEATION REPORT BY TETRA TECH.
4. BASED FLOOD ELEVATIONS SHOWN HEREIN ARE APPROXIMATE AND WERE OBTAINED FROM FEMA'S FIRM PANELS 36059C0218G AND 36059C0219G LAST REVISED SEPTEMBER 11, 2009.
5. NO IMPACTS, POSITIVE OR NEGATIVE, WERE ACCOUNTED FOR IN AREAS WHERE WETLANDS EXIST AT LOCATIONS WETLANDS ARE BEING PROPOSED. THESE NUMBERS ARE CONSIDERED A "WASH" FOR THE SAKE OF DETERMINING MITIGATION AND IMPACT NUMBERS.
6. EXISTING NATIVE AND INVASIVE VEGETATION, AS WELL AS UNCONSOLIDATED SHORELINE, WITHIN AND CONTIGUOUS TO THE PROPOSED LIVING SHORELINE AREA WAS SURVEYED AND DOCUMENTED DURING A SITE VISIT PERFORMED BY TETRA TECH ON FEBRUARY 14TH, 15TH, 18TH, AND 19TH, 2019.
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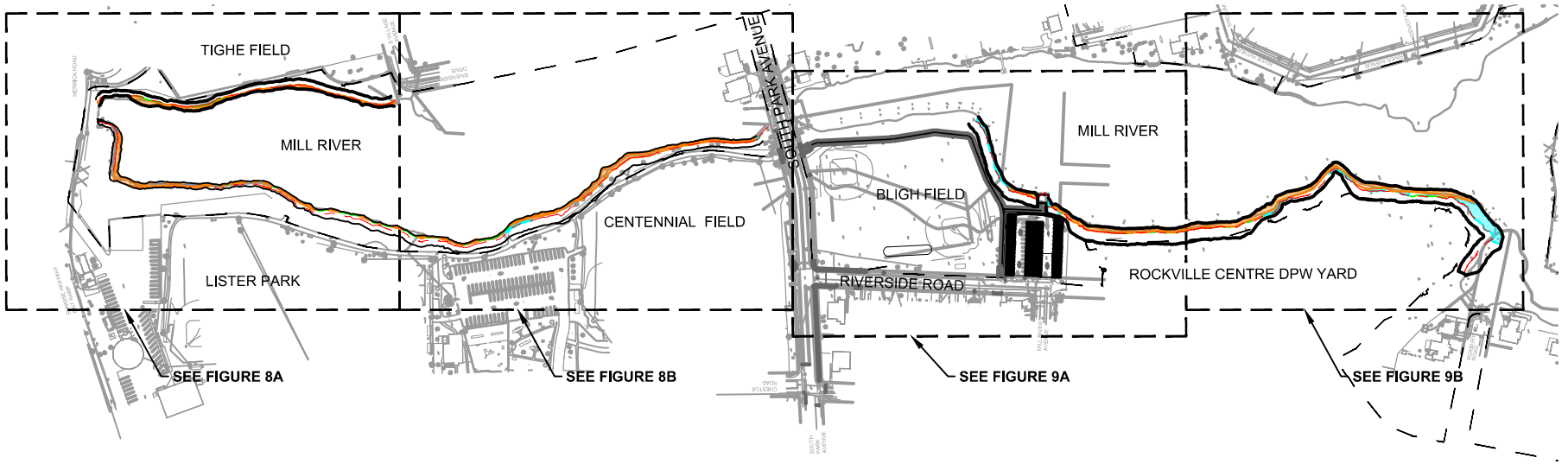

CIVIL LEGEND

- MEAN HIGH WATER LINE
- LIMITS OF DISTURBANCE
- EXISTING IMPACTED WETLANDS
- PROPOSED WETLANDS WHERE INVASIVE SPECIES CURRENTLY EXIST
- PROPOSED WETLANDS WHERE NO PLANTS EXIST (UNCONSOLIDATED SHORELINE)

WETLAND IMPACTS

EXISTING WETLAND DISTURBANCE: 6,805 SF / 0.16 ACRES

AREA OF WETLAND PLANTING PROPOSED: 26,554 SF / 0.61 ACRES

AREA OF NEW WETLAND CREATED: 19,749 SF / 0.45 ACRES

N

0 175 350 700

SCALE: 1"=350'

APPLICANT: TETRA TECH

WATERWAY: MILL RIVER

TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY

COUNTY: NASSAU COUNTY, NEW YORK

NUMBER OF SHEETS: 26 OF 30

TETRA TECH
www.tetratech.com
5 HANOVER SQUARE, SUITE 1003
NEW YORK, NY 10004
PHONE: (646)576-4034

GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY

LISTER PARK PROJECT

WETLANDS IMPACT PLAN - OVERALL

PROJ: 200-89763-18003

DATE: 02/14/2020

DESN: ES

FIGURE 9

Bar Measures 1 inch

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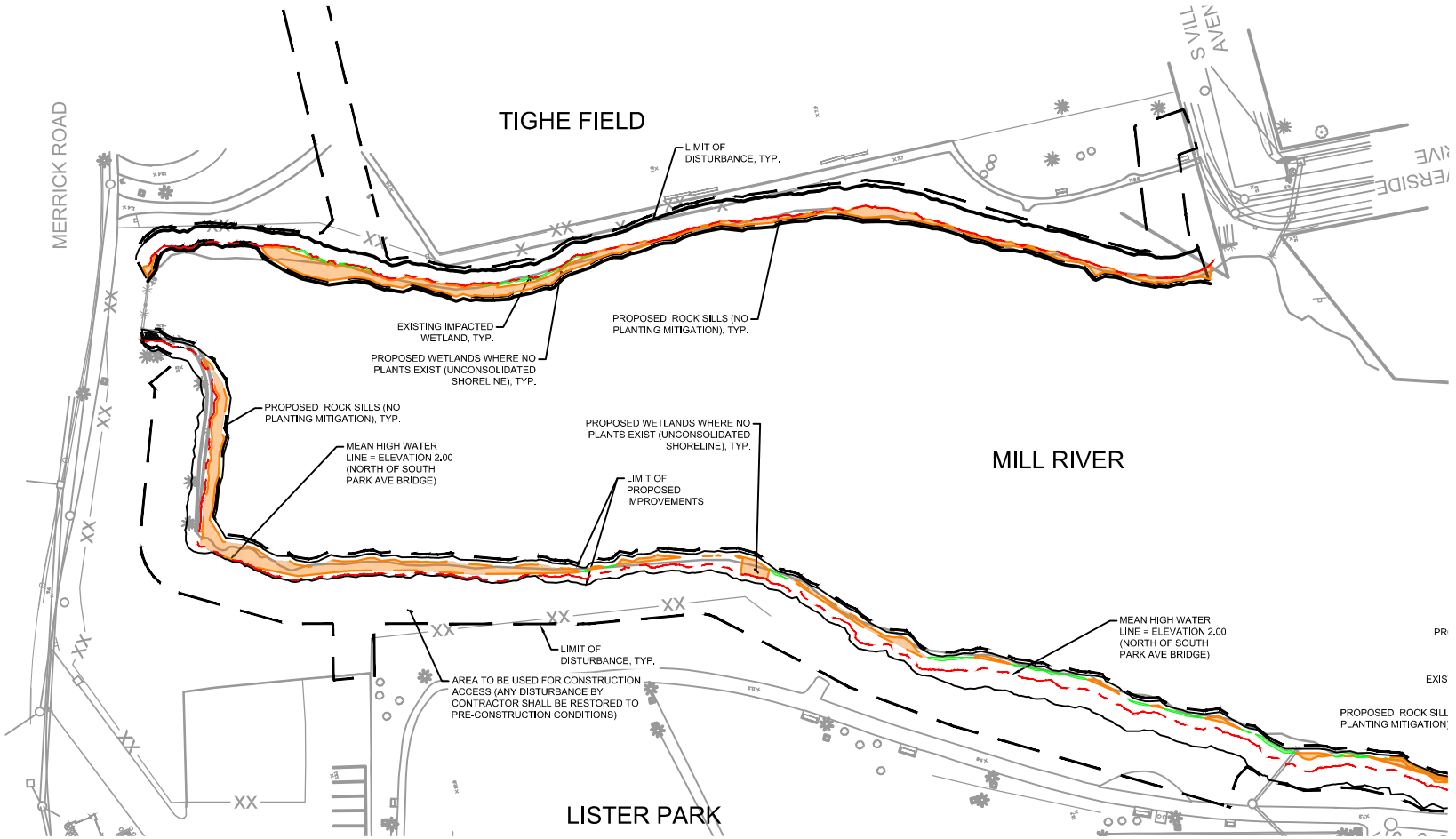

