

Permit Drawings and General Specifications

2020 FEMA Emergency Berm Project - Beacon Hill Segment



Gulf County Board of County Commissioners
1000 Cecil G. Costin, Sr. Boulevard, Port St. Joe, Florida, 32456

Commissioners

- David Rich - District 1
- Ward McDaniel - District 2
- Jimmy Rogers - District 3
- Sandy Quinn - District 4 (Chairman)
- Phillip McCroan - District 5
- Michael Hammond - County Administrator

PROJECT LOCATION

Gulf County, Florida
 Section 36, Township 06S, Range 12W
 Section 31, Township 06S, Range 11W
 Sections 05, 06, 08, Township 07S, Range 11W

Latitude/Longitude
 29.925° N, 85.389° W - 29.893° N, 85.360° W

Northing/Easting
 N: 337407.63, E: 1687001.65 - N: 325856.42, E: 169593.71

APPLICANT NAME AND ADDRESS

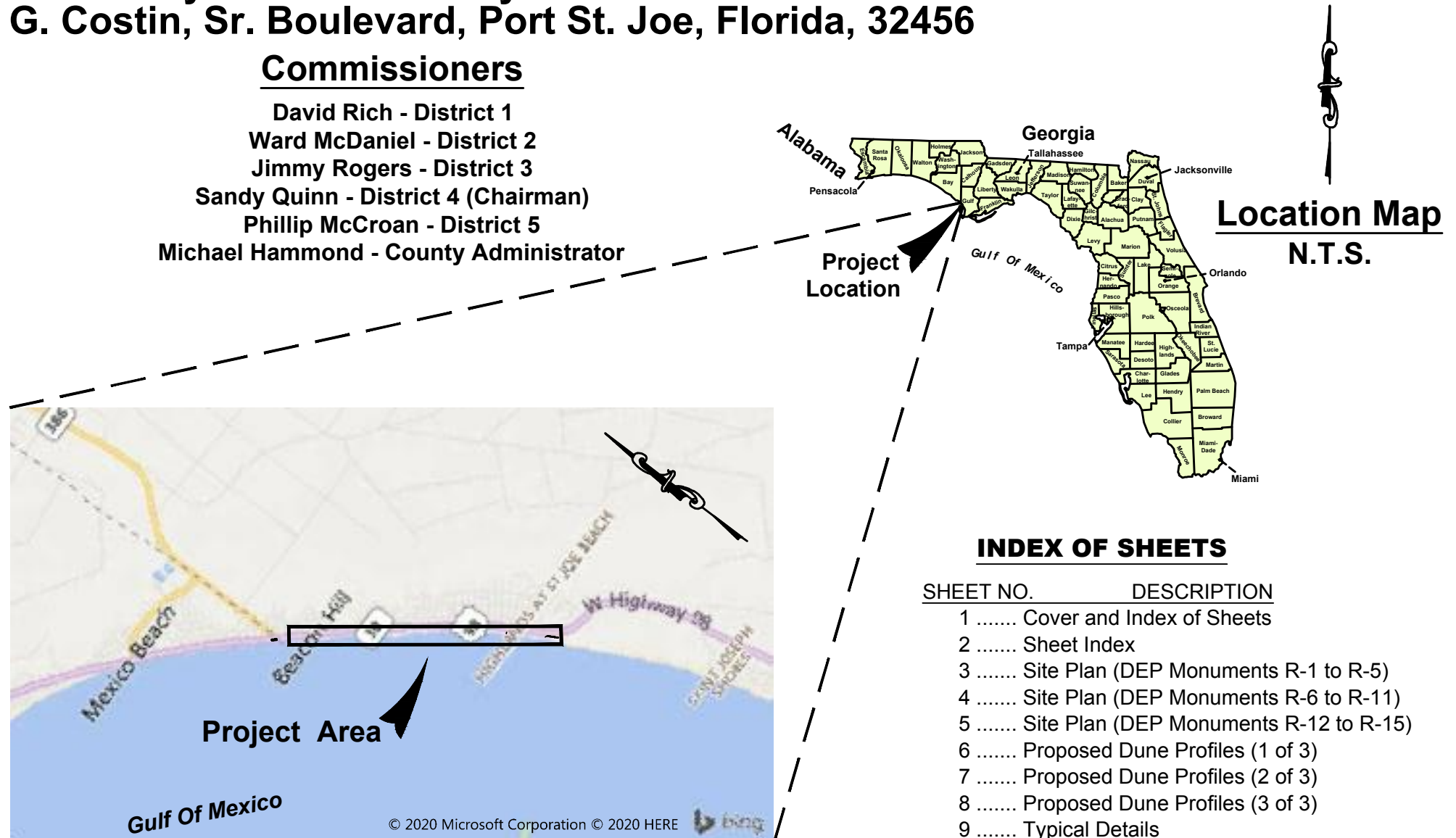
Gulf County Board of County Commissioners
 c/o Chairman Sandy Quinn
 1000 Cecil G. Costin, Sr. Boulevard
 Port St. Joe, Florida 32456

PROJECT DETAILS

This project is located along the gulf front of Beacon Hill (St. Joseph Beach) in Gulf County, Florida. The project consists of the construction of an emergency dune (FEMA Berm) for the segment of beach between the Bay/Gulf County border and R-15. There will be approximately 86,500 cubic yards of beach compatible sand placed, and approximately 345,700 native dune flora planted.

GENERAL NOTES

1. All elevations as shown are referenced to North American Vertical Datum, 1988 (NAVD 1988) unless otherwise stated.
2. Coordinates shown hereon refer to Florida State Plane Coordinate System, North Zone, NAD 1983.
3. All Florida Department of Environmental Protection R-Monuments shown are for informational purposes only.
4. Aerial photography obtained from NOAA, flown on 12-19-2015 and 01-11-2019. The location of all objects in the photographs are approximate and may not represent currently existing conditions.
5. Pre-storm and post-storm LIDAR data obtained from NOAA Data Access Viewer with fly dates 04-09-2017 to 05-17-2017 and 10-24-2018 to 11-04-2018, respectively.



Vicinity Map
1" = 8,000'

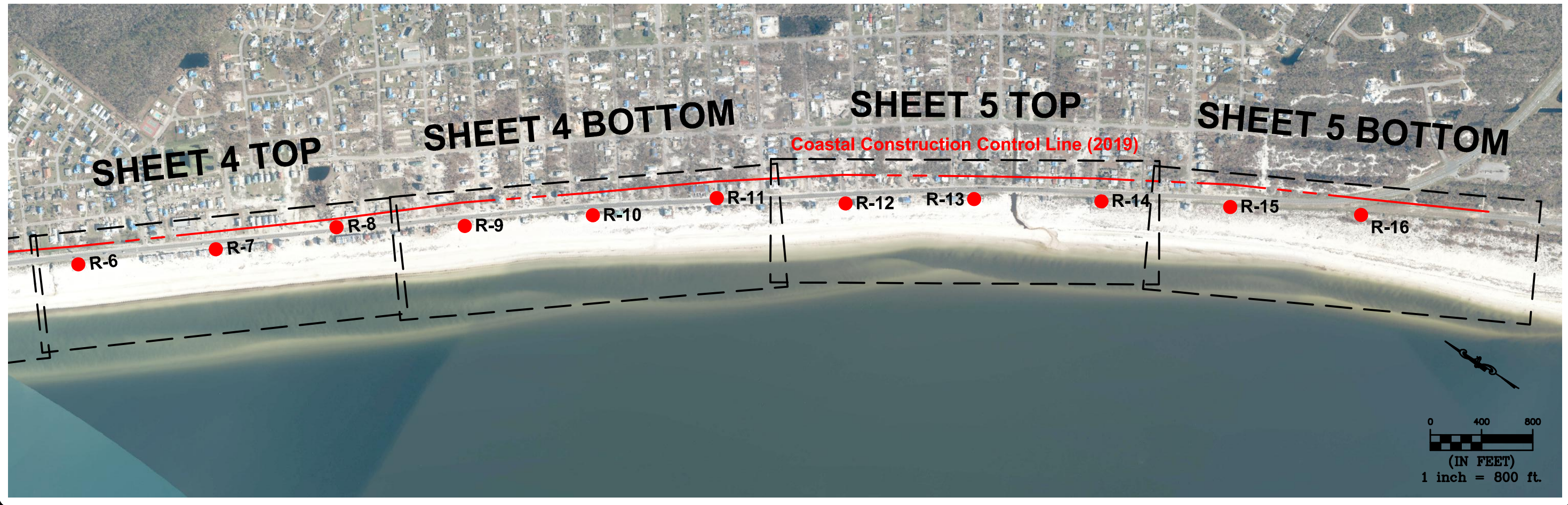
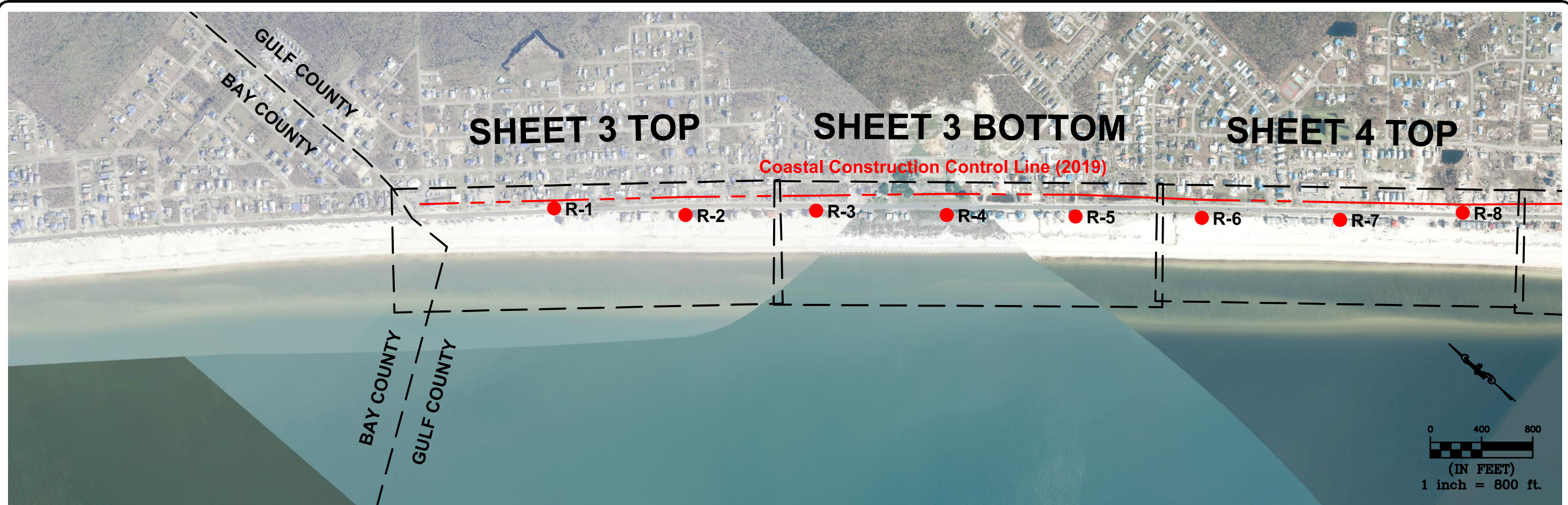
INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	..... Cover and Index of Sheets
2	..... Sheet Index
3	..... Site Plan (DEP Monuments R-1 to R-5)
4	..... Site Plan (DEP Monuments R-6 to R-11)
5	..... Site Plan (DEP Monuments R-12 to R-15)
6	..... Proposed Dune Profiles (1 of 3)
7	..... Proposed Dune Profiles (2 of 3)
8	..... Proposed Dune Profiles (3 of 3)
9	..... Typical Details
10	..... Proposed Access and Staging
11	..... Technical Specifications (1 of 4)
12 Technical Specifications (2 of 4)
13 Technical Specifications (3 of 4)
14 Technical Specifications (4 of 4)

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COVER AND INDEX OF SHEETS
Gulf County FEMA Berms - Beacon Hill Segment
 Gulf County Board of County Commissioners
 1000 Cecil G. Costin, Sr. Blvd., Port St. Joe, Florida 32456

Michael R. Dombrowski, P.E.
 Florida P.E. Number 55255
 Date: April 28, 2020
 Sheet Rev Date: July 28, 2020
 PROJECT NUMBER
19-210.24
 SHEET NUMBER
1



