Environmental Quality

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

WILLIAM F. LANE
General Counsel

TO: The Coastal Resources Commission

FROM: Christine A. Goebel, DEQ Assistant General Counsel

DATE: January 30, 2020 (for the February 12-13, 2020 CRC Meeting)

RE: **Variance Request by the Town of Sunset Beach (CRC-VR-19-09)**

Petitioner Town of Sunset Beach ("Petitioner" or "Town") has several waterbodies within its town jurisdiction, including Finger Canals A-D, the Feeder Channel, the Bay Area and South Jinks Creek. Following significant pre-application coordination with resource agencies, on April 12, 2019, DCM received the Town's application for a CAMA Major Permit seeking authorization to dredge these waterbodies. The Finger Canals would be dredged to -5' MLW, and dredged to -6' MLW in the other waterbodies. On October 29, 2019, DCM issued CAMA Major Permit No. 79-19 authorizing the project as proposed, but conditioned the maximum depth to -2' MLW in order to comply with 15A NCAC 7H .0208(b)(F) which requires dredging depths not to exceed those of connecting waters. Petitioner now seeks a variance to allow the proposed dredging to the original depths proposed in its application.

The following additional information is attached to this memorandum:

Attachment A: Relevant Rules
Attachment B: Stipulated Facts
Attachment C: Petitioner's Positions and Staff's Responses to Variance Criteria
Attachment D: Petitioner's Variance Request Materials
Attachment E: Stipulated Exhibits including powerpoint

cc(w/enc.): Town of Sunset Beach by Attorney Grady Richardson., electronically
Mary Lucasse, Special Deputy AG and CRC Counsel, electronically
Hiram Marziano, Town of Sunset Beach CAMA LPO, electronically

RELEVANT STATUTES OR RULES **APPENDIX A**

SECTION .0200 – THE ESTUARINE AND OCEAN SYSTEMS

15A NCAC 07H .0201 ESTUARINE AND OCEAN SYSTEM CATEGORIES

Included within the estuarine and ocean system are the following AEC categories: estuarine waters, coastal wetlands, public trust areas, and estuarine and public trust shorelines. Each of the AECs is either geographically within the estuary or, because of its location and nature, may significantly affect the estuarine and ocean system.

15A NCAC 07H .0202 SIGNIFICANCE OF THE SYSTEMS APPROACH IN ESTUARIES

The management program must embrace all characteristics, processes, and features of the whole system and not characterize individually any one component of an estuary. The AECs are interdependent and ultimately require management as a unit. Any alteration, however slight, in a given component of the estuarine and ocean system may result in unforeseen consequences in what may appear as totally unrelated areas of the estuary. For example, destruction of wetlands may have harmful effects on estuarine waters which are also areas within the public trust. As a unified system, changes in one AEC category may affect the function and use within another category.

15A NCAC 07H .0203 MANAGEMENT OBJECTIVE OF THE ESTUARINE AND OCEAN SYSTEM

It is the objective of the Coastal Resources Commission to conserve and manage estuarine waters, coastal wetlands, public trust areas, and estuarine and public trust shorelines, as an interrelated group of AECs, so as to safeguard and perpetuate their biological, social, economic, and aesthetic values and to ensure that development occurring within these AECs is compatible with natural characteristics so as to minimize the likelihood of significant loss of private property and public resources. Furthermore, it is the objective of the Coastal Resources Commission to protect present common law and statutory public rights of access to the lands and waters of the coastal area.

15A NCAC 07H .0204 AECS WITHIN THE ESTUARINE AND OCEAN SYSTEM

The following regulations in this Section define each AEC within the estuarine and ocean system, describe its significance, articulate the policies regarding development, and state the standards for development within each AEC.

15A NCAC 07H .0206 ESTUARINE WATERS

(a) Description. Estuarine waters are defined in G.S. 113A-113(b)(2) to include all the waters of the Atlantic Ocean within the boundary of North Carolina and all the waters of the bays, sounds, rivers and tributaries thereto seaward of the dividing line between coastal fishing waters and inland fishing waters…

(b) Significance. Estuarine waters are the dominant component and bonding element of the entire estuarine and ocean system, integrating aquatic influences from both the land and the sea. Estuaries are among the most productive natural environments of North Carolina. They support the valuable commercial and sports fisheries of the coastal area which are comprised of estuarine dependent species such as menhaden, flounder, shrimp, crabs, and oysters. These species must spend all or some part of their life cycle within the estuarine waters to mature and reproduce. Of the 10 leading species in the commercial catch, all but one is dependent on the estuary.

This high productivity associated with the estuary results from its unique circulation patterns caused by tidal energy, fresh water flow, and shallow depth; nutrient trapping mechanisms; and protection to the many organisms. The circulation of estuarine waters transports nutrients, propels plankton, spreads seed stages of fish and shellfish, flushes wastes from animal and plant life, cleanses the system of pollutants, controls salinity, shifts sediments, and mixes the water to create a multitude of habitats. Some important features of the estuary include mud and sand flats, eel grass beds, salt marshes, submerged vegetation flats, clam and oyster beds, and important nursery areas.

Secondary benefits include the stimulation of the coastal economy from the spin off operations required to service commercial and sports fisheries, waterfowl hunting, marinas, boatyards, repairs and supplies, processing operations, and tourist related industries. In addition, there is considerable nonmonetary value associated with aesthetics, recreation, and education.

(c) Management Objective. To conserve and manage the important features of estuarine waters so as to safeguard and perpetuate their biological, social, aesthetic, and economic values; to coordinate and establish a management system capable of conserving and utilizing estuarine waters so as to maximize their benefits to man and the estuarine and ocean system.

(d) Use Standards. Suitable land/water uses shall be those consistent with the management objectives in this Rule. Highest priority of use shall be allocated to the conservation of estuarine waters and their vital components. Second priority of estuarine waters use shall be given to those types of development activities that require water access and use which cannot function elsewhere such as simple access channels; structures to prevent erosion; navigation channels; boat docks, marinas, piers, wharfs, and mooring pilings.

In every instance, the particular location, use, and design characteristics shall be in accord with the general use standards for coastal wetlands, estuarine waters, and public trust areas described in Rule .0208 of this Section.

15A NCAC 07H .0207 PUBLIC TRUST AREAS

(a) Description. Public trust areas are all waters of the Atlantic Ocean and the lands thereunder from the mean high water mark to the seaward limit of state jurisdiction; all natural bodies of water subject to measurable lunar tides and lands thereunder to the normal high water or normal water level; all navigable natural bodies of water and lands thereunder to the normal high water or normal water level as the case may be, except privately-owned lakes to which the public has no right of access; all water in artificially created bodies of water containing public fishing resources or other public resources which are accessible to the public by navigation from bodies of water in which the public has rights of navigation; and all waters in artificially created bodies of water in which the public has acquired rights by prescription, custom, usage, dedication, or any other means. In determining whether the public has acquired rights in artificially created bodies of water, the following factors shall be considered:

(1) the use of the body of water by the public;

(2) the length of time the public has used the area;

(3) the value of public resources in the body of water;

(4) whether the public resources in the body of water are mobile to the extent that they can move into natural bodies of water;

(5) whether the creation of the artificial body of water required permission from the state; and

(6) the value of the body of water to the public for navigation from one public area to another public area.

(b) Significance. The public has rights in these areas, including navigation and recreation. In addition, these areas support commercial and sports fisheries, have aesthetic value, and are important resources for economic development.

(c) Management Objective. To protect public rights for navigation and recreation and to conserve and manage the public trust areas so as to safeguard and perpetuate their biological, economic and aesthetic value.

(d) Use Standards. Acceptable uses shall be those consistent with the management objectives in Paragraph (c) of this Rule. In the absence of overriding public benefit, any use which jeopardizes the capability of the waters to be used by the public for navigation or other public trust rights which the public may be found to have in these areas shall not be allowed. The development of navigational channels or drainage ditches, the use of bulkheads to prevent erosion, and the building of piers, wharfs, or marinas are examples of uses that may be acceptable within public trust areas, provided that such uses shall not be detrimental to the public trust rights and the biological and physical functions of the estuary. Projects which would directly or indirectly block or impair existing navigation channels, increase shoreline erosion, deposit spoils below normal high water, cause adverse water circulation patterns, violate water quality standards, or cause degradation of shellfish waters are considered incompatible with the management policies of public trust areas.

In every instance, the particular location, use, and design characteristics shall be in accord with the general use standards for coastal wetlands, estuarine waters, and public trust areas.

15A NCAC 07H .0208 USE STANDARDS

(a) General Use Standards

(1) Uses which are not water dependent shall not be permitted in coastal wetlands, estuarine waters, and public trust areas. Restaurants, residences, apartments, motels, hotels, trailer parks, private roads, factories, and parking lots are examples of uses that are not water dependent. Uses that are water dependent include: utility crossings, wind energy facilities, docks, wharves, boat ramps, dredging, bridges and bridge approaches, revetments, bulkheads, culverts, groins, navigational aids, mooring pilings, navigational channels, access channels and drainage ditches;

(2) Before being granted a permit, the CRC or local permitting authority shall find that the applicant has complied with the following standards:

(A) The location, design, and need for development, as well as the construction activities involved shall be consistent with the management objective of the Estuarine and Ocean System AEC (Rule .0203 of this subchapter) and shall be sited and designed to avoid significant adverse impacts upon the productivity and biologic integrity of coastal wetlands, shellfish beds, submerged aquatic vegetation as defined by the Marine Fisheries Commission, and spawning and nursery areas;

(B) Development shall comply with state and federal water and air quality

(C) Development shall not cause irreversible damage to documented archaeological or historic resources as identified by the N.C. Department of Cultural resources;

(D) Development shall not increase siltation;

(E) Development shall not create stagnant water bodies;

(F) Development shall be timed to avoid significant adverse impacts on life cycles of estuarine and ocean resources; and

(G) Development shall not jeopardize the use of the waters for navigation or for other public trust rights in public trust areas including estuarine waters.

(3) When the proposed development is in conflict with the general or specific use standards set forth in this Rule, the CRC may approve the development if the applicant can demonstrate that the activity associated with the proposed project will have public benefits as identified in the findings and goals of the Coastal Area Management Act, that the public benefits outweigh the long range adverse effects of the project, that there is no reasonable alternate site available for the project, and that all reasonable means and measures to mitigate adverse impacts of the project have been incorporated into the project design and shall be implemented at the

applicant's expense. Measures taken to mitigate or minimize adverse impacts shall include actions that:

(A) minimize or avoid adverse impacts by limiting the magnitude or degree of the action;

(B) restore the affected environment; or

(C) compensate for the adverse impacts by replacing or providing substitute resources.

(4) Primary nursery areas are those areas in the estuarine and ocean system where initial post larval development of finfish and crustaceans takes place. They are usually located in the uppermost sections of a system where populations are uniformly early juvenile stages. They are designated and described by the N.C. Marine Fisheries Commission (MFC) and by the N.C. Wildlife Resources Commission (WRC);

(5) Outstanding Resource Waters are those estuarine waters and public trust areas classified by the N.C. Environmental Management Commission (EMC). In those estuarine waters and public trust areas classified as ORW by the EMC no permit required by the Coastal Area Management Act shall be approved for any project which would be inconsistent with applicable use standards adopted by the CRC, EMC, or MFC for estuarine waters, public trust areas, or coastal wetlands. For development activities not covered by specific use standards, no permit shall be issued if the activity would, based on site specific information, degrade the water quality or outstanding resource values; and

(6) Beds of submerged aquatic vegetation (SAV) are those habitats in public trust and estuarine waters vegetated with one or more species of submergent vegetation. These vegetation beds occur in both subtidal and intertidal zones and may occur in isolated patches or cover extensive areas. In either case, the bed is defined by the Marine Fisheries Commission. Any rules relating to SAVs shall not apply to non-development control activities authorized by the Aquatic Weed Control Act of 1991 (G.S. 113A-220 et seq.).

(b) Specific Use Standards

(1) Navigation channels, canals, and boat basins shall be aligned or located so as to avoid primary nursery areas, shellfish beds, beds of submerged aquatic vegetation as defined by the MFC, or areas of coastal wetlands except as otherwise allowed within this Subchapter. Navigation channels, canals and boat basins shall also comply with the following standards:

(A) Navigation channels and canals may be allowed through fringes of regularly and ir-regularly flooded coastal wetlands if the loss of wetlands will have no significant adverse impacts on fishery resources, water quality or adjacent wetlands, and if there is no reasonable alternative that would avoid the wetland losses;

(B) All dredged material shall be confined landward of regularly and irregularly flooded coastal wetlands and stabilized to prevent entry of sediments into the adjacent water bodies or coastal wetlands;

(C) Dredged material from maintenance of channels and canals through irregularly flooded wetlands shall be placed on non wetland areas, remnant spoil piles, or disposed of by a method having no significant, long-term wetland impacts. Under no circumstances shall dredged material be placed on regularly flooded wetlands. New dredged material disposal areas shall not be located in the buffer area as outlined in 15A NCAC 07H .0209(d)(10);

(D) Widths of excavated canals and channels shall be the minimum required to meet the applicant's needs but not impair water circulation;

(E) Boat basin design shall maximize water exchange by having the widest possible opening and the shortest practical entrance canal. Depths of boat basins shall decrease from the waterward end inland;

(F) Any canal or boat basin shall be excavated no deeper than the depth of the connecting waters;

(G) Construction of finger canal systems are not allowed. Canals shall be either straight or meandering with no right angle corners;

(H) Canals shall be designed so as not to create an erosion hazard to adjoining property. Design may include shoreline stabilization, vegetative stabilization, or setbacks based on soil characteristics; and

(I) Maintenance excavation in canals, channels and boat basins within primary nursery areas and areas of submerged aquatic vegetation as defined by the MFC shall be avoided. However, when essential to maintain a traditional and established use, maintenance excavation may be approved if the applicant meets all of the following criteria:

(i) The applicant demonstrates and documents that a water dependent need exists for the excavation;

(ii) There exists a previously permitted channel that was constructed or maintained under permits issued by the State or Federal government. If a natural channel was in use, or if a human made channel was constructed before permitting was necessary, there shall be evidence that the channel was continuously used for a specific purpose;

(iii) Excavated material can be removed and placed in a disposal area in accordance with Part (b)(1)(B) of this Rule without impacting adjacent nursery areas and submerged aquatic vegetation as defined by the MFC; and

(iv) The original depth and width of a human made or natural channel shall not be increased to allow a new or expanded use of the channel.

This Part does not affect restrictions placed on permits issued after March 1, 1991.

STIPULATED FACTS **ATTACHMENT B**

1. Petitioner is the Town of Sunset Beach ("Petitioner" or "Town"), a North Carolina Municipality created by the General Assembly in 1963. The Town is represented in this variance by Town Attorney Grady Richardson.

2. The site of the proposed development ("Site") are approximately 18 acres encompassing the waterbodies know as Jinks Creek, the Bay Area, the Feeder Channel, and Finger Canals (A through D as shown on the attached map). The areas where dredging work is proposed are largely submerged lands owned by the state and held in public trust, and are within the Town's borders or its Extra Territorial Jurisdictional Area (shown on an attached map).

3. The water bodies which make up the Site are classified as SA, High Quality Waters ("HQW") by the Environmental Management Commission. The Finger Canals A-D and the Feeder Channel are closed to the harvest of shellfish by the DMF-Shellfish Sanitation Program, but the waters of the Bay Area and South Jinks Creek are open to the harvest of shellfish. None of the water bodies are classified as a Primary Nursery Area by the Marine Fisheries Commission, but the area just north of the South Jinks Creek dredge area is a PNA. A copy of the relevant PNA map from DMF is attached.

4. The proposed dredging work would take place in the Estuarine Waters, Public Trust Areas, and Estuarine Shorelines sub-category of the Coastal Shorelines Areas of Environmental Concern ("AECs"). The proposed deposition of beach compatible sand would take place in the Ocean Hazard AEC. Pursuant to N.C.G.S. 113A-118, CAMA/D&F permit authorization is required for the proposed development.

5. Aerial and ground-level photographs of The Site are part of the Powerpoint presentation, attached. Historic aerial photographs show the movement of the shoal which is now located within part of the area proposed for dredging.

6. As seen in the application materials, Jinks Creek (both North and South) connects Tubbs Inlet to the AIWW and provides navigable access for the Canals, the Feeder Channel and the Bay Area. Where the Feeder Channel connects to Jinks Creek is where the creek is generally divided into north and south, as seen on the revised site map provided by Petitioners and attached.

7. Based on historic aerial photography, it appears the Finger Canals and Feeder Channel were first excavated sometime around 1970, before the enactment of the Coastal Area Management Act ("CAMA") and just following the 1969 enactment of the State Dredge & Fill Law ("D&F"). It appears that all of the areas proposed for dredging have been dredged previously. Some areas were dredged prior to the CAMA so no permits exist/could be located for these areas. Past permits identified include CAMA Major Permit No. 45-02 for maintenance dredging of the Finger Canals and Feeder Channel to -5.2' MLW and CAMA Major Permit No. 211-85 which also authorized maintenance dredging of the Finger Canals and Feeder Channel. A summary of the permit history compiled by DCM Staff is found in the DCM Field Investigation Report, a copy of which is attached.

8. The Petitioner and its agent had significant contact with resource agencies before the CAMA Major/D&F Permit application was submitted, including five pre-application meetings over two years.

9. Through the pre-application process and in response to agency concerns regarding shellfish resources in North Jinks Creek, the Petitioner elected to remove North Jinks Creek from the proposed dredging.

10. As part of the pre-application process, on February 12, 2019, DMF sent a memo to DCM requesting additional information from the Town prior to the application submittal, including a shellfish relocation plan. A copy of this memorandum is attached.

11. On or about April 12, 2019, DCM received Petitioner's CAMA Major/D&F Permit application (following an initial draft application on March 22, 2019), and it was deemed complete on June 17, 2019. Petitioner's authorized CAMA agent is Moffatt & Nichol, Inc. Petitioner proposed the maintenance excavation of approximately 10,650 linear feet of South Jinks Creek, the Bay Area, the Feeder Channel and Finger Canals A-D to a maximum depth of -6' MLW (-5'+1' overdredge allowance) in all areas except to -5' MLW (-4' +1' overdredge) in the Finger Canals. The average water depths in the dredge footprint vary, as shown on the attached depth profiles which were taken every 200' feet in the original proposed dredge footprint. An estimated 40,500 cubic yards (CY) of beach compatible material will be dredged from South Jinks Creek, and an additional 48,600 CY of non-compatible material will be removed from Finger Canals A-D, the Feeder Channel system and Bay Area. The compatible dredge material will be placed via temporary pipeline to an 8.5-acre area of the oceanfront beach between 5th and 12th Streets on Sunset Beach, and non-compatible material will be placed in an upland landfill facility. A 10' dredge buffer from any Coastal Wetland was also proposed by Petitioner in response to agency concerns. A copy of Petitioner's CAMA/D&F application materials is attached.

12. As part of their application, Petitioner submitted a Sediment Analysis for the beach compatible sand deposition proposed, a Jinks Creek Shellfish Survey, the Essential Fish Habitat ("EFH") and Biological Assessments ("BA") required by federal permitting, a Manatee Avoidance Guideline, and a Section 106 report per the National Historical Preservation Act. Copies of these documents are part of the application.

13. As part of the CAMA/D&F Major Permit process, notice of the proposed dredging project was sent to adjacent riparian neighbors. In this case, Petitioner sent notice to all property owners adjacent to the waterbodies where dredging was proposed, as well as those lots adjacent to where spoil deposition is proposed on the oceanfront and those owners of property where disposal/pipes will be laid after securing easements. A copy of the spreadsheet created by the Town's agent is attached, as are emails between DCM counsel and the authorized agent regarding notice attempts.

14. As part of the CAMA/D&F Major Permit process, notice of the proposed dredging project was given to the general public through on-site posting and through the June 26, 2019 publishing of notice in the Wilmington Star Newspaper.

15. Many letters and emails were received by DCM related to this project, and included both objections and comments in support of the project, including multiple letters from some individuals. Copies of these letters are attached as a separate file in the materials.

16. As part of the CAMA/D&F Major Permit process, copies of the permit application materials and DCM's Field Investigation Report were sent to state and federal resource agencies for review and comment. Relevant comments from these agencies are described in the facts to follow.

17. On or about June 21, 2019, DCM's Field Representative Tara MacPherson submitted her comments to the Major Permitting staff, recommending that the proposed dredging depths were inconsistent with 15A NCAC 7H .0208(b)(F) which states "Any canal or boat basin shall be excavated no deeper than the depth of the connecting waters" and that the permit should be denied or the inconsistent dredge areas be conditioned out of a permit. A copy of this recommendation is attached.

18. On June 21, 2019, the Division of Energy, Mineral and Land Resources ("DEMLR") commented that the spoil deposition on the two acres of high ground will require an Erosion and Sediment Control plan approval, and that a stormwater application will be necessary for review and a possible exemption. A copy of this letter is attached.

19. On July 3, 2019, DCM received an email from the Army Corps of Engineers to staff of other commenting federal agencies indicating that, due to the large size of the application, a summary was being provided in the email, along with a link to the materials, and a summary of federal considerations. A copy of this email is attached.

20. On July 19, 2019, the Division of Marine Fisheries ("DMF") submitted its response to the project, indicating that it approved of the project with conditions, specifically set forth in its memo, including a shellfish relocation plan for shellfish resources in the proposed dredge cut and its buffer area, which is condition 7 on the Permit. DMF also suggested a dredging moratorium period of April 1 to September 30, which is condition 1 on the Permit. As part of this variance process, DCM reached out to DMF to ask about proposed dredging. Director Murphey indicated that "the proposed dredging of -5 to -6 ft. NLW as opposed to 2 ft. does not cause any fisheries or habitat concerns for us. Our principal concern with the proposal in the past was the dredging of North Jinks Creek to the waterway which contained significant shellfish habitat. My understanding was this approach [dredging North Jinks Creek] was later removed from the proposal."

21. On July 23, 2019, DCM was copied on a letter from the North Carolina Coastal Federation ("NCCF") to Col. Clark of the Army Corps of Engineers, providing comment on the proposed project, a copy of which is attached. Also attached is the August 9, 2019 response by the Town's authorized agent to Col. Clark.

22. On August 1, 2019, the Division of Water Resources indicated it did not object to the project and that it had issued the 401 Water Quality Certification that same day, a copy of which is attached.

23. DWR awarded a grant to the Town of Sunset Beach on May 28, 2019, using money from the Shallow Draft Inlet Fund for this proposed project. Copies of the Grant Award Document and the Grant Application are attached.

24. On August 2, 2019, the Army Corps of Engineers provided comments to DCM and the Town regarding the proposed dredging, a copy of which is attached. The Corps representative indicated that the National Marine Fisheries Service had no objection to the work as proposed as stated in its August 2, 2019 letter, but the US Fish and Wildlife Service did not concur with the Corps' effects determinations and requested they be changed to incorporate USFWS's July 29, 2019 written comments, including an updated BA, attached.

25. On August 6, 2019, DCM's District Planner found the proposed project consistent with the Town's Land Use Plan. A copy of this memo is attached.

26. On August 9, 2019, the Town's authorized agent provided an updated Biological Assessment ("BA") to the Corps, a copy of which is attached with the email.

27. On August 9, 2019, the NC Wildlife Resources Commission ("WRC") provided a written response indicating appreciation for the significant pre-application coordination and meetings with the Town, and also suggesting timing conditions intended to minimize and avoid impacts to sea turtles, endangered bird species, and marine life in the nearby PNA habitat. A copy of this memorandum is attached.

28. On August 27, 2019, the Corps notified the Town and review agencies that it would now process the permit application through a Standard Permit (SP) rather than a General Permit, at the federal level, due to significant public interest (including the volume of comments during the CAMA review process) and the need for more widespread notification to the public. A copy of this notice is attached.

29. The depth in Jinks Creek between Tubbs Inlet and the Feeder Channel is approximately 0' MLW (as shown on the revised site plan approaching Tubbs Inlet). The depth in North Jinks Creek (between the Feeder Channel and the AIWW) is approximately -2' MLW in the area where North Jinks Creek meets the AIWW and approximately 1,200'-1,400' down Jinks Creek from the confluence with the AIWW. Depth profiles of this area at 200' intervals are attached.

30. On October 28, 2019, DCM issued CAMA/D&F Major Permit No. 79-19 (the "Permit") to the Town, but, along with other conditions, conditioned-out the proposed -6' MLW dredging depths and authorized a maximum dredging depth of -2' MLW in order to comply with 15A NCAC 7H .0208(b)(F) which is the "connecting waters" rule. A copy of the Permit is attached and Condition 2 restricts the maximum dredging depth of any dredging to -2' MLW.

31. On December 20, 2019, Petitioner filed its Variance Request and proposed supporting materials through counsel, requesting that the Commission hear this matter at its February 2020 meeting. Petitioner seeks a variance from the "connecting waters" rule of the Commission at 15A NCAC 7H .0208(b)(F) in order to dredge to the depths proposed in Petitioner's CAMA Major/D&F Application (-6' MLW for all areas except -5' MLW for the Finger Canals).

32. As part of the variance process, the Commission's rules at 15A NCAC 7J. 0701(c)(7) requires that a variance petitioner send notice to adjacent property owners and persons who submitted written comments to DCM during the permit review process so they are aware of the Petition. DCM accepts written comments to include in the stipulated exhibits for the Commission's consideration. In this case, there were approximately 55 such comments received by a January 15, 2020 deadline communicated to the commenting parties. Please note: Due to the number of comments, DCM cannot confirm if the comments received are all from those who commented during permit review or if the comment website information has been passed on to others.

33. A comment letter was received on January 15, 2019 from Southern Environmental Law Center (SELC), a copy of which is attached and which responds to the Town's variance petition.

Stipulated Exhibits

There will be four separate PDF files available for download

1 of 4 Main Stipulated Exhibits, including:

1. Map of Town of Sunset Beach limits and ETJ
2. Site map from Petitioner showing/labeling the waterbodies
3. PNA maps of the area
4. DCM Field Investigation Report
5. February 12, 2019 DMF memo re: shellfish relocation plan
6. Spread sheet and information showing notice to adjacent riparian owners and emails discussing notice attempts
7. Newspaper Notice information
8. January 21, 2019 comments from DCM Field Representative
9. June 21, 2019 DEMLR comments
10. July 3, 2019 email from Corps to federal commenting staff
11. July 19, 2019 comments from DMF
12. July 23, 2019 comments from NCCF to Corps
13. August 9, 2019 response to NCCF comments to Corps from Petitioner's agent
14. August 1, 2019 comments and copy of 401 from DWR
15. Copy of Town's grant application and grant contract with DWR
16. August 2, 2019 comments from the Corps, enclosing NMFS August 2 letter and USS FWS letter of July 29, 2019 not-concurring requesting changes to the EA
17. August 6, 2019 comments of DCM district planner
18. August 9, 2019 revised BA with transmission email
19. August 9, 2019 comments from WRC
20. August 27, 2019 email from Corps indicating change to Standard Permit from General Permit
21. Depth Profiles of Jinks Creek
22. CAMA Major/D&F Permit No. 79-19
23. Powerpoint Presentation with ground-level and aerial photographs of the site including over time to show shoaling changes

2 of 4 Separate Stipulated Fact File: Petitioner's CAMA Major Permit Application including drawings, sediment analysis, Shellfish Survey, EFH, BA, Manatee Avoidance, Section 106

3 of 4 Separate Stipulated Fact File: Comments received during permit review

4 of 4 Separate Stipulated Fact File: Comments received following variance submittal through January 14, 2020

PETITIONER'S and STAFFS' POSITIONS **ATTACHMENT C**

To qualify for a variance, Petitioner must show all of the following:

I. Will Unnecessary Hardships would result from strict application of the rules, standards, or orders? If so, Petitioner must identify the unnecessary hardships.

Petitioner's Position: Yes.

Strict application of the rule in question would prevent the Town, as Petitioner, from maintaining the navigable areas of S. Jinks Creek, the Bay Area, and the Feeder Channel system at a depth consistent with most other maintained waterways in North Carolina. In order to maintain the referenced waterways, the Petitioner would be required to dredge a connecting channel to either the Atlantic Intracoastal Waterway (AIWW) or the Atlantic Ocean. Dredging Jinks Creek to the AIWW would create unavoidable shellfish impacts and dredging Jinks Creek to Tubbs Inlet would create a financial strain necessary to maintain a stable inlet position. Dredging Jinks Creek to the Eastern Channel to connect with the AIWW behind Ocean Isle Beach would also create potential environmental impacts and require significant financial expenditures. Additionally, the connecting channel at Shallotte Inlet, Lockwoods Folly Inlet, Carolina Beach Inlet, Mason Creek, Topsail Creek, and Cedar Bush Cut are all authorized to a depth equal to or greater (deeper) than -6-ft MLW. The additional depth provides storage capacity for shoaling material and additional space for navigation movement, which can extend maintenance intervals and allow recovery of important ecological resources while also saving construction expenditures and providing continued navigation access.

Maintaining S. Jinks Creek, the Bay Area and the Feeder Channel system at the elevation of only -2-ft MLW under the Subject Rule also does not allow the Town to provide a navigable waterway in accordance with recommended standards from national engineering agencies. The ASCE[1] (American Society of Civil Engineers) and PIANC[2] (The World Association for Waterborne Transport Infrastructure) recommends 3-ft under keel (MLLW) clearance plus 10% as a design depth in sheltered waters for vessel motion.

Staffs' Position: Yes.

Petitioner seeks a variance from the Commission's rule found at 15A NCAC 7H .0208(b)(1)(F), which states that "Any canal or boat basin shall be excavated no deeper than the depth of the connecting waters;" (the "connecting waters" rule). This was the basis for DCM to condition the Permit authorizing the dredging to only -2' MLW, which was determined to be depth of connecting waters. Staff's understanding is that this rule was codified by the Commission to prevent water from collecting in "sinks" and stagnating due to reduced flushing in canals, resulting in negative impacts on water quality and marine resources as a result of the accumulation of pollutants, low dissolved oxygen, and debris collecting in these deeper areas. Staff agree that Petitioner's inability to dredge the finger canals, the Feeder Channel, the Bay Area and South Jinks Creek to -6' MLW

[1] ASCE Manual No. 50 –Planning and design guidelines for small craft harbors (2012).
[2] PIANC (2016) Guidelines for marina design. Report 149, part 2. RecCom working group 149.

(-5' + -1' overdredge allowance) due to strict application of this rule results in hardships due to a need for more frequent dredging if only authorized to -2' MLW.

While Staff were required to limit dredging depths as a condition of the Permit based on the "connecting waters" rule, Staff note that DWR's issuance of the 401 Water Quality Certification for the project as originally designed indicates little to no concerns about water quality in this area due to its close proximity to the inlet and rapid flushing rate. Similarly, other relevant marine resource agencies, including DMF, WRC, and the National Marine Fisheries Service (NMFS), did not indicate any potential for significant adverse impacts to marine habitats. DCM staff note that dredging to a deeper depth (as proposed) may increase the time interval between dredging events (as the deeper footprint can hold shoaling sediment) and may be less impactful to coastal resources (particularly larval fish) than more frequent dredging events that might be required to maintain a -2' MLW channel.

As a point of clarification, Staff note that when the project as initially proposed was first reviewed, concerns were expressed by resource agencies about impacts to North Jinks Creek, which is a designated Primary Nursery Area (PNA) and also holds significant shellfish resources. Given these concerns and the Commission's rules restricting new dredging in PNAs, the proposed dredging of North Jinks Creek was removed from the application. Based on these considerations, Staff agree that strict application of the "connecting waters" rule causes Petitioner unnecessary hardships.

II. Do the hardships result from conditions that are peculiar to the property, such as the location, size, or topography of the property? Explain.

Petitioner's Position: Yes.

The hardships in this case result from the fact that Jinks Creek serves as a primary navigation route between the Atlantic Ocean and the AIWW and also provides a beneficial shellfish and juvenile fish habitat similar to a Primary Nursery Area (PNA). Sediment shoaling in Jinks Creek cannot be removed without dredging through shellfish habitat. Choosing an alternate route to deep water other than Jinks Creek also creates hardships in terms of managing a tidal inlet, or attempting to dredge through Eastern Channel. Eastern channel runs behind Ocean Isle beach and most likely carries the same environmental concerns as Jinks Creek. Furthermore, most other connecting channels supporting a developed inlet throughout North Carolina have been and are periodically dredged and maintained at a deeper depth than Jinks Creek. This has allowed Jinks Creek to achieve and maintain its high fisheries resource importance.

Staffs' Position: Yes.

Staff agrees that hardships result from conditions peculiar to the property, where the Commission's "connecting waters" rule has been applied on a larger scale to waterbodies adjacent to an ocean inlet with higher natural tidal flushing dynamics, as opposed to a traditional canal system or boat basin. In addition, the rapid shoaling of the South Jinks Creek area is clearly shown in the attached aerial photos, and could significantly impair recreational boating in the project area and/or require more frequent dredging if limited to -2' MLW depths.

III. Do the hardships result from actions taken by the petitioner? Explain.

Petitioner's Position: No.

The Town, as Petitioner, is attempting to manage a historically maintained navigation system that has experienced increased shoaling due to tidal currents in S. Jinks Creek and stormwater runoff in the Bay Area and Feeder Channel system. The establishment of shellfish resources in N. Jinks Creek has made it presently unfavorable to dredge while shoaling within the interior of Tubbs Inlet has also impeded deep water (-6-ft MLW) access. Portions of the site have a documented history of being maintained since approximately 1985; however, shoaling approximate to Tubbs Inlet and the shellfish establishment in Jinks Creek have negatively impacted the Town's ability to maintain the established recreational waterways along the east end of the Town.

Staffs' Position: No.

Staff first notes that the Town's removal of the initially proposed dredging of the PNA habitat in North Jinks Creek during the pre-application coordination process resolved most resource agency concerns with this project. Indeed, DMF did not object to the project or its originally proposed dredge depths as long as certain conditions were applied, including a shellfish relocation plan, buffers between the dredge footprint and coastal wetlands, and seasonal dredge windows. DWR issued the 401 Water Quality Certification on August 1, 2019 and NMFS and WRC also did not object to the work as proposed.

The Town is attempting to maintain historic access to recreational waterways while still protecting coastal resources. In comparison with the alternative of dredging the channel to -2' MLW as now authorized by the Permit, the Town's proposal to dredge deeper but less frequently should result in reduced impacts. Accordingly, Staff believe that hardships do not result from actions taken by the Town.

IV. Is the requested variance (1) consistent with the spirit, purpose, and intent of the rules, standards, or orders, (2) will secure public safety and welfare; and (3) will preserve substantial justice? Explain.

Petitioner's Position: Yes.

The Town, as Petitioner, has requested the variance in an attempt to preserve the ecological benefit provided by the shellfish and juvenile fish habitat present in N. Jinks Creek. This is consistent with the spirit, purpose, and intent of the rules issued by the Commission. The Subject Rule attempts to prevent the creation of dead zones, or areas of low dissolved oxygen (DO), in navigable waters. Dead zone areas are created due to the lack of water exchange or flushing and typically exist in holes or large depressions. Tidal currents may not reach below the governing depths and, therefore, the deeper waters may become stagnant. When this happens the DO concentrations continue to disperse without being replenished with new resources. Although this occurrence remains a possibility, the proposed change in elevations resemble the current variations within N. Jinks Creek. The average creek bed elevations in N. Jinks Creek range from -2-ft MLW to -6-ft MLW, but extreme depths reach approximately -15-ft MLW. Therefore, the requested variance would not create conditions abnormal to the current situation in N. Jinks Creek and would avoid the impacts associated with dredging through shellfish habitat.

The Subject Rule supports water quality and fisheries resources, and in this case the 401 water quality certification was issued without limitations on the Town's proposed dredge depth. In addition, the North Carolina Division of Marine Fisheries (DMF) did not object to the Town's proposed dredge depth of -6-ft MLW.

The proposed variance will secure the public's safety, health, and welfare of the recreational boaters using S. Jinks Creek, the Bay Area, and the Feeder Channel system by removing the shoaling hazards and providing reasonable clearance for vessel navigation. Additionally, the project will not increase flooding potential because it will not modify the tidal entrance at Tubbs Inlet or Jinks Creek's confluence with the AIWW. The proposed variance will also preserve substantial justice by allowing the Town to reasonably manage and maintain the navigable waters under its jurisdiction while also preserving the ecological benefit of N. Jinks Creek.

Staffs' Position: Yes.

The Commission's rule that provides the basis for the Division's condition limiting dredging to -2' MLW instead of the proposed -6' MLW (and -5' MLW in the Finger Canals) is 15A NCAC 7H .0208(b)(1)(F), which states that "Any canal or boat basin shall be excavated no deeper than the depth of the connecting waters." Staff's understanding is that this rule was codified by the Commission to prevent stagnant water from collecting in "sinks," thereby reducing the flushing rate in canals and resulting in the accumulation of pollutants and low dissolved oxygen levels, along with associated impacts to living marine resources.

In this case, resource agencies indicated that adequate flushing would take place, as evidenced by the issuance by DWR of the 401 Water Quality Certification, and that the impacts to marine resources resulting from the dredge depths as proposed are minimized, as evidenced by the approval of the project by DMF, WRC and NMFS. While the Corps has not made a final permit decision (which is typical when a CAMA variance is sought), DCM staff have had no indication from the Corps staff of additional concerns. Additionally, Staff believe that in this specific case, due to the site's proximity to Tubbs Inlet, dredging deeper but less frequently will result in less negative impacts to marine resources (specifically larval fish ingress/egress) than more frequent dredging. For these reasons, Staff believes the variance meets the spirit, purpose and intent of the Commission's prohibition against dredging boat basins deeper than connecting waters where significant adverse impacts from water stagnation are not likely to occur.

Staff believe public safety and welfare will be secured by allowing safe navigation in this area for a larger portion of the tidal cycle due to the deeper dredging proposed, and the likely reduction in needed dredging cycles and their resulting impacts to fisheries resources due to the increased capacity for the dredging footprint to hold future shoaling sediment. The Permit has been conditioned to require the development and implementation of an approved shellfish relocation plan, buffers between the proposed dredging and existing coastal wetlands resources, and regular dredging season windows. Staff believe that this approach has reduced impacts while improving navigation. With respect to concerns raised about flooding and erosion resulting from the proposed dredging, Staff note that the footprint of the proposed dredging is similar to the location of South Jinks Creek in 2008 aerial photos attached, and so DCM would expect there would be similar relationships, if any, between channel location, shoreline erosion, and flooding potentials along the northern shoreline of Sunset Beach. Currently, Palm Cove (at the far eastern end of Sunset Beach) is experiencing significant erosion, and Staff note that this is occurring before any shift of water flows through deepening and widening the proposed channel farther to the west. Substantial justice will be preserved by balancing protection of the resources with protection of recreational navigation, both identified as important goals of the Commission's rules and the CAMA.

ATTACHMENT D:

PETITIONERS' VARIANCE REQUEST MATERIALS

(except exhibits mutually stipulated to and Petitioner's initial proposed facts)

CAMA VARIANCE REQUEST FORM **DCM FORM 11**
DCM FILE No.:_____

PETITIONER'S NAME _Town of Sunset Beach_____

COUNTY WHERE THE DEVELOPMENT IS PROPOSED Brunswick_____

Pursuant to N.C.G.S. § 113A-120.1 and 15A N.C.A.C. 07J .0700 *et seq.*, the above named Petitioner hereby applies to the Coastal Resources Commission (CRC) for a variance.

VARIANCE HEARING PROCEDURES

A variance petition will be considered by the CRC at a regularly scheduled meeting, heard in chronological order based upon the date of receipt of a complete petition. 15A N.C.A.C. 07J .0701(e). A complete variance petition, as described below, must be *received* by the Division of Coastal Management (DCM) a minimum of six (6) weeks in advance of the first day of a regularly scheduled CRC meeting to be eligible for consideration by the CRC at that meeting. 15A N.C.A.C. 07J .0701(e). The final set of stipulated facts must be agreed to at least four (4) weeks prior to the first day of a regularly scheduled meeting. 15A N.C.A.C. 07J .0701(e). The dates of CRC meetings can be found at DCM's website: **www.nccoastalmanagement.net**

If there are controverted facts that are significant in determining the propriety of a variance, or if the Commission determines that more facts are necessary, the facts will be determined in an administrative hearing. 15A N.C.A.C. 07J .0701(b).

VARIANCE CRITERIA

The petitioner has the burden of convincing the CRC that it meets the following criteria:

(a) Will strict application of the applicable development rules, standards, or orders issued by the Commission cause the petitioner unnecessary hardships? Explain the hardships.

(b) Do such hardships result from conditions peculiar to the petitioner's property such as the location, size, or topography of the property? Explain.

(c) Do the hardships result from actions taken by the petitioner? Explain.

(d) Will the variance requested by the petitioner (1) be consistent with the spirit, purpose, and intent of the rules, standards or orders issued by the Commission; (2) secure the public safety and welfare; and (3) preserve substantial justice? Explain.

Please make your written arguments that Petitioner meets these criteria on a separate piece of paper.
The Commission notes that there are some opinions of the State Bar which indicate that non-attorneys may not represent others at quasi-judicial proceedings such as a variance hearing before the Commission. These opinions note that the practice of professionals, such as engineers, surveyors or contractors, representing others in quasi-judicial proceedings through written or oral argument, may be considered the practice of law. Before you proceed with this variance request, you may wish to seek the advice of counsel before having a non-lawyer represent your interests through preparation of this Petition.

For this variance request to be complete, the petitioner must provide the information listed below. The undersigned petitioner verifies that this variance request is complete and includes:

x The name and location of the development as identified on the permit application;

x A copy of the permit decision for the development in question;

n/a A copy of the deed to the property on which the proposed development would be located;

x A complete description of the proposed development including a site plan;

x A stipulation that the proposed development is inconsistent with the rule at issue;

x Proof that notice was sent to adjacent owners and objectors*, as required by 15A N.C.A.C. 07J .0701(c)(7);

n/a Proof that a variance was sought from the local government per 15A N.C.A.C. 07J .0701(a), if applicable;

x Petitioner's written reasons and arguments about why the Petitioner meets the four variance criteria, listed above;

x A draft set of proposed stipulated facts and stipulated exhibits. Please make these verifiable facts free from argument. Arguments or characterizations about the facts should be included in the written responses to the four variance criteria instead of being included in the facts.

x This form completed, dated, and signed by the Petitioner or Petitioner's Attorney.

**Please contact DCM or the local permit officer for a full list of comments received on your permit application. Please note, for CAMA Major Permits, the complete permit file is kept in the DCM Morehead City Office.*

Due to the above information and pursuant to statute, the undersigned hereby requests a variance.

G. Grady Richardson, Jr.

Signature of Petitioner or Attorney

12-19-2019
Date

Law Offices of
G. Grady Richardson, Jr. P.C.
Printed Name of Petitioner or Attorney

grady@ggrlawoffice.com
Email address of Petitioner or Attorney

1908 Eastwood Road, Suite 224, Lumina Station
Mailing Address

910.509.7166
Telephone Number of Petitioner or Attorney

Wilmington NC 28403
City State Zip

910.509.7167
Fax Number of Petitioner or Attorney

RECEIVED
DEC 20 2019
DCM-MHD CITY

DELIVERY OF THIS HEARING REQUEST

This variance petition must be **received by** the Division of Coastal Management at least six (6) weeks before the first day of the regularly scheduled Commission meeting at which it is heard. A copy of this request must also be sent to the Attorney General's Office, Environmental Division. 15A N.C.A.C. 07J .0701(e).

Contact Information for DCM:

By mail, express mail or hand delivery:
Director
Division of Coastal Management
400 Commerce Avenue
Morehead City, NC 28557

By Fax:
(252) 247-3330

By Email:
Check DCM website for the email address of the current DCM Director
www.nccoastalmanagement.net

Contact Information for Attorney General's Office:

By mail:
Environmental Division
9001 Mail Service Center
Raleigh, NC 27699-9001

By express mail:
Environmental Division
114 W. Edenton Street
Raleigh, NC 27603

By Fax:
(919) 716-6767

Revised: July 2014

ATTACHMENT 1 - PETITIONER'S (TOWN'S) VARIANCE REQUEST MATERIALS

(minus documents which are now stipulated exhibits)

1. **The name and location of the development as identified on the permit application:**

Name of Development: Town of Sunset Beach Navigation Project
Maintenance Dredging of South Jinks Creek, the Bay Area, and Feeder Channel

Location of Development: North Shore Drive (Feeder Channel); Cobia St. (Finger Canal D); Dolphin St. (Finger Canal C); Sailfish St. (Finger Canal B); Marlin St. (Finger Canal A), Canal Drive (Bay Area); & South Jinks Creek.

2. **A copy of the permit decision for the development in question:**

See Stipulated Exhibit 5

3. **A copy of the deed to the property on which the proposed development would be located:**

N/A - The waterbodies referenced as South Jinks Creek, the Bay Area, and Feeder Channel system are submerged lands and property of the North Carolina public trust.

4. **A complete description of the proposed development including a site plan:**

The proposed work covers maintenance dredging operations in S. Jinks Creek, the Bay Area, and Feeder Channel system, inclusive of finger canals A-D, in the Town of Sunset Beach ("Town"). The Bay Area, the Feeder Channel system, and portions of S. Jinks Creek were originally dredged in approximately 1970[3] for navigation purposes. Maintenance activities for the feeder system occurred in 1985 under CAMA permit 211-85 and 2002 under CAMA permit 45-02. The 2002 permit (and most likely the 1985 permit) allowed dredging to a depth of -5.2-ft MLW. The proposed action will be the first known maintenance event for the Bay Area and S. Jinks Creek since the initial dredging.

The proposed maintenance dredging will help improve navigational access within S. Jinks Creek, the Bay Area, and the Feeder Channel system. Shoaling patterns and sediment runoff have impaired access through the respective systems. As a result, the Town has proposed the maintenance operations as part of a long-term management strategy to maintain navigation access for small recreational vessels along the east end of the Town.

The maximum dredge depth in the Feeder Channel extends to -6-ft (-5+1) MLW and raises to -5-ft (-4+1) MLW, in the adjoining finger canals. The proposed Feeder Channel dredging maintains general consistency with the Town's documented pier head alignment and the previous 2002 maintenance operations conducted under permit 45-02. Small adjustments have been made to avoid the existing marsh grass and simplify the construction process. The channel alignment maintains a 20-ft width within Finger Canals A-D and increases to a maximum width of 40-ft in the Feeder Channel. The work in the Bay Area initiates with an 80-ft width at -6-ft (-5+1) MLW and reduces gradually to a 20-ft width progressing towards the inland terminus. The dredge alignment for S. Jinks Creek maintains a 100-ft width and maximum dredge depth of -6-ft (-5+1) MLW.

[3] Cleary, W. J. and Marden, T. P. 1999. Shifting Shorelines: A Pictorial Atlas of North Carolina Inlets. North Carolina Sea Grant. Raleigh, North Carolina

The dredging operations will remove approximately 15,900 cubic yards (CY) of material from the Bay Area and 32,700 CY from the Feeder Channel, inclusive of Finger Canals A - D. Approximately 40,500 CY will be dredged from S. Jinks Creek. Material removed from the Bay Area and Feeder Channel will be mechanically dredged and trucked to an upland landfill facility. However, the S. Jinks Creek material will be hydraulically dredged and placed as beneficial reuse along the beachfront.

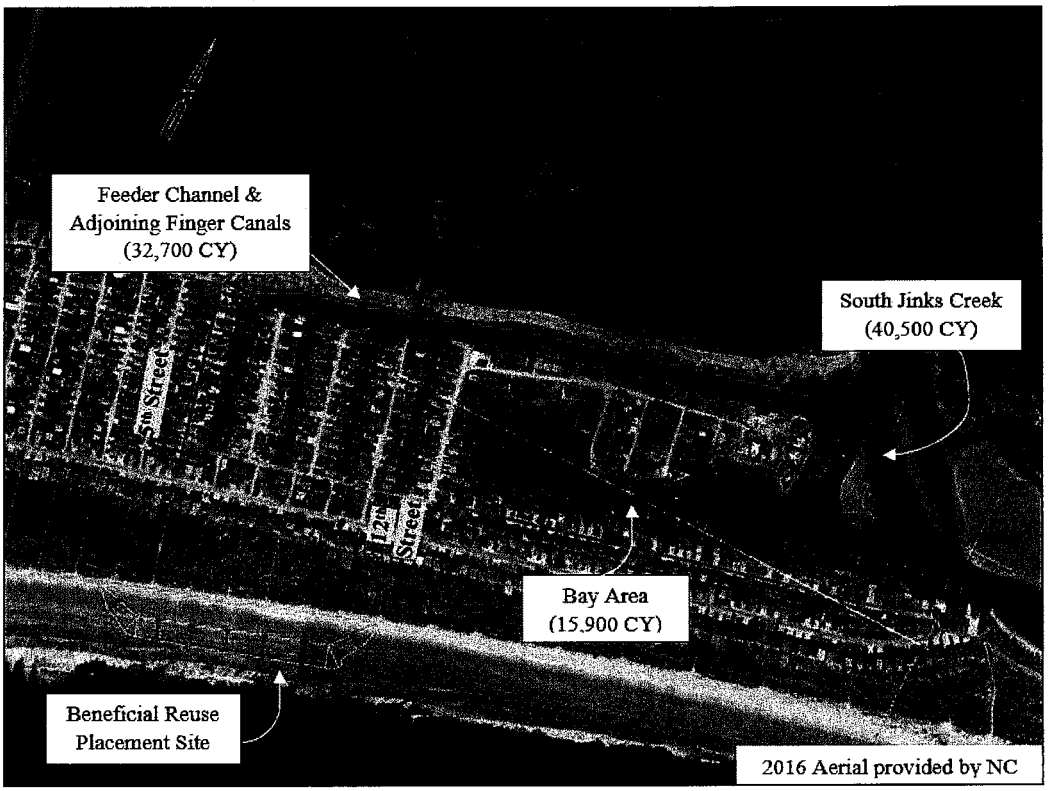

Figure 1. South Jinks Creek, Bay Area, & Feeder Channel Site Plan

Material excavated from the Bay Area and Feeder Channel will be loaded into a dump truck or other hauling apparatus at the end of Cobia Street. The material will be transported by road approximately 10 miles to a permitted landfill facility on Old Georgetown Road.

5. **A stipulation that the proposed development is inconsistent with the rule at issue:**

The Town, as Petitioner, hereby stipulates the proposed maintenance dredging of S. Jinks Creek, the Bay Area and Feeder Channel system is inconsistent with the rule at issue [15 NCAC 07H.0208(b)1(f)] (hereinafter "Subject Rule"). The Subject Rule requires "*any canal or boat basin shall be excavated no deeper than the depth of the connecting waters*". However, the Town avoided connecting to deep water to avoid potential dredging impacts to existing shellfish in north Jinks Creek.

6. **Proof that notice was sent to adjacent owners and objectors, as required by 15A N.C.A.C. 07J. 0701(c)(7):**

See Attachment 2 titled: Variance Notice Register.

7. **Proof that a variance was sought from the local government per 15 A N.C.A.C. 07J.0701(a) if applicable:**

   N/A - The Town is the local government and does not have jurisdiction over dredging operations.

8. **Petitioner's written reasons and arguments about why the Petitioner meets the four variance criteria, listed above:**

   See Attachment 3 titled: TOWN'S POSITION - Initial Procedural Variance Request.

9. **A draft set of proposed stipulated facts and stipulated exhibits:**

   See Attachment 4 titled: STIPULATED FACTS & EXHIBITS.

10. **The variance request form completed, dated, and signed by the Petitioner or Petitioner's Attorney:**

    See the front-end main document titled: CAMA Variance Request Form.

Attachment 2 - Variance Notice Register

(Certified mail receipts and email verifications provided in Attachment 5)

Town of Sunset Beach Navigation Project
Maintenance Dredging of S. Jinks Creek, the Bay Area & the Feeder Channel
Adjacent Riparian Property Owner & Commenter List

6TH STREET (WATER ACCESS)

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
ERWIN MARK D ET BETTY A	PO Box 7825	OCEAN ISLE BEACH	NC	28469	256OJ001	7019 0160 0000 5654 6574	Available for Customer Pickup
MELETIS THOMAS PETER & ETALS	26 ETON RD	CHARLESTON	SC	29407	256OJ002	7019 0160 0000 5654 6673	Delivered
YORK JAMES JOHNSON ETUX TAMMY TAYLO	204 LEONARD RD	PILOT MOUNTAIN	NC	27041	256OJ003	7019 0160 0000 5654 6277	Delivered
SLAPAK FRANCES K	3090 COLEMAN CT	ROCK HILL	SC	29835	256OJ004	7019 0160 0000 5654 6581	Delivered
HAWKEYE III ENTERPRISES LLC	2066 WILBUR STREET	EASTOVER	NC	28312	256OJ005	7019 0160 0000 5654 6680	Delivered
SMITH, RONALD C	2066 WILBUR STREET	EASTOVER	NC	28312-8815	256OJ005	7019 1640 0001 0909 5538	In-Transit
HOUGH WILLIAM EMMET	PO BOX 28	CHESTERFIELD	SC	29709	256OJ006	7019 0160 0000 5654 6284	Delivered
CLOANINGER WILLIAM G - ANNE K	13930 IDLEWILD RD	MATTHEWS	NC	28105	256OJ007	7019 0160 0000 5654 6598	Delivered
CLOANINGER WILLIAM G - ANNE K	13930 IDLEWILD RD	MATTHEWS	NC	28105	256OJ007	7019 0160 0000 5654 6598	Delivered
FLETCHER THOMAS A	13133 DONEGAL DRIVE	CHESTERFIELD	VA	23832	256OJ008	7019 0160 0000 5654 6697	Delivered
HARGRAVE M BATES ET LOIS B	41 JOYCE RD	TENAFLY	NJ	07670	256OJ009	7019 0160 0000 5654 6291	Owner moved - left no address
HARGRAVE M BATES ET LOIS B	112 5TH ST	WOOD RIDGE	NJ	07075-2130	256OJ009	7019 0160 0000 5654 6291	Owner moved - left no address
TODD STEVEN W ET KATHI W	6044 BRATTON PL	CHARLOTTE	NC	28277	256OJ010	7019 0160 0000 5654 6604	Delivered
THE MELETIS FAMILY LIMITED PAR	1007 BRIARCLIFF RD	MOORESVILLE	NC	28115	256OJ011	7019 0160 0000 5654 6703	Delivered
FISERV ISS & CO FBO J RENNIE JR & C/O SUNSET VACATIONS	401 SOUTH SUNSET BLVD	SUNSET BEACH	NC	28468	256OJ012	7019 0160 0000 5654 6307	Delivered
BLACK JOHN A ET CHRISTINE S	PO BOX 8169	OCEAN ISLE BEACH	NC	27410	256OJ013	7019 0160 0000 5654 6611	In transit
HARRISON MARK A & REBECCA BLACK	5002 LANCASTER ROAD	GREENSBORO	NC	27410	256OJ013	7019 0160 0000 5654 6710	Delivered
BUGG ROBERT W ETUX JEANNETTE	1704 ROSEBANK LANE	CHARLOTTE	NC	28226	256OJ014	7019 0160 0000 5654 6314	Delivered
HUGG INVESTMENT GROUP LLC	36 YAUPON WAY	OAK ISLAND	NC	28465	256OJ015	7019 0160 0000 5654 6628	Delivered
HUGG INVESTMENT GROUP LLC	106 AMESBURY LANE	CARY	NC	28465	256OJ015	7019 0160 0000 5654 6628	Delivered
MOORE MALCOLM C II ETUX LARA M	7033 COPPERLEAF PLACE	CARY	NC	27519	256OJ016	7019 0160 0000 5654 6727	Delivered
THOMAS WILLIAM C ET LUCILE R	1108 BRAUGHTON AVE	CONCORD	NC	28025	256ND00104	7019 0160 0000 5654 6321	Delivered

MARLIN STREET

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
LINDSEY FRANCES I	3023 COUNTRY LANE	REIDSVILLE	NC	27320	256OJ017	7019 0160 0000 5654 6635	Delivered
LAVELLE LYDIA	8107 KIT LANE	CHAPEL HILL	NC	27516	256OJ018	7019 0160 0000 5654 6239	Attempt on 12/12/19
WILLIAMSON JOHN H & HARRY GLEEN	1027 SHADY BLUFF DR	CHARLOTTE	NC	28211	256OJ019	7019 0160 0000 5654 6338	Attempt on 12/12/19
CHINNIS KATHLEEN W ETALS	61 LANDS END DRIVE	GREENSBORO	NC	27408	256OJ020	7019 0160 0000 5654 6642	Delivered
BELL TONY J JR ETALS	110 EQUESTRIAN COURT	CARY	NC	27513	256OJ021	7019 0160 0000 5654 6246	Delivered
MILLSAPS JEANETTE H TRUSTEE	825 BUTTONWOOD DRIVE	WINSTON SALEM	NC	27104	256OJ022	7019 0160 0000 5654 6345	Delivered
MILLSAPS JEANETTE H TRUSTEE	825 BUTTONWOOD DRIVE	WINSTON SALEM	NC	27104	256OJ022	7019 0160 0000 5654 6345	Delivered
SAWTSCHENKO ALEXANDER P (LT)	8999 TWIN RIVERS LANE	GLOUCESTER	VA	23061	256OJ023	7019 0160 0000 5654 6659	Attempt on 12/18/19
POLISCHUK SAWTSCHENKO STEPHEN ETUX CHERYL M	1400 MAINE BLVD.	E LIVERPOOL	OH	43920-1939	256OJ023	7019 0160 0000 5654 6659	Attempt on 12/18/19
MILLSAPS ANDREW KIRK	181 BROADMOOR LN APT P	WINSTON SALEM	NC	27104	256OJ024	7019 0160 0000 5654 6253	Attempt on 12/12/19
BRADFORD WILLIAM W ET MARGARET	PO BOX 7673	OCEAN ISLE BEACH	NC	28469	256OJ025	7019 0160 0000 5654 6352	Delivered
COE CLAUDE S ETUX CHRISTINE D	10501 ROSEBERRY COURT	CHARLOTTE	NC	28277	256OJ026	7019 0160 0000 5654 6666	Attempt on 12/12/19
WILKINSON WOODY H ETALS	133 N 2ND STREET	SMITHFIELD	NC	27577	256OJ027	7019 0160 0000 5654 6260	Delivered
CC & FT OLDHAM LLC	1276 OLD LYSTRA ROAD	CHAPEL HILL	NC	27517	256OJ028	7019 0160 0000 5654 6383	Attempt on 12/12/19
CC & FT OLDHAM LLC	1276 OLD LYSTRA ROAD	CHAPEL HILL	NC	27517	256OJ029	7019 0160 0000 5654 6383	Attempt on 12/12/19
WILSON ROBERT J III ETUX RITAMARIE	8 WOODBINE CT	DURHAM	NC	27713	256OJ030	7018 2290 0002 1478 2986	Attempt on 12/12/19
WILSON ROBERT J III ETUX RITAMARIE	8 WOODBINE CT	DURHAM	NC	27713	256OJ030	7018 2290 0002 1478 2986	Attempt on 12/12/19
BOND S ANDREW	3617 BEAVER FORD RD	WOODBRIDGE	VA	22192	256OJ031	7018 2290 0002 1478 3020	Delivered
CLARKSON FAMILY PROPERTIES LLC ETAL	602 27TH AVENUE N	MYRTLE BEACH	SC	29577	256OJ032	7019 0160 0000 5654 5973	Delivered
BROWN J RICHARD C/O REBECCA BROWN	3037 WYNTREE RIDGE WAY	RALEIGH	NC	27606	256NA001	7018 2290 0002 1478 2993	Attempt on 12/12/19
BROWN J RICHARD C/O REBECCA BROWN	3037 WYNTREE RIDGE WAY	RALEIGH	NC	27606	256NA001	7018 2290 0002 1478 2993	Attempt on 12/12/19
MARTIN JANICE K	622 GALWAY LANE	COLUMBIA	SC	29209	256NA002	7019 0160 0000 5654 5874	Delivered
STEWART KAYLA J	2049 LANGHAM LANE	RALEIGH	NC	27615	256NA003	7019 0160 0000 5654 6482	Delivered
MAURER SCOTT A ET CHRISTINE S	591 BORO LINE RD	TRAPPE	PA	19426	256NA004	7018 2290 0002 1478 3006	Delivered
MELVIN CHARLES H JR ET DEBBIE	2217 SELWYN AVENUE	CHARLOTTE	NC	28207	256NA005	7019 0160 0000 5654 5867	Delivered
GREALIS GEORGE E ET BARBARA A	216 LAFAYETTE ST	CHICOPEE	MA	1020	256NA006	7019 0160 0000 5654 6499	Attempt on 12/13/19
JONES MATHEW ET STACEY	31 WISETON CT	SIMPSONVILLE	SC	29681	256NA007	7018 2290 0002 1478 3013	Delivered
MOOCK BRADLEY H ETUX JEANINE M	6717 HAMMERSMITH DR	RALEIGH	NC	27613	256NA008	7019 0160 0000 5654 5850	Delivered
MOOCK BRADLEY H ETUX JEANINE M	1616 GLEN EDEN DRIVE	RALEIGH	NC	27612-4334	256NA008	7019 0160 0000 5654 5850	Delivered
ROGERS GEORGE C ETUX	3215 ALDRICH DRIVE	CUMMING	GA	30040	256NA009	7019 0160 0000 5654 6505	Attempt on 12/13/19
DAVIS CHARLES	567 HICKORY HILL CIRCLE	BLACKSBURG	VA	24060	256NA010	7019 0160 0000 5654 5935	Delivered
HOKE RONALD D ETUX LORRAINE A	3310 PLEASANTS ROAD	POWHATAN	VA	23139	256NA011	7019 0160 0000 5654 5591	Delivered

Town of Sunset Beach Navigation Project
Maintenance Dredging of S. Jinks Creek, the Bay Area & the Feeder Channel
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MARLIN STREET

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
SUGGS MARK F	321 FLEER ROAD	THOMASVILLE	NC	27360	256NA012	7019 0160 0000 5654 6512	Delivered
ANSON NICHOLAS ETUX SUSAN CONCORDIA	203 MAPLE CREEK COURT	APEX	NC	27502	256NA013	7019 0160 0000 5654 5928	Attempt on 12/16/19
KELLEHER MICHAEL	13 HEMLOCK DRIVE	MAHOPAC	NY	10541	256NA014	7019 0160 0000 5654 5584	Attempt on 12/16/19
KELLEHER MICHAEL	13 HEMLOCK DRIVE	MAHOPAC	NY	10541	256NA014	7019 0160 0000 5654 5584	Attempt on 12/16/19
DAVIS RYAN S ETUX TONI O	6868 DAVID COUNTRY RD	RANDELMAN	NC	27317	256NA015	7019 0160 0000 5654 6529	Delivered
PIERCE THOMAS A ET VEANNA M	13125 ADDISON ROAD	ROSWELL	GA	30075	256NA016	7019 0160 0000 5654 5911	Attempt 12/17/19

SAILFISH STREET

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
PAGE EDWARD W	708 TOPAZ COURT	SENECA	SC	29672	256NA017	7019 0160 0000 5654 5577	Delivered
YOUNG THOMAS E ETALS	7213 BIRCHBARK COURT	RALEIGH	NC	27615	256NA018	7019 0160 0000 5654 6536	Delivered
GOMEZ TERESA SPEARS	516 BROCHARDT BLVD	KNOXVILLE	TN	37934	256NA019	7019 0160 0000 5654 5904	Delivered
WARD KEITH WAYNE & ELEANOR STACY TR	3325 FALCON ROAD	PROSPER	TX	75078	256NA020	7019 0160 0000 5654 5942	In Transit
KORUDA MARK J ET BARBARA J	136 CAROLINA FOREST COURT	CHAPEL HILL	NC	27516	256NA021	7019 0160 0000 5654 6543	Attempt 12/12/19
PRETE KATHRYN	426 SAILFISH ST	SUNSET BEACH	NC	28468	256NA021	7019 1640 0001 0909 5545	In transit
CATHEY JOSEPH H JR ETUX PEGGY	1800 CHESTNUT LANE	MATTHEWS	NC	28104	256NA022	7019 0160 0000 5654 5898	Delivered
NEWTON JAMES H ETUX SUSAN C	405 TRAMORE DR	CHAPEL HILL	NC	27516	256NA023	7019 0160 0000 5654 5959	Delivered
SMALL JO ANN GRIFFIN TRUSTEE	165 SUMMERLEA DR	CHARLOTTE	NC	28214	256NA024	7019 0160 0000 5654 6550	Delivered
WATKINS TRACEY L ETUX WEBB KELLY	15 HUBBARD COURT	STAFFORD	VA	22554	256NA025	7019 0160 0000 5654 5881	Delivered
ELLIOTT JEFFREY M ETUX DARLENE W	13313 LADY ASHLEY RD	MIDLOTHIAN	VA	23114	256NA026	7019 0160 0000 5654 5966	Attempt 12/14/19
BLACK JOHN A & CHRISTINE S	PO BOX 8169	OCEAN ISLE BEACH	NC	28469	256NA027	7019 1640 0001 0909 4241	In Transit
HARRELL ANN M	412 SAILFISH ST	SUNSET BEACH	NC	28468	256NA028	7019 0160 0000 5654 6567	Delivered
BRITTIN CHRISTOPHER	412 SAILFISH ST	SUNSET BEACH	NC	28468	256NA028	7019 1640 0001 0909 4258	In Transit
DORIA DAVID ETUX SUSAN	5112 WOODVALLEY DR	RALEIGH	NC	27613	256NA029	7019 1640 0001 0909 4265	In Transit
NORRIS BARBARA P ETVIR	14 PATTERDALE PLACE	DOWINGTON	PA	19335	256NA030	7019 0160 0000 5654 7090	In Transit
WIGGINS CHARLES ETUX SUSAN	8500 GLENLAKE CT	RALEIGH	NC	27606	256NA031	7019 0160 0000 5654 7199	Delivered
WIGGINS CHARLES ETUX SUSAN	8500 GLENLAKE CT	RALEIGH	NC	27606	256NA031	7019 0160 0000 5654 7199	Delivered
GARNER JAMES H ET DOROTHY M	116 GARNER BRITT DR	ROBBINS	NC	27325	256NA032	7019 0160 0000 5654 6369	Delivered
HANEY BARBARA H	13440 OAKWOOD DRIVE	LAURINBURG	NC	28352	256NA032	7019 0160 0000 5654 7106	Delivered
DAVIS GEORGE H JR	317 LEANING TREE RD	COLUMBIA	SC	29223	256NA033	7019 0160 0000 5654 7205	In Transit
VOGLER PROPERTIES LLC	109 RONSARD LANE	CARY	NC	27511	256NB001	7019 0160 0000 5654 6390	Delivered
VOGLER PROPERTIES LLC	109 RONSARD LANE	CARY	NC	27511	256NB002	7019 0160 0000 5654 6406	In Transit
SMITH ARNOLD A ETALS	263 WOODLANDS DR	TUXEDO PARK	NY	10987	256NB003	7019 0160 0000 5654 7113	Attempt 12/13/19
LYLE RICHARD ETUX PEGGY	2780 KECOUGHTAN RD	PFAFFTOWN	NC	27040	256NB004	7019 0160 0000 5654 7212	Delivered
SALANE TERESSA HUTSON	104 CRICKET HILL ROAD	COLUMBIA	SC	29223	256NB005	7019 0160 0000 5654 6406	Delivered
FABREY ROBERT H II ET CAROL A	66 GERVAIS WAY	PAWLEYS ISLAND	SC	29585	256NB006	7019 0160 0000 5654 7120	Delivered
NOBLE ROBERT P ETUX NOBLE TRACEY B	9200 PALM BAY CIR	RALEIGH	NC	27617-7778	256NB006	7019 1640 0001 0909 4272	In Transit
BURTON WILLIAM C ET LINDALYN A	11808 EDGEWATER COURT	RALEIGH	NC	27614	256NB007	7019 0160 0000 5654 7229	Attempt 12/12/19
BURTON WILLIAM C ET LINDALYN A	1728 HASENTREE VILLA LN	WAKE FOREST	NC	27587-1738	256NB007	7019 0160 0000 5654 7229	Attempt 12/12/19
WEST HOWARD P ETUX ELLEN B	817 ABELIA ROAD	COLUMBIA	SC	29205	256NB008	7019 1640 0001 0909 4951	Attempt 12/13/19
HARRINGTON FRIEDA B	7103 EAST CREEKS EDGE DR	WILMINGTON	NC	28409	256NB009	7019 0160 0000 5654 6413	Attempt 12/16/19
PHILLIPS JULIUS C ETALS	601 W ROSEMARY ST #315	CHAPEL HILL	NC	27516	256NB010	7019 0160 0000 5654 7137	Delivered
ALDERSON PATRICK L ET KATHY C	421 SAILFISH ST	SUNSET BEACH	NC	28468	256NB011	7019 0160 0000 5654 7236	Delivered
BUTCHER JOHN E ETUX JOANIE R	29 WALLACE LANE	STAFFORD	VA	22554-8836	256NB012	7019 0160 0000 5654 6420	Delivered
MCGEE JANICE L & LESLIE J DEHAVEN	241 COLONY DRIVE	MOORESVILLE	NC	28115	256NB013	7019 0160 0000 5654 7144	Delivered
CARROS JAMES N ETALS	74 ROCK CREEK DRIVE	GREENVILLE	SC	29605	256NB014	7019 0160 0000 5654 6734	Delivered
MEASE ANNA S AS TRUSTEE	22211 SHILOH CHURCH ROAD	BOYDS	MD	20841	256NB015	7019 0160 0000 5654 6437	Delivered
SINGLETARY JOSEPH LEE	431 SAILFISH	SUNSET BEACH	NC	28468	256NB016	7019 0160 0000 5654 7151	Attempt 12/12/19
TAYLOR DONALD J & VIRGINIA J	361 FAIRBURN CT NW	CALABASH	NC	28467	256NB017	7019 0160 0000 5654 6741	Delivered

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DOLPHIN STREET

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
BOVE HOLDINGS LLC	335 BEECHNUT HILL AVE	AKRON	OH	44333	256NB018	7019 0160 0000 5654 6444	Delivered
BOVE HOLDINGS LLC	335 BEECHNUT HILL AVE	AKRON	OH	44333	256NB019	7019 0160 0000 5654 6444	Delivered
JOHNSON RAY N ET TERRY M	740 OAK POINTE DR	CLEVELAND	GA	30528	256NB020	7019 0160 0000 5654 7168	Delivered
DAVIS PENNY P	200 WOODLAND CIRCLE	RUTHERFORDTON	NC	28139	256NB02001	7019 0160 0000 5654 6758	Attempt 12/12/19
FARRAR JOHN WILLIAM TRUSTEE	3504 BIRDSBORO DRIVE	FAIRFAX	VA	22033	256NB021	7019 0160 0000 5654 6451	Delivered
SPANOS PAUL C ET KATHRYN L	850 AUSTIN LANE	WINSTON-SALEM	NC	27106	256NB022	7019 0160 0000 5654 7175	Attempt 12/12/19
HESTERS OTB LLC	4115 SOMERSET DR	OXFORD	NC	27565	256NB023	7019 0160 0000 5654 6765	Delivered
DANCY JANET B	PO BOX 7838	OCEAN ISLE BEACH	NC	28469	256NB024	7019 0160 0000 5654 6468	Available for Customer Pickup
DANCY JANET B	PO BOX 7838	OCEAN ISLE BEACH	NC	28469	256NB025	7019 0160 0000 5654 6468	Available for Customer Pickup
MANIS PAUL BARTON ETUX	121 SHADOW RIDGE PLACE	CHAPEL HILL	NC	27516	256NB027	7019 0160 0000 5654 7182	Delivered
PERFECT DAZE LLC	706 CRAVEN STREET	NEW BERN	NC	28560	256NB028	7019 0160 0000 5654 6772	Attempt 12/12/19
CLARK, WILLIAM S	110 HAWKS POIND RD	NEW BERN	NC	28562	256NB028	7019 1640 0001 0909 4289	InTransit
HERNDON STANLEY C ET DEBRA GILL	808 BELL DRIVE	ROCKY MOUNT	NC	27803	256NB029	7019 0160 0000 5654 6789	Attempt 12/13/19
CHAO NELSON J ET NORMA L POULSEN-CH	2408 VINTAGE HILL DR	DURHAM	NC	27712	256NB030	7019 0160 0000 5654 6888	Delivered
MENGEL LOIS S - % HARRY SAKELLARIS, EXECU	PO BOX 8200	DANVILLE	VA	24543	256NB031	7019 0160 0000 5654 7250	Delivered
PEDDER CHRISTIE ETVIR	1347 SHINNECOCK LANE	INDIAN LAND	SC	29707	256NB032	7019 0160 0000 5654 6796	Delivered
MCKINNEY BARNEY	3147 N HILL RD #23	PORTSMOUTH	OH	45662	256NB033	7019 0160 0000 5654 6895	Available for Customer Pickup
GOSNEY DENNIS R ET DEBORAH G	PO BOX 969	MONROE	NC	28111	256NC001	7019 0160 0000 5654 7243	Delivered
GIBSON PATTERSON B ETALS	420 E. MASSACHUSETTS AVE	SOUTHERN PINES	NC	28387	256NC002	7019 0160 0000 5654 6802	Available for Customer Pickup
BECK ALBERT WEBSTER	51 O'DONALD RD	ASHEVILLE	NC	28806	256NC003	7019 0160 0000 5654 6901	Delivered
BARBER EDWARD Z	2156 CUMBERLAND DR SE	SMYRNA	GA	30080	256NC005	7019 0160 0000 5654 7267	Attempt 12/13/19
BRYAN KENNETH M & ETALS	248 SUMMERWINDS DR	CARY	NC	27518	256NC006	7019 0160 0000 5654 6819	Attempt 12/14/19
BRYAN KENNETH M & ETALS	819 HENLEY PL	CHARLOTTE	NC	28207-1615	256NC006	7019 0160 0000 5654 6819	Attempt 12/14/19
SCHWEIGHARDT RUSSELL A ETUX SONYA K	1345 SHIREBOURN	HICKORY	NC	28602	256NC007	7019 0160 0000 5654 6918	Delivered
FELTON CHARLES M JR	210 EAGLE POINTE DR	COLUMBIA	SC	29229	256NC008	7019 0160 0000 5654 7274	Attempt 12/17/19
ANDREWS SHERYL D	5111 LAKESHORE DRIVE	COLUMBIA	SC	29206	256NC009	7019 0160 0000 5654 6826	Attempt 12/14/19
ALDERSON ROBERT A ET LESLIE L	827 WINDSON RD	CUMBERLAND	MD	21502	256NC010	7019 0160 0000 5654 6925	Delivered
OSBORNE CHARLES FREMONT JR	603 ABERDEEN DR	CHAPEL HILL	NC	27516-4459	256NC011	7019 0160 0000 5654 7281	Attempt 12/12/19
MATTHEWS HANSON S JR ETALS	2524 INDEPENDENCE BLVD	WILMINGTON	NC	28412	256NC012	7019 0160 0000 5654 6833	Delivered
SWAN CARL	9817 EMERALD DR -U9	CHARLOTTE	NC	28278	256NC013	7019 0160 0000 5654 6932	Attempt 12/12/19
SWAN CARL	1878 MONTAGUE RD	CLOVER	SC	29710-9163	256NC013	7019 0160 0000 5654 6932	Attempt 12/12/19
ODOM ALVIN J JR ET ANNETTE Y	PO BOX 7359	OCEAN ISLE BEACH	NC	28469	256NC014	7019 0160 0000 5654 7298	In Transit
ODOM ALVIN J JR ET ANNETTE Y	147 ROCKY RIDGE RD	HIGHLANDS	NC	28741	256NC014	7019 0160 0000 5654 7298	In Transit
DOLPHIN STREET LLC	513 IVERSON WAY	CHARLOTTE	NC	28203	256NC015	7019 0160 0000 5654 6840	Delivered
GLENN CHALMERS L IV	830 OAK BROOK BLVD	SUMTER	SC	29150	256NC016	7019 0160 0000 5654 6949	Delivered
COSTIN JOHN WILLIAM	1115 OFFSHORE DR	FAYETTEVILLE	NC	28305-5250	256NC017	7019 0160 0000 5654 7304	Attempt 12/13/19

COBIA STREET (CANAL)

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
NAIN ANN B & GINA S GAINES	4437 FOREST GATE LANE	CHARLOTTE	NC	28270	256NC018	7019 0160 0000 5654 6857	Delivered
MARTIN DONALD C ET CHRISTY F	2924 MICHELLE DR	MATTHEWS	NC	28105	256NC019	7019 0160 0000 5654 6956	Delivered
COWARD DAVID SCOTT ETUX	523 MOSS TREE DR	WILMINGTON	NC	28405	256NC020	7019 0160 0000 5654 7311	Attempt 12/12/19
MONTENYOHL ERIC L ET MARGARET M	116 RAVENNA WAY	CARY	NC	27513	256NC02001	7019 0160 0000 5654 6864	Delivered
MOORE FREDDIE H TRUSTEE	1860 CEDAR DRIVE	LENOIR	NC	28645	256NC021	7019 0160 0000 5654 6963	Delivered
GROVE MICHAEL	7 SUNRISE POINT CT	LAKE WYLIE	SC	29710	256NC022	7019 0160 0000 5654 7328	Attempt 12/12/19
WILLOUGHBY MILDRED SMITH	1385 WILLOUGHBY RD	TABOR CITY	NC	28463	256NC023	7019 0160 0000 5654 6871	Attempt 12/12/19
DUNLAP KEVIN	16408 MCGREGOR LANE	CHARLOTTE	NC	28278	256NC02301	7019 0160 0000 5654 6970	Attempt 12/12/19
DUNLAP KEVIN	16408 MCGREGOR LANE	CHARLOTTE	NC	28278	256NC02301	7019 0160 0000 5654 6970	Attempt 12/12/19
BOWEN INVESTMENTS	55 TRAMMELL ST	MARIETTA	GA	30064	256NC024	7019 0160 0000 5654 7335	Delivered
MOSHIER MARK ETUX ELIZABETH	1074 CANTEBURY LN	CHAPEL HILL	NC	27517	256NC025	7019 0160 0000 5654 7342	Delivered
KING WALTER L SR ET MIRIAM H	5048 16TH STREET DR NE	HICKORY	NC	28601	256NC026	7019 0160 0000 5654 7441	Attempt 12/12/19
HOSTETTER RICHARD B ETUX JOY B	24324 COUNTY ROAD 26	ELKHART	IN	46517	256NC027	7019 0160 0000 5654 7038	Delivered
OAKES ROBERT E JR TRUSTEE	708 SOUTH CREEK DRIVE	NASHVILLE	NC	27856	256NC028	7019 0160 0000 5654 7359	Delivered

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COBIA STREET (CANAL)

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
LAWRENCE JUDSON	3021 PINETUCK LANE	ROCK HILL	SC	29730	256NC029	7019 0160 0000 5654 7458	Delivered
SARKIS FAMILY LLC	7 GOLDEN DRIVE	WHEELING	WV	26003	256NC030	7019 0160 0000 5654 7045	Delivered
BEAMON MARIANNE E & CHRISTINA	POST OFFICE BOX 1403	NORTH WILKESBORO	NC	28659	256NC031	7019 0160 0000 5654 7366	Available for Customer Pickup
KISER FRANK W	1330 INDIA HOOK RD #514	ROCK HILL	SC	29732	256NC032	7019 0160 0000 5654 7465	Delivered
PAGE GEORGE W - % BOA 10-0803924	PO BOX 831589	DALLAS	TX	75283	256NC033	7019 0160 0000 5654 7052	Delivered

NORTH SHORE DRIVE EXT. (WATER ACCESS)

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
EVANS F GLENN ETUX NANCY D	45 MORRISON LANE	HARTSVILLE	SC	29550	256ND00301	7019 0160 0000 5654 7373	In Transit
DELLINGER DAVID L ETUX CANDICA W	2338 CLYDE ROAD	CATAWBA	NC	28609	256ND00302	7019 0160 0000 5654 7472	Delivered
ROBERTSON JOHN T ETUX DEBORAH	PO BOX 690328	CHARLOTTE	NC	28277	256ND00303	7019 0160 0000 5654 7069	Available for Customer Pickup
LINK LANCE ETUX PAMELA	5720 BRIGHTINGTON CT	KENERSVILLE	NC	27284	256ND00304	7019 0160 0000 5654 7380	Delivered
REHM JUDY	44 WOODSIDE CIRCLE	PINE	CO	80470	256ND00305	7019 0160 0000 5654 7489	Delivered
RS GILES LLC	PO BOX 4863	PINEHURST	NC	28374	256ND00306	7019 0160 0000 5654 7076	Delivered
POPE FRANK LAURIE JR ETUX MARGIE K	1213 N SHORE DR	SUNSET BEACH	NC	28468	256ND00307	7019 0160 0000 5654 7397	Delivered
REINHARDT MATTHEW F ETUX CLARE E	325 LAKEWOOD DR	PINEHURST	NC	28374	256ND00308	7019 0160 0000 5654 6987	Delivered
SWEETMAN ROBERT J ETUX MARY EILEEN	2008 SOUTHFORK ROAD	CHESTER	SC	29706	256ND00309	7019 0160 0000 5654 7083	Delivered
GOFF BENJAMIN F.	18 POWERS FARM ROAD	RANDOLPH	MA	02368	256ND00310	7019 0160 0000 5654 7403	Attempt 12/18/19
H&H CONSTRUCTORS INC	2919 BREEZEWOOD AVE SUITE 400	FAYETTEVILLE	NC	28303	256ND00311	7019 0160 0000 5654 6994	Delivered
H&H CONSTRUCTORS INC	2919 BREEZEWOOD AVE SUITE 400	FAYETTEVILLE	NC	28303	256ND00312	7019 0160 0000 5654 6994	Delivered
RUGGIERO PETER ETUX LINDA	517 QUAKER MEADOWS LN	FORT MILL	SC	29715	256ND00313	7019 0160 0000 5654 7496	Delivered
LILLIS RICHARD ETUX LINDA	1425 WESCOTT DRIVE	RALEIGH	NC	27614	256ND00314	7019 0160 0000 5654 7410	Attempt 12/12/19
MAURER STUART ETUX KAREN	PO BOX 146	NAVESINK	NJ	07752	256ND00315	7019 0160 0000 5654 7007	Addressee Unknown
MAURER STUART ETUX KAREN	1313 NORTH SHORE DRIVE E	SUNSET BEACH	NC	28468	256ND00315	7019 0160 0000 5654 7007	Addressee Unknown
DAIGLE BRIAN ETUX RAGAN	1725 FRENCHWOOD DRIVE	RALEIGH	NC	27612	256ND00316	7019 0160 0000 5654 7502	Delivered
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00317	7019 0160 0000 5654 7427	Attempt 12/17/19 - Forwarded
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00318	7019 0160 0000 5654 7427	Attempt 12/17/19 - Forwarded
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00319	7019 0160 0000 5654 7427	Attempt 12/17/19 - Forwarded
KISSAL BRUCE ETUX CAROL	855 EMORY POINT DR A3668	ATLANTA	GA	30329	256ND00320	7019 0160 0000 5654 7014	Delivered
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00321	7019 0160 0000 5654 7427	Attempt 12/17/19 - Forwarded
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00322	7019 0160 0000 5654 7427	Attempt 12/17/19 - Forwarded
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00323	7019 0160 0000 5654 7427	Attempt 12/17/19 - Forwarded
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00324	7019 0160 0000 5654 7427	Attempt 12/17/19 - Forwarded
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00325	7019 0160 0000 5654 7427	Attempt 12/17/19 - Forwarded
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00326	7019 0160 0000 5654 7427	Attempt 12/17/19 - Forwarded
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00327	7019 0160 0000 5654 7427	Attempt 12/17/19 - Forwarded
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00328	7019 0160 0000 5654 7427	Attempt 12/17/19 - Forwarded
RUCKER DAVID ETUX TONUA	7009 NORTH RIDGE DRIVE	RALEIGH	NC	27615	256ND00329	7019 1640 0001 0909 4081	Attempt 12/16/19
WISHON BARRY ETUX KAREN	7608 THE POINTE	RALEIGH	NC	27615	256ND00330	7019 0160 0000 5654 7434	Delivered
BORMANN THOMAS J ETUX DIANNE K	1515 NORTH SHORE DR	SUNSET BEACH	NC	28468	256ND00331	7019 0160 0000 5654 7021	Delivered
BORMANN THOMAS J ETUX DIANNE K	1515 HORTH SHORE DR	SUNSET BEACH	NC	28468	256ND00332	7019 0160 0000 5654 7021	Delivered
ROSSI MICHAEL A ETUX	8499 SILVERVIEW CT	LORTON	VA	22079	256ND00335	7019 0160 0000 5654 6475	In transit
DUNAWAY DONALD W & LYNDA L DUNAWAY	10613 MYSTIC POINTE DRIVE	FREDERICKSBURG	VA	22407	256ND00336	7019 0160 0000 5654 6062	Attempt 12/14/19

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Town of Sunset Beach Navigation Project
Maintenance Dredging of S. Jinks Creek, the Bay Area & the Feeder Channel
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RIVERSIDE DRIVE

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
BECK ALBERT WEBSTER	51 O'DONALD RD	ASHEVILLE	NC	28806	256ND00103	7019 1640 0001 0909 4296	In Transit
JANE DEAN LLC (Sunset Beach Holdings II c/o Incorp Services)	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00105	7019 0160 0000 5654 6178	Delivered
DISTINCTIVE BUILDING & DESIGN INC	24 CHLOE LANE	WAYNESVILLE	NC	28786-0799	256ND00105	7019 1640 0001 0909 4302	In Transit
JANE DEAN LLC (Sunset Beach Holdings II c/o Incorp Services)	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00106	7019 0160 0000 5654 6178	Delivered
JANE DEAN LLC (Sunset Beach Holdings II c/o Incorp Services)	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00107	7019 0160 0000 5654 6178	Delivered
AUSTIN JAMISON G ETUX CARIE A	206 DAVIS RD	ROANOKE	VA	24012-8972	256ND00107	7019 1640 0001 0909 4319	In Transit
AUSTIN JAMISON G ETUX CARIE A	206 DAVIS RD	ROANOKE	VA	24012-8972	256ND00107	7019 1640 0001 0909 4319	In Transit
ZBOROWSKI LAWRENCE ETUX DEBRA	22 CHAMBERLAIN PARKWAY	WORESTER	MA	01602	256ND00108	7019 0160 0000 5654 5980	Attempt 12/14/19
JANE DEAN LLC (Sunset Beach Holdings II c/o Incorp Services)	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00109	7019 0160 0000 5654 6178	Delivered
HELMS LELAND S	20401 STAGHORN CT	CORNELIUS	NC	28031-7185	256ND00109	7019 1640 0001 0909 4326	In Transit
JANE DEAN LLC (Sunset Beach Holdings II c/o Incorp Services)	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00110	7019 0160 0000 5654 6178	Delivered
BENNETT MICHAEL ETUX LYNN	1166 EASTWOOD LANDING WAY	SUNSET BEACH	NC	28468-6194	256ND00110	7019 1640 0001 0909 4333	In Transit
JANE DEAN LLC (Sunset Beach Holdings II c/o Incorp Services)	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00111	7019 0160 0000 5654 6178	Delivered
WILLIAMSON STEVEN ETUX AILEEN	49 ELDORADO DRIVE	WAYNE	NJ	07470	256ND00112	7019 0160 0000 5654 6086	Attempt 12/14/19
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00113	7019 0160 0000 5654 6185	Delivered
ARMSTRONG KEVIN CHRISTIAN AND LISA KATHRYN	111 WHEATLAND CT	LYNCHBURG	VA	24503-3359	256ND00113	7019 1640 0001 0909 4340	In Transit
REED CHARLES V AND DANA S	10501 WYNYATES LANE	CHARLOTTE	NC	28270	256ND00114	7019 0160 0000 5654 5997	Attempt 12/13/19
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00115	7019 0160 0000 5654 6185	Delivered
INCORP SERVICES, INC	176 MINE LAKE COURT, STE 100	RALEIGH	NC	27615-6417	256ND00115	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00116	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00117	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00118	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00119	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00120	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00121	7019 0160 0000 5654 6185	Delivered
HARTLANDER RICK AND BARBARA	407 SCHOOLHOUSE ROAD	MONROE	NJ	08831	256ND00122	7019 0160 0000 5654 6093	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00123	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00124	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00125	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00126	7019 0160 0000 5654 6185	Delivered
SANDERS EVELYN LANE	144 PEACH ORCHARD DR	BENSON	NC	27504-8304	256ND00126	7019 1640 0001 0909 4357	In Transit
SANDERS EVELYN LANE	144 PEACH ORCHARD DR	BENSON	NC	27504-8304	256ND00126	7019 1640 0001 0909 4357	In Transit
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00127	7019 0160 0000 5654 6185	Delivered
SPENCER SEAN ST. CYR, LORIE SEAN ST. CYR	500 PAINTED WOOD DR	ELDERSBURGCAR	MD	21784	256ND00128	7019 0160 0000 5654 6192	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00129	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00130	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00131	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00132	7019 0160 0000 5654 6185	Delivered
LYONS MICHAEL J ETUX MARY E	8305 SLIPPERY CREEK LANE	MINT HILL	NC	28227-9477	256ND00132	7019 1640 0001 0909 4364	In Transit
WALLER JAMES W AND SIMS, SHIRLEY D	24 FAIRWAY DRIVE	SHALLOTTE	NC	28470	256ND00133	7019 0160 0000 5654 6000	Attempt 12/12/19
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00134	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00135	7019 0160 0000 5654 6185	Delivered
CORVINO ANTHONY ETUX JOANN	1043 LEESBURG DR	LELAND	NC	28451-9386	256ND00135	7019 1640 0001 0909 4371	In Transit
MOORE MICHAEL E AND KIMBERLY E	11120 PENDER WOOD COURT	RALEIGH	NC	27617	256ND00136	7019 0160 0000 5654 6109	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00137	7019 0160 0000 5654 6185	Delivered
VENKATESWARAN VISWANATHAN AND PADMAPRIYA RAMASWAMY	1024 KENNICOTT AVENUE	CARY	NC	27513	256ND00138	7019 0160 0000 5654 6208	Delivered
VENKATESWARAN VISWANATHAN AND PADMAPRIYA RAMASWAMY	1024 KENNICOTT AVENUE	CARY	NC	27513	256ND00138	7019 0160 0000 5654 6208	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00139	7019 0160 0000 5654 6185	Delivered
CRANEY RICHARD LEE JR AND POWELL ANGELA MAY	5514 GUESS RD	ROUGEMONT	NC	27572-9071	256ND00139	7019 1640 0001 0909 4388	In transit
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00140	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00141	7019 0160 0000 5654 6185	Delivered
CARTER JOSEPH PHILIP ETUX PAMELA JEAN	3975 HIGHWAY 24 27 E	MIDLAND	NC	28107-6466	256ND00141	7019 1640 0001 0909 4395	In transit
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00142	7019 0160 0000 5654 6185	Delivered
WANG ANGUS	109 BROOKTREE CT	MORRISVILLE	NC	27560-5903	256ND00142	7019 1640 0001 0909 4401	In transit
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00143	7019 0160 0000 5654 6185	Delivered
BURGESS TIMOTHY R ETUX KRISSTINA D	2312 YANCEY ST	RALEIGH	NC	27608-1627	256ND00143	7019 1640 0001 0909 4418	In transit
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00144	7019 0160 0000 5654 6185	Delivered
MORGAN JOHN DAVID JR ETUX LINDA CROWDER	4600 ESHERWOOD LANE	CHARLOTTE	NC	28270-2562	256ND00144	7019 1640 0001 0909 4425	In transit
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00145	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00146	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00147	7019 0160 0000 5654 6185	Delivered
ELLIS VINCENT J	10 STAFFORD MANOR WAY	STAFFORD	VA	22556-5933	256ND00147	7019 1640 0001 0909 4432	In transit
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00148	7019 0160 0000 5654 6185	Delivered
ANDERSON MARSHALL W ETUX CATHERINE	605 MEADOWOOD DR	BURLINGTON	NC	27215-4680	256ND00148	7019 1640 0001 0909 4449	In transit
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00149	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00150	7019 0160 0000 5654 6185	Delivered
JOHNSON STEPHEN E ETUX JANICE E	717 ASHGROVE LANE	CHARLOTTE	NC	28270-3799	256ND00150	7019 1640 0001 0909 4562	In transit

Town of Sunset Beach Navigation Project
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RIVERSIDE DRIVE

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00151	7019 0160 0000 5654 6185	Delivered
CAPPELLO PAUL S ETUX SUSAN J	PO BOX 6910	OCEAN ISLE BEACH	NC	28469	256ND00151	7019 1640 0001 0909 4456	In transit
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00152	7019 0160 0000 5654 6185	Delivered
LEDERMANN MICHAEL ETUX JANET	2121 FLAGSTICK DR	MATTHEWS	NC	28104-0628	256ND00152	7019 1640 0001 0909 4463	In transit
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00153	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00154	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00155	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00156	7019 0160 0000 5654 6185	Delivered
BARILLA VINCENT AND KAREN A.	6841 WEEPING WILLOW PLACE SW	OCEAN ISLE BEACH	NC	28469	256ND00157	7019 0160 0000 5654 6017	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00158	7019 0160 0000 5654 6185	Delivered
GANDY QUINTON M ETUX KAREN G	PO BOX 3573	MOORESVILLE	NC	28117-3573	256ND00158	7019 1640 0001 0909 4470	In transit
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00159	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00160	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00161	7019 0160 0000 5654 6185	Delivered
SPAINHOUR MARY	4614 OLD LAKE TRAIL	HILLSBOROUGH	NC	27278	256ND00162	7019 0160 0000 5654 6116	Attempt 12/12/19
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00163	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00164	7019 0160 0000 5654 6185	Delivered
JOHNSON RONNIE T ETUX JO ANN J	129 US GRANT CT	HENDERSON	NC	27537-5013	256ND00164	7019 1640 0001 0909 4487	In transit
FARASY MICHAEL T AND KELLY	5018 CLYDEN COVE	RALEIGH	NC	27612	256ND00165	7019 0160 0000 5654 6215	Delivered
MARCKISOTTO DARLENE	3 GRAYHURST DRIVE	PITTSBURGH	PA	15235	256ND00166	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00167	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00168	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00169	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00170	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00171	7019 0160 0000 5654 6185	Delivered
SUNSET BEACH HOLDINGS II LLC c/o Incorp Services, Inc	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00172	7019 0160 0000 5654 6185	Delivered

NORTH SHORE DIRVE EXT. (BAY)

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
DEFRANCO JOSEPH M JR ETUX ANDREA M	7553 SILVER VIEW LN	RALEIGH	NC	27613	256ND00344	7019 0160 0000 5654 6123	Delivered
THOMAS JAMES JR ETUX JACQUELINE T	1520 NORTH SHORE DR	SUNSET BEACH	NC	28468	256ND00345	7019 0160 0000 5654 6222	Delivered
MARTYN ANTHONY ETUX FAITH R	6853 TOWBRIDGE RD	FAYETTEVILLE	NC	28306	256ND00346	7019 1640 0001 0909 4494	In transit
LAUGHERY THOMAS R ETUX DEBRA Z	7608 WINGFOOT DRIVE	RALEIGH	NC	27615	256ND00347	7019 0160 0000 5654 6031	Attempt 12/14/19
VESTAL MARK ET ANITA	117 GREAT OAKS	FAYETTEVILLE	NC	28303	256ND00348	7019 0160 0000 5654 6130	Attempt 12/12/19
HEILIG DAVID S ETALSL	100 HARRISON COURT	CHAPEL HILL	NC	27516	256ND00349	7018 2290 0002 1478 2948	Delivered
FLOYD HENNARD S & TIMOTHY O JACKSON	91 OCEAN BLVD W	OCEAN ISLE BEACH	NC	28469	256ND00350	7019 0160 0000 5654 6048	Attempt 12/12/19
FLOYD HENNARD S & TIMOTHY O JACKSON	91 OCEAN ISLE WEST BLVD	OCEAN ISLE BEACH	NC	28469	256ND00350	7019 0160 0000 5654 6048	Attempt 12/12/19

19TH STREET (BAY)

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
MATHERS EDWARD T ETUX LISA L	9114 FERNWOOD RD	BETHESDA	MD	20817	256ND00240	7019 0160 0000 5654 6147	Delivered
MATHERS EDWARD T ETUX LISA L	9114 FERNWOOD RD	BETHESDA	MD	20817	256ND00240	7019 0160 0000 5654 6147	Delivered
NORTHINGTON ROBERT S JR ET MARIANNE	1190 ARBOR RD	WINSTON SALEM	NC	27104	256ND00242	7018 2290 0002 1478 2955	Delivered
NORTHINGTON ROBERT S JR ET MARIANNE	1190 ARBOR RD	WINSTON SALEM	NC	27104	256ND00243	7018 2290 0002 1478 2955	Delivered
SAPPENFIELD AUDREY GADDY	111 AMITY CIRCLE	BELMONT	NC	28012	256ND00244	7019 0160 0000 5654 6055	Delivered

18TH STREET (BAY)

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
WILLIAMSON GERALDINE	416 18TH ST	SUNSET BEACH	NC	28468	256ND00226	7019 0160 0000 5654 6154	Attempt 12/12/19

17TH STREET (BAY)

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
HENSLEY DAVID A ET JENNIFER L	4909 LAKEGREEN CT	RALEIGH	NC	27612	256ND00225	7018 2290 0002 1478 2962	Attempt 12/13/19
CASEY JAMES CLIFTON ETUX ANN S	2715 KATHWOOD COURT	FLORENCE	SC	29501	256ND00210	7019 0160 0000 5654 6079	Delivered
KOWTONIUK WALTER V ET CAROL E	201 GARDNER STREET	JOHNSTOWN	PA	15905	256ND00208	7019 0160 0000 5654 6161	Delivered

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MAJESTIC OAK DRIVE (BAY)

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
SUNSET BEACH & TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BL00101	7018 2290 0002 1478 2979	Delivered
SUNSET BEACH & TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BL003	7018 2290 0002 1478 2979	Delivered
SUNSET BEACH & TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BL004	7018 2290 0002 1478 2979	Delivered
SUNSET BEACH & TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BL005	7018 2290 0002 1478 2979	Delivered
SUNSET BEACH & TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BL006	7018 2290 0002 1478 2979	Delivered
SUNSET BEACH & TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BL007	7018 2290 0002 1478 2979	Delivered
SUNSET BEACH & TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BL008	7018 2290 0002 1478 2979	Delivered
SUNSET BEACH & TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BL009	7018 2290 0002 1478 2979	Delivered
SUNSET BEACH & TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BL010	7018 2290 0002 1478 2979	Delivered

COBIA STREET PROPERTY (BAY)

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
COULTER RONALD G ETUX	2004 ELCOMBE COURT	CHAPEL HILL	NC	27517	256ND053	7019 1640 0001 0909 5262	Attempt 12/17/19
CROOM DALLAS KEVIN & MCINTYRE M S	109 HALEY HOUSE LANE	CARY	NC	27519	256ND054	7019 1640 0001 0909 5361	Delivered
WILLOUGHBY MARY L	425 COBIA STREET	SUNSET BEACH	NC	28468	256ND055	7019 1640 0001 0909 5613	Attempt 12/13/19
VOGEL JEFFERY M ETUX	427 COBIA ST	SUNSET BEACH	NC	28468	256ND056	7019 1640 0001 0909 5279	Delivered
TRUST C - C/O RICKENBAKER MARY KAYE	PO BOX 1796	SUMTER	SC	29151	256ND057	7019 1640 0001 0909 5378	In transit
PASSIALES JAMES J TRUSTEE AND	8855 RADCLIFF DR #57D	CALABASH	NC	28467	256ND058	7019 1640 0001 0909 5620	Attempt 12/13/19

CANAL DRIVE PROPERTY (BAY)

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
CARTER RICHARD M TRUSTEE & J CARTER	101 ROCKINGHAM ROAD	GREENVILLE	SC	29607	256ND061	7019 1640 0001 0909 5286	Delivered
WEBB H MICHAEL	801 CLEMONT DRIVE NE	ATLANTA	GA	30306	256ND062	7019 1640 0001 0909 5385	Attempt 12/16/19
BIGGERS MICHAEL D ETUX BETSY B	8030 ROCKY RIVER RD	HARRISBURG	NC	28075	256ND063	7019 1640 0001 0909 4500	In transit
MCCREARY VENTURE CAPITAL LLC	POST OFFICE BOX 130	NEWTON	NC	28658	MCCREARY VENTURE (	7019 1640 0001 0909 5293	Delivered
RAHMAN MICHAEL ETUX	428 BISCAYNE STREET	WINSTON SALEM	NC	27104	256ND065	7019 1640 0001 0909 5392	Delivered
NEWTON TIMOTHY W ETUX DEBBIE	4910 ASHTON COURT	MORGANTON	NC	28655	256ND065	7019 1640 0001 0909 4517	In transit
DELDUCA ANTHONY ET	855 MAIN AVE	BAY HEAD	NJ	08742	256ND066	7019 1640 0001 0909 5644	Delivered
GRANT LEE ETUX SOMMER	22 MONTROSE LANE	WILMINGTON	NC	28405	256ND06601	7019 1640 0001 0909 5309	Delivered
CRAVEN THOMAS F ETUX NANCY H	124 BERRY HILL DRIVE	RALEIGH	NC	27615	256ND067	7019 1640 0001 0909 5408	Delivered
WELSHOFER JOHN ARTHUR	PO BOX 963	MATTHEWS	NC	28106	256ND06701	7019 1640 0001 0909 5651	Available for Customer Pickup
PECK RAY F JR & ETALS	10709 BASS KETTLE RD	RALEIGH	NC	27614	256ND068	7019 1640 0001 0909 5316	Delivered
WAKE SUNSET ASSOCIATES - % DEBRA YOUNG	2209 ROYAL OAKS DR	RALEIGH	NC	27615	256ND06801	7019 1640 0001 0909 5415	Attempt 12/13/19
WAKE SUNSET ASSOCIATES - % DEBRA YOUNG	128 Mine Lake CT	RALEIGH	NC	27615	256ND06801	7019 1640 0001 0909 5415	Attempt 12/13/19
HARRISON JOHN M ETALS	2552 WATERSCAPE DR SW	SUPPLY	NC	28462-5640	256ND069	7019 1640 0001 0909 5668	Attempt 12/13/19
CORBETT JOHN F JR ETUX	1313 CANAL DRIVE	SUNSET BEACH	NC	28468	256ND06901	7019 1640 0001 0909 5323	Delivered
HARTSFIELD PROPERTIES LLC	PO BOX 267	HOPE MILLS	NC	28348	256ND070	7019 1640 0001 0909 4524	In transit
SHUGART WAYNE C ETALS - % MICHAEL PEARSALL	905 CAROLINA AVE	WINSTON SALEM	NC	27101	256ND071	7019 1640 0001 0909 5675	Attempt 12/18/19 - Forwarded
SPORTS ENDEAVORS INVESTMENTS LLC	431 US HWY 70A EAST	HILLSBOROUGH	NC	27278	256ND072	7019 1640 0001 0909 5330	Delivered
KNEDLIK RONALD WESLEY ETUX ANITA T	3230 5TH STREET CT NW	HICKORY	NC	28601	256ND073	7019 1640 0001 0909 5583	Delivered
WALKER ZACHARY T III ETALS	8811 CYPRESS LAKES DR UNIT 401	RALEIGH	NC	27615	256ND074	7019 1640 0001 0909 5682	Delivered
MAUNEY WILLIAM C ET GLORIA Y	PO BOX 36113	ROCK HILL	SC	29732	256ND075	7019 1640 0001 0909 5347	Delivered
AUSTIN L GLENN JR ET TEENA P	367 FOXCROFT DR	BLUE RIDGE	VA	24064	256ND076	7019 1640 0001 0909 5590	Delivered
RUSH PAUL F ET JUDITH N	11102 OLD JOHNS ROAD	LAURINBURG	NC	28352	256ND077	7019 1640 0001 0909 5699	Delivered

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CANAL DRIVE PROPERTY (BAY)

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SUNSET VIEW INC - C/O BETTY A UPSHAW(TREAS)	2890 ST CLAIRE RD	WINSTON-SALEM	NC	27106	256MA054	7019 1640 0001 0909 5354	Delivered
HILL DOUGLAS K	1613 CANAL DR	SUNSET BEACH	NC	28468	256MA055	7019 1640 0001 0909 5606	Attempt 12/14/19
SUNSET DAYS LLC	1350 HICKMAN RD NW	CALABASH	NC	28467	256MA056	7019 1640 0001 0909 5705	Attempt 12/13/19
MANESS JOHN M ETUX TERESA W	7516 VILLANOW DRIVE	SANFORD	NC	27332	256MA057	7019 1640 0001 0909 6160	Delivered
BIGGERS MICHAEL D ETUX BETSY B	8030 ROCKY RIVER RD	HARRISBURG	NC	28075	256MA058	7019 1640 0001 0909 5637	Delivered
MEYERS ROBERT N ETUX JUDITH A	12757 FOLLY QUARTER RD	ELLICOTT CITY	MD	21042	256MA059	7019 1640 0001 0909 4821	Attempt 12/17/19
GOFF KENNETH B ETUX SUSAN H	4520 W BENOIT DR	BLACKSBURG	VA	24060	256MA060	7019 1640 0001 0909 4920	Attempt 12/13/19
STEPHENS JANE A & SARA L LUDLUM	PO BOX 9695	ASHEVILLE	NC	28815	256MA061	7019 1640 0001 0909 6245	Delivered
CALDWELL FRANK S ETUX KATHERINE K	960 MURDOCKSVILLE RD	WEST END	NC	27376	256MA062	7019 1640 0001 0909 4838	Delivered
CAROLINA STONE SETTING CO INC	P O BOX 156	CARY	NC	27512	256MA06201	7019 1640 0001 0909 4937	Delivered
SMITHDEAL W GRAY & LISA J	1204 CHECKERBERRY DRIVE	MORRISVILLE	NC	27560	256MA063	7019 1640 0001 0909 6252	Attempt 12/14/19
SMITHDEAL W GRAY & LISA J	1204 CHECKERBERRY DRIVE	MORRISVILLE	NC	27560	256MA063	7019 1640 0001 0909 6252	Attempt 12/14/19
HOOVER ROBERT D ET MARGARET	601 FLOYD STREET	BLACKSBURG	VA	24060	256MA064	7019 1640 0001 0909 4845	Attempt 12/13/19
GUIDETTI RICHARD R ET CATHY	800 MARY ACRES COURT	WINSTON SALEM	NC	27106	256MA065	7019 1640 0001 0909 4944	Delivered
BOYKIN RICHARD A ETUX ANNA	946 JAMESTOWN CRES	NORFOLK	VA	23508	256MA066	7019 1640 0001 0909 4753	Attempt 12/14/19
MMLP LLC	3761 MASON RD	NEW HILL	NC	27562	256MA067	7019 1640 0001 0909 4852	Attempt 12/16/19
WEST HOWARD ETUX ELLEN B	817 ABELIA ROAD	COLUMBIA	SC	29205	256MA068	7019 1640 0001 0909 4951	Attempt 12/13/19

SOUTH JINKS CREEK

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
HETRICK BRETT R ETUX BEVERLY K	3808 SOLEBURY PLACE	MIDLOTHIAN	VA	23113	256MA053	7019 1640 0001 0909 4760	Attempt 12/14/19
BOOTH LARRY D ETUX VICKI A	100 ASHE PLACE	CHAPEL HILL	NC	27517	256MA052	7019 1640 0001 0909 4869	Attempt 12/17/19
INGRAM ARTHUR M SR ETALS	2711 FAIRVIEW RD	RALEIGH	NC	27608	256MA051	7019 1640 0001 0909 4968	Delivered
HA KHIE SEM	PO BOX 8019	OCEAN ISLE BEACH	NC	28469	256MA050	7019 1640 0001 0909 4777	Available for Customer Pickup
HA KHIE SEM	PO BOX 8019	OCEAN ISLE BEACH	NC	28469	256MA050	7019 1640 0001 0909 4777	Available for Customer Pickup
WILLIS STEVEN EDWARD ETALS	3070 HIGH CLIFFS ROAD	PFAFFTOWN	NC	27040	256MA049	7019 1640 0001 0909 4876	Delivered
DOVE JO ANN Y	2327 ROSWELL AVE	CHARLOTTE	NC	28207	256MA048	7019 1640 0001 0909 4975	Attempt 12/14/19
DOVE JO ANN Y	2327 ROSWELL AVE	CHARLOTTE	NC	28207	256MA048	7019 1640 0001 0909 4975	Attempt 12/14/19
GADDY MORGAN PROPERTIES LLC	295 COYOTE TRAIL	SALISBURY	NC	28144	256MA047	7019 1640 0001 0909 4784	Attempt 12/13/19
WATKINS THOMAS R JR ET LYDIA T	7360 FONTANA RIDGE LN	RALEIGH	NC	27613	256MA046	7019 1640 0001 0909 4883	Delivered
ACTON JOHN A ET ANITA M	3200 MILLSTREAM PLACE	RALEIGH	NC	27609	256MA045	7019 1640 0001 0909 4982	Attempt 12/17/19
REED JOHN W ET SALLY G	508 S MAIN ST	WINSTON SALEM	NC	27101	256MA04301	7019 1640 0001 0909 4791	Attempt 12/16/19
TYSON MARGARET S	3716 CYPRUS CLUB DR	CHARLOTTE	NC	28210	256MA043	7019 1640 0001 0909 4890	Attempt 12/13/19
LATELLA DONALD D	219 WOODCREST RD	FAYETTEVILLE	NC	28305	256MA042	7019 1640 0001 0909 4999	Delivered
HARRIS WADE KELLY ETUX LEIGH E	859 CHARTIER CT	ASHEBORO	NC	27203	256MA041	7019 1640 0001 0909 4807	Delivered
MERKEL THOMAS E ETUX SUSAN A	4831 ALLENCREST LANE	DALLAS	TX	75244	256MA040	7019 1640 0001 0909 4906	Delivered
KNOTT C FRANKLIN JR ET CAROLINE K	3646 WATKINS FARM ROAD	HILLSBOROUGH	NC	27278	256MA039	7019 1640 0001 0909 5002	Attempt 12/13/19
BOND JAMES & JAN DIAMONDSTONE TRSTE	1817 E MAIN STREET	SUNSET BEACH	NC	28468	256MA038	7019 1640 0001 0909 4814	Attempt 12/13/19
MUNTZ JAMES A ETUX DEBORAH L	408 COVINGTON ROAD	HAVERTOWN	PA	19083	256MA037	7019 1640 0001 0909 4913	In transit
MUNTZ JAMES A ETUX DEBORAH L	408 COVINGTON ROAD	HAVERTOWN	PA	19083	256MA037	7019 1640 0001 0909 4913	In transit
TRIBLE PRESTON G	640 DEERFIELD FARM CT.	GREAT FALLS	VA	22066-3934	256MA03601	7019 1640 0001 0909 5255	Delivered
1826 MAIN STREET EAST COA/SUNSET ENDS PARTNERS C/O JAY LUCAS	445 LAKE SHORE DRIVE	SUNSET BEACH	NC	28468	256MA003603	7019 1640 0001 0909 5934	Delivered
JONES SUNSET PROPERTIES LLC ETALS C/O MORGAN RONALD	4610 CHERRYHILL LANE	WINSTON SALEM	NC	27106-4287	256MA003602	7019 1640 0001 0909 6030	Attempt 12/16/19

JINKS CREEK PROPERTY

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
SUNSET BEACH WEST LLC	1574 MONSTER BUCK ESTATES	SUPPLY	NC	28462	256JA003	7019 1640 0001 0909 5989	Delivered
BIG PINE HOLDINGS LLC	1574 MONSTER BUCK ESTATES	SUPPLY	NC	28462	256JA00301	7019 1640 0001 0909 5989	Delivered
LEGGETT, CONSTANCE	1213 SMITH BAY CIRCLE W	WILMINGTON	NC	28405	256ND00102	7019 1640 0001 0909 4531	In transit
STATE OF NORTH CAROLINA	3441 ARENDELL STREET	MOREHEAD CITY	NC	28557	256JA002	7019 1640 0001 0909 4548	In transit
DEBELL JOHN D JR ETUX PAMELA A	5316 CHANDLEY FARM CIRCLE	CENTREVILLE	VA	20120	256ND00337	7019 1640 0001 0909 6085	Delivered
SCOTT PETER K ET CAROL K	1527 NORTH SHORE DRIVE	SUNSET BEACH	NC	28468	256ND00338	7019 1640 0001 0909 6191	Delivered
GORNEY JON ETUX NANCY	31780 LAKE ROAD	AVON LAKE	OH	44012	256ND00339	7019 1640 0001 0909 5996	Attempt 12/14/19
MARTYN ANTHONY ETUX FAITH R	6853 TOWBRIDGE RD	FAYETTEVILLE	NC	28306	256ND00343	7019 1640 0001 0909 6092	Attempt 12/13/19

Town of Sunset Beach Navigation Project
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5TH TO 6TH

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
SMITH CHARLES L JR	502 E MAIN ST	SUNSET BEACH	NC	28468-4074	263BJ005	7019 1640 0001 0909 4098	Delivered
SUNSET BEACH TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BJ00101	7019 1640 0001 0909 5989	Delivered
HUNT MARY WHALEY PHILLIPS	322 MCRAE ST	LAURINGBURG	NC	28352	263BJ003	7019 1640 0001 0909 6290	Attempt 12/13/19
FABREY FAMILY SSB HOUSE LLC	11612 W 101ST TERRACE	OVERLAND PARK	KS	66214	263BJ002	7019 1640 0001 0909 6399	Available for Customer Pickup

6TH TO 7TH

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
SUH KENDALL HYUNSUK TRUSTEE	PO BOX 5189	OCEAN ISLE BEACH	NC	28469	263CA040	7019 1640 0001 0909 4104	Available for Customer Pickup
REVOCABLE LIVING TRUST OF MARK B RATTERMAN	1 TRAILS END LN	SAINT LOUIS	MO	63124-1444	263CA040	7019 1640 0001 0909 4555	In transit
SUH KENDALL HYUNSUK TRUSTEE	PO BOX 5189	OCEAN ISLE BEACH	NC	28469	263CA04001	7019 1640 0001 0909 4104	Available for Customer Pickup
REVOCABLE LIVING TRUST OF MARK B RATTERMAN	1 TRAILS END LN	SAINT LOUIS	MO	63124-1444	263CA04001	7019 1640 0001 0909 4555	In transit
MOTEL EQUIPMENT LEASING CORP	2133 SUTTON SPRINGS RD	CHARLOTTE	NC	28226	263CA041	7019 1640 0001 0909 6306	Delivered
SUNSET BEACH MUSIC LLC	565 WEST DAVIS BOULEVARD	TAMPA	FL	33606	263CA042	7019 1640 0001 0909 6405	Delivered
FOWLER ROBERT L & BONNIE TRUSTEES	4433 BENT TREE FARM RD	WINSTON SALEM	NC	27106	263CA043	7019 1640 0001 0909 4111	Delivered

7TH TO 8TH

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
SHIPLEY ROBERT K - TRUSTEE THE SHIPLEY TRUST	105-F JONES FERRY ROAD	CARRBORO	NC	27510	263CA037	7019 1640 0001 0909 6313	Delivered
ODOM ALVIN J JR & ANNETTE Y TRUSTEE	P O BOX 7359	OCEAN ISLE BEACH	NC	28469	263CA03701	7019 1640 0001 0909 6412	Available for Customer Pickup
ODOM ALVIN J JR & ANNETTE Y TRUSTEE	147 ROCKY RIDGE RD	HIGHLANDS	NC	28741	263CA03701	7019 1640 0001 0909 6412	Available for Customer Pickup
ODOM ALVIN J JR & ANNETTE Y TRUSTEE	P O BOX 7359	OCEAN ISLE BEACH	NC	28469	263CA03702	7019 1640 0001 0909 6412	Available for Customer Pickup
ODOM ALVIN J JR & ANNETTE Y TRUSTEE	147 ROCKY RIDGE RD	HIGHLANDS	NC	28741	263CA03702	7019 1640 0001 0909 6412	Available for Customer Pickup
706 EAST MAIN STREET COA	PO BOX 7359	OCEAN ISLE BEACH	NC	28469	263CA03703	7019 1640 0001 0909 6412	Available for Customer Pickup
ODOM ALVIN J JR & ANNETTE Y TRUSTEE	147 ROCKY RIDGE RD	HIGHLANDS	NC	28741	263CA03703	7019 1640 0001 0909 6412	Available for Customer Pickup
SCHAEDE KAREN MCKEITHEN ETVIR	3104 WILLOW OAK DR	GREENSBORO	NC	27408	263CA038	7019 1640 0001 0909 4128	Delivered
EPSTEIN DIANE F TRUSTEE	11 WESTHAM PARKWAY	RICHMOND	VA	23229	263CA039	7019 1640 0001 0909 6320	Delivered
SUNSET TEE TIME LLC	445 LAKE SHORE DRIVE	SUNSET BEACH	NC	28468	263CA03901	7019 1640 0001 0909 6429	Delivered
702 EAST MAIN STREET OA INC % SUNSET TEE TIME LLC	445 LAKE SHORE DRIVE	SUNSET BEACH	NC	28468	263CA03903	7019 1640 0001 0909 6429	Delivered

8TH TO 9TH

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
YARBROUGH-FARR CONSTRUCTION CO	PO BOX 7057	OCEAN ISLE BEACH	NC	28469	263CA03203	7019 1640 0001 0909 4135	Delivered
BROOKS JERRY N	819 KAY STREET NE	LENOIR	NC	28845	263CA03204	7019 1640 0001 0909 6337	Delivered
MASON JAMES W III ETALS	108 CANDLE COURT	ROCKY MOUNT	NC	27804	263CA033	7019 1640 0001 0909 6436	Delivered
BROOKS JERRY N	819 KAY STREET NE	LENOIR	NC	28845	263CA034	7019 1640 0001 0909 6337	Delivered
SHIPLEY GRANT F ETUX YVONNE K STAM	604 HILLSBOROUGH RD	CARRBORO	NC	27510	263CA035	7019 1640 0001 0909 4142	Delivered
COPLEY DONALD J ETUX LORI M & DIANA	608 OLD MILL LANE	CAMDEN	SC	29020	263CA036	7019 1640 0001 0909 6344	Delivered
HINDMAN CAREY M	908 SANTEE DRIVE	FLORENCE	SC	29501	263CA03601	7019 1640 0001 0909 6443	Delivered
802 MAIN STREET EAST ASSOC %DONALD COPLEY ETALS	608 OLD MILL LANE	CAMDEN	SC	29020	263CA03602	7019 1640 0001 0909 6344	Delivered

9TH TO 10TH

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
PROUDFOOT KEVIN ETUX BETH	4 ACORN LANE	LEBANON	NJ	08833	263CA028	7019 1640 0001 0909 4159	Attempt 12/14/19
HARTZOG INVESTMENTS LLC	1101 HOBSON CT	RALEIGH	NC	27607	263CA029	7019 1640 0001 0909 6351	Attempt 12/13/19
SELISKER MARK R ET RACHEL	4620 WHITE CHAPEL WAY	RALEIGH	NC	27615	263CA030	7019 1640 0001 0909 6450	Delivered
SORRELL FAMILY LIMITED PARTNERSHIP	512 MEADOWSWEET LANE	WAXHAW	NC	28173	263CA031	7019 1640 0001 0909 6269	Delivered

10TH TO 11TH

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
CAROLINA SWEETWATER LTD	921 BEAVER ST	SEWICKLEY	PA	15143	263CA024	7019 1640 0001 0909 6368	Delivered
VOLINSKY JOHN B ETUX DIANE Y	833 ARMISTEAD ST	WINCHESTER	VA	22601	263CA02401	7019 1640 0001 0909 6467	Available for Customer Pickup
1008 EAST MAIN ST POA ASSOC %JOHN VOLINSKY ETUX DIANE	833 ARMISTEAD ST	WINCHESTER	VA	22601	263CA02402	7019 1640 0001 0909 6467	Available for Customer Pickup
PINK PARADISE LLP C/O TERRY COATS	360 BROOKTON DR	CLEMMONS	NC	27012	263CA025	7019 1640 0001 0909 6276	Delivered
MARKS MIRIAM W & JACQUELYN MASON TR	1004 E MAIN STREET	SUNSET BEACH	NC	28468	263CA026	7019 1640 0001 0909 6375	Delivered
TAYLOR LARRY W ET ELIZABETH W	1716 CEDAR DR	LENOIR	NC	28645	263CA027	7019 1640 0001 0909 5897	Delivered
VOLINSKY JOHN B ETALS	833 ARMISTEAD STREET	WINCHESTER	VA	22607	263CA03205	7019 1640 0001 0909 6283	Available for Customer Pickup

Town of Sunset Beach Navigation Project
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11TH TO 12TH

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
PEEPS LLC ETALS	11 CEDAR CHINE	ASHEVILLE	NC	28803	263CA023	7019 1640 0001 0909 6382	Delivered
A L MORRISON CONSTRUCTION CO INC % L.A. MORRISON	1732 HERON POINT RD SW	OCEAN ISLE BEACH	NC	28469	263CA02202	7019 1640 0001 0909 5903	Attempt 12/13/19
MORRISON, A L	401 S. SUNSET BLVD	SUNSET BEACH	NC	28459	263CA02202	7019 1640 0001 0909 5903	Attempt 12/13/19
SEYCHELLES LLP	8 PINE KNOLL DRIVE	LAKE WYLIE	SC	29710	263CA021	7019 1640 0001 0909 5910	Delivered
KEY ADELADE D	PO BOX 7625	ASHEVILLE	NC	28804	263CA02002	7019 1640 0001 0909 5927	Available for Customer Pickup

INDEPENDENT COMMENTORS

Name	Mailing Address	City	St	Zip	Parcel #	Tracking #	Status
Sam Swanson	29 Hunters LN	Hendersonville	NC	28791		7019 1640 0001 0909 5712	Attempt 12/16/19
Lois McClellan	901 Wyndfall Drive	Sunset Beach	NC	28468		7019 1640 0001 0909 5743	Delivered
Marge Friesleben	508 Shoreline Drvie East	Sunset Beach	NC	28468		7019 1640 0001 0909 5736	Delivered
Leonard Steiner	613 Kings Trail	Sunset Beach	NC	28468		7019 1640 0001 0909 5729	Delivered
Gregory Jensen	1309 E. Main Street	Sunset Beach	NC	28468		7019 1640 0001 0909 5750	Attempt 12/13/19
Steve & Lisa Morton	4021 Tuscany Lane	Greensboro	NC	27410		7019 1640 0001 0909 5569	Delivered
Marc & Rebecca Kaplan	101 W Main Street	Sunset Beach	NC	28468		7019 1640 0001 0909 6481	Delivered
Robert Forrester	110 Crooked Gulley Circle	Sunset Beach	NC	28468		7019 1640 0001 0909 6498	Delivered
Joan and Jack McCarron	2319-A Patriot Way	Greensboro	NC	27408		7019 1640 0001 0909 6504	Delivered
John D Wells & Carol Crane Wells	604 E Main Street	Sunset Beach	NC	28468		7019 1640 0001 0909 6511	Attempt 12/13/19
Jacqueline Trovato	1520 North Shore Drive	Sunset Beach	NC	28468		7019 1640 0001 0909 6528	Delivered
Karen Joseph	915 Sandpiper Bay Drive	Sunset Beach	NC	28468		7019 1640 0001 0909 6535	Attempt 12/13/19
Barry Agnew	3544 Forester Road	Roanoke	VA	24015		7019 1640 0001 0909 6542	Delivered

Town of Sunset Beach
S. Jinks Creek, Bay Area Feeder Channel
Email Commenters for USACE Permit

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Town of Sunset Beach
S. Jinks Creek, Bay Area Feeder Channel
Email Commenters for USACE Permit

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Ed & Lisa	Mathers		emathers@NEA.com	
Alex	Ritchie		ritchieracing@gmial.com	
Charles	Teker		c.l.teker101@gmail.com	
Phil	Post		philip.n.post@gmail.com	919.818.7862
John	Shelton		jdsjis@aol.com	
Charles	Winter		charliecsw@aol.com	
Knight	Gaillard		fannykgaillard@yahoo.com	
Mike & Meda	Pearsall		mpear47@yahoo.com	
Dianne	Patrick		dipat4459@yahoo.com	
Carol	Santavicca		csanta@hotmail.com	
Amy	Vance		asvance21@gmail.com	704.839.1577
Antoinette	De Luca			
Joe	Ingle		joeingle@comcast.net	
Nancy & Bonnie	Barrineay & Kelley		nwbarrineay@gmail.com	
Barry	Wishon		Barry.wishon@gmail.com	
Richard & Victoria	Heath		Whitelightning603@hotmail.com	
Ann	Jensen		Annjensen6@aol.com	
Judy	Lynch		handjilynch@atmc.net	
Jerry	Brooks		Jerrybk41@gmail.com	
Kim	Tennant		kwtennant@aol.com	
Denise	Williams		dcwbeachgirl@gmail.com	
Jeff	McArn		jmcarn@hamilton.edu	
Meg	Clunan		Kennethcln@aol.com	
John & Karen	Lenz		joklenz@icloud.com	
Susan	Bott			
Robert	Hoover		rdh041@hotmail.com	504.750.5335
Susan	Bridges		rusbridge@yahoo.com	910.575.4768
Colette & Jim	Worley		coletteworley@gmail.com	
Sandy	Acton		glenwod@aol.com	919.880.8989

Town of Sunset Beach
S. Jinks Creek, Bay Area Feeder Channel
Email Commenters for USACE Permit

Name				
First	Last		Email	Phone
Barry	Miller		btddmiller@gmail.com	
Michael	McConney		mdmcconney@gmail.com	
Jessica	Vet		jessicavet@gmail.com	
Jeffery	Brown		jeffchasbrown@gmail.com	
Robert	Smythe		rbsmythe@comcast.net	
Ray	Shehr		rayshehr@gmail.com	
Larry & Ann	Furguson		Deedyps@embarqmail.com	
Jim	Gude		Maxxwell105@hotmail.com	
Shelia	Sanders		magesheeros@gmail.com	
Gordon	Bokelman		Gordon_annbokelman@hotmail.com	
Ken	Schafer		lkshafer@atmc.net	
Frank	Alcaraz		falcaraz@sandpiperbay.net	910.575.7746
Mary	Masser		marymasser@aol.com	
Miriam	Marks		mwmarks@atmc.net	843-333.5406
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John	Misiaszek		misiaszekjj@yahoo.com	
Jon	Gorney		jon@gorneymail.com	
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Debbie	Morgan		debbie@sunsetrealty.com	828.460.2810
Jo	O'Keefe		jo@keefs.org	919.606.8345
George	Bartley		gandm@atmc.net	
Don	Meincke		Sunset2b@gmail.com	
Pete	Larkin		plarkin64@outlook.com	443.994.4242
Lloyd	Flemming		Lfleming1942@gmail.com	
Bob	Costa		Bcosta72@yahoo.com	
John	Welshofer		John.Welshofer@cnsa.com	
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Jim	Thomas		haggler@erols.com	703.765.3578
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William	Warren		Billw9876@gmail.com	
Andrea	Defranco		dfrancoam@gmail.com	
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Chal	Glenn		chal.glenn@stifel.com	
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David	Rucker		davidmarkrucker@gmail.com	
Karen	Joseph		kjoseph@atmc.net	910.616.2349
Peggy	Tyson		peggytyson311@gmail.com	704.502.4301
Jacqueline	Trovato		jtrovato@atmc.net	

jon@gorneymail.com; michael@michaelclappappraisals.com; saclapp@mindspring.com; dianeepstein1945@gmail.com; rcerrato@sunsetbeachnc.gov; agnew@cox.net; mwgiancaspro@gmail.com; jtrovato@atmc.net; blurbquen@aol.com; teddybill1957@gmail.com; mikeavent@triad.rr.com; jbarnett1716@gmail.com; defrancoam@gmail.com; calabashnapa@atmc.net; ryan@ryanvet.com; jcorrell@ghcfoundation.com; lfabrey1@gmail.com; grok40@hotmail.com; eismon757@bellsouth.net; ronandlibby@bellsouth.net; mavericksjava@gmail.com; acoan42@gmail.com; rayschehr@gmail.com; mpear47@yahoo.com; dnordan@bmico.com; ray.peck@raymondjames.com; kerria@nccoast.org; suem@iwss.net; jnewton-tig@mindspring.com; jandjmccarron@yahoo.com; drpriley@aol.com; rubybegonias@att.net; betheinstein200@gmail.com; kathyialderson@gmail.com; james.a.phillips.22@gmail.com; pla00954@gmail.com; john@jonesandpeacock.com; bmoock@bmico.com; tbormann17@gmail.com; kjoseph@atmc.net; kharris72@triad.rr.com; jmcculloch@triad.rr.com; jman7292@gmail.com; terpster75@aol.com; 855mainave@comcast.net; sensenig530@atmc.net; davidmarkrucker@gmail.com; jessicawvet@gmail.com; rdh041@hotmail.com; rjglenn59@gmail.com; rbugg@buggproperties.com; tracyco5@yahoo.com; drkellyharris@yahoo.com; clsavs@nc.rr.com; melissaw9876@gmail.com; chal.glenn@stifel.com; johnfcorbett@atmc.net; tmorganjr@carolina.rr.com; pigpick1@aol.com; bkissal@verizon.net; charles.melvin@mfllc.com; peggytyson311@gmail.com; glenwod@aol.com; dcwbeachgirl@gmail.com; dlewis1007@aol.com; michaelrevans1948@icloud.com; ewjanes@yahoo.com; radmd51@gmail.com; mac.nelson7810@gmail.com; art_byfayej@yahoo.com; doggenome@gmail.com; richardhilderman@gmail.com; Dean.McKinney@PharmaserveNorthWest.co.uk; kgoff1526@aol.com; jawelshofer@gmail.com; vabkbelt@verizon.net; emathers@NEA.com; ginnyjtaylor@yahoo.com; jdebell@aol.com; john.e.butcher.civ@mail.mil; Ryan@daviswaterinc.com; lydlavelle@outlook.com; 2066wilbur@gmail.com; jlsuncc@msn.com; miriamhk@aol.com; fugiandfitz@gmail.com; ksmcdonald712@gmail.com; sylviachester@comcast.net; a2sunsetbeach@gmail.com; tracyco5@yahoo.com; sugar7@atmc.net; grammyof3.rs@gmail.com; gparsons6336@yahoo.com; beachbumoib@gmail.com; norman_mease@yahoo.com; gweibl@yahoo.com; d.dean.mckinney@gmail.com; barnaclebill@atmc.net; LynnNesmith@mchsi.com; joe@thelineberrys.com; karenbfox@gmail.com; robin.n.murray@gmail.com; mwmarks@atmc.net; jkmharris45@gmail.com; beatpres@gmail.com; tcoggins@richmond.edu; vsmith@klaussner.com; ledford345@msn.com; westgp3@gmail.com; georgemaynard3@gmail.com; cacollins31@gmail.com; jennifer.vail.kirkbride@gmail.com; jfields48@hotmail.com; bandsjackson@triad.rr.com; whitelightning603@hotmail.com; c.l.teker101@gmail.com; drcmh@aol.com; ewgibbs@aol.com; eehedden@gmail.com; uncbrl@gmail.com; gullettba@gmail.com; stradershoes1@att.net; katehigginsphotos@gmail.com; lynnamayes@gmail.com; harmonypp@aol.com; smcfarland0102@gmail.com; barry_lentz@med.unc.edu; joycegibb@askjoedimatteo.com; teyoungmd@gmail.com; mfarre3@aol.com; lhoke3310@aol.com; maswhyte@gmail.com; tsroki@aol.com; livingston.helen@gmail.com; fbrantleygt64@gmail.com; ptthompson@nc.rr.com; shak5000@gmail.com; dwightwillis1952@gmail.com; mcors@heaindiana.org; grant.shipley@gmail.com; tmartyn89@gmail.com; hat1600@aol.com; robin.n.murray@gmail.com; westphalmartha@gmail.com; nern@atmc.net; harmonypp@aol.com; gfbruce@intrstar.net; earthwindfarmer@gmail.com; jdwells01@gmail.com; gyoung55@hotmail.com; barry.wishon@gmail.com; ninam20136mine@gmail.com; gyoung555999@icloud.com; bhughes@orionsolutionsllc.net; zgrandevc@bellsouth.net; robburcham104@gmail.com; tcoats@bellsouth.net; gyoung55@hotmail.com; don-melissa@carolina.rr.com; bpaul@gac.edu; mkbrown28451@yahoo.com; jeffchasbrown@gmail.com; dan.epstein@gmail.com; jkarriker@gmail.com; janekarriker@gmail.com; bfabrey@juno.com; Doug.Fabrey@roadrunner.com; rcerrato@sunsetbeachnc.gov; ewjanes@yahoo.com; ninam20136mine@gmail.com; gmerr946@aol.com;

ATTACHMENT 3 – TOWN'S POSITION

Initial Procedural Variance Request

I. Will strict application of the applicable development rules, standards, or orders issued by the Commission cause the petitioner unnecessary hardships? If so, the petitioner must identify the hardships.

Petitioner's Position: Yes.

Strict application of the rule in question would prevent the Town, as Petitioner, from maintaining the navigable areas of S. Jinks Creek, the Bay Area, and the Feeder Channel system at a depth consistent with most other maintained waterways in North Carolina. In order to maintain the referenced waterways, the Petitioner would be required to dredge a connecting channel to either the Atlantic Intracoastal Waterway (AIWW) or the Atlantic Ocean. Dredging Jinks Creek to the AIWW would create unavoidable shellfish impacts and dredging Jinks Creek to Tubbs Inlet would create a financial strain necessary to maintain a stable inlet position. Dredging Jinks Creek to the Eastern Channel to connect with the AIWW behind Ocean Isle Beach would also create potential environmental impacts and require significant financial expenditures.

Additionally, the connecting channel at Shallotte Inlet, Lockwoods Folly Inlet, Carolina Beach Inlet, Mason Creek, Topsail Creek, and Cedar Bush Cut are all authorized to a depth equal to or greater (deeper) than -6-ft MLW. The additional depth provides storage capacity for shoaling material and additional space for navigation movement, which can extend maintenance intervals and allow recovery of important ecological resources while also saving construction expenditures and providing continued navigation access.

Maintaining S. Jinks Creek, the Bay Area and the Feeder Channel system at the elevation of only -2-ft MLW under the Subject Rule also does not allow the Town to provide a navigable waterway in accordance with recommended standards from national engineering agencies. The ASCE[1] (American Society of Civil Engineers) and PIANC[2] (The World Association for Waterborne Transport Infrastructure) recommends 3-ft under keel (MLLW) clearance plus 10% as a design depth in sheltered waters for vessel motion.

II. Do such hardships result from conditions peculiar to the Petitioner's property, such as the location, size, or topography of the property? Explain.

Petitioner's Position: Yes.

The hardships in this case result from the fact that Jinks Creek serves as a primary navigation route between the Atlantic Ocean and the AIWW and also provides a beneficial shellfish and juvenile fish habitat similar to a Primary Nursery Area (PNA). Sediment shoaling in Jinks Creek cannot be removed without dredging through shellfish habitat. Choosing an alternate route to deep water other than Jinks Creek also creates hardships in terms of managing a tidal inlet, or attempting to dredge through Eastern Channel. Eastern channel runs behind Ocean Isle beach and most likely carries the same environmental concerns as Jinks Creek. Furthermore, most other connecting channels supporting a developed inlet

[1] ASCE Manual No. 50 –Planning and design guidelines for small craft harbors (2012).
[2] PIANC (2016) Guidelines for marina design. Report 149, part 2. RecCom working group 149.

throughout North Carolina have been and are periodically dredged and maintained at a deeper depth than Jinks Creek. This has allowed Jinks Creek to achieve and maintain its high fisheries resource importance.

III. Do the hardships result from actions taken by the Petitioner? Explain.

Petitioner's Position: No.

The Town, as Petitioner, is attempting to manage a historically maintained navigation system that has experienced increased shoaling due to tidal currents in S. Jinks Creek and stormwater runoff in the Bay Area and Feeder Channel system. The establishment of shellfish resources in N. Jinks Creek has made it presently unfavorable to dredge while shoaling within the interior of Tubbs Inlet has also impeded deep water (-6-ft MLW) access. Portions of the site have a documented history of being maintained since approximately 1985; however, shoaling approximate to Tubbs Inlet and the shellfish establishment in Jinks Creek have negatively impacted the Town's ability to maintain the established recreational waterways along the east end of the Town.

IV. Will the variance requested by the Petitioner (1) be consistent with the spirit, purpose, and intent of the rules, standards or orders issued by the Commission; (2) secure the public safety and welfare; and (3) preserve substantial justice? Explain.

Petitioner's Position: Yes.

The Town, as Petitioner, has requested the variance in an attempt to preserve the ecological benefit provided by the shellfish and juvenile fish habitat present in N. Jinks Creek. This is consistent with the spirit, purpose, and intent of the rules issued by the Commission. The Subject Rule attempts to prevent the creation of dead zones, or areas of low dissolved oxygen (DO), in navigable waters. Dead zone areas are created due to the lack of water exchange or flushing and typically exist in holes or large depressions. Tidal currents may not reach below the governing depths and, therefore, the deeper waters may become stagnant. When this happens the DO concentrations continue to disperse without being replenished with new resources. Although this occurrence remains a possibility, the proposed change in elevations resemble the current variations within N. Jinks Creek. The average creek bed elevations in N. Jinks Creek range from -2-ft MLW to -6-ft MLW, but extreme depths reach approximately -15-ft MLW. Therefore, the requested variance would not create conditions abnormal to the current situation in N. Jinks Creek and would avoid the impacts associated with dredging through shellfish habitat.

The Subject Rule supports water quality and fisheries resources, and in this case the 401 water quality certification was issued without limitations on the Town's proposed dredge depth. In addition, the North Carolina Division of Marine Fisheries (DMF) did not object to the Town's proposed dredge depth of -6-ft MLW.

The proposed variance will secure the public's safety, health, and welfare of the recreational boaters using S. Jinks Creek, the Bay Area, and the Feeder Channel system by removing the shoaling hazards and providing reasonable clearance for vessel navigation. Additionally, the project will not increase flooding potential because it will not modify the tidal entrance at Tubbs Inlet or Jinks Creek's confluence with the AIWW. The proposed variance will also preserve substantial justice by allowing the Town to reasonably manage and maintain the navigable waters under it's jurisdiction while also preserving the ecological benefit of N. Jinks Creek.

Attachment 5 – Certified Mail Receipts and Email Confirmations

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1826 MAIN STREET EAST COA/SUNSET ENDS
C/O JAY LUCAS
445 LAKE SHORE DRIVE
SUNSET BEACH, NC 28468

9590 9402 5510 9249 9328 49

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 5934

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* [signature] C. Date of Delivery 12-13-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
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☐ Registered Mail Restricted Delivery
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PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

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THE HICKMAN FAMILY TRUST
250 SHORELINE DR EAST
SUNSET BEACH, NC 28468

9590 9402 5510 9249 9326 41

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6122

COMPLETE THIS SECTION ON DELIVERY

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X [signature] ☐ Agent ☐ Addressee

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YEAGER JIM ETUX MARY BETH
104 HICKORY ST
SUNSET BEACH, NC 28468

9590 9402 5510 9249 9327 71

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6009

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
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☐ Registered Mail Restricted Delivery
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SLAPAK FRANCES K
3090 COLEMAN CT
ROCK HILL, SC 29732

9590 9402 5510 9249 9343 93

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6581

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
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RECEIVED
DEC 20 2019
DCM-MHD CITY

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- Print your name and address on the reverse so that we can return the card to you.
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RAHMAN MICHAEL ETUX
428 BISCAYNE STREET
WINSTON SALEM, NC 27104

9590 9402 5512 9249 0579 46

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 5392

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COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* MICHAEL RAHMAN C. Date of Delivery 12/13/2019

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
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☐ Collect on Delivery Restricted Delivery
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Domestic Return Receipt

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CHINNIS KATHLEEN W ETALS
61 LANDS END DRIVE
GREENSBORO, NC 27408

9590 9402 5510 9249 9343 48

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6642

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Kathy Chinnis ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Kathy Chinnis C. Date of Delivery 12-13-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
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TAYLOR DONALD J & VIRGINIA J
561 FAIRBURN CT NW
CALABASH, NC 28467

9590 9402 5510 9249 9338 46

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6741

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A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
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☐ Signature Confirmation Restricted Delivery

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LINK LANCE ETUX PAMELA
5720 BRIGHTINGTON CT
KENERSVILLE, NC 27284

9590 9402 5510 9249 9334 57

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 7380

PS Form 3811, July 2015 PSN 7530-02-000-9053

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A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery 12-12-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
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☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Priority Mail Express®
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☐ Registered Mail Restricted Delivery
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1. Article Addressed to:

LYLE RICHARD ETUX PEGGY
2780 KECOUGHTAN RD
PFAFFTOWN, NC 27040

9590 9402 5510 9249 9338 84

2. Article Number (Transfer from service label)

7019 0160 0000 5654 7212

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by (Printed Name) | C. Date of Delivery 12-13-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
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Steve and Lisa Morton
4021 Tuscany Lane
Greensboro, NC 27410

9590 9402 5512 9249 0577 24

2. Article Number (Transfer from service label)

7019 1640 0001 0909 5569

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by (Printed Name) | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☒ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

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SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

DAVIS CHARLES
567 HICKORY HILL CIRCLE
BLACKSBURG, VA 24060

9590 9402 5510 9249 9346 76

2. Article Number (Transfer from service label)

7019 0160 0000 5654 5935

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☒ Addressee

B. Received by (Printed Name) CAROLE C. DAVIS | C. Date of Delivery 12/12

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

---

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

DAVIS RYAN S ETUX TONI O
6868 DAVID COUNTRY RD
RANDELMAN, NC 27317

9590 9402 5510 9249 9344 54

2. Article Number (Transfer from service label)

7019 0160 0000 5654 6529

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by (Printed Name) TONI DAVIS | C. Date of Delivery 12-12-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

RECEIVED
DEC 20 2019
DCM-MHD CITY

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

REINHARDT MATTHEW F ETUX CLARE E
325 LAKEWOOD DR
PINEHURST, NC 28374

9590 9402 5510 9249 9333 41

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6987

PS Form 3811, July 2015 PSN 7530-02-000-9053 — Domestic Return Receipt

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

YORK JAMES JOHNSON ETUX TAMMY TAYLO
204 LEONARD RD
PILOT MOUNTAIN, NC 27041

9590 9402 5510 9249 9342 01

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6277

PS Form 3811, July 2015 PSN 7530-02-000-9053 — Domestic Return Receipt

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* | C. Date of Delivery
12-12-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

ALDERSON PATRICK L ET KATHY C
421 SAILFISH ST
SUNSET BEACH, NC 28468

9590 9402 5510 9249 9338 60

2. Article Number
7019 0160 0000 5654 7236

PS Form 3811, July 2015 PSN 7530-02-000-9053 — Domestic Return Receipt

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Kathy Alderson ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Kathy Alderson | C. Date of Delivery 12/12/19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

NORTHINGTON ROBERT S JR ET MARIANNE
1190 ARBOR RD
WINSTON SALEM, NC 27104

9590 9402 5510 9249 9347 44

2. Article Number
7018 2290 0002 1478 2955

PS Form 3811, July 2015 PSN 7530-02-000-9053 — Domestic Return Receipt

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* | C. Date of Delivery
12-13-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

0047

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SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1 Article Addressed to:

BARILLA VINCENT AND KAREN A
6841 WEEPING WILLOW PLACE
OCEAN ISLE BEACH, NC 28469

9590 9402 5510 9249 9349 73

2. Article Number (Transfer from service label)
7019 0160 0000 5654 6017

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

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SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1 Article Addressed to:

PAGE EDWARD W
708 TOPAZ COURT
SENECA, SC 29672

9590 9402 5510 9249 9345 46

2. Article Number (Transfer from service label)
7019 0160 0000 5654 5577

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Bonnie Page ☐ Agent ☐ Addressee

B. Received by (Printed Name) Bonnie Page | C. Date of Delivery 12-12-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

0048

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1 Article Addressed to:

SUGGS MARK F
321 FLEER ROAD
THOMASVILLE, NC 27360

9590 9402 5510 9249 9344 78

2. Article Number (Transfer from service label)
7019 0160 0000 5654 6512

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X B Burcham ☐ Agent ☐ Addressee

B. Received by (Printed Name) | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1 Article Addressed to:

BORMANN THOMAS J ETUX DIANNE K
1515 NORTH SHORE DR
SUNSET BEACH, NC 28468

9590 9402 5510 9249 9332 97

2. Article Number (Transfer from service label)
7019 0160 0000 5654 7021

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by (Printed Name) X Dianne Bormann | C. Date of Delivery 12-12-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

Attachment 5 - Certified Mail Confirmations Page 0048

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

RS GILES LLC
PO BOX 4863
PINEHURST, NC 28374

9590 9402 5510 9249 9332 42

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 7076

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Andra Giles ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Andra Giles | C. Date of Delivery 12-12-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

STEWART KAYLA J
2049 LANGHAM LANE
RALEIGH, NC 27615

9590 9402 5510 9249 9344 92

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6482

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* | C. Date of Delivery 12/12/19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

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DEC 20 2019
DCM-MHD CITY

0049

Attachment 5 - Certified Mail Receipts & Email Confirmations Page 7 of 32

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

YOUNG THOMAS E ETALS
7213 BIRCHBARK COURT
RALEIGH, NC 27615

9590 9402 5510 9249 9344 47

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6536

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Thomas E Young ☐ Agent ☑ Addressee

B. Received by *(Printed Name)* Thomas E Young | C. Date of Delivery 12/13

D. Is delivery address different from item 1? ☑ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

MANIS PAUL BARTON ETUX
121 SHADOW RIDGE PLACE
CHAPEL HILL, NC 27516

9590 9402 5510 9249 9339 14

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 7182

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

DAIGLE BRIAN ETUX RAGAN
1725 FRENCHWOOD DRIVE
RALEIGH, NC 27612

9590 9402 5510 9249 9332 11

2. Article Number (Transfer from service label)
7019 0160 0000 5654 7502

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by (Printed Name) C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

MOORE MALCOLM C II ETUX LARA M
7033 COPPERLEAF PLACE
CARY, NC 27519

9590 9402 5510 9249 9342 56

2. Article Number (Transfer from service label)
7019 0160 0000 5654 6727

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by (Printed Name) C. Date of Delivery
12-13

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

SHIPLEY GRANT F ETUX YVONNE K STAN
604 HILLSBOROUGH RD
CARRBORO, NC 27510

9590 9402 5510 9249 9331 43

2. Article Number (Transfer from service label)
7019 1640 0001 0909 4142

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by (Printed Name) C. Date of Delivery
Grant F Shipley

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

JANE DEAN LLC
2421 BOWLAND PARKWAY #104
VIRGINIA BEACH, VA 23454

9590 9402 5510 9249 9348 12

2. Article Number (Transfer from service label)
7019 0160 0000 5654 6178

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by (Printed Name) C. Date of Delivery
12-13-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

0050

Certified Mail Receipts & Email Confirmation Page 8 of 32

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SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

SMITH CHARLES L JR
502 E MAIN ST
SUNSET BEACH, NC 28468-4074

9590 9402 5510 9249 9331 98

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 4098

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Annette Smith ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Annette Smith C. Date of Delivery 12-13-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

FISERV ISS & CO FBO J RENNIE JR & C/O SUNSET VACATIONS
401 SOUTH SUNSET BLVD
SUNSET BEACH, NC 28468

9590 9402 5510 9249 9341 71

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6307

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X M Pascoe ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* M PASCOE C. Date of Delivery 12-13-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

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0051

Attachment 5 - Certified Mail & Email Correspondence Package

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

CORBETT JOHN F JR ETUX
1313 CANAL DRIVE
SUNSET BEACH, NC 28468

9590 9402 5512 9249 0580 28

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 5323

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X John F Corbett ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* John Corbett C. Date of Delivery 12-13-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Thunder Road LLC
10709 Beaver Pond Lane
Raleigh, NC 27614

9590 9402 5510 9249 9329 86

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6139

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☑ Agent ☐ Addressee

B. Received by *(Printed Name)* VAN EMS C. Date of Delivery 12-12-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☒ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1 Article Addressed to:

BELL TONY J JR ETALS
110 EQUESTRIAN COURT
CARY, NC 27513

9590 9402 5510 9249 9342 32

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6246

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Heather Bell ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* X H Bell C. Date of Delivery 12/13/19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

SWEETMAN ROBERT J ETUX MARY EILEEN
2008 SOUTHFORK ROAD
CHESTER, SC 29706

9590 9402 5510 9249 9332 35

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 7083

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Robert Sweetman C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

DEC 13 2019
USPS
29706

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

RECEIVED
DEC 20 2019

0052

Attachment 5 - Certified Mail Confirmations Page 10 of 32

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1 Article Addressed to:

SAPPENFIELD AUDREY GADDY
111 AMITY CIRCLE
BELMONT, NC 28012

9590 9402 5510 9249 9349 35

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6055

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☒ Addressee

B. Received by *(Printed Name)* C. Date of Delivery 12-12-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☒ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

TENBLER DAVID A ETUX
3217 THAM LANE
DURHAM, NC 27707

9590 9402 5510 9249 9327 19

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6061

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Lily Tendler C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Marc and Rebecca Kaplan
101 W Main Street
Sunset Beach, NC 28468

9590 9402 5512 9249 0577 17

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6481

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X BD Kaplan ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery
BD KAPLAN

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Jacqueline Trovato
1520 North Shore Drive
Sunset Beach, NC 28468

9590 9402 5512 9249 0576 70

2. Article Number (Transfer from service label)
7019 1640 0001 0909 6528

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery
12-13-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

RECEIVED
DEC 20 2019
PCM-MHD CITY

0053

Attachment 5 - Certified Mail Email Confirmations Page 32

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

FARASY MICHAEL T AND KELLY
5018 CLYDEN COVE
RALEIGH, NC 27612

9590 9402 5510 9249 9347 75

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6215

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery
Kelly Farasy

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

RALEIGH NC DEC 16 2019 USPS

3. Service Type
☑ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

SUNSET TEE TIME LLC
445 LAKE SHORE DRIVE
SUNSET BEACH, NC 28468

9590 9402 5510 9249 9329 31

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6429

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery
12-13-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

PEED JOE L ET TERESA P
310 SUNSET BLVD
SUNSET BEACH, NC 28468

9590 9402 5510 9249 9326 72

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6108

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☐ Addressee

B. Received by *(Printed Name)* | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Mail
☐ Mail Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

MOTEL EQUIPMENT LEASING CORP
2133 SUTTON SPRINGS RD
CHARLOTTE, NC 28226

9590 9402 5510 9249 9330 82

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6306

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X D Childers
☐ Agent
☐ Addressee

B. Received by *(Printed Name)* D Childers | C. Date of Delivery 12/14

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Mail
☐ Mail Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Rece

RECEIVED
DEC 20 2019

0054

Attachment 5 - Certified Mail Confirmations Page 1

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Robert A Forrester
110 Crooked Gulley Circle
Sunset Beach, NC 28468

9590 9402 5512 9249 0577 00

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6498

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☐ Addressee

B. Received by *(Printed Name)* | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Mail
☐ Mail Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

COPLEY DONALD J ETUX LORI M & DIANA
608 OLD MILL LANE
CAMDEN, SC 29020

9590 9402 5510 9249 9330 44

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6344

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☑ Addressee

B. Received by *(Printed Name)* Donald Copley | C. Date of Delivery 12-13-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Mail
☐ Mail Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1

GARNER JAMES H ET DOROTHY M
116 GARNER BRITT DR
ROBBINS, NC 27325

9590 9402 5510 9249 9340 96

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6369

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Sandra G Hussey ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Sandra G Hussey C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Mail
☐ Mail Restricted Delivery
00)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1 Article Addressed to:

HUGG INVESTMENT GROUP LLC
36 YAUPON WAY
OAK ISLAND, NC 28465

9590 9402 5510 9249 9343 55

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6628

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Randy Huggins ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* RANDY HUGGINS C. Date of Delivery 12-13-

D. Is delivery address different from Item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☑ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☑ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

RECEIVED
DEC 20 2019
PCM WILD CITY

0055

Attachment 5 - Certified Mail Confirmation Page

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

PINK PARADISE LLP C/O TERRY COATS
360 BROOKTON DR
CLEMMONS, NC 27012

9590 9402 5510 9249 9331 12

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6276

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Kat H Coats ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1 Article Addressed to:

HEILIG DAVID S ETALSL
100 HARRISON COURT
CHAPEL HILL, NC 27516

9590 9402 5510 9249 9347 51

2 Article Number *(Transfer from service label)*
7018 2290 0002 1478 2948

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X DS Heilig ☐ Agent ☑ Addressee

B. Received by *(Printed Name)* DS Heilig C. Date of Delivery 12/12/19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Mail
☐ Mail Restricted Delivery
00)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☑ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

BUTCHER JOHN E ETUX JOANIE R
29 WALLACE LANE
STAFFORD, VA 22554-8836

9590 9402 5510 9249 9340 58

2. Article Number (Transfer from service label)
7019 0160 0000 5654 6420

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature X [signature] ☐ Agent ☐ Addressee
B. Received by (Printed Name) C. Date of Delivery
D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1.