CIVIL LEGEND

- MEAN HIGH WATER LINE
- LIMITS OF DISTURBANCE
- EXISTING IMPACTED WETLANDS
- PROPOSED WETLANDS WHERE INVASIVE SPECIES CURRENTLY EXIST
- PROPOSED WETLANDS WHERE NO PLANTS EXIST (UNCONSOLIDATED SHORELINE)

NOTES:

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0 50 100 200
SCALE: 1"=100'

APPLICANT: TETRA TECH
WATERWAY: MILL RIVER
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY
COUNTY: NASSAU COUNTY, NEW YORK
NUMBER OF SHEETS: 27 OF 30

TETRA TECH
www.tetratech.com
5 HANOVER SQUARE, SUITE 1003
NEW YORK, NY 10004
PHONE: (646)576-4034

GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY

LISTER PARK PROJECT

WETLANDS IMPACT PLAN - NORTH (1 OF 2)

PROJ: 200-89763-18003
DATE: 02/14/2020
DESN: ES

FIGURE 10A

Bar Measures 1 inch

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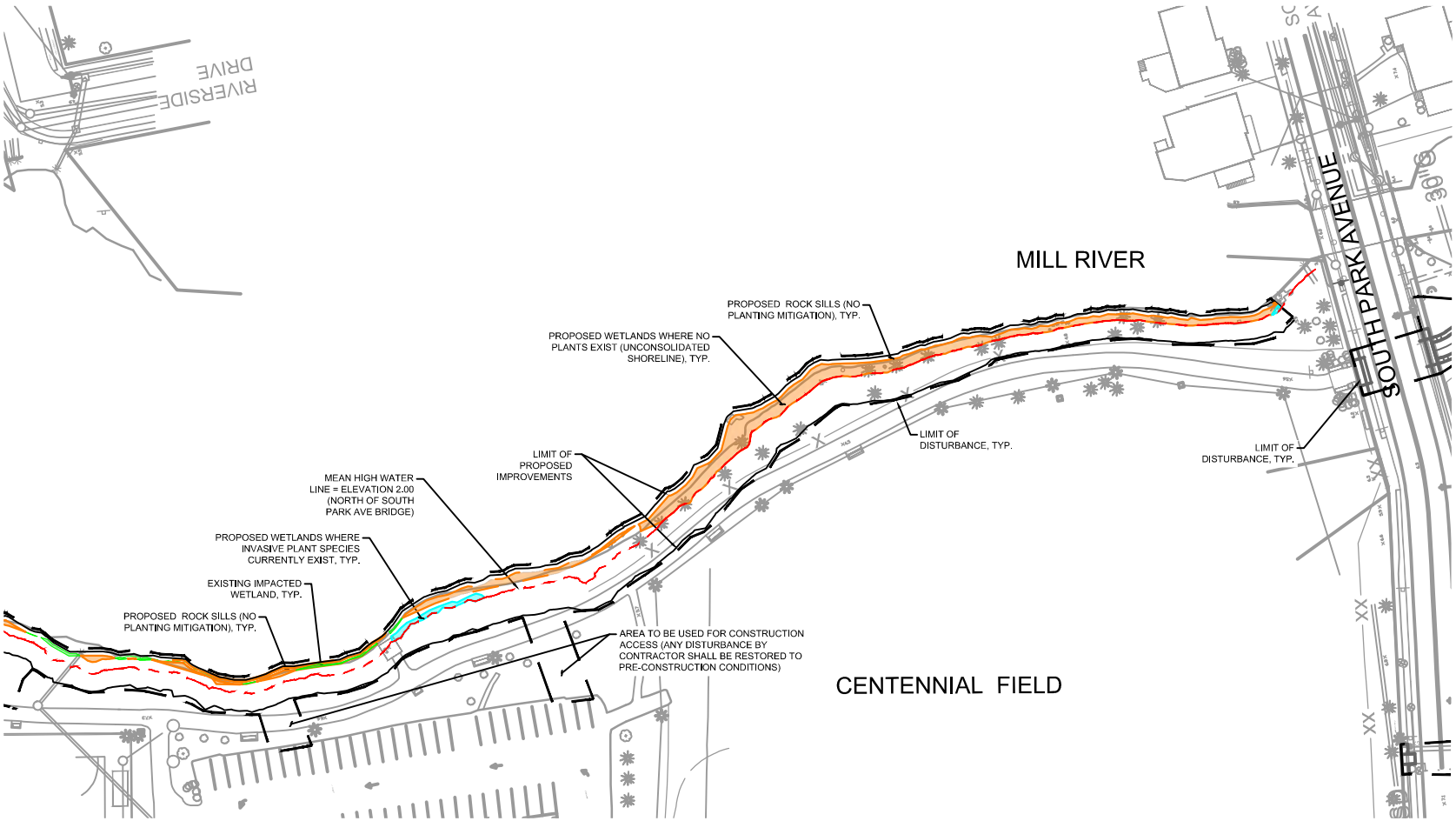

CIVIL LEGEND

- MEAN HIGH WATER LINE
- LIMITS OF DISTURBANCE
- EXISTING IMPACTED WETLANDS
- PROPOSED WETLANDS WHERE INVASIVE SPECIES CURRENTLY EXIST
- PROPOSED WETLANDS WHERE NO PLANTS EXIST (UNCONSOLIDATED SHORELINE)

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0 50 100 200
SCALE: 1"=100'

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APPLICANT: TETRA TECH
WATERWAY: MILL RIVER
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY
COUNTY: NASSAU COUNTY, NEW YORK
NUMBER OF SHEETS: 28 OF 30

TETRA TECH
www.tetratech.com
5 HANOVER SQUARE, SUITE 1003
NEW YORK, NY 10004
PHONE: (646)576-4034

GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY
LISTER PARK PROJECT

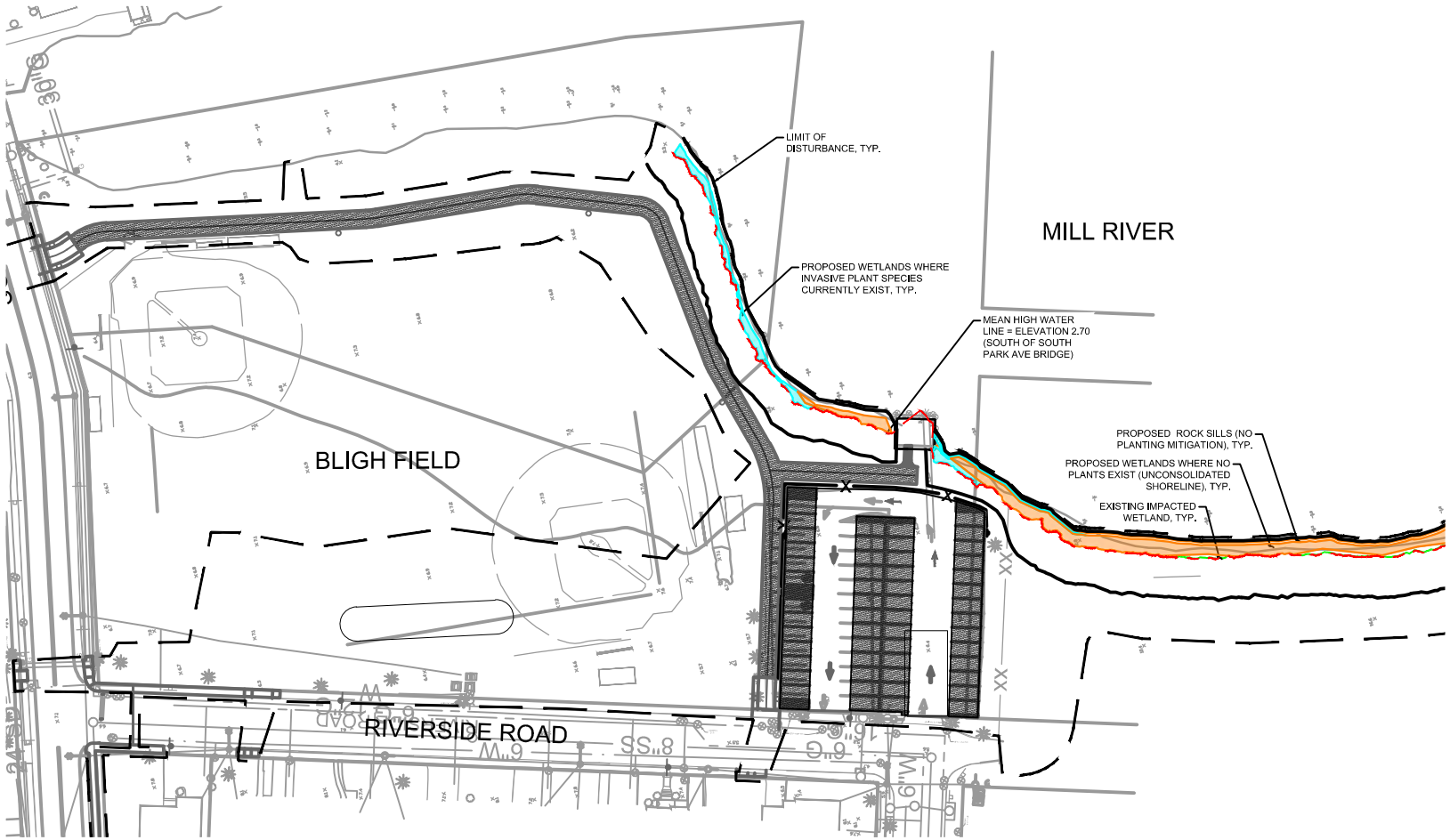
WETLANDS IMPACT PLAN - NORTH (2 OF 2)

PROJ: 200-89763-18003
DATE: 02/14/2020
DESN: ES

FIGURE 10B

Copyright: Tetra Tech

Bar Measures 1 inch



CIVIL LEGEND

- MEAN HIGH WATER LINE
- LIMITS OF DISTURBANCE
- EXISTING IMPACTED WETLANDS
- PROPOSED WETLANDS WHERE INVASIVE SPECIES CURRENTLY EXIST
- PROPOSED WETLANDS WHERE NO PLANTS EXIST (UNCONSOLIDATED SHORELINE)

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5. NO IMPACTS, POSITIVE OR NEGATIVE, WERE ACCOUNTED FOR IN AREAS WHERE WETLANDS EXIST AT LOCATIONS WETLANDS ARE BEING PROPOSED. THESE NUMBERS ARE CONSIDERED A "WASH" FOR THE SAKE OF DETERMINING MITIGATION AND IMPACT NUMBERS.
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7. THE TIDAL REFERENCE FOR THE PROJECT WATER DEPTHS IS MEAN LOW WATER (MLW) AND MEAN HIGH WATER (MHW). THE NEAREST NOAA TIDE STATION TO THE PROJECT AREA IS STATION 8516661 AT BAY PARK NY AND IS LOCATED NEAR THE MOUTH OF THE MILL RIVER WHERE IT EMPTIES INTO THE WATERS OF WEST HEMPSTEAD BAY, APPROXIMATELY 2.7 MILES DOWNSTREAM OF THE PROJECT AREA. ABSENT OF A LOCAL TIDE GAUGE, THE BOTH THE MLW AND MHW WERE DERIVED FROM SITE SPECIFIC DATA INCLUDING: WETLAND SURVEY DATA AND LOCATION OF HYDROPHYTIC VEGETATION, BATHYMETRIC AND TOPOGRAPHIC SURVEY DATA, SOIL DATA, VISUAL OBSERVATIONS OF SHORELINE FEATURES, WATER MARKS ON CULVERTS STRUCTURES, AND BANK SLOPE CONDITIONS.
8. FLOW RESTRICTIONS FROM THE SOUTH PARK AVENUE CULVERT CONTRIBUTES TO LOWER MHW LEVELS (+2.0 FT NAVD) IN THE NORTH SECTION OF THE PROJECT (NORTH OF S. PARK AVE.), COMPARED TO THE SOUTH SECTION (+2.7 FT NAVD, SOUTH OF S. PARK AVE.). MLW WAS DETERMINED TO BE CONSISTENT THROUGHOUT THE PROJECT AREA (+1.3 FT NAVD).

0 50 100 200

SCALE: 1"=100'

APPLICANT: TETRA TECH	TETRA TECH	GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY	PROJ: 200-89763-18003
WATERWAY: MILL RIVER	www.tetratech.com	LISTER PARK PROJECT	DATE: 02/14/2020
TOWNSHIP: VILLAGE OF ROCKVILLE CENTRE, NY	5 HANOVER SQUARE, SUITE 1003 NEW YORK, NY 10004 PHONE: (646)576-4034	WETLANDS IMPACT PLAN - SOUTH (1 OF 2)	DESN: ES
COUNTY: NASSAU COUNTY, NEW YORK			FIGURE 11A
NUMBER OF SHEETS: 29 OF 30			

Bar Measures 1 inch

Copyright: Tetra Tech

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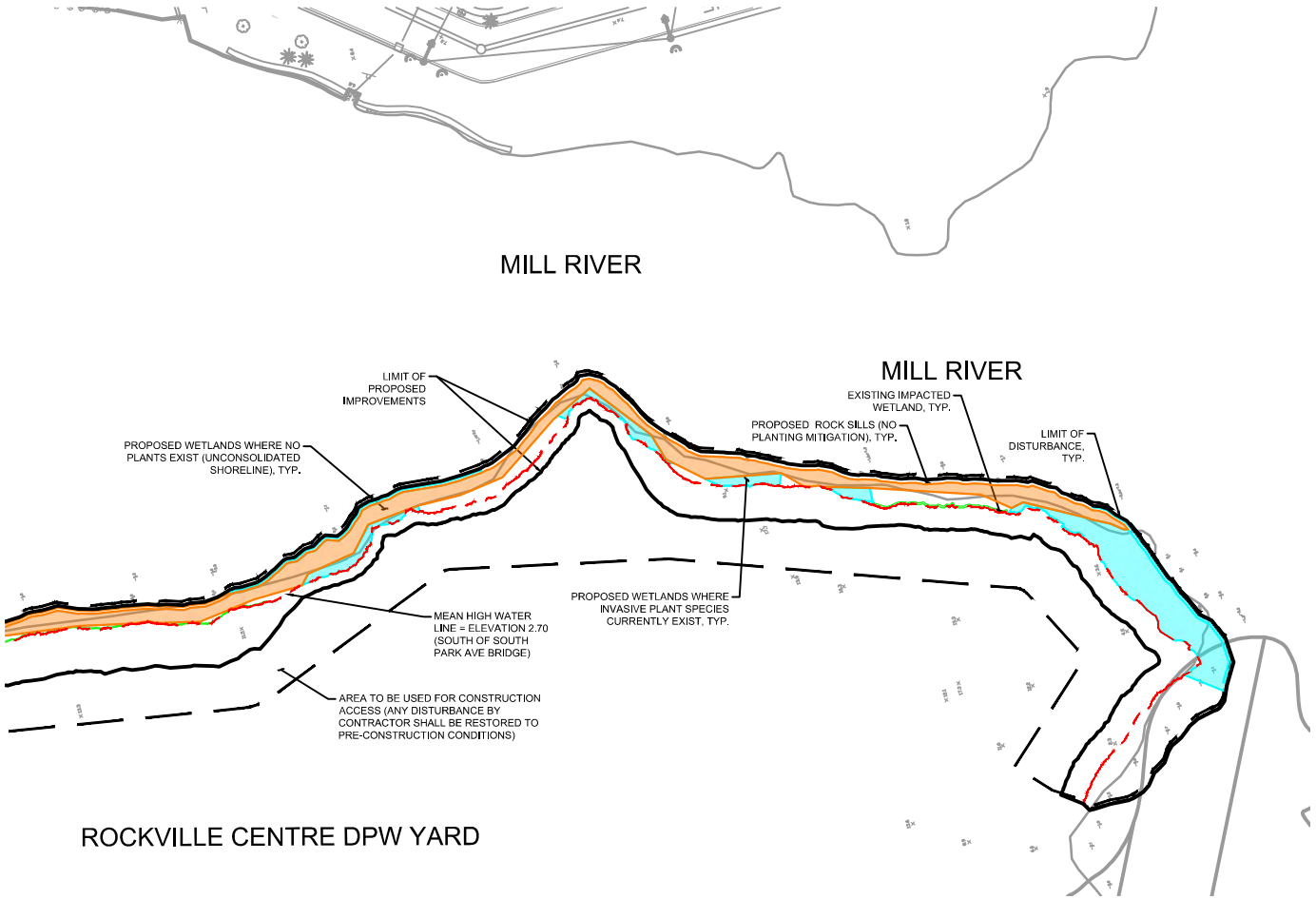