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SHEET INDEX

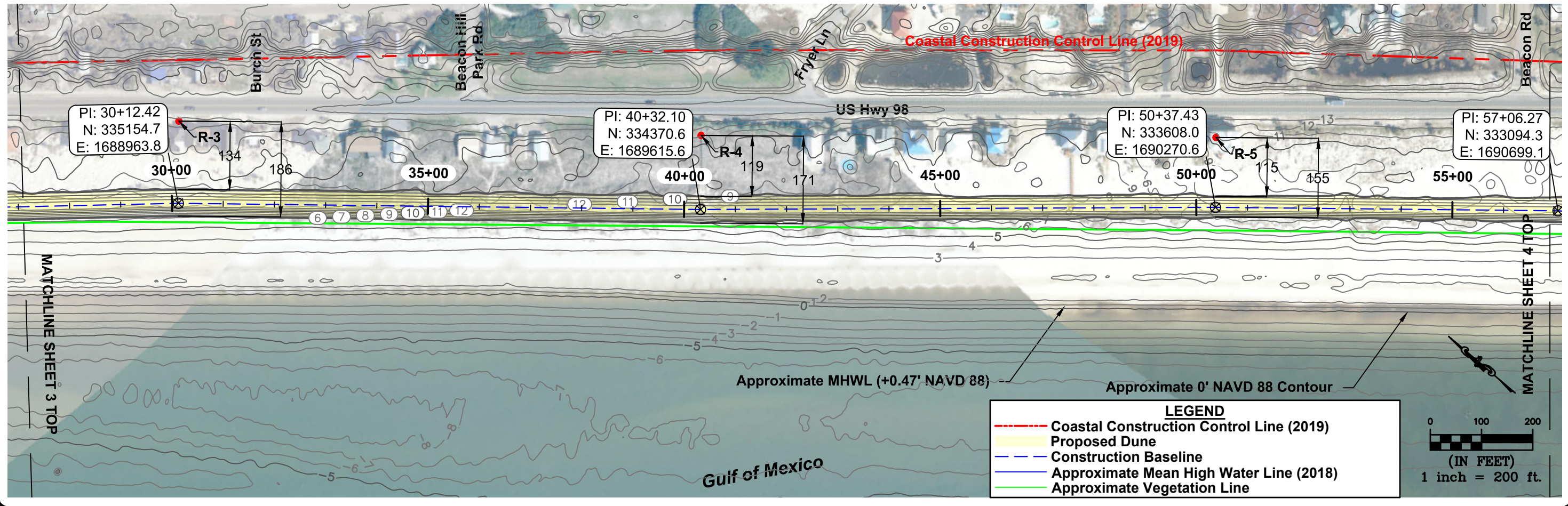
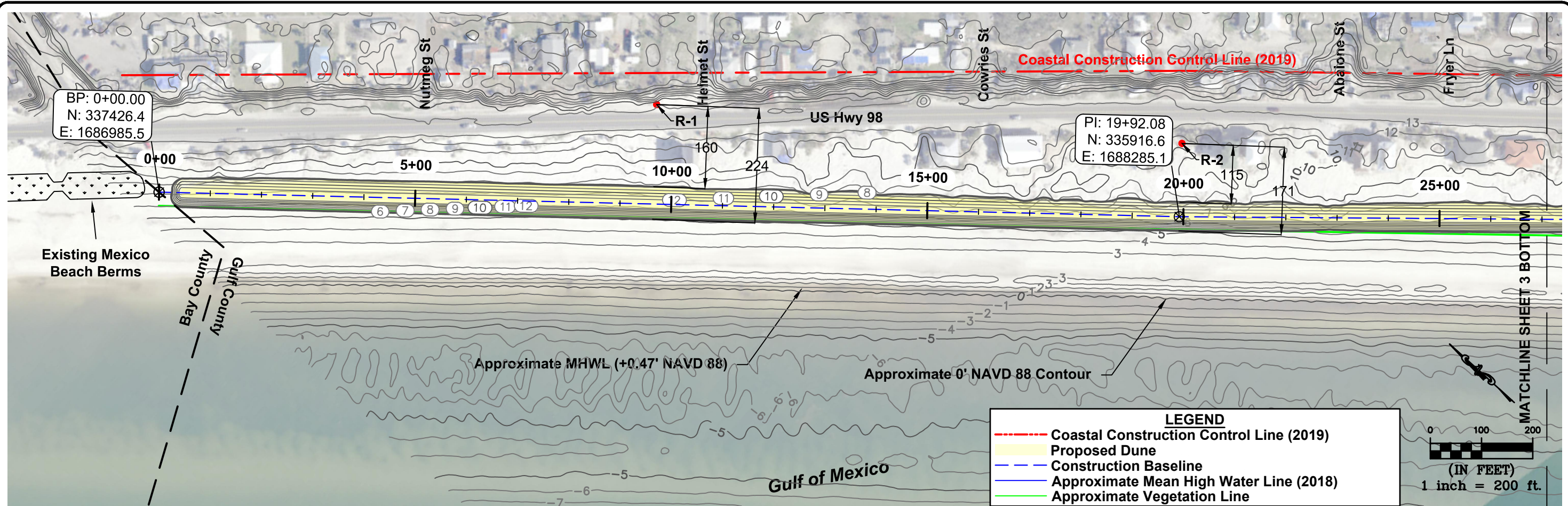
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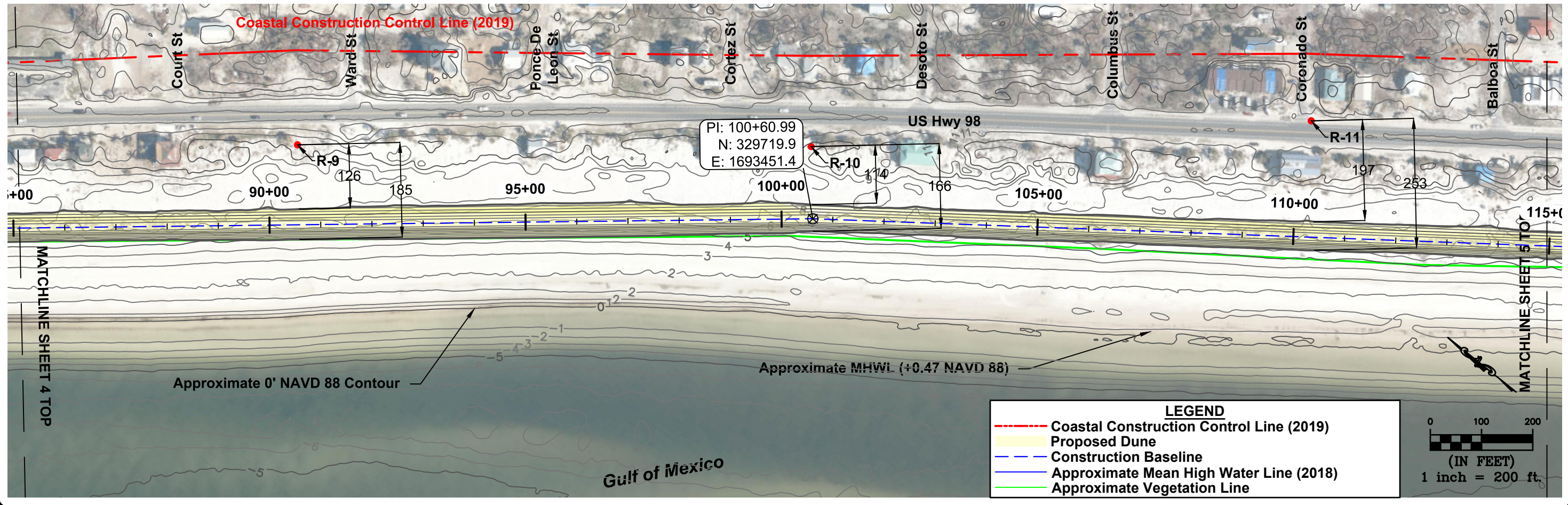
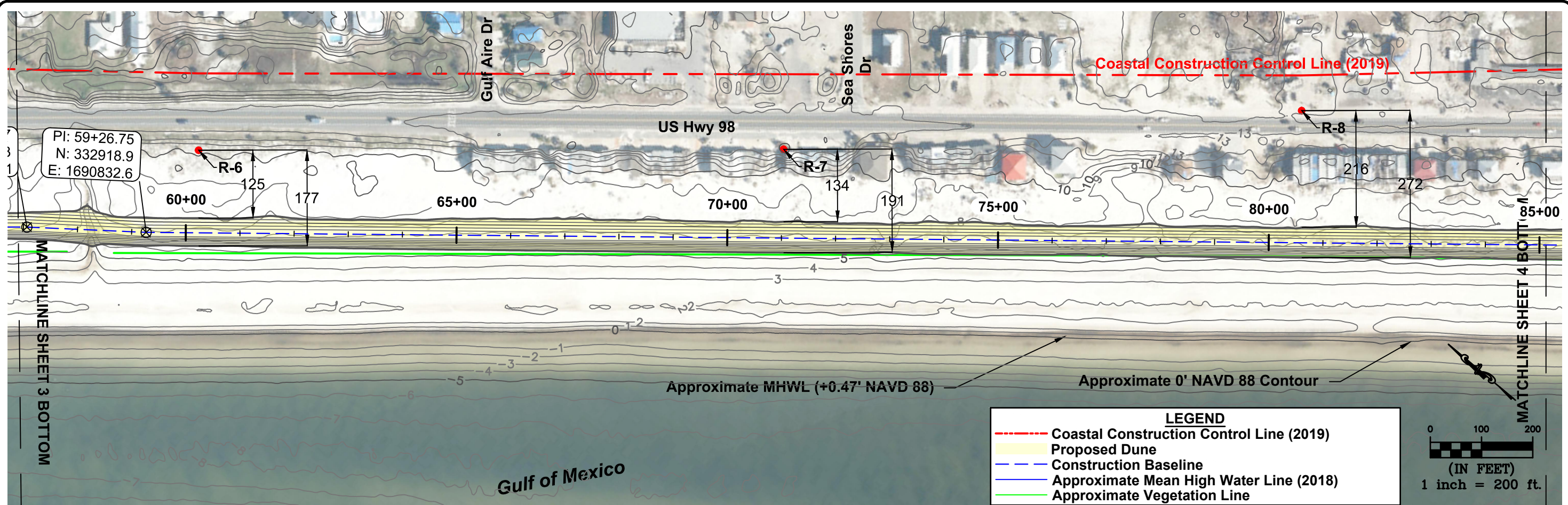
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SITE PLAN (DEP MONUMENTS R-1 TO R-5)
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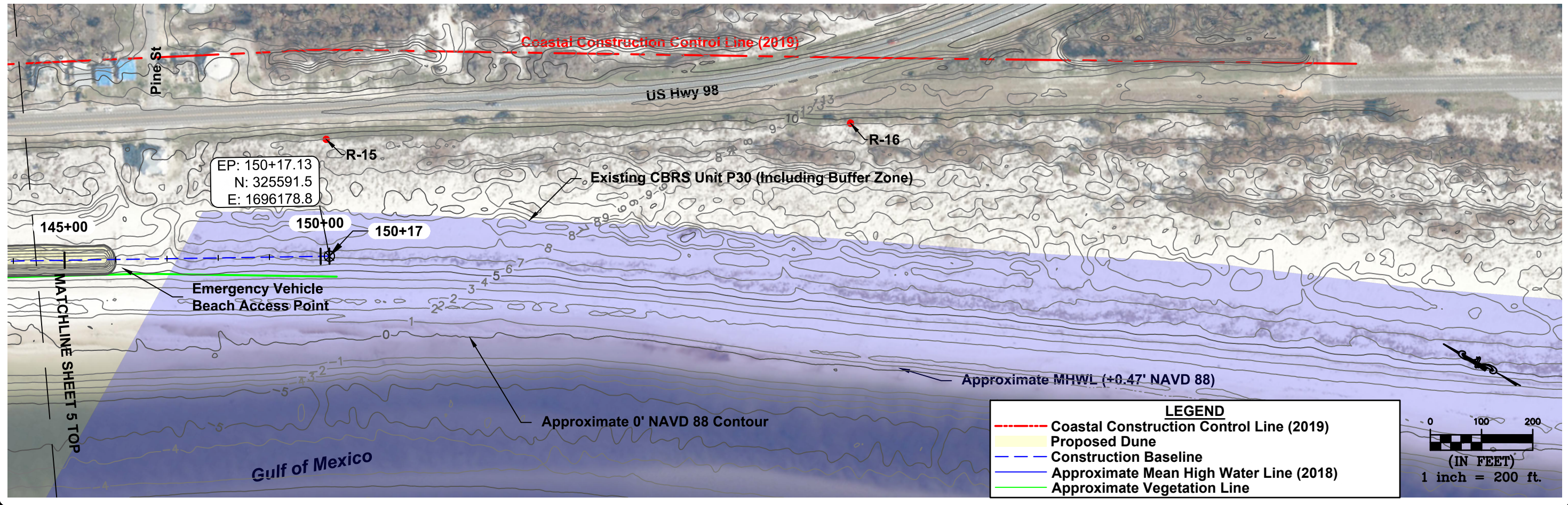
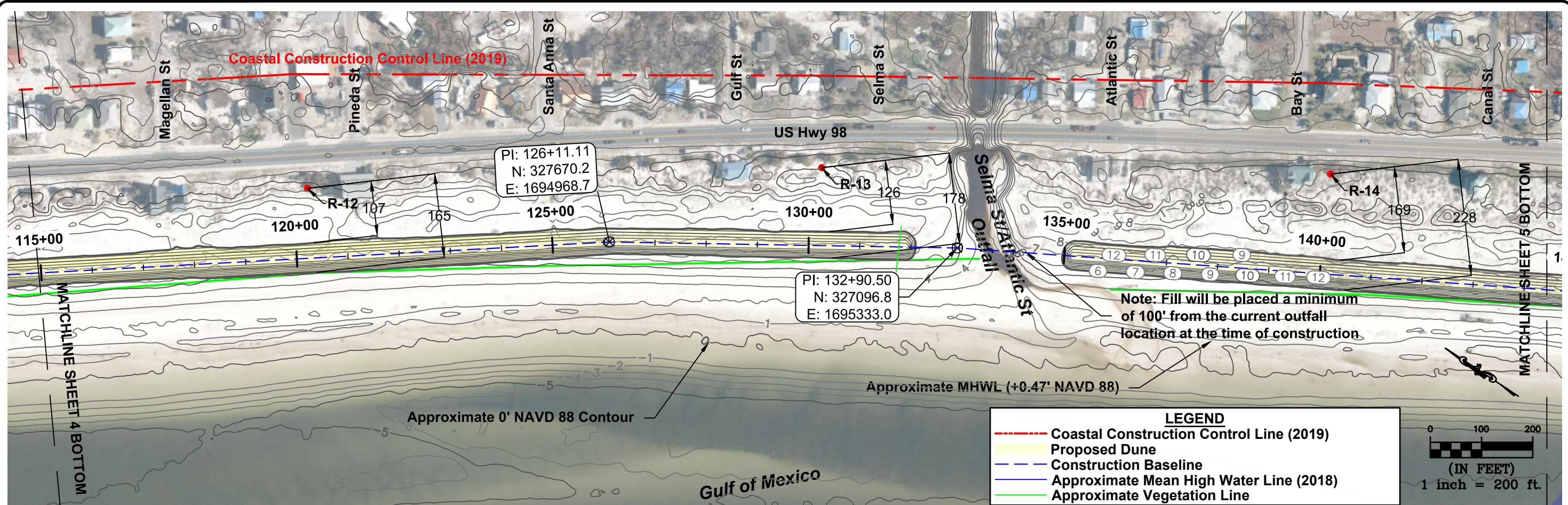
SITE PLAN (DEP MONUMENTS R-6 TO R-11)
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SHEET NUMBER
4



