Public Notice

US Army Corps of Engineers
Philadelphia District
Wanamaker Building
100 Penn Square East
Philadelphia, PA 19107-3390
ATTN: CENAP-OP-R

Public Notice No.
CENAP-OP-R-2015-0603

Date
AUG 05 2015

Application No.

File No.

In Reply Refer to:
REGULATORY BRANCH

This District has received an application for a Department of the Army permit pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) and Section 404 of the Clean Water Act (33 U.S.C. 1344).

The purpose of this notice is to solicit comments and recommendations from the public concerning issuance of a Department of the Army permit for the work described below.

APPLICANT: Dave Golden
New Jersey Departement of Environmental Protection:
Division of Fish and Wildlife
Mail Code 501-3
P.O. Box 420
Trenton, New Jersey 08622

AGENT: Princeton Hydro, LLC
1108 Old York Road, Suite 1
P.O. Box 720
Ringoes, New Jersey 08551

WATERWAY: Fortescue Creek/Delaware Bay

LOCATION: The habitat restoration site is located at Block 61, Lot 1, in Downe Township, Cumberland County, New Jersey; the dredging would occur within the state navigation channel of Fortescue Creek, near Downe Township, Cumberland County, New Jersey.

ACTIVITY: The applicant, using Department of the Interior, using National Fish and Wildlife Foundation funds, proposes to perform habitat restoration at 3 locations within the Fortescue Wildlife Management Area. This restoration would be performed as follows:

Low Marsh Restoration: Approximately twenty two and thirty six hundredths (22.36) acres of low marsh habitat would be impacted by the placement of hydraulically dredged material. Five (5) work cell areas would be established for the placement of the excavated material. The dredge pipeline would have a diffuser with six (6) discharge holes. Each opening would be manually operated, allowing control of where the dredged material would be placed within the cell. Approximately nine (9) inches of dredged material would be discharged over the majority of the site, bringing the elevation of the marsh to an elevation of three and three tenth (3.3) feet above

sea level (NAVD 88). High marsh habitat would be created at portions of the site where the diffuser would be located. These areas would have the maximum elevation of four (4) feet above sea level (NAVD 88). The pipeline and the diffuser would be moved within the cells using manual labor or low ground pressure marsh-tracked or wheeled vehicle. Representatives from the applicant would be on-site during the discharge of the dredged material to ensure the desired elevations are obtained. Watercourses around the work zones would be protected from the dredged material by twelve (12) inch high biodegradable filter block which would be staked into the ground. Fibre logs would also be used to minimize impacts to adjoining watercourses. From each watercourse, an exclusion zone of a minimum of ten (10) feet to a maximum of fifty (50) feet would be maintained by the siltation containment structures. Approximately eleven thousand three hundred fifty (11,350) cubic yards of dredged material, composed primarily of sand and silts, would be spread over the five (5) work cells. Upon completion of the dredged material placement, native vegetation would be planted, via hand in areas where no vegetation is present.

Beach Restoration and Habitat Creation: An area approximately three and eighty eight hundredths (3.88) acres in size would be modified during the project. The dredge pipeline would moved to the site via low ground pressure marsh-tracked or wheeled vehicle. The material would be discharged directly from the dredge pipe and would be spread over the site using low ground pressure marsh-tracked or wheeled vehicle. The material would be contained on the wetland side of the proposed beach restoration using training dikes that would be constructed from on-site materials. Approximatley fourteen thousand one hundred fifty (14,150) cubic yards of dredged material, composed primarily of sand, would be discharged at this site. The material would be installed with a slope of 15:1 to achieve the proposed slope of the beach. Of the above referenced area, approximately two and sixty five hundredth (2.65) of an acre of the bay, waterward of the existing high tide line and approximately one and seven hundredth (1.07) acres of wetlands would be impacted by the placement of the dredged material. The remaining sixteen hundreth (0.16) of an acre is uplands.

Dune Restoration: This would would be performed adjacent to the low marsh restoration portion of the project. Approximately one thousand three hundred fifty (1350) linear feet of an existing degraded dune would be restored by the project. The dredge pipeline would be moved at the site via low ground pressure marsh-tracked or wheeled vehicle. The material would be contained using training dykes to form the shape of the dune. Approximately seven thousand eight hundred (7800) cubic yards of material, composed primarily of sand, would be discharged at this site. Approximately two and eight hundredths (2.08) of an acre waterward of the high tide line and approximately one and forty eight hundredths (1.48) of an acre of wetlands would be impacted by the dredge material placement. Native vegetation would be planted, by hand throughout the entire area where the dredged material would be deposited.

The material to be used for the restorations would be obtained from the Fortescue Creek state navigation channel located adjacent to the proposed restoration sites This office has previously issued permits for dredging within this navigation channel (file numbers CENAP-OP-R-2-13-0589 and CENAP-OP-R-2013-0644). A maximum of eighty three thousand (83,000) cubic yards of material would be removed from the state navigation channel. While the project described above only requires approximately thirty three thousand (33,000) cubic yards of dredged material, additional material may be needed at a later date as settlement and subsidence takes place at the habitat restoration sites. The material would be generated using a cutterhead

hydraulic dredge with the material being pumped to the three (3) restoration sites. The twelve (12) inch dredge pipeline would float on the surface of the water except in areas of the navigation channel, where it would be secured on the bottom. The dredge pipeline would be marked per US Coast Guard standards. All work would be located no closer than six and one quarter (6.25) miles from the edge of the Federal navigation channel. The applicant has requested that a ten (10) year maintenance provision be added to any permit issued by this office for the work described above.

PURPOSE: The applicant's stated purpose is to explore the use of dredged material to restore degraded habitat and improve the overall environmental quality of the project site.

A preliminary review of this application indicates that the proposed work may impact 2 fish species listed on the Endangered Species List, Shortnose Sturgeon (Acipenser brevirostrum) and Atlantic Sturgeon (Acipenser oxyrinchus), and 5 turtle species Kemp's ridley sea turtle (Lepidochelys kempii), loggerhead sea turtle (Caretta caretta), green sea turtle (Chelonia mydas), leatherback sea turtle (Dermochelys coriacea) and hawksbill sea turtle (Eretmochelys imbricate) that may inhabit the area. The applicant has stated that they are planning to perform the work using best management practices, minimizing impact to aquatic resources. Based on all available information, this office has determined that the project is not likely to adversely affect any endangered species in the area of the dredging or in the 3 restoration sites. As required under Section 7 of the Endangered Species Act, this office will coordinate with the National Marine Fisheries Service to ensure impacts to these species will be minimal.

The decision whether to issue a permit will be based on an evaluation of the activity's probable impact including its cumulative impacts on the public interest. The decision will reflect the national concern for both protection and utilization of important resources. The benefits which reasonably may be expected to accrue from the work must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the work will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, flood plain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs and welfare of the people. A Department of the Army permit will be granted unless the District Engineer determines that it would be contrary to the public interest.

The Corps of Engineers is soliciting comments from the public; Federal, State, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

Comments on the proposed work should be submitted, in writing, within 30 days to the District Engineer, U.S. Army Corps of Engineers, Philadelphia District, Wanamaker Building, 100 Penn Square East, Philadelphia, Pennsylvania 19107-3390.

The proposed permit action to dredge an existing navigation channel and the discharge of dredged material will have no adverse effect to historic properties eligible for or listed on the National Register of Historic Places. This determination of No Adverse Effect will be coordinated with the SHPO and the Tribes for their review and concurrence.

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act 1996 (Public Law 104-267), requires all Federal agencies to consult with the National Marine Fisheries Service on all actions, or proposed actions, permitted, funded, or undertaken by the agency that may adversely effect Essential Fish Habitat (EFH). A preliminary assessment of the species listed in the "Guide to Essential Fish Habitat Designations in the Northeastern United States, Volume IV: New Jersey and Delaware", dated March 1999, specifically page 49, the project may have an adverse affect on EFH and the species of concern.

Analysis of the Effects: The project may impact Winter Flounder (Pseudopleuronectes americanus) and Sandbar Shark (Carcharhinus plumbeus) (neonatal) that are known to inhabit the area. Specifically, the dredging portion of the project and all work with respect to habitat restoration, waterward of mean high water may impact EFH and the species of concern. This office will be coordinating with the National Marine Fisheries Service to ensure that any action taken by this office will not have a substantial affect on EFH, or the species of concern.

Corps of Engineers View: Based upon the above analysis, the Corps of Engineers has determined that the proposed project, with the inclusion of seasonal restriction on in-water work, would have an adverse effect on EFH that is not substantial.

Compensatory mitigation According to Federal regulation 33 CFR 325.1(d)(7), applicants wishing to discharge dredged and fill material into waters of the U.S. must include a statement on how they have avoided and minimized impacts as well as how they intend to compensate for unavoidable impacts. The applicant has avoided/minimized impacts to the aquatic environment by incorporating engineering/construction procedures into the process that will substantially reduce impacts to aquatic resources. Additionally, the applicant states that the underlying intent of this project is to restore the marsh, dunes, and beach at this site using clean material taken from the adjacent navigation channel. The thin layer placement of material is one of the techniques that will be used to enhance marsh functions by raising the elevation of the marsh platform and increasing the marsh's resiliency, however, wetlands will not be converted to uplands through this technique. The applicant believes that, based on the project's restorative objective to increase the functions and resiliency of the marsh, no compensatory mitigation is required for this project.

In accordance with Section 307(c) of the Coastal Zone Management Act of 1972, applicants for Federal Licenses or Permits to conduct an activity affecting land or water uses in a State's coastal zone must provide certification that the activity complies with the State's Coastal Zone Management Program. The applicant has stated that the proposed activity complies with and will be conducted in a manner that is consistent with the approved State Coastal Zone Management (CZM) Program. No permit will be issued until the State has concurred with the

applicant's certification or has waived its right to do so. Comments concerning the impact of the proposed and/or existing activity on the State's coastal zone should be sent to this office, with a copy to the State's Office of Coastal Zone Management.

In accordance with Section 401 of the Clean Water Act, a Water Quality Certificate is necessary from the State government in which the work is located. Any comments concerning the work described above which relate to Water Quality considerations should be sent to this office with a copy to the State.

The evaluation of the impact of the work described above on the public interest will include application of the guidelines promulgated by the Administrator, U.S. Environmental Protection Agency, under authority of Section 404(b) of the Clean Water Act.

Any person may request, in writing, to the District Engineer, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for a public hearing shall state in writing, with particularity, the reasons for holding a public hearing.

Additional information concerning this permit application may be obtained by calling Lawrence M. Slavitter at 215-656-6734, via email at lawrence.m.slavitter@usace.army.mil, or writing this office at the above address.

Frank J. Cianfrani
Chief, Regulatory Branch

HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION
PERMIT PLAN SET

FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA
TOWNSHIP OF DOWNE
CUMBERLAND COUNTY, NEW JERSEY

GENERAL NOTES:

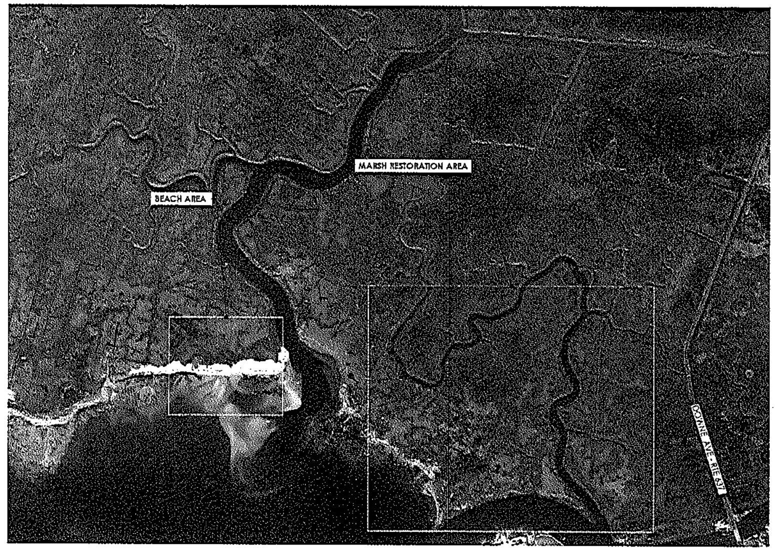
1. ALL ELEVATIONS AND QUANTITIES ARE BASED ON IN-SITU CONDITIONS. ONCE DISTURBED, MATERIAL CONDITIONS CAN VARY SIGNIFICANTLY.
2. THE APPROVAL AND USE OF THESE PLANS ARE FOR THE PROJECT APPLICANT AS DEPICTED ON THIS SHEET. THIS PLAN IS NOT TO BE UTILIZED IN THE PREPARATION OF ANY OTHER PROJECTS.
3. AS FIELD CONDITIONS MAY REQUIRE MODIFICATIONS TO PROPOSED TOPOGRAPHIC ELEVATIONS AND FACILITY LOCATIONS, THESE PLANS ARE NOT TO BE UTILIZED AS AS-BUILTS.

CONSTRUCTION NOTES:

1. CONTRACTOR TO USE AREAS WITHIN THE LIMIT OF DISTURBANCE ONLY.
2. ALL MATERIALS SHALL CONFORM TO THEIR RESPECTIVE LATEST AMERICAN STANDARDS FOR TESTING AND MATERIALS SPECIFICATIONS (ASTM).
3. ALL UTILITIES KNOWN AND UNKNOWN WITHIN THE PROJECT LIMIT OF DISTURBANCE SHALL BE LOCATED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
4. NECESSARY PRECAUTIONS SHALL BE TAKEN BY THE CONTRACTOR TO PROTECT EXISTING SERVICES, MAINS AND SITE IMPROVEMENTS AND INFRASTRUCTURE. ANY DAMAGE TO EXISTING SERVICES OR MAINS SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S OWN EXPENSE AND THE RESPECTIVE UTILITY COMPANY SHALL BE NOTIFIED IMMEDIATELY.
5. EXCAVATIONS AND STOCKPILES IN NO WAY SHALL HAVE SLOPES STEEPER THAN 2:1 UNLESS ACTIONS HAVE BEEN TAKEN TO STABILIZE THE SLOPE.
6. THE CONTRACTOR SHALL NOTE THAT IN THE CASE OF A DISCREPANCY BETWEEN THE SCALED AND THE FIGURED DIMENSIONS SHOWN ON THESE PLANS, THE FIGURED DIMENSIONS SHALL APPLY.
7. IT SHALL BE DISTINCTLY UNDERSTOOD THAT FAILURE TO MENTION SPECIFICALLY ANY WORK THAT WOULD NORMALLY BE REQUIRED TO COMPLETE THE PROJECT, SHALL NOT RELIEVE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM THAT WORK.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR AND REPLACEMENT OF FENCES, SIGNS, STRUCTURES, VEGETATION, IRRIGATION, LANDSCAPING COMPONENTS, AND ANY OTHER PROPERTY ITEMS THAT ARE REMOVED OR DAMAGED FOR THE PURPOSES OF THE PROJECT LOGISTICS AND/OR ACCIDENTS WHICH MAY OCCUR.
9. THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND PROPER DISPOSAL OF ALL STOCK-PILED SOIL, TRASH, CONSTRUCTION MATERIALS AND DEBRIS AFTER THE COMPLETION OF CONSTRUCTION. ALL DISPOSAL SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE MUNICIPAL, COUNTY, AND STATE REGULATIONS.
10. CONTRACTOR TO NOTIFY LOCAL COUNTY SOIL CONSERVATION DISTRICT ALL DISPOSAL LOCATIONS PRIOR TO START OF THE CONSTRUCTION.

CONSTRUCTION SAFETY AND SECURITY:

1. ALL CONSTRUCTION SHALL ADHERE TO OSHA STANDARDS AND REGULATIONS.



PROJECT SITE LOCATION/KEY MAP
2014 AERIAL PHOTOGRAPH
SCALE: 1" = 300'

PROJECT PARTNERS:

NEW JERSEY DIVISION OF FISH AND WILDLIFE
MAIL CODE 501-3
P.O. BOX 420
TRENTON, NEW JERSEY 08625-0420

THE NATURE CONSERVANCY
200 POTTERSVILLE ROAD
CHESTER, NEW JERSEY 07930

GREENTRUST ALLIANCE
210 NAJOLES ROAD, SUITE 200
MILLERSVILLE, MD 21108

GreenVest

GREENVEST
91 FIELDCREST AVENUE, SUITE A-1
RARITAN PLAZA II
EDISON, NEW JERSEY 08837

Princeton Hydro

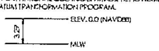
PRINCETON HYDRO, LLC
1108 OLD YORK ROAD, SUITE 1
P.O. BOX 720
RINGOES, NJ 08551

PROPERTY OWNER/APPLICANT:
NJDEP - DIVISION OF FISH AND WILDLIFE
MAIL CODE: 501-3
PO BOX 420
TRENTON, NJ 08625

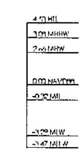
NEW JERSEY DIVISION OF Fish and Wildlife

NOTES:

1. VERTICAL DATUM IS IN REFERENCE TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88). NAVD88 IS 3.29 FEET ABOVE MEAN LOW WATER (MLW). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM DATUM TRANSFORMATION PROGRAM.



2. COORDINATES ARE EXPRESSED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE GRID COORDINATE SYSTEM NORTH AMERICAN DATUM OF 1983 (NAD83).
3. CONDITIONAL (CND) CONTOUR DATA SHOWN WAS COLLECTED IN JANUARY, APRIL, MAY, & JUNE OF 2015 BY GAHAGAN & BRYANT ASSOCIATES, PARSONS BRINKERHOFF, AND BOSWELL ENGINEERING.
4. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEYS CONDUCTED ON THE ABOVE DATE AND CAN BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
5. MLW, MHW, & HTL LINEWORK SHOWN WITHIN THIS SHEET FROM FIELD COLLECTED SURVEY DATA (SEE NOTE 3).
6. ELEVATION DIFFERENCE BETWEEN HTL & MHW FROM THE STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK" PLAN, DATED OCTOBER 10, 2013.
7. EXISTING SHORELINE AND DUNE LOCATIONS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
8. TIDELANDS AND SHELLFISH CLASSIFICATION BOUNDARIES OBTAINED FROM NJDEP GIS WEBSITE.
9. DUNES AS DELINEATED BY PROJECT TEAM BASED ON 2014 AERIAL IMAGERY AND SITE SURVEY.
10. TIDE ELEVATIONS OBTAINED FROM STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF ENGINEERING AND CONSTRUCTION BUREAU OF COASTAL ENGINEERING PROJECT 2155, SHEET 2 OF 14 "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK, TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, DATED JUNE 12, 2013. ELSE ELEVATIONS WERE CONVERTS TO NAVD88.
    - 10.1. MEAN HIGHER HIGH WATER (MHHW): 3.08'
    - 10.2. MEAN HIGH WATER (MHW): 2.66'
    - 10.3. MEAN LOW WATER (MLW): -3.29'
    - 10.4. HIGH TIDE LINE (HTL): 4.53'
11. NO SUBTIDAL AREAS ARE DEPICTED ON THE PLAN AS ENTIRE PROJECT AREA IS ABOVE THIS ZONE (MEAN LOW LOWER WATER (MLLW) -3.47').
12. THE ENTIRE PROJECT SITE FALLS WITHIN THE INTERTIDAL ZONE (ELEV. -3.47 TO 4.53').



RANGE OF TIDE (FT)
NOT TO SCALE

SHEET INDEX:

01 - TITLE	- TITLE SHEET
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03 - PL-02	- PROPOSED MARSH, DUNE, & BEACH PLACEMENT PLAN
04 - PL-03	- MARSH PLACEMENT AREA CROSS-SECTIONS
05 - PL-04	- DUNE & BEACH PLACEMENT AREA CROSS-SECTIONS
06 - PERMIT01	- REGULATORY PLAN FOR NJDEP GENERAL PERMIT 29 - WETLAND
07 - PERMIT02	- REGULATORY PLAN FOR NJDEP GENERAL PERMIT 29 - BEACH
08 - PERMIT03	- REGULATORY PLAN FOR ACOE INDIVIDUAL PERMIT - WETLAND
09 - PERMIT04	- REGULATORY PLAN FOR ACOE INDIVIDUAL PERMIT - BEACH
10 - E&S01	- SOIL EROSION AND SEDIMENT CONTROL PLAN
11 - E&S02	- SOIL EROSION AND SEDIMENT CONTROL DETAILS
12 - E&S03	- SOIL EROSION AND SEDIMENT CONTROL NOTES
13 - PLANT01	- PLANTING PLAN - WETLAND
14 - PLANT02	- PLANTING PLAN - DUNE

Mary L. Paist-Goldman

REV.	DATE	DESCRIPTION	BY	APPR.

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

TITLE SHEET

PROJECT: FORTESCUE CREEK CHANNEL TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: AEM	PRINCETON HYDRO, LLC. CERTIFICATION OF AUTHORIZATION NO.	PROJECT NO. 1563.007
CHECKED BY: MPG	24GA27976800	SHEET 1 OF 14
SCALE: AS SHOWN	MARY L. PAIST-GOLDMAN NEW JERSEY PROFESSIONAL ENGINEER	
5/21/15	NO. GE-45798	DWG. NO. TITLE

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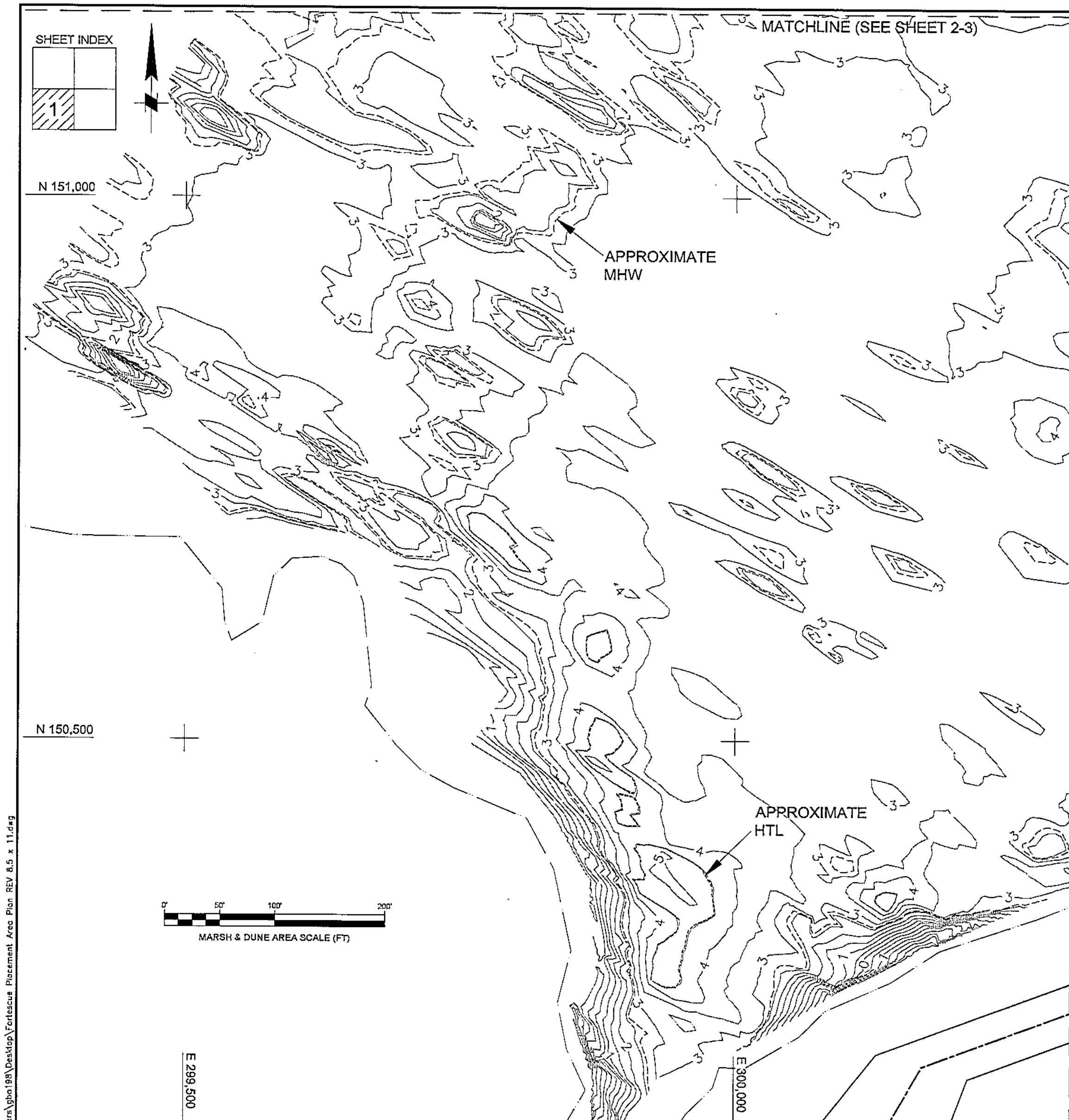
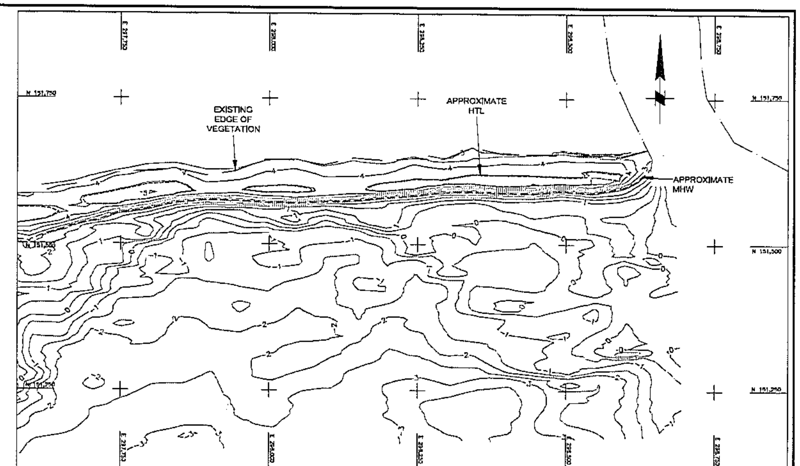


EXISTING MARSH & DUNE PLACEMENT AREA
SCALE: AS SHOWN



EXISTING BEACH PLACEMENT AREA
SCALE: AS SHOWN

0' 100' 200' 400'
BEACH PLACEMENT AREA SCALE (FT)

NOTES:

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   ELEV. 0.0 (NAVD88)
   3.29'
   MLW
2. COORDINATES ARE EXPRESSED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE GRID COORDINATE SYSTEM NORTH AMERICAN DATUM OF 1983 (NAD83).
3. EXISTING CONTOUR DATA SHOWN WAS COLLECTED IN JANUARY, APRIL, MAY, & JUNE OF 2015 BY GAHAGAN & BRYANT ASSOCIATES, PARSONS BRINKERHOFT, AND DOSWELL ENGINEERING.
4. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEYS CONDUCTED ON THE ABOVE DATE AND CAN BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
5. HIGH TIDE LINE (HTL) & MEAN HIGH WATER (MHW) LINE SHOWN WITHIN THIS SHEET ARE BASED ON EXISTING CONTOUR DATA SHOULD BE CONSIDERED APPROXIMATE.
6. ELEVATION DIFFERENCE BETWEEN HTL & MHW FROM THE STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK" PLAN, DATED OCTOBER 10, 2013.
7. EXISTING SHORELINE AND DOCK LOCATIONS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.

LEGEND

- CHANNEL LIMITS
- CHANNEL CENTERLINE
- EXISTING SHORELINE
- EXISTING 0.5' CONTOUR
- EXISTING 1' CONTOUR
- EXISTING EDGE OF VEGETATION
- APPROXIMATE HTL
- APPROXIMATE MHW

4.53 HTL
3.08 MHHW
2.66 MHW
0.00 NAVD88
-0.32 MTL
-3.29 MLW
-3.47 MLLW

RANGE OF TIDE (FT)
NOT TO SCALE

REV.	DATE	DESCRIPTION	BY	APPR.
1	7-23-15	ADDED HIGH TIDE & MEAN HIGH WATER LINES	SEF	MJM

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

EXISTING MARSH, DUNE, & BEACH PLACEMENT PLAN

PROJECT: FORTESCUE CREEK
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

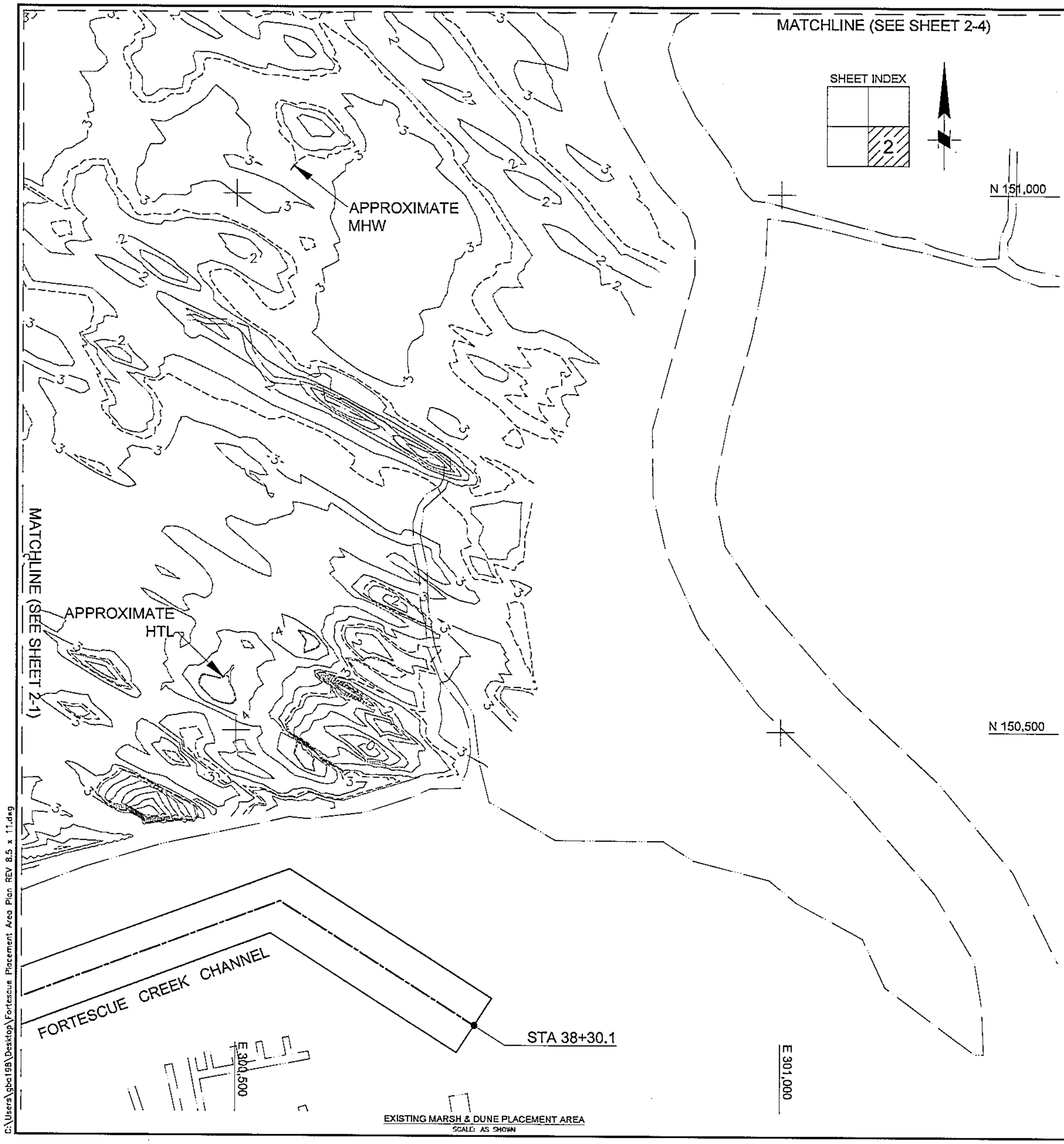
PARSONS BRINCKERHOFF
MICHAEL J. MARANO
NJ PE NO. 24GE04087500

DRAWN BY: SEF
CHECKED BY: MRS
SCALE: AS SHOWN
8/24/15

GAHAGAN & BRYANT ASSOCIATES, INC.
CERTIFICATION OF AUTHORIZATION NO. 24GA28192700
STAN LULEWICZ
NEW JERSEY PROFESSIONAL ENGINEER
NO. 24GE04770900

PROJECT NO.
SHEET 2-1 OF 14
DWG. NO. PL-01

C:\Users\gbo198\Desktop\Fortescue Placement Area Plan REV 8.5 x 11.dwg



LEGEND

- CHANNEL LIMITS
- CHANNEL CENTERLINE
- EXISTING SHORELINE
- EXISTING 0.5' CONTOUR
- EXISTING 1' CONTOUR
- EXISTING EDGE OF VEGETATION
- APPROXIMATE HTL
- APPROXIMATE MHW

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0' 50' 100' 200'

MARSH & DUNE AREA SCALE (FT)

4.53 HTL
3.00 MHHW
2.66 MHW
0.00 NAVD88
-0.32 MTL
-3.20 MLW
-3.47 MLLW

RANGE OF TIDE (FT)
NOT TO SCALE

REV.	DATE	DESCRIPTION	BY	APPR.
1	[illegible]	[illegible]	SEF	MJM

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

EXISTING MARSH, DUNE, & BEACH PLACEMENT PLAN

PROJECT: FORTESCUE CREEK
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

PARSONS BRINCKERHOFF
MICHAEL J. MARANO
NJ PE NO. 24GE04087500

DRAWN BY: SEF
CHECKED BY: MRS
SCALE: AS SHOWN
8/24/15

GAHAGAN & BRYANT ASSOCIATES, INC.
CERTIFICATION OF AUTHORIZATION NO. 24GA28192700
STAN LULEWICZ
NEW JERSEY PROFESSIONAL ENGINEER
NO. 24GE04770900

PROJECT NO.
SHEET 2-2 OF 14
DWG. NO. PL - 01

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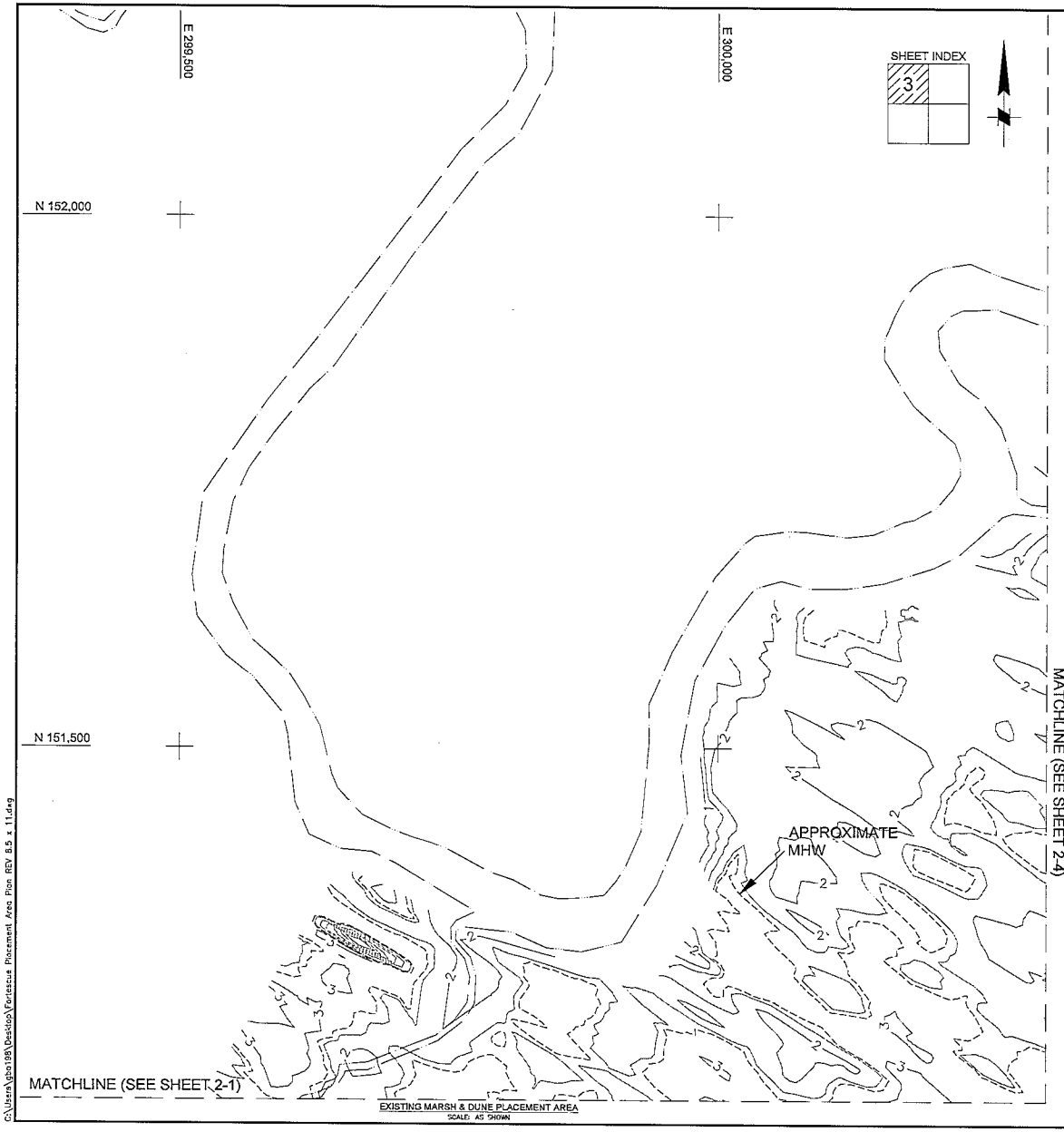

LEGEND

- CHANNEL LIMITS
- CHANNEL CENTERLINE
- EXISTING SHORELINE
- EXISTING 0.5' CONTOUR
- EXISTING 1' CONTOUR
- EXISTING EDGE OF VEGETATION
- APPROXIMATE HTL
- APPROXIMATE MHW

NOTES:

1. VERTICAL DATUM IS IN REFERENCE TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88). NAVD88 IS 3.29 FEET ABOVE MEAN LOW WATER (MLW). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM DATUM TRANSFORMATION PROGRAM.

