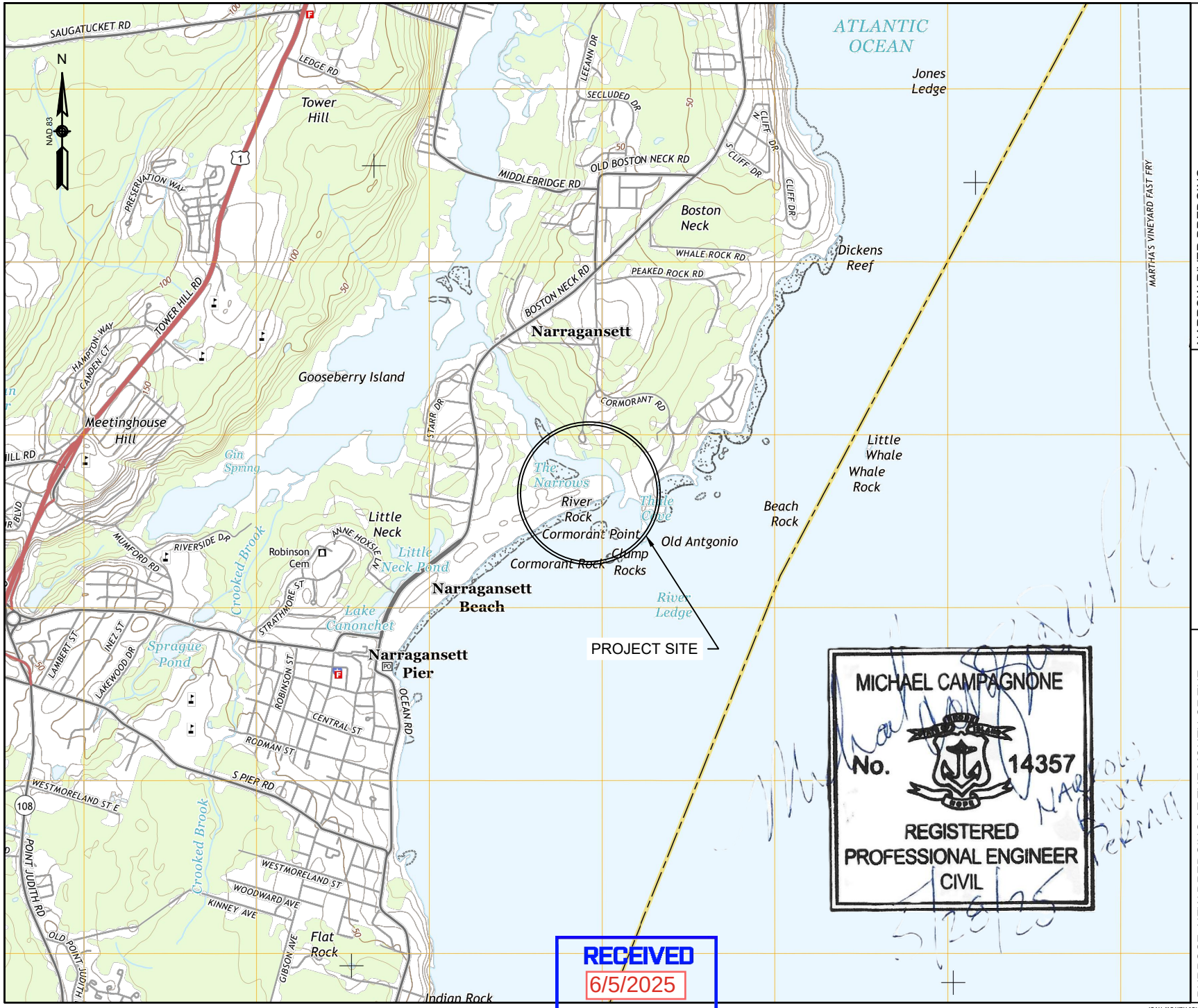
Appendix A

Narrow River Dredging Permit Plans

(Dated May 28, 2025)



MICHAEL CAMPAGNONE
No. 14357
REGISTERED PROFESSIONAL ENGINEER
CIVIL

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Pg.0018

NARROW RIVER DREDGING
AT: TOWN OF NARRAGANSETT
COUNTY OF: WASHINGTON COUNTY
APPLICATION BY: FOTH INFRASTRUCTURE & ENVIRONMENT, LLC
DATE: 05/28/2025
SHEET 1 OF 7

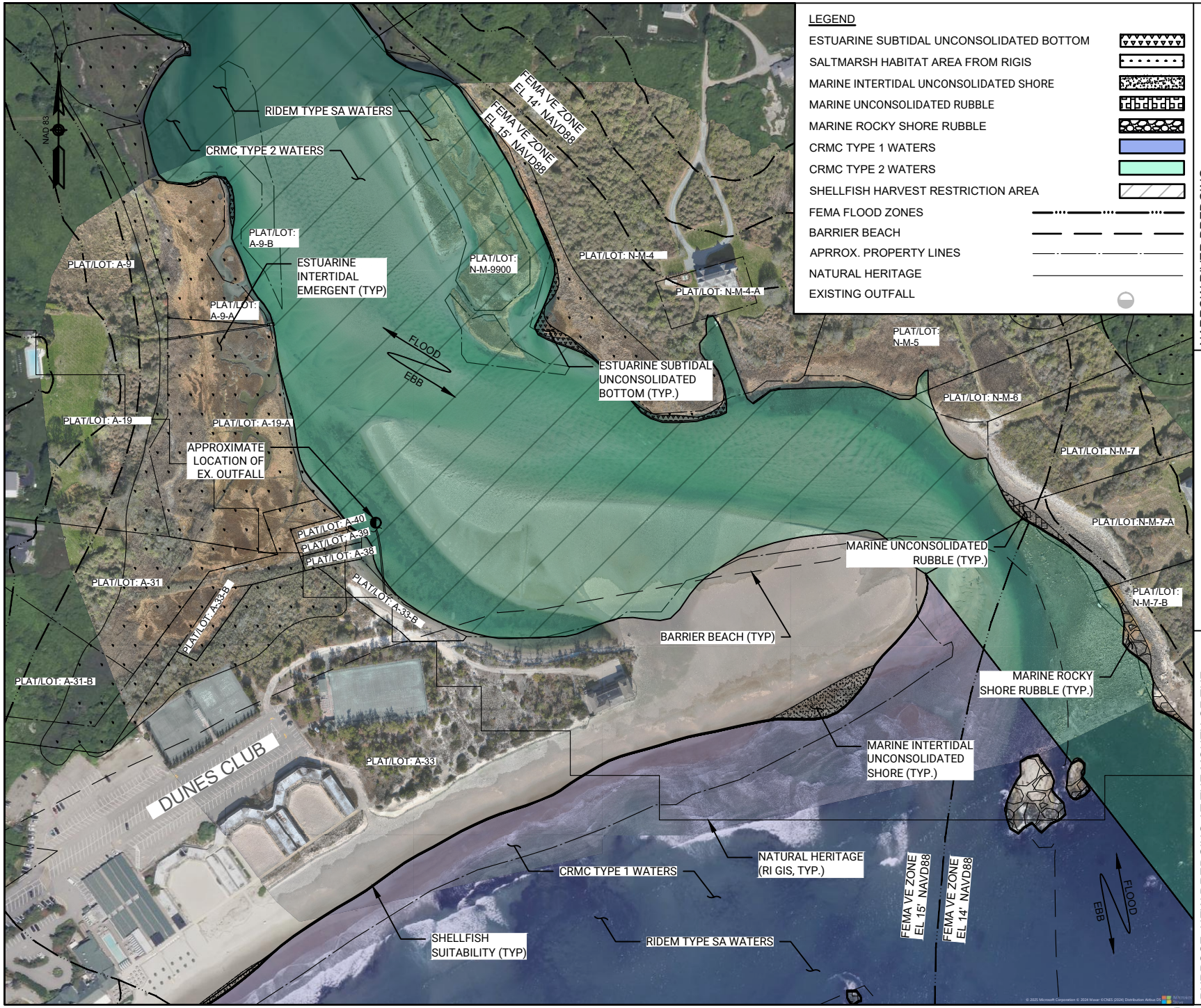
LOCUS MAP

GRAPHIC SCALE
NTS
0 NTS
SCALE IN FEET

PURPOSE: NEW DREDGING AT THE MOUTH OF THE NARROW RIVER
DATUM: MLLW = 0.00'
NAVD88 = +1.91'
MHW = +3.31'
AHTL = +4.89'

FOTH INFRASTRUCTURE & ENVIRONMENT, LLC.
114 TOURO ST. NEWPORT, RI 02840

c:\pw_workdir\pw_ie\d0846366\8.5 x 11_plot narrow river



NARROW RIVER DREDGING

AT: TOWN OF NARRAGANSETT
COUNTY OF: WASHINGTON COUNTY
APPLICATION BY: FOTH INFRASTRUCTURE & ENVIRONMENT LLC

DATE: 02/27/2025

SHEET 2 OF 7

NATURAL RESOURCE PLAN

GRAPHIC SCALE
0 150 300
SCALE IN FEET

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6/5/2025
COASTAL RESOURCES MANAGEMENT COUNCIL

PURPOSE: NEW DREDGING AT THE MOUTH OF THE NARROW RIVER

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114 TOURO ST. NEWPORT, RI 02840