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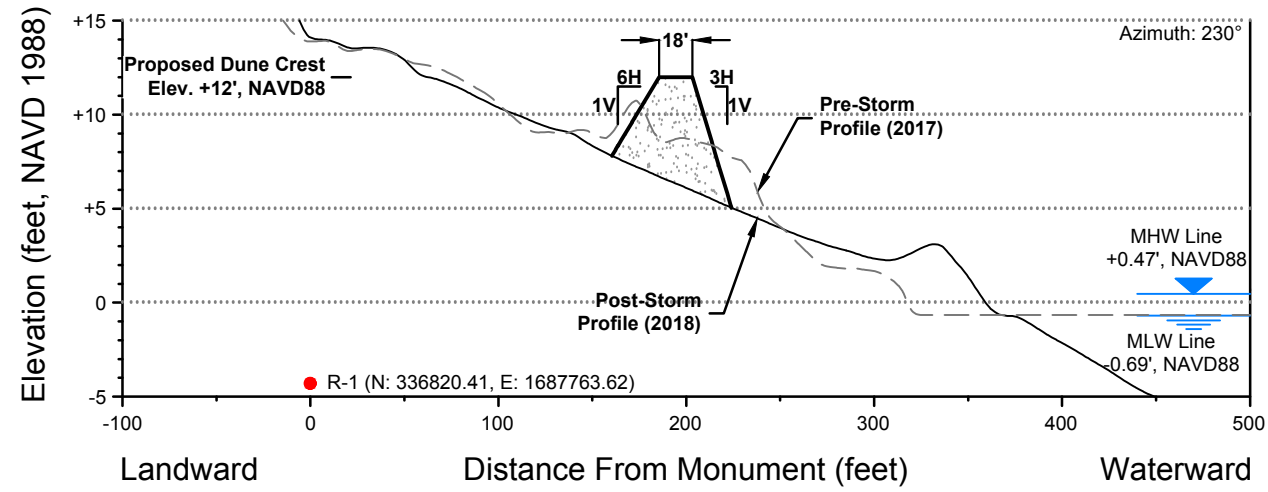
SITE PLAN (DEP MONUMENTS R-12 TO R-16)
Gulf County FEMA Berms - Beacon Hill Segment

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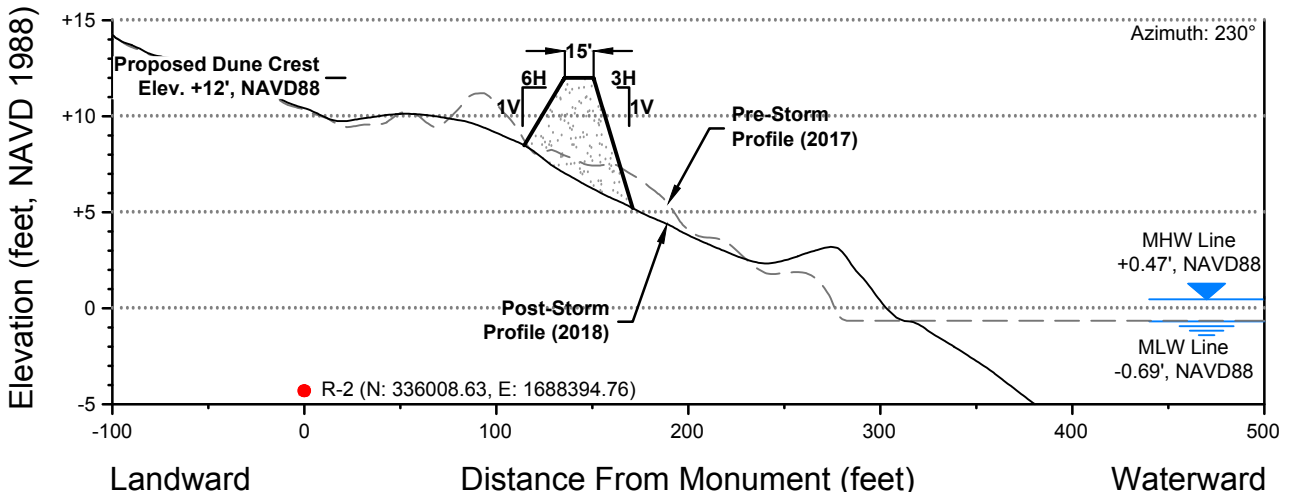
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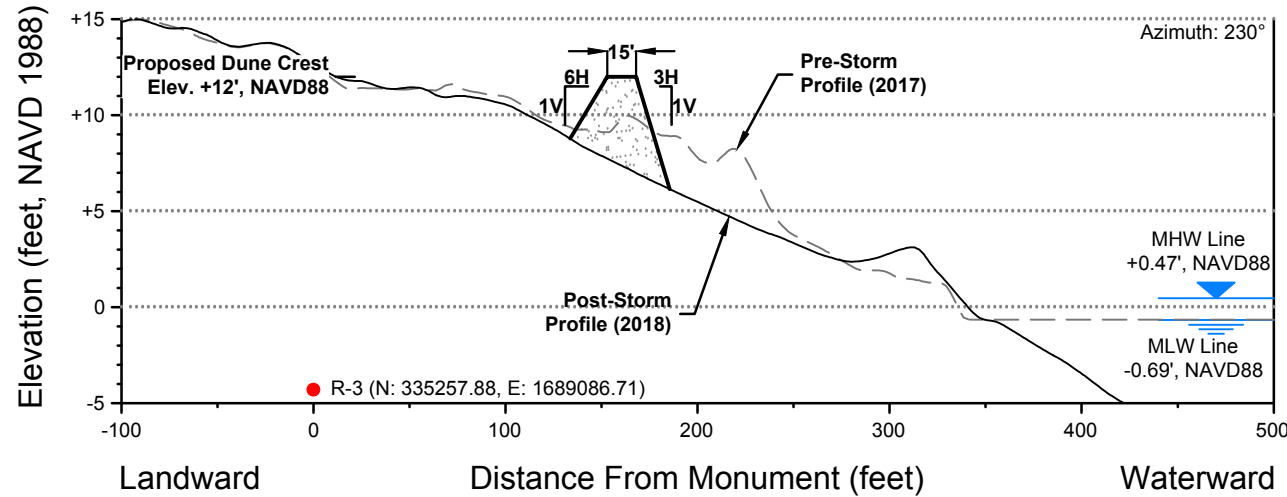
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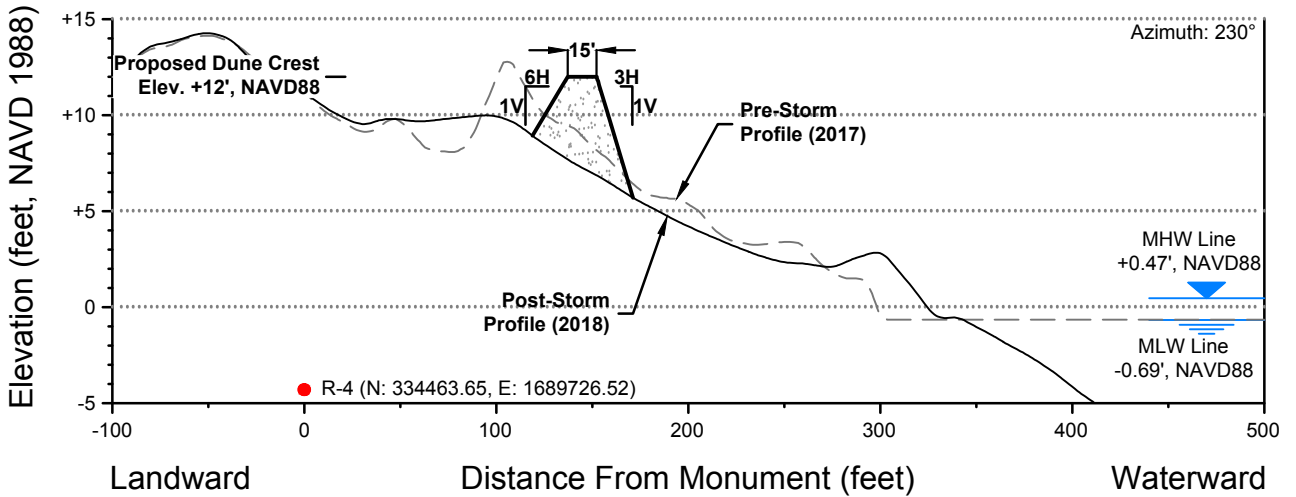
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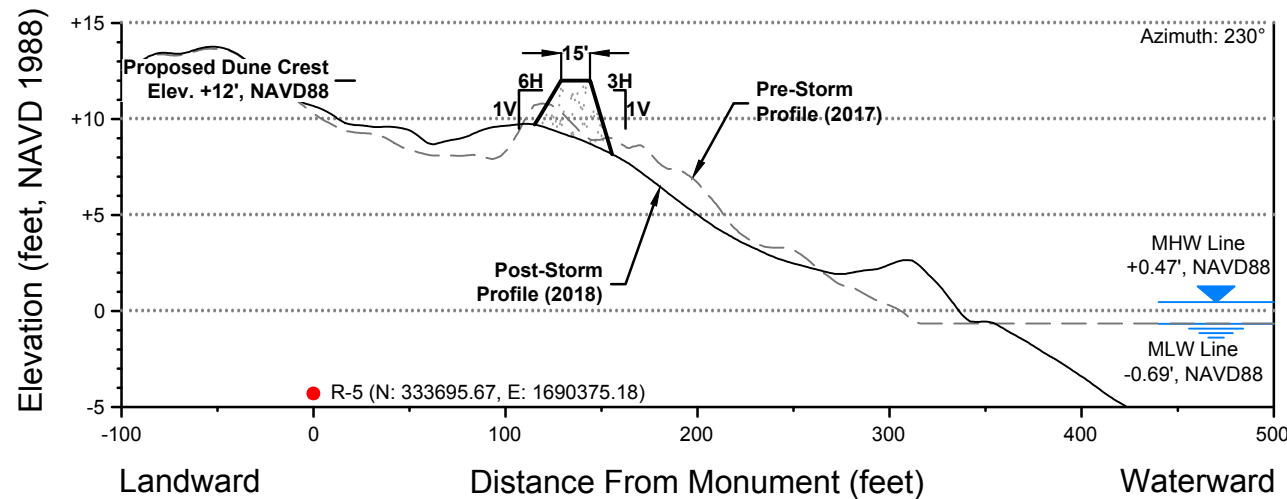
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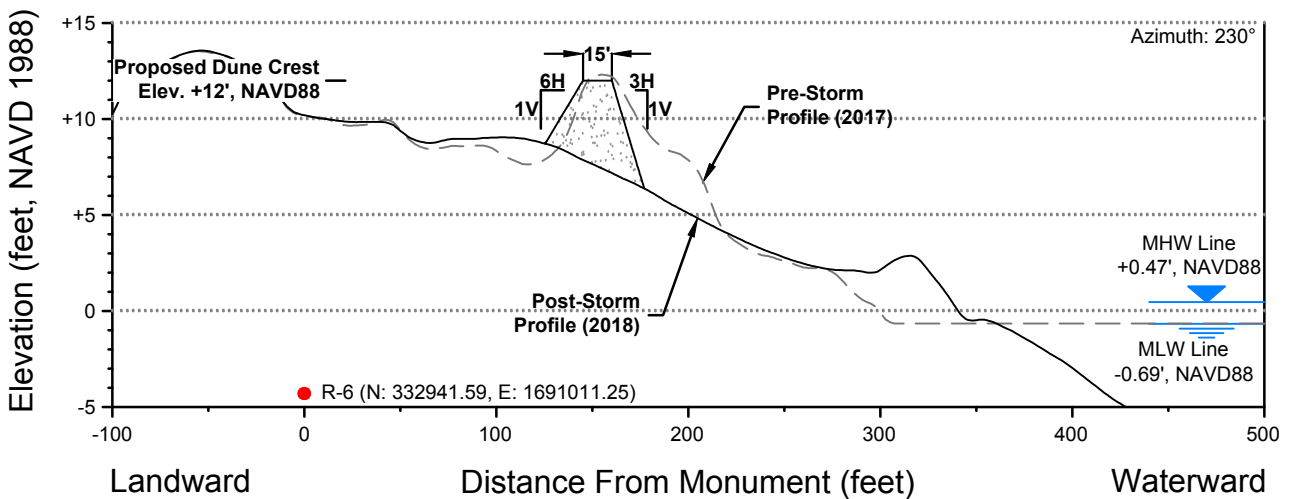
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MONUMENT R-5