CIVIL LEGEND

- MEAN HIGH WATER LINE
- LIMITS OF DISTURBANCE
- EXISTING IMPACTED WETLANDS
- PROPOSED WETLANDS WHERE INVASIVE SPECIES CURRENTLY EXIST
- PROPOSED WETLANDS WHERE NO PLANTS EXIST (UNCONSOLIDATED SHORELINE)

NOTES:

1. THE TOPOGRAPHIC AND BOUNDARY INFORMATION WAS OBTAINED FROM A SURVEY PREPARED BY GAYRON de BRUIN, DATED NOVEMBER 27, 2018.
2. THE VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 1988.
3. THE WETLAND BOUNDARY WAS DETERMINED AS PER THE EAST ROCKAWAY HIGH SCHOOL/LISTER PARK PROJECT M WETLAND DELINEATION REPORT BY TETRA TECH.
4. BASED FLOOD ELEVATIONS SHOWN HEREIN ARE APPROXIMATE AND WERE OBTAINED FROM FEMA'S FIRM PANELS 36059C0218G AND 36059C0219G LAST REVISED SEPTEMBER 11, 2009.
5. NO IMPACTS, POSITIVE OR NEGATIVE, WERE ACCOUNTED FOR IN AREAS WHERE WETLANDS EXIST AT LOCATIONS WETLANDS ARE BEING PROPOSED. THESE NUMBERS ARE CONSIDERED A "WASH" FOR THE SAKE OF DETERMINING MITIGATION AND IMPACT NUMBERS.
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0 50 100 200

SCALE: 1"=100'

APPLICANT: TETRA TECH	TETRA TECH	GOSR - VILLAGE OF ROCKVILLE CENTRE, EAST ROCKAWAY, NY	PROJ: 200-89763-18003
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COUNTY: NASSAU COUNTY, NEW YORK			FIGURE 11B
NUMBER OF SHEETS: 30 OF 30			

Bar Measures 1 inch

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Village of Rockville Centre
Governor's Office of Storm Recovery (GOSR)
Lister Park Project
Village of Rockville Centre
Nassau County, New York
ASGECI Project #4357

POST-CONSTRUCTION MONITORING PLANS

Governor's Office for Storm Recovery
Living with the Bay
Lister Park Living Shoreline Project
5-Year Post-Construction Operation and Adaptive Management Plan

200-87963-18003
October 18, 2019
Revised December 12, 2019
Revised February 5, 2020

PRESENTED TO

Governor's Office of Storm Recovery
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October 18, 2019 December 12, 2019, February 5, 2020

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October 18, 2019

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Title:

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ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
DEC	Department of Environmental Conservation
dbh	diameter at breast height
DO	Dissolved oxygen
DTM	digital terrain model
ERHS	East Rockaway High School
FEMA	Federal Emergency Management Agency
GPS	global positioning system
LF	linear feet
LiDAR	Light Detection and Ranging
LWTB	Living with the Bay
N	Nitrogen
NOAA	National Oceanic and Atmospheric Administration
NTU	Nephelometric Turbidity Units
P	Total Phosphorus
USFWS	U.S. Fish and Wildlife Service

1.0 INTRODUCTION

During Superstorm Sandy the homes in the Lister Park Project area were inundated from the Mill River while East Rockaway High School (ERHS) was severely damaged. The parking lots for Lister Park, Tighe Field, and Centennial Field are subject to flooding during higher rainfall events and tidal backup. Areas along the east and west banks of the Mill River experience shoreline erosion due to high river velocities and tides and/or have been hardened or native vegetative community removed. Several residential properties along the Mill River also flooded during Superstorm Sandy. Additionally, bike and pedestrian access to the waterfront in the Project area is currently limited due to thick vegetation.

The New York State Department of Environmental Conservation (DEC) recommends the use of ecologically sustainable techniques over hardening techniques for erosion control projects and presents the following benefits of living shoreline techniques (New York State Department of Environmental Conservation, 2017):

- Improving water quality through filtering nutrients and other pollutants;
- Creating habitats for fish, birds, and other marine resources;
- Providing attractive and natural appearance and offer public access opportunities;
- Providing for erosion control – reducing wave energy impacts;
- Adaptability and resilience to erosive forces and sea level rise in comparison to hardened shorelines;
- Maintaining natural shoreline dynamics and sand movement, and
- Economical, as they often are less costly than traditional shoreline stabilization methods such as bulkheads and revetments.

The design of the Lister Park Project of the Living with the Bay (LWTB) program includes the implementation of flood protection, erosion control, stormwater mitigation, and waterfront access improvements along a portion of the Mill River watershed (Figure 1). More specifically the Project elements include:

- Living shoreline improvements to mitigate shoreline erosion and enhance habitat along 3,550 LF of river bank
- Public access improvements to the waterfront along a section of the Mill River Greenway
- Protection of homes from flooding located within the Federal Emergency Management Agency (FEMA) 100-year flood plain
    - Runoff from the parking lots at Lister Park, specifically the parking lots of Centennial Field and Tighe Field will be treated with green infrastructure bioretention basins.
    - The bioretention basins will provide natural filtration via the use of vegetation that allows settlement of entrained sediment and other agents in the stormwater runoff, while allowing water to infiltrate into the ground and recharge the local/regional aquifer.
    - Runoff from the Bligh Field parking lot will be infiltrated through porous concrete panels.

This 5-Year Operation and Adaptive Management Plan (Plan) was developed to outline a program for routine maintenance and monitoring activities that will support the ecological communities that are critical to the Project area's stability. The primary purpose of the Plan is to account for the maintenance of the Project's features and ecological habitats over time, from both natural and man-made influences. This Plan includes: the eradication methods proposed for the removal of nuisance and invasive plant species and the frequency of the plant eradication events. The Plan will also provide assurances that the habitats within the proposed Project area will be monitored and maintained for success.

This Plan will afford the Village of Rockville Center (subrecipient) a means for early detection if the vegetative communities are trending toward optimum growth and composition; as well as give them the ability to quickly adjust or correct to assure long-term success. The subrecipients will implement this Plan which includes the methods for monitoring habitat, frequency for monitoring events, success criteria, observations, and wildlife

utilization. Annual reports resulting from the implementation of the Plan will be submitted to the agencies in partial fulfillment of regulatory and project funding requirements.

In addition to vegetative community and water quality monitoring, the Plan will also assess the structural performance of the Project features post-construction using Light Detection and Ranging (LiDAR) surveys, bathymetric surveys, topographic surveys, and visual inspections. As an adaptive management tool, the Plan allows for the adjustment of the monitoring schedule after a sequence of favorable inspections and includes provisions for inspections after the occurrence of severe weather events or special conditions.

While this Plan provides general maintenance and monitoring implementation guidance, detailed monitoring plans/scopes of work will be prepared to address task-specific protocols (e.g. sampling locations, number of monitoring stations/transects, etc.) for DEC approval.