2. COORDINATES ARE EXPRESSED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE GRID COORDINATE SYSTEM NORTH AMERICAN DATUM OF 1983 (NAD83).
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5. HIGH TIDE LINE (HTL) & MEAN HIGH WATER (MHW) LINE SHOWN WITHIN THIS SHEET ARE BASED ON EXISTING CONTOUR DATA SHOULD BE CONSIDERED APPROXIMATE.
6. ELEVATION DIFFERENCE BETWEEN HTL & MHW FROM THE STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK" PLAN, DATED OCTOBER 10, 2013.
7. EXISTING SHORELINE AND DOCK LOCATIONS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.

0' 50' 100' 200'

MARSH & DUNE AREA SCALE (FT)

4.13 HTL
3.68 MHHW
2.68 MHW
0.00 NAVD88
-0.32 MTL
-3.29 MLW
-3.47 MLLW

RANGE OF TIDE (FT)
NOT TO SCALE

REV	DATE	DESCRIPTION	BY	APPR
-	7.15	[illegible]	SF	GJ

PARSONS BRINCKERHOFF
MICHAEL J. MARANO
NJ PE NO. 24GE04087500

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

EXISTING MARSH, DUNE, & BEACH PLACEMENT PLAN

PROJECT: FORTESCUE CREEK
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: SEF
CHECKED BY: MRS
SCALE: AS SHOWN
8/24/15

GAHAGAN & BRYANT ASSOCIATES, INC.
CERTIFICATION OF AUTHORIZATION NO. 24GA28102700
STAN LULEWICZ
NEW JERSEY PROFESSIONAL ENGINEER NO. 24GE04770900

PROJECT NO.
SHEET 2-3 OF 14
DWG. NO. PL - 01

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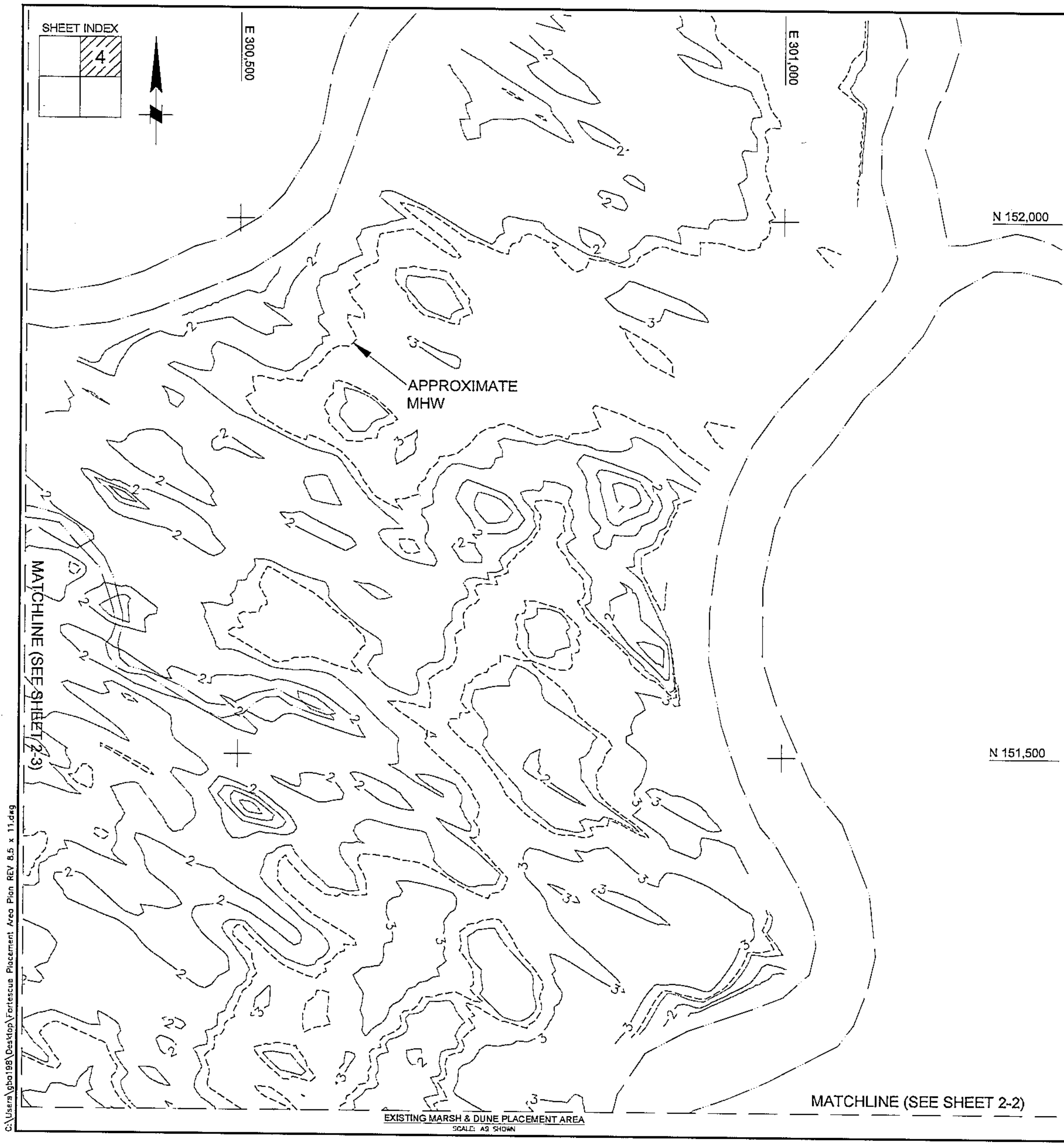

LEGEND

- CHANNEL LIMITS
- CHANNEL CENTERLINE
- EXISTING SHORELINE
- EXISTING 0.5' CONTOUR
- EXISTING 1' CONTOUR
- EXISTING EDGE OF VEGETATION
- APPROXIMATE HTL
- APPROXIMATE MHW

NOTES:

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   ELEV. 0.0 (NAVD88)
   3.29'
   MLW
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7. EXISTING SHORELINE AND DOCK LOCATIONS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.

0' 50' 100' 200'
MARSH & DUNE AREA SCALE (FT)

4.53 HTL
3.00 MHHW
2.66 MHW
0.00 NAVD88
-0.32 MTL
-3.29 MLW
-3.47 MLLW

RANGE OF TIDE (FT)
NOT TO SCALE

REV.	DATE	DESCRIPTION	BY	APPR.
1	7.23.15	ADDED HIGH TIDE & MEAN HIGH WATER LINES	SEF	MJM

PARSONS BRINCKERHOFF
MICHAEL J. MARANO
NJ PE NO. 24GE04087500

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

EXISTING MARSH, DUNE, & BEACH PLACEMENT PLAN

PROJECT: FORTESCUE CREEK
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: SEF	GAHAGAN & BRYANT ASSOCIATES, INC. CERTIFICATION OF AUTHORIZATION NO. 24GA28192700	PROJECT NO.
CHECKED BY: MRS		SHEET 2-4 OF 14
SCALE: AS SHOWN	STAN LULEWICZ NEW JERSEY PROFESSIONAL ENGINEER NO. 24GE04770900	
8/24/15		DWG. NO. PL - 01

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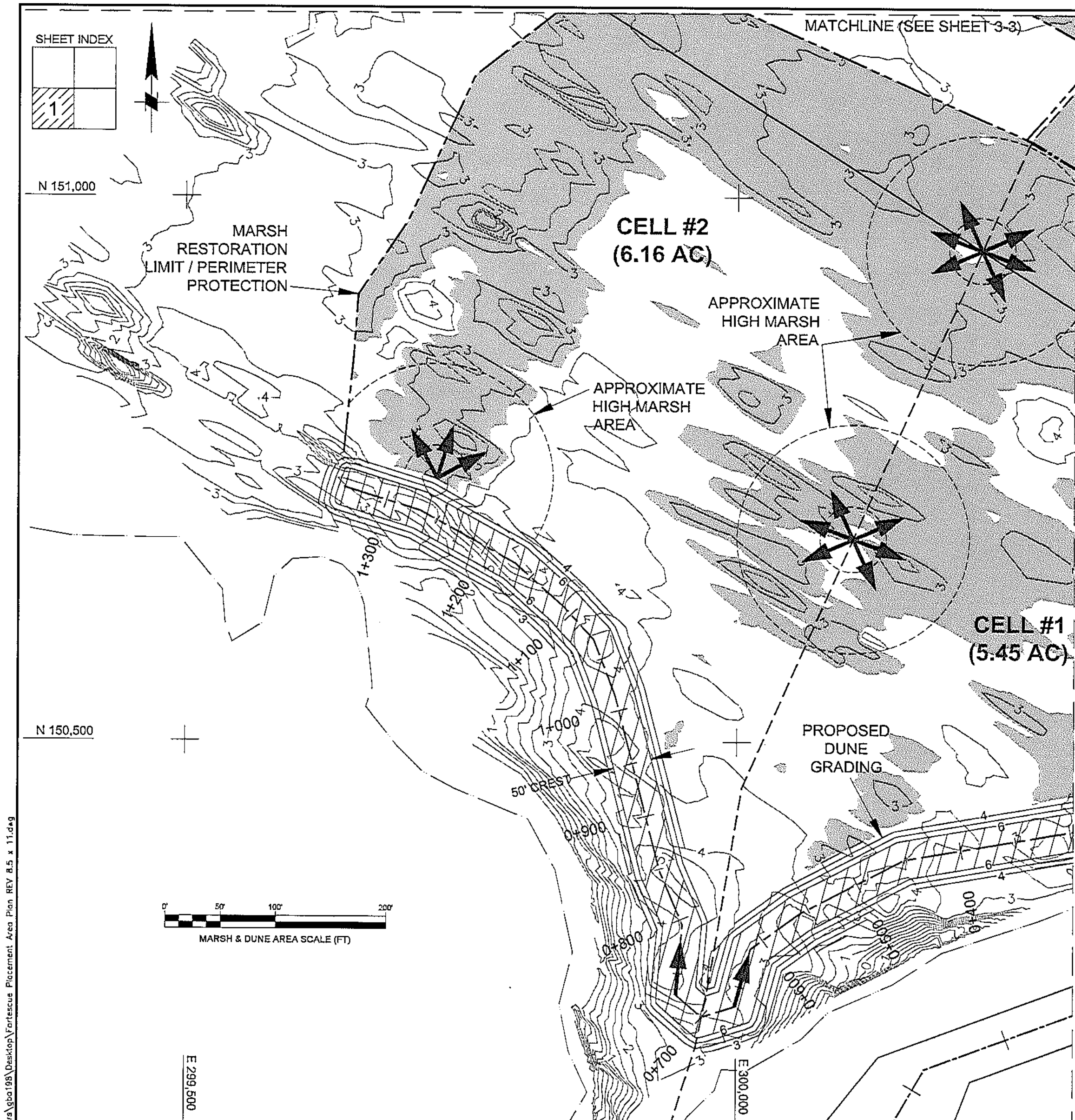
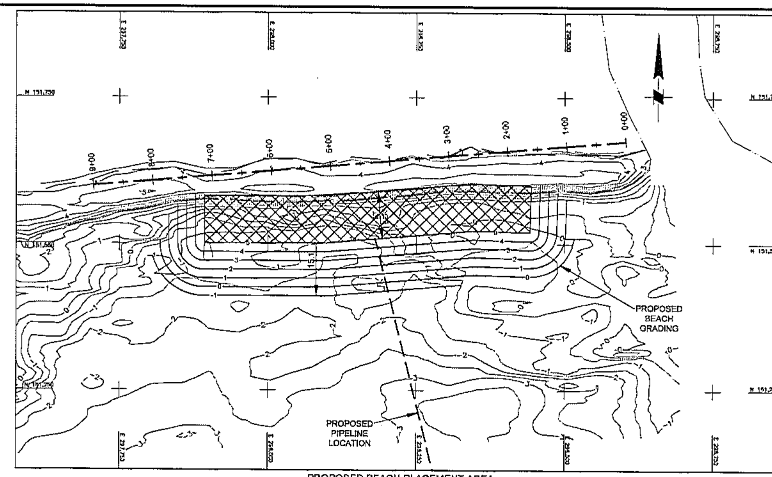


PROPOSED MARSH & DUNE PLACEMENT AREA
SCALE: AS SHOWN



PROPOSED BEACH PLACEMENT AREA
SCALE: AS SHOWN

0' 100' 200' 400'
BEACH PLACEMENT AREA SCALE (FT)

BASELINE OF CONSTRUCTION (DUNE) POINTS OF INTERSECTION TABLE

STATION	NORTHING	EASTING
0+000	150,497.29	300,600.21
0+172	150,441.05	300,426.89
0+462	150,392.62	300,151.62
0+559	150,343.13	300,057.43
0+614	150,310.48	300,013.07
0+669	150,257.81	299,998.76
0+700	150,246.10	299,968.94
0+731	150,248.32	299,945.60
0+795	150,332.68	299,951.27
0+849	150,382.40	299,930.33
1+014	150,542.31	299,880.80
1+066	150,593.93	299,870.12
1+110	150,624.18	299,842.60
1+170	150,664.04	299,798.40
1+268	150,711.79	299,713.01
1+340	150,733.32	299,643.99

BASELINE OF CONSTRUCTION (BEACH) POINTS OF INTERSECTION TABLE

STATION	NORTHING	EASTING
0+00	151,673.16	298,600.06
9+00	151,698.30	297,706.36

PROPOSED PLACEMENT AREA VOLUME SUMMARY TABLE

DESCRIPTION	MATERIAL VOLUME (CY)
MARSH	11,350 [illegible]
DUNE	7,800 [illegible]
BEACH	14,150 * [illegible]
TOTAL	33,300

* BEACH PLACEMENT DESIGN BASED ON 85% OF TOTAL AVAILABLE BEACH DESIGNATED DREDGE MATERIAL (16,650 CY)

LEGEND

- CHANNEL LIMITS
- CHANNEL CENTERLINE
- EXISITING SHORELINE
- EXISTING 0.5' CONTOUR
- EXISTING 1' CONTOUR
- EXISTING EDGE OF VEGETATION
- MARSH RESTORATION LIMIT / PERIMETER PROTECTION
- PROPOSED HIGH MARSH AREA (ELEV. +4.0 TO +3.3)
- MARSH CELL DIVIDE BOUNDARY
- PROPOSED MARSH INFLOW LOCATION
- BASELINE OF CONSTRUCTION (DUNE/BEACH)
- PROPOSED DUNE / BEACH CONTOUR
- PROPOSED PIPELINE LOCATION
- PROPOSED DUNE CREST (ELEV. +6.0)
- PROPOSED BEACH BERM (ELEV. +5.0)
- PROPOSED MARSH RESTORATION AREA (BELOW ELEV. +3.3)

NOTES:

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   ELEV. 0.0 (NAVD88) — 3.29' — MLW
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RANGE OF TIDE (FT)
NOT TO SCALE

- 4.53 HTL
- 3.06 MHHW
- 2.86 MHW
- 0.00 NAVD88
- -0.32 MTL
- -3.29 MLW
- -3.47 MLLW

REV.	DATE	DESCRIPTION	BY	APPR.
1	7/3/15	ADDED HIGH TIDE LINE & HIGH WATER LINES	SEF	MJM

PARSONS BRINCKERHOFF
MICHAEL J. MARANO
NJ PE NO. 24GE04087500

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

PROPOSED MARSH, DUNE, & BEACH PLACEMENT PLAN

PROJECT: FORTESCUE CREEK
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: SEF
CHECKED BY: MRS
SCALE: AS SHOWN
6/24/15

GAHAGAN & BRYANT ASSOCIATES, INC.
CERTIFICATION OF AUTHORIZATION NO. 24GA28192700
STAN LULEWICZ
NEW JERSEY PROFESSIONAL ENGINEER
NO. 24GE04770900

PROJECT NO.
SHEET 3-1 OF 14
DWG. NO. PL - 02

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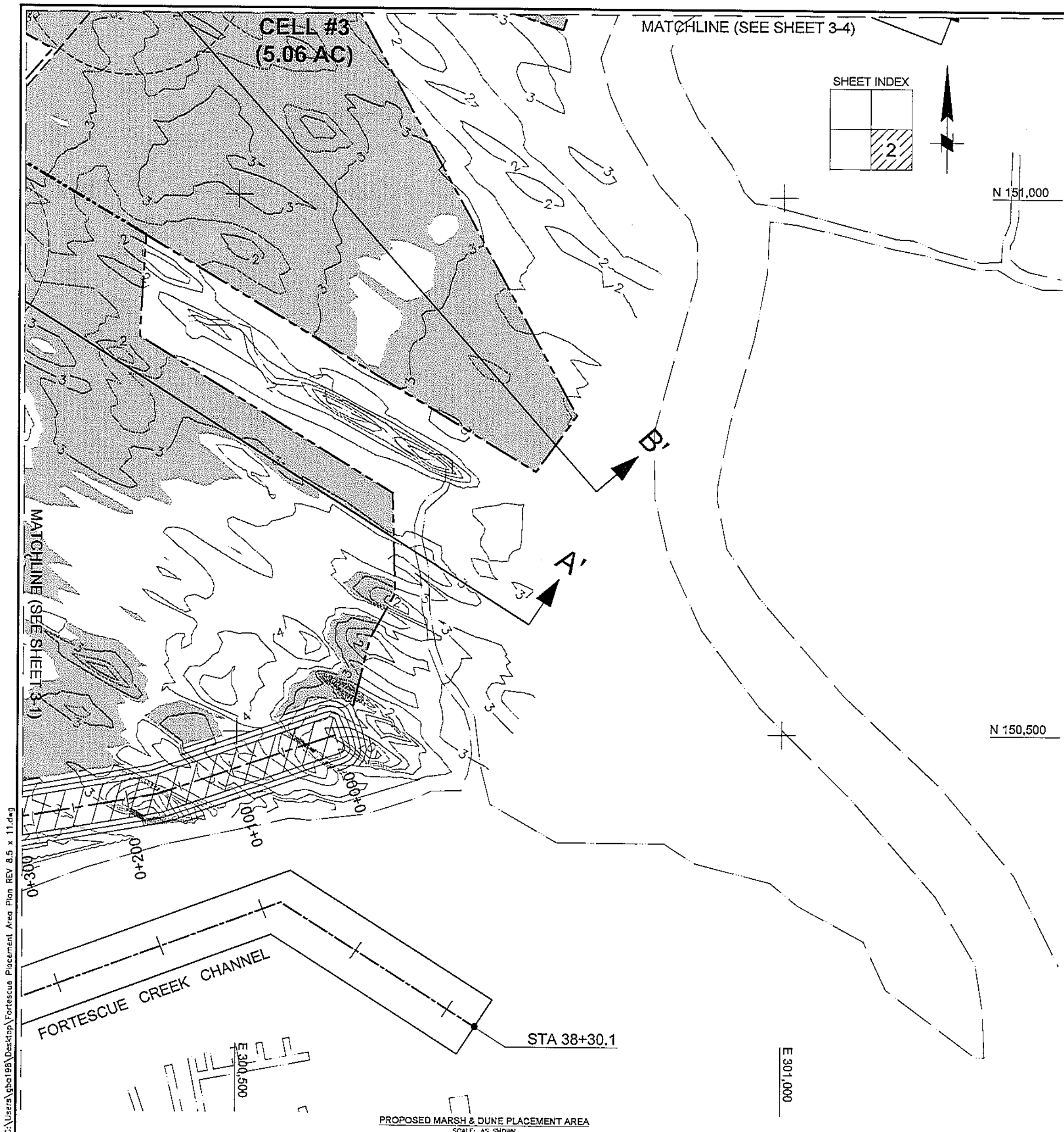

PROPOSED MARSH & DUNE PLACEMENT AREA
SCALE: AS SHOWN

LEGEND

- CHANNEL LIMITS
- CHANNEL CENTERLINE
- EXISTING SHORELINE
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- PROPOSED HIGH MARSH AREA (ELEV. +4.0 TO +3.3)
- MARSH CELL DIVIDE BOUNDARY
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- BASELINE OF CONSTRUCTION (DUNE/BEACH)
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0' 50' 100' 200'
MARSH & DUNE AREA SCALE (FT)

4.53 HTL
3.08 MHHW
2.66 MHW
0.00 NAVD88
-0.32 MTL
-3.29 MLW
-3.47 MLLW

RANGE OF TIDE (FT)
NOT TO SCALE

REV.	DATE	DESCRIPTION	BY	APPR.
1	7-23-15	ADDED HIGH TIDE & MEAN HIGH WATER LINES	SEF	MJM

PARSONS BRINCKERHOFF
MICHAEL J. MARANO
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6/24/15		DWG. NO. PL - 02

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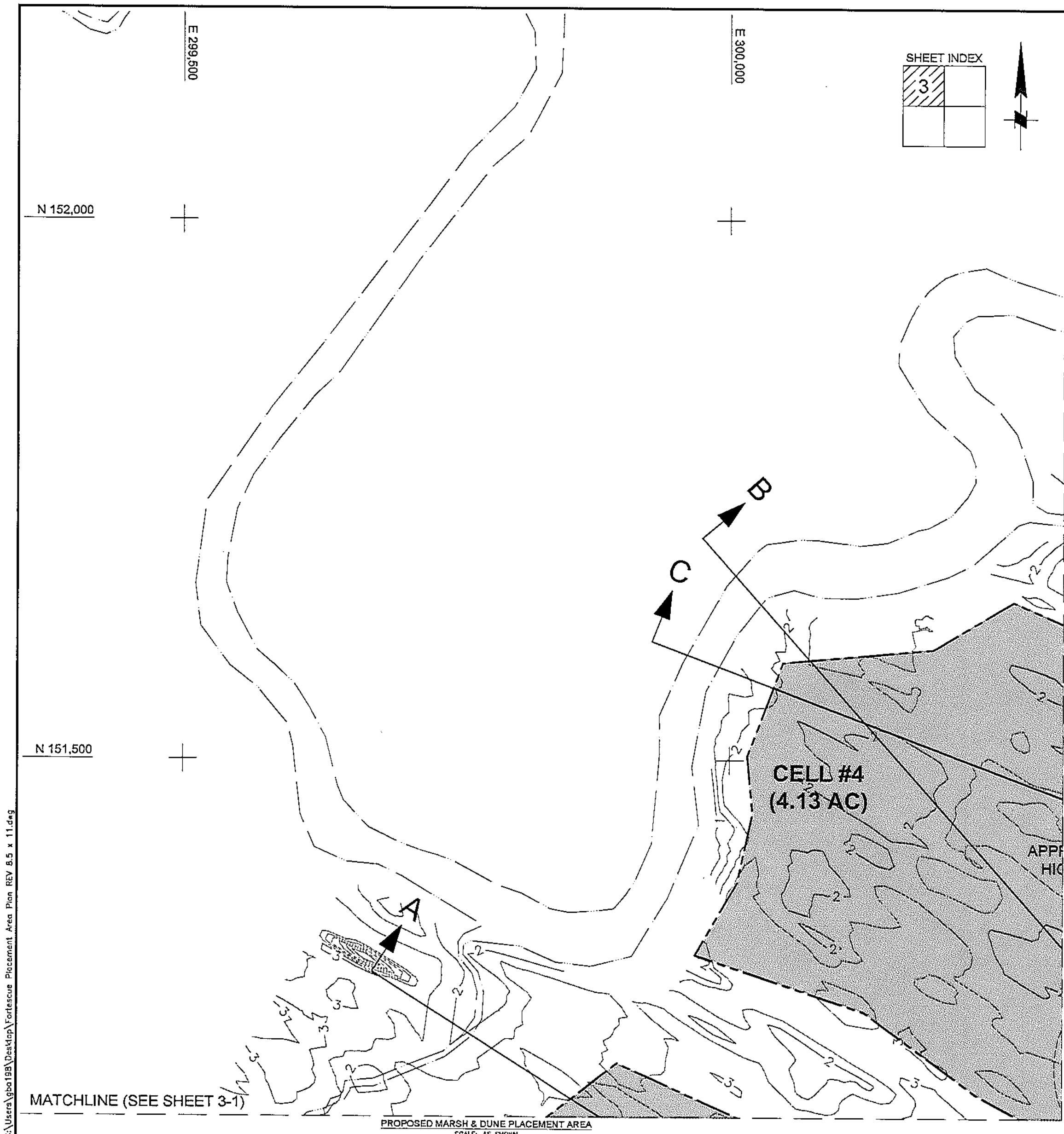

PROPOSED MARSH & DUNE PLACEMENT AREA
SCALE: AS SHOWN

LEGEND

- CHANNEL LIMITS
- CHANNEL CENTERLINE
- EXISTING SHORELINE
- EXISTING 0.5' CONTOUR
- EXISTING 1' CONTOUR
- EXISTING EDGE OF VEGETATION
- MARSH RESTORATION LIMIT / PERIMETER PROTECTION
- PROPOSED HIGH MARSH AREA (ELEV. +4.0 TO +3.3)
- MARSH CELL DIVIDE BOUNDARY
- PROPOSED MARSH INFLOW LOCATION
- BASELINE OF CONSTRUCTION (DUNE/BEACH)
- PROPOSED DUNE / BEACH CONTOUR
- PROPOSED PIPELINE LOCATION
- PROPOSED DUNE CREST (ELEV. +6.0)
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0' 50' 100' 200'
MARSH & DUNE AREA SCALE (FT)

4.53 HTL
3.06 MHHW
2.56 MHW
0.00 NAVD88
-0.32 MTL
-3.29 MLW
-3.47 MLLW

RANGE OF TIDE (FT)
NOT TO SCALE

REV.	DATE	DESCRIPTION	BY	APPR.
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STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

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PROPOSED MARSH, DUNE, & BEACH PLACEMENT PLAN

PROJECT: FORTESCUE CREEK
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: SEF	GAHAGAN & BRYANT ASSOCIATES, INC. CERTIFICATION OF AUTHORIZATION NO. 24GA28102700	PROJECT NO.
CHECKED BY: MRS		SHEET 3-3 OF 14
SCALE: AS SHOWN	STAN LULEWICZ NEW JERSEY PROFESSIONAL ENGINEER NO. 24GE04770900	
6/24/15		DWG. NO. PL - 02

PARSONS BRINCKERHOFF
MICHAEL J. MARANO
NJ PE NO. 24GE04087500

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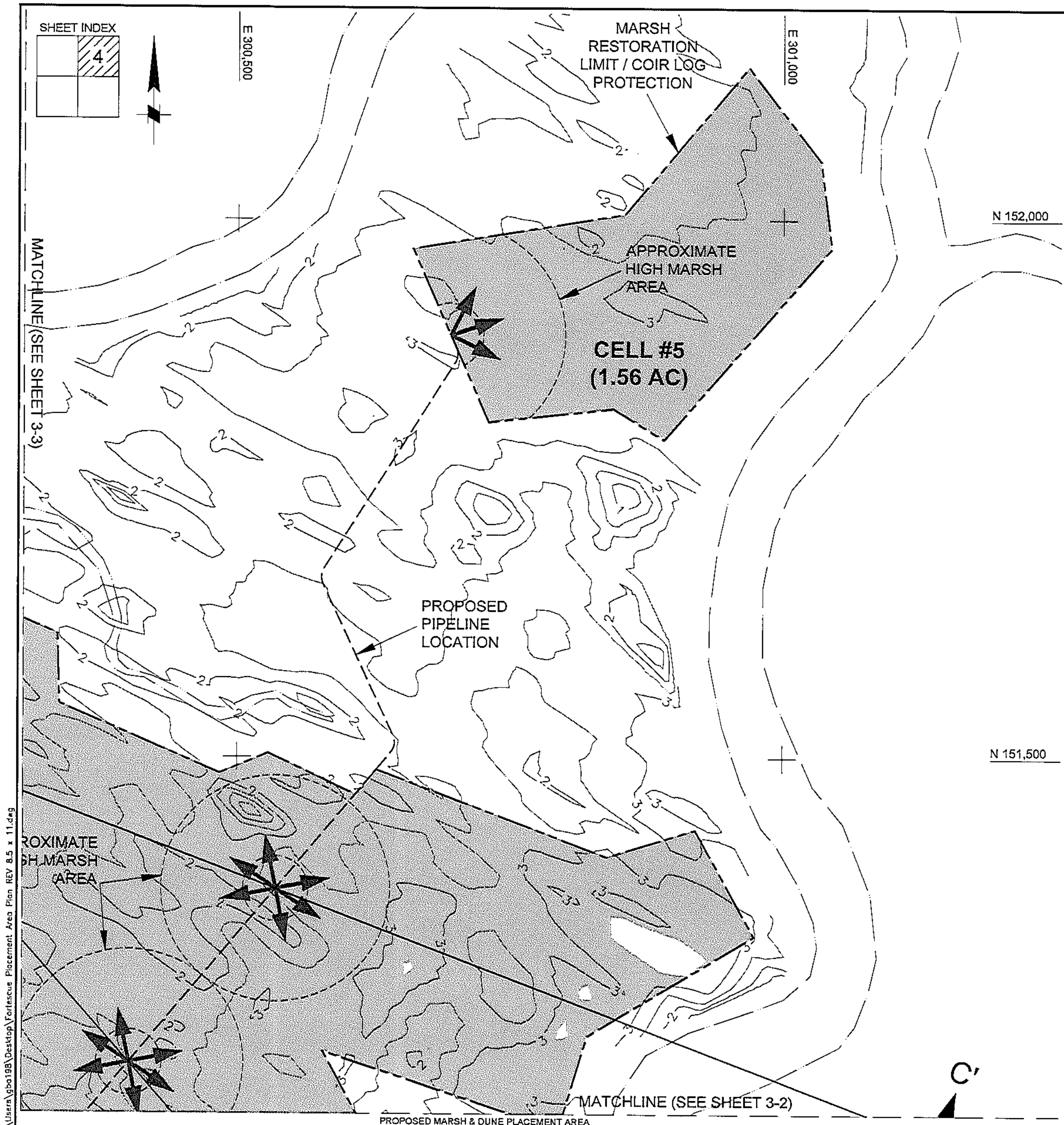

PROPOSED MARSH & DUNE PLACEMENT AREA
SCALE: AS SHOWN

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LEGEND

- CHANNEL LIMITS
- CHANNEL CENTERLINE
- EXISTING SHORELINE
- EXISTING 0.5' CONTOUR
- EXISTING 1' CONTOUR
- EXISTING EDGE OF VEGETATION
- MARSH RESTORATION LIMIT / PERIMETER PROTECTION
- PROPOSED HIGH MARSH AREA (ELEV. +4.0 TO +3.3)
- MARSH CELL DIVIDE BOUNDARY
- PROPOSED MARSH INFLOW LOCATION
- BASELINE OF CONSTRUCTION (DUNE/BEACH)
- PROPOSED DUNE / BEACH CONTOUR
- PROPOSED PIPELINE LOCATION
- PROPOSED DUNE CREST (ELEV. +6.0)
- PROPOSED BEACH BERM (ELEV. +5.0)
- PROPOSED MARSH RESTORATION AREA (BELOW ELEV. +3.3)

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   MLW
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0' 50' 100' 200'
MARSH & DUNE AREA SCALE (FT)

4.63 HTL
3.08 MHHW
2.66 MHW
0.00 NAVD88
-0.32 MTL
-3.20 MLW
-3.47 MLLW

RANGE OF TIDE (FT)
NOT TO SCALE

REV.	DATE	DESCRIPTION	BY	APPR.
1	[illegible]	[illegible]	SEF	MJM

STATE OF NEW JERSEY
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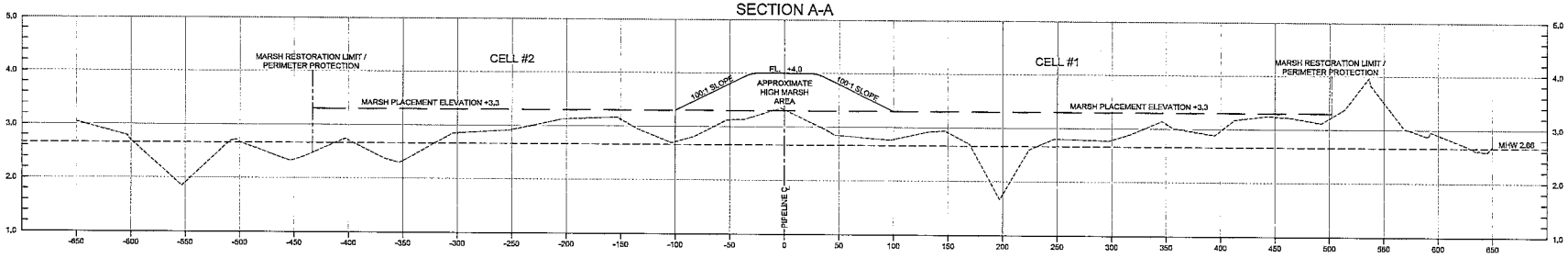
PROPOSED MARSH, DUNE, & BEACH PLACEMENT PLAN

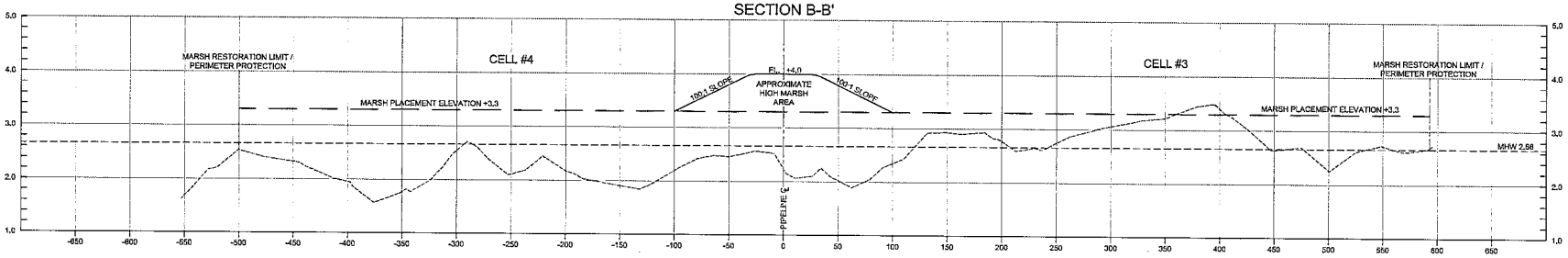
PROJECT: FORTESCUE CREEK
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

PARSONS BRINCKERHOFF	DRAWN BY: SEF	GAHAGAN & BRYANT ASSOCIATES, INC. CERTIFICATION OF AUTHORIZATION NO. 24GA28192700	PROJECT NO.
MICHAEL J. MARANO	CHECKED BY: MRS	STAN LULEWICZ NEW JERSEY PROFESSIONAL ENGINEER NO. 24GE04770900	SHEET 3-4 OF 14
NJ PE NO. 24GE04087500	SCALE: AS SHOWN		DWG. NO. PL - 02
	8/24/15		

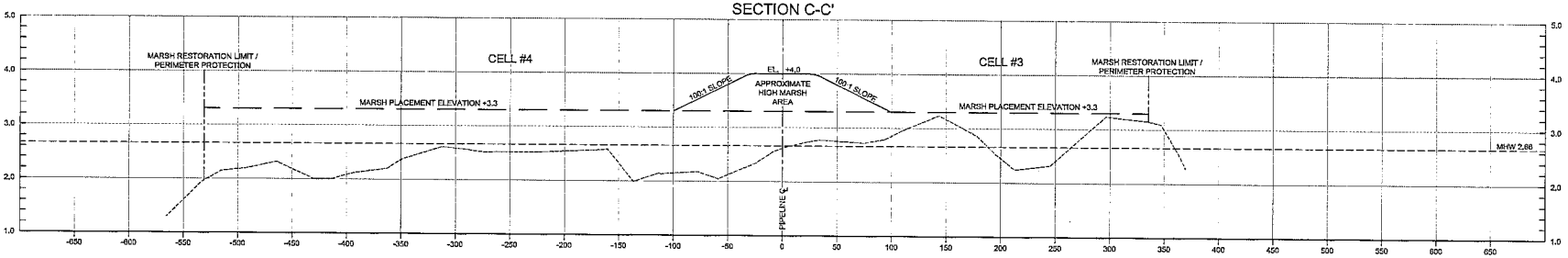
SECTION A-A



SECTION B-B'



SECTION C-C'



MARSH PLACEMENT AREA CROSS SECTIONS
HORIZONTAL SCALE:1"=50' VERTICAL SCALE:1"=1'

LEGEND

- EXISTING GROUND (NAVD88)
- MAX MARSH FILL ELEVATION (ELEV. +3.3)
- APPROXIMATE HIGH MARSH AREA (ELEV. +4.0 TO +3.3)
- MARSH RESTORATION LIMIT / PERIMETER PROTECTION
- MARSH FILL PIPELINE LOCATION
- EXISTING MHW / MLW LIMITS

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REV	DATE	DESCRIPTION	BY	APPR

PARSONS BRINCKERHOFF
MICHAEL J. MARANO
NJ PE NO. 24GE04067500

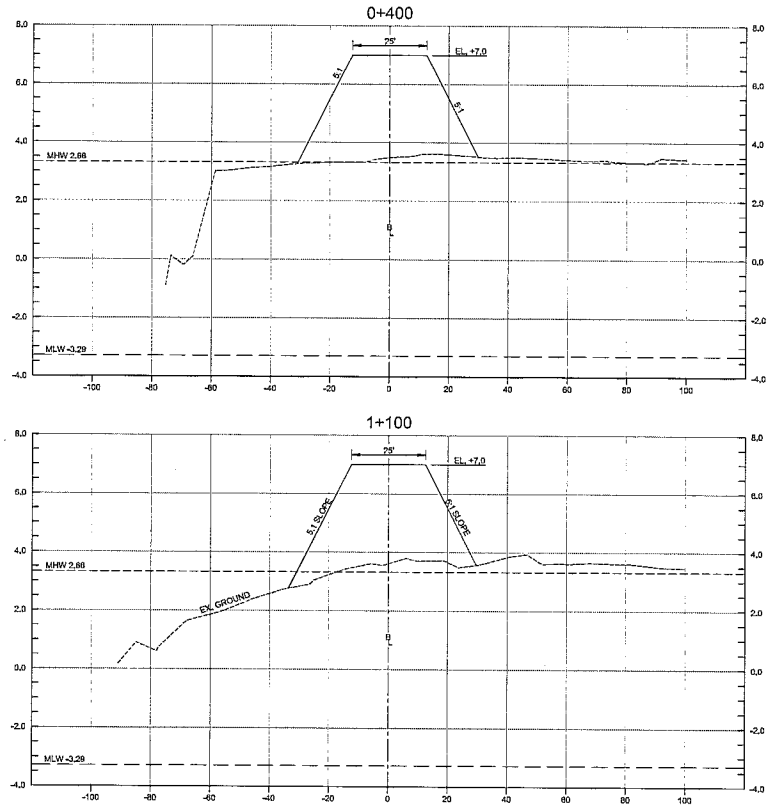
STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION
FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

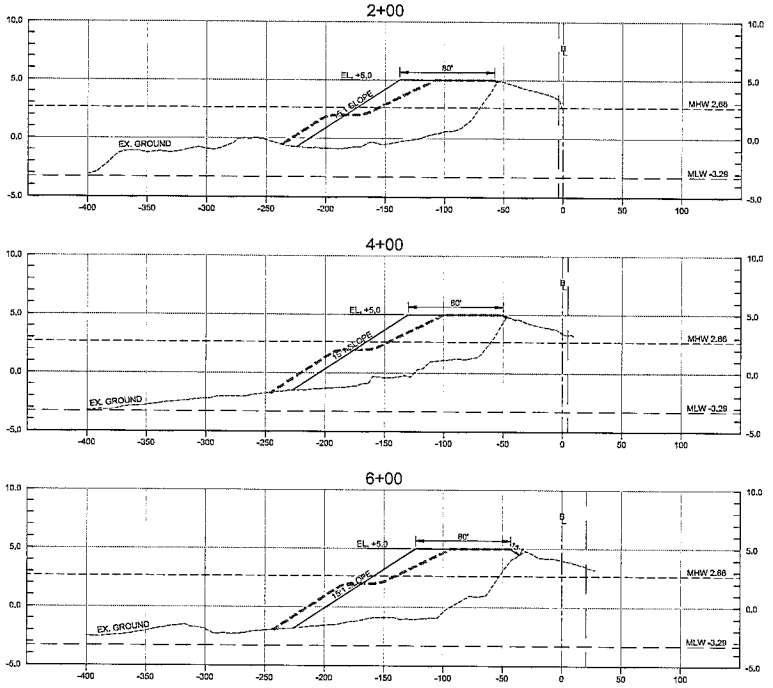
MARSH PLACEMENT AREA CROSS SECTIONS

PROJECT: FORTESCUE CREEK
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: SEF	CAMAGAN & BRYANT ASSOCIATES, INC. CERTIFICATION OF AUTHORIZATION NO. 24GA28192700	PROJECT NO.
CHECKED BY: MRS		SHEET 4 OF 14
SCALE: AS SHOWN	STAN LULEWICZ NEW JERSEY PROFESSIONAL ENGINEER NO. 24GE04770900	DWG. NO. PL - 03
8/24/15		



DUNE PLACEMENT AREA CROSS SECTIONS
HORIZONTAL SCALE: 1"=20' VERTICAL SCALE: 1"=2'



BEACH PLACEMENT AREA CROSS SECTIONS
HORIZONTAL SCALE: 1"=50' VERTICAL SCALE: 1"=1'

LEGEND

- EXISTING GROUND (NAVD88)
- PROPOSED BEACH / DUNE CONSTRUCTION TEMPLATE
- BASELINE OF BEACH / DUNE CONSTRUCTION
- EXISTING MHW / MLW LIMITS
- EXISTING EDGE OF VEGETATION
- APPROXIMATE POST CONSTRUCTION BEACH PROFILE

NOTE:

1. DUNE PLACEMENT AREA TO BE INITIALLY ROUNDED BY TRAINING DIKES IN ORDER TO CONTAIN INFLOW AND ALLOW FOR MATERIAL SETTLEMENT. INFLOW TO BE DIRECTED FROM CENTER LANDING POINT AND PROGRESS TOWARDS EAST AND WEST EXTENTS OF DUNE PLACEMENT AREA. DUNE SECTION TO BE GRADED TO FINAL DESIGN ELEVATION WITH SMALL LOW GROUND PRESSURE DOZER AS MATERIAL IS PLACED. PIPE WILL ADVANCE ON FINAL GRADE AS MATERIAL IS PLACED. FINAL DUNE VEGETATION TO BE ESTABLISHED ACCORDING TO ATTACHED PLANTING PLAN UPON COMPLETION OF CONSTRUCTION.