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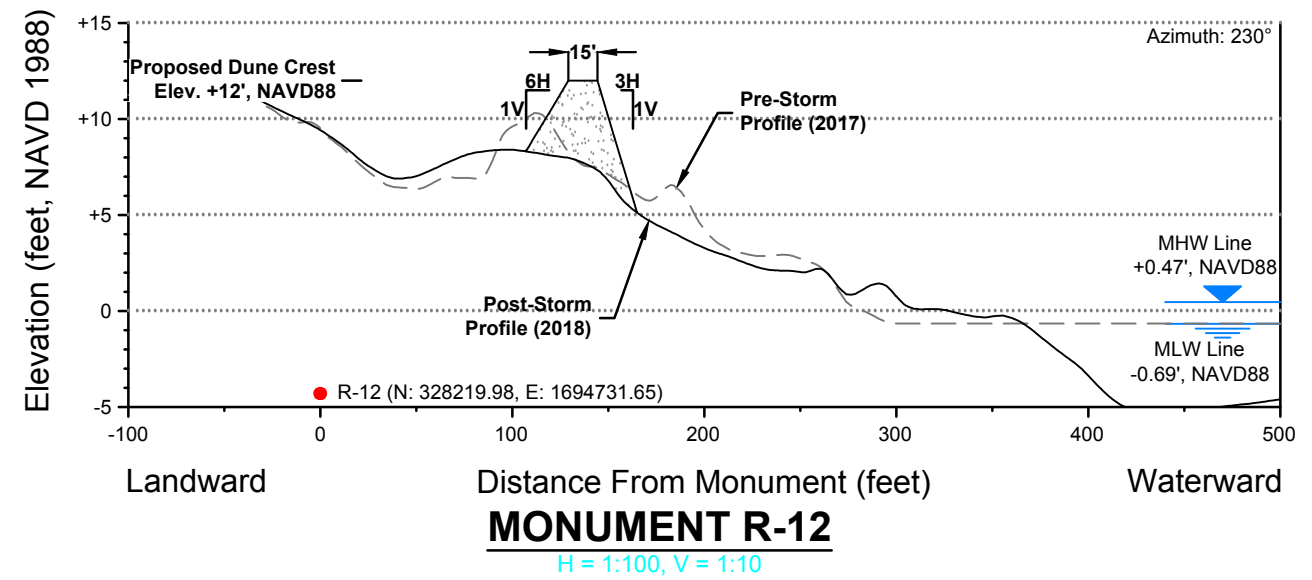
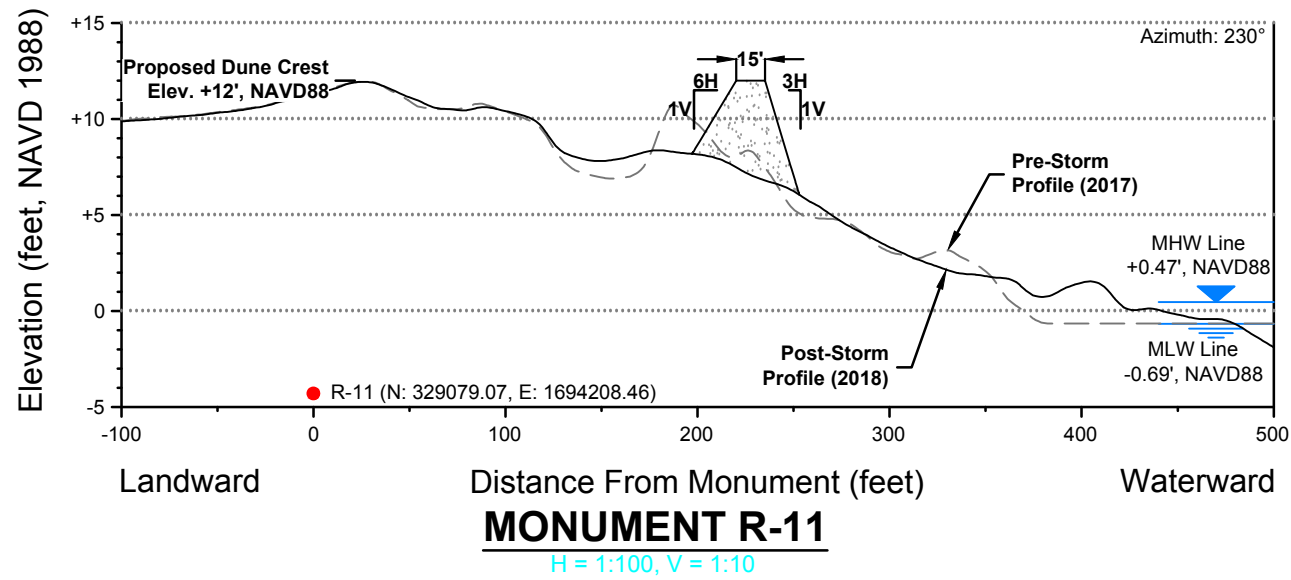
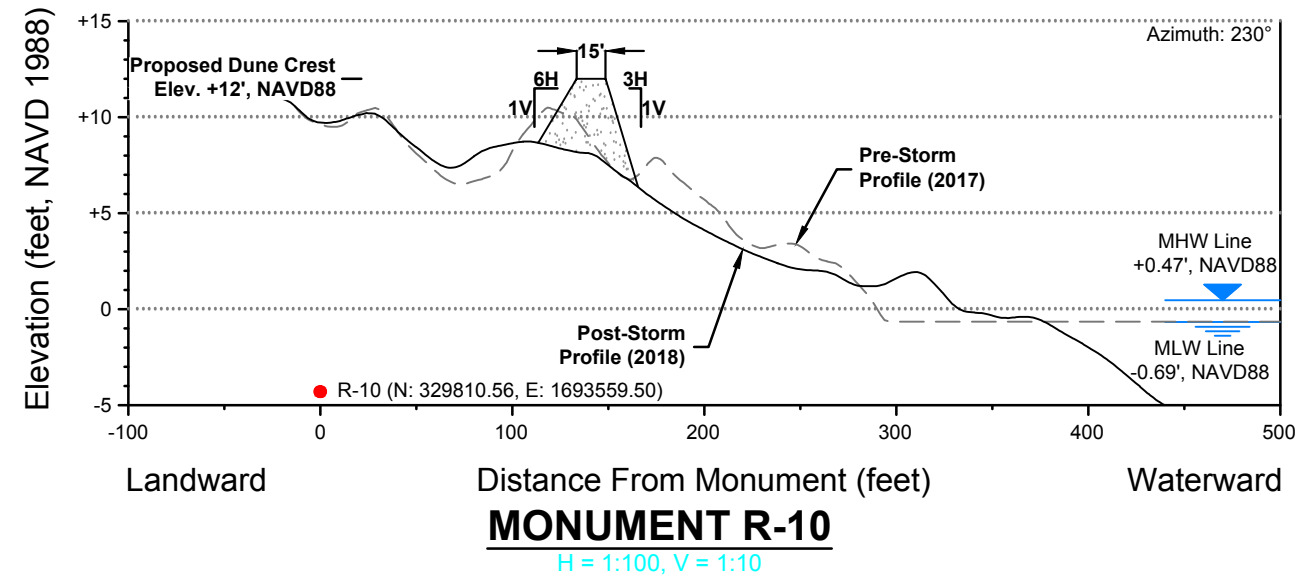
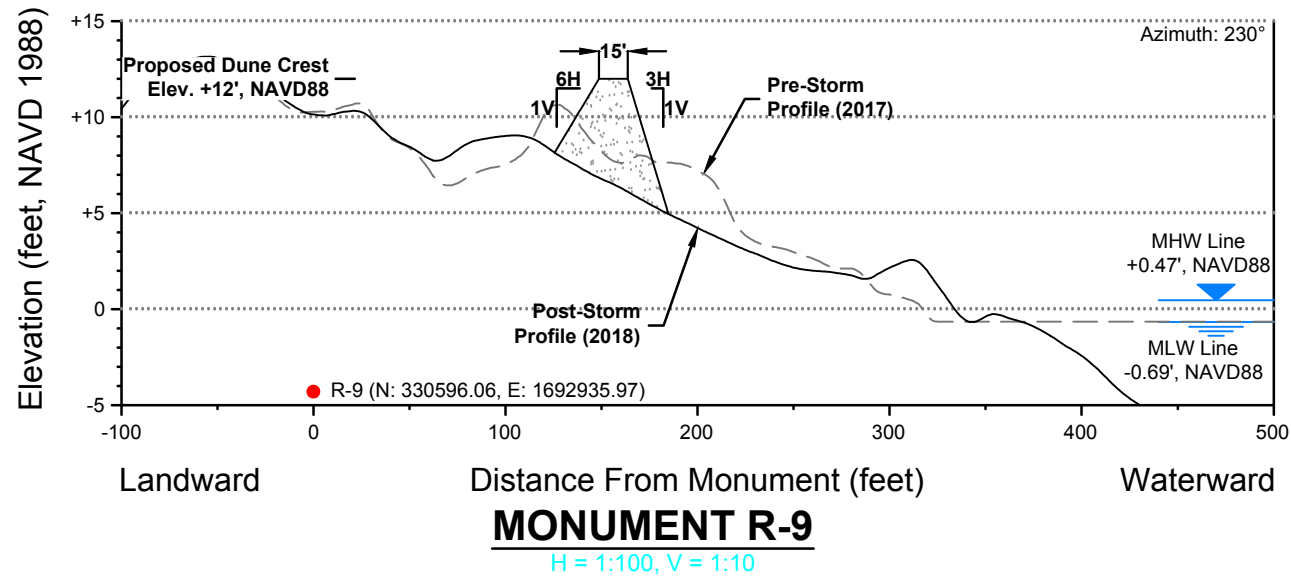
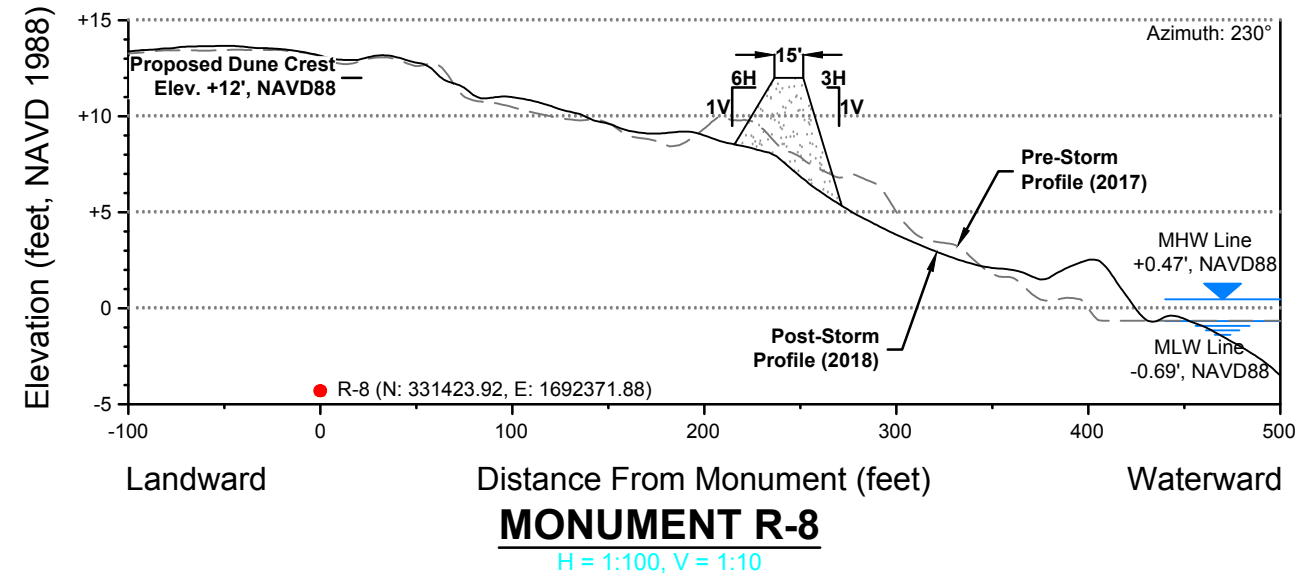
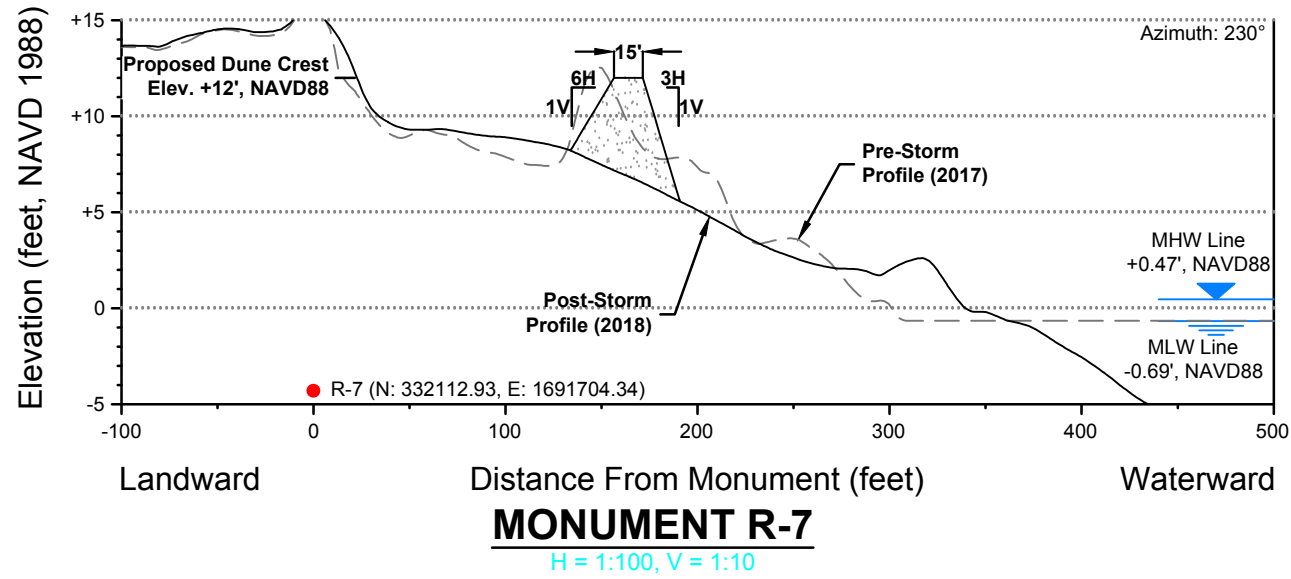
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PROPOSED DUNE PROFILES (1 OF 3)