HARRIS WADE KELLY ETUX LEIGH E
859 CHARTIER CT
ASHEBORO, NC 27205

9590 9402 5512 9249 0583 32

2. Article Number (Transfer from service label)
7019 1640 0001 0909 4807

PS Form 3811, July 2015

COMPLETE THIS SECTION ON DELIVERY

A. Signature X Wade Harris ☐ Agent ☐ Addressee
B. Received by (Printed Name) C. Date of Delivery 12-14-19
D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

0056

RECEIVED

DEC 20 2019

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

SUNSET BEACH HOLDINGS II LLC
2421 BOWLAND PARKWAY #104
VIRGINIA BEACH, VA 23454

9590 9402 5510 9249 9348 05

2. Article Number (Transfer from service label)
7019 0160 0000 5654 6185

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature X [signature] ☐ Agent ☐ Addressee
B. Received by (Printed Name) C. Date of Delivery 12-13-19
D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

SCHAEDE KAREN MCKEITHEN ETVIR
3104 WILLOW OAK DR
GREENSBORO, NC 27408

9590 9402 5510 9249 9331 67

2. Article Number (Transfer from service label)
7019 1640 0001 0909 4128

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature X [signature] ☐ Agent ☐ Addressee
B. Received by (Printed Name) C. Date of Delivery 12-14-19
D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

GREENSBORO MAIN OFFICE DEC 14 2019 USPS

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

MELETIS THOMAS PETER & ETALS
26 ETON RD
CHARLESTON, SC 29407

9590 9402 5510 9249 9343 00

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6673

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* | C. Date of Delivery
12/13/19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1.

EPSTEIN DIANE F TRUSTEE
11 WESTHAM PARKWAY
RICHMOND, VA 23229

9590 9402 5510 9249 9330 68

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6320

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* D EPSTEIN | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
(over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

RECEIVED
DEC 20 2019

0057

Attachment 5 - Certified Mail Receipts & Email Confirmations Page 32 of 32

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1

OAKES ROBERT E JR TRUSTEE
708 SOUTH CREEK DRIVE
NASHVILLE, NC 27856

9590 9402 5510 9249 9334 88

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 7359

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* ROBERT E. OAKES, JR | C. Date of Delivery 12/13/19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

FLETCHER THOMAS A
13133 DONEGAL DRIVE
CHESTERFIELD, VA 23832

9590 9402 5510 9249 9342 87

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6697

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* THOMAS A. FLETCHER | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

FINLEY EPARD LLC
2808 CHELSEA CIRCLE
DURHAM, NC 27707

9590 9402 5510 9249 9328 18

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 5965

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* | C. Date of Delivery
12/19/19

D. Is delivery address different from item 1? ☑ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

RECEIVED
DEC 20 2019
DCM-MHD CITY

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

MAURER SCOTT A ET CHRISTINE S
591 BORO LINE RD
TRAPPE, PA 19426

9590 9402 5510 9249 9346 90

2. Article Number *(Transfer from service label)*
7018 2290 0002 1478 3006

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

0058

Attachment 5 - Certified Mail Receipt & Email Confirmations Page 1

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

WATKINS THOMAS R JR ET LYDIA T
7360 FONTANA RIDGE LN
RALEIGH, NC 27613

9590 9402 5512 9249 0582 40

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 4883

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* | C. Date of Delivery
12/19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

PECK RAY F JR & ETALS
10709 BASS KETTLE RD
RALEIGH, NC 27614

9590 9402 5512 9249 0580 35

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 5316

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

HANEY BARBARA H
13440 OAKWOOD DRIVE
LAURINBURG, NC 28352

9590 9402 5510 9249 9339 90

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 7106

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Melissa Canyl C. Date of Delivery 12/13/19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

RECEIVED
DEC 20 2019
DCM-MHD CITY

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

INGRAM ARTHUR M SR ETALS
2711 FAIRVIEW RD
RALEIGH, NC 27608

9590 9402 5512 9249 0581 65

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 4968

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Arthur J Ingram C. Date of Delivery 12/14

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

0059

Attachment 5 - Certified Receipts Confirmations Page 17 of 32

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

MARKS MIRIAM W & JACQUELYN MASON TR
1004 E MAIN STREET
SUNSET BEACH, NC 28468

9590 9402 5510 9249 9328 56

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6375

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Miriam Marks ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* X Miriam Marks C. Date of Delivery 12/13/19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

MELVIN CHARLES H JR ET DEBBIE
2217 SELWYN AVENUE
CHARLOTTE, NC 28207

9590 9402 5510 9249 9345 84

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 5867

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1

SUNSET VIEW INC - C/O BETTY A UPSHAW(TREAS)
2890 ST CLAIRE RD
WINSTON-SALEM, NC 27106

9590 9402 5512 9249 0579 91

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 5354

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X O D Upshaw ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* OD UPSHAW C. Date of Delivery 14 Dec 19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

RECEIVED

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

TOWN OF SUNSET BEACH
700 SUNSET BLVD. NORTH
SUNSET BEACH, NC 28468

9590 9402 5510 9249 9325 80

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6207

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

DEC 20 2019

DCM-MHD CITY

0060

Attachment 5 - Certified Mail Confirmation Page 18 of

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

SCOTT PETER K ET CAROL K
1527 NORTH SHORE DRIVE
SUNSET BEACH, NC 28468

9590 9402 5510 9249 9325 97

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6191

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Carol Scott ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Carol Scott C. Date of Delivery 12-13-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Leonard A. Steiner, Jr.
613 KINGS TRAIL
SUNSET BEACH, NC 28468

9590 9402 5512 9249 0577 55

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 5729

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Patricia Steiner ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Patricia Steiner C. Date of Delivery 12-13-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

DEBELL JOHN D JR ETUX PAMELA A
5316 CHANDLEY FARM CIRCLE
CENTREVILLE, VA 20120

9590 9402 5510 9249 9326 96

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6085

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* John DeBell C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

RECEIVED
DEC 20 2019

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

CONNER DONNA W
13279 CATHARPIN VALLEY DR
GAINESVILLE, VA 20155

9590 9402 5510 9249 9326 27

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6153

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Donna W Conner ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

0061

Attachment 5 - Certified Mail Confirmation Page 1 of 2

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

ARRELSON DAVID ETUX FRANCES
4 SPICEBUSH DR
WINNABOW, NC 28479

9590 9402 5510 9249 9325 66

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6221

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Barbara Reavis ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

HOUGH WILLIAM EMMET
PO BOX 28
CHESTERFIELD, SC 29709

9590 9402 5510 9249 9341 95

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6284

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

DEFRANCO JOSEPH M JR ETUX ANDREA M
7553 SILVER VIEW LN
RALEIGH, NC 27613

9590 9402 5510 9249 9348 67

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6123

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Andrea M DeFranco ☐ Agent ☒ Addressee

B. Received by *(Printed Name)* C. Date of Delivery 12/13

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
Mail
Mail Restricted Delivery
0)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

RECEIVED Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

PEEPS LLC ETALS
11 CEDAR CHINE
ASHEVILLE, NC 28803

9590 9402 5510 9249 9330 13

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6382

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☒ Addressee

B. Received by *(Printed Name)* C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
Mail
Mail Restricted Delivery
(over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

DEC 20 2019
COMMAND CITY

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

MOORE MICHAEL E AND KIMBERLY E
1120 PENDER WOOD COURT
RALEIGH, NC 27617

9590 9402 5510 9249 9348 98

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6109

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Kimberly Moore ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

RALEIGH NC 276.. WESTGATE .. 2019

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
Restricted Delivery
(over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

TODD STEVEN W ET KATHI W
6044 BRATTON PL
CHARLOTTE, NC 28277

9590 9402 5510 9249 9343 79

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6604

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Steve Todd C. Date of Delivery 12/13/19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
Mail Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

FOWLER ROBERT L & BONNIE TRUSTEES
4433 BENT TREE FARM RD
WINSTON SALEM, NC 27106

9590 9402 5510 9249 9331 81

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 4111

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* [illegible] C. Date of Delivery 12-14-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

RECEIVED
DEC 20 2019
DCM-MHD CITY

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

LATELLA DONALD D
219 WOODCREST RD
FAYETTEVILLE, NC 28305

9590 9402 5512 9249 0581 34

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 4999

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* DON LATELLA C. Date of Delivery 12/19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

0063

Attachment 5 - Certified Mail Confirmation Page 3

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

BECK ALBERT WEBSTER
5 O'DONALD RD
ASHEVILLE, NC 28806

9590 9402 5510 9249 9336 86

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6901

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Albert Beck ☐ Agent ☑ Addressee

B. Received by *(Printed Name)* Albert Beck C. Date of Delivery 12-13-20

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

STROUPE DEAN N ETUX SHARON E
PO BOX 9
MOUNT HOLLY, NC 28120

9590 9402 5510 9249 9327 64

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6016

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Paul Nye C. Date of Delivery 12/13/19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

LEWIS DANIEL ETUX SHELIA
2087 BETHESDA CHURCH RD
ORRUM, NC 28369

9590 9402 5510 9249 9328 25

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 5958

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* DAN LEWIS C. Date of Delivery 12-13-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

RECEIVED
DEC 20 2019
DCM MUD CITY

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

GOMEZ TERESA SPEARS
516 BROCHARDT BLVD
KNOXVILLE, TN 37934

9590 9402 5510 9249 9346 45

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 5904

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Teresa Fisher ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Teresa Fisher C. Date of Delivery 12-13-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

KNOXVILLE TN 379 DEC 13 2019 CARRIER ANNEX

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

0064

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

JOHNSON RAY N ET TERRY M
710 OAK POINTE DR
CLEVELAND, GA 30528

9590 9402 5510 9249 9339 38

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 7168

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

SARKIS FAMILY LLC
7 GOLDEN DRIVE
WHEELING, WV 26003

9590 9402 5510 9249 9332 73

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 7045

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery 12-13-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

DEE ARTHUR PROPERTIES INC
2605 WEST C STREET
KANNAPOLIS, NC 28081

9590 9402 5510 9249 9325 59

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6238

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:
HESTERS OTB LLC
4115 SOMERSET DR
OXFORD, NC 27565

9590 9402 5510 9249 9338 22

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6765

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Ben Hester | C. Date of Delivery 12/17/19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

RECEIVED
DEC 20 2019

0065

Attachment 5 - Certified Mail & Return Receipt Confirmations Page 23 of 25

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

JONES MATHEW ET STACEY
31 WISETON CT
SIMPSONVILLE, SC 29681

9590 9402 5510 9249 9346 83

2. Article Number *(Transfer from service label)*
7018 2290 0002 1478 3013

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

HARRISON MARK A & REBECCA BLACK
5002 LANCASTER ROAD
GREENSBORO, NC 27410

9590 9402 5510 9249 9342 63

7019 0160 0000 5654 6710

Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Rebecca Harrison ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

KISER FRANK W
1330 INDIA HOOK RD #514
ROCK HILL, SC 29732

9590 9402 5510 9249 9333 72

2. Article Number (Transfer from service label)
7019 0160 0000 5654 7465

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) [illegible] C. Date of Delivery 12/12

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Mail
Mail Restricted Delivery
00)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

CLOANINGER WILLIAM G - ANNE K
13930 IDLEWILD RD
MATTHEWS, NC 28105

9590 9402 5510 9249 9343 86

2. Article Number (Transfer from service label)
7019 0160 0000 5654 6598

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) [illegible] C. Date of Delivery [illegible]

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Mail
☐ Mail Restricted Delivery
(over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

RECEIVED
DEC 20 2019
DCM-MHD CITY

9000

Attachment 5 - Certified Receipt and Confirmation Page 24

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

CLARKSON FAMILY PROPERTIES LLC ETAL
602 27TH AVENUE N
MYRTLE BEACH, SC 29577

9590 9402 5510 9249 9345 08

2. Article Number (Transfer from service label)
7019 0160 0000 5654 5973

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) Jerralynn Richards C. Date of Delivery 12-12-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Mail
Mail Restricted Delivery
00)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

H&H CONSTRUCTORS INC
2919 BREEZEWOOD AVE SUITE 400
FAYETTEVILLE, NC 28303

9590 9402 5510 9249 9333 34

2. Article Number (Transfer from service label)
7019 0160 0000 5654 6994

PS Form 3811, July 2015 PSN [illegible]

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) Amy Jarman C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

GOSNEY DENNIS R ET DEBORAH G
PO BOX 969
MONROE, NC 28111

9590 9402 5510 9249 9335 87

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 7243

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery
DEC 13 2019

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

THOMAS JAMES JR ETUX JACQUELINE T
1520 NORTH SHORE DR
SUNSET BEACH, NC 28468

9590 9402 5510 9249 9347 68

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6222

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery
X 12/12/19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

RECEIVED
DEC 20 2019

0067

Attachment 5 - Certified Mail Confirmations Page 2 of 3

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

SMALL JO ANN GRIFFIN TRUSTEE
165 SUMMERLEA DR
CHARLOTTE, NC 28214

9590 9402 5510 9249 9344 23

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6550

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☑ Addressee

B. Received by *(Printed Name)* C. Date of Delivery
LEIGH TOWSMALL 12-12-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☑ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

WILKINSON WOODY H ETALS
133 N 2ND STREET
SMITHFIELD, NC 27577

9590 9402 5510 9249 9342 18

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 6260

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☑ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery
Ed Spence 12/12/19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☑ No

SMITHFIELD NC 27577 DEC 17 2019 USPS

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

HAWKEYE III ENTERPRISES LLC
2066 WILBUR STREET
EASTOVER, NC 28312

9590 9402 5510 9249 9342 94

2. Article Number (Transfer from service label)
7019 0160 0000 5654 6680

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☒ Addressee

B. Received by (Printed Name) Debra Smith C. Date of Delivery 12/12/19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☒ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

MARTIN DONALD C ET CHRISTY F
2924 MICHELLE DR
MATTHEWS, NC 28105

9590 9402 5510 9249 9336 24

2. Article Number (Transfer from service label)
7019 0160 0000 5654 6956

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) CHASE MARTIN C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

RECEIVED

DEC 20 2019

DCM-MHD CITY

0068

Attachment 5 - Certified & Registered Confirmation Page 26

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

MILLSAPS JEANETTE H TRUSTEE
825 BUTTONWOOD DRIVE
WINSTON SALEM, NC 27104

9590 9402 5510 9249 9341 33

2. Article Number (Transfer from service label)
7019 0160 0000 5654 6345

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) JeanetteMillsaps C. Date of Delivery 12-13-19

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

RUGGIERO PETER ETUX LINDA
517 QUAKER MEADOWS LN
FORT MILL, SC 29715

9590 9402 5510 9249 9332 28

2. Article Number (Transfer from service label)
7019 0160 0000 5654 7496

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☒ Addressee

B. Received by (Printed Name) L. Ruggiero C. Date of Delivery 12-12

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☒ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

MENGEL LOIS S - % HARRY SAKELLARIS, EXECU
PO BOX 8200
DANVILLE, VA 24543

9590 9402 5510 9249 9335 94

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 7250

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Joyce Tate ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Joyce Tate | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

NEWTON JAMES H ETUX SUSAN C
405 TRAMORE DR
CHAPEL HILL, NC 27516

9590 9402 5510 9249 9345 22

2. Article Number *(Transfer from service label)*
7019 0160 0000 5654 5959

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☑ Addressee

B. Received by *(Printed Name)* James H Newton | C. Date of Delivery 12/13/19

D. Is delivery address different from item 1? ☑ Yes
If YES, enter delivery address below: ☐ No

USPS DEC 13 2019 CARRBORO NC 27510

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

0069

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

SHIPLEY ROBERT K - TRUSTEE THE SHIPLEY TRUST
105-F JONES FERRY ROAD
CARRBORO, NC 27510

9590 9402 5510 9249 9330 75

2. Article Number *(Transfer from service label)*
7019 1640 0001 0909 6313

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Robert K Shipley | C. Date of Delivery 12/13/2019

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

RECEIVED
DEC 20 2019
DCM-MHD

info

From: info <info@sunsetbeachnc.gov>
Sent: Wednesday, December 18, 2019 1:48 PM
To: 'info@sunsetbeachnc.gov'
Cc: rneal@moffattnichol.com
Subject: PUBLIC NOTICE OF VARIANCE REQUEST TO THE NORTH CAROLINA COASTAL RESOURCES COMMISSION (CRC)
Attachments: VARIANCE NOTICE_ FeederCanal_BayArea_SJinksCreek-120919-FINAL.pdf

Bcc: 'jon@gorneymail.com'; 'michael@michaelclappappraisals.com'; 'saclapp@mindspring.com'; 'dianeepstein1945@gmail.com'; 'rcerrato@sunsetbeachnc.gov'; 'agnew@cox.net'; 'mwgiancaspro@gmail.com'; 'jtrovato@atmc.net'; 'blurbquen@aol.com'; 'teddybill1957@gmail.com'; 'mikeavent@triad.rr.com'; 'jbarnett1716@gmail.com'; 'defrancoam@gmail.com'; 'calabashnapa@atmc.net'; 'ryan@ryanvet.com'; 'jcorrell@ghcfoundation.com'; 'lfabrey1@gmail.com'; 'grok40@hotmail.com'; 'eismon757@bellsouth.net'; 'ronandlibby@bellsouth.net'; 'mavericksjava@gmail.com'; 'acoan42@gmail.com'; 'rayschehr@gmail.com'; 'mpear47@yahoo.com'; 'dnordan@bmico.com'; 'ray.peck@raymondjames.com'; 'kerria@nccoast.org'; 'suem@iwss.net'; 'jnewton-tig@mindspring.com'; 'jandjmccarron@yahoo.com'; 'drpriley@aol.com'; 'rubybegonias@att.net'; 'betheinstein200@gmail.com'; 'kathyialderson@gmail.com'; 'james.a.phillips.22@gmail.com'; 'pla00954@gmail.com'; 'john@jonesandpeacock.com'; 'bmoock@bmico.com'; 'tbormann17@gmail.com'; 'kjoseph@atmc.net'; 'kharris72@triad.rr.com'; 'jmcculloch@triad.rr.com'; 'jman7292@gmail.com'; 'terpster75@aol.com'; '855mainave@comcast.net'; 'sensenig530@atmc.net'; 'davidmarkrucker@gmail.com'; 'jessicawvet@gmail.com'; 'rdh041@hotmail.com'; 'rjglenn59@gmail.com'; 'rbugg@buggproperties.com'; 'tracyco5@yahoo.com'; 'drkellyharris@yahoo.com'; 'clsavs@nc.rr.com'; 'melissaw9876@gmail.com'; 'chal.glenn@stifel.com'; 'johnfcorbett@atmc.net'; 'tmorganjr@carolina.rr.com'; 'pigpick1@aol.com'; 'bkissal@verizon.net'; 'charles.melvin@mfllc.com'; 'peggytyson311@gmail.com'; 'glenwod@aol.com'; 'dcwbeachgirl@gmail.com'; 'dlewis1007@aol.com'; 'michaelrevans1948@icloud.com'; 'ewjanes@yahoo.com'; 'radmd51@gmail.com'; 'mac.nelson7810@gmail.com'; 'art_byfayej@yahoo.com'; 'doggenome@gmail.com'; 'richardhilderman@gmail.com'; 'Dean.McKinney@PharmaserveNorthWest.co.uk'; 'kgoff1526@aol.com'; 'jawelshofer@gmail.com'; 'vabkbelt@verizon.net'; 'emathers@NEA.com'; 'ginnyjtaylor@yahoo.com'; 'jdebell@aol.com'; 'john.e.butcher.civ@mail.mil'; 'Ryan@daviswaterinc.com'; 'lydlavelle@outlook.com'; '2066wilbur@gmail.com'; 'jlsuncc@msn.com'; 'miriamhk@aol.com'; 'fugiandfitz@gmail.com'; 'ksmcdonald712@gmail.com'; 'sylviachester@comcast.net'; 'a2sunsetbeach@gmail.com'; 'tracyco5@yahoo.com'; 'sugar7@atmc.net'; 'grammyof3.rs@gmail.com'; 'gparsons6336@yahoo.com'; 'beachbumoib@gmail.com'; 'norman_mease@yahoo.com'; 'gweibl@yahoo.com'; 'd.dean.mckinney@gmail.com'; 'barnaclebill@atmc.net'; 'LynnNesmith@mchsi.com'; 'joe@thelineberrys.com'; 'karenbfox@gmail.com'; 'robin.n.murray@gmail.com'; 'mwmarks@atmc.net'; 'jkmharris45@gmail.com'; 'beatpres@gmail.com'; 'tcoggins@richmond.edu'; 'vsmith@klaussner.com'; 'ledford345@msn.com'; 'westgp3@gmail.com'; 'georgemaynard3@gmail.com'; 'cacollins31@gmail.com'; 'jennifer.vail.kirkbride@gmail.com'; 'jfields48@hotmail.com'; 'bandsjackson@triad.rr.com'; 'whitelightning603@hotmail.com'; 'c.l.teker101@gmail.com'; 'drcmh@aol.com'; 'ewgibbs@aol.com'; 'eehedden@gmail.com'; 'uncbrl@gmail.com'; 'gullettba@gmail.com'; 'stradershoes1@att.net';

Bcc: 'katehigginsphotos@gmail.com'; 'lynnamayes@gmail.com'; 'harmonypp@aol.com'; 'smcfarland0102@gmail.com'; 'barry_lentz@med.unc.edu'; 'joycegibb@askjoedimatteo.com'; 'teyoungmd@gmail.com'; 'mfarre3@aol.com'; 'lhoke3310@aol.com'; 'maswhyte@gmail.com'; 'tsroki@aol.com'; 'livingston.helen@gmail.com'; 'fbrantleygt64@gmail.com'; 'ptthompson@nc.rr.com'; 'shak5000@gmail.com'; 'dwightwillis1952@gmail.com'; 'mcors@heaindiana.org'; 'grant.shipley@gmail.com'; 'tmartyn89@gmail.com'; 'hat1600@aol.com'; 'robin.n.murray@gmail.com'; 'westphalmartha@gmail.com'; 'nern@atmc.net'; 'harmonypp@aol.com'; 'gfbruce@intrstar.net'; 'earthwindfarmer@gmail.com'; 'jdwells01 @gmail.com'; 'gyoung55@hotmail.com'; 'barry.wishon@gmail.com'; 'ninam20136mine@gmail.com'; 'gyoung555999@icloud.com'; 'bhughes@orionsolutionsllc.net'; 'zgrandevc@bellsouth.net'; 'robburcham104 @gmail.com'; 'tcoats@bellsouth.net'; 'gyoung55@hotmail.com'; 'don-melissa@carolina.rr.com'; 'bpaul@gac.edu'; 'mkbrown28451@yahoo.com'; 'jeffchasbrown@gmail.com'; 'dan.epstein@gmail.com'; 'jkarriker@gmail.com'; 'janekarriker@gmail.com'; 'bfabrey@juno.com'; 'Doug.Fabrey@roadrunner.com'; 'rcerrato@sunsetbeachnc.gov'; 'ewjanes@yahoo.com'; 'ninam20136mine@gmail.com'; 'gmerr946@aol.com'

Good Afternoon:

This email is being sent to you as you have been identified as someone who made comment to the Division of Coastal Management regarding the proposed dredging project in the Town of Sunset Beach. Attached is a Notice that the Town is applying for a variance to the issued permit.

Have a nice day.

Hiram J. Marziano, II, MPA CFM
Town Administrator
Town of Sunset Beach
700 Sunset Blvd. N
Sunset Beach, NC 28468

910.579.6297 ext. 1004
www.sunsetbeachnc.gov

info

From: info <info@sunsetbeachnc.gov>
Sent: Wednesday, December 18, 2019 1:20 PM
To: 'info@sunsetbeachnc.gov'
Cc: rneal@moffattnichol.com
Subject: PUBLIC NOTICE OF VARIANCE REQUEST TO THE NORTH CAROLINA COASTAL RESOURCES COMMISSION (CRC)
Attachments: VARIANCE NOTICE_ FeederCanal_BayArea_SJinksCreek-120919-FINAL.pdf

Bcc: 'rcerrato@sunsetbeachnc.gov'; 'arbor1190@gmail.com'; 'kschaede@connorsmorgan.com'; 'richardhilderman@gmail.com'; 'pla00954 @gmail.com'; 'jkarriker@gmail.com'; 'tbormann17@gmail.com'; 'don-melissachilders@carlina.rr.com'; 'tmartyn89@gmail.com'; 'leebettis1967@gmail.com'; 'jrwolfe515@aol.com'; 'drcmh@aol.com'; 'mmarti@atmc.net'; 'stan@beckandassociates.com'; 'johndm@aol.com'; 'rbugg@buggproperties.com'; 'emathers@NEA.com'; 'ritchieracing@gmial.com'; 'c.l.teker101@gmail.com'; 'philip.n.post@gmail.com'; 'jdsjis@aol.com'; 'charliecsw@aol.com'; 'fannykgaillard@yahoo.com'; 'mpear47@yahoo.com'; 'dipat4459@yahoo.com'; 'csanta@hotmail.com'; 'asvance21@gmail.com'; 'joeingle@comcast.net'; 'nwbarrineay@gmail.com'; 'Barry.wishon@gmail.com'; 'Whitelightning603 @hotmail.com'; 'Annjensen6@aol.com'; 'handjilynch@atmc.net'; 'Jerrybk41@gmail.com'; 'kwtennant@aol.com'; 'dcwbeachgirl@gmail.com'; 'jmcarn@hamilton.edu'; 'Kennethcln@aol.com'; 'joklenz@icloud.com'; 'rdh041@hotmail.com'; 'rusbridge@yahoo.com'; 'coletteworley@gmail.com'; 'glenwod@aol.com'; 'btddmiller@gmail.com'; 'mdmcconney@gmail.com'; 'jessicavet@gmail.com'; 'jeffchasbrown@gmail.com'; 'rbsmythe@comcast.net'; 'rayshehr@gmail.com'; 'Deedyps@embarqmail.com'; 'Maxxwell105@hotmail.com'; 'magesheeros@gmail.com'; 'Gordon_annbokelman@hotmail.com'; 'lkshafer@atmc.net'; 'falcaraz@sandpiperbay.net'; 'marymasser@aol.com'; 'mwmarks@atmc.net'; 'Lfabrey1@gmail.com'; 'misiaszekjj@yahoo.com'; 'jon@gorneymail.com'; 'jdwells01@gmail.com'; 'debbie@sunsetrealty.com'; 'jo@keefs.org'; 'gandm@atmc.net'; 'Sunset2b@gmail.com'; 'plarkin64@outlook.com'; 'Lfleming1942@gmail.com'; 'Bcosta72@yahoo.com'; 'John.Welshofer@cnsa.com'; 'saugustine@classicahomes.com'; 'Karenmaurer4 @gmail.com'; 'shadley@lee-associates.com'; 'haggler@erols.com'; 'Tmhmiller11 @gmail.com'; 'jman7292@gmail.com'; 'Billw9876@gmail.com'; 'dfrancoam@gmail.com'; 'calabashnapa@atmc.net'; 'chal.glenn@stifel.com'; 'clsavs@nc.rr.com'; 'Pigpick1 @aol.com'; 'davidmarkrucker@gmail.com'; 'kjoseph@atmc.net'; 'peggytyson311 @gmail.com'; 'jtrovato@atmc.net'; 'dwmarlsand@outlook.com'; 'jon@gorneymail.com'; 'ledford345@msn.com'; 'klein.26@nd.edu'; 'ledford636@gmail.com'; 'barbarasfraga@gmail.com'; 'uncbrl@gmail.com'; 'sportkim1@gmail.com'; 'patsyjberry@gmail.com'; 'abmatthews5@gmail.com'; 'Richard.m.lillis@att.net'; 'eddingtonfamily11@icloiud.com'; 'dallasalice86@gmial.com'; 'drew@adtaylor.com'; 'jlsuncc@msn.com'; 'ewjanes@yahoo.com'; 'stephani_Humrickhouse@nceb.uscourts.gov'; 'mtmothy@icloud.com'; 'ginamariegaines@gmail.com'; 'jpv1945@me.com'; 'nsms123@yahoo.com'; 'collierj@berea.edu'; 'Hdkscott@atmc.net'; 'email2libby@gmail.com'; 'mebstolfi@aol.com'; 'Trip7@carolina.rr.com'; 'mark@legacyrealpropertygroup.com'; 'mark@legacyrealpropertygroup.com'; 'norman_mease@yahoo.com'; 'ninam20136mine@gmail.com'; 'jay.klompmaker@gmail.com'; 'Bbrantley1941 @gmail.com'; 'drpriley@aol.com'; 'woodmanage@cs.com'; 'mbozymski@bellsouth.net'; 'cramer1130@gmail.com'; 'nancyhcraven@gmail.com'; 'tcraven@priestcraven.com';

Bcc: 'danareed@ls3p.com'; 'djdmelvin@gmail.com'; 'danareed@ls3p.com'; 'lhoke3310 @aol.com'; 'eliazbeth.moshier@grifols.com'; 'eliazbeth.moshier@grifols.com'; 'Maria.dunn@ncwildlife.org'; 'ljpietra@ncsu.edu'; 'dwightwillis1952@gmail.com'; 'michellepetersonlopez1@gmail.com'; 'melissa9876@gmail.com'; 'mselisker@gmail.com'; 'ppzcpa@gmail.com'; 'rbracken56@gmail.com'; 'artarter@bellsouth.net'; 'bmoock@bmico.com'; '2066wilbur@gmail.com'; 'drkellyharris@yahoo.com'; 'kdtca57@gmail.com'; 'bfabrey@juno.com'; '855mainave@comcast.net'; 'pkslawoffice@gmail.com'; 'tomlharrington@gmail.com'; 'd.dean.mckinney@gmail.com'; 'Doug.Fabrey@roadrunner.com'; 'tomlharrington@gmail.com'; 'vbarilla@aol.com'; 'eddie@sunsetproperties.travel'; 'robbiecox13@ncrr.com'; 'ginnyjtaylor@yahoo.com'; 'acoan@bellsouth.net'; 'fugiandfitz@gmail.com'; 'alderson@skidmorealderson.com'; 'teyoungmd@gmail.com'; 'naui@aol.com'; 'phillipsforsunset@gmail.com'; 'wadekharris@gmail.com'; 'sjc7116 @sbcglobal.net'; 'gerrydiana@atmc.net'; 'livingston.helen@gmail.com'; 'davedx@gmail.com'; 'rainbows@atmc.net'; 'shannonphillips2019@gmail.com'; 'teddybill1957@gmail.com'; 'huntmonroe@yahoo.con'; 'mcintyrecroom@gmail.com'

Good Afternoon:

This email is being sent to you as you have been identified as someone who made comment to the Division of Coastal Management regarding the proposed dredging project in the Town of Sunset Beach. Attached is a Notice that the Town is applying for a variance to the issued permit.

Have a nice day.

Hiram J. Marziano, II, MPA CFM
Town Administrator
Town of Sunset Beach
700 Sunset Blvd. N
Sunset Beach, NC 28468

910.579.6297 ext. 1004
www.sunsetbeachnc.gov

info

From: info <info@sunsetbeachnc.gov>
Sent: Wednesday, December 18, 2019 2:25 PM
To: 'info@sunsetbeachnc.gov'
Cc: rneal@moffattnichol.com
Subject: PUBLIC NOTICE OF VARIANCE REQUEST TO THE NORTH CAROLINA COASTAL RESOURCES COMMISSION (CRC)
Attachments: VARIANCE NOTICE_ FeederCanal_BayArea_SJinksCreek-120919-FINAL.pdf

Bcc: 'Jbarnett1716@gmail.com'; 'jandjmccarron@yahoo.com'; 'jmcculloch@triad.rr.com'; 'smcculloch@triad.rr.com'; 'Dlewis1007@aol.com'; 'jpagels@vcu.edu'; 'Robertforrersterlaw@verizon.net'; 'dougmallen@twc.com'; 'Benjie.hester@gmail.com'; 'johncorbett@atmc.net'; 'hansen@mwrealestate.com'; 'ewjanes@yahoo.com'; 'lmatthews0090@gmail.com'; 'massarophil@protonmail.com'; 'carolcwells@gmail.com'; 'andrew.schmidt@ppdi.com'; 'jjzmh@comcast.net'; 'Stephen@pmihq.com'; 'annalook@aim.com'; 'kent@backandassociates.com'; 'dianeepstein1945@gmail.com'; 'depstein@richmond.edu'; 'aineeharrell@gmail.com'

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This email is being sent to you as you have been identified as someone who made comment to the Division of Coastal Management regarding the proposed dredging project in the Town of Sunset Beach. Attached is a notice that the Town is applying for a variance to the issued permit.

Have a nice day.

Hiram J. Marziano, II, MPA CFM
Town Administrator
Town of Sunset Beach
700 Sunset Blvd. N
Sunset Beach, NC 28468

910.579.6297 ext. 1004
www.sunsetbeachnc.gov

ATTACHMENT E:

STIPULATED EXHIBITS INCLUDING POWERPOINT

There will be four separate PDF files available for download

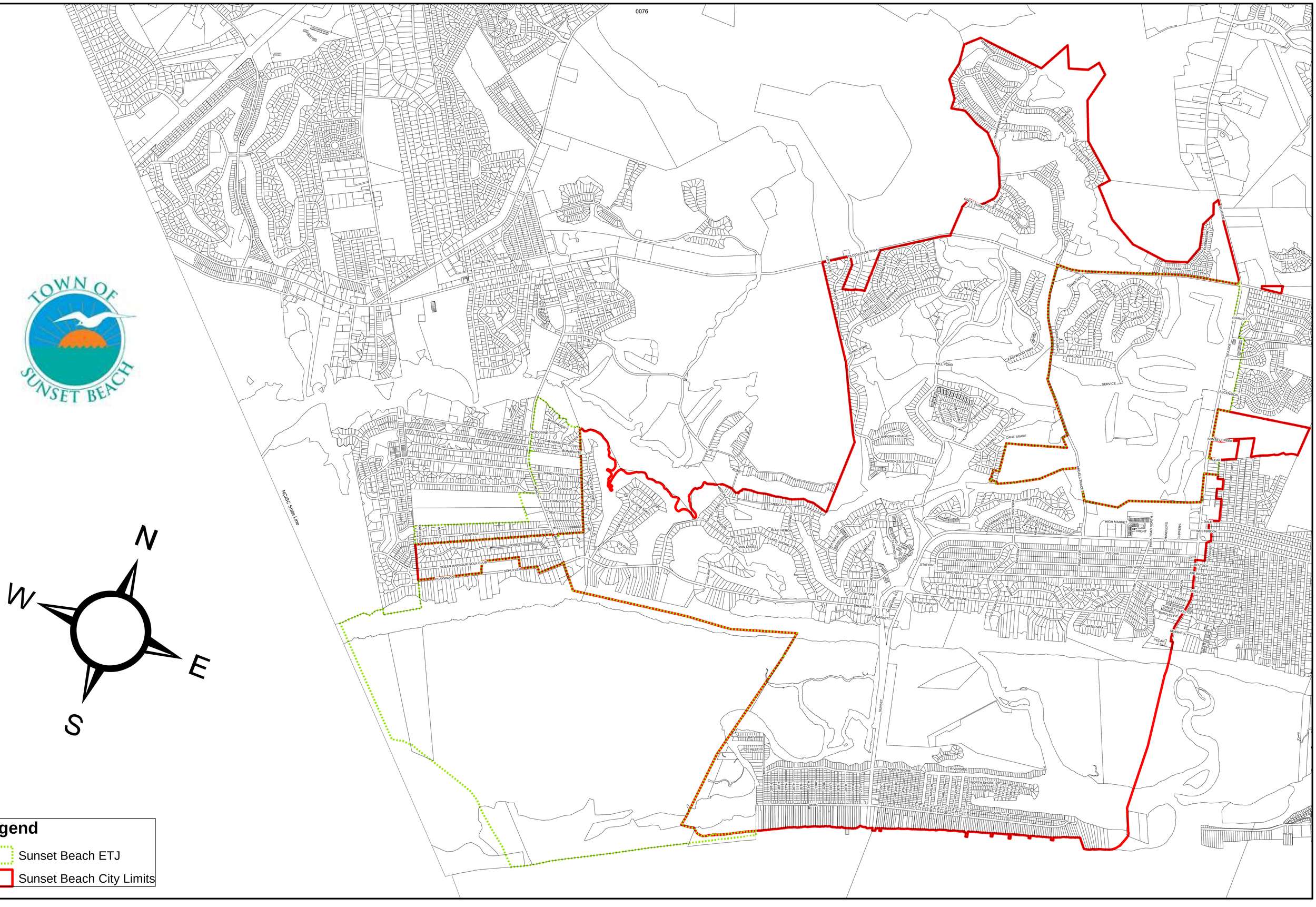
1 of 4 Main Stipulated Exhibits, including:

1. Map of Town of Sunset Beach limits and ETJ
2. Site map from Petitioner showing/labeling the waterbodies
3. PNA maps of the area
4. DCM Field Investigation Report
5. February 12, 2019 DMF memo re: shellfish relocation plan
6. Spread sheet and information showing notice to adjacent riparian owners and emails discussing notice attempts
7. Newspaper Notice information
8. January 21, 2019 comments from DCM Field Representative
9. June 21, 2019 DEMLR comments
10. July 3, 2019 email from Corps to federal commenting staff
11. July 19, 2019 comments from DMF
12. July 23, 2019 comments from NCCF to Corps
13. August 9, 2019 response to NCCF comments to Corps from Petitioner's agent
14. August 1, 2019 comments and copy of 401 from DWR
15. Copy of Town's grant application and grant contract with DWR
16. August 2, 2019 comments from the Corps, enclosing NMFS August 2 letter and USS FWS letter of July 29, 2019 not-concurring requesting changes to the EA
17. August 6, 2019 comments of DCM district planner
18. August 9, 2019 revised BA with transmission email
19. August 9, 2019 comments from WRC
20. August 27, 2019 email from Corps indicating change to Standard Permit from General Permit
21. Depth Profiles of Jinks Creek
22. CAMA Major/D&F Permit No. 79-19
23. Powerpoint Presentation with ground-level and aerial photographs of the site including over time to show shoaling changes

2 of 4 Separate Stipulated Fact File: Petitioner's CAMA Major Permit Application including drawings, sediment analysis, Shellfish Survey, EFH, BA, Manatee Avoidance, Section 106

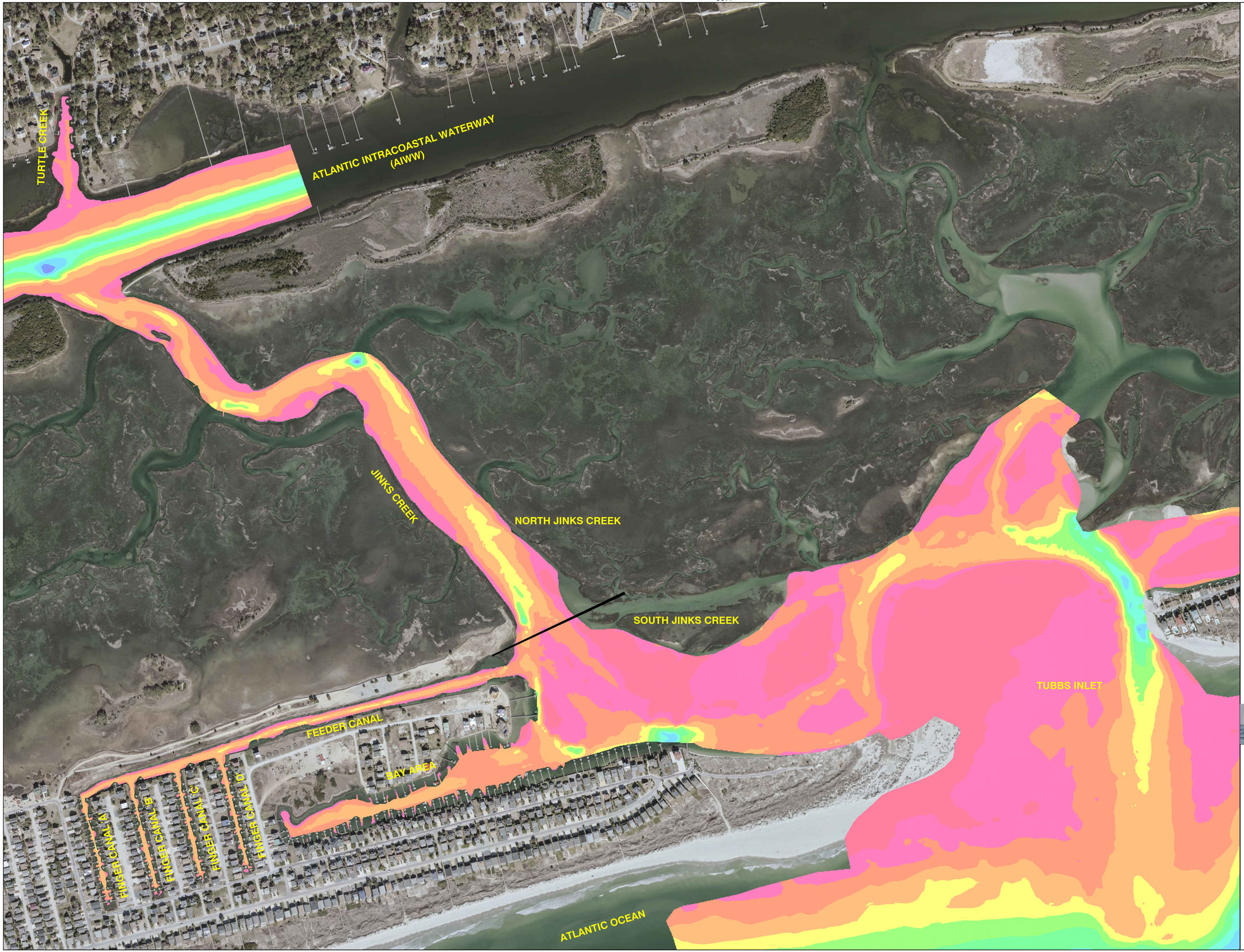
3 of 4 Separate Stipulated Fact File: Comments received during permit review

4 of 4 Separate Stipulated Fact File: Comments received following variance submittal through January 14, 2020



Town of Sunset Beach Map

Created 1/10/2020 TJR



ELEVATION LEGEND

- +2 ~ +4 MLW
- +2 ~ 0 MLW
- 0 ~ -2 MLW
- -2 ~ -4 MLW
- -4 ~ -6 MLW
- -6 ~ -8 MLW
- -8 ~ -10 MLW
- -10 ~ -12 MLW
- -12 ~ -14 MLW
- -14 ~ -16 MLW
- -16 ~ -18 MLW
- -18 ~ -20 MLW
- -20 ~ -22 MLW

NOTES

1. 2012 AERIAL PHOTO SHOWN PROVIDED BY NC ONEMAP.

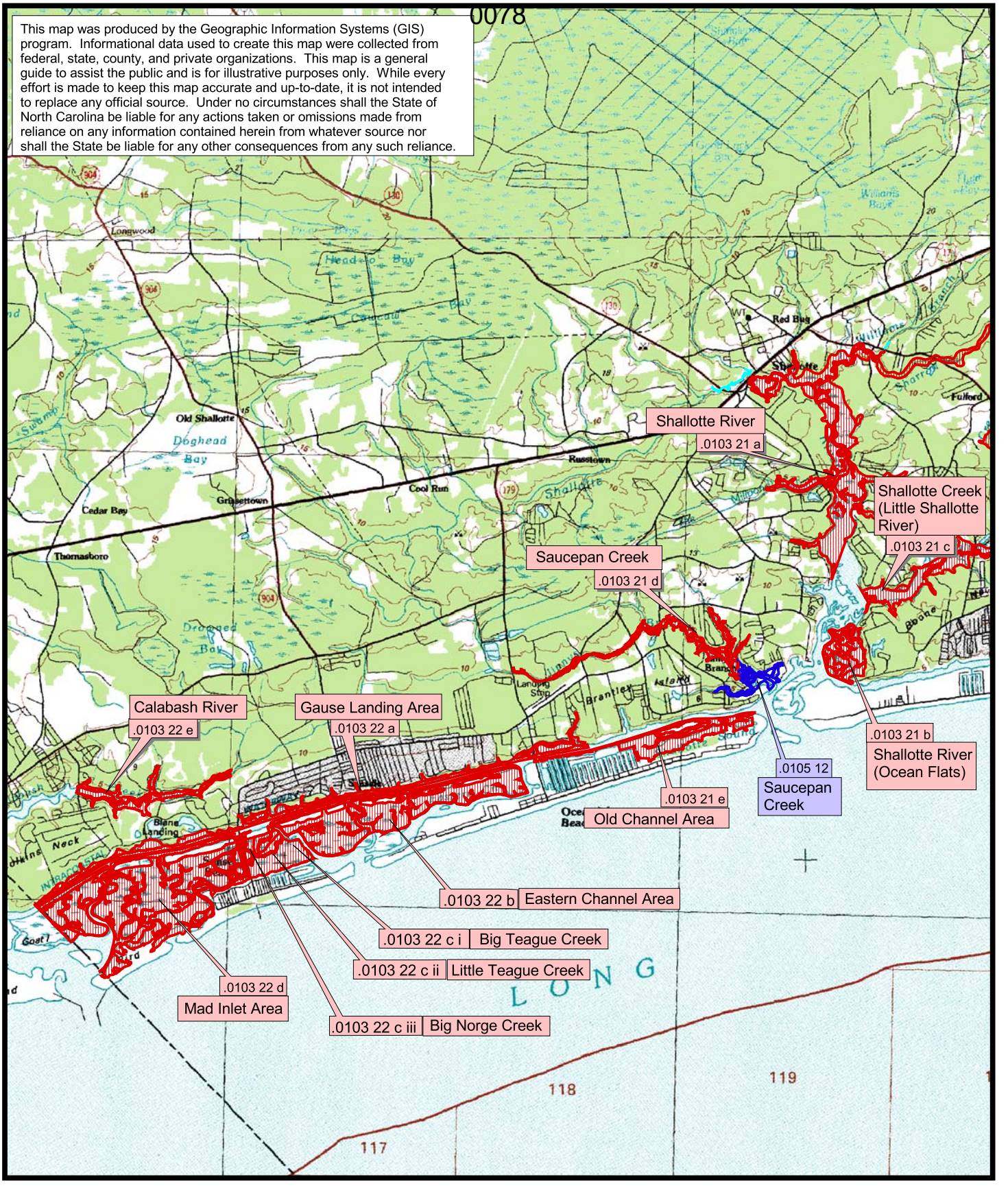
SUNSET BEACH
North Carolina

TOWN OF SUNSET BEACH
PRE-DREDGE ANALYSIS
PROJECT OVERVIEW PLAN

N

300' 0' 300' 600'
GRAPHIC SCALE IN FEET

moffatt & nichol



Background imagery are U.S. Geological Survey 1:100,000-scale planimetric maps.

Fishery Nursery Areas
- Primary
- Permanent Secondary
- Special Secondary

Military Danger Zones and Restricted Areas

Inland waters (WRC jurisdiction)

Fishery Nursery Areas

Map Datum: NAD83
Map Projection: NC State Plane
Map Date: March 2011

1000 0 1000 2000 Yards

0.7 0 0.7 1.4 Miles

Map 28

DIVISION OF COASTAL MANAGEMENT
FIELD INVESTIGATION REPORT

1. **APPLICANT'S NAME**: Town of Sunset Beach c/o Moffat & Nichol

2. **LOCATION OF PROJECT SITE:** East end Canals, Feeder Channel and Bay Area of Sunset Beach, Jinks Creek and the oceanfront beach between 5th st and 12th street, Brunswick County.

Photo Index – Finger Canals 2006: 1-6152:15-19, L-N **Feeder Channel 2006**: 1-6152:9-19, L
Bay Area – 2006: 1-6152:8-15, N **S. Jinks Creek – 2006:** 1-6152:5-8, J-N
Midpoint of Beneficial Placement Area: **Latitude**: 33.52'11.82"N **Longitude**: 78.30'04.11"N

3. **INVESTIGATION TYPE**: CAMA/ D & F

4. **INVESTIGATIVE PROCEDURE**: **Dates of Site Visit-** 10/23/18, 5/9/19 **Applicant Present** – Yes

5. **PROCESSING PROCEDURE**: **Application Received** – March 22, 2019 **Complete** -June 17, 2019
Office - Wilmington

6. **SITE DESCRIPTION**:
   - **(A)** **Local Land Use Plan** – Town of Sunset Beach
     Land Classification From LUP – Island Residential and Oceanfront Conservation
   - **(B)** **AEC(s) Involved**: PT, EW, ES, OH
   - **(C)** **Water Dependent**: Yes
   - **(D)** **Intended Use**: Navigation
   - **(E)** **Wastewater Treatment: Existing** – N/A
     Planned - N/A
   - **(F)** **Type of Structures: Existing** – Private piers and docks
     Planned – NONE
   - **(G)** **Estimated Annual Rate of Erosion**: 2 ft. per year (Oceanfront Only)
     Source - DCM-2013 Erosion Rate Maps

7. **HABITAT DESCRIPTION:**

	[AREA] DREDGED	FILLED	OTHER
(A) Non-Vegetated Wetlands (Open water)	~18 acres		
(B) Oceanfront Beach		~8.5 acres	
(C)) High Ground		~ 2 Acres	

** **Note**: Estimated dredge volumes are listed on the MP-2 Form as channel width varies in each location.

- **(D)** **Total Area Disturbed**: ~ 28.5 Acres
- **(E)** **Primary Nursery Area**: No
- **(F)** **Water Classification**: SA; HQW (Bay Area and S. Jinks Creek)
  Open: Yes (Bay Area and S. Jinks Creek only)

8. **PROJECT SUMMARY**: The applicant is proposing to perform navigational dredging of Canals A-D, the Feeder Channel, Bay Area and an area of South Jinks Creek on the east end of Sunset Beach with beneficial placement on 1,600 linear ft. of oceanfront beach.

9. **PROJECT DESCRIPTION:**

The project site is located within and adjacent to the eastern side of Sunset Beach in Brunswick County. The Finger Canal portion of the dredging is located adjacent to Marlin, Sailfish, Dolphin and Cobia Streets. The Feeder Canal runs between Riverside Drive and N. Shore Drive. The Bay Area is south of the Feeder Canal and runs along Canal Drive. Both the Feeder Canal and Bay Areas extend to South Jinks Creek. The beneficial placement area is on the oceanfront beach between 5th and 12th streets. To find the project site from US-17 S Shallotte, turn left onto Seaside Rd SW/NC-904 and travel approximately 3.6 miles. Turn right onto Sunset Blvd N/NC-179 Bus. Go right at the roundabout and continue onto the island. Turn left on East Main Street and turn left on 6th street to access the Bay Area adjacent to Canal drive (first right) or the Finger Canals off of Canal Drive. The Feeder Channel can be accessed at the end of 6th street by turning right on Riverside Drive.

The project area is on the eastern end of Sunset Beach between the island and Tubbs Inlet. The project is comprised of 4 man-made canals that connect to a Feeder Channel and a Bay Area to the south. Both the Feeder Channel and the Bay Area connect to South Jinks Creek. The shoreline of the Finger Canals is stabilized primarily by bulkheads, with some sections of riprap. The man-made canals border narrow residential lots heavily developed with single family residences and private docking facilities. The width of the canals is approximately 90 ft. and there are areas of oysters and coastal wetlands, mostly consisting of Salt Marsh Cordgrass (*Spartina alterniflora*), established along the 3,200 linear ft. project area. The 3,500 linear ft. Feeder Channel project area is stabilized by bulkheads with undeveloped lots to the north. The channel averages 90 ft. in width with Coastal Wetlands, mostly consisting of Salt Marsh Cordgrass (*Spartina alterniflora*), present on each shoreline east of the finger canals. To the south, the Bay Area is stabilized primarily by bulkheads, with some rip rap and sparse vegetation including Sea Oxeye and Salt Marsh Cordgrass. The Bay Area project extends 2,200 linear ft. to the east with widths ranging from 130 ft. in with to 470 ft nearest the confluence with Jinks Creek. Both the Feeder Channel and the Bay Area connect to the 1,700 linear ft. South Jinks Creek project to the east, which transitions into the Atlantic Ocean through Tubbs Inlet to the south and to the AIWW to the north.

A previous maintenance event of the Finger Canals and Feeder Channel was conducted under State Permit No. 45-02, which expired on December 31, 2005. The dredging event authorized the removal of 38,164 cubic yards with excavation to a depth of – 5.2 ft. at MLW, this was the first maintenance event for the feeder system since State Permit No. 211-85. There are no permits on file for the dredging of either the Bay Area or South Jinks Creek, but the application states that they both were previously dredged (pre-CAMA) in the early 70's. According to the applicant, significant accretion has occurred in the Finger Canal and Feeder Channel systems restricting navigation since the previous maintenance event. The "box-cut" dredge channel previously authorized within the Finger Canals and Feeder Channel measured approximately 30 ft. in width, this would be reduced to 20 ft. in width in the Finger Canals. The application states that the Finger Canals currently have an average water depth of – 2 ft. at MLW, the Feeder Channel averages - 3 ft. at MLW, the Bay Area averages – 2 ft. to -3 ft. at MLW and South Jinks Creek is approximately -1.5 ft. at MLW. Please note MLW data was converted by the applicant from NAVD88 using the Oak Island Pier tide station.

The application includes a Sediment Analysis (**Tab G**), a Jinks Creek Shellfish Survey (**Tab L**), EFH and Biological Assessments (**Tabs M and N**) and Manatee Avoidance Guidelines (**Tab O**). The applicant has also included comments issued per Section 106 of the National Historical Preservation Act of 1966 (P.L. 89-665) (**See Tab Q**).

The Town of Sunset Beach Land Use Plan classifies the surrounding area of the Canals, Feeder Channel and Bay Area as Island Residential and Oceanfront Conservation. The waters in the Bay Area and South Jinks Creek are classified **SA; HQW** by the Division of Water Resources. They **ARE NOT** designated as a Primary Nursery Area by (PNA) the N.C. Division of Marine Fisheries and the Finger Canals and Feeder Channel portions of the project are **CLOSED** to the harvest of shellfish. The Bay Area and South Jinks Creek are **OPEN** to the harvest of shellfish. There are no known archaeological resources within the project vicinity.

10. PROPOSED PROJECT:

The applicant is proposing to perform navigational dredging of Canals A-D, the Feeder Channel, Bay Area and an area of South Jinks Creek on the east end of Sunset Beach with beneficial placement on 1,600 linear ft. of oceanfront beach.

The project Narrative states that the proposed dredging project would connect the Feeder Channel off the Finger Canals with the Bay Area via South Jinks Creek creating navigation corridors. According to the application, the dredge channel templates for the Finger Canals A-D and Feeder Channel would be altered from the previous footprint to extend the navigational area approximately 50 ft. within the Finger Canals and to follow deep water in the Feeder Channel (**see Narrative**). The proposed channel base width has been reduced to 20 ft. from the previously permitted project due to clearance between docks and the existence of Coastal Wetlands. The maintenance dredging as proposed would aim to achieve average bottom depths ranging from approximately -5 ft. (-4 + 1 ft. over dredge) at MLW in the Finger Canals to -6 ft. (-5 ft. + 1 ft. over dredge) at MLW in Feeder Channel with side slopes of 3:1. The targeted cut depth in each area allow for a -1' over-dredge buffer **(See Narrative and Sheet 3, 9-12, 22-23 of 25).** The application indicates that the removal of approximately 10,700 cubic yards of material from the Finger Canals, in an area measuring 3200 ft. in length and 20 ft. in width, and 22,000 cubic yards of material from the Feeder Channel, in an area measuring 3,500 ft. in length and 30-40 ft. in width, would be performed by means of bucket to barge.

The Bay Area south of the Feeder Channel is proposed to be dredged to a final depth of -6 ft. (- 5 ft. + 1 ft. over dredge) at MLW in an area measuring 2,200 ft. in length by a varying width of 20 ft. to 80 ft. The proposed dredge footprint widens to a maximum of 80 ft. at the confluence with South Jinks Creek for an estimated volume of 15,900 cubic yards of material with a 3:1 side slope (**see Narrative and Sheet 3, Sheets 13-14 and 23 of 25**). The proposal states that the Finger Canals, Feeder Channel and Bay Area would be dredged via bucket to barge with the environmental window of November 16th to April 30th. The project narrative states that the proposed dredge spoil from these areas is not beach compatible and will be disposed via offload site at the end of Cobia street to an upland permitted landfill site currently owned by Ike Williamson, who has signed a letter of consent for use (**see Tab** I). The site is located adjacent to State Rd. 1163 (Old Gerogetown R.) and State Rd. 1154 (Hale Swamp Road).

The dredging of the South Jinks Creek area is proposed to be dredged to a final depth of -6 ft. (- 5 Ft. + 1 ft. over dredge) at MLW in an area measuring approximately 1,750 ft. in length by 100 ft. in width for a total volume of 40,500 cubic yards of material. The proposed template has a 5:1 slope throughout the dredge footprint (**see Sheets 3, 12, 14-15 and 23 of 25**). This material has been analyzed and the application states that it is compatible with NC standards for Beach Compatibility (**see Narrative and Tab G**). The material is proposed to be hydraulically dredged and placed via pipeline as beneficial re-use on a 1,600 linear ft. area of oceanfront beach between 5th Street and 12th Street extending up to 120 ft. below NHW. The proposed placement template would enhance the existing berm width of 275 ft. with a maximum height of + 9.0 MLW (6.1 NAVD) (**see Sheet 24 of 25**). The proposed beneficial placement footprint and pipeline

placement are described in the permit drawings section of the application. (**see Sheets 15 -21 of 25**).

The application indicates that the proposed pipeline would be anchored to the bottom waterward of MLW at the confluence of the Feeder Channel, Bay Area and South Jinks Creek. To avoid potential navigation concerns, the pipeline as proposed would cross the AIWW perpendicularly, limiting the amount of pipeline length within the existing navigation channel. The spoil material would then be transported via pipeline along the shoreline of the east end of Sunset Beach as close to the dune line as possible without impacting existing vegetation. The pipeline would have standard markings and emergency access areas for disposal seaward of the existing dunes. The application states that temporary in-situ sand dikes or berms would be used during beach placement to facilitate settlement and retention of sand on the beach which would allow the sandy material to settle out before the water re-enters the ocean.

Conservation measures submitted by the applicant include an environmental window of November 16-April 30 for implementation of dredging activities and beach placement. The application also states that there would be a minimum 10 ft. buffer from any Coastal Wetland Areas (**see Tab S**). The existing pierhead line can be found in Tab K of the application. There is also a discussion about a potential Variance request to rule NCAC 07H .0208 (b)(F) due to shallow connecting water depths, which range from 0 ft. to 2 ft. at MHW on the northern proposed Jinks creek project area to – 0 ft. to – 5ft. at MHW in the southern proposed Jinks Creek project area (**see Narrative and sheets 4-8, 12 and 15 of 25**).

11. ANTICIPATED IMPACTS:

The proposed excavation of approximately 89,100 cubic yards of material would disturb up to 18 acres of shallow bottom habitat within the project area. The final project depth would range from -5 ft. at MLW in the Finger Canals to -6 ft. at MLW in the Feeder Channel, Bay Area and S. Jinks Creek, and would not connect to deeper water within Jinks Creek and Tubbs Inlet. The application states that the Town intends to request a Variance for the proposed maintenance dredging without a connection to deeper waters as required by rule 15A NCAC 7H .0208 (b)(F).

The proposed excavation of South Jinks Creek by hydraulic means would create steeper side slopes of 5:1 and subsequent sloughing, thereby increasing the top width dimensions of the proposed project. Short term increases in turbidity can be expected during the dredging activity. There are Coastal Wetlands and oysters present in the project area that appear to have become established within the proposed dredge channel in some locations. The applicant has located these waterward marsh extents and proposed to maintain a 10' buffer from the edge of all Coastal Wetlands **(see Narrative and Tab S).**

According to the submitted Shellfish Survey Report, the proposed project will not likely be able to avoid potential impacts to clams present in South Jinks Creek, however the applicant states that the existing oyster beds appear to be located outside of the dredge channels **(see Tab L)**. An Essential Fish Habitat (EFH) Assessment was also submitted with the application, which in summary predicted only short-term impacts to EFH from increases in turbidity, siltation, and noise during construction **(see Tab M)**. The applicant has proposed limiting dredging activities to November 16 through April 30 of any given year, in an effort to alleviate concerns regarding impacts to EFH and adjacent PNA. A draft Biological Assessment has also been submitted with this application (**Tab N**).

The beneficial placement portion of the project would disturb a maximum of approximately 4,400 sq. ft. of oceanfront beach impacting areas below and above Mean High Water as a result of the nourishment activities. Placement of sand on the beach would result in temporary mortality for intertidal micro fauna

such as crabs and worms. Placement of material below the MHW boundary would result in temporary turbidity within the nearshore waters of the Atlantic Ocean; potentially affecting fish and aquatic life in the project area at the time. Limiting the work to the winter season should reduce potential adverse impacts to fish communities. There may be some impact to sea turtle nesting as a result of this project. Beach compaction should be monitored and tilling should be required to reduce the likelihood of impacting sea turtle nesting and hatching activities. Erosion escarpments forming after the project completion should also be leveled to reduce turtle nesting impacts. Public use of the beach during the beach fill process would be limited to some degree.

Submitted by: Tara MacPherson **Date: June 19, 2019** **Office:** Wilmington

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

STEPHEN W. MURPHEY
Director

MEMORANDUM:

TO: Courtney Spears, DCM Assistant Major Permit Coordinator

FROM: Curt Weychert, DMF Fisheries Resource Specialist

SUBJECT: Town of Sunset Beach Navigation Project

DATE: February 12, 2019

The North Carolina Division of Marine Fisheries (DMF) requests additional information prior to the submission of a CAMA Major Permit Application pursuant to General Statute §113-131. Through scoping meetings, site visits, and correspondence with the environmental consultant, the DMF has raised concerns for shellfish resources within the proposed dredge areas of "Jinks Creek". DMF has not had the opportunity to address concerns of shellfish resources located in the proposed dredging areas of the canals.

The sides of the canal's bulkheads contain intertidal beds of shellfish and marsh. Navigation dredging has the potential to indirectly impact these shellfish and coastal wetland species through sloughing. Sloughing occurs as a result of gravity normalizing slopes of a dredged area, usually at a 3:1 ratio. If sloughing occurs in shellfish habitat, this results in a change of vertical distribution in the water column. Oysters grow in intertidal areas because it provides them refuge from predators, relief from epiphyte competition, and protection from parasites. Altering this vertical distribution in the water column could result in the direct mortality of shellfish in the project vicinity.

Instead of requiring a shellfish survey to be conducted along the impact area of the proposed dredging, DMF would request that the applicant includes in their application a shellfish relocation plan. This plan should address what will be done with shellfish that fall within the impact area of the proposed dredging. The impact area will be defined as any area within a buffer that is 3 times the dredge depth; meaning, if a channel is proposed to be dredged to -5'NLW, the impact area would be a 15-foot buffer around the edges of the dredge footprint. Any shellfish identified within this impact area should be relocated to a nearby area in the same vertical distribution along the water column. In the past, raking shellfish away from the impact area to surrounding areas where shellfish are present, transporting to non-dredged areas within the project area where oysters are present, or relocation to natural shoreline to protect marsh within the project area where oysters are present have been utilized and proven effective. The applicant should identify where relocation areas are so that the DMF may comment.

When a shellfish relocation proposal is submitted, the DMF will approve the plan or make recommendations through comments on the Major Permit application.

Contact Curt Weychert at (252) 808-8050 or Curt.Weychert@ncdenr.gov with further questions or concerns.

ADJACENT RIPARIAN PROPERTY NOTICE

Town of Sunset Beach Navigation Project
Maintenance Dredging of South Jinks Creek, the Bay Area, & the Feeder Channel

The Town of Sunset Beach (Town) has applied for a Coastal Area Management Act (CAMA) Permit to conduct maintenance dredging in south Jinks Creek, the Bay Area, and the Feeder Channel systems as shown in Figure 1. The Town must provide this notification as part of the permitting process to all adjacent riparian property owners to allow an opportunity for comment on the project. The complete permit application may be obtained in digital format from the Town's website at www.sunsetbeachnc.gov. In addition, a hard copy may be provided upon request to Mr. Hiram Marziano, Interim Town Administrator / Planning Director, Town of Sunset Beach, 700 Sunset Blvd. N. Sunset Beach, NC 28468, (910) 579-6297, or via email at hmarziano@sunsetbeachnc.gov.

Comments on the application may be provided to Ms. Tara MacPherson, NC Division of Coastal Management (DCM) at 127 Cardinal Drive Ext., Wilmington, NC 28405-3845, 910-796-7424 or via email at tara.macpherson@ncdenr.gov. Please note, DCM will receive comments for a 30-day period. If no comments are provided within the 30-day period, DCM will consider the response as 'no objection'.

The proposed dredging is described below:

S. Jinks Creek, Bay Area, & Feeder Channel – The proposed work covers maintenance dredging operations in S. Jinks Creek, the Bay Area, and Feeder Channel system, inclusive of finger canals A-D, in the Town of Sunset Beach. The referenced waterbodies were originally dredged approximate to 1970[1] for navigation purposes. Maintenance activities for the feeder system occurred in 1985 under CAMA permit 211-85 and 2002 under CAMA permit 45-02. The proposed action will be the first known maintenance event for the Bay Area and south Jinks Creek since the initial dredging.

The proposed maintenance dredging will help improve navigational access within south Jinks Creek, the Bay Area, and the Feeder Channel system. Shoaling patterns and sediment runoff have impaired access and egress through the respective systems. As a result, the Town of Sunset Beach has proposed the maintenance operations as part of a long-term management strategy to maintain navigation access for small recreational vessels along the east end of Sunset Beach.

The maximum dredge depth in the Feeder Channel extends to -6-ft (-5+1) MLW and raises to -5-ft (-4+1) MLW, in the adjoining finger canals. The proposed Feeder Channel dredging maintains general consistency with the Town's documented pier head alignment and the previous 2002 maintenance operations conducted under permit 45-02. Small adjustments have been made to avoid the existing marsh grass and simplify the construction process. The channel alignment maintains a 20-ft width within Finger Canals A-D and increases to a maximum width of 40-ft in the Feeder Channel. The work in the Bay Area initiates with an 80-ft width at -6-ft (-5+1) MLW and reduces gradually to a 20-ft width progressing towards the inland terminus. The dredge alignment for south Jinks Creek maintains a 100-ft width and maximum dredge depth of -6-ft (-5+1) MLW.

The dredging operations will remove approximately 15,900 cubic yards (CY) of material from the Bay Area and 32,700 CY from the Feeder Channel, inclusive of Finger Canal A - D. Approximately 40,500 CY will be dredged from south Jinks Creek. Material removed from the Bay Area and Feeder Channel will be

[1] Cleary, W. J. and Marden, T. P. 1999. Shifting Shorelines: A Pictorial Atlas of North Carolina Inlets. North Carolina Sea Grant. Raleigh, North Carolina

mechanically dredged and trucked to an upland landfill facility. However, the south Jinks Creek material will be hydraulically dredged and placed as beneficial reuse along the Sunset Beach beachfront between 5th and 12th Street.

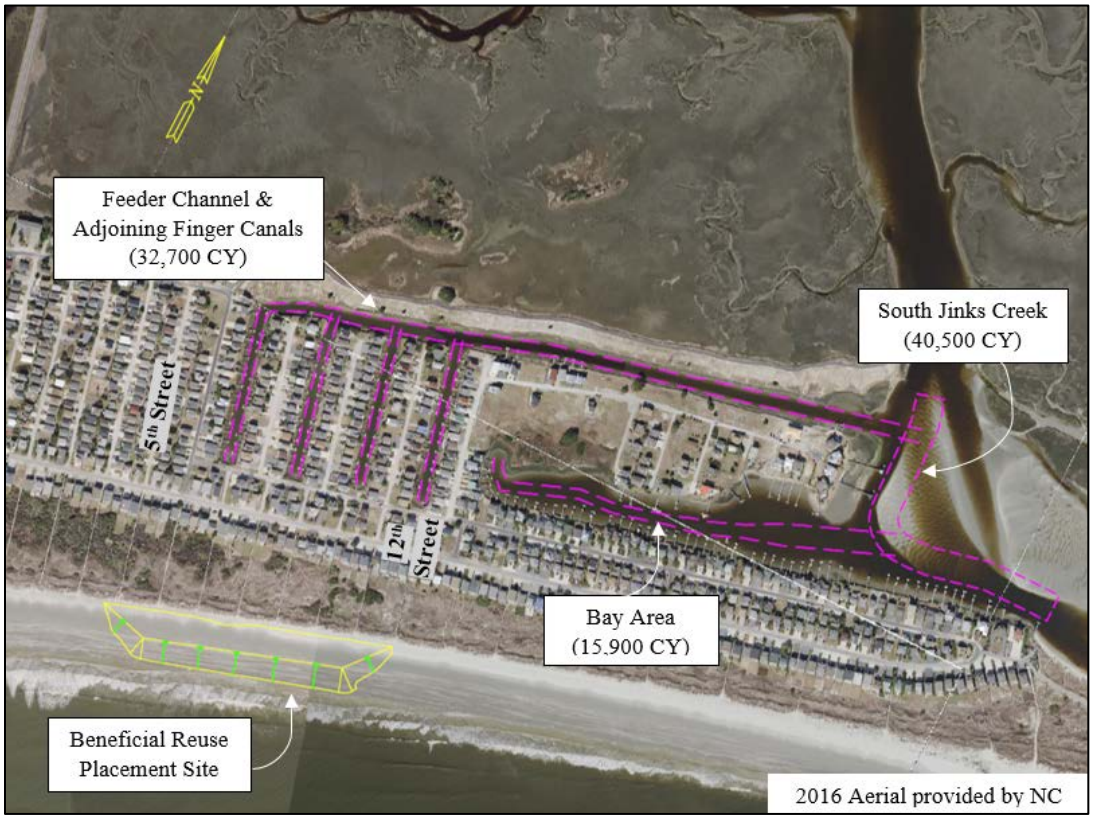


Figure 1. South Jinks Creek, Bay Area, & Feeder Channel Work Areas

Material excavated from the Bay Area and Feeder Channel will be loaded into a dump truck or other hauling apparatus at the end of Cobia Street. The material will be transported by road approximately 10 miles to a permitted landfill facility on Old Georgetown Road.

Town of Sunset Beach Navigation Project
Maintenance Dredging of S. Jinks Creek, the Bay Area & the Feeder Channel
Adjacent Riparian Property Owner List

6TH STREET (WATER ACCESS)

Name	Mailing Address	City	St	Zip	Parcel #
ERWIN MARK D ET BETTY A	PO Box 7825	OCEAN ISLE BEACH	NC	28469	256OJ001
MELETIS THOMAS PETER & ETALS	26 ETON RD	CHARLESTON	SC	29407	256OJ002
YORK JAMES JOHNSON ETUX TAMMY TAYLO	204 LEONARD RD	PILOT MOUNTAIN	NC	27041	256OJ003
SLAPAK FRANCES K	3090 COLEMAN CT	ROCK HILL	SC	29835	256OJ004
HAWKEYE III ENTERPRISES LLC	2066 WILBUR STREET	EASTOVER	NC	28312	256OJ005
HOUGH WILLIAM EMMET	PO BOX 28	CHESTERFIELD	SC	29709	256OJ006
CLOANINGER WILLIAM G - ANNE K	13930 IDLEWILD RD	MATTHEWS	NC	28105	256OJ007
FLETCHER THOMAS A	13133 DONEGAL DRIVE	CHESTERFIELD	VA	23832	256OJ008
HARGRAVE M BATES ET LOIS B	41 JOYCE RD	TENAFLY	NJ	07670	256OJ009
TODD STEVEN W ET KATHI W	6044 BRATTON PL	CHARLOTTE	NC	28277	256OJ010
THE MELETIS FAMILY LIMITED PAR	1007 BRIARCLIFF RD	MOORESVILLE	NC	28115	256OJ011
FISERV ISS & CO FBO J RENNIE JR & C/O SUNSET VACATIONS	401 SOUTH SUNSET BLVD	SUNSET BEACH	NC	28468	256OJ012
BLACK JOHN A ET CHRISTINE S	PO BOX 8169	OCEAN ISLE BEACH	NC	27410	256OJ013
HARRISON MARK A & REBECCA BLACK	5002 LANCASTER ROAD	GREENSBORO	NC	27410	256OJ013
BUGG ROBERT W ETUX JEANNETTE	1704 ROSEBANK LANE	CHARLOTTE	NC	28226	256OJ014
HUGG INVESTMENT GROUP LLC	36 YAUPON WAY	OAK ISLAND	NC	28465	256OJ015
MOORE MALCOLM C II ETUX LARA M	7033 COPPERLEAF PLACE	CARY	NC	27519	256OJ016
THOMAS WILLIAM C ET LUCILE R	1108 BRAUGHTON AVE	CONCORD	NC	28025	256ND00104

MARLIN STREET

Name	Mailing Address	City	St	Zip	Parcel #
LINDSEY FRANCES I	3023 COUNTRY LANE	REIDSVILLE	NC	27320	256OJ017
LAVELLE LYDIA	8107 KIT LANE	CHAPEL HILL	NC	27516	256OJ018
WILLIAMSON JOHN H & HARRY GLEEN	1027 SHADY BLUFF DR	CHARLOTTE	NC	28211	256OJ019
CHINNIS KATHLEEN W ETALS	61 LANDS END DRIVE	GREENSBORO	NC	27408	256OJ020
BELL TONY J JR ETALS	110 EQUESTRIAN COURT	CARY	NC	27513	256OJ021
MILLSAPS JEANETTE H TRUSTEE	825 BUTTONWOOD DRIVE	WINSTON SALEM	NC	27104	256OJ022
SAWTSCHENKO ALEXANDER P (LT)	8999 TWIN RIVERS LANE	GLOUCESTER	VA	23061	256OJ023
MILLSAPS ANDREW KIRK	181 BROADMOOR LN APT P	WINSTON SALEM	NC	27104	256OJ024
BRADFORD WILLIAM W ET MARGARET	PO BOX 7673	OCEAN ISLE BEACH	NC	28469	256OJ025
COE CLAUDE S ETUX CHRISTINE D	10501 ROSEBERRY COURT	CHARLOTTE	NC	28277	256OJ026
WILKINSON WOODY H ETALS	133 N 2ND STREET	SMITHFIELD	NC	27577	256OJ027
CC & FT OLDHAM LLC	1276 OLD LYSTRA ROAD	CHAPEL HILL	NC	27517	256OJ028
CC & FT OLDHAM LLC	1276 OLD LYSTRA ROAD	CHAPEL HILL	NC	27517	256OJ029
WILSON ROBERT J III ETUX RITAMARIE	8 WOODBINE CT	DURHAM	NC	27713	256OJ030
BOND S ANDREW	3617 BEAVER FORD RD	WOODBRIDGE	VA	22192	256OJ031
CLARKSON FAMILY PROPERTIES LLC ETAL	602 27TH AVENUE N	MYRTLE BEACH	SC	29577	256OJ032
BROWN J RICHARD C/O REBECCA BROWN	3037 WYNTREE RIDGE WAY	RALEIGH	NC	27606	256NA001
MARTIN JANICE K	622 GALWAY LANE	COLUMBIA	SC	29209	256NA002
STEWART KAYLA J	2049 LANGHAM LANE	RALEIGH	NC	27615	256NA003
MAURER SCOTT A ET CHRISTINE S	591 BORO LINE RD	TRAPPE	PA	19426	256NA004
MELVIN CHARLES H JR ET DEBBIE	2217 SELWYN AVENUE	CHARLOTTE	NC	28207	256NA005
GREALIS GEORGE E ET BARBARA A	216 LAFAYETTE ST	CHICOPEE	MA	1020	256NA006
JONES MATHEW ET STACEY	31 WISETON CT	SIMPSONVILLE	SC	29681	256NA007
MOOCK BRADLEY H ETUX JEANINE M	6717 HAMMERSMITH DR	RALEIGH	NC	27613	256NA008
ROGERS GEORGE C ETUX	3215 ALDRICH DRIVE	CUMMING	GA	30040	256NA009
DAVIS CHARLES	567 HICKORY HILL CIRCLE	BLACKSBURG	VA	24060	256NA010
HOKE RONALD D ETUX LORRAINE A	3310 PLEASANTS ROAD	POWHATAN	VA	23139	256NA011

Town of Sunset Beach Navigation Project
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MARLIN STREET

Name	Mailing Address	City	St	Zip	Parcel #
SUGGS MARK F	321 FLEER ROAD	THOMASVILLE	NC	27360	256NA012
ANSON NICHOLAS ETUX SUSAN CONCORDIA	203 MAPLE CREEK COURT	APEX	NC	27502	256NA013
KELLEHER MICHAEL	13 HEMLOCK DRIVE	MAHOPAC	NY	10541	256NA014
DAVIS RYAN S ETUX TONI O	6868 DAVID COUNTRY RD	RANDELMAN	NC	27317	256NA015
PIERCE THOMAS A ET VEANNA M	13125 ADDISON ROAD	ROSWELL	GA	30075	256NA016

SAILFISH STREET

Name	Mailing Address	City	St	Zip	Parcel #
PAGE EDWARD W	708 TOPAZ COURT	SENECA	SC	29672	256NA017
YOUNG THOMAS E ETALS	7213 BIRCHBARK COURT	RALEIGH	NC	27615	256NA018
GOMEZ TERESA SPEARS	516 BROCHARDT BLVD	KNOXVILLE	TN	37934	256NA019
WARD KEITH WAYNE & ELEANOR STACY TR	3325 FALCON ROAD	PROSPER	TX	75078	256NA020
KORUDA MARK J ET BARBARA J	136 CAROLINA FOREST COURT	CHAPEL HILL	NC	27516	256NA021
CATHEY JOSEPH H JR ETUX PEGGY	1800 CHESTNUT LANE	MATTHEWS	NC	28104	256NA022
NEWTON JAMES H ETUX SUSAN C	405 TRAMORE DR	CHAPEL HILL	NC	27516	256NA023
SMALL JO ANN GRIFFIN TRUSTEE	165 SUMMERLEA DR	CHARLOTTE	NC	28214	256NA024
WATKINS TRACEY L ETUX WEBB KELLY	15 HUBBARD COURT	STAFFORD	VA	22554	256NA025
ELLIOTT JEFFREY M ETUX DARLENE W	13313 LADY ASHLEY RD	MIDLOTHIAN	VA	23114	256NA026
BLACK JOHN A & CHRISTINE S	PO BOX 8169	OCEAN ISLE BEACH	NC	28469	256NA027
HARRELL ANN M	412 SAILFISH ST	SUNSET BEACH	NC	28468	256NA028
DORIA DAVID ETUX SUSAN	5112 WOODVALLEY DR	RALEIGH	NC	27613	256NA029
NORRIS BARBARA P ETVIR	14 PATTERDALE PLACE	DOWINGTON	PA	19335	256NA030
WIGGINS CHARLES ETUX SUSAN	8500 GLENLAKE CT	RALEIGH	NC	27606	256NA031
GARNER JAMES H ET DOROTHY M	116 GARNER BRITT DR	ROBBINS	NC	27325	256NA032
HANEY BARBARA H	13440 OAKWOOD DRIVE	LAURINBURG	NC	28352	256NA032
DAVIS GEORGE H JR	317 LEANING TREE RD	COLUMBIA	SC	29223	256NA033
VOGLER PROPERTIES LLC	109 RONSARD LANE	CARY	NC	27511	256NB001
VOGLER PROPERTIES LLC	109 RONSARD LANE	CARY	NC	27511	256NB002
SMITH ARNOLD A ETALS	263 WOODLANDS DR	TUXEDO PARK	NY	10987	256NB003
LYLE RICHARD ETUX PEGGY	2780 KECOUGHTAN RD	PFAFFTOWN	NC	27040	256NB004
SALANE TERESSA HUTSON	104 CRICKET HILL ROAD	COLUMBIA	SC	29223	256NB005
FABREY ROBERT H II ET CAROL A	66 GERVAIS WAY	PAWLEYS ISLAND	SC	29585	256NB006
BURTON WILLIAM C ET LINDALYN A	11808 EDGEWATER COURT	RALEIGH	NC	27614	256NB007
WEST HOWARD P ETUX ELLEN B	817 ABELIA ROAD	COLUMBIA	SC	29205	256NB008
HARRINGTON FRIEDA B	7103 EAST CREEKS EDGE DR	WILMINGTON	NC	28409	256NB009
PHILLIPS JULIUS C ETALS	601 W ROSEMARY ST #315	CHAPEL HILL	NC	27516	256NB010
ALDERSON PATRICK L ET KATHY C	421 SAILFISH ST	SUNSET BEACH	NC	28468	256NB011
BUTCHER JOHN E ETUX JOANIE R	29 WALLACE LANE	STAFFORD	VA	22554-8836	256NB012
MCGEE JANICE L & LESLIE J DEHAVEN	241 COLONY DRIVE	MOORESVILLE	NC	28115	256NB013
CARROS JAMES N ETALS	74 ROCK CREEK DRIVE	GREENVILLE	SC	29605	256NB014
MEASE ANNA S AS TRUSTEE	22211 SHILOH CHURCH ROAD	BOYDS	MD	20841	256NB015
SINGLETARY JOSEPH LEE	431 SAILFISH	SUNSET BEACH	NC	28468	256NB016
TAYLOR DONALD J & VIRGINIA J	561 FAIRBURN CT NW	CALABASH	NC	28467	256NB017

Town of Sunset Beach Navigation Project
Maintenance Dredging of S. Jinks Creek, the Bay Area & the Feeder Channel
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DOLPHIN STREET

Name	Mailing Address	City	St	Zip	Parcel #
BOVE HOLDINGS LLC	335 BEECHNUT HILL AVE	AKRON	OH	44333	256NB018
BOVE HOLDINGS LLC	335 BEECHNUT HILL AVE	AKRON	OH	44333	256NB019
JOHNSON RAY N ET TERRY M	740 OAK POINTE DR	CLEVELAND	GA	30528	256NB020
DAVIS PENNY P	200 WOODLAND CIRCLE	RUTHERFORDTON	NC	28139	256NB02001
FARRAR JOHN WILLIAM TRUSTEE	3504 BIRDSBORO DRIVE	FAIRFAX	VA	22033	256NB021
SPANOS PAUL C ET KATHRYN L	850 AUSTIN LANE	WINSTON-SALEM	NC	27106	256NB022
HESTERS OTB LLC	4115 SOMERSET DR	OXFORD	NC	27565	256NB023
DANCY JANET B	PO BOX 7838	OCEAN ISLE BEACH	NC	28469	256NB024
DANCY JANET B	PO BOX 7838	OCEAN ISLE BEACH	NC	28469	256NB025
MANIS PAUL BARTON ETUX	121 SHADOW RIDGE PLACE	CHAPEL HILL	NC	27516	256NB027
PERFECT DAZE LLC	706 CRAVEN STREET	NEW BERN	NC	28560	256NB028
HERNDON STANLEY C ET DEBRA GILL	808 BELL DRIVE	ROCKY MOUNT	NC	27803	256NB029
CHAO NELSON J ET NORMA L POULSEN-CH	2408 VINTAGE HILL DR	DURHAM	NC	27712	256NB030
MENGEL LOIS S - % HARRY SAKELLARIS, EXECU	PO BOX 8200	DANVILLE	VA	24543	256NB031
PEDDER CHRISTIE ETVIR	1347 SHINNECOCK LANE	INDIAN LAND	SC	29707	256NB032
MCKINNEY BARNEY	3147 N HILL RD #23	PORTSMOUTH	OH	45662	256NB033
GOSNEY DENNIS R ET DEBORAH G	PO BOX 969	MONROE	NC	28111	256NC001
GIBSON PATTERSON B ETALS	420 E. MASSACHUSETTS AVE	SOUTHERN PINES	NC	28387	256NC002
BECK ALBERT WEBSTER	51 O'DONALD RD	ASHEVILLE	NC	28806	256NC003
BARBER EDWARD Z	2156 CUMBERLAND DR SE	SMYRNA	GA	30080	256NC005
BRYAN KENNETH M & ETALS	248 SUMMERWINDS DR	CARY	NC	27518	256NC006
SCHWEIGHARDT RUSSELL A ETUX SONYA K	1345 SHIREBOURN	HICKORY	NC	28602	256NC007
FELTON CHARLES M JR	210 EAGLE POINTE DR	COLUMBIA	SC	29229	256NC008
ANDREWS SHERYL D	5111 LAKESHORE DRIVE	COLUMBIA	SC	29206	256NC009
ALDERSON ROBERT A ET LESLIE L	827 WINDSON RD	CUMBERLAND	MD	21502	256NC010
OSBORNE CHARLES FREMONT JR	603 ABERDEEN DR.	CHAPEL HILL	NC	27516-4459	256NC011
MATTHEWS HANSON S JR ETALS	2524 INDEPENDENCE BLVD	WILMINGTON	NC	28412	256NC012
SWAN CARL	9817 EMERALD DR -U9	CHARLOTTE	NC	28278	256NC013
ODOM ALVIN J JR ET ANNETTE Y	PO BOX 7359	OCEAN ISLE BEACH	NC	28469	256NC014
DOLPHIN STREET LLC	513 IVERSON WAY	CHARLOTTE	NC	28203	256NC015
GLENN CHALMERS L IV	830 OAK BROOK BLVD	SUMTER	SC	29150	256NC016
COSTIN JOHN WILLIAM	912 GROVE STREET	FAYETTEVILLE	NC	28301	256NC017

COBIA STREET (CANAL)

Name	Mailing Address	City	St	Zip	Parcel #
NAIN ANN B & GINA S GAINES	4437 FOREST GATE LANE	CHARLOTTE	NC	28270	256NC018
MARTIN DONALD C ET CHRISTY F	2924 MICHELLE DR	MATTHEWS	NC	28105	256NC019
COWARD DAVID SCOTT ETUX	523 MOSS TREE DR	WILMINGTON	NC	28405	256NC020
MONTENYOHL ERIC L ET MARGARET M	116 RAVENNA WAY	CARY	NC	27513	256NC02001
MOORE FREDDIE H TRUSTEE	1860 CEDAR DRIVE	LENOIR	NC	28645	256NC021
GROVE MICHAEL	7 SUNRISE POINT CT	LAKE WYLIE	SC	29710	256NC022
WILLOUGHBY MILDRED SMITH	1385 WILLOUGHBY RD	TABOR CITY	NC	28463	256NC023
DUNLAP KEVIN	16408 MCGREGOR LANE	CHARLOTTE	NC	28278	256NC02301
BOWEN INVESTMENTS	55 TRAMMELL ST	MARIETTA	GA	30064	256NC024
MOSHIER MARK ETUX ELIZABETH	1074 CANTEBURY LN	CHAPEL HILL	NC	27517	256NC025
KING WALTER L SR ET MIRIAM H	5048 16TH STREET DR NE	HICKORY	NC	28601	256NC026
HOSTETTER RICHARD B ETUX JOY B	24324 COUNTY ROAD 26	ELKHART	IN	46517	256NC027
OAKES ROBERT E JR TRUSTEE	708 SOUTH CREEK DRIVE	NASHVILLE	NC	27856	256NC028

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COBIA STREET (CANAL)

Name	Mailing Address	City	St	Zip	Parcel #
LAWRENCE JUDSON	3021 PINETUCK LANE	ROCK HILL	SC	29730	256NC029
SARKIS FAMILY LLC	7 GOLDEN DRIVE	WHEELING	WV	26003	256NC030
BEAMON MARIANNE E & CHRISTINA	POST OFFICE BOX 1403	NORTH WILKESBORO	NC	28659	256NC031
KISER FRANK W	1330 INDIA HOOK RD #514	ROCK HILL	SC	29732	256NC032
PAGE GEORGE W - % BOA 10-0803924	PO BOX 831589	DALLAS	TX	75283	256NC033

NORTH SHORE DRIVE EXT. (WATER ACCESS)

Name	Mailing Address	City	St	Zip	Parcel #
EVANS F GLENN ETUX NANCY D	45 MORRISON LANE	HARTSVILLE	SC	29550	256ND00301
DELLINGER DAVID L ETUX CANDICA W	2338 CLYDE ROAD	CATAWBA	NC	28609	256ND00302
ROBERTSON JOHN T ETUX DEBORAH	PO BOX 690328	CHARLOTTE	NC	28277	256ND00303
LINK LANCE ETUX PAMELA	5720 BRIGHTINGTON CT	KENERSVILLE	NC	27284	256ND00304
REHM JUDY	44 WOODSIDE CIRCLE	PINE	CO	80470	256ND00305
RS GILES LLC	PO BOX 4863	PINEHURST	NC	28374	256ND00306
POPE FRANK LAURIE JR ETUX MARGIE K	1213 N SHORE DR	SUNSET BEACH	NC	28468	256ND00307
REINHARDT MATTHEW F ETUX CLARE E	325 LAKEWOOD DR	PINEHURST	NC	28374	256ND00308
SWEETMAN ROBERT J ETUX MARY EILEEN	2008 SOUTHFORK ROAD	CHESTER	SC	29706	256ND00309
GOFF BENJAMIN F.	18 POWERS FARM ROAD	RANDOLPH	MA	02368	256ND00310
H&H CONSTRUCTORS INC	2919 BREEZEWOOD AVE SUITE 400	FAYETTEVILLE	NC	28303	256ND00311
H&H CONSTRUCTORS INC	2919 BREEZEWOOD AVE SUITE 400	FAYETTEVILLE	NC	28303	256ND00312
RUGGIERO PETER ETUX LINDA	517 QUAKER MEADOWS LN	FORT MILL	SC	29715	256ND00313
LILLIS RICHARD ETUX LINDA	1425 WESCOTT DRIVE	RALEIGH	NC	27614	256ND00314
MAURER STUART ETUX KAREN	PO BOX 146	NAVESINK	NJ	07752	256ND00315
DAIGLE BRIAN ETUX RAGAN	1725 FRENCHWOOD DRIVE	RALEIGH	NC	27612	256ND00316
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00317
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00318
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00319
KISSAL BRUCE ETUX CAROL	855 EMORY POINT DR A3668	ATLANTA	GA	30329	256ND00320
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00321
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00322
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00323
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00324
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00325
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00326
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00327
CEJ HOLDINGS	PO BOX 567	FAIRMONT	NC	28340	256ND00328
RUCKER DAVID ETUX TONUA	7009 NORTH RIDGE DRIVE	RALEIGH	NC	27615	256ND00329
WISHON BARRY ETUX KAREN	7608 THE POINTE	RALEIGH	NC	27615	256ND00330
BORMANN THOMAS J ETUX DIANNE K	1515 NORTH SHORE DR	SUNSET BEACH	NC	28468	256ND00331
BORMANN THOMAS J ETUX DIANNE K	1515 HORTH SHORE DR	SUNSET BEACH	NC	28468	256ND00332
ROSSI MICHAEL A ETUX	8499 SILVERVIEW CT	LORTON	VA	22079	256ND00335
DUNAWAY DONALD W & LYNDA L DUNAWAY	10613 MYSTIC POINTE DRIVE	FREDERICKSBURG	VA	22407	256ND00336

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RIVERSIDE DRIVE

Name	Mailing Address	City	St	Zip	Parcel #
BECK ALBERT WEBSTER	51 O'DONALD RD	ASHEVILLE	NC	28806	256ND00103
JANE DEAN LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00105
JANE DEAN LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00106
JANE DEAN LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00107
ZBOROWSKI LAWRENCE ETUX DEBRA	22 CHAMBERLAIN PARKWAY	WORESTER	MA	01602	256ND00108
JANE DEAN LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00109
JANE DEAN LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00110
JANE DEAN LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00111
WILLIAMSON STEVEN ETUX AILEEN	49 ELDORADO DRIVE	WAYNE	NJ	07470	256ND00112
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00113
REED CHARLES V AND DANA S	10501 WYNYATES LANE	CHARLOTTE	NC	28270	256ND00114
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00115
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00116
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00117
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00118
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00119
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00120
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00121
HARTLANDER RICK AND BARBARA	407 SCHOOLHOUSE ROAD	MONROE	NJ	08831	256ND00122
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00123
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00124
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00125
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00126
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00127
SPENCER SEAN ST. CYR, LORIE SEAN ST. CYR	500 PAINTED WOOD DR.	ELDERSBURGCAR	MD	21784	256ND00128
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00129
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00130
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00131
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00132
WALLER JAMES W AND SIMS, SHIRLEY D	24 FAIRWAY DRIVE	SHALLOTTE	NC	28470	256ND00133
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00134
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00135
MOORE MICHAEL E AND KIMBERLY E	11120 PENDER WOOD COURT	RALEIGH	NC	27617	256ND00136
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00137
VENKATESWARAN VISWANATHAN AND PADMAPRIYA RAMASWAMY	1024 KENNICOTT AVENUE	CARY	NC	27513	256ND00138
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00139
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00140
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00141
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00142
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00143
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00144
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00145
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00146
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00147
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00148
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00149
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00150

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RIVERSIDE DRIVE

Name	Mailing Address	City	St	Zip	Parcel #
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00151
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00152
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00153
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00154
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00155
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00156
BARILLA VINCENT AND KAREN A.	6841 WEEPING WILLOW PLACE SW	OCEAN ISLE BEACH	NC	28469	256ND00157
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00158
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00159
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00160
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00161
SPAINHOUR MARY	4614 OLD LAKE TRAIL	HILLSBOROUGH	NC	27278	256ND00162
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00163
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00164
FARASY MICHAEL T AND KELLY	5018 CLYDEN COVE	RALEIGH	NC	27612	256ND00165
MARCKISOTTO DARLENE	3 GRAYHURST DRIVE	PITTSBURGH	PA	15235	256ND00166
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00167
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00168
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00169
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00170
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00171
SUNSET BEACH HOLDINGS II LLC	2421 BOWLAND PARKWAY #104	VIRGINIA BEACH	VA	23454	256ND00172

NORTH SHORE DIRVE EXT. (BAY)

Name	Mailing Address	City	St	Zip	Parcel #
DEFRANCO JOSEPH M JR ETUX ANDREA M	7553 SILVER VIEW LN	RALEIGH	NC	27613	256ND00344
THOMAS JAMES JR ETUX JACQUELINE T	1520 NORTH SHORE DR	SUNSET BEACH	NC	28468	256ND00345
MARTYN ANTHONY ETUX FAITH R	6853 TOWBRIDGE RD	FAYETTEVILLE	NC	28306	256ND00346
LAUGHERY THOMAS R ETUX DEBRA Z	7608 WINGFOOT DRIVE	RALEIGH	NC	27615	256ND00347
VESTAL MARK ET ANITA	117 GREAT OAKS	FAYETTEVILLE	NC	28303	256ND00348
HEILIG DAVID S ETALSL	100 HARRISON COURT	CHAPEL HILL	NC	27516	256ND00349
FLOYD HENNARD S & TIMOTHY O JACKSON	91 OCEAN BLVD W	OCEAN ISLE BEACH	NC	28469	256ND00350

19TH STREET (BAY)

Name	Mailing Address	City	St	Zip	Parcel #
MATHERS EDWARD T ETUX LISA L	9114 FERNWOOD RD	BETHESDA	MD	20817	256ND00240
NORTHINGTON ROBERT S JR ET MARIANNE	1190 ARBOR RD	WINSTON SALEM	NC	27104	256ND00242
NORTHINGTON ROBERT S JR ET MARIANNE	1190 ARBOR RD	WINSTON SALEM	NC	27104	256ND00243
SAPPENFIELD AUDREY GADDY	111 AMITY CIRCLE	BELMONT	NC	28012	256ND00244

18TH STREET (BAY)

Name	Mailing Address	City	St	Zip	Parcel #
WILLIAMSON GERALDINE	416 18TH ST	SUNSET BEACH	NC	28468	256ND00226

17TH STREET (BAY)

Name	Mailing Address	City	St	Zip	Parcel #
HENSLEY DAVID A ET JENNIFER L	4909 LAKEGREEN CT	RALEIGH	NC	27612	256ND00225
CASEY JAMES CLIFTON ETUX ANN S	2715 KATHWOOD COURT	FLORENCE	SC	29501	256ND00210
KOWTONIUK WALTER V ET CAROL E	201 GARDNER STREET	JOHNSTOWN	PA	15905	256ND00208

Town of Sunset Beach Navigation Project
Maintenance Dredging of S. Jinks Creek, the Bay Area & the Feeder Channel
Adjacent Riparian Property Owner List

MAJESTIC OAK DRIVE (BAY)

Name	Mailing Address	City	St	Zip	Parcel #
SUNSET BEACH & TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BL00101
SUNSET BEACH & TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BL003
SUNSET BEACH & TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BL004
SUNSET BEACH & TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BL005
SUNSET BEACH & TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BL006
SUNSET BEACH & TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BL007
SUNSET BEACH & TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BL008
SUNSET BEACH & TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BL009
SUNSET BEACH & TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BL010

COBIA STREET PROPERTY (BAY)

Name	Mailing Address	City	St	Zip	Parcel #
COULTER RONALD G ETUX	2004 ELCOMBE COURT	CHAPEL HILL	NC	27517	256ND053
CROOM DALLAS KEVIN & MCINTYRE M S	109 HALEY HOUSE LANE	CARY	NC	27519	256ND054
WILLOUGHBY MARY L	425 COBIA STREET	SUNSET BEACH	NC	28468	256ND055
VOGEL JEFFERY M ETUX	427 COBIA ST	SUNSET BEACH	NC	28468	256ND056
TRUST C - C/O RICKENBAKER MARY KAYE	PO BOX 1796	SUMTER	SC	29151	256ND057
PASSIALES JAMES J TRUSTEE AND	8855 RADCLIFF DR #57D	CALABASH	NC	28467	256ND058

CANAL DRIVE PROPERTY (BAY)

Name	Mailing Address	City	St	Zip	Parcel #
CARTER RICHARD M TRUSTEE & J CARTER	101 ROCKINGHAM ROAD	GREENVILLE	SC	29607	256ND061
WEBB H MICHAEL	801 CLEMONT DRIVE NE	ATLANTA	GA	30306	256ND062
BIGGERS MICHAEL D ETUX BETSY B	8030 ROCKY RIVER RD	HARRISBURG	NC	28075	256ND063
MCCREARY VENTURE CAPITAL LLC	POST OFFICE BOX 130	NEWTON	NC	28658	256ND064
RAHMAN MICHAEL ETUX	428 BISCAYNE STREET	WINSTON SALEM	NC	27104	256ND065
DELDUCA ANTHONY ET	855 MAIN AVE	BAY HEAD	NJ	08742	256ND066
GRANT LEE ETUX SOMMER	22 MONTROSE LANE	WILMINGTON	NC	28405	256ND06601
CRAVEN THOMAS F ETUX NANCY H	124 BERRY HILL DRIVE	RALEIGH	NC	27615	256ND067
WELSHOFER JOHN ARTHUR	PO BOX 963	MATTHEWS	NC	28106	256ND06701
PECK RAY F JR & ETALS	10709 BASS KETTLE RD	RALEIGH	NC	27614	256ND068
WAKE SUNSET ASSOCIATES - % DEBRA YOUNG	2209 ROYAL OAKS DR	RALEIGH	NC	27615	256ND06801
HARRISON JOHN M ETALS	422 VILLAGE RD	SHALLOTTE	NC	28470	256ND069
CORBETT JOHN F JR ETUX	1313 CANAL DRIVE	SUNSET BEACH	NC	28468	256ND06901
HARTSFIELD PROPERTIES LLC	PO BOX 267	HOPE MILLS	NC	28348	256ND070
SHUGART WAYNE C ETALS - % MICHAEL PEARSALL	905 CAROLINA AVE	WINSTON SALEM	NC	27101	256ND071
SPORTS ENDEAVORS INVESTMENTS LLC	431 US HWY 70A EAST	HILLSBOROUGH	NC	27278	256ND072
KNEDLIK RONALD WESLEY ETUX ANITA T	3230 5TH STREET CT NW	HICKORY	NC	28601	256ND073
WALKER ZACHARY T III ETALS	8811 CYPRESS LAKES DR UNIT 401	RALEIGH	NC	27615	256ND074
MAUNEY WILLIAM C ET GLORIA Y	PO BOX 36113	ROCK HILL	SC	29732	256ND075
AUSTIN L GLENN JR ET TEENA P	367 FOXCROFT DR	BLUE RIDGE	VA	24064	256ND076
RUSH PAUL F ET JUDITH N	11102 OLD JOHNS ROAD	LAURINBURG	NC	28352	256ND077

Town of Sunset Beach Navigation Project
Maintenance Dredging of S. Jinks Creek, the Bay Area & the Feeder Channel
Adjacent Riparian Property Owner List

CANAL DRIVE PROPERTY (BAY)

Name	Mailing Address	City	St	Zip	Parcel #
SUNSET VIEW INC - C/O BETTY A UPSHAW(TREAS)	2890 ST CLAIRE RD	WINSTON-SALEM	NC	27106	256MA054
HILL DOUGLAS K	1613 CANAL DR	SUNSET BEACH	NC	28468	256MA055
SUNSET DAYS LLC	1350 HICKMAN RD NW	CALABASH	NC	28467	256MA056
MANESS JOHN M ETUX TERESA W	7516 VILLANOW DRIVE	SANFORD	NC	27332	256MA057
BIGGERS MICHAEL D ETUX BETSY B	8030 ROCKY RIVER RD	HARRISBURG	NC	28075	256MA058
MEYERS ROBERT N ETUX JUDITH A	12757 FOLLY QUARTER RD	ELLICOTT CITY	MD	21042	256MA059
GOFF KENNETH B ETUX SUSAN H	4520 W BENOIT DR	BLACKSBURG	VA	24060	256MA060
STEPHENS JANE A & SARA L LUDLUM	PO BOX 9695	ASHEVILLE	NC	28815	256MA061
CALDWELL FRANK S ETUX KATHERINE K	960 MURDOCKSVILLE RD	WEST END	NC	27376	256MA062
CAROLINA STONE SETTING CO INC	P O BOX 156	CARY	NC	27512	256MA06201
SMITHDEAL W GRAY & LISA J	1204 CHECKERBERRY DRIVE	MORRISVILLE	NC	27560	256MA063
HOOVER ROBERT D ET MARGARET	601 FLOYD STREET	BLACKSBURG	VA	24060	256MA064
GUIDETTI RICHARD R ET CATHY	800 MARY ACRES COURT	WINSTON SALEM	NC	27106	256MA065
BOYKIN RICHARD A ETUX ANNA	946 JAMESTOWN CRES	NORFOLK	VA	23508	256MA066
MMLP LLC	3761 MASON RD	NEW HILL	NC	27562	256MA067
WEST HOWARD ETUX ELLEN B	817 ABELIA ROAD	COLUMBIA	SC	29205	256MA068

SOUTH JINKS CREEK

Name	Mailing Address	City	St	Zip	Parcel #
HETRICK BRETT R ETUX BEVERLY K	3808 SOLEBUIRY PLACE	MIDLOTHIAN	VA	23113	256MA053
BOOTH LARRY D ETUX VICKI A	100 ASHE PLACE	CHAPEL HILL	NC	27517	256MA052
INGRAM ARTHUR M SR ETALS	2711 FAIRVIEW RD	RALEIGH	NC	27608	256MA051
HA KHIE SEM	PO BOX 8019	OCEAN ISLE BEACH	NC	28469	256MA050
WILLIS STEVEN EDWARD ETALS	3070 HIGH CLIFFS ROAD	PFAFFTOWN	NC	27040	256MA049
DOVE JO ANN Y	2327 ROSWELL AVE	CHARLOTTE	NC	28207	256MA048
GADDY MORGAN PROPERTIES LLC	295 COYOTE TRAIL	SALISBURY	NC	28144	256MA047
WATKINS THOMAS R JR ET LYDIA T	7360 FONTANA RIDGE LN	RALEIGH	NC	27613	256MA046
ACTON JOHN A ET ANITA M	3200 MILLSTREAM PLACE	RALEIGH	NC	27609	256MA045
REED JOHN W ET SALLY G	508 S MAIN ST	WINSTON SALEM	NC	27101	256MA04301
TYSON MARGARET S	3716 CYPRUS CLUB DR	CHARLOTTE	NC	28210	256MA043
LATELLA DONALD D	219 WOODCREST RD	FAYETTEVILLE	NC	28305	256MA042
HARRIS WADE KELLY ETUX LEIGH E	859 CHARTIER CT	ASHEBORO	NC	27203	256MA041
MERKEL THOMAS E ETUX SUSAN A	4831 ALLENCREST LANE	DALLAS	TX	75244	256MA040
KNOTT C FRANKLIN JR ET CAROLINE K	3646 WATKINS FARM ROAD	HILLSBOROUGH	NC	27278	256MA039
BOND JAMES & JAN DIAMONDSTONE TRSTE	1817 E MAIN STREET	SUNSET BEACH	NC	28468	256MA038
MUNTZ JAMES A ETUX DEBORAH L	408 COVINGTON ROAD	HAVERTOWN	PA	19083	256MA037
TRIBLE PRESTON G	640 DEERFIELD FARM CT.	GREAT FALLS	VA	22066-3934	256MA03601
1826 MAIN STREET EAST COA/SUNSET ENDS PARTNERS C/O JAY LUCAS	445 LAKE SHORE DRIVE	SUNSET BEACH	NC	28468	256MA003603
JONES SUNSET PROPERTIES LLC ETALS C/O MORGAN RONALD	4610 CHERRYHILL LANE	WINSTON SALEM	NC	27106-4287	256MA003602

Town of Sunset Beach Navigation Project
Maintenance Dredging of S. Jinks Creek, the Bay Area & the Feeder Channel
Adjacent Riparian Property Owner List

JINKS CREEK PROPERTY

Name	Mailing Address	City	St	Zip	Parcel #
SUNSET BEACH WEST LLC	1574 MONSTER BUCK ESTATES	SUPPLY	NC	28462	256JA003
BIG PINE HOLDINGS LLC	1574 MONSTER BUCK ESTATES	SUPPLY	NC	28462	256JA00301
LEGGETT, CONSTANCE	1213 SMITH BAY CIRCLE W	WILMINGTON	NC	28405	256ND00102
STATE OF NORTH CAROLINA	3441 ARENELL STREET	MOREHEAD CITY	NC	28557	256JA002
DEBELL JOHN D JR ETUX PAMELA A	5316 CHANDLEY FARM CIRCLE	CENTREVILLE	VA	20120	256ND00337
SCOTT PETER K ET CAROL K	1527 NORTH SHORE DRIVE	SUNSET BEACH	NC	28468	256ND00338
GORNEY JON ETUX NANCY	31780 LAKE ROAD	AVON LAKE	OH	44012	256ND00339
MARTYN ANTHONY ETUX FAITH R	6853 TOWBRIDGE RD	FAYETTEVILLE	NC	28306	256ND00343

5TH TO 6TH

Name	Mailing Address	City	St	Zip	Parcel #
SMITH CHARLES L JR	502 E MAIN ST	SUNSET BEACH	NC	28468-4074	263BJ005
SUNSET BEACH TWIN LAKES	435 W SHORELINE DRIVE	SUNSET BEACH	NC	28468	263BJ00101
HUNT MARY WHALEY PHILLIPS	322 MCRAE ST	LAURINGBURG	NC	28352	263BJ003
FABREY FAMILY SSB HOUSE LLC	11612 W 101ST TERRACE	OVERLAND PARK	KS	66214	263BJ002

6TH TO 7TH

Name	Mailing Address	City	St	Zip	Parcel #
SUH KENDALL HYUNSUK TRUSTEE	PO BOX 5189	OCEAN ISLE BEACH	NC	28469	263CA040
SUH KENDALL HYUNSUK TRUSTEE	PO BOX 5189	OCEAN ISLE BEACH	NC	28469	263CA04001
MOTEL EQUIPMENT LEASING CORP	2133 SUTTON SPRINGS RD	CHARLOTTE	NC	28226	263CA041
SUNSET BEACH MUSIC LLC	565 WEST DAVIS BOULEVARD	TAMPA	FL	33606	263CA042
FOWLER ROBERT L & BONNIE TRUSTEES	4433 BENT TREE FARM RD	WINSTON SALEM	NC	27106	263CA043

7TH TO 8TH

Name	Mailing Address	City	St	Zip	Parcel #
SHIPLEY ROBERT K - TRUSTEE THE SHIPLEY TRUST	105-F JONES FERRY ROAD	CARRBORO	NC	27510	263CA037
ODOM ALVIN J JR & ANNETTE Y TRUSTEE	P O BOX 7359	OCEAN ISLE BEACH	NC	28469	263CA03701
ODOM ALVIN J JR & ANNETTE Y TRUSTEE	P O BOX 7359	OCEAN ISLE BEACH	NC	28469	263CA03702
706 EAST MAIN STREET COA	PO BOX 7359	OCEAN ISLE BEACH	NC	28469	263CA03703
SCHAEDE KAREN MCKEITHEN ETVIR	3104 WILLOW OAK DR	GREENSBORO	NC	27408	263CA038
EPSTEIN DIANE F TRUSTEE	11 WESTHAM PARKWAY	RICHMOND	VA	23229	263CA039
SUNSET TEE TIME LLC	445 LAKE SHORE DRIVE	SUNSET BEACH	NC	28468	263CA03901
702 EAST MAIN STREET OA INC % SUNSET TEE TIME LLC	445 LAKE SHORE DRIVE	SUNSET BEACH	NC	28468	263CA03903

8TH TO 9TH

Name	Mailing Address	City	St	Zip	Parcel #
YARBROUGH-FARR CONSTRUCTION CO	PO BOX 7057	OCEAN ISLE BEACH	NC	28469	263CA03203
BROOKS JERRY N	819 KAY STREET NE	LENOIR	NC	28845	263CA03204
MASON JAMES W III ETALS	108 CANDLE COURT	ROCKY MOUNT	NC	27804	263CA033
BROOKS JERRY N	819 KAY STREET NE	LENOIR	NC	28845	263CA034
SHIPLEY GRANT F ETUX YVONNE K STAM	604 HILLSBOROUGH RD	CARRBORO	NC	27510	263CA035
COPLEY DONALD J ETUX LORI M & DIANA	608 OLD MILL LANE	CAMDEN	SC	29020	263CA036
HINDMAN CAREY M	908 SANTEE DRIVE	FLORENCE	SC	29501	263CA03601
802 MAIN STREET EAST ASSOC %DONALD COPLEY ETALS	608 OLD MILL LANE	CAMDEN	SC	29020	263CA03602

9TH TO 10TH

Name	Mailing Address	City	St	Zip	Parcel #
PROUDFOOT KEVIN ETUX BETH	4 ACORN LANE	LEBANON	NJ	08833	263CA028
HARTZOG INVESTMENTS LLC	1101 HOBSON CT	RALEIGH	NC	27607	263CA029
SELISKER MARK R ET RACHEL	4620 WHITE CHAPEL WAY	RALEIGH	NC	27615	263CA030
SORRELL FAMILY LIMITED PARTNERSHIP	512 MEADOWSWEET LANE	WAXHAW	NC	28173	263CA031

Town of Sunset Beach Navigation Project
Maintenance Dredging of S. Jinks Creek, the Bay Area & the Feeder Channel
Adjacent Riparian Property Owner List

10TH TO 11TH

Name	Mailing Address	City	St	Zip	Parcel #
CAROLINA SWEETWATER LTD	921 BEAVER ST	SEWICKLEY	PA	15143	263CA024
VOLINSKY JOHN B ETUX DIANE Y	833 ARMISTEAD ST	WINCHESTER	VA	22601	263CA02401
1008 EAST MAIN ST POA ASSOC %JOHN VOLINSKY ETUX DIANE	833 ARMISTEAD ST	WINCHESTER	VA	22601	263CA02402
PINK PARADISE LLP C/O TERRY COATS	360 BROOKTON DR	CLEMMONS	NC	27012	263CA025
MARKS MIRIAM W & JACQUELYN MASON TR	1004 E MAIN STREET	SUNSET BEACH	NC	28468	263CA026
TAYLOR LARRY W ET ELIZABETH W	1716 CEDAR DR	LENOIR	NC	28645	263CA027
VOLINSKY JOHN B ETALS	833 ARMISTEAD STREET	WINCHESTER	VA	22607	263CA03205

11TH TO 12TH

Name	Mailing Address	City	St	Zip	Parcel #
PEEPS LLC ETALS	11 CEDAR CHINE	ASHEVILLE	NC	28803	263CA023
A L MORRISON CONSTRUCTION CO INC % L.A. MORRISON	1732 HERON POINT RD SW	OCEAN ISLE BEACH	NC	28469	263CA02202
SEYCHELLES LLP	8 PINE KNOLL DRIVE	LAKE WYLIE	SC	29710	263CA021
KEY ADELADE D	PO BOX 7625	ASHEVILLE	NC	28804	263CA02002

NORTH CAROLINA
Environmental Quality

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

BRAXTON DAVIS
Director, Division of Coastal Management

June 21, 2019

Advertising@starnewsonline.com
2 Pages

Star News
Legal Advertisement Section
Post Office Box 840
Wilmington, North Carolina 28402

Re: Major Public Notice in Brunswick County

- **Town of Sunset Beach**

Hello Angie: Please publish the attached Notice in the **Wednesday, June 26, 2019** issue.

The State Office of Budget & Management requires an original Affidavit of Publication prior to payment for newspaper advertising.

Please send the original affidavit and invoice for payment to Debbie Wilson at the NC Division of Coastal Management, 127 Cardinal Drive Extension, Wilmington, NC 28405, 910-796-7266. Paying by credit card to the attention of Jarimy Springer.

Please email a copy of the credit card receipt to me.

Thank you for your assistance in this matter. If you should have any questions, please contact me at our Wilmington office.

Sincerely,

Tanya K. Pietila
Permitting Support & Customer Assistance

cc: MHC file
Courtney Spears - WiRO
Tyler Crumbley - USACE

NOTICE OF FILING OF

APPLICATION FOR CAMA MAJOR

DEVELOPMENT PERMIT

The Department of Environmental Quality hereby gives public notice as required by NCGS 113A-119(b) that the following application was submitted for a development permit in an Area of Environmental Concern as designated under the CAMA: ***On June 17, 2019 Town of Sunset Beach proposed to perform dredging at Canals A-D, Feeder Channel, Bay Area & South of Jinks Creek within Town Finger Canals, Bay Area, Feeder Channel and S. Jinks Creek adjacent to the AIWW, in Sunset Beach, Brunswick County.*** A copy of the application can be examined or copied at the office of ***Tara MacPherson,*** N.C. Dept. of Environmental Quality, Division of Coastal Management, 127 Cardinal Drive Ext., Wilmington, NC 28405, (***910-796-7425***) during normal business hours.

Comments mailed to Braxton C. Davis, Director, Division of Coastal Management, 400 Commerce Avenue, Morehead City, NC 28557-3421, prior to ***July 17, 2019*** will be considered in making the permit decision. Later comments will be accepted and considered up to the time of permit decision. Project modification may occur based on review and comment by the public and state and federal agencies. Notice of the permit decision in these matters will be provided upon written request.

AFFIDAVIT OF PUBLICATION

STATE OF NORTH CAROLINA
COUNTY OF NEW HANOVER

NOTICE OF FILING OF APPLICATION FOR CAMA MAJOR DEVELOPMENT PERMIT

The Department of Environmental Quality hereby gives public notice as required by NCGS 113A-119(b) that the following application was submitted for a development permit in an Area of Environmental Concern as designated under the CAMA: On June 17, 2019 Town of Sunset Beach proposed to perform dredging at Canals A-D, Feeder Channel, Bay Area & South of Jinks Creek within Town Finger Canals, Bay Area, Feeder Channel and S. Jinks Creek adjacent to the AIWW, in Sunset Beach, Brunswick County. A copy of the application can be examined or copied at the office of Tara MacPherson, N.C. Dept. of Environmental Quality, Division of Coastal Management, 127 Cardinal Drive Ext., Wilmington, NC 28405, (910-796-7425) during normal business hours. Comments mailed to Braxton C. Davis, Director, Division of Coastal Management, 400 Commerce Avenue, Morehead City, NC 28557-3421, prior to July 17, 2019 will be considered in making the permit decision. Later comments will be accepted and considered up to the time of permit decision. Project modification may occur based on review and comment by the public and state and federal agencies. Notice of the permit decision in these matters will be provided upon written request.

Before the undersigned, a Notary Public of Said County and State,

Jarimy Springer

Who, being duly sworn or affirmed, according to the law, says that he/she is

Accounting Specialist

of THE STAR-NEWS, a corporation organized and doing business under the Laws of the State of North Carolina, and publishing a newspaper known as STAR-NEWS in the City of Wilmington

NOTICE OF FILING OF APPLICATION FOR CAMA MAJOR DEVELOPMENT PERMIT The Department of Environmental Quality hereby gives public notice as required by NCGS 113A-119b that the following application was submitted for a development permit in an Area of Environ

was inserted in the aforesaid newspaper in space, and on dates as follows:

6/26 1x

And at the time of such publication Star-News was a newspaper meeting all the requirements and qualifications prescribed by Sec. No. 1-597 G.S. of N.C.

Jarimy Springer

Title: **Accounting Specialist**

Sworn or affirmed to, and subscribed before me this 3rd day of July, A.D., 2019

In Testimony Whereof, I have hereunto set my hand and affixed my official seal, the day and year aforesaid.

Dawn Bean

Notary Public

My commission expires 4th day of Nov., 20 23

DAWN BEAN NOTARY PUBLIC NEW HANOVER COUNTY, N

Upon reading the aforegoing affidavit with the advertisement thereto annexed it is adjudged by the Court that the said publication was duly and properly made and that the summons has been duly and legally served on the defendant(s).

This _____ day of _____, ____

_____
Clerk of Superior Court

MAIL TO:

RECEIVED
JUL 08 2019
DCM WILMINGTON, NC

Recommendations for State Permit –Town of Sunset Beach c/o Moffat & Nichol

It is staff's recommendation that the proposed dredging depths of the Sunset Beach Finger Canals, Feeder Channel, Bay Area and S. Jinks Creek appears IN**CONSISTENT** with the Rules of 15A NCAC 7H .0208 (b) Specific Use Standards (F) which states: Any Canal or Boat basin shall be excavated no deeper than the depth of the connecting waters. Therefore, it is recommended that the permit be denied or those affected inconsistent areas be conditioned out of the project.

MHC

NORTH CAROLINA
Environmental Quality

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

BRAXTON DAVIS
Director, Division of Coastal Management

June 21, 2019

MEMORANDUM:

FROM: **Courtney Spears, Assistant Major Permits Coordinator**
NCDEQ - Division of Coastal Management
127 Cardinal Drive Ext., Wilmington, NC 28405
Fax: 910-395-3964 ***(Courier 04-16-33)***
courtney.spears@ncdenr.gov

SUBJECT: *CAMA / Dredge & Fill Application Review*

Applicant: ***Town of Sunset Beach***

Project Location: *East end Canals, Feeder Channel, Bay Area of Sunset Beach, Jinks Creek and the oceanfront beach between 5th and 12th street, Adj to AIWW in Brunswick County*

Proposed Project: *Perform navigational dredging through residential systems*

Please indicate below your agency's position or viewpoint on the proposed project and ***return this form to Courtney Spears*** at the address above by ***July 17, 2019***. If you have any questions regarding the proposed project, contact Tara MacPherson at (910) 796-7425 when appropriate, in-depth comments with supporting data is requested.

REPLY:

_____ This agency has no objection to the project as proposed.
Additional comments may be attached

_____ This agency has no comment on the proposed project.

__X__ This agency approves of the project only if the recommended changes are incorporated. See attached.: **The two acres of high ground will be required to have Erosion and Sediment Control plan application and approval. Stormwater application will necessary for review for a possible exemption.**

_____ This agency objects to the project for reasons described in the attached comments.

PRINT NAME Dan Sams

AGENCY DEMLR

SIGNATURE Daniel Sams

DATE June 21, 2019

RECEIVED
JUN 21 2019
MP SECTION WIRO

MTC

Spears, Courtney

From: Crumbley, Tyler A CIV USARMY CESAW (USA) <Tyler.A.Crumbley@usace.army.mil>
Sent: Wednesday, July 3, 2019 2:14 PM
To: Arnette, Justin R CIV USARMY CESAW (USA); Spears, Courtney; Huggett, Doug; Ethan.J.Coble@uscg.mil; fritz.rohde; HORTON, J TODD CIV USARMY CESAW (US); kathryn_matthews@fws.gov; Matthew.K.Creelman2@uscg.mil; DCR - Environmental_Review; Owens, Jennifer L CIV USARMY CESAW (USA); Pace Wilber - NOAA Federal; Pete Benjamin; Bowers, Todd; Twyla.Cheatwood@noaa.gov; John; Coburn, Chad; Ryan.L.Taylor@uscg.mil; Amico, Patrick J; MacPherson, Tara
Cc: Beecher, Gary H CIV USARMY CESAW (USA); Crumbley, Tyler A CIV USARMY CESAW (USA); Mickey Sugg; Hair, Sarah E CIV CESAW CESAD (US)
Subject: [External] CAMA Major / SAW-2019-01155 / Town of Sunset Beach / Dredging of South Jinks, Canals, and Beach Placement
Attachments: Sunset Beach Canal Dredge.kmz; bio.Town of Sunset Beach.pdf; Tab_M-SJinks_Bay_FeederChannel_EFH Report-FINAL.PDF; Tab_Q-State_Historic_Preservation_Office_Historic_Resource_Review.pdf; [Non-DoD Source] Sunset Beach BA Revision ; Tab_N_S-Jinks_Bay_FeederChannel-Biological_Assessment-FINAL Re070319.pdf; ePN_SAW-2019-01155_Sunset Beach Canal Dredge South Jinks Beach Disposal.pdf

All,

Pursuant to the CAMA-Corps Programmatic Permit process, the North Carolina Division of Coastal Management (NCDCM) has forwarded to our office a copy of the CAMA permit application, Field Investigation Report and BioReport for the subject project. The attached notice requests federal agency comments on this project by August 3, 2019.

The documents submitted with the application are rather large and detailed in scope. To allow for a more abbreviated synopsis for review, I have embedded the NC DCM summary of impacts from the attached bioreport in the email below. Please utilize the attachments, the email below, and the entirety of the submitted documents as you see fit to conduct your review. Please cut and paste the link below to access the files from the Authorized Agent's website (Moffatt and Nichol). If unable to access from this link, please contact me for an alternative solution. Again, please note that the files are extremely large:

https://team.moffattnichol.com/DownloadWeb/predownload.aspx?qs=LR82FPL2GKZR6E2YA8NTK8A4FSVB2VRS9VNEPUJTKTRHUY8GDR5TSKR2XAJMKLDBQKSAYVTHY9T5TAF299WXS3MWFG7SJ8RUYCLAYR2VUGMSM8AKDUXWKJWR54WSJAJEY3P2H3S9T3BLGD8KD7N946WWZB6759PM3R5LHE3KTY5HMP96PBYFVL6FFBDZP5CUKQ3R75JBZ3ZT6S6N5VXAJB7P33

The applicant is proposing to perform navigational dredging of Canals A-D, the Feeder Channel, Bay Area and an area of South Jinks Creek on the east end of Sunset Beach with beneficial placement on 1,600 linear ft. of oceanfront beach in Sunset Beach, Brunswick County, North Carolina. Coordinates are 33.873711 N, -78.492266 W. A Google Earth .kmz file is attached for reference.

The project Narrative states that the proposed dredging project would connect the Feeder Channel of the Finger Canals with the Bay Area via South Jinks Creek maintaining navigation corridors. The Feeder Canal and Bay Area have

previously been dredged and the current project does not exceed the original project footprint. The most recent maintenance dredging for the Feeder Canal occurred in 2002 and the initial dredging of both the Feeder Canal and Bay Area occurred in early 1970's. According to the application, the dredge channel templates for the Finger Canals A-D and Feeder Channel would be altered from the previous footprint to extend the navigational area approximately 50 ft. within the Finger Canals and to follow deep water in the Feeder Channel. The proposed channel base width has been reduced to 20 ft. from the previously permitted project due to clearance between docks and the existence of Coastal Wetlands. The maintenance dredging as proposed would aim to achieve average bottom depths ranging from approximately -5 ft. (-4 + 1 ft. over dredge) at MLW in the Finger Canals to -6 ft. -5 ft.+ 1 ft. over dredge) at MLW in Feeder Channel with side slopes of 3:1. The targeted cut depth in each area allow for a -1' over-dredge buffer (See Narrative and Sheet 3, 9-12, 22-23 of25). The application indicates that the removal of approximately 10,700 cubic yards of material from the Finger Canals, in an area measuring 3200 ft. in length and 20 ft. in width, and 22,000 cubic yards of material from the Feeder Channel, in an area measuring 3,500 ft. in length and 30-40 ft. in width, would be performed by means of bucket to barge.

The Bay Area south of the Feeder Channel is proposed to be dredged to a final depth of -6 ft. (- 5 ft.+ 1 ft. over dredge) at MLW in an area measuring 2,200 ft. in length by a varying width of 20 ft. to 80 ft. The proposed dredge footprint widens to a maximum of 80 ft. at the confluence with South Jinks Creek for an estimated volume of 15,900 cubic yards of material with a 3:1 side slope (see Narrative and Sheet 3, Sheets 13-14 and 23 of 25). The proposal states that the Finger Canals, Feeder Channel, and Bay Area would also be dredged via bucket to barge. The project narrative states that the proposed dredge spoil from these areas is not beach compatible and will be disposed via offload site at the end of Cobia street to an upland permitted landfill site currently owned by Ike Williamson, who has signed a letter of consent for use (see Tab I). The site is located adjacent to State Rd. 1163 Old Gerogetown R.) and State Rd. 1154 (Hale Swamp Road).

The dredging of the South Jinks Creek area is proposed to be dredged to a final depth of-6 ft. (- 5 Ft.+1 ft. over dredge) at MLW in an area measuring approximately 1,750 ft. in length by 100 ft. in width for a total volume of 40,500 cubic yards of material. The proposed template has a 5:1 slope throughout the dredge footprint (see Sheets 3, 12, 14-15 and 23 of 25). This material has been analyzed and the application states that it is compatible with NC standards for Beach Compatibility (see Narrative and Tab G}. The material is proposed to be hydraulically dredged and placed via pipeline as beneficial use on a 1,600 linear ft. area of oceanfront beach between 5th Street and 12th Street extending up to 120 ft. below MHW. The proposed placement template would enhance the existing berm width of 275 ft. with a maximum height of+ 9.0 MLW (6.1 NAVO) (see Sheet 24 of 25). The proposed beneficial placement footprint and pipeline placement are described in the permit drawings section of the application. (see Sheets 15 -21 of 25). The beneficial placement portion of the project would disturb a maximum of approximately 4,400 sq. ft. of oceanfront beach impacting areas below and above Mean High Water as a result of the nourishment activities. Placement of sand on the beach would result in temporary mortality for intertidal micro fauna. Placement of material below the MHW boundary would result in temporary turbidity within the nearshore waters of the Atlantic Ocean; potentially affecting fish and aquatic life in the project area at the time. The applicant has proposed to conduct the dredging and placement in accordance with the USFWS August 2017 Statewide Programmatic Biological Opinion (SPBO).

The application indicates that the proposed pipeline would be anchored to the bottom waterward of MLW at the confluence of the Feeder Channel, Bay Area and South Jinks Creek. To avoid potential navigation concerns, the pipeline as proposed would cross the AIWW perpendicularly, limiting the amount of pipeline length within the existing navigation channel. The spoil material would then be transported via pipeline along the shoreline of the east end of Sunset Beach as close to the dune line as possible without impacting existing vegetation. The pipeline would have standard markings and emergency access areas for disposal seaward of the existing dunes. The application states that temporary in-situ sand dikes or berms would be used during beach placement to facilitate settlement and retention of sand on the beach which would allow the sandy material to settle out before the water re-enters the ocean.

The proposed excavation of approximately 89,100 cubic yards of material would disturb up to 18 acres of shallow bottom habitat within the project area. The final project depth would range from -5 ft. at MLW in the Finger Canals to -6 ft. at MLW in the Feeder Channel, Bay Area and S. Jinks Creek, and would not connect to deeper water within Jinks

Creek and Tubbs Inlet. The application states that the Town intends to request a Variance for the proposed maintenance dredging without a connection to deeper waters as required by rule 15A NCAC 7H .0208 (b)(F).
The proposed excavation of South Jinks Creek by hydraulic means would create steeper side slopes of 5:1 and subsequent sloughing, thereby increasing the top width dimensions of the proposed project. Short term increases in turbidity can be expected during the dredging activity. There are Coastal Wetlands and oysters present in the project area that appear to have become established within the proposed dredge channel in some locations. The applicant has located these waterward marsh extents and proposed to maintain a 10' dredge buffer from the edge of all Coastal Wetlands (see Narrative and Tab S).

EFH:
This notice initiates the Essential Fish Habitat (EFH) consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act. The Corps' initial determination is that the proposed project may adversely affect EFH or associated fisheries managed by the South Atlantic or Mid Atlantic Fishery Management Councils or the National Marine Fisheries Service. This determination is based upon the scale of impacts (18 acres of shallow subtidal soft bottom, and 8.5 acres of intertidal beach habitat), and inclusions of dredging and beach fill components. No SAVs are present in the project area. The area is not designated as PNA. An Essential Fish Habitat (EFH) Assessment was submitted with the application (attached and in Tab L of the application), which in summary predicted only short-term impacts to EFH from increases in turbidity, siltation, and noise during construction. The applicant has proposed limiting dredging activities to November 16 through April 30 of any given year, in an effort to alleviate concerns regarding impacts to EFH and adjacent PNA. According to the submitted Shellfish Survey Report, the proposed project may impact clams present in South Jinks Creek, however the applicant states that the existing oyster beds appear to be located outside of the dredge channels (see Tab L). Conservation measures submitted by the applicant include an environmental window of November 16-April 30 for implementation of dredging activities and beach placement. The application also states that there would be a minimum 10 ft. buffer from any Coastal Wetland Areas (see Tab S).

ESA:
A draft Biological Assessment has been submitted with this application (please find attached and in Tab N of the application). The Corps has reviewed the project area, examined all information provided by the applicant and consulted the latest North Carolina Natural Heritage Database and made the following determinations and requesting informal consultation on all species as described below:

Piping Plover and Red Knot(USFWS): The project area includes designated wintering habitat for piping plover and critical habitat for Rufa red knot. The Corps has determined that the project as proposed may affect, not likely to adversely affect piping plover critical habitat, and Rufa red knot individuals if all the proposed BMPs are strictly adhered to throughout the project life.
Sea Turtles(USFWS): The applicant has proposed to conduct all nourishment operations within the construction window for turtles to avoid nesting and hatching seasons. Based on these considerations and the conservation measures proposed and potential beneficial effects of the nourishment portion, the Corps has determined that the project may affect, not likely to adversely affect sea turtles.
Manatee(USFWS): Based on available information, the Corps has determined that the project may affect but is not likely to adversely affect the West Indian manatee. The use of the Manatee Guidelines will be required as a condition of this proposed action.
Wood Stork(USFWS): The project area is in close proximity to observed wood stork presence, however the dredging and placement activities are proposed to occur during the months of October through March, therefore a may affect, not likely to adversely affect determination has been made.
Seabeach Amaranth (USFWS): All sand placement activities will be completed between 16 November and 30 April; thereby avoiding the majority of the seabeach amaranth growing season in NC. a determination of may affect, not likely to adversely affect has been made. (Please note the typo in the effects determination in section 4.6 on page 21 of the draft BA corrected text also attached)
Shortnose and Atlantic Sturgeon (NMFS): No effect on Shortnose Sturgeon due to distance from major river mouth (>12.4 mi), and no spawning habitat, with mimimal likelihood of species presence in the dredge or construction area. May affect, not likely to adversely affect Atlantic Sturgeon if use of SARBO protocols are followed.

North Atlantic right whale(NMFS): The project area lacks appropriate habitat for the likely occurrence of the species or individuals within the area of dredge or construction. A no effect determination has been made.

The project will not affect any other species listed as threatened or endangered or their critical habitat formally designated pursuant to the Endangered Species Act of 1973 (ESA) within the project area.

NHPA 106:
Pursuant to Section 106 of the National Historic Preservation Act (NHPA) of 1966, Appendix C of 33 CFR Part 325, and the 2005 Revised Interim Guidance for Implementing Appendix C, the District Engineer has determined that no cultural nor historic resources would be affected by the proposed project. Additionally, the application contains correspondence from the NC Department of Natural and Cultural resources (attached) dated 03 October, 2017 that states there is no knowledge of historic resources that would be affected by the project and no comment on the project was submitted.

Please contact me if you have any questions and please provide comments by August 3, 2019.

Thank you,

Tyler Crumbley, PWS
Project Manager
Regulatory Division
U.S. Army Corps of Engineers-Wilmington District
69 Darlington Avenue
Wilmington, NC 28403

Phone: 910-251-4170
Fax: 910-251-4025
Email: tyler.a.crumbley@usace.army.mil

MMC

ROY COOPER

MICHAEL S. REGAN

BRAXTON DAVIS

June 21, 2019

MEMORANDUM:

FROM: **Courtney Spears, Assistant Major Permits Coordinator**
NCDEQ - Division of Coastal Management
127 Cardinal Drive Ext., Wilmington, NC 28405
Fax: 910-395-3964 ***(Courier 04-16-33)***
courtney.spears@ncdenr.gov

SUBJECT: *CAMA / Dredge & Fill Application Review*

Applicant: ***Town of Sunset Beach***

Project Location: *East end Canals, Feeder Channel, Bay Area of Sunset Beach, Jinks Creek and the oceanfront beach between 5th and 12th street, Adj to AIWW in Brunswick County*

Proposed Project: *Perform navigational dredging through residential systems*

Please indicate below your agency's position or viewpoint on the proposed project and ***return this form to Courtney Spears*** at the address above by ***July 17, 2019***. If you have any questions regarding the proposed project, contact Tara MacPherson at (910) 796-7425 when appropriate, in-depth comments with supporting data is requested.

REPLY:

____ This agency has no objection to the project as proposed.
Additional comments may be attached

____ This agency has no comment on the proposed project.

X This agency approves of the project only if the recommended changes are incorporated. See attached.

____ This agency objects to the project for reasons described in the attached comments.

RECEIVED
JUL 19 2019
DCM WILMINGTON, NC

PRINT NAME Curt Weychert

AGENCY DMF

SIGNATURE Curt Weychert

DATE 7-19-19

RECEIVED
JUL 19 2019
DCM WILMINGTON, NC

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

STEPHEN W. MURPHEY
Director

MEMORANDUM:

TO: Courtney Spears, DCM Assistant Major Permit Coordinator

FROM: Curt Weychert, DMF Fisheries Resource Specialist

SUBJECT: Town of Sunset Beach Navigation Dredging and Beach Armoring Project

DATE: July 19, 2019

A North Carolina Division of Marine Fisheries (DMF) Fisheries Resource Specialist has reviewed the CAMA Major Permit application for proposed actions that impact fish and fish habitats. The town of Sunset Beach is proposing a maintenance dredging and beach nourishment project. The town is proposing to dredge areas on the east end of Sunset Beach referred to as Canals A-D, the Feeder and Finger Canals, Bay Area, and an area of South Jinks Creek. 40,500 cubic yards of beach-compatible sand will be placed along 1600 linear feet of oceanfront beach. The project is located in waters classified by the NC Division of Water Resources as SA; high quality waters (HQW). The finger and feeder canals are closed to the harvest of shellfish by the NC Division of Marine Fisheries Shellfish Sanitation Program, however, the waters of the Bay Area and South Jinks Creek are open. The area of dredging near the North portion of the South Jinks Creek dredge footprint is designated as a primary nursery area (PNA) by the NC Division of Marine Fisheries (NCDMF). PNAs are estuarine waters where initial post-larval development occurs. Species within this area are early post-larval to juvenile and include finfish, crabs, and shrimp.

The proposed project has the potential to impact several different fisheries habitat types such as coastal marsh, shallow soft bottom habitat, shell bottom habitat, as well as water quality impacts associated with dredging. In the EFH documentation, the Applicant identifies the areas within the project as oligohaline. Upon review of DMF biological and environmental monitoring programs, the salinity classification is polyhaline (18-30 parts per thousand). This salinity regime would increase possible interaction with specific species such as mackerel and others mentioned in the EFH as unlikely to be impacted.

Shell bottom is an extremely productive self-building three-dimensional habitat that can be impacted long term through dredging and filling, pollution and other contaminants. This vital estuarine habitat is very limited in North Carolina, and restoration and conservation of shellfish habitat is at the forefront. The presence of live shellfish that historically or currently survive due to favorable conditions is considered shellfish habitat. Increased

sedimentation raises concern for shellfish and shellfish habitat by either the direct burial of oyster beds or reductions in filtration efficiency, respiration rates, and/or reproduction and settlement. Larval oysters require a clean hard bottom for attachment and sedimentation as little as 1 or 2 mm may inhibit settlement. Duration of sedimentation suspension and water quality degradation has been shown to result in juvenile oyster mortality. Oysters can only survive burial for 6 days by resorting to anerobic metabolism, but experience 100% mortality on day 7 (Wilbur et al. 2001).

Through multiple scoping meetings and conversations between NCDMF and the Town of Sunset Beach, concerns were expressed regarding the removal of significant areas of shellfish habitat. After performing a shellfish survey, the applicant removed the dredging of North Jinks Creek upon the request of NCDMF and other resource agencies. While NCDMF supports the decision to remove areas of significant subtidal and intertidal shellfish habitat, it is still important to recognize that much of the intertidal areas of the Finger and Feeder Canals, and the Bay area have a significant presence of shellfish habitat which is likely to be impacted by the dredge footprint and associated sloughing. For this reason, NCDMF would request that the Town of sunset beach create a plan to relocate any shellfish resource located within the dredging footprint as well as any resource located within a buffer of 3:1 to the proposed depth of the dredge cut (see attached request for additional information dated February 12, 2019). DMF would request to review and approve this relocation plan to ensure no transfer of oysters from closed areas of harvest have the potential to lead to human consumption.

Shallow soft bottom is an important foraging habitat for juvenile and adult fish and invertebrates, and aids in storing and cycling of sediment, nutrients, and toxins between the bottom and water column. Soft bottom habitat is used to some extent by most native coastal fish species in North Carolina. The habitat is particularly productive and, by providing refuge from predators, is an important nursery area. Species dependent on shallow soft bottom include clams, crabs, flounder, spot, Atlantic croaker, sea mullet, and rays (Deaton et al. 2010). Many benthic predators are highly associated with the shallow soft bottom habitat, including flounders, weakfish, red drum, sturgeon and coastal sharks, although almost all fish will forage on microalgae, infauna, or epifauna on the soft bottom. Tidal flats are inhabited by many species that are food sources for larger marine predators. These flats are utilized by anadromous, estuarine and marine species, such as cobia, red drum, gag grouper, king mackerel, shrimp, flounder and Atlantic sharpnose sharks (USFWS 2002). These species utilize the tidal flats for refuge, corridors, and nursery and spawning purposes (Deaton et al. 2010).

The applicant has stated that dredging operations will be conducted between November 16th and April 30th of any year to reduce potential environmental impacts. Because the dredge areas are part of an inlet complex and are connected to designated PNA areas, the NCDMF would request that no dredging occur after March 31st. In other words, to avoid impacts to fisheries resources and maintain consistency with similar projects in the area, NCDMF would request a moratorium period of April 1 to September 30.

Contact Curt Weychert at (252) 808-8050 or Curt.Weychert@ncdenr.gov with further questions or concerns.

Deaton, A.S., W.S. Chappell, K. Hart, J. O'Neal, B. Boutin. 2010. North Carolina Coastal Habitat Protection Plan. North Carolina Department of Environment and Natural Resources. Division of Marine Fisheries, NC. 639 pp.

USFWS (U. S. Fish and Wildlife Service. 2002. Draft Fish and Wildlife Coordination Act Report Bogue Banks Shore Protection Project, Carteret County, North Carolina.

Wilber, D. H., and D. G. Clarke. 2001. Biological effects of suspended sediments: A review of suspended sediment impacts on fish and shellfish with relation to dredging activities in estuaries. North American Journal of Fisheries Management 21(4):855-875.

0110

North Carolina Coastal Federation

Working Together for a Healthy Coast

July 23, 2019

Col. Robert J. Clark, Commander
Wilmington District Corps of Engineers
69 Darlington Avenue
Wilmington, NC 28403

Re: SAW-2019-01155 – Town of Sunset Beach Maintenance Dredging of South Jinks Creek, the Bay Area and the Feeder Channel

Colonel Clark:

On behalf of the North Carolina Coastal Federation, please accept the following comments on the Town of Sunset Beach's application to conduct navigational dredging in the water bodies known as south Jinks Creek, the Bay Area, and the Feeder Channel in Brunswick County, North Carolina (SAW-2019-01155). As proposed, this project poses impacts that are not compatible with the letter and intent of the Coastal Area Management Act (CAMA) and associated rules governing these activities, and lacks thorough evaluation as well as mitigation measures.

The federation is a non-profit organization dedicated to protecting and restoring the North Carolina coast. Our organization represents 16,000 supporters statewide. We work with the public, agencies and local governments to communicate and collaborate wherever possible towards solutions that lead to the stewardship and resiliency of our coast. Since 1982, the federation has been working with coastal communities and other partners to improve and protect coastal water quality and natural habitats, which are intricately tied to our coastal economy. By focusing primarily, but not exclusively on natural and productive estuarine shorelines, oyster and marsh restoration, coastal management and cleaning the estuaries of marine debris, we strive to support and enhance the coastal natural environment.

Specific concerns about the ecosystem impacts of the proposed maintenance dredging project are as follows:

1) The Applicant seeks final project depths from -5 feet MLW in the Finger Canals to -6 feet MLW in the Feeder Channel, Bay Area, and south Jinks Creek, and would not connect to deeper water within Jinks Creek and Tubbs Inlet. The proposed dredging of the Sunset Beach Finger Canals, Feeder Channel, Bay Area and south Jinks Creek lacks an adequate deep-water connection, as is required by CAMA rules. Section 15A NCAC 07H .0208(b)(F) states, "any canal or boat basin shall be excavated no deeper than the depth of the connecting waters." Dredging canals or boat basins deeper

Northeast Region
637 Harbor Road, P.O. Box 276
Wanchese, NC 27981
252.473.1607

Headquarters & Central Region
3609 N.C. 24 • Newport, NC 28570
252.393.8185
www.nccoast.org

Southeast Region
309 W. Salisbury Street
Wrightsville Beach, NC 28480
910.509.2838

than adjoining channels can allow sediment and pollution to build up in the basin. Per CAMA rules, connecting waterbodies of a maintained navigational channel must be at least as deep as the dredge area.

The Applicant justifies this proposed violation of state statute/rules by assuming previous dredging, said to have occurred in 1970 and 2002, would also have dredged deeper than connecting waters. The application states "since no known impacts were recorded from that event, indications suggest the current maintenance operations will also not create any adverse impacts." The federation sees two major flaws with operating under this premise.

First, this will be the first known maintenance event for south Jinks Creek and the Bay Area since original dredging, believed to have occurred in the early 1970's (2002 dredging was isolated to the Feeder Channel system). Since the action occurred prior to the establishment of CAMA in 1974, the action did not require a CAMA major permit authorization and is not thoroughly documented. Lack of documentation does not substantiate lack of impact. Without thorough evaluation and documentation of previous dredging events and their impact on surrounding environments, the Applicant cannot make such a claim.

Second, the Applicant cites shoaling and infill within south Jinks Creek, the Bay Area, and Feeder Channel system as primary justification for this project. The application also states that current shoaling patterns appear likely to continue and could potentially sever recreational access in each of the referenced work areas. If shoaling and material infilling have indeed constricted navigable access in regards to the available width and depth of each waterbody, we question the Applicant's intent to dredge deeper than the adjacent navigational channel, which could further exacerbate the buildup of sediment in the basin.

In order to meet state statute and minimize possible adverse impacts, we ask if the Applicant has considered reducing dredge depths to -2 feet MLW. A discussion of reduced dredge depths was not found in the application materials submitted in March of this year. In addition to minimizing impacts to the resource, reducing dredge depths could also reduce the potential for increased shoaling and infill within the Feeder Channel system.

As stands, the project proposal is in clear violation of state regulations regarding dredging depths, and DCM staff plainly term this finding as INCONSISTENT within the application package.

2) Moreover, this Feeder Channel system is ecologically unique in that it connects to a tidal creek, and not the Atlantic Intracoastal Waterway (AIWW) or a natural bay. The North Carolina Division of Marine Fisheries (DMF) has designated the boundary of Jinks Creek as primary nursery area (PNA) due to adjacent habitats potential to support shellfish and juvenile fish species.

PNAs are those areas in the estuarine and ocean system where initial post-larval development of finfish and crustaceans takes place. The North Carolina Marine Fisheries Commission designates PNAs to protect habitat, particularly the bottom structure, including sea grasses, oyster rocks, sand and mud, as well as adjacent wetlands. In addition, the North Carolina Environmental Management Commission designates all PNAs as High Quality Waters, limiting point source discharges and stormwater runoff.

Dredging is restricted in PNAs to protect water quality and fisheries, and limit stormwater runoff. As written in 15A NCAC 07H .0208(b)(1), "navigation channels, canals, and boat basins shall be aligned or located so as to avoid primary nursery areas, shellfish beds, beds of submerged aquatic vegetation as defined by the Marine Fisheries Commission."

Jinks Creek proper is not currently designated PNA. In the 1970's when nursery area designations were determined from state surveys, Jinks Creek surveyors did not collect sufficient data to merit a written report and therefore Jinks Creek was deemed non-PNA by default.

DMF's published *Fishery Nursey Area* map clearly designates all marshes and tidal creeks in and around Sunset and Ocean Isle beaches as PNA, with Jinks Creek being the only exception. Given the knowledge that Jinks Creek is completely surrounded by PNA habitat and is the connection between PNA and the Atlantic Ocean and AIWW, it is highly likely that Jinks Creek also functions as PNA.

As deemed necessary by the Coastal Resources Commission, PNAs serve to protect the resource values identified in the designation including, but not limited to, those values contributing to the continued productivity of estuarine and marine fisheries and thereby promoting the public health, safety and welfare.

With strong supposition that Jinks Creek may meet PNA designation, the federation encourages the Corps to further assess the ecological functions of the tidal creek before approving a project that would permanently alter the landscape of this essential estuarine environment.

3) In order to ascertain the direct, secondary, and long-term cumulative impacts of the proposed project, it is important to thoroughly review case history. The Applicant has submitted a major permit application for maintenance dredging of south Jinks Creek, the Bay Area, and the Feeder Canal, although it is unclear whether the southern end of Jinks Creek has been previously dredged.

   As documented in the application and in this letter, dredging of south Jinks Creek and the Bay Area is *believed* to have occurred in 1970, but since this took place prior to the establishment of CAMA, the action did not require a CAMA major permit authorization and is thus undocumented. Support for the 1970 dredging action is

found within a pictorial atlas of North Carolina inlets depicting "before and after" conditions from 1966 and 1974, respectively.

The negative environmental impacts of dredging a natural channel are well-documented, although any dredging, including maintenance, can result in significant adverse impacts. Acting upon the assumption that dredging *did* occur in 1970, it is important to consider the impacts that additional dredging may have after nearly a half-century. Without further manmade alterations, a highly dynamic tidal system such as Jinks Creek is likely to have reestablished sensitive habitat after five decades without disturbance.

4) Based on local observations and findings documented within the Applicant's February 2018 *Shellfish Survey Report,* significant shellfish resources occur within the waters of Jinks Creek.

If the proposed dredging project is approved, there will be unavoidable adverse impacts. As is required by state and federal rules and statutes, compensatory mitigation is required to replace the loss of wetland and aquatic resource functions in the watershed. While the amount and quality of compensatory mitigation does not substitute for avoiding and minimizing impacts, appropriate and practicable compensatory mitigation seeks to restore, establish, and/or preserve aquatic resources to offset the unavoidable adverse impacts that remain.

As stated in the application, the survey results indicate the proposed navigation project will most likely not be able to avoid potential impacts to the oyster resources present in Jinks Creek. Based on the calculated density of oyster potentially within Jinks Creek, the navigation project may create impacts to approximately 12,810 oysters based on the proposed dredge footprint. The dredging project is estimated to disturb 10.72 acres within Jinks Creek and is expected to have the highest impact to resources in the subtidal region.

In addition to 12,810 oyster resources, the proposed project is also expected to impact approximately 328 clams and 213 mussels, in addition to short-term impacts on local water quality and fish species.

The Applicant states that "minimization efforts can help reduce the potential for impacts; however, the survey results show the oyster resources may be too diverse to avoid." If and when the Corps is satisfied with the avoidance and minimization efforts in place, mitigation efforts are the logical next step. As such, the federation asks that such actions be reviewed and evaluated prior to implementation to establish adequate mitigation requirements to offset direct impacts from project dredging.