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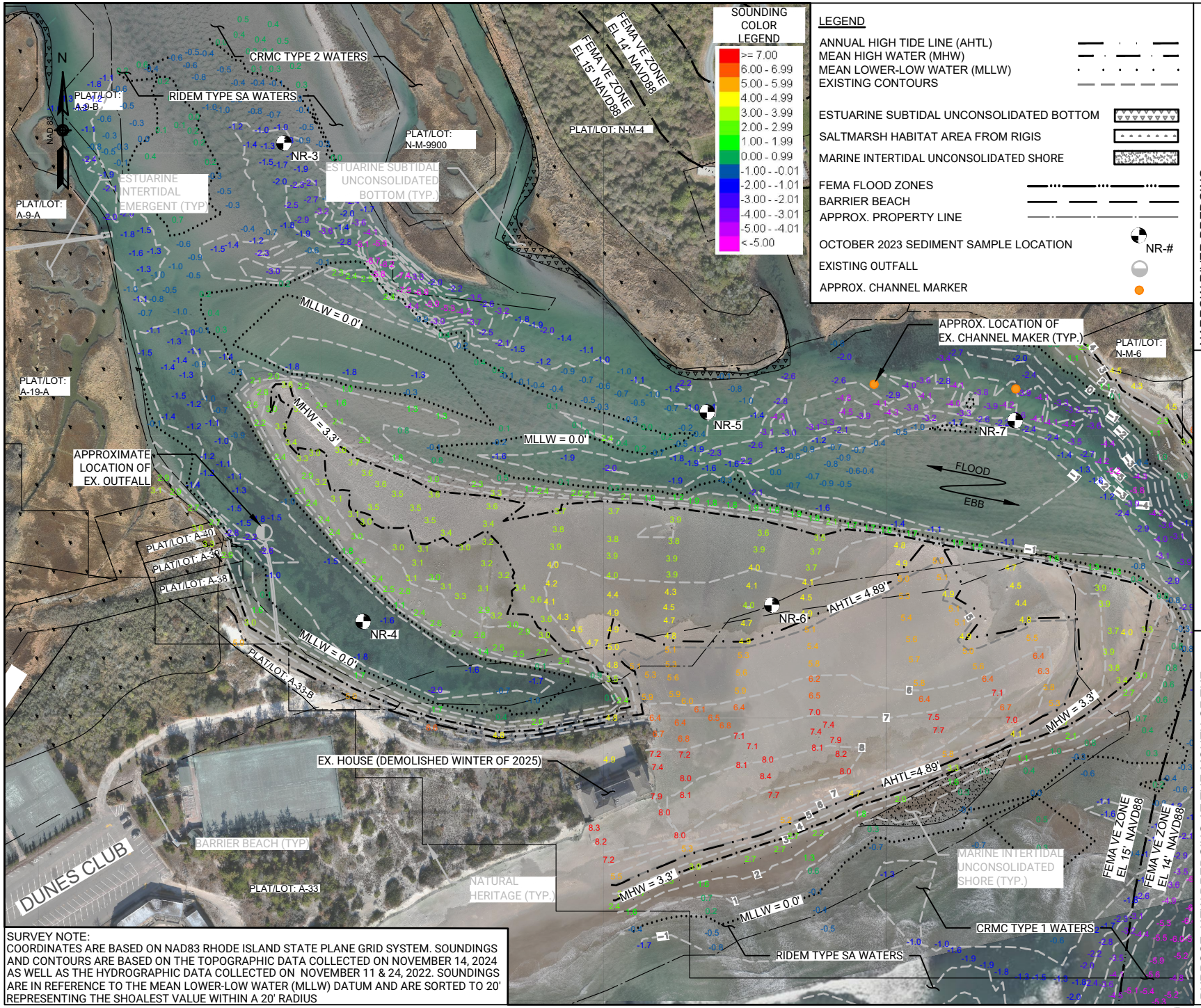

SURVEY NOTE:
COORDINATES ARE BASED ON NAD83 RHODE ISLAND STATE PLANE GRID SYSTEM. SOUNDINGS AND CONTOURS ARE BASED ON THE TOPOGRAPHIC DATA COLLECTED ON NOVEMBER 14, 2024 AS WELL AS THE HYDROGRAPHIC DATA COLLECTED ON NOVEMBER 11 & 24, 2022. SOUNDINGS ARE IN REFERENCE TO THE MEAN LOWER-LOW WATER (MLLW) DATUM AND ARE SORTED TO 20' REPRESENTING THE SHOALEST VALUE WITHIN A 20' RADIUS

NARROW RIVER DREDGING
AT: TOWN OF NARRAGANSETT
COUNTY OF: WASHINGTON COUNTY
APPLICATION BY: FOTH INFRASTRUCTURE & ENVIRONMENT LLC
DATE: 02/27/2025
SHEET 3 OF 7

EXISTING CONDITIONS

GRAPHIC SCALE
0 100 200
SCALE IN FEET

PURPOSE: NEW DREDGING AT THE MOUTH OF THE NARROW RIVER
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FOTH INFRASTRUCTURE & ENVIRONMENT, LLC
114 TOURO ST. NEWPORT, RI 02840