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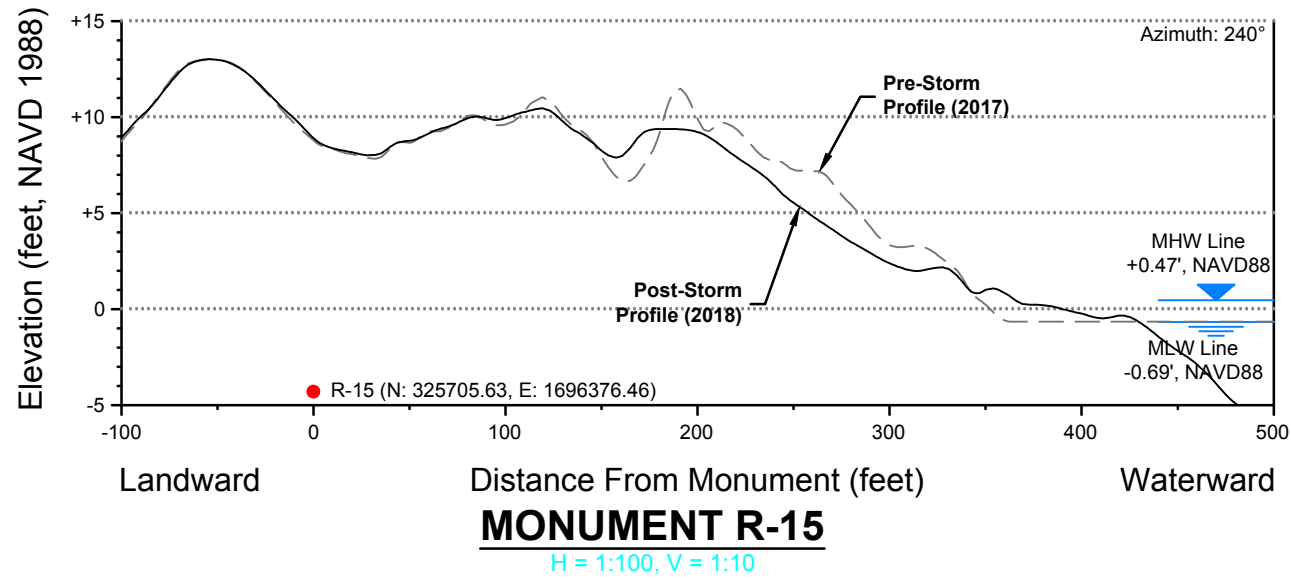
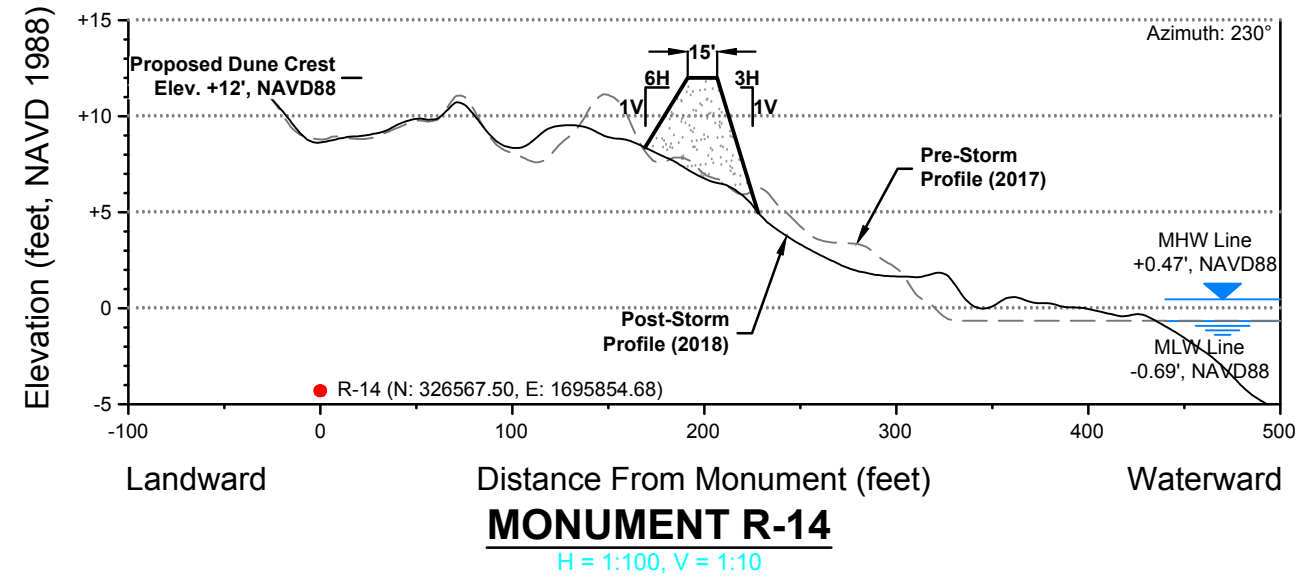
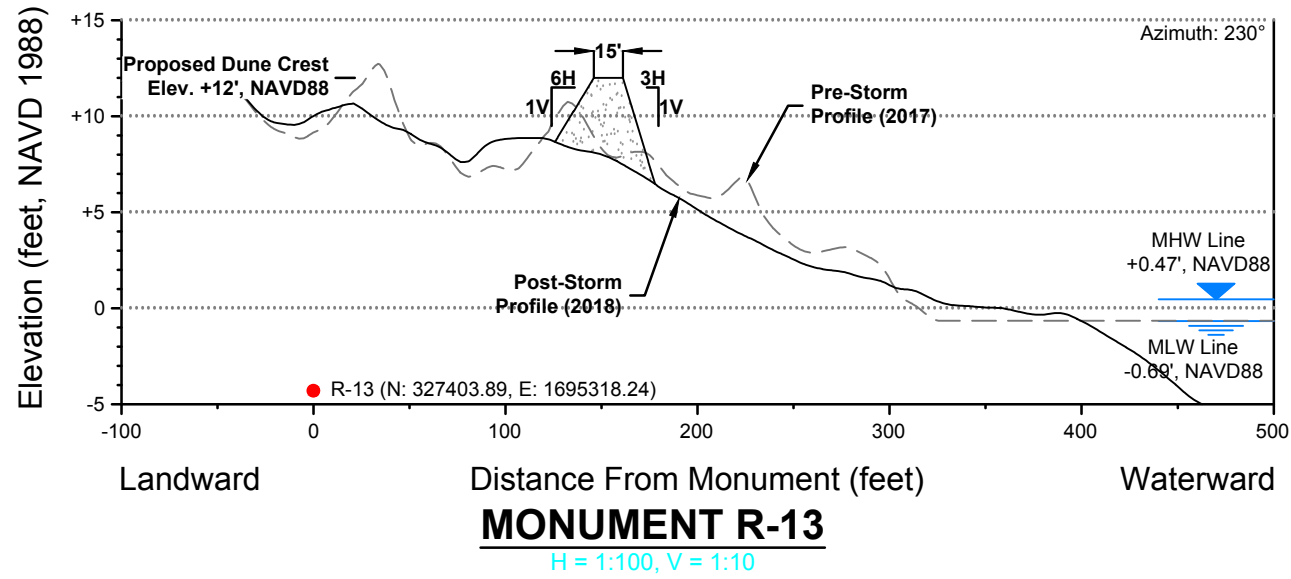
Michael R. Dombrowski, P.E.
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PROPOSED DUNE PROFILES (2 OF 3)
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7