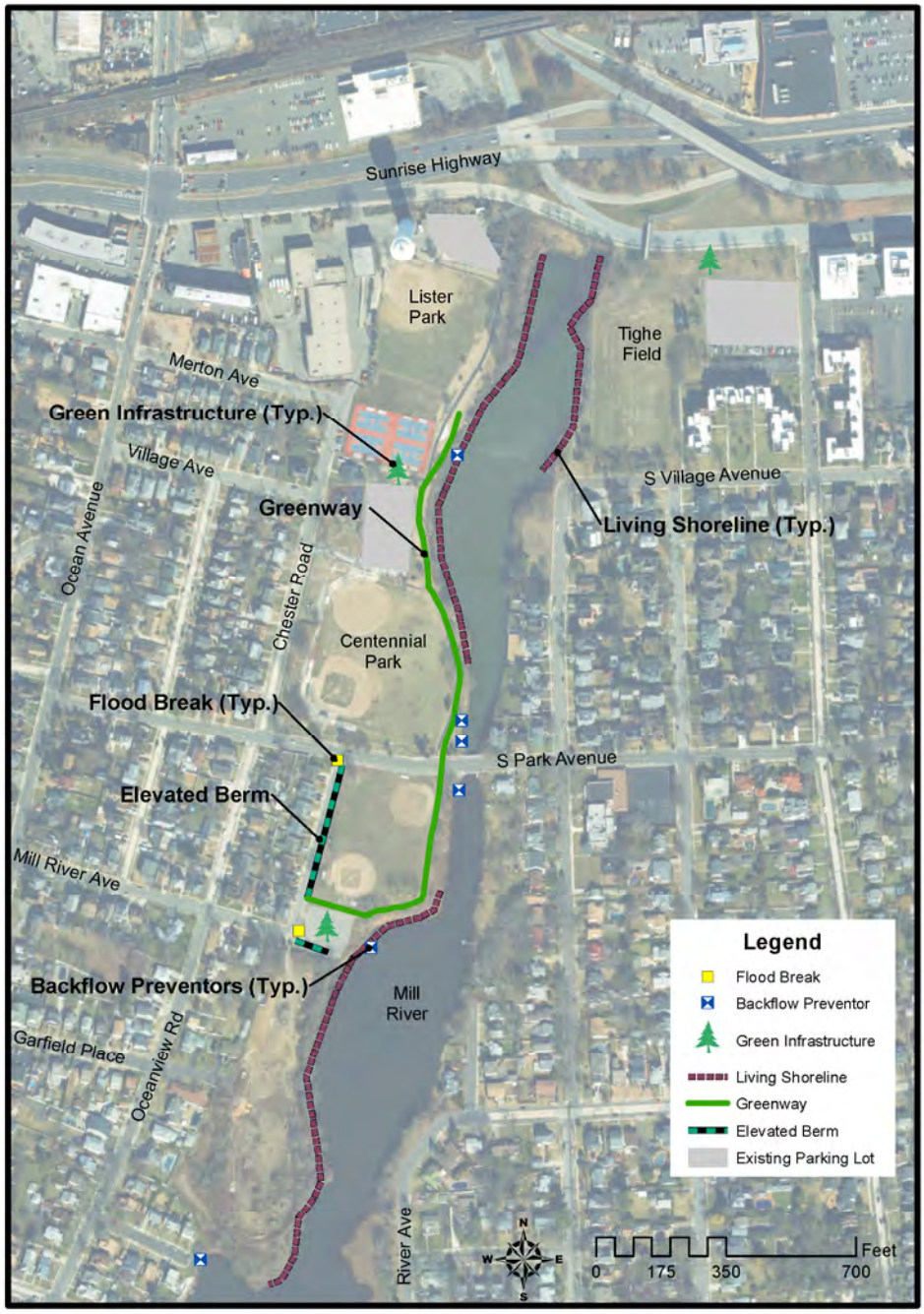

Figure 1. Proposed Project Improvements.

1.1 ADAPTIVE RESPONSES

As an adaptive management tool, the Plan herein promotes flexible decision making that can be adjusted after a sequence of favorable inspections and includes provisions for inspections after the occurrence of severe weather events or special conditions. Implementation of the adaptive management aspect of the Project include periodic review of the conditions in and adjacent to the Project area after construction is complete.

1.1.1 Weather Triggered Surveys

A weather triggered inspection will take place following a severe weather event and will consist of a visual inspection of all Project elements (bulkhead improvements, backflow prevention devices, living shoreline improvements, public access improvements, and bioretention basins). A weather triggered inspection will follow all the inspection and reporting requirements of the Post-Construction Monitoring Surveys.

1.1.1.1 Weather Data Sources

At a minimum, a visual inspection will be completed when severe weather conditions occur at or within ten miles of the site. The National Oceanic and Atmospheric Administration (NOAA) classifies a storm as severe when it produces wind gusts of 58 mph and/or hail one inch in diameter or larger and/or a tornado (NOAA, 2016).

Flooding, also a severe weather condition, can occur during heavy rainfall events or when snow melts at a rapid rate. Sources of weather data that can be used to determine if a weather triggered inspection is required are:

1. The NOAA National Weather Service (NWS) Storm Prediction Center: https://www.spc.noaa.gov/
2. The NWS provides a listing of watches, warnings, or advisories for Nassau County, NY at: https://alerts.weather.gov/cap/wwaatmget.php?x=NYC059&y=1

1.1.2 Special Conditions Surveys

A special condition survey is a visual inspection conducted in accordance with the procedures and requirements of the Post-Construction Monitoring Surveys (Section 2.2). A special inspection is required when an unusual and unanticipated incident occurs that has the potential to cause damage to any of the Project elements. A contaminant release in the upstream waterway is an example of a special condition that would require a visual inspection. Special inspections are case-by-case events and have no scheduled frequency. Follow-up inspection requirements do not affect the normal visual inspection schedules.

1.2 SUCCESS CRITERIA

Performance criteria, Project goals, and monitoring parameters have been developed as indicators of Project success. Monitoring is crucial to understanding whether the Project is working or to determine what changes to make if it is not working.

Goals for the Project include: providing flood protection to the ERHS and surrounding LWTB community, enhancing waterfront access, providing connectivity along the Mill River waterfront to existing pathways, enhancing habitat, improving water quality, and offering educational opportunities with Project access improvements. Green infrastructure techniques, such as bioretention basins, enhancing the waterfront with living shorelines, constructing flood protection for homes within the FEMA 100-year flood plain, and creating a greenway along the Mill River for public access to the waterfront will be incorporated.

- Goal 1) Flood Protection

Objective: Produce living shoreline improvements to mitigate shoreline erosion and install floodwalls and flood berms to provide flood protection for residential homes.

Monitoring will be accomplished via pre-construction and post-construction surveys (topographic, bathymetric, and LiDAR)

- Goal 2) Enhance Waterfront Access/ Providing Connectivity

Objective: Support beneficial use of waterfront by providing safe and enjoyable opportunities for the public.

Monitoring will be accomplished via visual surveys following construction.

- Goal 3) Enhance Habitat (maintain 80% plant survival [based on aerial coverage] over 5 years)

Objective: Living shoreline improvements to enhance habitat and increase vegetation productivity.

Monitoring will be accomplished via community composition post-construction vegetative community surveys. An invasive species management plan will also be developed as part of the Project to reduce the potential spread of invasive species.

- Goal 4) Improve Water Quality

Objective: To decrease nutrient levels and increase dissolved oxygen levels.

Monitoring will be accomplished via pre-construction and post-construction water quality sampling. Sampling will test for dissolved oxygen, water temperature, salinity, turbidity, Total Phosphorus (P), and Total Nitrogen (N).

- Goal 5) Increase Educational Opportunities

Objective: Educate the public regarding living shorelines and green infrastructure by installing signage at waterfront access points throughout the Project area.

Monitoring will be accomplished via visual inspections and photographic documentation.