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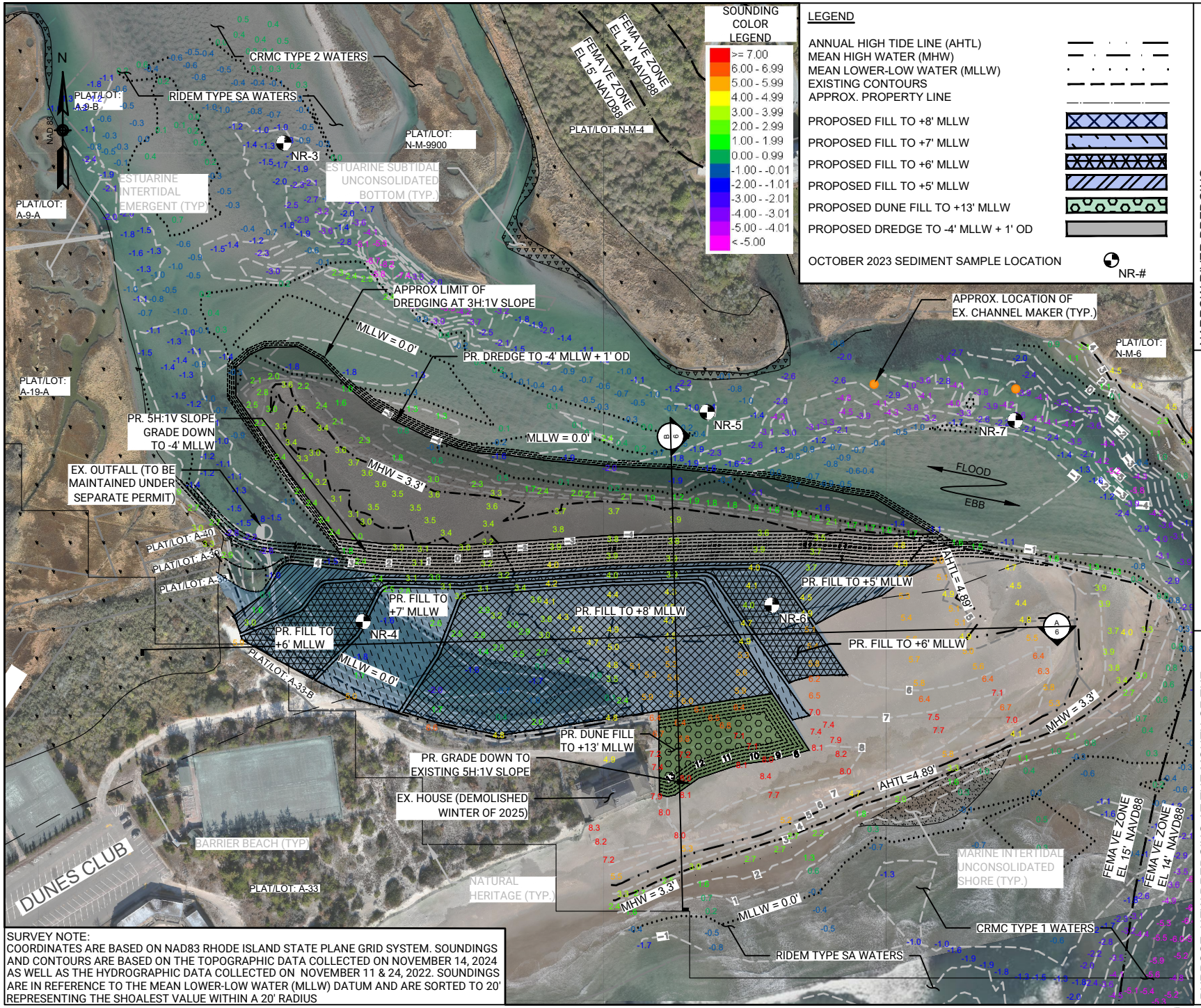
SOUNDING COLOR LEGEND
>= 7.00
6.00 - 6.99
5.00 - 5.99
4.00 - 4.99
3.00 - 3.99
2.00 - 2.99
1.00 - 1.99
0.00 - 0.99
-1.00 - -0.01
-2.00 - -1.01
-3.00 - -2.01
-4.00 - -3.01
-5.00 - -4.01
< -5.00
LEGEND
ANNUAL HIGH TIDE LINE (AHTL)
MEAN HIGH WATER (MHW)
MEAN LOWER-LOW WATER (MLLW)
EXISTING CONTOURS
APPROX. PROPERTY LINE
PROPOSED FILL TO +8' MLLW
PROPOSED FILL TO +7' MLLW
PROPOSED FILL TO +6' MLLW
PROPOSED FILL TO +5' MLLW
PROPOSED DUNE FILL TO +13' MLLW
PROPOSED DREDGE TO -4' MLLW + 1' OD
OCTOBER 2023 SEDIMENT SAMPLE LOCATION
NR-#
CRMC TYPE 2 WATERS
RIDEM TYPE SA WATERS
PLAT/LOT: A-9-B
PLAT/LOT: N-M-9900
PLAT/LOT: N-M-4
FEMA VE ZONE EL 15' NAVD88
FEMA VE ZONE EL 14' NAVD88
NR-3
ESTUARINE INTERTIDAL EMERGENT (TYP.)
ESTUARINE SUBTIDAL UNCONSOLIDATED BOTTOM (TYP.)
PLAT/LOT: A-9-A
APPROX LIMIT OF DREDGING AT 3H:1V SLOPE
MLLW = 0.0'
PR. DREDGE TO -4' MLLW + 1' OD
APPROX. LOCATION OF EX. CHANNEL MAKER (TYP.)
PLAT/LOT: N-M-6
PLAT/LOT: A-19-A
NR-5
NR-7
PR. 5H:1V SLOPE GRADE DOWN TO -4' MLLW
MLLW = 0.0'
MHW = 3.3'
FLOOD
EBB
EX. OUTFALL (TO BE MAINTAINED UNDER SEPARATE PERMIT)
PLAT/LOT: A-40
PLAT/LOT: A-36
PLAT/LOT: A-33
AHTL = 4.89'
PR. FILL TO +5' MLLW
PR. FILL TO +7' MLLW
PR. FILL TO +8' MLLW
NR-6
NR-4
PR. FILL TO +6' MLLW
MLLW = 0.0'
PLAT/LOT: A-33-B
PR. DUNE FILL TO +13' MLLW
PR. GRADE DOWN TO EXISTING 5H:1V SLOPE
MHW = 3.3'
AHTL=4.89'
EX. HOUSE (DEMOLISHED WINTER OF 2025)
BARRIER BEACH (TYP.)
DUNES CLUB
PLAT/LOT: A-33
NATURAL HERITAGE (TYP.)
MARINE INTERTIDAL UNCONSOLIDATED SHORE (TYP.)
FEMA VE ZONE EL 15' NAVD88
FEMA VE ZONE EL 14' NAVD88
MHW = 3.3'
MLLW = 0.0'
CRMC TYPE 1 WATERS
RIDEM TYPE SA WATERS
SURVEY NOTE:
COORDINATES ARE BASED ON NAD83 RHODE ISLAND STATE PLANE GRID SYSTEM. SOUNDINGS AND CONTOURS ARE BASED ON THE TOPOGRAPHIC DATA COLLECTED ON NOVEMBER 14, 2024 AS WELL AS THE HYDROGRAPHIC DATA COLLECTED ON NOVEMBER 11 & 24, 2022. SOUNDINGS ARE IN REFERENCE TO THE MEAN LOWER-LOW WATER (MLLW) DATUM AND ARE SORTED TO 20' REPRESENTING THE SHOALEST VALUE WITHIN A 20' RADIUS
NARROW RIVER DREDGING
AT: TOWN OF NARRAGANSETT
COUNTY OF: WASHINGTON COUNTY
APPLICATION BY: FOTH INFRASTRUCTURE & ENVIRONMENT LLC
DATE: 02/27/2025
SHEET 4 OF 7
PROPOSED DREDGE PLAN
GRAPHIC SCALE
0
100
200
SCALE IN FEET
RECEIVED
6/5/2025
COASTAL RESOURCES MANAGEMENT COUNCIL
PURPOSE: NEW DREDGING AT THE MOUTH OF THE NARROW RIVER
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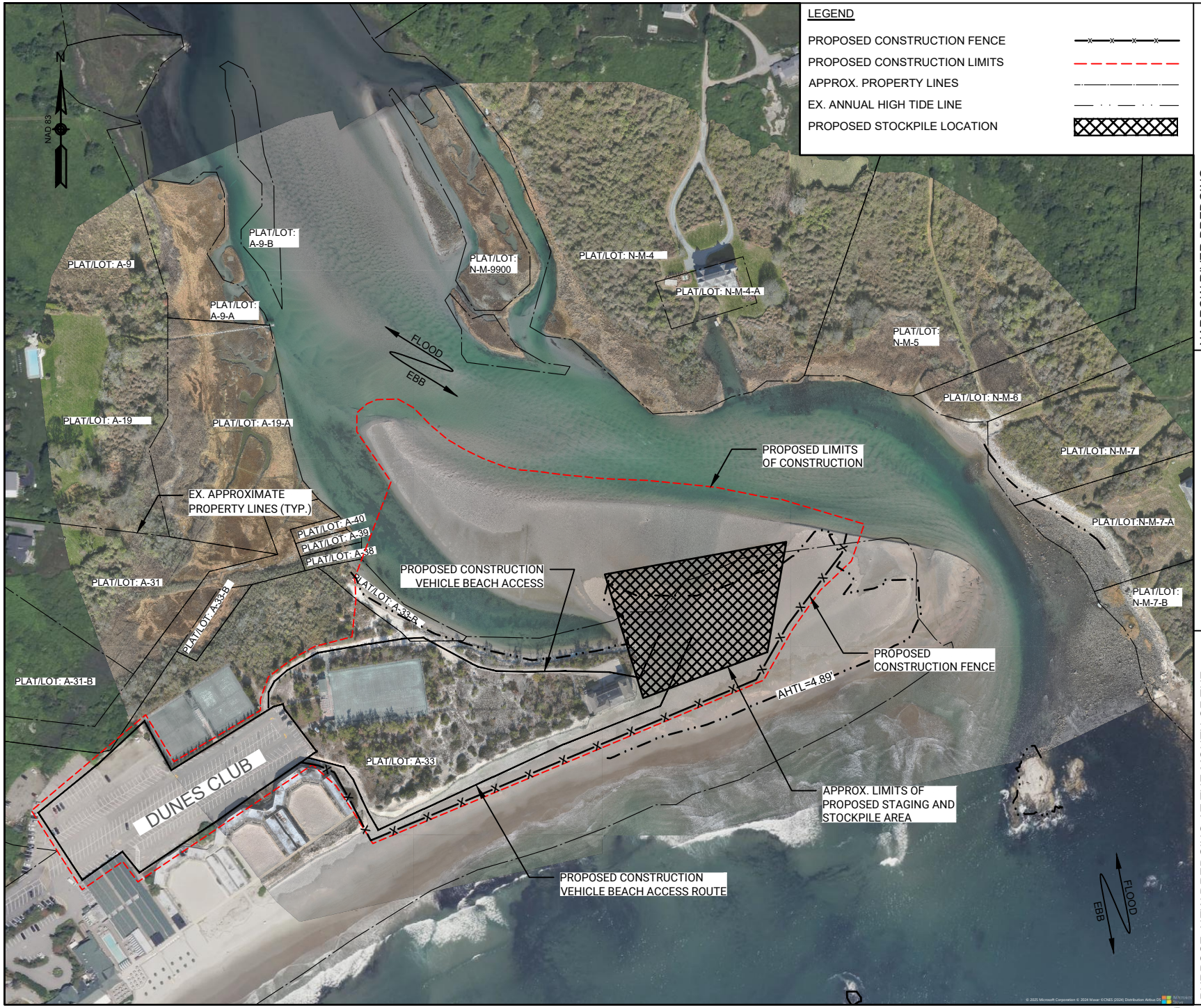
FOTH INFRASTRUCTURE & ENVIRONMENT, LLC
114 TOURO ST. NEWPORT, RI 02840



NARROW RIVER DREDGING

AT: TOWN OF NARRAGANSETT
COUNTY OF: WASHINGTON COUNTY
APPLICATION BY: FOTH INFRASTRUCTURE & ENVIRONMENT LLC

DATE: 02/27/2025

SHEET 5 OF 7

PROPOSED CONSTRUCTION PLAN

GRAPHIC SCALE
0 150 300
SCALE IN FEET

PURPOSE: NEW DREDGING AT THE MOUTH OF THE NARROW RIVER

DATUM: MLLW = 0.00'
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AHTL = +4.89'

FOTH INFRASTRUCTURE & ENVIRONMENT, LLC.
114 TOURO ST. NEWPORT, RI 02840

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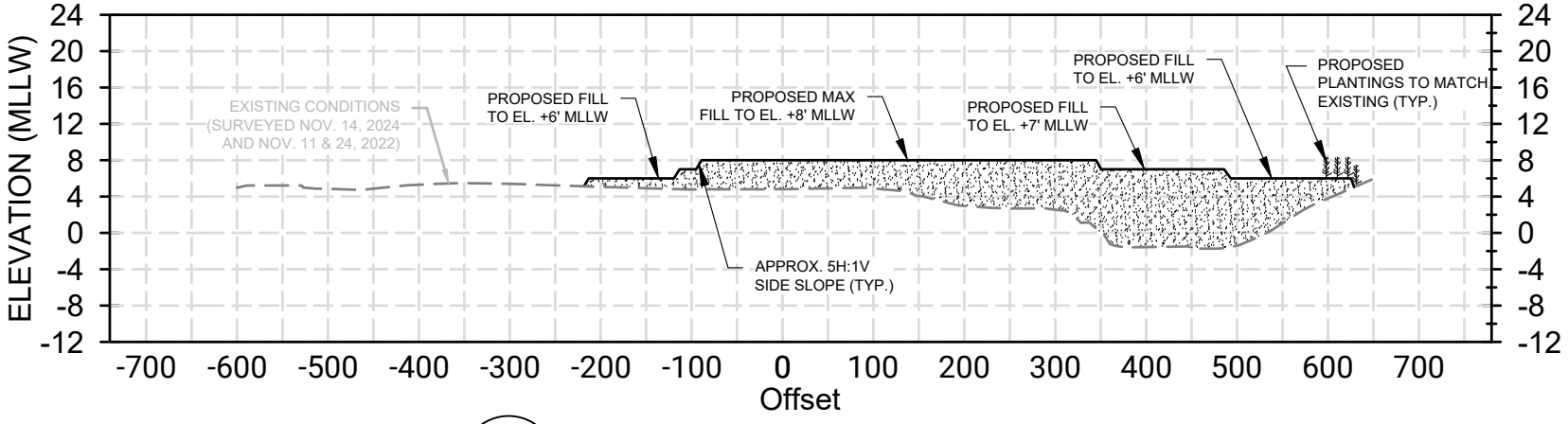
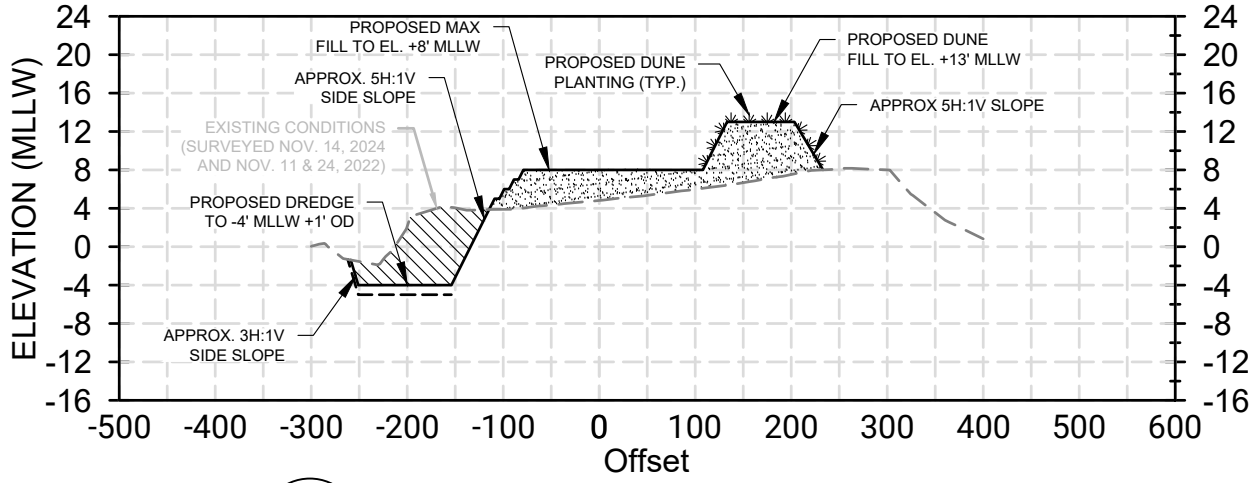