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Gulf County FEMA Berms - Beacon Hill Segment

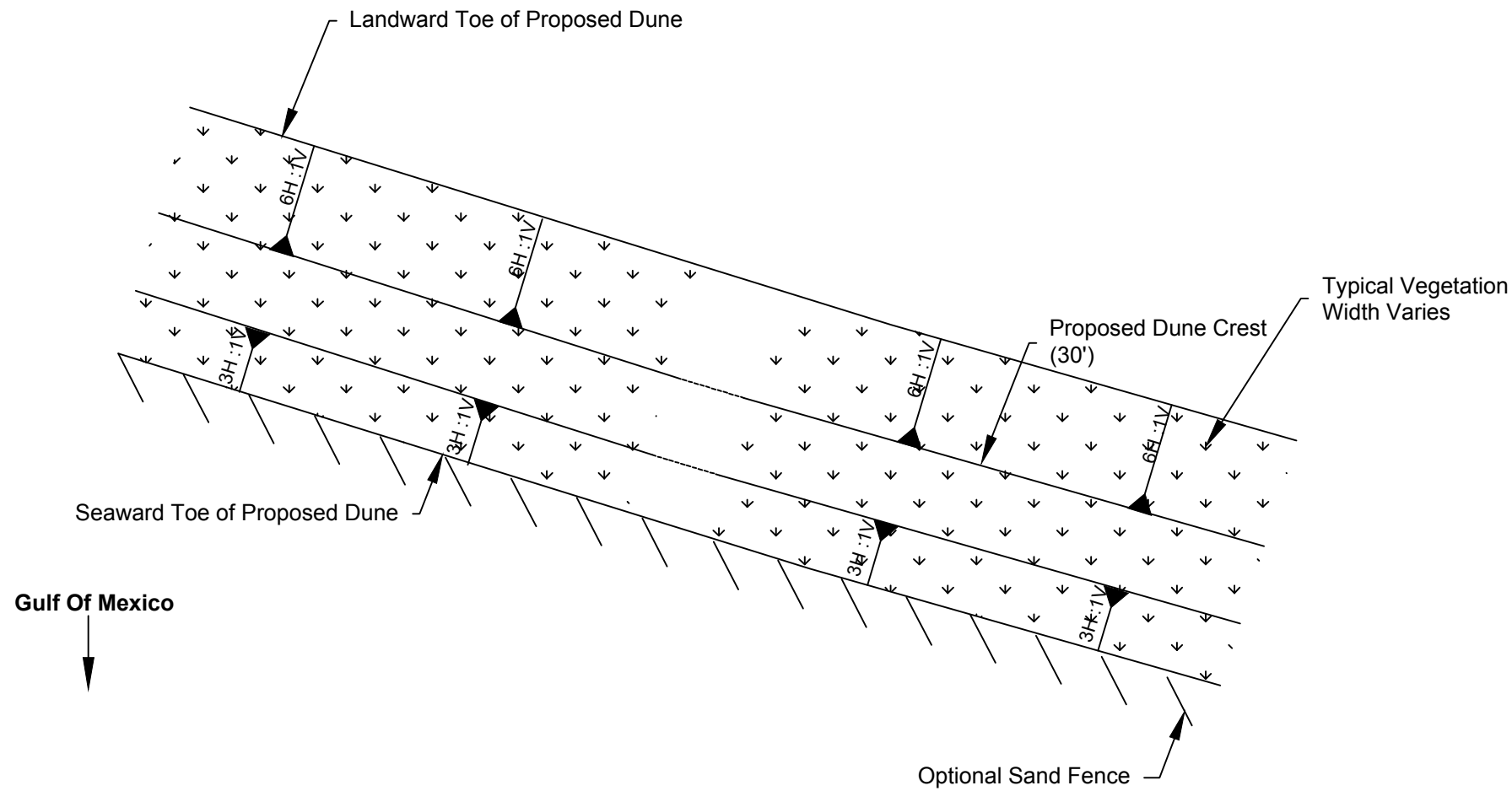
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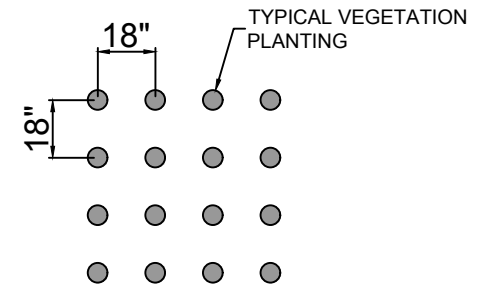
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SHEET NUMBER
8

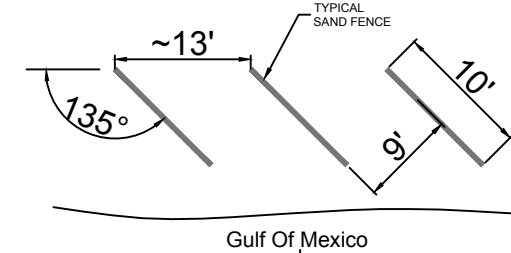


TYPICAL DUNE AND VEGETATION PLAN
NOT TO SCALE



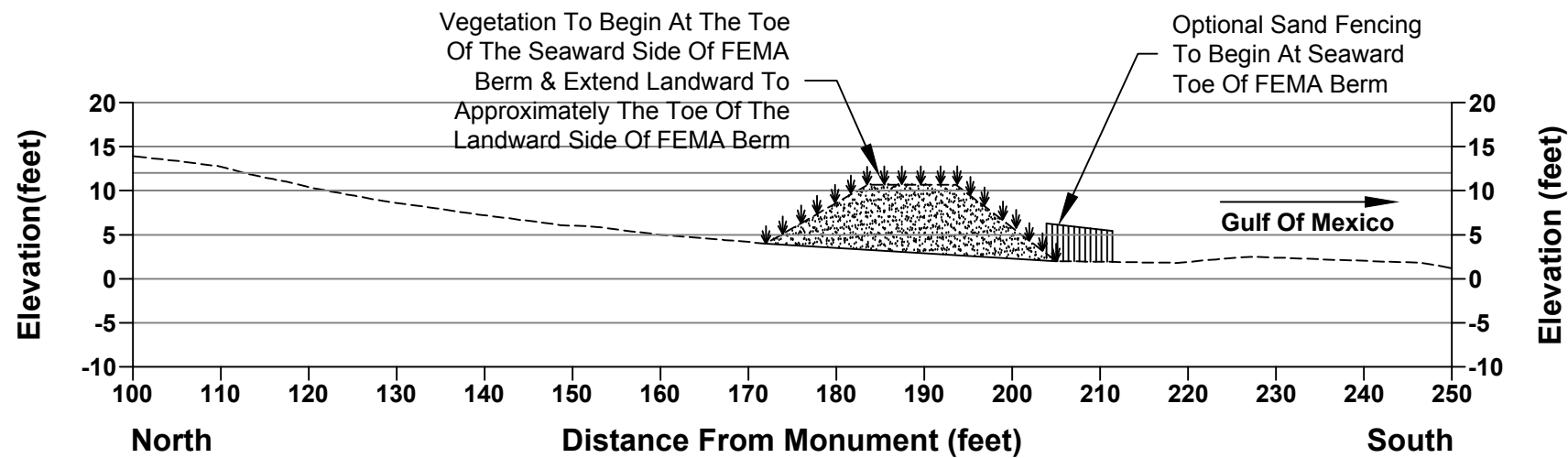
NOTE:
 1.) THE CONTRACTOR MAY ATTEMPT TO ACHIEVE A NATURAL LOOK BY NOT PLANTING IN STRAIGHT ROWS AND MAY MODIFY THE SPACING REQUIREMENTS $\pm 6"$ FOR UP TO 25% OF THE PLANTS.
 2.) CONTRACTOR SHALL PROVIDE PLANTS AND PLANTINGS ACCORDING TO TECHNICAL SPECIFICATIONS AND CONTRACT DOCUMENTS.

TYPICAL VEGETATION PLANTING SCHEDULE (18" O.C.)
NOT TO SCALE



NOTE:
 SAND FENCES ARE 4' IN HEIGHT AND SHALL BE INSTALLED AT A MAXIMUM OF 10' LENGTHS SPACED AT A MINIMUM OF 9' ON A DIAGONAL ALIGNMENT (NORTHWEST TO SOUTHEAST) FOR THE SHORE-PARALLEL COVERAGE.

OPTIONAL FDEP SAND FENCING GUIDELINES
NOT TO SCALE

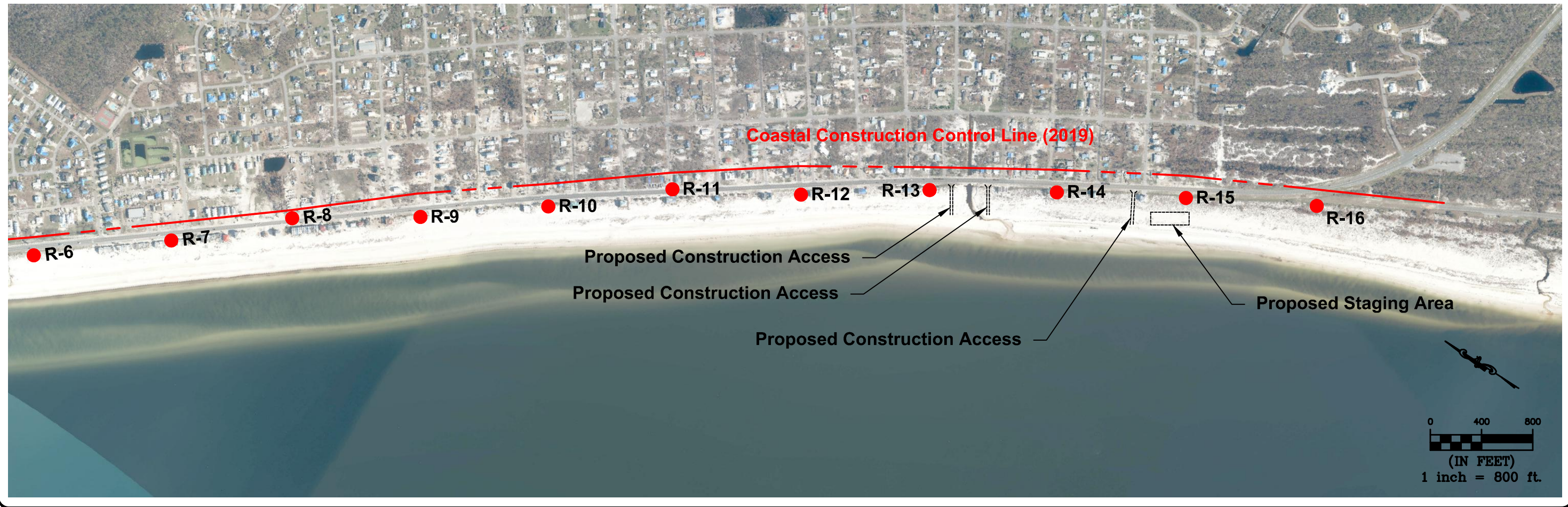


TYPICAL DUNE AND VEGETATION DETAIL
NOT TO SCALE

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TYPICAL DETAILS
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19-210.24
 SHEET NUMBER
9



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PROPOSED ACCESS AND STAGING
 Gulf County FEMA Berms - Beacon Hill Segment

Gulf County Board of County Commissioners
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SHEET NUMBER
10

1.0 OWNER CONTACT

Gulf County Board of County Commissioners
 Physical Address: Lee Street,
 Port St. Joe, FL 32456
 Mailing Address: 1000 Cecil G. Costin, Sr. Boulevard,
 Port St. Joe, Florida 32456
 Office: (850) 229-6106

2.0 ENGINEER CONTACT

Michael R. Dombrowski, P.E.
 MRD Associates, Inc.
 543 Harbor Boulevard, Suite 204
 Destin, Florida 32541
 Ph: 850-654-1555
 Fax: 850-654-0550

3.0 SCOPE

The WORK consists of the CONTRACTOR (including sub-CONTRACTORS) furnishing all labor, equipment, and materials, and performing all operations in connection with construction of the Emergency Berm [DUNE], installation of the native dune vegetation, installation of sand fencing and post and rope as described in these DRAWINGS and SPECIFICATIONS.