2.0 MAINTENANCE AND MONITORING

Maintenance and monitoring are vital to the success of living shoreline establishment (New York State Department of Environmental Conservation, 2017). The implementation of this Plan allows for the assessment of Project performance through surveys (topographic surveys, bathymetric surveys, wetland surveys, tree surveys, geotechnical sampling and analysis, water quality sampling, and visual inspections).

This Plan establishes a schedule of inspections and surveys and allows for the adjustment of the schedule after a sequence of favorable inspections occurs. The Plan also includes provisions for inspections of the system after the occurrence of severe weather or occurrence of a special condition (Section 1.1).

While this Plan provides general maintenance and monitoring implementation guidance, detailed monitoring plans/scopes of work will be prepared to address task-specific protocols (e.g. sampling locations, number of monitoring stations/transects, etc.) for DEC approval.

2.1 PRE-CONSTRUCTION SURVEYS

The pre-construction wetland delineation, tree survey, bathymetric and LiDAR survey, and geotechnical investigations have all occurred. Water quality was previously sampled (2016/2017) during an earlier component of the LWTB Rebuild by Design program of the Hurricane Sandy Rebuilding Strategy. Station SW13, monitored during the 2016/2017 sampling event, falls within the current ERHS Project area. Data collected at SW13, during the 2016/2017 water quality sampling efforts, in conjunction with the Project specific pre-construction water quality monitoring, will serve as a baseline. The Project specific pre-construction water quality sampling will commence prior to Project construction.

2.1.1 Wetland Delineation

Approximately 21.6 acres of estuarine wetlands were delineated within the 65.4-acre ERHS and Lister Park Site in July 2017. The tidal wetlands included approximately 19.6 acres of littoral zone and 2.0 acres of fringe high marsh and intertidal marsh communities. High marsh wetlands were dominated by saltmarsh elder (*Iva frutescens*) and intertidal marsh wetlands were dominated by common reed (*Phragmites australis*). Saltmarsh cordgrass (*Spartina alterniflora*) also occurred within two of the intertidal marshes. High marsh wetlands occurred between the mean high waterline and the mean higher high waterline. Intertidal marsh communities occurred between the mean low water and mean high waterlines. Due to the disturbed nature of the area, a gradual gradient supportive of several vegetative wetland communities was predominantly absent. This resulted in a limitation of vegetated wetland communities to the two referenced categories. A copy of the Wetland Delineation Map and detailed results are presented in the Wetland Delineation Report for the East Rockaway High School/Lister Park Project M Living with the Bay (Tetra Tech, Inc., 2017).

Federal and State species listed as either threatened or endangered were not observed at the Project area during the wetland delineation effort. Upland, and to a lesser degree wetland, plant species within the Project area were dominated by opportunistic species common to disturbed urban environments. Several invasive species of all strata (i.e., tree, shrub, herb and vine) were observed.

2.1.2 Tree Survey

A pre-construction tree survey was conducted within, and contiguous to, three proposed living shoreline areas in February 2019. Trees contiguous to the living shoreline areas, that provided shade, were surveyed. Generally, this included trees that occurred within 15 to 20 feet of the proposed living shoreline edge. The location of living trees with a diameter at breast height (dbh) of 5 inches or greater were documented with a sub-meter global positioning system (GPS). Dead trees were not surveyed; however, downed trees, if still living, were surveyed. In addition to locational data, species, dbh, and estimated canopy radius was recorded for each of the surveyed trees. Conditions regarding significant lean or blowdown were also noted.

Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 575, *Prohibited and Regulated Invasive Species*, lists 5 prohibited or regulated tree species for New York. Prohibited species are those that cannot be sold, imported, purchased, transported, introduced, or propagated in New York. Regulated species can be possessed, sold, purchased, propagated, and transported but cannot be introduced into a free-living state.

Two of the tree species identified within the living shoreline areas are listed by 6 NYCRR as invasive. These include: Norway maple (*Acer platanoides*: prohibited) and black locust (*Robinia pseudoacacia*: regulated). Although not identified on the referenced 6 NYCRR list, tree-of-heaven (*Ailanthus altissima*), princess tree (*Paulownia tomentosa*) and Japanese pagoda tree (*Styphnolobium japonicum*), all native to china; and silk tree (*Albizia julibrissin*), native to southwestern and eastern Asia, were also identified within, or contiguous to, the living shoreline areas.

All surveyed trees associated with the proposed living shoreline areas were deciduous. A list of species identified as well as the recorded dbh, crown radius, and location is provided in the Tetra Tech 2019 Tree Survey Memo (Tetra Tech, Inc., 2019).

2.1.3 Topographic, Bathymetric and LiDAR Survey

A topographic survey was performed in October/November 2018 by Gayron de Bruin Land Surveying and Engineering, PC in the ERHS/Lister Park Project area to identify surface features, site topography, utility alignments and depths, and property boundaries. The existing conditions provided were used to prepare the 60% design of the Project improvements.

A bathymetric survey of the Mill River bottom within the Project area, as well as a LiDAR survey of the river banks, was performed in November 2018 by Geodynamics, LLC. The surveys were conducted to establish the

bottom configuration and the detailed configuration of the river banks where the living shoreline components are proposed. Geodynamics performed a single-beam bathymetric survey together with a 3-D laser scanning survey of the river bank. The survey data was digitally blended to tie the river bottom and bank survey outputs with the existing upland LiDAR survey data, and to provide a seamless digital terrain model (DTM) of the river, banks and floodplain. The bathymetric/bank LiDAR surveys were performed to be consistent with the upland surveys. The 100% Design Report provides the DTM and example profiles of the Mill River floodplain in the Project area (Tetra Tech, Inc., 2018). In addition, the survey data were manipulated to provide a map of local slope conditions to assist in the assignment of living shoreline features based on local slope conditions.

2.1.4 Geotechnical Investigations

A geotechnical investigation was performed in October/November 2018 by Yu Associates and Land, Air, Water Environmental Services, Inc. to determine the soil design parameters for the various stormwater and surface improvements associated with the Project. The groundwater table depth and soil drainage characteristics of the drainage area were determined in the field by performing 14 soil borings,6 percolation tests and 13 sediment sampling locations. Borings were performed in Tighe Field, Lister Park, Centennial Field, and Bligh Field to confirm groundwater depths and soil characteristics for the proposed greenway, knee-walls, berms, and other proposed improvements. Borings were also performed along the perimeter of the ERHS for the proposed bulkhead. The subsurface soil profile encountered in the borings generally included heterogeneous fill overlying peat/organic soils followed by glacial outwash deposits consisting of medium dense coarse to fine sands with various amounts of gravels, silt, and clay.

The groundwater depths and permeability were used to confirm that the groundwater table was deep enough for efficient use of the proposed subsurface infiltration systems located at the Tighe Field and Centennial Field parking lots. The groundwater elevation at Tighe Field was approximately elevation 6.6 (NAVD88), however the Project Geotechnical Engineering Report indicates this elevation is considered an outlier and accurate percolation rates were not obtained for the area. Recommendations will be made to re-test and confirm the presence of groundwater at this location during construction. The groundwater elevation at Centennial Field was approximately elevation 2.9 (NAVD88) and the average percolation rate is 10 inches per hour (Tetra Tech, Inc., 2018).

2.1.5 Water Quality Sampling

Living shorelines can play an important role in removing nitrogen and improving water quality (Onorevole, Thompson, & Piehler, 2018). To establish a baseline, pre-construction water quality monitoring, in conjunction with the data collected during the 2016/2017 water quality sampling efforts, will occur at multiple sites throughout the Project area to obtain representative samples of site conditions.

Sampling will test for dissolved oxygen (DO), water temperature, salinity, turbidity, P, and N to monitor the health of the Mill River as it responds to the living shoreline Project element. Samples will be collected starting at the downstream end of the Project area. Sampling will proceed from downstream locations to upstream locations so that disturbance related to sampling does not affect sampling quality. Tidal influences will be considered during each sampling event; at a minimum, the stage of the tide at the time of sample collection will be recorded.