A / 4 SECTION A / NARROW RIVER PLACEMENT AREA
SCALE: HORIZONTAL 1" = 200'; VERTICAL 1" = 20'



B / 4 SECTION B / NARROW RIVER DREDGE & PLACEMENT AREA
SCALE: HORIZONTAL 1" = 200'; VERTICAL 1" = 20'

LEGEND

PROPOSED DREDGE

PROPOSED FILL

NARROW RIVER DREDGING
AT: TOWN OF NARRAGANSETT
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DATE: 02/27/2025
SHEET 6 OF 7

PROPOSED DREDGE PLAN SECTIONS

GRAPHIC SCALE 0 100 200 SCALE IN FEET

PURPOSE: NEW DREDGING AT THE MOUTH OF THE NARROW RIVER
DATUM: MLLW = 0.00'
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MHW = +3.31'
AHTL = +4.89'

FOTH INFRASTRUCTURE & ENVIRONMENT, LLC.
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CUT & FILL VOLUME SUMMARY:

Narrow River Dredge Area				
	Volume to Design (CY)	Overdepth Volume (CY)	Total Dredge Volume (CY)	Total Dredge Square Footage (SF)
Dredge to -4' MLLW +1' OD	35,923	5,628	41,551	122,389

Narrow River Sand Bar Placement Area		
	Required Fill (CY)	Required Fill (SF)
Narrow River Placement Area Fill to +8' to +5' MLLW	37,992	208,494

VOLUME NOTES: VOLUMES ARE CONSIDERED APPROXIMATE FOR CONCEPTUAL PURPOSES. VOLUMES INCLUDE A +10% CONTINGENCY. VOLUMES ARE BASED ON A COMBINATION OF TOPOGRAPHIC DATA COLLECTED ON NOVEMBER 14, 2024 AND HYDROGRAPHIC DATA COLLECTED ON NOVEMBER 11 & 24, 2022.

TOPOGRAPHIC SURVEY NOTES:

1. PROJECT NAME: NARROW RIVER DREDGING
2. PROJECT NUMBER: 0022N010
3. PLOT SCALE: 1" = 200' & 1" = 300'
4. SURVEY DATE: NOVEMBER 14, 2024 & NOVEMBER 11 & 24, 2022
5. SURVEYOR: M. CAMPAGNONE, E. BOWE, M. GOGGIN

8. WEATHER COND: SUNNY, 47 DEG F, WINDS NE 5-15 KTS
9. PROJECT DATUM: MLLW AS NOTED IN DATUM CONVERSION CHART
10. COOR. SYSTEM: NAD83 - RHODE ISLAND STATE PLANE
12. BENCHMARK: "RI STATE BOARD OF PUBLIC ROADS BM #399" E: 343765.71, N:134612.59, ELEVATION: 69.36' NAVD88

GENERAL NOTES:
1. THE CONCEPTUAL DESIGNS SHOWN ON THIS PLAN ARE BASED ON DATA THAT WAS GATHERS ON NOVEMBER 14, 2024 AS WELL AS NOVEMBER 11 & 24, 2022 USING TOPOGRAPHIC AND SINGLE BEAM HYDROGRAPHIC SURVEY METHODS.
2. COORDINATES ARE BASED ON NAD 83 RHODE ISLAND STATE PLANE GRID SYSTEM.
3. SOUNDINGS AND CONTOURS ARE BASED ON THE TOPOGRAPHIC DATA COLLECTED ON NOVEMBER 14, 2024 AS WELL AS THE HYDROGRAPHIC DATA COLLECTED ON NOVEMBER 11 & 24, 2022.
4. SOUNDINGS ARE IN REFERENCE TO THE MEAN LOWER-LOW WATER (MLLW) DATUM AND ARE SORTED TO 20' REPRESENTING THE SHOALEST VALUE WITHIN A 20' RADIUS
5. RTK CORRECTIONS FOR THIS SURVEY PROVIDED BY KEYNET - VRS (GEOID 12A)
6. ORTHO-IMAGERY AND SCALED DATA IS APPROXIMATE UNLESS OTHERWISE NOTED AND SHOULD BE USED AS GENERAL REFERENCE ONLY.
7. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF TOPOGRAPHIC AND HYDROGRAPHIC SURVEYS PERFORMED ON THE DATES SHOWN, AND CAN ONLY BE CONSIDERED AS INDICATING THE SEABED CONDITIONS AT THAT TIME. INTERPOLATED INFORMATION FROM BETWEEN SOUNDING RUNS IS NOT GUARANTEED. SHOALS, OBSTRUCTIONS OR OTHER DIFFERING CONDITIONS MAY EXIST BETWEEN THESE RUNS. CONSULT WITH FOTH INFRASTRUCTURE & ENVIRONMENT, LLC. FOR MORE DETAILED INFORMATION.
8. PROPERTY LINES SHOWN ARE ONLY APPROXIMATE. NO SURVEYS WERE CONDUCTED VERIFYING LOCATIONS OF SHOWN PROPERTY LINES. PROPERTY LINES SHOWN ARE BASED OFF NARRAGANSETT TOWN GIS DATA.
8. POSSESSION AND USE OF THE MATERIAL CONTAINED ON THESE DRAWINGS IS GRANTED ONLY IN CONNECTION WITH ITS USE AS IT RELATES TO THE TITLED PROJECT, ANY OTHER USE, REPRODUCTION OR DISCLOSURE OF THE INFORMATION CONTAINED HEREON IS EXPRESSLY PROHIBITED WITHOUT THE WRITTEN CONSENT OF FOTH.

DATUM OFFSETS

MLLW	MLW	NAVD 88	
4.89	4.76	2.98	AHTL
3.56	3.43	1.65	MHHW
3.31	3.18	1.40	MHW
1.91	1.78	0.00	NAVD 88
0.13	0.00	-1.78	MLW
0.00	-0.13	-1.91	MLLW
-0.94	-1.07	-2.85	ALTL

OFFSETS TAKEN FROM VDATUM ONLINE ON 09/06/2022 FOR 41.442489N, -71.441626W GEOID 18

AHTL AND ALTL VALUES DETERMINED FROM NOAA TIDE STATION #8452660 NEWPORT, RI 2025 PREDICTED TIDES. ALTL VALUE PREDICTED 3/1/2025. AHTL VALUE PREDICTED 11/6/2025.

NARROW RIVER DREDGING
AT: TOWN OF NARRAGANSETT
COUNTY OF: WASHINGTON COUNTY
APPLICATION BY: FOTH INFRASTRUCTURE & ENVIRONMENT LLC

DATE: 02/27/2025
SHEET 7 OF 7

SURVEY NOTES

GRAPHIC SCALE
0 NTS NTS
SCALE IN FEET

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AHTL = +4.89'

FOTH INFRASTRUCTURE & ENVIRONMENT, LLC.
114 TOURO ST. NEWPORT, RI 02840

Memorandum

114 Touro Street
Newport, RI 02840
(401) 236-0360
foth.com

November 7, 2025

TO: Town of Narragansett (Town)

FR: Foth Infrastructure & Environment, LLC

RE: Narrow River Dredging – Proposed Water Level Monitoring Work Plan

Overview

To support environmental review and permitting for the proposed dredging at the mouth of the Narrow River, a water level monitoring program will be implemented. The program is designed to capture tidal behavior and water level fluctuations over two full lunar cycles prior to dredging and two full lunar cycles following completion. This approach provides a comparative dataset to assess potential changes in tidal range, mean water level, and flow dynamics resulting from dredging. This work plan is intended to detail the proposed actions to document and evaluate changes in tidal hydrodynamics associated with dredging activities at the river mouth.

Where appropriate, collaboration with local and regional environmental organizations will be explored to enhance data sharing, community engagement, and ecological interpretation. Potential partners include the Narrow River Preservation Association (NRPA), Narragansett Chapter of Save The Bay, and the U.S. Fish and Wildlife Service (USFWS). These groups may provide historical data, assist with site access, or contribute to public outreach and stewardship efforts.