Given the relative complexity, scope and potential for direct, secondary and cumulative impacts to the natural and water resources of Jinks Creek and surrounding waters, the federation recommends the Corps **deny** the proposed major permit application.

Thank you for your careful attention to this matter and for taking these comments into consideration.

Sincerely,

Kerri Allen

Kerri Allen,
Coastal Advocate

cc: Todd Miller, Executive Director
cc: Tracy Skrabal, Coastal Scientist and Southeast Regional Manager

moffatt & nichol

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Raleigh, North Carolina 27609

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August 9, 2019

Tyler Crumbley, PWS
Project Manager
U.S. Army Corps of Engineers – Wilmington District
69 Darlington Avenue
Wilmington, North Carolina 28403 via email: Tyler.A.Crumbley@USACE.army.mil

Subject: **Sunset Beach Maintenance Dredging**
S. Jinks Creek, Bay Area, and Feeder Channel
Response to NCCF Comments

Dear Mr. Crumbley,

Please accept the following information in response to comments received for the Town of Sunset Beach's permit application for South Jinks Creek, the Bay Area, and the Feeder Channel. Specifically, the information below responds to the July 23, 2019 comments provided by the North Carolina Coastal Federation (NCCF). The comments received address four (4) points as outlined below:

Point 1: The comments reference 15A NCAC 07H.0208 (b) (F) and call out the projects lack of a deep-water connection, which is required by North Carolina Administrative Code.

Response: Development of the current dredge footprint and maintenance channel design proposal occurred through coordination efforts with State and Federal agencies, including the NC Division of Coastal Management (DCM), the North Carolina Division of Marine Fisheries (DMF) and the North Carolina Division of Water Resources (DWR), among other agencies through scoping. DMF and DWR have provided comments (attached for reference) on the permit application, which approve the project. Therefore, the applicant believes the current proposal meets the intent of the state environmental review agencies responsible for upholding the NCAC requirements.

Point 2. The comments request further evaluations related to classifying Jinks Creek as a Primary Nursery Area.

Response: As stated in the attached letter from the National Marine Fisheries Service, "*The State of North Carolina did not designate* (Jinks Creek) *as a PNA in the 1970's because the creek was a navigational route from the Atlantic Intracoastal Waterway to the Atlantic Ocean*". The applicant believes the State of North Carolina understands the importance of maintaining safe navigation and recreational access between the Atlantic Ocean and the Intracoastal Waterway. Therefore, the applicant believes the State did not designate Jinks Creek as a PNA because they understood dredging would be required at some point in the future to maintain the waterway.

Point 3. The comments reference the importance of considering potential impacts that may occur from dredging a system after nearly a half-century.

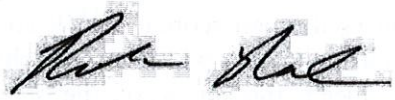
Response: The applicant developed the permit application through extensive coordination efforts with state and federal environmental staff in efforts to understand and address the potential impacts that may occur. Based on extensive discussions regarding the dredging of Jinks Creek, the applicant agreed to minimize dredging impacts by limiting the dredging to south Jinks Creek. The proposed project reflects a reasonable and prudent attempt to avoid and minimize environmental impacts (i.e. oyster habitat) while also preserving the area's historic navigational and recreational use.

Point 4. The comments state the project will create "*unavoidable adverse impacts*" as proposed.

Response: The applicant continues to work with the resource agencies and is committed to ensuring the proposed project avoids adverse impacts by continuous agency consultation, compliance with the Statewide Programmatic Biological Opinion Reasonable Prudent Measures and Terms and Conditions, Best Management Practices for dredging, and State sediment criteria for beach placement. As cited above, the attached comments from DWR, NMFS, and DMF as well as the reduction in dredging footprint within Jinks Creek demonstrates the applicant's efforts to work through concerns.

The Town of Sunset Beach appreciates the opportunity to provide a response to these comments and understands the complexity of the review process. The Town also appreciates your time and effort towards coordinating and reviewing the application and related correspondence. In that regard, if there are any additional questions or concerns, please feel free to contact me at your convenience at 910-218-7100.

Sincerely,



MOFFATT & NICHOL
Robert Neal, PE
Senior Coastal Engineer

Cc. Hiram Marziano, Town Administrator, Town of Sunset Beach (via email)
Lisa Anglin, Town Clerk, Town of Sunset Beach (via email)
Courtney Spears, Assistant Major Permits Coordinator, Division of Coastal Management (via email)
Tara McPherson, Compliance and Enforcement Representative, Division of Coastal Management (via email)

MH

NORTH CAROLINA
Environmental Quality

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

BRAXTON DAVIS
Director, Division of Coastal Management

June 21, 2019

MEMORANDUM:

FROM: **Courtney Spears, Assistant Major Permits Coordinator**
NCDEQ - Division of Coastal Management
127 Cardinal Drive Ext., Wilmington, NC 28405
Fax: 910-395-3964 ***(Courier 04-16-33)***
courtney.spears@ncdenr.gov

SUBJECT: *CAMA / Dredge & Fill Application Review*

Applicant: ***Town of Sunset Beach***

Project Location: *East end Canals, Feeder Channel, Bay Area of Sunset Beach, Jinks Creek and the oceanfront beach between 5th and 12th street, Adj to AIWW in Brunswick County*

Proposed Project: *Perform navigational dredging through residential systems*

Please indicate below your agency's position or viewpoint on the proposed project and ***return this form to Courtney Spears*** at the address above by [redacted]. If you have any questions regarding the proposed project, contact Tara MacPherson at (910) 796-7425 when appropriate, in-depth comments with supporting data is requested.

REPLY:

__X__ This agency has no objection to the project as proposed.
Additional comments may be attached

_____ This agency has no comment on the proposed project.

_____ This agency approves of the project only if the recommended changes are incorporated. See attached.

_____ This agency objects to the project for reasons described in the attached comments.

PRINT NAME ___**Morella Sanchez-King**_____

AGENCY ___**DWR**_____

SIGNATURE DocuSigned by: Morella Sanchez-King E3ABA14AC7DC434...

DATE 8/1/2019

RECEIVED
AUG 01 2019
MP SECTION WIRO

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
LINDA CULPEPPER
Director

NORTH CAROLINA
Environmental Quality

August 1, 2019

Brunswick County
DWR Project: 2002-0158v2

Town of Sunset Beach
Mr. Hiram Marziano
700 Sunset Boulevard North
Sunset Beach NC 28468

Subject Property: **Maintenance Dredging of South Jinks Creek, The Bay Area, & Feeder Channel**

Approval of 401 Water Quality Certification with Additional Conditions

Dear Mr. Marziano,

You have our approval, in accordance with the attached conditions and those listed below, to perform maintenance dredging of approximately 18 acres of open waters (Canals A-D, the Feeder Channel, Bay Area, and an area south of Jinks Creek on the east end of Sunset Beach) and to place sand onto approximately 1,600 linear feet of beach as described in the application received by the N.C. Division of Water Resources (DWR) on June 21, 2019. After reviewing your application, we have decided that the impacts are covered by General Water Quality Certification Number 4175 (GC4175).

In addition, you should obtain or otherwise comply with any other required federal, state or local permits before you go ahead with your project including (but not limited to) Erosion and Sediment Control, Non-discharge, and stormwater regulations. Also, this approval to proceed with your proposed impacts or to conduct impacts to waters as depicted in your application shall expire upon expiration of the 404 Permit. This Certification can also be found on line at: http://portal.ncdenr.org/web/wq/swp/ws/401/certsandpermits.

This approval is for the purpose and design that you described in your application. If you change your project, you must notify us and you may be required to send us a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter and is thereby responsible for complying with all conditions. If total fills for this project (now or in the future) exceed one acre of wetland or 150 linear feet of stream, compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h). **This approval requires you to follow the conditions listed in the attached certification and any additional conditions listed below.**

DEQ NORTH CAROLINA Department of Environmental Quality
North Carolina Department of Environmental Quality | Division of Water Resources
Wilmington Regional Office | 127 Cardinal Drive Extension | Wilmington, North Carolina 28405
910.796.7215

The Additional Conditions of the Certification are:

1. This approval is for the purpose and design described in your application. The plans and specifications for this project are incorporated by reference as part of the Certification. If you change your project, you must notify the Division and you may be required to submit a new application package with the appropriate fee. If the property is sold, the new owner must be given a copy of this approval letter and General Certification and is responsible for complying with all conditions. Any new owner must notify the Division and request the Certification be issued in their name {15A NCAC 02H .0501 and .0502}.

2. Any final construction plans for this project must include or reference the application and plans approved by the Division under this authorization letter and certification. The applicant will also be required to evaluate all acquired permits to assure that they are consistent and all relative impacts are accounted for and shown on the construction plans. [15A NCAC 02H .0502 (b) and 15A NCAC 02H .0506 (4)] The applicant shall require his contractors (and/or agents) to comply with all of the terms of this Certification and shall provide each of its contractors (and/or agents) a copy of this Certification.

3. Turbidity Standard

   The turbidity standard of 25 NTUs (Nephelometric Turbidity Units) shall not be exceeded as described in 15 A NCAC 2B .0220. Appropriate sediment and erosion control practices must be used to meet this standard. Turbidity curtains shall be used as appropriate. Please notify this Office if any turbidity issues arise at 910.796.7215

4. This General Certification shall expire on the same day as the expiration date of the corresponding General Permit. The conditions in effect on the date of issuance of the Certification for a specific project shall remain in effect for the life of the project, regardless of the expiration of this Certification.

5. The permittee shall require its contractors and/or agents to comply with the terms of this permit in the construction and maintenance of this project and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project a copy of this certification. A copy of this certification including all conditions shall be available at the project site during the construction and maintenance of this project. [15A NCAC 02H .0507 (c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

6. Continuing Compliance:

   The applicant/permittee and their authorized agents shall conduct all activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with 303(d) of the Clean Water Act), and any other appropriate requirements

of State and Federal law. If the Division determines that such standards or laws are not being met, including failure to sustain a designated or achieved use, or that State or Federal law is being violated, or that further conditions are necessary to assure compliance, than the Division may reevaluate and modify this General Water Quality Certification. [15A NCAC 02H .0507(d)]

7. All mechanized equipment operated near surface waters or wetlands will be regularly inspected and maintained to prevent contamination of waters and wetlands from fuels, lubricants, hydraulic fluids or other potential toxic chemicals. In the event of a hydrocarbon or chemical spill, the permittee/contractor shall immediately contact the Division of Water Quality, between the hours of 8 am to 5 pm at the Wilmington Regional Office at 910.796.7215 and after hours and on weekends call (800) 858-0368. Management of such spills shall comply with provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act. [15A NCAC 02H .0506 (b)(3) and (c)(3), 15A NCAC 02B .0200 (3)(f), and GS 143 Article 21A].

8. Fueling, lubrication and general equipment maintenance should not take place within 50 feet of a waterbody or wetlands to prevent contamination by fuel and oils. [15A NCAC 02H .0506 (b)(3) and (c)(3) and 15A NCAC 02B .0200 (3)(f)].

9. This certification grants permission to the director, an authorized representative of the Director, or DEQ staff, upon the presentation of proper credentials, to enter the property during normal business hours 15A NCAC 02H.0502(e).

10. Certificate of Completion

    Upon completion of all work approved within the 401 Water Quality Certification or applicable Buffer Rules, and any subsequent modifications, the applicant and/or authorized agent is required to return a completed certificate of completion form to the NCDEQ DWR 401 and Buffers Unit North Carolina Division of Water Resources, 1617 Mail Service Center, Raleigh, NC, 27699 within ten days of project completion. The certification of completion is available at: http://portal.ncdenr.org/web/wq/swp/ws/401/certsandpermits/apply/forms).

Violations of any condition herein set forth may result in revocation of this Certification and may result in criminal and/or civil penalties. The authorization to proceed with your proposed impacts or to conduct impacts to waters as depicted in your application and as authorized by this Certification shall expire upon expiration of the 404 or CAMA Permit.

This approval and its conditions are final and binding unless contested.

This Certification can be contested as provided in Articles 3 and 4 of General Statute 150B by filing a written petition for an administrative hearing to the Office of Administrative Hearings (hereby known as OAH). A petition form may be obtained from the OAH at

http://www.ncoah.com/ or by calling the OAH Clerk's Office at (919) 431-3000 for information. Within sixty (60) calendar days of receipt of this notice, a petition must be filed with the OAH. A petition is considered filed when the original and one (1) copy along with any applicable OAH filing fee is received in the OAH during normal office hours (Monday through Friday between 8:00 am and 5:00 pm, excluding official state holidays). The petition may be faxed to the OAH at (919) 431-3100, provided the original and one copy of the petition along with any applicable OAH filing fee is received by the OAH within five (5) business days following the faxed transmission.

Mailing address for the OAH:

If sending via US Postal Service:	*If sending via delivery service (UPS, FedEx, etc):*
Office of Administrative Hearings 6714 Mail Service Center Raleigh, NC 27699-6714	Office of Administrative Hearings 1711 New Hope Church Road Raleigh, NC 27609-6285

One (1) copy of the petition must also be served to DEQ:

William F. Lane, General Counsel
Department of Environmental Quality
1601 Mail Service Center
Raleigh, NC 27699-1601

This letter completes the review of the Division of Water Resources under Section 401 of the Clean Water Act. If you have any questions, please telephone Chad Coburn in the DWR Wilmington Regional Office at (910)796-7379 or Chad.Coburn@ncdenr.gov.

Sincerely,

DocuSigned by:
Morella Sanchez-King
E3ABA14AC7DC434...

Morella Sanchez-King, Regional Supervisor
Water Quality Regional Operations Section
Wilmington Regional Office
Division of Water Resources, NCDEQ

Enclosure: GC4175

cc: Tyler Crumbley - USACE Wilmington Regulatory Field Office (via email)
Courtney Spears – DCM Wilmington (via email)

GRANT CONTRACT NO. 7749

Sunset Beach Canal and Channel Dredging 2018/Town of Sunset Beach Shallow Draft Navigation Project

STATE OF NORTH CAROLINA
COUNTY OF WAKE

GRANTEE'S FEDERAL IDENTIFICATION NUMBER: **-***7576

North Carolina Department of Environmental Quality
Financial Assistance Agreement

This financial assistance agreement is hereby made and entered into this **May 28, 2019**, by and between the **NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY** (the "Department") and **TOWN OF SUNSET BEACH** (the "Grantee"[1]).

1. **Audit and Other Reporting Requirements of the Local Government Commission.** If subject to the audit and other reporting requirements of the Local Government Commission pursuant to Article 3 of Chapter 159 of the North Carolina General Statutes (Local Government Budget and Fiscal Control Act), the Grantee understands and agrees that the terms, conditions, restrictions and requirements hereinafter set forth shall only apply to the extent not inconsistent with, or superseded by, the audit and other reporting requirements of the Local Government Commission.

2. **Contract Documents.** The agreement between the parties consists of this document (the "Contract Cover") and its attachments, which are identified by name as follows:

   a. State's General Terms and Conditions (Attachment A)
   b. Department's Request for Proposal ("RFP") (Attachment B)
   c. Grantee's Response to RFP, including scope of work, line item budget, budget narrative and, *if applicable*, indirect cost documentation (hereinafter referred to generally as the "Award Proposal") (Attachment C)
   d. Notice of Certain Reporting and Audit Requirements (Attachment D)
   e. Conflict of Interest (Attachment E)

   Together, these documents (the "Contract Documents") constitute the entire agreement between the parties (the "Agreement"), superseding all prior oral or written statements or agreements. Modifications to this Contract Cover or to any other Contract Document may only be made through written amendments processed by the Department's Financial Services Division. Any such written amendment must be duly executed by an authorized representative of each party.

3. **Precedence Among Contract Documents.** In the event of a conflict or inconsistency between or among the Contract Documents, the document with the highest relative precedence shall prevail. This Contract Cover shall have the highest precedence. The order of precedence thereafter shall be determined by the order of documents listed in § 2 above, with the first-listed document having the second-highest precedence and the last-listed document having the lowest precedence. If there are multiple contract amendments, the most recent amendment has the highest precedence and the oldest amendment has the lowest precedence.

4. **Contract Period.** This Agreement shall be effective from **May 28, 2019** to **June 30, 2021**, inclusive of those dates.

5. **Grantee's Duties.** As a condition of the grant award, the Grantee agrees to:

   a. Undertake and deliver the grant award project, plan or services as described in the Award Proposal (Attachment C), adhering to all budgetary provisions set out therein throughout the course of performance.

   b. Ensure that all award funds are expended in a manner consistent with the purposes for which they were awarded, as described more fully in the attached Contract Documents.

[1] The contract documents attached hereto may at times use alternative terms to describe the Grantee. Such terms might include, but are not necessarily limited to, the following (in common or proper form): "recipient," "applicant," or "participant."

c. Comply with the requirements of 09 NCAC 03M .0101, *et seq.* (Uniform Administration of State Awards of Financial Assistance), including, but not limited to, those provisions relating to audit oversight, access to records, and availability of audit work papers in the possession of any auditor of any recipient of State funding.

d. Comply with the applicable provisions of Attachment D, Notice of Certain Reporting and Audit Requirements.

e. Maintain all records related to this Agreement (i) for a period of six (6) years following the date on which this Agreement expires or terminates, or (ii) until all audit exceptions have been resolved, whichever is longer.

f. Comply with all laws, ordinances, codes, rules, regulations, and licensing requirements applicable to its performance hereunder and/or the conduct of its business generally, including those of Federal, State, and local agencies having jurisdiction and/or authority.

g. Obtain written approval from the Department's Contract Administrator (see § 14 below) prior to making any subaward or subgrant not already described in the Award Proposal.

h. Ensure that the terms, conditions, restrictions and requirements of this Contract Cover, including those incorporated by reference to other Contract Documents and/or applicable law, are made applicable to, and binding upon, any subgrantee who receives as a subaward or subgrant any portion of the award funds made available to the Grantee hereunder.

i. Take reasonable measures to ensure that any subgrantee (i) complies with the terms, conditions, restrictions and requirements set forth in this Contract Cover, including those incorporated by reference to other Contract Documents and/or applicable law, and (ii) provides such information in its possession as may be necessary for the Grantee to comply with such terms, conditions, restrictions and requirements.

6. **Historically Underutilized Businesses.** Historically Underutilized Businesses (HUBs) consist of minority, women and disabled business firms that are at least fifty-one percent owned and operated by an individual(s) of the categories. Also included in this category are disabled business enterprises and non-profit work centers for the blind and severely disabled.

Pursuant to G.S. 143B-1361(a), 143-48 and 143-128.4, the Department invites and encourages participation in this procurement process by businesses owned by minorities, women, disabled, disabled business enterprises and non-profit work centers for the blind and severely disabled. This includes utilizing subcontractors to perform the required functions in this contract. Any questions concerning NC HUB certification, contact the North Carolina Office of Historically Underutilized Businesses at (919) 807-2330.

7. **Department's Duties.** The Department shall pay the Grantee in the manner and amounts specified below and in accordance with the approved budget set forth in the Award Proposal.

8. **Total Award Amount.** The total amount of award funds paid by the Department to the Grantee under this Agreement shall not exceed **THREE MILLION SEVEN HUNDRED FIFTY-SIX THOUSAND FOUR HUNDRED THIRTY-SIX DOLLARS AND THIRTY-FOUR CENTS ($3,756,436.34)** (the "Total Award Amount"). This amount consists of:

Funding:

Type of Funds	Funding Source	CFDA No.
Receipts	SDNCD&AW	N/A

Account Coding Information:

Dollars	GL Company	GL Account	GL Center
$3,756,436.34	1602	536990	2182

Grantee Matching Information:

[ ] a. There are no matching requirements from the Grantee.

[ ] b. There are no matching requirements from the Grantee; however, the Grantee has committed the following match to this project:

	In-Kind	$
	Cash	$
	Cash and In-Kind	$
	Other / Specify:	$

[X] c. The Grantee's matching requirement is **$1,878,188.66**, which shall consist of:

	In-Kind	$
X	Cash	$1,878,188.66
	Cash and In-Kind	$
	Other / Specify:	$

[ ] d. The Grantee is committing to an additional **$** to complete the project or services described in the Award Proposal.

Based on the figures above, the total contract amount is **$5,634,625.00**.

9. **Invoice and Payment.** The award funds shall be disbursed to the Grantee in accordance with the following provisions:

   a. The Grantee shall submit invoices to the Department's Contract Administrator at least quarterly. The final invoice must be received by the Department within forty-five (45) days following the date on which termination or expiration of this Agreement becomes effective. Amended or corrected invoices must be received by the Department's Financial Services Division within six (6) months of such date. Any invoice received thereafter shall be returned without action.

10. **Grantee's Fiscal Year.** The Grantee represents that its fiscal year is from July 1 to June 30.

11. **Availability of Funds.** The Grantee understands and agrees that payment of the sums specified herein shall be subject to, and contingent upon, the allocation and appropriation of funds to the Department for the purposes described in this Agreement.

12. **Reversion of Unexpended Funds.** The Grantee understands and agrees that any unexpended grant funds shall revert to the Department upon termination of this Agreement.

13. **Supplantation of Expenditure of Public Funds.** The Grantee understands and agrees that funds received pursuant to this Agreement shall be used only to supplement, not to supplant, the total amount of Federal, State and local public funding that the Grantee would otherwise expend to carry out the project or services described in the Award Proposal.

14. **Contract Administrators.** Each party shall submit notices, questions and correspondence related to this Agreement to the other party's Contract Administrator. The contact information for each party's Contract Administrator is set out below. Either party may change its Contract Administrator and/or the associated contact information by giving timely written notice to the other party.

15.

Grantee Contract Administrator	Department's Contract Administrator
Lisa Anglin, Town Clerk Town of Sunset Beach 700 Sunset Beach Blvd. North Sunset Beach, NC 28468 Telephone: 910-579-6297 Fax: Email: langlin@sunsetbeachnc.gov	Coley Corderio, Ph.D., GISP Coastal Infrastructure Projects Manager Division of Water Resources 1611 Mail Service Center Raleigh, NC 27699-1611 Telephone: 919-707-9013

16. **Assignment.** The Grantee may not assign its obligations or its rights to receive payment hereunder.

17. **Procurement.** The Grantee understands and agrees that all procurement activities undertaken in connection with this Agreement shall be subject to the following provisions:

    a. None of the work or services to be performed under this Agreement involving the specialized skill or expertise of the Grantee shall be contracted without prior written approval from the Department.

    b. In the event the Grantee or any subrecipient of the Grantee contracts for any of the work to be performed hereunder, the Grantee shall not be relieved of any duties or responsibilities herein set forth.

    c. The Grantee shall not contract with any vendor who is restricted from contracting with the State of North Carolina pursuant to N.C.G.S. §§ 143-133.3, 143-59.1, 143-59.2 or 147.86.60.

18. **Subawards.** The Grantee understands and agrees that any subaward or subgrant of any portion of the financial assistance provided hereunder shall not relieve the Grantee of any duties or responsibilities herein set forth.

19. **Title VI and Other Nondiscrimination Requirements.** Throughout the course of its performance hereunder, the Grantee shall comply with all applicable State and Federal laws, regulations, executive orders and policies relating to nondiscrimination, including, but not limited to:

    Title VI of the Civil Rights Act of 1964, as amended;

    Civil Rights Restoration Act of 1987, as amended;

    Section 504 of the Rehabilitation Act of 1973, as amended;

    Age Discrimination Act of 1975, as amended;

    Titles II and III of the Americans with Disabilities Act of 1990, as amended;

    Title IX of the Education Amendments of 1972, as amended;

    Part III of Executive Order No. 11246 (September 24, 1965), as amended; and

    Section 13 of the Federal Water Pollution Control Act Amendments of 1972.

    In accordance with the above laws and their implementing regulations, the Grantee agrees to ensure that no person in the United States is, on the basis of race, color, national origin, sex, age or disability, excluded from participation in, denied the benefits of, or subjected to discrimination under any program or activity for which the Grantee receives Federal assistance. For purposes of this provision, "program or activity" shall have the meaning ascribed to that term under Federal law (see 42 U.S.C.S. § 2000d-4a).

The Grantee understands and acknowledges that, in addition to itself, any lower-tier recipient of the financial assistance provided hereunder must also comply with the requirements of this section. Accordingly, the Grantee agrees to include a similar provision in any financial assistance agreement made with any lower-tier recipient of such assistance.

20. **E-Verify.** To the extent applicable, the Grantee represents that it and each of its subgrantees, contractors and/or subcontractors performing work pursuant to, or in association with, this Agreement are in compliance with Article 2 of Chapter 64 of the North Carolina General Statutes, including, in particular, the requirement that certain employers verify the work authorization of newly hired employees using the Federal E-Verify system.

21. **Termination by Mutual Consent.** This Agreement may be terminated by mutual consent of the parties, provided the consent is documented in writing and duly executed by an authorized representative of each party.

22. **Survival.** Any provision contained in this or any other Contract Document that contemplates performance or observance subsequent to the termination or expiration of this Agreement shall survive the termination or expiration hereof and continue in full force and effect.

23. **Signature Warranty.** The undersigned represent and warrant that they are authorized to bind their principals to the terms and conditions of this Contract Cover and the Agreement generally, including those incorporated by reference to applicable law.

IN WITNESS WHEREOF, the Grantee and the Department execute this Agreement in two (2) originals, one (1) to be retained by the Grantee and one (1) to be retained by the Department, the day and year first above written.

TOWN OF SUNSET BEACH

By _____
Grantee's Signature

HIRAM J. MARZIANO, II, Town Administrator
Printed Name and Title

Town of Sunset Beach
Organization

NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY

By _____
Signature of Department Head or Authorized Agent

Tommy Kirby, Purchasing Director
Printed Name and Title

Financial Services Division, Purchasing and Contracts Section
Division/Section

THIS INSTRUMENT HAS BEEN PREAUDITED IN THE MANNER REQUIRED BY THE LOCAL GOVERNMENT BUDGET AND FISCAL CONTROL ACT

ORIGINAL

Finance Director

General Terms and Conditions
Governmental Entities

DEFINITIONS

Unless indicated otherwise from the context, the following terms shall have the following meanings in this Contract. All definitions are from 9 NCAC 3M.0102 unless otherwise noted. If the rule or statute that is the source of the definition is changed by the adopting authority, the change shall be incorporated herein.

(1) "Agency" (as used in the context of the definitions below) means and includes every public office, public officer or official (State or local, elected or appointed), institution, board, commission, bureau, council, department, authority or other unit of government of the State or of any county, unit, special district or other political sub-agency of government. For other purposes in this Contract, "Agency" means the entity identified as one of the parties hereto.

(2) "Audit" means an examination of records or financial accounts to verify their accuracy.

(3) "Certification of Compliance" means a report provided by the Agency to the Office of the State Auditor that states that the Grantee has met the reporting requirements established by this Subchapter and included a statement of certification by the Agency and copies of the submitted grantee reporting package.

(4) "Compliance Supplement" refers to the North Carolina State Compliance Supplement, maintained by the State and Local Government Finance Agency within the North Carolina Department of State Treasurer that has been developed in cooperation with agencies to assist the local auditor in identifying program compliance requirements and audit procedures for testing those requirements.

(5) "Contract" means a legal instrument that is used to reflect a relationship between the agency, grantee, and sub-grantee.

(6) "Fiscal Year" means the annual operating year of the non-State entity.

(7) "Financial Assistance" means assistance that non-State entities receive or administer in the form of grants, loans, loan guarantees, property (including donated surplus property), cooperative agreements, interest subsidies, insurance, food commodities, direct appropriations, and other assistance. Financial assistance does not include amounts received as reimbursement for services rendered to individuals for Medicare and Medicaid patient services.

(8) "Financial Statement" means a report providing financial statistics relative to a given part of an organization's operations or status.

(9) "Grant" means financial assistance provided by an agency, grantee, or sub-grantee to carry out activities whereby the grantor anticipates no programmatic involvement with the grantee or sub-grantee during the performance of the grant.

(10) "Grantee" has the meaning in G.S. 143-6.2(b): a non-State entity that receives a grant of State funds from a State agency, department, or institution but does not include any non-State entity subject to the audit and other reporting requirements of the Local Government Commission. For other purposes in this Contract, "Grantee" shall mean the entity identified as one of the parties hereto. For purposes of this contract, Grantee also includes other State agencies such as universities.

(11) "Grantor" means an entity that provides resources, generally financial, to another entity in order to achieve a specified goal or objective.

(12) "Non-State Entity" has the meaning in N.C.G.S. 143-6.2(a)(1): A firm, corporation, partnership, association, county, unit of local government, public authority, or any other person, organization, group, or governmental entity that is not a State agency, department, or institution.

(13) "Public Authority" has the meaning in N.C.G.S. 143-6.2(a)(3): A municipal corporation that is not a unit of local government or a local governmental authority, board, commission, council, or agency that (i) is not a municipal corporation and (ii) operates on an area, regional, or multiunit basis, and the budgeting and accounting systems of which are not fully a part of the budgeting and accounting systems of a unit of local government.

(14) "Single Audit" means an audit that includes an examination of an organization's financial statements, internal controls, and compliance with the requirements of Federal or State awards.

(15) "Special Appropriation" means a legislative act authorizing the expenditure of a designated amount of public funds for a specific purpose.

(16) "State Funds" means any funds appropriated by the North Carolina General Assembly or collected by the State of North Carolina. State funds include federal financial assistance received by the State and transferred or disbursed to non-State entities. Both Federal and State funds maintain their identity as they are sub-granted to other organizations. Pursuant to N.C.G.S. 143-6.2(b), the terms "State grant funds" and "State grants" do not include any payment made by the Medicaid program, the Teachers' and State Employees' Comprehensive Major Medical Plan, or other similar medical programs.

(17) "Sub-grantee" has the meaning in G.S. 143-6.2(b): a non-State entity that receives a grant of State funds from a grantee or from another sub-grantee but does not include any non-State entity subject to the audit and other reporting requirements of the Local Government Commission.

(18) "Unit of Local Government has the meaning in G.S. 143-6.2(a)(2): A municipal corporation that has the power to levy taxes, including a consolidated city-county as defined by G.S. 160B-2(1), and all boards,

agencies, commissions, authorities, and institutions thereof that are not municipal corporations.

Relationships of the Parties

Independent Contractor: The Grantee is and shall be deemed to be an independent contractor in the performance of this Contract and as such shall be wholly responsible for the work to be performed and for the supervision of its employees. The Grantee represents that it has, or shall secure at its own expense, all personnel required in performing the services under this agreement. Such employees shall not be employees of, or have any individual contractual relationship with, the Agency.

Subcontracting: To subcontract work to be performed under this contract which involves the specialized skill or expertise of the Grantee or his employees, the Grantee first obtains prior approval of the Agency Contract Administrator. In the event the Grantee subcontracts for any or all of the services or activities covered by this contract: (a) the Grantee is not relieved of any of the duties and responsibilities provided in this contract; (b) the subcontractor agrees to abide by the standards contained herein or to provide such information as to allow the Grantee to comply with these standards, and; (c) the subcontractor agrees to allow state and federal authorized representatives access to any records pertinent to its role as a subcontractor.

Sub-grantees: The Grantee has the responsibility to ensure that all sub-grantees, if any, provide all information necessary to permit the Grantee to comply with the standards set forth in this Contract.

Assignment: The Grantee may not assign the Grantee's obligations or the Grantee's right to receive payment hereunder. However, upon Grantee's written request approved by the issuing purchasing authority, the Agency may:

(a) Forward the Grantee's payment check(s) directly to any person or entity designated by the Grantee, or
(b) Include any person or entity designated by Grantee as a joint payee on the Grantee's payment check(s).

Such approval and action does not obligate the State to anyone other than the Grantee and the Grantee remains responsible for fulfillment of all contract obligations.

Beneficiaries: Except as herein specifically provided otherwise, this Contract insures to the benefit of and is binding upon the parties hereto and their respective successors. It is expressly understood and agreed that the enforcement of the terms and conditions of this Contract, and all rights of action relating to such enforcement, are strictly reserved to the Agency and the named Grantee. Nothing contained in this document shall give or allow any claim or right of action whatsoever by any other third person. It is the express intention of the Agency and Grantee that any third person receiving services or benefits under this Contract is an incidental beneficiary only.

Indemnity

Indemnification: In the event of a claim against either party by a third party arising out of this contract, the party whose actions gave rise to the claim is responsible for the defense of the claim and any resulting liability, provided that a party may not waive the other party's sovereign immunity or similar defenses. The parties agree to consult with each other over the appropriate handling of a claim and, in the event they cannot agree, to consult with the Office of the Attorney General.

Default and Termination

Termination by Mutual Consent: Either party may terminate this agreement upon thirty (30) days notice in writing from the other party. In that event, all finished or unfinished documents and other materials, at the option of the Agency, be submitted to the Agency. If the contract is terminated as provided herein, the Grantee is paid in an amount which bears the same ratio to the total compensation as the services actually performed bear to the total services of the Grantee covered by this agreement; for costs of work performed by subcontractors for the Grantee provided that such subcontracts have been approved as provided herein; or for each full day of services performed where compensation is based on each full day of services performed, less payment of compensation previously made. The Grantee repays to the Agency any compensation the Grantee has received which is in excess of the payment to which he is entitled herein.

Termination for Cause: If, through any cause, the Grantee fails to fulfill in timely and proper manner the obligations under this agreement, the Agency thereupon has the right to terminate this contract by giving written notice to the Grantee of such termination and specifying the reason thereof and the effective date thereof. In that event, all finished or unfinished documents, data, studies, surveys, drawings, maps, models, photographs, and reports prepared by the Grantee , at the option of the Agency, be submitted to the Agency, and the Grantee is entitled to receive just and equitable compensation for any satisfactory work completed on such documents and other materials. The Grantee is not relieved of liability to the Agency for damages sustained by the Agency by virtue of any breach of this agreement, and the Agency may withhold payment to the Grantee for the purpose of set off until such time as the exact amount of damages due the Agency from such breach can be determined.

Waiver of Default: Waiver by the Agency of any default or breach in compliance with the terms of this Contract by the Grantee is not a waiver of any subsequent default or breach and is not a modification of the terms of this Contract unless stated to be such in writing, signed by an authorized representative of the Agency and the Grantee and attached to the contract.

Availability of Funds: The parties to this Contract agree and understand that the payment of the sums specified in this Contract is dependent and contingent upon and subject to the appropriation, allocation, and availability of funds for this purpose to the Agency.

Force Majeure: Neither party is in default of its obligations hereunder if and it is prevented from performing such obligations by any act of war, hostile foreign action, nuclear explosion, riot, strikes, civil insurrection, earthquake, hurricane, tornado, or other catastrophic natural event or act of God.

Survival of Promises: All promises, requirements, terms, conditions, provisions, representations, guarantees, and warranties contained herein shall survive the contract expiration or termination date unless specifically provided otherwise herein, or unless superseded by applicable federal or State statutes of limitation.

Intellectual Property Rights

Copyrights and Ownership of Deliverables: Any and all copyrights resulting from work under this agreement shall belong to the Grantee. The Grantee hereby grants to the North Carolina Department of Environment and Natural Resources a royalty-free, non-exclusive, paid-up license to use, publish and distribute results of work under this agreement for North Carolina State Government purposes only.

Compliance with Applicable Laws

Compliance with Laws: The Grantee understands and agrees that is subject to compliance with all laws, ordinances, codes, rules, regulations, and licensing requirements that are applicable to the conduct of its business, including those of federal, state, and local agencies having jurisdiction and/or authority.

Equal Employment Opportunity: The Grantee understands and agrees that it is subject to compliance with all federal and State laws relating to equal employment opportunity.

Confidentiality

Confidentiality: As authorized by law, the Grantee keeps confidential any information, data, instruments, documents, studies or reports given to or prepared or assembled by the Grantee under this agreement and does not divulge or make them available to any individual or organization without the prior written approval of the Agency. The Grantee acknowledges that in receiving, storing, processing or otherwise dealing with any confidential information it will safeguard and not further disclose the information except as otherwise provided in this Contract or without the prior written approval of the Agency.

Oversight

Access to Persons and Records: The State Auditor and the using agency's internal auditors shall have access to persons and records as a result of all contracts or grants entered into by State agencies or political subdivisions in accordance with General Statute 147-64.7 and Session Law 2010-194, Section 21 (i.e., the State Auditors and internal auditors may audit the records of the contractor during the term of the contract to verify accounts and data affecting fees or performance). The Contractor shall retain all records for a period of three years following completion of the contract or until any audits begun during this period are completed and findings resolved, whichever is later.

Record Retention: The Grantee may not destroy, purge or dispose of records without the express written consent of the Agency. State basic records retention policy requires all grant records to be retained for a minimum of five years or until all audit exceptions have been resolved, whichever is longer. If the contract is subject to Federal policy and regulations, record retention may be longer than five years since records must be retained for a period of three years following submission of the final Federal Financial Status Report, if applicable, or three years following the submission of a revised final Federal Financial Status Report. Also, if any litigation, claim, negotiation, audit, disallowance action, or other action involving this Contract has started before expiration of the five-year retention period described above, the records must be retained until completion of the action and resolution of all issues which arise from it, or until the end of the regular five-year period described above, whichever is later.

Time Records: The GRANTEE will maintain records of the time and effort of each employee receiving compensation from this contract, in accordance with the appropriate OMB circular.

Miscellaneous

Choice of Law: The validity of this Contract and any of its terms or provisions, as well as the rights and duties of the parties to this Contract, are governed by the laws of North Carolina. The Grantee, by signing this Contract, agrees and submits, solely for matters concerning this Contract, to the exclusive jurisdiction of the courts of North Carolina and agrees, solely for such purpose, that the exclusive venue for any legal proceedings shall be Wake County, North Carolina. The place of this Contract and all transactions and agreements relating to it, and their situs and forum, shall be Wake County, North Carolina, where all matters, whether sounding in contract or tort, relating to the validity, construction, interpretation, and enforcement shall be determined.

Amendment: This Contract may not be amended orally or by performance. Any amendment must be made in written form and executed by duly authorized representatives of the Agency and the Grantee.

Severability: In the event that a court of competent jurisdiction holds that a provision or requirement of this Contract violates any applicable law, each such provision or requirement shall continue to be enforced to the extent it is not in violation of law or is not otherwise unenforceable and all other provisions and requirements of this Contract shall remain in full force and effect.

Headings: The Section and Paragraph headings in these General Terms and Conditions are not material parts of the agreement and should not be used to construe the meaning thereof.

Time of the Essence: Time is of the essence in the performance of this Contract.

Care of Property: The Grantee agrees that it is be responsible for the proper custody and care of any State owned property furnished him for use in connection with the performance of his contract and will reimburse the State for its loss or damage.

Travel Expenses: All travel, lodging, and subsistence costs are included in the contract total and no additional payments will be made in excess of the contract amount indicated in above. Contractor must adhere to the travel, lodging and subsistence rates established in the Budget Manual for the State of North Carolina.

Sales/Use Tax Refunds: If eligible, the Grantee and all sub-grantees shall: (a) ask the North Carolina Department of Revenue for a refund of all sales and use taxes paid by them in the performance of this Contract, pursuant to G.S. 105-164.14; and (b) exclude all refundable sales and use taxes from all reportable expenditures before the expenses are entered in their reimbursement reports.

Advertising: The Grantee may not use the award of this Contract as a part of any news release or commercial advertising.

Recycled Paper: The Grantee ensures that all publications produced as a result of this contract are printed double-sided on recycled paper.

Sovereign Immunity: The Agency does not waive its sovereign immunity by entering into this contract and fully retains all immunities and defenses provided by law with respect to any action based on this contract.

Gratuities, Kickbacks or Contingency Fee(s): The parties certify and warrant that no gratuities, kickbacks or contingency fee(s) are paid in connection with this contract, nor are any fees, commissions, gifts or other considerations made contingent upon the award of this contract.

Lobbying: The Grantee certifies that it (a) has neither used nor will use any appropriated funds for payments to lobbyist; (b) will disclose the name, address, payment details, and purpose of any agreement with lobbyists whom the Grantee or its sub-tier contractor(s) or sub-grantee(s) will pay with profits or non-appropriated funds on or after December 22, 1989; and (c) will file quarterly updates about the use of lobbyists if material changes occur in their use.

By Executive Order 24, issued by Governor Perdue, and N.C. G.S.§ 133-32: It is unlawful for any vendor or contractor (i.e. architect, bidder, contractor, construction manager, design professional, engineer, landlord, offeror, seller, subcontractor, supplier, or vendor), to make gifts or to give favors to any State employee of the Governor's Cabinet Agencies (i.e., Administration, Commerce, Correction, Crime Control and Public Safety, Cultural Resources, Environment and Natural Resources, Health and Human Services, Juvenile Justice and Delinquency Prevention, Revenue, Transportation, and the Office of the Governor). This prohibition covers those vendors and contractors who:

(1) have a contract with a governmental agency; or
(2) have performed under such a contract within the past year; or
(3) anticipate bidding on such a contract in the future.

For additional information regarding the specific requirements and exemptions, vendors and contractors are encouraged to review Executive Order 24 and G.S. Sec. 133-32.

Executive Order 24 also encouraged and invited other State Agencies to implement the requirements and prohibitions of the Executive Order to their agencies. Vendors and contractors should contact other State Agencies to determine if those agencies have adopted Executive Order 24."

Water Resources Development Grant Program (WRDGP)
Shallow Draft Navigation Channel Dredging and Aquatic Weed Fund Guidelines FY 2018 - 2019

Administered by: N.C. Department of Environmental Quality (DEQ), Division of Water Resources (DWR), 1611 Mail Service Center, Raleigh, N.C., 27699-1611. Contact Coley Cordeiro at Coley.Cordeiro@ncdenr.gov or (919) 707-9013

Authority: DWR is authorized to provide grants to local governments for water resources development projects by N.C. Gen. Stat. § 143-215.70-.73 and 15A NCAC 02G .0100.

Who is Eligible: Units of local government, local political subdivisions, cooperating agencies

Application Deadlines: Applications can be received throughout the year for navigation projects on an as needed basis.

Funding Source: North Carolina Shallow Draft Navigation Channel Dredging and Aquatic Weed Fund (N.C. Gen. Stat. § 143-215.73F)

Eligible Purposes and Cost-Share Percentages: According to N.C. Gen. Stat. § 143-215.73F, revenue in the Fund may only be used to provide the State's cost share of the costs associated with any dredging project designed to keep shallow draft navigation channels located in State waters or waters of the State located within lakes navigable and safe. Any project funded by revenue from the Fund must be cost-shared with non-State dollars as follows: 1) The cost-share for dredging projects located, in whole or part, in a development tier one area, as defined in N.C. Gen. Stat. § 143B-437.08, shall be at least one non-State dollar for every three dollars from the Fund (Tier 1 county match: 75% State/25% Local). 2) The cost share for dredging projects not located, in whole or part, in a development tier one area shall be at least one non-State dollar for every two dollars from the Fund (Tier 2 & 3 county match: 66.67% State/33.33% Local).

Additional Information:
Funding provided from the Shallow Draft Navigation Channel Dredging and Aquatic Weed Fund must be primarily for general or recreational navigation purposes. Additional project outcomes from a navigation project such as beneficial placement of beach compatible material must be a secondary reason for the project (if applicable). Dredging around ship berths, piers, docks and access to private docks are not eligible for funding from the Shallow Draft Navigation Channel Dredging and Aquatic Weed Fund.

Application Submittal: All required forms and grant information can be found at the WRDGP website.

Application Spreadsheet (MS Excel) - Applications should be completed and returned via email to Coley Cordeiro at Coley.Cordeiro@ncdenr.gov. The complete application will be included in the DEQ contract documentation and the project budget will serve as the basis for the contract's financial documentation should a project be recommended for funding. Therefore, it is very important that its contents are accurate and complete.

Water Resources Development Grant Program (WRDGP)
Shallow Draft Navigation Channel Dredging and Aquatic Weed Fund
Guidelines FY 2018 - 2019

Project Plan and Location Maps – Project plans, a survey of the dredge site, and a survey of the dredge material disposal site (if applicable).

Official Resolution – As required in 15A NCAC 02G.0100, the Project Sponsor shall include a resolution adopted by the governing board stating the amount of State aid requested and accepting the Project Sponsor's responsibilities. The Official Resolution must be signed by a representative of the Project Sponsor with signatory authority and state that the local unit of government will:

1. Assume full obligation for payment of the balance of project costs.
2. Obtain all necessary State and Federal environmental permits.
3. Comply with all applicable laws governing the award of contracts and the expenditure of public funds by local governments.
4. Supervise construction of the project to ensure compliance with permit conditions and to agree to provide safe and proper construction in accordance with approved plans and specifications.
5. Obtain appropriate easements, rights-of-way or suitable dredge material disposal areas that may be necessary for the construction and operation of the project without cost or obligation to the State.
6. Ensure that the project is open for use by the public on an equal basis with limited restrictions (if on public property).
7. Hold the State harmless for any damages that may result from the construction, operation, and maintenance of the project.
8. Accept responsibility for operation and long-term maintenance of the completed project.

An Official Resolution template is available for download from the WRDGP website. The Project Sponsor may not revise or eliminate provisions from the Official Resolution template unless they have submitted written justification to DWR and received DWR's approval. Supplementary provisions may be added to address unique circumstances of a particular project.

No Conflict of Interest Certification – Project Sponsors must provide certification that the Project Sponsor, Project Sponsor's subordinates and any person or persons designated to act on behalf of the Project Sponsor does not have an actual or apparent conflict of interest with respect to the project. A representative of the Project Sponsor with signatory authority shall sign this certification, which is available for download from the WRDGP website.

Supplementary Documentation – The Project Sponsor may provide supplementary documentation (reports, photos, letters of support, etc.) as separate attachments via email as part of the application submittal. Application supplementary documents should be emailed to Coley Cordeiro at Coley.Cordeiro@ncdenr.gov.

Note: It is the Project Sponsor's responsibility to ensure the application submitted to DWR is accurate and complete. Erroneous or incomplete information in an application may prevent a

project from being recommended for grant funding and may delay processing of contracts and funds for approved projects.

Any changes to the original project budget and/or project scope submitted with the application will require the prior written approval of DWR and may also require a DEQ contract amendment. Unapproved changes to the project scope or budget throughout the course of a project will not be eligible for cost-share funding or reimbursement.

Grant Application Review and Approval

N.C. Gen. Stat. § 143-215.70-73 requires that Grants for Water Resources Development Projects consider the following criteria to approve, approve in part, or disapprove grant applications:

1. The economic, social, and environmental benefits to be provided by the projects;
2. Regional benefits of projects to an area greater than the area under the jurisdiction of the local sponsoring entity;
3. The financial resources of the local sponsoring entity;
4. The environmental impact of the project;
5. Any direct benefit to State-owned lands and properties.

Post Grant Funding Award

Acceptance of a grant award will require the Project Sponsor to enter into a grant contract with DEQ. Any changes to the scope of the project or project budget after submission of a grant application will require the written approval of the DWR Grant Administrator and may also require a DEQ contract amendment. In seeking DWR approval, the Project Sponsor must submit, at a minimum, a justification for any proposed changes, revised scope of work narrative, and a revised budget. Unapproved changes to the project scope or budget shall not be eligible for, and may result in additional reductions to, cost-share funding or reimbursement.

A DEQ grant contract is considered 'fully-executed' once it has been signed by both a signatory authority of the Grantee and DEQ Financial Services. A copy of the fully-executed contract shall be provided to the Grantee after being signed by DEQ. No portion of work or expenditure of funds for the project, plan or services shall begin prior to receiving a fully-executed contract from DEQ. Unforeseen circumstances such as legislative, policy or funding allocation changes may delay award notifications.

Project Sponsor Obligation – Environmental Permitting

All proposed projects are subject to environmental review and permitting under applicable federal and State law. It is the Project Sponsor's responsibility to prepare, provide and remain in compliance with all applicable environmental permitting requirements.

Extension Request

Grant award recipients may request a contract extension if a justification for the extension can be sufficiently documented. An extension is granted at the discretion of DWR. An extension request shall be submitted by the Project Sponsor or primary contact on official letterhead to

Coley.Cordeiro@ncdenr.gov. At a minimum, the extension request shall include:

1. Justification for the extension request
2. Summary of the current project status
3. Anticipated project schedule moving forward

Grant Reimbursement Payments

The grant award amount is the maximum possible reimbursement amount. Only expenditures incurred after a fully executed contract that are detailed in the contract budget are eligible for reimbursement. Allowable expenditures are expenditures associated with the work performed for a specific invoicing cycle that are in accordance with the DWR-approved application budget sheet for the project. Reimbursement requests can be submitted no more frequently than monthly. DWR will normally pay the Grantee by check or electronically within 30 days of receipt of the statement of expenses, provided the expenses are in accordance with the project information shown in the initial request or as amended. If the Grantee decides that significant changes to a project's scope from that in the original application are necessary, the Grantee must send a request in writing to the DWR Grant Administrator and receive approval of those changes. Unapproved changes will not be eligible for state cost-sharing.

Reimbursement requests shall include:

1. Cover letter on grantee letterhead that includes:
    a) DEQ grant contract number
    b) Total amount of reimbursement request
    c) Actual cost (expenses) by approved budget categories
    d) Total amount spent on the project to date of the request
2. Complete the Grant Reimbursement Template (both sheets labeled "Invoices" and "Request 1 Itemized") located on the WRDGP website.
3. Copies of invoices or other documentation for materials, services and other project costs detailed on the "Request 1 Itemized" sheet. Invoices submitted shall be on either the Grantee or the Grantee's subcontractor letterhead.

100% of the contract expenditures must be provided to DWR for the grant Project Sponsor to receive the full allowable amount for reimbursement.

DWR will retain 10% of the total grant award amount until after the final project has been inspected and accepted by DWR staff. The reimbursement request and supporting documentation should be submitted electronically to Coley.Cordeiro@ncdenr.gov.

Requests for Additional Funding

Grant recipients can submit a request for additional funding to DWR. Requests for additional funding must be submitted by the Project Sponsor on official letterhead via email. The following information shall be submitted by the Grantee to DWR for additional funding consideration:

1. A narrative describing the circumstances/need for an increased funding award, summary of current project status and anticipated project implementation schedule.
2. Copies of all subcontractor invoices for design, permitting, surveying, construction, construction oversight and project administration.

Upon receiving all relevant information from the Grantee, DWR will respond to the Grantee with within 30 calendar days with a decision regarding increased funding. Funding increases are subject to the availability of funds. DWR may not be able to grant requests for additional funding caused by inaccurate or incomplete information in the application or project budget provided by the Project Sponsor or Co-Project Sponsor.

Project Close-Out
The Grantee shall notify the DWR Grant Administrator upon project completion and provide DWR with the most recent set of permits, as-built/record, post-surveys of the dredge site, and post-surveys of the spoil site (if applicable) in Adobe PDF format prior to the project close-out.

DWR Grant Administrator may schedule a close-out inspection of the completed project with a representative of the Grantee. This inspection will verify that the project was implemented in accordance with the information provided in the grant application, along with the approved plans and specifications.

The Grantee shall address any remedial or compliance actions identified during this close out inspection prior to DWR project acceptance. After the project is inspected and accepted, DEQ will review the accounting statements and reimburse the Grantee for the remaining 10% of the State's share of the non-federal cost.

Additional References for the Shallow Draft Navigation Channel Dredging and Aquatic Weed Fund:

S.L. 2013-360

S.L. 2015-241

S.L. 2016-94

S.L. 2017-57

S.L. 2018-5

Attachment C
DEQ Contract 7749

NORTH CAROLINA
Environmental Quality

Water Resources Development Grant Program
Shallow Draft Navigation Channel Dredging Application
FY 2018 - 2019

North Carolina Department of Environmental Quality
Division of Water Resources
Contact Coley Cordeiro at Coley.Cordeiro@ncdenr.gov **or (919) 707-9013**

1. Project Title	***Sunset Beach Canal and Channel Dredging 2018/Town of Sunset Beach Shallow Draft Navigation Project***

2a. Primary Contact or Project Manager

Name	***Hiram Marzinao,***		
Title	***Town Administrator***		
Organization Name	***Town of Sunset Beach***		
Organization Tax ID Number	***560927576***		
E-mail address	hmarziano@sunsetbeachnc.gov		
Mailing Address	***700 Sunset Beach Boulevard***		
City	***Sunset Beach***	State ***NC***	Zip ***28468***
Telephone	***910.579.6297***	Fax Number ***910.579.1840***	

2b. Execution Address (where contract will be mailed for signature) - Write "same as above" if it is the Primary Contact information in 2a.

Name	***Paul Vanwormer***		
Title	***Mayor***		
Organization Name	***Town of Sunset Beach***		
E-mail Address	pvanwormer@sunsetbeachnc.gov		
Mailing Address	***700 Sunset Beach Boulevard***		
City	***Sunset Beach***	State ***NC***	Zip ***28468***
Telephone	***910.579.6297***	Fax Number ***910.579.1840***	

2c. Payment Address (where invoice payments will be mailed) - Write "same as above" if it is the Primary Contact information in 2a.

Name	***Lisa Anglin***		
Title	***Town Clerk***		
Organization Name	***Town of Sunset Beach***		
E-mail Address	langlin@sunsetbeachnc.gov		
Mailing Address	***700 Sunset Beach Boulevard***		
City	***Sunset Beach***	State ***NC***	Zip ***28468***
Telephone	***910.579.6297***	Fax Number ***910.579.1840***	

NORTH CAROLINA
Environmental Quality

Water Resources Development Grant Program
Shallow Draft Navigation Channel Dredging Application
FY 2018 - 2019

North Carolina Department of Environmental Quality
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Contact Coley Cordeiro at Coley.Cordeiro@ncdenr.gov or (919) 707-9013

3. Project Description - Provide a short summary of the project

Navigation dredging for residential canals along east end of Sunset Beach (Brunswick County), NC. The project entails maintenance dredging of Mary's Creek and Turtle Creek adjacent to the AIWW, as well as the Feeder Channel, Finger Canals, Bay Area, and South Jinks Creek adjacent to Tubbs Inlet. The project will remove approximately 105,000 CY of sediment from the navigation channels. Approximately 40,500 CY of compatible material will be placed along the ocean front as beneficial reuse, while 64,500 CY of non-compatible material will be placed in an upland facility. The beneficial reuse of material for beach placement will be a secondary benefit to the project to help control costs and maintain compatible material within the coastal system. Mary's & Turtle Creek are designated as PNA (Primary Nursery Area) and were last dredged in 2002. The Feeder Canal was also dredged in 2002, but the Bay Area and S. Jinks Creek were originally dredged approx. to 1970 as part of the development of Sunset Beach and have not received any documented maintenance work.

4. Project Scope – Brief description of the project scope (what is being proposed) and justification (why is it being proposed)

The Town of Sunset Beach is proposing to dredge several waterways along the east end of Sunset Beach. The project will significantly improve navigation access through the project area and help establish a long-term template for maintaining the navigation depths. The project will also assist in managing future development by helping to establish a pier head alignment.

5. Existing Conditions - Brief description of existing site conditions and land use within project area

The project area is mostly residential housing with park land. Some business, such as restaurants, also reside along the proposed dredge area.

6. Anticipated Contract Start Date	5/28/2019	Anticipated Contract End Date	6/30/2021

7. Project Location: Important to submit as completely as possible, especially the Lat/Long coordinates

Project Location	*Sunset Beach, NC*	
County Name	*Brunswick*	
Inlet/Channel/Waterbody Name	*Mary's & Turtle Creek, Bay Area, Feeder Channel, Finger Canals, & South Jinks Creek*	
Position coordinates of project location	Latitude	*33.876 N*
	Longitude	*-78.493 E*
Anticipated Total Dredged Material in Cubic Yards	*105,000*	

NORTH CAROLINA
Environmental Quality

Water Resources Development Grant Program
Shallow Draft Navigation Channel Dredging Application
FY 2018 - 2019

North Carolina Department of Environmental Quality
Division of Water Resources
Contact Coley Cordeiro at Coley.Cordeiro@ncdenr.gov or (919) 707-9013

8. General Statute 143-215.72 states that in reviewing applications the Secretary shall consider Economic, Social, and Environmental Benefits provided by the project; Regional Benefits of the project to an area greater than the area under jurisdiction of the local sponsoring entity; The financial resources of the local sponsoring entity; The enviornmental impact of the project; Any direct benefit to State-owned lands and properties. Please provide your answers below for each category:

Economic, Social, and Environmental Benefits
Improve navigation for residents and visitors of Sunset Beach, restore navigation depths to residential canals.
Regional Benefits
Restore navigation for tourism benefits to waterways within Sunset Beach.
Financial Resources
Sunset Beach intends to establish a dredging district for the residents to provide financial resources in addtion to the Towns contribution.
Environmental Impacts
The Town has reduced the project scope to limit or avoid potential environmental impacts identified.
Direct Benefit to State-Owned Lands and Properties

Attachment C
DEQ Contract 7749

NORTH CAROLINA
Environmental Quality

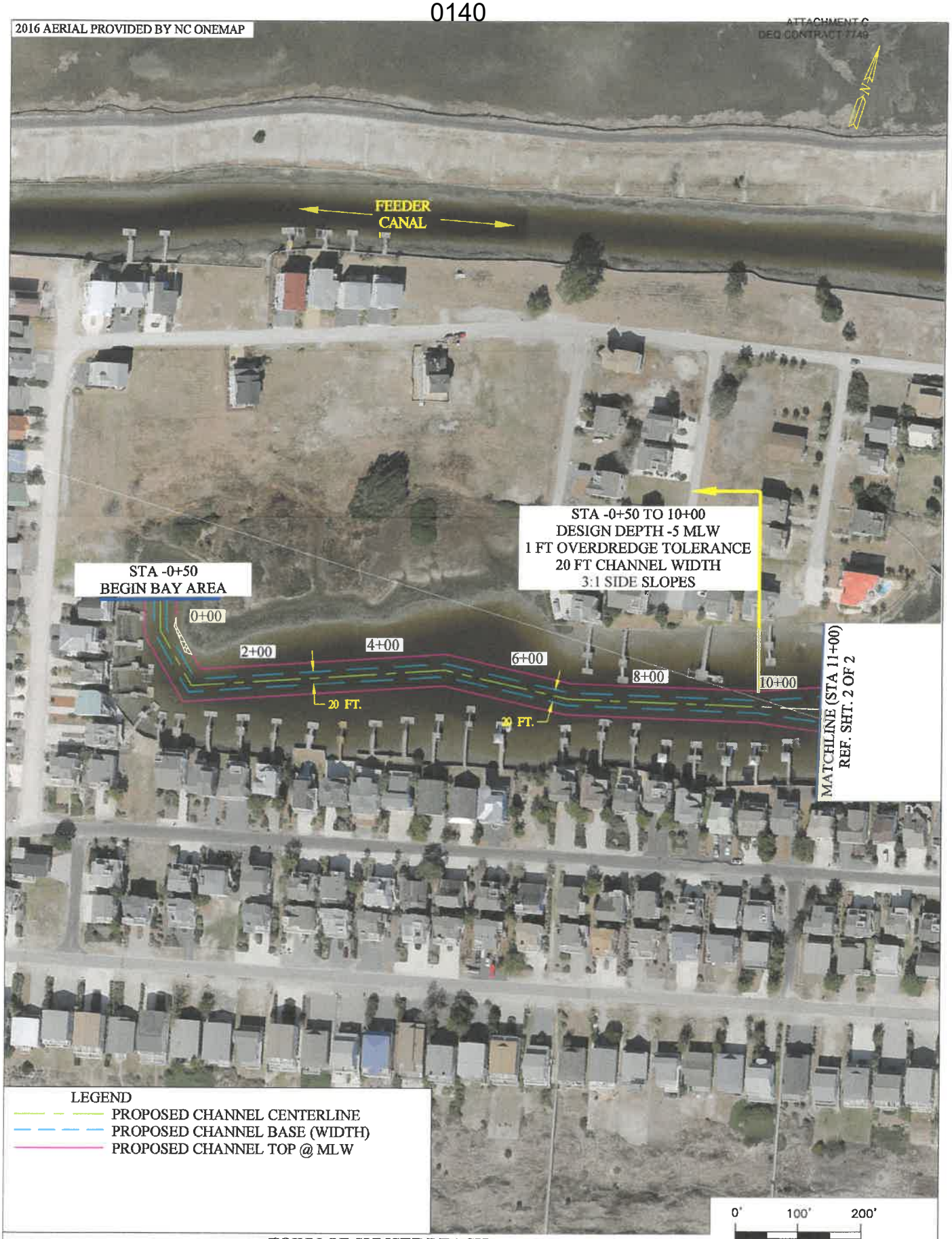
Water Resources Development Grant Program
Shallow Draft Navigation Channel Dredging Application
FY 2018 - 2019

North Carolina Department of Environmental Quality
Division of Water Resources
Contact Coley Cordeiro at Coley.Cordeiro@ncdenr.gov or (919) 707-9013

Project Name: *Town of Sunset Beach Shallow Draft Navigation Project* **Date:** *8-Nov-18*

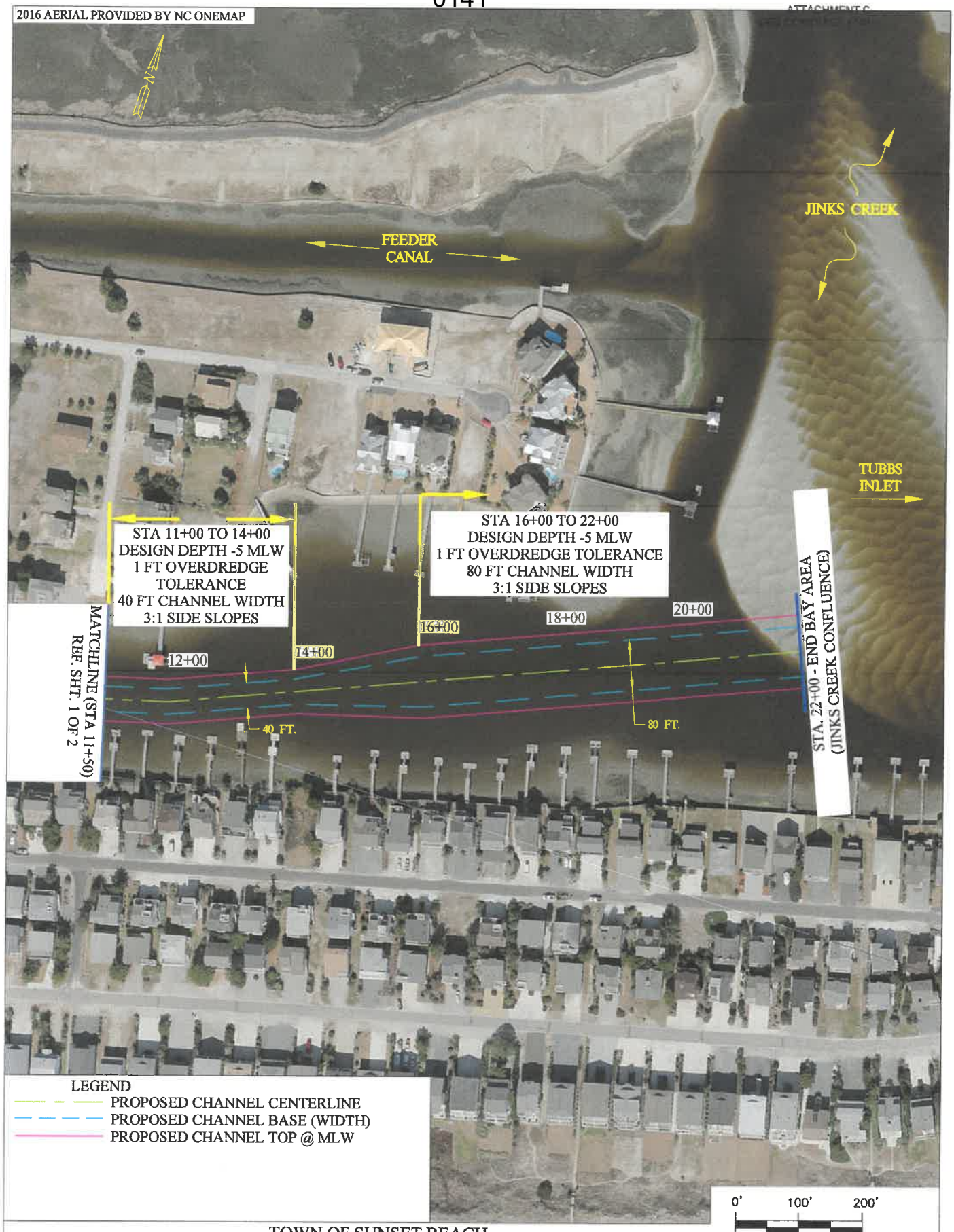
	State Contributio (DWR)	Local / Municipal Match	Other Non-Federal Match	Federal Contribution	Local + Other Non-Federal Match Total	Category Total
Administration						
Cash					$0.00	$0.00
In-kind					$0.00	$0.00
Design						
Cash	$223,112.00	$111,539.00			$111,539.00	$334,651.00
In-kind					$0.00	$0.00
Permitting						
Cash	$169,991.00	$84,983.00			$84,983.00	$254,974.00
In-kind					$0.00	$0.00
Survey						
Cash	$80,000.00	$40,000.00			$40,000.00	$120,000.00
In-kind					$0.00	$0.00
Construction Oversight						
Cash	$116,666.67	$58,333.33			$58,333.33	$175,000.00
In-kind					$0.00	$0.00
Construction						
Cash	$3,166,666.67	$1,583,333.33			$1,583,333.33	$4,750,000.00
In-kind					$0.00	$0.00
Construction Materials						
Cash					$0.00	$0.00
In-kind					$0.00	$0.00
Land						
Cash					$0.00	$0.00
In-kind					$0.00	$0.00
Cash Sub-total	$3,756,436.34	$1,878,188.66	$0.00	$0.00	$1,878,188.66	$5,634,625.00
In-kind Sub-total		$0.00	$0.00	$0.00	$0.00	$0.00
Total	$3,756,436.34	$1,878,188.66	$0.00	$0.00	$1,878,188.66	$5,634,625.00

DWR Total =	**$3,756,436.34**	**Local + Non-Fed Total =**	**$1,878,188.66**	Non-Federal % =	**100.00%**
DWR Match % =	**66.67%**	**Local + Non-Fed Match % =**	**33.33%**	Federal % =	**0.00%**



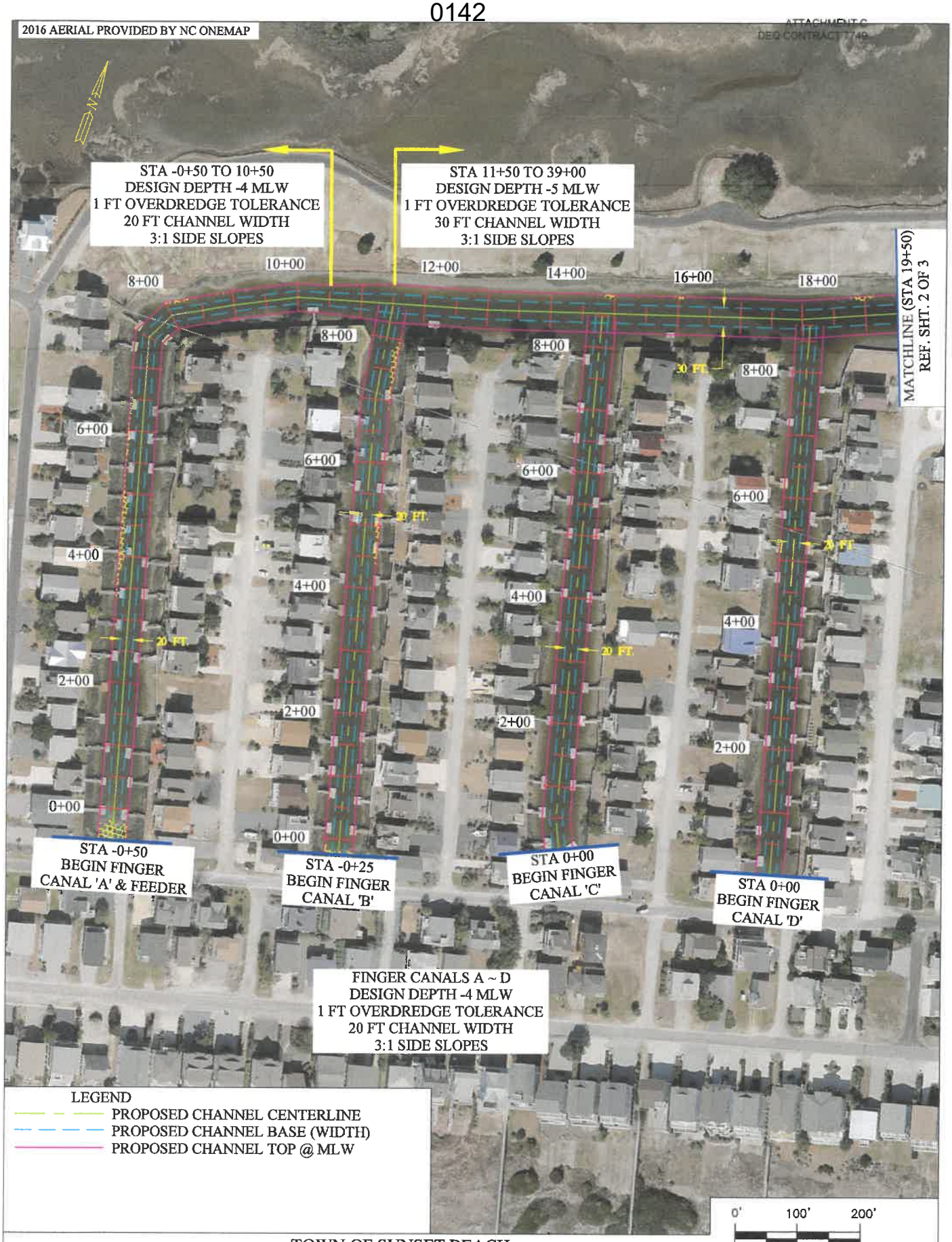
TOWN OF SUNSET BEACH
NAVIGATION PROJECT
BAY AREA DREDGE ALIGNMENT
PLAN VIEW

1 OF 2



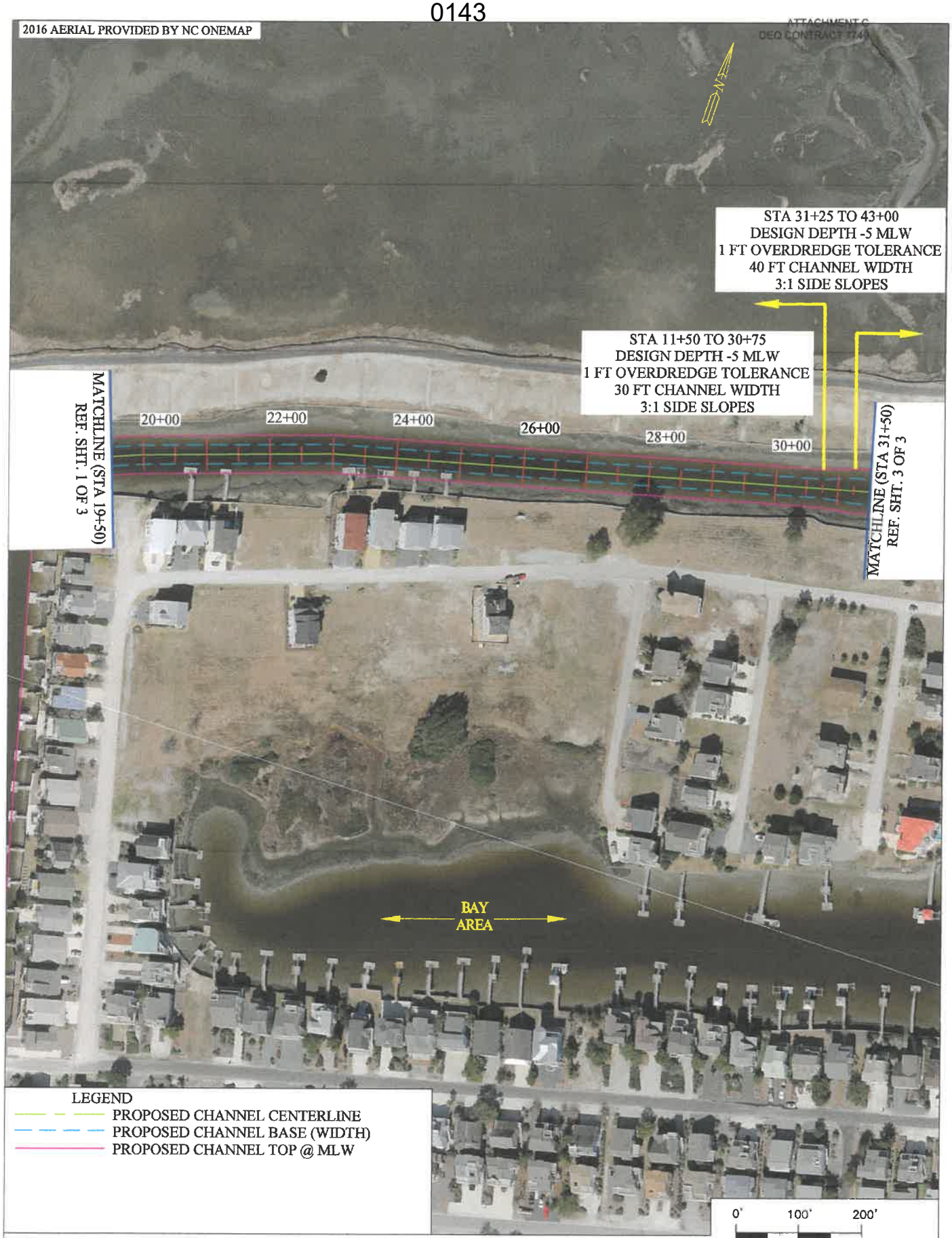
TOWN OF SUNSET BEACH
NAVIGATION PROJECT
BAY AREA DREDGE ALIGNMENT
PLAN VIEW

2 OF 2



TOWN OF SUNSET BEACH
NAVIGATION PROJECT
FEEDER CHANNEL DREDGE ALIGNMENT
PLAN VIEW

1 OF 3

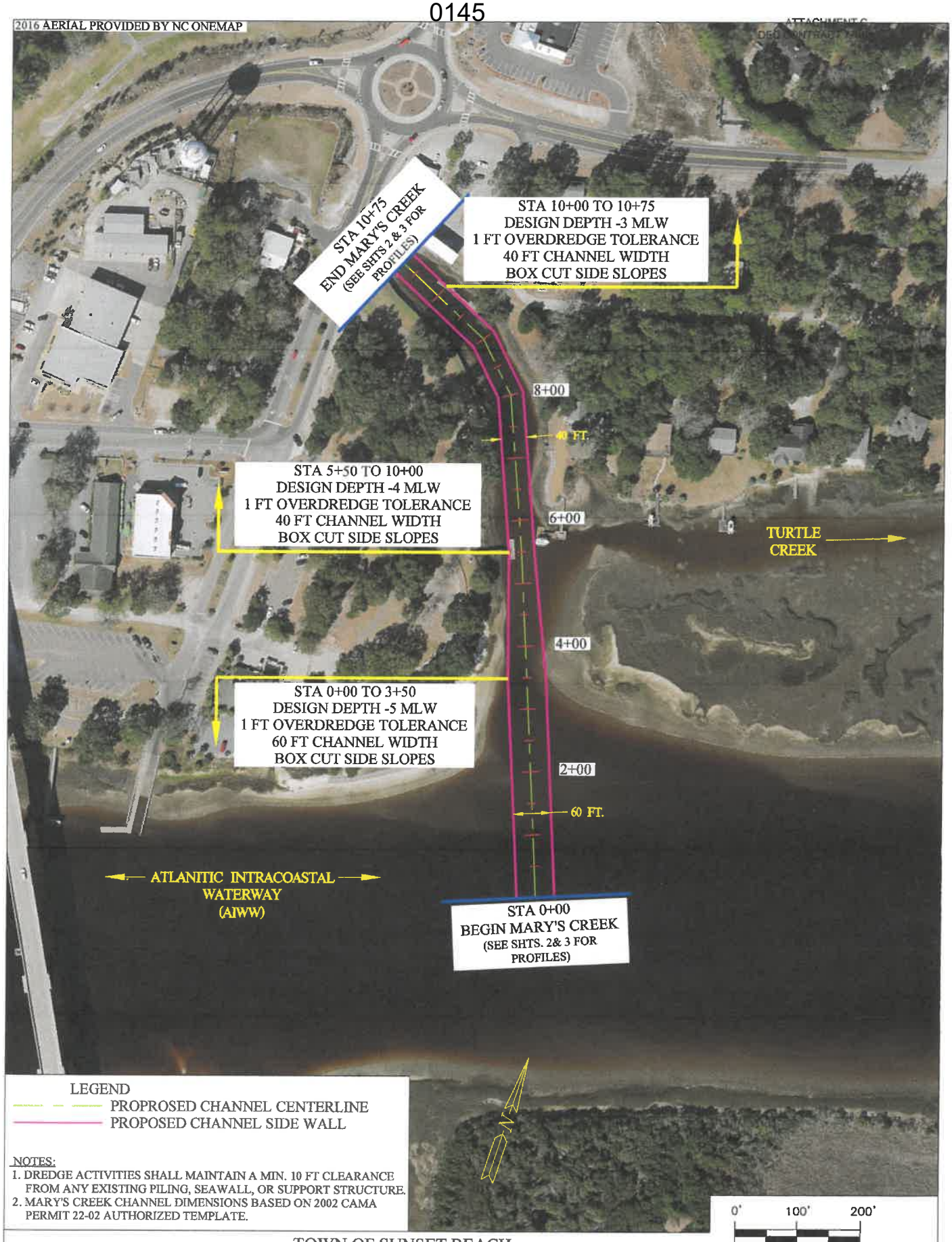


TOWN OF SUNSET BEACH
NAVIGATION PROJECT
FEEDER CHANNEL DREDGE ALIGNMENT
PLAN VIEW

2 OF 3

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
FEEDER CHANNEL SEDIMENT ANALYSIS
PLAN VIEW

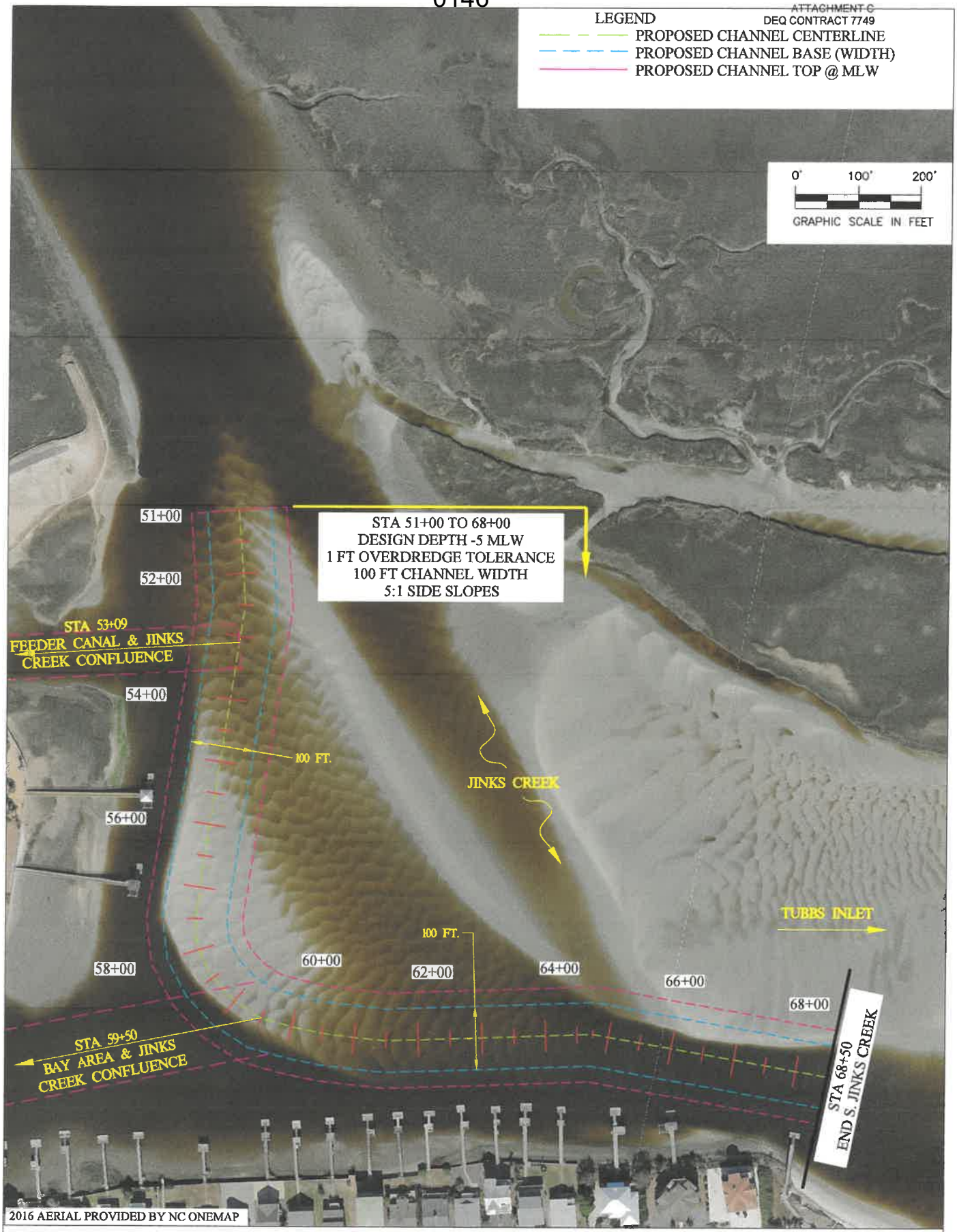
3 OF 3



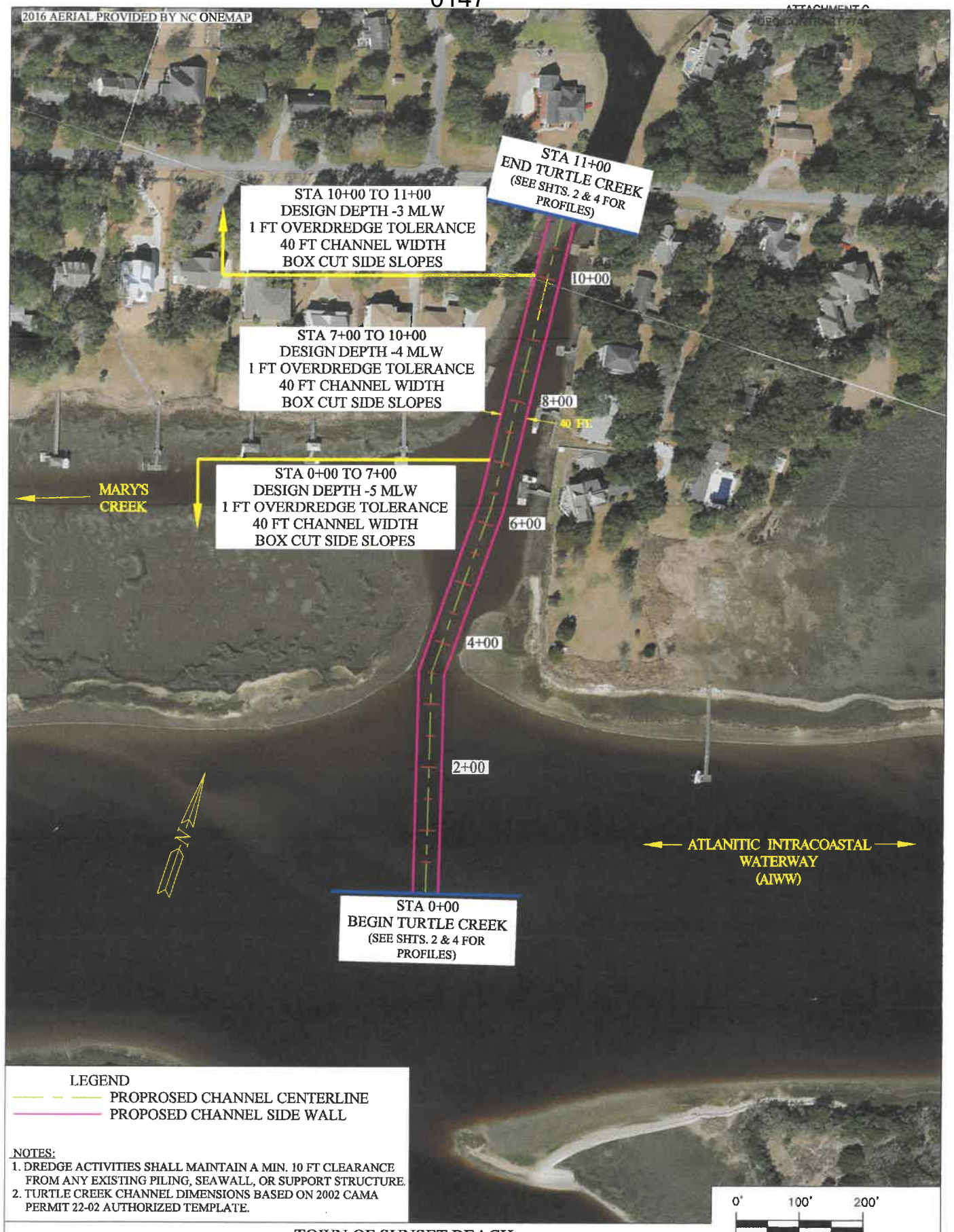
TOWN OF SUNSET BEACH
NAVIGATION PROJECT
MARY'S CREEK DREDGE ALIGNMENT
PLAN VIEW

PG. 1 OF 1

moffatt & nichol



TOWN OF SUNSET BEACH NAVIGATION PROJECT
SOUTH JINKS CREEK
PROPOSED DREDGE ALIGNMENT
PLAN VIEW



TOWN OF SUNSET BEACH
NAVIGATION PROJECT
TURTLE CREEK DREDGE ALIGNMENT
PLAN VIEW

PG. 1 OF 1

moffatt & nichol

ATTACHMENT C
DEQ CONTRACT 7749

Resolution Requesting State Assistance through the Shallow Draft Navigation Fund for the Sunset Beach Shallow Draft Navigation Project

WHEREAS, the Sunset Beach Town Council desires to sponsor the Sunset Beach Shallow Draft Navigation project to provide improved navigation access to the residents and guests of Sunset Beach;

NOW, THEREFORE, BE IT RESOLVED THAT:

1) The **Council** requests the State of North Carolina to provide financial assistance to The Town of Sunset Beach for the Sunset Beach Shallow Draft Navigation project in the amount of $3,756,436.34 or 66.67% percent of the feasibility, design, permitting, construction, and monitoring cost, whichever is the lesser amount;

2) The **Council** assumes full obligation for payment of the balance of project costs;

3) The **Council** will obtain all necessary State and Federal permits;

4) The **Council** will comply with all applicable laws governing the award of contracts and the expenditure of public funds by local governments;

5) The **Council** will supervise construction of the project to assure compliance with permit conditions and to assure safe and proper construction according to approved plans and specifications;

6) The **Council** will obtain suitable spoil disposal areas as needed and all other easements or rights-of-way that may be necessary for the construction and operation of the project without cost or obligation to the State;

7) The **Council** will assure that the project is open for use by the public on an equal basis with no restrictions;

8) The **Council** will hold the State harmless from any damages that may result from the construction, operation and maintenance of the project;

9) The **Council** accepts responsibility for the operation and maintenance of the completed project.

Adopted by the Sunset Beach Town Council this 13th day of November, 2018.

Lisa H. Anglin
Clerk to the Council/Board

Mayor
Town of Sunset Beach, NC

Notice of Certain Reporting and Audit Requirements

A recipient or subrecipient shall comply with the all rules and reporting requirements established by statute or administrative rules found in 09 NCAC Subchapter 3M. For convenience, the requirements of 09 NCAC Subchapter 3M.0205 are set forth in this Attachment.

Reporting Thresholds.
There are three reporting thresholds established for recipients and subrecipients receiving State awards of financial assistance. The reporting thresholds are:

(1) Less than $25,000 – A recipient or subrecipient that receives, hold, uses, or expends State financial assistance in an amount less than twenty-five thousand dollars ($25,000) within its fiscal year must comply with the reporting requirements established by this Subchapter including:
  (A) A certification that State financial assistance received or held was used for the purposes for which it was awarded; and
  (B) An accounting of all State financial assistance received, held, used, or expended.

(2) $25,000 up to $500,000 -A recipient or subrecipient that receives, holds uses, or expends State financial assistance in an amount of at least twenty-five thousand ($25,000) but less than five hundred thousand dollars ($500,000) within its fiscal year must comply with the reporting requirements established by this Subchapter including:
  (A) A certification that State financial assistance received or held was used for the purposes for which it was awarded; and
  (B) An accounting of all State financial assistance received, held, used, or expended.
  (C) A description of activities and accomplishments undertaken by the recipient, including reporting on any performance measures established in the contract.

(3) Greater than $500,000 – A recipient or subrecipient that receives, holds, uses, or expends State financial assistance in the amount equal to or greater than five hundred thousand dollars ($500,000) within its fiscal year must comply with the reporting requirements established by this Subchapter including:
  (A) A certification that State financial assistance received or held was used for the purposes for which it was awarded; and
  (B) An accounting of all State financial assistance received, held, used, or expended.
  (C) A description of activities and accomplishments undertaken by the recipient, including reporting on any performance measures established in the contract.
  (D) A single or program-specific audit prepared and completed in accordance with Generally Accepted Government Auditing Standards, also known as the Yellow Book.

Other Provisions:

1. All reports shall be filed with the disbursing agency in the format and method specified by the agency no later than three (3) months after the end of the recipient's fiscal year, unless the same information is already required through more frequent reporting. Audits must be provided to the funding agency no later than nine (9) months after the end of the recipient's fiscal year.

2. Unless prohibited by law, the costs of audits made in accordance with the provisions of 09 NCAC 03M .0205 shall be allowable charges to State and Federal awards. The charges may be considered a direct cost or an allocated indirect cost, as determined in accordance with cost principles outlined in the Code of Federal Regulations, 2CFR Part 200. The cost of any audit not conducted in accordance with this Subchapter shall not be charged to State awards.

3. Notwithstanding the provisions of 09 NCAC 03M .0205, a recipient may satisfy the reporting requirements of Part (3)(D) of this Rule by submitting a copy of the report required under the federal law with respect to the same funds.

4. Agency-established reporting requirements to meet the standards set forth in this Subchapter shall be specified in each recipient's contract.

No Conflict of Interest Certification

Regarding the Sunset Beach Canal and Channel Dredging 2018 Project, Town of Sunset Beach Council Member John Corbett, hereby certifies that :

- After conducting a reasonable inquiry, he complies with the requirements and prohibitions set forth in N.C. Gen. Stat. § 14-234;
- After conducting a reasonable inquiry, he has no actual or apparent conflicts of interest (including conflicts of interest for immediate family members: spouses, parents, or children) that would impinge on his ability to render impartial, technically sound, and objective assistance or advice or result in it being given an unfair competitive advantage;
- He will continue to comply with N.C. Gen. Stat. § 14-234 and the Town of Sunset Beach's duly adopted conflict of interest policy;
- He will mitigate and prevent potential conflicts of interest[1] from becoming actual or apparent conflicts of interest; and
- He will immediately mitigate and disclose to the Division of Water Resources any non-compliance with N.C. Gen. Stat. § 14-234, noncompliance with the Town of Sunset Beach's conflict of interest policy, or any discovery of an actual or apparent conflict of interest.

Print Name: JOHN F. CORBETT JR

Signature: John F Corbett

Title: Council member

Date: May 15, 2019

[1] The term "potential conflict" means reasonably foreseeable conflicts of interest.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
https://www.fisheries.noaa.gov/region/southeast

August 2, 2019 F/SER47:FR/pw

(Sent via Electronic Mail)

Colonel Robert J. Clark., Commander
U.S. Army Corps of Engineers Wilmington District
69 Darlington Avenue
Wilmington, North Carolina 28403-1398

Attention: Tyler Crumbley

Dear Colonel Clark:

NOAA's National Marine Fisheries Service (NMFS) reviewed the public notice for Action ID No. SAW-2019-01155 dated July 3, 2019. The Town of Sunset Beach is proposing to perform navigational dredging of Canals A-D, the Feeder Channel, Bay Area, and an area of South Jinks Creek on the east end of Sunset Beach with beneficial placement of sand on 1,600 linear feet of oceanfront beach in Sunset Beach, Brunswick County. As the nation's federal trustee for the conservation and management of marine, estuarine, and diadromous fishery resources, the NMFS provides the following comments pursuant to the authorities of the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

The project narrative states the proposed dredging would connect the Feeder Channel and the Finger Canals with the Bay Area via South Jinks Creek maintaining navigational corridors. The Finger Canals, Feeder Channel, Bay Area, and South Jinks Creek were dredged previously, and the current project does not exceed the original project footprint. The most recent maintenance dredging for the Finger Canals occurred in 2002, and the initial dredging of the Feeder Channel, Bay Area, and South Jinks Creek occurred in early 1970s. The applicant would use the bucket-to-barge method to remove approximately 10,700 cubic yards of material from the Finger Canals, in an area measuring 3,200 feet in length and 20 feet in width, and 22,000 cubic yards of material from the Feeder Channel, in an area measuring 3,500 feet in length and 30 to 40 feet in width. The applicant would remove an estimated 15,900 cubic yards of material from the Bay Area. The applicant will truck material to an upland disposal site. The dredging of South Jinks Creek will remove 40,500 cubic yards of material, which the applicant will place on the oceanfront beach. The total volume of dredge material is 89,100 cubic yards.

The Wilmington District's initial determination is the proposed dredging may adversely affect essential fish habitat (EFH) or associated fisheries managed by the South Atlantic Fishery management Council, Mid-Atlantic Fishery Management Council, or the NMFS. This determination is based upon the scale of impacts (18 acres of shallow subtidal soft bottom and 8.5 acres of intertidal beach habitat) and inclusions of dredging and beach fill components. No SAV is present in the project area. The State of North Carolina has not designated the project area as a Primary Nursery Area (PNA). The applicant provided an EFH Assessment with the application, which in summary predicted only short-term impacts to EFH from increases in turbidity, siltation, and noise during construction. According to the submitted Shellfish Survey Report, the proposed project may affect clams present in South Jinks Creek, however the applicant states that the existing oyster beds appear to be located outside of the dredge channels. Conservation measures submitted by the applicant include an environmental window of November 16

through April 30 for any given year for the dredging activities and beach placement. The application also states there would be a minimum buffer of ten feet from any coastal wetlands.

The NMFS staff attended several pre-application meetings and a site visit for this project. Initially, the Town of Sunset Beach proposed dredging all of Jinks Creek from the Atlantic Intracoastal Waterway to the ocean. Most of Jinks Creek has never been dredged. After the site visit, the NMFS requested a shellfish survey be conducted throughout Jinks Creek. During a meeting prior to receiving the results of the survey, the NMFS staff requested the applicant move any oysters that would be impacted by the dredging along with other mitigation.

Based on the shellfish survey, the applicant estimated there were approximately 50,000 oysters in Jinks Creek at a density of 1,131 oysters per acre. It was estimated that there would be direct impacts to approximately 13,000 oysters. Additionally, while not designated as a PNA, the NMFS and North Carolina Division of Marine Fisheries staff believe the area functions as one. The State of North Carolina did not designate the area as a PNA during the 1970s because the creek was a navigational route from the Atlantic Intracoastal Waterway to the Atlantic Ocean.

During the third pre-application meeting, the NMFS staff, with support from other resource agencies, recommended the Town eliminate the new dredging within the northern part of Jinks Creek and only apply for areas previously impacted. This would avoid disturbing some 393,800 square feet or 9.0 acres (including the side slopes) and removing about 100,000 cubic yards of material of undisturbed soft bottom/subtidal EFH. The NMFS staff informed the applicant that if they proceeded with the original application, substantial mitigation would be required.

Based on our review of the current application, the Town has accepted the NMFS recommendations to protect the northern portion of Jinks Creek. They have also proposed Conservation Measures listed above regarding dredging windows and a buffer around coastal wetlands. As a result, the NMFS offers no EFH recommendations at this time under the Magnuson-Stevens Act. If conditions change, the NMFS requests the District reinitiate EFH consultation.

Thank you for the opportunity to provide these comments. Please direct related questions or comments to the attention of Mr. Fritz Rohde at our Beaufort Field Office, 101 Pivers Island Road, Beaufort, North Carolina 28516-9722, or at (252) 838-0828.

Sincerely,

WILBER.THOMAS.PAYSON.1365820186

Digitally signed by WILBER.THOMAS.PAYSON.1365820186
Date: 2019.08.02 14:34:53 -04'00'

/ for

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

cc: COE, Tyler.A.Crumbley@usace.army.mil
USFWS, Pete_Benjamin@fws.gov
NCDCM, Doug.Huggett@ncdenr.gov, Curt.Weychert@ncdenr.gov
NCWRC, maria.dunn@ncwildlife.org
EPA, Bowers.Todd@epa.gov
SAFMC, Roger.Pugliese@safmc.net
F/SER47, Fritz.Rohde@noaa.gov

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
https://www.fisheries.noaa.gov/region/southeast

August 2, 2019 F/SER47:FR/pw

(Sent via Electronic Mail)

Colonel Robert J. Clark., Commander
U.S. Army Corps of Engineers Wilmington District
69 Darlington Avenue
Wilmington, North Carolina 28403-1398

Attention: Tyler Crumbley

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Thank you for the opportunity to provide these comments. Please direct related questions or comments to the attention of Mr. Fritz Rohde at our Beaufort Field Office, 101 Pivers Island Road, Beaufort, North Carolina 28516-9722, or at (252) 838-0828.

Sincerely,

WILBER.THOMAS.PAYSON.1365820186

Digitally signed by WILBER.THOMAS.PAYSON.1365820186
Date: 2019.08.02 14:34:53 -04'00'

/ for

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

cc: COE, Tyler.A.Crumbley@usace.army.mil
USFWS, Pete_Benjamin@fws.gov
NCDCM, Doug.Huggett@ncdenr.gov, Curt.Weychert@ncdenr.gov
NCWRC, maria.dunn@ncwildlife.org
EPA, Bowers.Todd@epa.gov
SAFMC, Roger.Pugliese@safmc.net
F/SER47, Fritz.Rohde@noaa.gov

MMC

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh ES Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

July 29, 2019

Mr. Tyler Crumbley
Project Manager
Wilmington District, Corps of Engineers
69 Darlington Avenue
Wilmington, NC 28403-1343

Subject: Town of Sunset Beach; Dredging of South Jinks Creek and Feeder Channels and Canals, with Sand Placement
Action ID No. SAW-2019-01155

Dear Mr. Crumbley:

This letter is in reference to your July 3, 2019 email, requesting comments on the permit application for the Town of Sunset Beach, Brunswick County, North Carolina. The Town has applied for a programmatic Coastal Area Management Act – U.S. Army Corps of Engineers (CAMA-Corps) permit to dredge Canals A-D, the Feeder Channel, Bay Area and an area of South Jinks Creek on the east end of Sunset Beach, with beneficial placement on 1,600 linear feet (lf) of ocean shoreline in Sunset Beach.

A biological assessment (BA) was provided in the email, along with other project information. For the sand placement portion of the project, the applicant proposes to comply with all conservation measures, reasonable and prudent measures (RPMs), and terms and conditions (T&Cs) of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Beach Sand Placement (SPBO), particularly the "B set" of RPMs and T&Cs. However, the applicant and Corps made a determination of No Effect (NE) or May Affect, Not Likely to Adversely Affect (MANLAA) for all of the species covered under the SPBO. The Service does not concur with any of those determinations, due to the potential for take, but we acknowledge that the take would be covered by the SPBO. We recommend that the BA be corrected to indicate that the project May Affect, and is Likely to Adversely Affect (MALAA) all five sea turtle species, red knot, piping plover, and seabeach amaranth. For these eight species, the BA should state "MALAA, and relying on findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Beach Sand Placement to fulfill our project-specific Section 7 responsibilities."

In addition, the BA does not provide any species occurrence data for red knot, piping plover, or seabeach amaranth. The BA also does not provide any information on nesting shorebirds in the Action Area, though American oystercatcher and Wilson's plover are known to nest on the south side of Tubbs Inlet. The BA does not explain why the "B set" of RPMs, T&Cs are proposed to be followed, instead of the "A set." The SPBO has two sets of RPMs and T&Cs. The "A set" is for traditional sand placement projects, primarily for shore protection. These projects are usually larger-scaled, but not always. The "B set" is intended for sand placement events associated with navigation maintenance dredging projects which have no local sponsor, are smaller-scaled, conducted at closer time intervals, and the sand often does not remain on the beach for an extended period of time. This project does not fit many of those descriptors, as "maintenance" dredging has not been conducted since 2002 (or in the case of the material proposed for beach placement, since the 1970s). The project does have a local sponsor, and is not proposed to be conducted at additional intervals in the future. There is no erosion history to indicate how long the material is expected to stay on the beach. The only descriptor that this project meets is "smaller-scaled," since the beneficial sand disposal area is only 1,600 lf. The "B set" of RPMs and T&Cs omits several RPMs and T&Cs which we believe are important for this project, including those pertaining to piping plovers, red knots, and nesting shorebirds.

Service Recommendations

1. It is clear from the July 3, 2019 email that the applicant has proposed to conduct the work in accordance with the SPBO, but no action is proposed in that regard by the Corps. The Corps should notify the Service in writing of its intent to cover the project using the SPBO, request agreement, and request that this project be appended to the SPBO.

2. Please revise the BA to state that the project May Affect, and is Likely to Adversely Affect (MALAA) all five sea turtle species, red knot, piping plover, and seabeach amaranth. For these eight species, the BA should state "MALAA, and relying on findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Beach Sand Placement to fulfill our project-specific Section 7 responsibilities."

3. The Service will agree to the application of the "B set" of RPMs and T&Cs for this project, as long as the Corps includes a permit condition to require close coordination with the Service and North Carolina Wildlife Resources Commission (NCWRC) on the pipeline route and other potential impacts to wintering and nesting shorebirds and their habitat. This coordination may result in recommendations to avoid work after March 31, since shorebird breeding activities may begin in early April. If the project is ongoing and shorebirds begin territorial or other nesting behaviors within the project area, then the Corps or Permittee must contact the Service and NCWRC as soon as possible.

Thank you for the opportunity to comment on this project. For further coordination please contact Kathy Matthews at (919) 856-4520, ext. 27.

Sincerely,

Tom Augspurger
For Pete Benjamin
Field Supervisor

cc: Maria Dunn, NCWRC
Doug Huggett, NCDCM
Twyla Cheatwood, NMFS
Todd Bowers, EPA

MEMO

To: Courtney Spears
From: Michael Christenbury, Wilmington District Planner
Subject: Consistency Determination, Major Permit Application, Town of Sunset Beach Dredging Jinks Creek, Sunset Beach, Brunswick County
Date: August 6, 2019

Consistency Determination:
This project is consistent with the Sunset Beach Land Use Plan Update.

The applicant is proposing to perform navigational dredging of canals A-D and an area of South Jinks Creek in Sunset Beach.

Areas of Environmental Concern (AEC's) impacted by the proposal are PT, ES, EW and OH.

Waters at the project site are classified as SA; HQW and are partially open to the harvesting of shellfish. The area is not a Primary Nursery Area.

I have reviewed this proposal for consistency with the Town of Sunset Beach Land Use Plan and offer the following comments.

The general area of the project is classified Residential, while the AECs impacted by the work are classified as Conservation.

In general, the Town of Sunset Beach allows development in Conservation classified AECs which is consistent with the State's minimum use standards. The Town of Sunset Beach Land Use Plan contains some policies, which exceed the State's minimum use standards. However, none of these standards appear to be applicable to this proposal.

Provided all local, state and federal requirements can be met, this project appears to be consistent with the Town of Sunset Beach Land Use Plan.

Cc: File

MHC

Spears, Courtney

From:	Neal, Robert <rneal@moffattnichol.com>
Sent:	Friday, August 9, 2019 4:23 PM
To:	Crumbley, Tyler A CIV USARMY CESAW (USA)
Cc:	York, Dawn; Hiram Marziano ; Lisa Anglin; Spears, Courtney; MacPherson, Tara; Coburn, Chad
Subject:	[External] Sunset Beach Maintenance Dredging - Revised BA and Response to NCCF Comments
Attachments:	9269-Response_To_USACE_Regarding_NCCF_Comments-080919_FINAL.pdf; Tab_N_S-Jinks_Bay_FeederChannel-Biological_Assessment-FINAL Re080919.pdf

Tyler – Good afternoon,

On behalf of the Town of Sunset Beach, please find attached a revised BA and letter response to the comments provided by the North Carolina Coastal Federation. I appreciate the opportunity to provide this information and thank you for your assistance in this process.

For reference the revised BA acknowledges the proposed action May Affect and is Likely to Adversely Affect (MALAA) all five sea turtle species, red knot, piping plover, and seabeach amaranth. For these eight species, the BA relies on the findings of the August 28, 2017 Statewide Programmatic Biological Opinion (SPBO) for North Carolina Beach Sand Placement to fulfill the project's Section 7 responsibilities.

Also, the applicant is appreciative of the opportunity to maintain the "B" set of Terms and Conditions from the SPBO and will coordinate with FWS and North Carolina Wildlife Resources Commission (NCWRC) on designating a pipeline route and other potential impacts to wintering and nesting shorebirds and their habitat, prior to construction.

Please let me know if additional information is required!

Best Regards,

Robert Neal, P.E.
Moffatt & Nichol
272 N. Front Street | Suite 204 | Wilmington, NC 28401
P 910.218.7100 | **F** 919.781.4869 | **C** 910.524.3285

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DRAFT BIOLOGICAL ASSESSMENT

Town of Sunset Beach - Navigation Project
Maintenance Dredging of South Jinks Creek,
the Bay Area & the Feeder Canal

Prepared by:

MOFFATT & NICHOL

4700 Falls of Neuse Road, Suite 300
Raleigh, NC 27609

Prepared for:

SUNSET BEACH
North Carolina

700 Sunset Blvd. N.

Sunset Beach. NC 28468

November 2018
Revised August 2019

TABLE OF CONTENTS

APPENDICES

LIST OF TABLES

LIST OF FIGURES

1.0 BACKGROUND

This Biological Assessment (BA) addresses the potential effects of the maintenance dredging and beneficial use placement proposed for South Jinks Creek, the Bay Area, and the Feeder Canal, inclusive of finger canals A-D, in Sunset Beach, NC. The BA evaluates the potential impacts the project may yield on federally protected resources, listed as endangered or threatened under the Endangered Species Act (ESA), and/or their designated critical habitat. Section 7 of the ESA requires a BA if a project, or action, could potentially jeopardize the continued existence of any threatened or endangered species. This includes the potential degradation or destruction of critical habitat believed to support a threatened or endangered species.

The Town of Sunset Beach is proposing to maintenance dredge South Jinks Creek, the Feeder Channel, inclusive of finger canals A-D, and the Bay Area in Sunset Beach, Brunswick County, NC. Sunset Beach lies in Brunswick County, along the southern coastal border of North Carolina, adjacent to Ocean Isle Beach. The proposed project will occur along the eastern border of Sunset Beach, within the interior waters of Tubbs Inlet. Figure 1 shows the proposed project area in relation to Brunswick County.

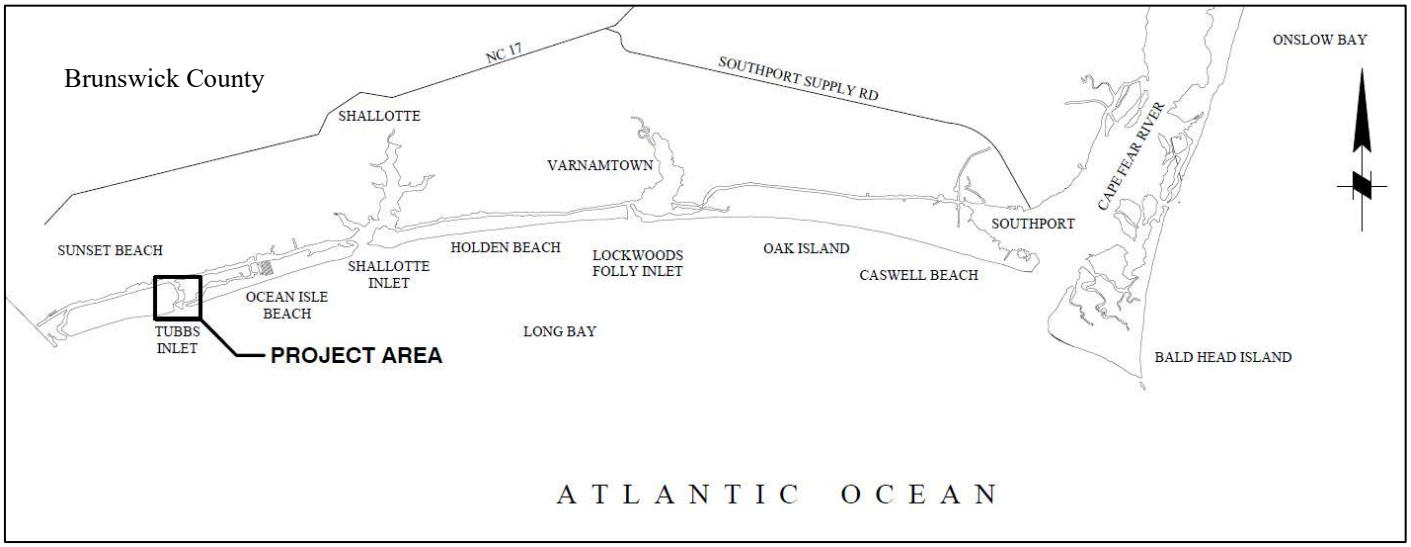

Figure 1. Project Vicinity Map

1.1 Summary of Proposed Project

In recent years, south Jinks Creek has incurred significant shoaling perceivably from tidal flows entering Tubbs Inlet. In addition, the Bay Area and Feeder Channel system, which were developed for recreational boating access, have been subject to infilling from adjacent upland run-off and erosion as well as wind and wave action. The shoaling and material infilling experienced by each waterbody has constricted navigable access in regards to the available width and depth. The current governing width of south Jinks Creek for navigation equals approximately 10 feet and the governing depth is above MLW. The Feeder Canal system and Bay Area are generally not constricted by width, but both maintain a governing depth between -2-ft and -3-ft MLW. The current shoaling patterns appear likely to continue and could potentially sever recreational access in each of the referenced work areas.

South Jinks Creek comprises a portion of the Jinks Creek connector channel that extends from the Atlantic Intracoastal Waterway (AIWW) to Tubbs Inlet and the Atlantic Ocean. The navigation project will connect the Bay Area and Feeder Channel systems along the southeast portion of Sunset Beach to south Jinks Creek. The Bay Area entails one (1) residential canal and the Feeder Channel system includes one (1) main channel connected to four (4) residential finger canals referenced as Canals A – D. The proposed project will help restore navigation access within these systems while also helping to restore access along Jinks Creek's eastern most shoreline within the Town's jurisdictional limits.

An estimated 40,500 cubic yards (CY) of beach compatible material will be dredged from S. Jinks Creek, and an additional 48,600 CY of non-compatible material will be removed from the Feeder Channel system and Bay Area. The beach compatible material will be hydraulically placed as beneficial reuse along approximately 1,600-ft of shoreline between 5th Street and 12th Street on Sunset Beach. The beneficial reuse material will provide an approximate 275-ft wide average berm with a maximum height of +9.0 MLW (6.1 NAVD). The non-compatible substrate will be mechanically dredged and placed at a permitted upland landfill facility.

South Jinks Creek, the Bay Area, and the Feeder Channel systems have been dredged previously, with the original event occurring approximate to 1970 (Cleary & Marden, 1999). Figures 2 and 3 show aerial photographs from 1966 and 1974 depicting before and after conditions of the initial dredging event. The initial dredging presumably occurred as part of a relocation project for Tubbs Inlet and the development of Sunset Beach. The action occurred prior to 1974 and the establishment of the Coastal Area Management Act (CAMA), so the action did not receive a CAMA Major permit authorization.

The first maintenance event for the feeder channel system occurred in 1985 under CAMA permit 211-85 and a subsequent maintenance occurred in 2002 under CAMA permit 45-02. The proposed action will be the first known maintenance event for south Jinks Creek and the Bay Area since the initial dredging approximate to 1970.

The proposed maintenance dredging will help establish and maintain a navigational channel for access to the residential docks along the east end of Sunset Beach. Sediment runoff from storm events has most likely impaired access through the Bay Area and Feeder Channel while shoaling from sediment transport has impaired navigation in south Jinks Creek. As a result, the Town of Sunset Beach has proposed the maintenance operations as part of a long-term management strategy to maintain navigation access for small recreational vessels through the waterbodies. However, future maintenance operations will be requested through separate permit applications.

Figure 2. Tubbs Inlet 1966 (Originally printed in Cleary & Marden, 1999)

Figure 3. Tubbs Inlet 1974 (Originally printed in Cleary & Marden, 1999)

Figure 4 provides a planview of the proposed maintenance dredging project as described above. The design template for the Feeder Channel follows the same alignment as proposed under permit 45-02 with small adjustments to avoid the existing marsh grass. In addition, the design depth for the proposed action has been raised from -5.27 MLW to -5 MLW. Raising of the design depth should help to simplify the construction process and reduce the potential for adverse impacts. The dredging proposal includes a 1-ft allowable overdredge template to provide a buffer for maneuvering the construction equipment within the work area. Therefore, the maximum dredge depth in the Feeder Channel extends to -6-ft MLW, inclusive of the proposed 1-ft allowable overdredge template. Within the finger canals the maximum dredge depth raises to -5-ft MLW, inclusive of the 1-foot overdredge tolerance.

The proposed template for the finger canals maintains a constant 20-ft width. This represents a reduction from the 2002 permitted template, which provided a varying width between 20-ft & 30-ft. The reduction in width helps provide adequate clearance between the proposed channel and the existing residential docks. In many instances, the navigable waterway through finger canals A-D remains even less than 20-ft wide. Therefore, the dredge equipment most likely will not be able to access the full channel even with the reduced 20-foot width. Although the docks may be moved by the private homeowners to help facilitate construction, expectations suggest the docks would

be returned to their original position after the maintenance event. Therefore, there would be little public benefit in providing more than a 20-foot channel through the residential waterway.

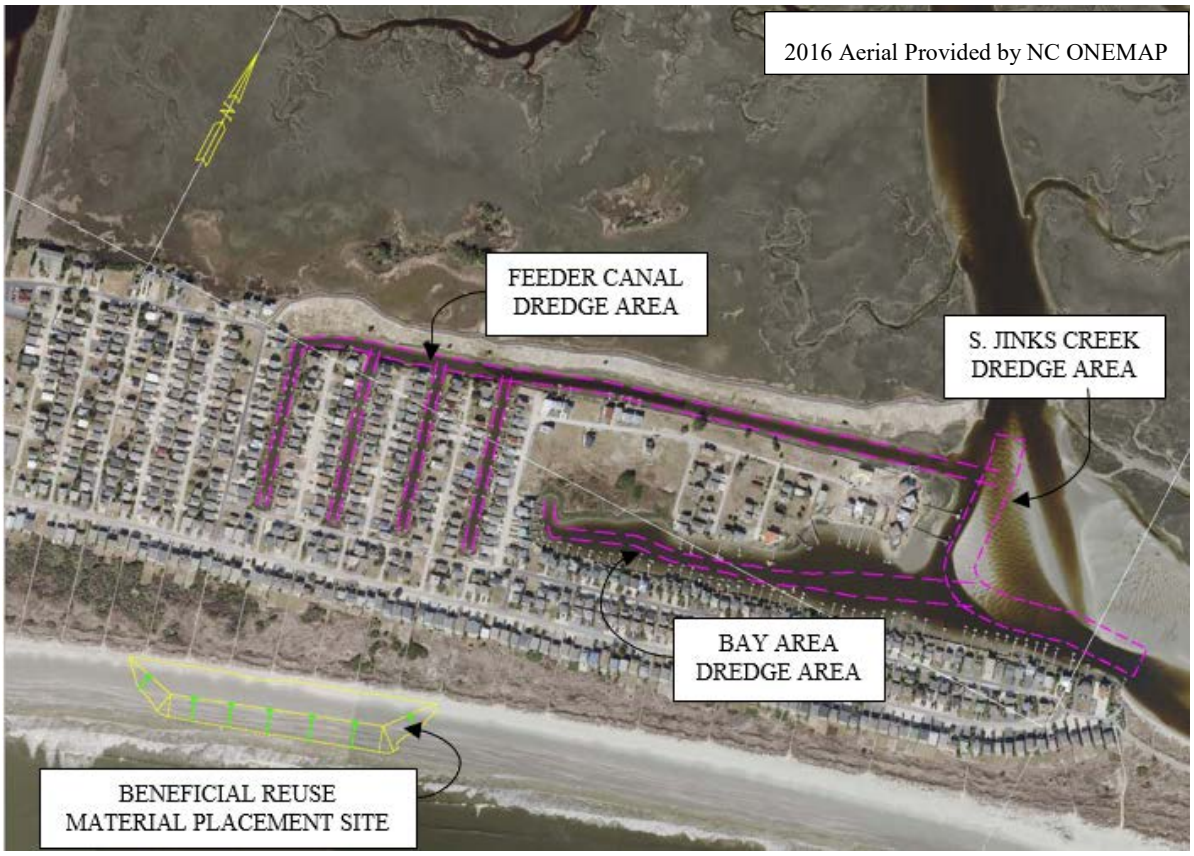

Figure 4. South Jinks Creek, the Bay Area, and Feeder Channel Work Areas

The dredge template for the Bay Area initiates with an 80-ft width at the connection with South Jinks Creek. The template reduces gradually to 20-ft progressing towards the Bay Area terminus. The larger width proposed for the Bay Area entrance should help control sediment shoaling during tidal influences by providing additional storage capacity within the dredge alignment. The template decreases in width to approximately 40-ft roughly 800-ft into the Bay Area. The minimized template helps reduce the potential for unexpected impacts while also attempting to balance the navigational need of the Bay Area residents. The maximum dredge depth for the Bay Area matches the Feeder Channel at -6-ft MLW for the complete system. The maximum dredge depth includes the 1-ft overdredge allowance provided from the design depth (-5 MLW) for maneuvering the dredge equipment. Table 1 provides a summary of the dredge templates.

The dredge material from the Feeder Channel and Bay Area will be mechanically dredged and trucked to a permitted landfill facility. Sediment tests show the material is not beach compatible in accordance with the North Carolina Administrative Code (NCAC). As a result, the upland landfill facility entails the most practical end use location identified for the dredge spoil. The template for south Jinks Creek also maintains the -6 MLW maximum dredge depth. The south Jinks Creek material meets the NCAC criterial for beneficial reuse and will be hydraulically dredged and placed between 5th Street and 12th Street on Sunset Beach.

The dredging operations will be conducted during the months of November 16th thru April 30th to reduce the potential for environmental impacts. In addition, the dredge footprint will be minimized to provide a minimum 10-ft buffer from any coastal marsh identified at the time of construction. The 6,500-ft hydraulic pipeline carrying the beneficial reuse material dredged from S. Jinks Creek will also be positioned away from any established dune or beach vegetation. These items are a few of the precautions proposed to help minimize the potential for environmental impacts on this project.

Table 1. Dredge Template Description

Area	Existing Avg. Depth (MLW-ft)	Proposed Depth (MLW-ft)	Length (ft)	Width (ft)	Side Slope (H:V)	Est. Volume (CY)	Placement Location
Feeder Channel	-3 MLW	-6 (-5+1) MLW	3,500	30 – 40	3:1	22,000	Landfill
Finger Canals A-D	-2 MLW	-5 (-4+1) MLW	3,200	20	3:1	10,700	Landfill
Bay Area	-2 MLW	-6 (-5+1) MLW	2,200	20 – 80	3:1	15,900	Landfill
S. Jinks Creek	- 1.5 MLW	-6 (-5+1) MLW	1,750	100	5:1	40,500	Beneficial Reuse (5th–12th St)
TOTAL			**10,650**	**Varies**	**Varies**	**89,100**	**Varies**

The maintenance dredging will remove approximately 89,100 CY of mixed beach compatible and non-compatible material. The beach compatible material will be placed as beneficial reuse along approximately 1,600-ft of shoreline between 5th Street and 12th Street to enhance an approximate 275-ft wide berm at elevation +9 MLW (+6.1 NAVD) on Sunset Beach. However, the non-compatible material will be excavated and trucked to an upland permitted landfill facility. Table 2 shows the material quantity estimated for removal from each work area.

The dredge template provides a 1-ft tolerance below the design depths to maneuver the dredge equipment in a manner sufficient to complete the work. Therefore, the maximum dredge depth for the maintenance operations equals – 6-ft (-5+1) MLW within south Jinks Creek, the Bay Area, and the Feeder Channel. The maximum dredge depth decreases to -5-ft (-4+1) MLW within finger canals A-D, which adjoin to the Feeder Channel.

Table 2. Estimated Dredge Volumes and Placement Locations

Work Area	Dredge Quantity	Sediment Classification	Placement Location
Feeder Channel & Finger Canals	32,700 CY	Non-Compatible	Upland
Bay Area	15,900 CY	Non-Compatible	Upland
South Jinks Creek	40,500 CY	Beneficial Reuse	Between 5th & 12th St on the Sunset Beach shoreline
TOTAL	89,100 CY		

Note: Estimated volumes include the 1-ft tolerance for maneuvering the dredge equipment.

1.2 Construction Methods

The construction methodology will vary for each work area based on the dredge material composition. The methods implemented for south Jinks Creek will vary from the methods used for the Feeder Channel system and the Bay Area as described below.

1.2.1 South Jinks Creek

The material within south Jinks Creek will be hydraulically dredged and placed along the shoreline between 5th Street and 12th Street on Sunset Beach. The material will be used to enhance a 1,600-ft long and 275-ft wide beach berm system and will be placed to a maximum elevation of +9.0-ft MLW (+6.1-ft NAVD). The south Jinks Creek material meets the minimum standards required for beneficial reuse in accordance with the NC standards for beach compatibility. A total of 26 sediment samples were collected from the proposed dredge area (borrow area) in efforts to define the beach compatible material. The calculated sediment characteristics from the dredge area were compared with composite characteristics of 65 samples analyzed from the recipient beach. Table 3 below shows the analysis results for the dredge material and recipient beach in accordance with the NCAC 15a 07h.0312.

Table 3. Sediment Comparison (South Jinks Creek & Recipient Beach)

Analysis Area	Gravel (%)	Granular (%)	Sand (%)	Fines (%)	Calcium Carbonate
South Jinks Creek	0.00%	0.00%	96.63%	3.37 %	16%
Recipient Beach	0.07 %	0.55 %	98.15%	1.23%	2%

Note: Sediment classifications determined in accordance with NCAC 15a07h.0312.

The hydraulic dredging work will be conducted on a 24-hr per day schedule by a cutterhead dredge between November 16th and April 30th, in accordance with the USFWS August 2017 Statewide Programmatic Biological Opinion (SPBO). The beneficial reuse material will be transported

through an approximate 6,500-ft hydraulic pipeline for beach placement. Floating pipeline will most likely be required immediately behind the hydraulic dredge plant and will have reflectors or lights as recommended by the USCG. Once the floating pipeline traverses landward of the MHW line, it will not be allowed to meander back into navigable waters. However, the shore pipe may be forced to cross navigable waterways at the Bay Area and Feeder Channel confluence with Jinks Creek. The pipeline will be anchored to the channel bottom to avoid a marine hazard at each crossing. The pipeline will also cross the waterways perpendicular to the directions of travel to minimize the pipeline length within the navigation channel. The pipeline will be anchored in the deepest depth available to not block navigation and will have buoys attached approximately every 25-feet along each crossing. Signage will also be provided and visible from both directions of travel to mark the pipeline crossing.

Along the beachfront, the pipeline will be located as close to the dune as reasonable without traversing over beach grass or other established vegetation. Markings shall be installed along the pipe to warn beach goers to use caution around the pipeline and to remain off the equipment. Sand ramps will also be constructed at each designated beach access for pedestrian crossings. The ramps may also be used for emergency beach access by the Town or construction related access for the Contractor.

The beneficial reuse material placement will occur directly on the sandy beach, seaward of the primary dune system. Sand dikes, or berms will be constructed as needed to help limit turbidity. The dikes will be constructed parallel to the beach front to direct the dredge slurry along the beach. This process will allow the beneficial reuse material to settle on the beach instead of entering the Atlantic Ocean. In addition, the project will implement the recommended SPBO conservation measures.

1.2.2 Feeder Channel, Finger Canals, & Bay Area

Dredging operations in the Feeder Channel, including the adjoining finger canals A-D, and the Bay Area will be conducted by a clamshell or bucket dredge / excavator also between November 16th and April 30th. Dredging activities for the mechanical equipment will extend through day light hours but will not entail nighttime operations. Material will be dredged from the respective waterbody and placed on a barge or other floating work plant. The material will be transported to an offloading site designated at the end of Cobia Street within the Feeder Channel. The material will then be placed in a truck or carrying apparatus for transportation to the upland landfill facility. A backhoe or excavator will move the material from the barge to the truck or other hauling equipment. The trucks or hauling equipment shall be configured to prohibit spillage during material transport. The roadways or travel ways used for material transport shall be inspected during and after each delivery to the landfill site. Any spillage noted shall be immediately cleaned and removed from the roadways. In addition, any equipment found to be continuously leaking material onto public roadways shall be removed from the project until such time repairs or modifications can be made to facilitate clean and spill fill material transport.

2.0 LISTED SPECIES AND CRITICAL HABITAT IN THE PROJECT AREA

This assessment considers federally listed species that may occur within the project area; including the North Atlantic right whale, humpback whale, West Indian manatee, piping plover, red knot, wood stork, sea turtles (loggerhead, green, leatherback, Kemp's ridley, and hawksbill), Atlantic and shortnose sturgeon, and seabeach amaranth. This BA also addresses effects on designated and proposed critical habitats within the action area; including critical habitat for the piping plover Atlantic Coast wintering population, terrestrial and marine critical habitats for the loggerhead sea turtle and proposed North Atlantic right whale critical habitat. Based on a detailed evaluation of the effects of beneficial use sand placement on Sunset Beach, dredging operations within South Jinks Creek, the Feeder Canals and Bay Area as well as informal consultation with USFWS on August 5, 2019; determinations of effect for the species and critical habitats considered are as follows:

Table 4. Threatened & Endangered Species that may occur within the Project Area

Species		Listing Status			Effects Determination
Scientific Name	**Common Name**	**Federal Status**	**Record Status**	**Habitat Present**	
Chelonia mydas	Green sea turtle	T	Current	Yes	MALAA
Eretmochelys imbricate	Hawksbill sea turtle	T	Historic	Yes	MALAA
Lepidochelys kempii	Kemp's (Atlantic) ridley sea turtle	E	Current	Yes	MALAA
Dermochelys coriacea	Leatherback sea turtle	E	Current	Yes	MALAA
Caretta caretta	Loggerhead sea turtle	T	Current	Yes	MALAA
Charadrius melodus	Piping plover	T	Current	Yes	MALAA
Picoides borealis	Red-cockaded woodpecker	E	Current	No	NE
Calidris canutus rufa	Red knot	T	Current	Yes	MALAA
Trichechus manatus	West Indian manatee	E	Current	Yes	NLAM
Mycteria americana	Wood stork	T	Current	Yes	NLAM
Thalictrum cooleyi	Cooley's meadowrue	E	Current	No	NE
Lysimachia asperulaefolia	Rough-leaved loosestrife	E	Current	No	NE
Amaranthus pumilus	Seabeach amaranth	T	Current	Yes	MALAA
Acipenser oxyrinchus oxyrinchus	Atlantic sturgeon (Carolina DPS)	E	Current	No	NLAM
Acipenser brevirostrum	Shortnose sturgeon	E	Current	No	NE

Species		Listing Status			Effects Determination
Scientific Name	**Common Name**	**Federal Status**	**Record Status**	**Habitat Present**	
Eubalaena glacialis	North Atlantic right whale	E	Current	No	NE
Loggerhead Marine and Terrestrial CH					NLAM
Piping Plover Wintering CH					NLAM
Proposed North Atlantic Right Whale CH					NLAM

Source: USFWS, 2015; NMFS, 2017; KEY: E = endangered, T = threatened; MALAA = may affect, is likely to adversely affect; LAA = likely to adversely affect; NLAM = Not likely to adversely modify; NE = no effect

3.0 SPECIES NOT LIKELY TO OCCUR IN THE PROJECT AREA

The following discussion addresses the listed species considered not likely to occur within the project site due to lack of appropriate habitat. This includes the following species:

- Red-Cockaded Woodpeckers
- Cooley's Meadowrue
- Rough-leaf Loosestrife
- Shortnose Sturgeon
- North Atlantic Right Whale

3.1 Red-Cockaded Woodpecker

Red-Cockaded Woodpeckers (*Picoides borealis*) require open, mature, and old growth pine habitats. Roosting trees generally must be at least 60-120 years old, depending on species of pine. Foraging habitat is provided in pine and pine hardwood stands 30 years old or older with foraging preference for pine trees 10 inches or larger in diameter. In good, moderately-stocked, pine habitat, sufficient foraging substrate can be provided on 80 to 125 acres (USFWS 2003). Since these types of terrestrial habitat are found well inland of the proposed project area, the analysis does not consider impacts to the red-cockaded woodpecker likely to occur because of project construction.

3.2 Vegetative Species

Cooley's meadowrue (*Thalictrum cooleyi*) is known from North Carolina, Georgia, and Florida. The North Carolina populations are located in Brunswick, Columbus, Onslow, and Pender counties. Cooley's meadowrue occurs on circumneutral soils in grass-sedge bogs and wet pine savannahs and savannah-like areas. It may also grow along fire-plow lines, in roadside ditches, woodland clearings, and powerline rights-of-way. Disturbance of some kind is usually required to maintain open habitat for Cooley's meadowrue (USFWS 1994). The habitat within the Feeder Canal and Bay Area generally consists of fine grain sediment, muck, and coastal marsh. These areas generally do not meet the documented criteria for the Cooley meadowrue habitat. Therefore, the species most likely will not occur within the project area and has been removed from further analysis.

Rough-leaved loosestrife (*Lysimachia asperulaefolia*) is endemic to the coastal plain and sand hills of North Carolina and South Carolina. Habitat for rough-leaved loosestrife generally occurs in the ecotone between longleaf pine or oak savannas and wet, shrubby areas containing moist, sandy, or

peaty soils and low vegetation. The grass-shrub ecotone, where rough-leaved loosestrife generally occurs, is fire-maintained, as are the adjacent plant communities (longleaf pine – scrub oak, savanna, flatwoods, and pocosin). Several populations are known from roadsides and power line rights-of-way where regular maintenance mimics fire and maintains vegetation so that herbaceous species are open to sunlight (USFWS 1995). The habitat within the Feeder Canal and Bay Area consists of fine grain sediment, muck, and coastal marsh and generally does not meet the documented criteria for the rough-leaved loosestrife habitat. Therefore, the species most likely will not occur within the project area and has been removed from further analysis.

3.3 Shortnose Sturgeon

The shortnose sturgeon *(Acipenser brevirostrum)* was listed as endangered under the Endangered Species Preservation Act in March 1967 (32 FR 4001) (ESA). The species inhabits large Atlantic coast rivers from New Brunswick, Canada south to northeastern Florida. Adults in southern rivers are estuarine anadromous, foraging at the freshwater-saltwater interface and moving upstream to spawn in the early spring. Shortnose sturgeons spend most of their life in their natal river systems and rarely migrate to marine environments. Spawning habitats include river channels with gravel, gravel/boulder, rubble/boulder, and gravel/sand/log substrates.

Shortnose sturgeon are not expected to be present in the areas where the proposed action is occurring. Prior assumptions were that shortnose sturgeon tended not to leave riverine waters (i.e., venture beyond the freshwater-saltwater interface); however, in a recent report by the South Carolina Division of National Resources (DNR) and Georgia DNR, the species was detected as far as 12.4 mi from the mouths of their spawning rivers in those states. While spawning data is lacking for the rivers in North Carolina, the project area is located much greater than 12.4 mi from the mouth of any major river that may be used for spawning (i.e., Neuse River and Cape Fear River). Therefore, we believe the proposed action will have no effect on shortnose sturgeon.

3.4 North Atlantic Right Whale

Right whales were listed as endangered under the Endangered Species Conservation Act in June 1970 and were subsequently listed as endangered under the ESA in 1973. Based on a census of individual whales identified through photo-identification techniques, the best estimate of catalogued North Atlantic right whales in 2012 was 510 individuals (Pettis 2013). North Atlantic right whales calve in warm subtropical waters during winter and migrate to feed in highly productive cold temperate and subpolar waters in spring and summer (Green and Pershing 2004). Waters along the southeastern US coast constitute the only known calving habitat for North Atlantic right whales (Kraus et al. 1986, Knowlton et al. 1994, Reeves et al. 2001). Based on effort-corrected sightings data, the densest distribution of observed right whale mother-calf pairs is generally in waters of the inner shelf between St. Augustine, Florida and just south of Savannah, Georgia. However, recent aerial survey data indicate calving and nursing occur as far north as NC (Good 2008, McLellan et al. 2004). Reproductive females typically arrive in the calving areas during late November and early December after migrating south from feeding grounds in the northeastern US and Canada (Fujiwara and Caswell 2001, Garrison 2007, Hamilton et al. 2007).

Mothers and newborn calves reside within the southeast through winter and generally depart the calving grounds by the end of March or early April (Reeves et al. 2001). There is relatively little information on the geographic and temporal extent of the migratory corridor (Firestone et al. 2008, Schick et al. 2009). A review of sightings data collected in the mid-Atlantic found that 94 percent of all right whale sightings were within 56 kilometers from shore (Knowlton et al. 2002).

Currently designated critical habitat units for the right whale include northeastern feeding grounds in the Gulf of Maine/Georges Bank region, and southeastern nearshore ocean calving habitats from central Florida to Cape Fear, NC [81 Federal Register (FR) 4838] (Figure 5). The essential features of the southeastern calving critical habitat area include physical oceanographic conditions that support calving and nursing; including calm sea surface conditions, sea surface temperatures of 45 degrees (°) Fahrenheit (F) to 63°F, and water depths of 20 ft to 92 ft. The essential features of the northern critical habitat areas include physical and biological features that provide optimal foraging areas with an abundance of the right whales' preferred copepod prey.

Proposed dredging operations within the project area would coincide with migration and calving periods along the NC coast. Project-related dredging could potentially affect right whale through vessel strikes and/or acoustic disturbance. However, dredging operations would be confined to waters inshore of the COLREGS line, and thus would not be expected to result in any direct or indirect interactions with right whales, therefore the right whale is not considered further in this assessment. Underwater noise produced by dredging in South Jinks Creek and the Bay Area may propagate into the open ocean but would not be expected to reach the thresholds described above for injurious (≥180 dB re 1µPa rms) or behavioral (≥120 dB re 1µPa rms) effects on cetaceans.

The essential features of proposed right whale critical habitat within the project area are those associated with optimal calving habitat; including calm sea surface conditions, sea surface temperatures of 45°F to 63°F, and water depths of 20 ft to 92 ft. Proposed inshore dredging and beach fill placement operations would not likely adversely modify (NLAM) any of these essential features for the critical habitat. Likewise, the project should provide no effect (NE) on the North Atlantic right whale species in accordance with Section 7 responsibilities of the ESA.

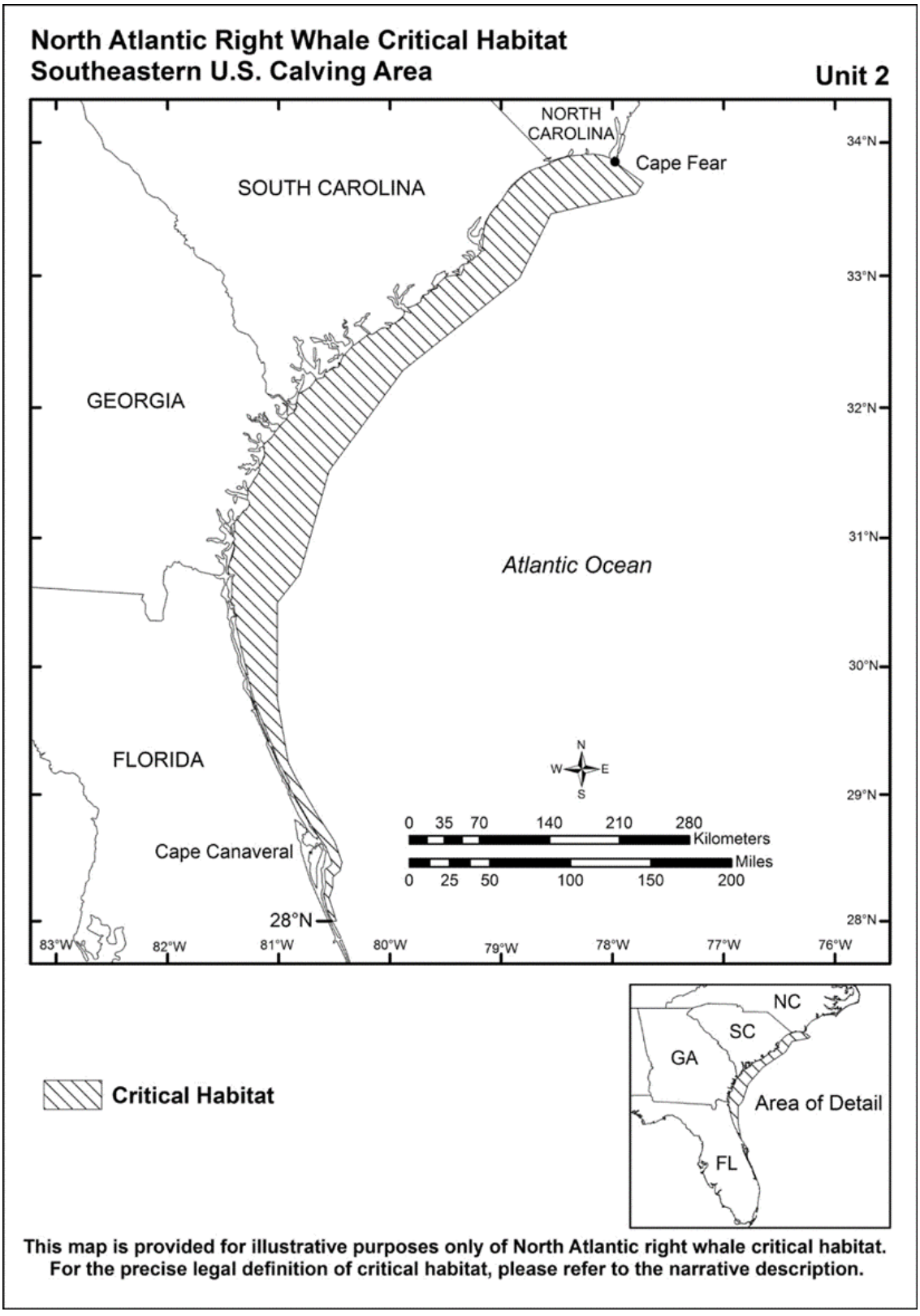

Figure 5. North Atlantic Right Whale Southeastern Calving Critical Habitat (Source: 81 FR 4838).

4.0 SPECIES THAT MAY OCCUR IN THE PROJECT AREA

The following discussion addresses listed, or endangered species generally considered likely to frequent the project site along with general construction practices proposed to help minimize potential impacts. This includes the following species:

- Sea Turtles
- Piping Plover
- Red Knot
- Wood Stork
- Atlantic Sturgeon
- West Indian Manatee
- Seabeach Amaranth

4.1 Sea Turtles

4.1.1 Green Sea Turtle

The green sea turtle (*Chelonia mydas*) has been documented to occur in coastal areas of Dare, Onslow, New Hanover, and Brunswick Counties of North Carolina. Green sea turtles are generally found in shallow waters (except when migrating) inside reefs, bays, and inlets. The green turtle is attracted to lagoons and shoals with an abundance of marine grass and algae. No SAV beds have been identified in Brunswick County, including the project area. Inspections of the project area occurred during October 2016 as part of alternate field work efforts to conduct a shellfish survey. Open beaches with a sloping platform and minimal disturbance are required for nesting.

Green sea turtles nest in relatively small numbers along the NC coast, with reported nesting from 2000 through 2016 averaging 18 nests per year. According to the SPBO (USFWS 2017), no green sea turtles have nested within the project area, however, 13 nests have been documented along southern NC beaches to Caswell Beach (approximately 31 shoreline miles) between 2000 and 2016 (4% statewide). Since nesting may occur along Sunset Beach, the action should be considered as may affect and is likely to adversely affect (MALAA) the species in accordance with Section 7 of the ESA. Furthermore, the action relies on the findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Sand Placement to fulfill our project-specific Section 7 responsibilities.

Critical habitat for the green sea turtle has been designated for the waters surrounding Culebra Island, Puerto Rico, and its outlying keys (63 FR 46693). No designated critical habitat is present in the project area.

4.1.2 Hawksbill Sea Turtle

The hawksbill sea turtle was listed as endangered throughout its range on 2 June 1970 (35 FR 8491). Nesting occurs on sandy beaches throughout the tropical and subtropical regions of the Atlantic, Pacific, and Indian Oceans. Nesting in the US is primarily limited to Florida and the US Caribbean on beaches throughout Puerto Rico and the US Virgin Islands (NMFS and USFWS 1993). Marine and nesting critical habitat for the hawksbill sea turtle have been designated in Puerto Rico along the islands of Mona, Monito, Culebrita, and Culebra (63 FR 46693). Rare nesting events in the continental US are essentially restricted to the southeastern coast of Florida and the Florida Keys (Meylan 1992; Meylan et al. 1995), although two hawksbill nests were

recently confirmed in NC (NPS 2015d). Sightings have been recorded from a handful of counties in North Carolina, but the turtle is not known to breed in the state, and there are no known occurrences of this species recorded from Brunswick County or near the project area (NCNHP 2017). The potential for in-water occurrences and/or nesting may occur along Sunset Beach therefore the action should be considered as may affect, and is likely to adversely affect (MALAA) the species in accordance with Section 7 of the ESA. Furthermore, the action relies on the findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Sand Placement to fulfill our project-specific Section 7 responsibilities.

4.1.3 Kemp's Ridley Sea Turtle

While sightings of the Kemp's ridley sea turtle (*Lepidochelys kempii*) in North Carolina remain rare, the occurrences may be on the rise. This species prefers shallow coastal waters. USFWS indicates sightings of this species has only occurred in Pamlico County within the past 20 years (USFWS, 2003). As a result, no sightings of this species have been recorded in the vicinity of the project area (NCNHP 2017). However, since nesting or in-water observations may occur along Sunset Beach, the action should be considered as may affect and is likely to adversely affect (MALAA) the species in accordance with Section 7 of the ESA. Furthermore, the action relies on the findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Sand Placement to fulfill our project-specific Section 7 responsibilities.

4.1.4 Leatherback Sea Turtle

Leatherbacks (*Dermochelys coriacea*) are distributed world-wide in tropical waters of the Atlantic, Pacific, and Indian oceans. They are generally open-ocean species and may be common off the North Carolina coast during certain times of the year. However, in northern waters leatherbacks are reported to enter bays, estuaries, and other inland bodies of water. Major nesting areas occur mainly in tropical regions. In the United States, primary nesting areas are in Florida; however, nests are known from Georgia, South Carolina, and North Carolina as well. The project area consists of two small interior channels and most likely could not support habitat suitable for a Leatherback. No known sightings of the Leatherback have been recorded near the project area (NCNHP 2017). However, since nesting or in-water observations may occur along Sunset Beach, the action should be considered as may affect and is likely to adversely affect (MALAA) the species in accordance with Section 7 of the ESA. Furthermore, the action relies on the findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Sand Placement to fulfill our project-specific Section 7 responsibilities.

4.1.5 Loggerhead Sea Turtle

The loggerhead sea turtle (*Caretta caretta*) is distributed widely in its range, including the entire North Carolina coast. It is often found hundreds of miles out to sea but can also be found in inshore areas such as bays, lagoons, salt marshes, creeks, ship channels, and the mouths of large rivers. Feeding areas are typically coral reefs, rocky places, and ship wrecks (USFWS 2003). The substrate of the Feeder Canal and Bay Area generally consist of soft muck or fine sediment and most likely would not be considered ideal habitat for the loggerhead. Young loggerheads are often found in SAV beds and nesting occurs mainly on open beaches or along narrows bays with suitable

soil (USFWS 2003). Loggerhead sightings near the project area have occurred over the past several decades (NCNHP 2017). Individual turtles may utilize the Feeder Canal and Bay Area temporarily during migration events. However, the species generally would not be expected during the colder winter months of October through March, when the proposed dredging will occur.

Loggerhead nesting occurs along the entire NC coast; however, nesting is concentrated along three sections of the coast: the Cape Fear region (Holden Beach, Oak Island, Caswell Beach, Bald Head Island, and Fort Fisher), Topsail Island and Onslow Beach, and the barriers that comprise from Shackleford Banks north to Bodie Island. Collectively, these three sections of the coast accounted for 83% of all loggerhead nesting in NC from 2000 through 2016. Based on data provided by NCWRC approximately 225 loggerhead nests have been laid on Sunset Beach between 2000 and 2018 with 2000 as a peak year with 28 nests (Appendix A – Sunset Beach Sea Turtle Data). Average annual density (nests/mile) along the 10 miles of oceanfront shoreline of Sunset Beach is 3.4. Beneficial placement of beach compatible material will take place during the environmental window of 16 November – 30 April, thereby avoiding nesting period of 1 May to 15 September. No designated critical habitat is present in the project area, therefore the action is not likely to adversely modify (NLAM) critical habitat in accordance with Section 7 of the ESA. However, since nesting occurs along Sunset Beach, the action should be considered as may affect and is likely to adversely affect (MALAA) the species in accordance with Section 7 of the ESA. Furthermore, the action relies on the findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Sand Placement to fulfill our project-specific Section 7 responsibilities.

4.2 Shorebirds

4.2.1 Piping Plover

Piping Plovers (*Charadrius melodus*) have nests consisting of shallow scraped depressions in the sand lined with shell fragments and little or no adjacent vegetation (Cohen *et al*., 2008; USFWS 1996). Piping plovers breed in three discrete geographic areas: the Atlantic Coast from NC to Newfoundland, the Great Lakes region, and the Northern Great Plains region. Members of the Atlantic Coast breeding population arrive on the breeding grounds and initiate courtship in late March and early April. In NC, the breeding season extends from April through August. Nests in NC may be found mid-to-late April and continue to nest through late May and early June. Chicks and fledglings may be found May through August. Wintering plovers on the Atlantic coast are found at accreting ends of barrier islands, along sandy peninsulas, and near coastal inlets. Preferred foraging habitats include sandflats adjacent to inlets or passes, sandy mudflats along prograding spits, and overwash areas. Roosting sites generally include inlet and adjacent ocean and estuarine shorelines and nearby exposed tidal flats (USFWS 1996).

Since no designated critical habitat is present in the project area, the action is not likely to adversely modify (NLAM) critical habitat in accordance with Section 7 of the ESA. However, the project is in the vicinity of Tubbs Inlet, and operations may affect piping plover foraging activities. Therefore, in accordance with Section 7 responsibilities of the ESA, the action should be considered as may affect and is likely to adversely affect (MALAA) the species. Therefore, the

action relies on the findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Sand Placement to fulfill our project-specific Section 7 responsibilities.

4.2.2 Red Knot

Red knots (*Calidris canutus rufa*) breed in the central Canadian Arctic and occur in three main wintering groups: short distance migrants that winter in the southeastern U.S., medium distance migrants that winter on the northern coast of Brazil, and long-distance migrants that winter in Tierra del Fuego (southern tip of South America) (Niles *et al*., 2012). In the southeastern U.S., red knots overwinter primarily in FL and GA (Niles *et al*., 2008). However, red knots are known to winter as far north as VA (Niles *et al*., 2012). Major stopover sites during the southbound migration include MA, CT, and RI. During the northbound migration, stopover sites along the U.S. Atlantic coast include the primary stopover in Delaware Bay although some red knots stop farther south between VA and FL (Gillings *et al*., 2009; Niles *et al*., 2008). In NC, red knots use the Outer Banks as a stopover site during spring and fall migrations. In some cases the Outer Banks has also served as an overwinter site to migrating red knots (Niles *et al*., 2012; Dinsmore *et al*., 1998). Red knots are most abundant in NC during the spring migration (April-June), with the highest concentration generally observed in May.

Preferred wintering and migration habitats include muddy or sandy coastal areas, particularly the mouths of bays and estuaries and unimproved tidal inlets and tidal flats. Wintering habitat in the southeastern U.S. also includes peat banks, salt marshes, brackish lagoons, and mangroves. In this region, red knots forage along sandy beaches, in tidal mudflats, along peat banks, and along barrier islands (Niles *et al*., 2008). Preferred prey in nonbreeding habitats include horseshoe crab eggs, snails, clams, and crustaceans (Cohen *et al.,* 2010; Niles *et al*., 2008; Tsipoura and Burger, 1999).

Since the project area contains habitat suitable for red knot foraging activities, the construction operations may affect the red knot foraging activities. Therefore, in accordance with the Section 7 responsibilities of the ESA, the action should be considered as may affect and is likely to adversely affect (MALAA) the species. However, the action relies on the findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Sand Placement to fulfill our project-specific Section 7 responsibilities.

4.3 Wood Stork

Wood storks (*Mycteria americana*) are not true migrants, but they generally disperse following breeding. Beginning in late May, following breeding in FL, most fledglings, immatures, and adults disperse in peninsular FL and northward (Coulter *et al*., 1999). The non-breeding season range extends to eastern MS and includes the above-mentioned areas as well as the rest of FL and the coastal plains and large river systems of AL (79 FR 37078). Wood storks sighted farther west are likely part of the Mexican/Guatemalan populations. However, some population mixing may occur (Bryan *et al*., 2008).

Wood storks use a wide variety of freshwater and estuarine wetlands for nesting, feeding, and roosting sites. Nesting colony sites are in freshwater and marine-estuarine forested habitats, primarily in cypress swamps. However, depending on the location, colony sites may consist of

other plants, such as dead oaks, mangroves, cactus, black gum, willow, and buttonbush (Coulter *et al*., 1999). Feeding habitat consists of natural and artificial wetlands where prey species are available and water depths are appropriate (<50 cm) (Coulter *et al*., 1999). However, wood storks are also known to feed in shallow brackish and saltwater pools and channels (LeGrand, 2013). Wood storks also use man-made wetlands for foraging and breeding. Some of these man-made wetlands include storm water treatment areas and ponds, golf course ponds, borrow pits, reservoirs, roadside ditches, agricultural ditches, drainages, flow-ways, mining and mine reclamation areas, and dredge spoil sites (USFWS 2007). Roosting sites are generally in trees over water, but storks may also rest on the ground close to feeding sites (Coulter *et al.,* 1999).