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BY	APPR	DESCRIPTION	REV.	DATE

PARSONS BRINCKERHOFF
MICHAEL J. MARANO
NJ PE NO. 24GE04067500

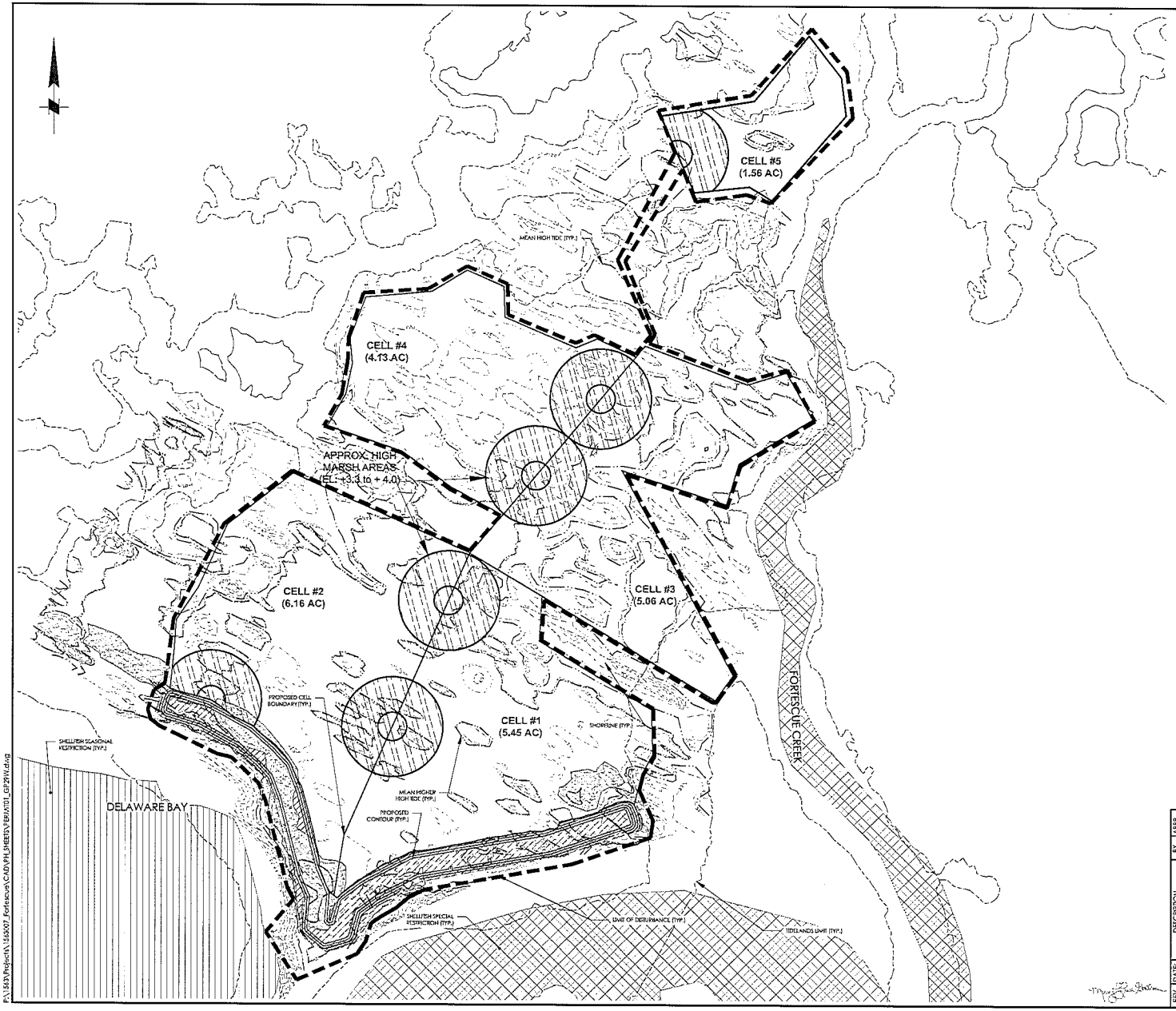
STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION
FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

DUNE & BEACH PLACEMENT AREA CROSS SECTIONS

PROJECT: FORTESCUE CREEK
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: SEF	GAHAGAN & BRYANT ASSOCIATES, INC. CERTIFICATION OF AUTHORIZATION NO. 24GA28192700	PROJECT NO.
CHECKED BY: MRS		SHEET 5 OF 14
SCALE: AS SHOWN	STAN LULEWICZ NEW JERSEY PROFESSIONAL ENGINEER NO. 24GE04770900	
6/24/15		DWG. NO. PL - 04



LEGEND

- LIMIT OF DISTURBANCE
- CELL BOUNDARY
- EXISTING CONTOUR - MAJOR
- EXISTING CONTOUR - MINOR
- PROPOSED CONTOUR - MAJOR
- SHORELINE
- MEAN HIGH WATER
- MEAN HIGHER HIGH WATER
- SHELLFISH ZONE S SEASONAL RESTRICTION
- SHELLFISH ZONE SR SPECIAL RESTRICTION
- EXISTING DUNE
- TIDELANDS
- HIGH MARSH CREATION
- PROPOSED DUNE

RANGE OF TIDE (FT)
NOT TO SCALE

PROJECT AREAS

TOTAL RESTORATION AREA: 28.32 AC.
WETLAND: 22.36 AC.
DUNE: 2.08AC.
UPLAND: 0.6 AC.
WETLAND CONVERSION: 1.48 AC.
BEACH: 3.88 AC.

HIGH MARSH CREATION: 3.97 AC.
LOW MARSH ENHANCEMENT: 15.39 AC.

NOTES:

1. VERTICAL DATUM IS IN REFERENCE TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88). NAVD88 IS 2.29 FEET ABOVE MEAN LOW WATER (MLW). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM DATUM TRANSFORMATION PROGRAM.

2. COORDINATES ARE DEPICTED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE GRID COORDINATE SYSTEM NORTH AMERICAN DATUM OF 1983 (NAD83).
3. CONDITIONAL LIDAR GROUND DATA SHOWN WAS COLLECTED IN JANUARY, APRIL, MAY, & JUNE OF 2013 BY DAMICAN & BRYANT ASSOCIATES, PARSONS, BRINKERHOFF, AND BOSKA GIL ENGINEERING.
4. THE INFORMATION DEPICTED ON THIS PLAN DERIVED BY THE RESULTS OF SURVEYS CONDUCTED ON THE AREAS ON FEE LAND CAN BE CONSIDERED AS INDICATIVE THE GENERAL CONDITIONS EXISTING AT THAT TIME.
5. MSW, MHW, & HTL LINEWORK SHOWN WITHIN THIS SHEET FROM FIELD COLLECTED SURVEY DATA (SEE NOTE 3).
6. ELEVATION DIFFERENCE BETWEEN HTL & MHW FROM THE STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION | BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK" PLAN, DATED OCTOBER 10, 2013.
7. EXISTING SHORELINE AND DUNE LOCATION IS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
8. TIDELANDS AND SHELLFISH CLASSIFICATION BOUNDARIES OBTAINED FROM NJDEP GIS WEBSITE.
9. DUNES AS DELINEATED BY PROJECT TEAM BASED ON 2014 AERIAL IMAGERY AND SITE SURVEY.
10. TIDE ELEVATIONS OBTAINED FROM STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF ENGINEERING AND CONSTRUCTION | BUREAU OF COASTAL ENGINEERING PROJECT 2936, SHEET 2 OF 11 "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK, TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, DATED JUNE 12, 2013. ELEVATIONS WERE CONVERTED TO NAVD88.
    - 10.1. MEAN HIGHER HIGH WATER (MHHW) | 3.08
    - 10.2. MEAN HIGH WATER (MHW) | 2.66
    - 10.3. MEAN LOW WATER (MLW) | -2.29
    - 10.4. HIGH TIDE LINE (HTL) | 4.53
11. NO SUBTIDAL AREAS ARE DEPICTED ON THE PLAN AS ENTIRE PROJECT AREA IS ABOVE THE ZONE (MEAN LOW LOW EP WATER (MLLW) -3.47').
12. THE ENTIRE PROJECT SITE FALLS WITHIN THE INTERTIDAL ZONE (ELEV. -3.47' TO 4.53').

GRAPHIC SCALE

0 50 100 200 300 400 FEET

SCALE: 1" = 100'

REV.	DATE	DESCRIPTION	BY	APPR.

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION
FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

REGULATORY PLAN FOR NJDEP GENERAL PERMIT 29 - WETLAND

PROJECT: FORTESCUE CREEK CHANNEL
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: AEM	PRINCETON HYDRO, LLC. CERTIFICATION OF AUTHORIZATION NO. 24GA27976800	PROJECT NO.	1563.007
CHECKED BY: MPG		SHEET	6 OF 14
SCALE: 1" = 100'	MARY L. PAST-GOLDMAN NEW JERSEY PROFESSIONAL ENGINEER NO. GE-45798	DWG. NO.	PERMIT01
5/21/15			

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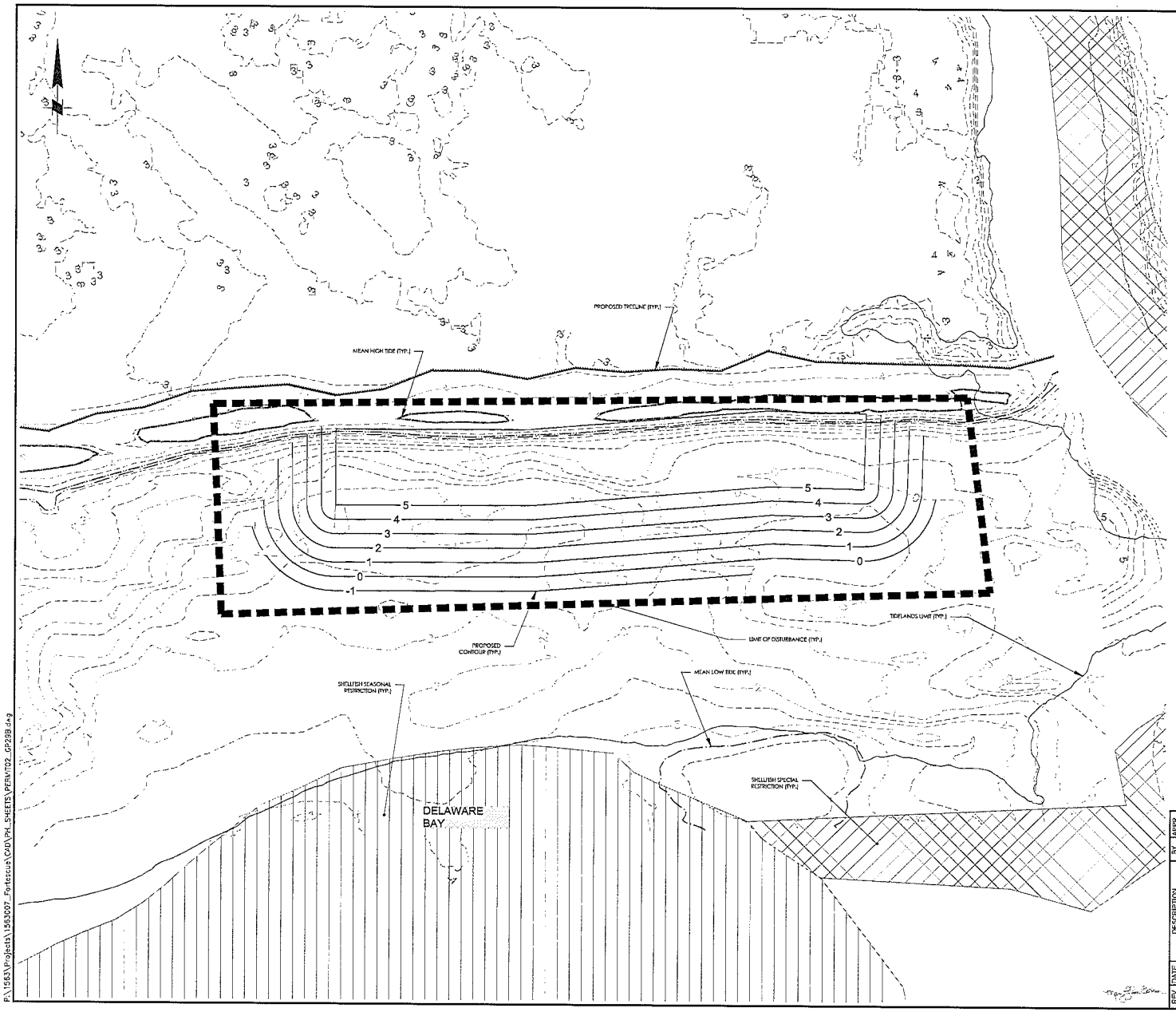

LEGEND

- LIMIT OF DISTURBANCE
- CELL BOUNDARY
- EXISTING CONTOUR - MAJOR
- EXISTING CONTOUR - MINOR
- PROPOSED CONTOUR - MAJOR
- SHORELINE
- MEAN HIGH WATER
- MEAN HIGHER HIGH WATER
- MEAN LOW WATER
- SHELLFISH ZONE 9 SEASONAL RESTRICTION
- SHELLFISH ZONE 9/8 PERMANENT RESTRICTION
- TIDELANDS
- MEAN TIDE
- PROPOSED TIELINE

GRAPHIC SCALE

0 10 20 30 40 50 100 150 200 FEET

SCALE: 1" = 50'

RANGE OF TIDE (FT)
NOT TO SCALE

4.43 MHW
3.04 MHW
2.44 MHW
0.00 NAVD88
-0.20 MTL
-3.27 MLW
-3.47 MLW

NOTES:

1. VERTICAL DATUM IS IN REFERENCE TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88). NAVD88 IS 3.29 FEET ABOVE MEAN LOW WATER (MLW). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM DATUM TRANSFORMATION PROGRAM.
   - ELEV. 0.0 (NAVD88)
   - 3.29' MLW
2. COORDINATES ARE DEPICTED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE (SPC) COORDINATE SYSTEM NORTH AMERICAN DATUM OF 1983 (NAD83).
3. CONDITIONAL (CHEN CONTOUR DATA SHOWN WAS COLLECTED IN JANUARY, APRIL, MAY, & JUNE OF 2013 BY CAHAGIAN & BRYANT ASSOCIATES, PARSONS BRINKERHOFF, AND ROSWELL ENGINEERING.
4. THE INFORMATION DEPICTED ON THE PLAN REPRESENTS THE RESULTS OF SURVEYS CONTRACTED ON THE ABOVE DATE AND CAN BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
5. MEAN, MHW, & MLW LINES ARE SHOWN WITHIN THIS SHEET FROM FIELD COLLECTED SURVEY DATA (SEE NOTE 3).
6. ELEVATION DIFFERENCE BETWEEN MTL & MHW FROM THE STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK" PLAN, DATED OCTOBER 10, 2013.
7. EXISTING SHORELINE AND DUNE LOCATIONS TRACED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
8. TIDELANDS AND SHELLFISH CLASSIFICATION BOUNDARIES OBTAINED FROM NJDEP GIS WEBSITE.
9. DUNES AS DELINEATED BY PROJECT TEAM BASED ON 2014 AERIAL IMAGERY AND SEE SURVEY.
10. TIDE ELEVATIONS OBTAINED FROM STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF ENGINEERING AND CONSTRUCTION BUREAU OF COASTAL ENGINEERING PROJECT 2105, SHEET 2 OF 14 "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK, TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, DATED JUNE 10, 2013. ELSE ELEVATIONS WERE CONVERTED TO NAVD88.
    - 10.1. MEAN HIGHER HIGH WATER (MHHW): 3.08'
    - 10.2. MEAN HIGH WATER (MHW): 2.44'
    - 10.3. MEAN LOW WATER (MLW): -3.29'
    - 10.4. HIGH TIDE LINE (HTL): 3.24'
11. NO SUBTIDAL AREAS ARE DEPICTED ON THE PLAN AS ENTIRE PROJECT AREA IS ABOVE THIS ZONE (MEAN LOW LOWER WATER (MLLW) -3.47').
12. THE ENTIRE PROJECT SITE FALLS WITHIN THE 9 (SUBTIDAL ZONE (ELEV. -3.47' TO 4.53').

PROJECT AREAS

TOTAL RESTORATION AREA: 28.32 AC.
- WETLAND: 22.36 AC.
- DUNE: 2.08AC.
  - UPLAND: 0.6 AC.
  - WETLAND CONVERSION: 1.48 AC.
- BEACH: 3.88 AC.

HIGH MARSH CREATION: 3.97 AC.
LOW MARSH ENHANCEMENT: 18.39 AC.

REV.	DATE	DESCRIPTION	BY	APPR

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

REGULATORY PLAN FOR NJDEP GENERAL PERMIT 29 - BEACH

PROJECT: FORTESCUE CREEK CHANNEL
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: AEM	PRINCETON HYDRO, LLC. CERTIFICATION OF AUTHORIZATION NO. 24GA27976800	PROJECT NO.	1563.007
CHECKED BY: MPG		SHEET	7 OF 14
SCALE: 1" = 50'	MARY L. PAIST-GOLDMAN NEW JERSEY PROFESSIONAL ENGINEER NO. GE-45796	DWG. NO.	PERMIT02
5/21/15			

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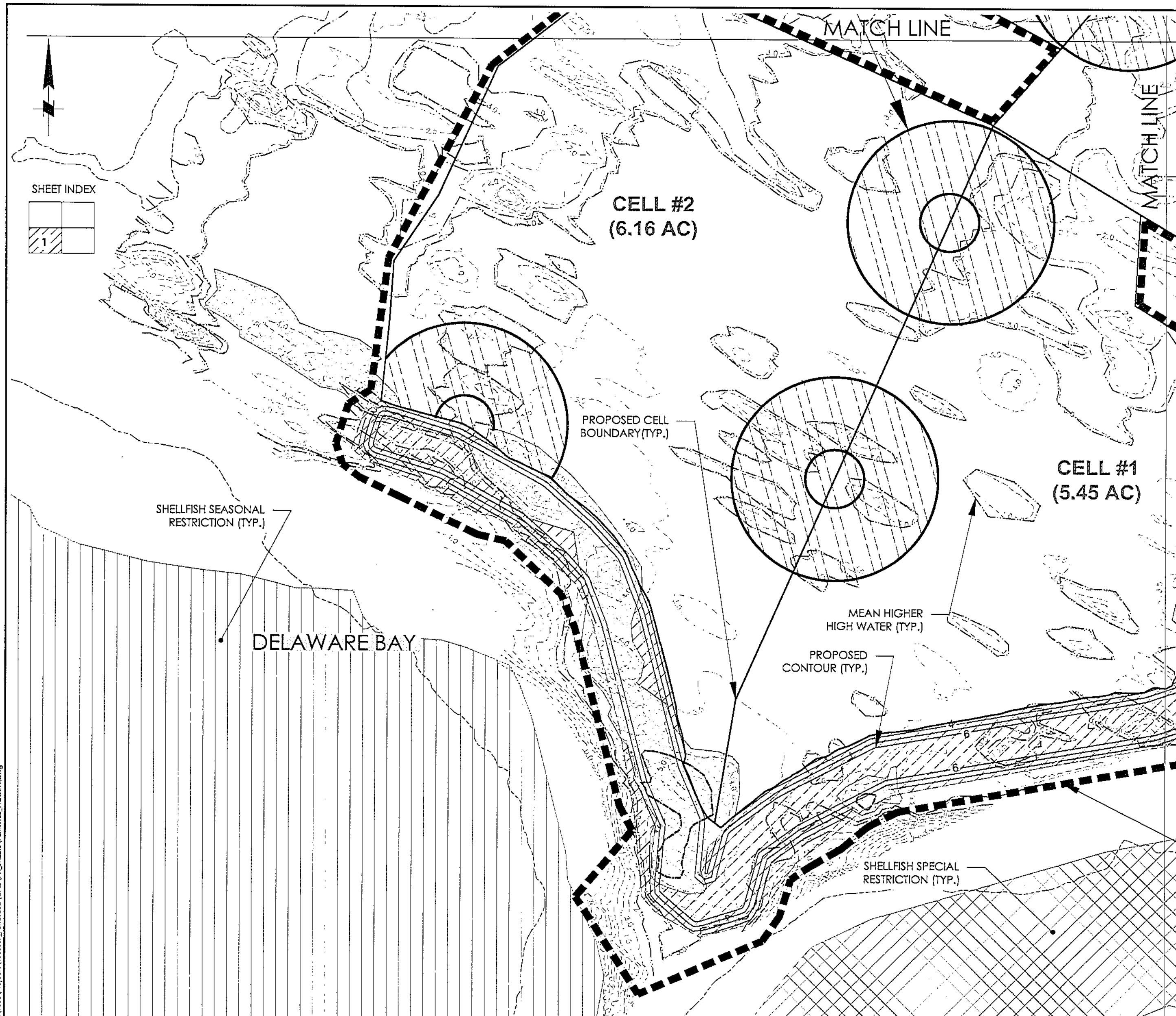

LEGEND

- LIMIT OF DISTURBANCE
- CELL BOUNDARY
- EXISTING CONTOUR - MAJOR
- EXISTING CONTOUR - MINOR
- PROPOSED CONTOUR - MAJOR
- SHORELINE
- MEAN HIGH WATER
- MEAN HIGHER HIGH WATER
- SHELLFISH ZONE S SEASONAL RESTRICTION
- SHELLFISH ZONE SP SPECIAL RESTRICTION
- EXISTING DUNE
- TIDELANDS
- HIGH MARSH CREATION
- PROPOSED DUNE
- HIGH TIDE LINE

4.53 HTL
3.08 MHHW
2.66 MHW
0.00 NAVD88
-0.32 MTL
-3.29 MLW
-3.47 MLLW

RANGE OF TIDE (FT)
NOT TO SCALE

PROJECT AREAS

TOTAL RESTORATION AREA: 28.32 AC.
WETLAND: 22.36 AC.
DUNE: 2.08AC.
UPLAND: 0.6 AC.
WETLAND CONVERSION: 1.48 AC.
BEACH: 3.88 AC.

HIGH MARSH CREATION: 3.97 AC.
LOW MARSH ENHANCEMENT: 18.39 AC.

NOTES:

1. VERTICAL DATUM IS IN REFERENCE TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88). NAVD88 IS 3.29 FEET ABOVE MEAN LOW WATER (MLW). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM DATUM TRANSFORMATION PROGRAM.

   ELEV. 0.0 (NAVD88)
   3.29
   MLW

2. COORDINATES ARE EXPRESSED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE GRID COORDINATE SYSTEM NORTH AMERICAN DATUM OF 1983 (NAD83).
3. CONDITIONAL (CND) CONTOUR DATA SHOWN WAS COLLECTED IN JANUARY, APRIL, MAY, & JUNE OF 2015 BY GAHAGAN & BRYANT ASSOCIATES, PARSONS BRINKERHOFF, AND BOSWELL ENGINEERING.
4. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEYS CONDUCTED ON THE ABOVE DATE AND CAN BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
5. MLW, MHW, & HTL LINEWORK SHOWN WITHIN THIS SHEET FROM FIELD COLLECTED SURVEY DATA (SEE NOTE 3).
6. ELEVATION DIFFERENCE BETWEEN HTL & MHW FROM THE STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK" PLAN, DATED OCTOBER 10, 2013.
7. EXISTING SHORELINE AND DUNE LOCATIONS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
8. TIDELANDS AND SHELLFISH CLASSIFICATION BOUNDARIES OBTAINED FROM NJDEP GIS WEBSITE.
9. DUNES AS DELINEATED BY PROJECT TEAM BASED ON 2014 AERIAL IMAGERY AND SITE SURVEY
10. TIDE ELEVATIONS OBTAINED FROM STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF ENGINEERING AND CONSTRUCTION BUREAU OF COASTAL ENGINEERING PROJECT 2155, SHEET 2 OF 14 "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK, TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, DATED JUNE 12, 2013. ELSE ELEVATIONS WERE CONVERTED TO NAVD88.
    10.1. MEAN HIGHER HIGH WATER (MHHW): 3.08'
    10.2. MEAN HIGH WATER (MHW): 2.66'
    10.3. MEAN LOW WATER (MLW): -3.29'
    10.4. HIGH TIDE LINE (HTL): 4.53'
11. NO SUBTIDAL AREAS ARE DEPICTED ON THE PLAN AS ENTIRE PROJECT AREA IS ABOVE THIS ZONE (MEAN LOW LOWER WATER (MLLW) -3.47').
12. THE ENTIRE PROJECT SITE FALLS WITHIN THE INTERTIDAL ZONE (ELEV. -3.47 TO 4.53').

GRAPHIC SCALE

0 10 20 30 40 50 100 150 200 FEET

SCALE: 1" = 50'

REV.	DATE	DESCRIPTION	BY	APPR.
1	7/2/15	REVISED PER ACOE COMMENTS DATED 7/2/15	RA	MPG

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

REGULATORY PLAN FOR ACOE - INDIVIDUAL PERMIT - WETLAND

PROJECT: FORTESCUE CREEK CHANNEL
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: AEM	PRINCETON HYDRO, LLC. CERTIFICATION OF AUTHORIZATION NO. 24GA27976800	PROJECT NO. 1563.007
CHECKED BY: MPG		SHEET 8-1 OF 14
SCALE: 1" = 50'	MARY L. PAIST-GOLDMAN NEW JERSEY PROFESSIONAL ENGINEER NO. GE-45798	DWG. NO. PERMIT03
5/21/15		

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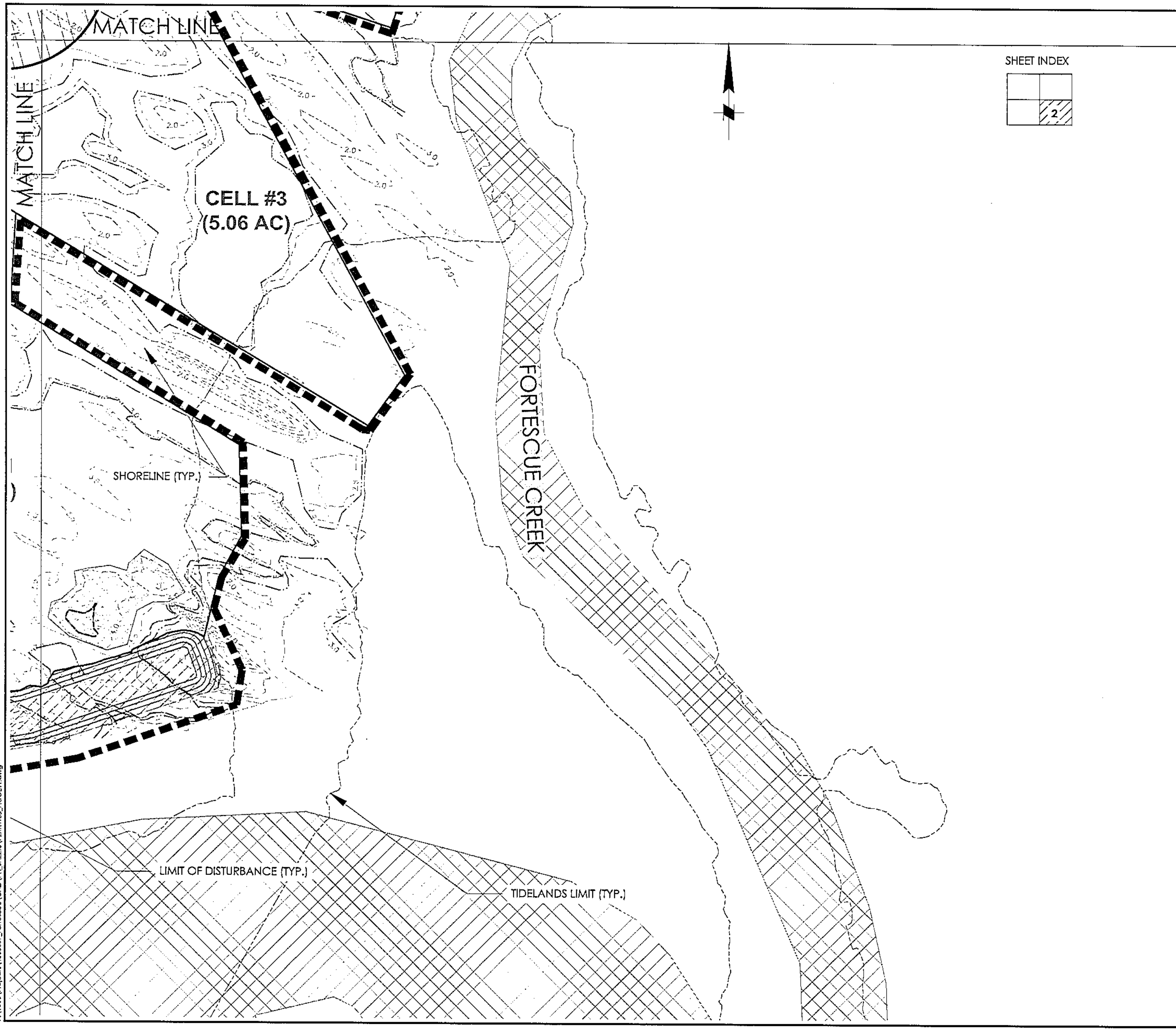

LEGEND

- LIMIT OF DISTURBANCE
- CELL BOUNDARY
- EXISTING CONTOUR - MAJOR
- EXISTING CONTOUR - MINOR
- PROPOSED CONTOUR - MAJOR
- SHORELINE
- MEAN HIGH WATER
- MEAN HIGHER HIGH WATER
- SHELLFISH ZONE S SEASONAL RESTRICTION
- SHELLFISH ZONE SP SPECIAL RESTRICTION
- EXISTING DUNE
- TIDELANDS
- HIGH MARSH CREATION
- PROPOSED DUNE
- HIGH TIDE LINE

4.53 HTL
3.08 MHHW
2.66 MHW
0.00 NAVD88
-0.32 MTL
-3.29 MLW
-3.47 MLLW

RANGE OF TIDE (FT)
NOT TO SCALE

PROJECT AREAS

TOTAL RESTORATION AREA: 28.32 AC.
WETLAND: 22.36 AC.
DUNE: 2.08AC.
UPLAND: 0.6 AC.
WETLAND CONVERSION: 1.48 AC.
BEACH: 3.88 AC.

HIGH MARSH CREATION: 3.97 AC.
LOW MARSH ENHANCEMENT: 18.39 AC.

NOTES:

1. VERTICAL DATUM IS IN REFERENCE TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88). NAVD88 IS 3.29 FEET ABOVE MEAN LOW WATER (MLW). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM DATUM TRANSFORMATION PROGRAM.
   ELEV. 0.0 (NAVD88)
   3.29'
   MLW
2. COORDINATES ARE EXPRESSED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE GRID COORDINATE SYSTEM NORTH AMERICAN DATUM OF 1983 (NAD83).
3. CONDITIONAL (CND) CONTOUR DATA SHOWN WAS COLLECTED IN JANUARY, APRIL, MAY, & JUNE OF 2015 BY GAHAGAN & BRYANT ASSOCIATES, PARSONS BRINCKERHOFF, AND BOSWELL ENGINEERING.
4. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEYS CONDUCTED ON THE ABOVE DATE AND CAN BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
5. MLW, MHW, & HTL LINEWORK SHOWN WITHIN THIS SHEET FROM FIELD COLLECTED SURVEY DATA (SEE NOTE 3).
6. ELEVATION DIFFERENCE BETWEEN HTL & MHW FROM THE STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK" PLAN, DATED OCTOBER 10, 2013.
7. EXISTING SHORELINE AND DUNE LOCATION IS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
8. TIDELANDS AND SHELLFISH CLASSIFICATION BOUNDARIES OBTAINED FROM NJDEP GIS WEBSITE.
9. DUNES AS DELINEATED BY PROJECT TEAM BASED ON 2014 AERIAL IMAGERY AND SITE SURVEY.
10. TIDE ELEVATIONS OBTAINED FROM STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF ENGINEERING AND CONSTRUCTION BUREAU OF COASTAL ENGINEERING PROJECT 3155, SHEET 2 OF 14 "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK, TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, DATED JUNE 12, 2013. ELSE ELEVATIONS WERE CONVERTS TO NAVD88.
    10.1. MEAN HIGHER HIGH WATER (MHHW): 3.08'
    10.2. MEAN HIGH WATER (MHW): 2.66'
    10.3. MEAN LOW WATER (MLW): -3.29'
    10.4. HIGH TIDE LINE (HTL): 4.53'
11. NO SUBTIDAL AREAS ARE DEPICTED ON THE PLAN AS ENTIRE PROJECT AREA IS ABOVE THIS ZONE (MEAN LOW LOWER WATER (MLLW) -3.47').
12. THE ENTIRE PROJECT SITE FALLS WITHIN THE INTERTIDAL ZONE (ELEV. -3.47 TO 4.53').