1. Monitoring Plan

The monitoring effort will be structured to ensure consistent data collection across both pre- and post-dredging phases. Key design elements include:

- Duration
  - Pre-dredging monitoring: ~60 days (two lunar cycles).
  - Post-dredging monitoring: ~60 days (two lunar cycles), initiated immediately after dredging completion.
- Instrumentation
  - Pressure-based water level loggers (e.g., RBRSolo Rose Gauges) will be used to record water levels at 6-minute intervals.
    - Two (2) gauges will be installed at each location to ensure logger error is mitigated.

- A barometric pressure logger will be deployed concurrently, or data will be sourced from a nearby NOAA station for atmospheric compensation.
- Loggers will be affixed to stable structures (e.g., pilings, structures, weighted frames) to minimize movement and ensure consistent vertical datum.

- Deployment Locations
  - Please see Attachment A for plan depicting proposed monitoring locations. Foth intends to place tidal monitors in the following locations:
    - Primary Site: South of the dredge footprint within the Narragansett Bay at State Pier 5 in Narragansett, RI.
    - Secondary Site: Upstream control location South of Boston Neck Road.

2. Data Collection and Processing

Data will be collected and processed using standard hydrologic monitoring protocols consistent with federal guidance from USGS, NOAA, and USFWS. These protocols ensure accuracy, consistency, and defensibility of results. The following procedures will be followed:

- Download Frequency
  - Data will be retrieved monthly to verify logger performance and prevent data loss.
  - Two (2) data loggers will be deployed to create redundancy in the event of a logger malfunction.
- Data Corrections:
  - Water level data will be corrected for atmospheric pressure using barometric readings.
  - Adjustments will be made to align with local tidal datums (e.g., MLLW, NAVD88) using NOAA benchmark data.
- Quality Assurance / Quality Control (QA/QC):
  - Raw data will be reviewed for anomalies such as spikes, dropouts, or drift.
  - Erroneous data points will be flagged and excluded from analysis.
  - Logger performance will be validated against NOAA tide gauge data from nearby coastal stations.
  - Calibration records and deployment logs will be maintained throughout the monitoring period.

These procedures are informed by the USGS National Field Manual for the Collection of Water-Quality Data, the USGS Techniques and Methods 1–D3, and NOAA's Capturing Water Levels Resource Guide and Water Level Station Specifications for Shoreline Mapping Projects. USFWS

protocols for hydrologic data collection and habitat mapping also support the QA/QC framework, particularly for wetland and estuarine environments.

3. Reporting and Deliverables

A technical memorandum will be prepared following completion of the post-dredging monitoring phase. The report will include:

- Summary of monitoring objectives, methods, and instrumentation.
- Time series plots of water level data for both pre- and post-dredging periods.
- Statistical comparison of tidal range, mean water level, and variability.
- Discussion of observed changes, if any.
- GIS-based map showing logger deployment locations.
- Appendices with raw and processed data tables

The draft report will be submitted within 30 days of completing the post-dredging monitoring. Final deliverables will be provided following review and comment resolution.

Attachments

Attachment 1 Proposed Monitoring Plan

References

NOAA Center for Operational Oceanographic Products and Services (CO-OPS). (2025). Capturing Water Levels: Resource Guide. Available at: https://tidesandcurrents.noaa.gov/education/tech-assist/training/water-level/pdf/Capturing%20Water%20Levels%20Resource%20Guide_2025.pdf

NOAA CO-OPS. (2009). Water Level Station Specifications and Deliverables for Shoreline Mapping Projects. Updated May 2009. Available at: https://tidesandcurrents.noaa.gov/publications/Water_Level_Station_Specifications_and_Deliverables_for_Shoreline_Mapping_Projects,_Updated_May_2009.pdf

U.S. Fish and Wildlife Service. (2020). Data Collection Requirements and Procedures for Mapping Wetland, Deepwater, and Related Habitats of the United States. Available at: https://www.fws.gov/sites/default/files/documents/data-collection-requirements-and-procedures-for-mapping-wetland-deepwater-and-related-habitats-of-the-united-states.pdf

U.S. Fish and Wildlife Service. (n.d.). Hydrologic Data Collection and Investigations. Project Overview. Available at: https://www.fws.gov/project/hydrologic-data-collection-and-investigations

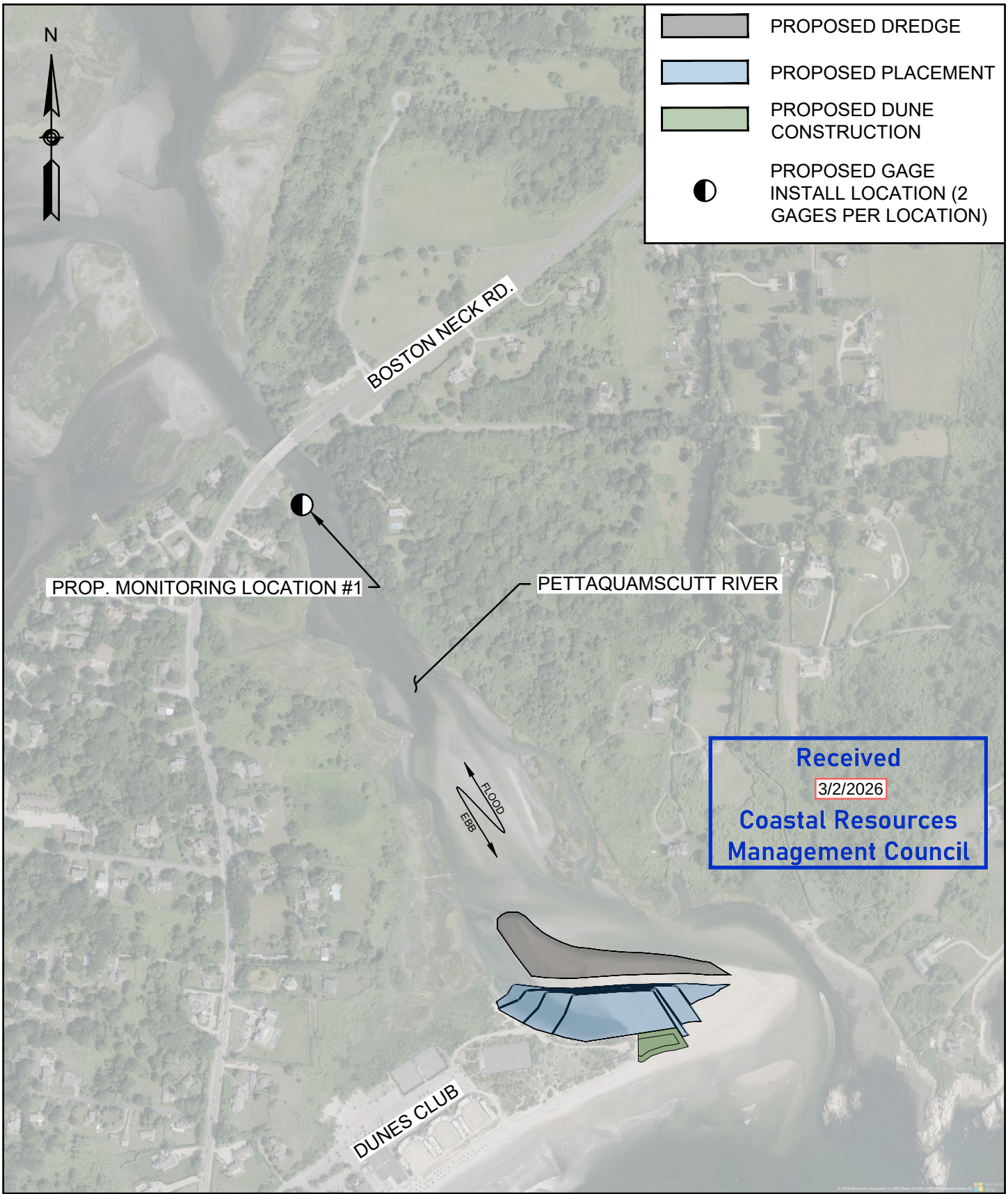
U.S. Geological Survey. (2002). Long-Term Hydrologic Monitoring Protocol for Coastal Ecosystems. Open-File Report 2002–497. Available at: https://pubs.usgs.gov/publication/ofr02497

U.S. Geological Survey. (2006). National Field Manual for the Collection of Water-Quality Data. Techniques of Water-Resources Investigations Book 9. Available at: https://www.usgs.gov/mission-areas/water-resources/science/national-field-manual-collection-water-quality-data-nfm

Wagner, R.J., Boulger, R.W., Oblinger, C.J., & Smith, B.A. (2006). Guidelines and Standard Procedures for Continuous Water-Quality Monitoring in Streams. U.S. Geological Survey Techniques and Methods 1–D3. Available at: https://pubs.usgs.gov/tm/2006/tm1D3/

Attachment 1

Proposed Monitoring Plan



Received
3/2/2026
Coastal Resources Management Council

PURPOSE: NEW DREDGING AT THE MOUTH OF THE NARROW RIVER

DATUM: MLLW = 0.00'
MLW = +1.91'
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AHTL = +4.89'