Sightings of wood storks made during the summer of 2017 confirms the species presence near the project area. Dredging activities will occur during the months of October through March, outside of the general migration period for wood storks in NC, however, since the project area contains habitat suitable for wood storks the action should be considered as not likely to adversely modify (NLAM) the species.

4.4 West Indian Manatee

West Indian manatees (Trichechus manatus) occur in shallow waters generally close to shore in estuarine and river mouth habitats (Rathbun et al., 1982). Preferred feeding habitats include shallow seagrass beds close to deep channels in coastal and riverine habitats (e.g., Lefebvre et al., 2000; USFWS 2001a). West Indian manatees are frequently located in secluded canals, creeks, embayments, and lagoons near the mouths of coastal rivers and sloughs. These areas serve as locations of feeding, resting, mating, and calving (USFWS 2001). Estuarine and brackish waters, including natural and artificial freshwater sources, are typical West Indian manatee habitat (USFWS 2001a). West Indian manatees rarely occur in offshore waters where abundant seagrass and vegetation are not available (Reynolds III and Odell, 1991); however, sighting and tracking data indicate that some animals have ventured offshore (e.g., Reynolds III and Ferguson, 1984; Lefebvre et al., 2001; Alvarez-Alemán et al., 2010). Critical habitat is designated for the West Indian manatee in FL (41 FR 41914).

The West Indian manatee occurs in warm, subtropical, and tropical waters of the western North Atlantic from the southeastern U.S. to Central America, northern South America, and the West Indies (Lefebvre *et al*., 2001). During winter months, the FL population confines itself to inshore and inner shelf waters of the southern half of peninsular FL where they utilize warm-water springs, heated industrial effluents, and other warm-water sites (Laist *et al*., 2013; Lefebvre *et al.,* 2001). As water temperatures rise in spring, West Indian manatees disperse from winter aggregation areas. West Indian manatees are frequently reported in coastal rivers of GA and SC during warmer months (Lefebvre *et al*., 2001), and have been sighted as far north as MA (Beck 2006).

The NCNHP shows sporadic occurrences of manatee in the project vicinity over the past several decades (NCNHP 2017). The northern limit of the manatee's range extends to North Carolina, but low temperatures prevent this species from commonly occurring in the area. The rarity of its occurrence in the vicinity of the project area makes impacts to this species unlikely (USFWS 2008), therefore, in accordance with Section 7 responsibilities of the ESA, the action should be considered as not likely to adversely modify (NLAM) the species.

Construction operations will occur during the months of October through March, when cooler water temperatures will further discourage the manatee presence. Further precautions to be implemented to help avoid impacts to the West Indian manatee include following the manatee avoidance measures published by USFWS. Appendix B provides the referenced precautionary measures.

4.5 Atlantic Sturgeon

The Atlantic sturgeon (*A.* oxyrinchus oxyrinchus) was listed under the ESA on 6 February 2012 (77 FR 5914, 77 FR 5880). The NMFS recognizes five Distinct Population Segments (DPSs); including four that are listed as endangered (New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs) and one (Gulf of Maine DPS) that is listed as threatened. The Carolina DPS encompasses Atlantic sturgeons from the Roanoke, Tar/Pamlico, Cape Fear, Waccamaw, Pee Dee, and Santee-Cooper Rivers. The spawning population in each of these river systems is thought to number less than 300 adults [Atlantic Sturgeon Status Review Team (ASSRT) 2007]. Atlantic sturgeons spawn in freshwater but spend most of their adult life in the marine environment. Spawning adults generally migrate upriver in the spring/early summer (Smith and Clugston 1997). Spawning is believed to occur in flowing water between the salt front and fall line of large rivers. Post-larval juveniles move downstream into brackish waters and eventually move to estuarine waters where they reside for a period of months or years (Moser and Ross 1995). Subadult and adult Atlantic sturgeons emigrate from rivers into coastal waters where they may undertake long range migrations. Migratory subadult and adult sturgeon are typically found in shallow (10 to 50 m) nearshore waters with gravel and sand substrates (Collins and Smith 1997, Stein et al. 2004). Although extensive mixing occurs in coastal waters, Atlantic sturgeons return to their natal river to spawn (ASSRT 2007). In NC, spawning occurs in the Roanoke, Tar-Pamlico, and Cape Fear River systems and possibly in the Neuse River (ASSRT 2007).

The Atlantic sturgeon occurs in the Cape Fear River system east of the project area. Based on incidental capture data from tagging cruises, shallow nearshore ocean waters along the NC coast may represent a winter (January-February) aggregation site for Atlantic sturgeons (Laney et al. 2007). Incidental captures typically occurred over sand substrate in nearshore waters that were less than 59 ft deep. Based on previous communication with NOAA Fisheries, occurrences of Atlantic sturgeons are not expected in the inshore waters of the action area; however, the species may use Tubbs inlet and nearshore ocean along Sunset Beach as a feeding/staging area during coastal migrations. Since the project does not include dredging operations in the Atlantic and only entails sand placement along the oceanfront, the action is not likely to adversely modify the species in accordance with Section 7 responsibilities of the ESA.

4.6 Seabeach Amaranth

Seabeach amaranth (*Amaranthus pumilus*) is an annual plant found only along the Atlantic coastal plain where it inhabits barrier island beaches. Its primary habitat includes overwash flats at the accreting ends of the islands, lower foredunes, and upper strands of noneroding beaches (at the

wrackline). Seabeach amaranth is usually found on a nearly pure silica sand substrate that is sparsely vegetated with annual herbs (forbs) and, less commonly, perennial herbs (mostly grasses) and scattered shrubs. In NC, seeds germinate from April through July and flowering begins as early as June. Seabeach amaranth seed production begins in July or August and peaks in September. The reproductive season may extend into January (USFWS 1996b). The construction window for each sand placement event (16 November - 30 April) would avoid the majority of the seabeach amaranth growing season in NC, thereby minimizing the likelihood of direct impacts on actively growing plants. Although, the habitat within the Feeder Canal and Bay Area consists of fine grain sediment, muck, and coastal marsh and generally does not meet the documented criteria for seabeach amaranth habitat, it may occur on the oceanfront shoreline of Sunset Beach within the beneficial use placement area.

Sand placement activities may directly impact seabeach amaranth through the destruction or burial of plants and/or through the transfer of seeds to unsuitable habitats. The construction of stabilizing berms and dunes may have long-term indirect negative effects on the quality or availability of seabeach amaranth habitat. Wider beaches may induce additional recreational activities that impact seabeach amaranth through trampling or crushing and/or habitat modification. Based on these potential impacts, it is determined that the proposed action may affect, and is likely to adversely affect (MALAA) seabeach amaranth. However, the action relies on the findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Sand Placement to fulfill our project-specific Section 7 responsibilities.

5.0 EFFECTS OF THE ACTION

Potential effects considered as a direct result of the maintenance dredging project primarily occur as temporary and localized impacts. These potential impacts include injury from entrainment or burial, behavioral effects caused by temporarily altered estuarine conditions such as dissolved oxygen reductions, increases in turbidity and suspended sediments, and effects on movement of certain species through the waterways. Construction best management practices (BMP)'s and turbidity controls will be utilized during construction activities to minimize impacts where possible.

The BMP's proposed include limiting the dredging activities to the months of October through March when colder temperatures discourage an abundance of environmental activity. In addition, marine vessels associated with the project will follow the precautionary measures recommended by the USFWS for minimizing impacts to manatee. The guidelines published by the NMFS for minimizing potential impacts to sea turtle and Smalltooth sawfish will also be followed. Appendix B provides a copy of the referenced precautionary measures and guidelines.

Turbidity controls will be implemented at the material placement site to minimize the suspended sediment re-introduced into the coastal waters surrounding the site. The effluent waters will be detained within the material placement site through the use of a weir system to allow settling time for the dredge effluent. Visual monitoring will also occur to help monitor the discharge waters and limit the turbidity effects. The settling time for the dredge effluent will be increased at any point when an increased turbidity plume becomes evident at the discharge location. Water quality testing

may also occur at the discharge location of the material placement site to help monitor potential increases in turbidity. The tests, when considered necessary, will monitor the increase in NTU's provided by the effluent discharge compared to a background or control site adjacent to the project area.

The proposed maintenance dredging activities most likely will not create any long-term permanent effects to the project site. Both the Feeder Canal and Bay Area have previously been dredged and the current project does not exceed the original project footprint. Therefore, the project should not create any changes to the overall sedimentology or hydrology of the water bodies. The most recent maintenance dredging for the Feeder Canal occurred in 2002 and the initial dredging of both the Feeder Canal and Bay Area occurred in early 1970's.

6.0 CONCLUSION

This biological assessment concludes the proposed maintenance dredging of South Jinks Creek, the Feeder Canal and Bay Area and beneficial use placement of beach compatible material on the oceanfront shoreline of Sunset Beach may have a potential effect on the listed species/designated critical habitat within the vicinity of the project area. The action may affect, and is likely to adversely affect (MALAA) all five turtle species, red knot, piping plover, and seabeach amaranth. The findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Beach Sand Placement will fulfill the project-specific Section 7 responsibilities. In addition, dredge and placement activities will be limited to November 16th through April 30th to help minimize potential impacts. In addition, published guidelines and precautionary measures from the USFWS SPBO and the NMFS will be implemented during the construction process to reduce the potential for impacts.

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MTC

NORTH CAROLINA
Environmental Quality

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

BRAXTON DAVIS
Director, Division of Coastal Management

June 21, 2019

MEMORANDUM:

FROM: **Courtney Spears, Assistant Major Permits Coordinator**
NCDEQ - Division of Coastal Management
127 Cardinal Drive Ext., Wilmington, NC 28405
Fax: 910-395-3964 ***(Courier 04-16-33)***
courtney.spears@ncdenr.gov

SUBJECT: *CAMA / Dredge & Fill Application Review*

Applicant: ***Town of Sunset Beach***

Project Location: *East end Canals, Feeder Channel, Bay Area of Sunset Beach, Jinks Creek and the oceanfront beach between 5th and 12th street, Adj to AIWW in Brunswick County*

Proposed Project: *Perform navigational dredging through residential systems*

Please indicate below your agency's position or viewpoint on the proposed project and ***return this form to Courtney Spears*** at the address above by ***July 17, 2019***. If you have any questions regarding the proposed project, contact Tara MacPherson at (910) 796-7425 when appropriate, in-depth comments with supporting data is requested.

REPLY:

____ This agency has no objection to the project as proposed.
Additional comments may be attached

____ This agency has no comment on the proposed project.

__✓__ This agency approves of the project only if the recommended changes are incorporated. See attached.

____ This agency objects to the project for reasons described in the attached comments.

PRINT NAME Maria T. Dunn

AGENCY NCNRC

SIGNATURE MTD

DATE 8-9-2019

RECEIVED
AUG 09 2019
MP SECTION WIRO

North Carolina Wildlife Resources Commission

Gordon Myers, Executive Director

MEMORANDUM

TO: Courtney Spears
Division of Coastal Management
North Carolina Department of Environmental Quality

FROM: Maria T. Dunn, Coastal Coordinator
Habitat Conservation Division

DATE: August 9, 2019

SUBJECT: CAMA Dredge/Fill Permit Application for Town of Sunset Beach, Brunswick County, North Carolina.

Biologists with the North Carolina Wildlife Resources Commission (NCWRC) reviewed the permit application with regard to impacts on fish and wildlife resources. The project site is located within Canals A-D, Feeder Channel, Bay Area of Sunset Beach, South Jinks Creek on the east side of Sunset Beach, and 1600' of oceanfront beach between 5th and 12th Streets. Our comments are provided in accordance with provisions of the Coastal Area Management Act (G.S. 113A-100 through 113A-128), as amended, Sections 401 and 404 of the Clean Water Act, as amended, and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

The Town of Sunset Beach proposes to perform navigation dredging at the above locations with varying widths and depths depending on the reach. Material excavated from Canals A-D, the Feeder Channel, and Bay Area of Sunset Beach would be conducted via bucket-to-barge and trucked to an approved upland disposal site. The South Jinks Creek area is stated to contain beach compatible material and is proposed to be placed on the oceanfront shoreline via pipeline routed around the inlet area and down the oceanfront beach. To minimize impacts to environmental resources, the applicant states a 10' buffer would be included adjacent coastal wetlands and work would be conducted between November 16 – April 30. Shellfish and submerged aquatic vegetation (SAV) surveys were conducted and a biological assessment was included to locate and assess resources. The Bay Area and South Jinks Creek are classified SA HQW by the Environmental Management Commission and are open to shellfish harvesting. Primary Nursery Areas (PNA) designated by the NC Division of Marine Fisheries (NCDMF) are in the vicinity but are not directly within the project proposal.

Mailing Address: Habitat Conservation • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 707-0220 • **Fax:** (919) 707-0028

The NCWRC has reviewed the current project application and has comments regarding the proposal. Our agency has participated in several interagency meetings, site visits, and has provided comments during these occasions. Many measures to minimize the project's impacts to environmental resources have been incorporated since the project inception. We appreciate the applicant's coordination, cooperation and inclusion of more protective measures in this application.

One aspect of the project includes the beneficial placement of material along 1600' of oceanfront shoreline. The material would be dredged from South Jinks Creek and pipelined around the inlet spit to the shoreline between 5th and 12th Streets. The applicant states this material is beach compatible and that work would be conducted between November 16 – April 30 to minimize impacts to nesting sea turtles and aquatic marine resources.

The NCWRC requests placement of the material on the oceanfront shoreline and removal of equipment associated with nourishment occur outside an April 1 – November 15 moratorium to avoid impacts to numerous shore birds that use the bare sand area along the inlet spit. This area is used by several species for foraging and nesting throughout the month of April. Heavy equipment use and activities associated with the pumping of material from the South Jinks Creek area around the inlet to the beach would disturb these species. Scheduling the project so the dredging of South Jinks Creek and associated nourishment would occur first would ensure the work could be finished and equipment removed from the beach outside the requested moratorium. Excavating this area first may also prevent any suspended sediments from the other dredged areas from accumulating within the material proposed to be placed on the beach. Material placed on the beach must be compatible with native beach material. This includes grain size, percent fines, shell, rock, and color. Any material placed on the beach that is not compatible must be removed and the site remediated outside the April 1 – November 15 moratorium. Adherence to the April 1 – November 15 moratorium would also benefit marine resources in the adjacent PNA designated waters if applied to the entire project proposal.

The NCWRC appreciates the opportunity to review and comment on this permit application. If you need further assistance or additional information, please contact me at (252) 948-3916 or at maria.dunn@ncwildlife.org

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Phone: 910-251-4170
Fax: 910-251-4025
Email: tyler.a.crumbley@usace.army.mil

-----Original Message-----
From: Crumbley, Tyler A CIV USARMY CESAW (USA)
Sent: Tuesday, August 27, 2019 12:07 PM
To: Neal, Robert <rneal@moffattnichol.com>
Cc: Hiram Marziano <HMarziano@sunsetbeachnc.gov>; Lisa Anglin <langlin@sunsetbeachnc.gov>; York, Dawn <dyork@moffattnichol.com>; Sugg, Mickey T CIV USARMY CESAW (USA) <Mickey.T.Sugg@usace.army.mil>; Crumbley, Tyler A CIV USARMY CESAW (USA) <Tyler.A.Crumbley@usace.army.mil>; McLendon, C S CIV USARMY CESAW (USA) <Scott.C.McLendon@usace.army.mil>
Subject: RE: Sunset Beach

Hello All,

Please allow this email to serve as official correspondence in response to the email below.

Hopefully, as is known, the project has had 5 pre-application meetings in various locations over the past 2 years (I was only present at 2 of those due to a deployment). The application came in on 21 June, 2019. The application submitted was incomplete with regard to the Biological Assessment and the discussions on disposal of beneficial material as beach placement. The application was initially processed as a GP291 with an Abbreviated Public Notice (PN). The federal and state agencies were notified of the project proposal (they were also on all of the previous pre-application meetings) via this PN. The USFWS sent a reply letter (attached) stating that the use of the State Programmatic Biological Opinion (SPBO) required effects determinations of May Affect Likely to Adversely Affect (MALAA) species of concern under their purview. The Corps initial determinations were May Affect Likely to Not Adversely Affect, based on the use of the SPBO. Additional unsolicited responses and comments from the general public have been received from the issuance of the Abbreviated PN (to federal and state resource and commenting agencies). Those comments indicated that the project has significant public interest, mostly in opposition to the proposal. This office has subsequently determined that a more widespread notification to the public is warranted and will issue a Standard Public Notice with a review of the project proposal as a Standard Permit (SP), rather than as a General Permit. We have also determined that a response letter to the USFWS requesting use of the SPBO through the recommended effects determinations is necessary. The NMFS Protected Resources Division (PRD) will also be notified and consultation requested to utilize the South Atlantic Regional Biological Opinion.

The next step will be to complete the requests for consultation to the USFWS and the NMFS PRD with an updated Biological Assessment and effects determinations. This office also has spoken to the Agent for the Applicant and discussed the process for transferring the review of the proposal to SP, rather than GP. This entails the submission of a EN Form 4345 application for a Standard Permit (attached). The majority of the information has already been received under the GP application via NC DCM and will just need to be referenced. A 30 day Standard PN notice will be issued by this office to solicit comments from a wider net of the notified public to assist this office in determining the extent of relevant public issues. Please note that, through previous project reviews, the consultation process with the resource agencies has the potential to be the most time consuming, especially with this type of coastal project.

If you have any further questions please feel free to contact me.

Thank you.

Tyler Crumbley, PWS
Regulatory Division
U.S. Army Corps of Engineers-Wilmington District
69 Darlington Avenue
Wilmington, NC 28403

Phone: 910-251-4170
Fax: 910-251-4025
Email: tyler.a.crumbley@usace.army.mil

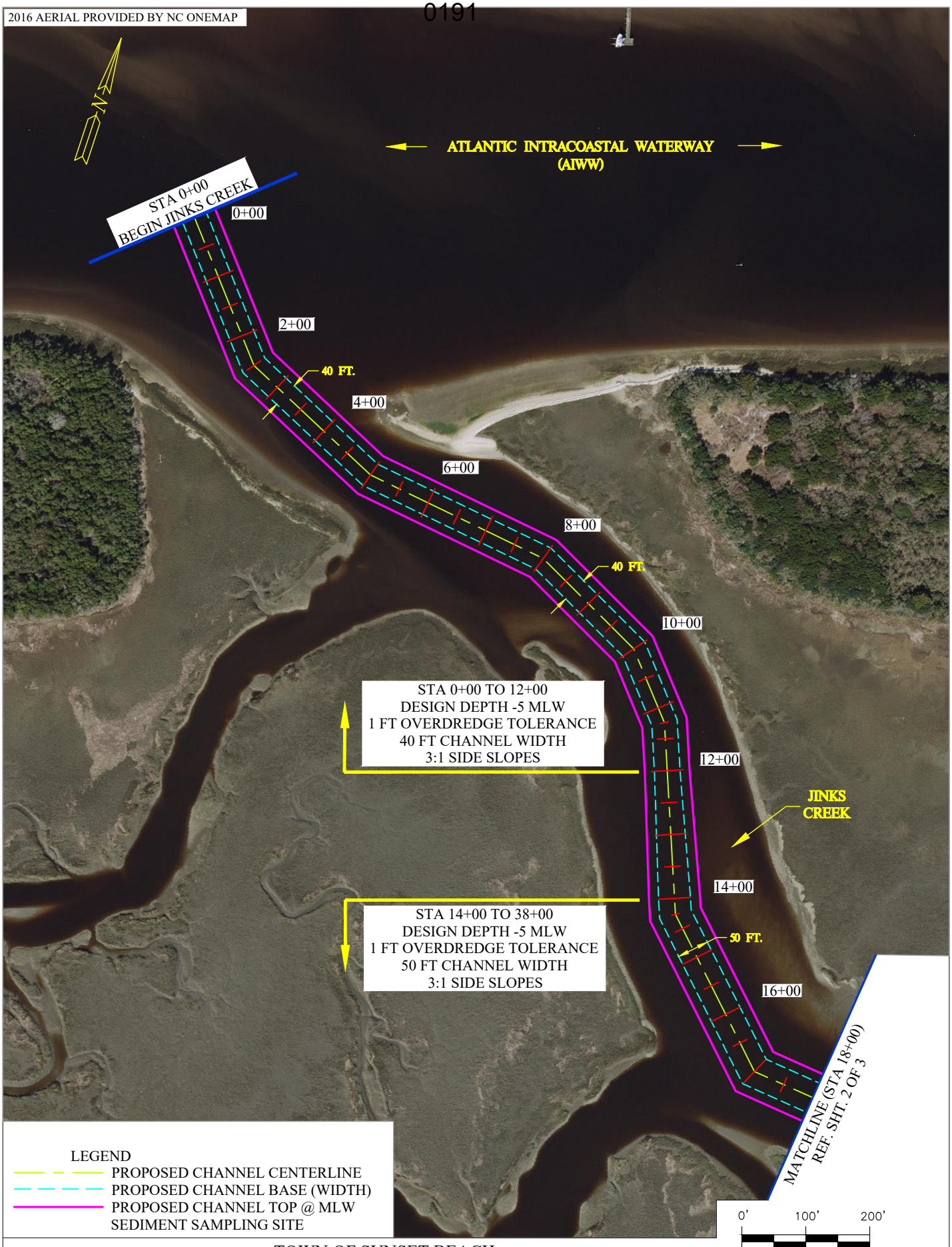
-----Original Message-----
From: Neal, Robert [mailto:rneal@moffattnichol.com]
Sent: Friday, August 23, 2019 10:15 AM
To: Crumbley, Tyler A CIV USARMY CESAW (USA) <Tyler.A.Crumbley@usace.army.mil>
Cc: Hiram Marziano <HMarziano@sunsetbeachnc.gov>; Lisa Anglin <langlin@sunsetbeachnc.gov>; York, Dawn <dyork@moffattnichol.com>
Subject: [Non-DoD Source] Sunset Beach

Tyler, Good morning!

The Town of Sunset Beach has requested if you could provide a written statement explaining or directing the need for a special / individual permit and the individual biological opinion.
The official statement will help with our record keeping and to help ensure we are all of the same understanding for the path forward.
Please let me know if this is something you can provide!

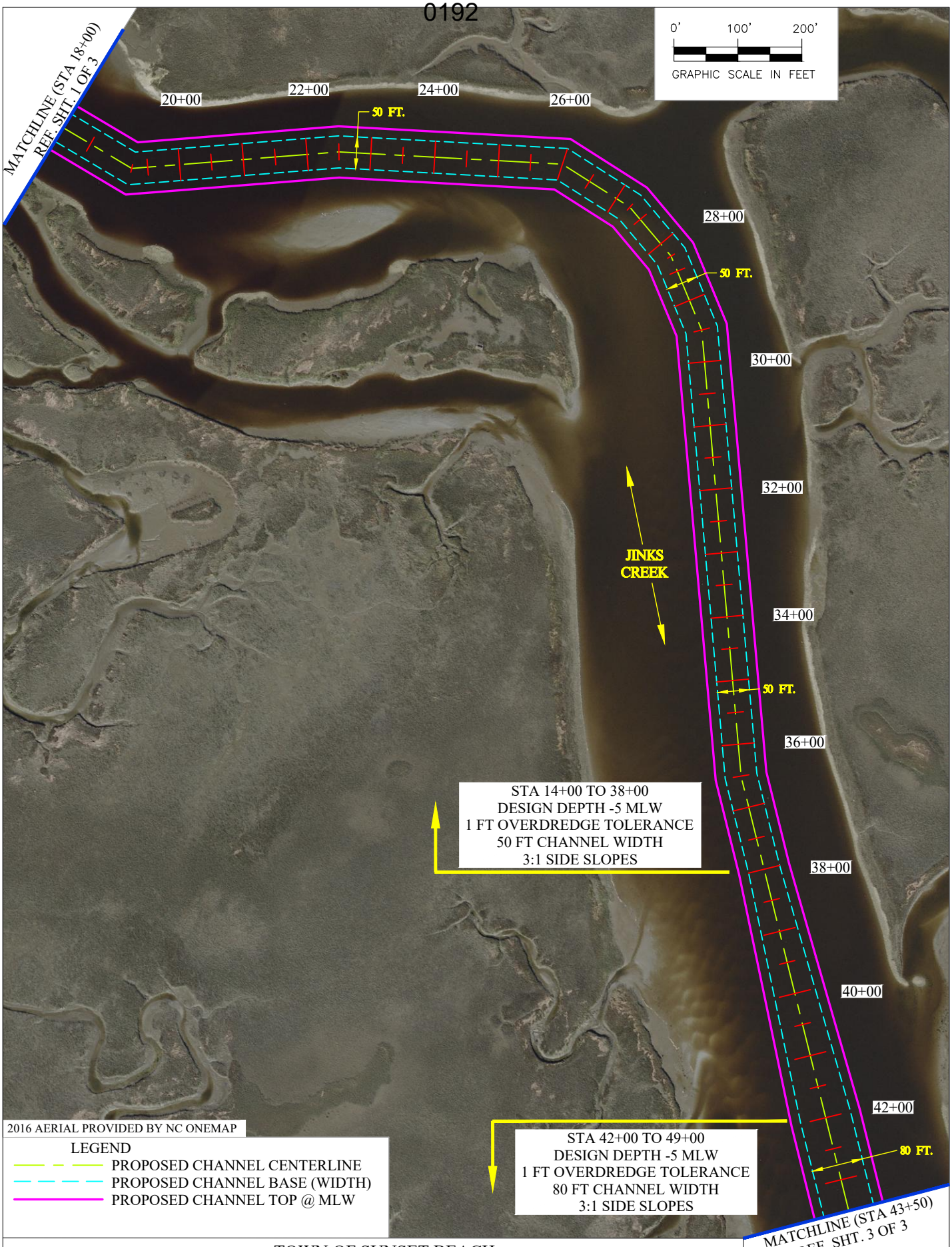
Best Regards,

Robert Neal, P.E.
Moffatt & Nichol
272 N. Front Street | Suite 204 | Wilmington, NC 28401 P 910.218.7100 | F 919.781.4869 | C 910.524.3285



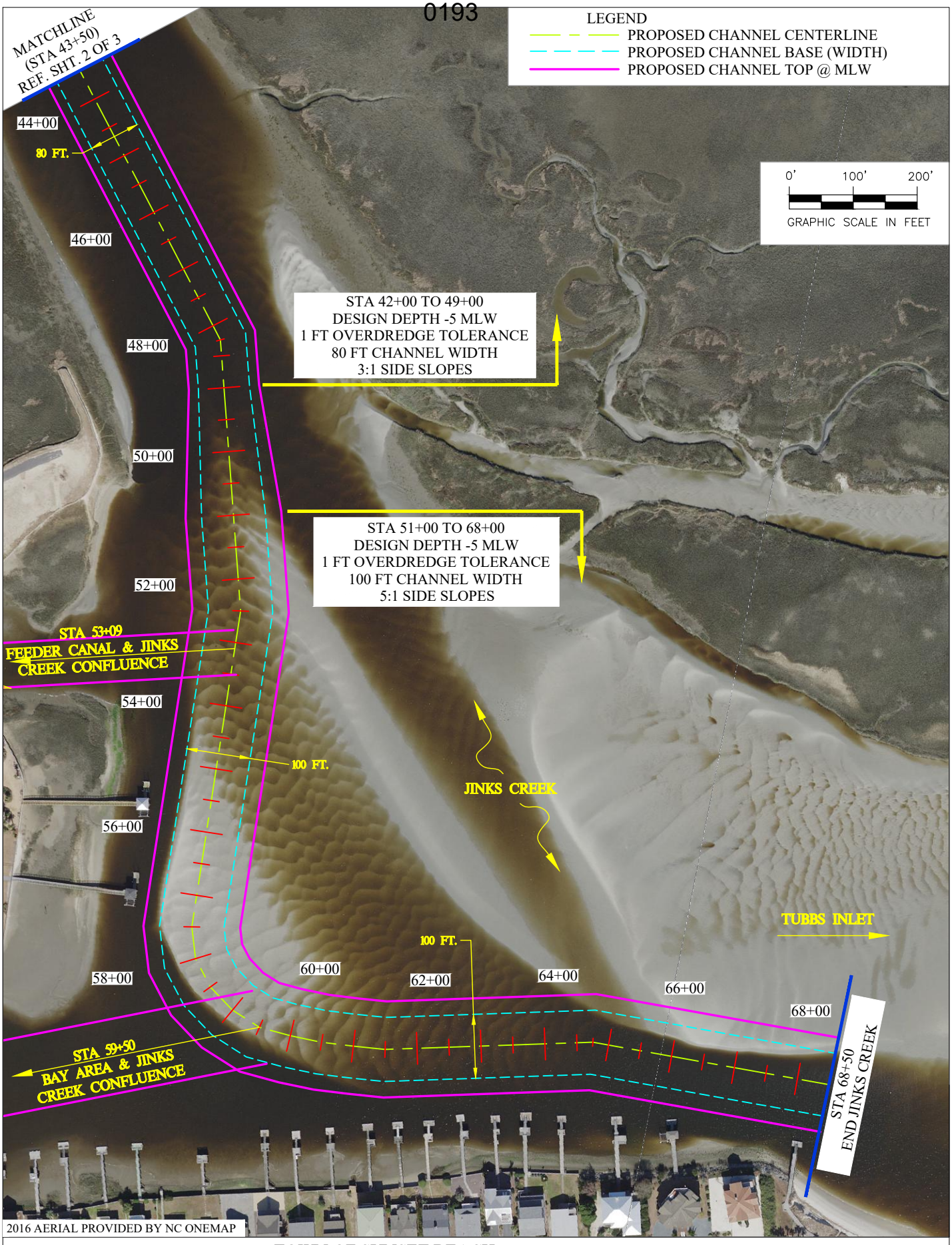
TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK ALIGNMENT
PLAN VIEW

A1–1



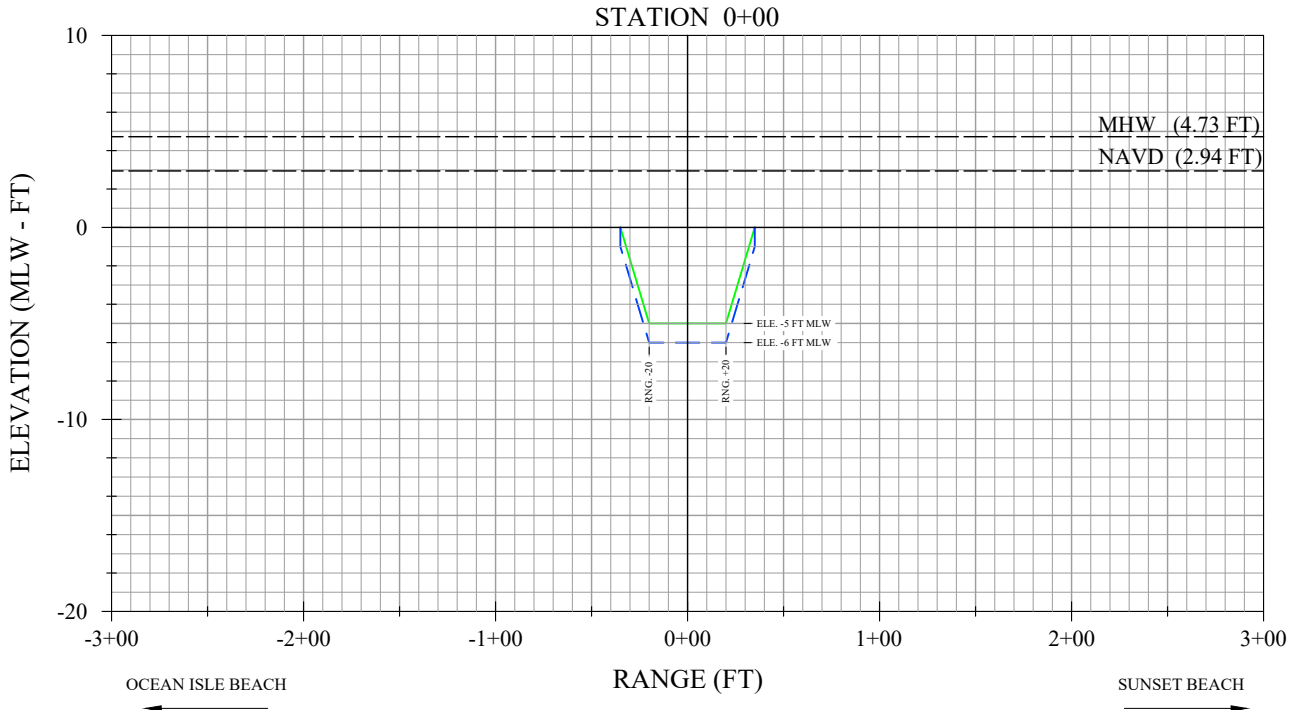
TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK ALIGNMENT
PLAN VIEW

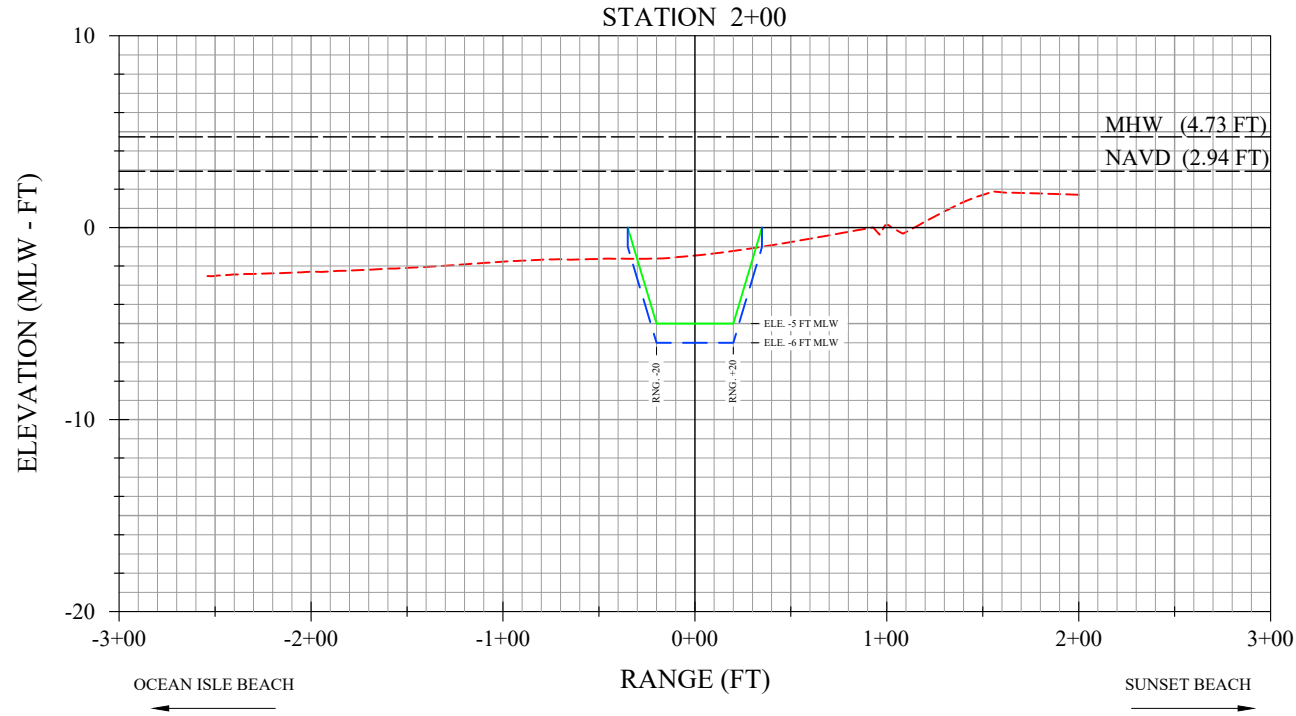
A1–2



2016 AERIAL PROVIDED BY NC ONEMAP

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK ALIGNMENT
PLAN VIEW





FOR REVIEW ONLY - NOT FOR CONSTRUCTION

LEGEND

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- PROPOSED DESIGN TEMPLATE
- PROPOSED OVERDREDGE TEMPLATE

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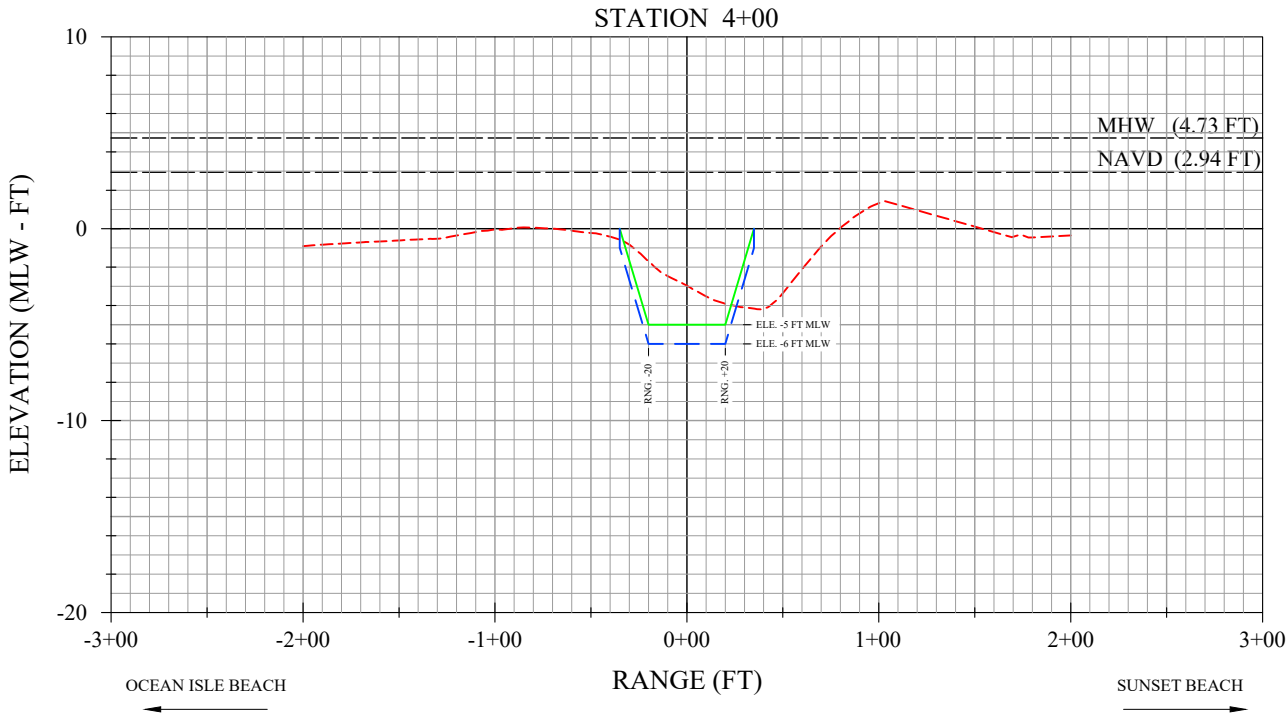
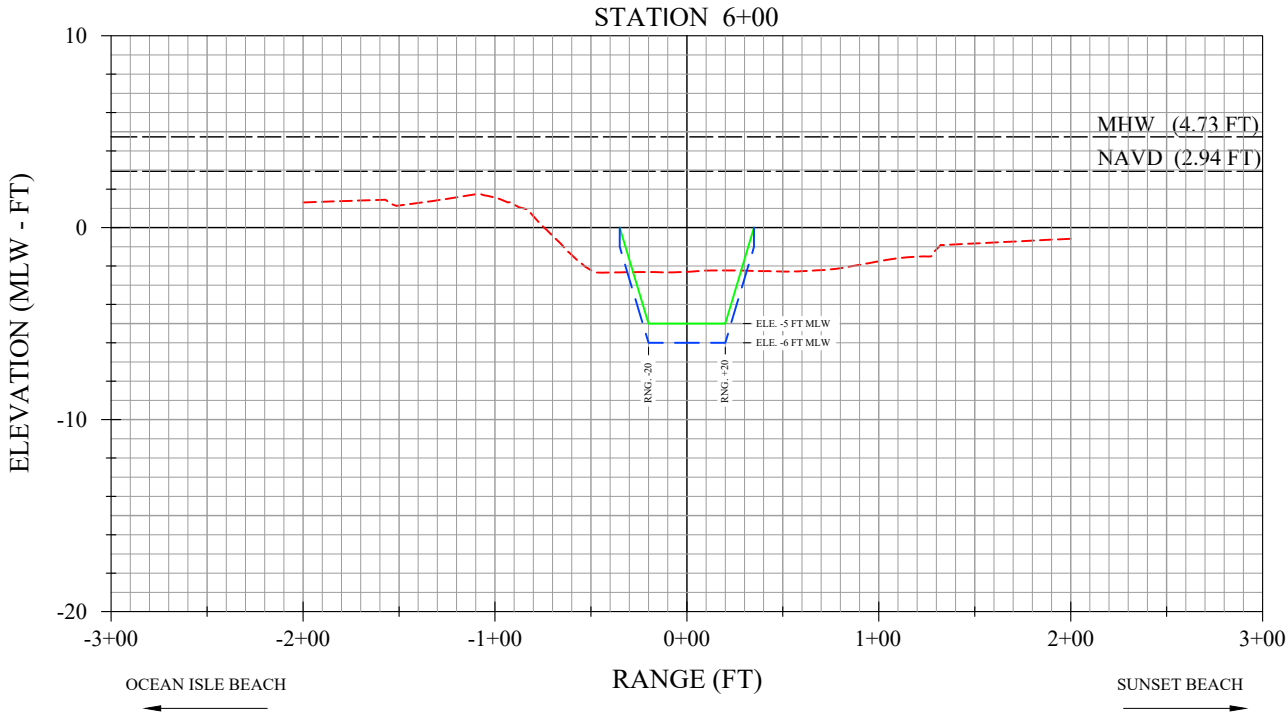
0' 50' 100'
HORIZONTAL SCALE: 1"=100'

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK PROFILES
STA 0+00 & 2+00

moffatt & nichol





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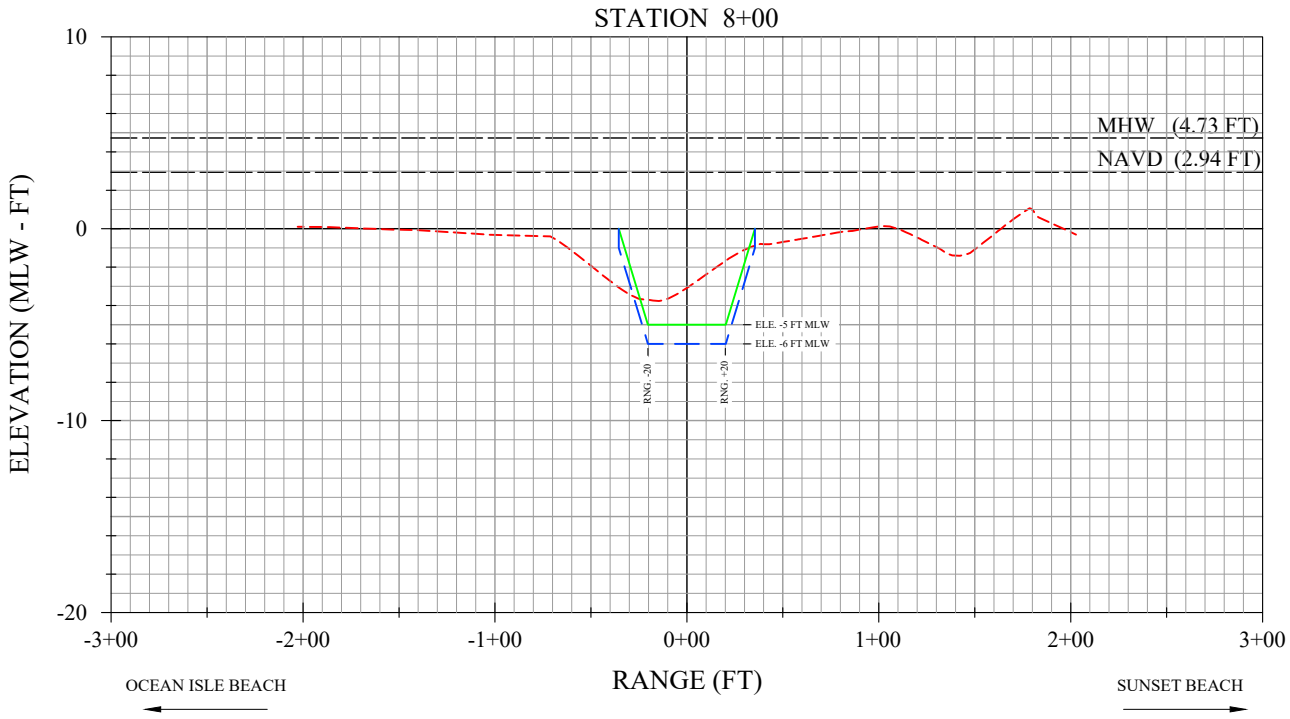
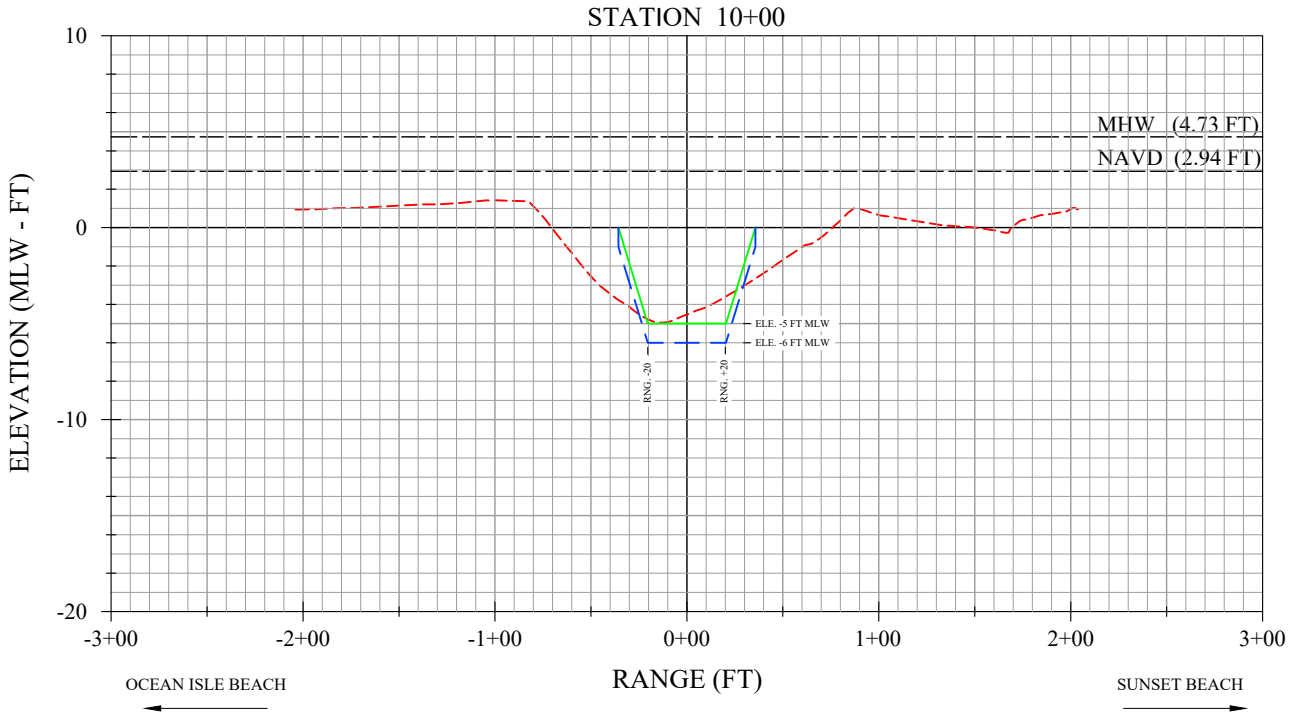
TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK PROFILES
STA 4+00 & 6+00

moffatt & nichol





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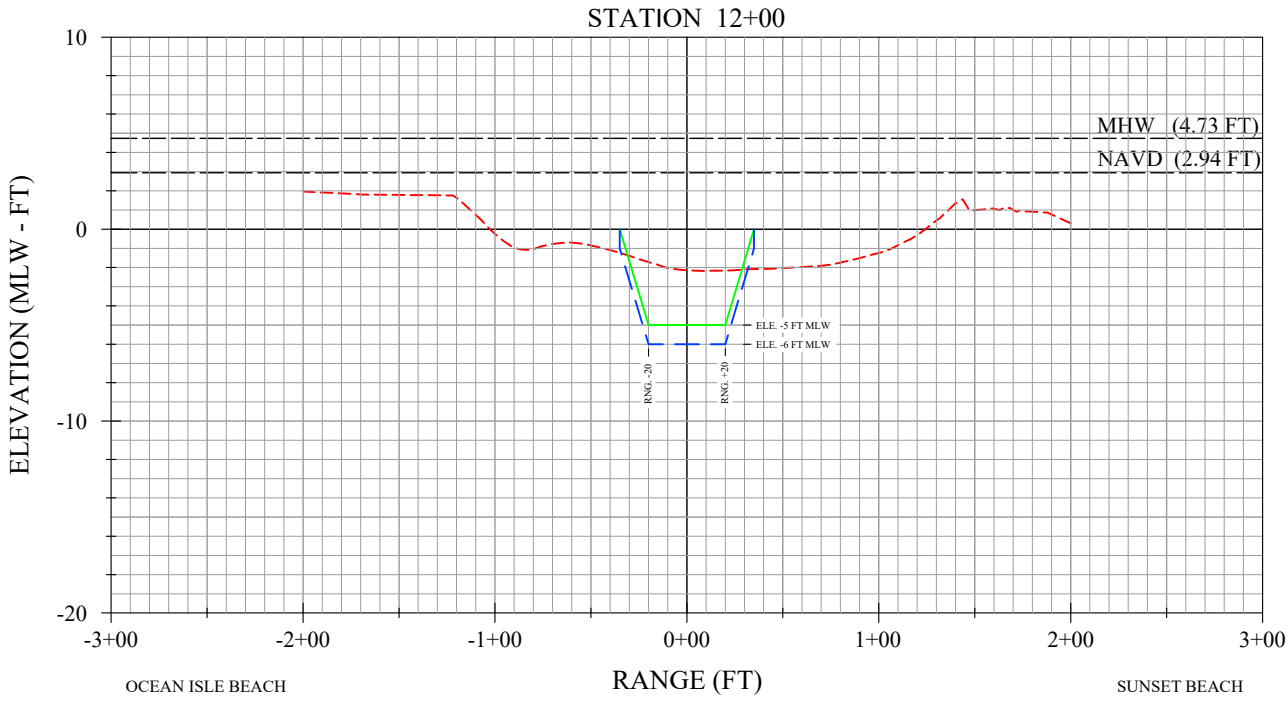
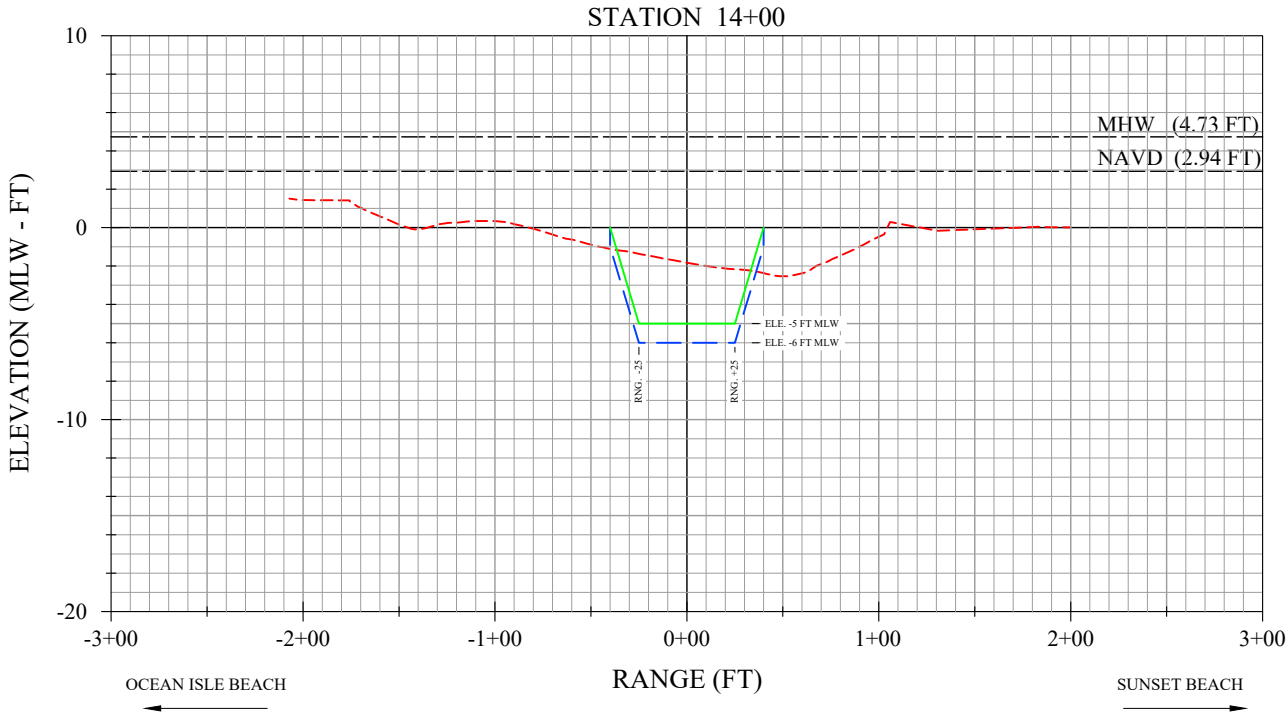
TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK PROFILES
STA 8+00 & 10+00

moffatt & nichol





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LEGEND

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- PROPOSED OVERDREDGE TEMPLATE

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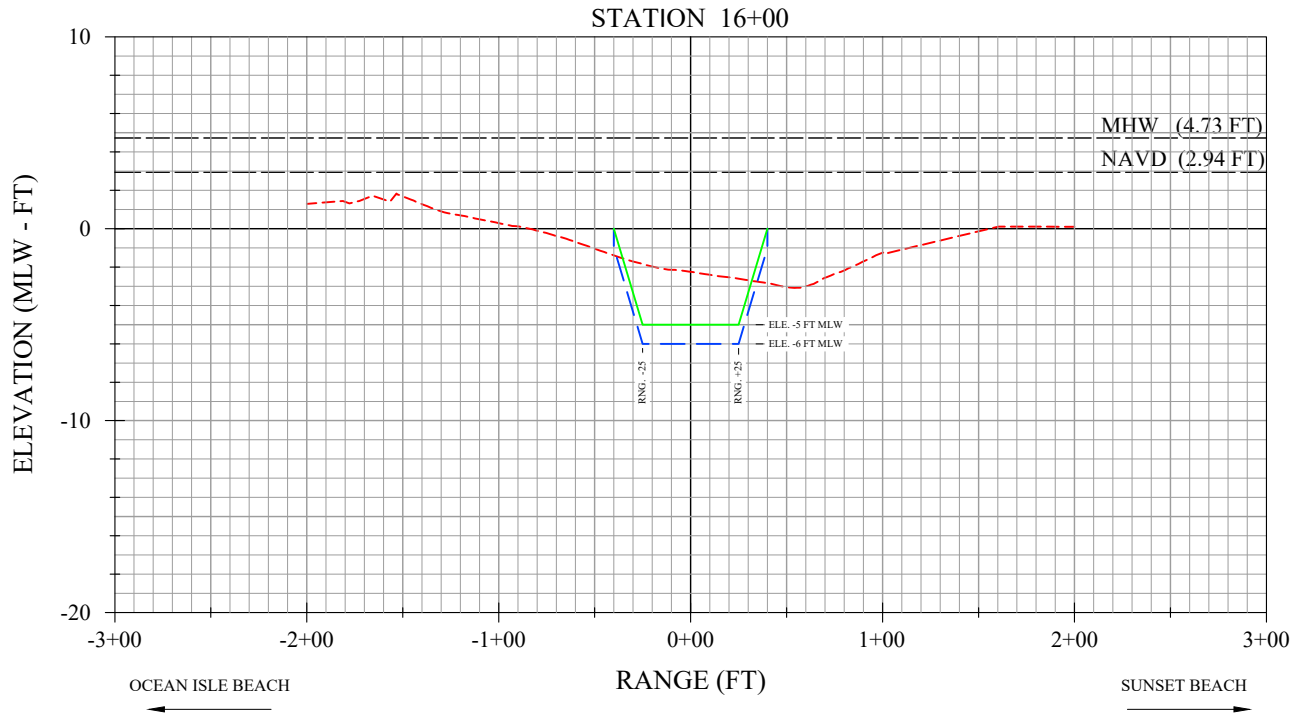
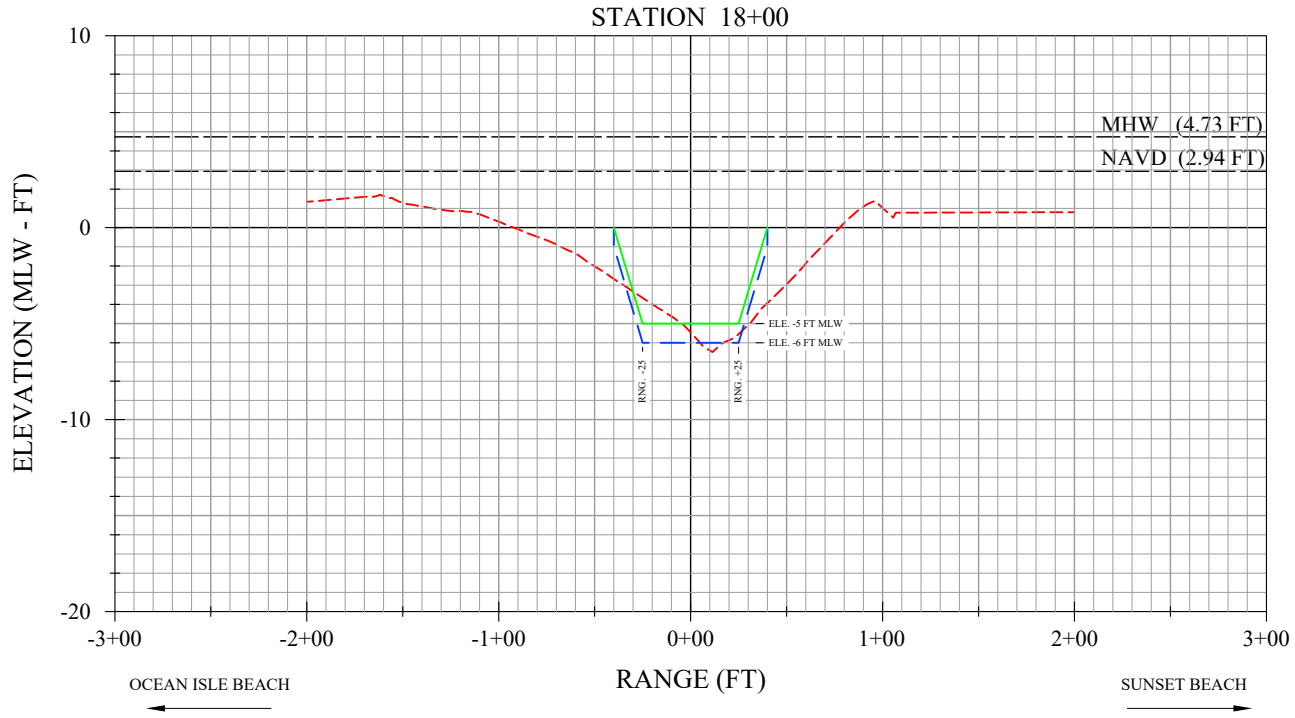
0' 50' 100'
HORIZONTAL SCALE: 1"=100'

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK PROFILES
STA 12+00 & 14+00

moffatt & nichol





FOR REVIEW ONLY - NOT FOR CONSTRUCTION

LEGEND

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- PROPOSED DESIGN TEMPLATE
- PROPOSED OVERDREDGE TEMPLATE

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VERTICAL SCALE: 1"=10'
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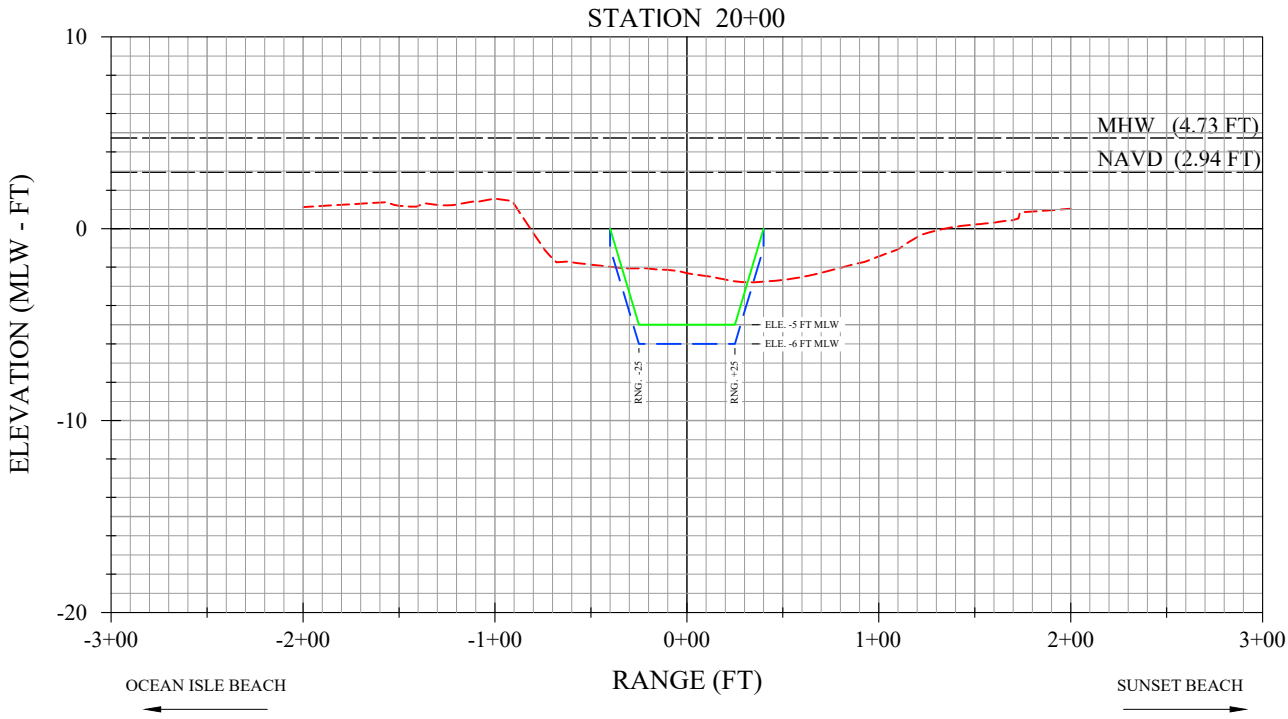
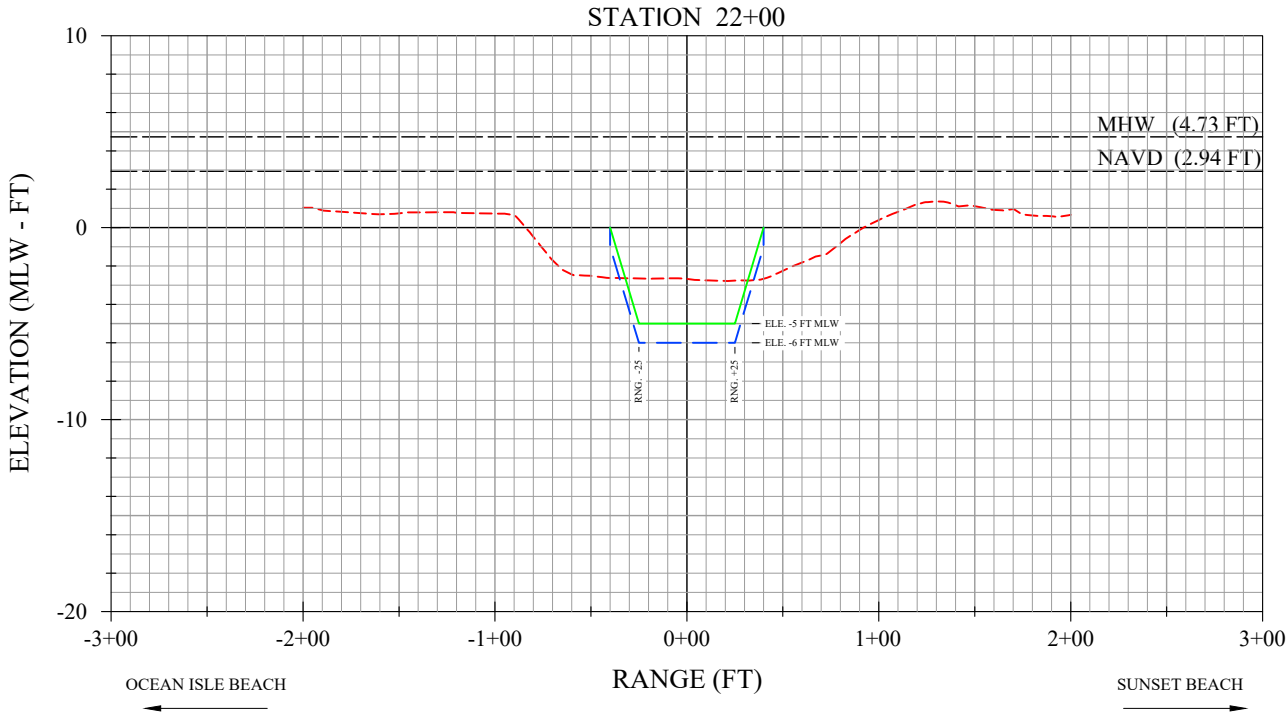
HORIZONTAL SCALE: 1"=100'

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK PROFILES
STA 16+00 & 18+00

moffatt & nichol





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LEGEND

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- PROPOSED DESIGN TEMPLATE
- PROPOSED OVERDREDGE TEMPLATE

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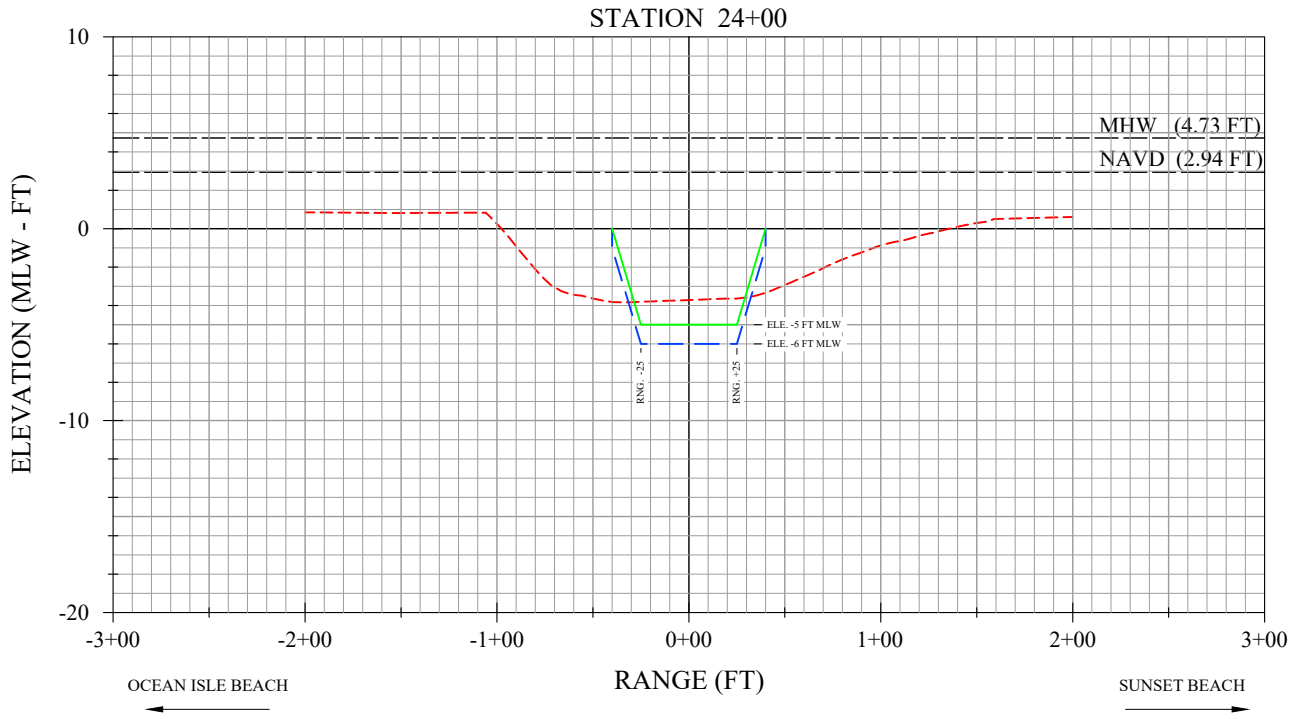
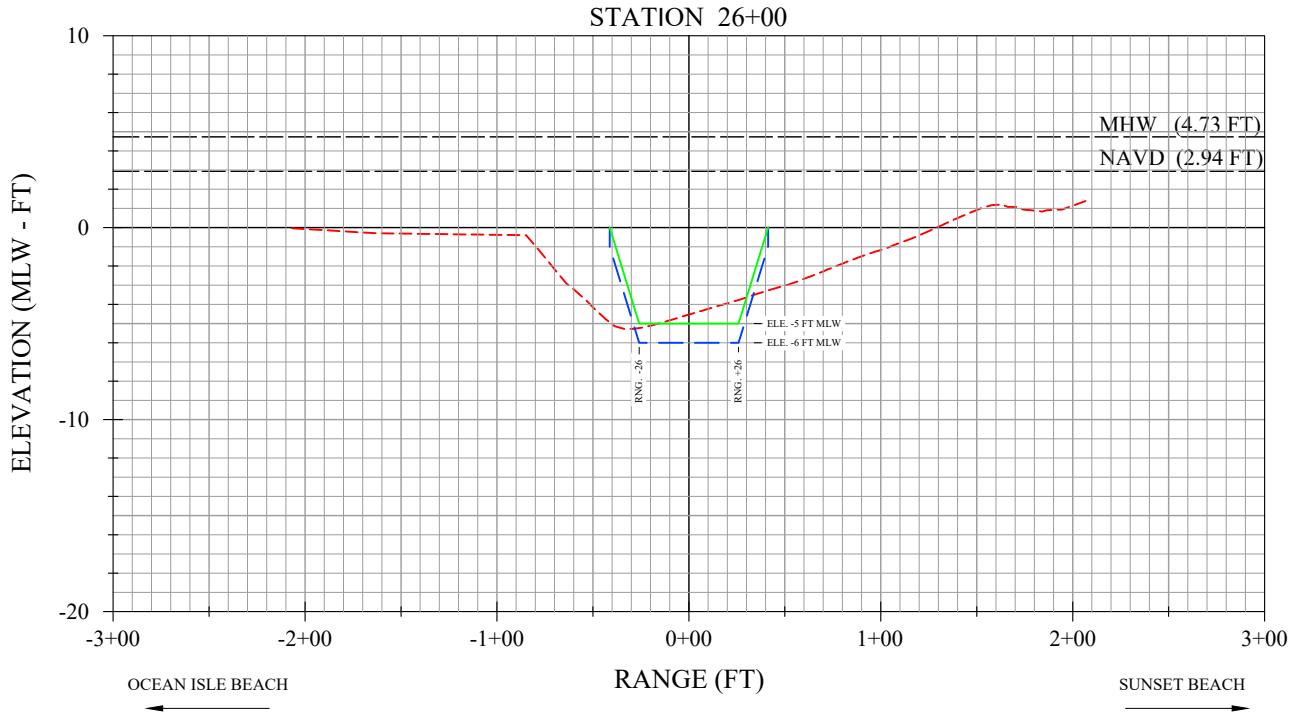
VERTICAL SCALE: 1"=10'
0' 50' 100'
HORIZONTAL SCALE: 1"=100'

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK PROFILES
STA 20+00 & 22+00

moffatt & nichol





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LEGEND

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- PROPOSED DESIGN TEMPLATE
- PROPOSED OVERDREDGE TEMPLATE

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VERTICAL SCALE: 1"=10'
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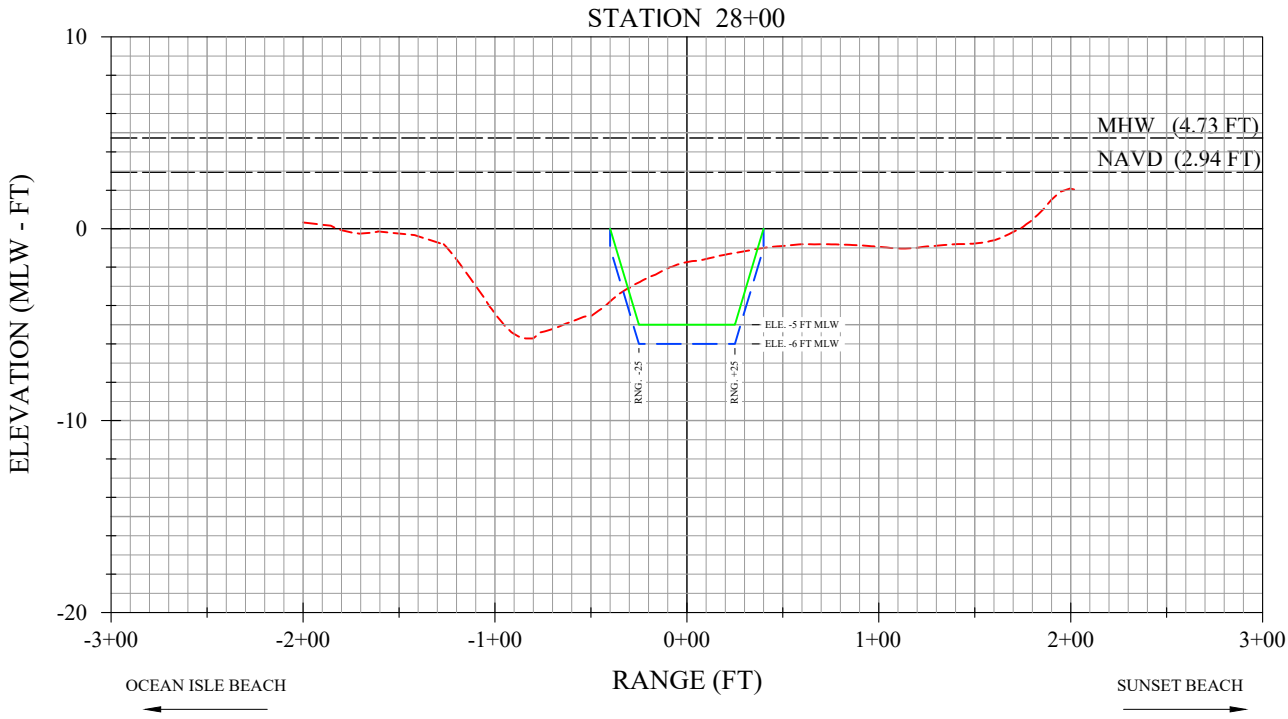
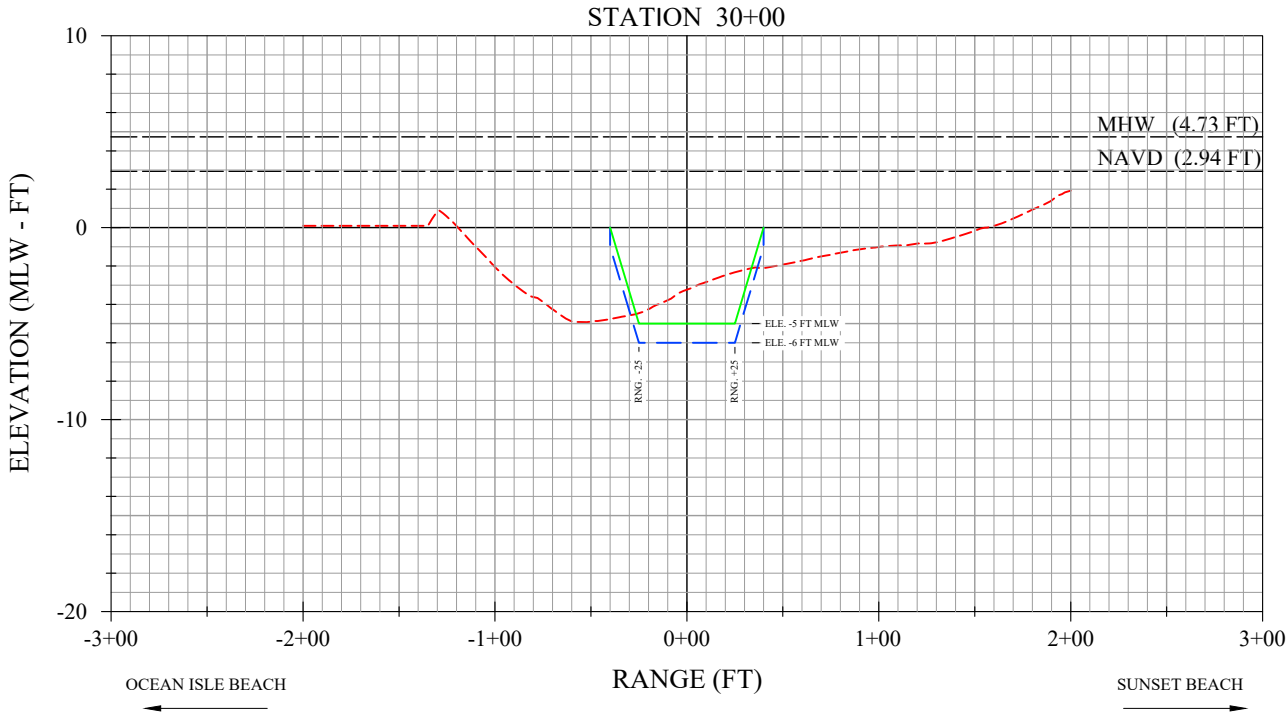
HORIZONTAL SCALE: 1"=100'

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK PROFILES
STA 24+00 & 26+00

moffatt & nichol





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LEGEND

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- PROPOSED DESIGN TEMPLATE
- PROPOSED OVERDREDGE TEMPLATE

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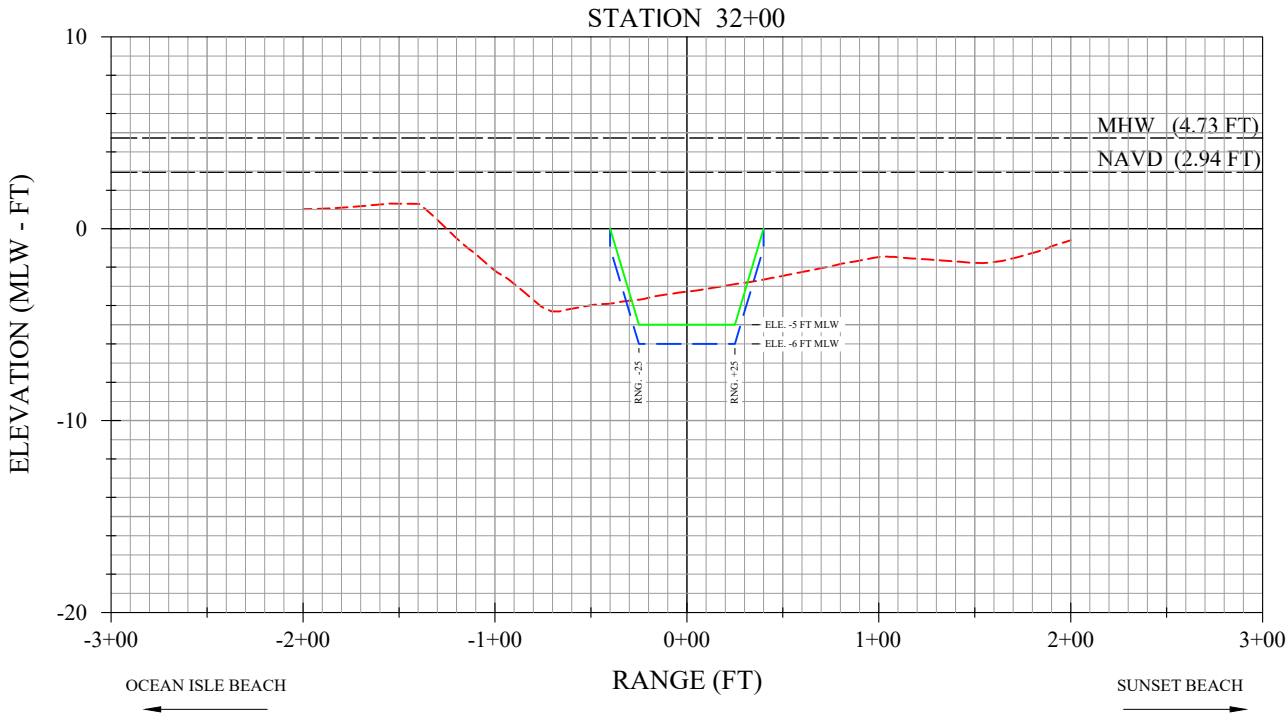
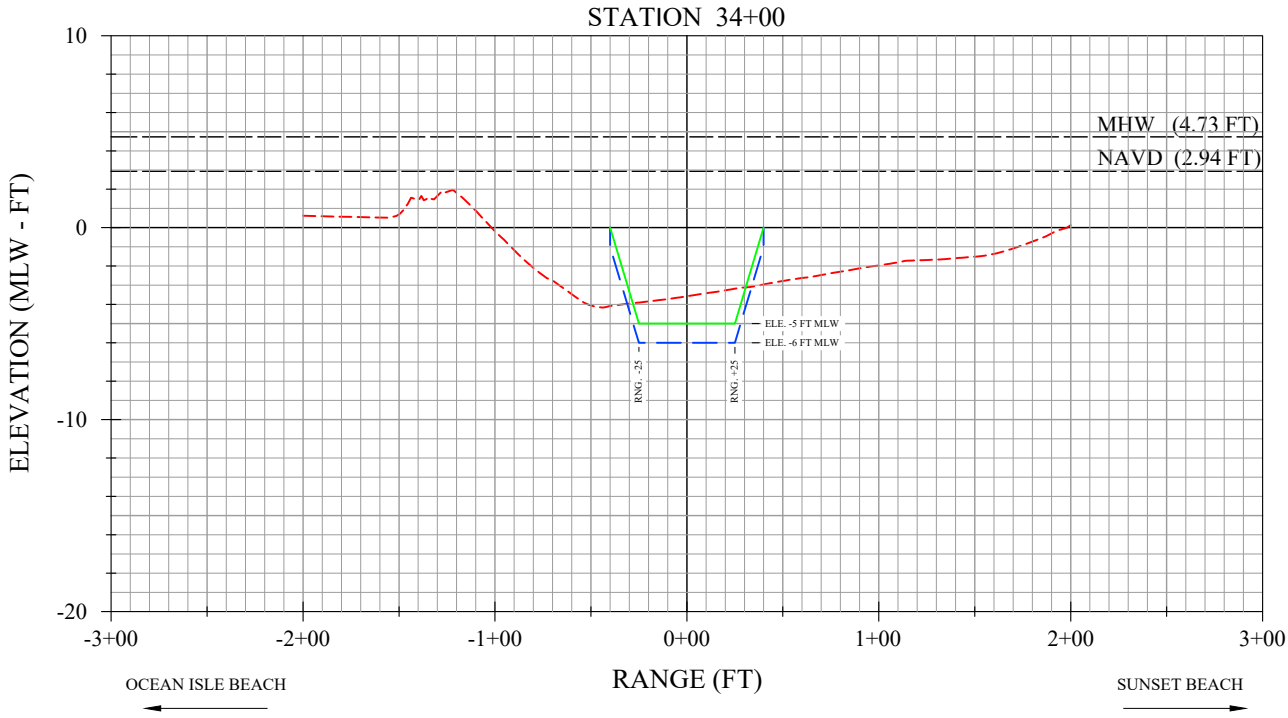
HORIZONTAL SCALE: 1"=100'

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK PROFILES
STA 28+00 & 30+00

moffatt & nichol





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LEGEND

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- PROPOSED DESIGN TEMPLATE
- PROPOSED OVERDREDGE TEMPLATE

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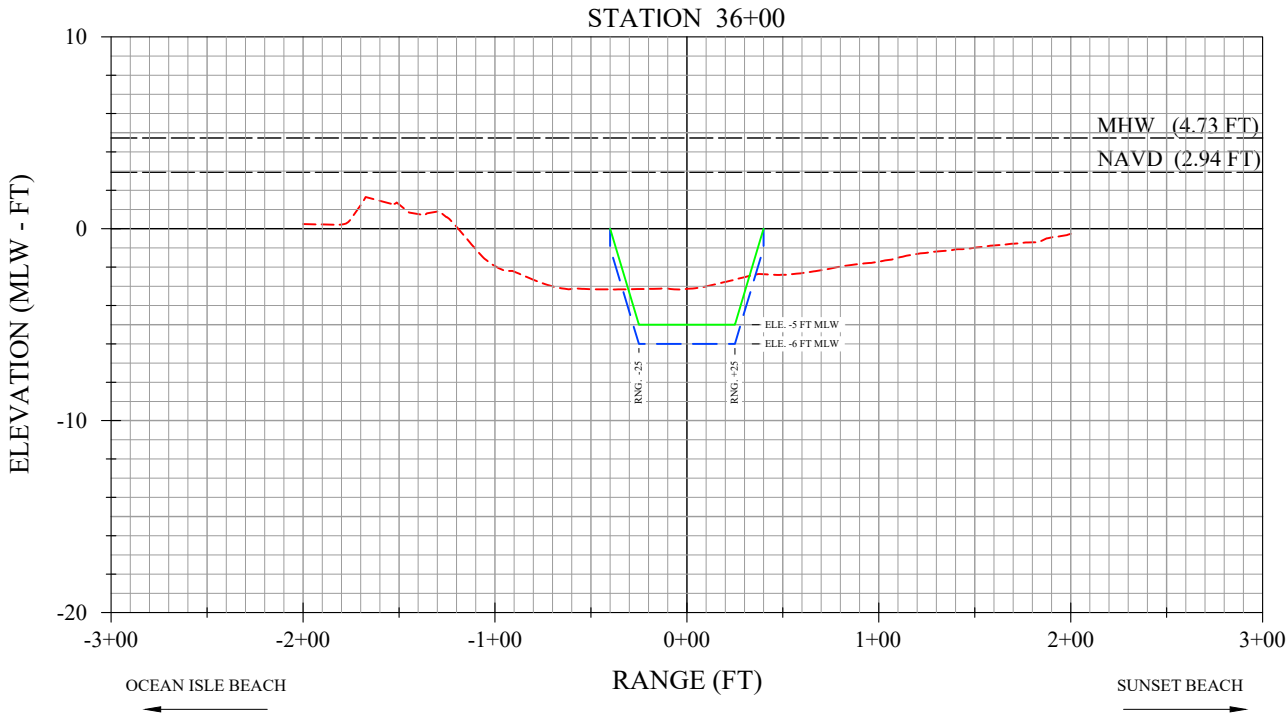
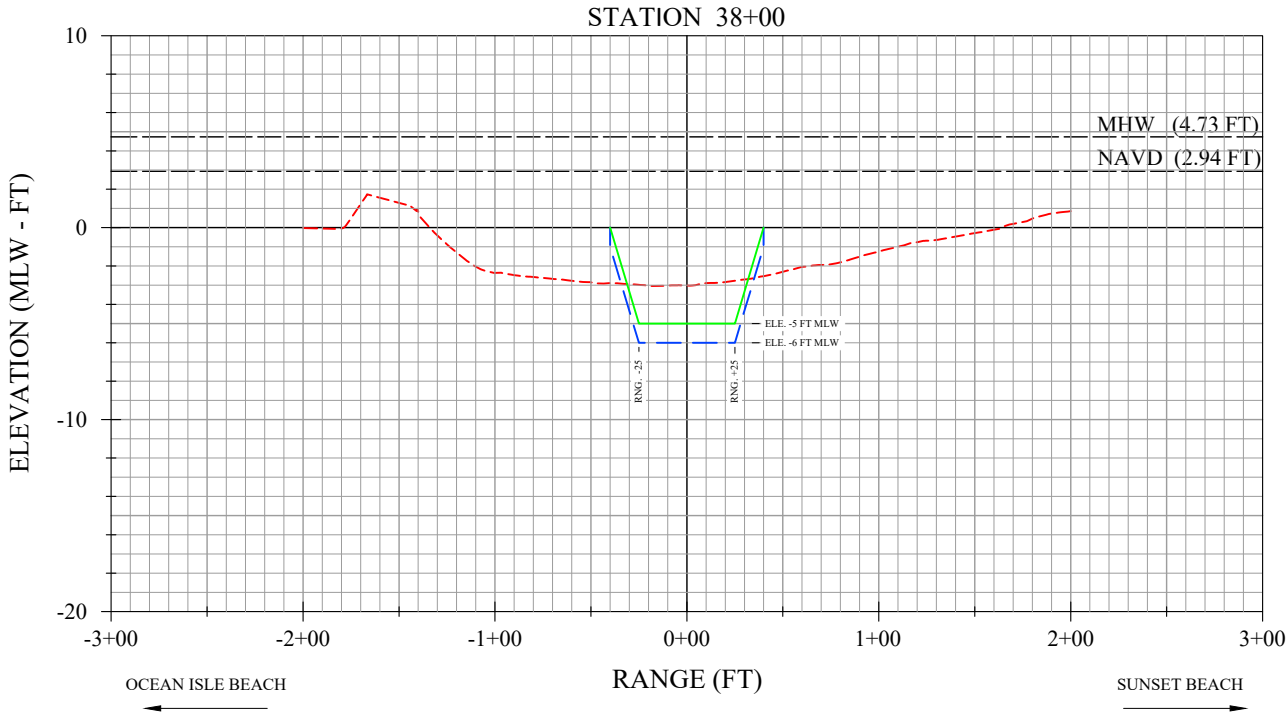
HORIZONTAL SCALE: 1"=100'

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK PROFILES
STA 32+00 & 34+00

moffatt & nichol





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LEGEND

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- PROPOSED DESIGN TEMPLATE
- PROPOSED OVERDREDGE TEMPLATE

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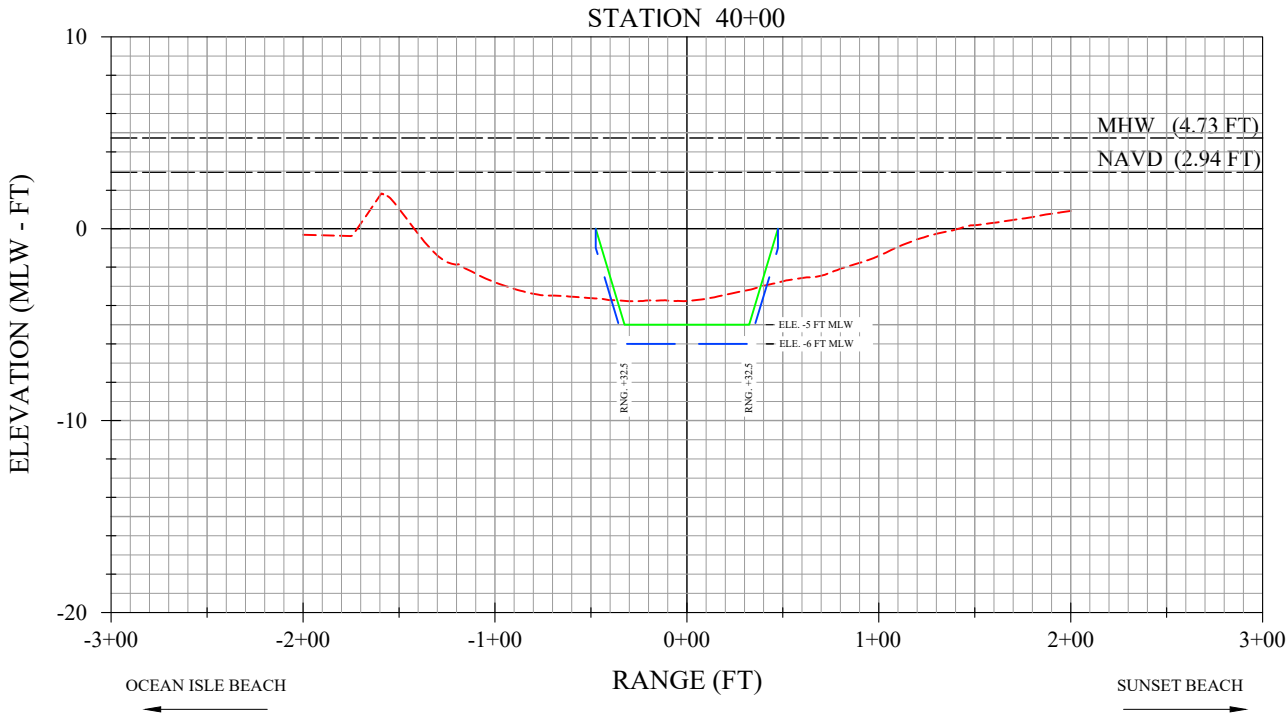
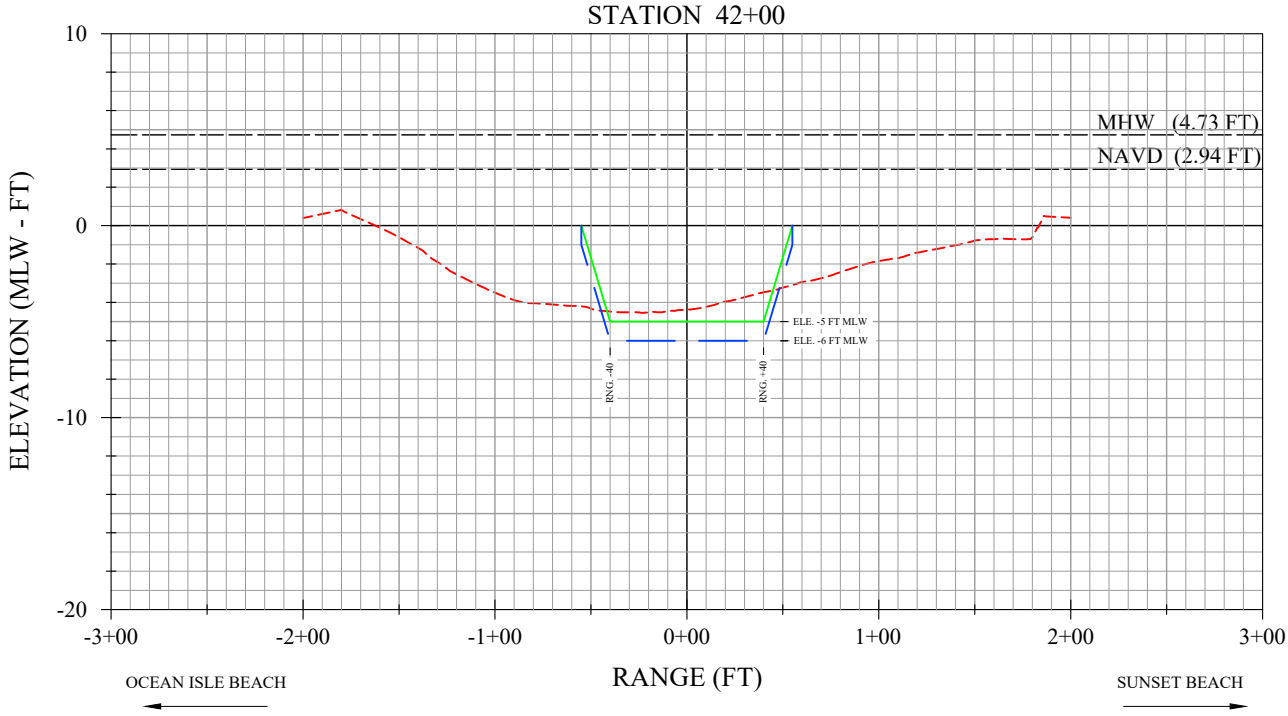
HORIZONTAL SCALE: 1"=100'

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK PROFILES
STA 36+00 & 38+00

moffatt & nichol





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LEGEND

- EXISTING PROFILE (FEB. 2016)
- PROPOSED DESIGN TEMPLATE
- PROPOSED OVERDREDGE TEMPLATE

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VERTICAL SCALE: 1"=10'
0' 50' 100'
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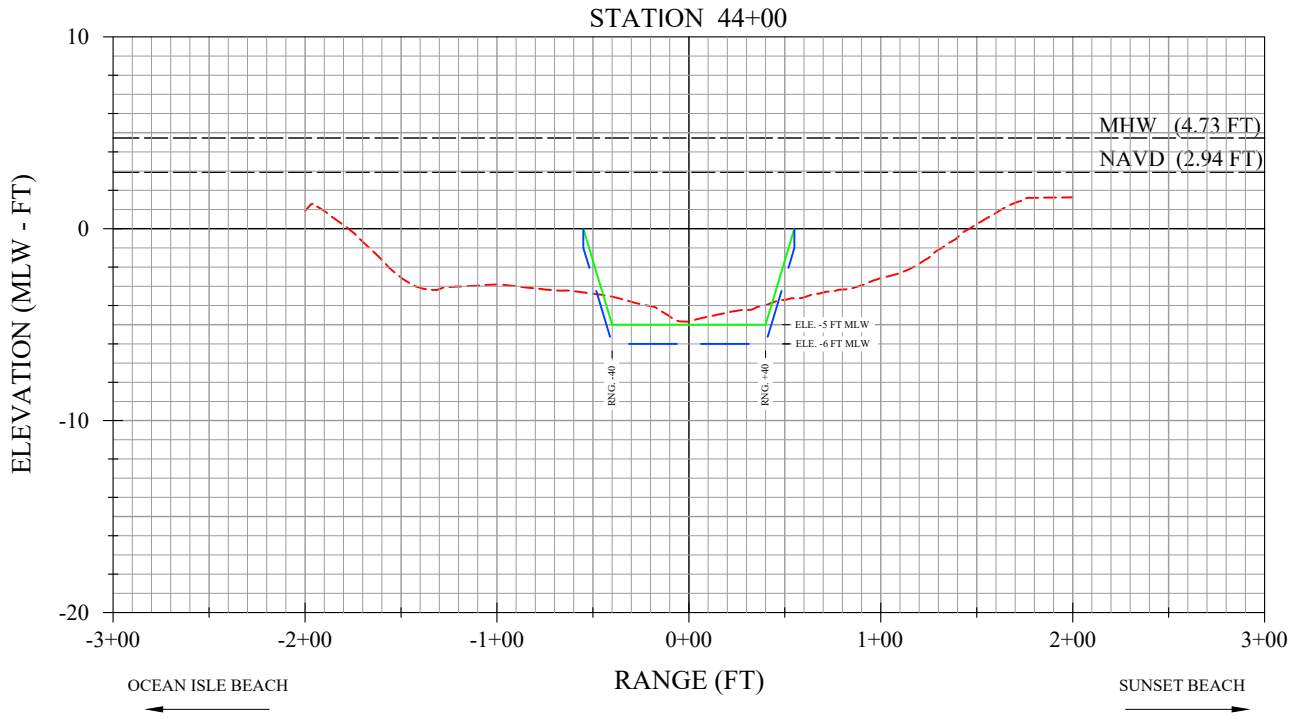
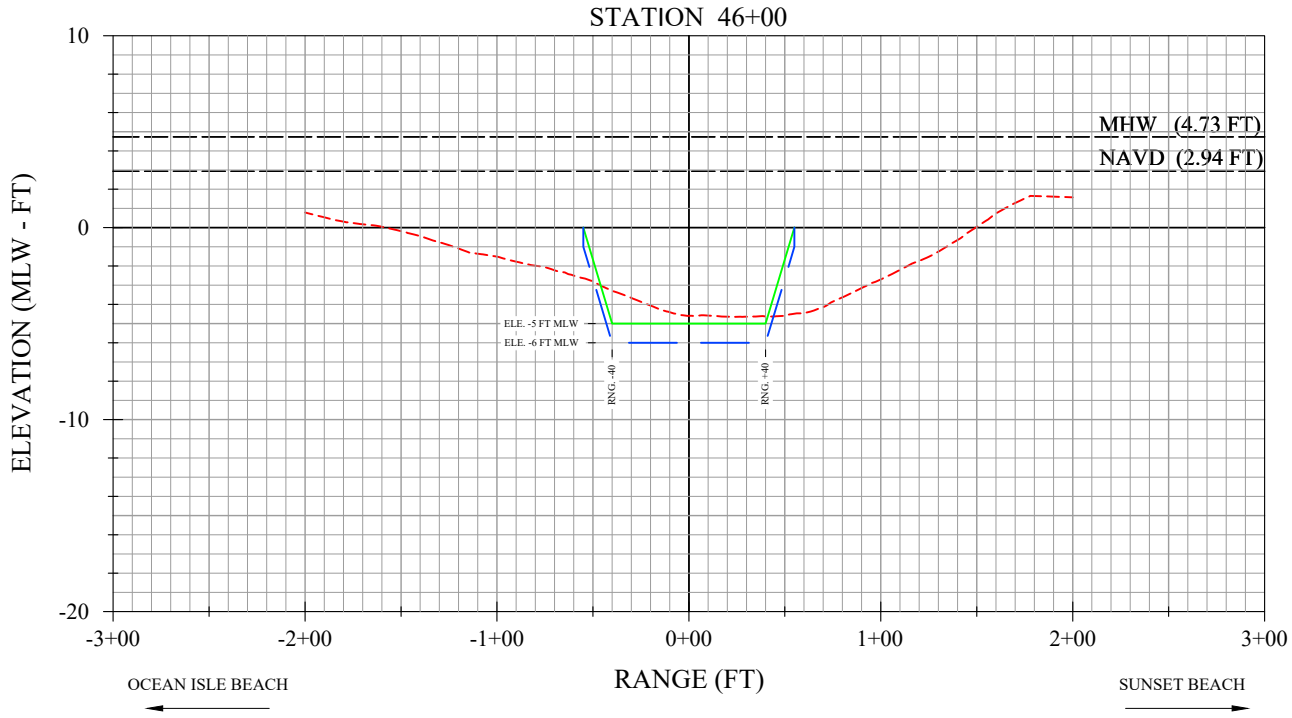
TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK PROFILES
STA 40+00 & 42+00

moffatt & nichol





FOR REVIEW ONLY - NOT FOR CONSTRUCTION

LEGEND

- EXISTING PROFILE (FEB. 2016)
- PROPOSED DESIGN TEMPLATE
- PROPOSED OVERDREDGE TEMPLATE

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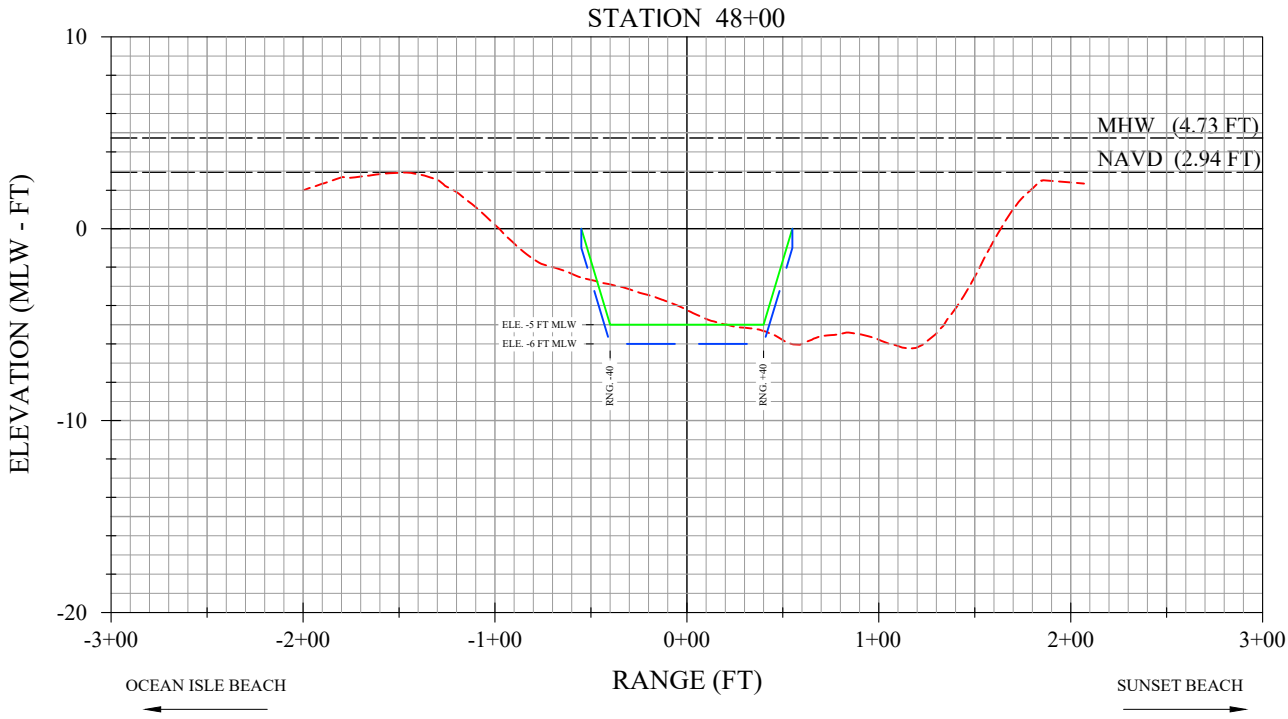
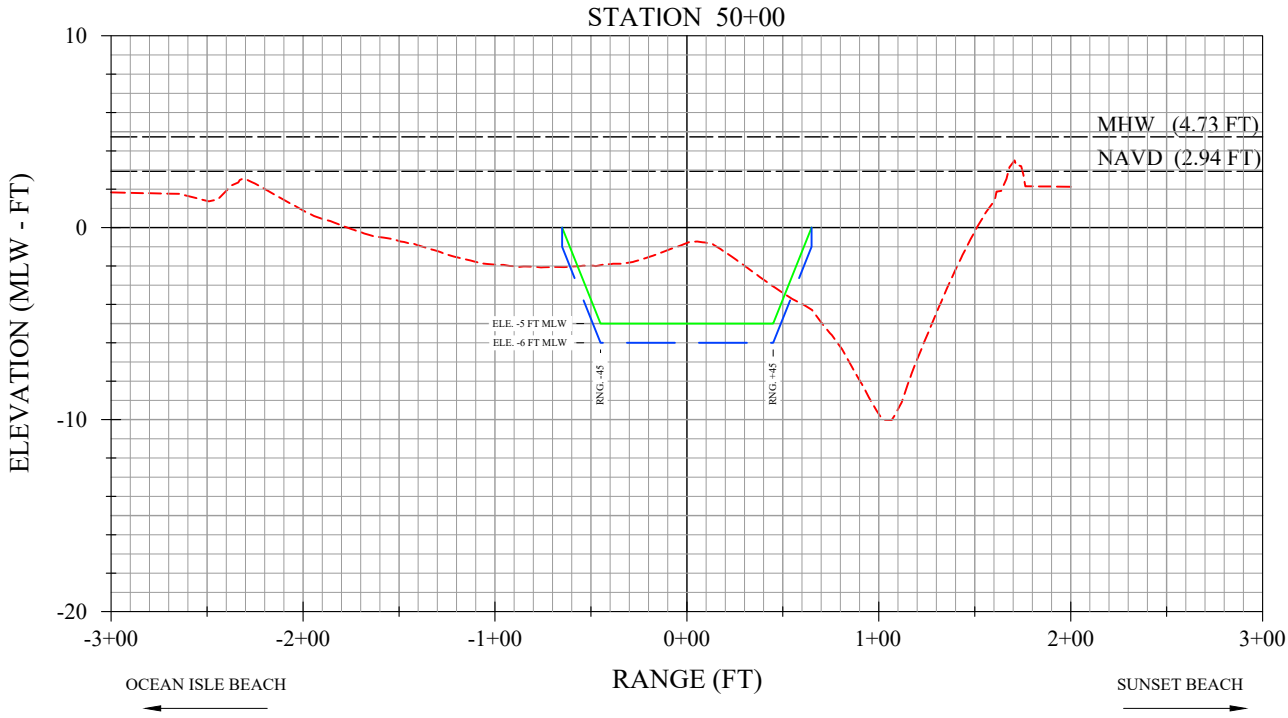
VERTICAL SCALE: 1"=10'
0' 50' 100'
HORIZONTAL SCALE: 1"=100'

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK PROFILES
STA 44+00 & 46+00

moffatt & nichol





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LEGEND

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- PROPOSED DESIGN TEMPLATE
- PROPOSED OVERDREDGE TEMPLATE

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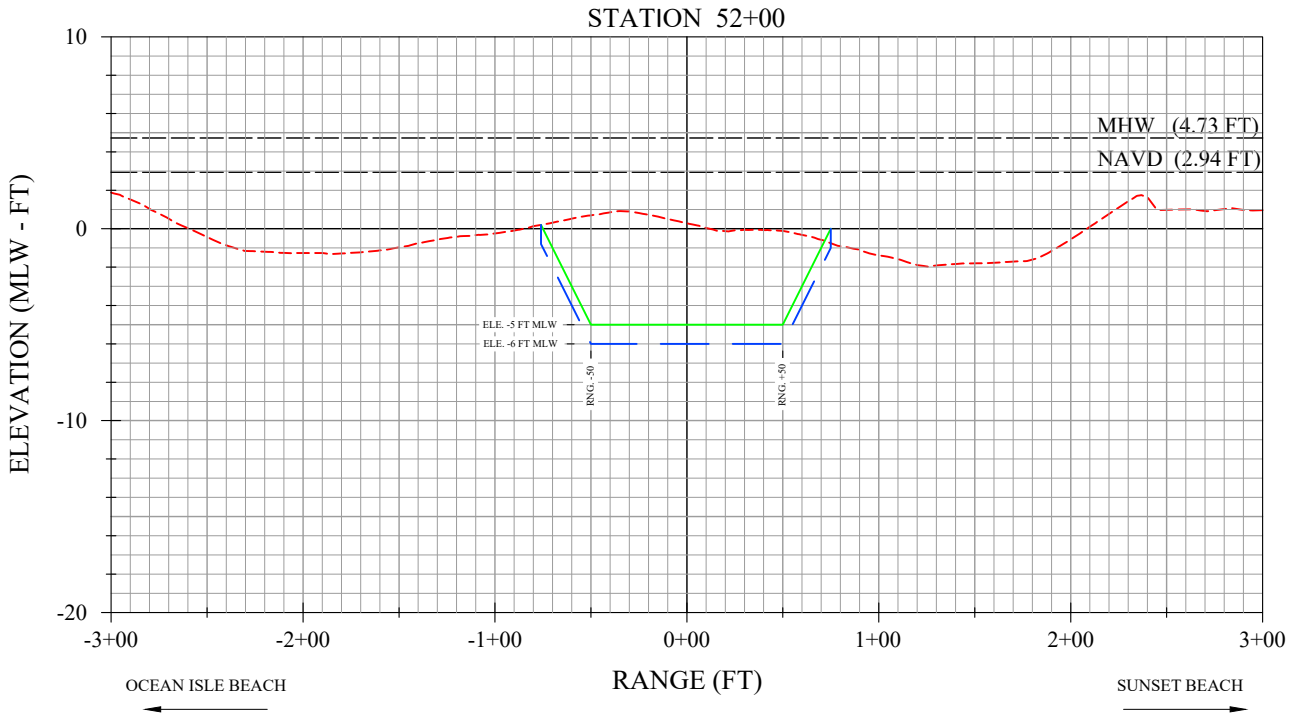
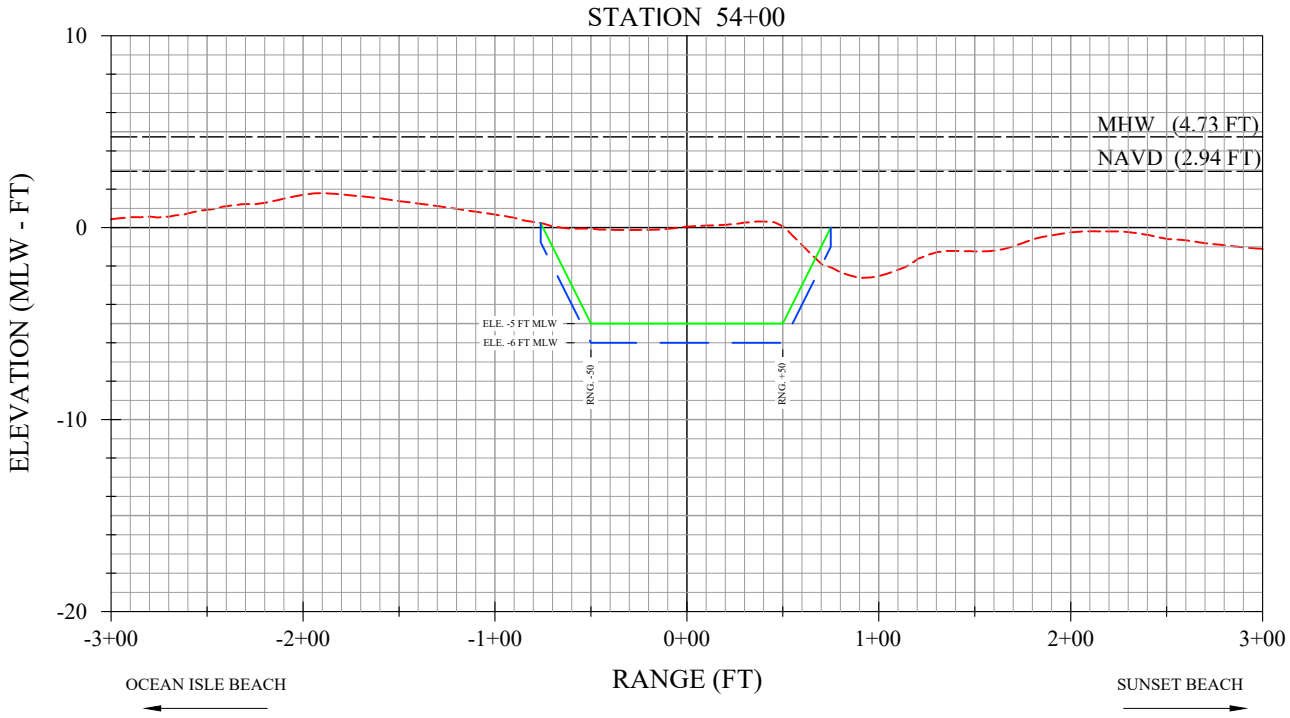
VERTICAL SCALE: 1"=10'
0' 50' 100'
HORIZONTAL SCALE: 1"=100'

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK PROFILES
STA 48+00 & 50+00

moffatt & nichol





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- PROPOSED DESIGN TEMPLATE
- PROPOSED OVERDREDGE TEMPLATE

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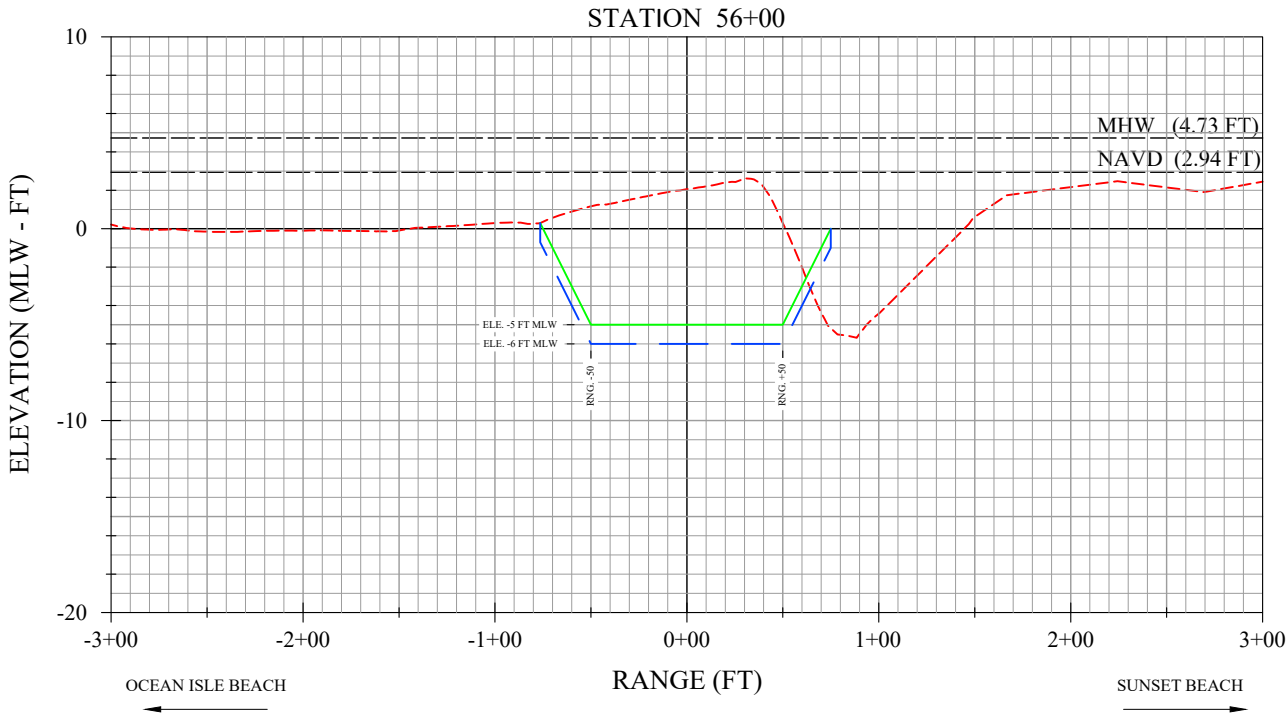
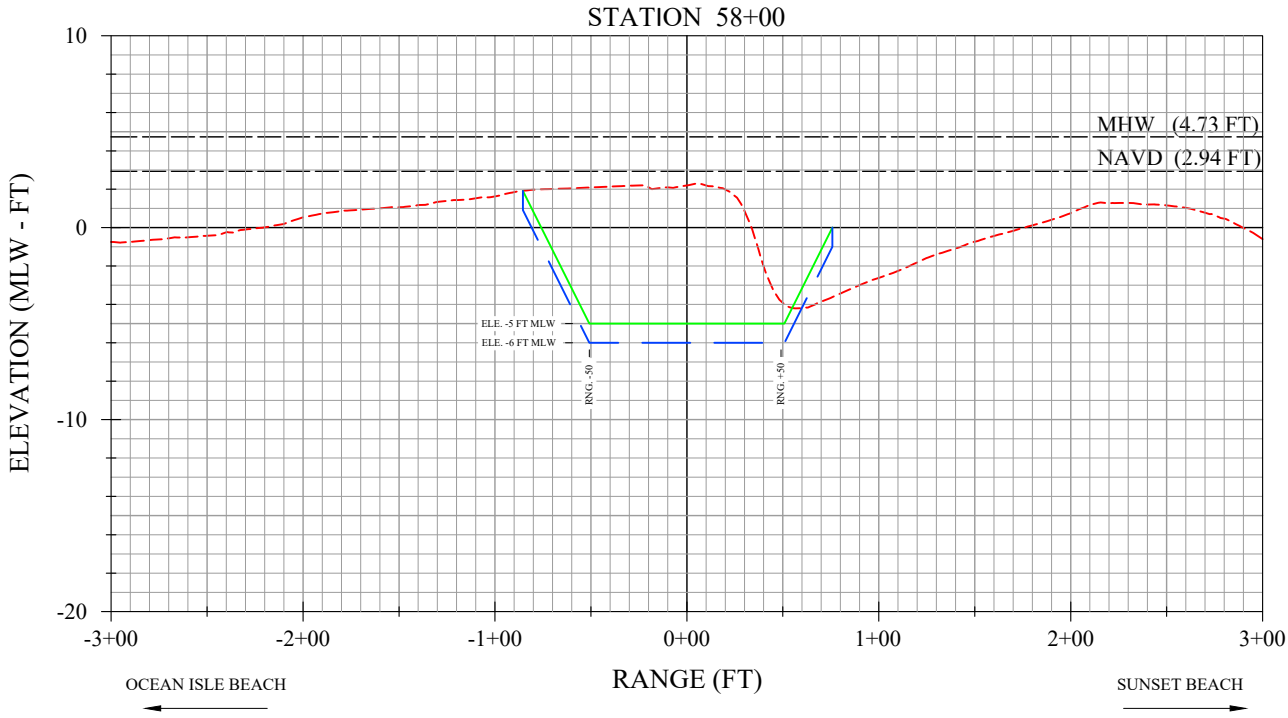
0' 50' 100'
HORIZONTAL SCALE: 1"=100'

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK PROFILES
STA 52+00 & 54+00

moffatt & nichol





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LEGEND

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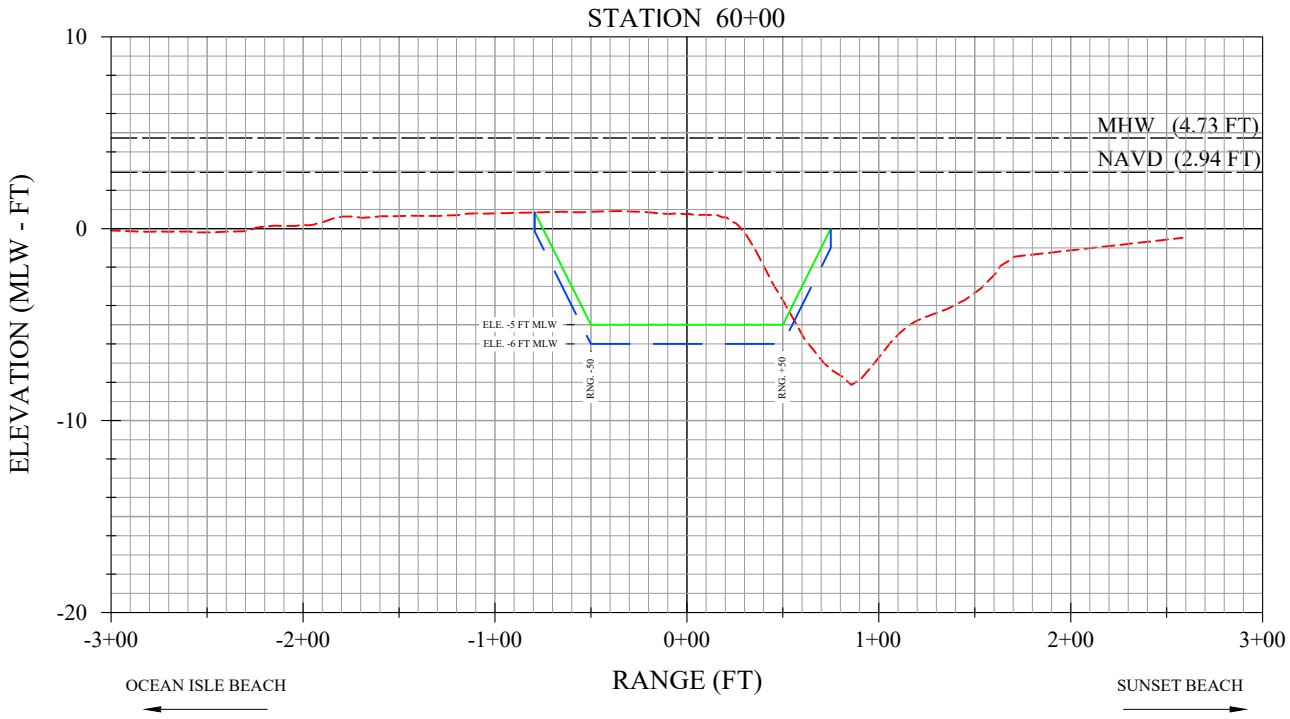
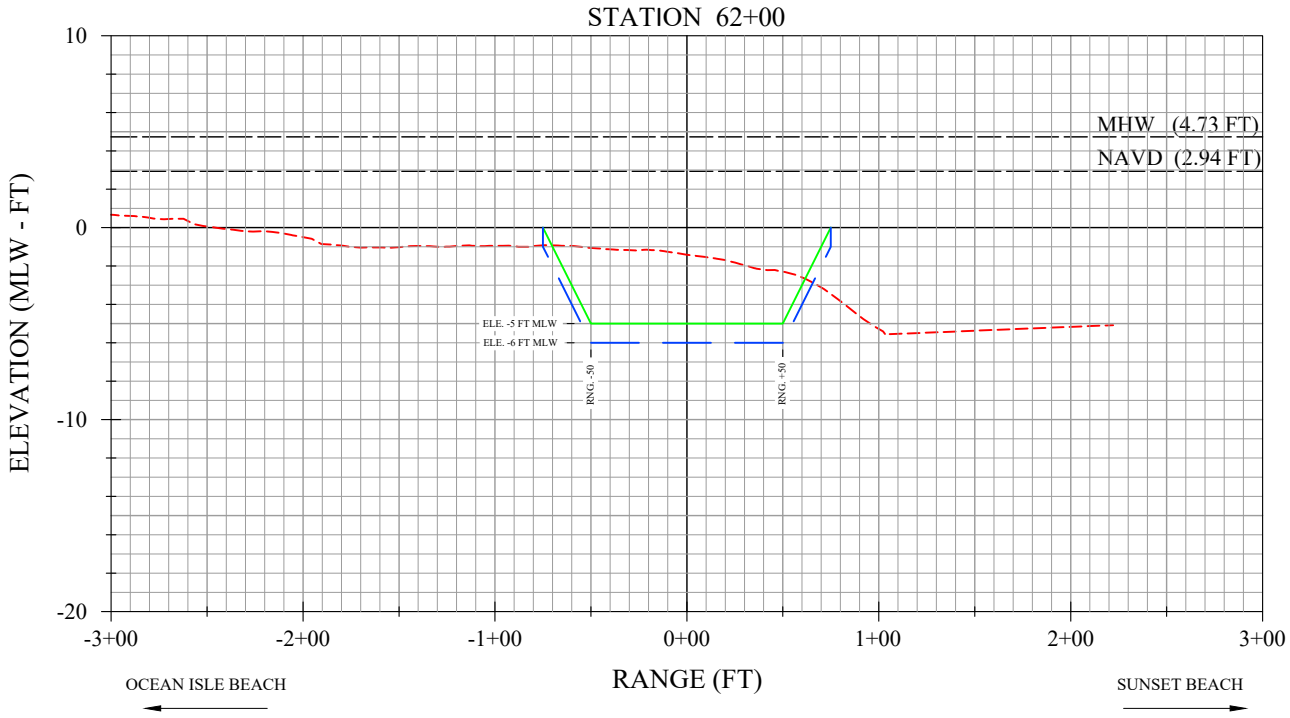
- PROPOSED OVERDREDGE TEMPLATE

0' 5' 10'
VERTICAL SCALE: 1"=10'
0' 50' 100'
HORIZONTAL SCALE: 1"=100'

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK PROFILES
STA 56+00 & 58+00

moffatt & nichol





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LEGEND

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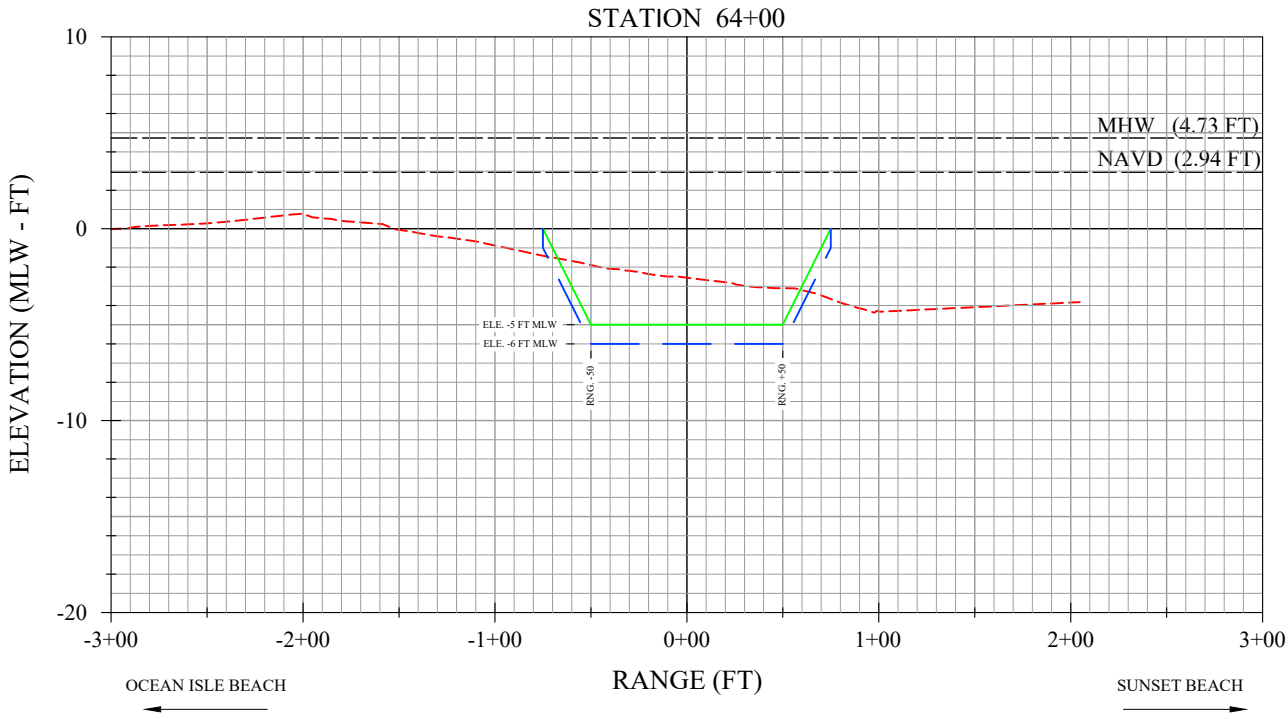
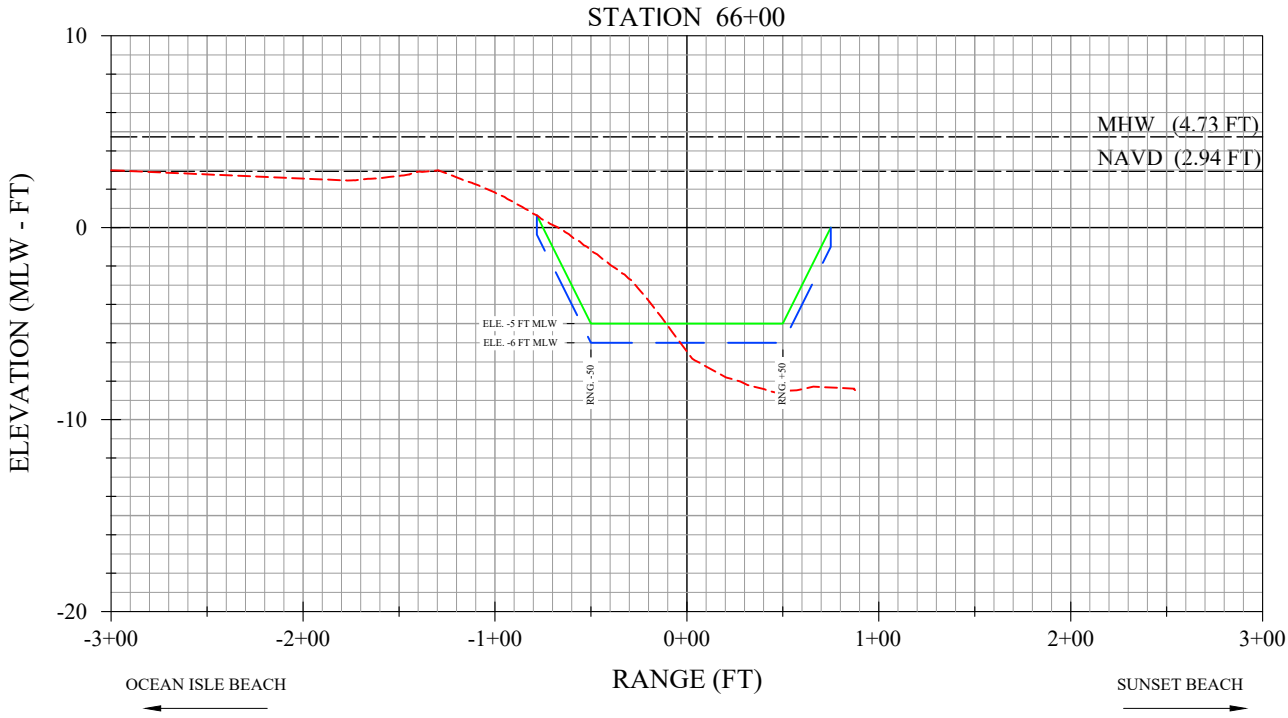
- PROPOSED DESIGN TEMPLATE
- PROPOSED OVERDREDGE TEMPLATE

0' 5' 10'
VERTICAL SCALE: 1"=10'
0' 50' 100'
HORIZONTAL SCALE: 1"=100'

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK PROFILES
STA 60+00 & 62+00

moffatt & nichol





FOR REVIEW ONLY - NOT FOR CONSTRUCTION

LEGEND

- EXISTING PROFILE (FEB. 2016)
- PROPOSED DESIGN TEMPLATE
- PROPOSED OVERDREDGE TEMPLATE

0' 5' 10'
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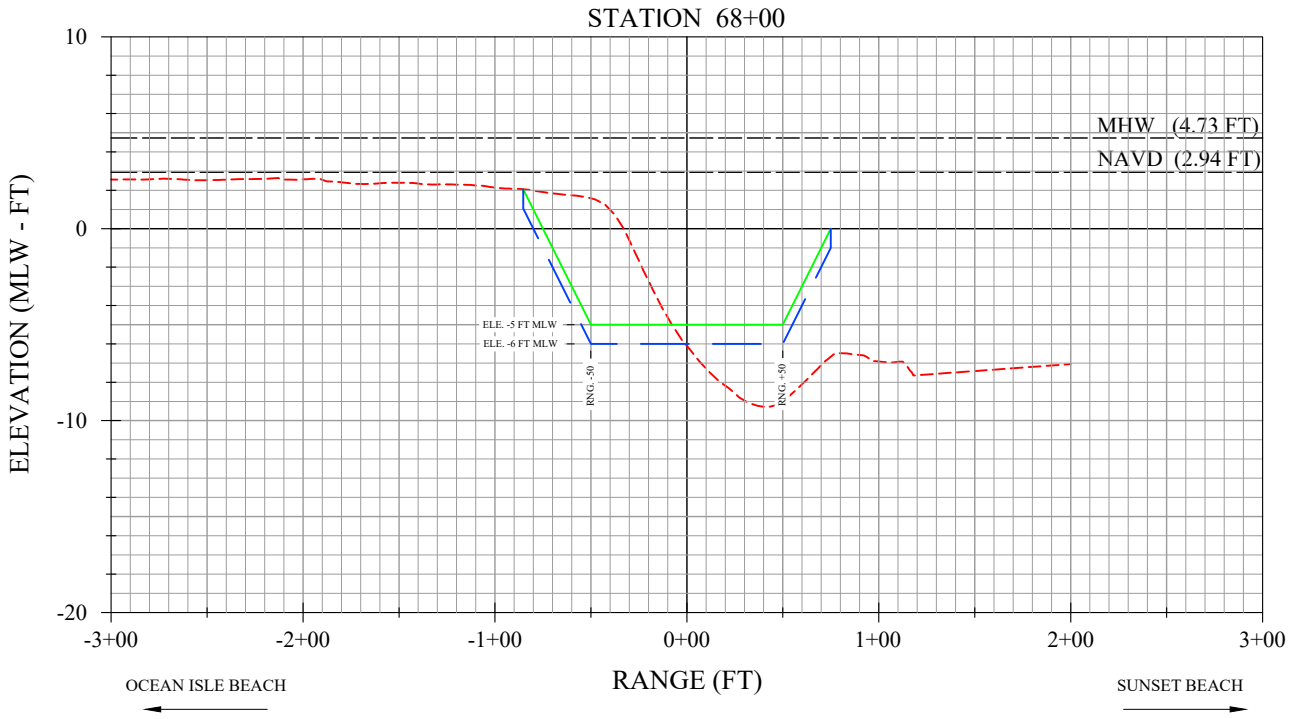
STA 64+00 & 66+00

moffatt & nichol



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0' 50' 100'
HORIZONTAL SCALE: 1"=100'

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK PROFILES
STA 68+00

moffatt & nichol

Permit Class
NEW

0212

Permit Number
79-19

STATE OF NORTH CAROLINA
Department of Environmental Quality
and
Coastal Resources Commission

Permit

for

X Major Development in an Area of Environmental Concern pursuant to NCGS 113A-118

X Excavation and/or filling pursuant to NCGS 113-229

Issued to **Town of Sunset Beach c/o Hiram Marziano, 700 Sunset Blvd. N, Sunset Beach, NC 28468**

Authorizing development in Brunswick County at S. Jinks Creek, the Bay Area, Feeder Channel and Finger Canals, Sunset Beach, as requested in the permittee's application dated 04/03/19, including attached workplan drawings (25) 1-25 of 25 all dated 01/31/19, and marsh buffer drawings (5) 1-3 of 3 and 1-2 of 2 all dated 03/19/19.

This permit, issued on **October 28, 2019**, is subject to compliance with the application (where consistent with the permit), all applicable regulations, special conditions and notes set forth below. Any violation of these terms may be subject to fines, imprisonment or civil action; or may cause the permit to be null and void.

Excavation

1) In order to protect juvenile shrimp and finfish populations, no excavation shall be permitted between April 1 and September 30 of any year without the prior approval of the Division of Coastal Management, in consultation with appropriate resource agencies.

2) Excavation shall not exceed -2 feet below the mean low water. In no case shall the depth of excavation exceed the depth of connecting waters.

3) The temporary placement or double handling of excavated or fill materials within waters or vegetated wetlands is not authorized.

(See attached sheets for Additional Conditions)

This permit action may be appealed by the permittee or other qualified persons within twenty (20) days of the issuing date.

This permit must be accessible on-site to Department personnel when the project is inspected for compliance.

Any maintenance work or project modification not covered hereunder requires further Division approval.

All work must cease when the permit expires on

December 31, 2022

In issuing this permit, the State of North Carolina agrees that your project is consistent with the North Carolina Coastal Management Program.

Signed by the authority of the Secretary of DEQ and the Chair of the Coastal Resources Commission.

Braxton C. Davis, Director
Division of Coastal Management

This permit and its conditions are hereby accepted.

Signature of Permittee

ADDITIONAL CONDITIONS

4) No excavation or filling of Coastal Wetlands is authorized by this permit.

5) In accordance with commitments made by the permittee and to satisfy resource impact concerns, excavation shall not occur within ten (10) feet of any Coastal Wetlands.

6) All excavation shall take place entirely within the areas indicated on the attached workplan drawings.

Oyster Relocation

7) Prior to the initiation of any dredging activities, the permittee shall, in coordination with the Division of Marine Fisheries, develop and implement an oyster relocation plan. Contact the Division of Marine Fisheries at (252) 808-8050 to initiate the required coordination. Notice of satisfactory completion of the relocation efforts shall be provided to the Division of Coastal Management prior to initiation of dredging.

Upland Spoil Disposal

8) No excavated materials shall be deposited, even temporarily within 30' of the normal high water line.

9) All excavated materials shall be confined above normal low water level and landward of regularly or irregularly flooded marsh behind adequate dikes or other retaining structures to prevent spillover of solids into any marsh or surrounding waters.

10) The spoil disposal area shall be inspected and approved by a representative of the Division of Coastal Management prior to the commencement of any excavation activities.

NOTE: An Erosion and Sedimentation Control Plan and Stormwater Management Plan may be required for this project. If required, these plans must be filed at least thirty (30) days prior to the beginning of any land disturbing activity. Submit these plans to the Department of Energy, Mineral, and Land Resources, Land Quality Section, 127 Cardinal Drive Extension, Wilmington, NC 28405.

Beach Fill

11) Prior to the initiation of any beach fill activity on a specific property, easements or similar legal instruments shall be obtained from the impacted property owner(s).

12) In order to protect nesting sea turtles and aquatic marine resources, no beach fill or associated activities, including mobilization, demobilization, or remediation or the use of heavy equipment on the beach shall be permitted between April 1 and November 15 of any year without the prior approval of the Division of Coastal Management, in consultation with appropriate resource agencies.

13) This permit authorizes beach fill activities to be carried out one (1) time along the entire reach of the requested project area. Any request to carry out additional activities within an area where beach fill activities have been completed under this permit shall require a modification of this permit.

ADDITIONAL CONDITIONS

14) Prior to initiation of beach fill activity along each section of beach, the existing mean high water line shall be surveyed, and a copy of the survey provided to the Division of Coastal Management.

NOTE: The permittee is advised that, per N.C. General Statute §146-6, the State of North Carolina claims title to all currently submerged lands and any future lands that are raised above the mean high water level as a result of this project.

15) The seaward beach fill limit shall be conducted in accordance with the attached work plats (2) labeled "Dredge Plan Work Area – Sheet 12 of 13" and "Dredge Plan Work Area – Sheet 13 of 13" figures 20 and 21 both dated 01/31/19.

16) Temporary dikes shall be used to retain and direct flow of material parallel to the shoreline to minimize surf zone turbidities. The temporary dikes shall be removed and the beach graded in accordance with approved profiles upon completion of pumping activities in that particular section of beach.

17) Should dredging operations encounter sand deemed non-compatible with 15A NCAC 07H .0312 (Technical Standards for Beach Fill Projects), the dredge operator shall immediately cease operation and contact the NCDCM. Dredge operations shall resume after resolution of the issue of sand compatibility.

18) In order to prevent leakage, dredge pipes shall be routinely inspected. If leakage is found and repairs cannot be made immediately, pumping of material shall stop until such leaks are fixed.

19) Once a section is complete, piping and heavy equipment shall be removed or shifted to a new section and the area graded and dressed to final approved slopes.

20) Land-based equipment necessary for beach fill work shall be brought to the site through existing accesses. Should the work result in any damage to existing accesses, the accesses shall be restored to pre-project conditions immediately upon project completion in that specific area

NOTE: The permittee is advised that any new access site would require a modification of this permit.

21) Where oceanfront development exists at elevations nearly equal to that of the native beach, a low protective dune shall be pushed up along the backbeach to prevent slurry from draining towards the development.

22) Dune disturbance shall be kept to a minimum. Any alteration of existing dunes shall be coordinated with the Division of Coastal Management as well as the appropriate property owner(s). All disturbed areas shall be restored to original contours and configuration with reference to the surveyed normal high water line and shall be revegetated immediately following project completion in that specific area.

ADDITIONAL CONDITIONS

Maintenance Clause

23) The Division of Coastal Management shall be notified in writing at least two (2) weeks in advance of any maintenance excavation authorized by this permit, and such notification shall include:
   A. The number of the original permit.
   B. A statement that no dimensional changes are proposed.
   C. A copy of the original permit plans with cross-hatching indicating the area to be excavated, the area to be used for spoil disposal, and the estimated amount of material to be removed. The location, design and holding capacity of the spoil disposal site shall be approved by a representative of the Division prior to the initiation of any maintenance dredging activities.
   D. The date of map revision and the permittee's signature shown anew on the original plan.

General

24) The permittee and/or his or her contractor shall meet with a representative of the Division prior to initiation of any phase of this project.

25) This permit shall not be assigned, transferred, sold, or otherwise disposed of to a third party without the written approval of the Division of Coastal Management.

26) No attempt shall be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the authorized work.

27) This permit does not authorize the interference with any existing or proposed Federal project, and the permittee shall not be entitled to compensation for damage to the authorized structure or work, or injury which may be caused from existing or future operations undertaken by the United States in the public interest.

28) The permittee shall obtain any necessary authorizations or approvals from the US Army Corps of Engineers prior to initiation of any permitted activity. Unless specifically altered herein, the permittee shall adhere to all conditions of the Federal approval.

29) The permittee and/or his contractor shall provide for proper storage and handling of all oils, chemicals hydraulic fluids, etc., necessary to carry out the project.

30) This permit does not authorize any permanent or long-term interference with the public's right of access and/or usage of all State lands and waters.

31) The permittee shall make every effort possible to minimize any negative impacts of trucks and construction equipment on roadway and pedestrian traffic. The permittee should also ensure that the ability of individuals to access and enjoy the beach is not impeded outside of the construction limits.

NOTE: This permit does not eliminate the need to obtain any additional state, federal or local permits, approvals or authorizations that may be required.

ADDITIONAL CONDITIONS

NOTE: Future development of the permittee's property may require a modification of this permit. Contact a representative of the Division at (910) 796-7215 prior to the commencement of any such activity for this determination.

NOTE: The N.C. Division of Water Resources assigned the project DWR Project No. 2002-0158v2.

NOTE: The U.S. Army Corps of Engineers assigned the project Action ID SAW-2019-01155.

NOTE: An application processing fee of $475 was received by DCM for this project. This fee also satisfied the Section 401 application processing fee requirements of the Division of Water Resources.