4.0 INDEMNIFICATION REQUIREMENTS

The CONTRACTOR shall indemnify and hold harmless the OWNER and ENGINEER and their respective representatives, agents, and employees, in both individual and official capacities, against all lawsuits, claims, damages, losses and expenses, including attorney fees, caused by, resulting from, and/or incidental to the performance of the WORK under the full extent as allowed by the laws of the State of Florida and not beyond any extent which would render these provisions void or unenforceable. In the event of any such injury, death, loss, or damage, or claims thereof, the CONTRACTOR shall give prompt notice to the OWNER and the ENGINEER.

5.0 ENVIRONMENTAL AND SITE PROTECTION

During construction operations, the CONTRACTOR shall assume responsibility for protecting the site as well as any natural resources and structures (newly constructed or existing) in the vicinity of active construction, staging and construction accesses operations not specifically identified to be demolished, removed, or modified. Repair of damaged site features or natural resources or structures shall be at CONTRACTOR's expense.

5.1 Construction Hours

Construction activities shall be limited to during daylight hours only. Construction activities may be allowed to operate 24 hours a day, seven (7) days a week if authorized and permissible by the Florida Department of Environmental Protection (FDEP) and U.S. Army Corps of Engineers (USACE) permits as well as Gulf County.

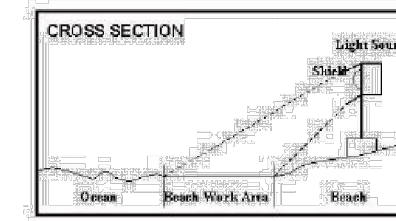
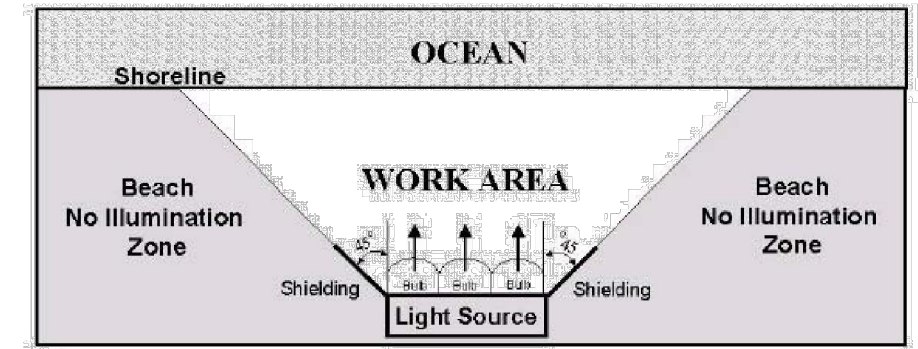
5.2 Landscape Protection

Trees, shrubs, vines, grasses, land forms, and other landscape features within the construction area, staging area or construction access points shall be preserved unless identified in the DRAWINGS for removal, and clearly delineated by the CONTRACTOR, by marking, fencing, or wrapping with boards, or any other techniques approved by the ENGINEER. Unless otherwise approved by the ENGINEER, no trees, shrubs, vines, grasses or other vegetation will be harmed or destroyed by the CONTRACTOR for any purpose.

5.3 Sea Turtle Protection

If the Project is conducted during sea turtle nesting season (May 1 through October 31), the OWNER will begin daily sea turtle nesting surveys and continue through nesting season. The CONTRACTOR is responsible for sea turtle protection measures during construction which includes, but not limited to coordinating with the OWNER's sea turtle nesting monitor to obtain clearance prior to proceeding with construction. Refer to the FDEP permit, USACE permit and the U.S. Fish and Wildlife Service (USFWS) Biological Opinions, if available for this project. Additionally, the following provisions shall be followed:

- A. Any signs of turtle nesting activity observed by the CONTRACTOR shall be reported immediately to the ENGINEER and the OWNER's sea turtle monitoring agent. No construction activity shall occur near nesting turtles, turtle nests or hatching turtles until the nesting or hatching turtles are protected during construction by the marine turtle permit holder for this beach. The CONTRACTOR shall instruct all personnel associated with the construction of the project, including SUBCONTRACTORS, about the presence of sea turtles and sea turtle nests in the area, stressing the need to avoid disturbance of nesting sea turtles, nests or hatchlings.
- B. All on-beach lighting associated with the project shall be limited to the immediate area of active construction only. Such lighting shall be the minimal lighting necessary to comply with safety requirements and shall be shielded low pressure sodium vapor lights to minimize illumination of the nesting beach and nearshore waters. The intensity of lighting shall be reduced to the minimum standard required for general construction area safety. Shields shall be affixed to the light housing on dredge and land-based lights and be large enough to block lamp light from being transmitted outside the construction area or to the adjacent marine turtle nesting beach (Figure Below). Refer to the DEP and USFWS Lighting Guidelines.



BEACH LIGHTING SCHEMATIC

5.4 Shorebird Protection

Shorebird breeding season dates for this project area are February 15 through September 1 (note that while most species have completed the breeding cycle by September 1, flightless young may be present through September and must be protected if present). If any project activities as described within are conducted during shorebird nesting season, the shorebird protection conditions outlined in the applicable permits are required during the shorebird breeding cycle, which includes nesting. Please reference the conditions outlined in the applicable environmental permits. Additionally, the following provisions shall be followed if construction occurs within the shorebird nesting season:

- A. The OWNER's shorebird monitoring agent shall conduct shorebird monitoring of all potential beach-nesting bird habitat in the active construction work area in accordance with the Florida Shorebird Alliance Breeding Bird Protocol. Shorebird surveys shall be conducted by trained, dedicated individuals with proven shorebird identification skills and avian survey experience.
- B. If breeding is detected as evidenced by the presence of a scrape, eggs or young, the OWNER's shorebird monitoring agent shall rope off a buffer zone and the Bird Monitor(s) shall notify the applicable agencies within 24 hours.

5.5 Protection of Fish and Wildlife Resources:

The CONTRACTOR shall keep construction activities under continued surveillance, management, and control to minimize interference with, disturbance to, and damage of fish and wildlife.

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TECHNICAL SPECIFICATIONS (1 of 4)
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 SHEET NUMBER
11

5.6 Fuel Oil Transfer Operations and Spill Prevention

Oil transfer operations shall meet or exceed all State and Federal requirements. Fuel transfer operations for land-based equipment shall be conducted at the construction site or access points and off the beach.

A. Spill Containment: A 16-gauge metal pan with sides a minimum of eight (8) inches high shall be placed under the equipment on the beach or adjacent area during refueling. The pan shall have a capacity equal to 120% of the fuel tank/can contents to catch any spills or leaks during refueling. Pans shall be cleaned by an approved method immediately after every dispensing of fuel and wastes disposed of offsite in an approved area. Under no condition shall the material be discharged on the beach, adjacent lands or State or Federal waters.

B. Storage of Fuel Oil and Lubricants: The CONTRACTOR shall not store fuel oil and/or lubricants on the beach, or equipment that is not required for daily construction activities. All lubricants and other potential liquid pollutants shall be stored in sealed, non-corrosive containers in approved storage site located upland of the beach and dune. Individual containers shall be stored in metal pans with sealed corners. Pans shall be deep enough to prevent contamination of the ground and shall be kept clean of all spillage or leakage.

C. Hazardous Material Spills: The CONTRACTOR shall ensure that all hazardous material spills are immediately reported to the ENGINEER. All hazardous material spills shall be immediately contained and cleaned up in accordance with the U.S. Army Corps of Engineers' Safety and Health Requirements Manual, EM 385-1-1. The CONTRACTOR shall use suitable methods to prevent the spread of hazardous materials from above ground storage tanks and piping in case of leakage. The CONTRACTOR will be solely responsible for any fines, penalties or other legal activities related to fuel spills.

5.7 Noise Control

The CONTRACTOR shall keep construction activities under surveillance, and control to minimize damage to the environment by noise. The CONTRACTOR shall conduct his operations so as to comply with all Federal, State, and local laws pertaining to noise. The use of horns, whistles, signals, and handling of equipment and materials shall be held to the minimum necessary to ensure as quiet an operation as possible while maintaining safety on the job site and meet OSHA requirements. All equipment used on this WORK shall be equipped with satisfactory mufflers or other noise abatement devices.

6.0 PERMITS

It remains the sole responsibility of the CONTRACTOR to comply with all applicable Federal, State or Local laws or regulations, and permits in the performance of the WORK. In the case of conflict with these SPECIFICATIONS, the permits shall govern. If the CONTRACTOR violates any condition of the

permits and WORK is stopped and/or fines are levied by the State of Florida or other public entity, then any additional costs incurred shall be paid by the CONTRACTOR and not charged to the OWNER.

The ENGINEER will notify the CONTRACTOR and the OWNER of any observed noncompliance with the aforementioned Federal, State, or local laws or regulations, permits and other elements of the Contract Documents. The OWNER will determine what action will be taken and such response will be transmitted to the CONTRACTOR by the ENGINEER which may include stopping construction of the PROJECT until the CONTRACTOR complies with the Contract Documents. It will also be the CONTRACTOR's responsibility to advise all subCONTRACTORS to comply with all applicable laws, regulations, and permit requirements.

7.0 ACCESS AND STAGING AREAS

There are four construction access points and two staging areas available to the CONTRACTOR as identified on the DRAWINGS. The CONTRACTOR shall coordinate with the OWNER to verify the limits of the area and identify any additional accesses and staging other than the ones listed above that may be used.

The CONTRACTOR shall be responsible for any damage and repair at the beach accesses as a result of the construction activities and shall take full responsibility for works in the vicinity of existing utility lines, including buried water and sewer lines.

Additional control measures may be necessary in order to minimize impacts to adjacent vegetation and to control rain runoff within the staging area by installing temporary silt screens and construction fencing. The CONTRACTOR shall consult with ENGINEER to determine applicable methodology and prevention methods.

8.0 PRE-CONSTRUCTION MEETING

Prior to commencement of construction, the CONTRACTOR shall meet on site with the ENGINEER, OWNER, a representative of the DEP Beaches, Inlets and Ports Program and other appropriate agencies to establish an understanding of the permit conditions, verify the construction access and limits, trailer location, construction fence location, pre-construction conditions of the site (photographs will be taken by the ENGINEER), construction layout, and other issues related to site features and construction.

A. Construction Schedule: The CONTRACTOR shall provide the ENGINEER with a schedule for the WORK for all phases of the PROJECT at least two (2) days prior to the pre-construction meeting.

B. Sand Samples: The CONTRACTOR shall submit four (4) sand samples proposed to be used for this PROJECT for approval by the ENGINEER. The first three (3) samples shall be submitted at the pre-construction meeting

and the forth sample prior to the delivery of the last half of the sand to be imported to the construction site.

9.0 SURVEYS

The CONTRACTOR shall be responsible for all Stake-out Surveys to accurately layout the construction of the PROJECT to the horizontal (referenced to NAD 1983) and elevations (referenced to NAVD 1988) specified in the DRAWINGS. The ENGINEER will supply the CONTRACTOR with a scale-rectified and geo-referenced AutoCAD drawing for their use.