FOTH INFRASTRUCTURE & ENVIRONMENT, LLC.
114 TOURO ST. NEWPORT, RI 02840

PROPOSED WATER LEVEL MONITORING PLAN

GRAPHIC SCALE
0 300 600
SCALE IN FEET

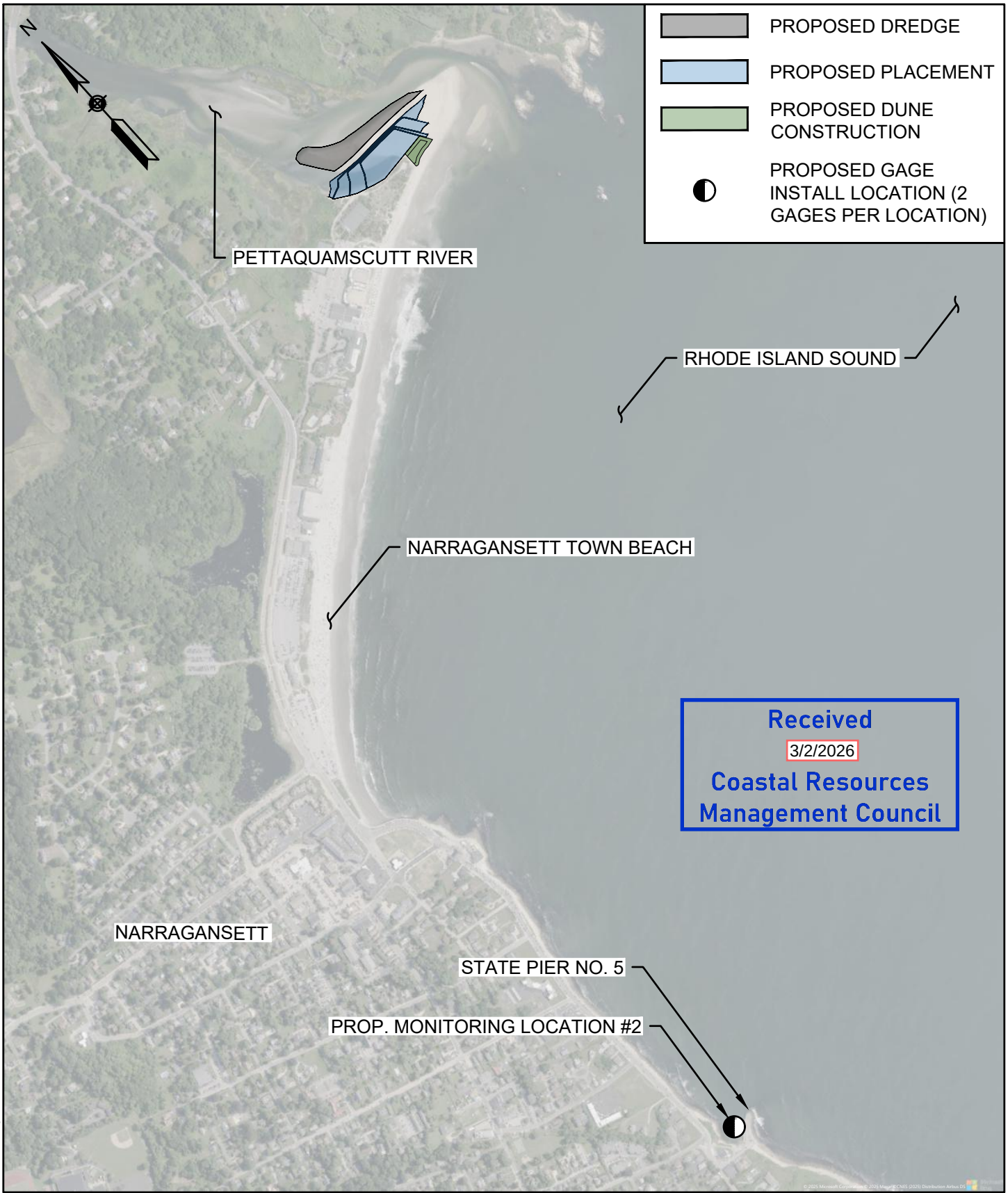
NARROW RIVER DREDGING

AT: TOWN OF NARRAGANSETT
COUNTY OF: WASHINGTON
APPLICATION BY: FOTH INFRASTRUCTURE & ENVIRONMENT, LLC

DATE: 11/5/2025

SHEET 1 OF 2

c:\pw_work\dnjpw_jet\d0626014\narrow river water level monitoring plan



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3/2/2026
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FOTH INFRASTRUCTURE & ENVIRONMENT, LLC.
114 TOURO ST. NEWPORT, RI 02840

PROPOSED WATER LEVEL MONITORING PLAN

GRAPHIC SCALE
0 500 1000
SCALE IN FEET

NARROW RIVER DREDGING

AT: TOWN OF NARRAGANSETT
COUNTY OF: WASHINGTON
APPLICATION BY: FOTH INFRASTRUCTURE & ENVIRONMENT, LLC

DATE: 11/5/2025

SHEET 2 OF 2

c:\pw_work\dirpw_jeld\d062801d\narrow river water level monitoring plan

Memorandum

114 Touro Street
Newport, RI 02840
(401) 236-0360
foth.com

February 6, 2026

TO: Town of Narragansett, Rhode Island (Town)

FR: Foth Infrastructure & Environment, LLC

RE: Dune Vegetation Planting Plan

Site Overview

- **Location**: Coastal dune system in Rhode Island
- **Soil**: Sandy, well-drained
- **Exposure**: Full sun, high wind, salt spray
- **Goal**: Stabilize dune, prevent erosion, restore native vegetation

1. Planting Plan

1.1 Species Selection

Zone	Species	Notes
Foredune	*Ammophila breviligulata* (American beachgrass)	Primary stabilizer
Dune Crest	*Morella pensylvanica* (Northern bayberry), *Prunus maritima* (Beach plum)	Shrubs for structure
Backdune	*Solidago sempervirens* (Seaside goldenrod), *Schizachyrium littorale* (Shore Little bluestem), Panicum virgatum (Switchgrass)	Pollinator support

1.2 Planting Zones

1.2.1 Foredune Zone (Primary Stabilization)

- Species:
  - *Ammophila breviligulata* (American beachgrass – perennial grass)
- Layout:
  - Plant in staggered rows.
  - Rows should follow the contour of the dune to reduce wind exposure.

- Plant in clusters of two (2) to three (3) culms (bare root stems with roots) per hole to mimic natural colonization (herein considered a plant).

- Spacing:
  - Row spacing: Staggered rows, 12" offset between rows.
  - Planting within rows: Space plants 18” apart, if wind erosion is severe reduce spacing to 12”.
- Density:
  - Approximately 1,000–1,500 culms per 1,000 sq ft
- Planting Guidelines:
  - Planting seeds is not permitted due to their low germination rates.
  - Plant culms at least 8" deep.
  - Avoid planting in straight lines, use a zigzag pattern to reduce erosion.
  - Typical planting window ranges between March 1 to April 30 depending on seasonal weather conditions. Avoid planting when the soil is frozen.
  - Do not plant during the summer.
  - Keep culms and roots moist before and during planting. Water in thoroughly after planting.
- Fertilization: Applying fertilizer is not recommended.

1.2.2 Dune Crest Zone (Structural Vegetation)

- Species:
  - *Morella pensylvanica* (Northern bayberry –perennial shrub)
  - *Prunus maritima* (Beach plum – perennial shrub)
    - Note: Beach Plum seeds (pits) contain hydrocyanic acid (cyanide) and are toxic if consumed. Recommend signage on toe of dune not to consume.
- Layout:
  - Plant shrubs in naturalistic drifts or clusters, not in rows.
  - Use shrubs to create windbreaks and anchor sand.
- Spacing:
  - Perennial shrubs should be planted 3 ft–5 ft apart (on center).
  - Include 3–7 plants of the same species within each cluster.

- Randomly arrange Northern bayberry and Beach plum clusters throughout dune crest.

- Density:
  - Approximately 100–150 shrubs per 1,000 sq ft
- Planting Guidelines:
  - Perennial shrubs should be one (1) to two (2) year old bare root or containerized plants.
  - Dig holes twice the width of root balls.
  - Mulch with salt hay to retain moisture.
  - Planting should be installed in early spring prior to the shrubs breaking dormancy.
  - Avoid planting when the soil is frozen.
  - Optional: Beach Plum should be inoculated with both an arbuscular mycorrhizal fungus and a phosphate solubilizing fungus at the time of planting to enhance salt tolerance and soil health at the root.
- Fertilization: Applying fertilizer is not recommended.

1.2.3 Backdune Zone (Pollinator and Biodiversity Support)

- Species:
  - *Solidago sempervirens* (Seaside goldenrod – perennial forb)
  - *Schizachyrium littorale (Nash or* Shore Little bluestem – perennial grass)
  - *Panicum virgatum* (Switchgrass – perennial grass)
- Layout:
  - Plant in staggered rows.
  - Rows should follow the contour of the dune to reduce wind exposure.
  - Mix grasses and forbs in alternating patches.
- Spacing:
  - Row spacing: 3 ft from previous center.
  - Planting within rows: 18"–24" apart (plug center to center)
- Density:
  - Approximately 400–600 plugs per 1,000 sq ft
- Planting Guidelines:

- Forbs and grasses should be planted as containerized stock (plugs).
- Grasses should be planted with the root ball 2” below nursery grow depth.
- If planting stock, stems should be 1 -2 ft tall.
- Direct seeding for coastal dune environments is not recommended and may result in insufficient grass establishment.
- Keep substrate attached to the roots of the seedlings while planting (i.e. keep plugs intact).
- Transplant forb stock in late winter to early spring.
- Planting forbs and grasses should be done between March to May.
- Avoid planting when the soil is frozen.
- Use erosion control fabric if slope exceeds 3:1.

- Fertilization: Applying fertilizer is not required for forbs.

1.3 Planting Timeline

Task	Timing
Site prep (dredging, grading, invasive removal)	Fall/Winter (October–January)
Install erosion controls (snow fencing)	Winter (January/February)
Site inspection (assess erosion)	Early Spring (March)
Planting beachgrass culms, shrub and perennial	Mid-Spring (March – April)
Mulching, erosion control, and repair fencing as needed	Immediately after planting
Supplemental planting (if needed)	Fall (September–October) (pending weather)

1.4 General Layout Recommendations

- Orientation**:** Rows should run parallel to prevailing wind direction.
- Edge Planting**:** Use denser planting at dune edges to reduce wind scour.

1.5 Irrigation

- Initial Watering: Thoroughly water in all culms, shrubs, forbs, and plugs immediately after planting.
- Establishment Period: Water weekly for first 6–8 weeks if rainfall is insufficient.
- Long-Term: No irrigation needed once established; plants are drought-tolerant.