Division of Coastal Management

Variance Request for:
The Town of Sunset Beach

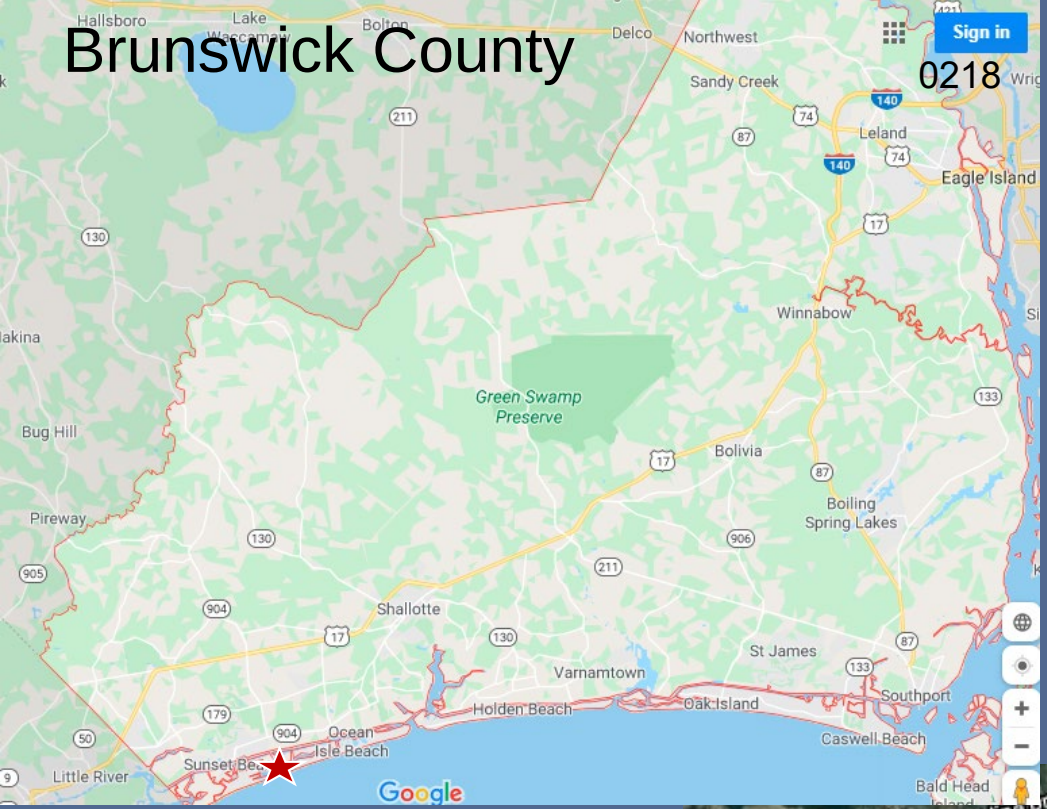
Project Location:

Sunset Beach Canals, Feeder Channel, Bay Area and South Jinks Creek

Town of Sunset Beach

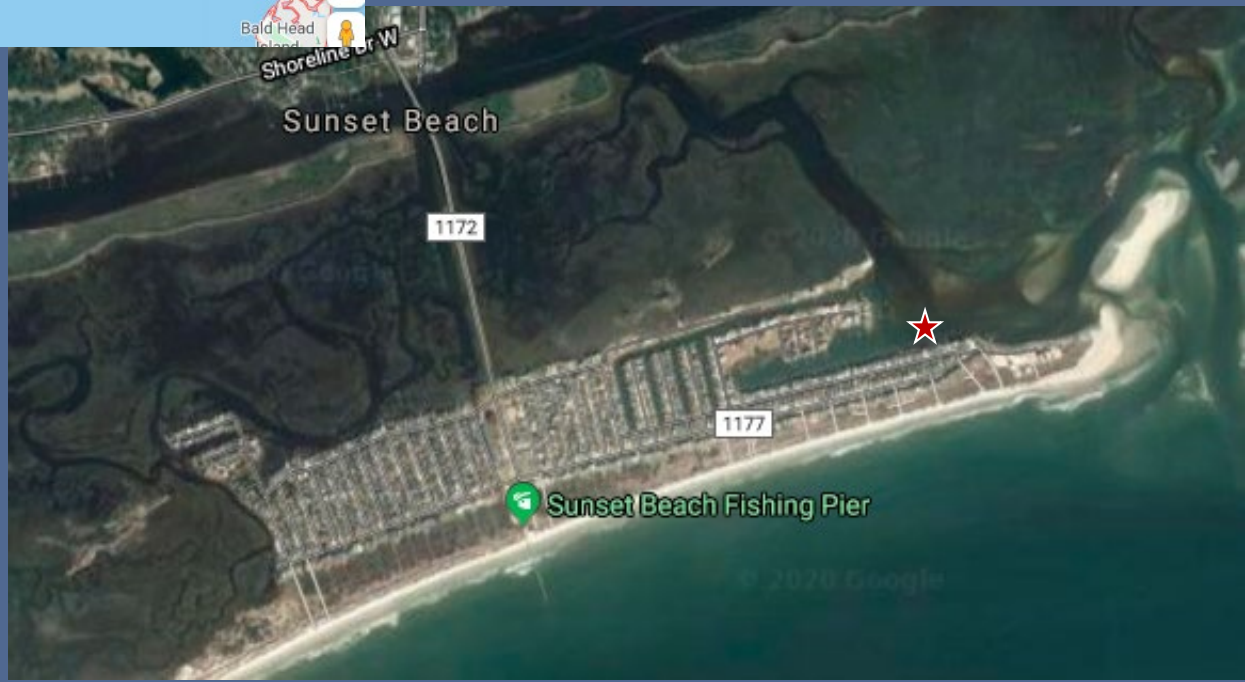
Brunswick County, NC

February 12, 2020



Photos Courtesy of Google Maps 2020

★ = South Jinks Creek



Provided by Petitioner

0219

Photo Taken by DCM Staff 1.21.20

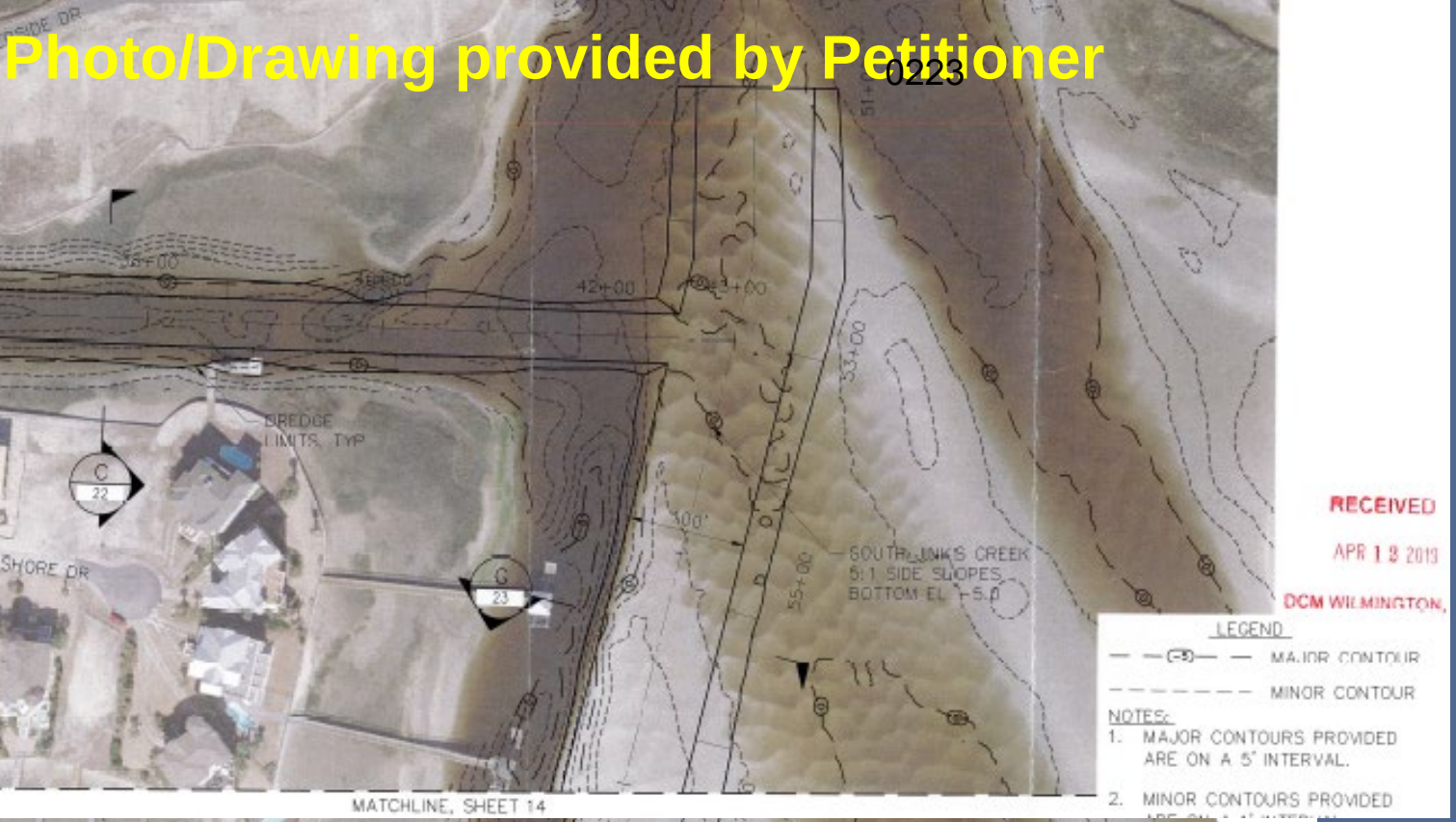
0220

Photo Taken by DCM Staff 1.21.20

Photo Taken by DCM Staff 1.21.20

South Jinks Creek facing north

Photo/Drawing provided by Petitioner



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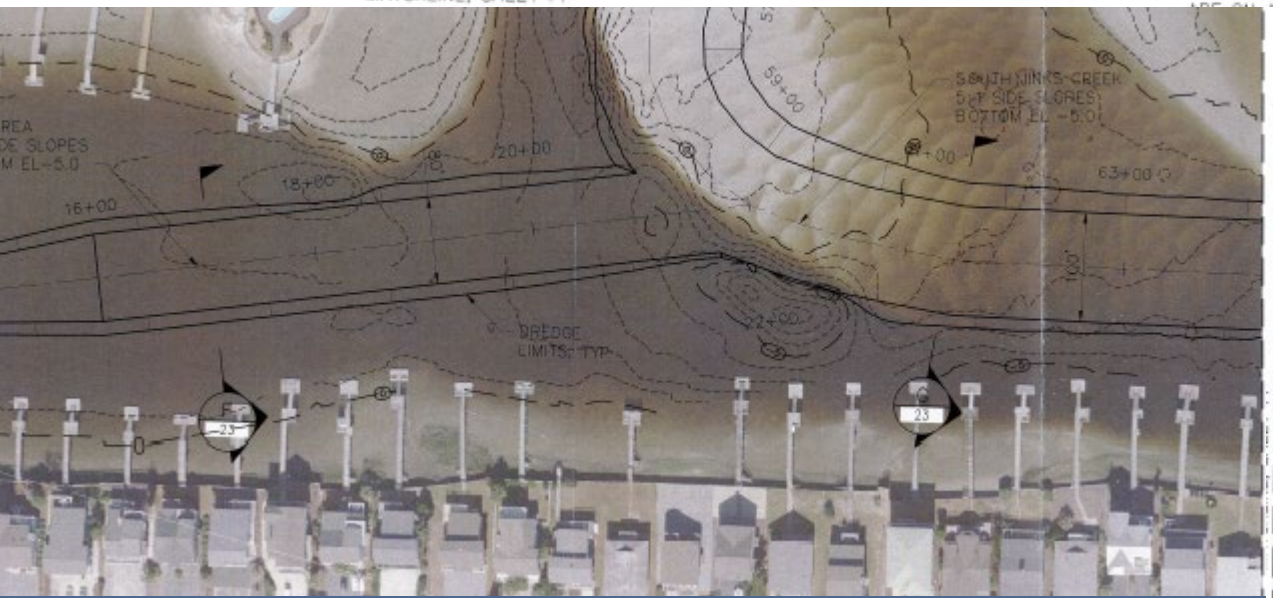
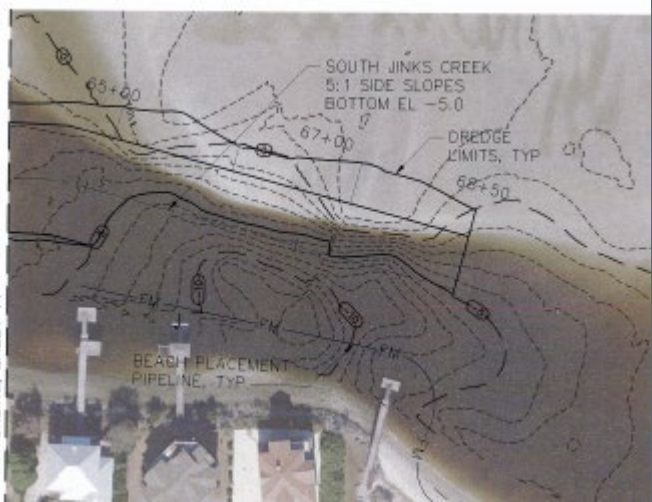
LEGEND
MAJOR CONTOUR
MINOR CONTOUR

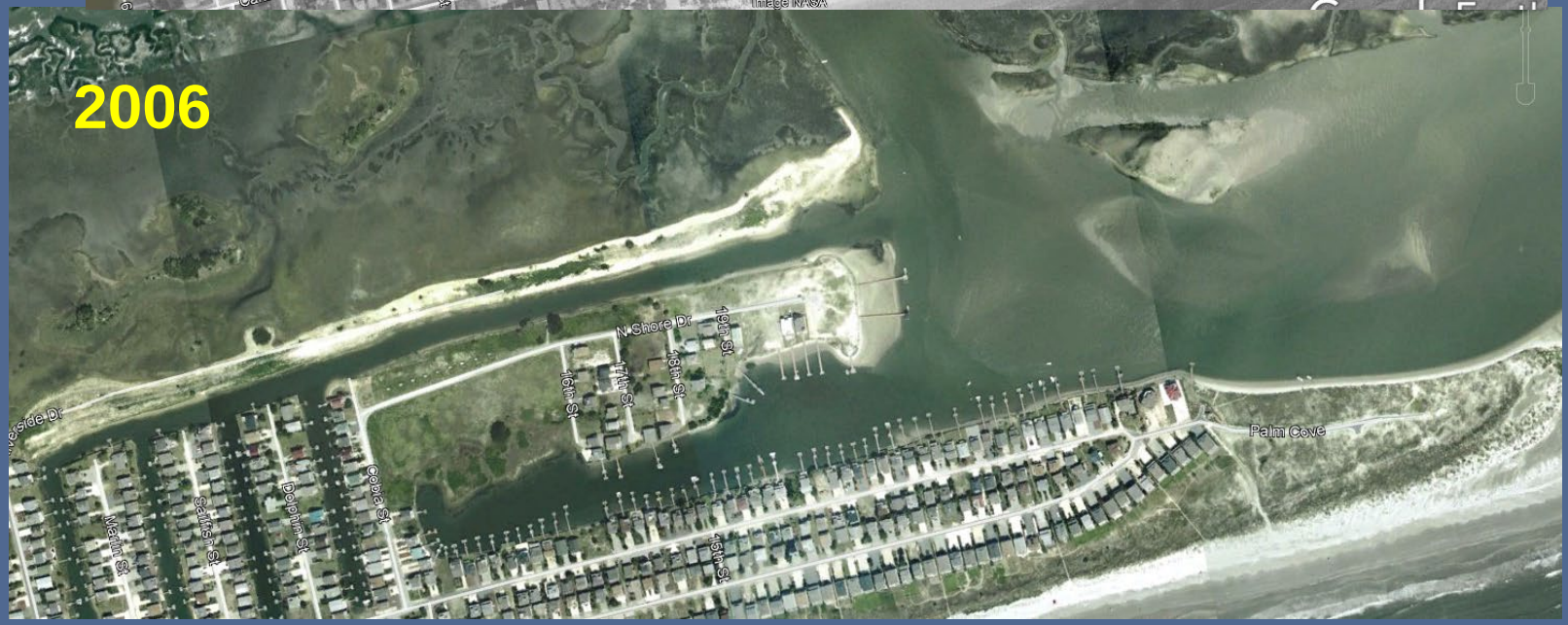
NOTES:
1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED





Photos Courtesy of Google Earth

0224



Photos Courtesy of Google Earth

Photos Courtesy of Google Earth

Town of Sunset Beach- Jinks Creek 0227

February 12, 2020– Petition for Variance

Division of Coastal Management

VARIANCE CRITERIA

15A NCAC 07J.0703(f)
To grant a variance, the Commission must affirmatively find each of the four factors listed in G.S. 113A-120.1(a).

(1) that unnecessary hardships would result from strict application of the development rules, standards, or orders issued by the Commission;

(2) that such hardships result from conditions peculiar to the petitioner's property such as location, size, or topography;

(3) that such hardships did not result from actions taken by the petitioner; and

(4) that the requested variance is consistent with the spirit, purpose and intent of the Commission's rules, standards or orders; will secure the public safety and welfare; and will preserve substantial justice.

moffatt & nichol

272 N. Front Street, Suite 204
Wilmington, NC 28041

(910) 218-7100 Fax (919) 781-4869

April 12, 2019

Ms. Tara MacPherson
N.C. Division of Coastal Management (NCDCM)
127 Cardinal Drive Extension
Wilmington, NC 28468

Re: CAMA Major Permit Application
Maintenance Dredging of South Jinks Creek, the Bay Area, & the Feeder Channel
Sunset Beach, NC

Dear Ms. MacPherson,

On behalf of the Town of Sunset Beach, please find enclosed a CAMA Major Permit application for the above referenced project. The permit package includes NCDCM Forms MP-1 and MP-2, permit drawings, and additional information in support of the project. To the best of my knowledge, the information provided in the application meets the compliance requirements of the N.C. Environmental Policy Act (NCGS 113A 1-10). Please note, the application fee of $475.00 is also included with this submittal.

We appreciate the Division's assistance and guidance in preparing the enclosed application and look forward to a favorable review. As the authorized agent for the Town, please feel free to contact me if you have any questions or need additional information.

Sincerely,
MOFFATT & NICHOL

Robert Neal, P.E.
Senior Coastal Engineer

Enclosures

cc: Hiram Marziano, Town of Sunset Beach
Lisa Anglin, Town of Sunset Beach (w/o attachment)
Dawn York, Moffatt & Nichol (w/o attachment)

TOWN OF SUNSET BEACH NAVIGATION PROJECT
MAINTENANCE DREDGING OF S. JINKS CREEK, THE BAY AREA & THE FEEDER CHANNEL
CAMA MAJOR PERMIT APPLICATION

March 2019

Prepared By:
Moffatt & Nichol
272 N. Front Street, Ste. 204
Wilmington, NC 28401

Prepared For:
Town of Sunset Beach
700 Sunset Blvd. N.
Sunset Beach, NC 28468

Town of Sunset Beach Navigation Project
Maintenance Dredging of South Jinks Creek, the Bay Area, & Feeder Channel
CAMA Major Permit Application

Table of Contents

DCM MP-1

APPLICATION for Major Development Permit

(last revised 12/27/06)

North Carolina DIVISION OF COASTAL MANAGEMENT

1. Primary Applicant/ Landowner Information

Business Name Town Of Sunset Beach			Project Name (if applicable) Town of Sunset Beach Navigation Project; Maintenance Dredging of South Jinks Creek, the Bay Area and the Feeder Channel	
Applicant 1: First Name Hiram	MI J	Last Name Marziano		
Applicant 2: First Name	MI	Last Name		
If additional applicants, please attach an additional page(s) with names listed.				
Mailing Address 700 Sunset Blvd N.		PO Box	City Sunset Beach	State North Carolina
ZIP 28468	Country USA	Phone No. 910 - 579 - 6297 ext. 1014	FAX No. 910 - 579 - 1840	
Street Address *(if different from above)*		City	State	ZIP -
Email hmarziano@sunsetbeachnc.gov				

2. Agent/Contractor Information

Business Name Moffatt & Nichol				
Agent/ Contractor 1: First Name Robert	MI B	Last Name Neal		
Agent/ Contractor 2: First Name	MI	Last Name		
Mailing Address 272 N. Front Street, Suite 204		PO Box	City Wilmington	State NC
ZIP 28401		Phone No. 1 910 - 218 - 7082 ext.	Phone No. 2 - - ext.	
FAX No. 919 781 4869		Contractor #		
Street Address *(if different from above)*		City	State	ZIP -
Email rneal@moffattnichol.com				

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3. Project Location

County (can be multiple)	Street Address	State Rd. #
Brunswick	North Shore Drive (Feeder Channel); Cobia St (Finger Canal D);Dolphin St. (Finger Canal C); Sailfish St (Finger Canal B); Marlin St. (Finger Canal A), Canal Drive (Bay Area); & South Jinks Creek	n/a

Subdivision Name	City	State	Zip
	Sunset Beach	NC	28468 -

Phone No.	Lot No.(s) *(if many, attach additional page with list)*
910 - 579 - 6297 ext. 1014	, , , ,

a. In which NC river basin is the project located?	b. Name of body of water nearest to proposed project
Lumber	Jinks Creek
c. Is the water body identified in (b) above, natural or manmade? ☒Natural ☐Manmade ☐Unknown	d. Name the closest major water body to the proposed project site. Tubbs Inlet
e. Is proposed work within city limits or planning jurisdiction? ☒Yes ☐No	f. If applicable, list the planning jurisdiction or city limit the proposed work falls within. Sunset Beach

4. Site Description

a. Total length of shoreline on the tract (ft.)	b. Size of entire tract (sq.ft.)
10,800 ft	18 acres
c. Size of individual lot(s) Submerged Lands, , , *(If many lot sizes, please attach additional page with a list)*	d. Approximate elevation of tract above NHW *(normal high water)* or NWL *(normal water level)* n/a ☐NHW or ☐NWL

e. Vegetation on tract

Spartina alterniflora and patens at various locations throughout the dredge area. The project will maintain a 10-ft dredging buffer from any coastal marsh.

f. Man-made features and uses now on tract

Fixed and floating docks, bulkheads, spillway and the canals themselves.

g. Identify and describe the existing land uses <u>adjacent</u> to the proposed project site.

Residential

h. How does local government zone the tract?	i. Is the proposed project consistent with the applicable zoning? (Attach zoning compliance certificate, if applicable) ☒Yes ☐No ☐NA
Residential	

j. Is the proposed activity part of an urban waterfront redevelopment proposal? ☐Yes ☒No

k. Has a professional archaeological assessment been done for the tract? If yes, attach a copy. ☐Yes ☒No ☐NA

If yes, by whom?

l. Is the proposed project located in a National Registered Historic District or does it involve a National Register listed or eligible property? ☐Yes ☒No ☐NA

m. (i) Are there wetlands on the site?	☒Yes ☐No
(ii) Are there coastal wetlands on the site?	☒Yes ☐No
(iii) If yes to either (i) or (ii) above, has a delineation been conducted? *(Attach documentation, if available)*	☐Yes ☒No

n. Describe existing wastewater treatment facilities.

Sanitary sewer

o. Describe existing drinking water supply source.

Town supplied water system

p. Describe existing storm water management or treatment systems.

Storm water drains into Finger Canals A-D, Feeder Channel, Bay Area & S. Jinks Creek.

5. Activities and Impacts

a. Will the project be for commercial, public, or private use? ☐Commercial ☒Public/Government ☐Private/Community

b. Give a brief description of purpose, use, and daily operations of the project when complete.

Provide recreational navigation access through the residential systems on the east end of Sunset Beach.

c. Describe the proposed construction methodology, types of construction equipment to be used during construction, the number of each type of equipment and where it is to be stored.

Expect 1-hydraulic and up to 2-mechanical dredges. Approximately 6,500 ft of temporary pipeline will be installed along the bay and ocean side of Sunset Beach to transport approx. 40,500 CY of beach compatible material. Also, numerous dump trucks will be used to transport approx. 48,600 CY of non-compatible material to an upland landfill facility.

d. List all development activities you propose.

Navigation dredging of the Bay Area, Finger Canals A-D, the Feeder Channel, and S. Jinks Creek. All areas have previously been dredged; however, some areas were dredged prior to the establishment of CAMA and no previous permits exist for these areas. Work will include beneficial placement of beach compatible material between 5th and 12th St. on Sunset Beach shoreline and non-compatible material placement in an upland landfill facility.

e. Are the proposed activities maintenance of an existing project, new work, or both?	Both - All areas have been dredged previously, but some areas were dredged prior to CAMA establishment, so may be considered new work.
f. What is the approximate total disturbed land area resulting from the proposed project?	18 Ac - Dredge Area 8.5 Ac - Beach Placement Site ☐Sq.Ft or ☒Acres
g. Will the proposed project encroach on any public easement, public accessway or other area that the public has established use of?	☒Yes ☐No ☐NA

h. Describe location and type of existing and proposed discharges to waters of the state.

Beach compatible material and return waters will be placed along the Sunset Beach shoreline between 5th and 12th Street. Also, minor quantities of effluent will be expected from the mechanical dredging equipment during dredging of the Feeder Channel system and Bay Area, including material transfer to the hauling equipment.

i. Will wastewater or stormwater be discharged into a wetland?	☐Yes ☒No ☐NA
If yes, will this discharged water be of the same salinity as the receiving water?	☐Yes ☐No ☐NA
j. Is there any mitigation proposed?	☐Yes ☒No ☐NA
If yes, attach a mitigation proposal.	

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DCM WILMINGTON, NC

<Form continues on back>

6. Additional Information

In addition to this completed application form, (MP-1) the following items below, if applicable, must be submitted in order for the application package to be complete. Items (a) – (f) are always applicable to any major development application. Please consult the application instruction booklet on how to properly prepare the required items below.

a. A project narrative.

b. An accurate, dated work plat (including plan view and cross-sectional drawings) drawn to scale. Please give the present status of the proposed project. Is any portion already complete? If previously authorized work, clearly indicate on maps, plats, drawings to distinguish between work completed and proposed.

c. A site or location map that is sufficiently detailed to guide agency personnel unfamiliar with the area to the site.

d. A copy of the deed (with state application only) or other instrument under which the applicant claims title to the affected properties.

e. The appropriate application fee. Check or money order made payable to DENR.

f. A list of the names and complete addresses of the adjacent waterfront (riparian) landowners and signed return receipts as proof that such owners have received a copy of the application and plats by certified mail. Such landowners must be advised that they have 30 days in which to submit comments on the proposed project to the Division of Coastal Management.

Name	Phone No.
Address See Tab R	
Name	Phone No.
Address	
Name	Phone No.
Address	

g. A list of previous state or federal permits issued for work on the project tract. Include permit numbers, permittee, and issuing dates.

CAMA Permit 45-02, issued on April 10, 2002, Town of Sunset Beach

CAMA Permit 211-85, issued on December 11, 1985, Town of Sunset Beach

Corps of Engineers Permit in 1972, Town of Sunset Beach (copy not available)

h. Signed consultant or agent authorization form, if applicable.

i. Wetland delineation, if necessary.

j. A signed AEC hazard notice for projects in oceanfront and inlet areas. *(Must be signed by property owner)*

k. A statement of compliance with the N.C. Environmental Policy Act (N.C.G.S. 113A 1-10), if necessary. If the project involves expenditure of public funds or use of public lands, attach a statement documenting compliance with the North Carolina Environmental Policy Act.

7. Certification and Permission to Enter on Land

I understand that any permit issued in response to this application will allow only the development described in the application. The project will be subject to the conditions and restrictions contained in the permit.

I certify that I am authorized to grant, and do in fact grant permission to representatives of state and federal review agencies to enter on the aforementioned lands in connection with evaluating information related to this permit application and follow-up monitoring of the project.

I further certify that the information provided in this application is truthful to the best of my knowledge.

Date April 3, 2019 Print Name Hiram J. Marziano, II

Signature 

Please indicate application attachments pertaining to your proposed project.

☒DCM MP-2 Excavation and Fill Information ☐DCM MP-5 Bridges and Culverts

☐DCM MP-3 Upland Development

Form DCM MP-2 0235

EXCAVATION and FILL

(Except for bridges and culverts)

Attach this form to Joint Application for CAMA Major Permit, Form DCM MP-1. Be sure to complete all other sections of the Joint Application that relate to this proposed project. Please include all supplemental information.

Describe below the purpose of proposed excavation and/or fill activities. **All values should be given in feet.**

Table 1 – Dredge Template Description

Area	Existing Avg. Depth (MLW-ft)	Proposed Depth (MLW-ft)	Length (ft)	Width (ft)	Side Slope (H:V)	Est. Volume (CY)	Placement Location
Feeder Channel	-3 MLW	-6 (-5+1) MLW	3,500	30 – 40	3:1	22,000	Landfill
Finger Canals A-D	-2 MLW	-5 (-4+1) MLW	3,200	20	3:1	10,700	Landfill
Bay Area	-2 MLW	-6 (-5+1) MLW	2,200	20 – 80	3:1	15,900	Landfill
S. Jinks Creek	- 1.5 MLW	-6 (-5+1) MLW	1,750	100	5:1	40,500	Beneficial Reuse (5^{th}–12^{th} St)
TOTAL			10,650	Varies	Varies	89,100	Varies

1. EXCAVATION

☐ *This section not applicable*

a. Amount of material to be excavated from below NHW or NWL in cubic yards.
89,100 CY

b. Type of material to be excavated.
sand, silty sand, sandy silt, and silt

c. (i) Does the area to be excavated include coastal wetlands/marsh (CW), submerged aquatic vegetation (SAV), shell bottom (SB), or other wetlands (WL)? If any boxes are checked, provide the number of square feet affected.
☐CW _____ ☐SAV _____ ☐SB _____
☐WL _____ ☒None

(ii) Describe the purpose of the excavation in these areas:
a 10-ft buffer will be maintained from any coastal marsh

d. High-ground excavation in cubic yards.
0 CY

2. DISPOSAL OF EXCAVATED MATERIAL

☐ *This section not applicable*

a. Location of disposal area.
Landfill Facility off State Rd. 1154 in Shallotte (Brunswick)
Beach placement between 5^{th} & 12^{th} St. on Sunset Beach.

b. Dimensions of disposal area.
< 2 Ac - Landfill facility
8.5 Ac - Beneficial reuse site

c. (i) Do you claim title to disposal area?
☐Yes ☒No ☐NA

(ii) If no, attach a letter granting permission from the owner.

d. (i) Will a disposal area be available for future maintenance?
☒Yes ☐No ☐NA

(ii) If yes, where?
Same location for landfill and beneficial reuse site.

e. (i) Does the disposal area include any coastal wetlands/marsh (CW), submerged aquatic vegetation (SAV), shell bottom (SB), or other wetlands (WL)? If any boxes are checked, provide the number of square feet affected.
☐CW _____ ☐SAV _____ ☐SB _____
☐WL _____ ☒None

(ii) Describe the purpose of disposal in these areas:

f. (i) Does the disposal include any area in the water?
☒Yes ☐No ☐NA

(ii) If yes, how much water area is affected?
4.7 Ac- Beneficial reuse material placement (below MHW)

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Form DCM MP-2 (Excavation and Fill, Page 2 of 2)

3. SHORELINE STABILIZATION

☐ *This section not applicable*

(If development is a wood groin, use MP-4 – Structures)

a. Type of shoreline stabilization:
☐Bulkhead ☐Riprap ☐Breakwater/Sill ☒Other: Beneficial Reuse

b. Length: 1,600 ft
Width: ~275 ft

c. Average distance waterward of NHW or NWL: 100

d. Maximum distance waterward of NHW or NWL: 120 ft

e. Type of stabilization material:
Sand

f. (i) Has there been shoreline erosion during preceding 12 months?
☐Yes ☐No ☒NA
(ii) If yes, state amount of erosion and source of erosion amount information.

g. Number of square feet of fill to be placed below water level.
Bulkhead backfill _____ Riprap _____
Breakwater/Sill _____ Other _____

h. Type of fill material.
Sand

i. Source of fill material.
S. Jinks Creek Navigation Channel

4. OTHER FILL ACTIVITIES

☒ *This section not applicable*

(Excluding Shoreline Stabilization)

a. (i) Will fill material be brought to the site? ☐Yes ☐No ☐NA
If yes,
(ii) Amount of material to be placed in the water _____
(iii) Dimensions of fill area
(iv) Purpose of fill

b. (i) Will fill material be placed in coastal wetlands/marsh (CW), submerged aquatic vegetation (SAV), shell bottom (SB), or other wetlands (WL)? If any boxes are checked, provide the number of square feet affected.
☐CW _____ ☐SAV _____ ☐SB _____
☐WL _____ ☐None
(ii) Describe the purpose of the fill in these areas:

5. GENERAL

a. How will excavated or fill material be kept on site and erosion controlled?
Weir and dike / berm system

b. What type of construction equipment will be used (e.g., dragline, backhoe, or hydraulic dredge)?
Hydraulic dredge for beneficial reuse material / mechanical dredge (excavator) & dump truck for non-compatible

c. (i) Will navigational aids be required as a result of the project?
☒Yes ☐No ☐NA
(ii) If yes, explain what type and how they will be implemented.
Temporary aids (lights) will be provided by the Contractor during construction

d. (i) Will wetlands be crossed in transporting equipment to project site? ☐Yes ☒No ☐NA
(ii) If yes, explain steps that will be taken to avoid or minimize environmental impacts.

April 03, 2019
Date

Hiram J. Marziano, II, CFM

Sunset Beach Navigation Project - Maintenance Dredging of South Jinks Creek, the Bay Area and the Feeder Channel
Project Name

AGENT AUTHORIZATION FOR CAMA PERMIT APPLICATION

Applicant:	Town of Sunset Beach, NC
Mailing Address:	700 Sunset Boulevard North Sunset Beach, NC 28468
Phone Number:	910.579.6297 ext. 1014
Email Address:	hmarziano@sunsetbeachnc.gov

The Town of Sunset Beach has authorized: Moffatt & Nichol

as an Agent to act on the Town's behalf, for the purpose of applying for and obtaining all CAMA permits necessary for the project known as:

Town of Sunset Beach Navigation Project:
Maintenance Dredging of South Jinks Creek, the Bay Area, and the Feeder Channel.

The project location is: Sunset Beach, (Brunswick County), NC.

I further certify that I am authorized to grant, and do in fact grant permission to Division of Coastal Management staff, the Local Permit Officer and their agents to enter on the aforementioned lands in connection with evaluating information related to this permit application.

Town Representative:

Hiram J. Marziano, II, CFM
Interim Town Administrator / Director of Planning

10/15/18
Date

This certification is valid through **January 1, 2020**

Town of Sunset Beach Navigation Project
Maintenance Dredging of South Jinks Creek, the Bay Area, & the Feeder Channel
Project Narrative

INTRODUCTION

The Town of Sunset Beach (Town) intends to conduct navigational dredging in the water bodies known as south Jinks Creek, the Bay Area, and the Feeder Channel. Sunset Beach lies in Brunswick County, along the southern coastal border of North Carolina, adjacent to Ocean Isle Beach. The proposed project will occur along the eastern border of Sunset Beach, within the interior waters of Tubbs Inlet. Figure 1 shows the proposed project area in relation to Brunswick County.

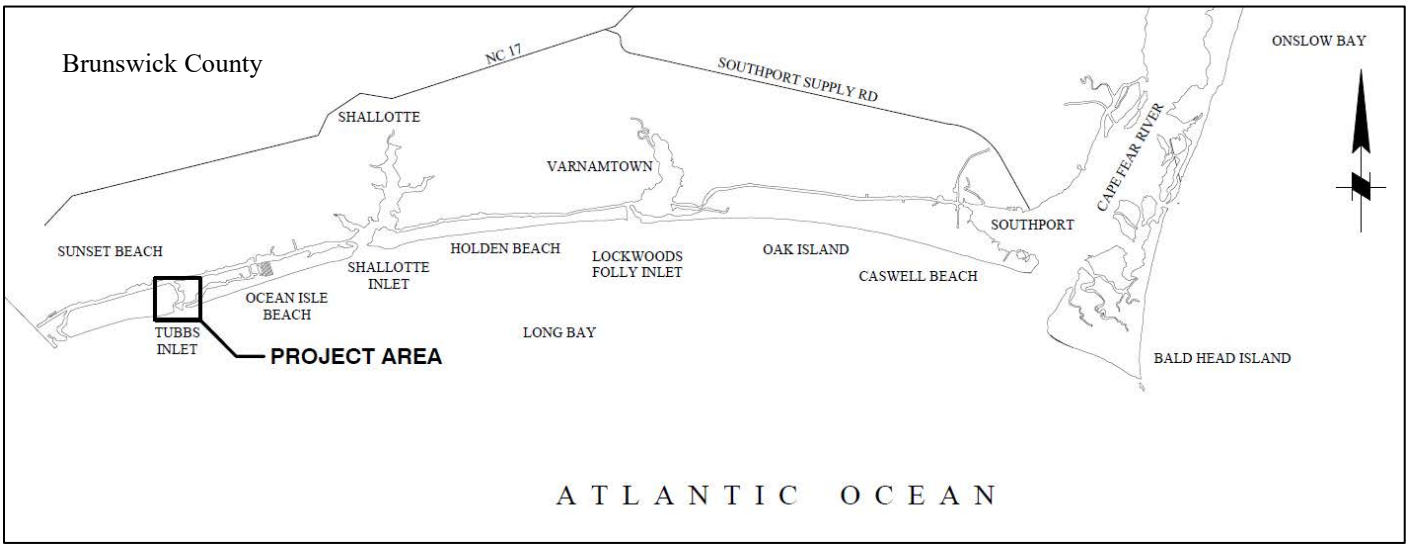

Figure 1. Project Vicinity Map

South Jinks Creek comprises a portion of the Jinks Creek connector channel that extends from the Atlantic Intracoastal Waterway (AIWW) to Tubbs Inlet and the Atlantic Ocean. The navigation project in south Jinks Creek will connect the Bay Area and Feeder Channel systems along the southeast portion of Sunset Beach. The Bay Area entails one (1) residential canal and the Feeder Channel system includes one (1) main channel connected to four (4) residential finger canals referenced as Canals A – D. The project will help restore navigation access within these systems while also helping to restore access along Jinks Creek's eastern most shoreline within the Town's jurisdictional limits.

An estimated 40,500 cubic yards (CY) of beach compatible material will be dredged from S. Jinks Creek, and an additional 48,600 CY of non-compatible material will be removed from the Feeder Channel system and Bay Area. The beach compatible material will be hydraulically placed as beneficial reuse along approximately 1,600-ft of shoreline between 5th Street and 12th Street on Sunset Beach. The beneficial reuse material will provide an approximate 275-ft wide average berm with a maximum height of +9.0 MLW (6.1 NAVD). The non-compatible substrate will be mechanically dredged and placed at a permitted upland landfill facility. Figure 2 shows the work areas and estimated dredge volumes along the east end of Sunset Beach.

The average depth in the Feeder Channel and Bay Area systems will be increased from approximately -2 to -3 MLW to -5 (-4+1) and -6 (-5+1) MLW. The Feeder Channel and Bay Area will be dredged to a depth of -6 (-5+1) MLW and finger canals A-D will be dredged to -5 (-4+1) MLW. The Feeder Channel extends approximately 3,500-ft and each of the four (4) finger canals A-D extend approximately 800 feet (3,200-ft

total). The Feeder Channel dredge template varies in width between 30-ft and 40-ft, excluding the 3:1 side slopes. The Feeder Channel commences with a 40-ft width at the confluence with S. Jinks Creek and reduces to a 30-ft width approximately 1,200 feet within the channel. The Feeder Channel maintains the 30-ft width for approximately 2,300 feet, until transitioning into Finger Canal A. Each of the four (4) finger canals maintain a constant width of 20-ft and 3H:1V side slopes. Similar to the Feeder Channel, the Bay Area template maintains a 3H:1V side slope throughout its full 2,200-ft length. The Bay Area template maintains an 80-ft width for approximately 600 ft and then transitions to a 40-ft width over approximately 200 feet. The template continues at the 40-ft width for approximately 300-ft and then transitions to a 20-ft width for the remaining approximate 1,100 feet of the template.

South Jinks Creek will be dredged to a depth of -6 (-5+1) MLW while maintaining a 100-ft base width. The south Jinks Creek template will differ from the Feeder Channel and Bay Area in respect to the side slopes. The S. Jinks Creek template side slopes will maintain a 5H:1V grade throughout its approximate 1,750 ft length. Table 1 provides a summary of the dredge templates for S. Jinks Creek, the Bay Area, and the Feeder Channel system.

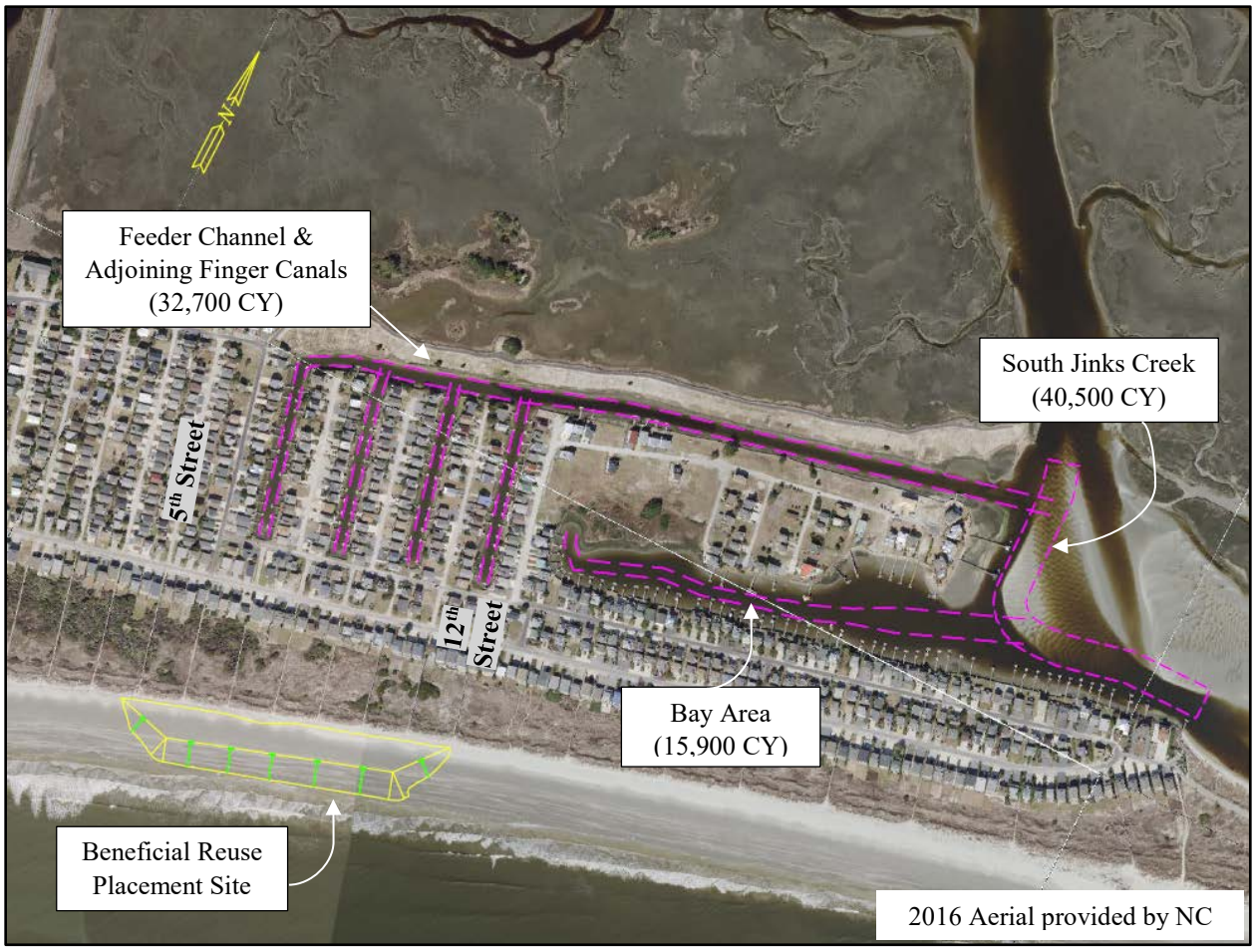

Figure 2. South Jinks Creek, the Bay Area, and Feeder Channel Work Areas

The dredging operations will be conducted during the months of November 16th thru April 30th to reduce the potential for environmental impacts. In addition, the dredge footprint will be minimized to provide a minimum 10-ft buffer from any coastal marsh identified at the time of construction. The 6,500-ft hydraulic pipeline carrying the beneficial reuse material dredged from S. Jinks Creek will also be positioned away

from any established dune or beach vegetation. These items are a few of the precautions proposed to help minimize the potential for environmental impacts on this project.

Table 1 – Dredge Template Description

Area	Existing Avg. Depth (MLW-ft)	Proposed Depth (MLW-ft)	Length (ft)	Width (ft)	Side Slope (H:V)	Est. Volume (CY)	Placement Location
Feeder Channel	-3 MLW	-6 (-5+1) MLW	3,500	30 – 40	3:1	22,000	Landfill
Finger Canals A-D	-2 MLW	-5 (-4+1) MLW	3,200	20	3:1	10,700	Landfill
Bay Area	-2 MLW	-6 (-5+1) MLW	2,200	20 – 80	3:1	15,900	Landfill
S. Jinks Creek	- 1.5 MLW	-6 (-5+1) MLW	1,750	100	5:1	40,500	Beneficial Reuse (5^{th}–12^{th} St)
TOTAL			**10,650**	**Varies**	**Varies**	**89,100**	**Varies**

All of the proposed work areas have previously been dredged. However, only the Feeder Channel and adjoining finger canals have previous identified state and federal permits. The dredging plan for the Feeder Channel system generally maintains consistency with the previous permits. However, the dredge depths have been altered slightly to account for an overdredge tolerance and the template has been shifted to follow the existing deep-water path. The dredge template has also been extended within finger canals A-D to restore access to the complete navigable canal system. Although the proposed plan extends the work area in the finger canals, the final dredging footprint will most likely be reduced due to the established coastal marsh.

Due to some of the precautions taken to help avoid environmental impacts, the maintenance dredging request is not consistent with the North Carolina Administrative Code (NCAC) 15 A 07H.0208 (b) (F). Based on agency feedback, the Town intends to request a variance of the referenced administrative code from the North Carolina Coastal Resources Commission (CRC). The variance will request the authorization to maintenance dredge the referenced work areas without providing a connection to the adjacent AIWW or Atlantic Ocean at an equal or greater depth. The Town removed the deep-water connection through north Jinks Creek in efforts to avoid existing shellfish habitat.

PROJECT PURPOSE, NEED & SCOPE

In recent years, south Jinks Creek has incurred significant shoaling perceivably from tidal flows entering Tubbs Inlet. In addition, the Bay Area and Feeder Channel system, which were developed for recreational boating access, have been subject to infilling from adjacent upland run-off and erosion as well as wind and wave action. The shoaling and material infilling experienced by each waterbody has constricted navigable access in regards to the available width and depth. The current governing width of south Jinks Creek for navigation equals approximately 10 feet and the governing depth is above MLW. The Feeder Canal system and Bay Area are generally not constricted by width, but both maintain a governing depth between -2-ft and -3-ft MLW. The current shoaling patterns appear likely to continue and could potentially sever recreational access in each of the referenced work areas.

The maintenance dredging will remove approximately 89,100 CY of mixed beach compatible and non-compatible material. The beach compatible material will be placed as beneficial reuse along approximately

1,600-ft of shoreline between 5th Street and 12th Street to enhance an approximate 275-ft wide berm at elevation +9 MLW (+6.1 NAVD) on Sunset Beach. However, the non-compatible material will be excavated and trucked to an upland permitted landfill facility. Table 2 shows the material quantity estimated for removal from each work area:

Table 2. Estimated Dredge Volumes and Placement Locations

Work Area	Dredge Quantity	Sediment Classification	Placement Location
Feeder Channel & Finger Canals	32,700 CY	Non-Compatible	Upland
Bay Area	15,900 CY	Non-Compatible	Upland
South Jinks Creek	40,500 CY	Beneficial Reuse	Between 5th & 12th St on the Sunset Beach shoreline
TOTAL	89,100 CY		

Note: Estimated volumes include the 1-ft tolerance for maneuvering the dredge equipment.

The dredge template provides a 1-ft tolerance below the design depths to maneuver the dredge equipment in a manner sufficient to complete the work. Therefore, the maximum dredge depth for the maintenance operations equals – 6-ft (-5+1) MLW within south Jinks Creek, the Bay Area, and the Feeder Channel. The maximum dredge depth decreases to -5-ft (-4+1) MLW within finger canals A-D, which adjoin to the Feeder Channel. Tab F (Permit Drawings) provides detailed drawings of the proposed work.

CONSTRUCTION METHODS

The construction methodology will vary for each work area based on the dredge material composition. The methods implemented for south Jinks Creek will vary from the methods used for the Feeder Channel system and the Bay Area as described below.

South Jinks Creek

The material within south Jinks Creek will be hydraulically dredged and placed along the shoreline between 5th Street and 12th Street on Sunset Beach. The material will be used to enhance a 1,600-ft long and 275-ft wide beach berm system and will be placed to a maximum elevation of +9.0-ft MLW (+6.1-ft NAVD). The south Jinks Creek material meets the minimum standards required for beneficial reuse in accordance with the NC standards for beach compatibility. A total of 6 sediment samples were collected from the proposed dredge area (borrow area) in efforts to define the beach compatible material. The calculated sediment characteristics from the dredge area were compared with composite characteristics of 65 samples analyzed from the recipient beach. Table 3 below shows the analysis results for the dredge material and recipient beach in accordance with the NCAC 15a 07h.0312. Tab G (Sediment Analysis) shows additional detail for the grain size analysis including the sediment collection sites and individual gain size analyses for each sample.

Table 3. Sediment Comparison (South Jinks Creek & Recipient Beach)

Analysis Area	Gravel (%)	Granular (%)	Sand (%)	Fines (%)	Calcium Carbonate
South Jinks Creek	0.00%	0.01%	98.38%	1.42 %	5%
Recipient Beach	0.07 %	0.55 %	98.15%	1.23%	2%

Note: Sediment classifications determined in accordance with NCAC 15a07h.0312.

The hydraulic dredging work will be conducted on a 24-hr per day schedule by a cutterhead dredge between November 16th and April 30th, in accordance with the USFWS August 2017 Statewide Programmatic Biological Opinion (SPBO). The beneficial reuse material will be transported through an approximate 6,500-ft hydraulic pipeline for beach placement. Floating pipeline will most likely be required immediately behind the hydraulic dredge plant and will have reflectors or lights as recommended by the USCG. Once the floating pipeline traverses landward of the MHW line, it will not be allowed to meander back into navigable waters. However, the shore pipe may be forced to cross navigable waterways at the Bay Area and Feeder Channel confluence with Jinks Creek. The pipeline will be anchored to the channel bottom to avoid a marine hazard at each crossing. The pipeline will also cross the waterways perpendicular to the directions of travel to minimize the pipeline length within the navigation channel. The pipeline will be anchored in the deepest depth available to not block navigation and will have buoys attached approximately every 25-feet along each crossing. Signage will also be provided and visible from both directions of travel to mark the pipeline crossing.

Along the beachfront, the pipeline will be located as close to the dune as reasonable without traversing over beach grass or other established vegetation. Markings shall be installed along the pipe to warn beach goers to use caution around the pipeline and to remain off the equipment. Sand ramps will also be constructed at each designated beach access for pedestrian crossings. The ramps may also be used for emergency beach access by the Town or construction related access for the Contractor.

The beneficial reuse material placement will occur directly on the sandy beach, seaward of the primary dune system. Sand dikes, or berms will be constructed as needed to help limit turbidity. The dikes will be constructed parallel to the beach front to direct the dredge slurry along the beach. This process will allow the beneficial reuse material to settle on the beach instead of entering the Atlantic Ocean. In addition, the project will implement the recommended SPBO conservation measures listed in Tab H (SPBO Conservation Measures).

Feeder Channel, Finger Canals, & Bay Area

Dredging operations in the Feeder Channel, including the adjoining finger canals A-D, and the Bay Area will be conducted by a clamshell or bucket dredge / excavator also between November 16th and April 30th. Dredging activities for the mechanical equipment will extend through day light hours but will not entail night time operations. Material will be dredged from the respective waterbody and placed on a barge or other floating work plant. The material will be transported to an offloading site designated at the end of Cobia Street within the Feeder Channel. The material will then be placed in a truck or carrying apparatus for transportation to the upland landfill facility. A backhoe or excavator will move the material from the barge to the truck or other hauling equipment. The trucks or hauling equipment shall be configured to prohibit spillage during material transport. The roadways or travel ways used for material transport shall be inspected during and after each delivery to the landfill site. Any spillage noted shall be immediately cleaned and removed from the roadways. In addition, any equipment found to be continuously leaking material onto public roadways shall be removed from the project until such time repairs or modifications can be made to facilitate clean and spill fill material transport.

Figure 3 shows the material offloading site on Cobia Street. The material offloading site entails a Town owned road and the Town supports its use for the project. In addition, Tab F (Permit Drawings) shows the final material placement site and permitted landfill on Old Georgetown Road (State Road 1154). Tab I (Consent Agreement) provides a consent of use letter for the landfill site. As indicated in Tab I (Consent Agreement), a formal and legally binding agreement will be negotiated between the Town and the facility

owner prior to project commencement. In addition, DCM representatives will be invited to inspect the landfill facility prior to construction.

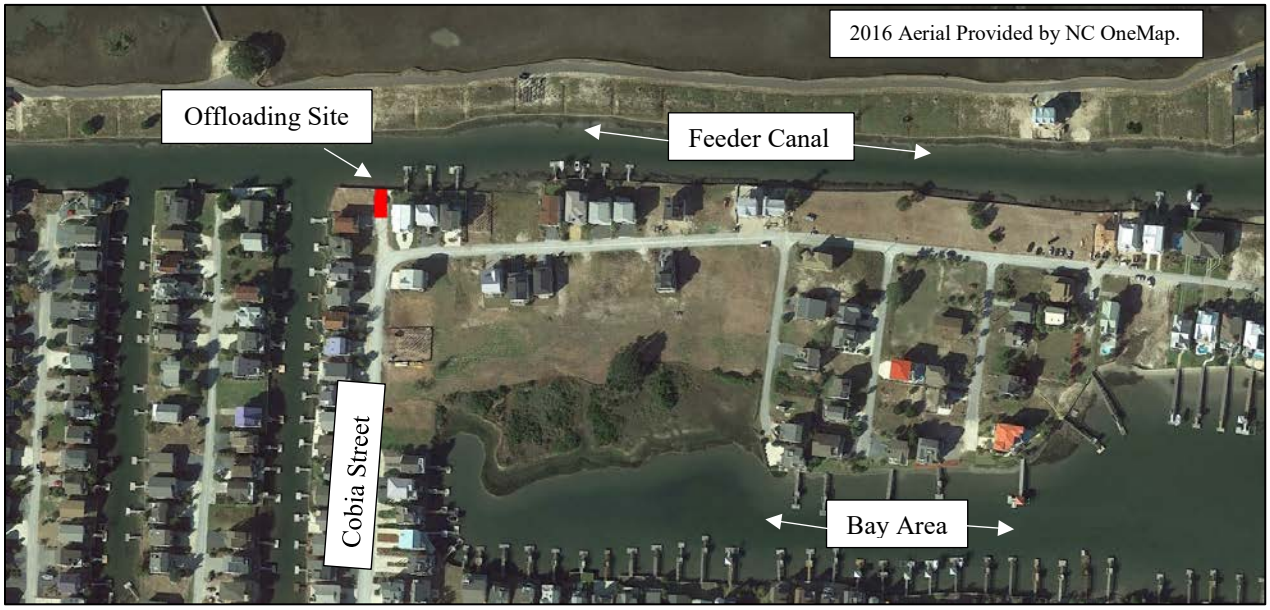

Figure 3. Material Offloading Site

CONSISTENCY WITH PREVIOUS PERMITS

The proposed work generally maintains consistency with previous permits issued for the maintenance dredging of the Feeder Channel. The first maintenance for the feeder system occurred in 1985 under CAMA permit 211-85 and a subsequent maintenance occurred in 2002 under CAMA 45-02. Tab J (Previous Permits) provides a copy of CAMA permit 45-02.

Alterations from the previous 2002 permit include increasing the maximum dredge depth from -5.2-ft MLW to -6-ft (-5+1) MLW in the Feeder Channel system. Permit 45-02 (2002) fails to provide an overdredge tolerance for the dredging equipment to conduct the work and establishes a design depth of -5.2-ft MLW. To compensate for this action, the current plan raises the design depth to -5-ft MLW in the Feeder Channel and provides a 1-foot overdredge tolerance. Thus, the maximum dredge depth (deepest) in the Feeder Channel equals -6-ft (-5+1) MLW.

The dredge alignment within the Feeder Channel and finger canals A-D has also been altered in the current proposal. West of station 20+00, the Feeder Channel dredge alignment deviates from Permit 45-02 in attempts to follow the existing deep water path back to the terminus of Finger Canal A. The change in alignment helps reduce the required dredge volume necessary to complete the project and also helps avoid the existing marsh grass located between stations 20+00 and 13+00, as shown in Tab S (Marsh Buffer). East of station 20+00, the Feeder Channel template maintains consistency with permit 45-02 and an existing pier head alignment adopted by the Town. Tab K (Ex. Pier Head Alignment) provides the existing pier head alignment and Tab J (Previous Permits) provides permit 45-02. The pier head alignment mimics the design for the 2002 maintenance event and extends from S. Jinks Creek to approximately Cobia Street (station 20+00).

The template alteration in the finger canals entails reducing the base width down to 20 feet. This represents a reduction from the 2002 permitted template, which provided a varying width between 20-ft & 30-ft. The reduction in width reflects the available clearance between the existing docks. In many instances, the

navigable waterway through canals A-D extends approximately 20-ft due to residential docks encroaching into the navigable channel. Although the docks may be moved by the private homeowners to help facilitate construction, expectations suggest the docks would be returned to their original position after the maintenance event. Therefore, there would be little public benefit in providing more than a 20-ft channel through the residential waterway.

Another alteration from permit 45-02 includes the extension of the dredge footprint approximately 50-ft in each of the four (4) finger canals. The template has been extended to include the complete navigable waterway in each of the finger canals. The channel terminus has experienced significant sediment accumulation due to storm water runoff and minimal tidal flushing. However, to help avoid potential impacts to established marsh grasses, the vegetation boundary will be mapped prior to construction. The boundary will be incorporated into the construction documents and the dredge template will be revised to provide a minimum 10-ft buffer from any marsh. Therefore, the actual dredge template will be dependent on the established grasses at the time of construction.

This will be the first known maintenance event for south Jinks Creek and the Bay Area since the original dredging believed to be in the early 1970's[1]. The initial dredging presumable occurred as part of a relocation project for Tubbs Inlet and the development of Sunset Beach. The action occurred prior to 1974 and the establishment of the Coastal Area Management Act (CAMA), so the action did not require a CAMA major permit authorization. Figures 4 and 5 show aerial photographs from 1966 and 1974 depicting before and after conditions of the initial dredging event.

Figure 4. Tubbs Inlet 1966 (Originally printed in Cleary & Marden, 1999)

[1] Cleary, W. J. and Marden, T. P. 1999. Shifting Shorelines: A Pictorial Atlas of North Carolina Inlets. North Carolina Sea Grant. Raleigh, North Carolina.

Figure 5. Tubbs Inlet 1974 (Originally printed in Cleary & Marden, 1999)

VARIANCE REQUEST TO RULE 15A NCAC 07H.0208 (B) (F)

The Town of Sunset Beach will be seeking a variance request from 15A NCAC 07H.208 (b)(F) in order to minimize impacts to potential shellfish habitat. The referenced administrative code requires the connecting waterbodies of a maintained navigation channel to be at least as deep as the dredge area. The original intent for this maintenance dredging request included a connection to the AIWW through north Jinks Creek. The governing depth of north Jinks Creek resides at approximately -2 ft MLW and the proposed maintenance operations will dredge to -6 ft (-5+1) MLW. Figure 6 shows the current (2016) water depths (elevations) of Jinks Creek and the surrounding waterbodies.

Due to the shellfish presence in north Jinks Creek, the State resource agencies indicated a permit would be difficult to authorize with the inclusion of the AIWW connection through north Jinks Creek. Therefore, the Town has removed north Jinks Creek from the current plan to avoid the potential impacts. Tab L (Jinks Creek Shellfish Survey) contains results of a shellfish survey sponsored by the Town to document the existing species presence within north Jinks Creek. The Town has also strayed away from attempting to establish a deep water connection through Tubbs Inlet due to the increased potential for environmental impacts associated with inlet maintenance and the increased project costs.

The Town recognizes the need to protect the water quality in south Jinks Creek and understands removing north Jinks Creek from the dredge template creates additional concerns. However, the project has a proven success record with no known occurrence of impacts from the original dredging around 1970 or the 2002 maintenance event. Although the north Jinks Creek water depths in 2002 are not clear, records do not indicate north Jinks Creek has experienced significant changes since this period. Figure 7 below shows an aerial comparison of Jinks Creek between January 2000 and January 2017. The figure generally shows the alignment and width of north Jinks Creek has remained consistent between 2000 and 2017. Therefore, assuming the depths also remained relatively consistent, the maintenance work in 2002 for the Feeder Channel would also have dredged deeper than the connecting waters to the AIWW. Since no known impacts were recorded from that event, indications suggest the current maintenance operations will also not create any adverse impacts.

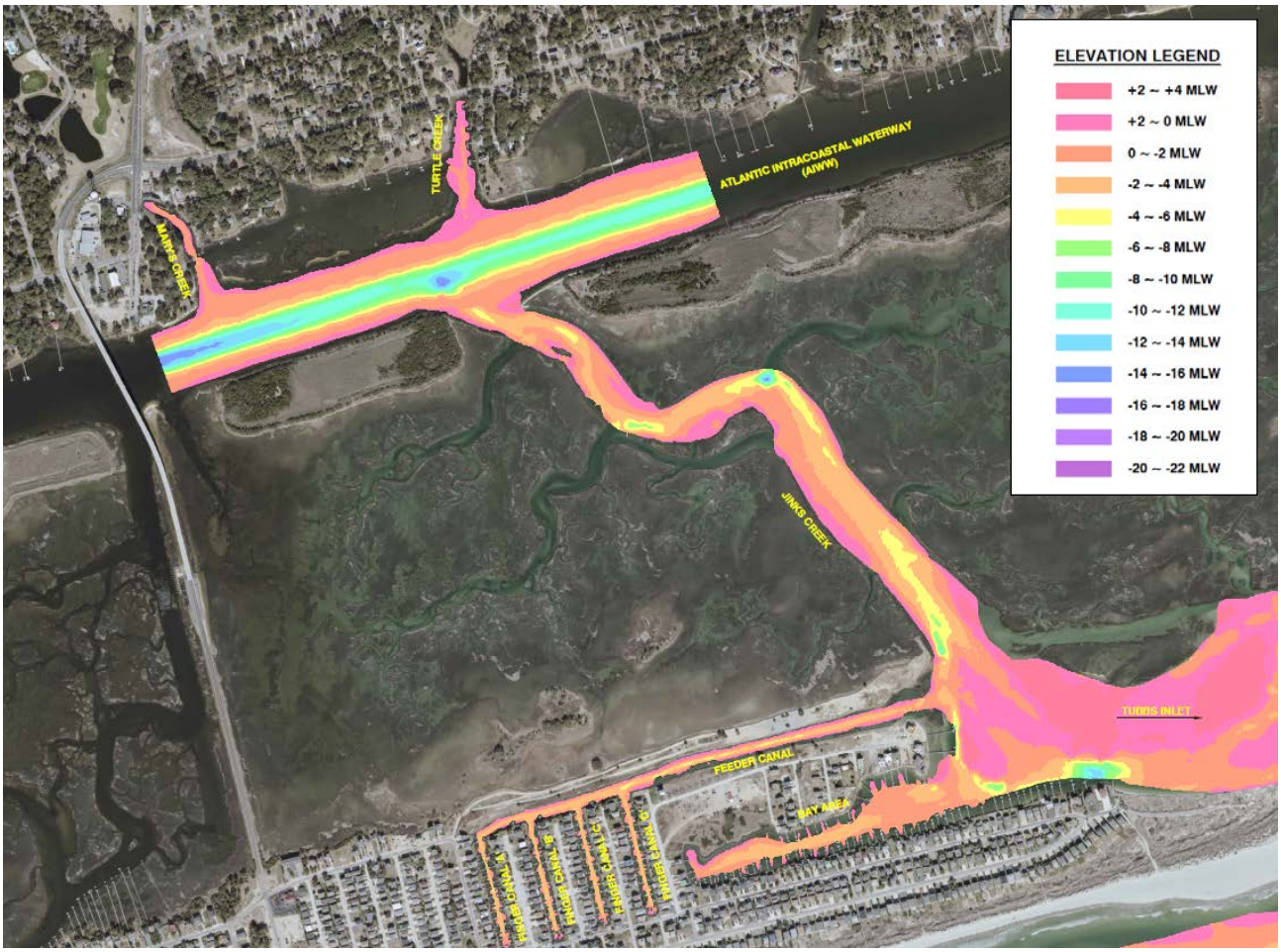

Figure 6. 2016 Elevations for Jinks Creek and Surrounding Waterbodies

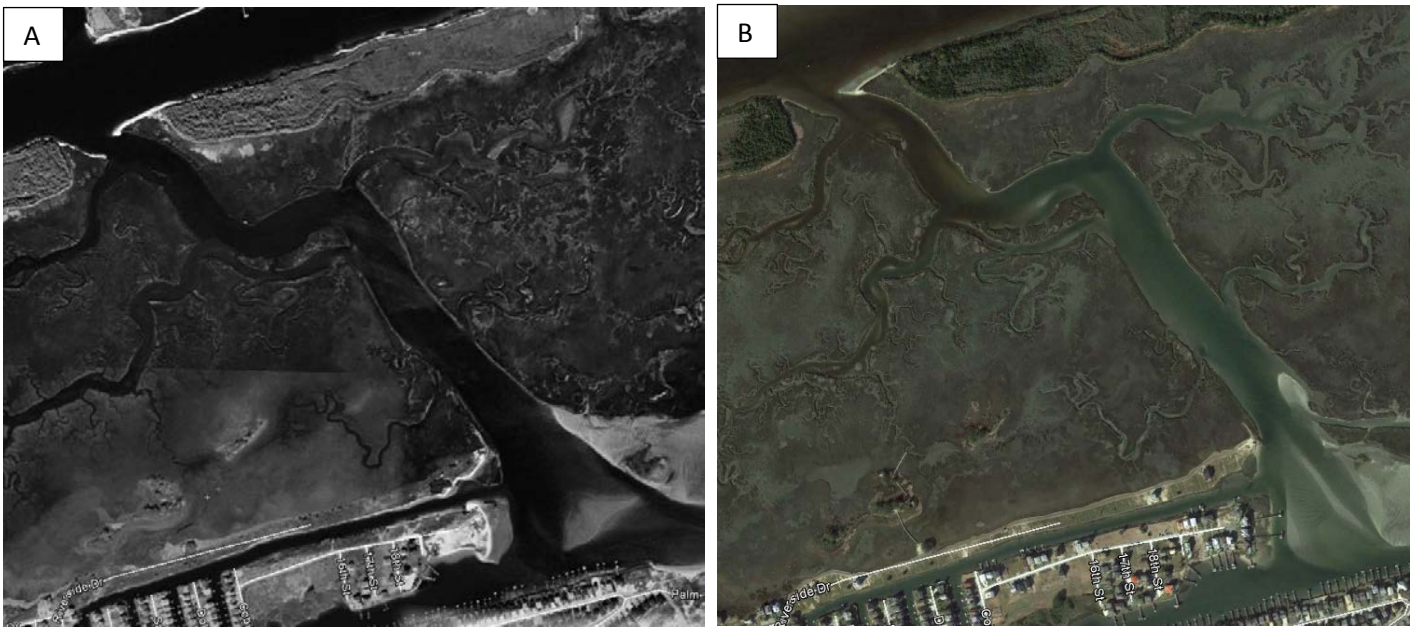

Figure 7. Aerial Comparison of North Jinks Creek (a) January 2000 and (b) January 2017 (Images provided by Google Earth)

The current bathymetry of Jinks Creek also suggests removing north Jinks Creek from the work plan will not create adverse water quality conditions for the surrounding aquaculture. Although the controlling depth in north Jinks Creek equals approximately -2-ft MLW, several deep water crevices exist along the channel. The crevices most likely formed from tidal velocities scouring sediment from the dominant flow way. Figure 8 shows the most prevalent instance in Jinks Creek where the creek bed elevations drop well below the proposed dredge depths for this project. The example shown within the 'S' curve alignment at approximate station 27+00 in north Jinks Creek reaches approximately -14-ft MLW. From visual observations, this location provides a very efficient fishing location as observed during multiple site visits during summer 2018. Tab F (Permit Drawings) shows the existing (2016) creek bed elevations for north Jinks Creek as well as the complete work area.

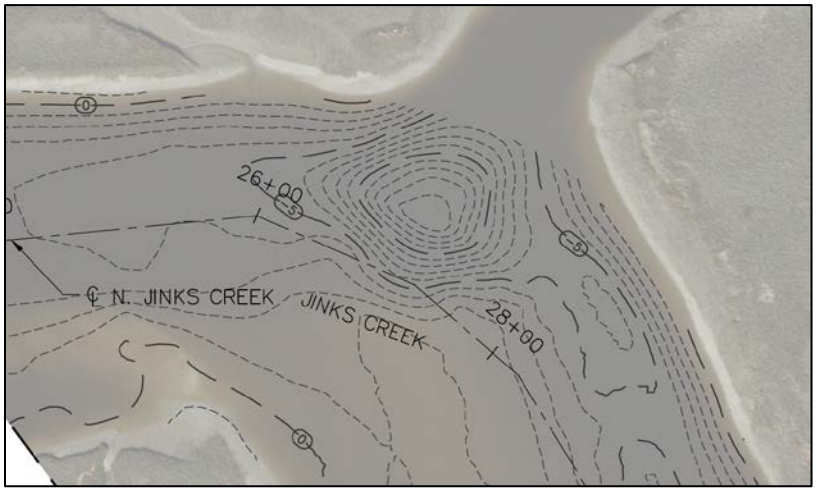

Figure 8 – Existing Deep Water Crevice in Jinks Creek

ADDITIONAL ENVIRONMENTAL CONCERNS

Strands of *Spartina alterniflora* with scattered locations of *Spartina* exist along the intertidal and supratidal regions of the Feeder Channel and Bay Area. These grasses generally provide suitable habitat for juvenile fish. Tab F (Permit Drawings) provides an aerial view showing the waterward extents of the marsh grasses as identified in September 2017. As shown in Tab S (Marsh Buffer), the salt marsh extents have encroached within or close to the anticipated dredge area of the Feeder Channel and Bay Area. To maintain consistency with the previous permits for the Feeder Channel and to minimize the potential for adverse impacts, the current project proposes to maintain a 10-ft dredging buffer from any coastal marsh. (CAMA permit 45-02 originally required the 10-foot buffer as condition #3.)

The 10-ft buffer should allow the channel adequate space to equilibrate without eroding the coastal marshes. The design will maintain the proposed 3H:1V sideslope within the Bay Area and Feeder Channel system to help provide stability to the newly dredged channel. Maintaining the sideslope will help minimize the sloughing area needed for channel equilibration. Therefore, the channel base width will be reduced in areas where the marsh grass encroaches near the maintenance footprint. Prior to construction the marsh boundary will be mapped with a copy provided to DCM designating the 10-ft marsh buffer. During construction the dredge equipment shall be prohibited from entering the buffer zone. Tab S (Marsh Buffer) shows the proposed 10-ft buffer based on the marsh conditions as identified in September 2017.

The applicant has also conducted additional studies to evaluate potential impacts to managed or endangered species that may occur as a result of the project. Tab M (EFH Assessment) provides an Essential Fish Habitat (EFH) assessment and Tab N (Biological Assessment) provides a Biological Assessment (BA) for

the project. Generally the referenced reports support the project should not adversely impact any threatened or managed species. Additional precautions proposed for the maintenance project include following FWS recommended guidelines for avoiding impacts to West Indian Manatee. Recommendations provided by NOAA to help protect sea turtles and smalltooth sawfish will also be included as construction conditions. Tab O (Manatee Avoidance Guidelines) shows the manatee guidelines while Tab P (NOAA Recommendations) provides the sea turtle and smalltooth sawfish recommendations

HISTORIC RESOURCES

The applicant has also contacted the State Historic Preservation Office (SHPO) to inquire on any known historic resources in the area such as shipwrecks or archeological artifacts. The inquiry did not identify any known resources with the potential to be impacted by the project. Tab Q (SHPO Resource Review) provides the written response from SHPO.

SUMMARY

The Town of Sunset Beach intends to maintenance dredge south Jinks Creek, the Bay Area, and the Feeder Channel to restore navigational access to the residential canal systems. The project provides a key element for the Town and residents to manage the established navigation corridors on the east end of Sunset Beach. The proposed work follows a similar scope as previously authorized in 2002 for maintenance of the Feeder Channel and will be the first permitted dredging event for south Jinks Creek and the Bay Area. The dredge material will be hydraulically placed as beneficial reuse material or mechanically transported to a nearby upland facility for storage or permanent placement. Approximately 40,500 CY will be placed as beneficial reuse material from south Jinks Creek along a 1,600-ft long by 275-ft wide stretch of oceanfront between 5th Street and 12th Street. In addition, approximately 32,700 CY will be removed from the Feeder Channel system and 15,900 CY from the Bay Area for upland placement. The maintenance of south Jinks Creek will be conducted by a hydraulic pipeline dredge while the Feeder Canal and Bay Area will be dredged by a mechanical excavator.

The project will help restore navigation access to the waterway systems on the east end of Sunset Beach. The maximum dredge depth will range from -5-ft (-4+1) MLW for the finger canals to -6-ft (-5+1) MLW for the Feeder Channel, the Bay Area, and south Jinks Creek. The dredging will provide a buffer zone between the work area and any coastal marsh or wetland habitat to reduce the potential for impacts. The work will also follow additional guidelines and recommendations provided by FWS and NOAA to further minimize the potential for environmental impacts during construction. This includes constructing during the cooler winter period of November 16th through April 30th. Furthermore, the project will follow construction guidelines designed to protect manatee, sea turtle, and smalltooth sawfish.

To conduct the work as proposed, the Town anticipates requesting a variance from the CRC to satisfy the requirements of 15A NCAC 07H.208 (b)(F). The current plan avoids dredging the connecting waters in north Jinks Creek to evade potential impacts to shellfish resources. The Town also does not intend to dredge Tubbs Inlet due to the potential for environmental impacts and increased cost. As such, the current plan will not provide a connection to the AIWW or the Atlantic Ocean at a depth equal to or greater than the propose dredge areas.

TOWN OF SUNSET BEACH NAVIGATION PROJECT

MAINTENANCE DREDGING OF SOUTH JINKS CREEK, THE BAY AREA, & THE FEEDER CHANNEL

SEDIMENT ANALYSIS

PAGE INDEX

PREPARED FOR:
TOWN OF SUNSET BEACH, NC
700 SUNSET BOULEVARD NORTH
SUNSET BEACH, NC 28468

PREPARED BY:
MOFFATT & NICHOL
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WILMINGTON, NC 28401

moffatt & nichol

Town of Sunset Beach Navigation Project
Maintenance Dredging of South Jinks Creek, the Bay Area & the Feeder Channel
Sediment Analysis Summary Table

Work Area	Vibracores	Stations		Volume (CY)		Composite Summary (% By Wt. Passing)					Mean	Sorting	Skewness	Kurtosis	Calcium Content (%)
		Start	Stop	Compatible	Non-Compatible	% Fines	% Sand	% Granular	% Gravel	Total	(mm)	(σ)	(α)	(β)	
South Jinks Creek															
	SJ-01	51+00	52+50	4,311	-	1.42	98.56	0.02	0.00	100.00	0.16	0.41	-0.16	0.99	4%
	SJ-02	52+50	54+25	5,096	-	2.66	97.33	0.01	0.00	100.00	0.15	0.43	-0.01	0.84	6%
	SJ-03	54+25	56+75	7,985	-	2.05	97.94	0.01	0.00	100.00	0.17	0.41	-0.14	0.99	5%
	SJ-04	56+75	60+00	10,293	-	1.70	98.30	0.01	0.00	100.00	0.17	0.40	-0.11	0.88	5%
	SJ-05	60+00	62+50	5,720	-	0.57	99.40	0.02	0.00	100.00	0.17	0.42	-0.16	0.94	4%
	SJ-06	62+50	68+50	7,045	-	1.14	98.85	0.01	0.00	100.00	0.17	0.45	-0.14	0.89	4%
SubTotal		**51+00**	**68+50**	**40,450**	**0**	**1.60**	**98.38**	**0.01**	**0.00**	**100.00**	**0.17**	**0.42**	**-0.12**	**0.92**	**5%**
Feeder Canal															
	VC-23	Finger Canal A		-	2,600	40.44	59.48	0.09	0.00	100.00	0.10	1.31	0.31	0.24	-
	VC-24	Finger Canal B		-	2,800	66.80	33.10	0.10	0.00	100.00	0.03	2.38	-0.05	0.24	-
	VC-25	Finger Canal C		-	2,500	74.90	24.50	0.10	0.50	100.00	0.02	3.27	-0.05	0.24	-
	VC-26	Finger Canal D		-	2,800	78.20	21.80	0.00	0.00	100.00	0.01	3.75	-0.05	0.23	-
	VC-18	8+00	15+50	-	3,600	24.16	75.78	0.05	0.00	100.00	0.12	1.03	0.33	0.23	-
	VC-17	15+50	21+50	-	3,000	81.50	18.50	0.00	0.00	100.00	0.01	4.25	-0.04	0.27	-
	VC-16	21+50	27+50	-	3,600	54.10	45.60	0.20	0.10	100.00	0.06	1.69	-0.05	0.24	-
	VC-15	27+50	34+50	-	5,200	6.88	93.12	0.00	0.00	100.00	0.17	0.43	0.00	1.63	-
	VC-14	34+50	40+00	-	4,800	47.60	52.10	0.10	0.20	100.00	0.06	1.73	0.18	0.28	-
	VC-11	40+00	43+00	-	1,800	4.40	95.60	0.00	0.00	100.00	0.15	0.57	0.12	0.51	-
SubTotal		**0+00**	**43+00**	**0**	**32,700**	**45.77**	**54.08**	**0.07**	**0.08**	**100.00**	**0.02**	**0.59**	**0.02**	**0.08**	-
Bay Area															
	VC-22	-0+50	3+50	-	2,500	70.50	29.30	0.00	0.20	1.00	0.02	2.74	-0.05	0.24	-
	VC-21	3+50	9+50	-	2,100	94.39	5.51	0.10	0.00	1.00	0.00	14.14	0.00	0.34	-
	VC-20	9+50	15+50	-	4,400	93.90	6.00	0.10	0.00	1.00	0.00	14.78	0.00	0.33	-
	VC-19	15+50	20+50	-	6,400	86.40	13.20	0.10	0.30	1.00	0.00	4.18	0.03	0.39	-
	VC-12	20+50	22+00	-	500	2.40	97.60	0.00	0.00	1.00	0.17	0.42	0.00	1.27	-
SubTotal		**-0+50**	**22+00**	**0**	**15,900**	**84.39**	**15.38**	**0.08**	**0.15**	**100.00**	**0.01**	**8.08**	**0.00**	**0.37**	-
Total				**40,450**	**48,600**										

Notes:

1 Composite values determined by weighted averages.
2 Fine grained content(X < 0.0625 mm) must be within 10% of recipient beach for compatible material (navigation channel).
3 Granular content (2mm ≤ X < 4.76 mm) must be within 10% of recipient beach for compatible material.
4 Gravel content (4.76 mm ≤ X < 76 mm) must be within 5% of recipient beach for compatible material.
5 Calcium Carbonate of dredge material must be within 15% of recipient beach values.
6 Volumetric quantities are rounded for clarity.

TOWN OF SUNSET BEACH - NAVIGATION PROJECT
MAINTENANCE DREDGING OF SOUTH JINKS CREEK, THE BAY AREA & THE FEEDER CANAL
SEDIMENT SAMPLING MAP

2012 AERIAL PROVIDED BY NC ONEMAP

LEGEND

◉	VIBRACORE SAMPLE SITE
▲	GRAB SAMPLE SITE
RL	REPORTING LIMIT
mg/kg	MILLIGRAM PER KILOGRAM
MDL	METHOD DETECTION LIMIT
TOC	TOTAL ORGANIC CARBON

V1618 (COMPOSTIE OF VC-16 & VC-18)

ANALYTE	RESULT	RL	MDL	UNITS	METHOD
Toluene	0.112 J	0.21	0.11	mg/kg	MADEP VPH REV 1.1
Arsenic	3.4	0.58		mg/kg	SW846 6101D
Beryllium	0.30	0.29		mg/kg	SW846 6101D
Chromium	17.0	0.58		mg/kg	SW846 6101D
Copper	3.7	1.4		mg/kg	SW846 6101D
Lead	6.0	1.2		mg/kg	SW846 6101D
Nickel	3.3	2.3		mg/kg	SW846 6101D
Zinc	16.3	1.2		mg/kg	SW846 6101D
TOC	33,700	1,600		mg/kg	SW846 9060A M

V2022 (COMPOSTIE OF VC-20 & VC-22)

ANALYTE	RESULT	RL	UNITS	METHOD
Arsenic	15.7	1.2	mg/kg	SW846 6101D
Beryllium	0.94	0.62	mg/kg	SW846 6101D
Chromium	48.7	1.2	mg/kg	SW846 6101D
Copper	11.6	3.1	mg/kg	SW846 6101D
Lead	23.9	2.5	mg/kg	SW846 6101D
Nickel	11.8	5	mg/kg	SW846 6101D
Zinc	51.0	2.5	mg/kg	SW846 6101D
TOC	111,000	2,800	mg/kg	SW846 9060A M

V23242526 (COMPOSITE OF VC-23, VC-24, VC-25 & VC-26)

ANALYTE	RESULT	RL	UNITS	METHOD
Arsenic	6.2	0.88	mg/kg	SW846 6101D
Chromium	24.3	0.88	mg/kg	SW846 6101D
Copper	7.5	2.2	mg/kg	SW846 6101D
Lead	7.8	1.8	mg/kg	SW846 6101D
Nickel	4.6	3.5	mg/kg	SW846 6101D
Zinc	23.8	1.8	mg/kg	SW846 6101D
TOC	65,000	2,100	mg/kg	SW846 9060A M

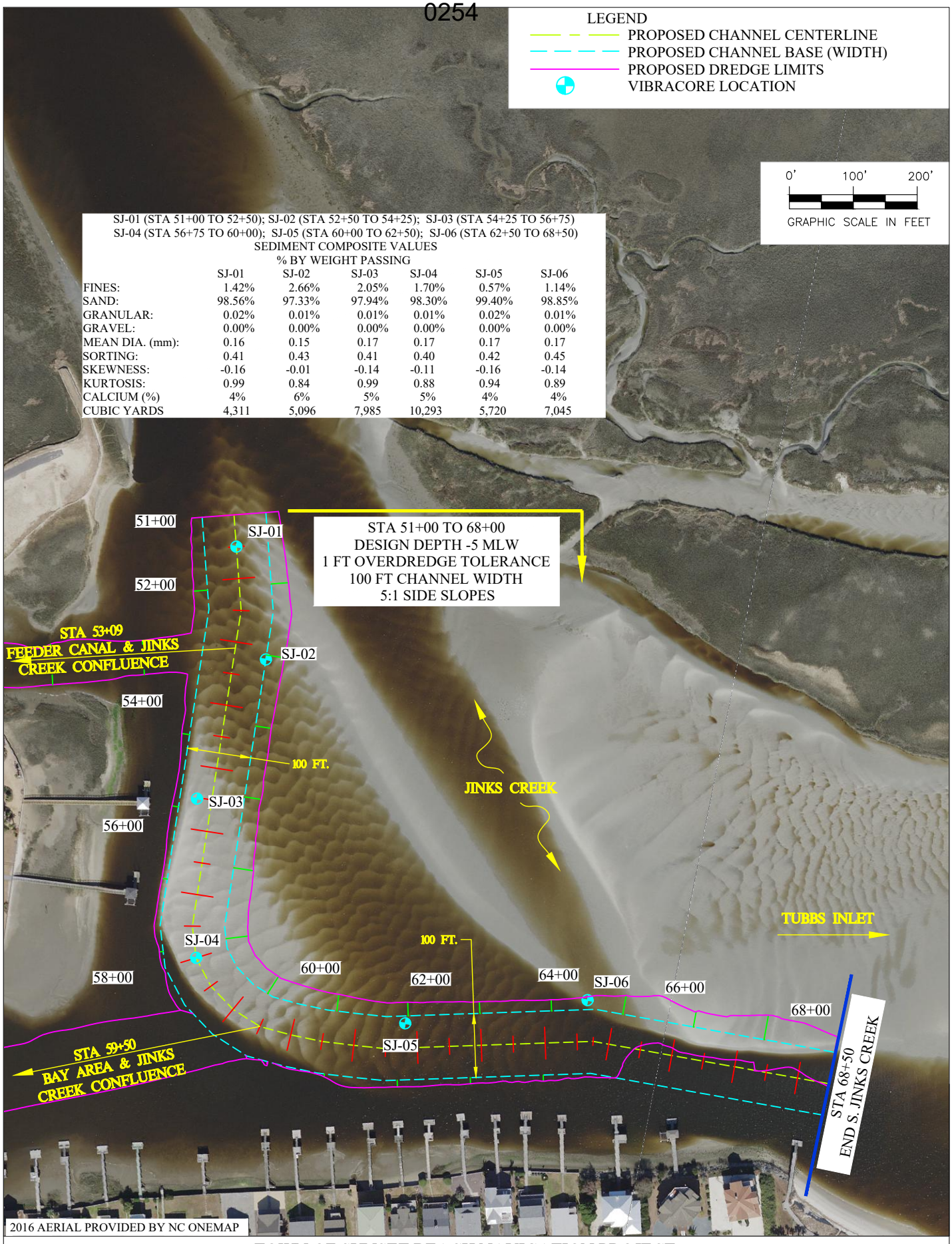
0' 400' 800'

GRAPHIC SCALE IN FEET

TOWN OF SUNSET BEACH - NAVIGATION PROJECT
MAINTENANCE DREDGING OF SOUTH JINKS CREEK, THE BAY AREA & THE FEEDER CHANNEL
CHEMICAL ANALYSIS SUMMARY

APPENDIX A

SOUTH JINKS CREEK SEDIMENT ANALYSIS



SJ-01 (STA 51+00 TO 52+50); SJ-02 (STA 52+50 TO 54+25); SJ-03 (STA 54+25 TO 56+75)
SJ-04 (STA 56+75 TO 60+00); SJ-05 (STA 60+00 TO 62+50); SJ-06 (STA 62+50 TO 68+50)

SEDIMENT COMPOSITE VALUES
% BY WEIGHT PASSING

	SJ-01	SJ-02	SJ-03	SJ-04	SJ-05	SJ-06
FINES:	1.42%	2.66%	2.05%	1.70%	0.57%	1.14%
SAND:	98.56%	97.33%	97.94%	98.30%	99.40%	98.85%
GRANULAR:	0.02%	0.01%	0.01%	0.01%	0.02%	0.01%
GRAVEL:	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
MEAN DIA. (mm):	0.16	0.15	0.17	0.17	0.17	0.17
SORTING:	0.41	0.43	0.41	0.40	0.42	0.45
SKEWNESS:	-0.16	-0.01	-0.14	-0.11	-0.16	-0.14
KURTOSIS:	0.99	0.84	0.99	0.88	0.94	0.89
CALCIUM (%)	4%	6%	5%	5%	4%	4%
CUBIC YARDS	4,311	5,096	7,985	10,293	5,720	7,045

TOWN OF SUNSET BEACH NAVIGATION PROJECT
SOUTH JINKS CREEK
SEDIMENT ANALYSIS SUMMARY
PLAN VIEW

9269
Town of Sunset Beach
Navigation Project
South Jinks Creek Sediment Analysis Summary Table

Per 15A NCAC 07H.0312

Fines: X < 0.0625 mm
Sand: 0.0625 ≤ X < 2 mm
Granular: 2 mm ≤ X < 4.76 mm
Gravel: 4.76 ≤ X < 76 mm

South Jinks Creek Vibracore Composite Summary Table

	Representative Stations		Representative Volume (CY)	Sample Elevation (FT-MLW)		Max. Disturbance (FT-MLW)	% Coverage of Disturbance Depth	Composite Summary (% By Wt. Passing)					Mean	Sorting	Skewness	Kurtosis	Calcium Content
Vibracore	Start	Stop		Top	Bottom			Fines	Sand	Granular	Gravel	Total	(mm)	(σ)	(α)	(β)	(%)
SJ-01	51+00	52+50	4,311	-0.01	-6	-6	100%	1.42	98.56	0.02	0.00	100.00	0.16	0.41	-0.16	0.99	4%
SJ-02	52+50	54+25	5,096	0.2	-6	-6	100%	2.66	97.33	0.01	0.00	100.00	0.15	0.43	-0.01	0.84	6%
SJ-03	54+25	56+75	7,985	0.3	-6	-6	100%	2.05	97.94	0.01	0.00	100.00	0.17	0.41	-0.14	0.99	5%
SJ-04	56+75	60+00	10,293	1.1	-6	-6	100%	1.70	98.30	0.01	0.00	100.00	0.17	0.40	-0.11	0.88	5%
SJ-05	60+00	62+50	5,720	-2.3	-6	-6	100%	0.57	99.40	0.02	0.00	100.00	0.17	0.42	-0.16	0.94	4%
SJ-06	62+50	68+50	7,045	0.5	-6	-6	100%	1.14	98.85	0.01	0.00	100.00	0.17	0.45	-0.14	0.89	4%

Area	Volume (CY)	Stations
Beach Compatible Material	40,450	51+00 - 68+50

1. Max. Disturbance Depth includes overdredge tolerance.
2. Volumetric quantities are rounded for clarity.

Recipient Beach Sediiment Analysis (Reference Only)

DCM Compatibility Summary

Transect	Gravel	Granular	Sand	<#230	Carbonate
0+00	0.07%	0.09%	98.61%	1.22%	2.00%
4+00	0.04%	0.06%	98.67%	1.23%	2.00%
8+00	0.04%	0.09%	98.39%	1.49%	2.00%
12+00	0.10%	2.44%	96.36%	1.11%	2.00%
16+00	0.11%	0.06%	98.70%	1.13%	2.00%
Grand Mean	**0.07%**	**0.55%**	**98.15%**	**1.23%**	**2.00%**

Native Summary

Transect	Median (mm)	Mean (mm)	D5 (mm)	D16 (mm)	D50 (mm)	D84 (mm)	D95 (mm)
0+00	0.18	0.17	0.29	0.22	0.18	0.14	0.11
4+00	0.17	0.17	0.27	0.22	0.17	0.13	0.11
8+00	0.18	0.18	0.29	0.23	0.18	0.14	0.11
12+00	0.17	0.17	0.30	0.23	0.17	0.13	0.11
16+00	0.17	0.17	0.29	0.23	0.17	0.13	0.11
Grand Mean (mm)	**0.17**	**0.17**	**0.29**	**0.23**	**0.17**	**0.13**	**0.11**
Grand Mean (φ)	**2.52**	**2.52**	**1.80**	**2.15**	**2.52**	**2.90**	**3.20**

Mφn	**2.525**
σφn	**0.420**

VIBRACORE COMPOSITES

Sieve Designation Legend

Sieve #	3/4	5/8	7/16	5/16	3.5	4	5	7	10	14	18	25	35	45	60	80	120	170	200	230
Sieve Size (Φ)	-4.25	-4.00	-3.50	-3.00	-2.50	-2.25	-2.00	-1.50	-1.00	-0.50	0.00	0.50	1.00	1.50	2.00	2.50	3.00	3.50	3.75	4.00
Sieve Size (mm)	19.0	16	11	8	5.7	4.76	4	2.8	2	1.4	1	0.71	0.5	0.35	0.25	0.18	0.125	0.09	0.0743	0.0625

Town of Sunset Beach Navigation Project
South Jinks Creek Vibracore Composites
Design Depth -5 MLW (+1)

Vibracore SJ-1 (Max. Dredge Depth -6 MLW)

Sieve (Phi)	SJ-1 Sample Cumulative % by Weight Retained #1	#2	#3	#4
-4.25	0.00	0.00		
-4.00	0.00	0.00		
-3.50	0.00	0.00		
-3.00	0.00	0.00		
-2.50	0.00	0.00		
-2.25	0.00	0.00		
-2.00	0.00	0.00		
-1.50	0.01	0.02		
-1.00	0.03	0.02		
-0.50	0.05	0.03		
0.00	0.13	0.07		
0.50	0.30	0.16		
1.00	0.77	0.31		
1.50	2.39	0.91		
2.00	12.21	5.34		
2.50	37.29	26.62		
3.00	87.02	84.47		
3.50	98.36	97.64		
3.75	98.83	98.28		
4.00	98.89	98.36		

SJ-1 Sample Cumulative % by Weight Passing #1	#2	#3	#4
100.00	100.00		
100.00	100.00		
100.00	100.00		
100.00	100.00		
100.00	100.00		
100.00	100.00		
100.00	100.00		
99.99	99.98		
99.97	99.98		
99.95	99.97		
99.87	99.93		
99.70	99.84		
99.23	99.69		
97.61	99.09		
87.79	94.66		
62.71	73.38		
12.98	15.53		
1.64	2.36		
1.17	1.72		
1.11	1.64		

Weighted Composite % Retained	% Passing
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.02	99.98
0.02	99.98
0.04	99.96
0.10	99.90
0.22	99.78
0.50	99.50
1.53	98.47
8.22	91.78
31.09	68.91
85.54	14.46
97.94	2.06
98.51	1.49
98.58	1.42

SJ-1	Depth Interval (MLW)		Representative Values			Munsell Color
Sample	Top	Bottom	Length (ft)	Percent	USCS	
1	-0.01	-2.1	2.09	41.88%	SP	10Y 6/2
2	-3.1	-6	2.9	58.12%	SP	5Y 6/1
Composite	**-0.01**	**-6**	**4.99**	**100.00%**		

SJ-1	Moment Statistics and Properties in Phi Units						
Sample	φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	1.63	2.08	2.25	2.63	2.88	2.97	3.35
2	1.96	2.25	2.46	2.70	2.92	3.00	3.40
Composite	**1.76**	**2.17**	**2.37**	**2.67**	**2.90**	**2.99**	**3.38**

SJ-1					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	2.63	0.16	2.56	0.17	0.45	-0.16	0.92
2	2.70	0.15	2.65	0.16	0.37	-0.14	0.93
Composite	**2.67**	**0.16**	**2.61**	**0.16**	**0.41**	**-0.16**	**0.99**

Calcium Carbonate Content
Composite: 4%

* Twenhofel & Tyler (1941)

SJ-1 Composite Grain Size Distribution (% by Weight Passing)					
Sample	Fines	Sand	Granular	Gravel	Total
1.00	1.11	98.86	0.03	0.00	100%
2.00	1.64	98.34	0.02	0.00	100%
Composite	**1.42**	**98.56**	**0.02**	**0.00**	**100%**

Per 15A NCAC 07H.0312

Fines: X < 0.0625 mm
Sand: 0.0625 ≤ X < 2 mm
Granular: 2 mm ≤ X < 4.76 mm
Gravel: 4.76 ≤ X < 76 mm

Notes:
1. Mean grain size ($M_{d\Phi}$) determined by $[(\Phi_{84}+\Phi_{50}+\Phi_{16})/3]$ (Folk & Ward,1957).
2. Sorting determined by $[(\Phi_{84}-\Phi_{16})/2]$ (Dean & Dalrymple, 2002).
3. Skewness determined by $[(M_{d\Phi}-\Phi_{50})/\sigma_{\Phi}]$ (Dean & Dalrymple, 2002).
4. Kurtosis determined by $\{[(\Phi_{16}-\Phi_5)+(\Phi_{95}-\Phi_{84})]/2\sigma_{\Phi}\}$ (Dean & Dalrymple, 2002).
5. Calcium Carbonate content of dredge material must be within 15% of recipient beach values.
6. Moment statistics determined by linear interpretation of composite properties.

Sieve Designation Legend

Sieve #	3/4	5/8	7/16	5/16	3.5	4	5	7	10	14	18	25	35	45	60	80	120	170	200	230
Sieve Size (Φ)	-4.25	-4.00	-3.50	-3.00	-2.50	-2.25	-2.00	-1.50	-1.00	-0.50	0.00	0.50	1.00	1.50	2.00	2.50	3.00	3.50	3.75	4.00
Sieve Size (mm)	19.0	16	11	8	5.7	4.76	4	2.8	2	1.4	1	0.71	0.5	0.35	0.25	0.18	0.125	0.09	0.0743	0.0625

Town of Sunset Beach Navigation Project
South Jinks Creek Vibracore Composites
Design Depth -5 MLW (+1)

Vibracore SJ-2 (Max. Dredge Depth -6 MLW)

Sieve (Phi)	SJ-2 Sample Cumulative % by Weight Retained #1	#2	#3	#4
-4.25	0.00	0.00	0.00	
-4.00	0.00	0.00	0.00	
-3.50	0.00	0.00	0.00	
-3.00	0.00	0.00	0.00	
-2.50	0.00	0.00	0.00	
-2.25	0.00	0.00	0.00	
-2.00	0.00	0.00	0.00	
-1.50	0.00	0.00	0.00	
-1.00	0.01	0.00	0.03	
-0.50	0.04	0.00	0.05	
0.00	0.11	0.02	0.17	
0.50	0.27	0.05	0.37	
1.00	0.70	0.12	0.89	
1.50	2.07	0.28	2.05	
2.00	9.20	1.69	5.54	
2.50	27.59	15.74	19.00	
3.00	81.63	77.22	68.06	
3.50	96.47	96.75	91.95	
3.75	97.42	97.96	94.18	
4.00	97.59	98.11	94.61	

SJ-2 Sample Cumulative % by Weight Passing #1	#2	#3	#4
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
99.99	100.00	99.97	
99.96	100.00	99.95	
99.89	99.98	99.83	
99.73	99.95	99.63	
99.30	99.88	99.11	
97.93	99.72	97.95	
90.80	98.31	94.46	
72.41	84.26	81.00	
18.37	22.78	31.94	
3.53	3.25	8.05	
2.58	2.04	5.82	
2.41	1.89	5.39	

Weighted Composite % Retained	% Passing
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.01	99.99
0.03	99.97
0.09	99.91
0.20	99.80
0.51	99.49
1.39	98.61
5.81	94.19
21.82	78.18
77.92	22.08
95.89	4.11
97.13	2.87
97.34	2.66

SJ-2 Sample	Depth Interval (MLW) Top	Bottom	Representative Values Length (ft)	Percent	USCS	Munsell Color
1	0.2	-2.3	2.5	47.17%	SP	5Y 6/2
2	-2.8	-4.8	2	37.74%	SP	5Y 5/2
3	-5.2	-6	0.8	15.09%	SP-SM	5Y 4/1
Composite	**0.2**	**-6**	**5.3**	**100.00%**		

SJ-2 Sample	Moment Statistics and Properties in Phi Units φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	1.71	2.18	2.43	2.71	2.94	3.08	3.45
2	2.12	2.50	2.58	2.78	2.98	3.17	3.46
3	1.92	2.39	2.56	2.82	3.15	3.33	4.23
Composite	**1.91**	**2.32**	**2.53**	**2.75**	**2.97**	**3.17**	**3.48**

SJ-2 Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Parameters in Phi Units Sorting (σ)	Skewness (α)	Kurtosis (β)
1	2.71	0.15	2.66	0.16	0.45	-0.11	0.95
2	2.78	0.15	2.82	0.14	0.34	0.12	0.99
3	2.82	0.14	2.85	0.14	0.47	0.06	1.44
Composite	**2.75**	**0.15**	**2.75**	**0.15**	**0.43**	**-0.01**	**0.84**

Calcium Carbonate Content
Composite: 5.9%

* Twenhofel & Tyler (1941)

SJ-2 Composite Grain Size Distribution (% by Weight Passing) Sample	Fines	Sand	Granular	Gravel	Total
1.00	2.41	97.58	0.01	0.00	100%
2.00	1.89	98.11	0.00	0.00	100%
3.00	5.39	94.58	0.03	0.00	100%
Composite	**2.66**	**97.33**	**0.01**	**0.00**	**100%**

Per 15A NCAC 07H.0312
Fines: X < 0.0625 mm
Sand: 0.0625 ≤ X < 2 mm
Granular: 2 mm ≤ X < 4.76 mm
Gravel: 4.76 ≤ X < 76 mm

Notes:
1. Mean grain size ($M_{d\Phi}$) determined by $[(\Phi_{84}+\Phi_{50}+\Phi_{16})/3]$ (Folk & Ward,1957).
2. Sorting determined by $[(\Phi_{84}-\Phi_{16})/2]$ (Dean & Dalrymple, 2002).
3. Skewness determined by $[(M_{d\Phi}-\Phi_{50})/\sigma_\Phi]$ (Dean & Dalrymple, 2002).
4. Kurtosis determined by $\{[(\Phi_{16}-\Phi_5)+(\Phi_{95}-\Phi_{84})]/2\sigma_{\Phi}\}$ (Dean & Dalrymple, 2002).
5. Calcium Carbonate content of dredge material must be within 15% of recipient beach values.
6. Moment statistics determined by linear interpretation of composite properties.

Sieve Designation Legend

Sieve #	3/4	5/8	7/16	5/16	3.5	4	5	7	10	14	18	25	35	45	60	80	120	170	200	230
Sieve Size (Φ)	-4.25	-4.00	-3.50	-3.00	-2.50	-2.25	-2.00	-1.50	-1.00	-0.50	0.00	0.50	1.00	1.50	2.00	2.50	3.00	3.50	3.75	4.00
Sieve Size (mm)	19.0	16	11	8	5.7	4.76	4	2.8	2	1.4	1	0.71	0.5	0.35	0.25	0.18	0.125	0.09	0.0743	0.0625

Town of Sunset Beach Navigation Project
South Jinks Creek Vibracore Composites
Design Depth -5 MLW (+1)

Vibracore SJ-3 (Max. Dredge Depth -6 MLW)

Sieve (Phi)	SJ-3 Sample Cumulative % by Weight Retained #1	#2	#3	#4
-4.25	0.00	0.00	0.00	
-4.00	0.00	0.00	0.00	
-3.50	0.00	0.00	0.00	
-3.00	0.00	0.00	0.00	
-2.50	0.00	0.00	0.00	
-2.25	0.00	0.00	0.00	
-2.00	0.00	0.00	0.00	
-1.50	0.00	0.00	0.00	
-1.00	0.01	0.01	0.02	
-0.50	0.03	0.05	0.13	
0.00	0.05	0.12	0.20	
0.50	0.16	0.21	0.61	
1.00	0.46	0.37	1.76	
1.50	1.39	0.88	4.96	
2.00	8.27	5.57	14.59	
2.50	42.47	32.58	37.54	
3.00	93.42	86.44	88.84	
3.50	98.98	96.21	98.05	
3.75	99.19	96.82	98.43	
4.00	99.22	96.92	98.46	

SJ-3 Sample Cumulative % by Weight Passing #1	#2	#3	#4
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
99.99	99.99	99.98	
99.97	99.95	99.87	
99.95	99.88	99.80	
99.84	99.79	99.39	
99.54	99.63	98.24	
98.61	99.12	95.04	
91.73	94.43	85.41	
57.53	67.42	62.46	
6.58	13.56	11.16	
1.02	3.79	1.95	
0.81	3.18	1.57	
0.78	3.08	1.54	

Weighted Composite % Retained	% Passing
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.01	99.99
0.06	99.94
0.12	99.88
0.29	99.71
0.74	99.26
2.03	97.97
8.55	91.45
36.60	63.40
89.00	11.00
97.45	2.55
97.89	2.11
97.95	2.05

SJ-3	Depth Interval (MLW)		Representative Values			Munsell Color
Sample	Top	Bottom	Length (ft)	Percent	USCS	
1	0.3	-1.2	1.5	28.30%	SP	5Y 6/1
2	-1.7	-4.2	2.5	47.17%	SP	5Y 6/1
3	-4.7	-6	1.3	24.53%	SP	5Y 7/1
Composite	**0.3**	**-6**	**5.3**	**100.00%**		

SJ-3	Moment Statistics and Properties in Phi Units						
Sample	φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	1.76	2.11	2.24	2.57	2.82	2.91	3.14
2	1.94	2.19	2.36	2.66	2.89	2.98	3.44
3	1.50	2.03	2.23	2.62	2.87	2.95	3.33
Composite	**1.73**	**2.13**	**2.29**	**2.63**	**2.87**	**2.95**	**3.36**

SJ-3					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	2.57	0.17	2.53	0.17	0.40	-0.11	0.74
2	2.66	0.16	2.61	0.16	0.39	-0.13	0.91
3	2.62	0.16	2.53	0.17	0.46	-0.19	0.99
Composite	**2.63**	**0.16**	**2.57**	**0.17**	**0.41**	**-0.14**	**0.99**

Calcium Carbonate Content
Composite: 4.5%

* Twenhofel & Tyler (1941)

SJ-3 Composite Grain Size Distribution (% by Weight Passing)					
Sample	Fines	Sand	Granular	Gravel	Total
1.00	0.78	99.21	0.01	0.00	100%
2.00	3.08	96.91	0.01	0.00	100%
3.00	1.54	98.44	0.02	0.00	100%
Composite	**2.05**	**97.94**	**0.01**	**0.00**	**100%**

Per 15A NCAC 07H.0312
Fines: X < 0.0625 mm
Sand: 0.0625 ≤ X < 2 mm
Granular: 2 mm ≤ X < 4.76 mm
Gravel: 4.76 ≤ X < 76 mm

Notes:
1. Mean grain size ($M_{d\Phi}$) determined by $[(\Phi_{84}+\Phi_{50}+\Phi_{16})/3]$ (Folk & Ward,1957).
2. Sorting determined by $[(\Phi_{84}-\Phi_{16})/2]$ (Dean & Dalrymple, 2002).
3. Skewness determined by $[(M_{d\Phi}-\Phi_{50})/\sigma_\Phi]$ (Dean & Dalrymple, 2002).
4. Kurtosis determined by $\{[(\Phi_{16}-\Phi_5) + (\Phi_{95}-\Phi_{84})]/2\sigma_{\Phi}\}$ (Dean & Dalrymple, 2002).
5. Calcium Carbonate content of dredge material must be within 15% of recipient beach values.
6. Moment statistics determined by linear interpretation of composite properties.

Sieve Designation Legend

Sieve #	3/4	5/8	7/16	5/16	3.5	4	5	7	10	14	18	25	35	45	60	80	120	170	200	230
Sieve Size (Φ)	-4.25	-4.00	-3.50	-3.00	-2.50	-2.25	-2.00	-1.50	-1.00	-0.50	0.00	0.50	1.00	1.50	2.00	2.50	3.00	3.50	3.75	4.00
Sieve Size (mm)	19.0	16	11	8	5.7	4.76	4	2.8	2	1.4	1	0.71	0.5	0.35	0.25	0.18	0.125	0.09	0.0743	0.0625

Town of Sunset Beach Navigation Project
South Jinks Creek Vibracore Composites
Design Depth -5 MLW (+1)

Vibracore SJ-4 (Max. Dredge Depth -6 MLW)

Sieve (Phi)	SJ-4 Sample Cumulative % by Weight Retained #1	#2	#3	#4
-4.25	0.00	0.00	0.00	
-4.00	0.00	0.00	0.00	
-3.50	0.00	0.00	0.00	
-3.00	0.00	0.00	0.00	
-2.50	0.00	0.00	0.00	
-2.25	0.00	0.00	0.00	
-2.00	0.00	0.00	0.00	
-1.50	0.00	0.00	0.00	
-1.00	0.00	0.02	0.00	
-0.50	0.04	0.06	0.02	
0.00	0.13	0.10	0.02	
0.50	0.37	0.21	0.07	
1.00	0.77	0.44	0.16	
1.50	1.73	1.05	0.48	
2.00	9.13	7.21	4.08	
2.50	39.64	40.38	36.68	
3.00	89.99	87.72	90.87	
3.50	97.75	96.30	98.39	
3.75	98.19	97.75	98.75	
4.00	98.26	97.85	98.78	

SJ-4 Sample Cumulative % by Weight Passing #1	#2	#3	#4
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	99.98	100.00	
99.96	99.94	99.98	
99.87	99.90	99.98	
99.63	99.79	99.93	
99.23	99.56	99.84	
98.27	98.95	99.52	
90.87	92.79	95.92	
60.36	59.62	63.32	
10.01	12.28	9.13	
2.25	3.70	1.61	
1.81	2.25	1.25	
1.74	2.15	1.22	

Weighted Composite % Retained	% Passing
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.01	99.99
0.04	99.96
0.09	99.91
0.23	99.77
0.48	99.52
1.13	98.87
6.94	93.06
38.92	61.08
89.58	10.42
97.51	2.49
98.23	1.77
98.30	1.70

SJ-4	Depth Interval (MLW)		Representative Values			Munsell Color
Sample	Top	Bottom	Length (ft)	Percent	USCS	
1	1.1	-1.4	2.5	37.88%	SP	10Y 6/1
2	-1.9	-3.9	2	30.30%	SP	5Y 5/2
3	-3.9	-6	2.1	31.82%	SP	5GY 5/2
Composite	**1.1**	**-6**	**6.6**	**100.00%**		

SJ-4	Moment Statistics and Properties in Phi Units						
Sample	φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	1.72	2.11	2.26	2.60	2.85	2.94	3.32
2	1.82	2.13	2.27	2.60	2.87	2.96	3.42
3	2.01	2.18	2.32	2.62	2.85	2.94	3.27
Composite	**1.83**	**2.14**	**2.28**	**2.61**	**2.86**	**2.94**	**3.34**

SJ-4					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	2.60	0.16	2.55	0.17	0.41	-0.12	0.93
2	2.60	0.16	2.56	0.17	0.41	-0.09	0.94
3	2.62	0.16	2.58	0.17	0.38	-0.11	0.67
Composite	**2.61**	**0.16**	**2.57**	**0.17**	**0.40**	**-0.11**	**0.88**

Calcium Carbonate Content
Composite: 4.8%

* Twenhofel & Tyler (1941)

SJ-4 Composite Grain Size Distribution (% by Weight Passing)					
Sample	Fines	Sand	Granular	Gravel	Total
1.00	1.74	98.26	0.00	0.00	100%
2.00	2.15	97.83	0.02	0.00	100%
3.00	1.22	98.78	0.00	0.00	100%
Composite	**1.70**	**98.30**	**0.01**	**0.00**	**100%**

Per 15A NCAC 07H.0312
Fines: X < 0.0625 mm
Sand: 0.0625 ≤ X < 2 mm
Granular: 2 mm ≤ X < 4.76 mm
Gravel: 4.76 ≤ X < 76 mm

Notes:
1. Mean grain size ($M_{d\Phi}$) determined by $[(\Phi_{84}+\Phi_{50}+\Phi_{16})/3]$ (Folk & Ward,1957).
2. Sorting determined by $[(\Phi_{84}-\Phi_{16})/2]$ (Dean & Dalrymple, 2002).
3. Skewness determined by $[(M_{d\Phi}-\Phi_{50})/\sigma_{\Phi}]$ (Dean & Dalrymple, 2002).
4. Kurtosis determined by $\{[(\Phi_{16}-\Phi_5) + (\Phi_{95}-\Phi_{84})]/2\sigma_{\Phi}\}$ (Dean & Dalrymple, 2002).
5. Calcium Carbonate content of dredge material must be within 15% of recipient beach values.
6. Moment statistics determined by linear interpretation of composite properties.

Sieve Designation Legend

Sieve #	3/4	5/8	7/16	5/16	3.5	4	5	7	10	14	18	25	35	45	60	80	120	170	200	230
Sieve Size (Φ)	-4.25	-4.00	-3.50	-3.00	-2.50	-2.25	-2.00	-1.50	-1.00	-0.50	0.00	0.50	1.00	1.50	2.00	2.50	3.00	3.50	3.75	4.00
Sieve Size (mm)	19.0	16	11	8	5.7	4.76	4	2.8	2	1.4	1	0.71	0.5	0.35	0.25	0.18	0.125	0.09	0.0743	0.0625

Town of Sunset Beach Navigation Project
South Jinks Creek Vibracore Composites
Design Depth -5 MLW (+1)

Vibracore SJ-5 (Max. Dredge Depth -6 MLW)

Sieve (Phi)	SJ-5 Sample Cumulative % by Weight Retained #1	#2	#3	#4
-4.25	0.00	0.00	0.00	
-4.00	0.00	0.00	0.00	
-3.50	0.00	0.00	0.00	
-3.00	0.00	0.00	0.00	
-2.50	0.00	0.00	0.00	
-2.25	0.00	0.00	0.00	
-2.00	0.00	0.00	0.00	
-1.50	0.03	0.00	0.00	
-1.00	0.04	0.02	0.00	
-0.50	0.23	0.04	0.00	
0.00	0.48	0.07	0.03	
0.50	0.98	0.18	0.06	
1.00	2.18	1.27	0.13	
1.50	5.45	2.31	0.31	
2.00	19.04	8.75	2.62	
2.50	49.34	34.45	22.23	
3.00	91.36	91.29	85.39	
3.50	97.91	99.56	98.55	
3.75	98.32	99.89	99.00	
4.00	98.39	99.94	99.06	

SJ-5 Sample Cumulative % by Weight Passing #1	#2	#3	#4
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
100.00	100.00	100.00	
99.97	100.00	100.00	
99.96	99.98	100.00	
99.77	99.96	100.00	
99.52	99.93	99.97	
99.02	99.82	99.94	
97.82	98.73	99.87	
94.55	97.69	99.69	
80.96	91.25	97.38	
50.66	65.55	77.77	
8.64	8.71	14.61	
2.09	0.44	1.45	
1.68	0.11	1.00	
1.61	0.06	0.94	

Weighted Composite % Retained	% Passing
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.01	99.99
0.02	99.98
0.09	99.91
0.18	99.82
0.38	99.62
1.39	98.61
2.94	97.06
10.87	89.13
37.15	62.85
90.67	9.33
99.00	1.00
99.37	0.63
99.43	0.57

SJ-5	Depth Interval (MLW) Top	Bottom	Representative Values Length (ft)	Percent	USCS	Munsell Color
1	-2.3	-3.3	1	27.03%	SP	10Y 6/1
2	-3.3	-5.6	2.3	62.16%	SP	10Y 6/1
3	-5.6	-6	0.4	10.81%	SP	5GY 6/1
Composite	**-2.3**	**-6**	**3.7**	**100.00%**		

SJ-5	Moment Statistics and Properties in Phi Units φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	1.43	1.89	2.10	2.51	2.81	2.91	3.28
2	1.71	2.14	2.32	2.64	2.86	2.94	3.22
3	2.06	2.34	2.52	2.72	2.92	2.99	3.37
Composite	**1.63**	**2.10**	**2.27**	**2.62**	**2.85**	**2.94**	**3.26**

SJ-5					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	2.51	0.18	2.44	0.18	0.51	-0.14	0.80
2	2.64	0.16	2.57	0.17	0.40	-0.16	0.91
3	2.72	0.15	2.68	0.16	0.32	-0.11	1.01
Composite	**2.62**	**0.16**	**2.55**	**0.17**	**0.42**	**-0.16**	**0.94**

Calcium Carbonate Content
Composite: 4.1%

* Twenhofel & Tyler (1941)

SJ-5 Composite Grain Size Distribution (% by Weight Passing) Sample	Fines	Sand	Granular	Gravel	Total
1.00	1.61	98.35	0.04	0.00	100%
2.00	0.06	99.92	0.02	0.00	100%
3.00	0.94	99.06	0.00	0.00	100%
Composite	**0.57**	**99.40**	**0.02**	**0.00**	**100%**

Per 15A NCAC 07H.0312
Fines: X < 0.0625 mm
Sand: 0.0625 ≤ X < 2 mm
Granular: 2 mm ≤ X < 4.76 mm
Gravel: 4.76 ≤ X < 76 mm

Notes:
1. Mean grain size ($M_{d\Phi}$) determined by $[(\Phi_{84}+\Phi_{50}+\Phi_{16})/3]$ (Folk & Ward,1957).
2. Sorting determined by $[(\Phi_{84}-\Phi_{16})/2]$ (Dean & Dalrymple, 2002).
3. Skewness determined by $[(M_{d\Phi}-\Phi_{50})/\sigma_\Phi]$ (Dean & Dalrymple, 2002).
4. Kurtosis determined by $\{[(\Phi_{16}-\Phi_5)+(\Phi_{95}-\Phi_{84})]/2\sigma_\Phi\}$ (Dean & Dalrymple, 2002).
5. Calcium Carbonate content of dredge material must be within 15% of recipient beach values.
6. Moment statistics determined by linear interpretation of composite properties.

Sieve Designation Legend

Sieve #	3/4	5/8	7/16	5/16	3.5	4	5	7	10	14	18	25	35	45	60	80	120	170	200	230
Sieve Size (Φ)	-4.25	-4.00	-3.50	-3.00	-2.50	-2.25	-2.00	-1.50	-1.00	-0.50	0.00	0.50	1.00	1.50	2.00	2.50	3.00	3.50	3.75	4.00
Sieve Size (mm)	19.0	16	11	8	5.7	4.76	4	2.8	2	1.4	1	0.71	0.5	0.35	0.25	0.18	0.125	0.09	0.0743	0.0625

Town of Sunset Beach Navigation Project
South Jinks Creek Vibracore Composites
Design Depth -5 MLW (+1)

Vibracore SJ-6 (Max. Dredge Depth -6 MLW)

Sieve (Phi)	SJ-6 Sample Cumulative % by Weight Retained #1	#2	#3	#4
-4.25	0.00	0.00	0.00	0.00
-4.00	0.00	0.00	0.00	0.00
-3.50	0.00	0.00	0.00	0.00
-3.00	0.00	0.00	0.00	0.00
-2.50	0.00	0.00	0.00	0.00
-2.25	0.00	0.00	0.00	0.00
-2.00	0.00	0.00	0.00	0.00
-1.50	0.00	0.00	0.00	0.00
-1.00	0.00	0.01	0.03	0.00
-0.50	0.02	0.02	0.08	0.03
0.00	0.03	0.04	0.20	0.09
0.50	0.08	0.14	0.57	0.22
1.00	0.24	0.50	1.95	0.50
1.50	0.93	1.68	7.31	1.44
2.00	7.74	7.92	34.29	5.94
2.50	40.60	29.77	67.27	22.43
3.00	92.05	87.41	93.68	73.20
3.50	98.69	98.38	98.96	95.51
3.75	98.99	98.78	99.20	97.00
4.00	99.00	98.82	99.22	97.20

SJ-6 Sample Cumulative % by Weight Passing #1	#2	#3	#4
100.00	100.00	100.00	100.00
100.00	100.00	100.00	100.00
100.00	100.00	100.00	100.00
100.00	100.00	100.00	100.00
100.00	100.00	100.00	100.00
100.00	100.00	100.00	100.00
100.00	100.00	100.00	100.00
100.00	100.00	100.00	100.00
100.00	99.99	99.97	100.00
99.98	99.98	99.92	99.97
99.97	99.96	99.80	99.91
99.92	99.86	99.43	99.78
99.76	99.50	98.05	99.50
99.07	98.32	92.69	98.56
92.26	92.08	65.71	94.06
59.40	70.23	32.73	77.57
7.95	12.59	6.32	26.80
1.31	1.62	1.04	4.49
1.01	1.22	0.80	3.00
1.00	1.18	0.78	2.80

Weighted Composite % Retained	% Passing
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.01	99.99
0.03	99.97
0.08	99.92
0.22	99.78
0.73	99.27
2.67	97.33
13.78	86.22
42.02	57.98
89.55	10.45
98.41	1.59
98.82	1.18
98.86	1.14

SJ-6 Sample	Depth Interval (MLW) Top	Bottom	Representative Values Length (ft)	Percent	USCS	Munsell Color
1	0.5	-2	2.5	38.46%	SP	5GY 6/2
2	-2	-4	2	30.77%	SP	5GY 6/2
3	-4	-5.5	1.5	23.08%	SP	5GY 6/1
4	-5.5	-6	0.5	7.69%	SP	5GY 6/2
Composite	**0.5**	**-6**	**6.5**	**100.00%**		

SJ-6 Sample	Moment Statistics and Properties in Phi Units φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	1.80	2.13	2.26	2.59	2.83	2.92	3.22
2	1.77	2.18	2.39	2.68	2.89	2.97	3.35
3	1.28	1.66	1.83	2.24	2.65	2.82	3.13
4	1.90	2.31	2.53	2.77	3.04	3.24	3.49
Composite	**1.60**	**2.04**	**2.20**	**2.58**	**2.85**	**2.94**	**3.31**

SJ-6 Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Parameters in Phi Units Sorting (σ)	Skewness (α)	Kurtosis (β)
1	2.59	0.17	2.55	0.17	0.40	-0.11	0.79
2	2.68	0.16	2.61	0.16	0.39	-0.17	1.01
3	2.24	0.21	2.24	0.21	0.58	0.00	0.59
4	2.77	0.15	2.77	0.15	0.47	0.00	0.70
Composite	**2.58**	**0.17**	**2.52**	**0.17**	**0.45**	**-0.14**	**0.89**

Calcium Carbonate Content
Composite: 4.4%

* Twenhofel & Tyler (1941)

SJ-6 Composite Grain Size Distribution (% by Weight Passing) Sample	Fines	Sand	Granular	Gravel	Total
1.00	1.00	99.00	0.00	0.00	100%
2.00	1.18	98.81	0.01	0.00	100%
3.00	0.78	99.19	0.03	0.00	100%
4.00	2.80	97.20	0.00	0.00	100%
Composite	**1.14**	**98.85**	**0.01**	**0.00**	**100%**

Per 15A NCAC 07H.0312
Fines: X < 0.0625 mm
Sand: 0.0625 ≤ X < 2 mm
Granular: 2 mm ≤ X < 4.76 mm
Gravel: 4.76 ≤ X < 76 mm

Notes:
1. Mean grain size ($M_{d\Phi}$) determined by $[(\Phi_{84}+\Phi_{50}+\Phi_{16})/3]$ (Folk & Ward,1957).
2. Sorting determined by $[(\Phi_{84}-\Phi_{16})/2]$ (Dean & Dalrymple, 2002).
3. Skewness determined by $[(M_{d\Phi}-\Phi_{50})/\sigma_{\Phi}]$ (Dean & Dalrymple, 2002).
4. Kurtosis determined by $\{[(\Phi_{16}-\Phi_5) + (\Phi_{95}-\Phi_{84})]/2\sigma_{\Phi}\}$ (Dean & Dalrymple, 2002).
5. Calcium Carbonate content of dredge material must be within 15% of recipient beach values.
6. Moment statistics determined by linear interpretation of composite properties.

VIBRACORE LOGS

Boring Designation SJ-01

DRILLING LOG

CLIENT	Moffatt & Nichol
PROJECT OWNER	Town Of Sunset Beach, North Carolina
SHEET	1 OF 1 SHEETS
1. PROJECT	Town of Sunset Beach Navigation Project South Jinks Creek, Brunswick County, North Carolina
2. BORING DESIGNATION	SJ-01
LOCATION COORDINATES	X = 2,154,194 Y = 46,153
3. DRILLING AGENCY	Athena Technologies, Inc.
CONTRACTOR FILE NO.	
4. NAME OF DRILLER	P. McClellan
5. DIRECTION OF BORING	☒ VERTICAL ☐ INCLINED
DEG. FROM VERTICAL	
BEARING	
6. THICKNESS OF OVERBURDEN	0.0 Ft.
7. DEPTH DRILLED INTO ROCK	0.0 Ft.
8. TOTAL DEPTH OF BORING	10.5 Ft.
9. SIZE AND TYPE OF BIT	3.0 In.
10. COORDINATE SYSTEM/DATUM	NC State Plane
HORIZONTAL	NAD 1983
VERTICAL	MLW
11. MANUFACTURER'S DESIGNATION OF DRILL	☐ AUTO HAMMER ☐ MANUAL HAMMER
12. TOTAL SAMPLES	DISTURBED: 3 / UNDISTURBED (UD):
13. TOTAL NUMBER CORE BOXES	
14. WATER DEPTH	3.5 Ft.
15. DATE BORING	STARTED: 01-03-19 08:40 / COMPLETED: 01-03-19
16. ELEVATION TOP OF BORING	-0.1 Ft.
17. TOTAL RECOVERY FOR BORING	10.1 Ft.
18. SIGNATURE AND TITLE OF INSPECTOR	A. Freeze

ELEV. (ft)	SCALE (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-0.1	0.0				S-1	Sample #S-1, Depth = 0.0' - 2.0' Mean (mm): 0.17, Phi Sorting: 0.48 Fines (#200) - 1.17 (SP)
			Poorly graded SAND; mostly fine quartz sand, trace inorganic silt in occasional burrows, trace fine sand-sized shell in matrix, loose, subangular, color grades to gray (5Y 5/1) from, olive gray (5Y-5/2), (SP).		S-2	Sample #S-2, Depth = 3.0' - 5.9' Mean (mm): 0.16, Phi Sorting: 0.40 Fines (#200) - 1.72 (SP)
-7.0	6.9				C-1	Sample #C-1, Depth = 0.0' - 5.9' Carbonate: 4.0%
			Poorly graded SAND with silt; mostly fine quartz sand, few inorganic silt in burrows and layers, trace fine sand to fine gravel-sized shell in matrix, loose, subangular, bioturbated, dark gray (5Y-4/1), (SP-SM).			
-10.2	10.1					
			End of Boring			

0 5 10 15

FLORIDA DEP ROSS M&N SUNSET BEACH NAVIGATION PROJECT.GPJ FL DEP ROSS.GDT 2/4/19

SAJ FORM 1836 JUN 02 **MODIFIED FOR THE FLORIDA DEP** JUN 04

Boring Designation SJ-02

DRILLING LOG

CLIENT	Moffatt & Nichol
PROJECT OWNER	Town Of Sunset Beach, North Carolina
SHEET	1 OF 1 SHEETS
1. PROJECT	Town of Sunset Beach Navigation Project South Jinks Creek, Brunswick County, North Carolina
9. SIZE AND TYPE OF BIT	3.0 In.
10. COORDINATE SYSTEM/DATUM	NC State Plane / NAD 1983 / MLW
2. BORING DESIGNATION	SJ-02
LOCATION COORDINATES	X = 2,154,275 Y = 45,987
11. MANUFACTURER'S DESIGNATION OF DRILL	☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY	Athena Technologies, Inc.
CONTRACTOR FILE NO.	
12. TOTAL SAMPLES	DISTURBED: 4 / UNDISTURBED (UD):
4. NAME OF DRILLER	P. McClellan
13. TOTAL NUMBER CORE BOXES	
5. DIRECTION OF BORING	☒ VERTICAL ☐ INCLINED; DEG. FROM VERTICAL; BEARING
14. WATER DEPTH	3.5 Ft.
15. DATE BORING	STARTED: 01-03-19 08:27 / COMPLETED: 01-03-19
6. THICKNESS OF OVERBURDEN	0.0 Ft.
16. ELEVATION TOP OF BORING	0.2 Ft.
7. DEPTH DRILLED INTO ROCK	0.0 Ft.
17. TOTAL RECOVERY FOR BORING	9.5 Ft.
8. TOTAL DEPTH OF BORING	10.0 Ft.
18. SIGNATURE AND TITLE OF INSPECTOR	A. Freeze

ELEV. (ft)	SCALE (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
0.2	0.0		Poorly graded SAND; mostly fine quartz sand, trace inorganic silt in occasional layers and laminations, trace fine sand-sized shell in matrix, loose, subangular, olive gray (5Y-5/2), (SP).		S-1	Sample #S-1, Depth = 0.0' - 2.5' Mean (mm): 0.16, Phi Sorting: 0.47 Fines (#200) - 2.58 (SP)
					S-2	Sample #S-2, Depth = 3.0' - 5.0' Mean (mm): 0.15, Phi Sorting: 0.35 Fines (#200) - 2.04 (SP)
-5.2	5.4		Poorly graded SAND with silt; mostly fine quartz sand, few inorganic silt in matrix, burrows, layers and laminations, trace fine sand-sized shell in matrix, coarse gravel-sized wood fragment at 7.3', loose, subangular, bioturbated, dark gray (5Y-4/1), (SP-SM).		S-3	Sample #S-3, Depth = 5.4' - 6.2' Mean (mm): 0.15, Phi Sorting: 0.49 Fines (#200) - 5.82 (SP-SM)
-7.2	7.4		Poorly graded SAND; mostly fine to medium quartz sand, trace inorganic silt in occasional burrows, trace fine sand-sized shell in matrix, coarse gravel-sized shell at 8.4', loose, subangular, gray (5Y-6/1), (SP).		C-1	Sample #C-1, Depth = 0.0' - 6.2' Carbonate: 5.9%
-9.3	9.5		End of Boring			

0 5 10 15

FLORIDA DEP ROSS M&N SUNSET BEACH NAVIGATION PROJECT.GPJ FL DEP ROSS.GDT 2/4/19

SAJ FORM 1836 JUN 02 **MODIFIED FOR THE FLORIDA DEP** JUN 04

Boring Designation SJ-03

DRILLING LOG

CLIENT	Moffatt & Nichol
PROJECT OWNER	Town Of Sunset Beach, North Carolina
SHEET	1 OF 1 SHEETS
1. PROJECT	Town of Sunset Beach Navigation Project South Jinks Creek, Brunswick County, North Carolina
2. BORING DESIGNATION	SJ-03
LOCATION COORDINATES	X = 2,154,213 Y = 45,751
3. DRILLING AGENCY	Athena Technologies, Inc.
CONTRACTOR FILE NO.	
4. NAME OF DRILLER	P. McClellan
5. DIRECTION OF BORING	☒ VERTICAL ☐ INCLINED
DEG. FROM VERTICAL	
BEARING	
6. THICKNESS OF OVERBURDEN	0.0 Ft.
7. DEPTH DRILLED INTO ROCK	0.0 Ft.
8. TOTAL DEPTH OF BORING	10.0 Ft.
9. SIZE AND TYPE OF BIT	3.0 In.
10. COORDINATE SYSTEM/DATUM	NC State Plane
HORIZONTAL	NAD 1983
VERTICAL	MLW
11. MANUFACTURER'S DESIGNATION OF DRILL	☐ AUTO HAMMER ☐ MANUAL HAMMER
12. TOTAL SAMPLES	DISTURBED 4 / UNDISTURBED (UD)
13. TOTAL NUMBER CORE BOXES	
14. WATER DEPTH	3.7 Ft.
15. DATE BORING	STARTED 01-03-19 08:12 / COMPLETED 01-03-19
16. ELEVATION TOP OF BORING	0.3 Ft.
17. TOTAL RECOVERY FOR BORING	9.7 Ft.
18. SIGNATURE AND TITLE OF INSPECTOR	A. Freeze

ELEV. (ft)	SCALE (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
0.3	0.0					
			Poorly graded SAND; mostly fine quartz sand, trace inorganic silt in occasional laminations, trace fine sand-sized shell in matrix, loose, subangular, color changes to olive gray (5Y 5/2) from, gray (5Y-6/1), (SP).		S-1	Sample #S-1, Depth = 0.0' - 1.5' Mean (mm): 0.18, Phi Sorting: 0.40 Fines (#200) - 0.81 (SP)
					S-2	Sample #S-2, Depth = 2.0' - 4.5' Mean (mm): 0.16, Phi Sorting: 0.41 Fines (#200) - 3.18 (SP)
					S-3	Sample #S-3, Depth = 5.0' - 6.3' Mean (mm): 0.18, Phi Sorting: 0.54 Fines (#200) - 1.57 (SP)
-6.6	6.9				C-1	Sample #C-1, Depth = 0.0' - 6.3' Carbonate: 4.5%
			Poorly graded SAND; mostly fine to medium quartz sand, trace fine to coarse sand-sized shell in matrix, trace inorganic silt in occasional burrows, loose, subangular, light gray (5Y-7/1), (SP).			
-9.4	9.7					
			End of Boring			

0 5 10 15

FLORIDA DEP ROSS M&N SUNSET BEACH NAVIGATION PROJECT.GPJ FL DEP ROSS.GDT 2/4/19

SAJ FORM 1836 JUN 02 **MODIFIED FOR THE FLORIDA DEP** JUN 04

Boring Designation SJ-04

DRILLING LOG

CLIENT	Moffatt & Nichol
PROJECT OWNER	Town Of Sunset Beach, North Carolina
SHEET	1 OF 1 SHEETS
1. PROJECT	Town of Sunset Beach Navigation Project South Jinks Creek, Brunswick County, North Carolina
2. BORING DESIGNATION	SJ-04
LOCATION COORDINATES	X = 2,154,296 Y = 45,507
3. DRILLING AGENCY	Athena Technologies, Inc.
CONTRACTOR FILE NO.	
4. NAME OF DRILLER	P. McClellan
5. DIRECTION OF BORING	☒ VERTICAL ☐ INCLINED
DEG. FROM VERTICAL	
BEARING	
6. THICKNESS OF OVERBURDEN	0.0 Ft.
7. DEPTH DRILLED INTO ROCK	0.0 Ft.
8. TOTAL DEPTH OF BORING	10.5 Ft.
9. SIZE AND TYPE OF BIT	3.0 In.
10. COORDINATE SYSTEM/DATUM	NC State Plane
HORIZONTAL	NAD 1983
VERTICAL	MLW
11. MANUFACTURER'S DESIGNATION OF DRILL	☐ AUTO HAMMER ☐ MANUAL HAMMER
12. TOTAL SAMPLES	DISTURBED: 4 / UNDISTURBED (UD):
13. TOTAL NUMBER CORE BOXES	
14. WATER DEPTH	3.5 Ft.
15. DATE BORING	STARTED: 01-03-19 07:21 / COMPLETED: 01-03-19
16. ELEVATION TOP OF BORING	1.1 Ft.
17. TOTAL RECOVERY FOR BORING	10 Ft.
18. SIGNATURE AND TITLE OF INSPECTOR	A. Freeze

ELEV. (ft)	SCALE (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
1.1	0.0					
			Poorly graded SAND; mostly fine quartz sand, trace inorganic silt in layers and laminations, trace fine to medium sand-sized shell in matrix, loose, subangular, gray (5Y-5/1), (SP).		S-1	Sample #S-1, Depth = 0.0' - 2.5' Mean (mm): 0.17, Phi Sorting: 0.44 Fines (#200) - 1.81 (SP)
					S-2	Sample #S-2, Depth = 3.0' - 5.0' Mean (mm): 0.17, Phi Sorting: 0.43 Fines (#200) - 2.25 (SP)
					S-3	Sample #S-3, Depth = 5.0' - 7.1' Mean (mm): 0.17, Phi Sorting: 0.36 Fines (#200) - 1.25 (SP)
-6.8	7.9				C-1	Sample #C-1, Depth = 0.0' - 7.1' Carbonate: 4.8%
			Fat inorganic CLAY; mostly inorganic clay, soft, moderate to high plasticity, very dark gray (5Y-3/1), (CH).			
-8.9	10.0					
			End of Boring			

0 5 10 15

FLORIDA DEP ROSS M&N SUNSET BEACH NAVIGATION PROJECT.GPJ FL DEP ROSS.GDT 2/4/19

SAJ FORM 1836 JUN 02 **MODIFIED FOR THE FLORIDA DEP** JUN 04

Boring Designation SJ-05

DRILLING LOG

CLIENT	Moffatt & Nichol
PROJECT OWNER	Town Of Sunset Beach, North Carolina
SHEET	1 OF 1 SHEETS
1. PROJECT	Town of Sunset Beach Navigation Project South Jinks Creek, Brunswick County, North Carolina
2. BORING DESIGNATION	SJ-05
LOCATION COORDINATES	X = 2,154,596 Y = 45,464
3. DRILLING AGENCY	Athena Technologies, Inc.
CONTRACTOR FILE NO.	
4. NAME OF DRILLER	P. McClellan
5. DIRECTION OF BORING	☒ VERTICAL ☐ INCLINED
DEG. FROM VERTICAL	
BEARING	
6. THICKNESS OF OVERBURDEN	0.0 Ft.
7. DEPTH DRILLED INTO ROCK	0.0 Ft.
8. TOTAL DEPTH OF BORING	9.0 Ft.
9. SIZE AND TYPE OF BIT	3.0 In.
10. COORDINATE SYSTEM/DATUM	NC State Plane
HORIZONTAL	NAD 1983
VERTICAL	MLW
11. MANUFACTURER'S DESIGNATION OF DRILL	☐ AUTO HAMMER ☐ MANUAL HAMMER
12. TOTAL SAMPLES	DISTURBED: 4 / UNDISTURBED (UD):
13. TOTAL NUMBER CORE BOXES	
14. WATER DEPTH	6.6 Ft.
15. DATE BORING	STARTED: 01-03-19 07:50 / COMPLETED: 01-03-19
16. ELEVATION TOP OF BORING	-2.3 Ft.
17. TOTAL RECOVERY FOR BORING	8.3 Ft.
18. SIGNATURE AND TITLE OF INSPECTOR	A. Freeze

ELEV. (ft)	SCALE (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-2.3	0.0					0
			Poorly graded SAND; mostly fine quartz sand, trace inorganic silt in layers, laminations and burrows, trace fine to medium sand-sized shell in matrix, loose, subangular, olive gray (5Y-5/2), (SP).		S-1	Sample #S-1, Depth = 0.0' - 1.0' Mean (mm): 0.19, Phi Sorting: 0.56 Fines (#200) - 1.68 (SP)
					S-2	Sample #S-2, Depth = 1.0' - 3.3' Mean (mm): 0.17, Phi Sorting: 0.45 Fines (#200) - 0.11 (SP)
					S-3	Sample #S-3, Depth = 3.3' - 3.7' Mean (mm): 0.15, Phi Sorting: 0.34 Fines (#200) - 1.00 (SP)
					C-1	Sample #C-1, Depth = 0.0' - 3.7' Carbonate: 4.1%
						5
-10.6	8.3					
			End of Boring			10
						15

FLORIDA DEP ROSS M&N SUNSET BEACH NAVIGATION PROJECT.GPJ FL DEP ROSS.GDT 2/4/19

SAJ FORM 1836 **MODIFIED FOR THE FLORIDA DEP**
JUN 02 JUN 04

Boring Designation SJ-06

DRILLING LOG

CLIENT	Moffatt & Nichol
PROJECT OWNER	Town Of Sunset Beach, North Carolina
SHEET	1 OF 1 SHEETS
1. PROJECT	Town of Sunset Beach Navigation Project South Jinks Creek, Brunswick County, North Carolina
9. SIZE AND TYPE OF BIT	3.0 In.
10. COORDINATE SYSTEM/DATUM	NC State Plane / NAD 1983 / MLW
2. BORING DESIGNATION	SJ-06
LOCATION COORDINATES	X = 2,154,873 Y = 45,561
11. MANUFACTURER'S DESIGNATION OF DRILL	☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY	Athena Technologies, Inc.
CONTRACTOR FILE NO.	
12. TOTAL SAMPLES	DISTURBED 5 / UNDISTURBED (UD)
4. NAME OF DRILLER	P. McClellan
13. TOTAL NUMBER CORE BOXES	
5. DIRECTION OF BORING	☒ VERTICAL ☐ INCLINED
DEG. FROM VERTICAL	
BEARING	
14. WATER DEPTH	3.9 Ft.
15. DATE BORING	STARTED 01-03-19 07:34 / COMPLETED 01-03-19
6. THICKNESS OF OVERBURDEN	0.0 Ft.
16. ELEVATION TOP OF BORING	0.5 Ft.
7. DEPTH DRILLED INTO ROCK	0.0 Ft.
17. TOTAL RECOVERY FOR BORING	10.3 Ft.
8. TOTAL DEPTH OF BORING	10.5 Ft.
18. SIGNATURE AND TITLE OF INSPECTOR	A. Freeze

ELEV. (ft)	SCALE (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
0.5	0.0					
			Poorly graded SAND; mostly fine quartz sand, trace inorganic silt in occasional laminations and burrows, trace fine sand-sized shells in matrix, loose, subangular, gray (5Y-6/1), (SP).		S-1	Sample #S-1, Depth = 0.0' - 2.5' Mean (mm): 0.17, Phi Sorting: 0.39 Fines (#200) - 1.01 (SP)
					S-2	Sample #S-2, Depth = 2.5' - 4.5' Mean (mm): 0.16, Phi Sorting: 0.43 Fines (#200) - 1.22 (SP)
					S-3	Sample #S-3, Depth = 4.5' - 6.0' Mean (mm): 0.21, Phi Sorting: 0.55 Fines (#200) - 0.80 (SP)
-5.5	6.0				S-4	Sample #S-4, Depth = 6.0' - 6.5' Mean (mm): 0.15, Phi Sorting: 0.46 Fines (#200) - 3.00 (SP)
			Silty SAND; mostly fine quartz sand, little inorganic silt in matrix, layers, laminations and burrows, trace fine sand-sized shell in matrix, loose, subangular, bioturbated, gray (5Y-5/1), (SM).		C-1	Sample #C-1, Depth = 0.0' - 6.5' Carbonate: 4.4%
-9.8	10.3					
			End of Boring			

0 5 10 15

FLORIDA DEP ROSS M&N SUNSET BEACH NAVIGATION PROJECT.GPJ FL DEP ROSS.GDT 2/4/19

SAJ FORM 1836 JUN 02 **MODIFIED FOR THE FLORIDA DEP** JUN 04

GRADATION CURVES

Terracon
9655 Florida Mining Boulevard West
Jacksonville, Florida 32257
(904) 900-6494 (Tel) · (904) 268-5255 (Fax)

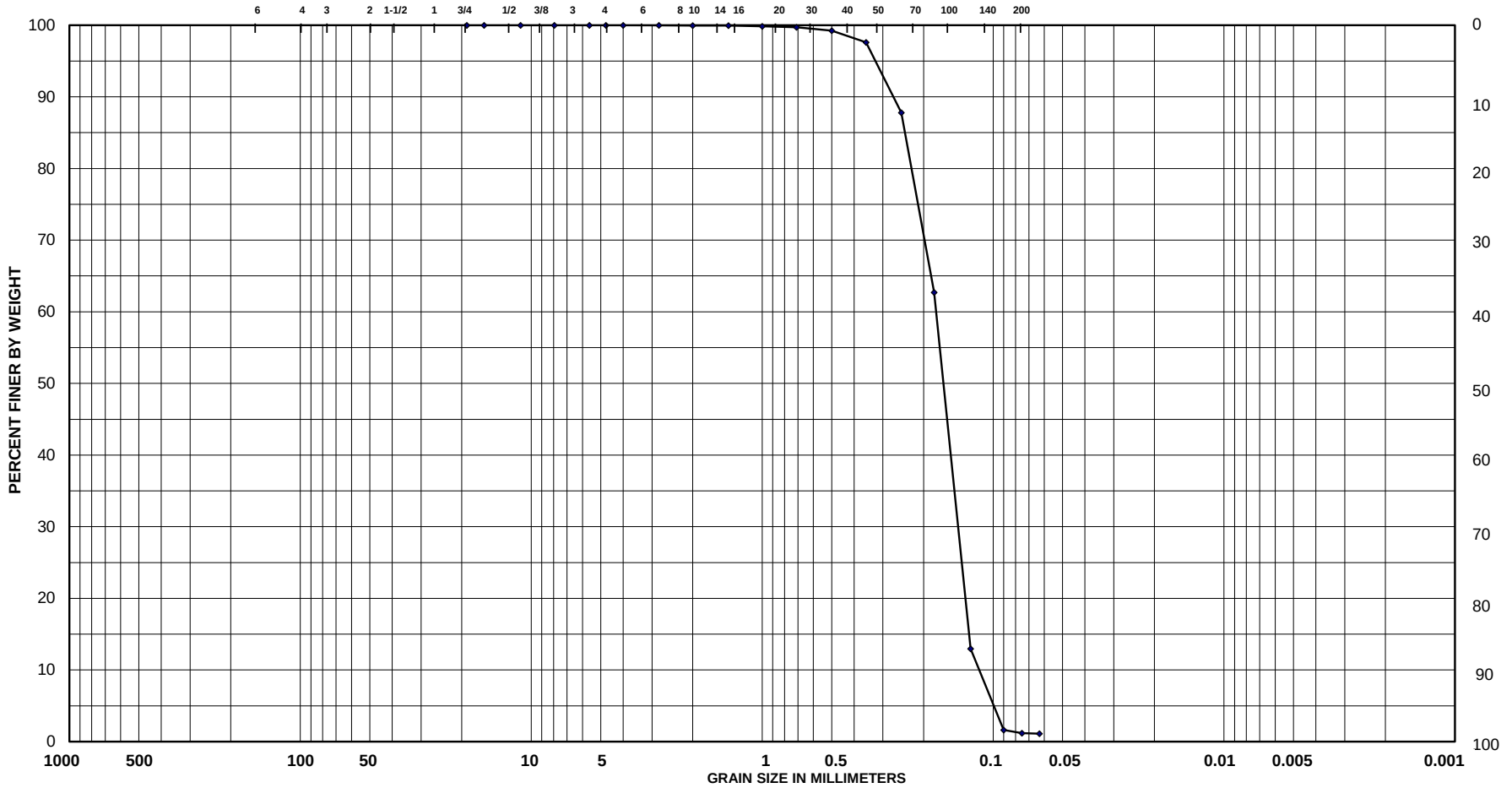
VISUAL SHELL CONTENT

GRAIN SIZE AND VISUAL SHELL CONTENT

Project:	**M&N Sunset Beach NC**	**Depth:**	**0/2**
Project No.:	**EQ191008**	**Date:**	**1/18/2019**
Boring No.:	**SJ-01**		
Sample No.:	**S-1**		
Description:	**SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 10Y 6/2**		

Tare Weight, (g):	51.28	
	185.22	(with tare)
Dry Weight After Washing (g):		(with tare)

Sieve Size (Name)	Sieve Size (mm)	Weight Retained (g)	% Passing	Approx. Visual Shell %	Approx. Visual Shell Wt. (g)
3/4"	19.000	0.00	100.00	0	0.00
5/8"	16.000	0.00	100.00	0	0.00
7/16	11.112	0.00	100.00	0	0.00
5/16	7.938	0.00	100.00	0	0.00
#3.5	5.600	0.00	100.00	0	0.00
#4	4.750	0.00	100.00	0	0.00
#5	4.000	0.00	100.00	0	0.00
#7	2.800	0.02	99.99	100	0.02
#10	2.000	0.02	99.97	100	0.02
#14	1.400	0.03	99.95	100	0.03
#18	1.000	0.11	99.87	100	0.11
#25	0.710	0.22	99.70	95	0.21
#35	0.500	0.63	99.23	40	0.25
#45	0.355	2.17	97.61	25	0.54
#60	0.250	13.16	87.79	15	1.97
#80	0.180	33.59	62.71	5	1.68
#120	0.125	66.60	12.98	1	0.67
#170	0.090	15.20	1.64	0	0.00
#200	0.075	0.62	1.17	0	0.00
#230	0.063	0.08	1.11	0	0.00
Total Shell Content:		**4**			



Sample No.	Elev. Or Depth	Classification	% CO_3	G_s	Shell	LL	PL	PI
◆ S-1	0/2	SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 10Y 6/2			4			

Project M&N Sunset Beach NC

Area

Boring No. SJ-01

Date 1/18/2019

GRADATION CURVES

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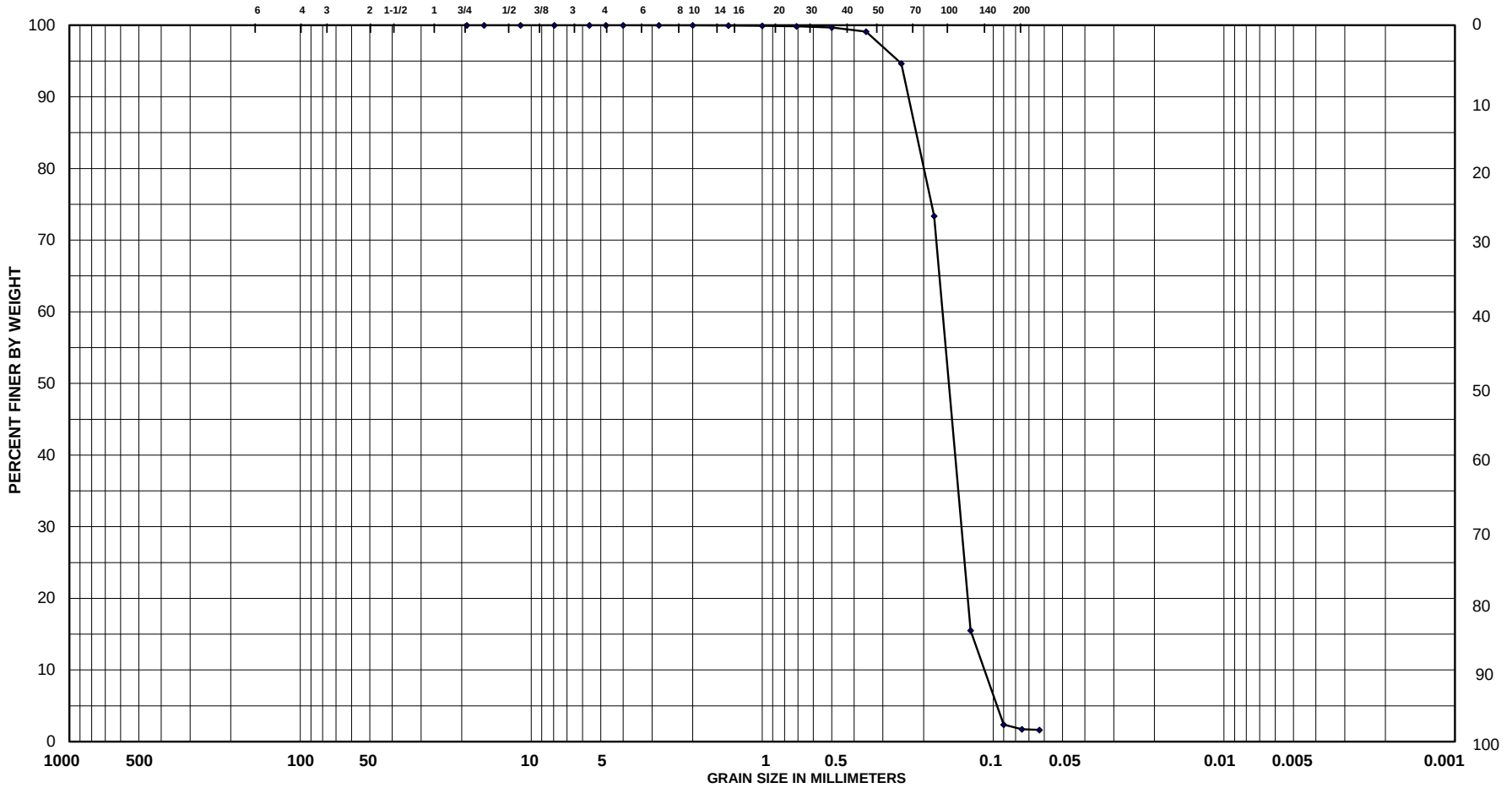
VISUAL SHELL CONTENT

GRAIN SIZE AND VISUAL SHELL CONTENT

Project:	**M&N Sunset Beach NC**	**Depth:**	**3/5.9**
Project No.:	**EQ191008**	**Date:**	**1/18/2019**
Boring No.:	**SJ-01**		
Sample No.:	**S-2**		
Description:	**SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5Y 6/1**		

Tare Weight, (g):	51.04	
	172.31	(with tare)
Dry Weight After Washing (g):		(with tare)

Sieve Size (Name)	Sieve Size (mm)	Weight Retained (g)	% Passing	Approx. Visual Shell %	Approx. Visual Shell Wt. (g)
3/4"	19.000	0.00	100.00	0	0.00
5/8"	16.000	0.00	100.00	0	0.00
7/16	11.112	0.00	100.00	0	0.00
5/16	7.938	0.00	100.00	0	0.00
#3.5	5.600	0.00	100.00	0	0.00
#4	4.750	0.00	100.00	0	0.00
#5	4.000	0.00	100.00	0	0.00
#7	2.800	0.02	99.98	100	0.02
#10	2.000	0.00	99.98	0	0.00
#14	1.400	0.02	99.97	100	0.02
#18	1.000	0.05	99.93	100	0.05
#25	0.710	0.11	99.84	95	0.10
#35	0.500	0.17	99.69	30	0.05
#45	0.355	0.73	99.09	20	0.15
#60	0.250	5.37	94.66	5	0.27
#80	0.180	25.81	73.38	1	0.26
#120	0.125	70.16	15.53	0	0.00
#170	0.090	15.97	2.36	0	0.00
#200	0.075	0.77	1.72	0	0.00
#230	0.063	0.10	1.64	0	0.00
Total Shell Content:		**1**			



Sample No.	Elev. Or Depth	Classification	% CO_3	G_s	Shell	LL	PL	PI
◆ S-2	3/5.9	SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5Y 6/1			1			

Project M&N Sunset Beach NC

Area

Boring No. SJ-01

Date 1/18/2019

GRADATION CURVES

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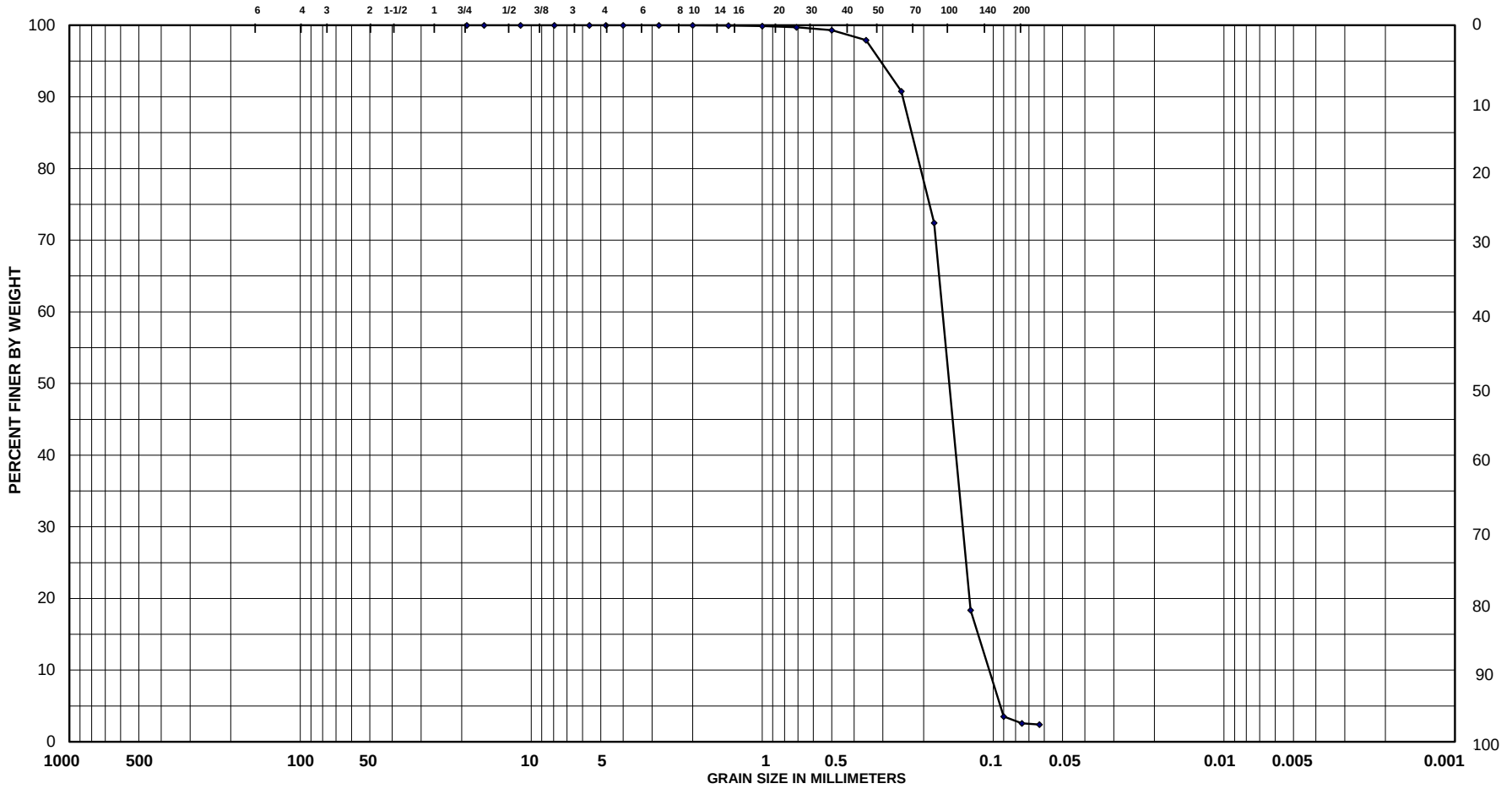
VISUAL SHELL CONTENT