Within seven (7) days of the placement, final grading, installation of the native vegetation and sand fencing, an As-Built Survey will be performed. The surveys may be performed along completed sections. Within seven (7) days of the completion of the As-Built Survey(s), the CONTRACTOR shall provide the ENGINEER with three (3) signed and sealed hard-copy sets and one (1) PDF format of the As-Built Survey Drawing(s). The survey shall comply with the requirements given in Rule 62B-56.080, F.A.C., and include field data conducted not more than seven days (as amended in these SPECIFICATIONS) following completion of construction. The survey shall include the location, elevations, and distances measured perpendicular from the CCCL to the dune and plantings. The As-Built field survey drawing shall be referenced to state plane Florida North, NAD 1983 (horizontal) and North American Vertical Datum (NAVD) 1988.

10.0 SAND SPECIFICATIONS

Fill material shall be placed in accordance with the guidelines provided under the Florida Department of Environmental Protection (FDEP) Emergency Final Order pursuant to the following conditions:

- A. All fill material shall be sand that is similar to the pre-Hurricane beach sand in both coloration and grain size and be free of debris, rocks, clay, organic matter or other foreign matter. In general, beach-compatible fill material will be predominantly quartz sand of a mean grain size diameter between 0.20mm and 0.45mm and a moist Munsell color-value/chroma of 7/1 or lighter with similar quantity of shell as the existing beach. No sand may be obtained from the beach, near shore, or below mean high water seaward of the CCCL without specific written authorization from the Department.
- B. During visual inspection of sand material upon arrival to the beach access site, physical samples will be taken for later quantitative analysis (sieving, color, etc) if the suitability of the material is uncertain at delivery time.
- C. Fill placement will follow the guidelines provided under the FDEP Emergency Final Order. Any single or cumulative placement of greater than 15 cubic yards of material determined not to meet the benchmark beach sand sample quality shall be remediated. Upon discovery of such an occurrence, all sand placement shall cease and

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TECHNICAL SPECIFICATIONS (2 of 4)
 Gulf County FEMA Berms - Beacon Hill Segment

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 Date: May 22, 2020

Sheet Rev Date: July 28, 2020

PROJECT NUMBER
 19-210.24

SHEET NUMBER
 12

the incompatible material removed and disposed of in an upland site. Sand that does not meet the beach compatibility requirements must be removed immediately. The CONTRACTOR shall provide the ENGINEER with an estimate of all quantities of incompatible material removed from the project site.

11.0 DUNE CONSTRUCTION

The Emergency Berm [DUNE] construction limits and templates are shown on these DRAWINGS. Prior to placement of fill, the CONTRACTOR shall remove from the WORK site all snags, driftwood, and similar debris lying within the foundation limits of the DUNE construction template. All materials removed shall be disposed of in an appropriate and legal manner and at the expense of the CONTRACTOR. Grading and other construction equipment will not be permitted outside the construction limits except for ingress or egress to and from the WORK site.

Approximately 86,500 cubic yards of beach quality sand shall be imported and placed to construct the DUNE. This quantity is an in-place volume and does not include a "fluff" (i.e., expansion or swell) factor. This quantity is also an estimate and CONTRACTOR shall be responsible for verifying and calculating quantity takeoffs.

CONTRACTOR is required to meet the fill template as specified in these plans and specifications, which may require more volume of beach quality sand than is estimated above. Unless otherwise approved by the ENGINEER, fill placement must be within a vertical tolerance of one-half (1/2) foot above the fill template. Any material placed above the specified tolerance may be left in place at the discretion of the ENGINEER. However, this material will not be included in the pay quantities unless the ENGINEER directs the CONTRACTOR to refill or regrade any deficient section of DUNE to meet the template within the vertical tolerances.

If any material is deposited other than in places designated by the DRAWINGS, or otherwise approved, the CONTRACTOR may be required to remove such misplaced material and redeposit it where directed by the ENGINEER or OWNER, at the CONTRACTOR's expense.

12.0 DUNE VEGETATION

Within 7 days of completion of sand placement, the constructed DUNE, mitigation areas and any areas of existing dune vegetation disturbed by construction activities shall be re-vegetated in accordance with the requirements of Rule 62B-56.150 (l)(i), F.A.C.

12.1 Plant Material

All plant materials shall be propagated, prepared, handled, packed, stored, and installed in accordance with the SPECIFICATIONS provided in the following sections. Any plant materials not meeting these SPECIFICATIONS will be rejected at the discretion of the ENGINEER. The plant material shall consist at a minimum of Beach Panicum (*Panicum amarum*), Sea Oats (*Uniola paniculata*) and Beach Morning Glory (*Ipomoea imperati*) at the coverage and number of plants indicated in these SPECIFICATIONS and the specific planting areas shown on these DRAWINGS. Permits may require a different mix of species and plant species may be substituted or added at the discretion of the ENGINEER depending on species availability and applicable permit conditions.

PLANTING QUANTITIES

Species	Distribution (%)	Area (SQ FT)	Estimated Quantities (18" spacing with triangular rows)
Sea Oats (Uniola paniculata)	55	427,804	190,135
Beach Panicum (Panicum amarum)	15	116,674	51,855
Beach Morning Glory (Ipomoea imperati)	30	223,347	103,710
Totals	100	777,825	345,700

- A. Liners: All plant materials shall be grown in multi-well trays (liners) with a minimum size of approximately 1.5" wide by 1.5" long, and not less than 2.5" in depth.
- B. Plant Preparation, Handling and Storage: The root ball shall be properly moistened to prevent desiccation. All planting units shall be handled, packed, transported and stored at the installation site in such a manner as to ensure protection against desiccation, thermal stress, disease or physical damage.
- C. Plant Condition: All planting units provided under this contract shall have moist, vigorous root systems free of rot, disease, or discoloration at the time of delivery and installation. The plants shall be installed within 24 hours of delivery.

12.2 Plant Depth and Spacing

- A. Planting Unit Depth: All planting units shall be installed at a minimum depth of 6", as measured from the top of the root ball to the sand surface. The top of the root ball shall be completely covered by at least 1 inch of sand.
- B. Planting Unit Spacing: The spacing in all designated planting zones is 18" on center, with every other row parallel to the shoreline staggered.

Plants installed more densely than required will not be eligible for payment.

Plants will be installed in varying widths and locations. The CONTRACTOR may attempt to achieve a natural look by meandering the rows and may modify the spacing requirements +/- 6-inch for up to 25% of the plants. All other vegetation shall be planted according to the DRAWINGS. The approximate locations and numbers of plants to be installed under this contract are listed in these SPECIFICATIONS. Field adjustments in both the numbers and locations of the plants to be installed may be necessary depending on site and weather conditions encountered at the start and during installation of the plants. The ENGINEER may determine final planting widths and exact planting locations to be planted in the field as WORK under this contract progresses.

C. Number of Planting Units Delivered: The drawings and the "PLANTING QUANTITIES" table specify the estimated number of planting units required for the work. Varying site conditions may require adjustments beyond or below the estimated quantities. The Contractor is required to provide sufficient plant quantities in order to perform the work in accordance with the contract documents. The engineer will determine the final number of planting units eligible for payment.

12.3 Irrigation and Fertilization

A. Irrigation: It is up to the CONTRACTOR to determine the type, method, and amount of irrigation required to meet the required plant survival criteria. At the CONTRACTOR's discretion, this may include a water gel material such as Terrasorb, Stockosorb, or approved equal with each newly installed planting unit to assist with meeting the required plant survival criteria. The cost of irrigation shall be included in the proposed unit prices for the installed plants. No temporary or permanent piped irrigation system shall be allowed.


B. Fertilizer (if necessary): The CONTRACTOR may apply fertilizer at the time of planting. The CONTRACTOR may apply Stockosorb water retaining gel (or equivalent) and Osmocote (18-6-12 nitrogen-phosphorous-pot ash) slow release fertilizer (or equivalent) to ensure rapid growth and survival. For each linear, 1/2 cup of mix containing the water retaining gel and fertilizer shall be added and mixed in with sand in each hole prior to placement of the liner in the hole. The plants shall be placed in the holes so that the roots are in contact with the gel. The root ball shall not be dipped in the gel and fertilizer mix to meet these requirements.

C. Maintenance Fertilization: Maintenance fertilization is not permitted.

12.4 Success Criteria and Replanting

A. Initial Planting Unit Survival: Planting units that do not survive for a minimum of 10 days after installation will be rejected and not be considered eligible for payment. New, within-specification, planting units

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Sheet Rev Date: July 28, 2020

PROJECT NUMBER
19-210.24

SHEET NUMBER
13

will be installed by the CONTRACTOR in the areas that do not survive for a minimum of 10 days. CONTRACTOR will be responsible for installing the new replacement planting units within 5 days of notification by the ENGINEER that an area of initial planting units did not survive for 10 days. The replacement planting units will be considered eligible for payment as "original" planting units only after they have survived a minimum of 10 days from installation.

B. Planting Unit Success Criteria: The success of the planting effort will be assessed by the ENGINEER approximately 180-days from the end of the planting unit installation using three measures: *Whole-Site Survival Rate*, planting unit *Survival Pattern*, and *Planting Unit Root Penetration*. The planting effort shall be deemed a success if, in the sole judgement of the OWNER, all three of the described criteria are met at the 85% level:

1. *Whole-Site Survival Rate*. A minimum survival rate of 85% of all planting units installed over the site shall be achieved. Plants will be considered to be surviving if they show clearly vigorous rhizomes and white, turgid roots, even in the absence of vital above ground growth.
2. *Survival Pattern*. A minimum of 85% of the planting zone width perpendicular to the shoreline shall be occupied by surviving planting units at all locations.
3. *Planting Unit Root Penetration*. A minimum of 14 out of 16 (85%) randomly selected plants in each planting zone shall have achieved root penetration of 9" or greater, as measured from the top of the root ball down. The CONTRACTOR and the ENGINEER immediately following plant installation shall tag the 16 randomly selected plants in the field. This success criterion may be waived, at the sole discretion of the ENGINEER, if lesser root penetration is otherwise determined to be acceptable, or if it was caused by factors outside the control of the CONTRACTOR (i.e., excessive natural rainfall).

C. Replanting of Planting Units: If any of the above success criteria are not met, as determined by the ENGINEER, the CONTRACTOR shall replant with viable, and within specification, planting units in all areas considered to be deficient according to the planting unit success criteria after coordination with the ENGINEER and the DEP. The replanting of planting units will be the sole responsibility of the CONTRACTOR and be completed at no cost to the OWNER. All warranty and survival provisions and requirements will apply to replanted planting units.

D. The CONTRACTOR shall not be held responsible for losses beyond his control arising from vandalism or "Acts of God." Maintenance of planting units beyond the initial planting will be forbidden without permission from the OWNER and ENGINEER, especially during sea turtle and shorebird nesting seasons.

13.0 SITE RESTORATION

A. The CONTRACTOR shall restore site features to pre-construction conditions or better including all roads, landscape features, beach berm, and natural vegetation damaged or destroyed during construction operations. All construction related debris shall be removed and the site shall be cleaned and restored to the site condition that existed prior to construction or in a better condition.

B. Final Dressing: After completion of all WORK, the beach shall be graded smooth and dressed so as to eliminate any undrained pockets, ridges, ruts, depression and/or berms in the beach and DUNE template and surfaces. The manner of smoothing may be by a pipe or beam dragged behind a bulldozer of similar equipment, acceptable to the ENGINEER. The smoothing operation shall be undertaken so as to avoid re-compaction of the beach, to as great a degree as practical.

C. During the Substantial Completion site visit, the ENGINEER will identify any areas requiring restoration. If directed by the ENGINEER, the CONTRACTOR will prepare a restoration plan based on the listing of requirements provided by the ENGINEER. The CONTRACTOR will complete such restoration in accordance with the plan submitted by the CONTRACTOR and approved by the ENGINEER and shall be completed 10 days after the Substantial Completion site visit, whichever is earlier. Site restoration work will be accomplished at the CONTRACTOR's expense.

D. Site Restoration Plan (if necessary): The CONTRACTOR shall submit a plan to address all identified site restoration requirements within 2 days of the Substantial Completion site visit. The plan shall provide written and/or graphic representation of the CONTRACTORS proposed site restoration activities. The Site Restoration Plan will also include a schedule for completion of the restoration work. The CONTRACTOR will address any comments or requests made by the ENGINEER and commence restoration work immediately upon receipt of submittal approval.

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TECHNICAL SPECIFICATIONS (4 of 4)
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PROJECT NUMBER
19-210.24

SHEET NUMBER
14