A multiparameter sonde (i.e., YSI) can be used to collect DO, temperature, salinity, and turbidity at the mid and upper water columns, depending on water depths. The sonde instrument could be installed for automatic sampling and logging, or they can be used for single/individual sampling events. An automatic sampler would be temporarily installed along the river to collect continuous data. This would result in a higher resolution of water quality site conditions over time.

Nutrient samples will need to be collected using a sampling vessel, submerged in site water and rinsed 3 to 4 times before collecting. Once the sample is obtained, it will be transferred directly into the sample bottle. Proper use of the sampling device chosen will include slow lowering and retrieval of the sample, immediate transfer of

the liquid into the sampling container, and logbook notation of the depth at which the sample was collected. After collection, the sampling device will be decontaminated before taking the next sample.

Sampling from a boat will be performed as far from the stern as possible and only after the turbulence from the wake has subsided.

Dissolved Oxygen

Dissolved oxygen concentration is a key parameter that defines the quality of a water body (Miller, Rella, Williams, & Sproule, 2016). The amount of oxygen that is dissolved in the water column dictates both the abundance and categories of aquatic life that can live and reproduce (Miller, Rella, Williams, & Sproule, 2016). Dissolved oxygen fluctuates according to the time of day, tidal cycle, season, and water depth (Miller, Rella, Williams, & Sproule, 2016). Dissolved oxygen water quality standards for the Project will be based either on daily averages or individual sampling events, rather than seasonal averages.

Water Temperature

Water temperature has a large influence on biological activity and the growth of aquatic flora and fauna (Miller, Rella, Williams, & Sproule, 2016). Fish, insects, zooplankton, phytoplankton, and other aquatic organisms all have an ideal temperature range (Miller, Rella, Williams, & Sproule, 2016). Temperature is also important because of its impact on water chemistry and its capacity to increase the rate of chemical reactions at higher temperatures (Miller, Rella, Williams, & Sproule, 2016). Metabolic rates of aquatic plants increase with greater water temperature and therefore increases their demand for oxygen (Miller, Rella, Williams, & Sproule, 2016).

Salinity

Salinity measures the amount of salt dissolved in the water (Miller, Rella, Williams, & Sproule, 2016). Like temperature, salinity plays an important role in defining the type of growth that can be expected in a given body of water (Miller, Rella, Williams, & Sproule, 2016).

Turbidity

Turbidity measures particles or solids suspended in water (Miller, Rella, Williams, & Sproule, 2016). These particles can include organic matter, waste, pollution, sediment, or anything that cannot settle (Miller, Rella, Williams, & Sproule, 2016). Turbidity is measured in Nephelometric Turbidity Units (NTU). Excess sediment and contaminants in runoff, caused by an increase in paved surfaces, can reduce water clarity and quality (Miller, Rella, Williams, & Sproule, 2016); therefore, the creation of a living shoreline is expected to improve water quality within the Project area.

Nutrients

Nutrients, such as phosphorus and nitrogen, are essential for plant and animal growth and nourishment, but the excess of certain nutrients in water can cause many adverse ecological effects (U.S. Geological Survey (USGS), 1999). In streams, the highest concentrations of total nitrogen correspond to broad patterns of nitrogen inputs from agricultural and urban areas; coastal waters near such areas of high nitrogen input are at greatest risk of eutrophication (U.S. Geological Survey (USGS), 1999).

2.2 POST-CONSTRUCTION MONITORING

To determine if the Project goals are being met, a post-construction maintenance and monitoring program will be implemented. The program will include biological and physical surveys including an assessment of the vegetative community included in the living shoreline Project element.

2.2.1 Biological Resource Survey

During the peak summer growing season, flora and fauna, found within the Project area, will be documented through treatment and control areas on an annual basis. Monitoring will be accomplished via transects that will extend from the upper limit of construction to the water. *In situ* sampling will include quadrat photographs, plant

species counts, count of dead plants, number of plants replaced, evidence of herbivory, percent plant cover, blade height, and counts of fauna. One immediate post-construction monitoring event will occur to identify baseline field conditions. If possible, annual monitoring events will occur around the same time of year for a direct comparison. Monitoring annually for five years, will be important to assessing the health and success of the Project. After 5 years of monitoring, an 80% plant survival rate (based on aerial coverage) will be required. If this is achieved prior to the 5-year monitoring event, then the surveys will discontinue as the success criteria had been reached.

2.2.2 Bathymetric and LiDAR Survey

To monitor for sediment erosion or deposition, regularly scheduled comprehensive hydrographic surveys will be performed along the river bed within the Project site boundaries annually for 5 years.

To remain consistent with the pre-construction surveys, annual field survey will be performed in October/November in the Lister Park Project area to identify surface features, utility alignments and depths, and property boundaries.

An annual topo-bathy LiDAR survey of the Mill River bottom and the river banks within the Project area will also be flown in October/November. The surveys will be conducted to establish the bottom configuration and the detailed configuration of the river banks where the living shoreline components will be implemented. Elevation data will be collected using a green laser for bathymetry and a green laser or near-infrared lidar for topography. Depth of maximum retrievals will be dependent on water clarity and the instrument used.

Regularly scheduled surveys will cover the entire Project area while surveys triggered as a result of a weather event or a special condition may be limited to the affected area(s), if appropriate.

If the analysis of 2 subsequent annual surveys shows that no substantial change has occurred during the survey interval, then regularly scheduled post-construction surveys may be suspended. Surveys may still be required if scheduled, severe weather, or special conditions surveys detect damage or substantial change.

2.2.3 Water Quality Sampling

Post-construction water quality will be sampled at the same sites and with the same methodology as sampled during the pre-construction survey. Post-construction sampling will test for DO, water temperature, salinity, turbidity, Total P and Total N.

Water quality sampling will occur, in conjunction with the biological resource surveys, annually for five years post-construction.

2.3 REMOVAL OF NUISANCE AND INVASIVE PLANT SPECIES

While not required by the DEC, a critical part of the Project's success will be the development and application of an Invasive Species Management Plan used to guide the removal and reduction of the potential spread of invasive species. Removal of the existing invasive species within the Project area, including frequent eradication events, will be likely required as part of the Invasive Species Management plan. The establishment of native trees and shrubs during the habitat enhancement phase of the Project will aid in the control of invasive plants. But while the native trees and shrubs are growing, monitoring and removal of invasive species will be necessary for the Project to be successful (NYC Department of Parks & Recreation Natural Resources Group, 2012).

Invasive plants compete with newly planted trees and shrubs for water, nutrients, and sunlight. Controlling invasive plants may involve multiple treatments over several years as many species may re-emerge on the site from the remaining rootstock and/or seed bank in the soil (NYC Department of Parks & Recreation Natural Resources Group, 2012).

A total of 55 invasive tree species were documented within the Project area during pre-construction survey (Tetra Tech, Inc., 2019). In addition to invasive tree species, several invasive species of all strata (shrub, herb, vine) were also observed within the site (Tetra Tech, Inc., 2017). Invasive species observed within the Project area included:

- Common Reed (*Phragmites australis*)– common wetland dominant of the intertidal marsh and high marsh wetlands throughout the Site. Occurred in both sparse narrow and dense wide stands along the eastern and western banks of the river.
- Norway maple (*Acer platanoides*)– mature and young saplings were located in the adjacent upland wooded rows, specifically in the northern portion of the Site near Merrick Road and along the eastern edge of the Municipal Yard property, located to the north of the High School property.
- English Ivy (*Hedera helix*)– observed at several locations in dense stands of the adjacent uplands; particularly along the Municipal Yard property.
- Tree-of-heaven (*Ailanthus altissima*)– mature trees prevalent in the uplands of the northern portion of the Site.
- Black locust (*Robinia pseudoacacia*)– mature trees located throughout the upland portions of the Site.
- Oriental bittersweet (*Celastrus orbiculatus*) - located throughout the upland portions of the Site.
- Japanese Knotweed (*Fallopia japonica*) – observed in dense stands in the more wooded uplands and contiguous Site wetlands.
- Mugwort (*Artemisia vulgaris*) – located throughout the adjacent uplands of the Site.
- Multiflora rose (*Rosa multiflora*)– located throughout the Site.
- Princess tree (*Paulownia tomentosa*)- located in the northeastern segment and the southwestern segment the Site.
- Japanese pagoda tree (*Styphnolobium japonicum*)- located in the northeastern segment the Site.
- Silk tree (*Albizia julibrissin*)- located in the northeastern segment and the southwestern segment the Site.