GRAPHIC SCALE

0 10 20 30 40 50 100 150 200 FEET

SCALE: 1" = 50'

REV.	DATE:	DESCRIPTION	BY	APPR.
1	7/2/15	REVISED PER ACOE COMMENTS DATED 7/2/15	FA	MPG

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION
FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

REGULATORY PLAN FOR ACOE - INDIVIDUAL PERMIT - WETLAND

PROJECT: FORTESCUE CREEK CHANNEL
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: AEM	PRINCETON HYDRO, LLC. CERTIFICATION OF AUTHORIZATION NO. 24GA27976800	PROJECT NO.	1563.007
CHECKED BY: MPG			
SCALE: 1" = 50'	MARY L. PAIST-GOLDMAN NEW JERSEY PROFESSIONAL ENGI NO. GE-45798	SHEET 8-2 OF	14
5/21/15		DWG. NO. PERMIT03	

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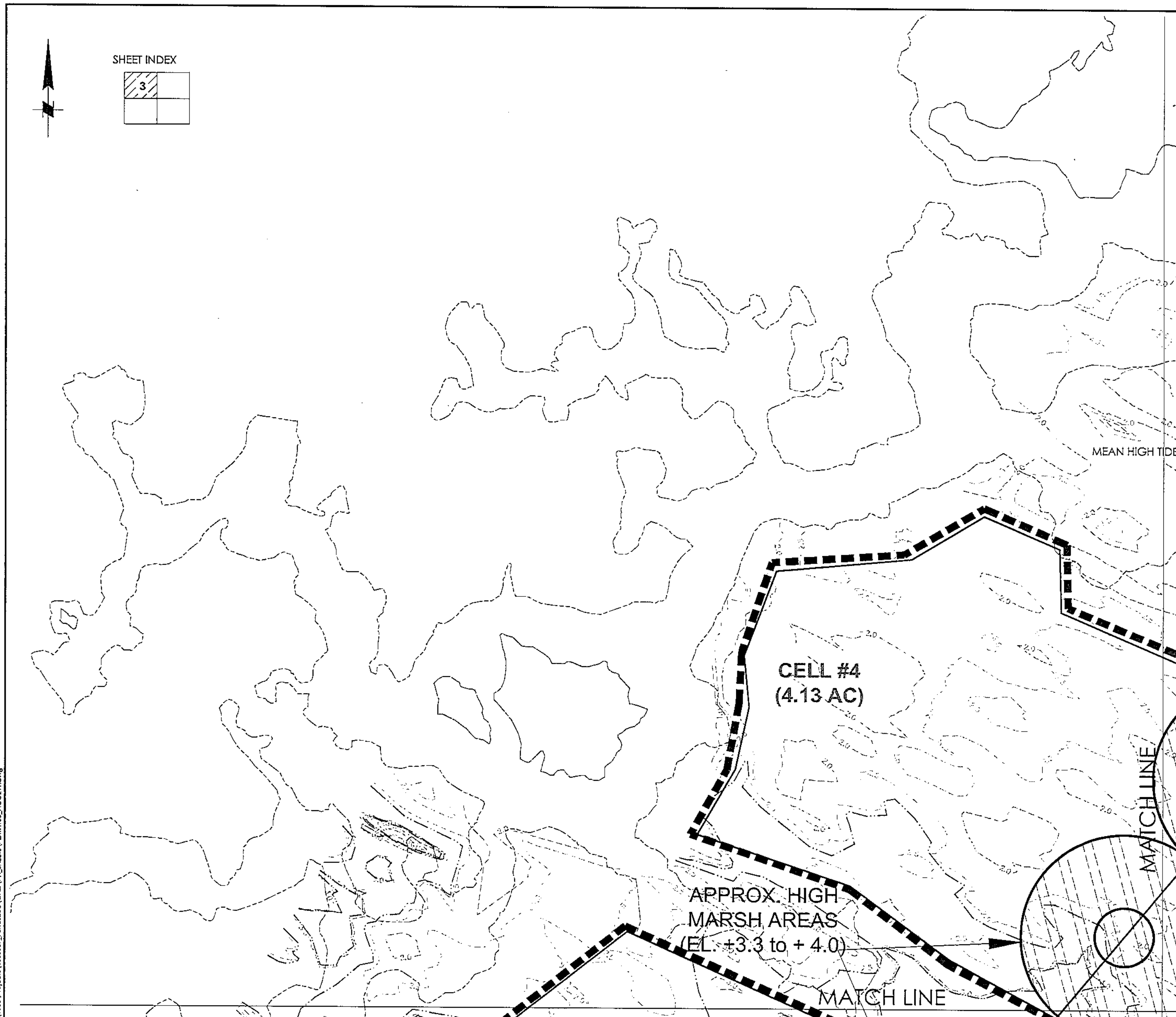

LEGEND

- LIMIT OF DISTURBANCE
- CELL BOUNDARY
- EXISTING CONTOUR - MAJOR
- EXISTING CONTOUR - MINOR
- PROPOSED CONTOUR - MAJOR
- SHORELINE
- MEAN HIGH WATER
- MEAN HIGHER HIGH WATER
- SHELLFISH ZONE S SEASONAL RESTRICTION
- SHELLFISH ZONE SR SPECIAL RESTRICTION
- EXISTING DUNE
- TIDELANDS
- HIGH MARSH CREATION
- PROPOSED DUNE
- HIGH TIDE LINE

RANGE OF TIDE (FT)
NOT TO SCALE

4.53 HTL
3.09 MHHW
2.66 MHW
0.00 NAVD88
-0.32 MTL
-3.29 MLW
-3.47 MLLW

PROJECT AREAS

TOTAL RESTORATION AREA: 28.32 AC.
WETLAND: 22.36 AC.
DUNE: 2.08AC.
UPLAND: 0.6 AC.
WETLAND CONVERSION: 1.48 AC.
BEACH: 3.88 AC.

HIGH MARSH CREATION: 3.97 AC.
LOW MARSH ENHANCEMENT: 18.39 AC.

NOTES:

1. VERTICAL DATUM IS IN REFERENCE TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88). NAVD88 IS 3.29 FEET ABOVE MEAN LOW WATER (MLW). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM DATUM TRANSFORMATION PROGRAM.
   ELEV. 0.0 (NAVD88)
   3.29
   MLW
2. COORDINATES ARE EXPRESSED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE GRID COORDINATE SYSTEM NORTH AMERICAN DATUM OF 1983 (NAD83).
3. CONDITIONAL (CND) CONTOUR DATA SHOWN WAS COLLECTED IN JANUARY, APRIL, MAY, & JUNE OF 2015 BY CAHAGAN & BRYANT ASSOCIATES, PARSONS BRINKERHOFF, AND BOSWELL ENGINEERING
4. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEYS CONDUCTED ON THE ABOVE DATE AND CAN BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
5. MLW, MHW, & HTL LINEWORK SHOWN WITHIN THIS SHEET FROM FIELD COLLECTED SURVEY DATA (SEE NOTE 3).
6. ELEVATION DIFFERENCE BETWEEN HTL & MHW FROM THE STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK" PLAN, DATED OCTOBER 10, 2013.
7. EXISTING SHORELINE AND DUNE LOCATION IS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
8. TIDELANDS AND SHELLFISH CLASSIFICATION BOUNDARIES OBTAINED FROM NJDEP GIS WEBSITE.
9. DUNES AS DELINEATED BY PROJECT TEAM BASED ON 2014 AERIAL IMAGERY AND SITE SURVEY.
10. TIDE ELEVATIONS OBTAINED FROM STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF ENGINEERING AND CONSTRUCTION BUREAU OF COASTAL ENGINEERING PROJECT 2155, SHEET 2 OF 14 "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK, TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, DATED JUNE 12, 2013. ELSE ELEVATIONS WERE CONVERTS TO NAVD88.
    10.1. MEAN HIGHER HIGH WATER (MHHW): 3.09'
    10.2. MEAN HIGH WATER (MHW): 2.66'
    10.3. MEAN LOW WATER (MLW): -3.29'
    10.4. HIGH TIDE LINE (HTL): 4.53'
11. NO SUBTIDAL AREAS ARE DEPICTED ON THE PLAN AS ENTIRE PROJECT AREA IS ABOVE THE ZONE (MEAN LOW LOWER WATER (MLLW) -3.47').
12. THE ENTIRE PROJECT SITE FALLS WITHIN THE INTERTIDAL ZONE (ELEV. -3.47 TO 4.53').

GRAPHIC SCALE
0 10 20 30 40 50 100 150 200 FEET
SCALE: 1" = 50'

REV.	DATE:	DESCRIPTION	BY	APPR.
1	7/1/15	REVISED PER ACOE COMMENTS DATED 6/15/15	AA	MPG

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION
FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

REGULATORY PLAN FOR ACOE - INDIVIDUAL PERMIT - WETLAND

PROJECT: FORTESCUE CREEK CHANNEL
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: AEM	PRINCETON HYDRO, LLC. CERTIFICATION OF AUTHORIZATION NO. 24GA27976800	PROJECT NO.	1563.007
CHECKED BY: MPG		SHEET 8-3 OF	14
SCALE: 1" = 50'	MARY L. PAIST-GOLDMAN NEW JERSEY PROFESSIONAL ENGINEER NO. GE-45798	DWG. NO. PERMIT03	
5/21/15			

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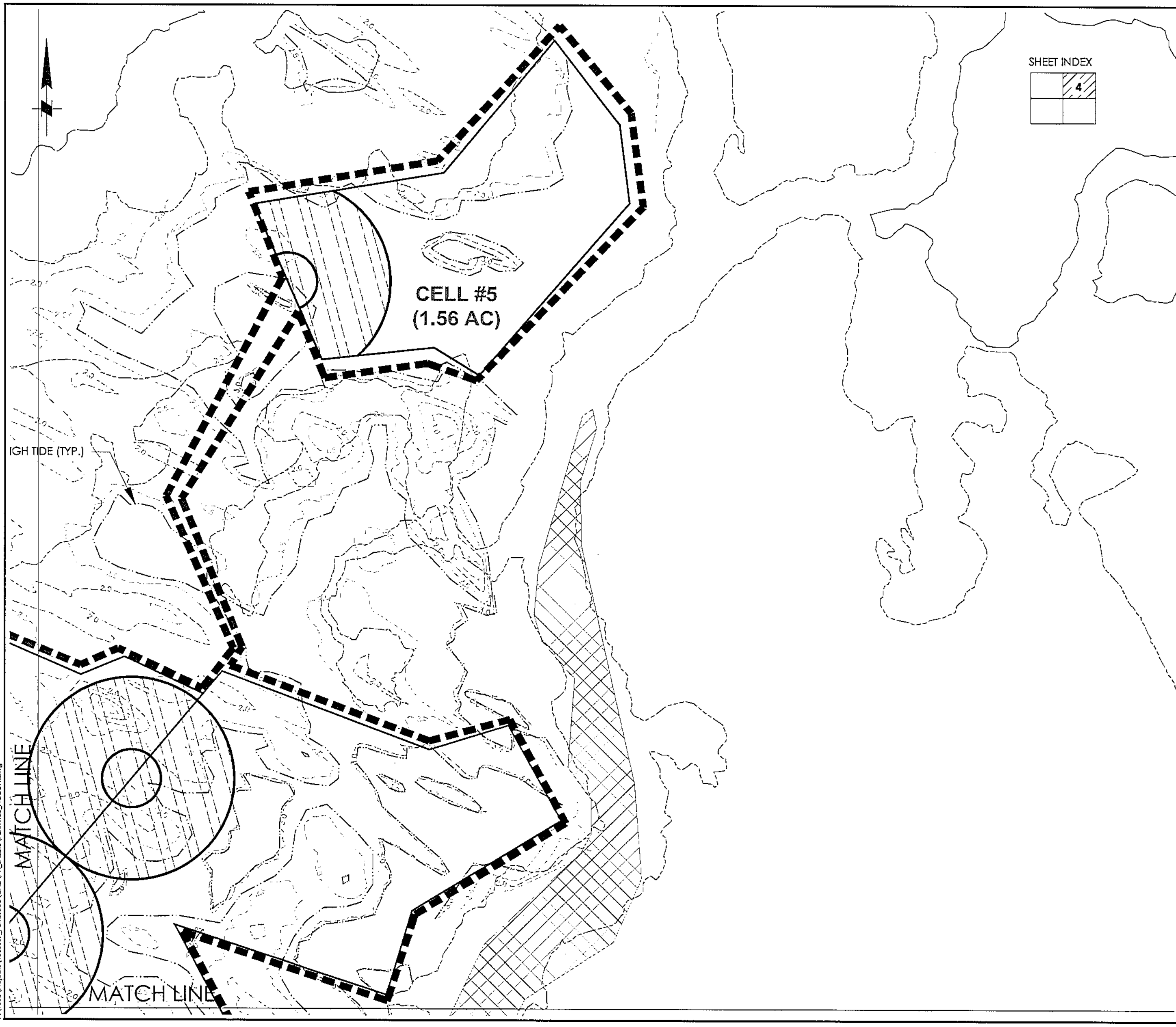

LEGEND

- LIMIT OF DISTURBANCE
- CELL BOUNDARY
- EXISTING CONTOUR - MAJOR
- EXISTING CONTOUR - MINOR
- PROPOSED CONTOUR - MAJOR
- SHORELINE
- MEAN HIGH WATER
- MEAN HIGHER HIGH WATER
- SHELLFISH ZONE S SEASONAL RESTRICTION
- SHELLFISH ZONE SR SPECIAL RESTRICTION
- EXISTING DUNE
- TIDELANDS
- HIGH MARSH CREATION
- PROPOSED DUNE
- HIGH TIDE LINE

RANGE OF TIDE (FT)
NOT TO SCALE

PROJECT AREAS

TOTAL RESTORATION AREA: 28.32 AC.
WETLAND: 22.36 AC.
DUNE: 2.08AC.
UPLAND: 0.6 AC.
WETLAND CONVERSION: 1.48 AC.
BEACH: 3.88 AC.

HIGH MARSH CREATION: 3.97 AC.
LOW MARSH ENHANCEMENT: 18.39 AC.

NOTES:

1. VERTICAL DATUM IS IN REFERENCE TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88). NAVD88 IS 3.29 FEET ABOVE MEAN LOW WATER (MLW). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM DATUM TRANSFORMATION PROGRAM.
   ELEV. 0.0 (NAVD88)
   3.29
   MLW
2. COORDINATES ARE EXPRESSED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE GRID COORDINATE SYSTEM NORTH AMERICAN DATUM OF 1983 (NAD83).
3. CONDITIONAL (CND) CONTOUR DATA SHOWN WAS COLLECTED IN JANUARY, APRIL, MAY, & JUNE OF 2015 BY DAHAOAN & BRYANT ASSOCIATES, PARSONS BRINKERHOFF, AND BOSWELL ENGINEERING.
4. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEYS CONDUCTED ON THE ABOVE DATE AND CAN BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
5. MLW, MHW, & HTL LINEWORK SHOWN WITHIN THIS SHEET FROM FIELD COLLECTED SURVEY DATA (SEE NOTE 3).
6. ELEVATION DIFFERENCE BETWEEN HTL & MHW FROM THE STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK" PLAN, DATED OCTOBER 10, 2013.
7. EXISTING SHORELINE AND DUNE LOCATION IS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
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9. DUNES AS DELINEATED BY PROJECT TEAM BASED ON 2014 AERIAL IMAGERY AND SITE SURVEY.
10. TIDE ELEVATIONS OBTAINED FROM STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF ENGINEERING AND CONSTRUCTION BUREAU OF COASTAL ENGINEERING PROJECT 2155, SHEET 2 OF 14 "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK, TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, DATED JUNE 12, 2013. ELSE ELEVATIONS WERE CONVERTS TO NAVD88.
    10.1. MEAN HIGHER HIGH WATER (MHHW): 3.08'
    10.2. MEAN HIGH WATER (MHW): 2.66'
    10.3. MEAN LOW WATER (MLW): -3.29'
    10.4. HIGH TIDE LINE (HTL): 4.53'
11. NO SUBTIDAL AREAS ARE DEPICTED ON THE PLAN AS ENTIRE PROJECT AREA IS ABOVE THIS ZONE (MEAN LOW LOWER WATER (MLLW) -3.47').
12. THE ENTIRE PROJECT SITE FALLS WITHIN THE INTERTIDAL ZONE (ELEV. -3.47 TO 4.53').

GRAPHIC SCALE
0 10 20 30 40 50 100 150 200 FEET
SCALE: 1" = 50'

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION
FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

REGULATORY PLAN FOR ACOE - INDIVIDUAL PERMIT - WETLAND

PROJECT: FORTESCUE CREEK CHANNEL
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: AEM	PRINCETON HYDRO, LLC. CERTIFICATION OF AUTHORIZATION NO. 24GA27976800	PROJECT NO.	1563.007
CHECKED BY: MPG			
SCALE: 1" = 50'	MARY L. PAIST-GOLDMAN NEW JERSEY PROFESSIONAL ENG! NO. GE-45798	SHEET 8-4 OF 14	
5/21/15		DWG. NO. PERMIT03	

REV.	DATE	DESCRIPTION	BY	APPR.
1	7/2/15	REVISED PER ACOE COMMENTS DATED 7/2/15	PA	MPG

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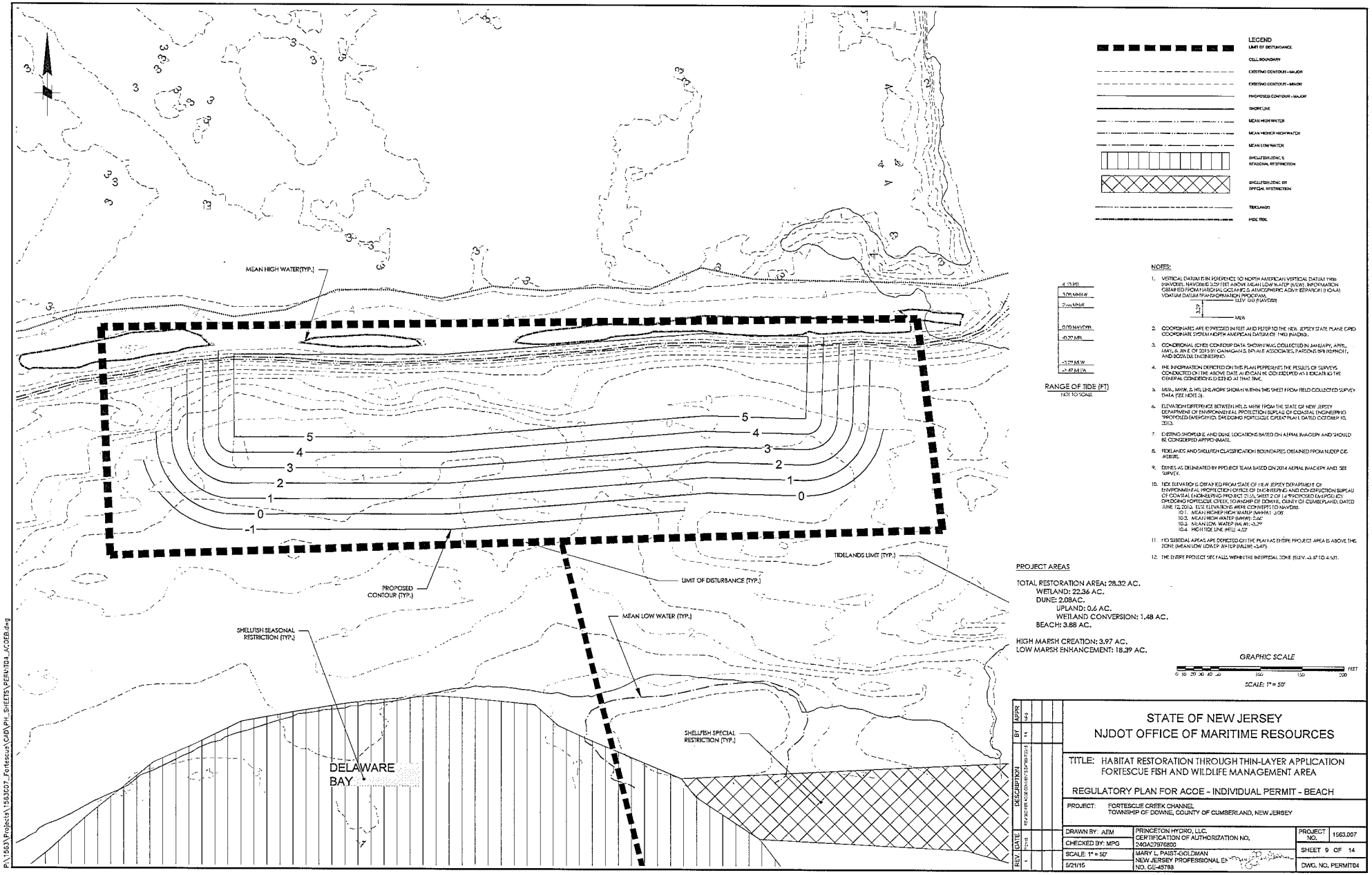

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REV	DATE	DESCRIPTION	BY	APPR
1	7/7/15	PROJECT PER ACOE COMMENTS DATED 7/7/15	AEM	MPG

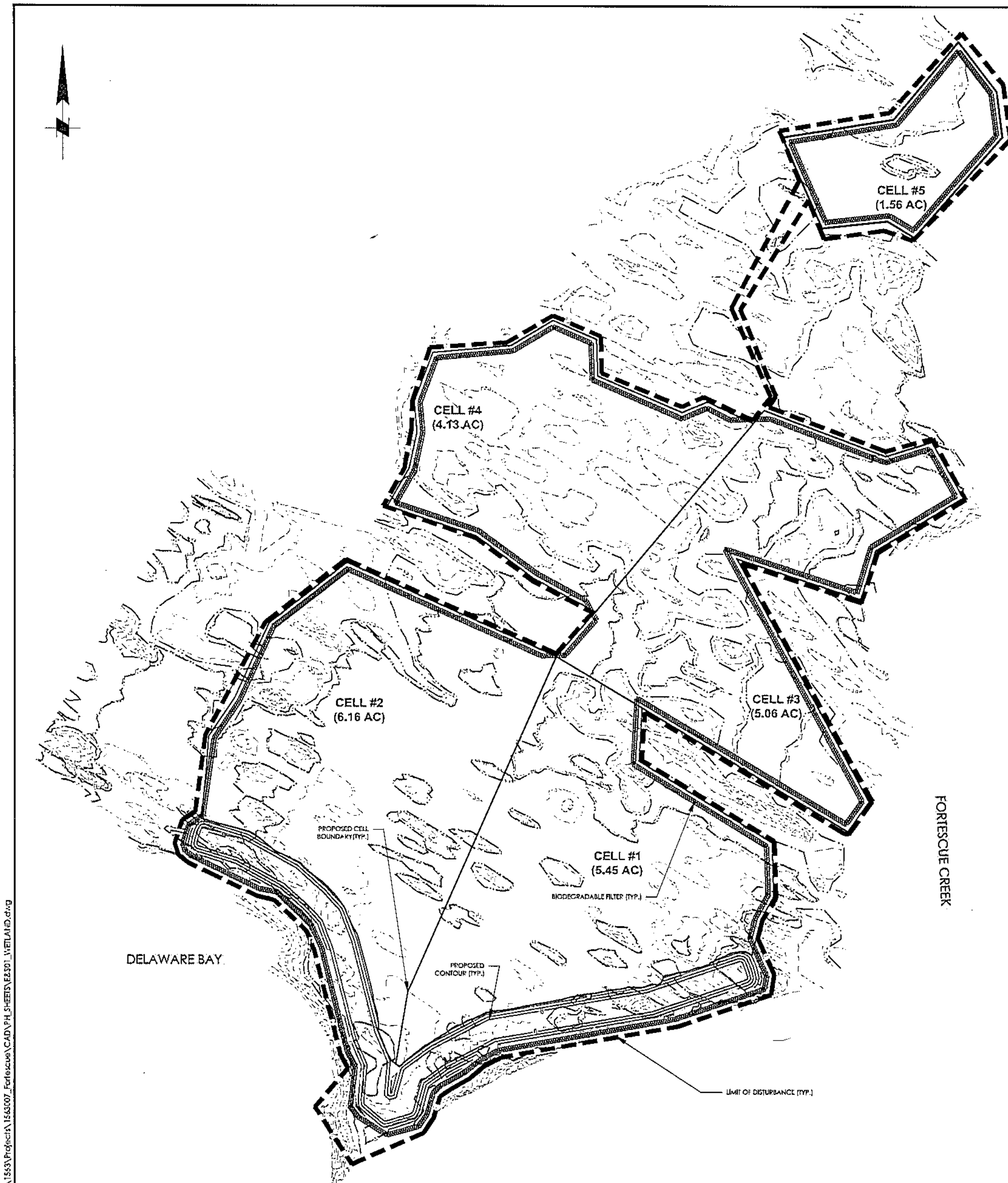
STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION
FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

REGULATORY PLAN FOR ACOE - INDIVIDUAL PERMIT - BEACH

PROJECT: FORTESCUE CREEK CHANNEL
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: AEM	PRINCETON HYDRO, LLC. CERTIFICATION OF AUTHORIZATION NO. 24GA27976800	PROJECT NO.	1563.007
CHECKED BY: MPG		SHEET	9 OF 14
SCALE: 1" = 50'	MARY L. PAIST-GOLDMAN NEW JERSEY PROFESSIONAL EN NO. GE-45788	DWG. NO.	PERMIT04
5/21/15			



LEGEND

- LIMIT OF DISTURBANCE
- CELL BOUNDARY
- EXISTING CONTOUR - MAJOR
- EXISTING CONTOUR - MINOR
- PROPOSED CONTOUR - MAJOR
- BIODEGRADABLE FILTER

TOTAL PROJECT DISTURBANCE: 28.32 AC.
WETLAND PROJECT DISTURBANCE: 22.36 AC.
DUNE PROJECT DISTURBANCE: 2.08 AC.
BEACH PROJECT DISTURBANCE: 3.88 AC.

GRAPHIC SCALE

0 20 40 60 80 100 200 300 400 FEET

SCALE: 1" = 100'

NOTES:

1. VERTICAL DATUM IS IN REFERENCE TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88). NAVD88 IS 3.29 FEET ABOVE MEAN LOW WATER (MLW). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM DATUM TRANSFORMATION PROGRAM.

ELEV. 0.0 (NAVD88)
3.29
MLW

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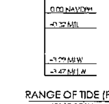
12. THE ENTIRE PROJECT SITE FALLS WITHIN THE INTERTIDAL ZONE (ELEV. -3.47 TO 4.53').



RANGE OF TIDE (FT)
NOT TO SCALE

REV.	DATE	DESCRIPTION	BY	APPR.

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION
FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

SOIL EROSION AND SEDIMENT CONTROL PLAN

PROJECT: FORTESCUE CREEK CHANNEL
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: AEM	PRINCETON HYDRO, LLC. CERTIFICATION OF AUTHORIZATION NO. 24GA27976800	PROJECT NO. 1563.007
CHECKED BY: MPG		SHEET 10 OF 14
SCALE: 1" = 100'	MARY L. PAIST-GOLDMAN NEW JERSEY PROFESSIONAL ENGINEER NO. GE-45798	
5/21/15		DWG. NO. ES501

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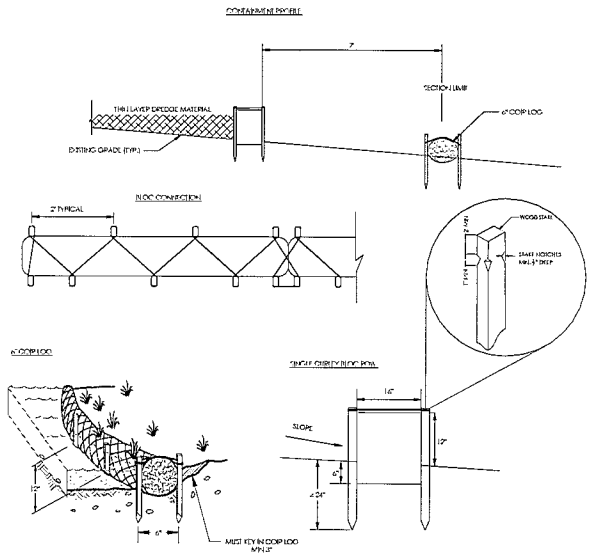
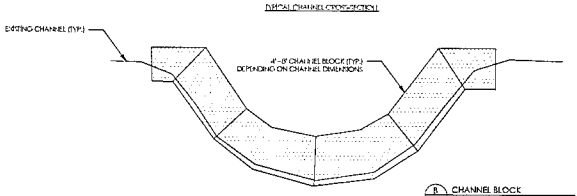


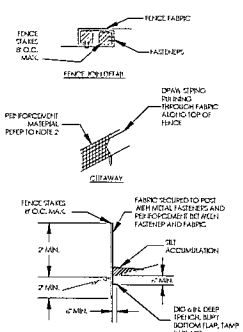
NOTE:
1. NON-STRETCHING ROPE WHEN WET.
2. 1 1/2" X 1 1/2" X 48" WOODEN STAKES ARE RECOMMENDED.
3. POUND STAKES HIGHLY NEXT TO CURVED BLOCK LEAVING APPROXIMATELY 4" OF STAKE ABOVE SURFACE OF THE BLOCK.
4. INSTALL ROPE ACCORDING TO DRAWING (ENSURING ROPE IS WRAPPED TIGHTLY IN STAKE NOTCHES.
5. KNOT OFF ROPE TO STAKE AT LEAS EVERY 25 FT OF ROPE.
6. POUND DOWN STAKES FLUSH WITH SURFACE OF BLOCK AFTER ALL ARE INSTALLED TO TIGHTEN ROPES.
7. ABUT ADJOINING BLOCKS TIGHTLY AND SECURE WITH STAKES AND ROPE ACCORDING TO DRAWING.
8. INCORPORATION OF LIVE PLANTS INTO AND AROUND BLOCKS IS COMMON.
9. 8' LONG BLOCK SHOWN. ADJUST STAKING AND ROPING PATTERN ACCORDINGLY IF 4' BLOCKS ARE USED

A BIODEGRADABLE FILTER
NOT TO SCALE
AS NECESSARY

NOTES:
1. NON-STRETCHING ROPE WHEN WET.
2. 1 1/2" X 1 1/2" X 48" WOODEN STAKES ARE RECOMMENDED.
3. POUND STAKES HIGHLY NEXT TO CURVED BLOCK LEAVING APPROXIMATELY 4" OF STAKE ABOVE SURFACE OF THE BLOCK.
4. INSTALL ROPE ACCORDING TO DRAWING (ENSURING ROPE IS WRAPPED TIGHTLY IN STAKE NOTCHES.
5. KNOT OFF ROPE TO STAKE AT LEAS EVERY 25 FT OF ROPE.
6. POUND DOWN STAKES FLUSH WITH SURFACE OF BLOCK AFTER ALL ARE INSTALLED TO TIGHTEN ROPES.
7. ABUT ADJOINING BLOCKS TIGHTLY AND SECURE WITH STAKES AND ROPE ACCORDING TO DRAWING.
8. INCORPORATION OF LIVE PLANTS INTO AND AROUND BLOCKS IS COMMON.
9. 8' LONG BLOCK SHOWN. ADJUST STAKING AND ROPING PATTERN ACCORDINGLY IF 4' BLOCKS ARE USED
10. REFER TO DETAIL A FOR BLOCK CONNECTION DETAILS.
11. DOUBLE BLOCK TO BE STACKED AS NECESSARY.



B CHANNEL BLOCK
NOT TO SCALE
AS NECESSARY



NOTES:

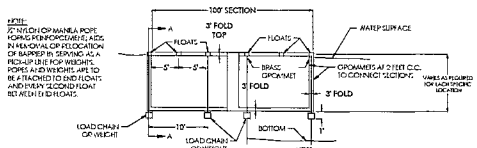
1. FENCE POSTS SHALL BE SPACED 8 FEET CENTER TO CENTER OR CLOSER. THE POSTS SHALL EXTEND AT LEAST 2 FEET INTO THE GROUND AND EXTEND AT LEAST 2 FEET ABOVE THE GROUND AND SHALL BE CONSTRUCTED OF HARDWOOD WITH A MINIMUM CROSS-SECTIONAL AREA OF 3 SQUARE INCHES AND A MINIMUM DIAMETER THICKNESS OF 1.5 INCHES.

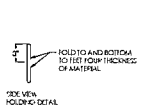
2. A METAL FENCE WITH A 6 INCH OR SMALLER OPENINGS AND AT LEAST 3 FEET HIGH MAY BE UTILIZED, FASTENED TO THE FENCE POSTS, TO PROVIDE REINFORCEMENT AND SUPPORT TO THE GEOTEXTILE FABRIC WHERE SPACE FOR OTHER PRACTICES IS LIMITED AND HEAVY SEDIMENT LOADING IS EXPECTED.

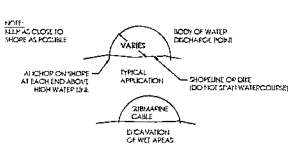
3. A GEOTEXTILE FABRIC RECOMMENDED FOR SILT USE BY THE MANUFACTURER, SHALL BE BURIED AT LEAST 6 INCHES DEEP IN THE GROUND. THE FABRIC SHALL EXTEND AT LEAST 2 FEET ABOVE THE GROUND. FABRIC MUST BE SECURELY FASTENED TO THE POSTS USING A SYSTEM CONSISTING OF METAL FASTENERS, (NAILS OR STAPLES) AND HIGH STRENGTH REINFORCEMENT MATERIAL (NYLON WEBBING, GROMMETS, WASHERS, ETC.) PLACED BETWEEN THE FASTENER AND THE GEOTEXTILE FABRIC. THE FASTENING SYSTEM SHALL RESIST TEARING AWAY FROM THE POST. THE FABRIC SHALL INCORPORATE A DRAWSTRING IN THE TOP PORTION OF THE FENCE FOR ADDED STRENGTH.

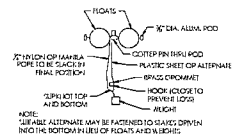
4. SEDIMENTS SHALL BE REMOVED WHEN THE ACCUMULATION HEIGHT REACHES ONE HALF THE GROUND HEIGHT OF THE FENCE.

C SILT FENCE DETAIL
NOT TO SCALE

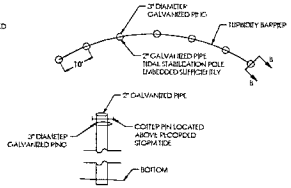








SECTION A-A



SECTION B-B

NOTES:
1. INSTALL TURBIDITY BARRIER TO PREVENT DRIFTING OF SILT CAUSE BY DISCHARGE OF STORM SEWERS, OR WATERING BASINS, CONSTRUCTION, DREDGING OR FILLING OPERATIONS, OR OTHER ACTIVITIES THAT COULD CAUSE TURBIDITY.
2. EXACT PLACEMENT OF TURBIDITY BARRIER SHALL BE SO AS TO EFFECTIVELY CONTROL SILT DISPERSION UNDER THE CONDITIONS PRESENT ON A PARTICULAR PROJECT.
3. THE DETAILS SHOWN ON THIS SHEET ARE SUGGESTED METHODS ONLY. ALTERNATIVE SOLUTION AND USAGE OF MATERIALS MAY BE USED AS APPROVED.
4. USE APPROPRIATE NAVIGATIONAL WARNING LIGHTS WHEN USED HERE TO NAVIGATIONAL CHANNEL.
5. TYPE I IS FOR POKED SHALLOW LAKES, SMALL STREAMS AND MARSHES WITH CURRENT VELOCITIES LESS THAN 1 FT/SEC. AND SHELTERED FROM WINDS.
6. TYPE 2 IS FOR LAKES, STREAMS, INTERCOASTAL AND TIDAL AREAS WITH CURRENT VELOCITIES UP TO 3 FT/SEC.
7. TYPE 3 IS FOR LAKES, STREAMS, INTERCOASTAL AND TIDAL AREAS WITH CONSIDERABLE CURRENTS IF VELOCITIES UP TO 5 FT./SEC. TIDAL ACTION AND SUBJECT TO WIND AND WAVES.

D FLOATING TURBIDITY BARRIER DETAIL
NOT TO SCALE
AS NECESSARY

REV.	DATE	DESCRIPTION	BY	APPR.