1.6 Temporary Winter Erosion Controls

- Sand Fencing (Helps trap sand on the dune surface, reduces wind-driven (aeolian) sediment transport and contributes to dune growth and stability.)
  - Snow fencing along the dune shall be installed in a zig-zag configuration to maximize its effectiveness in capturing wind-blown sand. The fencing should be set at alternating angles rather than in a straight line, which helps reduce wind velocity, promote sand deposition, and support continued dune growth and stabilization.
  - Staggered rows, 10–20 ft apart.
  - Signage should be installed on sand fencing to deter public passage.
- Dune Sand Replacement/Post Storm Maintenance
  - The constructed dune will be inspected following major storm events during the period between completion of construction and installation of planting. If storm-related erosion or loss of fill is observed, affected dune areas will be repaired by placement of compatible dredged material.
  - Approximately 750 CY of compatible dredged material will be stockpiled at the Town Beach West Parking lot for use as needed for dune repairs. Any stockpiled material not placed on the proposed dune prior to planting will be transported to Narragansett Town Beach and distributed evenly along the existing beach, graded to an approximate 10H:1V slope landward of and above the AHTL.
  - All dune sand replacement material will consist of compatible dredged sediments generated from the Narrow River dredging area, as depicted in the project plans titled “Narrow River Dredging,” Sheet 4 of 7, dated February 27, 2025.

2. Maintenance Plan

Task	Frequency	Notes
Watering	Weekly (first 2 months)	Only during dry spells
Invasive species removal	Monthly (Year 1), then quarterly	Hand-pulling preferred
Dune Sand Replacement	As needed (After storm events)	Reference Section 1.6
Replanting	As needed	Fill gaps in spring or fall
Mulch replenishment	Annually	Use salt hay or straw
Monitoring	Biannual	Check for erosion, plant health, and coverage

3. Revegetation Timeline

Phase	Duration	Outcome
Establishment	0–3 months	Root development, minimal growth
Early Growth	3–12 months	Beachgrass spreads via rhizomes
Stabilization	12–24 months	Full coverage, erosion control
Maturity	2–3 years	Self-sustaining dune vegetation

4. References

Rhode Island Coastal Resources Management Council. *BZ Guidance: Invasives Checklist*. https://www.crmc.ri.gov/applicationforms/BZGuidance_Invasives_Checklist.pdf.

Rhode Island Coastal Resources Management Council. *Coastal Buffer Planting Guide*. https://www.crmc.ri.gov/coastallandscapes/Coastal_Buffer_Planting_Guide.pdf.

Rhode Island Coastal Resources Management Council. *Red Book (650-RICR-20-00-1)*. Rhode Island Coastal Resources Management Council, https://rules.sos.ri.gov/regulations/part/650-20-00-1.

RI Coastal Resources Management Council. (2008). *RI.gov*. Retrieved from Coastal Landscapes Program: https://www.crmc.ri.gov/coastallandscapes.html#:~:text=These%20include%20a%20Coastal%20Buffer%20Planting%20Guide%20%28PDF%29,for%20coastal%20property%20owners%20under%20current%20CRMC%20regulations.

New Jersey Sea Grant Consortium. Building and Planting Coastal Sand Dunes: Frontal Dune Species. May 2016, https://njseagrant.org/wp-content/uploads/2016/05/Building-and-Planting-Coastal-Sand-Dunes-Frontal-Dune-Species.pdf.

USDA Natural Resources Conservation Service. (2006). Plant Guide for American Beachgrass (Ammophila breviligulata Fernald). Retrieved from https://plants.usda.gov/DocumentLibrary/plantguide/pdf/pg_ambr.pdf

USDA Natural Resources Conservation Service. (2014). SEASIDE GOLDENROD Solidago sempervirens L. Retrieved from https://plants.usda.gov/DocumentLibrary/plantguide/pdf/pg_sose.pdf

USDA Natural Resources Conservation Service. (2018). Beach Plum (Prunus maritima Marshall). Retrieved from https://plants.usda.gov/DocumentLibrary/plantguide/pdf/pg_prma2.pdf

USDA Natural Resources Conservation Service. (2022). Shore Little Bluestem Schizachyrium littorale (Nash). Retrieved from https://www.nrcs.usda.gov/plantmaterials/njpmcpg13947.pdf

USDA Natural Resources Conservation Services. (2005). Switchgrass Panicum virgatum L. Plant Fact Sheet. Retrieved from https://plants.usda.gov/DocumentLibrary/factsheet/pdf/fs_pavi2.pdf

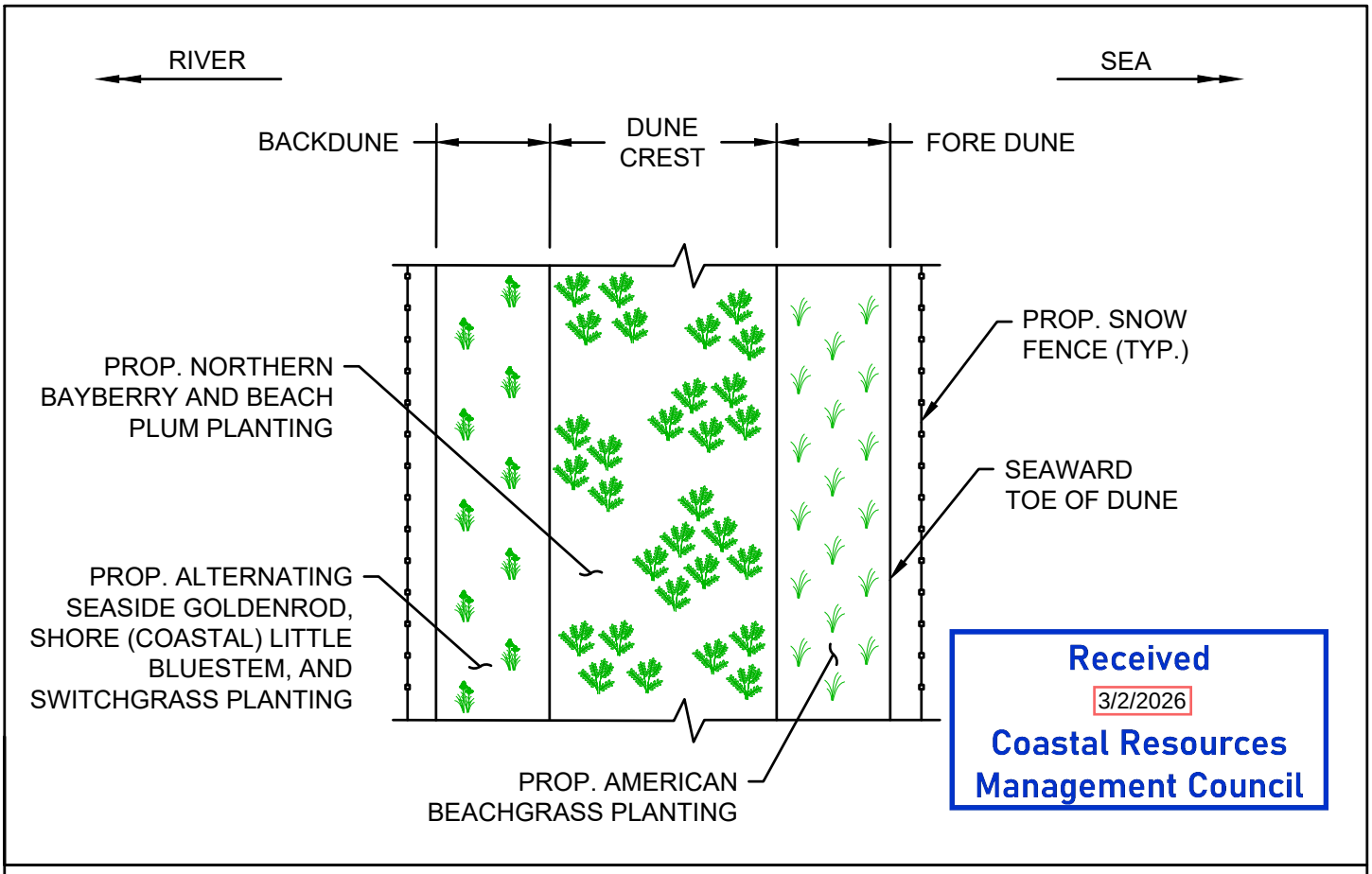
USDA Natural Resources Conservation Services. (2019). NORTHERN BAYBERRY Morella pensylvanica (Mirb.) Kartesz. Retrieved from https://plants.usda.gov/DocumentLibrary/plantguide/pdf/pg_mope6.pdf