GRAIN SIZE AND VISUAL SHELL CONTENT

Project:	**M&N Sunset Beach NC**	**Depth:**	**0/2.5**
Project No.:	**EQ191008**	**Date:**	**1/18/2019**
Boring No.:	**SJ-02**		
Sample No.:	**S-1**		
Description:	**SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5Y 6/2**		

Tare Weight, (g):	49.62	
	177.62	(with tare)
Dry Weight After Washing (g):		(with tare)

Sieve Size (Name)	Sieve Size (mm)	Weight Retained (g)	% Passing	Approx. Visual Shell %	Approx. Visual Shell Wt. (g)
3/4"	19.000	0.00	100.00	0	0.00
5/8"	16.000	0.00	100.00	0	0.00
7/16	11.112	0.00	100.00	0	0.00
5/16	7.938	0.00	100.00	0	0.00
#3.5	5.600	0.00	100.00	0	0.00
#4	4.750	0.00	100.00	0	0.00
#5	4.000	0.00	100.00	0	0.00
#7	2.800	0.00	100.00	0	0.00
#10	2.000	0.01	99.99	100	0.01
#14	1.400	0.04	99.96	100	0.04
#18	1.000	0.09	99.89	100	0.09
#25	0.710	0.21	99.73	95	0.20
#35	0.500	0.55	99.30	40	0.22
#45	0.355	1.75	97.93	30	0.53
#60	0.250	9.13	90.80	10	0.91
#80	0.180	23.54	72.41	1	0.24
#120	0.125	69.17	18.37	0	0.00
#170	0.090	18.99	3.53	0	0.00
#200	0.075	1.22	2.58	0	0.00
#230	0.063	0.22	2.41	0	0.00
Total Shell Content:		**2**			



Sample No.	Elev. Or Depth	Classification	% CO_3	G_s	Shell	LL	PL	PI
◆ S-1	0/2.5	SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5Y 6/2			2			

Project M&N Sunset Beach NC

Area

Boring No. SJ-02

Date 1/18/2019

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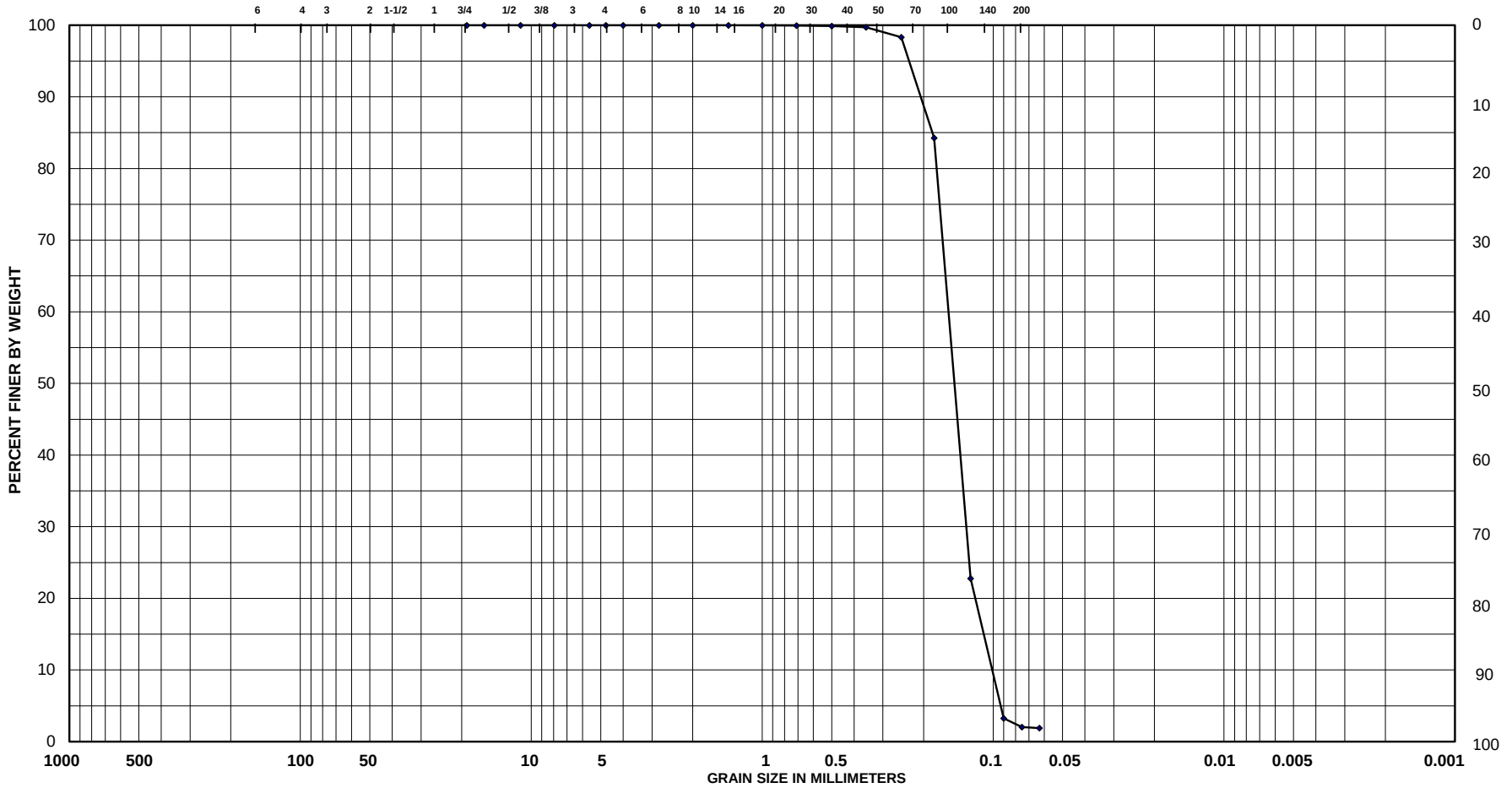
VISUAL SHELL CONTENT

GRAIN SIZE AND VISUAL SHELL CONTENT

Project:	**M&N Sunset Beach NC**	**Depth:**	**3/5**
Project No.:	**EQ191008**	**Date:**	**1/18/2019**
Boring No.:	**SJ-02**		
Sample No.:	**S-2**		
Description:	**SAND, poorly-graded, mostly fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5Y 5/2**		

Tare Weight, (g):	49.83	
	179.54	(with tare)
Dry Weight After Washing (g):		(with tare)

Sieve Size (Name)	Sieve Size (mm)	Weight Retained (g)	% Passing	Approx. Visual Shell %	Approx. Visual Shell Wt. (g)
3/4"	19.000	0.00	100.00	0	0.00
5/8"	16.000	0.00	100.00	0	0.00
7/16	11.112	0.00	100.00	0	0.00
5/16	7.938	0.00	100.00	0	0.00
#3.5	5.600	0.00	100.00	0	0.00
#4	4.750	0.00	100.00	0	0.00
#5	4.000	0.00	100.00	0	0.00
#7	2.800	0.00	100.00	0	0.00
#10	2.000	0.00	100.00	0	0.00
#14	1.400	0.00	100.00	0	0.00
#18	1.000	0.03	99.98	100	0.03
#25	0.710	0.04	99.95	100	0.04
#35	0.500	0.08	99.88	95	0.08
#45	0.355	0.21	99.72	50	0.11
#60	0.250	1.83	98.31	15	0.27
#80	0.180	18.22	84.26	1	0.18
#120	0.125	79.75	22.78	0	0.00
#170	0.090	25.34	3.25	0	0.00
#200	0.075	1.57	2.04	0	0.00
#230	0.063	0.19	1.89	0	0.00
Total Shell Content:		**1**			



Sample No.	Elev. Or Depth	Classification	% CO_3	G_s	Shell	LL	PL	PI
◆ S-2	3/5	SAND, poorly-graded, mostly fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5Y 5/2			1			

Project M&N Sunset Beach NC

Area

Boring No. SJ-02

Date 1/18/2019

GRADATION CURVES

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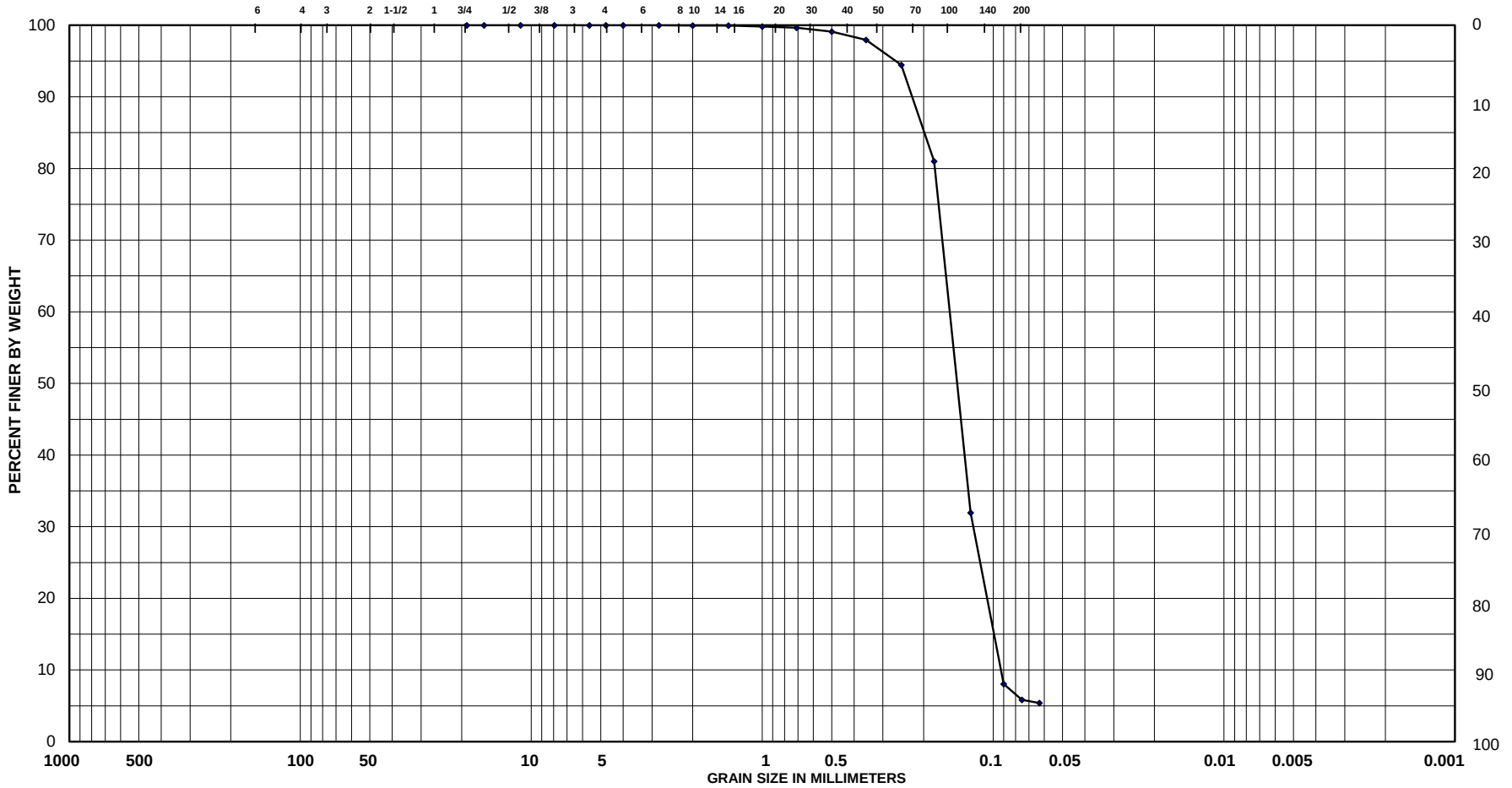
VISUAL SHELL CONTENT

GRAIN SIZE AND VISUAL SHELL CONTENT

Project:	**M&N Sunset Beach NC**	**Depth:**	**5.4/6.2**
Project No.:	**EQ181220**	**Date:**	**1/18/2019**
Boring No.:	**SJ-02**		
Sample No.:	**S-3**		
Description:	**SAND, poorly-graded with silt, mostly medium to fine-grained quartz, few silt, trace medium to fine sand-sized shell fragments (SP-SM) 5Y 5/2**		

Tare Weight, (g):	52.03	
	153.18	(with tare)
Dry Weight After Washing (g):		(with tare)

Sieve Size (Name)	Sieve Size (mm)	Weight Retained (g)	% Passing	Approx. Visual Shell %	Approx. Visual Shell Wt. (g)
3/4"	19.000	0.00	100.00	0	0.00
5/8"	16.000	0.00	100.00	0	0.00
7/16	11.112	0.00	100.00	0	0.00
5/16	7.938	0.00	100.00	0	0.00
#3.5	5.600	0.00	100.00	0	0.00
#4	4.750	0.00	100.00	0	0.00
#5	4.000	0.00	100.00	0	0.00
#7	2.800	0.00	100.00	0	0.00
#10	2.000	0.03	99.97	50	0.02
#14	1.400	0.02	99.95	50	0.01
#18	1.000	0.12	99.83	50	0.06
#25	0.710	0.20	99.63	30	0.06
#35	0.500	0.53	99.11	20	0.11
#45	0.355	1.17	97.95	15	0.18
#60	0.250	3.53	94.46	5	0.18
#80	0.180	13.62	81.00	1	0.14
#120	0.125	49.62	31.94	0	0.00
#170	0.090	24.17	8.05	0	0.00
#200	0.075	2.25	5.82	0	0.00
#230	0.063	0.44	5.39	0	0.00
Total Shell Content:		**1**			



Sample No.	Elev. Or Depth	Classification	% CO_3	G_s	Shell	LL	PL	PI
◆ S-3	5.4/6.2	SAND, poorly-graded with silt, mostly medium to fine-grained quartz, few silt, trace medium to fine sand-sized shell fragments (SP-SM) 5Y 5/2			1			

Project M&N Sunset Beach NC

Area

Boring No. SJ-02

Date 1/18/2019

GRADATION CURVES

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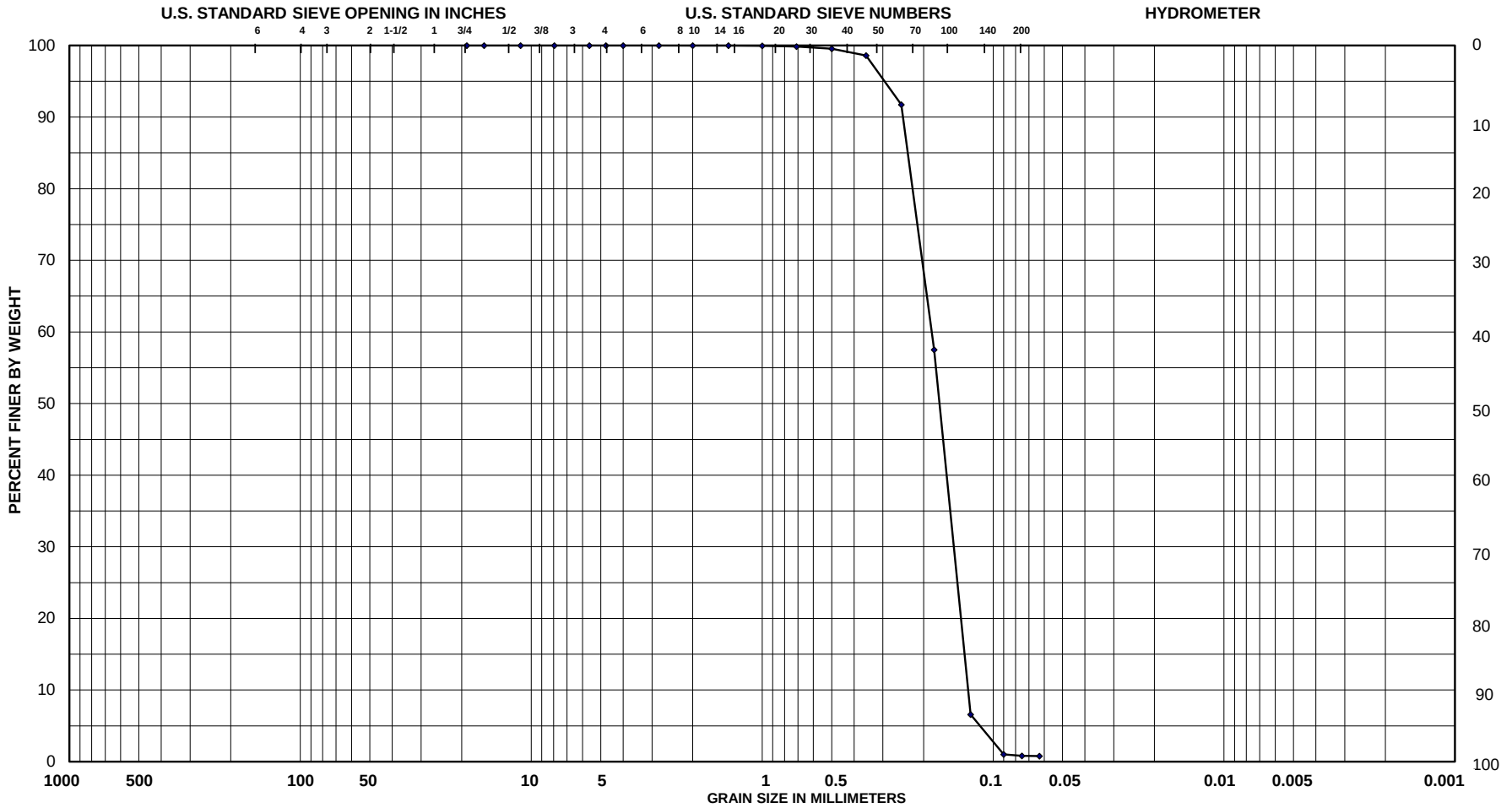
VISUAL SHELL CONTENT

GRAIN SIZE AND VISUAL SHELL CONTENT

Project:	**M&N Sunset Beach NC**	**Depth:**	**0/1.5**
Project No.:	**EQ191008**	**Date:**	**1/18/2019**
Boring No.:	**SJ-03**		
Sample No.:	**S-1**		
Description:	**SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 10Y 6/1**		

Tare Weight, (g):	49.52	
	154.46	(with tare)
Dry Weight After Washing (g):		(with tare)

Sieve Size (Name)	Sieve Size (mm)	Weight Retained (g)	% Passing	Approx. Visual Shell %	Approx. Visual Shell Wt. (g)
3/4"	19.000	0.00	100.00	0	0.00
5/8"	16.000	0.00	100.00	0	0.00
7/16	11.112	0.00	100.00	0	0.00
5/16	7.938	0.00	100.00	0	0.00
#3.5	5.600	0.00	100.00	0	0.00
#4	4.750	0.00	100.00	0	0.00
#5	4.000	0.00	100.00	0	0.00
#7	2.800	0.00	100.00	0	0.00
#10	2.000	0.01	99.99	100	0.01
#14	1.400	0.02	99.97	100	0.02
#18	1.000	0.02	99.95	100	0.02
#25	0.710	0.12	99.84	95	0.11
#35	0.500	0.31	99.54	75	0.23
#45	0.355	0.98	98.61	50	0.49
#60	0.250	7.22	91.73	10	0.72
#80	0.180	35.89	57.53	1	0.36
#120	0.125	53.46	6.58	0	0.00
#170	0.090	5.84	1.02	0	0.00
#200	0.075	0.22	0.81	0	0.00
#230	0.063	0.03	0.78	0	0.00
Total Shell Content:		**2**			



Sample No.	Elev. Or Depth	Classification	% CO_3	G_s	Shell	LL	PL	PI
◆ S-1	0/1.5	SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 10Y 6/1			2			

Project M&N Sunset Beach NC

Area

Boring No. SJ-03

Date 1/18/2019

GRADATION CURVES

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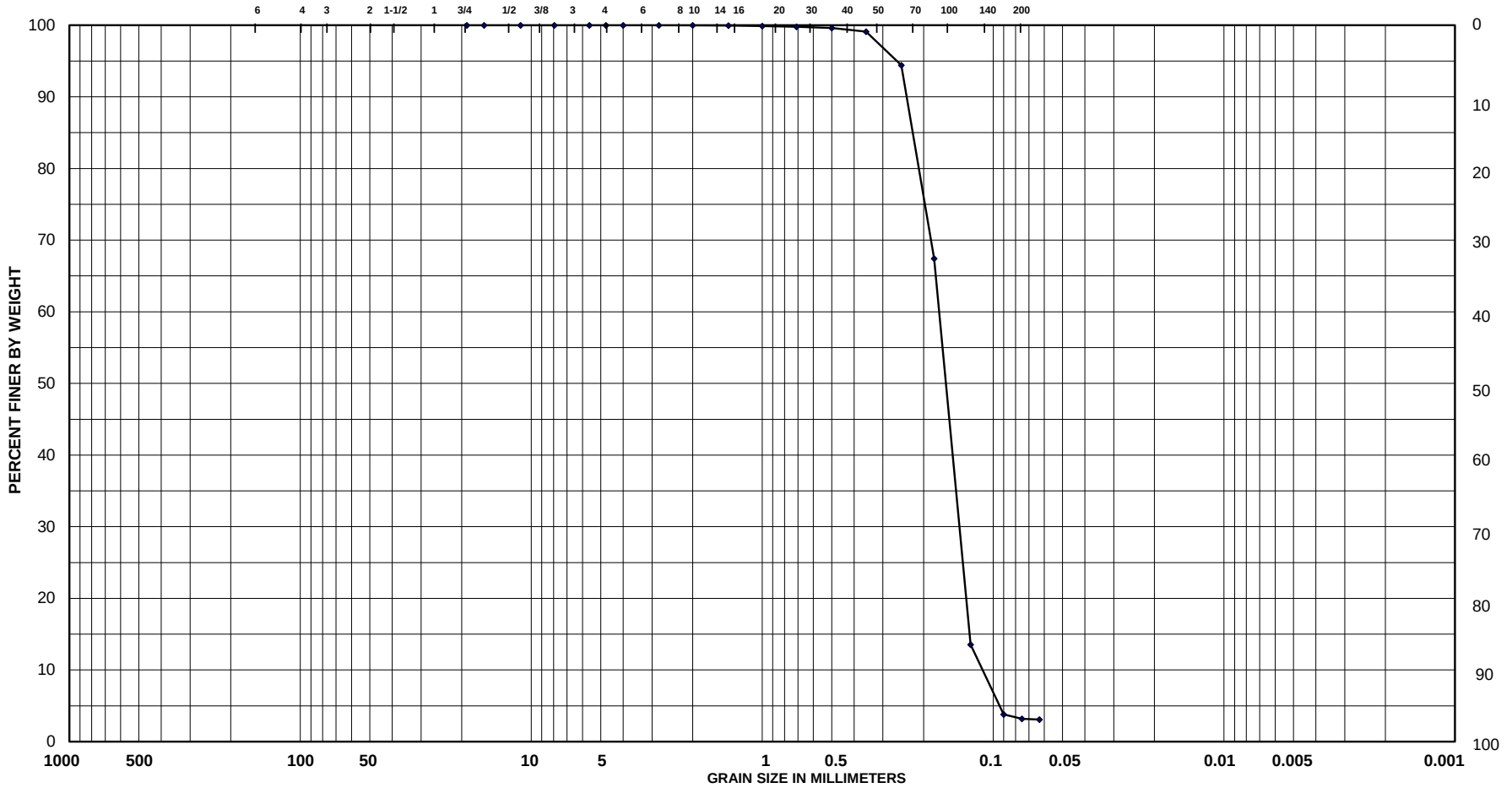
VISUAL SHELL CONTENT

GRAIN SIZE AND VISUAL SHELL CONTENT

Project:	**M&N Sunset Beach NC**	**Depth:**	**2/4.5**
Project No.:	**EQ191008**	**Date:**	**1/18/2019**
Boring No.:	**SJ-03**		
Sample No.:	**S-2**		
Description:	**SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5GY 5/2**		

Tare Weight, (g):	51.42	
	150.46	(with tare)
Dry Weight After Washing (g):		(with tare)

Sieve Size (Name)	Sieve Size (mm)	Weight Retained (g)	% Passing	Approx. Visual Shell %	Approx. Visual Shell Wt. (g)
3/4"	19.000	0.00	100.00	0	0.00
5/8"	16.000	0.00	100.00	0	0.00
7/16	11.112	0.00	100.00	0	0.00
5/16	7.938	0.00	100.00	0	0.00
#3.5	5.600	0.00	100.00	0	0.00
#4	4.750	0.00	100.00	0	0.00
#5	4.000	0.00	100.00	0	0.00
#7	2.800	0.00	100.00	0	0.00
#10	2.000	0.01	99.99	100	0.01
#14	1.400	0.04	99.95	60	0.02
#18	1.000	0.07	99.88	20	0.01
#25	0.710	0.09	99.79	60	0.05
#35	0.500	0.16	99.63	80	0.13
#45	0.355	0.50	99.12	70	0.35
#60	0.250	4.65	94.43	15	0.70
#80	0.180	26.75	67.42	1	0.27
#120	0.125	53.34	13.56	0	0.00
#170	0.090	9.68	3.79	0	0.00
#200	0.075	0.60	3.18	0	0.00
#230	0.063	0.10	3.08	0	0.00
Total Shell Content:		**2**			



Sample No.	Elev. Or Depth	Classification	% CO_3	G_s	Shell	LL	PL	PI
◆ S-2	2/4.5	SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5GY 5/2			2			

Project M&N Sunset Beach NC

Area

Boring No. SJ-03

Date 1/18/2019

GRADATION CURVES

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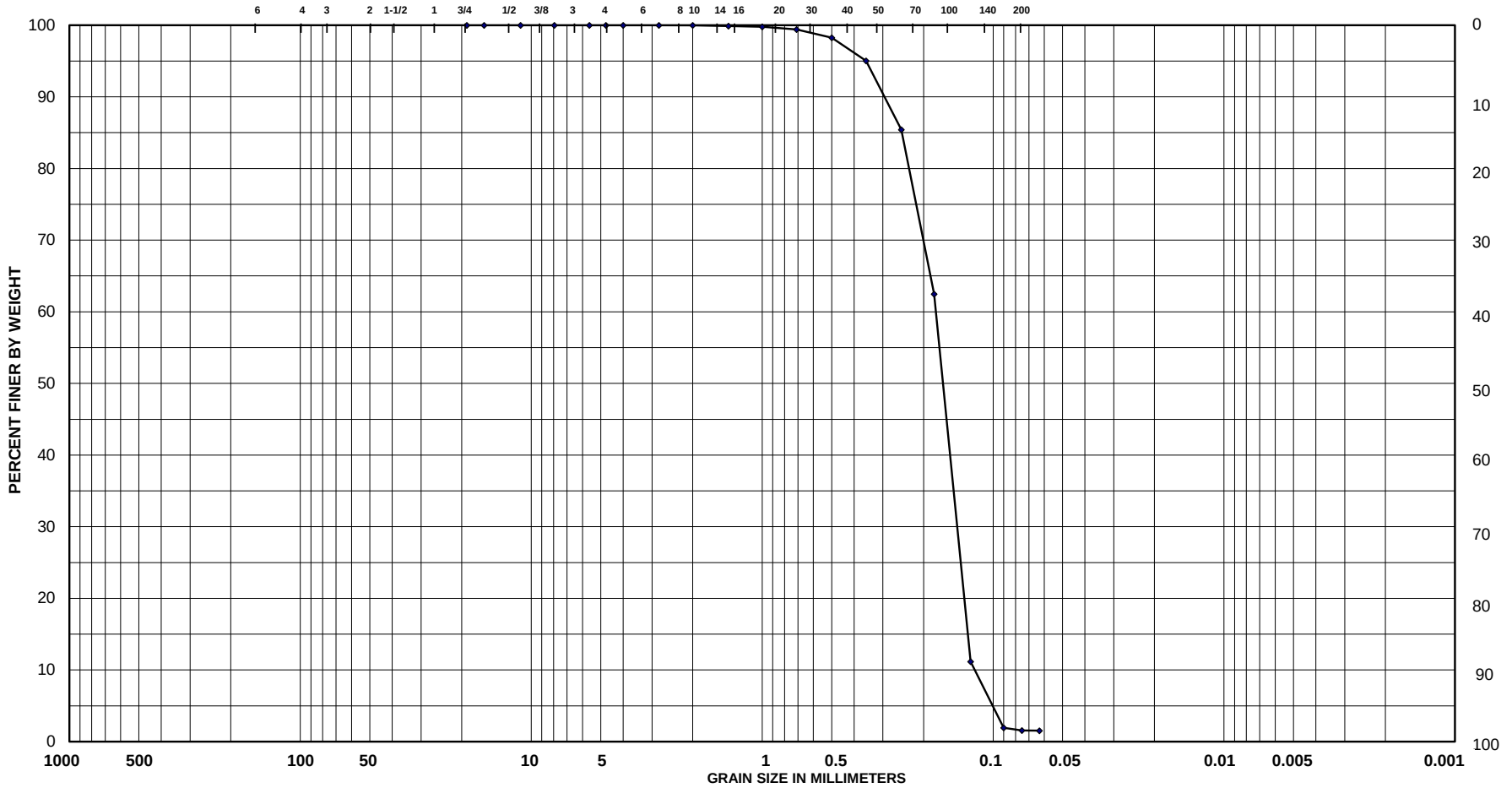
VISUAL SHELL CONTENT

GRAIN SIZE AND VISUAL SHELL CONTENT

Project:	**M&N Sunset Beach NC**	**Depth:**	**5/6.3**
Project No.:	**EQ191008**	**Date:**	**1/18/2019**
Boring No.:	**SJ-03**		
Sample No.:	**S-3**		
Description:	**SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5GY 5/2**		

Tare Weight, (g):	50.48	
	167.63	(with tare)
Dry Weight After Washing (g):		(with tare)

Sieve Size (Name)	Sieve Size (mm)	Weight Retained (g)	% Passing	Approx. Visual Shell %	Approx. Visual Shell Wt. (g)
3/4"	19.000	0.00	100.00	0	0.00
5/8"	16.000	0.00	100.00	0	0.00
7/16	11.112	0.00	100.00	0	0.00
5/16	7.938	0.00	100.00	0	0.00
#3.5	5.600	0.00	100.00	0	0.00
#4	4.750	0.00	100.00	0	0.00
#5	4.000	0.00	100.00	0	0.00
#7	2.800	0.00	100.00	0	0.00
#10	2.000	0.02	99.98	100	0.02
#14	1.400	0.13	99.87	100	0.13
#18	1.000	0.09	99.80	100	0.09
#25	0.710	0.47	99.39	60	0.28
#35	0.500	1.35	98.24	25	0.34
#45	0.355	3.75	95.04	10	0.38
#60	0.250	11.28	85.41	1	0.11
#80	0.180	26.89	62.46	0	0.00
#120	0.125	60.10	11.16	0	0.00
#170	0.090	10.79	1.95	0	0.00
#200	0.075	0.44	1.57	0	0.00
#230	0.063	0.04	1.54	0	0.00
Total Shell Content:		**1**			



Sample No.	Elev. Or Depth	Classification	% CO_3	G_s	Shell	LL	PL	PI
◆ S-3	5/6.3	SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5GY 5/2			1			

Project M&N Sunset Beach NC

Area

Boring No. SJ-03

Date 1/18/2019

GRADATION CURVES

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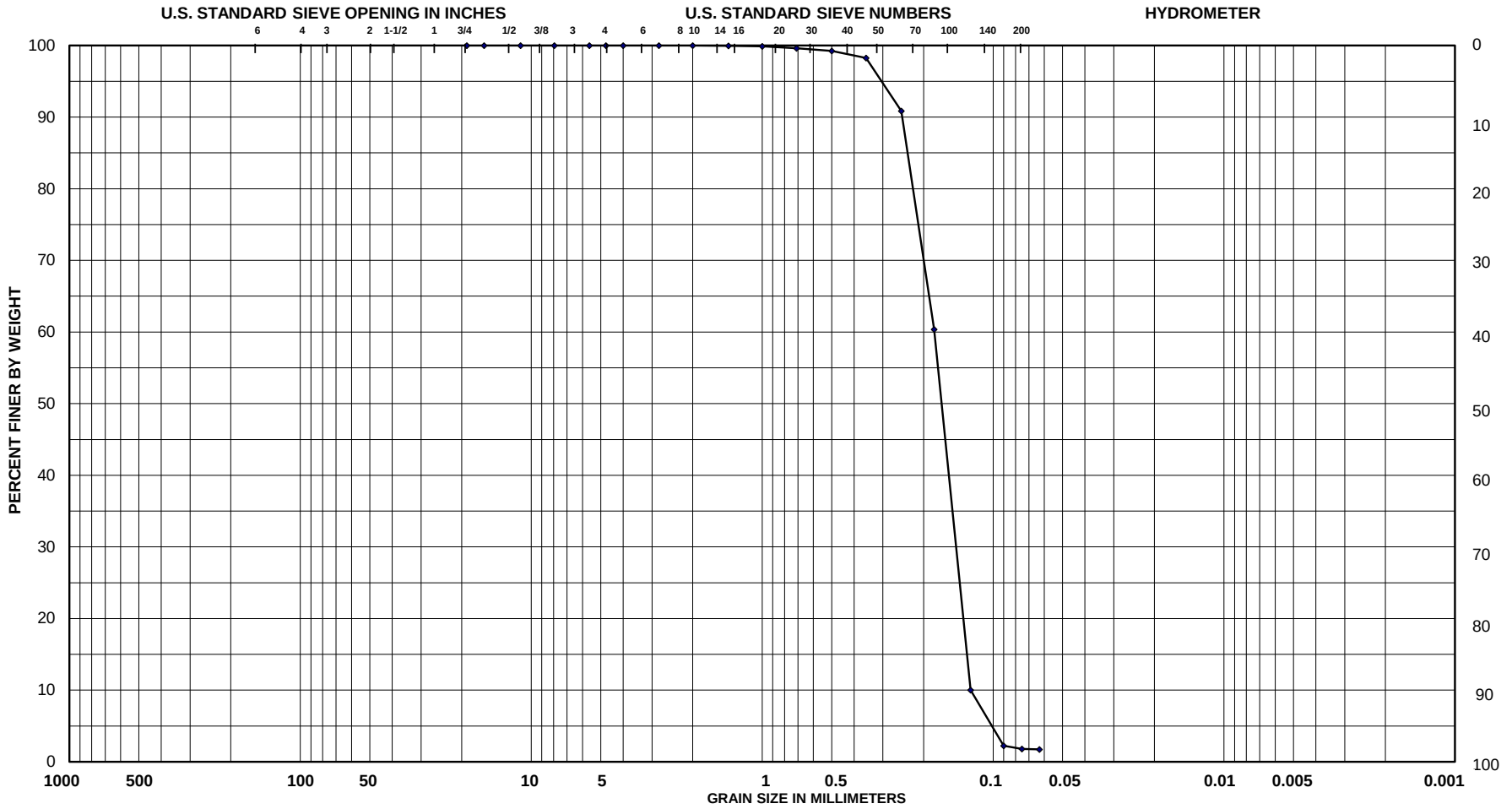
VISUAL SHELL CONTENT

GRAIN SIZE AND VISUAL SHELL CONTENT

Project:	**M&N Sunset Beach NC**	**Depth:**	**0/2.5**
Project No.:	**EQ191008**	**Date:**	**1/18/2019**
Boring No.:	**SJ-04**		
Sample No.:	**S-1**		
Description:	**SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 10Y 6/1**		

Tare Weight, (g):	52.19	
	159.83	(with tare)
Dry Weight After Washing (g):		(with tare)

Sieve Size (Name)	Sieve Size (mm)	Weight Retained (g)	% Passing	Approx. Visual Shell %	Approx. Visual Shell Wt. (g)
3/4"	19.000	0.00	100.00	0	0.00
5/8"	16.000	0.00	100.00	0	0.00
7/16	11.112	0.00	100.00	0	0.00
5/16	7.938	0.00	100.00	0	0.00
#3.5	5.600	0.00	100.00	0	0.00
#4	4.750	0.00	100.00	0	0.00
#5	4.000	0.00	100.00	0	0.00
#7	2.800	0.00	100.00	0	0.00
#10	2.000	0.00	100.00	0	0.00
#14	1.400	0.04	99.96	10	0.00
#18	1.000	0.10	99.87	95	0.10
#25	0.710	0.26	99.63	50	0.13
#35	0.500	0.43	99.23	35	0.15
#45	0.355	1.03	98.27	25	0.26
#60	0.250	7.97	90.87	5	0.40
#80	0.180	32.84	60.36	1	0.33
#120	0.125	54.19	10.01	0	0.00
#170	0.090	8.36	2.25	0	0.00
#200	0.075	0.47	1.81	0	0.00
#230	0.063	0.08	1.74	0	0.00
Total Shell Content:		**1**			



Sample No.	Elev. Or Depth	Classification	% CO_3	G_s	Shell	LL	PL	PI
◆ S-1	0/2.5	SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 10Y 6/1			1			

Project M&N Sunset Beach NC

Area

Boring No. SJ-04

Date 1/18/2019

GRADATION CURVES

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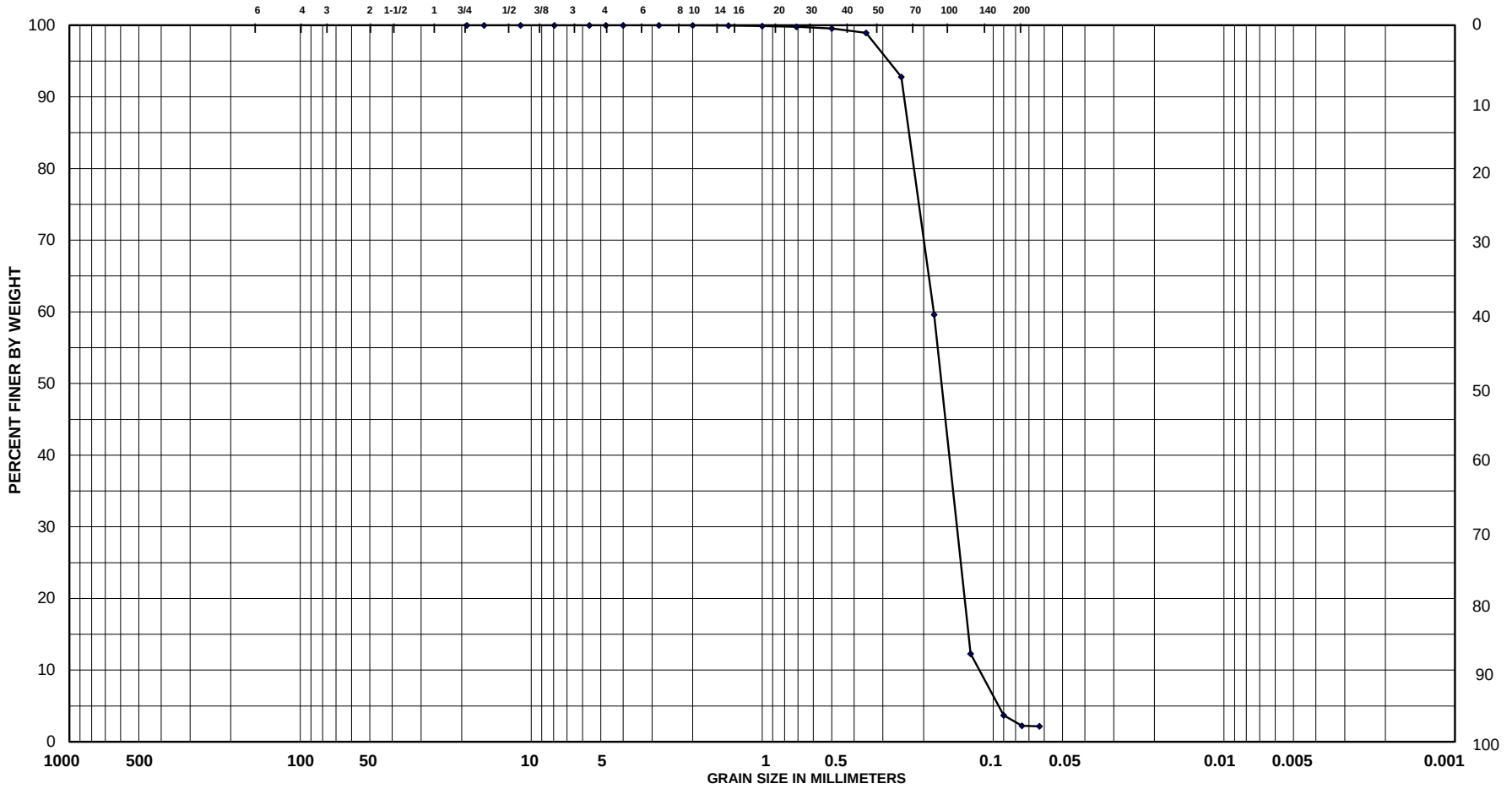
VISUAL SHELL CONTENT

GRAIN SIZE AND VISUAL SHELL CONTENT

Project:	**M&N Sunset Beach NC**	**Depth:**	**3/5**
Project No.:	**EQ191008**	**Date:**	**1/18/2019**
Boring No.:	**SJ-04**		
Sample No.:	**S-2**		
Description:	**SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5Y 5/2**		

Tare Weight, (g):	51.60	
	166.72	(with tare)
Dry Weight After Washing (g):		(with tare)

Sieve Size (Name)	Sieve Size (mm)	Weight Retained (g)	% Passing	Approx. Visual Shell %	Approx. Visual Shell Wt. (g)
3/4"	19.000	0.00	100.00	0	0.00
5/8"	16.000	0.00	100.00	0	0.00
7/16	11.112	0.00	100.00	0	0.00
5/16	7.938	0.00	100.00	0	0.00
#3.5	5.600	0.00	100.00	0	0.00
#4	4.750	0.00	100.00	0	0.00
#5	4.000	0.00	100.00	0	0.00
#7	2.800	0.00	100.00	0	0.00
#10	2.000	0.02	99.98	0	0.00
#14	1.400	0.05	99.94	10	0.01
#18	1.000	0.05	99.90	20	0.01
#25	0.710	0.12	99.79	50	0.06
#35	0.500	0.27	99.56	50	0.14
#45	0.355	0.70	98.95	50	0.35
#60	0.250	7.09	92.79	10	0.71
#80	0.180	38.18	59.62	1	0.38
#120	0.125	54.50	12.28	0	0.00
#170	0.090	9.88	3.70	0	0.00
#200	0.075	1.67	2.25	0	0.00
#230	0.063	0.11	2.15	0	0.00
Total Shell Content:		**1**			



Sample No.	Elev. Or Depth	Classification	% CO_3	G_s	Shell	LL	PL	PI
◆ S-2	3/5	SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5Y 5/2			1			

Project M&N Sunset Beach NC

Area

Boring No. SJ-04

Date 1/18/2019

GRADATION CURVES

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VISUAL SHELL CONTENT

GRAIN SIZE AND VISUAL SHELL CONTENT

Project:	**M&N Sunset Beach NC**	**Depth:**	**5/7.1**
Project No.:	**EQ191008**	**Date:**	**1/18/2019**
Boring No.:	**SJ-04**		
Sample No.:	**S-3**		
Description:	**SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5GY 5/2**		

Tare Weight, (g):	52.09	
	184.60	(with tare)
Dry Weight After Washing (g):		(with tare)

Sieve Size (Name)	Sieve Size (mm)	Weight Retained (g)	% Passing	Approx. Visual Shell %	Approx. Visual Shell Wt. (g)
3/4"	19.000	0.00	100.00	0	0.00
5/8"	16.000	0.00	100.00	0	0.00
7/16	11.112	0.00	100.00	0	0.00
5/16	7.938	0.00	100.00	0	0.00
#3.5	5.600	0.00	100.00	0	0.00
#4	4.750	0.00	100.00	0	0.00
#5	4.000	0.00	100.00	0	0.00
#7	2.800	0.00	100.00	0	0.00
#10	2.000	0.00	100.00	0	0.00
#14	1.400	0.02	99.98	25	0.01
#18	1.000	0.01	99.98	100	0.01
#25	0.710	0.06	99.93	90	0.05
#35	0.500	0.12	99.84	80	0.10
#45	0.355	0.42	99.52	80	0.34
#60	0.250	4.77	95.92	30	1.43
#80	0.180	43.21	63.32	1	0.43
#120	0.125	71.80	9.13	0	0.00
#170	0.090	9.96	1.61	0	0.00
#200	0.075	0.48	1.25	0	0.00
#230	0.063	0.05	1.22	0	0.00
Total Shell Content:		**2**			

Sample No.	Elev. Or Depth	Classification	% CO_3	G_s	Shell	LL	PL	PI
◆ S-3	5/7.1	SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5GY 5/2			2			

Project M&N Sunset Beach NC

Area

Boring No. SJ-04

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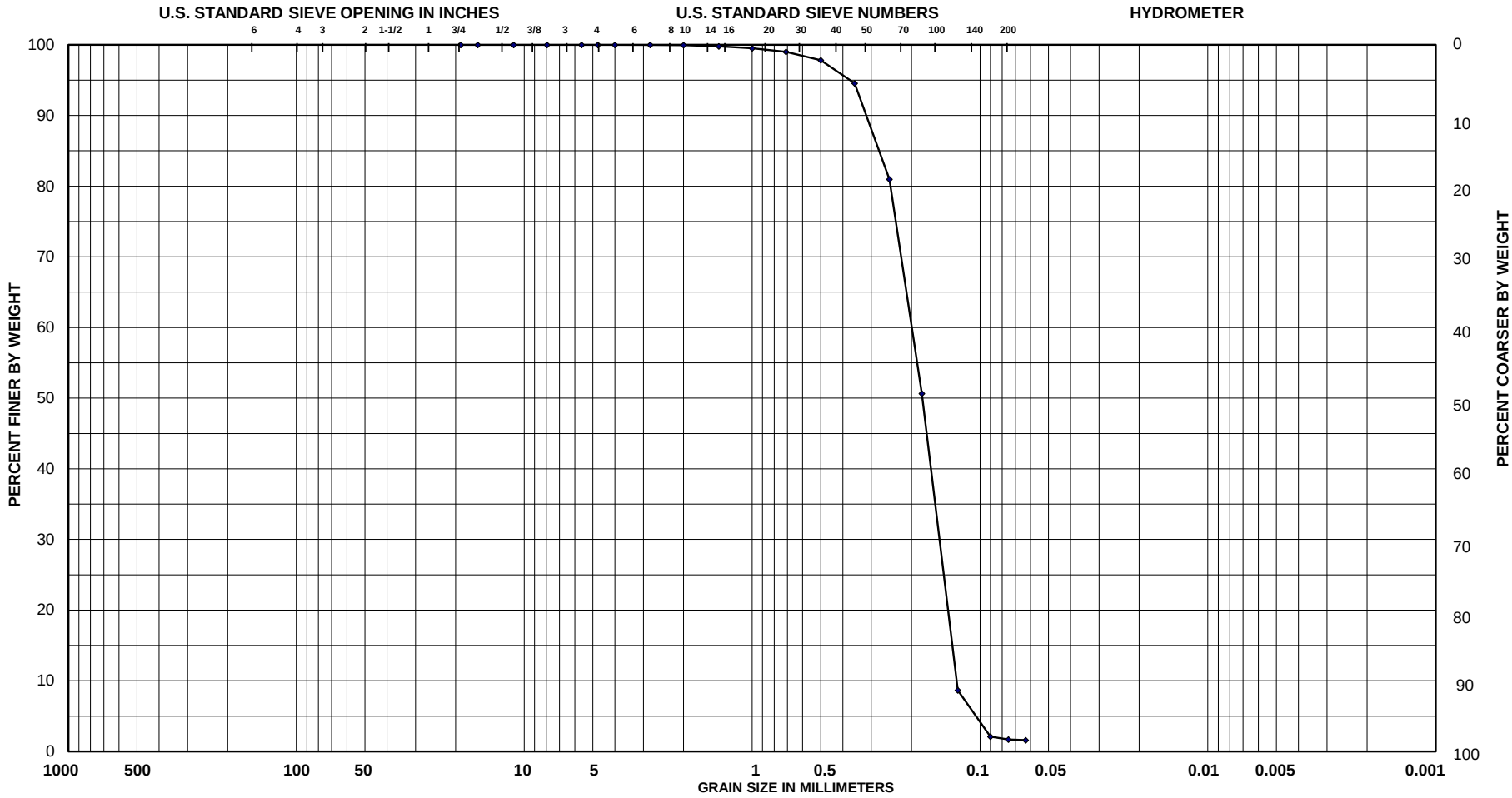
VISUAL SHELL CONTENT

GRAIN SIZE AND VISUAL SHELL CONTENT

Project:	**M&N Sunset Beach NC**	**Depth:**	**0/1**
Project No.:	**EQ191008**	**Date:**	**1/18/2019**
Boring No.:	**SJ-05**		
Sample No.:	**S-1**		
Description:	**SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 10Y 6/1**		

Tare Weight, (g):	50.17	
	162.03	(with tare)
Dry Weight After Washing (g):		(with tare)

Sieve Size (Name)	Sieve Size (mm)	Weight Retained (g)	% Passing	Approx. Visual Shell %	Approx. Visual Shell Wt. (g)
3/4"	19.000	0.00	100.00	0	0.00
5/8"	16.000	0.00	100.00	0	0.00
7/16	11.112	0.00	100.00	0	0.00
5/16	7.938	0.00	100.00	0	0.00
#3.5	5.600	0.00	100.00	0	0.00
#4	4.750	0.00	100.00	0	0.00
#5	4.000	0.00	100.00	0	0.00
#7	2.800	0.03	99.97	100	0.03
#10	2.000	0.02	99.96	100	0.02
#14	1.400	0.21	99.77	70	0.15
#18	1.000	0.28	99.52	70	0.20
#25	0.710	0.56	99.02	70	0.39
#35	0.500	1.34	97.82	40	0.54
#45	0.355	3.66	94.55	20	0.73
#60	0.250	15.20	80.96	5	0.76
#80	0.180	33.89	50.66	0	0.00
#120	0.125	47.00	8.64	0	0.00
#170	0.090	7.33	2.09	0	0.00
#200	0.075	0.46	1.68	0	0.00
#230	0.063	0.08	1.61	0	0.00
Total Shell Content:		**3**			



Sample No.	Elev. Or Depth	Classification	% CO_3	G_s	Shell	LL	PL	PI
◆ S-1	0/1	SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 10Y 6/1			3			

Project M&N Sunset Beach NC

Area

Boring No. SJ-05

Date 1/18/2019

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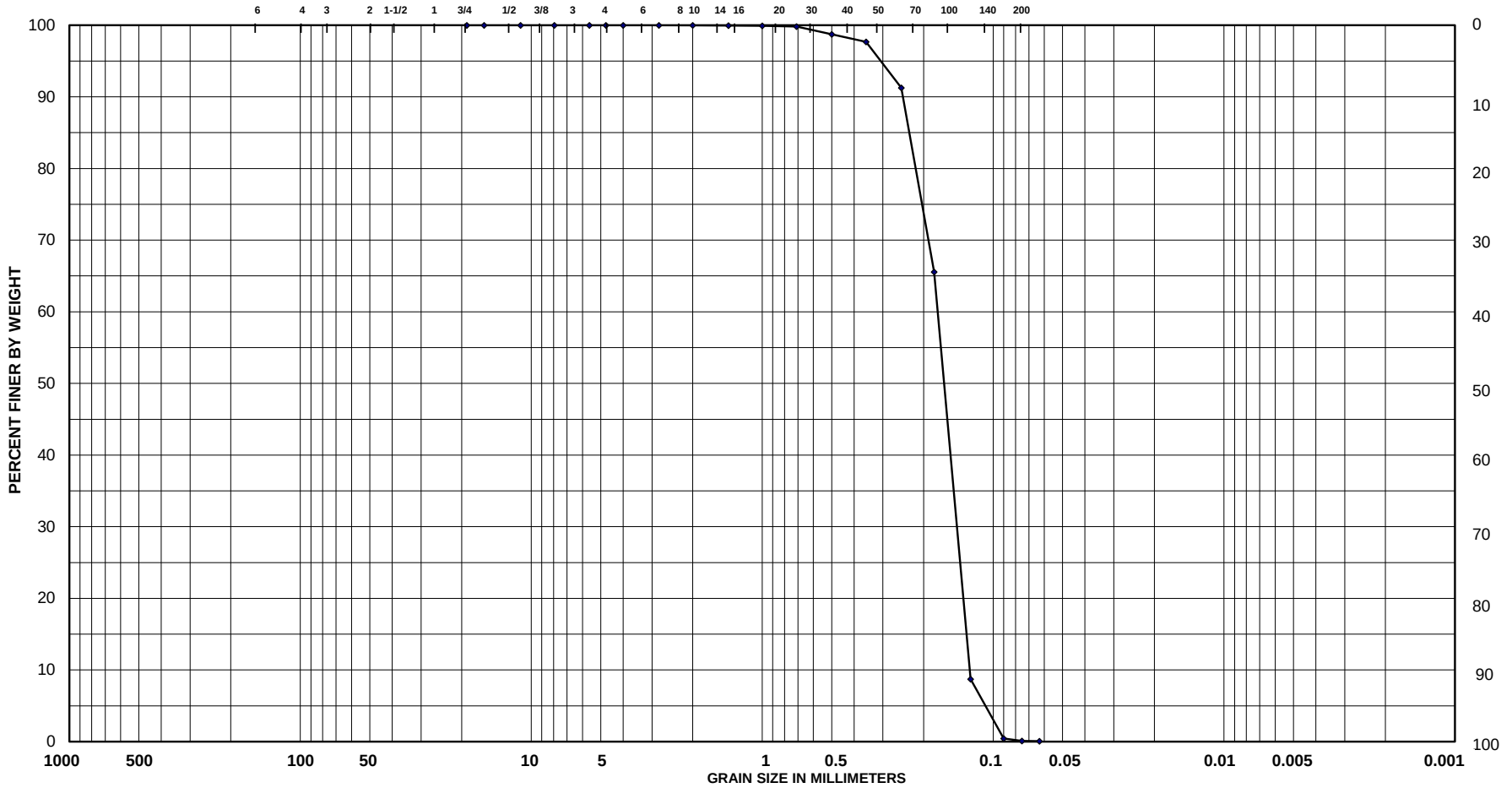
VISUAL SHELL CONTENT

GRAIN SIZE AND VISUAL SHELL CONTENT

Project:	**M&N Sunset Beach NC**	**Depth:**	**1/3.3**
Project No.:	**EQ191008**	**Date:**	**1/18/2019**
Boring No.:	**SJ-05**		
Sample No.:	**S-2**		
Description:	**SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 10Y 6/1**		

Tare Weight, (g):	51.70	
	177.83	(with tare)
Dry Weight After Washing (g):		(with tare)

Sieve Size (Name)	Sieve Size (mm)	Weight Retained (g)	% Passing	Approx. Visual Shell %	Approx. Visual Shell Wt. (g)
3/4"	19.000	0.00	100.00	0	0.00
5/8"	16.000	0.00	100.00	0	0.00
7/16	11.112	0.00	100.00	0	0.00
5/16	7.938	0.00	100.00	0	0.00
#3.5	5.600	0.00	100.00	0	0.00
#4	4.750	0.00	100.00	0	0.00
#5	4.000	0.00	100.00	0	0.00
#7	2.800	0.00	100.00	0	0.00
#10	2.000	0.02	99.98	100	0.02
#14	1.400	0.03	99.96	100	0.03
#18	1.000	0.04	99.93	90	0.04
#25	0.710	0.14	99.82	60	0.08
#35	0.500	1.37	98.73	50	0.69
#45	0.355	1.31	97.69	20	0.26
#60	0.250	8.13	91.25	5	0.41
#80	0.180	32.41	65.55	1	0.32
#120	0.125	71.69	8.71	0	0.00
#170	0.090	10.44	0.44	0	0.00
#200	0.075	0.41	0.11	0	0.00
#230	0.063	0.06	0.06	0	0.00
Total Shell Content:		**1**			



Sample No.	Elev. Or Depth	Classification	% CO_3	G_s	Shell	LL	PL	PI
◆ S-2	1/3.3	SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 10Y 6/1			1			

Project M&N Sunset Beach NC

Area

Boring No. SJ-05

Date 1/18/2019

GRADATION CURVES

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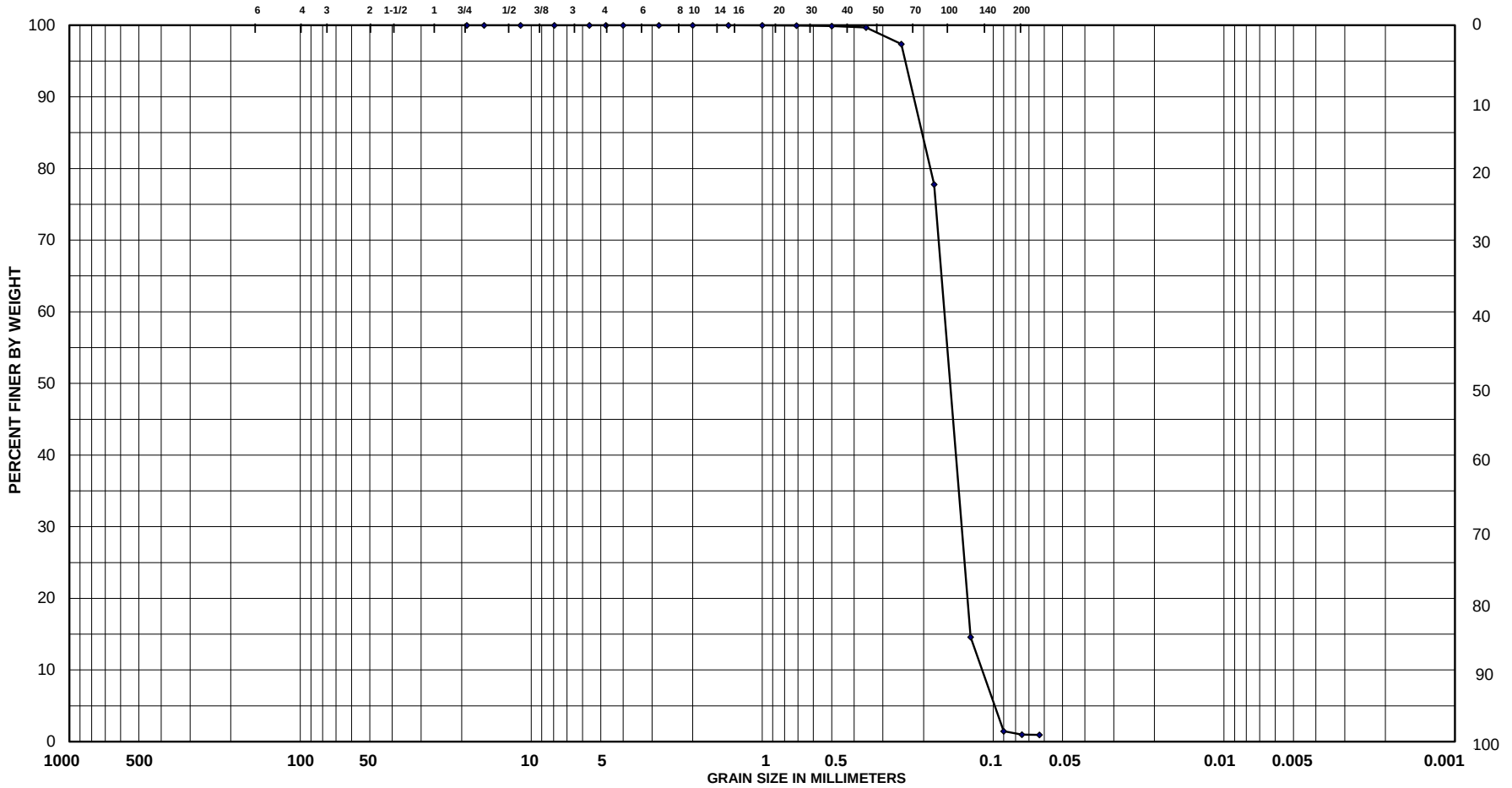
VISUAL SHELL CONTENT

GRAIN SIZE AND VISUAL SHELL CONTENT

Project:	**M&N Sunset Beach NC**	**Depth:**	**3.3/3.7**
Project No.:	**EQ191008**	**Date:**	**1/18/2019**
Boring No.:	**SJ-05**		
Sample No.:	**S-3**		
Description:	**SAND, poorly-graded, mostly fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5GY 6/1**		

Tare Weight, (g):	51.90	
	167.47	(with tare)
Dry Weight After Washing (g):		(with tare)

Sieve Size (Name)	Sieve Size (mm)	Weight Retained (g)	% Passing	Approx. Visual Shell %	Approx. Visual Shell Wt. (g)
3/4"	19.000	0.00	100.00	0	0.00
5/8"	16.000	0.00	100.00	0	0.00
7/16	11.112	0.00	100.00	0	0.00
5/16	7.938	0.00	100.00	0	0.00
#3.5	5.600	0.00	100.00	0	0.00
#4	4.750	0.00	100.00	0	0.00
#5	4.000	0.00	100.00	0	0.00
#7	2.800	0.00	100.00	0	0.00
#10	2.000	0.00	100.00	0	0.00
#14	1.400	0.00	100.00	0	0.00
#18	1.000	0.03	99.97	100	0.03
#25	0.710	0.04	99.94	60	0.02
#35	0.500	0.08	99.87	50	0.04
#45	0.355	0.21	99.69	50	0.11
#60	0.250	2.67	97.38	15	0.40
#80	0.180	22.66	77.77	1	0.23
#120	0.125	73.00	14.61	0	0.00
#170	0.090	15.20	1.45	0	0.00
#200	0.075	0.53	1.00	0	0.00
#230	0.063	0.06	0.94	0	0.00
Total Shell Content:		**1**			



Sample No.	Elev. Or Depth	Classification	% CO_3	G_s	Shell	LL	PL	PI
◆ S-3	3.3/3.7	SAND, poorly-graded, mostly fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5GY 6/1			1			

Project M&N Sunset Beach NC

Area

Boring No. SJ-05

Date 1/18/2019

GRADATION CURVES

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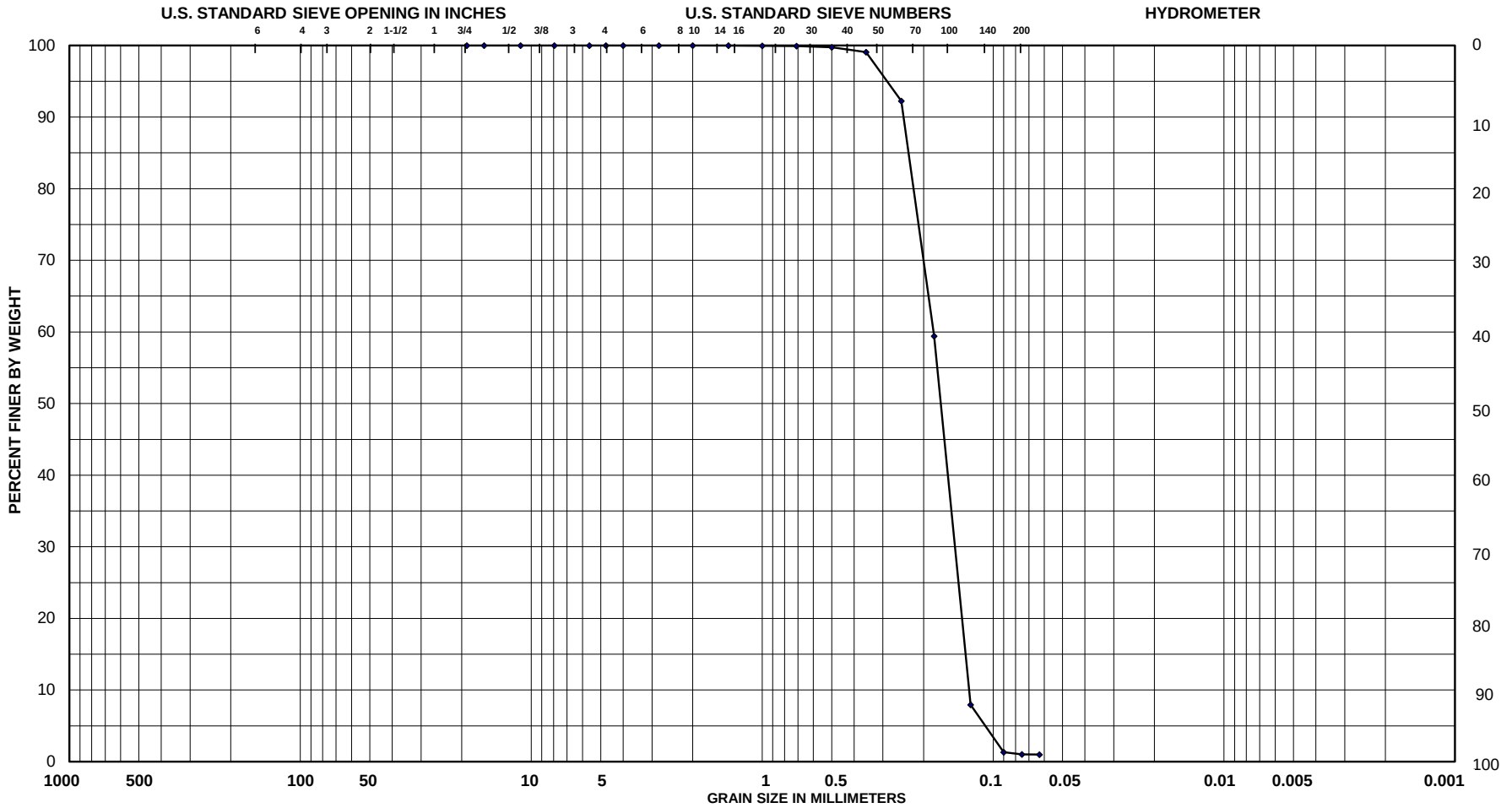
VISUAL SHELL CONTENT

GRAIN SIZE AND VISUAL SHELL CONTENT

Project:	**M&N Sunset Beach NC**	**Depth:**	**0/2.5**
Project No.:	**EQ191008**	**Date:**	**1/18/2019**
Boring No.:	**SJ-06**		
Sample No.:	**S-1**		
Description:	**SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5GY 6/2**		

Tare Weight, (g):	49.80	
	172.26	(with tare)
Dry Weight After Washing (g):		(with tare)

Sieve Size (Name)	Sieve Size (mm)	Weight Retained (g)	% Passing	Approx. Visual Shell %	Approx. Visual Shell Wt. (g)
3/4"	19.000	0.00	100.00	0	0.00
5/8"	16.000	0.00	100.00	0	0.00
7/16	11.112	0.00	100.00	0	0.00
5/16	7.938	0.00	100.00	0	0.00
#3.5	5.600	0.00	100.00	0	0.00
#4	4.750	0.00	100.00	0	0.00
#5	4.000	0.00	100.00	0	0.00
#7	2.800	0.00	100.00	0	0.00
#10	2.000	0.00	100.00	0	0.00
#14	1.400	0.02	99.98	100	0.02
#18	1.000	0.02	99.97	100	0.02
#25	0.710	0.06	99.92	100	0.06
#35	0.500	0.20	99.76	60	0.12
#45	0.355	0.84	99.07	40	0.34
#60	0.250	8.34	92.26	15	1.25
#80	0.180	40.24	59.40	1	0.40
#120	0.125	63.00	7.95	0	0.00
#170	0.090	8.14	1.31	0	0.00
#200	0.075	0.36	1.01	0	0.00
#230	0.063	0.02	1.00	0	0.00
Total Shell Content:		**2**			



Sample No.	Elev. Or Depth	Classification	% CO_3	G_s	Shell	LL	PL	PI
◆ S-1	0/2.5	SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5GY 6/2			2			

Project M&N Sunset Beach NC

Area

Boring No. SJ-06

Date 1/18/2019

GRADATION CURVES

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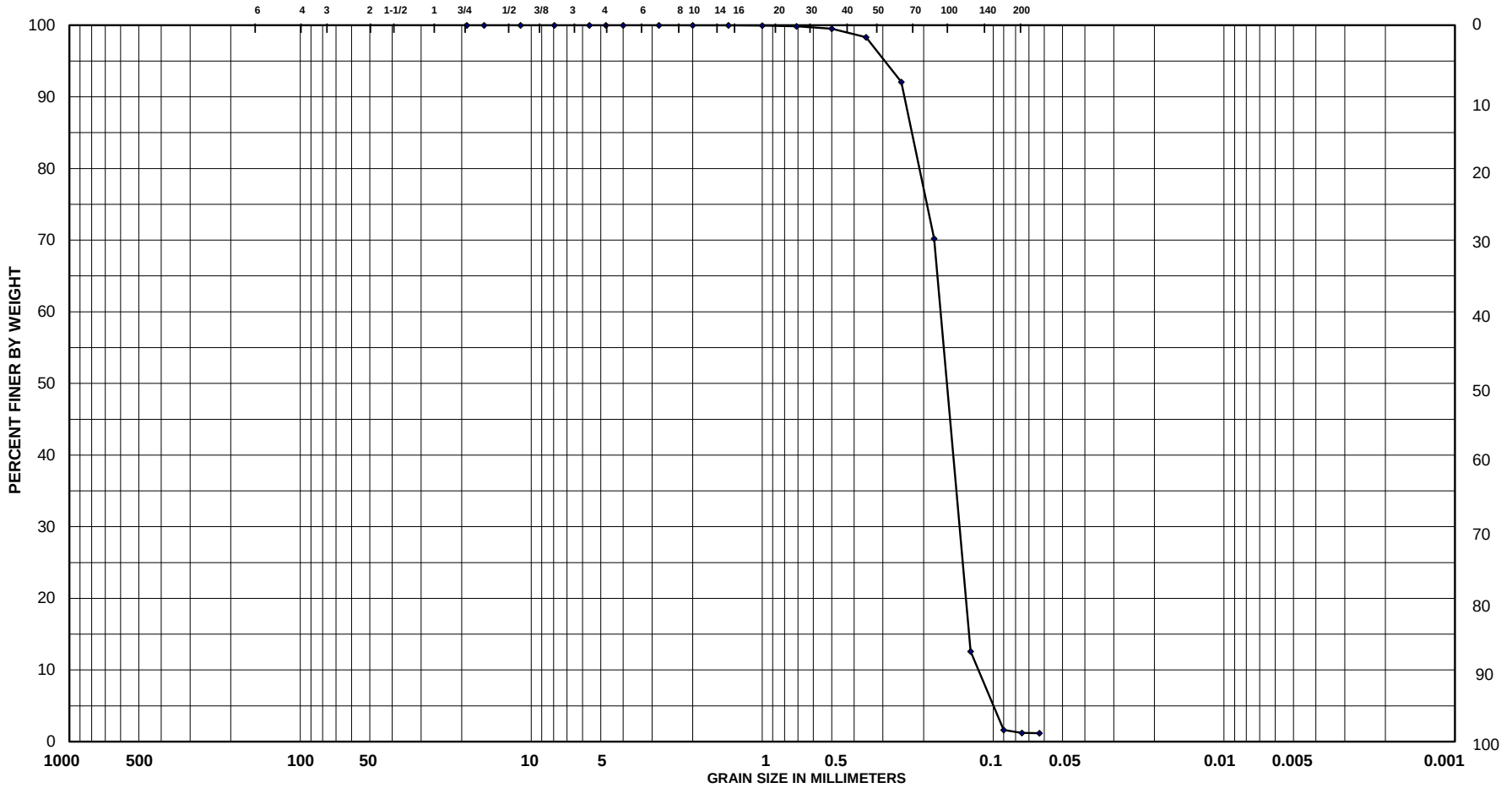
VISUAL SHELL CONTENT

GRAIN SIZE AND VISUAL SHELL CONTENT

Project:	**M&N Sunset Beach NC**	**Depth:**	**2.5/4.5**
Project No.:	**EQ191008**	**Date:**	**1/18/2019**
Boring No.:	**SJ-06**		
Sample No.:	**S-2**		
Description:	**SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5GY 6/2**		

Tare Weight, (g):	51.57	
	192.03	(with tare)
Dry Weight After Washing (g):		(with tare)

Sieve Size (Name)	Sieve Size (mm)	Weight Retained (g)	% Passing	Approx. Visual Shell %	Approx. Visual Shell Wt. (g)
3/4"	19.000	0.00	100.00	0	0.00
5/8"	16.000	0.00	100.00	0	0.00
7/16	11.112	0.00	100.00	0	0.00
5/16	7.938	0.00	100.00	0	0.00
#3.5	5.600	0.00	100.00	0	0.00
#4	4.750	0.00	100.00	0	0.00
#5	4.000	0.00	100.00	0	0.00
#7	2.800	0.00	100.00	0	0.00
#10	2.000	0.01	99.99	100	0.01
#14	1.400	0.02	99.98	100	0.02
#18	1.000	0.03	99.96	80	0.02
#25	0.710	0.13	99.86	60	0.08
#35	0.500	0.51	99.50	50	0.26
#45	0.355	1.66	98.32	50	0.83
#60	0.250	8.77	92.08	20	1.75
#80	0.180	30.69	70.23	1	0.31
#120	0.125	80.95	12.59	0	0.00
#170	0.090	15.42	1.62	0	0.00
#200	0.075	0.55	1.22	0	0.00
#230	0.063	0.06	1.18	0	0.00
Total Shell Content:		**2**			



Sample No.	Elev. Or Depth	Classification	% CO_3	G_s	Shell	LL	PL	PI
◆ S-2	2.5/4.5	SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5GY 6/2			2			

Project M&N Sunset Beach NC

Area

Boring No. SJ-06

Date 1/18/2019

GRADATION CURVES

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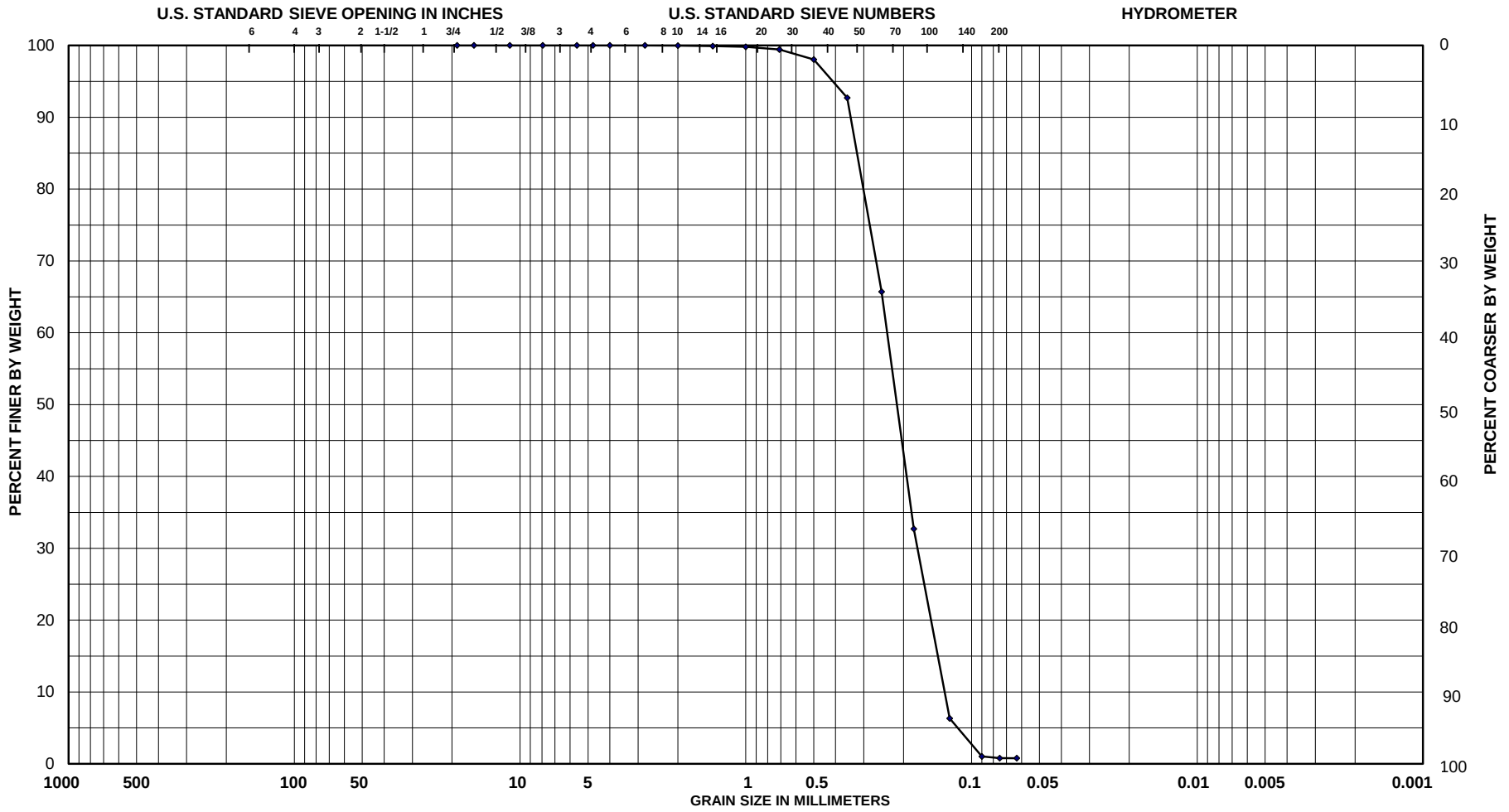
VISUAL SHELL CONTENT

GRAIN SIZE AND VISUAL SHELL CONTENT

Project:	**M&N Sunset Beach NC**	**Depth:**	**4.5/6**
Project No.:	**EQ191008**	**Date:**	**1/18/2019**
Boring No.:	**SJ-06**		
Sample No.:	**S-3**		
Description:	**SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5GY 6/2**		

Tare Weight, (g):	51.64	
	166.07	(with tare)
Dry Weight After Washing (g):		(with tare)

Sieve Size (Name)	Sieve Size (mm)	Weight Retained (g)	% Passing	Approx. Visual Shell %	Approx. Visual Shell Wt. (g)
3/4"	19.000	0.00	100.00	0	0.00
5/8"	16.000	0.00	100.00	0	0.00
7/16	11.112	0.00	100.00	0	0.00
5/16	7.938	0.00	100.00	0	0.00
#3.5	5.600	0.00	100.00	0	0.00
#4	4.750	0.00	100.00	0	0.00
#5	4.000	0.00	100.00	0	0.00
#7	2.800	0.00	100.00	0	0.00
#10	2.000	0.03	99.97	100	0.03
#14	1.400	0.06	99.92	100	0.06
#18	1.000	0.14	99.80	95	0.13
#25	0.710	0.42	99.43	65	0.27
#35	0.500	1.58	98.05	40	0.63
#45	0.355	6.13	92.69	25	1.53
#60	0.250	30.88	65.71	5	1.54
#80	0.180	37.74	32.73	1	0.38
#120	0.125	30.22	6.32	0	0.00
#170	0.090	6.04	1.04	0	0.00
#200	0.075	0.28	0.80	0	0.00
#230	0.063	0.02	0.78	0	0.00
Total Shell Content:		**4**			



Sample No.	Elev. Or Depth	Classification	% CO_3	G_s	Shell	LL	PL	PI
◆ S-3	4.5/6	SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5GY 6/2			4			

Project M&N Sunset Beach NC

Area

Boring No. SJ-06

Date 1/18/2019

GRADATION CURVES

ENG FORM 2087
MAY 63

** The USC classification is based on laboratory grain size distribution and visual classification*

Terracon
9655 Florida Mining Boulevard West
Jacksonville, Florida 32257
(904) 900-6494 (Tel) · (904) 268-5255 (Fax)

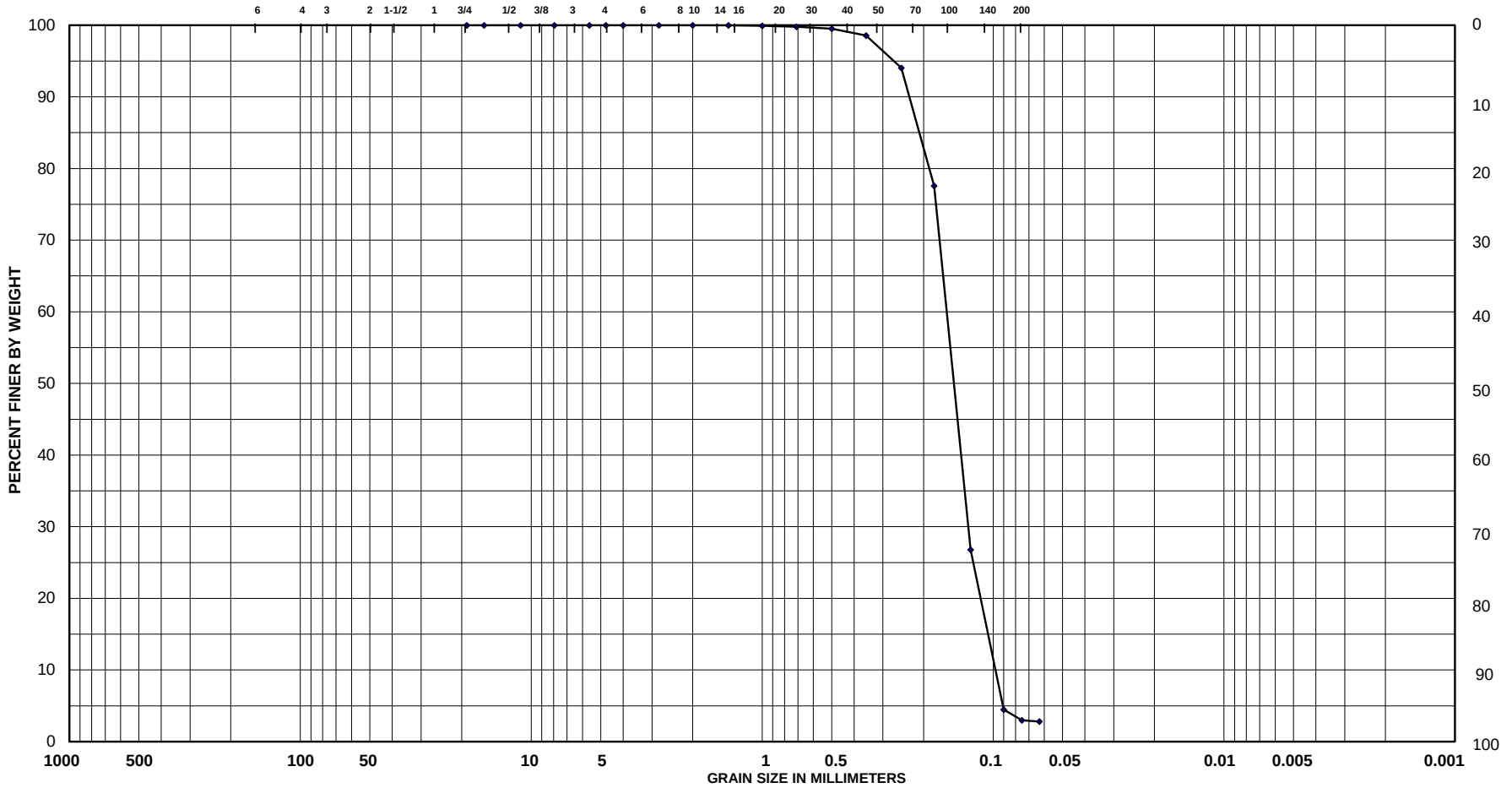
VISUAL SHELL CONTENT

GRAIN SIZE AND VISUAL SHELL CONTENT

Project:	**M&N Sunset Beach NC**	**Depth:**	**6/6.5**
Project No.:	**EQ191008**	**Date:**	**1/18/2019**
Boring No.:	**SJ-06**		
Sample No.:	**S-4**		
Description:	**SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5GY 6/2**		

Tare Weight, (g):	49.69	
	161.15	(with tare)
Dry Weight After Washing (g):		(with tare)

Sieve Size (Name)	Sieve Size (mm)	Weight Retained (g)	% Passing	Approx. Visual Shell %	Approx. Visual Shell Wt. (g)
3/4"	19.000	0.00	100.00	0	0.00
5/8"	16.000	0.00	100.00	0	0.00
7/16	11.112	0.00	100.00	0	0.00
5/16	7.938	0.00	100.00	0	0.00
#3.5	5.600	0.00	100.00	0	0.00
#4	4.750	0.00	100.00	0	0.00
#5	4.000	0.00	100.00	0	0.00
#7	2.800	0.00	100.00	0	0.00
#10	2.000	0.00	100.00	0	0.00
#14	1.400	0.03	99.97	25	0.01
#18	1.000	0.07	99.91	20	0.01
#25	0.710	0.14	99.78	20	0.03
#35	0.500	0.32	99.50	15	0.05
#45	0.355	1.04	98.56	15	0.16
#60	0.250	5.02	94.06	10	0.50
#80	0.180	18.38	77.57	1	0.18
#120	0.125	56.59	26.80	0	0.00
#170	0.090	24.87	4.49	0	0.00
#200	0.075	1.66	3.00	0	0.00
#230	0.063	0.22	2.80	0	0.00
Total Shell Content:		**1**			



Sample No.	Elev. Or Depth	Classification	% CO_3	G_s	Shell	LL	PL	PI
◆ S-4	6/6.5	SAND, poorly-graded, mostly medium to fine-grained quartz, trace silt, trace medium to fine sand-sized shell fragments (SP) 5GY 6/2			1			

Project M&N Sunset Beach NC

Area

Boring No. SJ-06

Date 1/18/2019

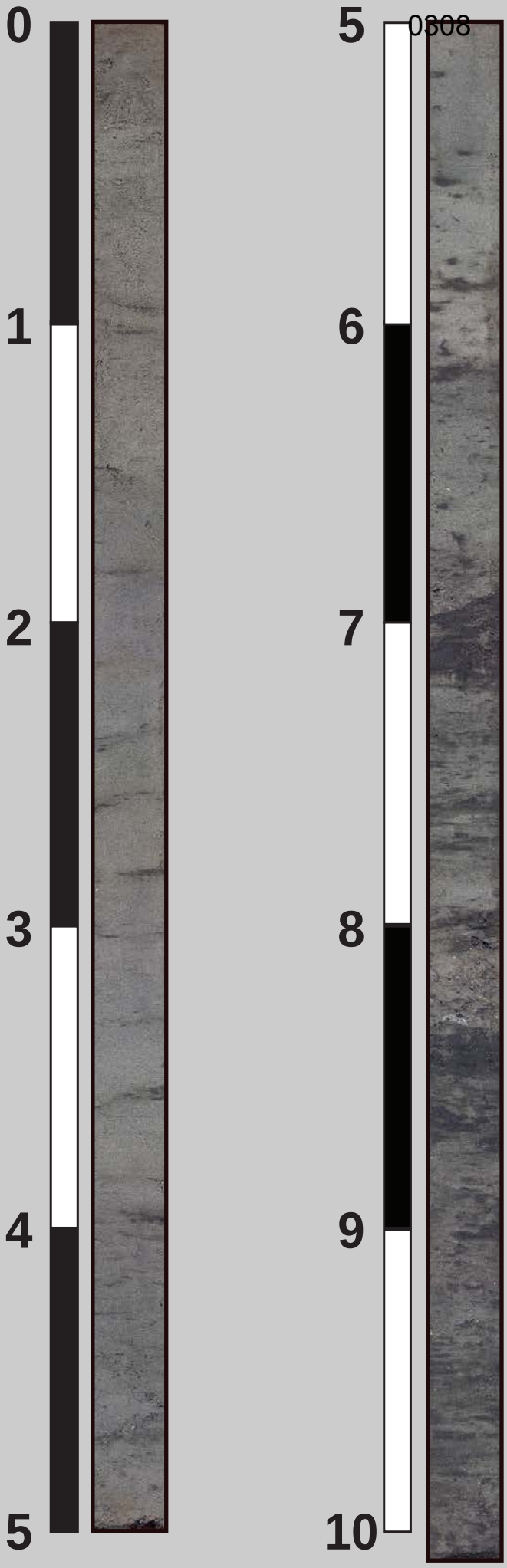
GRADATION CURVES

** The USC classification is based on laboratory grain size distribution and visual classification*

ENG FORM 2087

MAY 63

VIBRACORE PHOTOGRAPHS



SJ-01

Moffatt & Nichol

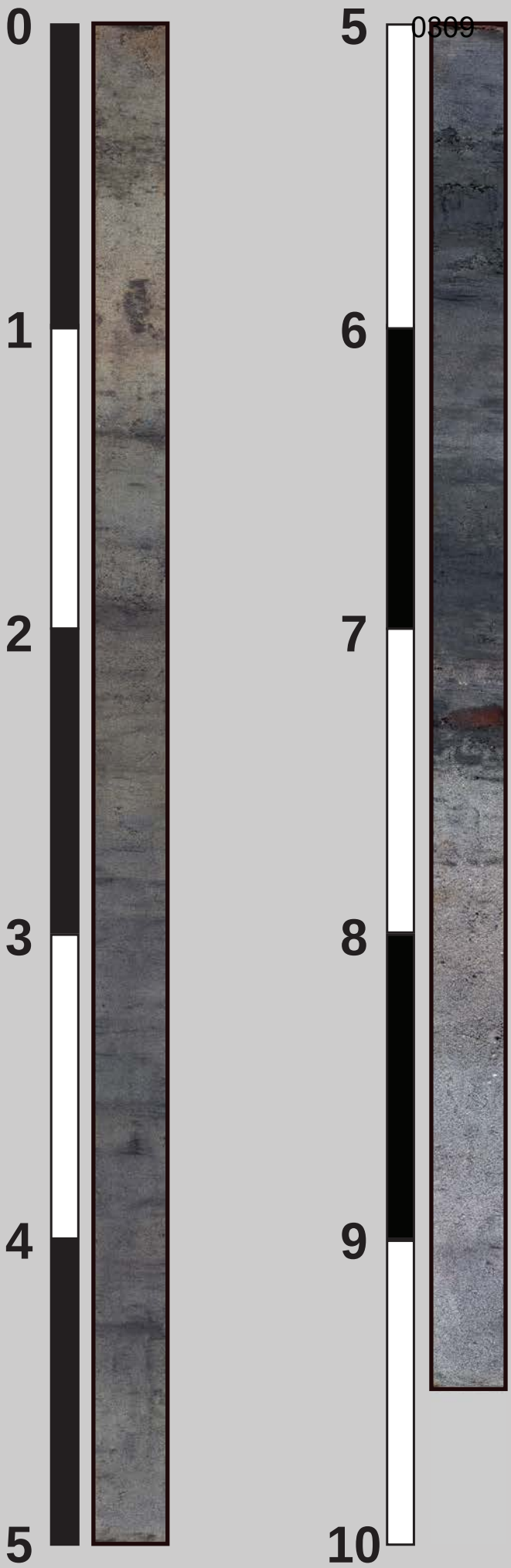
Town of Sunset Beach
Navigation Project
South Jinks Creek
Brunswick County,
North Carolina

Top Elev. (ft MLW): -0.1
Bottom Elev. (ft MLW): -10.2

Notes:
- Photo Mosaic Image
- Photo Scale in Feet

ATHENA TECHNOLOGIES, INC.

Athena Technologies, Inc.
1293 Graham Farm Road
McClellanville, SC 29458
www.athenatechnologies.com
(843) 887-3800



SJ-02

Moffatt & Nichol

Town of Sunset Beach
Navigation Project
South Jinks Creek
Brunswick County,
North Carolina

Top Elev. (ft MLW): 0.2
Bottom Elev. (ft MLW): -9.3

Notes:
- Photo Mosaic Image
- Photo Scale in Feet

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McClellanville, SC 29458
www.athenatechnologies.com
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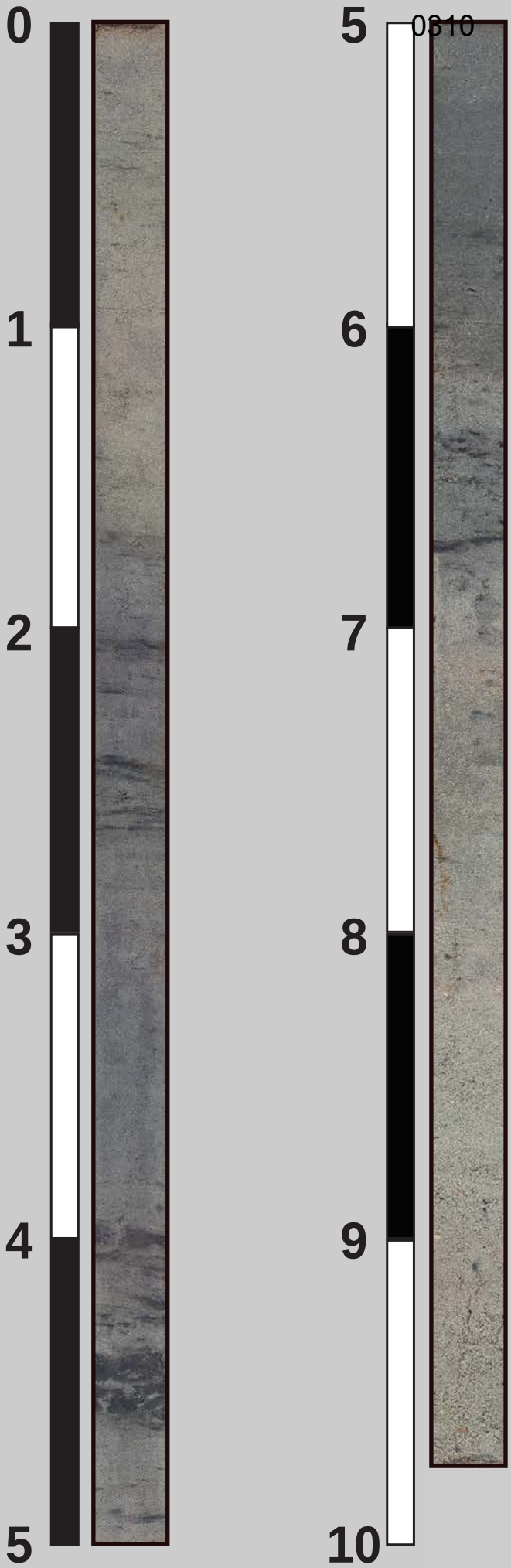

SJ-03

Moffatt & Nichol

Town of Sunset Beach
Navigation Project
South Jinks Creek
Brunswick County,
North Carolina

Top Elev. (ft MLW): 0.3
Bottom Elev. (ft MLW): -9.4

Notes:
- Photo Mosaic Image
- Photo Scale in Feet

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McClellanville, SC 29458
www.athenatechnologies.com
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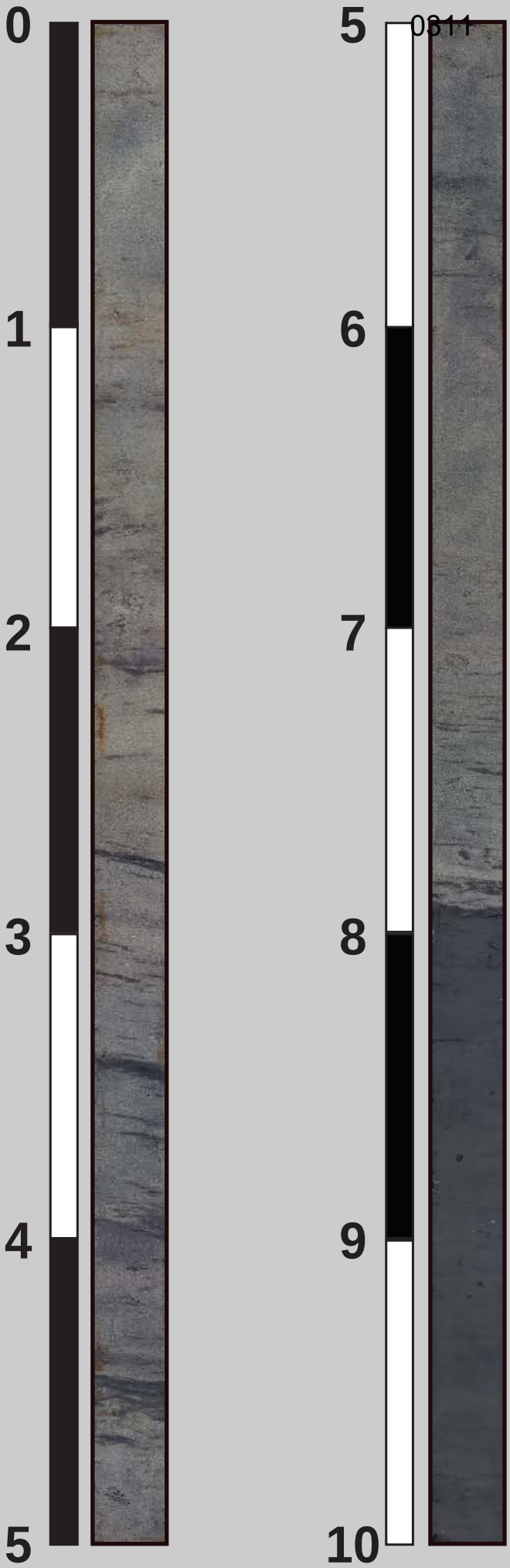

SJ-04

Moffatt & Nichol

Town of Sunset Beach
Navigation Project
South Jinks Creek
Brunswick County,
North Carolina

Top Elev. (ft MLW): 1.1
Bottom Elev. (ft MLW): -8.9

Notes:
- Photo Mosaic Image
- Photo Scale in Feet

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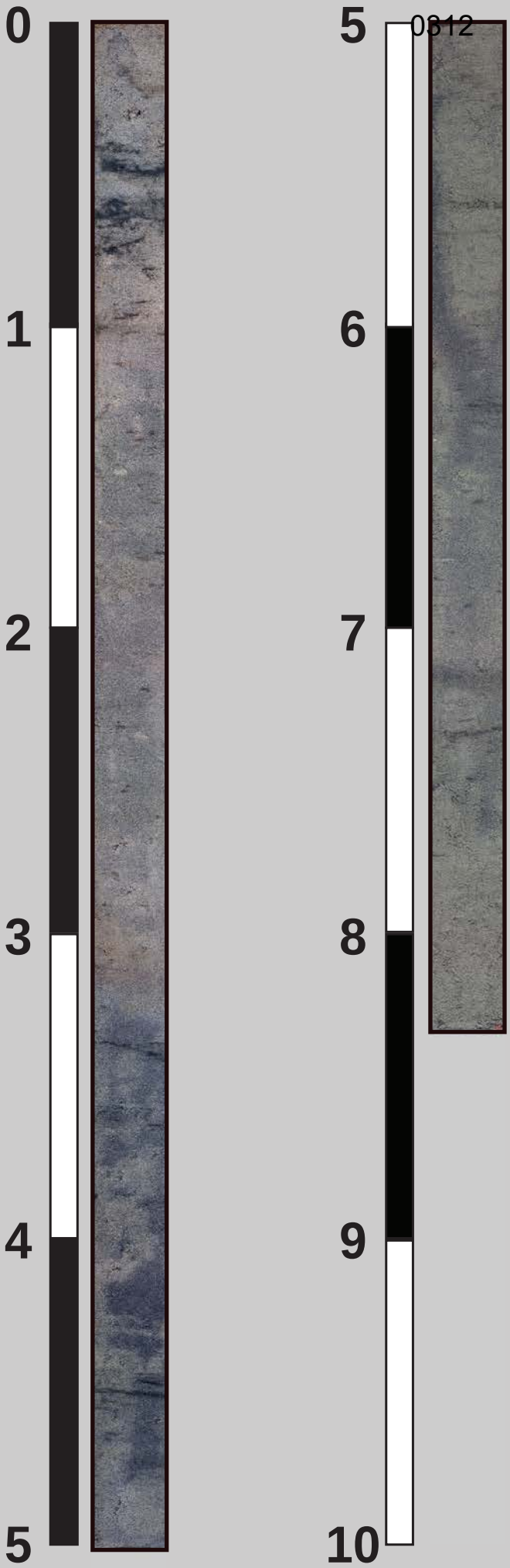
1293 Graham Farm Road
McClellanville, SC 29458
www.athenatechnologies.com
(843) 887-3800



A5-5

SJ-05

Moffatt & Nichol

Town of Sunset Beach
Navigation Project
South Jinks Creek
Brunswick County,
North Carolina

Top Elev. (ft MLW): -2.3
Bottom Elev. (ft MLW): -10.6

Notes:
- Photo Mosaic Image
- Photo Scale in Feet

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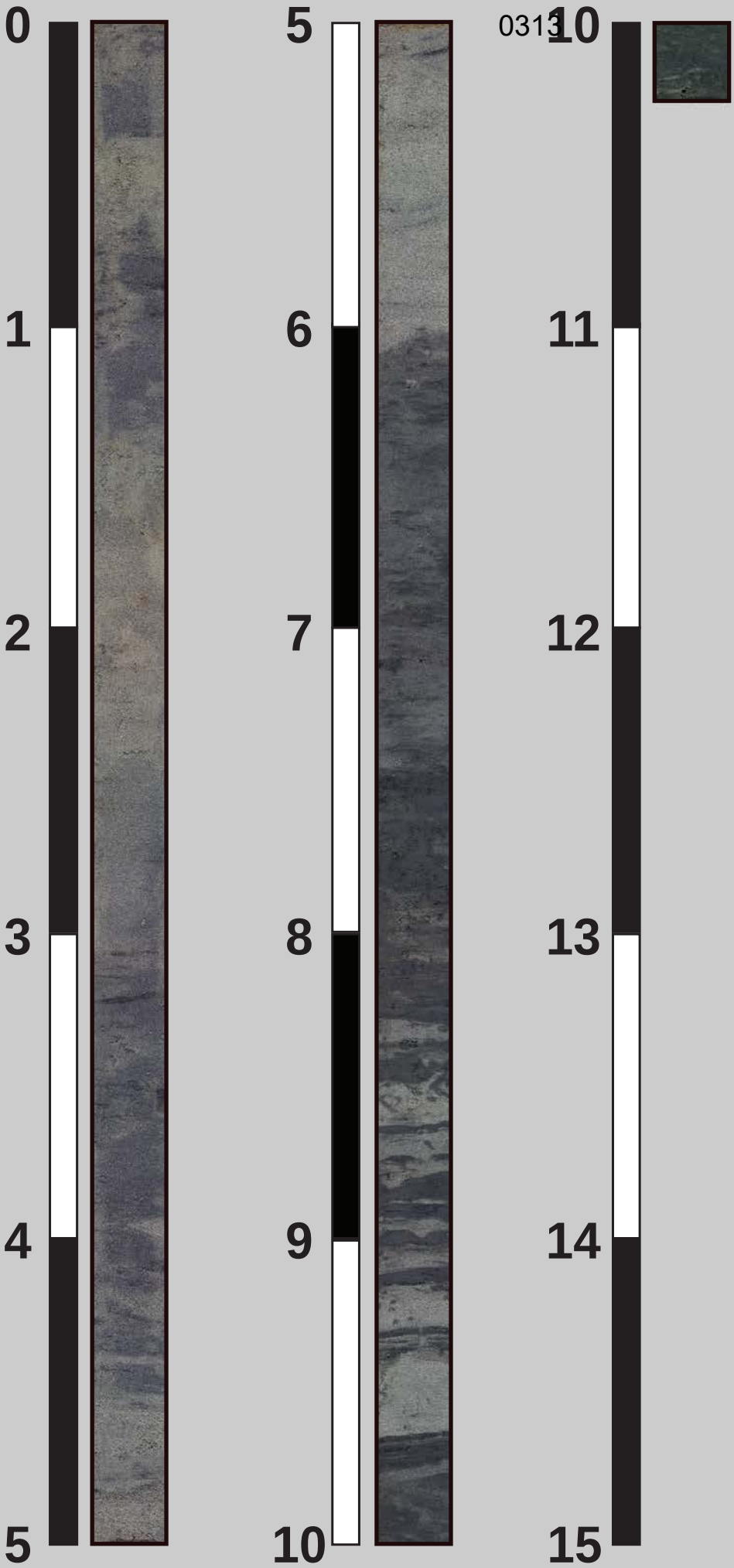
1293 Graham Farm Road
McClellanville, SC 29458
www.athenatechnologies.com
(843) 887-3800



SJ-06

Moffatt & Nichol

Town of Sunset Beach
Navigation Project
South Jinks Creek
Brunswick County,
North Carolina

Top Elev. (ft MLW): 0.5
Bottom Elev. (ft MLW): -9.8

Notes:
- Photo Mosaic Image
- Photo Scale in Feet

ATHENA TECHNOLOGIES, INC.

Athena Technologies, Inc.
1293 Graham Farm Road
McClellanville, SC 29458
www.athenatechnologies.com
(843) 887-3800

CALCITE COMPOSITE

Terracon
Consulting Engineers & Scientists

Carbonate Content Data

Project Name: M&N Sunset Beach
Project Number: EQ191008
Date: 1/29/2019

Boring No.	Sample No.	Depth Range, Feet	Tare No.	Beaker No.	Dry Sample Wt.		Percent Carbonate
					Before	After	
SJ-01	C-1	0-5.9	797	1	80.09	76.90	4.0
SJ-02	C-1	0-6.2	415	2	70.17	66.05	5.9
SJ-03	C-1	0-6.3	228	3	79.86	76.30	4.5
SJ-04	C-1	0-7.1	441	4	77.54	73.84	4.8
SJ-05	C-1	0-3.7	198	5	87.16	83.60	4.1
SJ-06	C-1	0-6.5	66	6	84.43	80.74	4.4

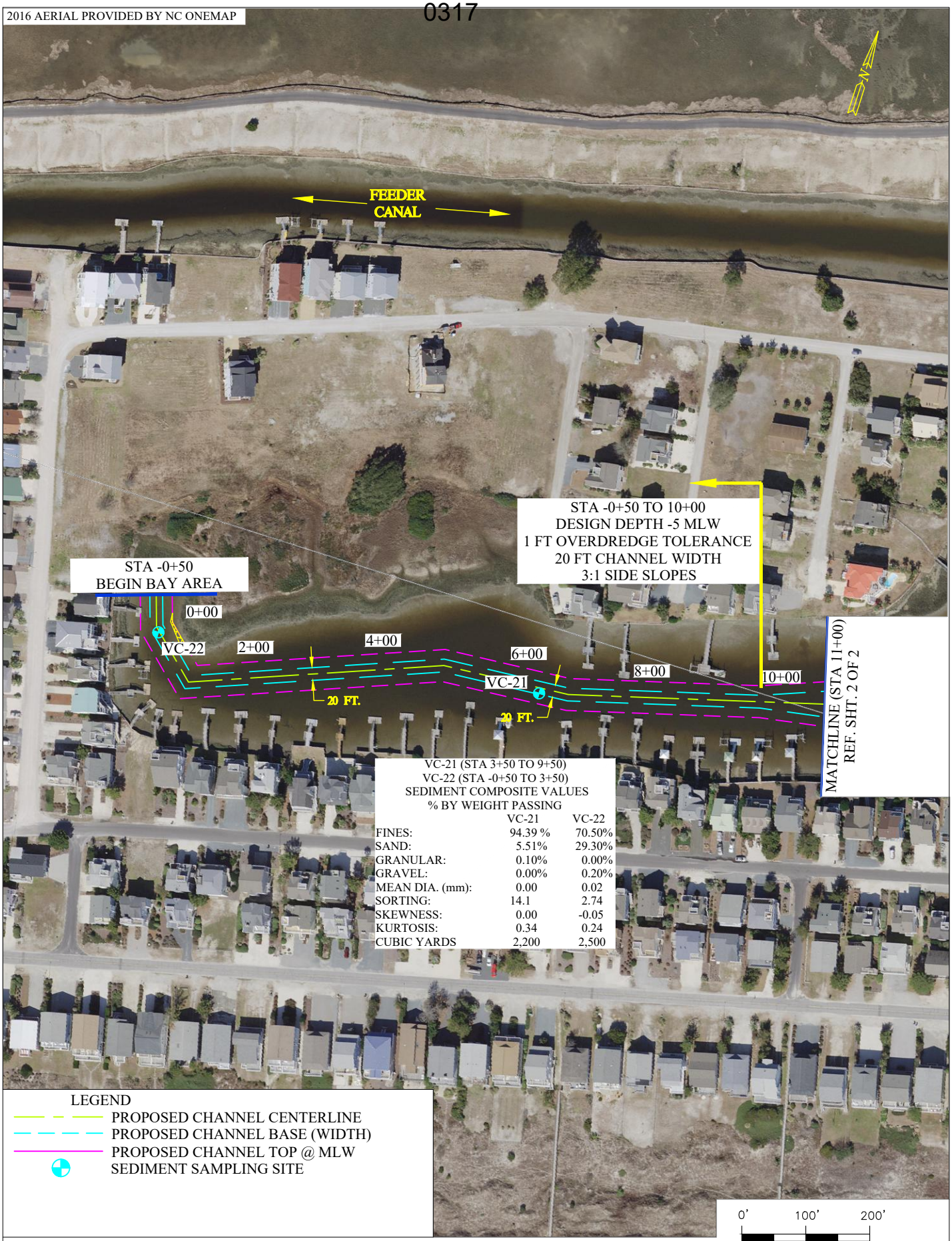
Tested By: CRM Sr.

Reviewed By: TES

APPENDIX B

BAY AREA SEDIMENT ANALYSIS

2016 AERIAL PROVIDED BY NC ONEMAP



VC-21 (STA 3+50 TO 9+50)
VC-22 (STA -0+50 TO 3+50)
SEDIMENT COMPOSITE VALUES
% BY WEIGHT PASSING

	VC-21	VC-22
FINES:	94.39 %	70.50%
SAND:	5.51%	29.30%
GRANULAR:	0.10%	0.00%
GRAVEL:	0.00%	0.20%
MEAN DIA. (mm):	0.00	0.02
SORTING:	14.1	2.74
SKEWNESS:	0.00	-0.05
KURTOSIS:	0.34	0.24
CUBIC YARDS	2,200	2,500

LEGEND
- PROPOSED CHANNEL CENTERLINE
- PROPOSED CHANNEL BASE (WIDTH)
- PROPOSED CHANNEL TOP @ MLW
- SEDIMENT SAMPLING SITE

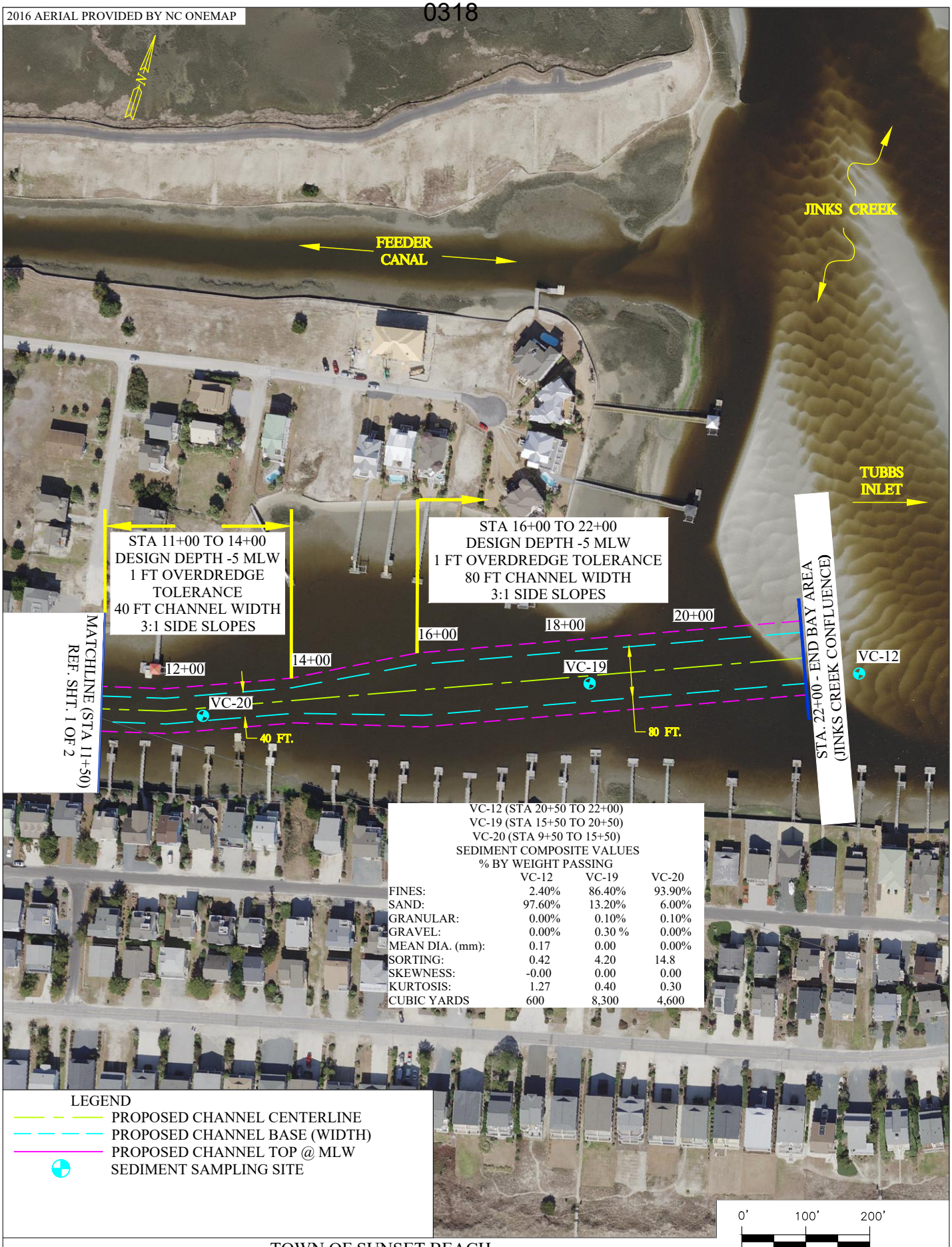
0' 100' 200'
GRAPHIC SCALE IN FEET

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
BAY AREA SEDIMENT ANALYSIS
PLAN VIEW

B1-1

moffatt & nichol

2016 AERIAL PROVIDED BY NC ONEMAP



VC-12 (STA 20+50 TO 22+00)
VC-19 (STA 15+50 TO 20+50)
VC-20 (STA 9+50 TO 15+50)
SEDIMENT COMPOSITE VALUES
% BY WEIGHT PASSING

	VC-12	VC-19	VC-20
FINES:	2.40%	86.40%	93.90%
SAND:	97.60%	13.20%	6.00%
GRANULAR:	0.00%	0.10%	0.10%
GRAVEL:	0.00%	0.30 %	0.00%
MEAN DIA. (mm):	0.17	0.00	0.00%
SORTING:	0.42	4.20	14.8
SKEWNESS:	-0.00	0.00	0.00
KURTOSIS:	1.27	0.40	0.30
CUBIC YARDS	600	8,300	4,600

LEGEND
- PROPOSED CHANNEL CENTERLINE
- PROPOSED CHANNEL BASE (WIDTH)
- PROPOSED CHANNEL TOP @ MLW
- SEDIMENT SAMPLING SITE

0' 100' 200'
GRAPHIC SCALE IN FEET

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
BAY AREA SEDIMENT ANALYSIS
PLAN VIEW

B1-2

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9269
Town of Sunset Beach
Navigation Project
Bay Area Sediment Analysis Table

Per 15A NCAC 07H.0312

Fines: X < 0.0625 mm
Sand: 0.0625 ≤ X < 2 mm
Granular: 2 mm ≤ X < 4.76 mm
Gravel: 4.76 ≤ X < 76 mm

Bay Area Vibracore Composite Summary Table

	Representative Stations		Representative Volume (CY)	Sample Elevation (FT-MLW)		Max. Disturbance (FT-MLW)	% Coverage of Disturbance Depth	Composite Summary (% By Wt. Passing)					Mean	Sorting	Skewness	Kurtosis
Vibracore	Start	Stop		Top	Bottom			Fines	Sand	Granular	Gravel	Total	(mm)	(σ)	(α)	(β)
VC-22	-0+50	3+50	2,500	-0.4	-6	-6	100%	70.5	29.3	0.00	0.20	100%	0.02	2.74	-0.05	0.24
VC-21	3+50	9+50	2,100	-3.5	-6	-6	100%	94.39	5.51	0.10	0.00	100%	1.7E-07	14.1	2.5E-16	0.34
VC-20	9+50	15+50	4,400	-2.2	-6	-6	100%	93.90	6.00	0.10	0.00	100%	1.1E-07	14.8	0.0E+00	0.33
VC-19	15+50	20+50	6,400	-2.2	-6	-6	100%	86.40	13.20	0.10	0.30	100%	2.3E-03	4.2	2.9E-02	0.4
VC-12	20+50	22+00	500	-0.2	-6	-6	100%	2.40	97.60	0.00	0.00	100%	0.17	0.42	0.00	1.27

Area	Volume (CY)	Stations
Beach Compatible Material	-	20+50 to 22+00
Non-Compatible Material	15,900	-0+50 to 20+50
Total	15,900	-0+50 to 22+00

1. Sediment represented by VC-12 is classified as non-compatible for planning purposes. The material (600 CY) will be placed in an upland spoil area if dredged as part of the Bay Area work.
2. Max. Disturbance Depth includes overdredge tolerance.
3. Volumetric quantities rounded for clarity.

VIBRACORE COMPOSITES

9269
Sunset Beach
Navigation Project
Sediment Analysis

Sieve Designation Legend

Sieve #	3/4	5/8	5/16	4	5	10	18	35	60	120	200	230
Sieve Size (Φ)	-4.25	-4.00	-3.00	-2.25	-2.00	-1.00	0.00	1.00	2.00	3.00	3.75	4.00
Sieve Size (mm)	19.0	16	8	4.76	4	2	1	0.5	0.25	0.125	0.0743	0.0625

Mean grain size ($M_{d\Phi}$) determined by $[(\Phi_{84}+\Phi_{50}+\Phi_{16})/3]$ (Folk & Ward,1957).
Sorting determined by $[(\Phi_{84}-\Phi_{16})/2]$ (Dean & Dalrymple, 2002).
Skewness determined by $[(M_{d\Phi}-\Phi_{50})/\sigma_{\Phi}]$ (Dean & Dalrymple, 2002).
Kurtosis determined by $\{[(\Phi_{16}-\Phi_5)+(\Phi_{95}-\Phi_{84})]/2\sigma_{\Phi}\}$ (Dean & Dalrymple, 2002).
Moment statistics determined by linear interpretation of composite properties.

Bay Area Vibracore Composites
Design Depth -5 MLW +1 FT OD

Vibracore VC-12 (Max. Dredge Depth -6 MLW)

Sieve (Phi)	VC-12 Sample Cumulative % by Retained Weight #1	#2	#3	#4
-4.25	0.00			
-4.00	0.00			
-3.00	0.00			
-2.00	0.00			
-1.00	0.00			
0.00	0.10			
1.00	0.70			
2.00	7.50			
3.00	89.00			
3.75	97.50			
4.00	97.60			

VC-12 Sample Cumulative % by Weight Passing #1	#2	#3	#4
100.0			
100.0			
100.0			
100.0			
100.0			
99.9			
99.3			
92.5			
11.0			
2.5			
2.4			

Weighted Composite % Retained	% Passing
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.10	99.90
0.70	99.30
7.50	92.50
89.00	11.00
97.50	2.50
97.60	2.40

VC-12	Depth Interval (MLW) Top	Bottom	Representative Values Length (ft)	Percent	USCS
1	-0.2	-6	5.8	100.00%	SP
Composite	**-0.2**	**-6**	**5.8**	**100.00%**	**SP**

VC-12	Moment Statistics and Properties in Phi Units φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	1.63	2.10	2.21	2.52	2.83	2.94	3.53
Composite	**1.63**	**2.10**	**2.21**	**2.52**	**2.83**	**2.94**	**3.53**

VC-12

Composite Grain Size Distribution (% by Weight Passing) Sample	Fines	Sand	Granular	Gravel	Total
1.00	2.40	97.60	0.00	0.00	100%
Composite	**2.40**	**97.60**	**0.00**	**0.00**	**100%**

Per 15A NCAC 07H.0312

Fines: X < 0.0625 mm
Sand: 0.0625 ≤ X < 2 mm
Granular: 2 mm ≤ X < 4.76 mm
Gravel: 4.76 ≤ X < 76 mm

VC-12					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	2.52	0.17	2.52	0.17	0.42	0.00	1.27
Composite	**2.52**	**0.17**	**2.52**	**0.17**	**0.42**	**0.00**	**1.27**

Note: 1. Analysis did not include 4.76 mm sieve (-2.25 ϕ); therefore the divide between granular and gravel based on % passing the 4 mm (-2 φ) sieve.
2. Calcium Carbonate content of dredge material must be within 15% of recipient beach values.

Vibracore VC-19 Max Dredge Depth -6 MLW

Sieve (Phi)	VC-19 Sample Cumulative % by Retained Weight #1	#2	#3	#4
-4.25	0.00			
-4.00	0.00			
-3.00	0.20			
-2.00	0.30			
-1.00	0.40			
0.00	0.50			
1.00	0.60			
2.00	1.20			
3.00	5.80			
3.75	12.70			
4.00	13.60			

VC-19 Sample Cumulative % by Weight Passing #1	#2	#3	#4
100.0			
100.0			
99.8			
99.7			
99.6			
99.5			
99.4			
98.8			
94.2			
87.3			
86.4			

Composite VC-19 Weighted Composite (% Retained)	Weighted Composite (% Passing)
0.00	100.00
0.00	100.00
0.20	99.80
0.30	99.70
0.40	99.60
0.50	99.50
0.60	99.40
1.20	98.80
5.80	94.20
12.70	87.30
13.60	86.40

VC-19	Depth Interval (MLW) Top	Bottom	Representative Values Length (ft)	Percent	USCS
1	-2.2	-6	3.8	100.00%	OL/OH
2					
3					
4					
Composite	**-2.2**	**-6**	**3.8**	**100.00%**	**OL/OH**

VC-19	Moment Statistics and Properties in Phi Units φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	2.83	4.67	5.46	8.67	11.87	13.03	14.44
2							
3							
4							
Composite	**2.83**	**4.67**	**5.46**	**8.67**	**11.87**	**13.03**	**14.44**

VC-19

Composite Grain Size Distribution (% by Weight Passing) SubSample	% Fines	% Sand	% Granular	% Gravel	Total
1.00	86.40	13.20	0.10	0.30	100%
2.00					
3.00					
4.00					
Composite	**86.40**	**13.20**	**0.10**	**0.30**	**100%**

Per 15A NCAC 07H.0312

% Fines: X < 0.0625 mm
% Sand: 0.0625 ≤ X < 2 mm
% Granular: 2 mm ≤ X < 4.76 mm
% Gravel: 4.76 ≤ X < 76 mm

VC-19					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	8.67	0.00	8.79	0.00	4.18	0.03	0.39
2							
3							
4							
Composite	**8.67**	**0.00**	**8.79**	**0.00**	**4.18**	**0.03**	**0.39**

Note: Grain size analysis did not include 4.76 mm sieve (-2.25 ϕ); therefore the divide between granular and gravel based on % passing the 4 mm (-2 ϕ) sieve.

moffatt & nichol

9269
Sunset Beach
Navigation Project
Sediment Analysis

Sieve Designation Legend

Sieve #	3/4	5/8	5/16	4	5	10	18	35	60	120	200	230
Sieve Size (Φ)	-4.25	-4.00	-3.00	-2.25	-2.00	-1.00	0.00	1.00	2.00	3.00	3.75	4.00
Sieve Size (mm)	19.0	16	8	4.76	4	2	1	0.5	0.25	0.125	0.0743	0.0625

Mean grain size ($M_{dΦ}$) determined by $[(Φ_{84}+Φ_{50}+Φ_{16})/3]$ (Folk & Ward,1957).
Sorting determined by $[(Φ_{84}-Φ_{16})/2]$ (Dean & Dalrymple, 2002).
Skewness determined by $[(M_{dΦ}-Φ_{50})/σ_{Φ}]$ (Dean & Dalrymple, 2002).
Kurtosis determined by $\{[(Φ_{16}-Φ_5)+(Φ_{95}-Φ_{84})]/2σ_{Φ}\}$ (Dean & Dalrymple, 2002).
Moment statistics determined by linear interpretation of composite properties.

Bay Area Vibracore Composites
Design Depth -5 MLW +1 Ft OD

Vibracore VC-20 Max Dredge Depth -6 MLW

	VC-20			
	Sample Cumulative % by Weight Retained			
Sieve (Phi)	#1	#2	#3	#4
-4.25	0.00			
-4.00	0.00			
-3.00	0.00			
-2.00	0.00			
-1.00	0.10			
0.00	0.20			
1.00	0.50			
2.00	1.50			
3.00	4.40			
3.75	5.80			
4.00	6.10			

VC-20			
Sample Cumulative % by Weight Passing			
#1	#2	#3	#4
100.0			
100.0			
100.0			
100.0			
99.9			
99.8			
99.5			
98.5			
95.6			
94.2			
93.9			

Composite VC-20	
Weighted Composite (% Retained)	Weighted Composite (% Passing)
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.10	99.90
0.20	99.80
0.50	99.50
1.50	98.50
4.40	95.60
5.80	94.20
6.10	93.90

VC-20	Depth Interval (MLW)		Representative Values		
Sample	Top	Bottom	Length (ft)	Percent	USCS
1	-2.2	-6	3.8	100.00%	OL/OH
2					
3					
4					
Composite	**-2.2**	**-6**	**3.8**	**100.00%**	**OL/OH**

VC-20	Moment Statistics and Properties in Phi Units						
Sample	$φ_5$	$φ_{16}$	$φ_{25}$	$φ_{50}$	$φ_{75}$	$φ_{84}$	$φ_{95}$
1	3.32	8.30	12.22	23.09	33.96	37.87	42.65
2							
3							
4							
Composite	**3.32**	**8.30**	**12.22**	**23.09**	**33.96**	**37.87**	**42.65**

VC-20	Composite Grain Size Distribution (% by Weight Passing)				
SubSample	% Fines	% Sand	% Granular	% Gravel	Total
1.00	93.90	6.00	0.10	0.00	100%
2.00					
3.00					
4.00					
Composite	**93.90**	**6.00**	**0.10**	**0.00**	**100%**

Note: Grain size analysis did not include 4.76 mm sieve (-2.25 ϕ); therefore the divide between granular and gravel based on % passing the 4 mm (-2 ϕ) sieve.

Per 15A NCAC 07H.0312

% Fines: X < 0.0625 mm
% Sand: 0.0625 ≤ X < 2 mm
% Granular: 2 mm ≤ X < 4.76 mm
% Gravel: 4.76 ≤ X < 76 mm

VC-20					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	23.09	0.00	23.09	0.00	14.78	0.00	0.33
2							
3							
4							
Composite	**23.09**	**0.00**	**23.09**	**0.00**	**14.78**	**0.00**	**0.33**

Vibracore VC-21 Max Dredge Depth -6 MLW

	VC-21			
	Sample Cumulative % by Weight Retained			
Sieve (Phi)	#1	#2	#3	#4
-4.25	0.00			
-4.00	0.00			
-3.00	0.00			
-2.00	0.00			
-1.00	0.10			
0.00	0.20			
1.00	0.20			
2.00	0.80			
3.00	4.80			
3.75	5.60			
4.00	5.61			

VC-21			
Sample Cumulative % by Weight Passing			
#1	#2	#3	#4
100.0			
100.0			
100.0			
100.0			
99.9			
99.8			
99.8			
99.2			
95.2			
94.4			
94.4			

Composite VC-21	
Weighted Composite (% Retained)	Weighted Composite (% Passing)
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.10	99.90
0.20	99.80
0.20	99.80
0.80	99.20
4.80	95.20
5.60	94.40
5.61	94.39

VC-21	Depth Interval (MLW)		Representative Values		
Sample	Top	Bottom	Length (ft)	Percent	USCS
1	-3.5	-6	2.5	100.00%	OL/OH
2					
3					
4					
Composite	**-3.5**	**-6**	**2.5**	**100.00%**	**OL/OH**

VC-21	Moment Statistics and Properties in Phi Units						
Sample	$φ_5$	$φ_{16}$	$φ_{25}$	$φ_{50}$	$φ_{75}$	$φ_{84}$	$φ_{95}$
1	3.19	8.32	12.06	22.46	32.85	36.59	41.17
2							
3							
4							
Composite	**3.19**	**8.32**	**12.06**	**22.46**	**32.85**	**36.59**	**41.17**

VC-21	Composite Grain Size Distribution (% by Weight Passing)				
SubSample	% Fines	% Sand	% Granular	% Gravel	Total
1.00	94.4	5.51	0.10	0.00	100%
2.00					
3.00					
4.00					
Composite	**94.4**	**5.51**	**0.10**	**0.00**	**100%**

Note: Grain size analysis did not include 4.76 mm sieve (-2.25 ϕ); therefore the divide between granular and gravel based on % passing the 4 mm (-2 ϕ) sieve.

Per 15A NCAC 07H.0312

% Fines: X < 0.0625 mm
% Sand: 0.0625 ≤ X < 2 mm
% Granular: 2 mm ≤ X < 4.76 mm
% Gravel: 4.76 ≤ X < 76 mm

VC-21					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	22.46	0.00	22.46	0.00	14.14	0.00	0.34
2							
3							
4							
Composite	**22.46**	**0.00**	**22.46**	**0.00**	**14.14**	**0.00**	**0.34**

9269
Sunset Beach
Navigation Project
Sediment Analysis

Sieve Designation Legend

Sieve #	3/4	5/8	5/16	4	5	10	18	35	60	120	200	230
Sieve Size (Φ)	-4.25	-4.00	-3.00	-2.25	-2.00	-1.00	0.00	1.00	2.00	3.00	3.75	4.00
Sieve Size (mm)	19.0	16	8	4.76	4	2	1	0.5	0.25	0.125	0.0743	0.0625

Mean grain size ($M_{d\Phi}$) determined by $[(\Phi_{84}+\Phi_{50}+\Phi_{16})/3]$ (Folk & Ward,1957).
Sorting determined by $[(\Phi_{84}-\Phi_{16})/2]$ (Dean & Dalrymple, 2002).
Skewness determined by $[(M_{d\Phi}-\Phi_{50})/\sigma_{\Phi}]$ (Dean & Dalrymple, 2002).
Kurtosis determined by $\{[(\Phi_{16}-\Phi_{5}) + (\Phi_{95}-\Phi_{84})]/2\sigma_{\Phi}\}$ (Dean & Dalrymple, 2002).
Moment statistics determined by linear interpretation of composite properties.

Bay Area Vibracore Composites
Design Depth -5 MLW +1 Ft OD

Vibracore VC-22 Max Dredge Depth -6 MLW

VC-22				
	Sample Cumulative % by Weight Retained			
Sieve (Phi)	#1	#2	#3	#4
-4.25	0.00			
-4.00	0.00			
-3.00	0.20			
-2.00	0.20			
-1.00	0.20			
0.00	0.30			
1.00	0.40			
2.00	2.60			
3.00	25.80			
3.75	29.40			
4.00	29.50			

VC-22			
Sample Cumulative % by Weight Passing			
#1	#2	#3	#4
100.0			
100.0			
99.8			
99.8			
99.8			
99.7			
99.6			
97.4			
74.2			
70.6			
70.5			

Composite VC-22	
Weighted Composite (% Retained)	Weighted Composite (% Passing)
0.00	100.00
0.00	100.00
0.20	99.80
0.20	99.80
0.20	99.80
0.30	99.70
0.40	99.60
2.60	97.40
25.80	74.20
29.40	70.60
29.50	70.50

VC-22	Depth Interval (MLW)		Representative Values		
Sample	Top	Bottom	Length (ft)	Percent	USCS
1	-0.4	-6	5.6	100.00%	OL/OH
2					
3					
4					
Composite	**-0.4**	**-6**	**5.6**	**100.00%**	**OL/OH**

VC-22	Moment Statistics and Properties in Phi Units						
Sample	φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	2.10	2.58	2.97	5.52	7.38	8.05	8.87
2							
3							
4							
Composite	**2.10**	**2.58**	**2.97**	**5.52**	**7.38**	**8.05**	**8.87**

VC-22					
Composite Grain Size Distribution (% by Weight Passing)					
SubSample	% Fines	% Sand	% Granular	% Gravel	Total
1.00	70.5	29.30	0.00	0.20	100%
2.00					
3.00					
4.00					
Composite	**70.5**	**29.30**	**0.00**	**0.20**	**100%**

Note: Grain size analysis did not include 4.76 mm sieve (-2.25 ϕ); therefore the divide between granular and gravel based on % passing the 4 mm (-2 ϕ) sieve.