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

SOIL EROSION AND SEDIMENT CONTROL DETAILS

PROJECT: FORTESCUE CREEK CHANNEL
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: ABM
CHECKED BY: MPG
SCALE: 1" = 100'
5/21/15

PRINCETON HYDRO, LLC.
CERTIFICATION OF AUTHORIZATION NO. 24GA27976800

MARY L. PAET-GOLDMAN
NEW JERSEY PROFESSIONAL ENGINEER
NO. GE-45798

PROJECT NO. 1563.007
SHEET 11 OF 14
DWG. NO. EE502

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CUMBERLAND-SALEM CONSERVATION DISTRICT NOTES

1. ALL APPLICABLE EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE IN PLACE PRIOR TO ANY GRADING OPERATION AND/OR INSTALLATION OF PROPOSED STRUCTURES OR UTILITIES.
2. SOIL EROSION AND SEDIMENT CONTROL PRACTICES ON THE PLAN SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL IN NEW JERSEY.
3. ALL APPLICABLE EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE LEFT IN PLACE UNTIL CONSTRUCTION IS COMPLETED AND/OR THE AREA IS STABILIZED.
4. ANY DISTURBED AREA THAT WILL BE LEFT EXPOSED FOR MORE THAN SIXTY (60) DAYS AND NOT SUBJECT TO CONSTRUCTION TRAFFIC SHALL IMMEDIATELY RECEIVE A TEMPORARY SEEDING AND FERTILIZATION IN ACCORDANCE WITH THE NEW JERSEY STANDARDS AND APPLICATION RATES SHALL BE INCLUDED IN THE NARRATIVE. IF THE SEASON PROHIBITS TEMPORARY SEEDING, THE DISTURBED AREAS WILL BE MULCHED WITH SALT HAY OR EQUIVALENT AND ANCHORED IN ACCORDANCE WITH THE NEW JERSEY STANDARDS (I.E. PEG AND TWINE, MULCH MATTING OR LIQUID MULCH BINDER).
5. ALL CRITICAL AREAS SUBJECT TO EROSION WILL RECEIVE A TEMPORARY SEEDING IN COMBINATION WITH STRAW MULCH AT A RATE OF 2 TONS PER ACRE, ACCORDING TO THE NEW JERSEY STANDARDS IMMEDIATELY FOLLOWING ROUGH GRADING.
6. THE SITE SHALL AT ALL TIMES BE GRADED AND MAINTAINED SUCH THAT ALL STORMWATER RUNOFF IS DIVERTED TO SOIL EROSION AND SEDIMENT CONTROL FACILITIES.
7. ALL SOIL EROSION AND SEDIMENTATION STRUCTURES WILL BE INSPECTED AND MAINTAINED ON A REGULAR BASIS AND AFTER EVERY STORM EVENT.
8. SOIL STOCKPILES ARE NOT TO BE LOCATED WITHIN FIFTY (50) FEET OF A FLOODPLAIN, SLOPE, ROADWAY OR DRAINAGE FACILITY. THE BASE OF ALL STOCKPILES SHOULD BE PROTECTED BY A HAY BALE BARRIER OR SEDIMENT FENCE. PROPOSED LOCATIONS MUST BE DELINEATED ON THE PLAN.
9. A CRUSHED STONE, TIRE CLEANING PAD WILL BE INSTALLED WHEREVER A CONSTRUCTION ENTRANCE EXISTS. THE RIP-RAP PAD MUST BE 100 FEET IN LENGTH AND THE STONE MUST BE 1.5-4" IN SIZE, PLACED 12" THICK AND THE FULL WIDTH OF THE ENTRANCE. IT SHOULD BE UNDERLAIN WITH A SUITABLE SYNTHETIC FILTER FABRIC AND MAINTAINED. (THE STRUCTURE MUST BE DELINEATED AND DETAIL INCLUDED ON THE PLANS.)
10. IF A STONE CONSTRUCTION ENTRANCE IS TO BE USED AS AN EXIT ON TO A MAJOR HIGHWAY, A THIRTY (30) FOOT PAVED TRANSITION AREA SHALL BE INSTALLED.
11. ALL DRIVEWAYS MUST BE STABILIZED WITH 2 1/2" CRUSHED STONE OR SUBBASE PRIOR TO INDIVIDUAL LOT CONSTRUCTION.
12. PAVED ROADWAYS MUST BE KEPT CLEAN AT ALL TIMES.
13. ALL CATCH BASIN INLETS WILL BE PROTECTED DURING CONSTRUCTION (FILTER DETAILS APPEAR ON PLAN).
14. ALL STORM DRAINAGE OUTLETS WILL BE STABILIZED, AS REQUIRED, BEFORE THE DISCHARGE POINTS BECOME OPERATIONAL.
15. ALL DEWATERING OPERATIONS MUST DISCHARGE DIRECTLY INTO A SEDIMENT FILTRATION DEVICE. THE SEDIMENT FILTER MUST BE CAPABLE OF FILTERING THE SEDIMENT AND BE PLACED SO AS NOT TO CAUSE EROSION OF THE DOWNSTREAM AREA. DETAILS AND MAINTENANCE OF THE DEVICE MUST BE INCLUDED ON THE PLANS. FIELD PLACEMENT AND USE OF THE STRUCTURE MUST BE APPROVED BY THE DISTRICT EROSION CONTROL INSPECTOR PRIOR TO COMMENCEMENT OF DEWATERING ACTIVITIES.
16. THE CUMBERLAND/SALEM SOIL CONSERVATION DISTRICT SHALL BE NOTIFIED, IN WRITING, 72 HOURS PRIOR TO ANY LAND DISTURBANCE.
17. TOPSOIL A STANDARD UNIFORM APPLICATION OF 5" OF CLEAN TOPSOIL IS RECOMMENDED. SOILS HAVING A PH OF 4.0 OR LESS OR CONTAINING IRON SULFIDE MUST BE COVERED WITH A MINIMUM OF 12 INCHES OF SOIL HAVING A PH OF 5.0 OR MORE BEFORE SEEDBED PREPARATION.
18. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER TO PROVIDE CONFIRMATION OF LIME, FERTILIZER AND SEED APPLICATION RATES AT THE REQUEST OF THE CUMBERLAND/SALEM SOIL CONSERVATION DISTRICT.
19. NJSA 4:24-39, ET SEQ., REQUIRES THAT NO CERTIFICATE OF OCCUPANCY BE ISSUED BEFORE ALL THE PROVISIONS OF THE CERTIFIED SOIL EROSION AND SEDIMENT CONTROL PLAN HAVE BEEN COMPLIED WITH FOR PERMANENT MEASURES. ALL SITE WORK FOR THE PROJECT MUST BE COMPLETED PRIOR TO THE DISTRICT ISSUING A REPORT OF COMPLIANCE AS A PREREQUISITE TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY BY THE MUNICIPALITY.
20. NJSA 4:24-39, ET SEQ., REQUIRES THAT UPON PERMANENT SITE STABILIZATION AND COMPLETION OF THE CONTRACTOR SHALL APPLY TO THE SOIL CONSERVATION DISTRICT FOR A FINAL COMPLIANCE INSPECTION TO CHECK THAT ALL THE PROVISIONS OF THE CERTIFIED SOIL EROSION AND SEDIMENT CONTROL PLAN HAVE BEEN COMPLIED WITH FOR PERMANENT MEASURES.
21. OFFSITE SEDIMENT DISTURBANCE MAY REQUIRE ADDITIONAL CONTROL MEASURES TO BE DETERMINED BY THE EROSION CONTROL INSPECTOR.
22. A COPY OF THE CERTIFIED SOIL EROSION AND SEDIMENT CONTROL PLAN MUST BE MAINTAINED ON THE PROJECT SITE DURING CONSTRUCTION.
23. ANY CONVEYANCE OF THIS PROJECT PRIOR TO ITS COMPLETION WILL TRANSFER FULL RESPONSIBILITY FOR COMPLIANCE WITH THE CERTIFIED PLAN TO ALL SUBSEQUENT OWNERS.
24. IMMEDIATELY AFTER THE COMPLETION OF STRIPPING AND STOCKPILING OF TOPSOIL, SEED THE STOCKPILE WITH ANNUAL RYE GRASS. STABILIZE TOPSOIL STOCKPILE WITH STRAW MULCH FOR PROTECTION IF THE SEASON DOES NOT PERMIT THE APPLICATION AND ESTABLISHMENT OF TEMPORARY SEEDING.
25. ANY CHANGES TO THE SITE PLAN WILL REQUIRE THE SUBMISSION OF A REVISED SOIL EROSION AND SEDIMENT CONTROL PLAN TO THE CUMBERLAND/SALEM SOIL CONSERVATION DISTRICT. THE REVISED PLAN MUST BE IN ACCORDANCE WITH THE CURRENT NEW JERSEY STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL.
26. MAXIMUM SIDE SLOPES OF ALL EXPOSED SURFACES SHALL NOT BE CONSTRUCTED STEEPER THAN 3:1 UNLESS OTHERWISE APPROVED BY THE DISTRICT.
27. THE SOIL EROSION INSPECTOR MAY REQUIRE ADDITIONAL SOIL EROSION MEASURES TO BE INSTALLED, AS DIRECTED BY THE DISTRICT INSPECTOR.

STANDARD FOR LAND GRADING

DEFINITION
RESHAPING THE GROUND SURFACE BY GRADING TO PLANNED ELEVATIONS WHICH ARE DETERMINED BY TOPOGRAPHIC SURVEY AND LAYOUT.

PURPOSE
THE PRACTICE IS FOR ONE OR MORE OF THE FOLLOWING: PROVIDE MORE SUITABLE SITES FOR LAND DEVELOPMENT; IMPROVE SURFACE DRAINAGE AND CONTROL EROSION.

CONDITION WHERE PRACTICE APPLIES
THIS PRACTICE IS APPLICABLE WHERE GRADING TO PLANNED ELEVATIONS IS PRACTICAL AND IT IS DETERMINED THAT GRADING IS NEEDED. GRADING THAT INVOLVES THE DISTURBANCE OF VEGETATION OVER LARGE AREAS SHALL BE AVOIDED. IT MAY BE NECESSARY TO PROVIDE FOR TEMPORARY STABILIZATION OF LARGE AREAS.

WATER QUALITY ENHANCEMENT
PROPER GRADING OF DISTURBED SITES WILL PROTECT AGAINST SOIL LOSS FROM EROSION, ENHANCE ESTABLISHMENT OF PERMANENT VEGETATIVE COVER AND HELP TO PROPERLY MANAGE STORMWATER RUNOFF ALL OF WHICH WILL REDUCE OFF SITE DISCHARGE POLLUTANTS.

PLANNING CRITERIA
THE GRADING PLAN AND INSTALLATION SHALL BE BASED UPON TOPOGRAPHIC SURVEYS AND INVESTIGATIONS. THE PLAN IS TO SHOW THE LOCATION, SLOPE, CUT, FILL AND FINISH ELEVATION OF THE SURFACES TO BE GRADED. THE PLAN SHOULD ALSO INCLUDE AUXILIARY PRACTICES FOR SAFE DISPOSAL OF RUNOFF WATER, SLOPE STABILIZATION, EROSION CONTROL AND DRAINAGE. FACILITIES SUCH AS WATERWAYS, DITCHES, DIVERSIONS, GRADE STABILIZATION STRUCTURES, RETAINING WALLS AND SUBSURFACE DRAINS SHOULD BE INCLUDED WHERE NECESSARY.
EROSION CONTROL MEASURES SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE APPLICABLE STANDARD CONTAINED HEREIN.
THE DEVELOPMENT AND ESTABLISHMENT OF THE PLAN SHALL INCLUDE THE FOLLOWING:

1. THE CUT FACE OF EARTH EXCAVATIONS AND FILLS SHALL BE NO STEEPER THAN THE SAFE ANGLE OF REPOSE FOR THE MATERIALS ENCOUNTERED AND FLAT ENOUGH FOR PROPER MAINTENANCE.
2. THE PERMANENTLY EXPOSED FACES OF EARTH CUTS AND FILLS SHALL BE VEGETATED OR OTHERWISE PROTECTED FROM EROSION.
3. PROVISIONS SHALL BE MADE TO SAFELY CONDUCT SURFACE WATER TO STORM DRAINS OR SUITABLE WATER COURSES AND TO PREVENT SURFACE RUNOFF FROM DAMAGING CUT FACES AND FILL SLOPES.
4. SUBSURFACE DRAINAGE IS TO BE PROVIDED IN AREAS HAVING A HIGH WATER TABLE, TO INTERCEPT SEEPAGE THAT WOULD ADVERSELY AFFECT SLOPE STABILITY, BUILDING FOUNDATIONS OR CREATE UNDESIRABLE WETNESS. SEE STANDARD FOR SUBSURFACE DRAINAGE, PG. 30-1.
5. ADJOINING PROPERTY SHALL BE PROTECTED FROM EXCAVATION AND FILLING OPERATIONS.
6. FILL SHALL NOT BE PLACED ADJACENT TO THE BANK OF A STREAM OR CHANNEL UNLESS PROVISIONS ARE MADE TO PROTECT THE HYDRAULIC, BIOLOGICAL AESTHETIC AND OTHER ENVIRONMENTAL FUNCTIONS OF THE STREAM.

INSTALLATION REQUIREMENTS
1. TIMBER, LOGS, BRUSH, RUBBISH, ROCKS, STUMPS AND VEGETATIVE MATTER WHICH WILL INTERFERE WITH THE GRADING OPERATION OR AFFECT THE PLANNED STABILITY OR FILL AREAS SHALL BE REMOVED AND DISPOSED OF ACCORDING TO THE PLAN.
2. TOPSOIL IS TO BE STRIPPED AND STOCKPILED IN AMOUNTS NECESSARY TO COMPLETE FINISH GRADING OF ALL EXPOSED AREAS REQUIRING TOPSOIL. SEE STANDARD FOR TOPSOILING, PG. 8-1.
3. FILL MATERIAL IS TO BE FREE OF BRUSH, RUBBISH, TIMBER, LOGS, VEGETATIVE MATTER AND STUMPS IN AMOUNTS THAT WILL BE DETRIMENTAL TO CONSTRUCTING STABLE FILLS.
4. ALL FILLS SHALL BE COMPACTED SUFFICIENTLY FOR THEIR INTENDED PURPOSED AND AS REQUIRED TO REDUCE SLIPPING, EROSION OR EXCESSIVE SATURATION.
5. ALL DISTURBED AREAS SHALL BE LEFT WITH A NEAT AND FINISHED APPEARANCE AND SHALL BE PROTECTED FROM EROSION. SEE STANDARDS FOR PERMANENT VEGETATIVE COVER FOR SOIL STABILIZATION, PG. 4-1.
6. TREES TO BE RETAINED SHALL BE PROTECTED IF NECESSARY IN ACCORDANCE WITH THE STANDARD FOR TREE PROTECTION DURING CONSTRUCTION, PG. 9-1.
7. SOIL COMPACTION RESULTING FROM LAND GRADING ACTIVITIES CAN IMPACT THE INFILTRATION RATE OF THE SOIL. RESTORATION OF COMPACTED SOILS THROUGH DEEP TILLAGE (6" TO 12") AND THE ADDITION OF ORGANIC MATTER MAY BE REQUIRED IN PLANNED PERVIOUS AREAS TO ENHANCE THE INFILTRATION RATE OF THE DISTURBED SOIL. **THIS PRACTICE IS PERMISSIBLE ONLY WHERE THERE IS NO DANGER TO UNDERGROUND UTILITIES (CABLES, IRRIGATION SYSTEMS, ETC.)**

STANDARD FOR TEMPORARY VEGETATIVE COVER FOR SOIL STABILIZATION

DEFINITION
ESTABLISHMENT OF TEMPORARY VEGETATIVE COVER ON SOILS EXPOSED FOR PERIODS OF TWO TO 6 MONTHS WHICH ARE NOT BEING GRADED, NOT UNDER ACTIVE CONSTRUCTION OR NOT SCHEDULED FOR PERMANENT SEEDING WITHIN 60 DAYS.

PURPOSE
TO TEMPORARILY STABILIZE THE SOIL AND REDUCE DAMAGE FROM WIND AND WATER EROSION UNTIL PERMANENT STABILIZATION IS ACCOMPLISHED.

WATER QUALITY ENHANCEMENT
PROVIDES TEMPORARY PROTECTION AGAINST THE IMPACTS OF WIND AND RAIN, SLOWS THE OVERLAND MOVEMENT OF STORMWATER RUNOFF, INCREASES INFILTRATION AND RETAINS SOIL AND NUTRIENTS ON SITE, PROTECTING STREAMS OR OTHER STORMWATER CONVEYANCES.

WHERE APPLICABLE
ON EXPOSED SOILS THAT HAVE A POTENTIAL FOR CAUSING OFF-SITE ENVIRONMENTAL DAMAGE.

METHODS AND MATERIALS
1. SITE PREPARATION
   A. GRADE AS NEEDED AND FEASIBLE TO PERMIT THE USE OF CONVENTIONAL EQUIPMENT FOR SEEDBED PREPARATION, SEEDING, MULCH APPLICATION, AND MULCH ANCHORING. ALL GRADING SHOULD BE DONE IN ACCORDANCE WITH STANDARDS FOR LAND GRADING, PG. 19-1.
   B. INSTALL NEEDED EROSION CONTROL PRACTICES OR FACILITIES SUCH AS DIVERSIONS, GRADE STABILIZATION STRUCTURES, CHANNEL STABILIZATION MEASURES, SEDIMENT BASINS, AND WATERWAYS. SEE STANDARDS 11 THROUGH 42.
   C. IMMEDIATELY PRIOR TO SEEDING, THE SURFACE SHOULD BE SCARIFIED 6" TO 12" WHERE THERE HAS BEEN SOIL COMPACTION. **THIS PRACTICE IS PERMISSIBLE ONLY WHERE THERE IS NO DANGER TO UNDERGROUND UTILITIES (CABLES, IRRIGATION SYSTEMS, ETC.).**
2. SEEDBED PREPARATION
   A. APPLY GROUND LIMESTONE AND FERTILIZER ACCORDING TO SOIL TEST RECOMMENDATIONS SUCH AS OFFERED BY RUTGERS CO-OPERATIVE EXTENSION. SOIL SAMPLE MAILERS ARE AVAILABLE FROM THE LOCAL RUTGERS COOPERATIVE EXTENSION OFFICES. FERTILIZER SHALL BE APPLIED AT THE RATE OF 500 POUNDS PER ACRE OR 11 POUNDS PER 1,000 SQUARE FEET OF 10-20-10 OR EQUIVALENT WITH 50% WATER INSOLUBLE NITROGEN UNLESS A SOIL TEST INDICATES OTHERWISE. APPLY LIMESTONE AT THE RATE OF 2 TONS/ACRE UNLESS SOIL TESTING INDICATES OTHERWISE. CALCIUM CARBONATE IS THE EQUIVALENT AND STANDARD FOR MEASURING THE ABILITY OF LIMING MATERIALS TO NEUTRALIZE SOIL ACIDITY AND SUPPLY CALCIUM AND MAGNESIUM TO GRASSES AND LEGUMES.
   B. WORK LIME AND FERTILIZER INTO THE SOIL AS NEARLY AS PRACTICAL TO A DEPTH OF 4 INCHES WITH A DISC, SPRINGTOOTH HARROW, OR OTHER SUITABLE EQUIPMENT. THE FINAL HARROWING OR DISKING OPERATION SHOULD BE ON THE GENERAL CONTOUR. CONTINUE TILLAGE UNTIL A REASONABLE UNIFORM SEEDBED IS PREPARED.
   C. INSPECT SEEDBED JUST BEFORE SEEDING. IF TRAFFIC HAS LEFT THE SOIL COMPACTED, THE AREA MUST BE RETILLED IN ACCORDANCE WITH THE ABOVE.
   D. SOILS HIGH IN SULFIDES OR HAVING A PH OF 4 OR LESS REFER TO STANDARD FOR MANAGEMENT OF HIGH ACID PRODUCING SOIL, PG. 1-1.
3. SEEDING
   A. SELECT SEED FROM RECOMMENDATIONS IN TABLE 7-2.
   B. CONVENTIONAL SEEDING. APPLY SEED UNIFORMLY BY HAND, CYCLONE (CENTRIFUGAL) SEEDER, DROP SEEDER, DRILL OR CULTIPACKER SEEDER. EXCEPT FOR DRILLED, HYDROSEEDED OR CULTIPACKED SEEDINGS, SEED SHALL BE INCORPORATED INTO THE SOIL, TO A DEPTH OF ¼ TO ½ INCH, BY RAKING OR DRAGGING. DEPTH OF SEED PLACEMENT MAY BE ¼ INCH DEEPER ON COARSE TEXTURED SOIL.
   C. HYDROSEEDING IS A BROADCAST SEEDING METHOD USUALLY INVOLVING A TRUCK OR TRAILER MOUNTED TANK, WITH AN AGITATION SYSTEM AND HYDRAULIC PUMP FOR MIXING SEED, WATER AND FERTILIZER AND SPRAYING THE MIX ONTO THE PREPARED SEEDBED. MULCH **SHALL NOT** BE INCLUDED IN THE TANK WITH SEED. SHORT FIBERED MULCH MAY BE APPLIED WITH A HYDROSEEDER FOLLOWING SEEDING. (ALSO SEE SECTION IV MULCHING) HYDROSEEDING IS NOT A PREFERRED SEEDING METHOD BECAUSE SEED AND FERTILIZER ARE APPLIED TO THE SURFACE AND NOT INCORPORATED INTO THE SOIL. POOR SEED TO SOIL CONTACT OCCURS REDUCING SEED GERMINATION AND GROWTH. HYDROSEEDING MAY BE USED FOR AREAS TOO STEEP FOR CONVENTIONAL EQUIPMENT TO TRAVERSE OR TOO OBSTRUCTED WITH ROCKS, STUMP, ETC.
   D. AFTER SEEDING, FIRMING THE SOIL WITH A CORRUGATED ROLLER WILL ASSURE GOOD SEED-TO-SOIL CONTACT, RESTORE CAPILLARITY, AND IMPROVE SEEDLING EMERGENCE. THIS IS THE PREFERRED METHOD. WHEN PERFORMED ON THE CONTOUR, SHEET EROSION WILL BE MINIMIZED AND WATER CONSERVATION ON SITE WILL BE MAXIMIZED.
4. MULCHING
   MULCHING IS REQUIRED ON ALL SEEDING. MULCH WILL INSURE AGAINST EROSION BEFORE GRASS IS ESTABLISHED AND WILL PROMOTE FASTER AND EARLIER ESTABLISHMENT. THE EXISTENCE OF VEGETATION SUFFICIENT TO CONTROL SOIL EROSION SHALL BE DEEMED COMPLIANCE WITH THIS MULCHING REQUIREMENT.
   A. STRAW OR HAY. UNROTTED SMALL GRAIN STRAW, HAY FREE OF SEEDS, APPLIED AT THE RATE OF 1-1/2 TO 2 TONS PER ACRE (70 TO 90 POUNDS PER 1,000 SQUARE FEET), EXCEPT THAT WHERE A CRIMPER IS USED INSTEAD OF A LIQUID MULCH-BINDER (TACKIFYING OR ADHESIVE AGENT), THE RATE OF APPLICATION IS 3 TONS PER ACRE. MULCH CHOPPER-BLOWERS MUST NOT GRIND THE MULCH. HAY MULCH IS NOT RECOMMENDED FOR ESTABLISHING FINE TURF OR LAWNS DUE TO THE PRESENCE OF WEED SEED.
      APPLICATION. SPREAD MULCH UNIFORMLY BY HAND OR MECHANICALLY SO THAT APPROXIMATELY 95% OF THE SOIL SURFACE WILL BE COVERED. FOR UNIFORM DISTRIBUTION OF HAND-SPREAD MULCH, DIVIDE AREA INTO APPROXIMATELY 1,000 SQUARE FEET SECTIONS AND DISTRIBUTE 70 TO 90 POUNDS WITHIN EACH SECTION.
      ANCHORING SHALL BE ACCOMPLISHED IMMEDIATELY AFTER PLACEMENT TO MINIMIZE LOSS BY WIND OR WATER. THIS MAY BE DONE BY ONE OF THE FOLLOWING METHODS, DEPENDING UPON THE SIZE OF THE AREA, STEEPNESS OF SLOPES, AND COST.
      4.A. PEG AND TWINE. DRIVE 8 TO 10 INCH WOODEN PEGS TO WITHIN 2 TO 3 INCHES OF THE SOIL SURFACE EVERY 4 FEET IN ALL DIRECTIONS. STAKES MAY BE DRIVEN BEFORE OR AFTER APPLYING MULCH. SECURE MULCH TO SOIL SURFACE BY STRETCHING TWINE BETWEEN PEGS IN A CRISS-CROSS AND A SQUARE PATTERN. SECURE TWINE AROUND EACH PEG WITH TWO OR MORE ROUND TURNS.
      4.B. MULCHING NETTINGS. STAPLE PAPER, JUTE, COTTON, OR PLASTIC NETTINGS TO THE SOIL SURFACE. USE A DEGRADABLE NETTING IN AREAS TO BE MOWED.
      4.C. CRIMPER (MULCH ANCHORING COULTER TOOL). A TRACTOR-DRAWN IMPLEMENT, SOMEWHAT LIKE A DISC HARROW, ESPECIALLY DESIGNED TO PUSH OR CUT SOME OF THE BROADCAST LONG FIBER MULCH 3 TO 4 INCHES INTO THE SOIL SO AS TO ANCHOR IT AND LEAVE PART STANDING UPRIGHT. THIS TECHNIQUE IS LIMITED TO AREAS TRAVERSABLE BY A TRACTOR, WHICH MUST OPERATE ON THE CONTOUR OF SLOPES. STRAW MULCH RATE MUST BE 3 TONS PER ACRE. NO TACKIFYING OR ADHESIVE AGENT IS REQUIRED.
      4.D. LIQUID MULCH-BINDERS - MAY BE USED TO ANCHOR HAY OR STRAW MULCH.
         a. APPLICATIONS SHOULD BE HEAVIER AT EDGES WHERE WIND MAY CATCH THE MULCH, IN VALLEYS, AND AT CRESTS OF BANKS. THE REMAINDER OF THE AREA SHOULD BE UNIFORM IN APPEARANCE.
         b. USE ONE OF THE FOLLOWING:
            (1) ORGANIC AND VEGETABLE BASED BINDERS - NATURALLY OCCURRING, POWDER BASED, HYDROPHILIC MATERIALS WHEN MIXED WITH WATER FORMULATES A GEL AND WHEN APPLIED TO MULCH UNDER SATISFACTORY CURING CONDITIONS WILL FORM MEMBRANED NETWORKS OF INSOLUBLE POLYMERS. THE VEGETABLE GEL SHALL BE PHYSIOLOGICALLY HARMLESS AND NOT RESULT IN A PHYTOTOXIC EFFECT OR IMPEDE GROWTH OF TURFGRASS. USE AT RATES AND WEATHER CONDITIONS AS RECOMMENDED BY THE MANUFACTURER TO ANCHOR MULCH MATERIALS. MANY NEW PRODUCTS ARE AVAILABLE, SOME OF WHICH MAY NEED FURTHER EVALUATION FOR USE IN THIS STATE.
            (2) SYNTHETIC BINDERS - HIGH POLYMER SYNTHETIC EMULSION, MISCIBLE WITH WATER WHEN DILUTED AND FOLLOWING APPLICATION TO MULCH, DRYING AND CURING SHALL NO LONGER BE SOLUBLE OR DISPERSIBLE IN WATER. IT SHALL BE APPLIED AT RATES RECOMMENDED BY THE MANUFACTURER AND REMAIN TACKY UNTIL GERMINATION OF GRASS.
            NOTE: ALL NAMES GIVEN ABOVE ARE REGISTERED TRADE NAMES. THIS DOES NOT CONSTITUTE A COMMENDATION OF THESE PRODUCTS TO THE EXCLUSION OF OTHER PRODUCTS.
   B. WOOD-FIBER OR PAPER-FIBER MULCH. SHALL BE MADE FROM WOOD, PLANT FIBERS OR PAPER CONTAINING NO GROWTH OR GERMINATION INHIBITING MATERIALS. USED AT THE RATE OF 1,500 POUNDS PER ACRE (OR AS RECOMMENDED BY THE PRODUCT MANUFACTURER) AND MAY BE APPLIED BY A HYDROSEEDER. THIS MULCH SHALL NOT BE MIXED IN THE TANK WITH SEED. USE IS LIMITED TO FLATTER SLOPES AND DURING OPTIMUM SEEDING PERIODS IN SPRING AND FALL.
   C. PELLETIZED MULCH. COMPRESSED AND EXTRUDED PAPER AND/OR WOOD FIBER PRODUCT, WHICH MAY CONTAIN CO-POLYMERS, TACKIFIERS, FERTILIZERS AND COLORING AGENTS. THE DRY PELLETS, WHEN APPLIED TO A SEEDED AREA AND WATERED, FORM A MULCH MAT. PELLETIZED MULCH SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS. MULCH MAY BE APPLIED BY HAND OR MECHANICAL SPREADER AT THE RATE OF 60-75 LBS/1,000 SQUARE FEET AND ACTIVATED WITH 0.2 TO 0.4 INCHES WATER. THIS MATERIAL HAS BEEN FOUND TO BE BENEFICIAL FOR USE ON SMALL LAWN OR RENOVATION AREAS, SEEDED AREAS WHERE WEED-SEED FREE MULCH IS DESIRED OR ON SITES WHERE STRAW MULCH AND TACKIFIER AGENT ARE NOT PRACTICAL OR DESIRABLE.
      APPLYING THE FULL 0.2 TO 0.4 INCHES OF WATER AFTER SPREADING PALLETIZED MULCH ON THE SEED BED IS EXTREMELY IMPORTANT FOR SUFFICIENT ACTIVATION AND EXPANSION OF THE MULCH TO PROVIDE SOIL COVERAGE.

STANDARD FOR PERMANENT VEGETATIVE COVER FOR SOIL STABILIZATION

DEFINITION
ESTABLISHMENT OF PERMANENT VEGETATIVE COVER ON EXPOSED SOILS WHERE PERENNIAL VEGETATION IS NEEDED FOR LONG-TERM PROTECTION.

PURPOSE
TO PERMANENTLY STABILIZE THE SOIL, ENSURING CONSERVATION OF SOIL AND WATER, AND TO ENHANCE THE ENVIRONMENT.

WATER QUALITY ENHANCEMENT
SLOWS THE OVERLAND MOVEMENT OF STORMWATER RUNOFF, INCREASES INFILTRATION AND RETAINS SOIL AND NUTRIENTS ON SITE, PROTECTING STREAMS OR OTHER STORMWATER CONVEYANCES.

WHERE APPLICABLE
ON EXPOSED SOILS THAT HAVE A POTENTIAL FOR CAUSING OFF-SITE ENVIRONMENTAL DAMAGE.