Attachments

Attachment 1 Conceptual Dune Vegetation Plan

Attachment 1

Conceptual Dune Vegetation Plan



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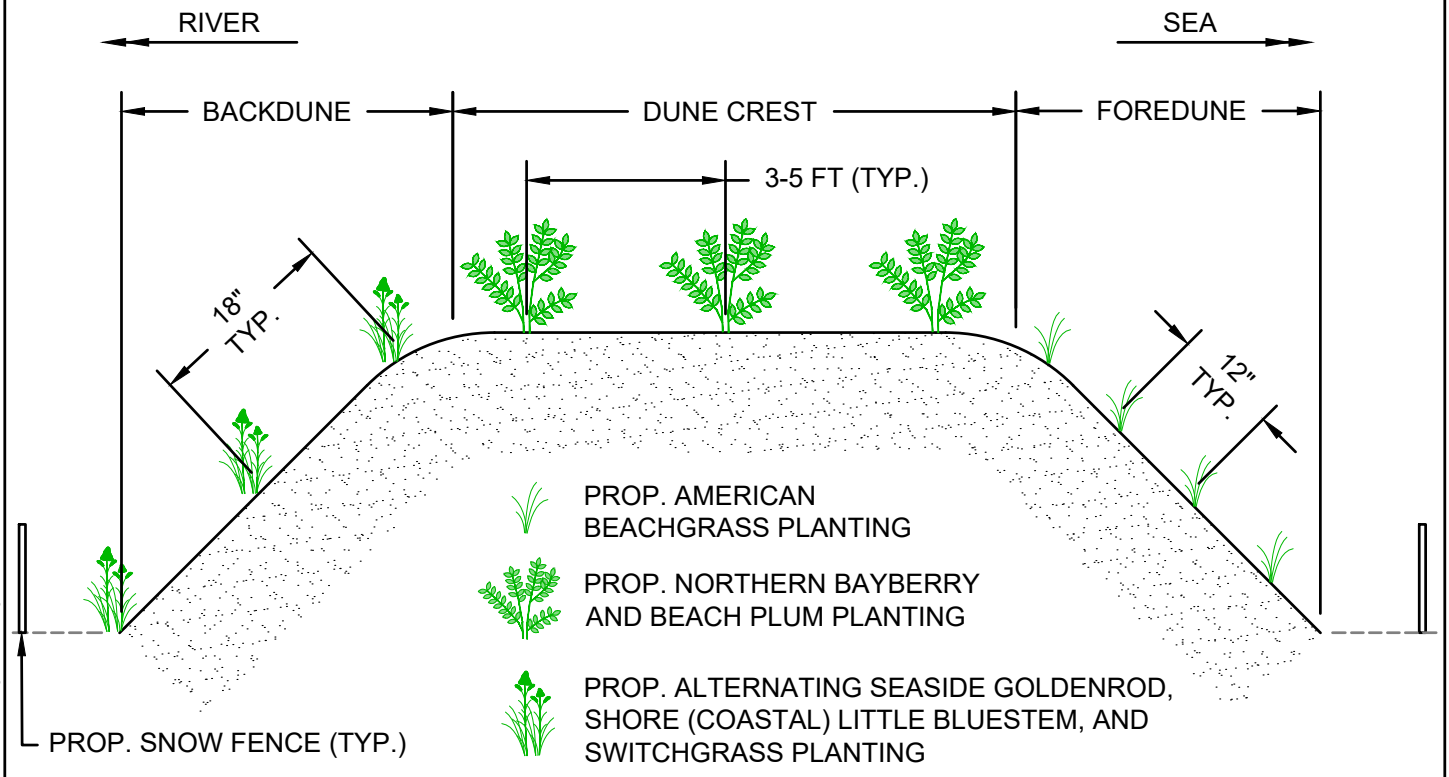
3/2/2026
Coastal Resources Management Council



PURPOSE: NEW DREDGING AT THE MOUTH OF THE NARROW RIVER

DATUM: MLLW = 0.00'
MLW = +1.91'
NAVD88 = +3.31'
AHTL = +4.89'

FOTH INFRASTRUCTURE & ENVIRONMENT, LLC.
114 TOURO ST. NEWPORT, RI 02840

PROPOSED DUNE PLANTING PLAN

GRAPHIC SCALE
0 NTS NTS
SCALE IN FEET

NARROW RIVER DREDGING

AT: TOWN OF NARRAGANSETT
COUNTY OF: WASHINGTON
APPLICATION BY: FOTH INFRASTRUCTURE & ENVIRONMENT, LLC

DATE: 11/5/2025

SHEET 1 OF 2

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PURPOSE: NEW DREDGING AT THE MOUTH OF THE NARROW RIVER

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PROPOSED DUNE STOCKPILE

GRAPHIC SCALE

AS NOTED

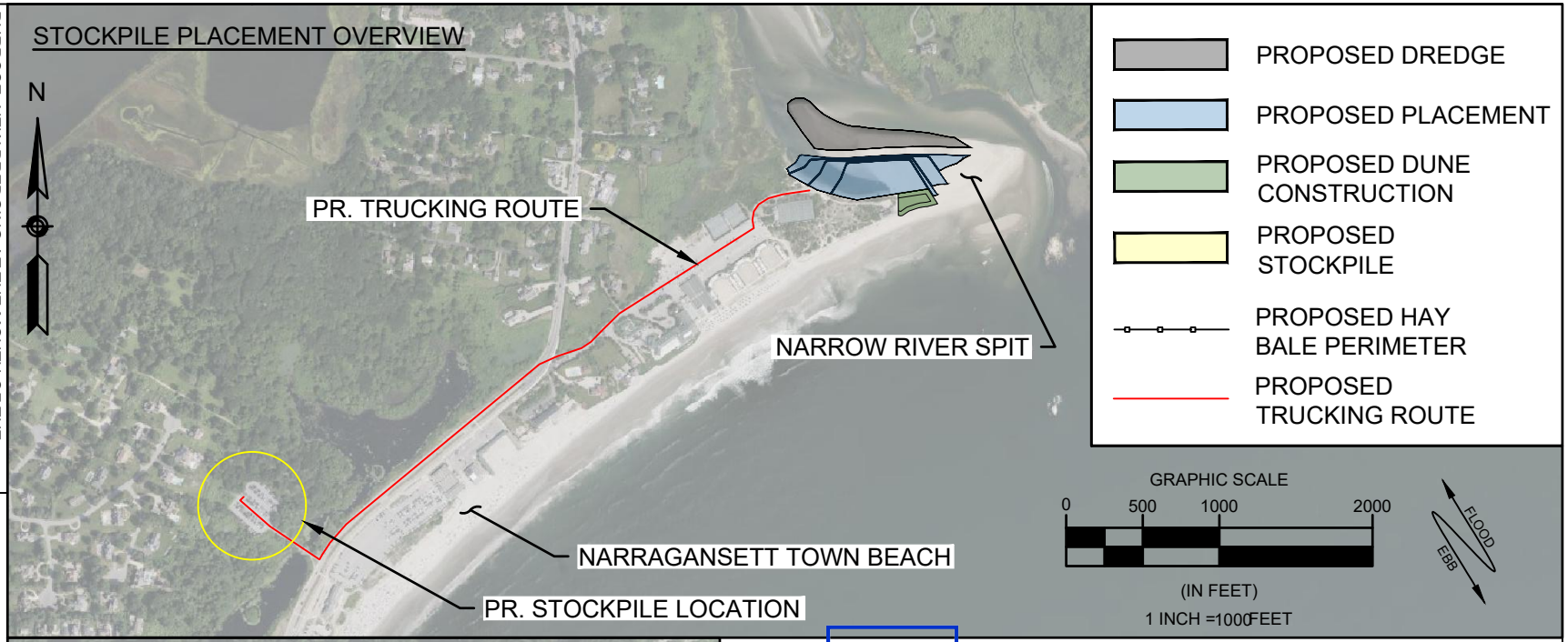
NARROW RIVER DREDGING

AT: TOWN OF NARRAGANSETT
COUNTY OF: WASHINGTON
APPLICATION BY: FOTH INFRASTRUCTURE & ENVIRONMENT, LLC

DATE: 11/5/2025

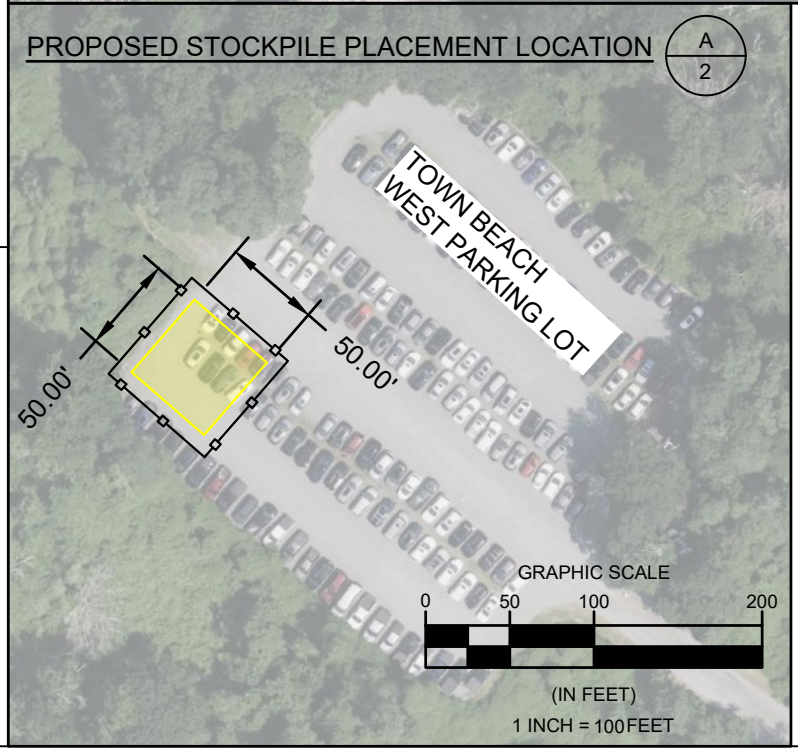
SHEET 2 OF 2

STOCKPILE PLACEMENT OVERVIEW

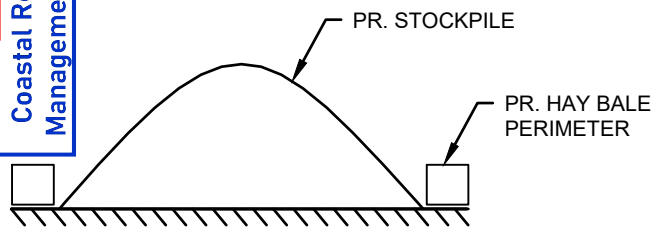


PROPOSED STOCKPILE PLACEMENT LOCATION

A/2



Received 3/2/2026
Coastal Resources Management Council



A/2 TYPICAL STOCKPILE DETAIL
SCALE: NOT TO SCALE

NOTES:

1. ALL STOCKPILED MATERIAL WILL IMPLEMENT DUST CONTROL AS NECESSARY THROUGHOUT THE PROPOSED WORK.
2. DREDGED MATERIAL WILL BE PROPERLY DEWATERED ON THE NARROW RIVER SPIT PRIOR TO THE TRANSPORT TO THE TOWN BEACH WEST PARKING LOT.