Following the initial invasive species removal, it is recommended that Project area is visited bi-annually to remove invasive/exotic species (once in the fall and once in the spring). Invasive vegetation that may limit or prohibit the settlement and growth of natural plant species will be monitored.

2.3.1 Management Options

2.3.1.1 Mechanical Removal

Mechanical removal techniques include the hand pulling, cutting, mowing, digging, prescribed burning, use of shovels, spades, chainsaws, handsaws, hedge trimmers, and heavy equipment (if needed) to remove and eradicate plants (NYC Department of Parks & Recreation Natural Resources Group, 2012).

2.3.1.2 Herbicidal Application

Herbicide use is typically a multi-year, multi-step process because touch-up applications may be required (New York Department of Environmental Conservation). Usage of compounds that are effective against the target species, not likely to drift, leach to groundwater or wash into the river, are non-toxic to people and other organisms, are not persistent in the environment, and are easy to apply will be considered (NYC Department of Parks & Recreation Natural Resources Group, 2012). Many herbicides are not selective; therefore, care will be required to apply herbicides as not to harm the newly planted trees or other desirable vegetation (New York Department of Environmental Conservation). All herbicide spraying will require a New York DEC permit and herbicide usage in wetland areas will require a New York DEC Aquatic Pesticide Permit (NYC Department of Parks & Recreation Natural Resources Group, 2012).

2.3.1.3 Biological Control

Biological control is a tool proven effective in controlling widespread invasive plants (U.S. Forest Service, 2014). Successful biological control agents can offer expanding control while reducing necessity for pesticides. However, because ecosystems are complex, consideration of the effects on all other organisms within the community must be taken, not just the pest and biological control agent (U.S. Forest Service, 2014).

2.3.1.4 Invasive Species Management Option Summary

An Invasive Species Management Plan will be used to guide the removal and reduction of the potential spread of invasive species. Removal of the existing invasive species within the Project area, including frequent eradication events, will be likely required. The Invasive Species Management Plan will be drafted to include which of the management options (mechanical, herbicidal, biological), or a combination of options, will be employed to aid in the control of invasive plants.

2.4 MAINTENANCE

2.4.1 Education Signage

Educational signs are a frequently used means of communicating with the public. The signs, to be posted at the waterfront access points throughout the Project area, will be designed to present information in a consistent, attractive, and convenient format. While signage will be designed to be vandal resistant and to require low maintenance, occasional field cleaning and touch up will be required to keep them in good condition. During monitoring events, attention will be paid to:

- Loss of stability
- Tilting
- Coverage (fouling)/graffiti
- Removal/theft
- Fading

To monitor integrity over time, all signs will be checked bi-annually. If indicators of abuse or fouling have occurred, signs will be scraped, cleaned, and straightened to return them to as close to original condition as possible. If signs are missing or beyond repair, the proper officials will be contacted to begin the process of sign replacement.

2.4.2 Animal Exclusion

2.4.2.1 Turf Reinforcement Mats

Turf reinforcement mats will be included with the Project design to aid in long-term erosion protection, vegetative reinforcement, and water quality enhancement. Seeds will be placed beneath the mats along with root balls that will be installed under the mats and staked as needed to secure the mats around the plant stems. Mats will be established with minimal exposure of the root system to protect from bird, primarily the Canada Goose (*Branta canadensis*), foraging. In most cases, only the stem, leaves, and flowers will be exposed. The matted areas will be inspected weekly and after each runoff event until perennial vegetation is established to a minimum uniform 80% coverage throughout the blanketed area. Damaged or displaced mats will be restored within 10 calendar days.

2.4.2.2 Fencing

One of DEC's recommended techniques for discouraging geese is the use of fencing (NY DEC and U.S. Department of Agriculture, 1999). Fencing or other physical barriers can be effective where geese land on water and walk up onto adjacent properties to forage or rest. Fencing is best suited as a deterrent during the summer

when geese molt and unable to fly (NY DEC and U.S. Department of Agriculture, 1999). Fencing, dense shrubbery, or other physical barricades mounted near the water's edge can serve as an effective way to control goose movements. To be effective, fences must enclose the entire site. Fencing around large open areas, such as athletic fields or ponds, may not be an effective means of controlling free-flying birds (NY DEC and U.S. Department of Agriculture, 1999).

2.4.2.3 Visual Scaring Devices

Various materials may be used to produce an image that geese may evade, especially if they have not already established themselves, such as newly seeded areas (NY DEC and U.S. Department of Agriculture, 1999). While geese are typically disinclined to remain beneath an overhead object, visual scaring devices are not likely to be effective on maintained lawns where trees or other overhead objects exist and where geese have established a feeding ground (NY DEC and U.S. Department of Agriculture, 1999).

One effective visual deterrent for geese is Mylar tape that reflects sunlight and produces a flashing effect. When a breeze causes the tape to move, it pulses and produces a humming sound that deters birds (NY DEC and U.S. Department of Agriculture, 1999). To discourage geese from walking up onto the shoreline from the water, the tape should be placed along the water's edge (NY DEC and U.S. Department of Agriculture, 1999).

2.4.3 Irrigation

Irrigation of the plantings within the Project area will commence immediately after installing erosion control products and vegetation. Water will be applied to supplement rainfall at a rate to ensure moist soil conditions to a minimum 300 mm (12-inch) depth. Run-off and puddling will be prevented.

Water will be applied to trenches immediately before placement of live vegetation. Plantings will be watered at the end of each day, as needed to control dust and to prevent excessive drying of vegetation. Irrigation will be applied after installation for three months or until the end of the first-year growing season. Irrigation will not exceed 20 minutes/day for two times/day and three days/week. Irrigation will not exceed limits that could impair the stability of the plantings and will be adjusted to compensate for additions or deficits to soil moisture caused by precipitation or evaporation.

3.0 REPORTING

Permits issued by the DEC will likely include requirements for 5 years of annual monitoring and reporting (New York State Department of Environmental Conservation, 2017). In addition to the 5 years of post-construction monitoring, additional monitoring will be conducted (Table 1) and reported immediately following severe weather events or special conditions. Per DEC guidance, annual reports will present the Project status and the following elements (New York State Department of Environmental Conservation, 2017):

- Representative photographs
- Assessment of established plants
- Action taken with respect to invasive species removal
- Monitoring of sediment erosion of deposition
- Structural maintenance (if applicable)
- General site conditions

Annual reports resulting from the implementation of the Plan will be submitted to the agencies in partial fulfillment of regulatory and Project funding requirements.

Table 1. Monitoring and maintenance schedule/timeline.

Maintenance and Monitoring	Monitoring Event	Survey Date/Schedule
Pre-Construction Monitoring	Wetland Delineation	July 2017
	Tree Survey	February 2019
	Bathymetric Survey	October/November 2018
	LiDAR Survey	October/November 2018
	Geotechnical Investigations	October/November 2018
	Water Quality Sampling	2016/2017 (LWTB Rebuild by Design program)
		Summer Prior to Construction
Post-Construction Monitoring	Biological Resource Survey	Immediate Post-Construction and Annual Summer Monitoring (5 Years)
	Bathymetric Survey	Annual Autumn (Oct/Nov) Monitoring (5 Years)
	LiDAR Survey	Annual Autumn (Oct/Nov) Monitoring (5 Years)
	Water Quality Sampling	Annual Summer Monitoring (5 Years)
Post-Construction Maintenance	Invasive Species Removal	Initial Event
		First Autumn Post-Construction
		First Spring Post-Construction
	Educational Sign Maintenance	Bi-annually for the Duration of the Monitoring Program
	Turf Reinforcement Mats	Inspected Weekly
		After Each Runoff Event Until Perennial Vegetation is Established
	Irrigation	Daily as Needed Immediately Following Planting
		Two Times/Day for Three Days/Week for Three Months or Until the End of the First-Year Growing Season

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