METHODS AND MATERIALS
1. SITE PREPARATION
   A. GRADE AS NEEDED AND FEASIBLE TO PERMIT THE USE OF CONVENTIONAL EQUIPMENT FOR SEEDBED PREPARATION, SEEDING, MULCH APPLICATION AND MULCH ANCHORING. ALL GRADING SHOULD BE DONE IN ACCORDANCE WITH STANDARDS FOR LAND GRADING.
   B. IMMEDIATELY PRIOR TO SEEDING AND TOPSOIL APPLICATION, THE SUBSOIL SHALL BE EVALUATED FOR COMPACTION IN ACCORDANCE WITH THE STANDARD FOR LAND GRADING.
   C. TOPSOIL SHOULD BE HANDLED ONLY WHEN IT IS DRY ENOUGH TO WORK WITHOUT DAMAGING THE SOIL STRUCTURE. A UNIFORM APPLICATION TO A DEPTH OF 5 INCHES (UNSETTLED) IS REQUIRED ON ALL SITES. TOPSOIL SHALL BE AMENDED WITH ORGANIC MATTER, AS NEEDED, IN ACCORDANCE WITH THE STANDARD FOR TOPSOILING.
   D. INSTALL NEEDED EROSION CONTROL PRACTICES OF FACILITIES SUCH AS DIVERSIONS, GRADE STABILIZATION STRUCTURES, CHANNEL STABILIZATION MEASURES, SEDIMENT BASINS, AND WATERWAYS.
2. SEEDBED PREPARATION
   A. UNIFORMLY APPLY GROUND LIMESTONE AND FERTILIZER TO TOPSOIL WHICH HAS BEEN SPREAD AND FIRMED, ACCORDING TO SOIL TEST RECOMMENDATIONS SUCH AS OFFERED BY RUTGERS CO-OPERATIVE EXTENSION. SOIL SAMPLE MAILERS ARE AVAILABLE FROM THE LOCAL RUTGERS COOPERATIVE EXTENSION OFFICES (HTTP://NJAES.RUTGERS.EDU/COUNTY/). FERTILIZER SHALL BE APPLIED AT THE RATE OF 500 POUNDS PER ACRE OR 11 POUNDS PER 1,000 SQUARE FEET OF 10-10-10 OR EQUIVALENT WITH 50% WATER INSOLUBLE NITROGEN UNLESS A SOIL TEST INDICATES OTHERWISE AND INCORPORATED INTO THE SURFACE 4 INCHES. IF FERTILIZER IS NOT INCORPORATED, APPLY ONE-HALF THE RATE DESCRIBED ABOVE DURING SEEDBED PREPARATION AND REPEAT ANOTHER ONE-HALF RATE APPLICATION OF THE SAME FERTILIZER WITHIN 3 TO 5 WEEKS AFTER SEEDING.
   B. WORK LIME AND FERTILIZER INTO THE TOPSOIL AS NEARLY AS PRACTICAL TO A DEPTH OF 4 INCHES WITH A DISC, SPRINGTOOTH HARROW, OR OTHER SUITABLE EQUIPMENT. THE FINAL HARROWING OR DISKING OPERATION SHOULD BE ON THE GENERAL CONTOUR. CONTINUE TILLAGE UNTIL A REASONABLE UNIFORM SEEDBED IS PREPARED.
   C. HIGH ACID PRODUCING SOIL. SOILS HAVING A PH OF 4 OR LESS OR CONTAINING IRON SULFIDE SHALL BE COVERED WITH A MINIMUM OF 12 INCHES OF SOIL HAVING A PH OF 5 OR MORE BEFORE INITIATING SEEDBED PREPARATION. SEE STANDARD FOR MANAGEMENT OF HIGH ACID-PRODUCING SOILS FOR SPECIFIC REQUIREMENTS.
3. SEEDING
   A. SELECT A MIXTURE FROM TABLE 4-3 OR USE MIXTURE RECOMMENDED BY RUTGERS COOPERATIVE EXTENSION OR NATURAL RESOURCES CONSERVATION SERVICE WHICH IS APPROVED BY THE SOIL CONSERVATION DISTRICT. SEED GERMINATION SHALL HAVE BEEN TESTED WITHIN 12 MONTHS OF THE PLANTING DATE. NO SEED SHALL BE ACCEPTED WITH A GERMINATION TEST DATE MORE THAN 12 MONTHS OLD UNLESS RETESTED.
   3.A. SEEDING RATES SPECIFIED ARE REQUIRED WHEN A REPORT OF COMPLIANCE IS REQUESTED PRIOR TO ACTUAL ESTABLISHMENT OF PERMANENT VEGETATION. UP TO 50% REDUCTION IN RATES MAY BE USED WHEN PERMANENT VEGETATION IS ESTABLISHED PRIOR TO A REPORT OF COMPLIANCE INSPECTION. THESE RATES APPLY TO ALL METHODS OF SEEDING. ESTABLISHING PERMANENT VEGETATION MEANS 80% VEGETATIVE COVERAGE WITH THE SPECIFIED SEED MIXTURE FOR THE SEEDED AREA AND MOWED ONCE.
   3.B. WARM-SEASON MIXTURES ARE GRASSES AND LEGUMES WHICH MAXIMIZE GROWTH AT HIGH TEMPERATURES, GENERALLY 85 °F AND ABOVE. SEE TABLE 4-3 MIXTURES 1 TO 7. PLANTING RATES FOR WARM-SEASON GRASSES SHALL BE THE AMOUNT OF PURE LIVE SEED (PLS) AS DETERMINED BY GERMINATION TESTING RESULTS.
   3.C. COOL-SEASON MIXTURES ARE GRASSES AND LEGUMES WHICH MAXIMIZE GROWTH AT TEMPERATURES BELOW 85 °F. MANY GRASSES BECOME ACTIVE AT 65 °F. SEE TABLE 3-4, MIXTURES 8-20. ADJUSTMENT OF PLANTING RATES TO COMPENSATE FOR THE AMOUNT OF PURE LIVE SEED IS NOT REQUIRED FOR COOL SEASON GRASSES.
   B. **CONVENTIONAL SEEDING** IS PERFORMED BY APPLYING SEED UNIFORMLY BY HAND, CYCLONE (CENTRIFUGAL) SEEDER, DROP SEEDER, DRILL OR CULTIPACKER SEEDER. EXCEPT FOR DRILLED, HYDROSEEDED OR CULTIPACKED SEEDINGS, SEED SHALL BE INCORPORATED INTO THE SOIL WITHIN 24 HOURS OF SEEDBED PREPARATION TO A DEPTH OF ¼ TO ½ INCH, BY RAKING OR DRAGGING. DEPTH OF SEED PLACEMENT MAY BE ¼ INCHES DEEPER ON COARSE-TEXTURED SOIL.
   C. AFTER SEEDING, FIRMING THE SOIL WITH A CORRUGATED ROLLER WILL ASSURE GOOD SEED-TO-SOIL CONTACT, RESTORE CAPILLARITY, AND IMPROVE SEEDLING EMERGENCE. THIS IS THE PREFERRED METHOD. WHEN PERFORMED ON THE CONTOUR, SHEET EROSION WILL BE MINIMIZED AND WATER CONSERVATION ON SITE WILL BE MAXIMIZED.
   D. **HYDROSEEDING** IS A BROADCAST SEEDING METHOD USUALLY INVOLVING A TRUCK, OR TRAILER-MOUNTED TANK, WITH AN AGITATION SYSTEM AND HYDRAULIC PUMP FOR MIXING SEED, WATER AND FERTILIZER AND SPRAYING THE MIX ONTO THE PREPARED SEEDBED. **MULCH SHALL NOT BE INCLUDED IN THE TANK WITH SEED.** SHORT-FIBERED MULCH MAY BE APPLIED WITH A HYDROSEEDER FOLLOWING SEEDING (ALSO SEE SECTION 4-MULCHING BELOW). HYDROSEEDING IS NOT A PREFERRED SEEDING METHOD BECAUSE SEED AND FERTILIZER ARE APPLIED TO THE SURFACE AND NOT INCORPORATED INTO THE SOIL. WHEN POOR SEED TO SOIL CONTACT OCCURS, THERE IS A REDUCED SEED GERMINATION AND GROWTH.
4. MULCHING
   MULCHING IS REQUIRED ON ALL SEEDING. MULCH WILL PROTECT AGAINST EROSION BEFORE GRASS IS ESTABLISHED AND WILL PROMOTE FASTER AND EARLIER ESTABLISHMENT. THE EXISTENCE OF VEGETATION SUFFICIENT TO CONTROL SOIL EROSION SHALL BE DEEMED COMPLIANCE WITH THE MULCHING REQUIREMENT.
   A. STRAW OR HAY. UNROTTED SMALL GRAIN STRAW, HAY FREE OF SEEDS, TO BE APPLIED AT THE RATE OF 1-½ TO 2 TONS PER ACRE (70 TO 90 POUND PER 1,000 SQUARE FEET), EXCEPT THAT WHERE A CRIMPER IS USED INSTEAD OF A LIQUID MULCH-BINDER (TACKIFYING OR ADHESIVE AGENT), THE RATE OF APPLICATION IS 3 TONS PER ACRE. MULCH CHOPPER-BLOWERS MUST NOT GRIND THE MULCH. HAY MULCH IS NOT RECOMMENDED FOR ESTABLISHING FINE TURF OR LAWNS DUE TO THE PRESENCE OF WEED SEED.
      APPLICATION - SPREAD MULCH UNIFORMLY BY HAND OR MECHANICALLY SO THAT AT LEAST 85% OF THE SOIL SURFACE IS COVERED. FOR UNIFORM DISTRIBUTION OF HAND-SPREAD MULCH, DIVIDE AREA INTO APPROXIMATELY 1,000 SQUARE FEET SECTIONS AND DISTRIBUTE 70 TO 90 POUNDS WITHIN EACH SECTION.
      ANCHORING SHALL BE ACCOMPLISHED IMMEDIATELY AFTER PLACEMENT TO MINIMIZE LOSS BY WIND OR WATER. THIS MAY BE DONE BY ONE OF THE FOLLOWING METHODS, DEPENDING UPON THE SIZE OF THE AREA, STEEPNESS OF SLOPES, AND COSTS.
      A.1. PEG AND TWINE. DRIVE 8 TO 10 INCH WOODEN PEGS TO WITHIN 2 TO 3 INCHES OF THE SOIL SURFACE EVERY 4 FEET IN ALL DIRECTIONS. STAKES MAY BE DRIVEN BEFORE OR AFTER APPLYING MULCH. SECURE MULCH TO SOIL SURFACE BY STRETCHING TWINE BETWEEN PEGS IN A CRISS-CROSS AND A SQUARE PATTERN. SECURE TWINE AROUND EACH PEG WITH TWO OR MORE ROUND TURNS.
      A.2. MULCH NETTINGS - STAPLE PAPER, JUTE, COTTON OR PLASTIC NETTINGS TO THE SOIL SURFACE. USE A DEGRADABLE NETTING IN AREAS TO BE MOWED.
      A.3. CRIMPER (MULCH ANCHORING COULTER TOOL) - A TRACTOR-DRAWN IMPLEMENT, SOMEWHAT LIKE A DISC HARROW, ESPECIALLY DESIGNED TO PUSH OR CUT SOME OF THE BROADCAST LONG FIBER MULCH 3 TO 4 INCHES INTO THE SOIL SO AS TO ANCHOR IT AND LEAVE PART STANDING UPRIGHT. THIS TECHNIQUE IS LIMITED TO AREAS TRAVERSABLE BY A TRACTOR, WHICH MUST OPERATE ON THE CONTOUR OF SLOPES. STRAW MULCH RATE MUST BE 3 TONS PER ACRE. NO TACKIFYING OR ADHESIVE AGENT IS REQUIRED.
      A.4. LIQUID MULCH-BINDERS - MAY BE USED TO ANCHOR SALT HAY, HAY OR STRAW MULCH.
         a. APPLICATIONS SHOULD BE HEAVIER AT EDGES WHERE WIND MAY CATCH THE MULCH, IN VALLEYS, AND AT CRESTS OF BANKS. THE REMAINDER OF THE AREA SHOULD BE UNIFORM IN APPEARANCE.
         b. USE ONE OF THE FOLLOWING:
            i. ORGANIC AND VEGETABLE BASED BINDERS - NATURALLY OCCURRING, POWDER BASED, HYDROPHILIC MATERIALS WHEN MIXED WITH WATER FORMULATES A GEL AND WHEN APPLIED TO MULCH UNDER SATISFACTORY CURING CONDITIONS WILL FORM MEMBRANED NETWORKS OF INSOLUBLE POLYMERS. THE VEGETABLE GEL SHALL BE PHYSIOLOGICALLY HARMLESS AND NOT RESULT IN A PHYTOTOXIC EFFECT OR IMPEDE GROWTH OF TURF GRASS. USE AT RATES AND WEATHER CONDITIONS AS RECOMMENDED BY THE MANUFACTURER TO ANCHOR MULCH MATERIALS. MANY NEW PRODUCTS ARE AVAILABLE, SOME OF WHICH MAY NEED FURTHER EVALUATION FOR USE IN THIS STATE.
            ii. SYNTHETIC BINDERS - HIGH POLYMER SYNTHETIC EMULSION, MISCIBLE WITH WATER WHEN DILUTED AND, FOLLOWING APPLICATION OF MULCH, DRYING AND CURING, SHALL NO LONGER BE SOLUBLE OR DISPERSIBLE IN WATER. BINDER SHALL BE APPLIED AT RATES RECOMMENDED BY THE MANUFACTURER AND REMAIN TACKY UNTIL GERMINATION OF GRASS.
            NOTE: ALL NAMES GIVEN ABOVE ARE REGISTERED TRADE NAMES. THIS DOES NOT CONSTITUTE A RECOMMENDATION OF THESE PRODUCTS TO THE EXCLUSION OF OTHER PRODUCTS.
   B. WOOD-FIBER OR PAPER-FIBER MULCH - SHALL BE MADE FROM WOOD, PLANT FIBERS OR PAPER CONTAINING NO GROWTH OR GERMINATION INHIBITING MATERIALS, USED AT THE RATE OF 1,500 POUNDS PER ACRE (OR AS RECOMMENDED BY THE PRODUCT MANUFACTURER) AND MAY BE APPLIED BY A HYDROSEEDER. **MULCH SHALL NOT BE MIXED IN THE TANK WITH SEED.** USE IS LIMITED TO FLATTER SLOPES AND DURING OPTIMUM SEEDING PERIODS IN SPRING AND FALL.
   C. PELLETIZED MULCH - COMPRESSED AND EXTRUDED PAPER AND/OR WOOD FIBER PRODUCT, WHICH MAY CONTAIN CO-POLYMERS, TACKIFIERS, FERTILIZERS, AND COLORING AGENTS. THE DRY PELLETS, WHEN APPLIED TO A SEEDED AREA AND WATERED, FORM A MULCH MAT. PELLETIZED MULCH SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS. MULCH MAY BE APPLIED BY HAND OR MECHANICAL SPREADER AT THE RATE OF 60-75 LBS. / 1,000 SQUARE FEET AND ACTIVATED WITH 0.2 TO 0.4 INCHES OF WATER. THE MATERIAL HAS BEEN FOUND TO BE BENEFICIAL FOR USE ON SMALL LAWN OR RENOVATION AREAS, SEEDED AREAS WHERE WEED-SEED FREE MULCH IS DESIRED, OR ON SITES WHERE STRAW MULCH AND TACKIFIER AGENT ARE NOT PRACTICAL OR DESIRABLE. APPLYING THE FULL 0.2 TO 0.4 INCHES OF WATER AFTER SPREADING PALLETIZED MULCH ON THE SEED BED IS EXTREMELY IMPORTANT FOR SUFFICIENT ACTIVATION AND EXPANSION OF THE MULCH TO PROVIDE SOIL COVERAGE.
5. IRRIGATION (WHERE FEASIBLE)
   IF SOIL MOISTURE IS DEFICIENT SUPPLY NEW SEEDINGS WITH ADEQUATE WATER (A MINIMUM OF ¼ INCH APPLIED UP TO TWICE A DAY UNTIL VEGETATION IS WELL ESTABLISHED). THIS IS ESPECIALLY TRUE WHEN SEEDINGS ARE MADE IN ABNORMALLY DRY OR HOT WEATHER OR ON DROUGHTY SITES.
6. TOPDRESSING
   SINCE SOIL ORGANIC MATTER CONTENT AND SLOW RELEASE NITROGEN FERTILIZER (WATER INSOLUBLE) ARE PRESCRIBED IN SECTION 2A - SEEDBED PREPARATION IN THIS STANDARD, NO FOLLOW-UP OF TOPDRESSING IS MANDATORY. AN EXCEPTION MAY BE MADE WHERE GROSS NITROGEN DEFICIENCY EXISTS IN THE SOIL TO THE EXTENT THAT TURF FAILURE MAY DEVELOP. IN THAT INSTANCE, TOPDRESS WITH 10-10-10 OR EQUIVALENT AT 300 POUNDS PER ACRE OR 7 POUNDS PER 1,000 SQUARE FEET EVERY 3 TO 5 WEEKS UNTIL THE GROSS NITROGEN DEFICIENCY IN THE TURF IS AMELIORATED.
7. ESTABLISHING PERMANENT VEGETATIVE STABILIZATION
   THE QUALITY OF PERMANENT VEGETATION RESTS WITH THE CONTRACTOR. THE TIMING OF SEEDING, PREPARING THE SEEDBED, APPLYING NUTRIENTS, MULCH AND OTHER MANAGEMENT ARE ESSENTIAL. THE SEED APPLICATION RATES IN TABLE 4-3 ARE REQUIRED WHEN A REPORT OF COMPLIANCE IS REQUESTED PRIOR TO ACTUAL ESTABLISHMENT OF PERMANENT VEGETATION. UP TO 50% REDUCTION IN APPLICATION RATES MAY BE USED WHEN PERMANENT VEGETATION IS ESTABLISHED PRIOR TO REQUESTING A REPORT OF COMPLIANCE FROM THE DISTRICT. THESE RATES APPLY TO ALL METHODS OF SEEDING. **ESTABLISHING PERMANENT VEGETATION MEANS 80% VEGETATIVE COVER (OF THE SEEDED SPECIES) AND MOWED ONCE.** NOTE THIS DESIGNATION OF MOWED ONCE DOES NOT GUARANTEE THE PERMANENCY OF THE TURF SHOULD OTHER MAINTENANCE FACTORS BE NEGLECTED OR OTHERWISE MISMANAGED.

REV.	DATE	DESCRIPTION	BY	APPR.

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

SOIL EROSION AND SEDIMENT CONTROL DETAILS

PROJECT: FORTESCUE CREEK CHANNEL, TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: AEM	PRINCETON HYDRO, LLC. CERTIFICATION OF AUTHORIZATION NO. 24GA27976800	PROJECT NO.	1563.007
CHECKED BY: MPG		SHEET 12 OF 14	
SCALE: 1" = 100'	MARY L. PAIST-GOLDMAN NEW JERSEY PROFESSIONAL ENGINEER NO. GE-45798	DWG. NO. ES502	
5/21/15			

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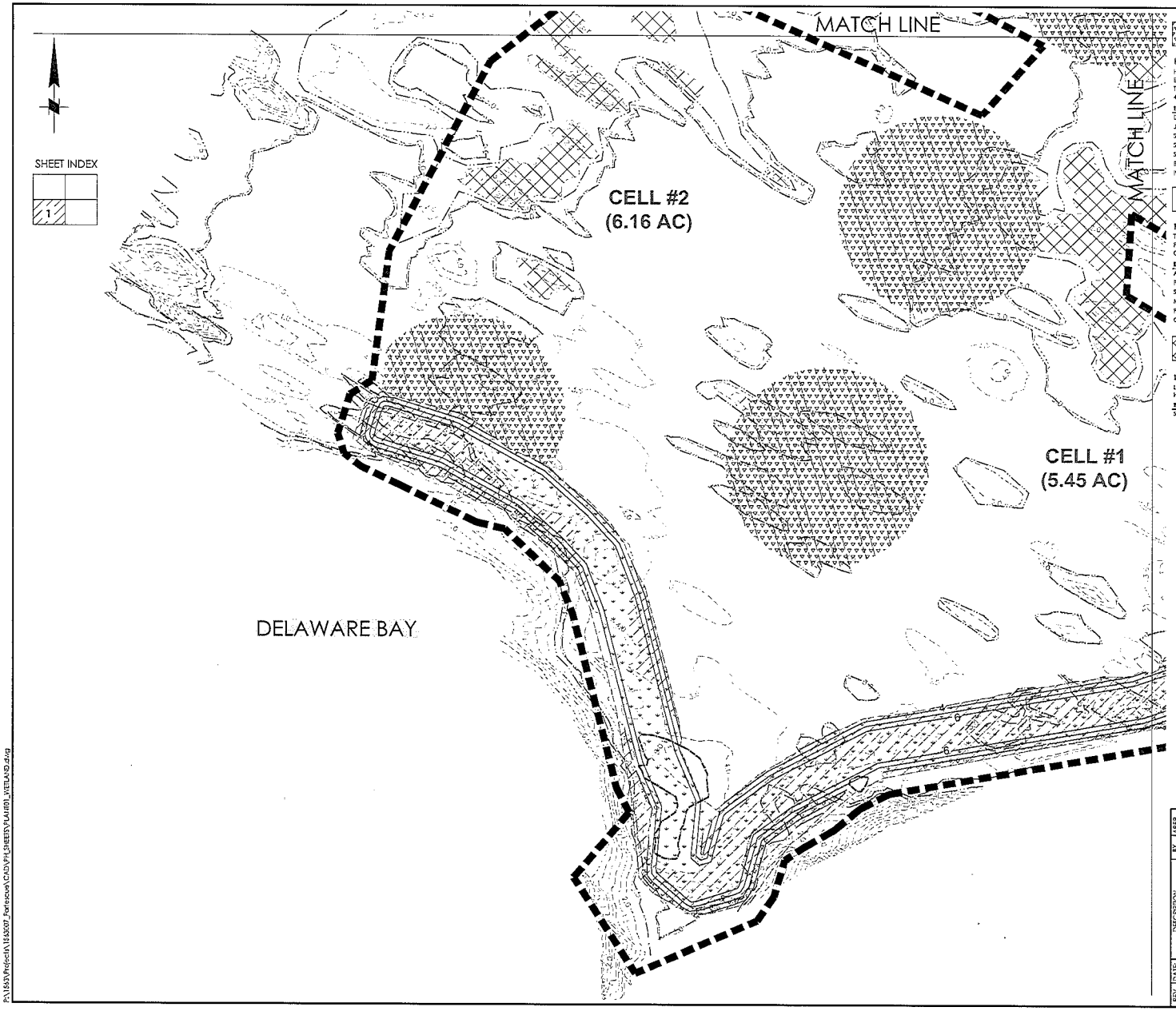

HIGH MARSH: 4.08 ACRES

HIGH MARSH IS A TRANSITIONAL COMMUNITY BETWEEN LOW MARSH AND UPLAND. THE PLANTING AREAS WILL BE SITUATED APPROXIMATELY BETWEEN THE ELEVATIONS OF MEAN HIGH TIDE (3.0' AND 4.0'. THE NUMBER OF HERBACEOUS PLANT MATERIAL IS BASED ON A PLANTING DENSITY OF 3 FEET ON CENTER. THE SHRUB SPECIES WILL BE PLANTED IN ** SINGLE SPECIES CLUSTERS OF FIVE PLANTS. THE CLUSTERS WILL BE LIMITED TO ELVATIONS BETWEEN 3.5' AND 4.0'.

BOTANICAL NAME:	SPECIES NAME:	PLANTING TYPE:	INDICATOR STATUS:	QUANTITY:
DISTICHLIS SPICATA	SPIKE GRASS	PLUGS/BR	OBL	3000
JUNCUS GERARDII	BLACK GRASS	PLUGS/BR	OBL	4000
SPARTINA CYNOSUROIDES	BIG CORDGRASS	PLUGS/BR	OBL	4000
SPARTINA PATENS	SALT MEADOW GRASS	PLUGS/BR	FACW	3000
SOLIDAGO SEMPERVIRENS	SEASIDE GOLDENROD	PLUGS/BR	FACW	3000
BACCHARIS HALIMIFOLIA	GROUNDSEL BUSH	24"-36" CONTAINER	FAC	1000
IVA FRUTESCENS	MARSH ELDER	24"-36" CONTAINER	FACW	2000

PRIMARY FOREDUNE: 1.79 ACRES

THE FOREDUNE WILL BE PLANTED FOR 50% COVER WITH WOODY MATERIAL AND 50% COVER HERBACEOUS MATERIAL. THE NUMBER OF HERBACEOUS PLANTS IS BASED ON A PLANTING DENSITY OF 3 FEET ON CENTER. THE NUMBER OF WOODY PLANTS IS BASED ON A PLANTING DENSITY OF 8 FEET ON CENTER.

BOTANICAL NAME:	SPECIES NAME:	PLANTING TYPE:	INDICATOR STATUS:	QUANTITY:
AMMOPHILA BREVIGULATA	DUNEGRASS	PLUGS/BR	UPL	4400
PANICUM AMARUM	SEA-BEACH PANIC-GRASS	PLUGS/BR	NL	3500
SOLIDAGO SEMPERVIRENS	SEASIDE GOLDENROD	PLUGS/BR	FACW	900
MYRICA PENSYLVANICA	BAYBERRY	24"-36" CONTAINER	FAC	500
PRUNUS MARITIMA	BEACH PLUM	24"-36" CONTAINER	NL	400
CELTIS OCCIDENTALIS	HACKBERRY	24"-36" CONTAINER	FACU	400

LOW MARSH: 1.93 ACRES

LOW MARSH IS A TIDAL MARSH ZONE. THE PLANTING AREAS WILL BE SITUATED APPROXIMATELY BETWEEN THE ELEVATIONS 2.0' AND 3'. THE NUMBER OF HERBACEOUS PLANT MATERIAL IS BASED ON A PLANTING DENSITY OF 3 FEET ON CENTER.

BOTANICAL NAME:	SPECIES NAME:	PLANTING TYPE:	INDICATOR STATUS:	QUANTITY:
SPARTINA ALTERNIFLORA	SALTMARSH CORDGRASS	PLUGS/BR	OBL	9350

NOTES:

1. VERTICAL DATUM IS IN REFERENCE TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88). NAVD88 IS 3.29' FEET ABOVE MEAN LOW WATER (MLW). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM DATUM TRANSFORMATION PROGRAM.
   ELEV. 0.0 (NAVD88)
   3.29'
   MLW
2. COORDINATES ARE EXPRESSED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE GRID COORDINATE SYSTEM (NORTH AMERICAN DATUM OF 1983 (NAD83).
3. CONDITIONAL (CHIEF) CONTOUR DATA SHOWN WAS COLLECTED IN JANUARY, APRIL, MAY, & JUNE OF 2015 BY GAMADATA, BRYANT ASSOCIATES, PARSONS BRINCKERHOFF, AND BOSWELL ENGINEERING.
4. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEYS CONDUCTED ON THE ABOVE DATE AND CAN BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
5. M.L.W., M.H.W., & MTL LINEWORK SHOWN WITHIN THIS SHEET FROM FIELD COLLECTED SURVEY DATA (SEE NOTE 3).
6. ELEVATION DIFFERENCE BETWEEN MTL & NAVD FROM THE STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK" PLAN, DATED OCTOBER 10, 2013.
7. EXISTING SHORELINE AND DUNE LOCATIONS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
8. TIDELANDS AND SHELLFISH CLASSIFICATION BOUNDARIES OBTAINED FROM NJDEP GIS WEBSITE.
9. DUNES AS DELINEATED BY PROJECT TEAM BASED ON 2014 AERIAL IMAGERY AND SITE SURVEY.
10. TIDE ELEVATIONS OBTAINED FROM STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF ENGINEERING AND CONSTRUCTION BUREAU OF COASTAL ENGINEERING PROJECT 31-LA, SHEET 2 OF 14 "PROPOSED EMERGENCY DREDGING HOPESCUL CREEK, TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, DATED JUNE 12, 2013. (USE ELEVATION WERE CONVERTED TO NAVD88)
    10.1. MEAN HIGHER HIGH WATER (MHHW): 3.08'
    10.2. MEAN HIGH WATER (MHW): 2.66'
    10.3. MEAN LOW WATER (MLW): -3.29'
    10.4. HIGH TIDE LINE (HTL): 4.53'
11. NO SUBTIDAL AREAS ARE DEPICTED ON THE PLAN AS ENTIRE PROJECT AREA IS ABOVE THIS ZONE (MEAN LOW LOWER WATER (MLLW) -3.46').
12. THE ENTIRE PROJECT SITE FALLS WITHIN THE INTERTIDAL ZONE (ELEV. -3.46' TO 4.53').

RANGE OF TIDE (FT)
NOT TO SCALE

4.53 HTL	
3.08 MHHW	
2.66 MHW	
0.00 NAVD88	
-3.29' MLW	
-3.46' MLLW	

GRAPHIC SCALE
0 10 20 30 40 50 100 150 200 FEET
SCALE: 1" = 50'

REV.	DATE	DESCRIPTION	BY	APPR.
1	10/15	REVISED PER COMMENTS	KS	KS

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION
FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

PLANTING PLAN - WETLAND/DUNE

PROJECT: FORTESCUE CREEK CHANNEL
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: AEM
CHECKED BY: MPG
SCALE: 1" = 50'
5/21/15

PRINCETON HYDRO, LLC.
CERTIFICATION OF AUTHORIZATION NO. 24GA27976800
MARY L. PAST-GOLDMAN
NEW JERSEY PROFESSIONAL ENGR
NO. GE45798

PROJECT NO. 1563.007
SHEET 13-1 OF 14
DWG. NO. PLANT01

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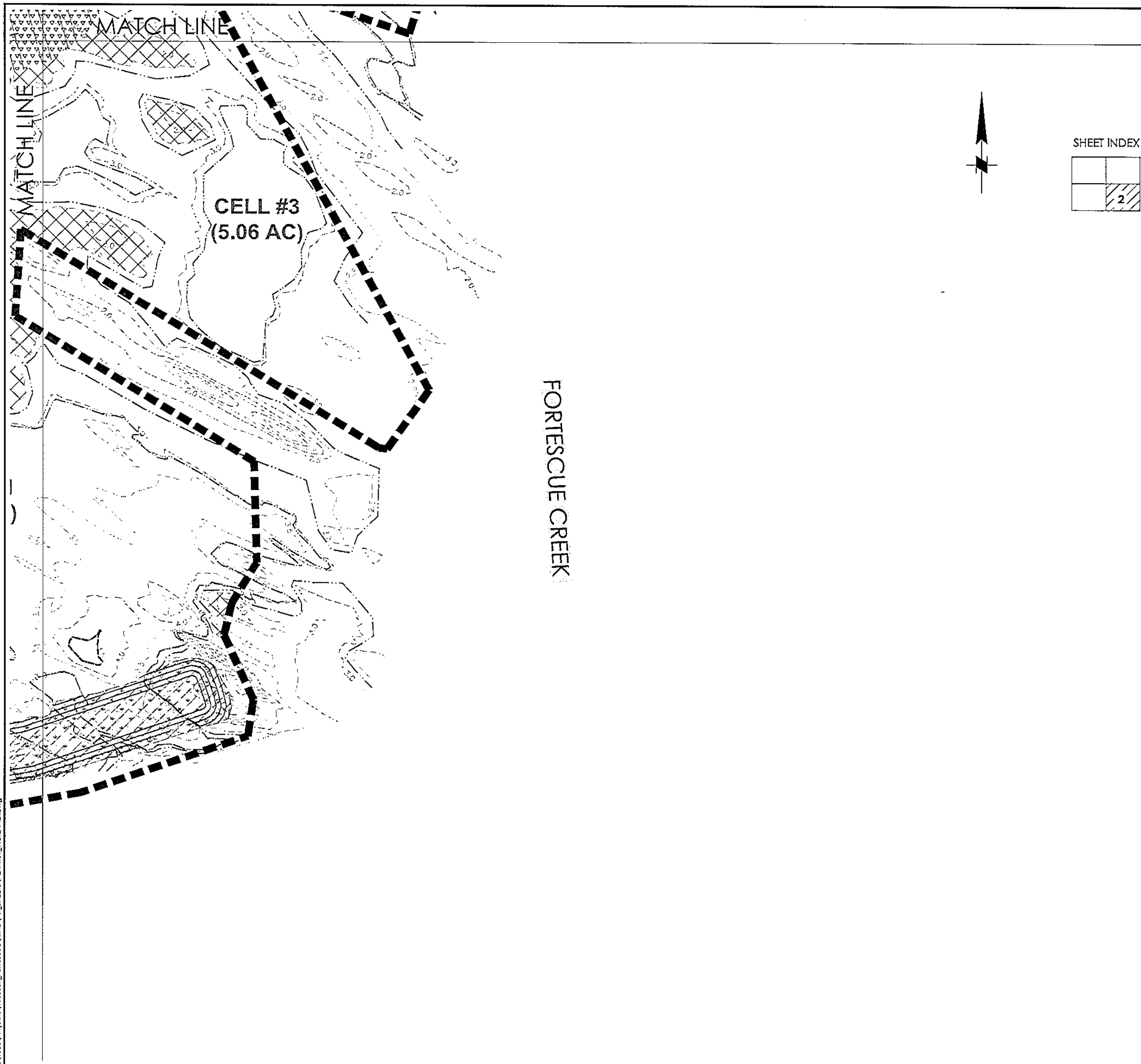

HIGH MARSH: 4.08 ACRES

HIGH MARSH IS A TRANSITIONAL COMMUNITY BETWEEN LOW MARSH AND UPLAND. THE PLANTING AREAS WILL BE SITUATED APPROXIMATELY BETWEEN THE ELEVATIONS OF MEAN HIGH TIDE 3.0' AND 4.0' THE NUMBER OF HERBACEOUS PLANT MATERIAL IS BASED ON A PLANTING DENSITY OF 3 FEET ON CENTER. THE SHRUB SPECIES WILL BE PLANTED IN ** SINGLE SPECIES CLUSTERS OF FIVE PLANTS. THE CLUSTERS WILL BE LIMITED TO ELVATIONS BETWEEN 3.5' AND 4.0'.

BOTANICAL NAME:	SPECIES NAME:	PLANTING TYPE:	INDICATOR STATUS:	QUANTITY:
DISTICHLIS SPICATA	SPIKE GRASS	PLUGS/BR	OBL	3000
JUNCUS GERARDII	BLACK GRASS	PLUGS/BR	OBL	4000
SPARTINA CYNOSUROIDES	BIG CORDGRASS	PLUGS/BR	OBL	4000
SPARTINA PATENS	SALT-MEADOW GRASS	PLUGS/BR	FACW	3000
SOLIDAGO SEMPERVIRENS	SEASIDE GOLDENROD	PLUGS/BR	FACW	3000
BACCHARIS HALIMIFOLIA	GROUNDSEL BUSH	24"-36" CONTAINER	FAC	1000
IVA FRUTESCENS	MARSH ELDER	24"-36" CONTAINER	FACW	2000

PRIMARY FOREDUNE: 1.79 ACRES

THE FOREDUNE WILL BE PLANTED FOR 50% COVER WITH WOODY MATERIAL AND 50% COVER HERBACEOUS MATERIAL. THE NUMBER OF HERBACEOUS PLANTS IS BASED ON A PLANTING DENSITY OF 3 FEET ON CENTER. THE NUMBER OF WOODY PLANTS IS BASED ON A PLANTING DENSITY OF 8 FEET ON CENTER.

BOTANICAL NAME:	SPECIES NAME:	PLANTING TYPE:	INDICATOR STATUS:	QUANTITY:
AMMOPHILA BREVILIGULATA	DUNEGRASS	PLUGS/BR	UPL	4400
PANICUM AMARUM	SEA-BEACH PANIC-GRASS	PLUGS/BR	NL	3500
SOLIDAGO SEMPERVIRENS	SEASIDE GOLDENROD	PLUGS/BR	FACW	900
MYRICA PENSYLVANICA	BAYBERRY	24"-36" CONTAINER	FAC	500
PRUNUS MARITIMA	BEACH PLUM	24"-36" CONTAINER	NL	400
CELTIS OCCIDENTALIS	HACKBERRY	24"-36" CONTAINER	FACU	400

LOW MARSH: 1.93 ACRES

LOW MARSH IS A TIDAL MARSH ZONE. THE PLANTING AREAS WILL BE SITUATED APPROXIMATELY BETWEEN THE ELEVATIONS 2.0' AND 3' THE NUMBER OF HERBACEOUS PLANT MATERIAL IS BASED ON A PLANTING DENSITY OF 3 FEET ON CENTER.

BOTANICAL NAME:	SPECIES NAME:	PLANTING TYPE:	INDICATOR STATUS:	QUANTITY:
SPARTINA ALTERNIFLORA	SALTMARSH CORDGRASS	PLUGS/BR	OBL	9350

NOTES:

1. VERTICAL DATUM IS IN REFERENCE TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88). NAVD88 IS 3.29 FEET ABOVE MEAN LOW WATER (MLW). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM DATUM TRANSFORMATION PROGRAM.
   ELEV. 0.0 (NAVD88)
   3.29
   MLW
2. COORDINATES ARE EXPRESSED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE GRID COORDINATE SYSTEM (NORTH AMERICAN DATUM OF 1983 (NAD83)).
3. CONDITIONAL (CND) CONTOUR DATA SHOWN WAS COLLECTED IN JANUARY, APRIL, MAY, & JUNE OF 2015 BY CAHAGAN & BRYANT ASSOCIATES, PARSONS BRINKERHOFF, AND BOSWELL ENGINEERING
4. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEYS CONDUCTED ON THE ABOVE DATE AND CAN BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
5. MLW, MHW, & HTL LINEWORK SHOWN WITHIN THIS SHEET FROM FIELD COLLECTED SURVEY DATA (SEE NOTE 3).
6. ELEVATION DIFFERENCE BETWEEN HTL & MHW FROM THE STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK" PLAN, DATED OCTOBER 10, 2013.
7. EXISTING SHORELINE AND DUNE LOCATIONS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
8. TIDELANDS AND SHELLFISH CLASSIFICATION BOUNDARIES OBTAINED FROM NJDEP GIS WEBSITE.
9. DUNES AS DELINEATED BY PROJECT TEAM BASED ON 2014 AERIAL IMAGERY AND SITE SURVEY.
10. TIDE ELEVATIONS OBTAINED FROM STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF ENGINEERING AND CONSTRUCTION BUREAU OF COASTAL ENGINEERING PROJECT 2155, SHEET 2 OF 14 "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK, TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, DATED JUNE 12, 2013. ELSE ELEVATIONS WERE CONVERTS TO NAVD88
   - 10.1. MEAN HIGHER HIGH WATER (MHHW): 3.08'
   - 10.2. MEAN HIGH WATER (MHW): 2.66'
   - 10.3. MEAN LOW WATER (MLW): -3.29'
   - 10.4. HIGH TIDE LINE (HTL): 4.53'
11. NO SUBTIDAL AREAS ARE DEPICTED ON THE PLAN AS ENTIRE PROJECT AREA IS ABOVE THIS ZONE (MEAN LOW LOWER WATER (MLLW) -3.47').
12. THE ENTIRE PROJECT SITE FALLS WITHIN THE INTERTIDAL ZONE (ELEV. -3.47' TO 4.53').

4.53 HTL
3.08 MHHW
2.66 MHW
0.00 NAVD88
-0.22 MTL
-3.29 MLW
-3.47 MLLW

RANGE OF TIDE (FT)
NOT TO SCALE

GRAPHIC SCALE
0 10 20 30 40 50 100 150 200 FEET
SCALE: 1" = 50'

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

PLANTING PLAN - WETLAND/DUNE

PROJECT: FORTESCUE CREEK CHANNEL
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: AEM	PRINCETON HYDRO, LLC. CERTIFICATION OF AUTHORIZATION NO. 24GA27976800	PROJECT NO. 1563.007
CHECKED BY: MPG		SHEET 13-2 OF 14
SCALE: 1" = 50'	MARY L. PAIST-GOLDMAN NEW JERSEY PROFESSIONAL ENGINEER NO. GE-45798	DWG. NO. PLANT01
5/21/15		

REV.	DATE:	DESCRIPTION	BY	APPR.
1	7/21/15	[illegible]	TA	MPG

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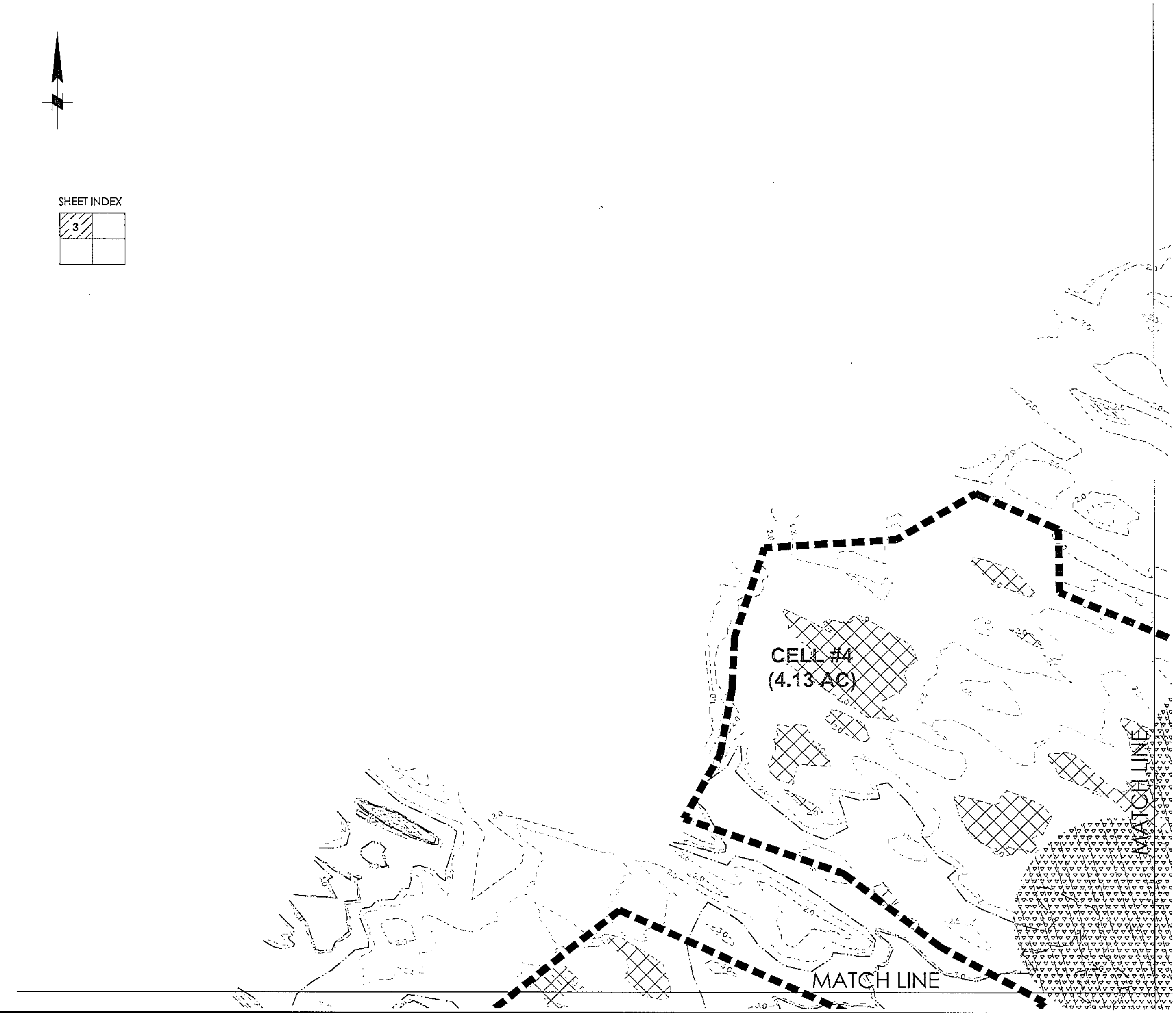


HIGH MARSH: 4.08 ACRES

HIGH MARSH IS A TRANSITIONAL COMMUNITY BETWEEN LOW MARSH AND UPLAND. THE PLANTING AREAS WILL BE SITUATED APPROXIMATELY BETWEEN THE ELEVATIONS OF MEAN HIGH TIDE 3.0' AND 4.0' THE NUMBER OF HERBACEOUS PLANT MATERIAL IS BASED ON A PLANTING DENSITY OF 3 FEET ON CENTER. THE SHRUB SPECIES WILL BE PLANTED IN ** SINGLE SPECIES CLUSTERS OF FIVE PLANTS. THE CLUSTERS WILL BE LIMITED TO ELVATIONS BETWEEN 3.5' AND 4.0'.