Per 15A NCAC 07H.0312

% Fines: X < 0.0625 mm
% Sand: 0.0625 ≤ X < 2 mm
% Granular: 2 mm ≤ X < 4.76 mm
% Gravel: 4.76 ≤ X < 76 mm

VC-22					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	5.52	0.02	5.38	0.02	2.74	-0.05	0.24
2							
3							
4							
Composite	**5.52**	**0.02**	**5.38**	**0.02**	**2.74**	**-0.05**	**0.24**

VIBRACORE LOGS

VIBRACORE LOG

CATLIN Engineers and Scientists
215122 Wilmington, NC

CATLIN NO.: 215122	**STATE:** NC	**COUNTY:** BRUNSWICK	**CITY:** Sunset Beach
PROJECT NAME: Sunset Beach Pre-Dredge Analysis		**LOGGED BY:** Shawn McGuire **OPERATOR:** D.T. Chalmers, Jr.	**BORING ID.** VC-22
NORTHING: 44806	**EASTING:** 2152329	**FIELD GEO.:** Corey Futral	**MUDLINE ELEV.:** -0.4 ft.
SYSTEM: NCSP NAD 83 (USft)	**MACHINE:** PVL VC-3.5.2	**WATER DEPTH:** 4.4 ft.	**DEPTH IN SEDS.:** 7.2 ft.
METHOD: Vibracore	**CORE MATERIAL:** Unlined Acetate	**CORE DIAMETER:** 4 in.	**TARGET ELEV.:** -10.0 ft.
START DATE: 08/18/16	**FINISH DATE:** 08/18/16	**BORING LOCATION:** Canal Drive Bay Area	

DEPTH	ELEV.	ENV. SAMP. ELEV.	ENV. SAMP. ID.	GEOTECH SAMPLE	USCS	LOG	SEDIMENT DESCRIPTION DEPTH	SEDIMENT DESCRIPTION	ELEVATION
							0.0	Mudline	-0.4
0.0	-0.4	-0.4	V2022	V22-S01	OL/OH			Gray, ORGANIC SOIL	
							6.7		-7.1
6.7	-7.1	-7.6		V22-S02	SP		7.2	Gray, poorly graded SAND	-7.6
7.2	-7.6							BORING TERMINATED WITH VIBRACORE REFUSAL AT ELEVATION -7.6 ft (MLW)	

COMMENTS: All elevations referenced to Mean Low Water (MLW)
All depths and elevations in United States Feet (USft)
BML = Below Mudline
VCR = Vibracore Refusal

NOTES:
Composite sample collected for chemical analysis from borings VC-20 & VC-22

VIBRACORE LOG 215122 M&N SUNSET BEACH SEDIMENT SAMPLING.GPJ CATLIN.GDT 11/29/16

VIBRACORE LOG

CATLIN Engineers and Scientists
215122 Wilmington, NC

SHEET 1 OF 1

CATLIN NO.: 215122	**STATE:** NC	**COUNTY:** BRUNSWICK	**CITY:** Sunset Beach
PROJECT NAME: Sunset Beach Pre-Dredge Analysis		**LOGGED BY:** Shawn McGuire **OPERATOR:** D.T. Chalmers, Jr.	**BORING ID.** VC-21
NORTHING: 44896	**EASTING:** 2152926	**FIELD GEO.:** Corey Futral	**MUDLINE ELEV.:** -3.5 ft.
SYSTEM: NCSP NAD 83 (USft)	**MACHINE:** PVL VC-3.5.2	**WATER DEPTH:** 5.4 ft.	**DEPTH IN SEDS.:** 6.5 ft.
METHOD: Vibracore	**CORE MATERIAL:** Unlined Acetate	**CORE DIAMETER:** 4 in.	**TARGET ELEV.:** -10.0 ft.
START DATE: 08/18/16	**FINISH DATE:** 08/18/16	**BORING LOCATION:** Canal Drive Bay Area	

DEPTH	ELEV.	ENV. SAMP. ELEV.	ENV. SAMP. ID.	GEOTECH SAMPLE	USCS	LOG	SEDIMENT DESCRIPTION DEPTH	SEDIMENT DESCRIPTION	ELEVATION
							0.0	Mudline	-3.5
0.0	-3.5			V21-S01	OL/OH			Gray to dark gray, ORGANIC SOIL	
6	-9.5						6.0		-9.5
							6.5	No Recovery	-10.0
								BORING TERMINATED AT ELEVATION -10.0 ft (MLW)	

COMMENTS: All elevations referenced to Mean Low Water (MLW)
All depths and elevations in United States Feet (USft)
BML = Below Mudline
VCR = Vibracore Refusal

NOTES:

VIBRACORE LOG_215122 M&N_SUNSET_BEACH_SEDIMENT_SAMPLING.GPJ_CATLIN.GDT_11/29/16

VIBRACORE LOG

CATLIN Engineers and Scientists
215122 Wilmington, NC

SHEET 1 OF 1

CATLIN NO.: 215122	**STATE:** NC	**COUNTY:** BRUNSWICK	**CITY:** Sunset Beach
PROJECT NAME: Sunset Beach Pre-Dredge Analysis		**LOGGED BY:** Shawn McGuire **OPERATOR:** D.T. Chalmers, Jr.	**BORING ID.** **VC-20**
NORTHING: 45052	**EASTING:** 2153509	**FIELD GEO.:** Corey Futral	**MUDLINE ELEV.:** -2.2 ft.
SYSTEM: NCSP NAD 83 (USft)	**MACHINE:** PVL VC-3.5.2	**WATER DEPTH:** 7.5 ft.	**DEPTH IN SEDS.:** 7.9 ft.
METHOD: Vibracore	**CORE MATERIAL:** Unlined Acetate	**CORE DIAMETER:** 4 in.	**TARGET ELEV.:** -10.0 ft.
START DATE: 08/19/16	**FINISH DATE:** 08/19/16	**BORING LOCATION:** Canal Drive Bay Area	

DEPTH	ELEV.	ENV. SAMP. ELEV.	ENV. SAMP. ID.	GEOTECH SAMPLE	USCS	LOG	SEDIMENT DESCRIPTION DEPTH	SEDIMENT DESCRIPTION	ELEVATION
							0.0	Mudline	-2.2
0.0	-2.2	-2.2	V2022	V20-S01	OL/OH			Gray to dark gray, ORGANIC SOIL	
6.8	-9.0	-9.0					6.8		-9.0
							7.9	No Recovery	-10.1
								BORING TERMINATED AT ELEVATION -10.1 ft (MLW)	

COMMENTS: All elevations referenced to Mean Low Water (MLW)
All depths and elevations in United States Feet (USft)
BML = Below Mudline
VCR = Vibracore Refusal

NOTES:
Composite sample collected for chemical analysis from borings VC-20 & VC-22

VIBRACORE LOG 215122 M&N_SUNSET_BEACH_SEDIMENT_SAMPLING.GPJ CATLIN.GDT 11/29/16

VIBRACORE LOG

CATLIN Engineers and Scientists
215122 Wilmington, NC

SHEET 1 OF 1

CATLIN NO.: 215122	**STATE:** NC	**COUNTY:** BRUNSWICK	**CITY:** Sunset Beach
PROJECT NAME: Sunset Beach Pre-Dredge Analysis		**LOGGED BY:** Shawn McGuire **OPERATOR:** D.T. Chalmers, Jr.	**BORING ID.** VC-19
NORTHING: 45283	**EASTING:** 2154070	**FIELD GEO.:** Corey Futral	**MUDLINE ELEV.:** -2.2 ft.
SYSTEM: NCSP NAD 83 (USft)	**MACHINE:** PVL VC-3.5.2	**WATER DEPTH:** 6.9 ft.	**DEPTH IN SEDS.:** 7.8 ft.
METHOD: Vibracore	**CORE MATERIAL:** Unlined Acetate	**CORE DIAMETER:** 4 in.	**TARGET ELEV.:** -10.0 ft.
START DATE: 08/19/16	**FINISH DATE:** 08/19/16	**BORING LOCATION:** Canal Drive Bay Area	

DEPTH	ELEV.	ENV. SAMP. ELEV.	ENV. SAMP. ID.	GEOTECH SAMPLE	USCS	LOG	SEDIMENT DESCRIPTION DEPTH	SEDIMENT DESCRIPTION	ELEVATION
							0.0	Mudline	-2.2
0.0	-2.2			V19-S01	OL/OH			Gray, ORGANIC SOIL	
6	-8.2						6.0		-8.2
							7.8	No Recovery	-10.0
								BORING TERMINATED AT ELEVATION -10.0 ft (MLW)	

COMMENTS: All elevations referenced to Mean Low Water (MLW)
All depths and elevations in United States Feet (USft)
BML = Below Mudline
VCR = Vibracore Refusal

NOTES:

VIBRACORE LOG_215122 M&N_SUNSET BEACH_SEDIMENT_SAMPLING.GPJ_CATLIN.GDT_11/29/16

VIBRACORE LOG

CATLIN Engineers and Scientists
215122 Wilmington, NC

SHEET 1 OF 1

CATLIN NO.: 215122	**STATE:** NC	**COUNTY:** BRUNSWICK	**CITY:** Sunset Beach
PROJECT NAME: Sunset Beach Pre-Dredge Analysis		**LOGGED BY:** Shawn McGuire **OPERATOR:** D.T. Chalmers, Jr.	**BORING ID.** VC-12
NORTHING: 45425	**EASTING:** 2154467	**FIELD GEO.:** Steven Hudson	**MUDLINE ELEV.:** -0.2 ft.
SYSTEM: NCSP NAD 83 (USft)	**MACHINE:** PVL VC-3.5.2	**WATER DEPTH:** 5.3 ft.	**DEPTH IN SEDS.:** 8.9 ft.
METHOD: Vibracore	**CORE MATERIAL:** Unlined Acetate	**CORE DIAMETER:** 4 in.	**TARGET ELEV.:** -10.0 ft.
START DATE: 08/23/16	**FINISH DATE:** 08/23/16	**BORING LOCATION:** Jinks Creek	

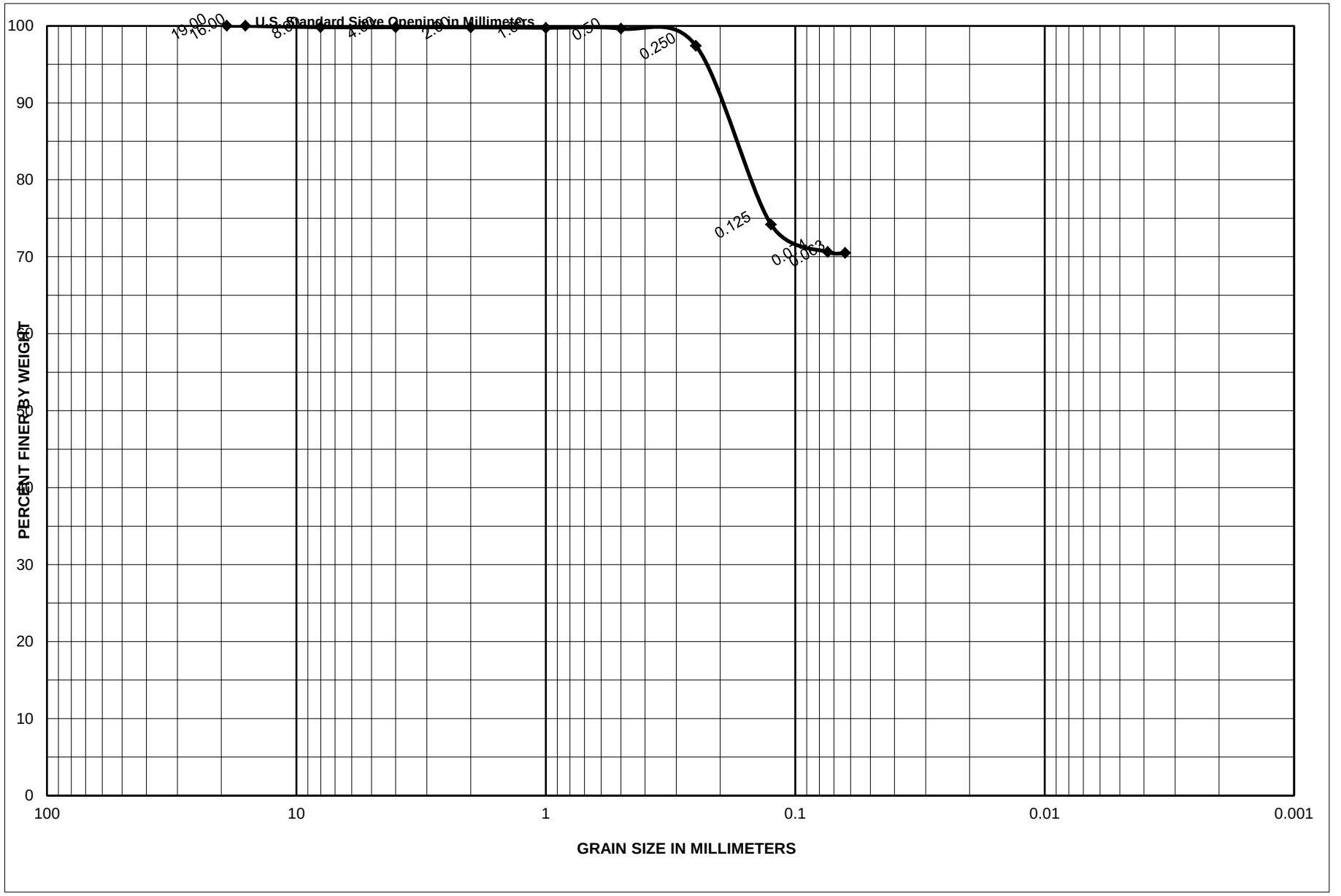
DEPTH	ELEV.	ENV. SAMP. ELEV.	ENV. SAMP. ID.	GEOTECH SAMPLE	USCS	LOG	SEDIMENT DESCRIPTION	DEPTH	ELEVATION
								0.0	-0.2
0.0	-0.2			V12-S01	SP		Tan to gray, poorly graded SAND		
8.9	-9.1							8.9	-9.1
							BORING TERMINATED WITH VIBRACORE REFUSAL AT ELEVATION -9.1 ft (MLW)		

COMMENTS: All elevations referenced to Mean Low Water (MLW)
All depths and elevations in United States Feet (USft)
BML = Below Mudline
VCR = Vibracore Refusal

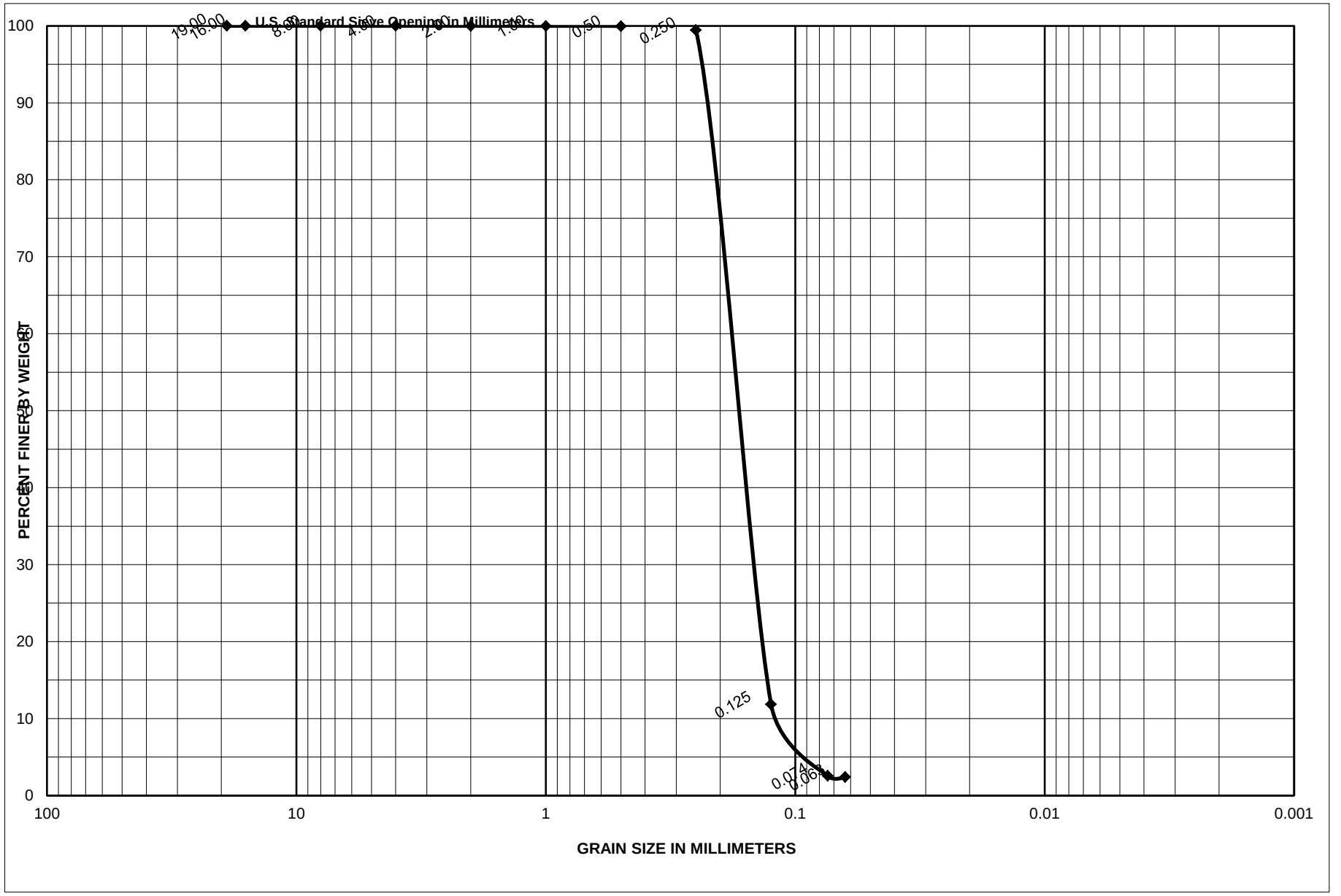
NOTES:

VIBRACORE LOG_215122 M&N_SUNSET_BEACH_SEDIMENT_SAMPLING.GPJ_CATLIN.GDT_11/29/16

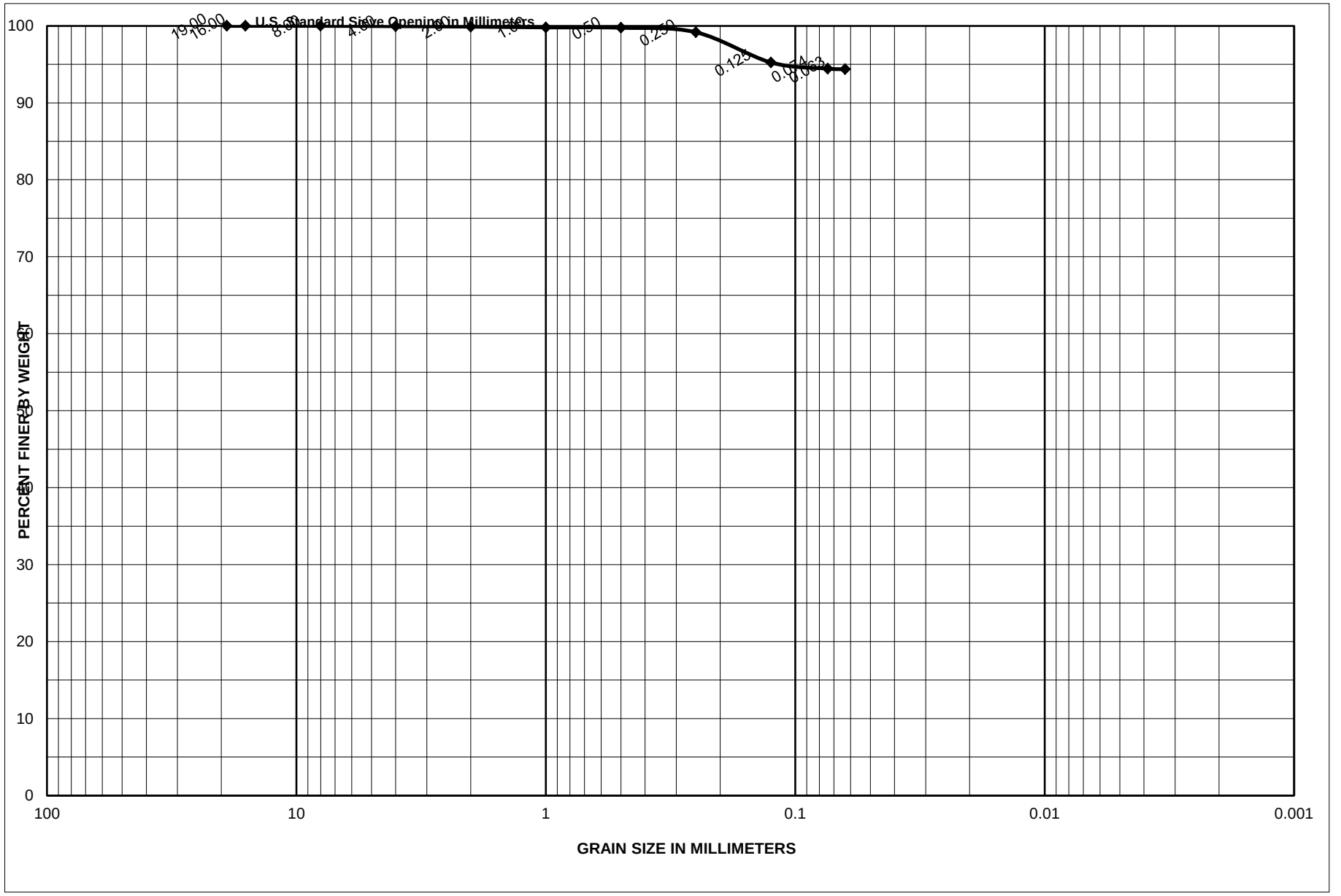
GRADATION CURVES



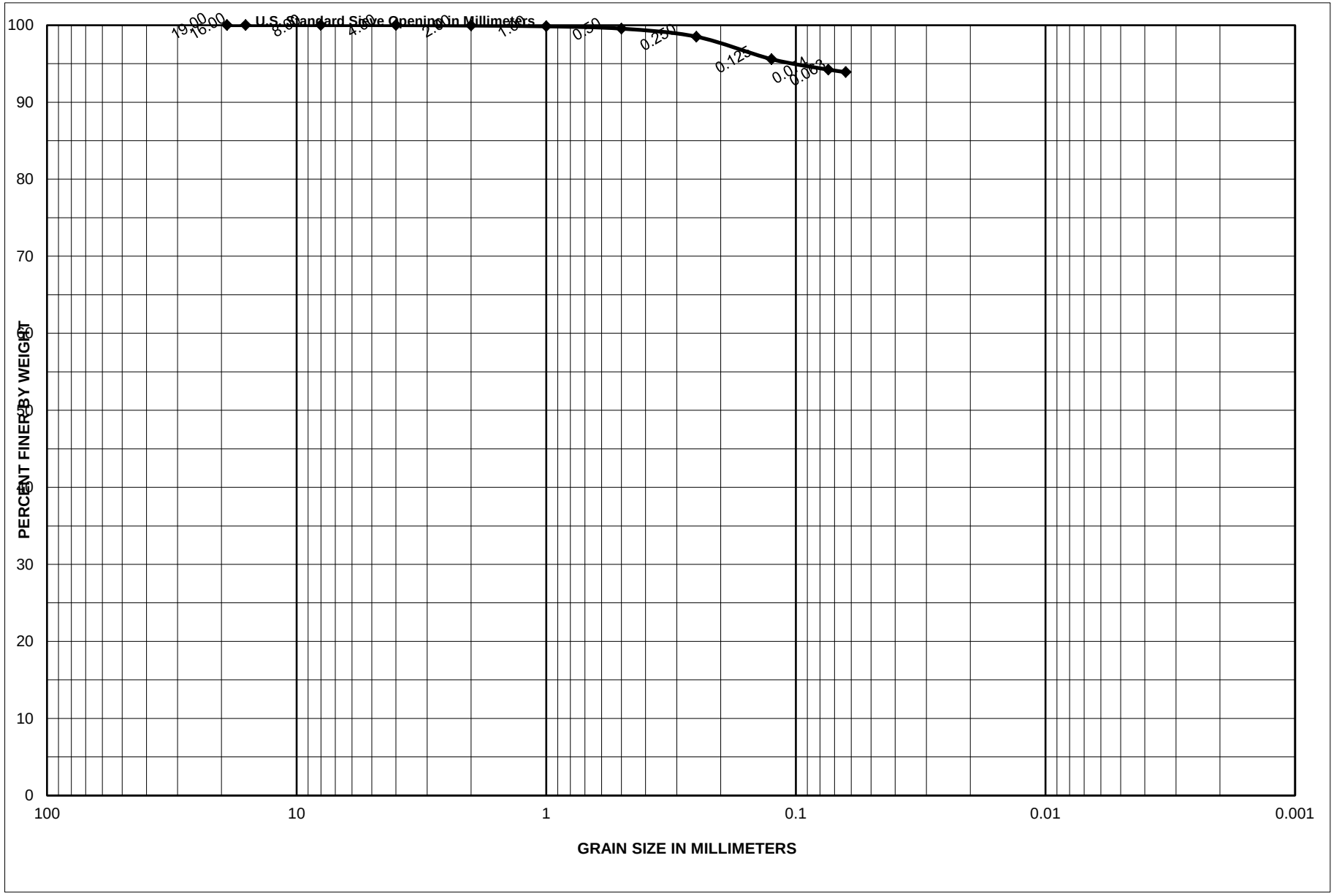
Sample No.	Depth (ft)	Classification		
V22-S01	0-6.7	Gray, Organic soil, OL/OH	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-22
			Date	9/14/2016



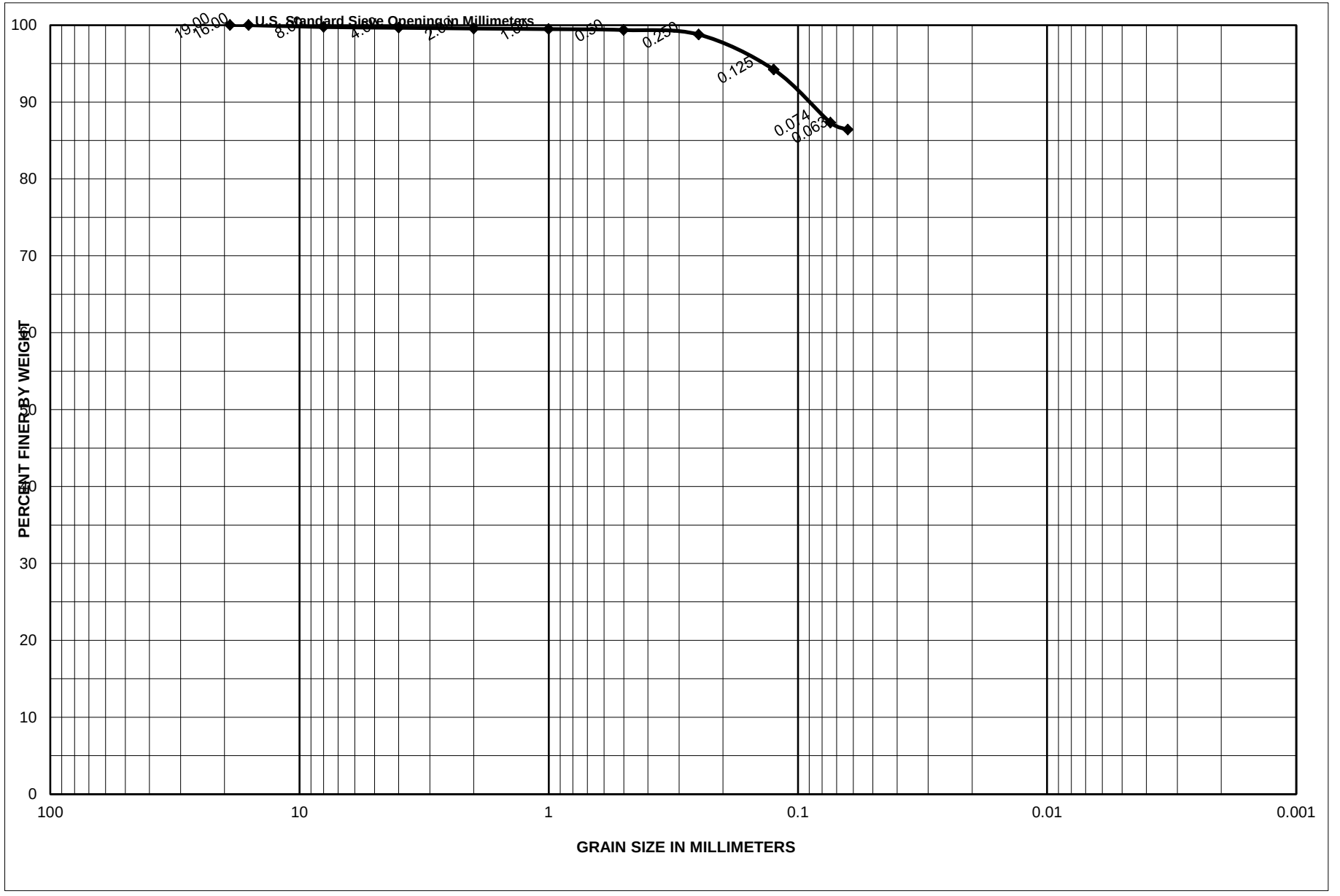
Sample No.	Depth (ft)	Classification		
V22-S02	6.7-7.2	Gray, poorly graded SAND, SP	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-22
			Date	9/14/2016



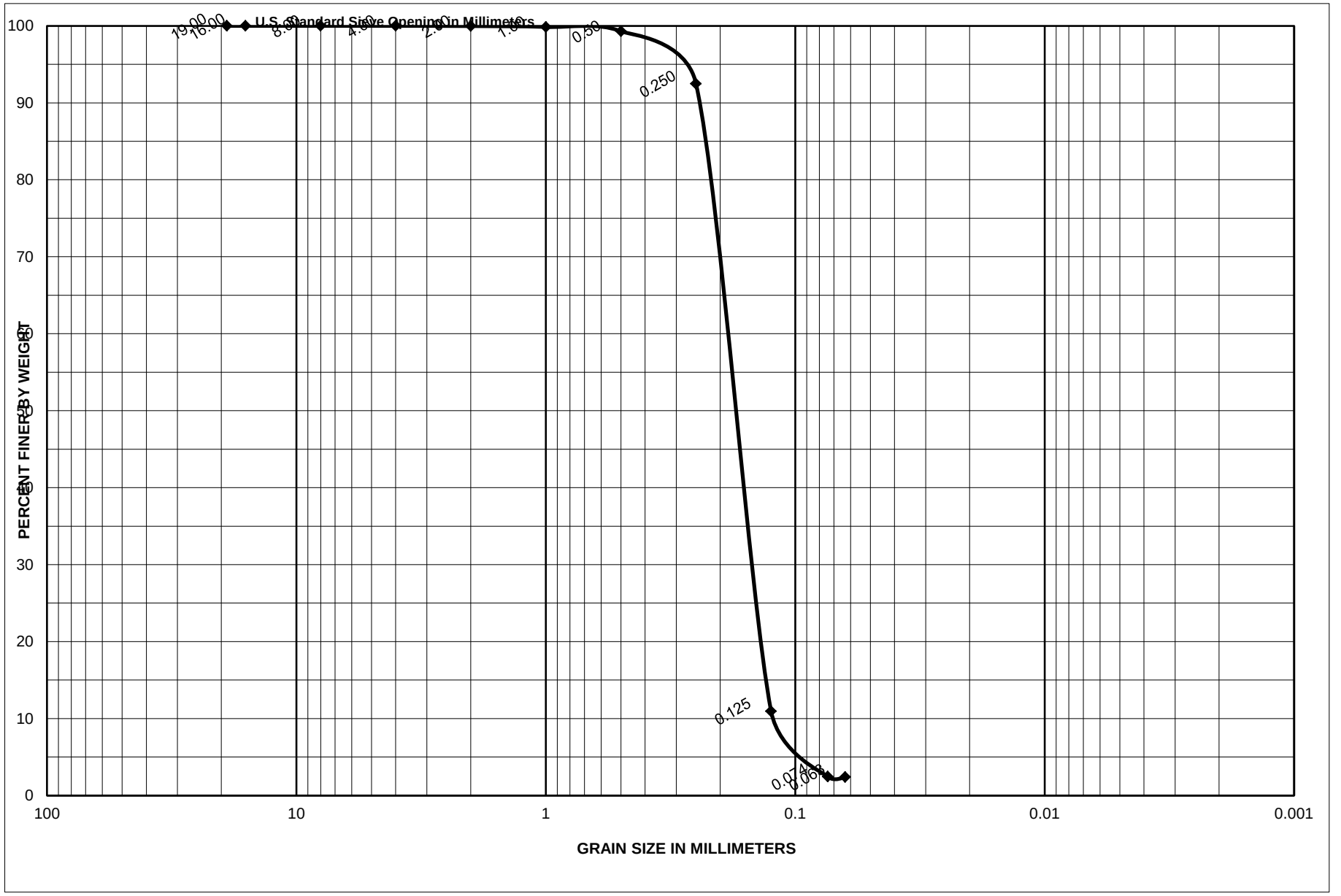
Sample No.	Depth (ft)	Classification		
V21-S01	0-6	Gray to dark gray, Organic soil, OL/OH	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-21
			Date	9/14/2016



Sample No.	Depth (ft)	Classification		
V20-S01	0-6.8	Gray to dark gray, Organic soil, OL/OH	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-20
			Date	9/14/2016



Sample No.	Depth (ft)	Classification		
V19-S01	0-6.0	Gray, Organic soil, OL/OH	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-19
			Date	9/14/2016



Sample No.	Depth (ft)	Classification		
V12-S01	0-8.9	Tan to gray, poorly graded SAND, SP	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-12
			Date	9/14/2016

VIBRACORE PHOTOGRAPHS

Sample VC-22

Top Elevation: -0.4 MLW Bottom Elevation: -7.6 MLW

Sample Length: 7.2 ft

Sample VC-20

Top Elevation: -2.2 MLW Bottom Elevation: -9.0 MLW

Sample Length: 6.8 ft

Sample VC-21

Top Elevation: -3.5 MLW Bottom Elevation: -9.5 MLW

Sample Length: 6.0 ft

Sample VC-19

Top Elevation: -2.2 MLW Bottom Elevation: -8.2 MLW

Sample Length: 6.0 ft

Sample VC-12-1

Top Elevation: -0.2 MLW Bottom Elevation: -5.2 MLW

Sample Length: 5.0 ft

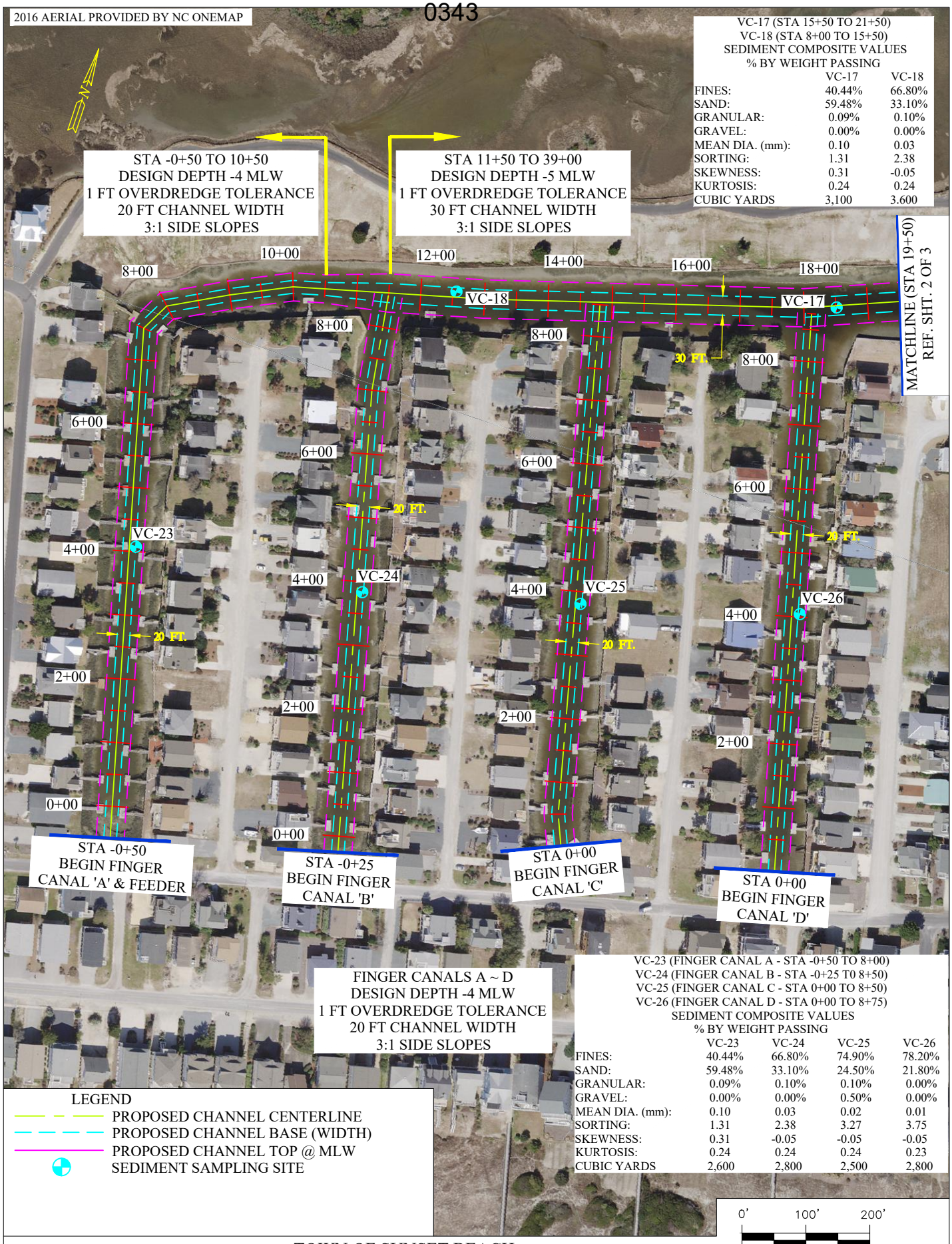
Sample VC-12-2

Top Elevation: -5.2 MLW Bottom Elevation: -9.1 MLW

Sample Length: 3.9 ft

APPENDIX C

FEEDER CHANNEL SEDIMENT ANALYSIS



TOWN OF SUNSET BEACH
NAVIGATION PROJECT
FEEDER CHANNEL SEDIMENT ANALYSIS
PLAN VIEW

C1-1

moffatt & nichol

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
FEEDER CHANNEL SEDIMENT ANALYSIS
PLAN VIEW

C1-2

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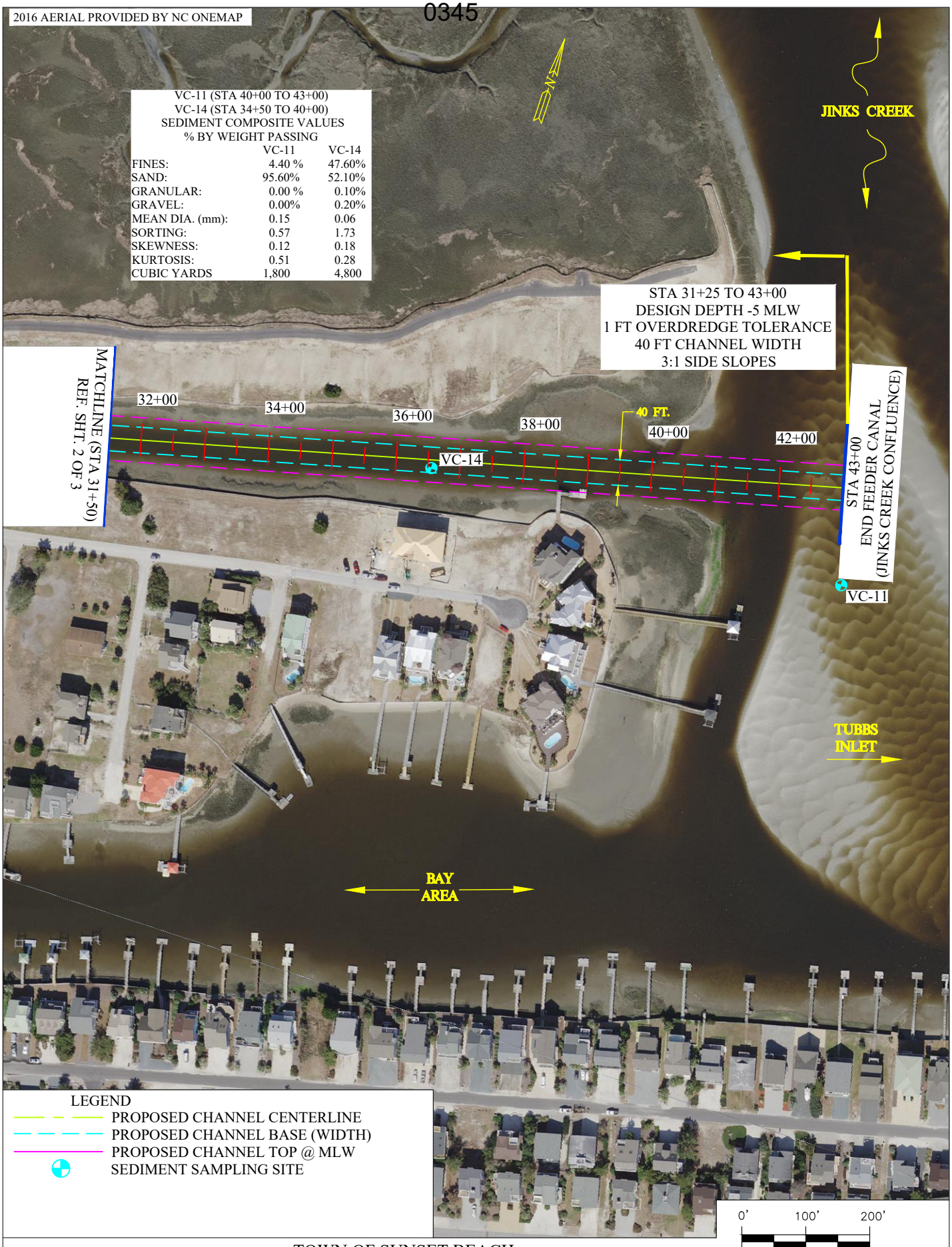

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
FEEDER CHANNEL SEDIMENT ANALYSIS
PLAN VIEW

C1-3

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9269
Town of Sunset Beach
Navigation Project
Feeder Channel Sediment Analysis Summary Table

Per 15A NCAC 07H.0312

Fines: X < 0.0625 mm
Sand: 0.0625 ≤ X < 2 mm
Granular: 2 mm ≤ X < 4.76 mm
Gravel: 4.76 ≤ X < 76 mm

Feeder Channel Vibracore Composite Summary Table

	Representative Stations		Representative Volume (CY)	Sample Elevation (FT-MLW)		Max. Disturbance (FT-MLW)	% Coverage of Disturbance Depth	Composite Summary (% By Wt. Passing)					Mean	Sorting	Skewness	Kurtosis
Vibracore	Start	Stop		Top	Bottom			Fines	Sand	Granular	Gravel	Total	(mm)	(σ)	(α)	(β)
VC-26	0+00	8+75	2,800	-2.4	-5	-5	100%	78.20	21.80	0.00	0.00	1.00	0.01	3.75	-0.05	0.23
VC-25	0+00	8+50	2,500	-2.4	-5	-5	100%	74.90	24.50	0.10	0.50	1.00	0.02	3.27	-0.05	0.24
VC-24	-0+25	8+50	2,800	-3.1	-5	-5	100%	66.80	33.10	0.10	0.00	1.00	0.03	2.38	-0.05	0.24
VC-23	-0+50	8+00	2,600	-4.2	-5	-5	100%	40.44	59.48	0.09	0.00	1.00	0.10	1.31	0.31	0.24
VC-18	8+00	15+50	3,600	-2.2	-6	-6	100%	24.16	75.78	0.05	0.00	1.00	0.12	1.03	0.33	0.23
VC-17	15+50	21+50	3,000	-4.6	-6	-6	100%	81.50	18.50	0.00	0.00	1.00	0.01	4.25	-0.04	0.27
VC-16	21+50	27+50	3,600	-4.9	-6	-6	100%	54.10	45.60	0.20	0.10	1.00	0.06	1.69	-0.05	0.24
VC-15	27+50	34+50	5,200	-1	-6	-6	100%	6.88	93.12	0.00	0.00	1.00	0.17	0.43	0.00	1.63
VC-14	34+50	40+00	4,800	-2.1	-6	-6	100%	47.60	52.10	0.10	0.20	1.00	0.06	1.73	0.18	0.28
VC-11	40+00	43+00	1,800	-0.4	-6	-6	100%	4.40	95.60	0.00	0.00	1.00	0.15	0.57	0.12	0.51

Area	Volume (CY)	Stations
Beach Compatible Material	0	-
Non-Compatible Material	32,700	0+00 - 43+00
Total	32,700	0+00 - 43+00

1. The volumetric quantity shown for VC-11 has been reduced from 2,600 CY to 1,800 CY to account for the overlap in dredge areas between the Feeder Channel and S. Jinks Creek.
2. Max. Disturbance depth includes overdredge tolerance.
3. Volumetric quantities are rounded for clarity.

VIBRACORE COMPOSITES

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Town of Sunset Beach
Navigation Project
Sediment Analysis

Sieve Designation Legend

Sieve #	3/4	5/8	5/16	4	5	10	18	35	60	120	200	230
Sieve Size (Φ)	-4.25	-4.00	-3.00	-2.25	-2.00	-1.00	0.00	1.00	2.00	3.00	3.75	4.00
Sieve Size (mm)	19.0	16	8	4.76	4	2	1	0.5	0.25	0.125	0.0743	0.0625

Mean grain size ($M_{\phi\phi}$) determined by $[(\Phi_{84}+\Phi_{50}+\Phi_{16})/3]$ (Folk & Ward,1957).
Sorting determined by $[(\Phi_{84}-\Phi_{16})/2]$ (Dean & Dalrymple, 2002).
Skewness determined by $[(M_{\phi\phi}-\Phi_{50})/\sigma_{\phi}]$ (Dean & Dalrymple, 2002).
Kurtosis determined by $\{[(\Phi_{16}-\Phi_5)+(\Phi_{95}-\Phi_{84})]/2\sigma_{\phi_I}$ (Dean & Dalrymple, 2002).
Moment statistics determined by linear interpretation of composite properties.

Feeder Channel Composites
Design Depth -5 MLW +1 Ft OD

Vibracore VC-11 (Max. Dredge Depth -6 MLW)

Sieve (Phi)	VC-11 Sample Cumulative % by Weight Retained #1	#2	#3	#4	VC-11 Sample Cumulative % by Weight Passing #1	#2	#3	#4	Weighted Composite % Retained	% Passing
-4.25	0.00				100.0				0.00	100.00
-4.00	0.00				100.0				0.00	100.00
-3.00	0.00				100.0				0.00	100.00
-2.00	0.00				100.0				0.00	100.00
-1.00	0.00				100.0				0.00	100.00
0.00	0.00				100.0				0.00	100.00
1.00	0.30				99.7				0.30	99.70
2.00	3.40				96.6				3.40	96.60
3.00	75.90				24.1				75.90	24.10
3.75	95.40				4.6				95.40	4.60
4.00	95.60				4.4				95.60	4.40

VC-11	Depth Interval (MLW)		Representative Values		
Sample	Top	Bottom	Length (ft)	Percent	USCS
1	-0.4	-6	5.6	100.00%	SP
Composite	**-0.4**	**-6**	**5.6**	**100.00%**	**SP**

VC-11	Moment Statistics and Properties in Phi Units						
Sample	φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	2.02	2.17	2.30	2.64	2.99	3.31	3.73
Composite	**2.02**	**2.17**	**2.30**	**2.64**	**2.99**	**3.31**	**3.73**

VC-11
Composite Grain Size Distribution (% by Weight Passing)

Sample	Fines	Sand	Granular	Gravel	Total
1.00	4.40	95.60	0.00	0.00	100%
Composite	**4.40**	**95.60**	**0.00**	**0.00**	**100%**

Per 15A NCAC 07H.0312

Fines: X < 0.0625 mm
Sand: 0.0625 ≤ X < 2 mm
Granular: 2 mm ≤ X < 4.76 mm
Gravel: 4.76 ≤ X < 76 mm

VC-11					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	2.64	0.16	2.71	0.15	0.57	0.12	0.51
Composite	**2.64**	**0.16**	**2.71**	**0.15**	**0.57**	**0.12**	**0.51**

Note: 1. Analysis did not include 4.76 mm sieve (-2.25 ϕ); therefore the divide between granular and gravel based on % passing the 4 mm (-2 φ) sieve.
2. Calcium Carbonate content of dredge material must be within 15% of recipient beach values.

Vibracore VC-14 (Max Dredge Depth -6 MLW)

Sieve (Phi)	VC-14 Sample Cumulative % by Weight Retained #1	#2	#3	#4	VC-14 Sample Cumulative % by Weight Passing #1	#2	#3	#4	Composite VC-14 Weighted Composite (% Retained)	Weighted Composite (% Passing)
-4.25	0.00				100.0				0.00	100.00
-4.00	0.10				99.9				0.10	99.90
-3.00	0.10				99.9				0.10	99.90
-2.00	0.20				99.8				0.20	99.80
-1.00	0.30				99.7				0.30	99.70
0.00	0.40				99.6				0.40	99.60
1.00	0.60				99.4				0.60	99.40
2.00	1.60				98.4				1.60	98.40
3.00	35.70				64.3				35.70	64.30
3.75	51.40				48.6				51.40	48.60
4.00	52.40				47.6				52.40	47.60

VC-14	Depth Interval (MLW)		Representative Values		
Sample	Top	Bottom	Length (ft)	Percent	USCS
1	-2.1	-6	3.9	100.00%	OL/OH
2					
3					
4					
Composite	**-2.1**	**-6**	**3.9**	**100.00%**	

VC-14	Moment Statistics and Properties in Phi Units						
Sample	φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	2.10	2.42	2.69	3.68	5.35	5.89	6.55
2							
3							
4							
Composite	**2.10**	**2.42**	**2.69**	**3.68**	**5.35**	**5.89**	**6.55**

VC-14
Composite Grain Size Distribution (% by Weight Passing)

SubSample	% Fines	% Sand	% Granular	% Gravel	Total
1.00	47.60	52.10	0.10	0.20	100%
2.00					
3.00					
4.00					
Composite	**47.60**	**52.10**	**0.10**	**0.20**	**100%**

Per 15A NCAC 07H.0312

% Fines: X < 0.0625 mm
% Sand: 0.0625 ≤ X < 2 mm
% Granular: 2 mm ≤ X < 4.76 mm
% Gravel: 4.76 ≤ X < 76 mm

VC-14					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	3.68	0.08	4.00	0.06	1.73	0.18	0.28
2							
3							
4							
Composite	**3.68**	**0.08**	**4.00**	**0.06**	**1.73**	**0.18**	**0.28**

Note: Grain size analysis did not include 4.76 mm sieve (-2.25 ϕ); therefore the divide between granular and gravel based on % passing the 4 mm (-2 ϕ) sieve.

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Sediment Analysis

Sieve Designation Legend

Sieve #	3/4	5/8	5/16	4	5	10	18	35	60	120	200	230
Sieve Size (Φ)	-4.25	-4.00	-3.00	-2.25	-2.00	-1.00	0.00	1.00	2.00	3.00	3.75	4.00
Sieve Size (mm)	19.0	16	8	4.76	4	2	1	0.5	0.25	0.125	0.0743	0.0625

Mean grain size ($M_{\phi\phi}$) determined by $[(\Phi_{84}+\Phi_{50}+\Phi_{16})/3]$ (Folk & Ward,1957).
Sorting determined by $[(\Phi_{84}-\Phi_{16})/2]$ (Dean & Dalrymple, 2002).
Skewness determined by $[(M_{\phi\phi}-\Phi_{50})/\sigma_{\phi}]$ (Dean & Dalrymple, 2002).
Kurtosis determined by $\{[(\Phi_{16}-\Phi_5)+(\Phi_{95}-\Phi_{84})]/2\sigma_{\phi_I}$ (Dean & Dalrymple, 2002).
Moment statistics determined by linear interpretation of composite properties.

Feeder Channel Composites
Design Depth -5 MLW +1 Ft OD

Vibracore VC-15 (Max Dredge Depth -6 MLW)

VC-15	Sample Cumulative % by Retained			Weight
Sieve (Phi)	#1	#2	#3	#4
-4.25	0.00	0.00		
-4.00	0.00	0.00		
-3.00	0.00	0.00		
-2.00	0.00	0.00		
-1.00	0.00	0.00		
0.00	0.10	0.00		
1.00	0.20	0.10		
2.00	6.50	6.50		
3.00	85.60	83.70		
3.75	91.80	95.00		
4.00	92.00	95.30		

VC-15	Sample Cumulative % by Weight Passing			
	#1	#2	#3	#4
	100.0	100.0		
	100.0	100.0		
	100.0	100.0		
	100.0	100.0		
	100.0	100.0		
	99.9	100.0		
	99.8	99.9		
	93.5	93.5		
	14.4	16.3		
	8.2	5.0		
	8.0	4.7		

Composite VC-15	
Weighted Composite (% Retained)	Weighted Composite (% Passing)
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.07	99.93
0.17	99.83
6.50	93.50
84.95	15.05
92.89	7.11
93.12	6.88

VC-15	Depth Interval (MLW)		Representative Values		
Sample	Top	Bottom	Length (ft)	Percent	USCS
1	-1	-4.3	3.3	66.00%	SP/SM
2	-4.3	-6	1.7	34.00%	SP
3					
4					
Composite	**-1**	**-6**	**5**	**100.00%**	

VC-15	Moment Statistics and Properties in Phi Units						
Sample	φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	1.76	2.12	2.23	2.55	2.87	2.98	4.07
2	1.77	2.12	2.24	2.56	2.89	3.02	3.75
3							
4							
Composite	**1.76**	**2.12**	**2.24**	**2.55**	**2.87**	**2.99**	**4.04**

VC-15

Composite Grain Size Distribution (% by Weight Passing)					
SubSample	**% Fines**	**% Sand**	**% Granular**	**% Gravel**	**Total**
1.00	8.00	92.00	0.00	0.00	100%
2.00	4.70	95.30	0.00	0.00	100%
Composite	**6.88**	**93.12**	**0.00**	**0.00**	**100%**

Note: Grain size analysis did not include 4.76 mm sieve (-2.25 ϕ); therefore the divide between granular and gravel based on % passing the 4 mm (-2 ϕ) sieve.

Per 15A NCAC 07H.0312

% Fines: X < 0.0625 mm
% Sand: 0.0625 ≤ X < 2 mm
% Granular: 2 mm ≤ X < 4.76 mm
% Gravel: 4.76 ≤ X < 76 mm

VC-15					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	2.55	0.17	2.55	0.17	0.43	0.00	1.69
2	2.56	0.17	2.57	0.17	0.45	0.01	1.21
Composite	**2.55**	**0.17**	**2.55**	**0.17**	**0.43**	**0.00**	**1.63**

Vibracore VC-16 (Max Dredge Depth -6 MLW)

VC-16	Sample Cumulative % by Retained			Weight
Sieve (Phi)	#1	#2	#3	#4
-4.25	0.00			
-4.00	0.00			
-3.00	0.00			
-2.00	0.10			
-1.00	0.30			
0.00	0.40			
1.00	0.60			
2.00	2.70			
3.00	38.00			
3.75	45.30			
4.00	45.90			

VC-16	Sample Cumulative % by Weight Passing			
	#1	#2	#3	#4
	100.0			
	100.0			
	100.0			
	99.9			
	99.7			
	99.6			
	99.4			
	97.3			
	62.0			
	54.7			
	54.1			

Composite VC-16	
Weighted Composite (% Retained)	Weighted Composite (% Passing)
0.00	100.00
0.00	100.00
0.00	100.00
0.10	99.90
0.30	99.70
0.40	99.60
0.60	99.40
2.70	97.30
38.00	62.00
45.30	54.70
45.90	54.10

VC-16	Depth Interval (MLW)		Representative Values		
Sample	Top	Bottom	Length (ft)	Percent	USCS
1	-4.9	-6	1.1	100.00%	OL/OH
2					
3					
4					
Composite	**-4.9**	**-6**	**1.1**	**100.00%**	

VC-16	Moment Statistics and Properties in Phi Units						
Sample	φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	2.07	2.38	2.63	4.19	5.35	5.76	6.27
2							
3							
4							
Composite	**2.07**	**2.38**	**2.63**	**4.19**	**5.35**	**5.76**	**6.27**

VC-16

Composite Grain Size Distribution (% by Weight Passing)					
SubSample	**% Fines**	**% Sand**	**% Granular**	**% Gravel**	**Total**
1.00	54.10	45.60	0.20	0.10	100%
2.00					
3.00					
4.00					
Composite	**54.10**	**45.60**	**0.20**	**0.10**	**100%**

Note: Grain size analysis did not include 4.76 mm sieve (-2.25 ϕ); therefore the divide between granular and gravel based on % passing the 4 mm (-2 ϕ) sieve.

Per 15A NCAC 07H.0312

% Fines: X < 0.0625 mm
% Sand: 0.0625 ≤ X < 2 mm
% Granular: 2 mm ≤ X < 4.76 mm
% Gravel: 4.76 ≤ X < 76 mm

VC-16					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	4.19	0.05	4.11	0.06	1.69	-0.05	0.24
2							
3							
4							
Composite	**4.19**	**0.05**	**4.11**	**0.06**	**1.69**	**-0.05**	**0.24**

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Sediment Analysis

Sieve Designation Legend

Sieve #	3/4	5/8	5/16	4	5	10	18	35	60	120	200	230
Sieve Size (Φ)	-4.25	-4.00	-3.00	-2.25	-2.00	-1.00	0.00	1.00	2.00	3.00	3.75	4.00
Sieve Size (mm)	19.0	16	8	4.76	4	2	1	0.5	0.25	0.125	0.0743	0.0625

Mean grain size ($M_{\phi\phi}$) determined by $[(\Phi_{84}+\Phi_{50}+\Phi_{16})/3]$ (Folk & Ward,1957).
Sorting determined by $[(\Phi_{84}-\Phi_{16})/2]$ (Dean & Dalrymple, 2002).
Skewness determined by $[(M_{\phi\phi}-\Phi_{50})/\sigma_{\phi}]$ (Dean & Dalrymple, 2002).
Kurtosis determined by $\{[(\Phi_{16}-\Phi_5)+(\Phi_{95}-\Phi_{84})]/2\sigma_{\phi_I}$ (Dean & Dalrymple, 2002).
Moment statistics determined by linear interpretation of composite properties.

Feeder Channel Composites
Design Depth -5 MLW +1 Ft OD

Vibracore VC-17 (Max Dredge Depth -6 MLW)

	VC-17 Sample Cumulative % by Weight Retained			
Sieve (Phi)	#1	#2	#3	#4
-4.25	0.00			
-4.00	0.00			
-3.00	0.00			
-2.00	0.00			
-1.00	0.00			
0.00	0.10			
1.00	0.20			
2.00	1.60			
3.00	14.90			
3.75	18.10			
4.00	18.50			

	VC-17 Sample Cumulative % by Weight Passing			
	#1	#2	#3	#4
	100.0			
	100.0			
	100.0			
	100.0			
	100.0			
	99.9			
	99.8			
	98.4			
	85.1			
	81.9			
	81.5			

Composite VC-17	
Weighted Composite (% Retained)	Weighted Composite (% Passing)
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.10	99.90
0.20	99.80
1.60	98.40
14.90	85.10
18.10	81.90
18.50	81.50

VC-17	Depth Interval (MLW)		Representative Values		
Sample	Top	Bottom	Length (ft)	Percent	USCS
1	-4.6	-6	1.4	100.00%	OL/OH
2					
3					
4					
Composite	**-4.6**	**-6**	**1.4**	**100.00%**	**OL/OH**

VC-17	Moment Statistics and Properties in Phi Units						
Sample	φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	2.26	3.26	4.77	7.73	10.69	11.75	13.05
2							
3							
4							
Composite	**2.26**	**3.26**	**4.77**	**7.73**	**10.69**	**11.75**	**13.05**

VC-17	Composite Grain Size Distribution (% by Weight Passing)				
SubSample	% Fines	% Sand	% Granular	% Gravel	Total
1.00	81.50	18.50	0.00	0.00	100%
2.00					
3.00					
4.00					
Composite	**81.50**	**18.50**	**0.00**	**0.00**	**100%**

Note: Grain size analysis did not include 4.76 mm sieve (-2.25 ϕ); therefore the divide between granular and gravel based on % passing the 4 mm (-2 ϕ) sieve.

Per 15A NCAC 07H.0312

% Fines: X < 0.0625 mm
% Sand: 0.0625 ≤ X < 2 mm
% Granular: 2 mm ≤ X < 4.76 mm
% Gravel: 4.76 ≤ X < 76 mm

VC-17					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	7.73	0.00	7.58	0.01	4.25	-0.04	0.27
Composite	**7.73**	**0.00**	**7.58**	**0.01**	**4.25**	**-0.04**	**0.27**

Vibracore VC-18 (Max Dredge Depth -6 MLW)

	VC-18 Sample Cumulative % by Weight Retained			
Sieve (Phi)	#1	#2	#3	#4
-4.25	0.00	0.00		
-4.00	0.00	0.00		
-3.00	0.00	0.00		
-2.00	0.00	0.00		
-1.00	0.10	0.00		
0.00	0.10	0.00		
1.00	0.30	0.10		
2.00	4.50	4.50		
3.00	67.10	74.20		
3.75	72.70	79.00		
4.00	72.90	79.10		

	VC-18 Sample Cumulative % by Weight Passing			
	#1	#2	#3	#4
	100.0	100.0		
	100.0	100.0		
	100.0	100.0		
	100.0	100.0		
	99.9	100.0		
	99.9	100.0		
	99.7	99.9		
	95.5	95.5		
	32.9	25.8		
	27.3	21.0		
	27.1	20.9		

Composite VC-18	
Weighted Composite (% Retained)	Weighted Composite (% Passing)
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.05	99.95
0.05	99.95
0.21	99.79
4.50	95.50
70.46	29.54
75.68	24.32
75.84	24.16

VC-18	Depth Interval (MLW)		Representative Values		
Sample	Top	Bottom	Length (ft)	Percent	USCS
1	-2.2	-4.2	2	52.63%	SM
2	-4.2	-6	1.8	47.37%	SM
3					
4					
Composite	**-2.2**	**-6**	**3.8**	**100.00%**	**SM**

VC-18	Moment Statistics and Properties in Phi Units						
Sample	φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	2.01	2.18	2.33	2.73	4.06	4.32	4.65
2	2.01	2.16	2.29	2.65	3.13	4.13	4.43
3							
4							
Composite	**2.01**	**2.17**	**2.31**	**2.69**	**3.65**	**4.23**	**4.54**

VC-18	Composite Grain Size Distribution (% by Weight Passing)				
SubSample	% Fines	% Sand	% Granular	% Gravel	Total
1.00	27.10	72.80	0.10	0.00	100%
2.00	20.90	79.10	0.00	0.00	100%
3.00					
4.00					
Composite	**24.16**	**75.78**	**0.05**	**0.00**	**100%**

Note: Grain size analysis did not include 4.76 mm sieve (-2.25 ϕ); therefore the divide between granular and gravel based on % passing the 4 mm (-2 ϕ) sieve.

Per 15A NCAC 07H.0312

% Fines: X < 0.0625 mm
% Sand: 0.0625 ≤ X < 2 mm
% Granular: 2 mm ≤ X < 4.76 mm
% Gravel: 4.76 ≤ X < 76 mm

VC-18					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	2.73	0.15	3.08	0.12	1.07	0.33	0.23
2	2.65	0.16	2.98	0.13	0.98	0.34	0.23
3							
4							
Composite	**2.69**	**0.15**	**3.03**	**0.12**	**1.03**	**0.33**	**0.23**

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Sieve Designation Legend

Sieve #	3/4	5/8	5/16	4	5	10	18	35	60	120	200	230
Sieve Size (Φ)	-4.25	-4.00	-3.00	-2.25	-2.00	-1.00	0.00	1.00	2.00	3.00	3.75	4.00
Sieve Size (mm)	19.0	16	8	4.76	4	2	1	0.5	0.25	0.125	0.0743	0.0625

Mean grain size ($M_{\phi\phi}$) determined by $[(\Phi_{84}+\Phi_{50}+\Phi_{16})/3]$ (Folk & Ward,1957).
Sorting determined by $[(\Phi_{84}-\Phi_{16})/2]$ (Dean & Dalrymple, 2002).
Skewness determined by $[(M_{\phi\phi}-\Phi_{50})/\sigma_{\phi}]$ (Dean & Dalrymple, 2002).
Kurtosis determined by $\{[(\Phi_{16}-\Phi_5)+(\Phi_{95}-\Phi_{84})]/2\sigma_{\phi_I}$ (Dean & Dalrymple, 2002).
Moment statistics determined by linear interpretation of composite properties.

Feeder Channel Composites
Design Depth -4 MLW +1 Ft OD

Vibracore VC-23 (Max Dredge Depth -5 MLW)

VC-23	Sample Cumulative % by Weight Retained			
Sieve (Phi)	#1	#2	#3	#4
-4.25	0.00	0.00		
-4.00	0.00	0.00		
-3.00	0.00	0.00		
-2.00	0.00	0.00		
-1.00	0.10	0.00		
0.00	0.20	0.00		
1.00	0.60	0.10		
2.00	3.90	2.40		
3.00	47.00	91.30		
3.75	53.70	99.10		
4.00	53.90	99.20		

VC-23	Sample Cumulative % by Weight Passing			
	#1	#2	#3	#4
	100.0	100.0		
	100.0	100.0		
	100.0	100.0		
	100.0	100.0		
	99.9	100.0		
	99.8	100.0		
	99.4	99.9		
	96.1	97.6		
	53.0	8.7		
	46.3	0.9		
	46.1	0.8		

Composite VC-23	
Weighted Composite (% Retained)	Weighted Composite (% Passing)
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.09	99.91
0.17	99.83
0.54	99.46
3.71	96.29
52.54	47.46
59.38	40.63
59.56	40.44

VC-23	Depth Interval (MLW)		Representative Values		
Sample	Top	Bottom	Length (ft)	Percent	USCS
1	-4.2	-4.9	0.7	87.50%	OL/OH/SM
2	-4.9	-5	0.1	12.50%	SP
3					
4					
Composite	**-4.2**	**-5**	**0.8**	**100.00%**	

VC-23	Moment Statistics and Properties in Phi Units						
Sample	φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	2.03	2.28	2.49	3.34	4.84	5.20	5.64
2	2.03	2.15	2.25	2.54	2.82	2.92	3.36
3							
4							
Composite	**2.03**	**2.25**	**2.44**	**2.95**	**4.55**	**4.88**	**5.27**

VC-23	Composite Grain Size Distribution (% by Weight Passing)				
SubSample	% Fines	% Sand	% Granular	% Gravel	Total
1.00	46.10	53.80	0.10	0.00	100%
2.00	0.80	99.20	0.00	0.00	100%
3.00					
4.00					
Composite	**40.44**	**59.48**	**0.09**	**0.00**	**100%**

Per 15A NCAC 07H.0312

% Fines: X < 0.0625 mm
% Sand: 0.0625 ≤ X < 2 mm
% Granular: 2 mm ≤ X < 4.76 mm
% Gravel: 4.76 ≤ X < 76 mm

VC-23					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	3.34	0.10	3.61	0.08	1.46	0.19	0.24
2	2.54	0.17	2.54	0.17	0.38	0.00	0.73
3							
4							
Composite	**2.95**	**0.13**	**3.36**	**0.10**	**1.31**	**0.31**	**0.24**

Note: Grain size analysis did not include 4.76 mm sieve (-2.25 ϕ); therefore the divide between granular and gravel based on % passing the 4 mm (-2 ϕ) sieve.

Vibracore VC-24 (Max Dredge Depth -5 MLW)

VC-24	Sample Cumulative % by Weight Retained			
Sieve (Phi)	#1	#2	#3	#4
-4.25	0.00			
-4.00	0.00			
-3.00	0.00			
-2.00	0.00			
-1.00	0.10			
0.00	0.20			
1.00	0.40			
2.00	2.20			
3.00	28.60			
3.75	33.00			
4.00	33.20			

VC-24	Sample Cumulative % by Weight Passing			
	#1	#2	#3	#4
	100.0			
	100.0			
	100.0			
	100.0			
	99.9			
	99.8			
	99.6			
	97.8			
	71.4			
	67.0			
	66.8			

Composite VC-24	
Weighted Composite (% Retained)	Weighted Composite (% Passing)
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.10	99.90
0.20	99.80
0.40	99.60
2.20	97.80
28.60	71.40
33.00	67.00
33.20	66.80

VC-24	Depth Interval (MLW)		Representative Values		
Sample	Top	Bottom	Length (ft)	Percent	USCS
1	-3.1	-5	1.9	100.00%	OL/OH
2					
3					
4					
Composite	**-3.1**	**-5**	**1.9**	**100.00%**	**OL/OH**

VC-24	Moment Statistics and Properties in Phi Units						
Sample	φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	2.11	2.52	2.86	5.08	6.70	7.28	7.99
2							
3							
4							
Composite	**2.11**	**2.52**	**2.86**	**5.08**	**6.70**	**7.28**	**7.99**

VC-24	Composite Grain Size Distribution (% by Weight Passing)				
SubSample	% Fines	% Sand	% Granular	% Gravel	Total
1.00	66.80	33.10	0.10	0.00	100%
2.00					
3.00					
4.00					
Composite	**66.80**	**33.10**	**0.10**	**0.00**	**100%**

Per 15A NCAC 07H.0312

% Fines: X < 0.0625 mm
% Sand: 0.0625 ≤ X < 2 mm
% Granular: 2 mm ≤ X < 4.76 mm
% Gravel: 4.76 ≤ X < 76 mm

VC-24					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	5.08	0.03	4.96	0.03	2.38	-0.05	0.24
2							
3							
4							
Composite	**5.08**	**0.03**	**4.96**	**0.03**	**2.38**	**-0.05**	**0.24**

Note: Grain size analysis did not include 4.76 mm sieve (-2.25 ϕ); therefore the divide between granular and gravel based on % passing the 4 mm (-2 ϕ) sieve.

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Sieve Designation Legend

Sieve #	3/4	5/8	5/16	4	5	10	18	35	60	120	200	230
Sieve Size (Φ)	-4.25	-4.00	-3.00	-2.25	-2.00	-1.00	0.00	1.00	2.00	3.00	3.75	4.00
Sieve Size (mm)	19.0	16	8	4.76	4	2	1	0.5	0.25	0.125	0.0743	0.0625

Mean grain size ($M_{\phi\phi}$) determined by $[(\Phi_{84}+\Phi_{50}+\Phi_{16})/3]$ (Folk & Ward,1957).
Sorting determined by $[(\Phi_{84}-\Phi_{16})/2]$ (Dean & Dalrymple, 2002).
Skewness determined by $[(M_{\phi\phi}-\Phi_{50})/\sigma_{\phi}]$ (Dean & Dalrymple, 2002).
Kurtosis determined by $\{[(\Phi_{16}-\Phi_5)+(\Phi_{95}-\Phi_{84})]/2\sigma_{\phi_I}$ (Dean & Dalrymple, 2002).
Moment statistics determined by linear interpretation of composite properties.

Feeder Channel Composites
Design Depth -4 MLW +1 Ft OD

Vibracore VC-25 (Max Dredge Depth -5 MLW)

VC-25	Sample Cumulative % by Retained			Weight
Sieve (Phi)	#1	#2	#3	#4
-4.25	0.00			
-4.00	0.00			
-3.00	0.50			
-2.00	0.50			
-1.00	0.60			
0.00	0.80			
1.00	0.90			
2.00	2.60			
3.00	22.00			
3.75	24.90			
4.00	25.10			

VC-25	Sample Cumulative % by Weight Passing			
	#1	#2	#3	#4
	100.0			
	100.0			
	99.5			
	99.5			
	99.4			
	99.2			
	99.1			
	97.4			
	78.0			
	75.1			
	74.9			

Composite VC-25	
Weighted Composite (% Retained)	Weighted Composite (% Passing)
0.00	100.00
0.00	100.00
0.50	99.50
0.50	99.50
0.60	99.40
0.80	99.20
0.90	99.10
2.60	97.40
22.00	78.00
24.90	75.10
25.10	74.90

VC-25	Depth Interval (MLW)		Representative Values		
Sample	Top	Bottom	Length (ft)	Percent	USCS
1	-2.4	-5	2.6	100.00%	OL/OH
2					
3					
4					
Composite	**-2.4**	**-5**	**2.6**	**100.00%**	**OL/OH**

VC-25	Moment Statistics and Properties in Phi Units						
Sample	φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	2.12	2.69	3.88	6.21	8.44	9.24	10.21
2							
3							
4							
Composite	**2.12**	**2.69**	**3.88**	**6.21**	**8.44**	**9.24**	**10.21**

VC-25	Composite Grain Size Distribution (% by Weight Passing)				
SubSample	% Fines	% Sand	% Granular	% Gravel	Total
1.00	74.90	24.50	0.10	0.50	100%
2.00					
3.00					
4.00					
Composite	**74.90**	**24.50**	**0.10**	**0.50**	**100%**

Note: Grain size analysis did not include 4.76 mm sieve (-2.25 ϕ); therefore the divide between granular and gravel based on % passing the 4 mm (-2 ϕ) sieve.

Per 15A NCAC 07H.0312

% Fines: X < 0.0625 mm
% Sand: 0.0625 ≤ X < 2 mm
% Granular: 2 mm ≤ X < 4.76 mm
% Gravel: 4.76 ≤ X < 76 mm

VC-25					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	6.21	0.01	6.05	0.02	3.27	-0.05	0.24
2							
3							
4							
Composite	**6.21**	**0.01**	**6.05**	**0.02**	**3.27**	**-0.05**	**0.24**

Vibracore VC-26 (Max Dredge Depth -5 MLW)

VC-26	Sample Cumulative % by Retained			Weight
Sieve (Phi)	#1	#2	#3	#4
-4.25	0.00			
-4.00	0.00			
-3.00	0.00			
-2.00	0.00			
-1.00	0.00			
0.00	0.10			
1.00	0.20			
2.00	2.10			
3.00	19.30			
3.75	21.60			
4.00	21.80			

VC-26	Sample Cumulative % by Weight Passing			
	#1	#2	#3	#4
	100.0			
	100.0			
	100.0			
	100.0			
	100.0			
	99.9			
	99.8			
	97.9			
	80.7			
	78.4			
	78.2			

Composite VC-26	
Weighted Composite (% Retained)	Weighted Composite (% Passing)
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.00	100.00
0.10	99.90
0.20	99.80
2.10	97.90
19.30	80.70
21.60	78.40
21.80	78.20

VC-26	Depth Interval (MLW)		Representative Values		
Sample	Top	Bottom	Length (ft)	Percent	USCS
1	-2.4	-5	2.6	100.00%	OL/OH
2					
3					
4					
Composite	**-2.4**	**-5**	**2.6**	**100.00%**	**OL/OH**

VC-26	Moment Statistics and Properties in Phi Units						
Sample	φ_5	φ_{16}	φ_{25}	φ_{50}	φ_{75}	φ_{84}	φ_{95}
1	2.17	2.81	4.32	6.86	9.40	10.31	11.43
2							
3							
4							
Composite	**2.17**	**2.81**	**4.32**	**6.86**	**9.40**	**10.31**	**11.43**

VC-26	Composite Grain Size Distribution (% by Weight Passing)				
SubSample	% Fines	% Sand	% Granular	% Gravel	Total
1.00	78.20	21.80	0.00	0.00	100%
2.00					
3.00					
4.00					
Composite	**78.20**	**21.80**	**0.00**	**0.00**	**100%**

Note: Grain size analysis did not include 4.76 mm sieve (-2.25 ϕ); therefore the divide between granular and gravel based on % passing the 4 mm (-2 ϕ) sieve.

Per 15A NCAC 07H.0312

% Fines: X < 0.0625 mm
% Sand: 0.0625 ≤ X < 2 mm
% Granular: 2 mm ≤ X < 4.76 mm
% Gravel: 4.76 ≤ X < 76 mm

VC-26					Parameters in Phi Units		
Sample	Median (ϕ)	Median (mm)	Mean (ϕ)	Mean (mm)	Sorting (σ)	Skewness (α)	Kurtosis (β)
1	6.86	0.01	6.66	0.01	3.75	-0.05	0.23
2							
3							
4							
Composite	**6.86**	**0.01**	**6.66**	**0.01**	**3.75**	**-0.05**	**0.23**

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VIBRACORE LOGS

VIBRACORE LOG

CATLIN Engineers and Scientists
215122 Wilmington, NC

SHEET 1 OF 1

CATLIN NO.: 215122	**STATE:** NC	**COUNTY:** BRUNSWICK	**CITY:** Sunset Beach
PROJECT NAME: Sunset Beach Pre-Dredge Analysis		**LOGGED BY:** Shawn McGuire **OPERATOR:** D.T. Chalmers, Jr.	**BORING ID.** VC-11
NORTHING: 45844	**EASTING:** 2154270	**FIELD GEO.:** Steven Hudson	**MUDLINE ELEV.:** -0.4 ft.
SYSTEM: NCSP NAD 83 (USft)	**MACHINE:** PVL VC-3.5.2	**WATER DEPTH:** 4.5 / 2.8 ft.	**DEPTH IN SEDS.:** 10.0 ft.
METHOD: Vibracore	**CORE MATERIAL:** Unlined Acetate / Lined Aluminum	**CORE DIAMETER:** 4 in.	**TARGET ELEV.:** -10.0 ft.
START DATE: 08/23/16	**FINISH DATE:** 10/26/16	**BORING LOCATION:** Jinks Creek	

DEPTH	ELEV.	ENV. SAMP. ELEV.	ENV. SAMP. ID.	GEOTECH SAMPLE	USCS	LOG	SEDIMENT DESCRIPTION	DEPTH	ELEVATION
								0.0	-0.4
0.0	-0.4			V11-S01	SP		Mudline Tan to gray, poorly graded SAND	7.0	-7.4
7	-7.4				SP			10.0	-10.4
							BORING TERMINATED AT ELEVATION -10.4 ft (MLW)		

COMMENTS: All elevations referenced to Mean Low Water (MLW)
All depths and elevations in United States Feet (USft)
BML = Below Mudline
VCR = Vibracore Refusal

NOTES:
1st Run from mudline w/Clear Acetate Core terminated w/VCR @ 7.0ft BML.
2nd Run from 6.0ft BML w/Lined Aluminum terminated @ 10.0ft BML.

VIBRACORE LOG 215122 M&N_SUNSET_BEACH_SEDIMENT_SAMPLING.GPJ CATLIN.GDT 11/29/16

VIBRACORE LOG

CATLIN Engineers and Scientists
215122 Wilmington, NC

CATLIN NO.: 215122	**STATE:** NC	**COUNTY:** BRUNSWICK	**CITY:** Sunset Beach
PROJECT NAME: Sunset Beach Pre-Dredge Analysis		**LOGGED BY:** Shawn McGuire **OPERATOR:** D.T. Chalmers, Jr.	**BORING ID.** VC-14
NORTHING: 45818	**EASTING:** 2153604	**FIELD GEO.:** Corey Futral	**MUDLINE ELEV.:** -2.1 ft.
SYSTEM: NCSP NAD 83 (USft)	**MACHINE:** PVL VC-3.5.2	**WATER DEPTH:** 6.0 ft.	**DEPTH IN SEDS.:** 5.9 ft.
METHOD: Vibracore	**CORE MATERIAL:** Unlined Acetate	**CORE DIAMETER:** 4 in.	**TARGET ELEV.:** -9.0 ft.
START DATE: 08/19/16	**FINISH DATE:** 08/19/16	**BORING LOCATION:** North Shore Drive Entrance Canals	

DEPTH	ELEV.	ENV. SAMP. ELEV.	ENV. SAMP. ID.	GEOTECH SAMPLE	USCS	LOG	SEDIMENT DESCRIPTION DEPTH	SEDIMENT DESCRIPTION	ELEVATION
							0.0	Mudline	-2.1
0.0	-2.1			V14-S01	OL/OH			Gray, Silty SAND to Sandy ORGANIC SOIL	
							5.4		-7.5
5.4	-7.5			V14-S02	SP		5.9	Gray, poorly graded SAND	-8.0
5.9	-8.0							BORING TERMINATED WITH VIBRACORE REFUSAL AT ELEVATION -8.0 ft (MLW)	

COMMENTS: All elevations referenced to Mean Low Water (MLW)
All depths and elevations in United States Feet (USft)
BML = Below Mudline
VCR = Vibracore Refusal

NOTES:

VIBRACORE LOG_215122 M&N_SUNSET_BEACH_SEDIMENT_SAMPLING.GPJ_CATLIN.GDT_11/29/16

VIBRACORE LOG

CATLIN Engineers and Scientists
215122 Wilmington, NC

SHEET 1 OF 1

CATLIN NO.: 215122	**STATE:** NC	**COUNTY:** BRUNSWICK	**CITY:** Sunset Beach
PROJECT NAME: Sunset Beach Pre-Dredge Analysis		**LOGGED BY:** Shawn McGuire **OPERATOR:** D.T. Chalmers, Jr.	**BORING ID.** VC-15
NORTHING: 45665	**EASTING:** 2153018	**FIELD GEO.:** Corey Futral	**MUDLINE ELEV.:** -1.0 ft.
SYSTEM: NCSP NAD 83 (USft)	**MACHINE:** PVL VC-3.5.2	**WATER DEPTH:** 2.3 ft.	**DEPTH IN SEDS.:** 7.4 ft.
METHOD: Vibracore	**CORE MATERIAL:** Unlined Acetate	**CORE DIAMETER:** 4 in.	**TARGET ELEV.:** -9.0 ft.
START DATE: 08/17/16	**FINISH DATE:** 08/17/16	**BORING LOCATION:** North Shore Drive Entrance Canals	

DEPTH	ELEV.	ENV. SAMP. ELEV.	ENV. SAMP. ID.	GEOTECH SAMPLE	USCS	LOG	SEDIMENT DESCRIPTION	DEPTH	ELEVATION
								0.0	-1.0
0.0	-1.0			V15-S01	SP/SM		Gray, poorly graded SAND with silt	3.3	-4.3
3.3	-4.3			V15-S02	SP		Light gray, poorly graded SAND	5.2	-6.2
5.2	-6.2			V15-S03	SC		Gray, Clayey SAND	7.4	-8.4
7.4	-8.4						BORING TERMINATED WITH VIBRACORE REFUSAL AT ELEVATION -8.4 ft (MLW)		

COMMENTS: All elevations referenced to Mean Low Water (MLW)
All depths and elevations in United States Feet (USft)
BML = Below Mudline
VCR = Vibracore Refusal

NOTES:

VIBRACORE LOG_215122 M&N_SUNSET BEACH_SEDIMENT_SAMPLING.GPJ_CATLIN.GDT_11/29/16

VIBRACORE LOG

CATLIN Engineers and Scientists
215122 Wilmington, NC

CATLIN NO.: 215122	**STATE:** NC	**COUNTY:** BRUNSWICK	**CITY:** Sunset Beach
PROJECT NAME: Sunset Beach Pre-Dredge Analysis		**LOGGED BY:** Shawn McGuire **OPERATOR:** D.T. Chalmers, Jr.	**BORING ID.** VC-16
NORTHING: 45535	**EASTING:** 2152438	**FIELD GEO.:** Corey Futral	**MUDLINE ELEV.:** -4.9 ft.
SYSTEM: NCSP NAD 83 (USft)	**MACHINE:** PVL VC-3.5.2	**WATER DEPTH:** 5.3 ft.	**DEPTH IN SEDS.:** 5.0 ft.
METHOD: Vibracore	**CORE MATERIAL:** Unlined Acetate	**CORE DIAMETER:** 4 in.	**TARGET ELEV.:** -9.0 ft.
START DATE: 08/17/16	**FINISH DATE:** 08/17/16	**BORING LOCATION:** North Shore Drive Entrance Canals	

DEPTH	ELEV.	ENV. SAMP. ELEV.	ENV. SAMP. ID.	GEOTECH SAMPLE	USCS	LOG	SEDIMENT DESCRIPTION DEPTH	SEDIMENT DESCRIPTION	ELEVATION
							0.0	Mudline	-4.9
0.0	-4.9			V16-S01	OL/OH			Gray, Sandy ORGANIC SOIL	
3.7	-8.6			V16-S02	SP/SM		3.7		-8.6
5	-9.9						5.0	Gray, poorly graded SAND with silt	-9.9
								BORING TERMINATED AT ELEVATION -9.9 ft (MLW)	

COMMENTS: All elevations referenced to Mean Low Water (MLW)
All depths and elevations in United States Feet (USft)
BML = Below Mudline
VCR = Vibracore Refusal

NOTES:
Composite sample collected for chemical analysis from borings VC-16 & VC-18

VIBRACORE LOG 215122 M&N_SUNSET_BEACH_SEDIMENT_SAMPLING.GPJ CATLIN.GDT 11/29/16

VIBRACORE LOG

CATLIN Engineers and Scientists
215122 Wilmington, NC

CATLIN NO.: 215122	**STATE:** NC	**COUNTY:** BRUNSWICK	**CITY:** Sunset Beach
PROJECT NAME: Sunset Beach Pre-Dredge Analysis		**LOGGED BY:** Shawn McGuire **OPERATOR:** D.T. Chalmers, Jr.	**BORING ID.** VC-17
NORTHING: 45341	**EASTING:** 2151866	**FIELD GEO.:** Corey Futral	**MUDLINE ELEV.:** -4.6 ft.
SYSTEM: NCSP NAD 83 (USft)	**MACHINE:** PVL VC-3.5.2	**WATER DEPTH:** 4.8 ft.	**DEPTH IN SEDS.:** 4.9 ft.
METHOD: Vibracore	**CORE MATERIAL:** Unlined Acetate	**CORE DIAMETER:** 4 in.	**TARGET ELEV.:** -9.0 ft.
START DATE: 08/17/16	**FINISH DATE:** 08/17/16	**BORING LOCATION:** North Shore Drive Entrance Canals	

DEPTH	ELEV.	ENV. SAMP. ELEV.	ENV. SAMP. ID.	GEOTECH SAMPLE	USCS	LOG	SEDIMENT DESCRIPTION	ELEVATION
							0.0 Mudline	-4.6
0.0	-4.6			V17-S01	OL/OH		Gray, ORGANIC SOIL	
2.9	-7.5			V17-S02	SP/SM		2.9	-7.5
3.6	-8.2						3.6 Gray, poorly graded SAND with silt	-8.2
4.0	-8.6			V17-S03	CL		4.0 Gray, Sandy Lean Clay	-8.6
4.4				V17-S04	SP/SM		4.9 Gray, poorly graded SAND with silt	-9.5
4.9	-9.5						BORING TERMINATED AT ELEVATION -9.5 ft (MLW)	

COMMENTS: All elevations referenced to Mean Low Water (MLW)
All depths and elevations in United States Feet (USft)
BML = Below Mudline
VCR = Vibracore Refusal

NOTES:

VIBRACORE LOG_215122 M&N_SUNSET BEACH_SEDIMENT_SAMPLING.GPJ_CATLIN.GDT_11/29/16

VIBRACORE LOG

CATLIN Engineers and Scientists
215122 Wilmington, NC

SHEET 1 OF 1

CATLIN NO.: 215122	**STATE:** NC	**COUNTY:** BRUNSWICK	**CITY:** Sunset Beach
PROJECT NAME: Sunset Beach Pre-Dredge Analysis		**LOGGED BY:** Shawn McGuire **OPERATOR:** D.T. Chalmers, Jr.	**BORING ID.** VC-18
NORTHING: 45179	**EASTING:** 2151293	**FIELD GEO.:** Corey Futral	**MUDLINE ELEV.:** -2.2 ft.
SYSTEM: NCSP NAD 83 (USft)	**MACHINE:** PVL VC-3.5.2	**WATER DEPTH:** 3.1 ft.	**DEPTH IN SEDS.:** 5.6 ft.
METHOD: Vibracore	**CORE MATERIAL:** Unlined Acetate	**CORE DIAMETER:** 4 in.	**TARGET ELEV.:** -9.0 ft.
START DATE: 08/17/16	**FINISH DATE:** 08/17/16	**BORING LOCATION:** North Shore Drive Entrance Canals	

DEPTH	ELEV.	ENV. SAMP. ELEV.	ENV. SAMP. ID.	GEOTECH SAMPLE	USCS	LOG	SEDIMENT DESCRIPTION	DEPTH	ELEVATION
							Mudline	0.0	-2.2
0.0	-2.2	-2.2	V1618	V18-S01	SM		Gray, Silty SAND	2.0	-4.2
2.0	-4.2			V18-S02	SM		Gray, Silty SAND	4.9	-7.1
4.9	-7.1	-7.8		V18-S03	SP		Light gray, poorly graded SAND	5.6	-7.8
5.6	-7.8						BORING TERMINATED WITH VIBRACORE REFUSAL AT ELEVATION -7.8 ft (MLW)		

COMMENTS: All elevations referenced to Mean Low Water (MLW)
All depths and elevations in United States Feet (USft)
BML = Below Mudline
VCR = Vibracore Refusal

NOTES:
Composite sample collected for chemical analysis from borings VC-16 & VC-18

VIBRACORE LOG 215122 M&N_SUNSET_BEACH_SEDIMENT_SAMPLING.GPJ CATLIN.GDT 11/29/16

VIBRACORE LOG

CATLIN Engineers and Scientists
215122 Wilmington, NC

SHEET 1 OF 1

CATLIN NO.: 215122	**STATE:** NC	**COUNTY:** BRUNSWICK	**CITY:** Sunset Beach
PROJECT NAME: Sunset Beach Pre-Dredge Analysis		**LOGGED BY:** Shawn McGuire **OPERATOR:** D.T. Chalmers, Jr.	**BORING ID.** VC-23
NORTHING: 44643	**EASTING:** 2150941	**FIELD GEO.:** Corey Futral	**MUDLINE ELEV.:** -4.2 ft.
SYSTEM: NCSP NAD 83 (USft)	**MACHINE:** PVL VC-3.5.2	**WATER DEPTH:** 6.5 ft.	**DEPTH IN SEDS.:** 3.0 ft.
METHOD: Vibracore	**CORE MATERIAL:** Unlined Acetate	**CORE DIAMETER:** 4 in.	**TARGET ELEV.:** -7.0 ft.
START DATE: 08/16/16	**FINISH DATE:** 08/16/16	**BORING LOCATION:** Finger Canals	

DEPTH	ELEV.	ENV. SAMP. ELEV.	ENV. SAMP. ID.	GEOTECH SAMPLE	USCS	LOG	SEDIMENT DESCRIPTION DEPTH	SEDIMENT DESCRIPTION	ELEVATION
							0.0	Mudline	-4.2
0.0	-4.2	-4.2		V23-S01	OL/OH		0.7	Gray, ORGANIC SOIL to Silty SAND	-4.9
0.8	-5.0		V23242526	V23-S02	SP			Gray, poorly graded SAND	
		-7.2					3.0		-7.2
3	-7.2							BORING TERMINATED AT ELEVATION -7.2 ft (MLW)	

COMMENTS: All elevations referenced to Mean Low Water (MLW)
All depths and elevations in United States Feet (USft)
BML = Below Mudline
VCR = Vibracore Refusal

NOTES:
Composite sample collected for chemical analysis from borings VC-23, VC-24, VC-25, & VC-26

VIBRACORE LOG_215122 M&N_SUNSET BEACH_SEDIMENT_SAMPLING.GPJ_CATLIN.GDT_11/29/16

VIBRACORE LOG

CATLIN Engineers and Scientists
215122 Wilmington, NC

SHEET 1 OF 1

CATLIN NO.: 215122	**STATE:** NC	**COUNTY:** BRUNSWICK	**CITY:** Sunset Beach
PROJECT NAME: Sunset Beach Pre-Dredge Analysis		**LOGGED BY:** Shawn McGuire **OPERATOR:** D.T. Chalmers, Jr.	**BORING ID.** VC-24
NORTHING: 44686	**EASTING:** 2151300	**FIELD GEO.:** Corey Futral	**MUDLINE ELEV.:** -3.1 ft.
SYSTEM: NCSP NAD 83 (USft)	**MACHINE:** PVL VC-3.5.2	**WATER DEPTH:** 4.0 ft.	**DEPTH IN SEDS.:** 5.0 ft.
METHOD: Vibracore	**CORE MATERIAL:** Unlined Acetate	**CORE DIAMETER:** 4 in.	**TARGET ELEV.:** -7.0 ft.
START DATE: 08/16/16	**FINISH DATE:** 08/16/16	**BORING LOCATION:** Finger Canals	

DEPTH	ELEV.	ENV. SAMP. ELEV.	ENV. SAMP. ID.	GEOTECH SAMPLE	USCS	LOG	SEDIMENT DESCRIPTION DEPTH	SEDIMENT DESCRIPTION	SEDIMENT DESCRIPTION ELEVATION
							0.0	Mudline	-3.1
0.0	-3.1	-3.1	V23242526	V24-S01	OL/OH			Gray, ORGANIC SOIL	
3.7	-6.8			V24-S02	SP		3.7		-6.8
5	-8.1	-8.1					5.0	Gray, poorly graded SAND	-8.1
								BORING TERMINATED AT ELEVATION -8.1 ft (MLW)	

COMMENTS: All elevations referenced to Mean Low Water (MLW)
All depths and elevations in United States Feet (USft)
BML = Below Mudline
VCR = Vibracore Refusal

NOTES:
Composite sample collected for chemical analysis from borings VC-23, VC-24, VC-25, & VC-26

VIBRACORE LOG 215122 M&N_SUNSET_BEACH_SEDIMENT_SAMPLING.GPJ CATLIN.GDT 11/29/16

VIBRACORE LOG

CATLIN Engineers and Scientists
215122 Wilmington, NC

SHEET 1 OF 1

CATLIN NO.: 215122	**STATE:** NC	**COUNTY:** BRUNSWICK	**CITY:** Sunset Beach
PROJECT NAME: Sunset Beach Pre-Dredge Analysis		**LOGGED BY:** Shawn McGuire **OPERATOR:** D.T. Chalmers, Jr.	**BORING ID.** VC-25
NORTHING: 44775	**EASTING:** 2151630	**FIELD GEO.:** Corey Futral	**MUDLINE ELEV.:** -2.4 ft.
SYSTEM: NCSP NAD 83 (USft)	**MACHINE:** PVL VC-3.5.2	**WATER DEPTH:** 3.0 ft.	**DEPTH IN SEDS.:** 4.6 ft.
METHOD: Vibracore	**CORE MATERIAL:** Unlined Acetate	**CORE DIAMETER:** 4 in.	**TARGET ELEV.:** -7.0 ft.
START DATE: 08/16/16	**FINISH DATE:** 08/16/16	**BORING LOCATION:** Finger Canals	

DEPTH	ELEV.	ENV. SAMP. ELEV.	ENV. SAMP. ID.	GEOTECH SAMPLE	USCS	LOG	SEDIMENT DESCRIPTION DEPTH	SEDIMENT DESCRIPTION	ELEVATION
							0.0	Mudline	-2.4
0.0	-2.4	-2.4	V23242526	V25-S01	OL/OH			Gray, ORGANIC SOIL	
4	-6.4	-6.4					4.0		-6.4
							4.6	No Recovery	-7.0
								BORING TERMINATED AT ELEVATION -7.0 ft (MLW)	

COMMENTS: All elevations referenced to Mean Low Water (MLW)
All depths and elevations in United States Feet (USft)
BML = Below Mudline
VCR = Vibracore Refusal

NOTES:
Composite sample collected for chemical analysis from borings VC-23, VC-24, VC-25, & VC-26

VIBRACORE LOG_215122 M&N_SUNSET BEACH_SEDIMENT_SAMPLING.GPJ_CATLIN.GDT_11/29/16

VIBRACORE LOG

CATLIN Engineers and Scientists
215122 Wilmington, NC

SHEET 1 OF 1

CATLIN NO.: 215122	**STATE:** NC	**COUNTY:** BRUNSWICK	**CITY:** Sunset Beach
PROJECT NAME: Sunset Beach Pre-Dredge Analysis		**LOGGED BY:** Shawn McGuire **OPERATOR:** D.T. Chalmers, Jr.	**BORING ID.** VC-26
NORTHING: 44867	**EASTING:** 2151961	**FIELD GEO.:** Corey Futral	**MUDLINE ELEV.:** -2.4 ft.
SYSTEM: NCSP NAD 83 (USft)	**MACHINE:** PVL VC-3.5.2	**WATER DEPTH:** 3.0 ft.	**DEPTH IN SEDS.:** 4.7 ft.
METHOD: Vibracore	**CORE MATERIAL:** Unlined Acetate	**CORE DIAMETER:** 4 in.	**TARGET ELEV.:** -7.0 ft.
START DATE: 08/16/16	**FINISH DATE:** 08/16/16	**BORING LOCATION:** Finger Canals	

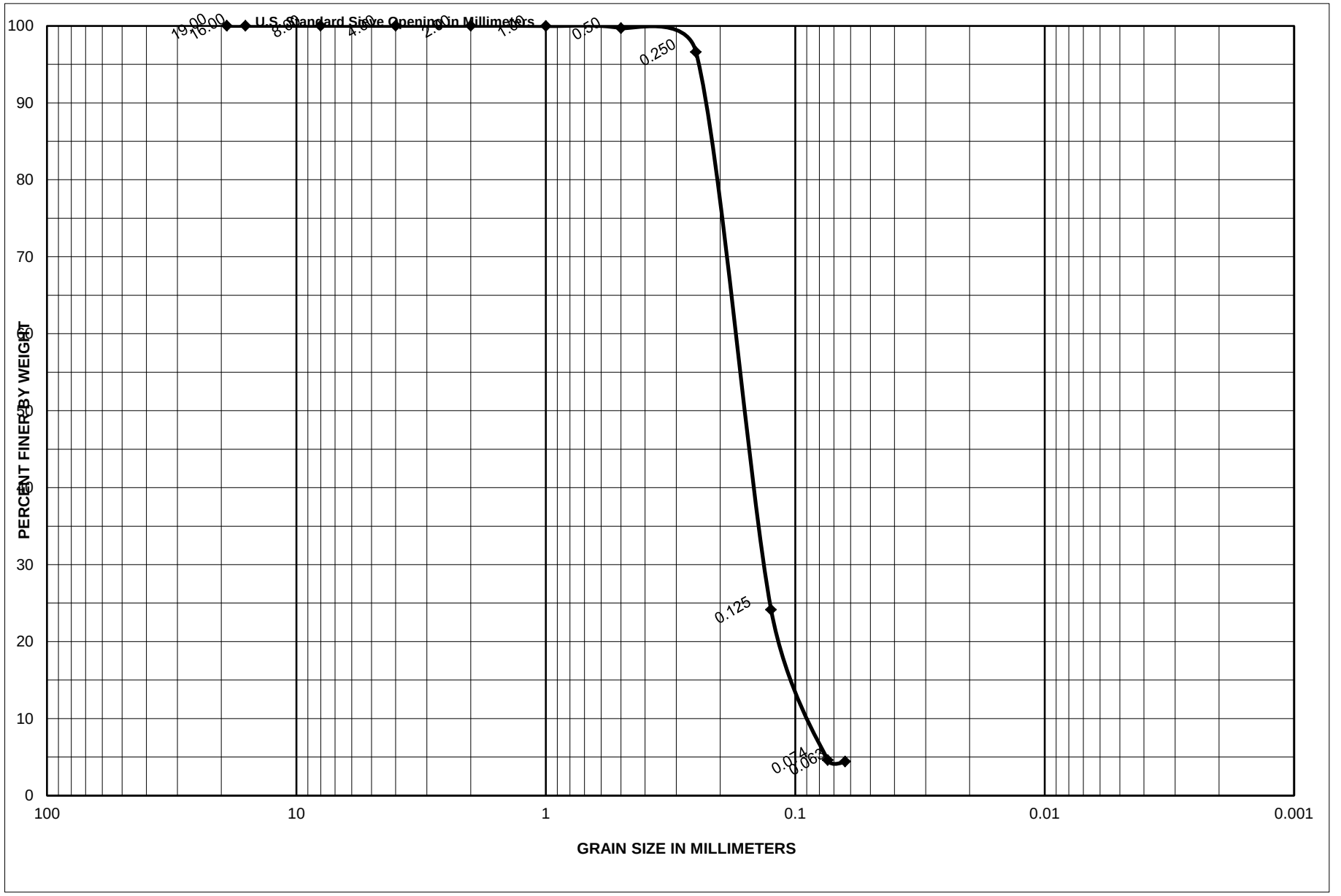
DEPTH	ELEV.	ENV. SAMP. ELEV.	ENV. SAMP. ID.	GEOTECH SAMPLE	USCS	LOG	SEDIMENT DESCRIPTION DEPTH	SEDIMENT DESCRIPTION
							0.0	Mudline -2.4
0.0	-2.4	-2.4	V23242526	V26-S01	OL/OH		2.6	Gray, ORGANIC SOIL -5.0
2.6	-5.0	-7.1		V26-S02	SP		4.7	Gray, poorly graded SAND -7.1
4.7	-7.1							BORING TERMINATED WITH VIBRACORE REFUSAL AT ELEVATION -7.1 ft (MLW)

COMMENTS: All elevations referenced to Mean Low Water (MLW)
All depths and elevations in United States Feet (USft)
BML = Below Mudline
VCR = Vibracore Refusal

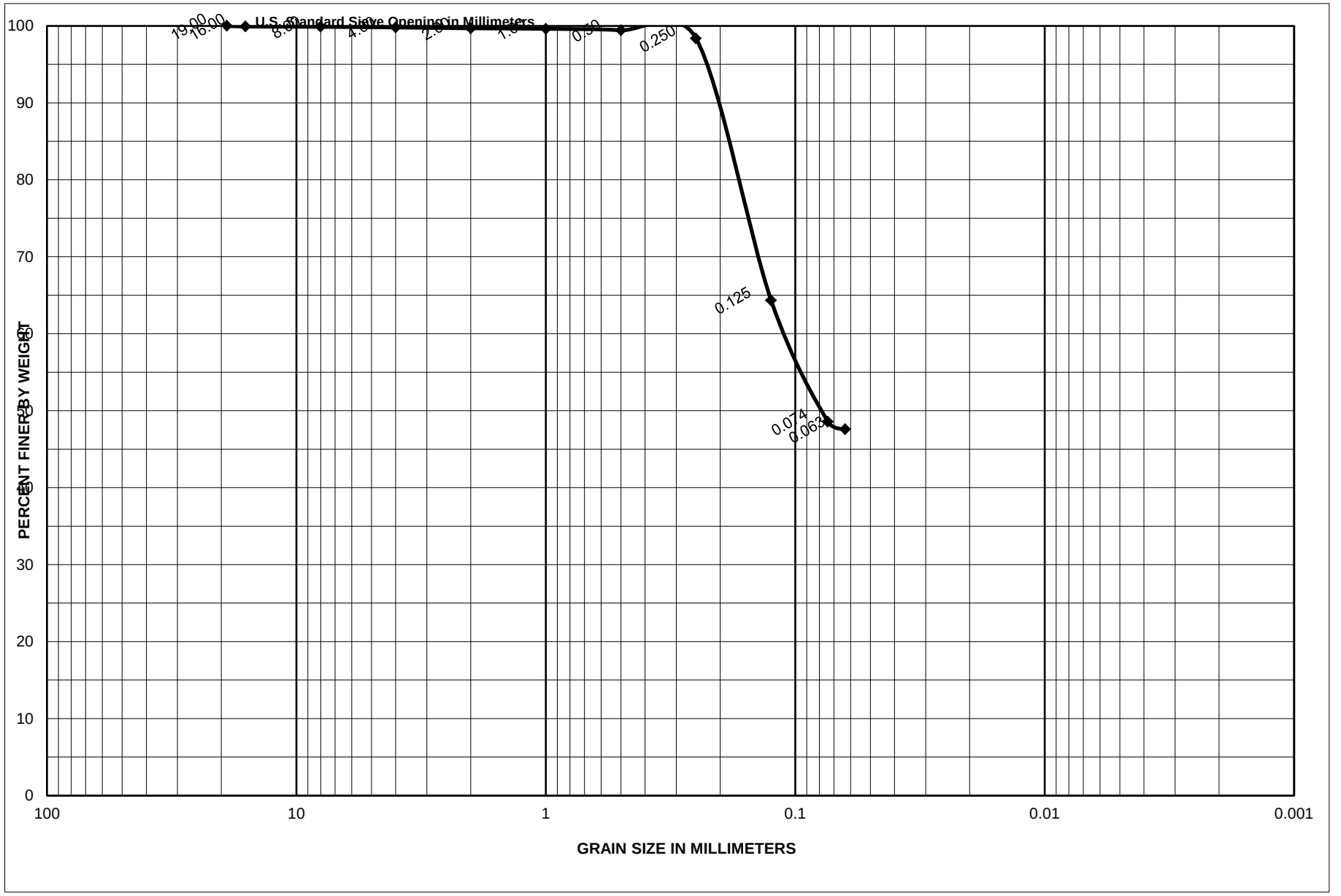
NOTES:
Composite sample collected for chemical analysis from borings VC-23, VC-24, VC-25, & VC-26

VIBRACORE LOG 215122 M&N_SUNSET_BEACH_SEDIMENT_SAMPLING.GPJ CATLIN.GDT 11/29/16

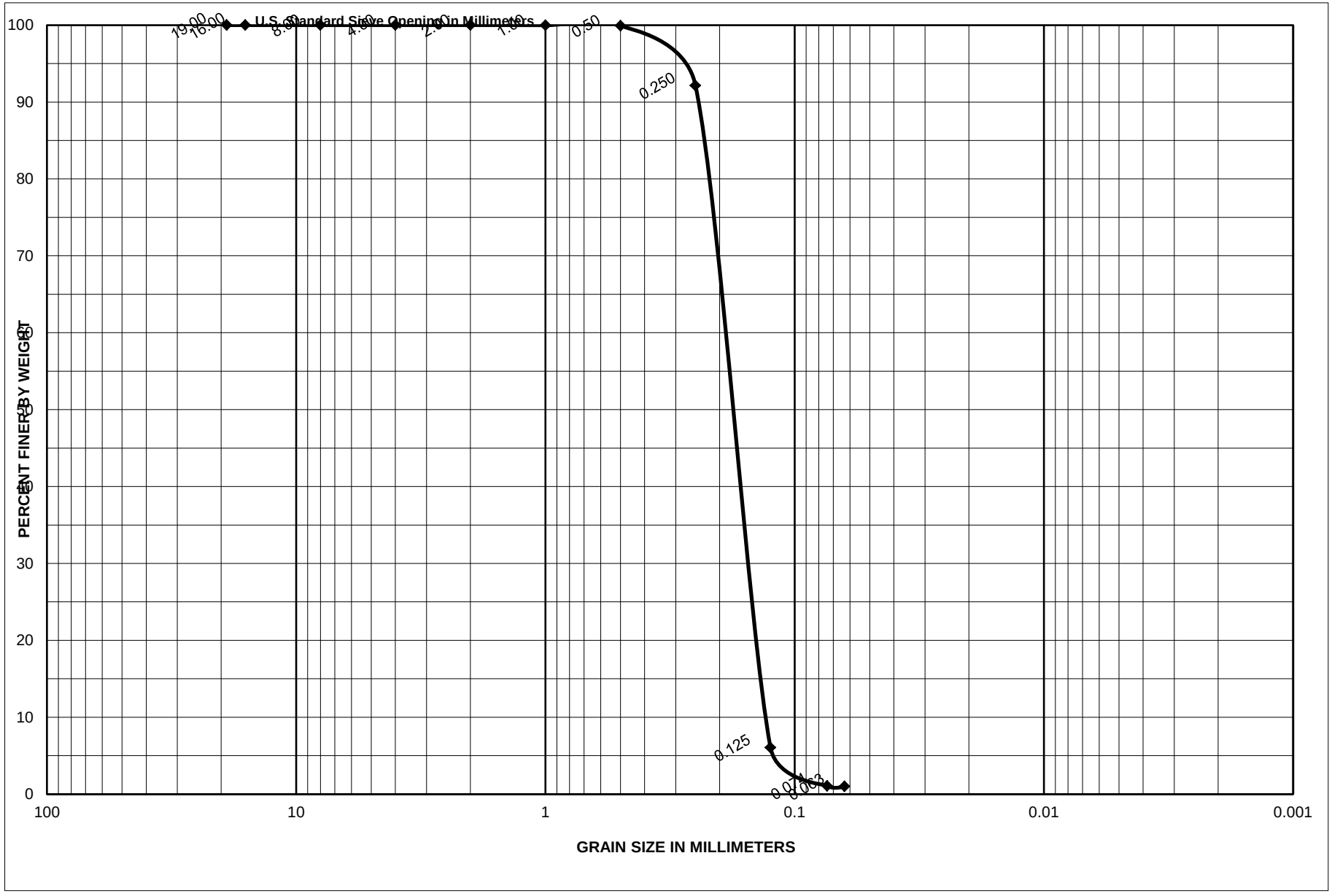
GRADATION CURVES



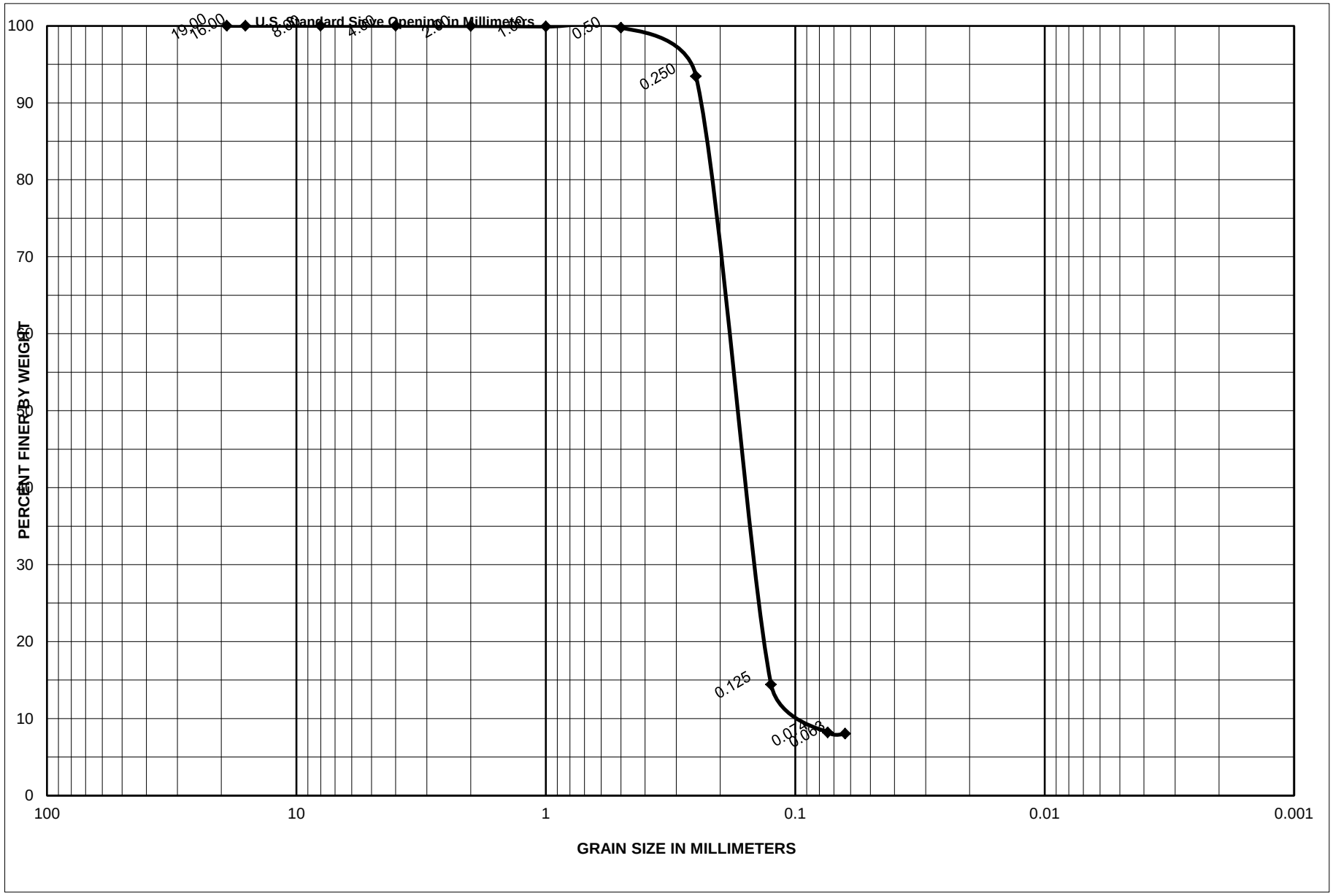
Sample No.	Depth (ft)	Classification		
V11-S01	0-7	Tan to gray, poorly graded SAND, SP	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-11
			Date	9/14/2016



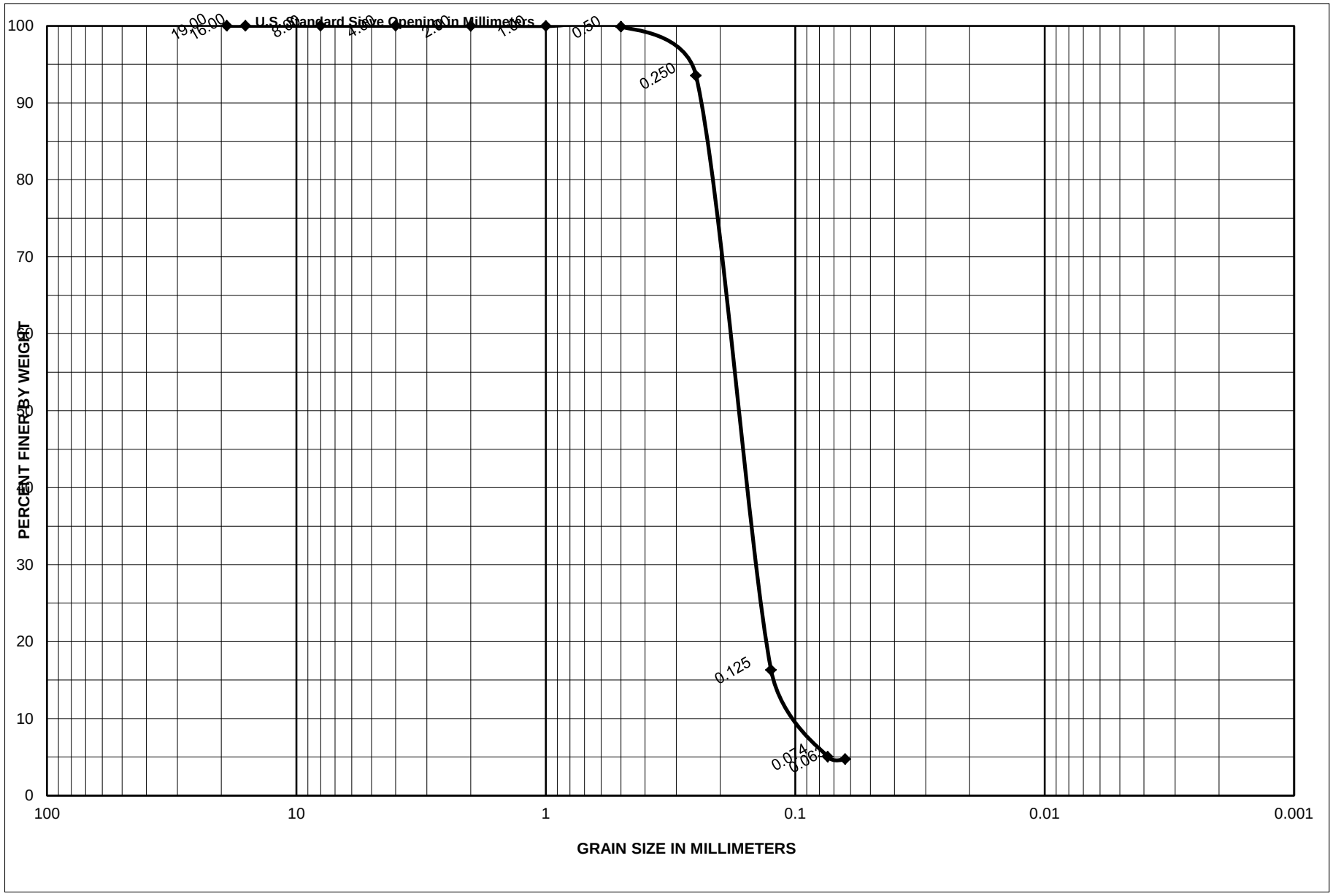
Sample No.	Depth (ft)	Classification		
V14-S01	0-5.4	Gray, Silty SAND to Sandy Organic soil, SM/OL/OH	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-14
			Date	9/14/2016



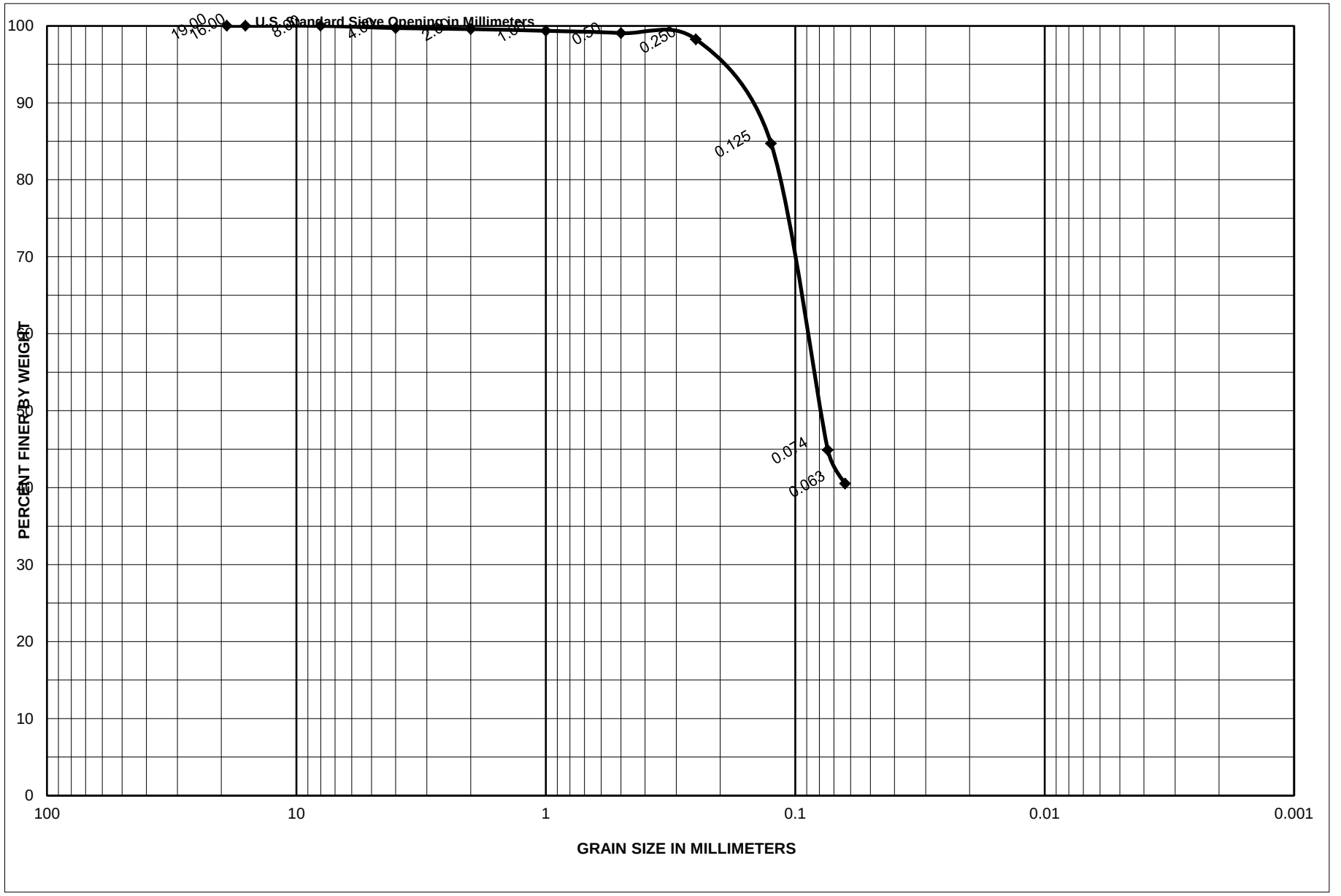
Sample No.	Depth (ft)	Classification		
V14-S02	5.4-5.9	Gray, poorly graded SAND, SP	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-14
			Date	9/14/2016



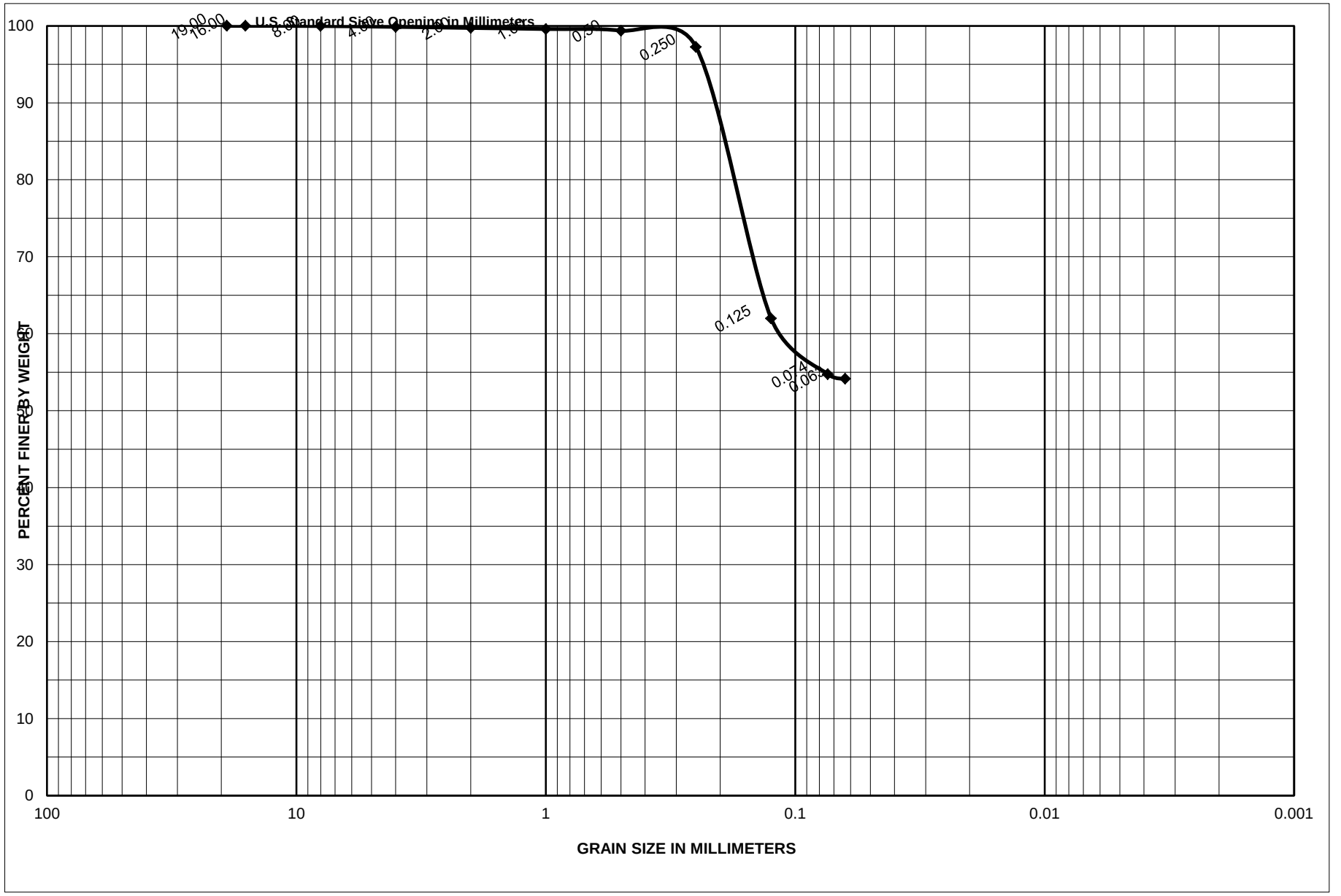
Sample No.	Depth (ft)	Classification		
V15-S01	0-3.3	Gray, poorly graded SAND with silt, SP-SM	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-15
			Date	9/14/2016



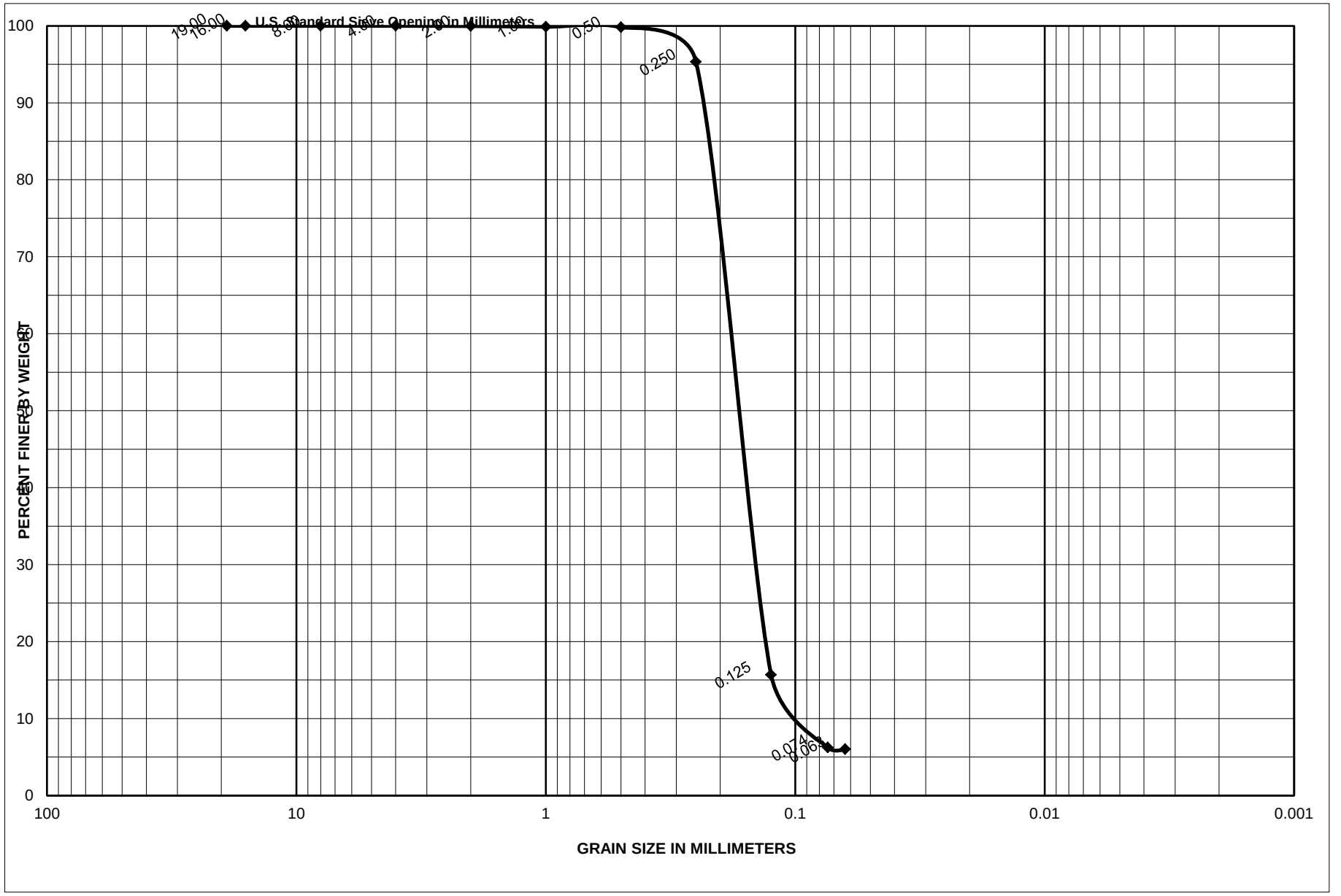
Sample No.	Depth (ft)	Classification		
V15-S02	3.3-5.2	Light gray, poorly graded SAND, SP	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-15
			Date	9/14/2016



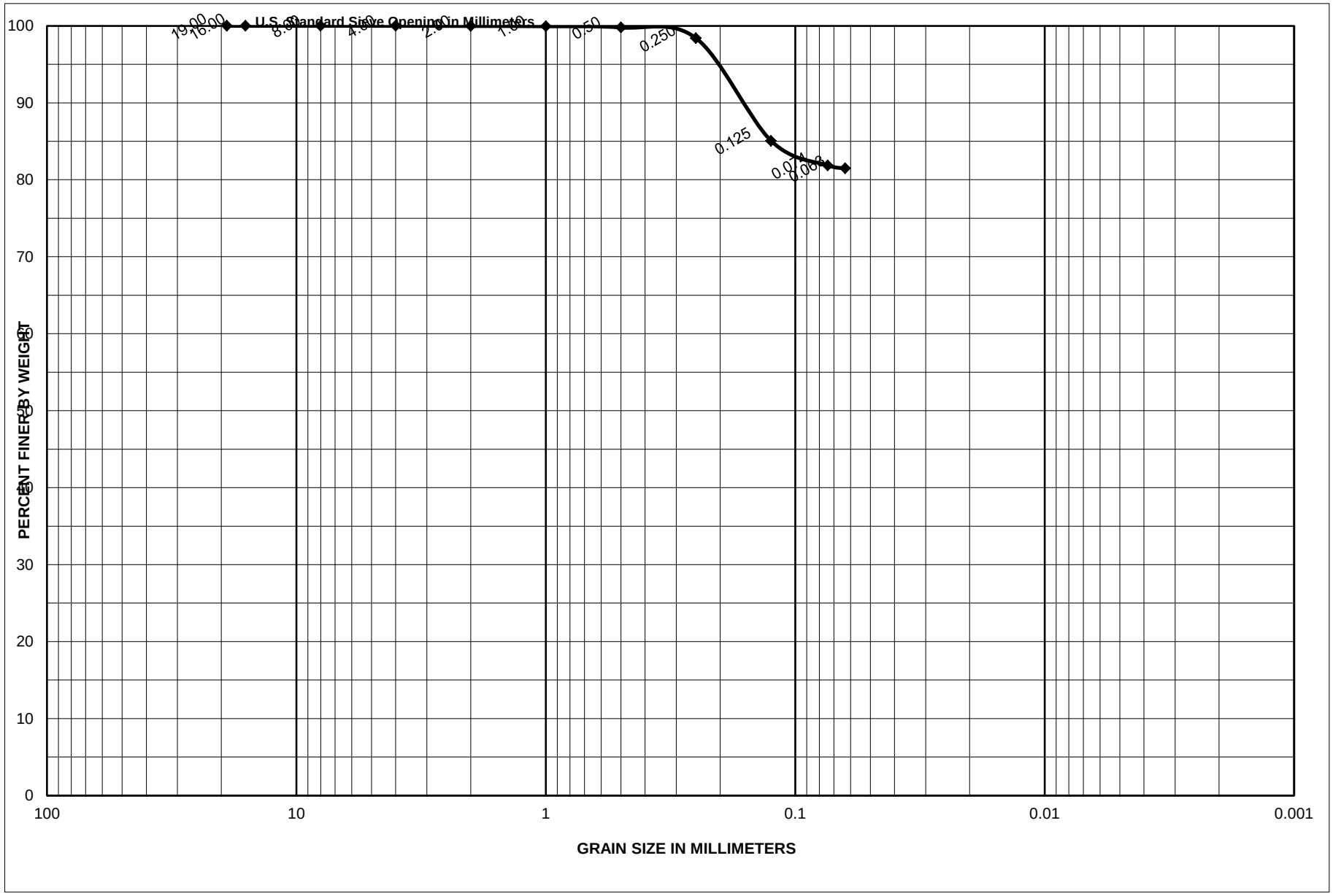
Sample No.	Depth (ft)	Classification		
V15-S03	5.2-7.4	Gray, Clayey SAND, SC	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-15
			Date	9/14/2016



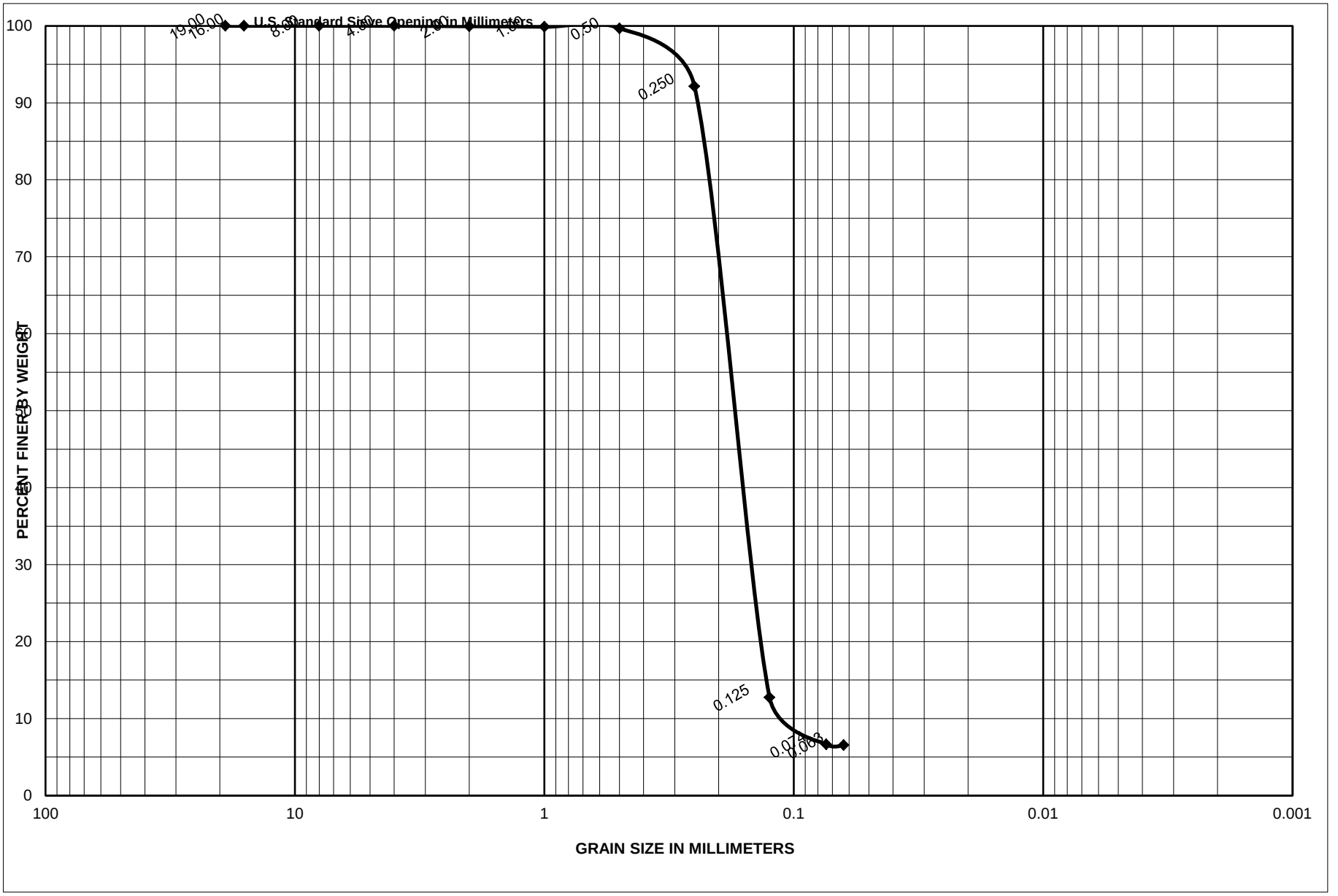
Sample No.	Depth (ft)	Classification		
V16-S01	0-3.7	Gray, Sandy Organic soil, OL/OH	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-16
			Date	9/14/2016



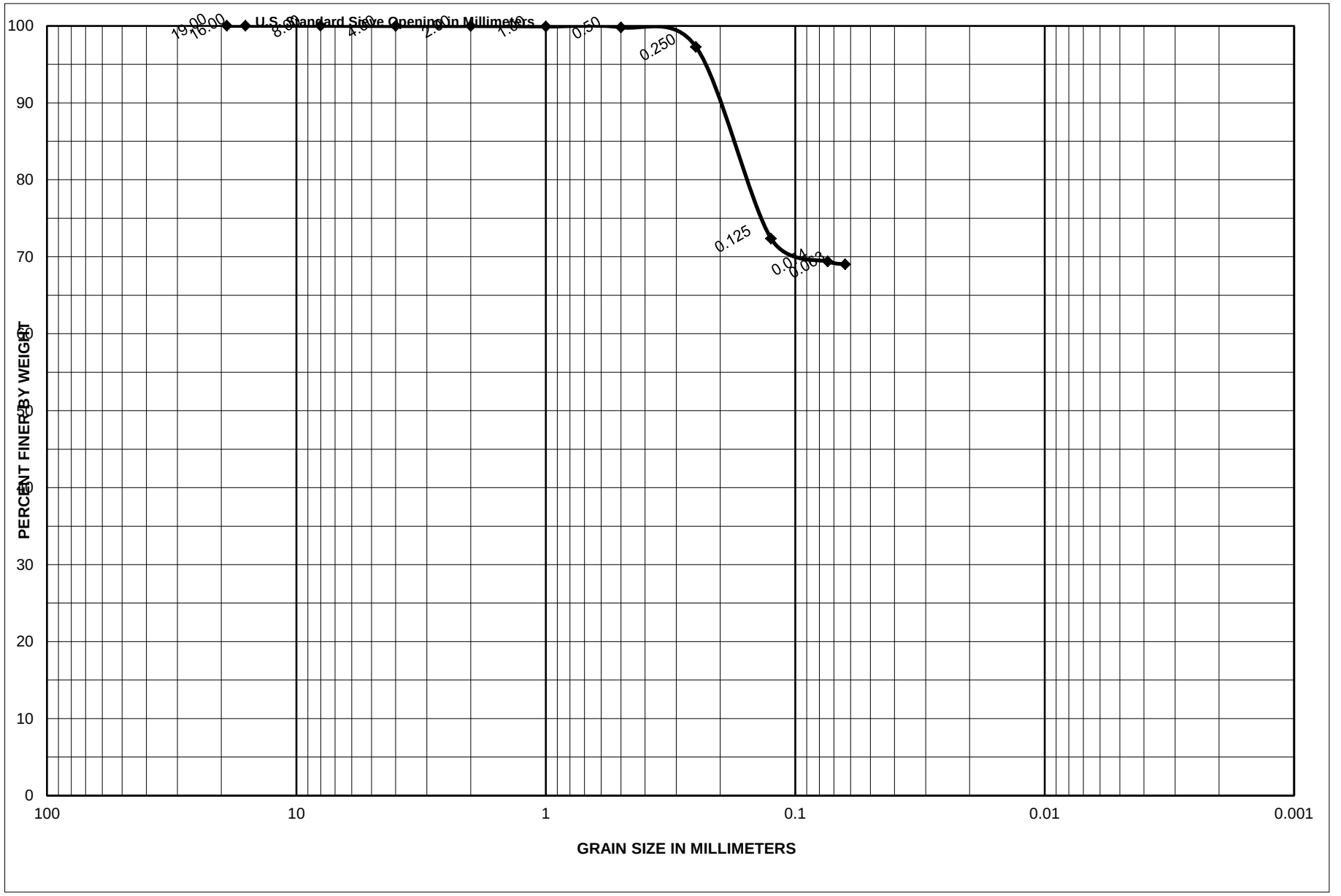
Sample No.	Depth (ft)	Classification		
V16-S02	3.7-5	Gray, poorly graded SAND with silt, SP-SM	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-16
			Date	9/14/2016



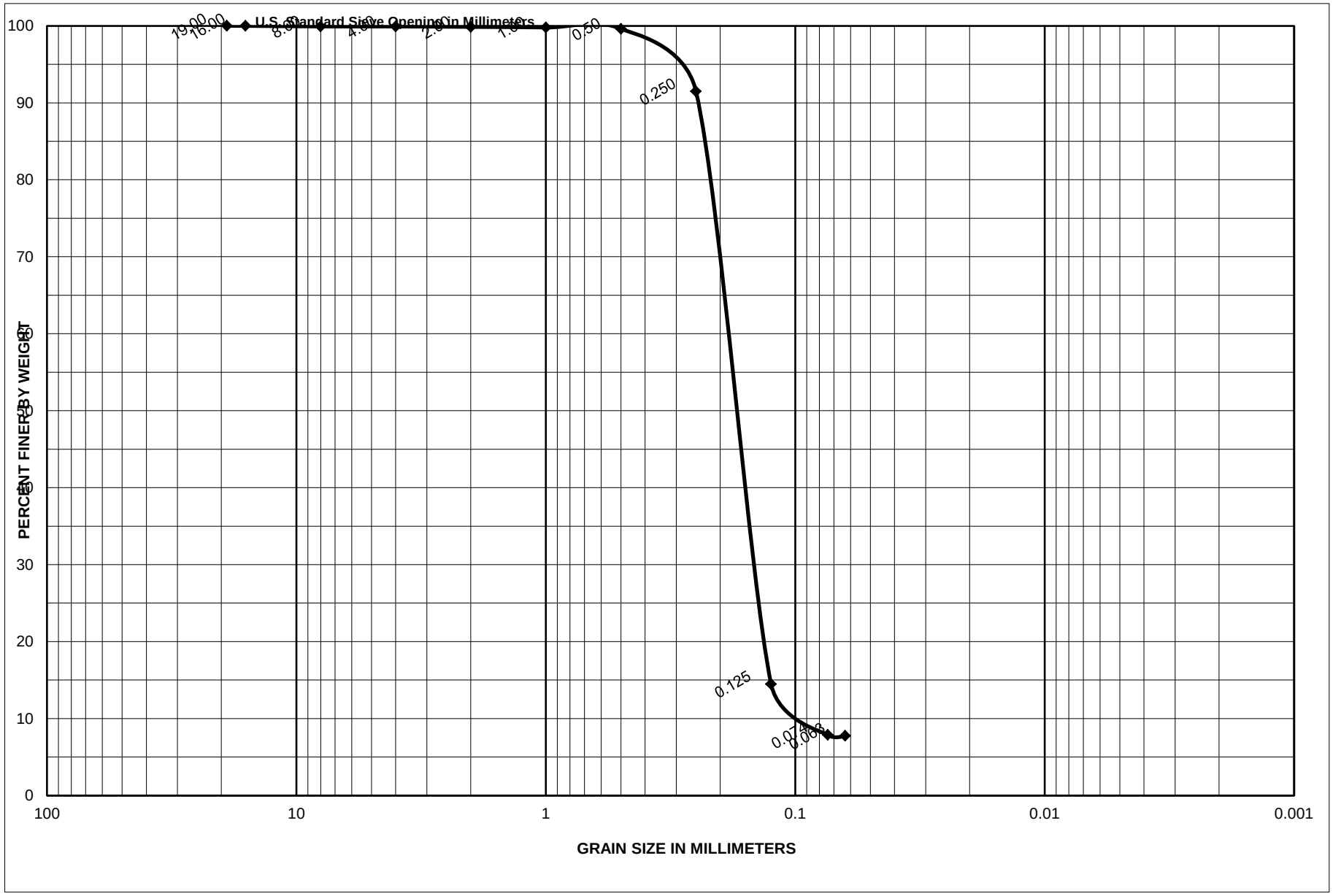
Sample No.	Depth (ft)	Classification		
V17-S01	0-2.9	Gray, Organic soil, OL/OH	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-17
			Date	9/14/2016



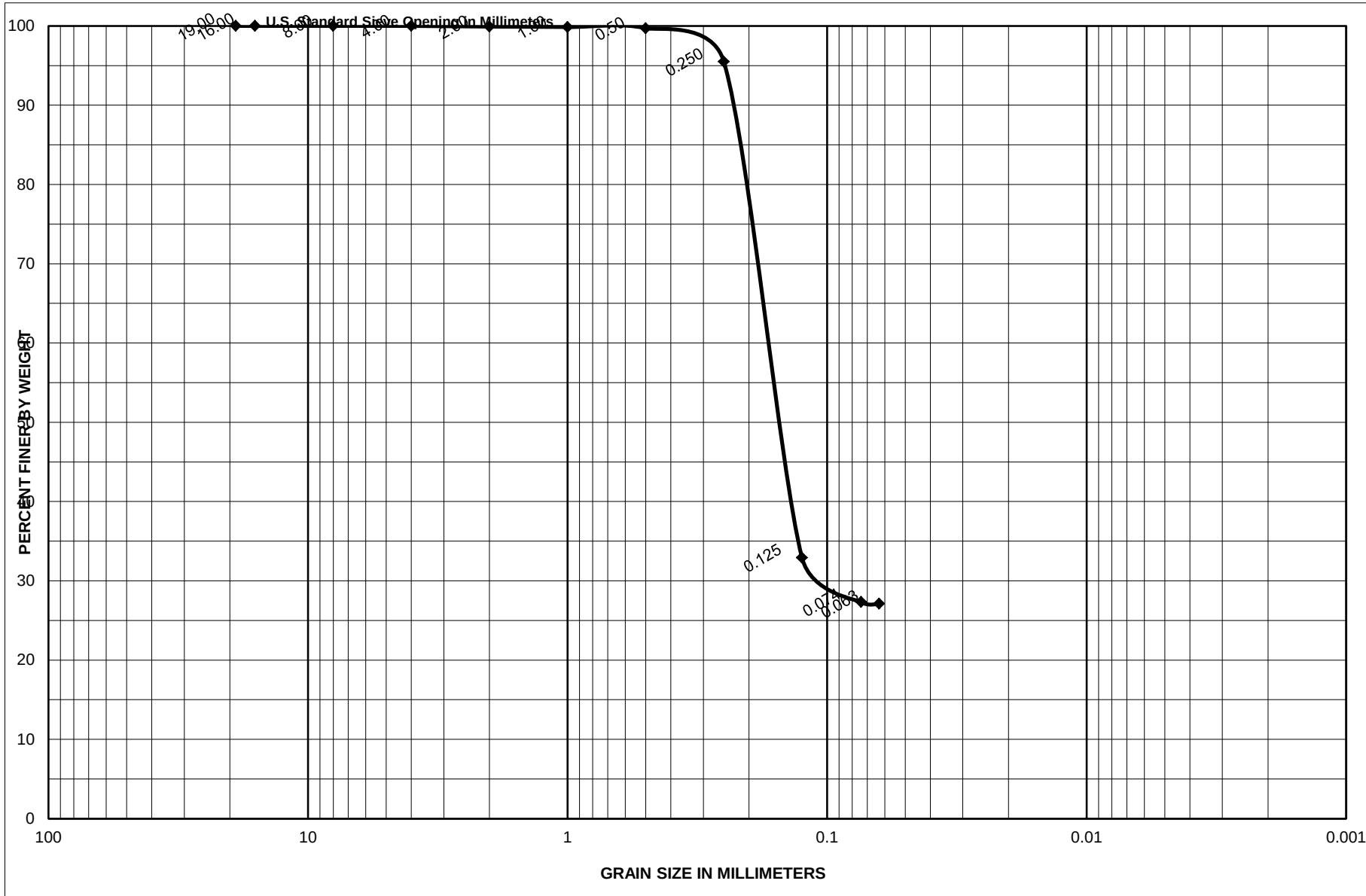
Sample No.	Depth (ft)	Classification		
V17-S02	2.9-3.6	Gray, poorly graded SAND with silt, SP-SM	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-17
			Date	9/14/2016



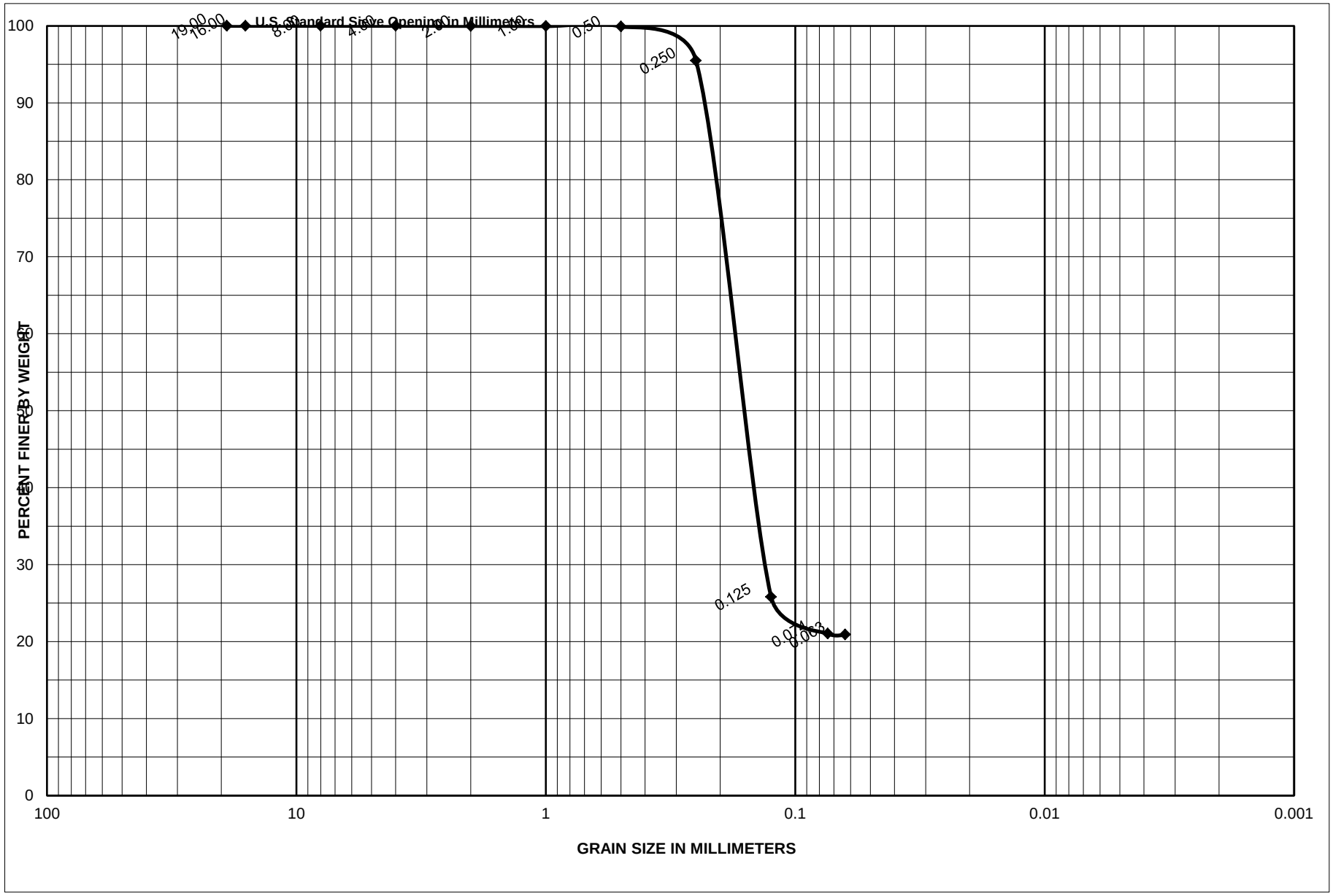
Sample No.	Depth (ft)	Classification		
V17-S03	3.6-4.0	Gray, Sandy lean CLAY, CL	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-17
			Date	9/14/2016



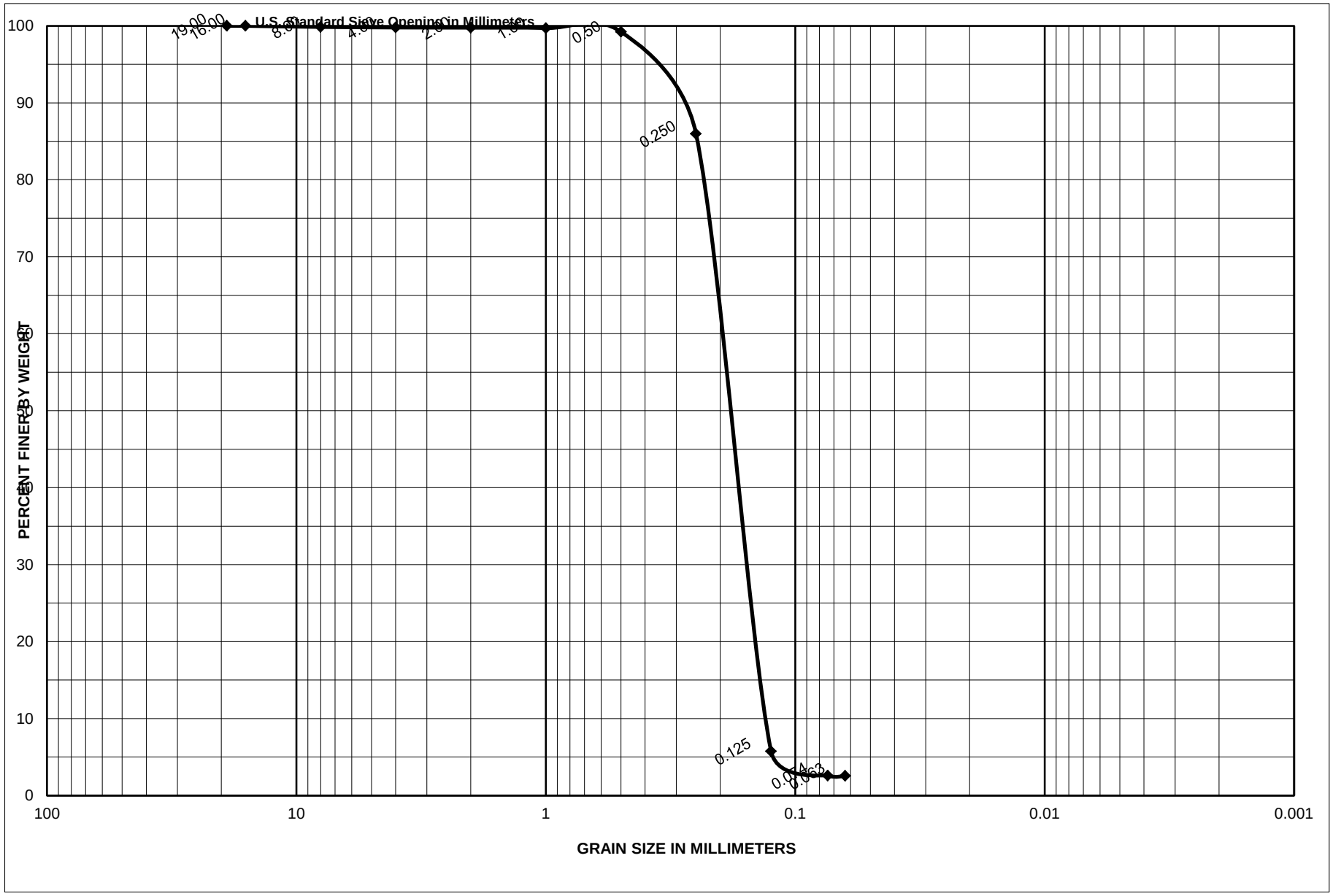
Sample No.	Depth (ft)	Classification		
V17-S04	4.0-4.9	Gray, poorly graded SAND with silt, SP-SM	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-17
			Date	9/14/2016



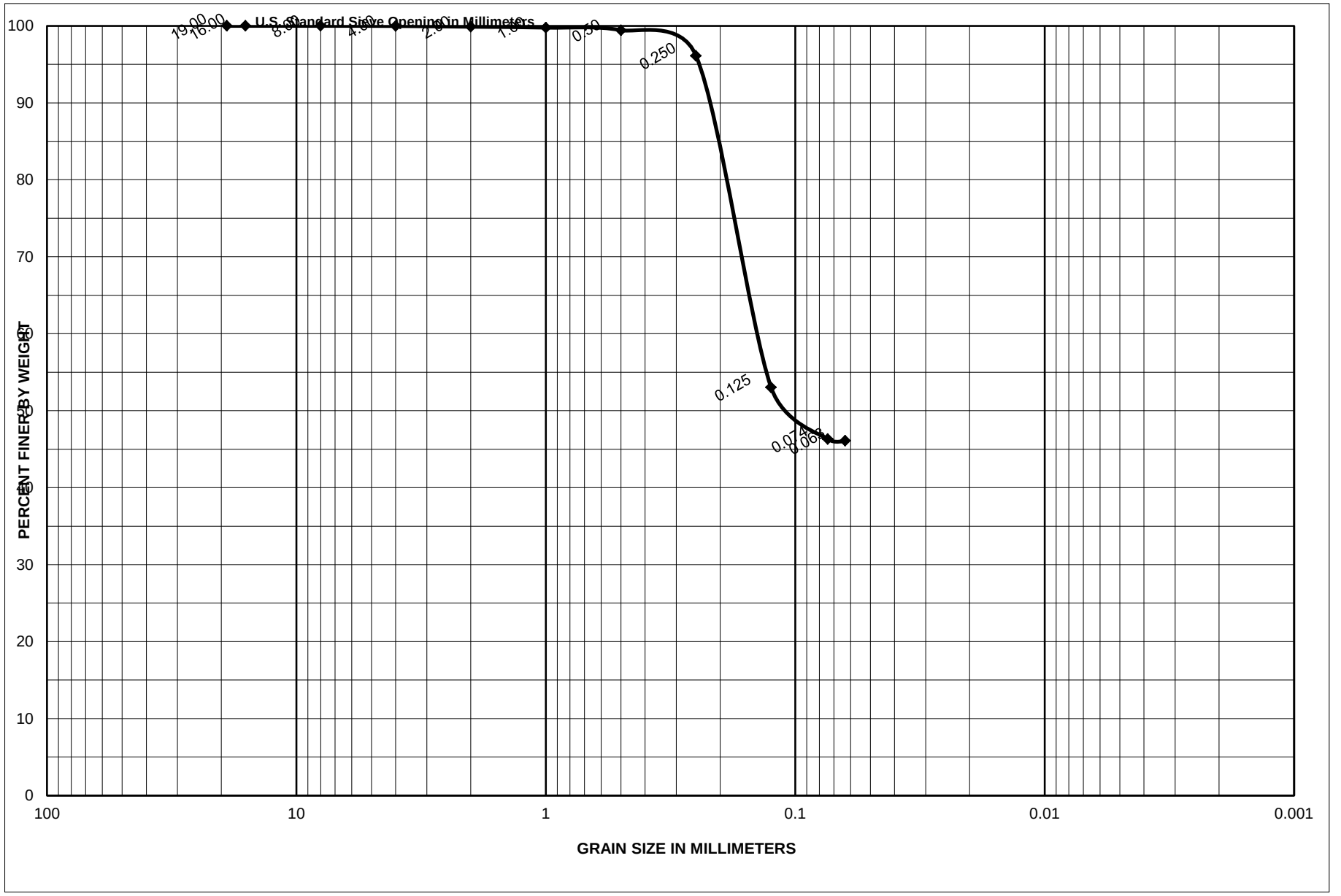
Sample No.	Depth (ft)	Classification		
V18-S01	0-2	Gray, Silty SAND, SM	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-18
			Date	9/14/2016



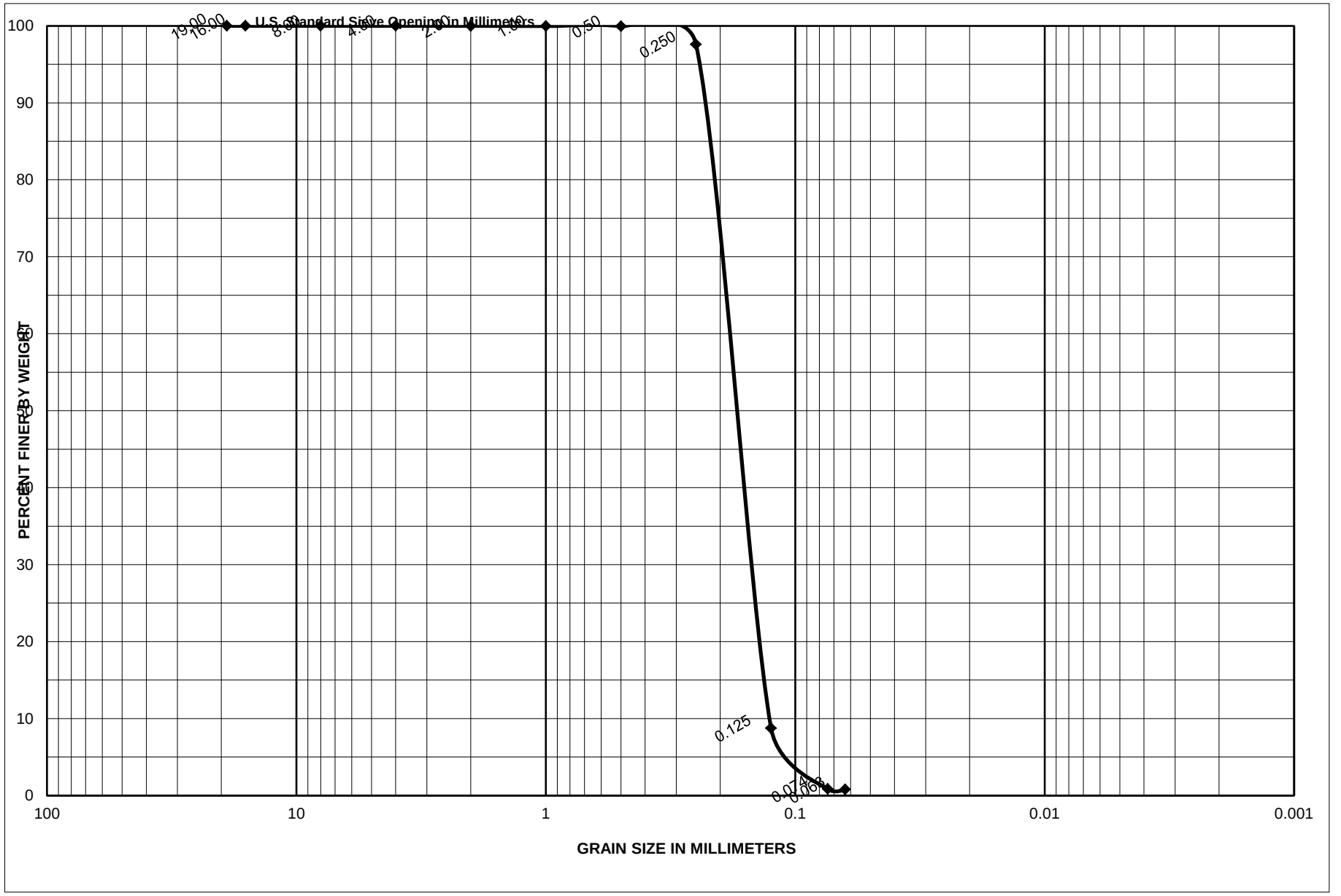
Sample No.	Depth (ft)	Classification		
V18-S02	2-4.9	Gray, Silty SAND, SM	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-18
			Date	9/14/2016



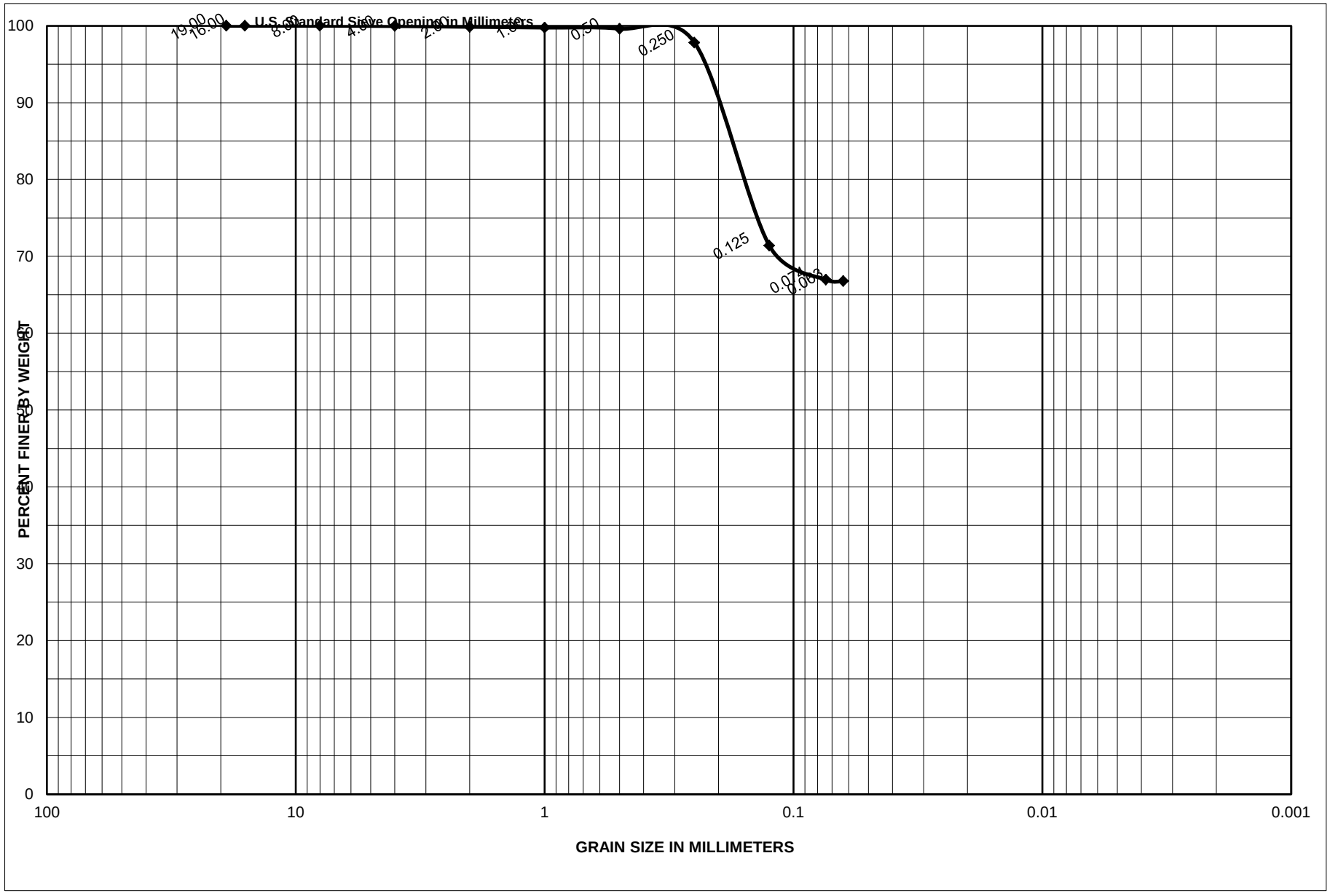
Sample No.	Depth (ft)	Classification		
V18-S03	4.9-5.6	Light gray, poorly graded SAND, SP	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-18
			Date	9/14/2016