BOTANICAL NAME:	SPECIES NAME:	PLANTING TYPE:	INDICATOR STATUS:	QUANTITY:
DISTICHLIS SPICATA	SPIKE GRASS	PLUGS/BR	OBL	3000
JUNCUS GERARDII	BLACK GRASS	PLUGS/BR	OBL	4000
SPARTINA CYNOSUROIDES	BIG CORDGRASS	PLUGS/BR	OBL	4000
SPARTINA PATENS	SALT-MEADOW GRASS	PLUGS/BR	FACW	3000
SOLIDAGO SEMPERVIRENS	SEASIDE GOLDENROD	PLUGS/BR	FACW	3000
BACCHARIS HALIMIFOLIA	GROUNDSEL BUSH	24"-36" CONTAINER	FAC	1000
IVA FRUTESCENS	MARSH ELDER	24"-36" CONTAINER	FACW	2000

PRIMARY FOREDUNE: 1.79 ACRES

THE FOREDUNE WILL BE PLANTED FOR 50% COVER WITH WOODY MATERIAL AND 50% COVER HERBACEOUS MATERIAL. THE NUMBER OF HERBACEOUS PLANTS IS BASED ON A PLANTING DENSITY OF 3 FEET ON CENTER. THE NUMBER OF WOODY PLANTS IS BASED ON A PLANTING DENSITY OF 8 FEET ON CENTER.

BOTANICAL NAME:	SPECIES NAME:	PLANTING TYPE:	INDICATOR STATUS:	QUANTITY:
AMMOPHILA BREVILIGULATA	DUNEGRASS	PLUGS/BR	UPL	4400
PANICUM AMARUM	SEA-BEACH PANIC-GRASS	PLUGS/BR	NL	3500
SOLIDAGO SEMPERVIRENS	SEASIDE GOLDENROD	PLUGS/BR	FACW	900
MYRICA PENSYLVANICA	BAYBERRY	24"-36" CONTAINER	FAC	500
PRUNUS MARITIMA	BEACH PLUM	24"-36" CONTAINER	NL	400
CELTIS OCCIDENTALIS	HACKBERRY	24"-36" CONTAINER	FACU	400

LOW MARSH: 1.93 ACRES

LOW MARSH IS A TIDAL MARSH ZONE. THE PLANTING AREAS WILL BE SITUATED APPROXIMATELY BETWEEN THE ELEVATIONS 2.0' AND 3' THE NUMBER OF HERBACEOUS PLANT MATERIAL IS BASED ON A PLANTING DENSITY OF 3 FEET ON CENTER.

BOTANICAL NAME:	SPECIES NAME:	PLANTING TYPE:	INDICATOR STATUS:	QUANTITY:
SPARTINA ALTERNIFLORA	SALTMARSH CORDGRASS	PLUGS/BR	OBL	9350

NOTES:

1. VERTICAL DATUM IS IN REFERENCE TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88). NAVD88 IS 3.29 FEET ABOVE MEAN LOW WATER (MLW). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM DATUM TRANSFORMATION PROGRAM.

   ELEV. 0.0 (NAVD88) — 3.29 — MLW

2. COORDINATES ARE EXPRESSED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE GRID COORDINATE SYSTEM NORTH AMERICAN DATUM OF 1983 (NAD83).
3. CONDITIONAL (COND) CONTOUR DATA SHOWN WAS COLLECTED IN JANUARY, APRIL, MAY, & JUNE OF 2015 BY OAHAGAN & BRYANT ASSOCIATES, PARSONS BRINKERHOFF, AND BOSWELL ENGINEERING
4. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEYS CONDUCTED ON THE ABOVE DATE AND CAN BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
5. MLW, MHW, & HTL LINEWORK SHOWN WITHIN THIS SHEET FROM FIELD COLLECTED SURVEY DATA (SEE NOTE 3).
6. ELEVATION DIFFERENCE BETWEEN HTL & MHW FROM THE STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK" PLAN, DATED OCTOBER 10, 2013.
7. EXISTING SHORELINE AND DUNE LOCATIONS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
8. TIDELANDS AND SHELLFISH CLASSIFICATION BOUNDARIES OBTAINED FROM NJDEP GIS WEBSITE.
9. DUNES AS DELINEATED BY PROJECT TEAM BASED ON 2014 AERIAL IMAGERY AND SITE SURVEY.
10. TIDE ELEVATIONS OBTAINED FROM STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF ENGINEERING AND CONSTRUCTION BUREAU OF COASTAL ENGINEERING PROJECT 2155, SHEET 2 OF 14 "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK, TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, DATED JUNE 12, 2013. ELSE ELEVATIONS WERE CONVERTS TO NAVD88.
    - 10.1. MEAN HIGHER HIGH WATER (MHHW): 3.00'
    - 10.2. MEAN HIGH WATER (MHW): 2.66'
    - 10.3. MEAN LOW WATER (MLW): -3.29'
    - 10.4. HIGH TIDE LINE (HTL): 4.53'
11. NO SUBTIDAL AREAS ARE DEPICTED ON THE PLAN AS ENTIRE PROJECT AREA IS ABOVE THIS ZONE (MEAN LOW LOWER WATER (MLLW) -3.47').
12. THE ENTIRE PROJECT SITE FALLS WITHIN THE INTERTIDAL ZONE (ELEV. -3.47' TO 4.53').

RANGE OF TIDE (FT)
NOT TO SCALE

4.53 HTL
3.00 MHHW
2.66 MHW
0.00 NAVD88
-0.32 MTL
-3.29 MLW
-3.47 MLLW

GRAPHIC SCALE
0 10 20 30 40 50 100 150 200 FEET
SCALE: 1" = 50'

REV.	DATE	DESCRIPTION	BY	APPR.
1	7/2/15	REVISED PER AGENCY COMMENTS DATED 7/2015	RA	MPG

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

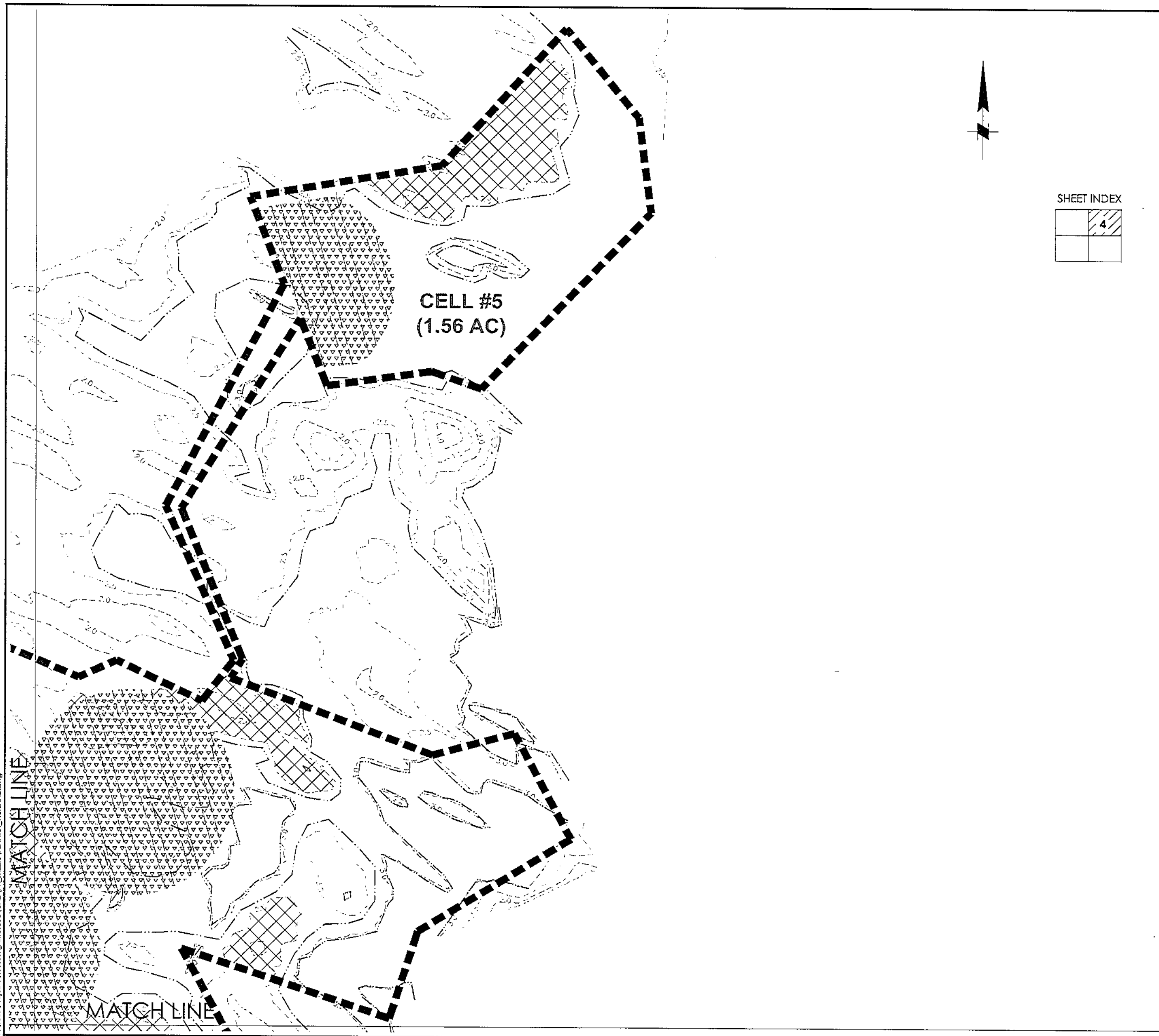
TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

PLANTING PLAN - WETLAND/DUNE

PROJECT: FORTESCUE CREEK CHANNEL
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: AEM	PRINCETON HYDRO, LLC. CERTIFICATION OF AUTHORIZATION NO. 24GA27976800	PROJECT NO. 1563.007
CHECKED BY: MPG		SHEET 13-3 OF 14
SCALE: 1" = 50'	MARY L. PAIST-GOLDMAN NEW JERSEY PROFESSIONAL ENGINEER NO. GE-45798	DWG. NO. PLANT01
5/21/15		

P:\1563\Projects\1563007_Fortescue\CAD\PH_SHEETS\PLANT01_WETLAND.dwg



HIGH MARSH: 4.08 ACRES

HIGH MARSH IS A TRANSITIONAL COMMUNITY BETWEEN LOW MARSH AND UPLAND. THE PLANTING AREAS WILL BE SITUATED APPROXIMATELY BETWEEN THE ELEVATIONS OF MEAN HIGH TIDE 3.0' AND 4.0' THE NUMBER OF HERBACEOUS PLANT MATERIAL IS BASED ON A PLANTING DENSITY OF 3 FEET ON CENTER. THE SHRUB SPECIES WILL BE PLANTED IN ** SINGLE SPECIES CLUSTERS OF FIVE PLANTS. THE CLUSTERS WILL BE LIMITED TO ELEVATIONS BETWEEN 3.5' AND 4.0'.

BOTANICAL NAME:	SPECIES NAME:	PLANTING TYPE:	INDICATOR STATUS:	QUANTITY:
DISTICHLIS SPICATA	SPIKE GRASS	PLUGS/BR	OBL	3000
JUNCUS GERARDII	BLACK GRASS	PLUGS/BR	OBL	4000
SPARTINA CYNOSUROIDES	BIG CORDGRASS	PLUGS/BR	OBL	4000
SPARTINA PATENS	SALT-MEADOW GRASS	PLUGS/BR	FACW	3000
SOLIDAGO SEMPERVIRENS	SEASIDE GOLDENROD	PLUGS/BR	FACW	3000
BACCHARIS HALIMIFOLIA	GROUNDSEL BUSH	24"-36" CONTAINER	FAC	1000
IVA FRUTESCENS	MARSH ELDER	24"-36" CONTAINER	FACW	2000

PRIMARY FOREDUNE: 1.79 ACRES

THE FOREDUNE WILL BE PLANTED FOR 50% COVER WITH WOODY MATERIAL AND 50% COVER HERBACEOUS MATERIAL. THE NUMBER OF HERBACEOUS PLANTS IS BASED ON A PLANTING DENSITY OF 3 FEET ON CENTER. THE NUMBER OF WOODY PLANTS IS BASED ON A PLANTING DENSITY OF 8 FEET ON CENTER.

BOTANICAL NAME:	SPECIES NAME:	PLANTING TYPE:	INDICATOR STATUS:	QUANTITY:
AMMOPHILA BREVILIGULATA	DUNEGRASS	PLUGS/BR	UPL	4400
PANICUM AMARUM	SEA-BEACH PANIC-GRASS	PLUGS/BR	NL	3500
SOLIDAGO SEMPERVIRENS	SEASIDE GOLDENROD	PLUGS/BR	FACW	900
MYRICA PENSYLVANICA	BAYBERRY	24"-36" CONTAINER	FAC	500
PRUNUS MARITIMA	BEACH PLUM	24"-36" CONTAINER	NL	400
CELTIS OCCIDENTALIS	HACKBERRY	24"-36" CONTAINER	FACU	400

LOW MARSH: 1.93 ACRES

LOW MARSH IS A TIDAL MARSH ZONE. THE PLANTING AREAS WILL BE SITUATED APPROXIMATELY BETWEEN THE ELEVATIONS 2.0' AND 3' THE NUMBER OF HERBACEOUS PLANT MATERIAL IS BASED ON A PLANTING DENSITY OF 3 FEET ON CENTER.

BOTANICAL NAME:	SPECIES NAME:	PLANTING TYPE:	INDICATOR STATUS:	QUANTITY:
SPARTINA ALTERNIFLORA	SALTMARSH CORDGRASS	PLUGS/BR	OBL	9350

NOTES:

1. VERTICAL DATUM IS IN REFERENCE TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88). NAVD88 IS 3.29 FEET ABOVE MEAN LOW WATER (MLW). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM DATUM TRANSFORMATION PROGRAM.

ELEV. 0.0 (NAVD88)
3.29'
MLW

2. COORDINATES ARE EXPRESSED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE GRID COORDINATE SYSTEM NORTH AMERICAN DATUM OF 1983 (NAD83).
3. CONDITIONAL (CND) CONTOUR DATA SHOWN WAS COLLECTED IN JANUARY, APRIL, MAY, & JUNE OF 2015 BY GAHAGAN & BRYANT ASSOCIATES, PARSONS BRINCKERHOFF, AND BOSWELL ENGINEERING
4. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEYS CONDUCTED ON THE ABOVE DATE AND CAN BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
5. MLW, MHW, & HTL LINEWORK SHOWN WITHIN THIS SHEET FROM FIELD COLLECTED SURVEY DATA (SEE NOTE 3).
6. ELEVATION DIFFERENCE BETWEEN HTL & MHW FROM THE STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK" PLAN, DATED OCTOBER 10, 2013.
7. EXISTING SHORELINE AND DUNE LOCATIONS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
8. TIDELANDS AND SHELLFISH CLASSIFICATION BOUNDARIES OBTAINED FROM NJDEP GIS WEBSITE.
9. DUNES AS DELINEATED BY PROJECT TEAM BASED ON 2014 AERIAL IMAGERY AND SITE SURVEY.
10. TIDE ELEVATIONS OBTAINED FROM STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF ENGINEERING AND CONSTRUCTION BUREAU OF COASTAL ENGINEERING PROJECT 2155, SHEET 2 OF 14 "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK, TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, DATED JUNE 12, 2013. ELSE ELEVATIONS WERE CONVERTS TO NAVD88
   - 10.1. MEAN HIGHER HIGH WATER (MHHW): 3.08'
   - 10.2. MEAN HIGH WATER (MHW): 2.66'
   - 10.3. MEAN LOW WATER (MLW): -3.29'
   - 10.4. HIGH TIDE LINE (HTL): 4.53'
11. NO SUBTIDAL AREAS ARE DEPICTED ON THE PLAN AS ENTIRE PROJECT AREA IS ABOVE THIS ZONE (MEAN LOW LOWER WATER (MLLW) -3.47').
12. THE ENTIRE PROJECT SITE FALLS WITHIN THE INTERTIDAL ZONE (ELEV. -3.47' TO 4.53').

4.53 HTL
3.08 MHHW
2.66 MHW
0.00 NAVD88
-0.32 MTL
-3.29 MLW
-3.47 MLLW

RANGE OF TIDE (FT)
NOT TO SCALE

GRAPHIC SCALE

0 10 20 30 40 50 100 150 200 FEET

SCALE: 1" = 50'

REV.	DATE	DESCRIPTION	BY	APPR.
1	7/21/15	REVISED PER AGENCY COMMENTS 6/30/2015	EA	MPG

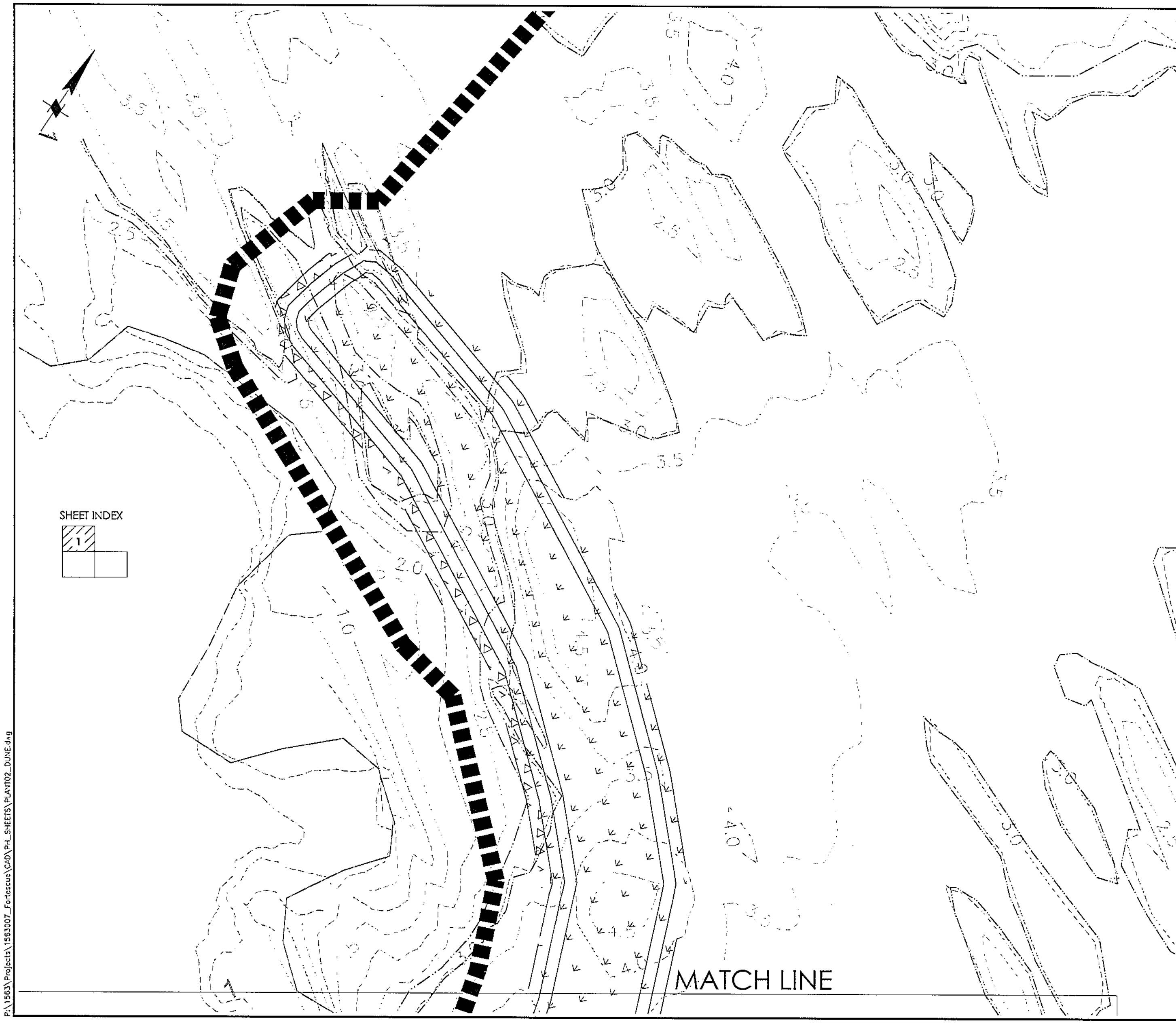
STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

PLANTING PLAN - WETLAND/DUNE

PROJECT: FORTESCUE CREEK CHANNEL
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: AEM	PRINCETON HYDRO, LLC. CERTIFICATION OF AUTHORIZATION NO. 24GA27976800	PROJECT NO.	1563.007
CHECKED BY: MPG			
SCALE: 1" = 50'	MARY L. PAIST-GOLDMAN NEW JERSEY PROFESSIONAL ENGINEER NO. GE-45798	SHEET 13-4 OF 14	
5/21/15		DWG. NO. PLANT01	



HIGH MARSH: .12 ACRES

HIGH MARSH IS A TRANSITIONAL COMMUNITY BETWEEN LOW MARSH AND UPLAND. THE PLANTING AREAS WILL BE SITUATED APPROXIMATELY BETWEEN THE ELEVATIONS OF MEAN HIGH TIDE 3.0' AND 4.0' THE NUMBER OF HERBACEOUS PLANT MATERIAL IS BASED ON A PLANTING DENSITY OF 3 FEET ON CENTER. THE SHRUB SPECIES WILL BE PLANTED IN ** SINGLE SPECIES CLUSTERS OF FIVE PLANTS. THE CLUSTERS WILL BE LIMITED TO ELVATIONS BETWEEN 3.5' AND 4.0'. *NUMBERS LISTED ARE INCLUDED ON MASTER LIST OF SHEET 13 OF 14

BOTANICAL NAME:	SPECIES NAME:	PLANTING TYPE:	INDICATOR STATUS:	QUANTITY:
DISTICHLIS SPICATA	SPIKE GRASS	PLUGS/BR	OBL	83
JUNCUS GERARDII	BLACK GRASS	PLUGS/BR	OBL	110
SPARTINA CYNOSUROIDES	BIG CORDGRASS	PLUGS/BR	OBL	110
SPARTINA PATENS	SALT-MEADOW GRASS	PLUGS/BR	FACW	83
SOLIDAGO SEMPERVIRENS	SEASIDE GOLDENROD	PLUGS/BR	FACW	83
BACCHARIS HALIMIFOLIA	GROUNDSEL BUSH	24"-36" CONTAINER	FAC	27
IVA FRUTESCENS	MARSH ELDER	24"-36" CONTAINER	FACW	55

PRIMARY FOREDUNE: 1.79 ACRES

THE FOREDUNE WILL BE PLANTED FOR 50% COVER WITH WOODY MATERIAL AND 50% COVER HERBACEOUS MATERIAL. THE NUMBER OF HERBACEOUS PLANTS IS BASED ON A PLANTING DENSITY OF 3 FEET ON CENTER. THE NUMBER OF WOODY PLANTS IS BASED ON A PLANTING DENSITY OF 8 FEET ON CENTER.

BOTANICAL NAME:	SPECIES NAME:	PLANTING TYPE:	INDICATOR STATUS:	QUANTITY:
AMMOPHILA BREVILIGULATA	DUNEGRASS	PLUGS/BR	UPL	4400
PANICUM AMARUM	SEA-BEACH PANIC-GRASS	PLUGS/BR	NL	3500
SOLIDAGO SEMPERVIRENS	SEASIDE GOLDENROD	PLUGS/BR	FACW	900
MYRICA PENSYLVANICA	BAYBERRY	24"-36" CONTAINER	FAC	500
PRUNUS MARITIMA	BEACH PLUM	24"-36" CONTAINER	NL	400
CELTIS OCCIDENTALIS	HACKBERRY	24"-36" CONTAINER	FACU	400

NOTES:

1. VERTICAL DATUM IS IN REFERENCE TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88). NAVD88 IS 3.29 FEET ABOVE MEAN LOW WATER (MLW). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM DATUM TRANSFORMATION PROGRAM.

   ELEV. 0.0 (NAVD88)
   3.29
   MLW

2. COORDINATES ARE EXPRESSED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE GRID COORDINATE SYSTEM NORTH AMERICAN DATUM OF 1983 (NAD83).
3. CONDITIONAL (CND) CONTOUR DATA SHOWN WAS COLLECTED IN JANUARY, APRIL, MAY, & JUNE OF 2015 BY GAHAGAN & BRYANT ASSOCIATES, PARSONS BRINKERHOFF, AND BOSWELL ENGINEERING.
4. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEYS CONDUCTED ON THE ABOVE DATE AND CAN BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
5. MLW, MHW, & HTL LINE WORK SHOWN WITHIN THIS SHEET FROM FIELD COLLECTED SURVEY DATA (SEE NOTE 3).
6. ELEVATION DIFFERENCE BETWEEN HTL & MHW FROM THE STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK" PLAN, DATED OCTOBER 10, 2013.
7. EXISTING SHORELINE AND DUNE LOCATIONS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
8. TIDELANDS AND SHELLFISH CLASSIFICATION BOUNDARIES OBTAINED FROM NJDEP GIS WEBSITE.
9. DUNES AS DELINEATED BY PROJECT TEAM BASED ON 2014 AERIAL IMAGERY AND SITE SURVEY.
10. TIDE ELEVATIONS OBTAINED FROM STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF ENGINEERING AND CONSTRUCTION BUREAU OF COASTAL ENGINEERING PROJECT 2155, SHEET 2 OF 14 "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK, TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, DATED JUNE 12, 2013. ELSE ELEVATIONS WERE CONVERTS TO NAVD88.
    - 10.1. MEAN HIGHER HIGH WATER (MHHW): 3.08'
    - 10.2. MEAN HIGH WATER (MHW): 2.66'
    - 10.3. MEAN LOW WATER (MLW): -3.29'
    - 10.4. HIGH TIDE LINE (HTL): 4.53'
11. NO SUBTIDAL AREAS ARE DEPICTED ON THE PLAN AS ENTIRE PROJECT AREA IS ABOVE THIS ZONE (MEAN LOW LOWER WATER (MLLW) -3.47').
12. THE ENTIRE PROJECT SITE FALLS WITHIN THE INTERTIDAL ZONE (ELEV. -3.47' TO 4.53').

4.53 HTL
3.08 MHHW
2.66 MHW
0.00 NAVD88
-0.32 MTL
-3.29 MLW
-3.47 MLLW

RANGE OF TIDE (FT)
NOT TO SCALE

GRAPHIC SCALE
0 4 8 12 16 20 40 60 80 FEET
SCALE: 1" = 20'

REV.	DATE	DESCRIPTION	BY	APPR.
1	[illegible]	[illegible]	[illegible]	[illegible]

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

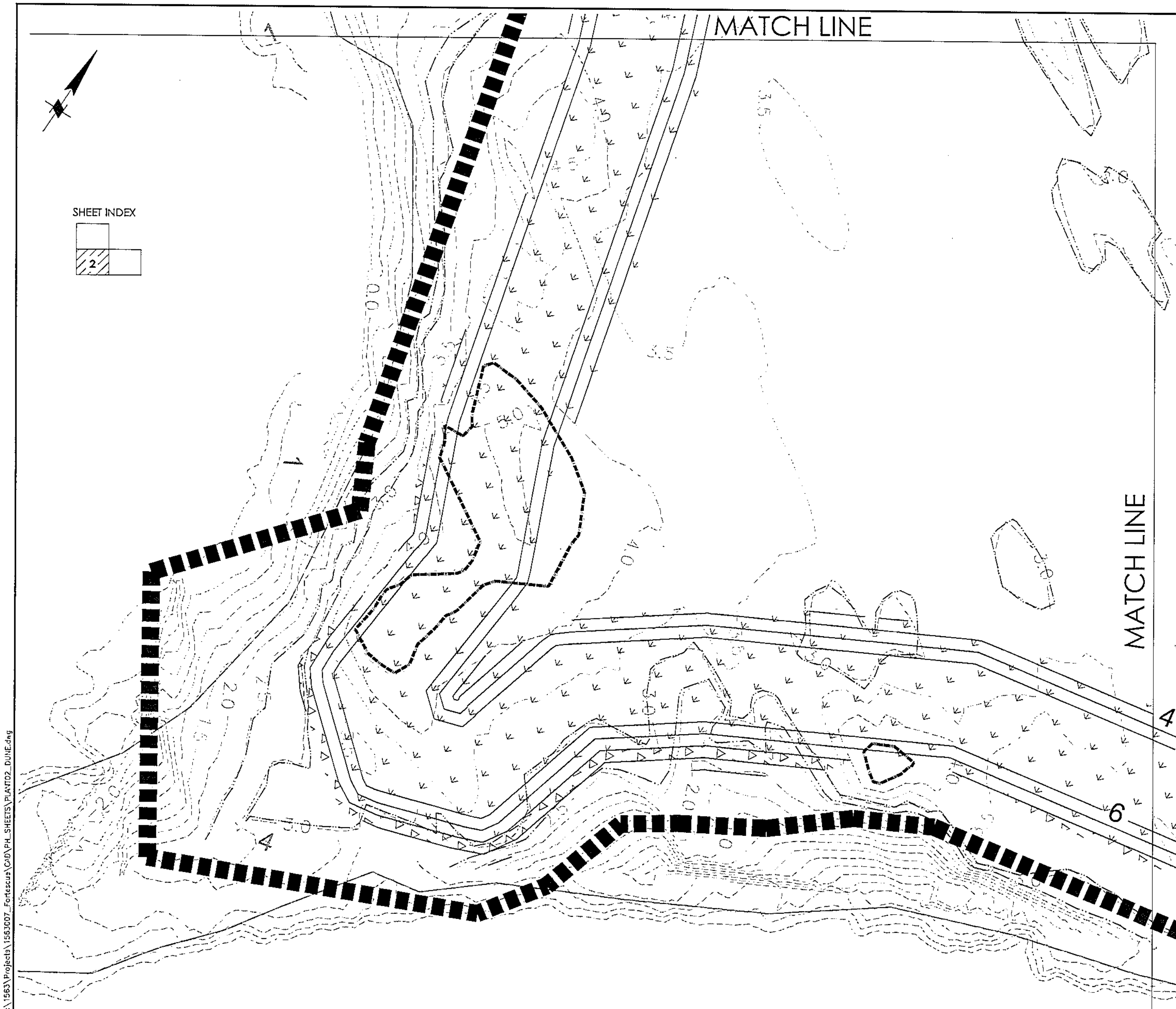
TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

PLANTING PLAN - FOREDUNE

PROJECT: FORTESCUE CREEK CHANNEL
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: AEM	PRINCETON HYDRO, LLC. CERTIFICATION OF AUTHORIZATION NO. 24GA27976800	PROJECT NO. 1563.007
CHECKED BY: MPG		SHEET 14-1 OF 14
SCALE: 1" = 20'	MARY L. PAIST-GOLDMAN NEW JERSEY PROFESSIONAL EN[GINEER] NO. GE-45798	DWG. NO. PLANT02
5/21/15		

P:\1563\Projects\1563007_Fortescue\CAD\PH_SHEETS\PLANT02_DUNE.dwg



HIGH MARSH: .12 ACRES

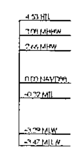
HIGH MARSH IS A TRANSITIONAL COMMUNITY BETWEEN LOW MARSH AND UPLAND. THE PLANTING AREAS WILL BE SITUATED APPROXIMATELY BETWEEN THE ELEVATIONS OF MEAN HIGH TIDE 3.0' AND 4.0' THE NUMBER OF HERBACEOUS PLANT MATERIAL IS BASED ON A PLANTING DENSITY OF 3 FEET ON CENTER. THE SHRUB SPECIES WILL BE PLANTED IN ** SINGLE SPECIES CLUSTERS OF FIVE PLANTS. THE CLUSTERS WILL BE LIMITED TO ELVATIONS BETWEEN 3.5' AND 4.0'. *NUMBERS LISTED ARE INCLUDED ON MASTER LIST OF SHEET 13 OF 14

BOTANICAL NAME:	SPECIES NAME:	PLANTING TYPE:	INDICATOR STATUS:	QUANTITY:
DISTICHLIS SPICATA	SPIKE GRASS	PLUGS/BR	OBL	83
JUNCUS GERARDII	BLACK GRASS	PLUGS/BR	OBL	110
SPARTINA CYNOSUROIDES	BIG CORDGRASS	PLUGS/BR	OBL	110
SPARTINA PATENS	SALT-MEADOW GRASS	PLUGS/BR	FACW	83
SOLIDAGO SEMPERVIRENS	SEASIDE GOLDENROD	PLUGS/BR	FACW	83
BACCHARIS HALIMIFOLIA	GROUNDSEL BUSH	24"-36" CONTAINER	FAC	27
IVA FRUTESCENS	MARSH ELDER	24"-36" CONTAINER	FACW	55

PRIMARY FOREDUNE: 1.79 ACRES

THE FOREDUNE WILL BE PLANTED FOR 50% COVER WITH WOODY MATERIAL AND 50% COVER HERBACEOUS MATERIAL. THE NUMBER OF HERBACEOUS PLANTS IS BASED ON A PLANTING DENSITY OF 3 FEET ON CENTER. THE NUMBER OF WOODY PLANTS IS BASED ON A PLANTING DENSITY OF 8 FEET ON CENTER.

BOTANICAL NAME:	SPECIES NAME:	PLANTING TYPE:	INDICATOR STATUS:	QUANTITY:
AMMOPHILA BREVILIGULATA	DUNEGRASS	PLUGS/BR	UPL	4400
PANICUM AMARUM	SEA-BEACH PANIC-GRASS	PLUGS/BR	NL	3500
SOLIDAGO SEMPERVIRENS	SEASIDE GOLDENROD	PLUGS/BR	FACW	900
MYRICA PENSYLVANICA	BAYBERRY	24"-36" CONTAINER	FAC	500
PRUNUS MARITIMA	BEACH PLUM	24"-36" CONTAINER	NL	400
CELTIS OCCIDENTALIS	HACKBERRY	24"-36" CONTAINER	FACU	400



RANGE OF TIDE (FT)
NOT TO SCALE

NOTES:

1. VERTICAL DATUM IS IN REFERENCE TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88). NAVD88 IS 3.29 FEET ABOVE MEAN LOW WATER (MLW). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM DATUM TRANSFORMATION PROGRAM.

   ELEV. 0.0 (NAVD88)
   3.29
   MLW

2. COORDINATES ARE EXPRESSED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE GRID COORDINATE SYSTEM NORTH AMERICAN DATUM OF 1983 (NAD83).
3. CONDITIONAL (CHD) CONTOUR DATA SHOWN WAS COLLECTED IN JANUARY, APRIL, MAY, & JUNE OF 2015 BY GAHAGAN & BRYANT ASSOCIATES, PARSONS BRINKERHOFF, AND BOSWELL ENGINEERING.
4. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEYS CONDUCTED ON THE ABOVE DATE AND CAN BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
5. MLW, MHW, & HTL LINEWORK SHOWN WITHIN THIS SHEET FROM FIELD COLLECTED SURVEY DATA (SEE NOTE 3).
6. ELEVATION DIFFERENCE BETWEEN HTL & MHW FROM THE STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK" PLAN, DATED OCTOBER 10, 2013.
7. EXISTING SHORELINE AND DUNE LOCATIONS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
8. TIDELANDS AND SHELLFISH CLASSIFICATION BOUNDARIES OBTAINED FROM NJDEP GIS WEBSITE.
9. DUNES AS DELINEATED BY PROJECT TEAM BASED ON 2014 AERIAL IMAGERY AND SITE SURVEY.
10. TIDE ELEVATIONS OBTAINED FROM STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF ENGINEERING AND CONSTRUCTION BUREAU OF COASTAL ENGINEERING PROJECT 2155, SHEET 2 OF 14 "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK, TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, DATED JUNE 12, 2013. ELSE ELEVATIONS WERE CONVERTS TO NAVD88.
    - 10.1. MEAN HIGHER HIGH WATER (MHHW): 3.08'
    - 10.2. MEAN HIGH WATER (MHW): 2.66'
    - 10.3. MEAN LOW WATER (MLW): -3.29'
    - 10.4. HIGH TIDE LINE (HTL): 4.53'
11. NO SUBTIDAL AREAS ARE DEPICTED ON THE PLAN AS ENTIRE PROJECT AREA IS ABOVE THE ZONE (MEAN LOW LOWER WATER (MLLW) -3.47').
12. THE ENTIRE PROJECT SITE FALLS WITHIN THE INTERTIDAL ZONE (ELEV. -3.47' TO 4.53').

GRAPHIC SCALE
0 4 8 12 16 20 40 60 80 FEET
SCALE: 1" = 20'

REV.	DATE	DESCRIPTION	BY	APPR.
1	[illegible]	[illegible]	[illegible]	[illegible]

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

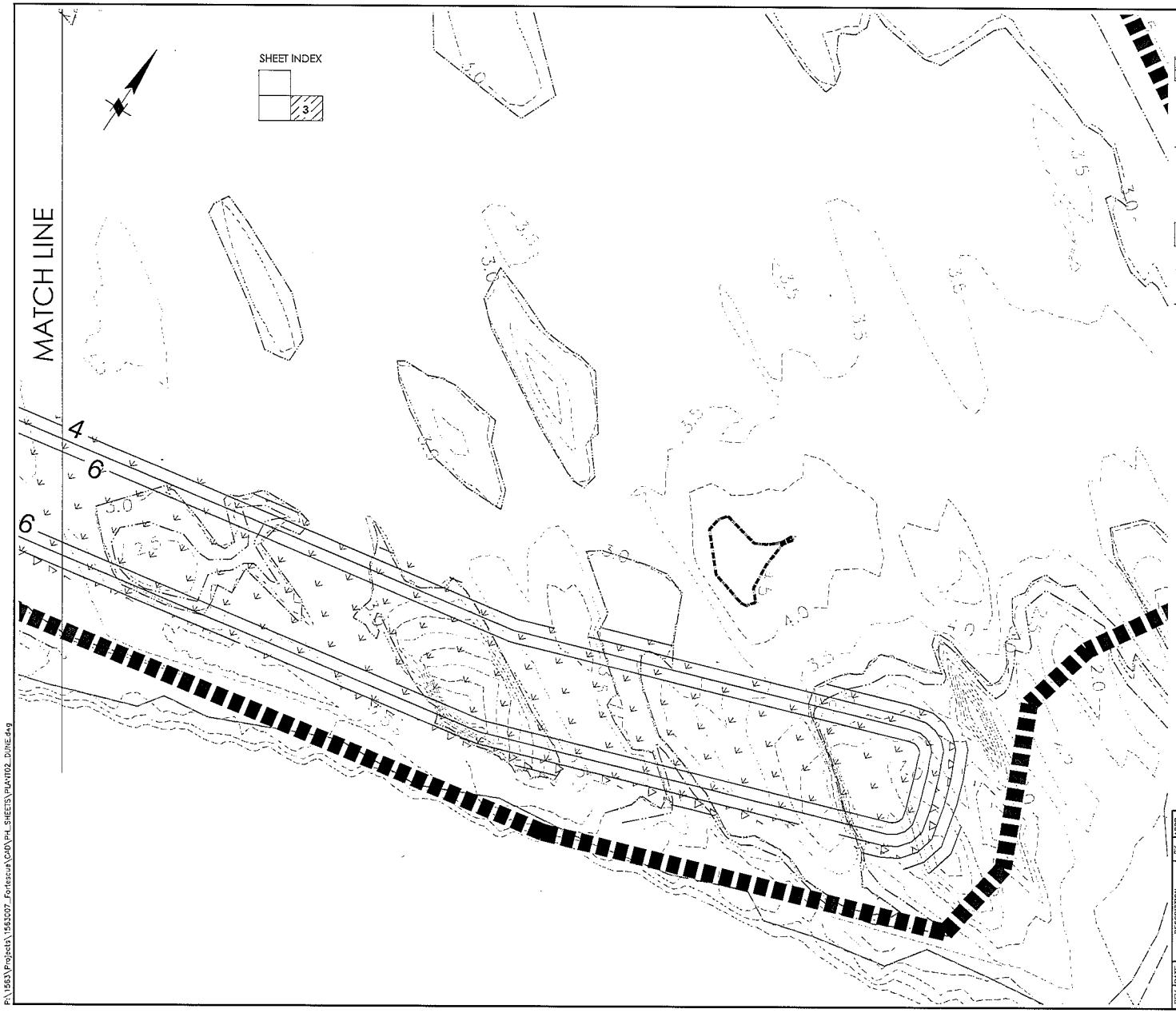
TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

PLANTING PLAN - FOREDUNE

PROJECT: FORTESCUE CREEK CHANNEL
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: AEM	PRINCETON HYDRO, LLC. CERTIFICATION OF AUTHORIZATION NO. 24GA27976800	PROJECT NO. 1563.007
CHECKED BY: MPG		SHEET 14-2 OF 14
SCALE: 1" = 20'	MARY L. PAIST-GOLDMAN NEW JERSEY PROFESSIONAL EN[GINEER] NO. GE-45708	DWG. NO. PLANT02
5/21/15		

P:\1563\Projects\1563007_Fortescue\CAD\PH_SHEETS\PLANT02_DUNE.dwg



HIGH MARSH: .12 ACRES

HIGH MARSH IS A TRANSITIONAL COMMUNITY BETWEEN LOW MARSH AND UPLAND. THE PLANTING AREAS WILL BE SITUATED APPROXIMATELY BETWEEN THE ELEVATIONS OF MEAN HIGH TIDE 3.0' AND 4.0'. THE NUMBER OF HERBACEOUS PLANT MATERIAL IS BASED ON A PLANTING DENSITY OF 3 FEET ON CENTER. THE SHRUB SPECIES WILL BE PLANTED IN ** SINGLE SPECIES CLUSTERS OF FIVE PLANTS. THE CLUSTERS WILL BE LIMITED TO ELVATIONS BETWEEN 3.5' AND 4.0'. *NUMBERS LISTED ARE INCLUDED ON MASTER LIST OF SHEET 13 OF 14

BOTANICAL NAME:	SPECIES NAME:	PLANTING TYPE:	INDICATOR STATUS:	QUANTITY:
DISTICHLIS SPICATA	SPIKE GRASS	PLUGS/BR	OBL	83
JUNCUS GERARDII	BLACK GRASS	PLUGS/BR	OBL	110
SPARTINA CYNOSUROIDES	BIG CORDGRASS	PLUGS/BR	OBL	110
SPARTINA PATENS	SALT-MEADOW GRASS	PLUGS/BR	FACW	83
SOLIDAGO SEMPERVIRENS	SEASIDE GOLDENROD	PLUGS/BR	FACW	83
BACCHARIS HALIMIFOLIA	GROUNDSEL BUSH	24"-36" CONTAINER	FAC	27
IVA FRUTICSCENS	MARSH ELDER	24"-36" CONTAINER	FACW	55

PRIMARY FOREDUNE: 1.79 ACRES

THE FOREDUNE WILL BE PLANTED FOR 50% COVER WITH WOODY MATERIAL AND 50% COVER HERBACEOUS MATERIAL. THE NUMBER OF HERBACEOUS PLANTS IS BASED ON A PLANTING DENSITY OF 3 FEET ON CENTER. THE NUMBER OF WOODY PLANTS IS BASED ON A PLANTING DENSITY OF 8 FEET ON CENTER.

BOTANICAL NAME:	SPECIES NAME:	PLANTING TYPE:	INDICATOR STATUS:	QUANTITY:
AMMOPHILA BREVILIGULATA	DUNEGRASS	PLUGS/BR	UPL	4400
PANICUM AMARUM	SEA BEACH PANIC-GRASS	PLUGS/BR	NL	3500
SOLIDAGO SEMPERVIRENS	SEASIDE GOLDENROD	PLUGS/BR	FACW	900
MYRICA PENSYLVANICA	BAYBERRY	24"-36" CONTAINER	FAC	500
PRUNUS MARITIMA	BEACH PLUM	24"-36" CONTAINER	NL	400
CELTIS OCCIDENTALIS	HACKBERRY	24"-36" CONTAINER	FACU	400

NOTES:

1. VERTICAL DATUM IS IN REFERENCE TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88). NAVD88 IS 3.27' FEET ABOVE MEAN LOW WATER (MLW). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM- DATUM TRANSFORMATION PROGRAM.

ELEV. 0.0 (NAVD88)
3.27
MLW

2. COORDINATES ARE EXPRESSED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE GRID COORDINATE SYSTEM (NORTH AMERICAN DATUM OF 1983 (NAD83)).
3. CONDITIONAL (CH3D) CONTOUR DATA SHOWN WAS COLLECTED BY JANUARY, APRIL, MAY, & JUNE OF 2015 BY CAHACAN & BYLAND ASSOCIATES, PARSONS, BRINKERHOFF, AND BOWELL ENGINEERING
4. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEYS CONDUCTED ON THE ABOVE DATE AND CAN BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
5. MHW, MMW, & MLW LINE WORK SHOWN WITHIN THIS SHEET FROM FIELD COLLECTED SURVEY DATA (SEE NOTE 3).
6. ELEVATION DIFFERENCE BETWEEN MHW & MMW FROM THE STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION | BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK PLAN, DATED OCTOBER 10, 2013.
7. EXISTING SHORELINE AND DUNE LOCATIONS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
8. TIDELANDS AID SHELLFISH CLASSIFICATION BOUNDARIES OBTAINED FROM NJDEP GIS WEBSITE.
9. DUNES AS DELINEATED BY PROJECT TEAM BASED ON 2014 AERIAL IMAGERY AND SITE SURVEY.
10. TIDE ELEVATIONS OBTAINED FROM STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF ENGINEERING AND CONSTRUCTION | BUREAU OF COASTAL ENGINEERING PROJECT 21-65, SHEET 2 OF 14 "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK, TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, DATED JUNE 12, 2013. ELSE ELEVATIONS WERE CONVERTED TO NAVD88.
    - 10.1. MEAN HIGHER HIGH WATER (MHHW): 3.03'
    - 10.2. MEAN HIGH WATER (MHW): 2.66'
    - 10.3. MEAN LOW WATER (MLW): -3.27'
    - 10.4. HIGH TIDE LINE (HTL): 4.53'
11. NO SUBTIDAL AREAS ARE DEPICTED ON THE PLAN AS ENTIRE PROJECT AREA IS ABOVE THE ZONE (MEAN LOW LOW BY WATER (MLLW) -3.47').
12. THE ENTIRE PROJECT SITE FALLS WITHIN THE INTERTIDAL ZONE (ELEV. -3.47' TO 4.53').

RANGE OF TIDE (FT)
NOT TO SCALE

4.53 HTL
3.03 MHHW
2.66 MHW
0.00 NAVD88
-3.27 MLW
-3.29 MLLW
-3.47 MLLW

GRAPHIC SCALE
0 4 8 12 16 20 40 60 80 FEET
SCALE: 1" = 20'

REV	DATE	DESCRIPTION	BY	APPR.
1	7/21/15	REVISED PER AGENCY COMMENTS DATED 7/20/15	MPG	MPG

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: HABITAT RESTORATION THROUGH THIN-LAYER APPLICATION
FORTESCUE FISH AND WILDLIFE MANAGEMENT AREA

PLANTING PLAN - FOREDUNE

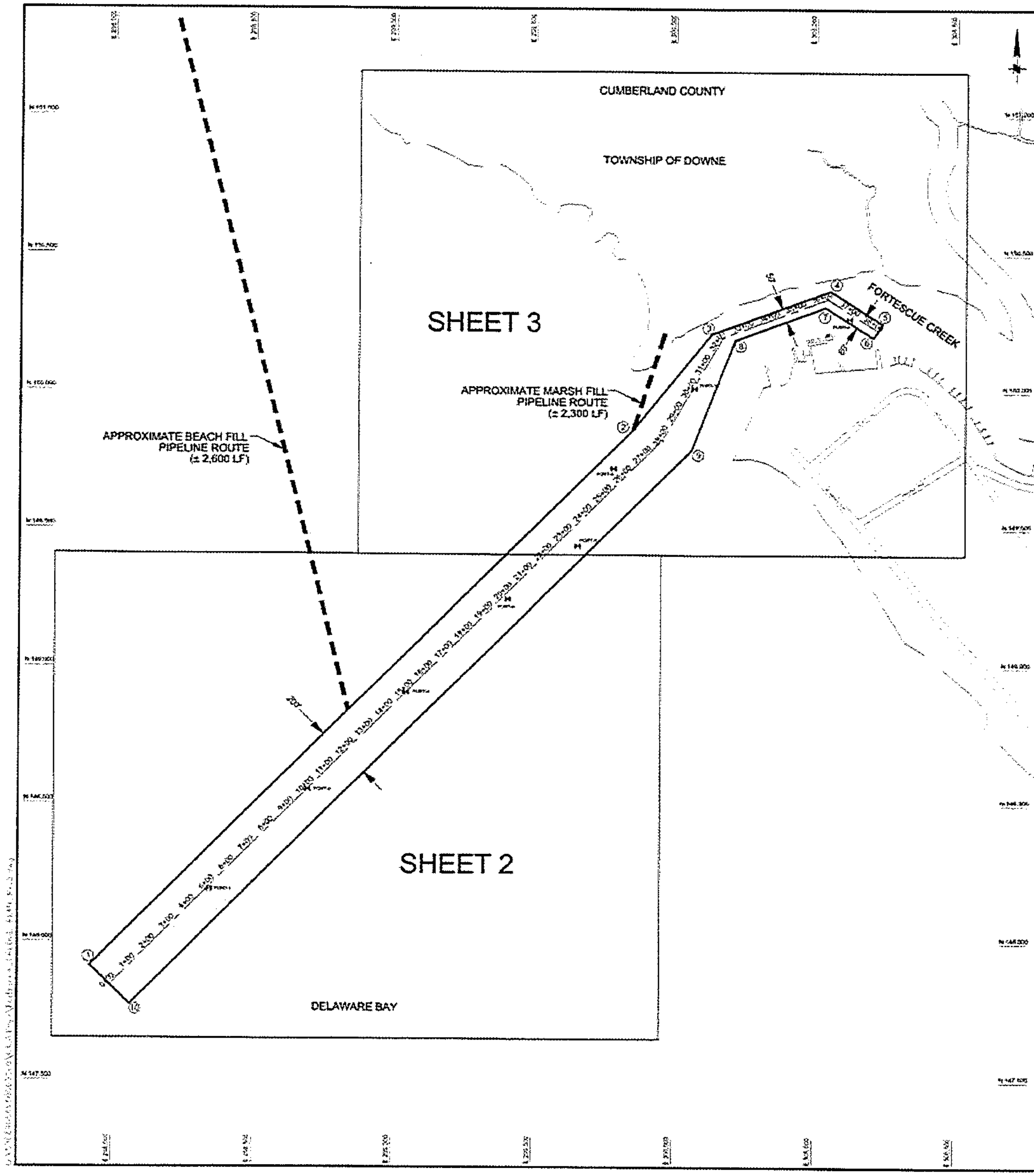
PROJECT: FORTESCUE CREEK CHANNEL
TOWNSHIP OF DOWNE, COUNTY OF CUMBERLAND, NEW JERSEY

DRAWN BY: AEM
CHECKED BY: MPG
SCALE: 1" = 20'
5/21/15

PRINCETON HYDRO, LLC.
CERTIFICATION OF AUTHORIZATION NO. 24GA27970800
MARY L PAIST-GOLDMAN
NEW JERSEY PROFESSIONAL ENGINEER NO. GE-45798

PROJECT NO. 1563.007
SHEET 14-3 OF 14
DWG. NO. PLANT02

P:\1563\Projects\1562007_Fortescue\CAD\PH_SHEETS\PLANT02_DUNE.dwg



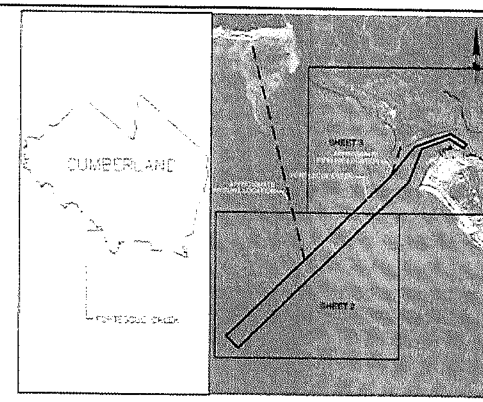
FORTESCUE CREEK COORDINATES		
POINT	NORTHING	EASTING
1	147914.24	297922.04
2	149862.70	299850.97
3	150212.18	300128.64
4	150371.30	300550.10
5	150251.76	300735.89
6	150201.32	300703.41
7	150111.21	300532.57
8	150190.01	300212.66
9	149787.88	300058.33
10	147773.54	298064.17

FORTESCUE CENTERLINE COORDINATES		
STATION	NORTHING	EASTING
0+00	147843.89	297993.10
25+88	149825.29	299954.65
32+21	150201.10	300170.25
36+18	150341.26	300541.34
38+30	150226.55	300719.66

CORE SAMPLE COORDINATES		
LOCATION	NORTHING	EASTING
FORT-1	148190.50	298346.40
FORT-2	148552.30	298696.50
FORT-3	148906.80	299045.80
FORT-4	149245.50	299405.60
FORT-5	149439.30	299654.10
FORT-6	149721.20	299780.90
FORT-7	150012.9	300068.00
FORT-8	150268.30	300617.40

DREDGE VOLUMES BASED ON DEC. 2014 SURVEY DATA

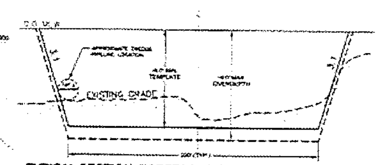
FORTESCUE CREEK	
DEPTH	STA. 0+00 TO 38+30.09
TEMPLATE (-8 MLW)	57,420 CY
OVERDEPTH (-9 MLW)	25,590 CY
TOTAL VOLUME	83,010 CY



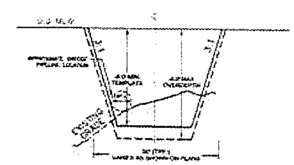
CHANNEL LOCATION PLAN

NOTES:

1. VERTICAL DATUM IS IN REFERENCE TO MEAN LOW WATER (MLW). MLW IS 3.12 FEET BELOW THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM DATUM TRANSFORMATION PROGRAM.
2. COORDINATES ARE EXPRESSED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE GRID COORDINATE SYSTEM NORTH AMERICAN DATUM OF 1983.
3. EXISTING SHORELINE & DOCK LOCATIONS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
4. BATHYMETRIC DATA IS EXPRESSED IN FEET BELOW MLW BASED UPON SURVEY COMPLETED DECEMBER 5, 2014 BY GAHAGAN & BRYANT ASSOCIATES, INC.
5. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEY CONDUCTED ON THE ABOVE DATES AND CAN BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
6. AERIAL IMAGERY FROM NEW JERSEY STATE GEOGRAPHIC INFORMATION NETWORK, DATED 2012-2013.
7. CHANNEL LIMITS/CENTERLINE SHOWN FROM NJDEP OFFICE OF ENGINEERING & CONSTRUCTION, BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK" (PROJECT NO. 2155) DATED OCTOBER 2013.



TYPICAL SECTION: FORTESCUE CREEK STA 0+00 to 27+88
NOT TO SCALE



TYPICAL SECTION: FORTESCUE CREEK STA 32+21 to 38+30
NOT TO SCALE

LEGEND

- EXISTING SHORELINE
- EXISTING ROAD/PAVEMENT
- CHANNEL CENTERLINE
- CHANNEL LIMITS
- CORE SAMPLE LOCATION
- CHANNEL COORDINATE POINT
- APPROXIMATE PIPELINE LOCATION

RANGE OF TIDE
NOT TO SCALE

GRAPHIC SCALE (FT): 0' 200' 400' 800'

REV.	DATE	DESCRIPTION	BY	APPR
1	5/7/15	FOR NJDEP GENERAL PERMIT 21	CEV	JH
2	7/23/15	REV. TYP. SECTION TO SHOW DREDGE PIPE PLACEMENT COMMENTS	JA	JK

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

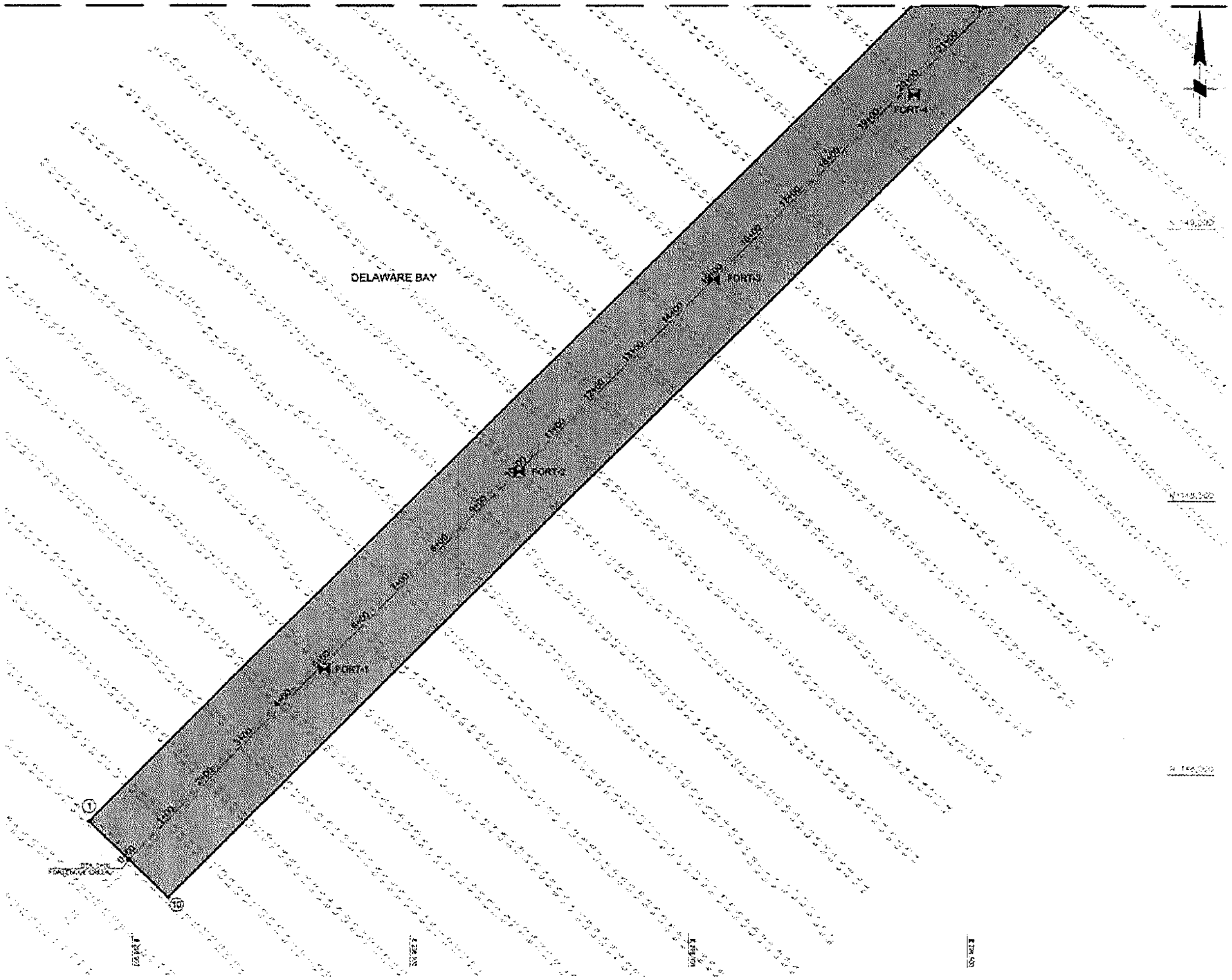
TITLE: MAINTENANCE DREDGING AND CHANNEL IMPROVEMENTS FOR FORTESCUE CREEK

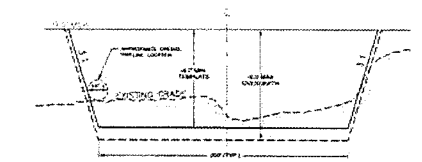
CHANNEL ARRANGEMENT & GEOMETRY PLAN

PROJECT: FORTESCUE CREEK
TOWNSHIP OF DOWNE, CUMBERLAND COUNTY, NEW JERSEY

DRAWN BY: CEM	DEWBERRY ENGINEERS INC. CERTIFICATION OF AUTHORIZATION NO. 24GA28047600	PROJECT NO.
CHECKED BY: ST		SHEET 1 OF 4
SCALE: AS SHOWN	JAMES D. HEEREN NEW JERSEY PROFESSIONAL ENGINEER NO. 24GE04031000	
DATE: 4/18/15		DWG. NO. DRG-01

MATCHLINE STA. 22+00 - SEE SHEET 3



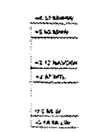


TYPICAL SECTION: FORTESCUE CREEK STA 0+00 to 27+88
NOT TO SCALE

NOTES:
1. VERTICAL DATUM IS IN REFERENCE TO MEAN LOW WATER (MLW). MLW IS 3.12 FEET BELOW THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM DATUM TRANSFORMATION PROGRAM.
2. COORDINATES ARE EXPRESSED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE GRID COORDINATE SYSTEM NORTH AMERICAN DATUM OF 1983.
3. EXISTING SHORELINE & DOCK LOCATIONS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
4. BATHYMETRIC DATA IS EXPRESSED IN FEET BELOW MLW BASED UPON SURVEY COMPLETED DECEMBER 5, 2014 BY [illegible] & BRYANT ASSOCIATES, INC.
5. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEY CONDUCTED ON THE ABOVE DATES AND CAN BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
6. AERIAL IMAGERY FROM NEW JERSEY STATE GEOGRAPHIC INFORMATION NETWORK, DATED 2012-2013.
7. CHANNEL LIMITS/CENTERLINE SHOWN FROM NJDOT OFFICE OF ENGINEERING & CONSTRUCTION, BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK" (PROJECT NO. 1155) DATED OCTOBER 2013.

LEGEND

- EXISTING SHORELINE
- EXISTING ROAD/PAVEMENT
- CHANNEL CENTERLINE
- CHANNEL LIMITS
- CHANNEL SHOALING AREA – 6' DEEP TEMPLATE NAVIGATIONAL CHANNEL
- CHANNEL SHOALING AREA + 1' DEEP OVERDEPTH
- CORE SAMPLE LOCATION
- CHANNEL COORDINATE POINT



RANGE OF TIDE
NOT TO SCALE

0' 100' 200' 400'
GRAPHIC SCALE (FT)

REV.	DATE	DESCRIPTION	BY	APPR.
1	6/19/15	FOR NJDEP GENERAL PERMIT 24	CEM	JH
2	7/29/15	REV. TYP. SECTION TO SHOW DREDGE PIPE PER USACE COMMENTS	ST	JH

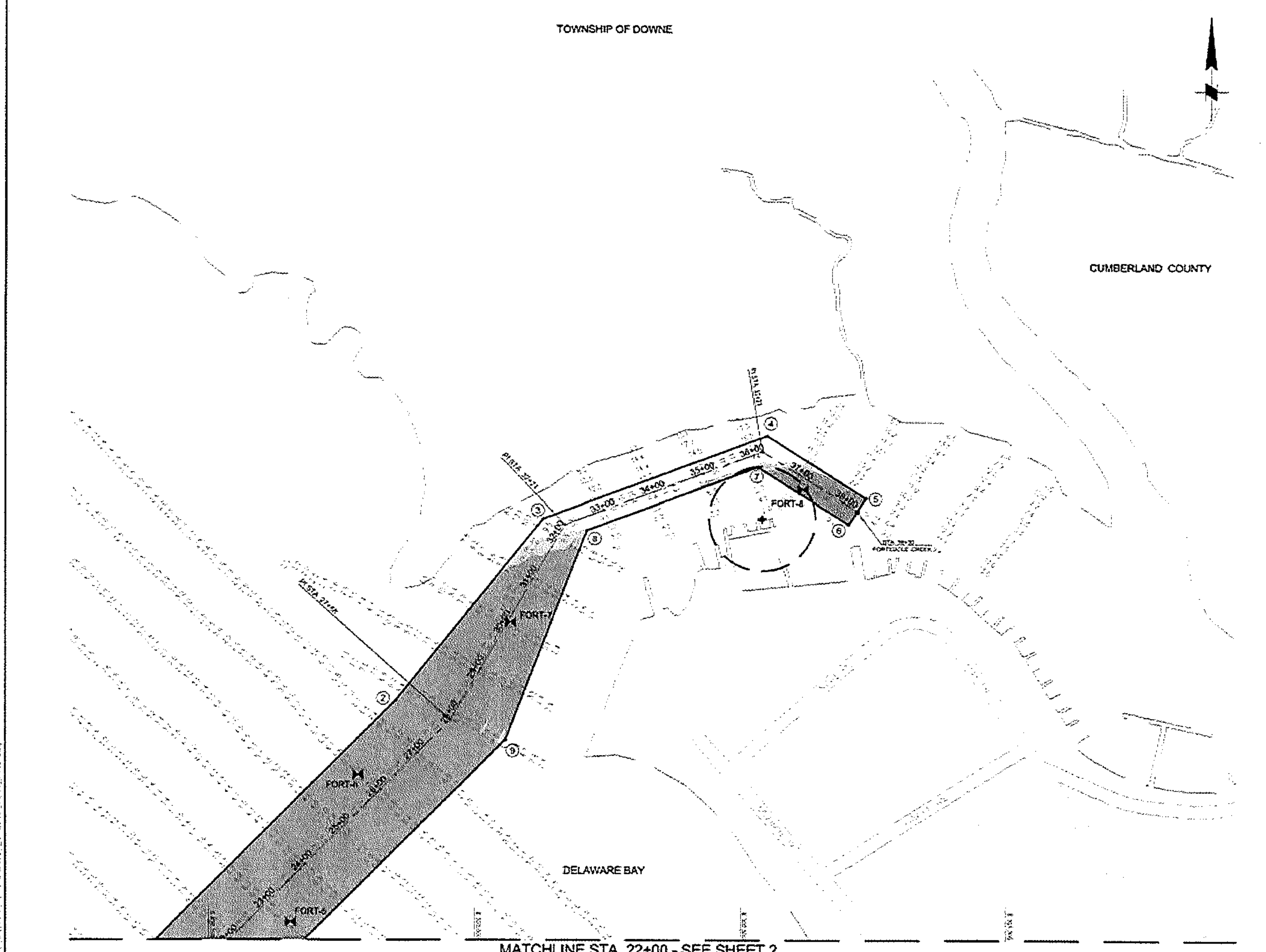
STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

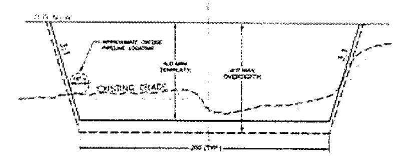
TITLE: MAINTENANCE DREDGING AND CHANNEL IMPROVEMENTS FOR FORTESCUE CREEK

CHANNEL BATHYMETRY PLAN

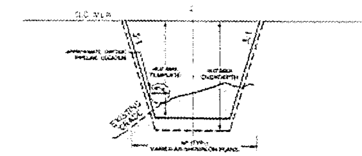
PROJECT: FORTESCUE CREEK
TOWNSHIP OF DOWNE, CUMBERLAND COUNTY, NEW JERSEY

DRAWN BY: CEM	DEWBERRY ENGINEERS INC. CERTIFICATION OF AUTHORIZATION NO. 24GA28047900	PROJECT NO.
CHECKED BY: ST		SHEET 2 OF 4
SCALE: AS SHOWN	JAMES D. HEEKEN NEW JERSEY PROFESSIONAL ENGINEER NO. 24GE04831500	
DATE: 6/18/15		DWG. NO. DRG-02





TYPICAL SECTION: FORTESCUE CREEK STA 0+00 to 27+88
NOT TO SCALE



TYPICAL SECTION:
FORTESCUE CREEK STA 32+21 to 38+30
NOT TO SCALE

NOTES:

1. VERTICAL DATUM IS IN REFERENCE TO MEAN LOW WATER (MLW). MLW IS 3.12 FEET BELOW THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). INFORMATION OBTAINED FROM NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) VDATUM DATUM TRANSFORMATION PROGRAM.
2. COORDINATES ARE EXPRESSED IN FEET AND REFER TO THE NEW JERSEY STATE PLANE GRID COORDINATE SYSTEM NORTH AMERICAN DATUM OF 1983.
3. EXISTING SHORELINE & DOCK LOCATIONS BASED ON AERIAL IMAGERY AND SHOULD BE CONSIDERED APPROXIMATE.
4. BATHYMETRIC DATA IS EXPRESSED IN FEET BELOW MLW BASED UPON SURVEY COMPLETED DECEMBER 5, 2014 BY GAHAGAN & BRYANT ASSOCIATES, INC.
5. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEY CONDUCTED ON THE ABOVE DATES AND CAN BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
6. AERIAL IMAGERY FROM NEW JERSEY STATE GEOGRAPHIC INFORMATION NETWORK, DATED 2012-2013.
7. CHANNEL LIMITS/CENTERLINE SHOWN FROM NJDEP OFFICE OF ENGINEERING & CONSTRUCTION, BUREAU OF COASTAL ENGINEERING "PROPOSED EMERGENCY DREDGING FORTESCUE CREEK" (PROJECT NO. 2150) DATED OCTOBER 2013.

LEGEND

- EXISTING SHORELINE
- EXISTING ROAD/PAVEMENT
- CHANNEL CENTERLINE
- CHANNEL LIMITS
- CHANNEL SHOALING AREA – 6' DEEP TEMPLATE, NAVIGATIONAL CHANNEL
- CHANNEL SHOALING AREA – 1' DEEP OVERDEPTH
- CORE SAMPLE LOCATION
- CHANNEL COORDINATE POINT
- HISTORIC RESOURCE AND ASSOCIATED BUFFER

RANGE OF TIDE
NOT TO SCALE

0' 100' 200' 400'
GRAPHIC SCALE (FT)

REV.	DATE	DESCRIPTION	BY	APPR.
1	6/18/15	FOR NJDEP GENERAL PERMIT 24	CEM	JH
2	7/29/15	REV. TYP. SECTION TO SHOW DREDGE PIPE PER NJDEP COMMENTS	GA	JH

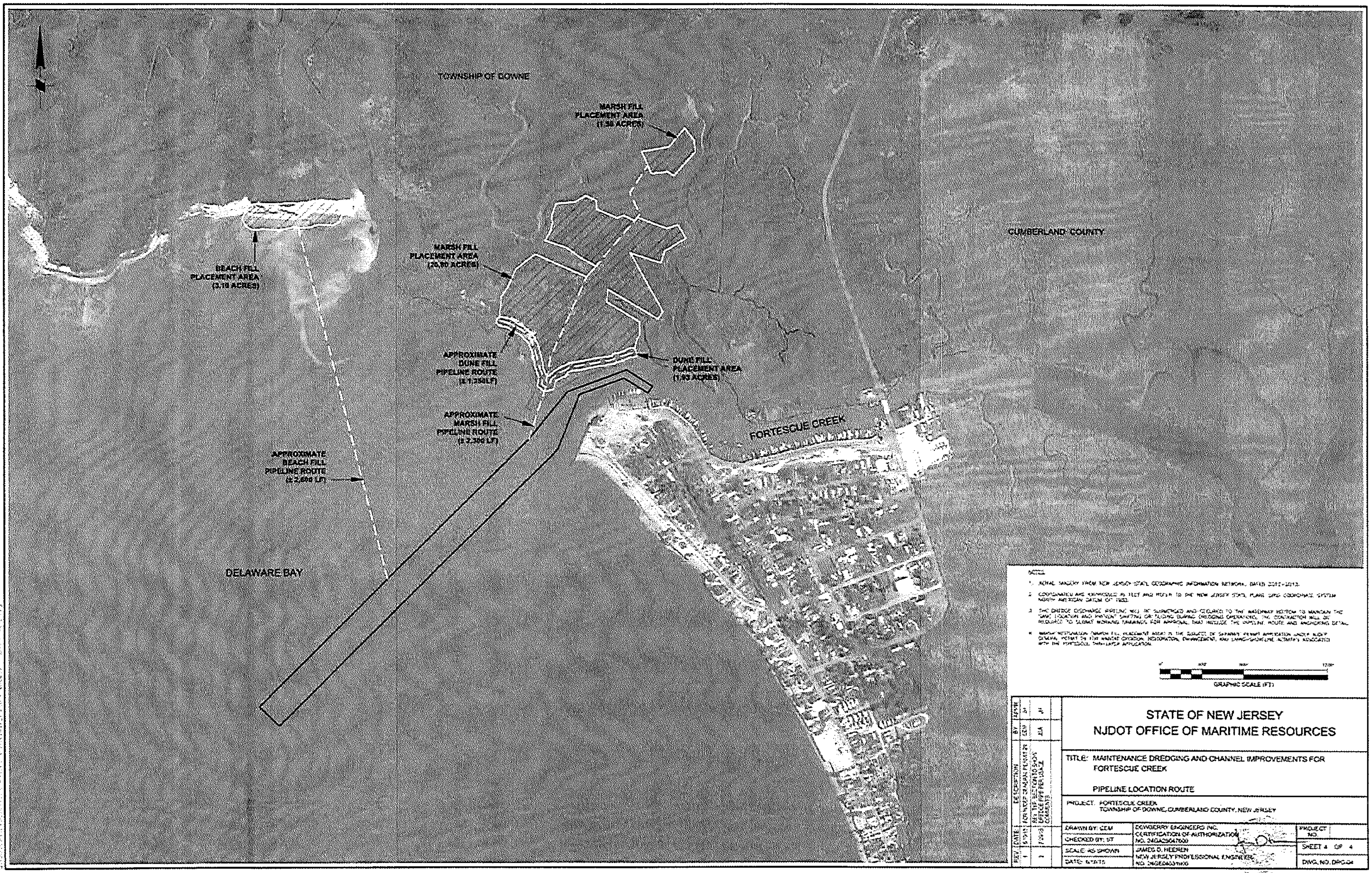
STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: MAINTENANCE DREDGING AND CHANNEL IMPROVEMENTS FOR FORTESCUE CREEK

CHANNEL BATHYMETRY PLAN

PROJECT: FORTESCUE CREEK
TOWNSHIP OF DOWNE, CUMBERLAND COUNTY, NEW JERSEY

DRAWN BY: CEM	DEWBERRY ENGINEERS INC. CERTIFICATION OF AUTHORIZATION NO. 24GA28047600	PROJECT NO.
CHECKED BY: JST		SHEET 3 OF 4
SCALE: AS SHOWN	JAMES D. HOURAN NEW JERSEY PROFESSIONAL ENGINEER NO. 24GE04031000	
DATE: 6/18/15		DWG. NO. CRG-03



NOTES:

1. AERIAL IMAGERY FROM NEW JERSEY STATE GEOGRAPHIC INFORMATION NETWORK, DATED 2012-2013.

STATE OF NEW JERSEY
NJDOT OFFICE OF MARITIME RESOURCES

TITLE: MAINTENANCE DREDGING AND CHANNEL IMPROVEMENTS FOR FORTESCUE CREEK

PIPELINE LOCATION ROUTE

PROJECT: FORTESCUE CREEK
TOWNSHIP OF DOWNE, CUMBERLAND COUNTY, NEW JERSEY

DRAWN BY: CEM	DEWBERRY ENGINEERS INC. CERTIFICATION OF AUTHORIZATION NO. 24GA28047600	PROJECT NO.
CHECKED BY: ST		SHEET 4 OF 4
SCALE: AS SHOWN	JAMES D. HEEREN NEW JERSEY PROFESSIONAL ENGINEER NO. 24GE04031900	
DATE: 6/3/15		DWG. NO. DRG-04