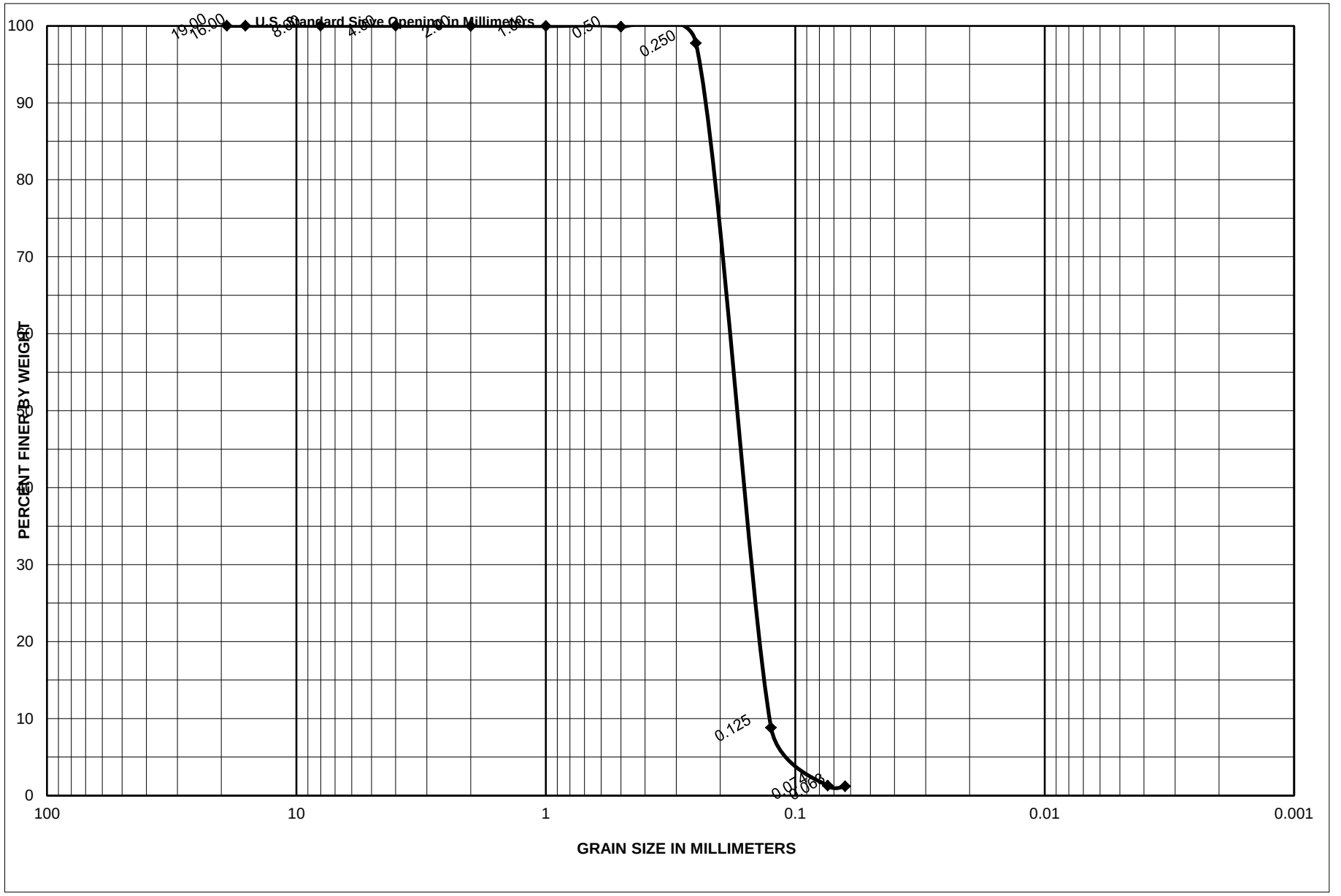
Sample No.	Depth (ft)	Classification		
V23-S01	0-0.8	Gray, Organic soil to Silty SAND, OL/OH/SM	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-23
			Date	9/14/2016



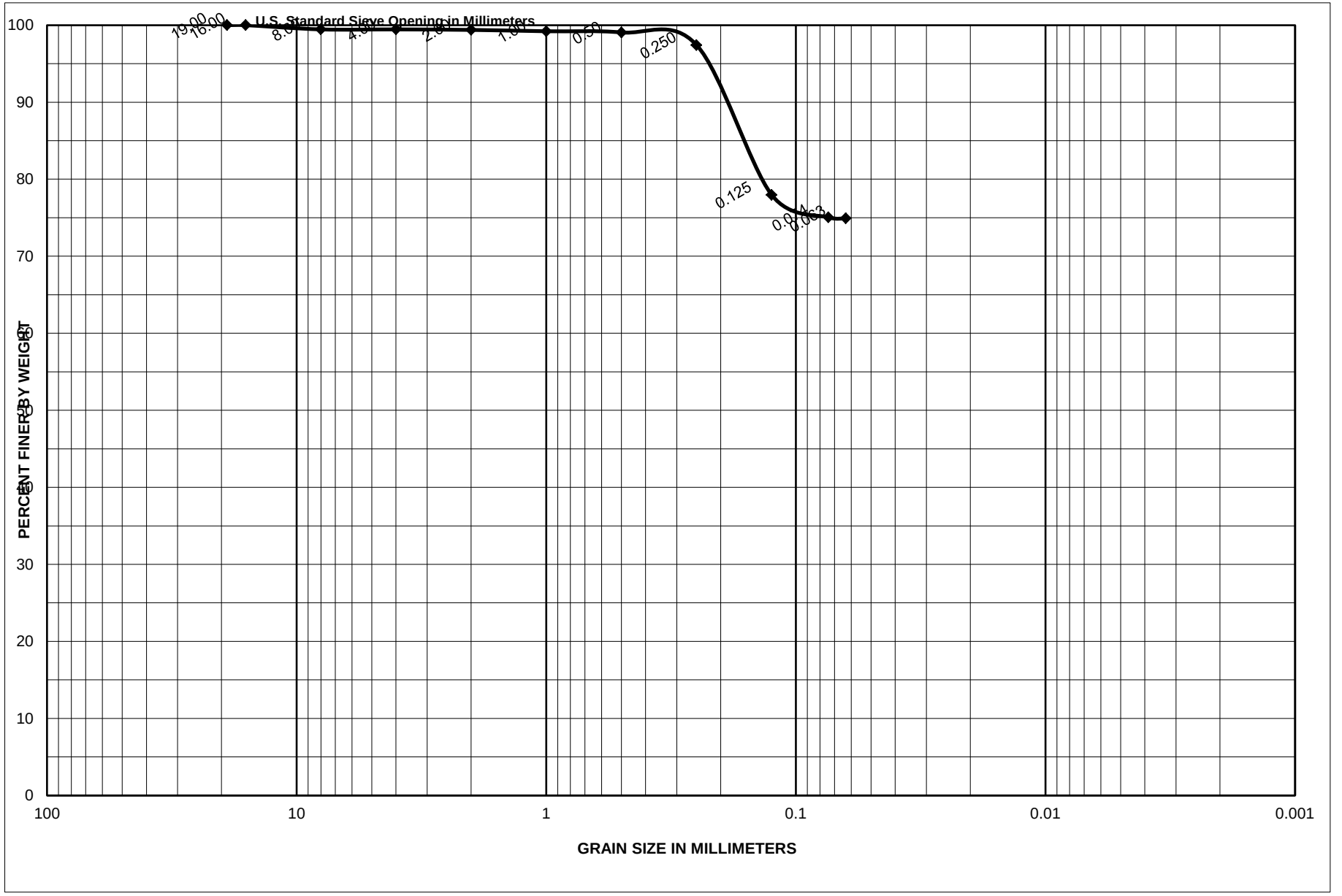
Sample No.	Depth (ft)	Classification		
V23-S02	0.8-3.0	Gray, poorly graded SAND, SP	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-23
			Date	9/14/2016



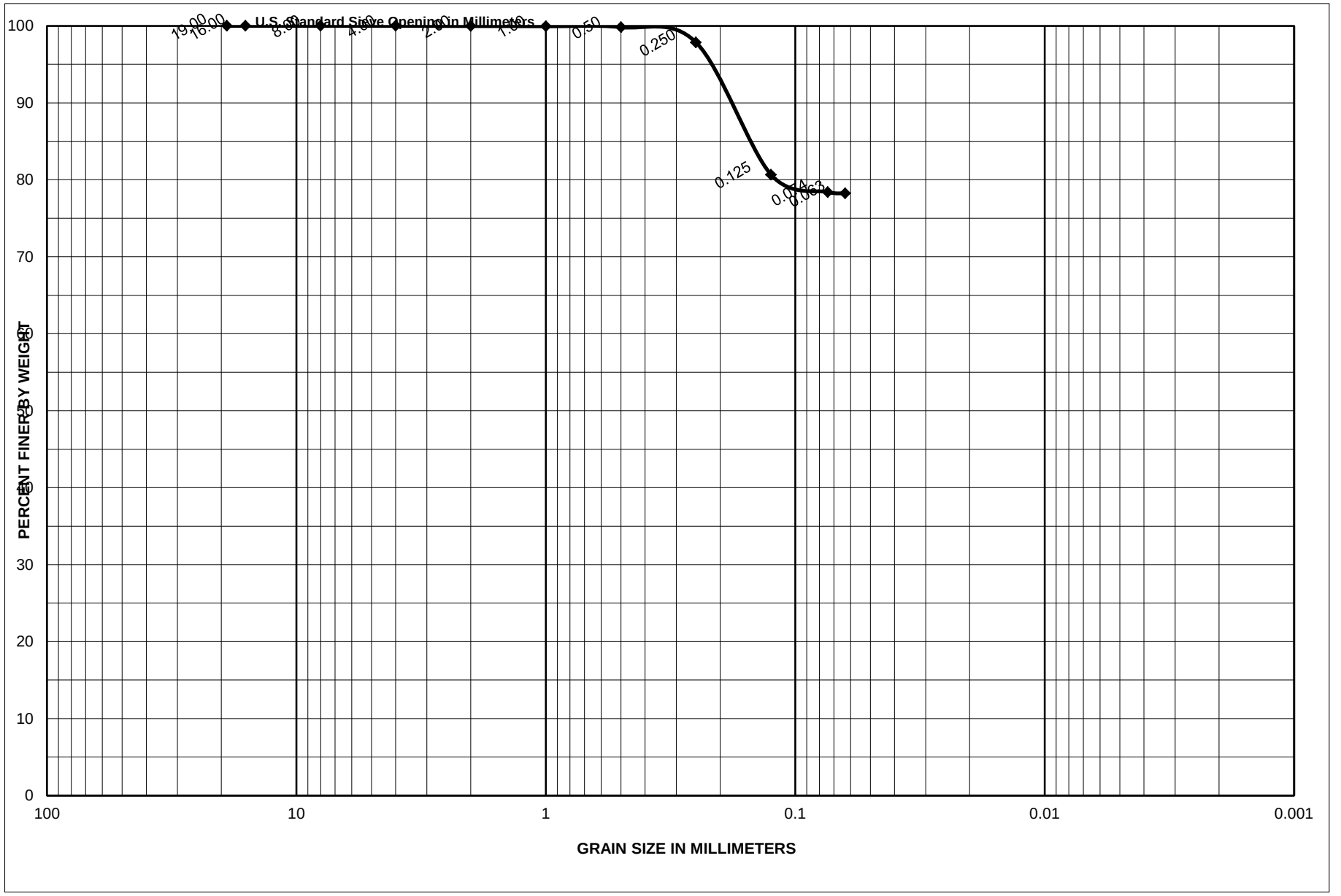
Sample No.	Depth (ft)	Classification		
V24-S01	0-3.7	Gray, Organic soil, OL/OH	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-24
			Date	9/14/2016



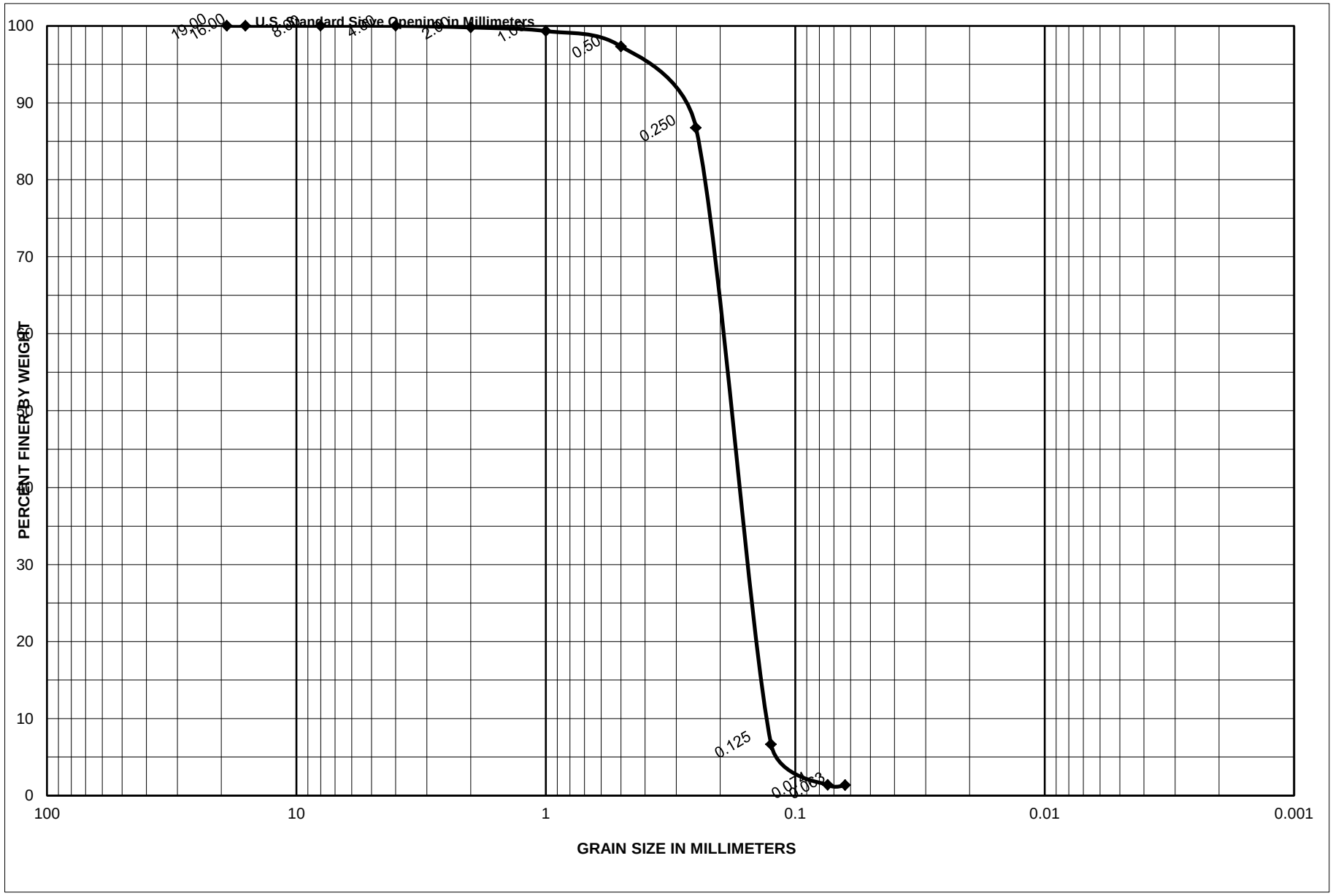
Sample No.	Depth (ft)	Classification		
V24-S02	3.7-5	Gray, poorly graded SAND, SP	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-24
			Date	9/14/2016



Sample No.	Depth (ft)	Classification		
V25-S01	0-4	Gray, Organic soil, OL/OH	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-25
			Date	9/14/2016



Sample No.	Depth (ft)	Classification		
V26-S01	0-2.6	Gray, Organic soil, OL/OH	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-26
			Date	9/14/2016



Sample No.	Depth (ft)	Classification		
V26-S02	2.6-4.7	Gray, poorly graded SAND, SP	**Project**	Sunset Beach Vibracore
			Area	Sunset Beach, NC
			CATLIN Geotechnical Laboratory	
			Boring No.	VC-26
			Date	9/14/2016

VIBRACORE PHOTOGRAPHS

Sample VC-11-1

Top Elevation: -0.4 MLW

Bottom Elevation: -3.1 MLW

Sample Length: 2.7 ft

Sample VC-11-2

Top Elevation: -3.1 MLW Bottom Elevation: -7.4 MLW

Sample Length: 4.3 ft

Sample VC-11-3

Top Elevation: -3.7 MLW Bottom Elevation: -10.4 MLW

Sample Length: 6.7 ft

Sample VC-14

Top Elevation: -2.1 MLW Bottom Elevation: -8.0 MLW

Sample Length: 5.9 ft

Sample VC-16

Top Elevation: -4.9 MLW Bottom Elevation: -9.9 MLW

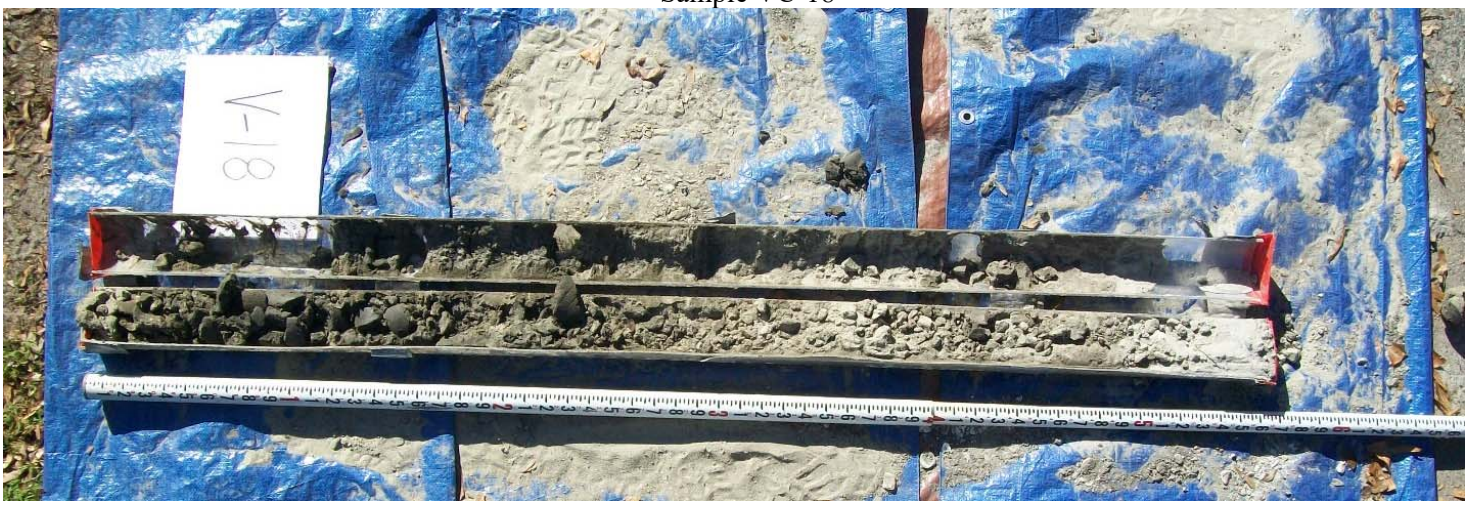
Sample Length: 5.0 ft

Sample VC-17

Top Elevation: -4.6 MLW Bottom Elevation: -9.5 MLW

Sample Length: 4.9 ft

Sample VC-18



Top Elevation: -2.2 MLW Bottom Elevation: -7.8 MLW

Sample Length: 5.6 ft

Sample VC-23

Top Elevation: -4.2 MLW

Bottom Elevation: -7.2 MLW

Sample Length: 3.0 ft

Sample VC-24

Top Elevation: -3.1 MLW Bottom Elevation: -8.1 MLW

Sample Length: 5.0 ft

Sample VC-25

Top Elevation: -2.4 MLW Bottom Elevation: -6.4 MLW

Sample Length: 4.0 ft

Sample VC-26

Top Elevation: -2.4 MLW Bottom Elevation: -7.1 MLW

Sample Length: 4.7 ft

APPENDIX D

RECIPIENT BEACH SEDIMENT ANALYSIS

SEDIMENT SAMPLING KEY

S1:	FRONTAL DUNE (FD)	TROUGH:	NEARSHORE TROUGH (T)
S2:	DUNE TOE (DT)	CREST:	NEARSHORE BAR (C)
S3:	MID-BERM (MB)	S106:	-6.0 NAVD88
S4:	MHW	S109.5:	-9.5 NAVD88
S5:	MID-TIDE (MT)	S113:	-13.0 NAVD88
S6:	MLW	S116.5:	-16.5 NAVD88
S7:	INCREMENTAL SAMPLE (SZ)	S120:	-20 NAVD88

LEGEND

▲ GRAB SAMPLE SITE

0' 300' 600'

GRAPHIC SCALE IN FEET

TOWN OF SUNSET BEACH - NAVIGATION PROJECT
MAINTENANCE DREDGING OF SOUTH JINKS CREEK, THE BAY AREA & THE FEEDER CHANNEL
RECIPIENT BEACH SEDIMENT SAMPLING MAP

D1-1

ANALYSIS SUMMARY TABLE

Recipient Beach Sediiment Analysis

DCM Compatibility Summary					
Transect	**Gravel**	**Granular**	**Sand**	**<#230**	**Carbonate**
0+00	0.07%	0.09%	98.61%	1.22%	2.00%
4+00	0.04%	0.06%	98.67%	1.23%	2.00%
8+00	0.04%	0.09%	98.39%	1.49%	2.00%
12+00	0.10%	2.44%	96.36%	1.11%	2.00%
16+00	0.11%	0.06%	98.70%	1.13%	2.00%
Grand Mean	**0.07%**	**0.55%**	**98.15%**	**1.23%**	**2.00%**

Native Summary							
Transect	**Median (mm)**	**Mean (mm)**	**D5 (mm)**	**D16 (mm)**	**D50 (mm)**	**D84 (mm)**	**D95 (mm)**
0+00	0.18	0.17	0.29	0.22	0.18	0.14	0.11
4+00	0.17	0.17	0.27	0.22	0.17	0.13	0.11
8+00	0.18	0.18	0.29	0.23	0.18	0.14	0.11
12+00	0.17	0.17	0.30	0.23	0.17	0.13	0.11
16+00	0.17	0.17	0.29	0.23	0.17	0.13	0.11
Grand Mean (mm)	**0.17**	**0.17**	**0.29**	**0.23**	**0.17**	**0.13**	**0.11**
Grand Mean (ϕ)	**2.52**	**2.52**	**1.80**	**2.15**	**2.52**	**2.90**	**3.20**

$M_{\phi n}$	**2.525**
$\sigma_{\phi n}$	**0.420**

Transect	Location	Dry Weight (g)	Gravel >#4	Granular #10<x<#4	Sand #230<x<#10	Fine <#230	Carbonate	Median (mm)	Mean (mm)	Mean (φ)	D5 (mm)	D16 (mm)	D50 (mm)	D84 (mm)	D95 (mm)	φ5	φ16	φ50	φ84	φ95
0+00	FD	230.01	0.10%	0.00%	99.80%	0.10%		0.20	0.19	2.39	0.25	0.24	0.20	0.15	0.13	2.00	2.08	2.33	2.75	2.96
0+00	DT	218.14	0.00%	0.00%	99.50%	0.50%		0.20	0.17	2.58	0.30	0.15	0.20	0.15	0.13	1.76	2.71	2.31	2.73	2.96
0+00	MB	271.78	0.00%	0.10%	99.70%	0.20%		0.20	0.19	2.40	0.25	0.23	0.20	0.15	0.13	2.02	2.09	2.34	2.76	2.96
0+00	MHW	178.47	0.00%	0.00%	99.20%	0.80%		0.18	0.18	2.49	0.25	0.23	0.18	0.14	0.12	2.01	2.12	2.49	2.86	3.01
0+00	MT	258.2	0.30%	0.10%	98.80%	0.80%		0.20	0.19	2.37	0.33	0.25	0.20	0.15	0.13	1.60	2.02	2.32	2.77	2.97
0+00	MLW	241.9	0.00%	0.00%	99.10%	0.90%		0.20	0.19	2.38	0.33	0.25	0.20	0.14	0.13	1.60	2.02	2.34	2.79	2.98
0+00	SZ	220.85	0.00%	0.00%	98.70%	1.30%		0.16	0.17	2.58	0.25	0.22	0.16	0.13	0.11	2.01	2.20	2.62	2.92	3.19
0+00	T	243.11	0.00%	0.00%	97.80%	2.20%		0.17	0.18	2.51	0.32	0.24	0.17	0.13	0.10	1.62	2.08	2.54	2.90	3.27
0+00	C	249.92	0.00%	0.10%	99.10%	0.80%		0.17	0.18	2.50	0.32	0.24	0.17	0.14	0.11	1.63	2.08	2.53	2.88	3.14
0+00	-6	232.64	0.20%	0.10%	98.90%	0.80%		0.17	0.18	2.50	0.35	0.24	0.17	0.13	0.11	1.52	2.05	2.55	2.89	3.15
0+00	-9.5	246.16	0.10%	0.20%	98.70%	1.00%		0.18	0.18	2.48	0.33	0.24	0.18	0.14	0.12	1.60	2.07	2.49	2.87	3.11
0+00	-13	246.71	0.00%	0.10%	98.70%	1.20%		0.16	0.16	2.69	0.24	0.19	0.16	0.13	0.10	2.09	2.43	2.69	2.95	3.32
0+00	-16.5	275.09	0.10%	0.40%	95.60%	3.90%		0.15	0.14	2.83	0.24	0.18	0.15	0.11	0.07	2.05	2.49	2.76	3.24	3.79
0+00	-20	233.74	0.20%	0.20%	97.00%	2.60%		0.16	0.16	2.66	0.26	0.22	0.16	0.12	0.08	1.95	2.22	2.67	3.10	3.61
	AVERAGE		**0.07%**	**0.09%**	**98.61%**	**1.22%**	**2.00%**	**0.18**	**0.17**	**2.52**	**0.29**	**0.22**	**0.18**	**0.14**	**0.11**	**1.80**	**2.18**	**2.49**	**2.88**	**3.15**
4+00	FD	301.92	0.00%	0.00%	99.90%	0.10%		0.19	0.18	2.47	0.25	0.23	0.19	0.14	0.13	2.02	2.11	2.43	2.85	2.99
4+00	DT	233.21	0.00%	0.00%	99.80%	0.20%		0.20	0.19	2.40	0.25	0.24	0.20	0.14	0.13	1.98	2.06	2.36	2.79	2.97
4+00	MB	211.64	0.00%	0.00%	99.90%	0.10%		0.17	0.17	2.55	0.01	0.22	0.17	0.13	0.12	6.38	2.18	2.58	2.89	3.05
4+00	MHW	208.26	0.00%	0.00%	99.10%	0.90%		0.17	0.18	2.50	0.26	0.23	0.17	0.14	0.12	1.94	2.11	2.52	2.88	3.11
4+00	MT	234.08	0.10%	0.00%	98.90%	1.00%		0.22	0.22	2.17	0.39	0.32	0.22	0.16	0.13	1.37	1.65	2.17	2.69	2.95
4+00	MLW	245.48	0.00%	0.00%	99.10%	0.90%		0.19	0.19	2.41	0.34	0.25	0.19	0.14	0.12	1.55	2.00	2.40	2.84	3.02
4+00	SZ	231.26	0.00%	0.00%	98.90%	1.10%		0.16	0.16	2.61	0.25	0.21	0.16	0.13	0.10	2.01	2.25	2.65	2.94	3.25
4+00	T	230.78	0.00%	0.00%	98.80%	1.20%		0.16	0.16	2.63	0.28	0.21	0.16	0.13	0.10	1.85	2.27	2.67	2.95	3.29
4+00	C	229.83	0.00%	0.10%	98.80%	1.10%		0.16	0.17	2.58	0.32	0.22	0.16	0.13	0.10	1.65	2.16	2.64	2.94	3.30
4+00	-6	231.02	0.00%	0.30%	98.60%	1.10%		0.16	0.17	2.55	0.38	0.24	0.16	0.13	0.10	1.42	2.08	2.62	2.95	3.33
4+00	-9.5	253.58	0.10%	0.20%	98.60%	1.10%		0.16	0.17	2.58	0.32	0.22	0.16	0.13	0.10	1.66	2.17	2.64	2.94	3.30
4+00	-13	215.76	0.10%	0.00%	98.20%	1.70%		0.15	0.15	2.78	0.21	0.17	0.15	0.12	0.09	2.25	2.52	2.75	3.07	3.45
4+00	-16.5	213.55	0.20%	0.10%	96.30%	3.40%		0.14	0.13	2.89	0.22	0.17	0.14	0.10	0.08	2.17	2.53	2.83	3.32	3.72
4+00	-20	271.65	0.10%	0.10%	96.50%	3.30%		0.15	0.15	2.75	0.25	0.20	0.15	0.11	0.08	2.02	2.30	2.73	3.23	3.70
	AVERAGE		**0.04%**	**0.06%**	**98.67%**	**1.23%**	**2.00%**	**0.17**	**0.17**	**2.55**	**0.27**	**0.22**	**0.17**	**0.13**	**0.11**	**1.91**	**2.15**	**2.56**	**2.94**	**3.23**
8+00	FD	222.55	0.00%	0.00%	99.90%	0.10%		0.18	0.18	2.46	0.24	0.23	0.18	0.14	0.13	2.03	2.12	2.44	2.82	2.98
8+00	DT	236.58	0.00%	0.00%	99.90%	0.10%		0.20	0.20	2.34	0.31	0.24	0.20	0.15	0.13	1.70	2.04	2.29	2.71	2.94
8+00	MB	222.25	0.00%	0.00%	99.80%	0.20%		0.19	0.18	2.44	0.25	0.23	0.19	0.14	0.13	2.02	2.11	2.39	2.82	2.99
8+00	MHW	203.83	0.00%	0.00%	99.30%	0.70%		0.19	0.19	2.42	0.25	0.23	0.19	0.14	0.13	2.01	2.09	2.38	2.80	2.98
8+00	MT	257.54	0.00%	0.10%	99.10%	0.80%		0.22	0.22	2.17	0.35	0.31	0.22	0.16	0.13	1.50	1.69	2.18	2.64	2.93
8+00	MLW	268.78	0.10%	0.00%	99.10%	0.80%		0.20	0.19	2.36	0.34	0.25	0.20	0.15	0.13	1.58	2.01	2.31	2.77	2.98
8+00	SZ	222.72	0.10%	0.00%	98.90%	1.00%		0.16	0.17	2.59	0.26	0.22	0.16	0.13	0.11	1.97	2.21	2.64	2.92	3.17
8+00	T	228.23	0.10%	0.00%	99.00%	0.90%		0.16	0.17	2.55	0.31	0.23	0.16	0.13	0.11	1.71	2.14	2.60	2.91	3.17
8+00	C	226.7	0.20%	0.00%	98.90%	0.90%		0.16	0.17	2.57	0.31	0.22	0.16	0.13	0.11	1.69	2.17	2.63	2.92	3.24
8+00	-6	272.88	0.00%	0.00%	99.00%	1.00%		0.17	0.18	2.50	0.35	0.24	0.17	0.13	0.10	1.50	2.05	2.54	2.91	3.26
8+00	-9.5	249.57	0.00%	0.00%	99.00%	1.00%		0.17	0.18	2.50	0.34	0.24	0.17	0.13	0.11	1.56	2.08	2.55	2.89	3.16
8+00	-13	224.38	0.00%	0.20%	98.70%	1.10%		0.15	0.17	2.55	0.23	0.18	0.15	0.18	0.10	2.12	2.49	2.71	2.44	3.35
8+00	-16.5	186.62	0.00%	0.80%	94.70%	4.50%		0.14	0.14	2.87	0.24	0.18	0.14	0.10	0.07	2.04	2.51	2.79	3.30	3.89
8+00	-20	258.72	0.10%	0.10%	92.10%	7.70%		0.15	0.14	2.79	0.27	0.21	0.15	0.10	0.04	1.86	2.28	2.74	3.35	4.55
	AVERAGE		**0.04%**	**0.09%**	**98.39%**	**1.49%**	**2.00%**	**0.18**	**0.18**	**2.50**	**0.29**	**0.23**	**0.18**	**0.14**	**0.11**	**1.79**	**2.13**	**2.50**	**2.85**	**3.20**

Recipient Beach Sediiment Analysis

DCM Compatibility Summary					
Transect	**Gravel**	**Granular**	**Sand**	**<#230**	**Carbonate**
0+00	0.07%	0.09%	98.61%	1.22%	2.00%
4+00	0.04%	0.06%	98.67%	1.23%	2.00%
8+00	0.04%	0.09%	98.39%	1.49%	2.00%
12+00	0.10%	2.44%	96.36%	1.11%	2.00%
16+00	0.11%	0.06%	98.70%	1.13%	2.00%
Grand Mean	**0.07%**	**0.55%**	**98.15%**	**1.23%**	**2.00%**

Native Summary							
Transect	**Median (mm)**	**Mean (mm)**	**D5 (mm)**	**D16 (mm)**	**D50 (mm)**	**D84 (mm)**	**D95 (mm)**
0+00	0.18	0.17	0.29	0.22	0.18	0.14	0.11
4+00	0.17	0.17	0.27	0.22	0.17	0.13	0.11
8+00	0.18	0.18	0.29	0.23	0.18	0.14	0.11
12+00	0.17	0.17	0.30	0.23	0.17	0.13	0.11
16+00	0.17	0.17	0.29	0.23	0.17	0.13	0.11
Grand Mean (mm)	**0.17**	**0.17**	**0.29**	**0.23**	**0.17**	**0.13**	**0.11**
Grand Mean (ϕ)	**2.52**	**2.52**	**1.80**	**2.15**	**2.52**	**2.90**	**3.20**

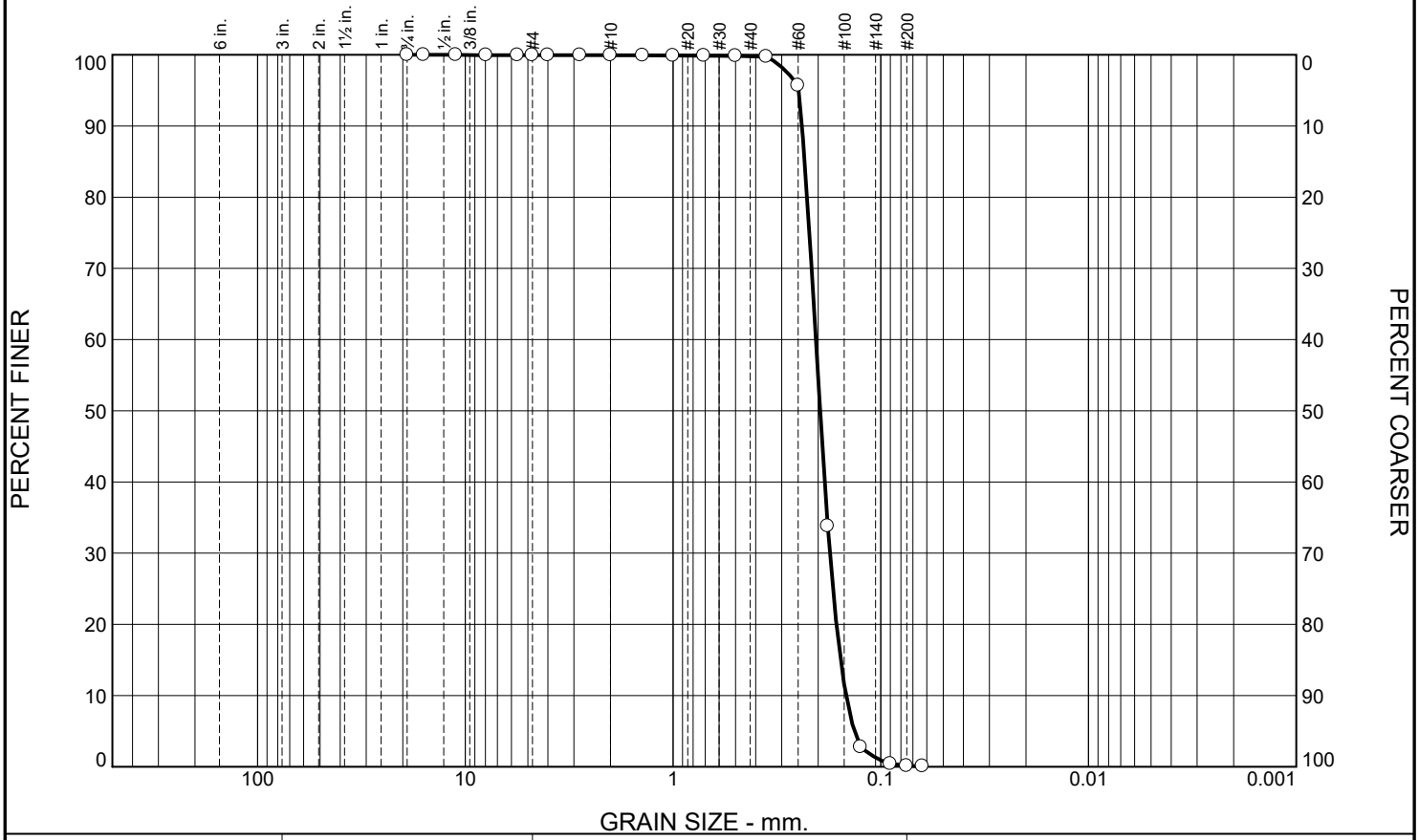
$M_{\phi n}$	**2.525**
$\sigma_{\phi n}$	**0.420**

Transect	Location	Dry Weight (g)	Gravel >#4	Granular #10<x<#4	Sand #230<x<#10	Fine <#230	Carbonate	Median (mm)	Mean (mm)	Mean (φ)	D5 (mm)	D16 (mm)	D50 (mm)	D84 (mm)	D95 (mm)	φ5	φ16	φ50	φ84	φ95
12+00	FD	254.09	0.00%	0.00%	100.00%	0.00%		0.20	0.19	2.39	0.25	0.24	0.20	0.15	0.13	2.00	2.08	2.34	2.76	2.96
12+00	DT	300.67	0.00%	0.00%	99.80%	0.20%		0.21	0.19	2.37	0.25	0.24	0.21	0.15	0.13	2.00	2.08	2.27	2.77	2.97
12+00	MB	334.19	0.00%	0.10%	99.60%	0.30%		0.20	0.19	2.37	0.25	0.24	0.20	0.15	0.13	2.00	2.07	2.31	2.72	2.96
12+00	MHW	211.01	0.00%	0.00%	99.10%	0.90%		0.17	0.17	2.54	0.29	0.23	0.17	0.13	0.12	1.81	2.14	2.60	2.90	3.09
12+00	MT	253.21	0.00%	0.00%	99.20%	0.80%		0.20	0.19	2.37	0.34	0.25	0.20	0.15	0.13	1.58	2.01	2.32	2.77	2.97
12+00	MLW	243.69	0.00%	0.10%	99.30%	0.60%		0.20	0.21	2.26	0.43	0.31	0.20	0.15	0.13	1.20	1.71	2.30	2.79	2.98
12+00	SZ	240.26	0.00%	0.00%	99.10%	0.90%		0.17	0.18	2.50	0.34	0.24	0.17	0.13	0.11	1.56	2.05	2.55	2.89	3.17
12+00	T	197.3	0.00%	0.10%	99.00%	0.90%		0.16	0.16	2.61	0.31	0.21	0.16	0.13	0.10	1.68	2.23	2.66	2.94	3.28
12+00	C	205.53	0.00%	0.10%	98.80%	1.10%		0.16	0.17	2.57	0.34	0.23	0.16	0.13	0.10	1.55	2.13	2.64	2.95	3.33
12+00	-6	224.6	0.70%	0.10%	98.10%	1.10%		0.16	0.17	2.57	0.35	0.23	0.16	0.13	0.10	1.51	2.13	2.64	2.94	3.32
12+00	-9.5	180.38	0.30%	33.10%	65.60%	1.00%		0.16	0.17	2.54	0.36	0.24	0.16	0.13	0.10	1.49	2.08	2.61	2.93	3.26
12+00	-13	193.08	0.40%	0.30%	98.00%	1.30%		0.15	0.15	2.74	0.22	0.18	0.15	0.13	0.09	2.17	2.51	2.73	2.98	3.40
12+00	-16.5	199.32	0.00%	0.00%	96.80%	3.20%		0.14	0.14	2.87	0.19	0.17	0.14	0.10	0.08	2.41	2.55	2.81	3.27	3.69
12+00	-20	194.51	0.00%	0.20%	96.60%	3.20%		0.15	0.14	2.80	0.25	0.18	0.15	0.11	0.08	2.01	2.46	2.74	3.21	3.70
	AVERAGE		**0.10%**	**2.44%**	**96.36%**	**1.11%**	**2.00%**	**0.17**	**0.17**	**2.52**	**0.30**	**0.23**	**0.17**	**0.13**	**0.11**	**1.75**	**2.14**	**2.52**	**2.91**	**3.20**
16+00	FD	298.52	0.00%	0.00%	99.80%	0.20%		0.20	0.19	2.39	0.25	0.23	0.20	0.15	0.13	2.02	2.09	2.33	2.75	2.96
16+00	DT	243.94	0.00%	0.00%	99.80%	0.20%		0.22	0.22	2.20	0.34	0.31	0.22	0.15	0.13	1.55	1.68	2.18	2.75	2.96
16+00	MB	242.18	0.10%	0.00%	99.80%	0.10%		0.19	0.19	2.42	0.25	0.24	0.19	0.14	0.13	2.01	2.09	2.37	2.80	2.99
16+00	MHW	198.11	0.00%	0.00%	99.20%	0.80%		0.18	0.18	2.47	0.25	0.23	0.18	0.14	0.12	2.01	2.11	2.46	2.85	3.01
16+00	MT	247.08	0.00%	0.10%	99.00%	0.90%		0.19	0.19	2.42	0.34	0.24	0.19	0.14	0.13	1.56	2.03	2.40	2.83	3.00
16+00	MLW	203.03	0.00%	0.00%	99.00%	1.00%		0.17	0.18	2.51	0.33	0.24	0.17	0.13	0.11	1.61	2.08	2.56	2.90	3.15
16+00	SZ	243.55	0.00%	0.00%	99.20%	0.80%		0.16	0.17	2.56	0.32	0.23	0.16	0.13	0.11	1.65	2.14	2.62	2.91	3.18
16+00	T	221.62	0.10%	0.10%	98.90%	0.90%		0.16	0.17	2.57	0.33	0.23	0.16	0.13	0.10	1.61	2.14	2.63	2.94	3.28
16+00	C	298.81	0.10%	0.10%	98.60%	1.20%		0.16	0.17	2.55	0.35	0.23	0.16	0.13	0.11	1.53	2.12	2.62	2.92	3.23
16+00	-6	255.64	0.00%	0.10%	98.90%	1.00%		0.16	0.17	2.54	0.39	0.24	0.16	0.13	0.10	1.35	2.07	2.63	2.94	3.30
16+00	-9.5	228.51	0.60%	0.30%	98.00%	1.10%		0.16	0.16	2.60	0.32	0.22	0.16	0.13	0.10	1.64	2.21	2.65	2.94	3.27
16+00	-13	239.62	0.50%	0.10%	98.00%	1.40%		0.15	0.15	2.75	0.21	0.17	0.15	0.13	0.09	2.27	2.52	2.74	2.99	3.43
16+00	-16.5	208.26	0.10%	0.10%	96.70%	3.10%		0.14	0.14	2.87	0.21	0.17	0.14	0.10	0.08	2.25	2.53	2.80	3.28	3.70
16+00	-20	253.89	0.00%	0.00%	96.90%	3.10%		0.15	0.14	2.79	0.24	0.19	0.15	0.11	0.08	2.04	2.43	2.74	3.19	3.68
	AVERAGE		**0.11%**	**0.06%**	**98.70%**	**1.13%**	**2.00%**	**0.17**	**0.17**	**2.54**	**0.29**	**0.23**	**0.17**	**0.13**	**0.11**	**1.77**	**2.15**	**2.54**	**2.92**	**3.21**

PROFILE 0+00

PARTICLE SIZE DISTRIBUTION REPORTS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.0	0.1	99.7	0.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	99.9		
#3.5	99.9		
#4	99.9		
#5	99.9		
#7	99.9		
#10	99.9		
#14	99.9		
#18	99.9		
#25	99.9		
#35	99.8		
#45	99.7		
#60	95.7		
#80	33.8		
#120	2.8		
#170	0.4		
#200	0.1		
#230	0.1		

* (no specification provided)

Soil Description

Light Gray (10YR 7/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2396 D_{85}= 0.2324 D_{60}= 0.2051
D_{50}= 0.1957 D_{30}= 0.1759 D_{15}= 0.1561
D_{10}= 0.1469 C_u= 1.40 C_c= 1.03

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.91

Source of Sample: SBSS 0
Sample Number: SBSS 0.1

Date: 7/18/18

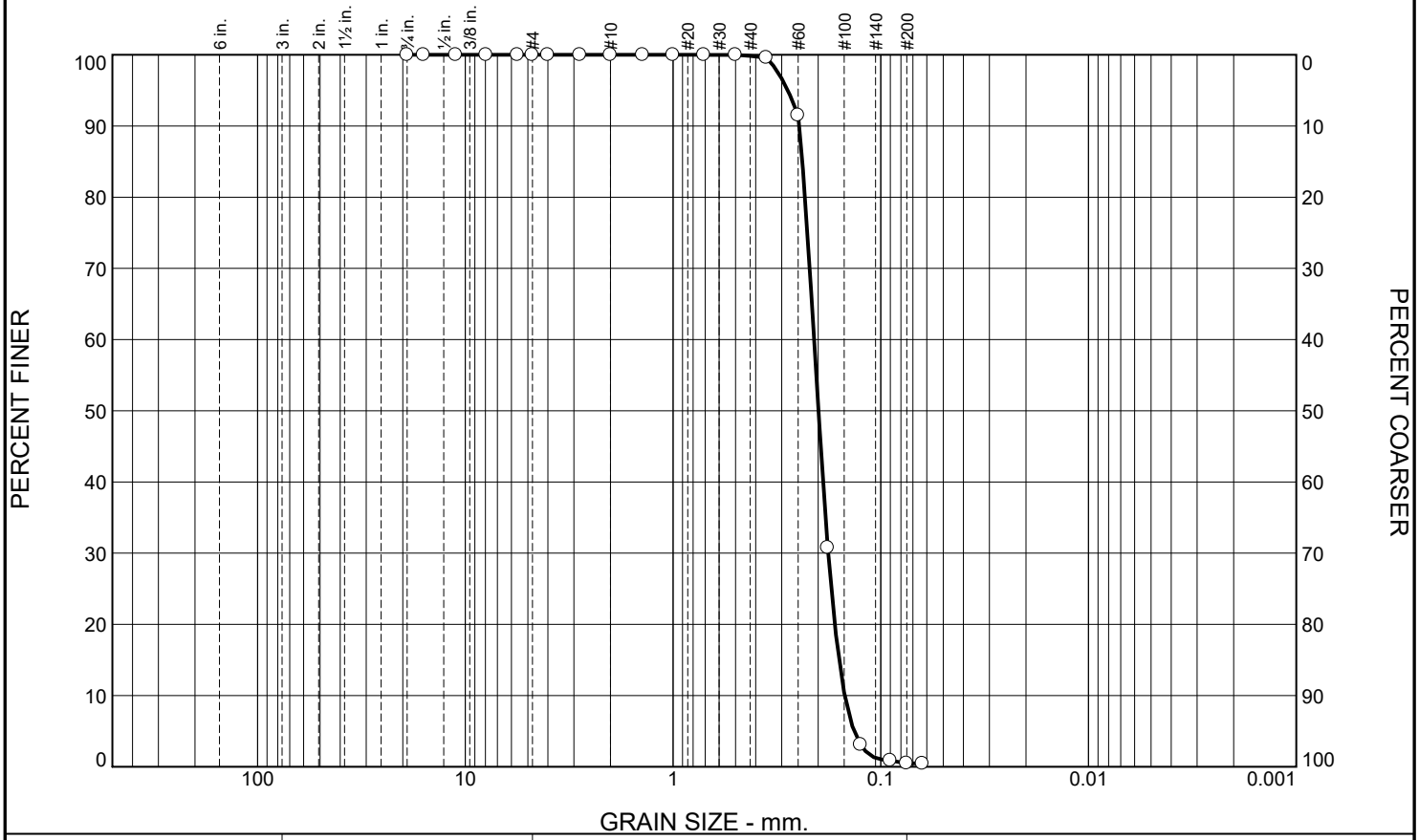
ECS SOUTHEAST, LLP
6714 Netherlands Drive
Wilmington, NC 28405
Phone: (910) 686-9114
Fax: (910) 686-9666

Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	99.3	0.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	100.0		
#35	100.0		
#45	99.6		
#60	91.5		
#80	30.8		
#120	3.1		
#170	0.9		
#200	0.5		
#230	0.5		

* (no specification provided)

Soil Description

Light Gray (10YR 7/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2470 D_{85}= 0.2387 D_{60}= 0.2092
D_{50}= 0.1994 D_{30}= 0.1791 D_{15}= 0.1589
D_{10}= 0.1491 C_u= 1.40 C_c= 1.03

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.93

Source of Sample: SBSS 0
Sample Number: SBSS 0.2

Date: 7/18/18

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6714 Netherlands Drive
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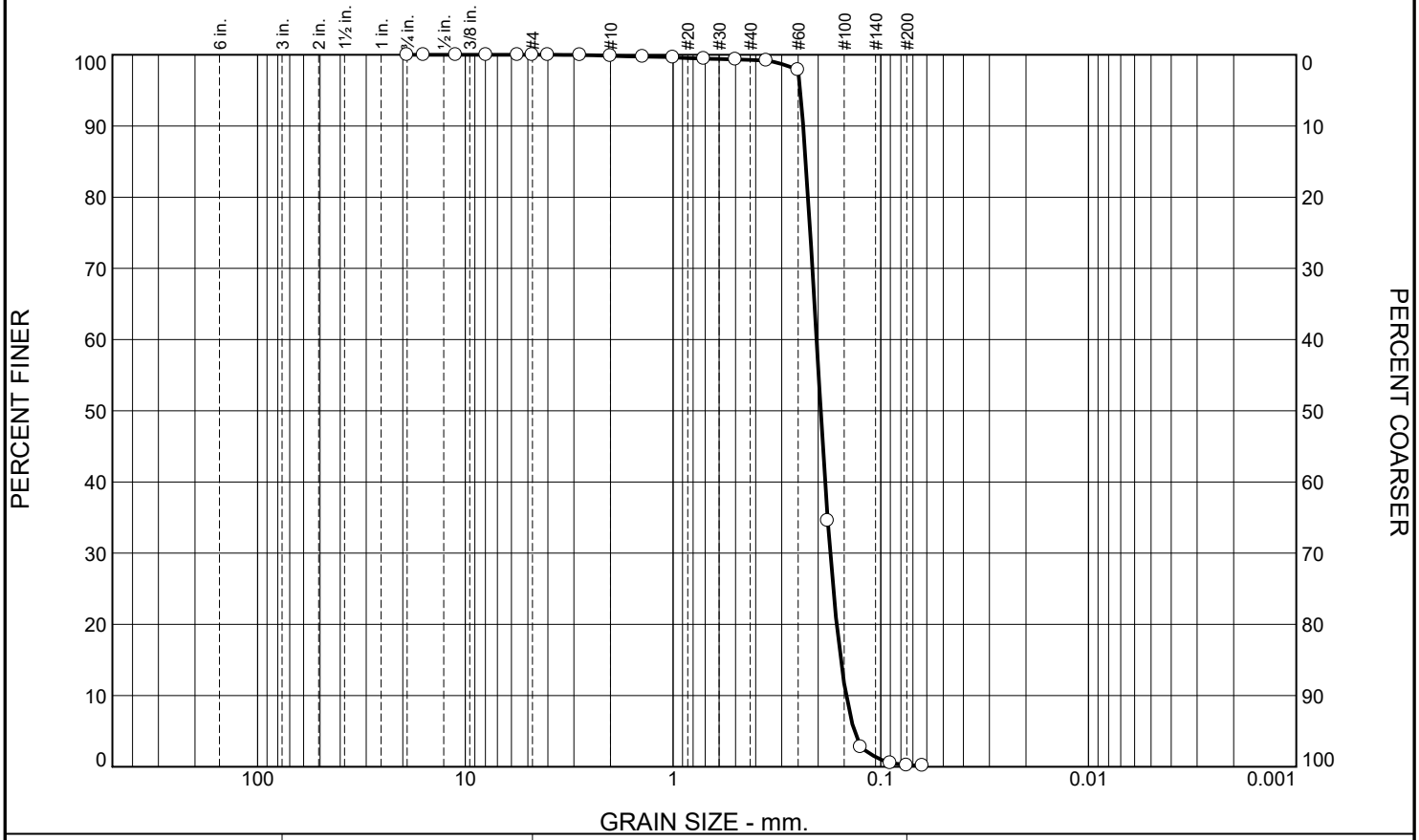
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	0.6	99.1	0.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	99.9		
#14	99.7		
#18	99.6		
#25	99.5		
#35	99.3		
#45	99.2		
#60	97.9		
#80	34.6		
#120	2.8		
#170	0.5		
#200	0.2		
#230	0.2		

* (no specification provided)

Soil Description

Light Gray (10YR 7/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2363 D_{85}= 0.2296 D_{60}= 0.2037
D_{50}= 0.1945 D_{30}= 0.1752 D_{15}= 0.1558
D_{10}= 0.1467 C_u= 1.39 C_c= 1.03

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.91

Source of Sample: SBSS 0
Sample Number: SBSS 0.3

Date: 7/18/18

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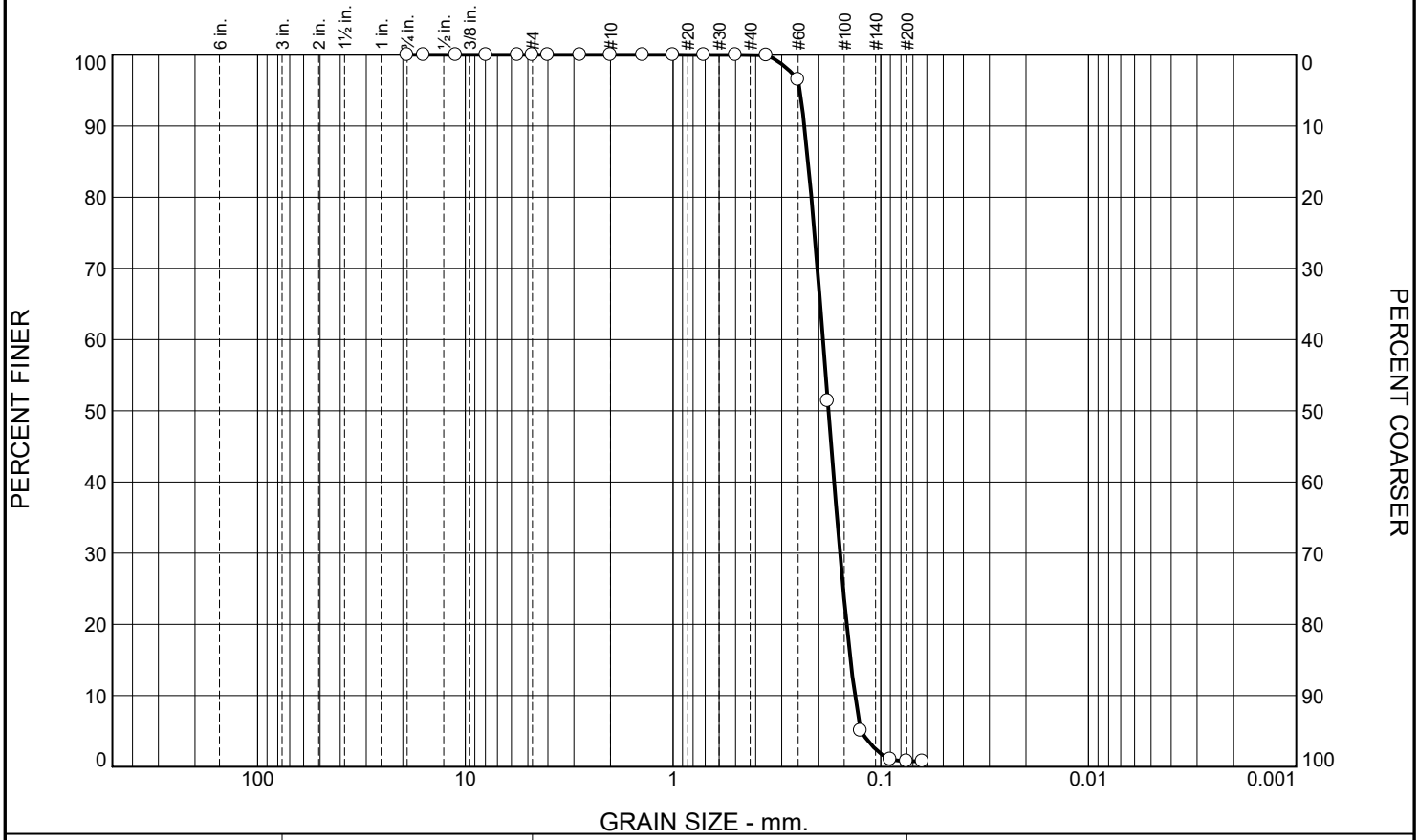
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	99.2	0.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	100.0		
#35	100.0		
#45	99.9		
#60	96.5		
#80	51.4		
#120	5.1		
#170	1.0		
#200	0.8		
#230	0.8		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2332 D_{85}= 0.2237 D_{60}= 0.1897
D_{50}= 0.1785 D_{30}= 0.1571 D_{15}= 0.1399
D_{10}= 0.1332 C_u= 1.42 C_c= 0.98

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.78

Source of Sample: SBSS 0
Sample Number: SBSS 0.4

Date: 7/18/18

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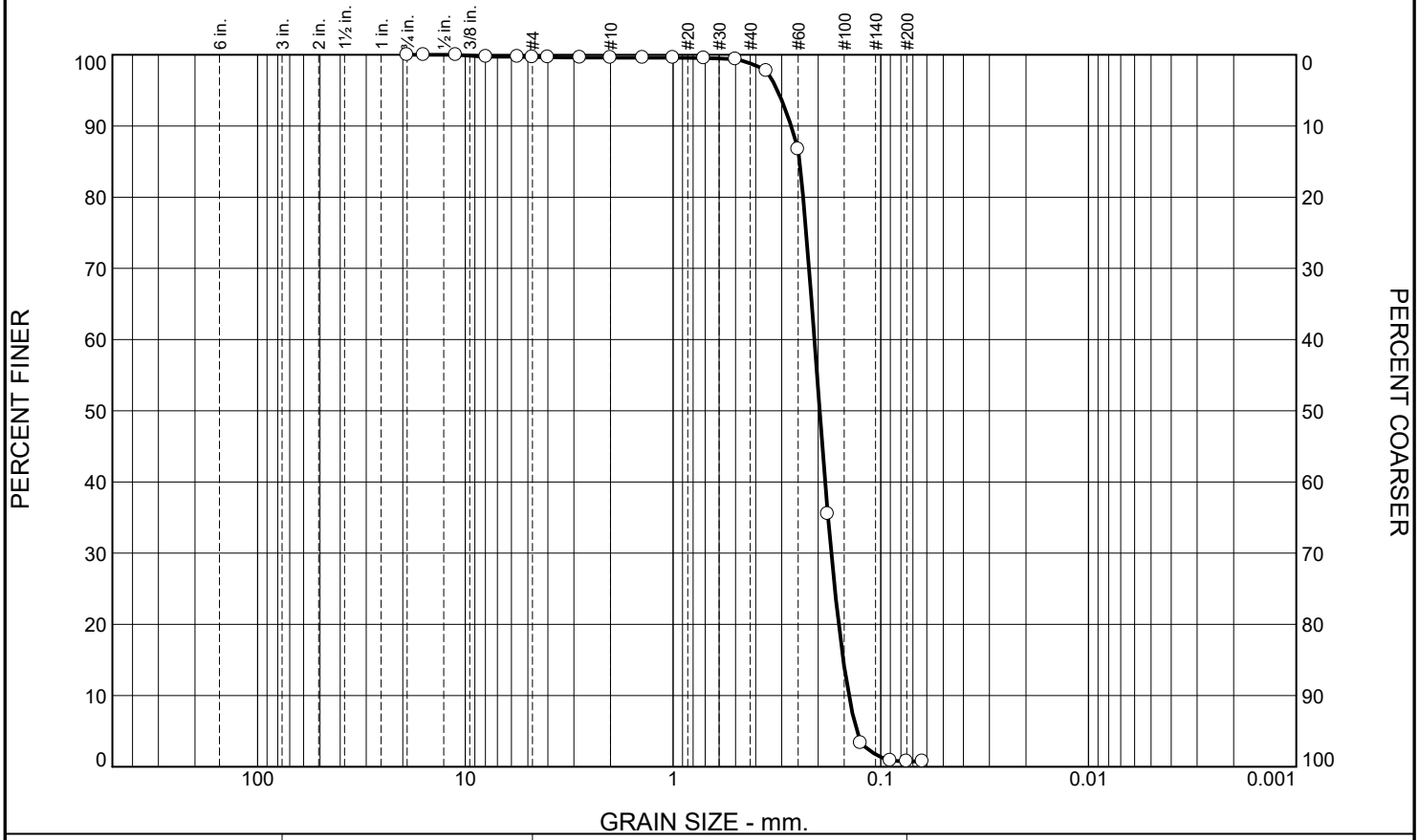
Fax: (910) 686-9666

Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.3	0.1	0.8	98.0	0.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	99.7		
#3.5	99.7		
#4	99.7		
#5	99.7		
#7	99.6		
#10	99.6		
#14	99.6		
#18	99.6		
#25	99.5		
#35	99.4		
#45	97.7		
#60	86.8		
#80	35.5		
#120	3.3		
#170	0.9		
#200	0.8		
#230	0.8		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2702 D_{85}= 0.2460 D_{60}= 0.2084
D_{50}= 0.1967 D_{30}= 0.1732 D_{15}= 0.1515
D_{10}= 0.1423 C_u= 1.46 C_c= 1.01

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.94

Source of Sample: SBSS 0
Sample Number: SBSS 0.5

Date: 7/18/18

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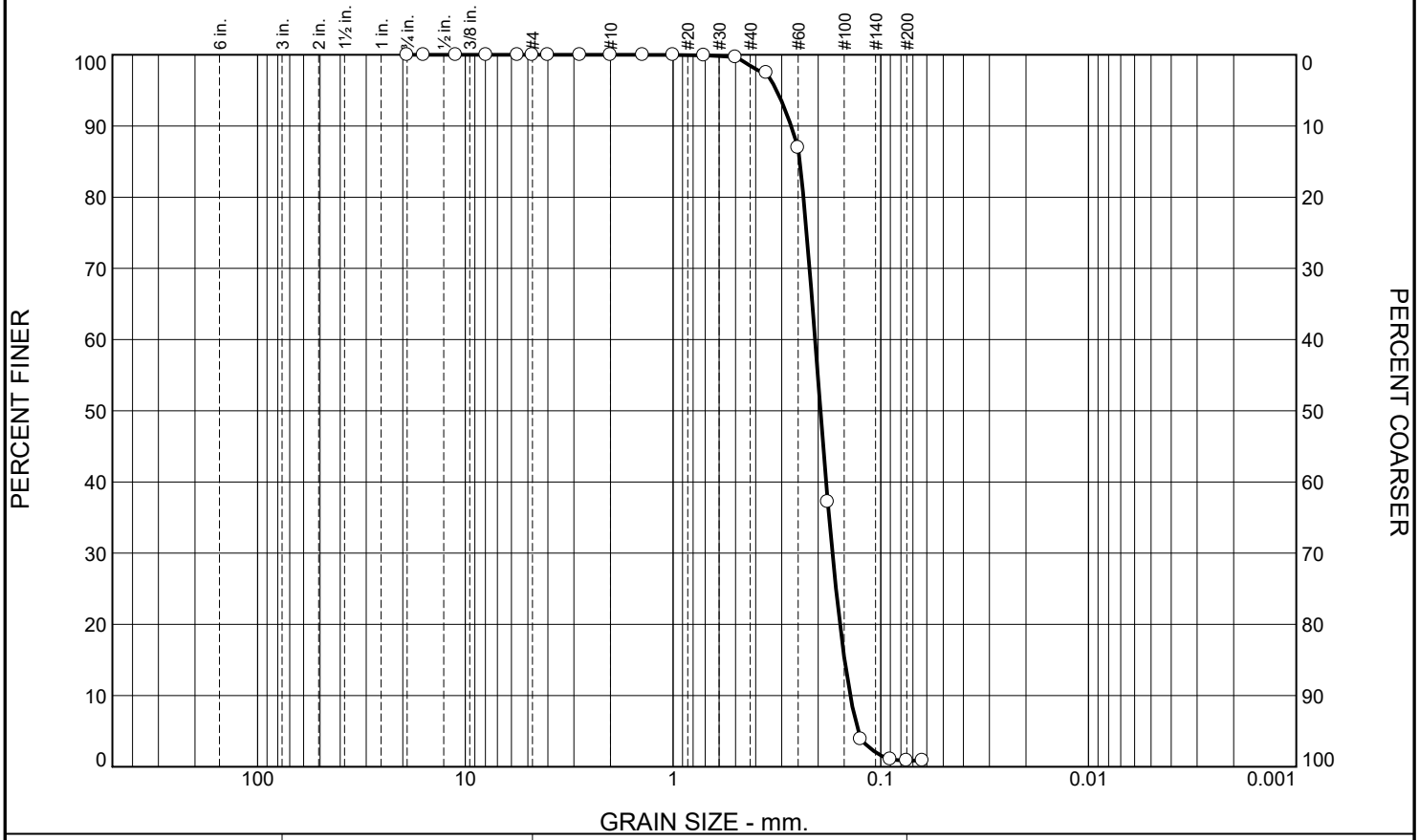
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.5	97.6	0.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	99.9		
#35	99.7		
#45	97.5		
#60	87.0		
#80	37.2		
#120	3.9		
#170	1.0		
#200	0.9		
#230	0.9		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2702 D_{85}= 0.2454 D_{60}= 0.2070
D_{50}= 0.1950 D_{30}= 0.1710 D_{15}= 0.1493
D_{10}= 0.1402 C_u= 1.48 C_c= 1.01

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.91

Source of Sample: SBSS 0
Sample Number: SBSS 0.6

Date: 7/18/18

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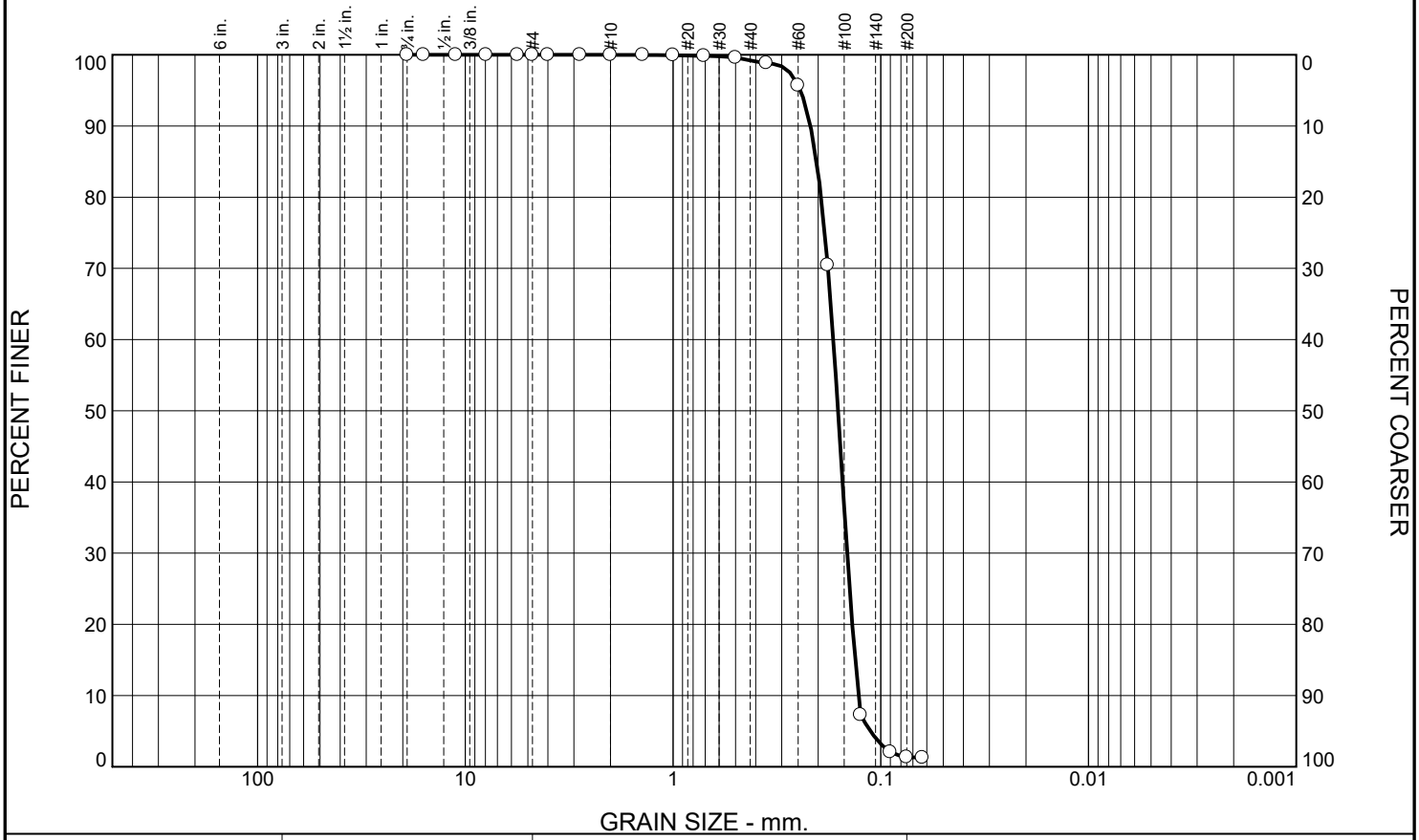
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.8	97.9	1.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	99.9		
#25	99.8		
#35	99.6		
#45	98.8		
#60	95.7		
#80	70.5		
#120	7.3		
#170	2.1		
#200	1.3		
#230	1.3		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2178 D_{85}= 0.2035 D_{60}= 0.1692
D_{50}= 0.1606 D_{30}= 0.1450 D_{15}= 0.1329
D_{10}= 0.1281 C_u= 1.32 C_c= 0.97

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.65

Source of Sample: SBSS 0
Sample Number: SBSS 0.7

Date: 7/18/18

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Wilmington, NC 28405
Phone: (910) 686-9114
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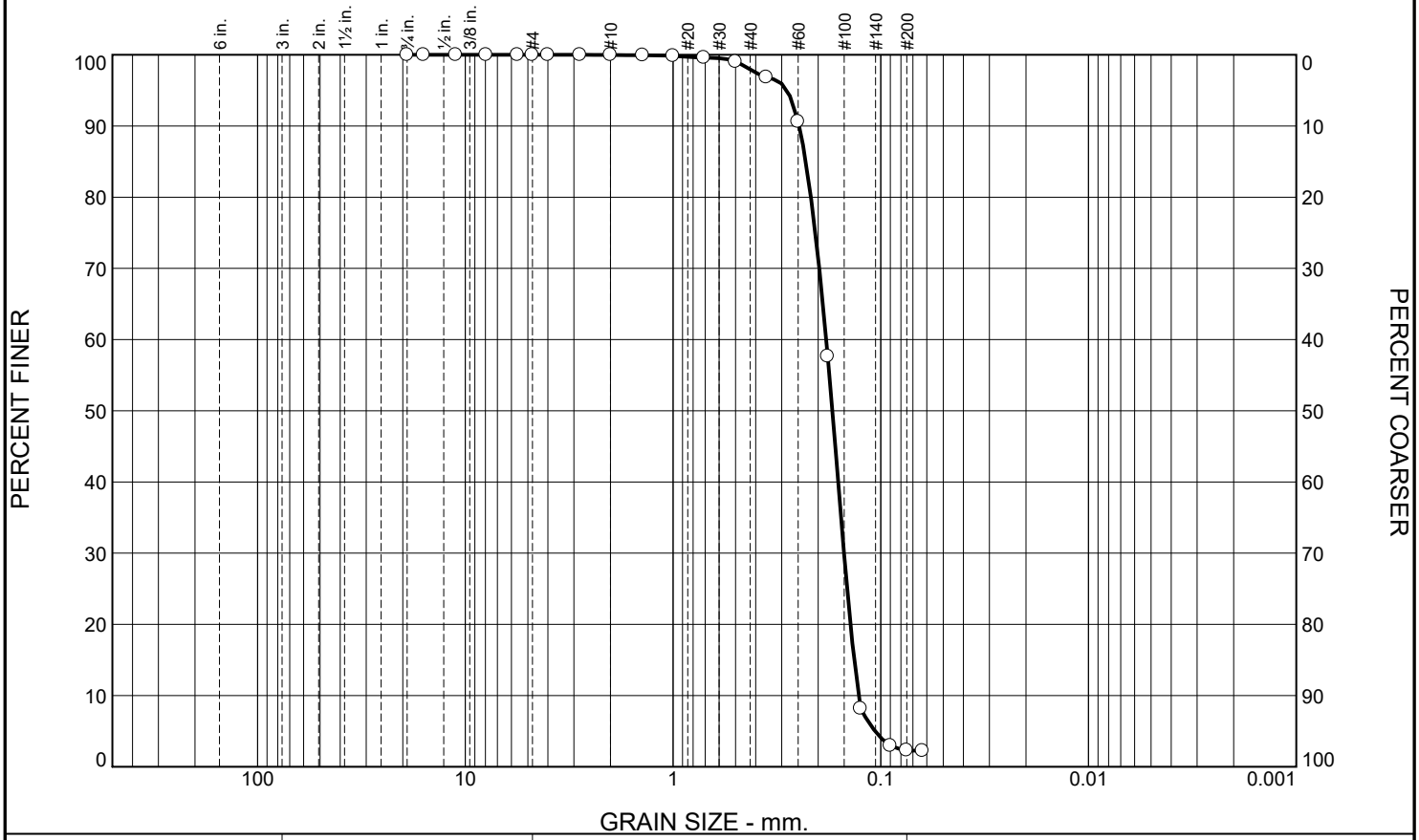
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	2.1	95.6	2.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	99.9		
#18	99.8		
#25	99.6		
#35	99.0		
#45	96.8		
#60	90.6		
#80	57.6		
#120	8.2		
#170	3.0		
#200	2.3		
#230	2.2		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2472 D_{85}= 0.2295 D_{60}= 0.1830
D_{50}= 0.1710 D_{30}= 0.1502 D_{15}= 0.1343
D_{10}= 0.1278 C_u= 1.43 C_c= 0.96

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.75

Source of Sample: SBSS 0
Sample Number: SBSS 0.TROUGH

Date: 7/18/18

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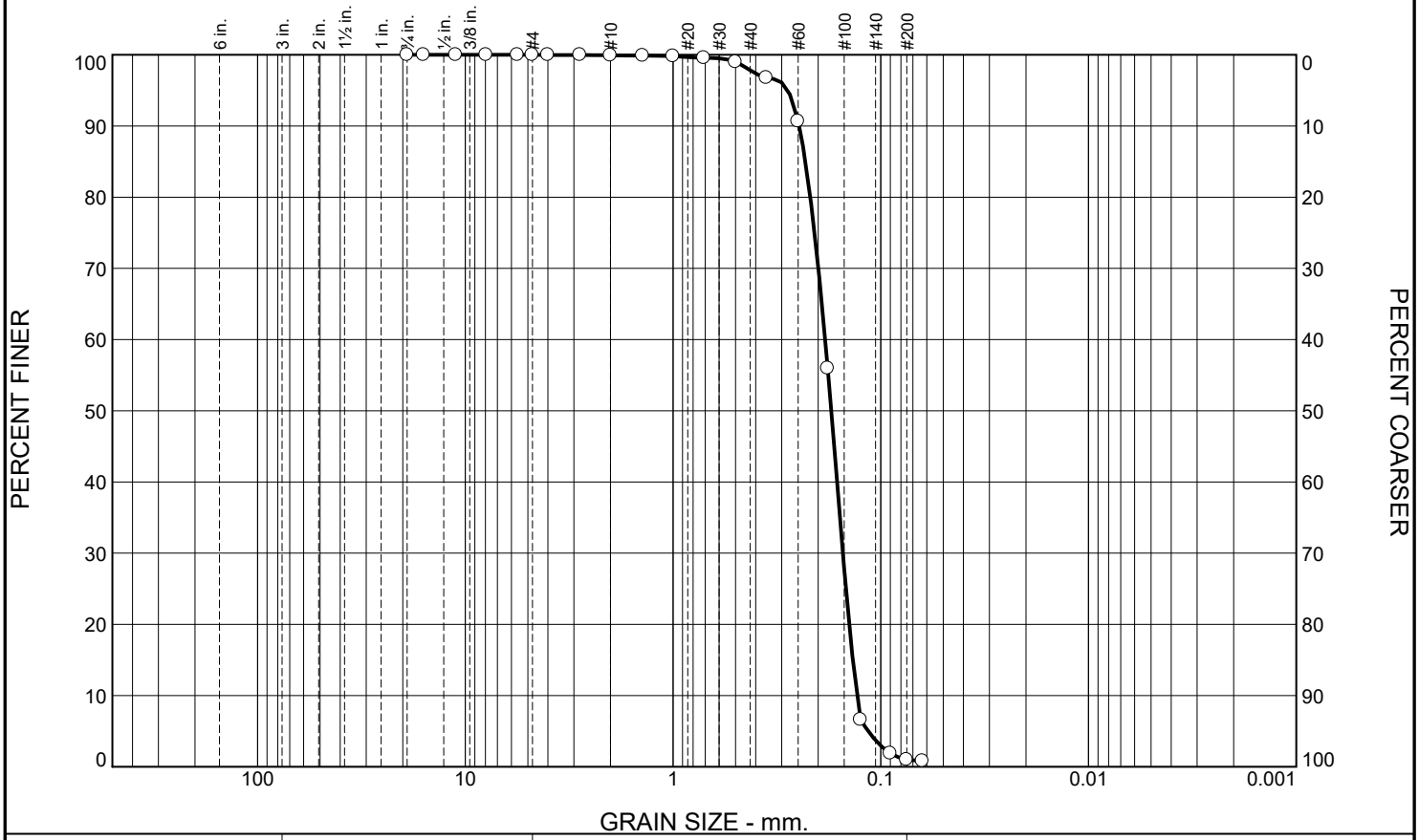
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	2.1	96.8	1.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	99.9		
#14	99.9		
#18	99.8		
#25	99.6		
#35	99.0		
#45	96.8		
#60	90.7		
#80	55.9		
#120	6.6		
#170	1.9		
#200	1.0		
#230	0.8		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2472 D_{85}= 0.2305 D_{60}= 0.1851
D_{50}= 0.1731 D_{30}= 0.1521 D_{15}= 0.1363
D_{10}= 0.1301 C_u= 1.42 C_c= 0.96

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.77

Source of Sample: SBSS 0
Sample Number: SBSS 0.CREST

Date: 7/18/18

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Phone: (910) 686-9114
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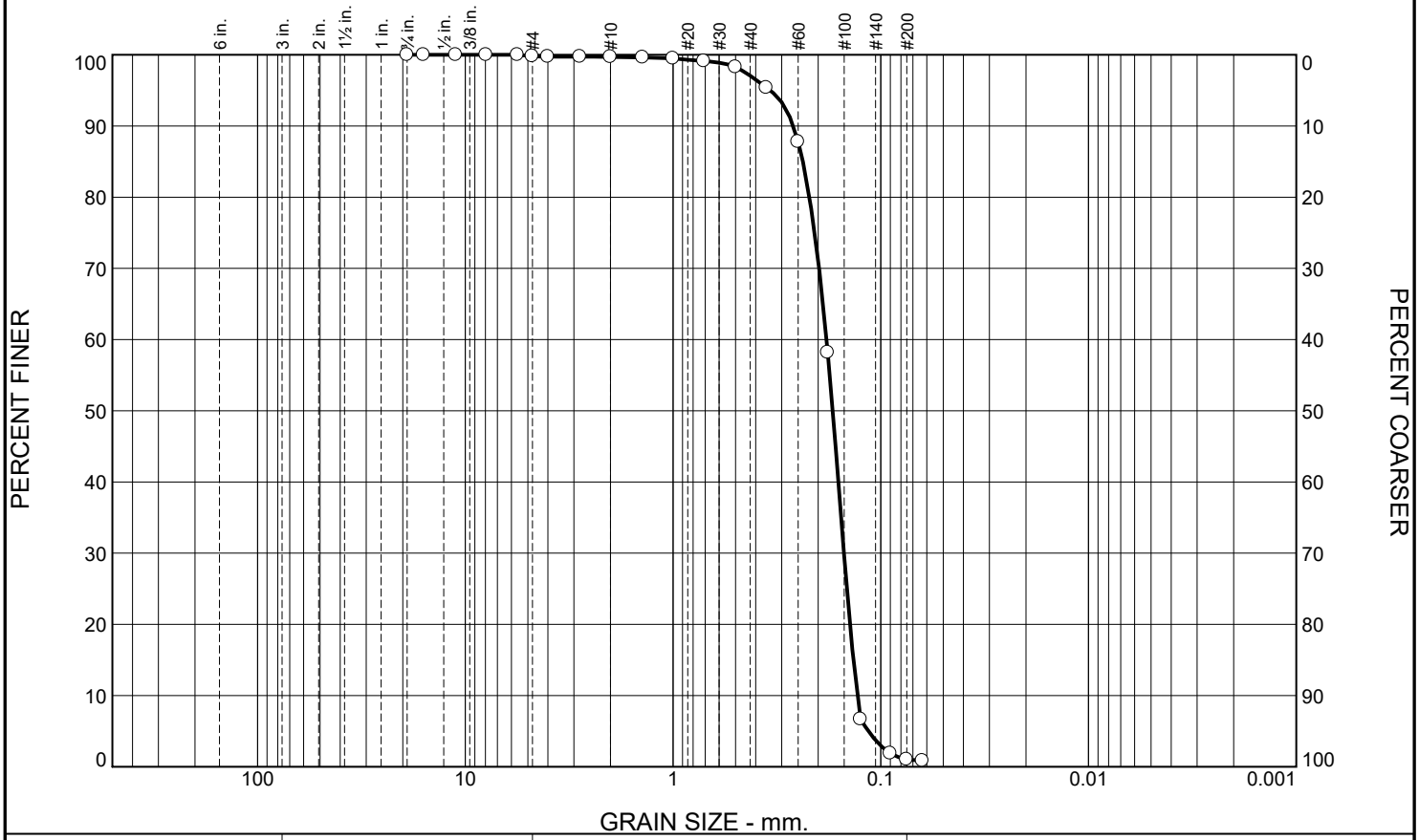
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.1	2.6	96.1	1.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	99.8		
#5	99.7		
#7	99.7		
#10	99.7		
#14	99.6		
#18	99.5		
#25	99.1		
#35	98.3		
#45	95.4		
#60	87.8		
#80	58.2		
#120	6.7		
#170	1.9		
#200	1.0		
#230	0.8		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2637 D_{85}= 0.2372 D_{60}= 0.1824
D_{50}= 0.1704 D_{30}= 0.1503 D_{15}= 0.1354
D_{10}= 0.1297 C_u= 1.41 C_c= 0.96

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.79

Source of Sample: SBSS 0
Sample Number: SBSS 0.106

Date: 7/18/18

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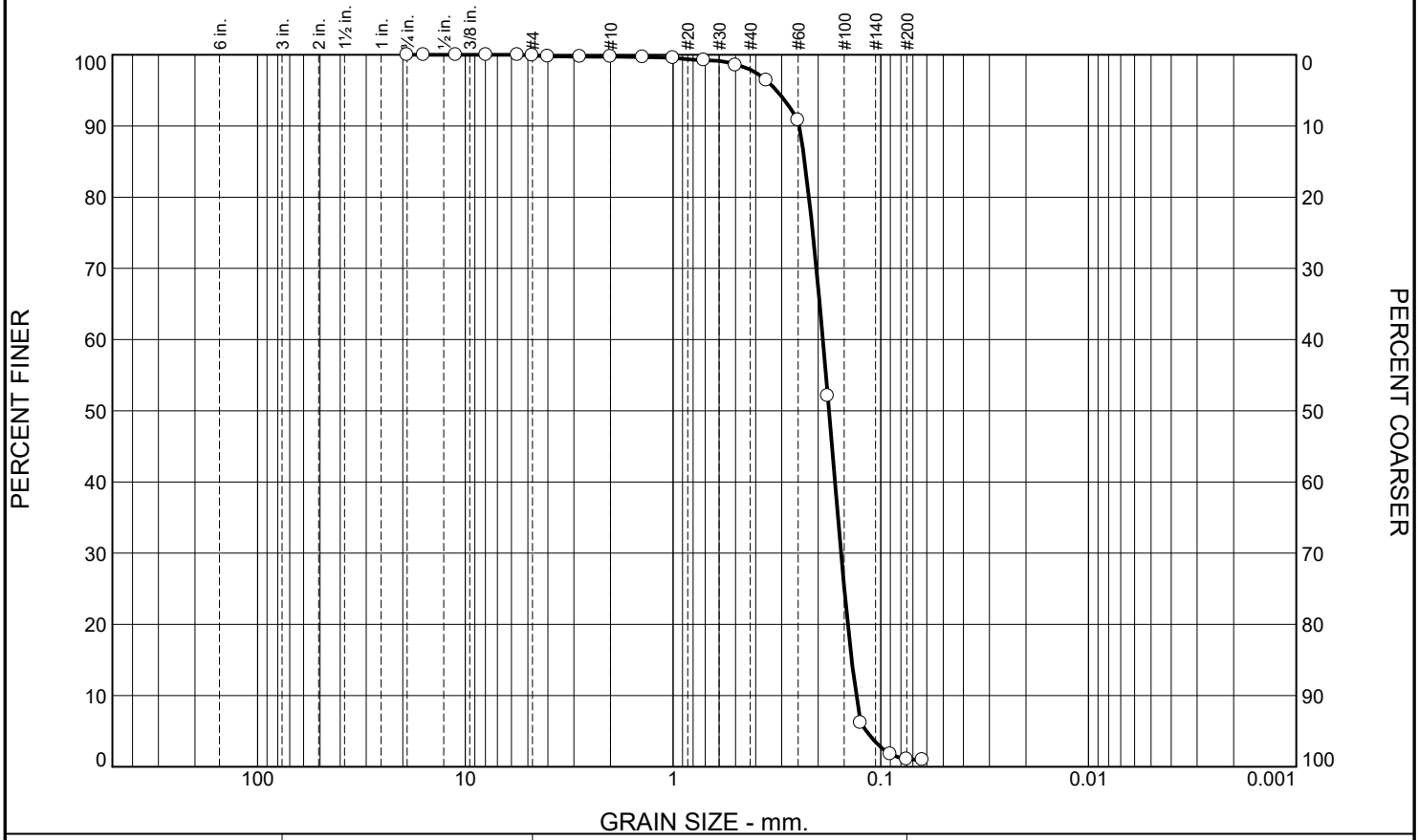
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.2	1.8	96.8	1.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	99.9		
#5	99.8		
#7	99.8		
#10	99.7		
#14	99.7		
#18	99.5		
#25	99.2		
#35	98.5		
#45	96.4		
#60	90.8		
#80	52.1		
#120	6.2		
#170	1.8		
#200	1.1		
#230	1.0		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2470 D_{85}= 0.2324 D_{60}= 0.1899
D_{50}= 0.1775 D_{30}= 0.1552 D_{15}= 0.1381
D_{10}= 0.1313 C_u= 1.45 C_c= 0.97

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.82

Source of Sample: SBSS 0
Sample Number: SBSS 0.109.5

Date: 7/18/18

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Phone: (910) 686-9114
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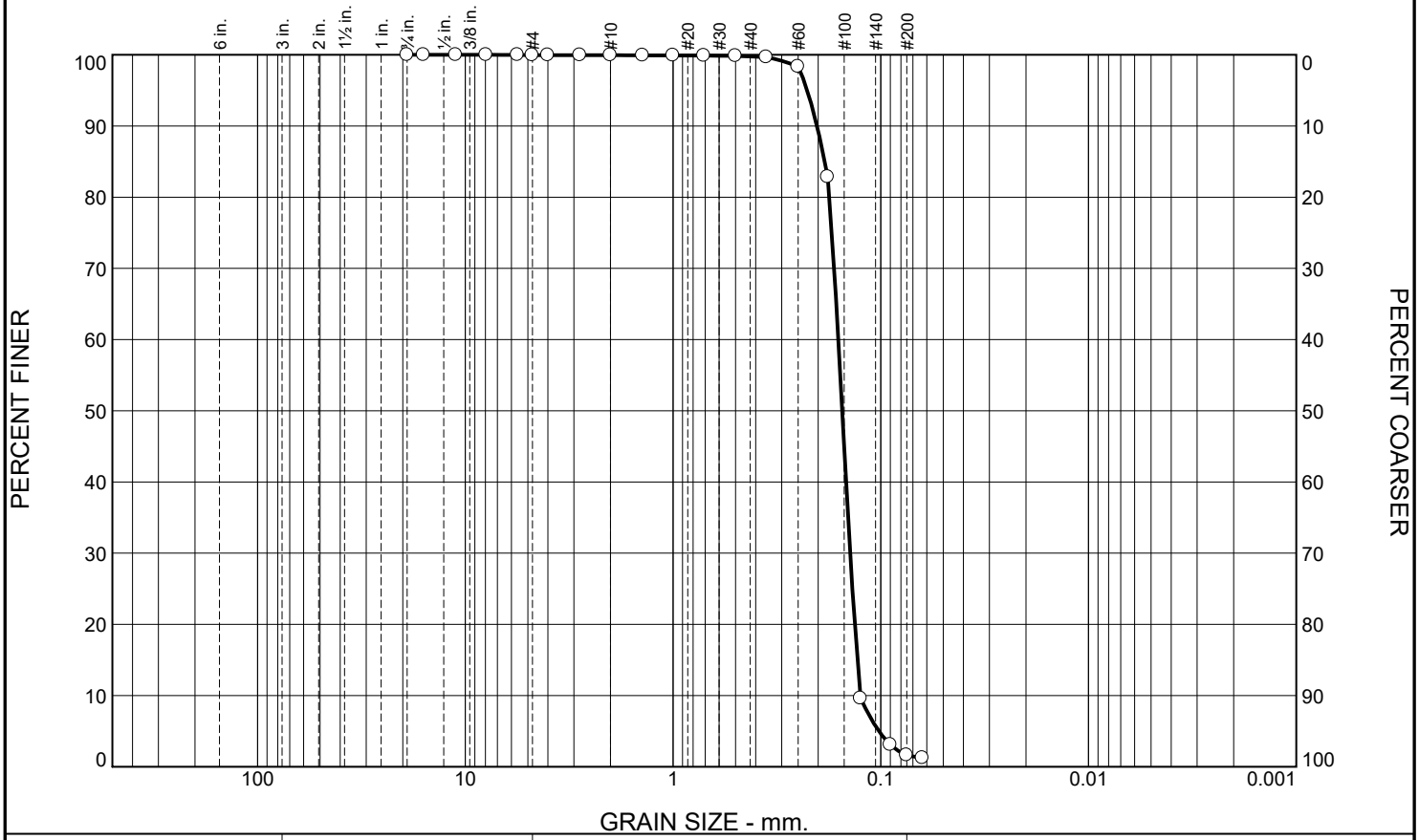
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	0.1	98.2	1.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	99.9		
#10	99.9		
#14	99.9		
#18	99.9		
#25	99.9		
#35	99.8		
#45	99.7		
#60	98.3		
#80	82.8		
#120	9.6		
#170	3.1		
#200	1.6		
#230	1.2		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2026 D_{85}= 0.1860 D_{60}= 0.1600
D_{50}= 0.1532 D_{30}= 0.1403 D_{15}= 0.1298
D_{10}= 0.1254 C_u= 1.28 C_c= 0.98

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.56

Source of Sample: SBSS 0
Sample Number: SBSS 0.113

Date: 7/18/18

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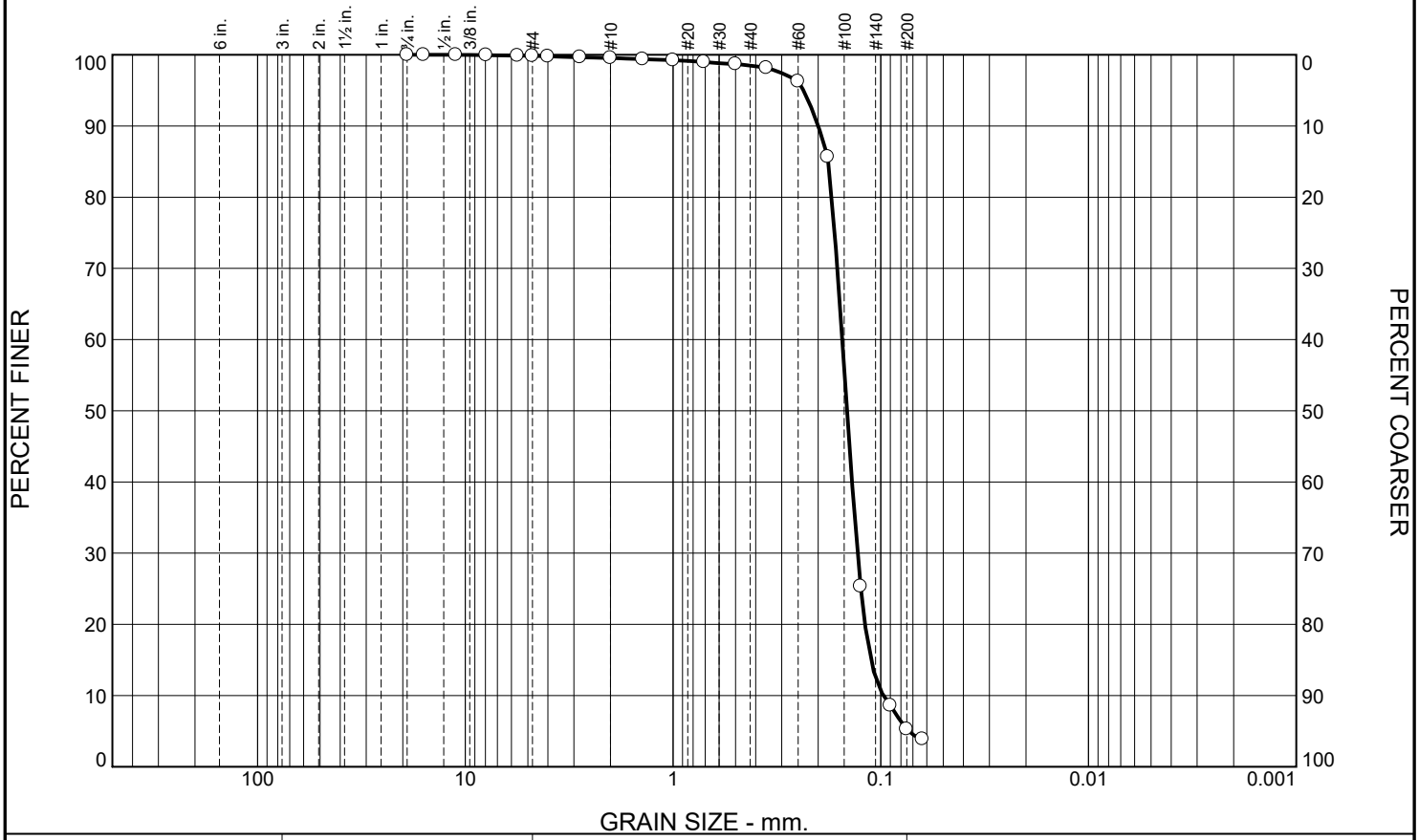
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.4	1.0	93.2	5.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	99.9		
#4	99.9		
#5	99.8		
#7	99.7		
#10	99.5		
#14	99.4		
#18	99.2		
#25	99.0		
#35	98.7		
#45	98.2		
#60	96.3		
#80	85.7		
#120	25.3		
#170	8.6		
#200	5.3		
#230	3.9		

* (no specification provided)

Soil Description

Grayish Brown (10YR 5/2), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2000 D_{85}= 0.1790 D_{60}= 0.1532
D_{50}= 0.1452 D_{30}= 0.1293 D_{15}= 0.1115
D_{10}= 0.0971 C_u= 1.58 C_c= 1.12

Classification

USCS= AASHTO=

Remarks

F.M.=0.49

Source of Sample: SBSS 0
Sample Number: SBSS 0.116.5

Date: 7/18/18

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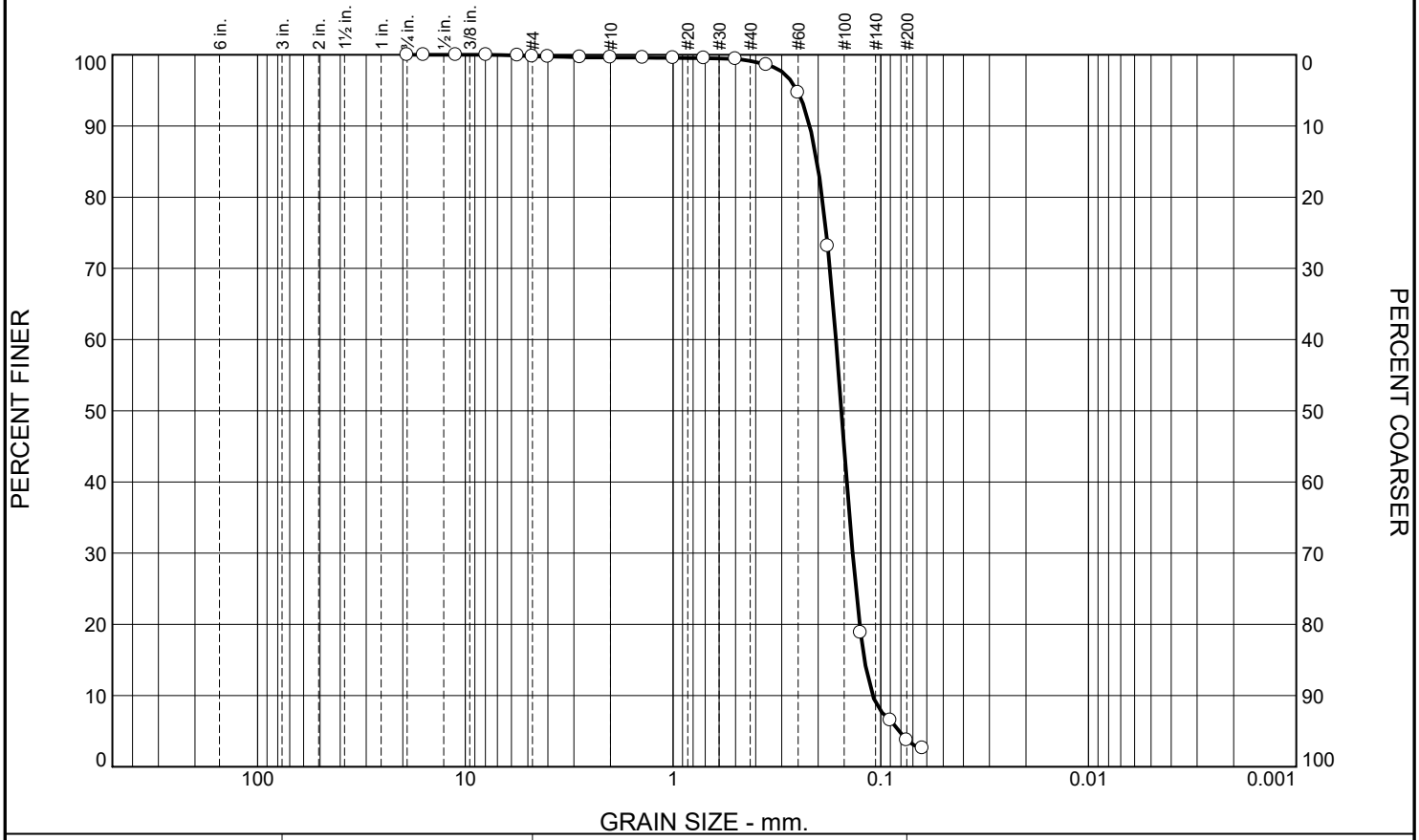
Phone: (910) 686-9114
Fax: (910) 686-9666

Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.2	0.5	95.4	3.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	99.9		
#4	99.8		
#5	99.8		
#7	99.6		
#10	99.6		
#14	99.6		
#18	99.6		
#25	99.5		
#35	99.4		
#45	98.6		
#60	94.7		
#80	73.1		
#120	18.8		
#170	6.5		
#200	3.7		
#230	2.6		

* (no specification provided)

Soil Description

Grayish Brown (10YR 5/2), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2196 D_{85}= 0.2027 D_{60}= 0.1644
D_{50}= 0.1547 D_{30}= 0.1366 D_{15}= 0.1197
D_{10}= 0.1094 C_u= 1.50 C_c= 1.04

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.59

Source of Sample: SBSS 0
Sample Number: SBSS 0.120

Date: 7/18/18

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Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

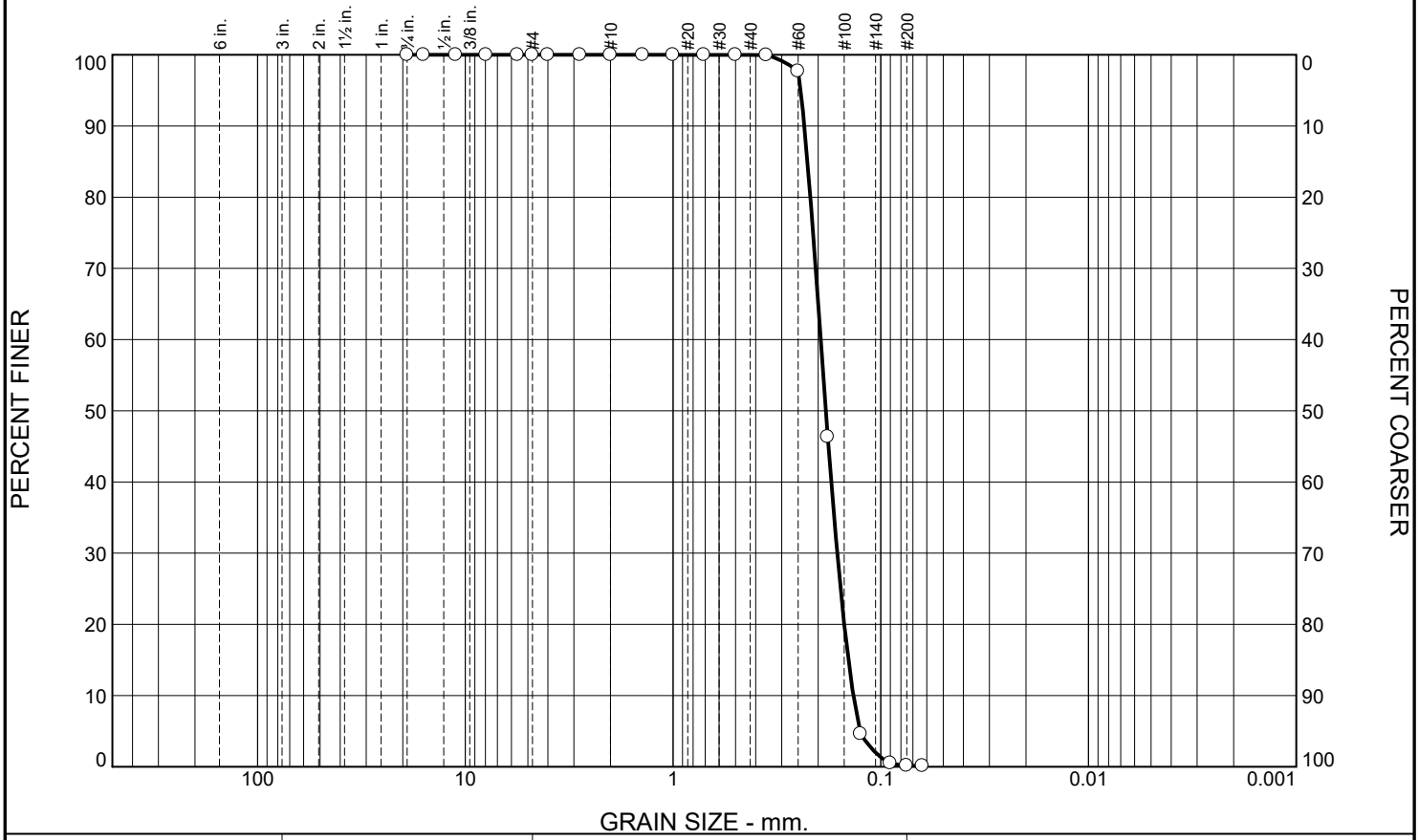
Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

PROFILE 4+00

PARTICLE SIZE DISTRIBUTION REPORTS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	99.9	0.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	100.0		
#35	100.0		
#45	100.0		
#60	97.7		
#80	46.3		
#120	4.6		
#170	0.5		
#200	0.1		
#230	0.1		

* (no specification provided)

Soil Description

Light Gray (10YR 7/2), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2332 D_{85}= 0.2251 D_{60}= 0.1945
D_{50}= 0.1839 D_{30}= 0.1621 D_{15}= 0.1432
D_{10}= 0.1355 C_u= 1.43 C_c= 1.00

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.81

Source of Sample: SBSS 4
Sample Number: SBSS 4.1

Date: 7/17/18

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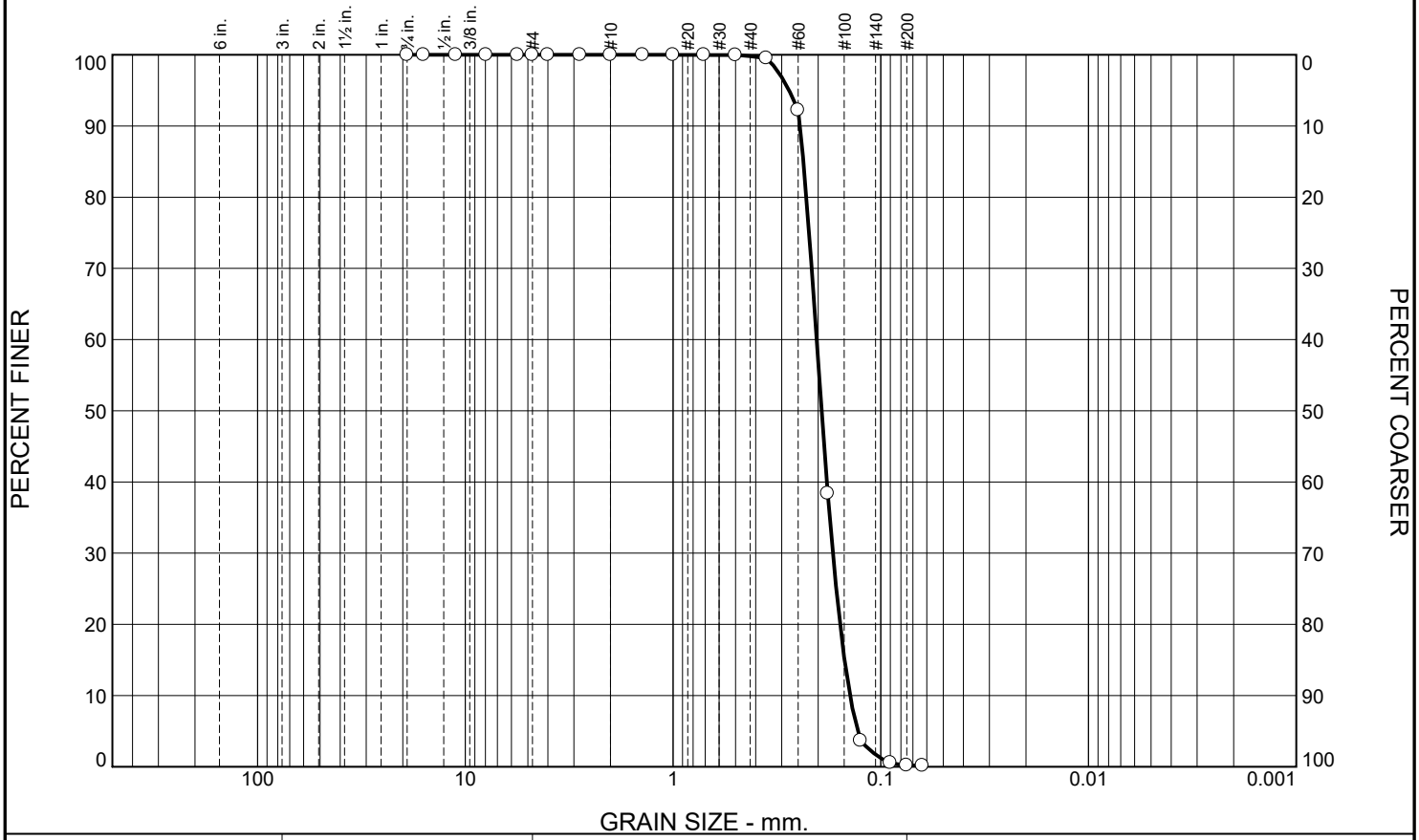
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	99.6	0.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	100.0		
#35	100.0		
#45	99.5		
#60	92.2		
#80	38.4		
#120	3.6		
#170	0.6		
#200	0.2		
#230	0.2		

* (no specification provided)

Soil Description

Light Gray (10YR 7/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2450 D_{85}= 0.2358 D_{60}= 0.2034
D_{50}= 0.1926 D_{30}= 0.1702 D_{15}= 0.1494
D_{10}= 0.1406 C_u= 1.45 C_c= 1.01

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.88

Source of Sample: SBSS 4
Sample Number: SBSS 4.2

Date: 7/17/18

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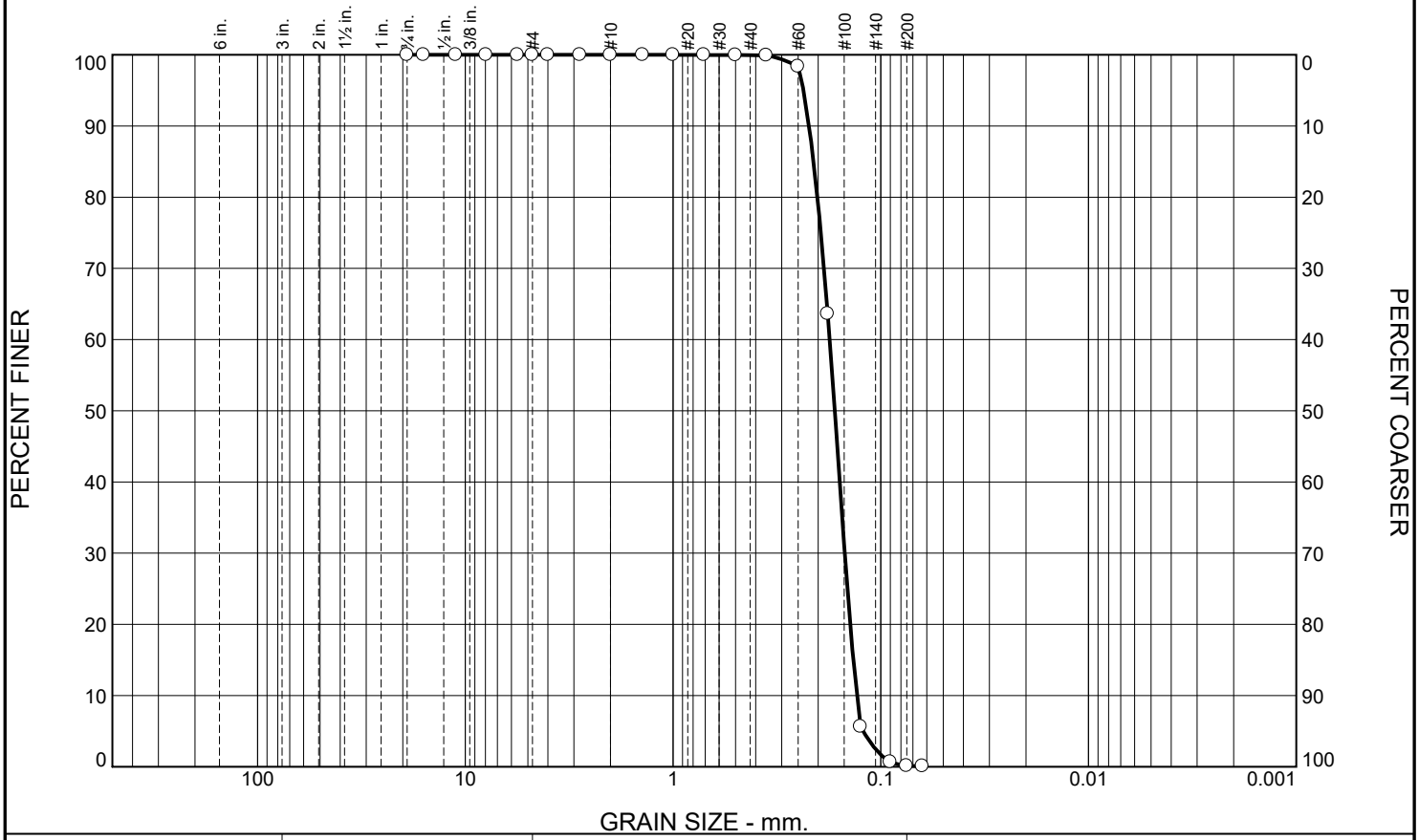
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	99.9	0.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	100.0		
#35	100.0		
#45	99.9		
#60	98.4		
#80	63.6		
#120	5.6		
#170	0.6		
#200	0.1		
#230	0.1		

* (no specification provided)

Soil Description

Light Gray (10YR 7/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2212 D_{85}= 0.2104 D_{60}= 0.1762
D_{50}= 0.1665 D_{30}= 0.1490 D_{15}= 0.1356
D_{10}= 0.1304 C_u= 1.35 C_c= 0.97

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.70

Source of Sample: SBSS 4
Sample Number: SBSS 4.3

Date: 7/17/18

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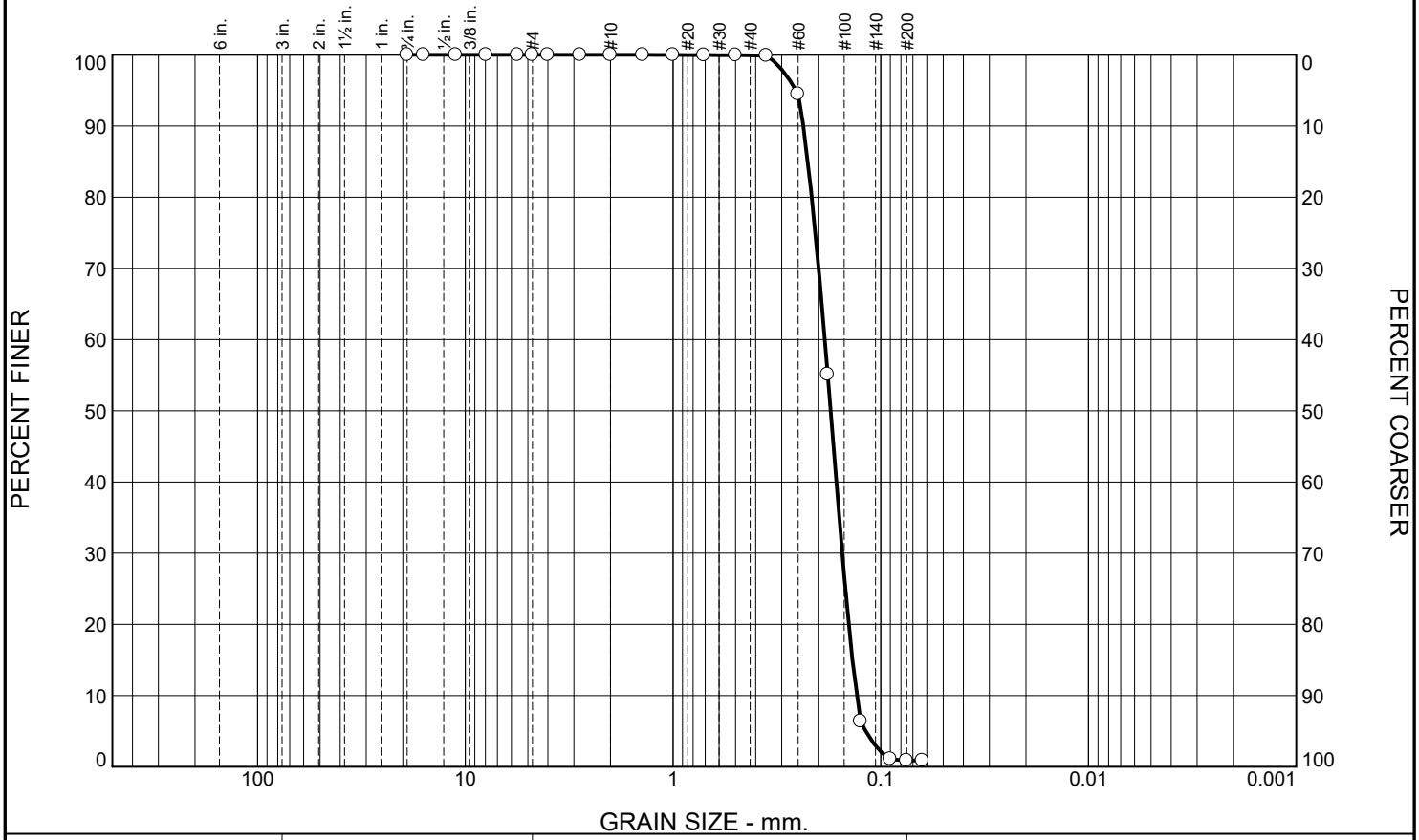
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	99.0	0.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	100.0		
#35	100.0		
#45	99.9		
#60	94.5		
#80	55.1		
#120	6.4		
#170	1.1		
#200	0.9		
#230	0.9		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2359 D_{85}= 0.2243 D_{60}= 0.1858
D_{50}= 0.1743 D_{30}= 0.1532 D_{15}= 0.1369
D_{10}= 0.1305 C_u= 1.42 C_c= 0.97

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.75

Source of Sample: SBSS 4
Sample Number: SBSS 4.4

Date: 7/17/18

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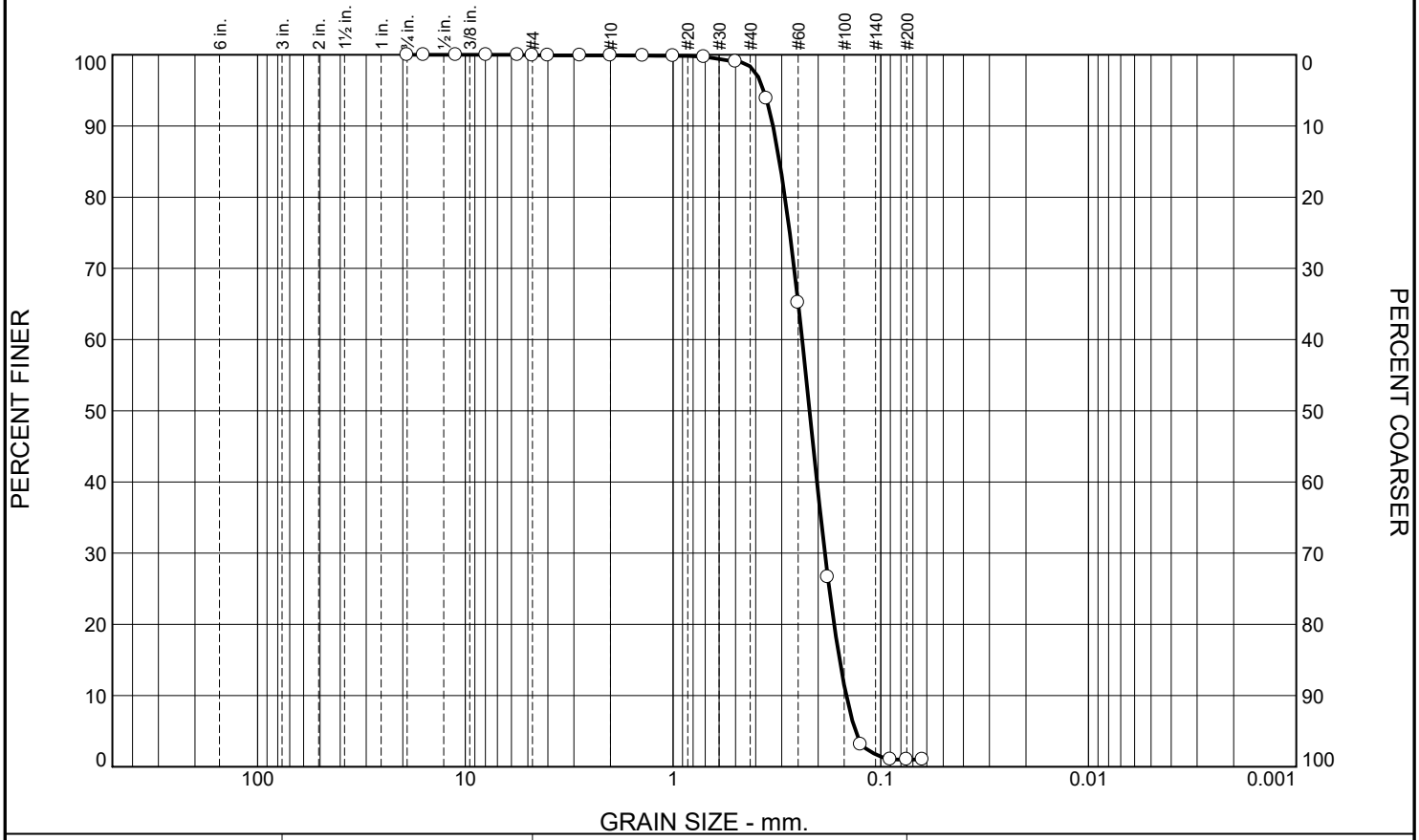
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.0	1.5	97.4	1.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	99.9		
#5	99.9		
#7	99.9		
#10	99.9		
#14	99.9		
#18	99.9		
#25	99.7		
#35	99.1		
#45	93.9		
#60	65.2		
#80	26.7		
#120	3.1		
#170	1.0		
#200	1.0		
#230	1.0		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3300 D_{85}= 0.3071 D_{60}= 0.2391
D_{50}= 0.2201 D_{30}= 0.1858 D_{15}= 0.1578
D_{10}= 0.1465 C_u= 1.63 C_c= 0.99

Classification

USCS= SP AASHTO=

Remarks

F.M.=1.06

Source of Sample: SBSS 4
Sample Number: SBSS 4.5

Date: 7/17/18

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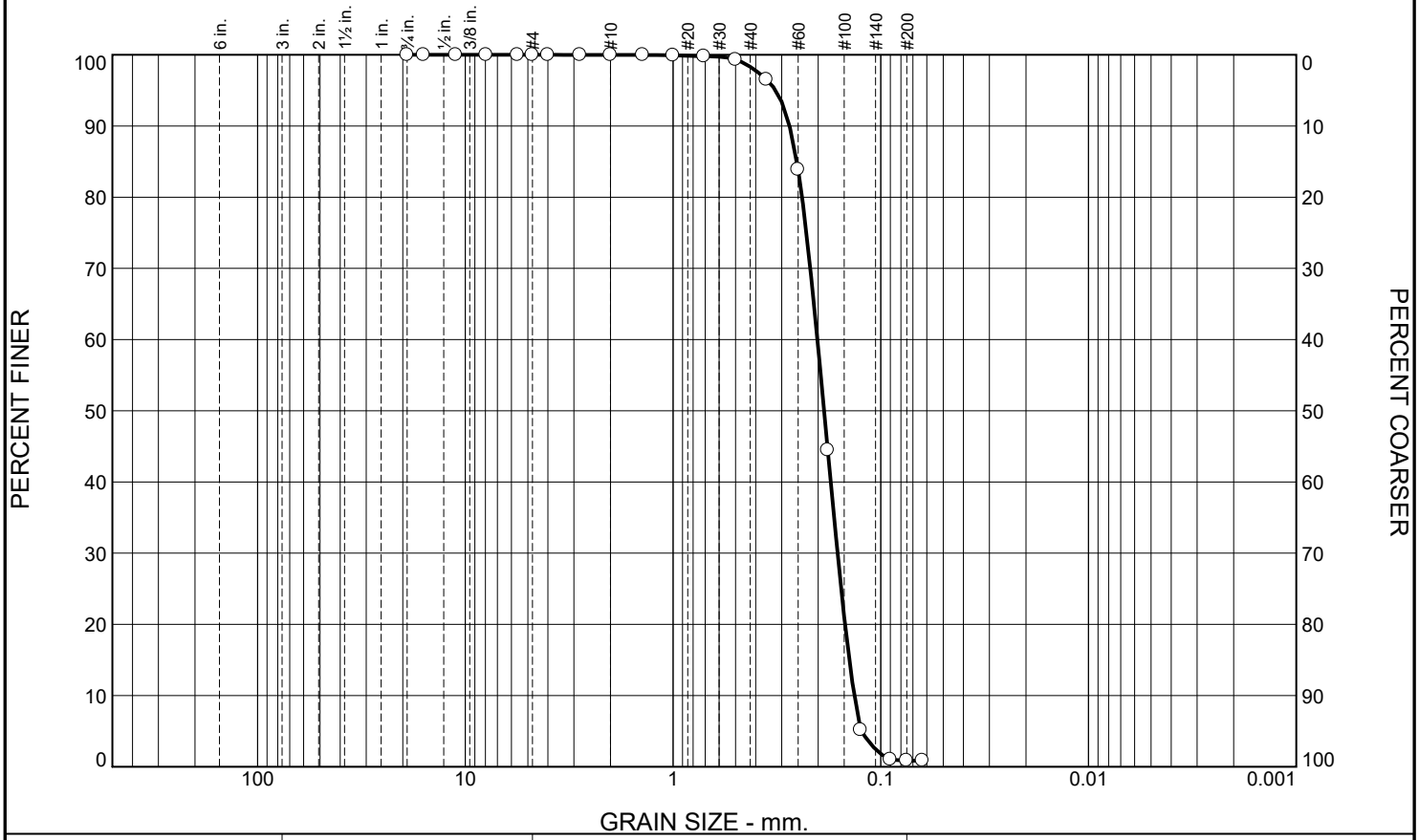
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.7	97.4	0.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	99.9		
#25	99.8		
#35	99.3		
#45	96.5		
#60	83.9		
#80	44.5		
#120	5.2		
#170	1.0		
#200	0.9		
#230	0.9		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2749 D_{85}= 0.2537 D_{60}= 0.2017
D_{50}= 0.1874 D_{30}= 0.1615 D_{15}= 0.1417
D_{10}= 0.1341 C_u= 1.50 C_c= 0.96

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.86

Source of Sample: SBSS 4
Sample Number: SBSS 4.6

Date: 7/17/18

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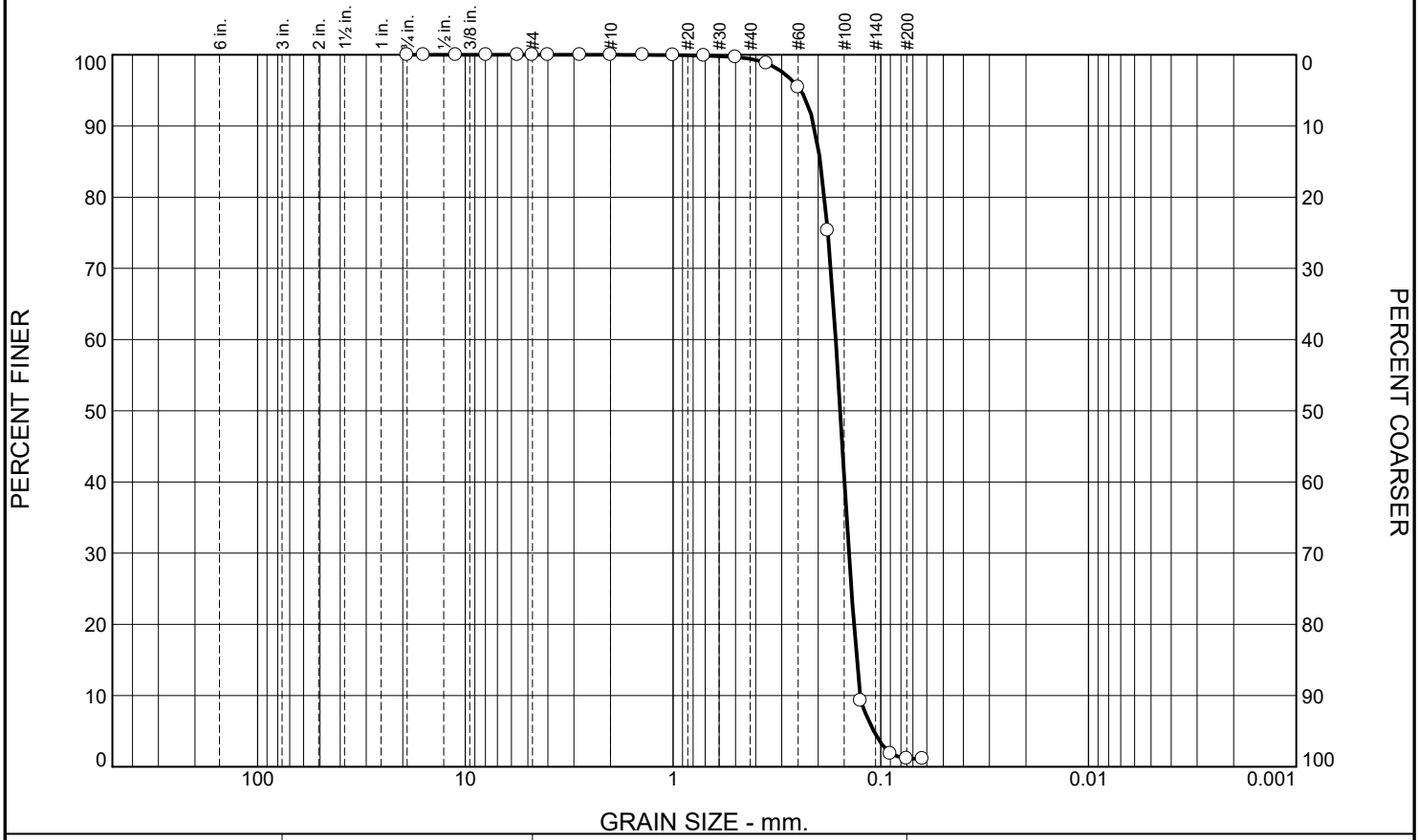
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.6	98.2	1.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	99.9		
#35	99.7		
#45	98.8		
#60	95.4		
#80	75.3		
#120	9.3		
#170	1.8		
#200	1.2		
#230	1.1		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2092 D_{85}= 0.1954 D_{60}= 0.1648
D_{50}= 0.1568 D_{30}= 0.1422 D_{15}= 0.1305
D_{10}= 0.1258 C_u= 1.31 C_c= 0.98

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.62

Source of Sample: SBSS 4
Sample Number: SBSS 4.7

Date: 7/17/18

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Wilmington, NC 28405
Phone: (910) 686-9114
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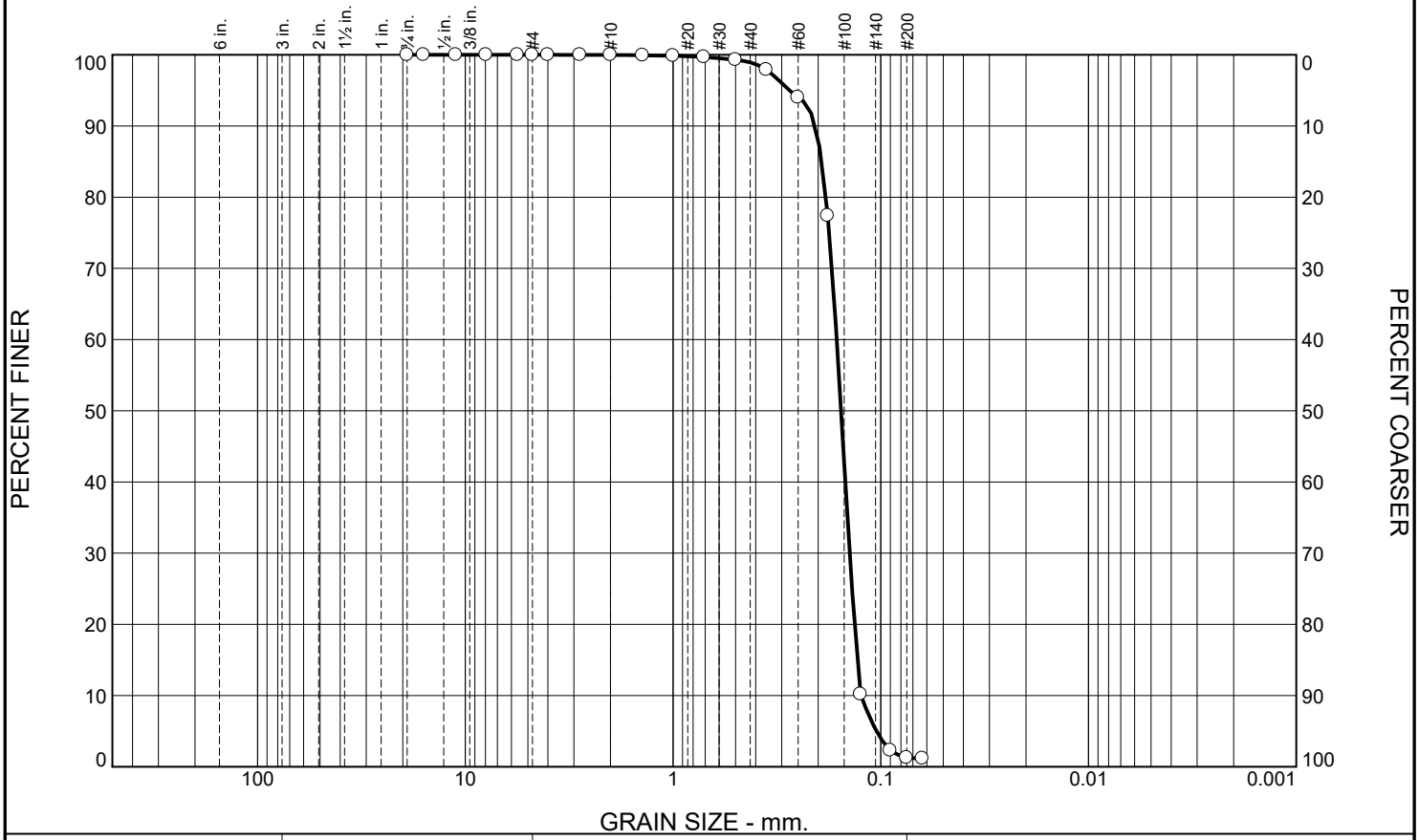
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.1	97.6	1.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	99.9		
#18	99.9		
#25	99.7		
#35	99.3		
#45	97.9		
#60	94.0		
#80	77.4		
#120	10.2		
#170	2.3		
#200	1.3		
#230	1.2		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2067 D_{85}= 0.1923 D_{60}= 0.1629
D_{50}= 0.1552 D_{30}= 0.1410 D_{15}= 0.1296
D_{10}= 0.1244 C_u= 1.31 C_c= 0.98

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.62

Source of Sample: SBSS 4
Sample Number: SBSS 4.TROUGH

Date: 7/17/18

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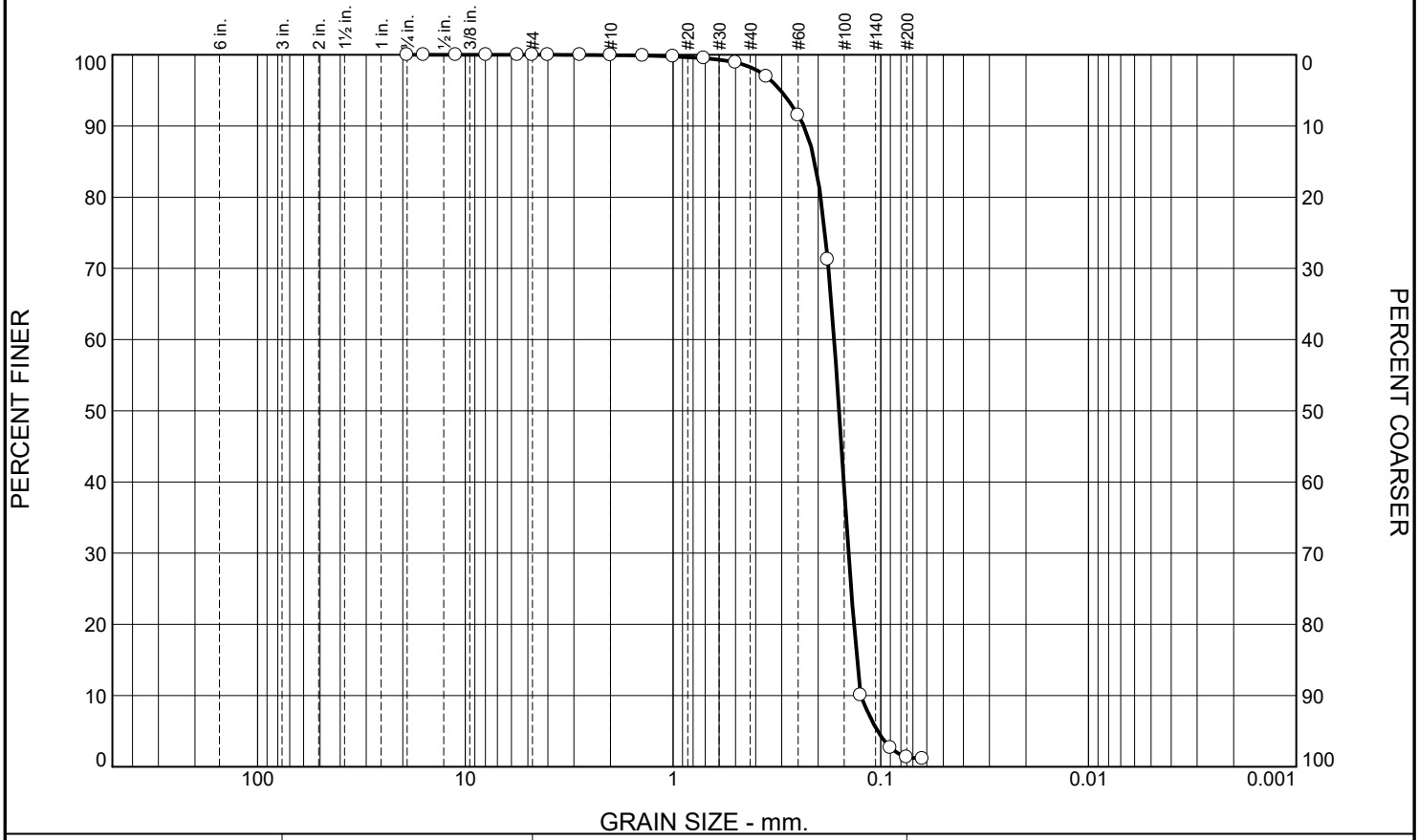
Fax: (910) 686-9666

Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.6	97.0	1.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	99.9		
#14	99.9		
#18	99.8		
#25	99.5		
#35	98.9		
#45	96.9		
#60	91.5		
#80	71.3		
#120	10.1		
#170	2.6		
#200	1.3		
#230	1.1		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2345 D_{85}= 0.2078 D_{60}= 0.1676
D_{50}= 0.1587 D_{30}= 0.1428 D_{15}= 0.1302
D_{10}= 0.1248 C_u= 1.34 C_c= 0.98

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.67

Source of Sample: SBSS 4
Sample Number: SBSS 4.CREST

Date: 7/17/18

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Wilmington, NC 28405
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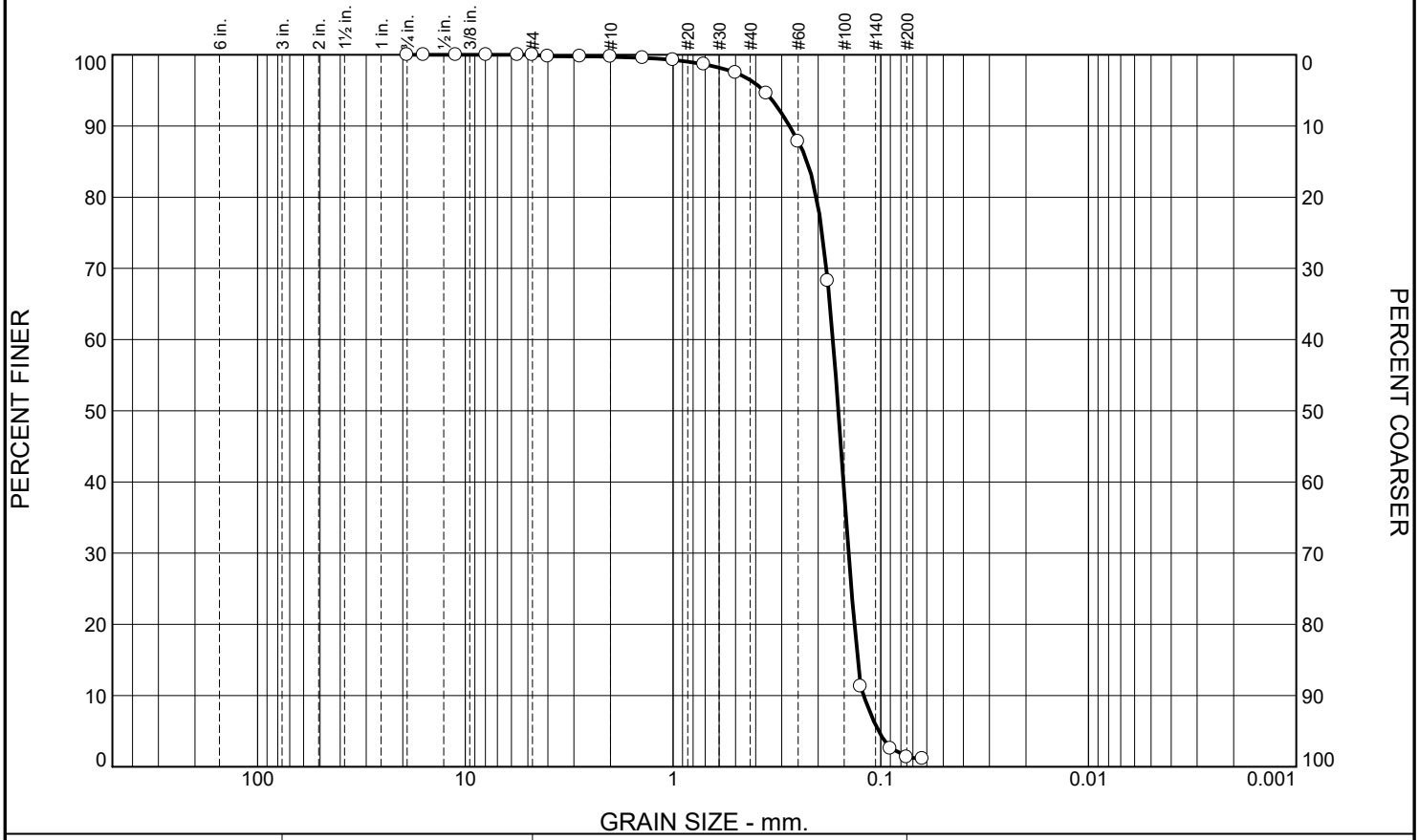
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	3.2	95.2	1.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	99.8		
#7	99.8		
#10	99.7		
#14	99.6		
#18	99.3		
#25	98.7		
#35	97.5		
#45	94.6		
#60	87.8		
#80	68.3		
#120	11.3		
#170	2.6		
#200	1.3		
#230	1.1		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2750 D_{85}= 0.2260 D_{60}= 0.1699
D_{50}= 0.1600 D_{30}= 0.1428 D_{15}= 0.1292
D_{10}= 0.1208 C_u= 1.41 C_c= 0.99

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.72

Source of Sample: SBSS 4
Sample Number: SBSS 4.106

Date: 7/17/18

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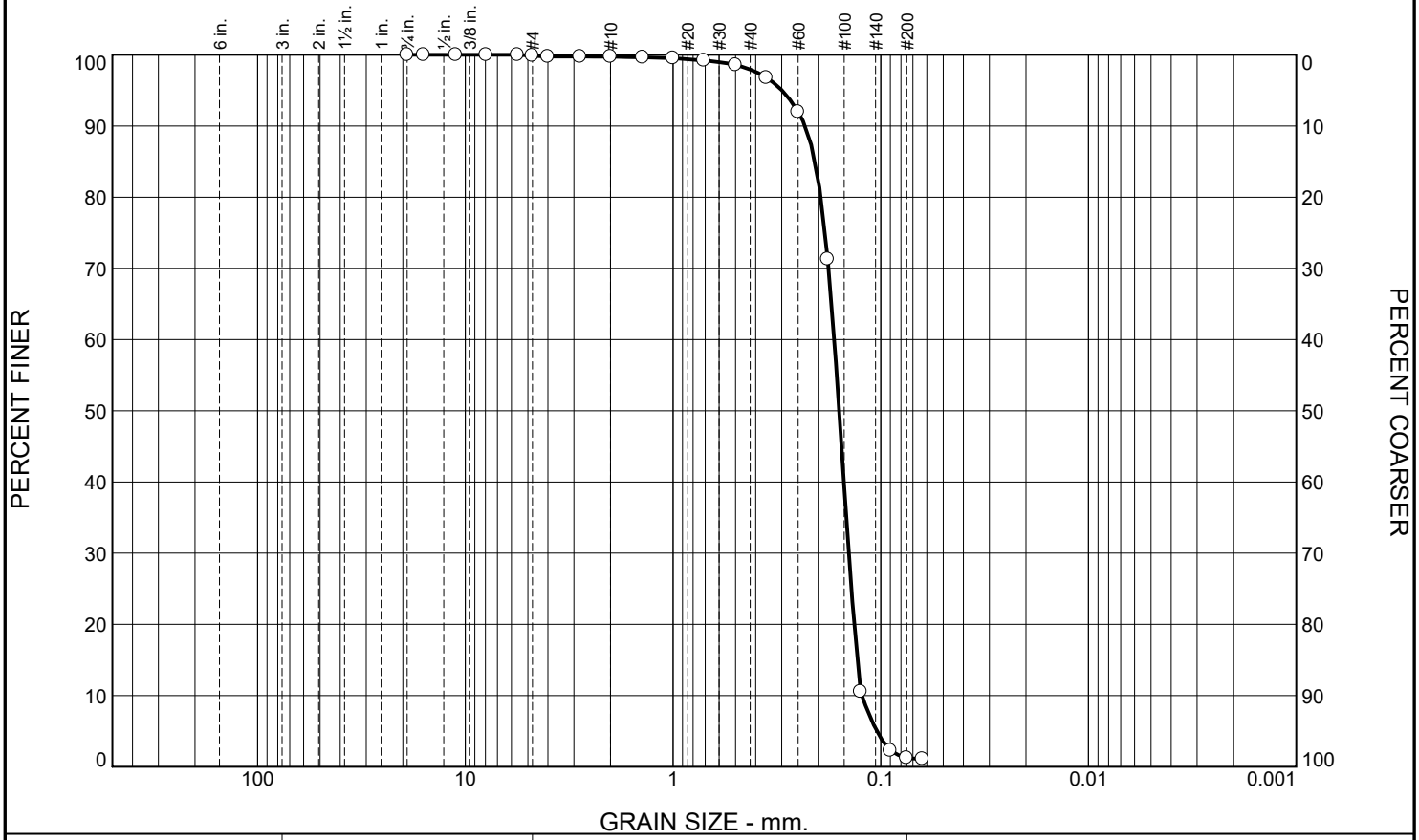
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.2	1.8	96.7	1.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	99.9		
#5	99.8		
#7	99.8		
#10	99.7		
#14	99.6		
#18	99.5		
#25	99.2		
#35	98.6		
#45	96.8		
#60	92.0		
#80	71.3		
#120	10.5		
#170	2.3		
#200	1.2		
#230	1.1		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2312 D_{85}= 0.2072 D_{60}= 0.1675
D_{50}= 0.1586 D_{30}= 0.1425 D_{15}= 0.1297
D_{10}= 0.1232 C_u= 1.36 C_c= 0.98

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.67

Source of Sample: SBSS 4
Sample Number: SBSS 4.109.5

Date: 7/17/18

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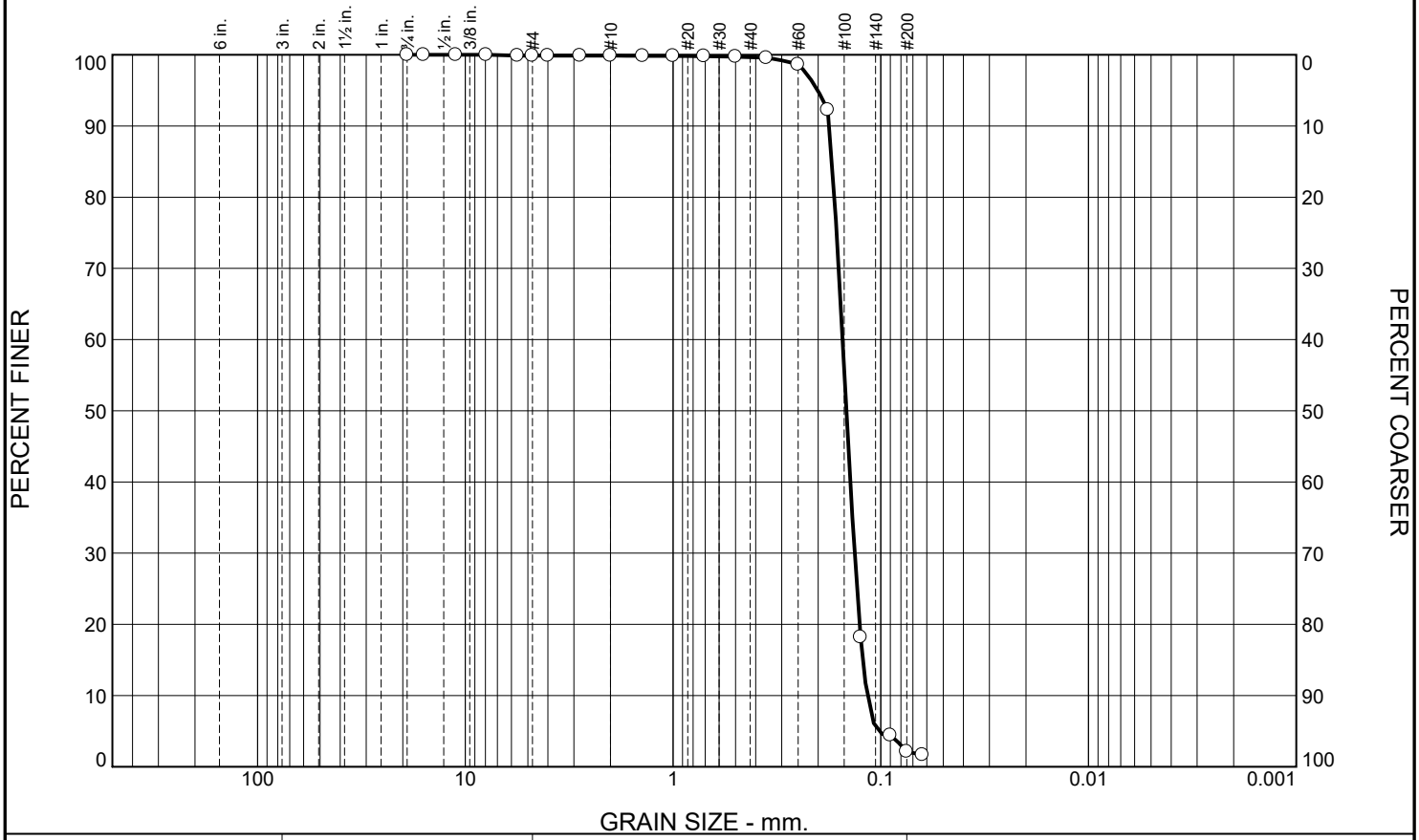
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.0	0.2	97.6	2.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	99.9		
#4	99.9		
#5	99.9		
#7	99.9		
#10	99.9		
#14	99.9		
#18	99.8		
#25	99.8		
#35	99.7		
#45	99.6		
#60	98.6		
#80	92.3		
#120	18.2		
#170	4.4		
#200	2.1		
#230	1.7		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1771 D_{85}= 0.1717 D_{60}= 0.1526
D_{50}= 0.1463 D_{30}= 0.1337 D_{15}= 0.1220
D_{10}= 0.1160 C_u= 1.32 C_c= 1.01

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.45

Source of Sample: SBSS 4
Sample Number: SBSS 4.113

Date: 7/17/18

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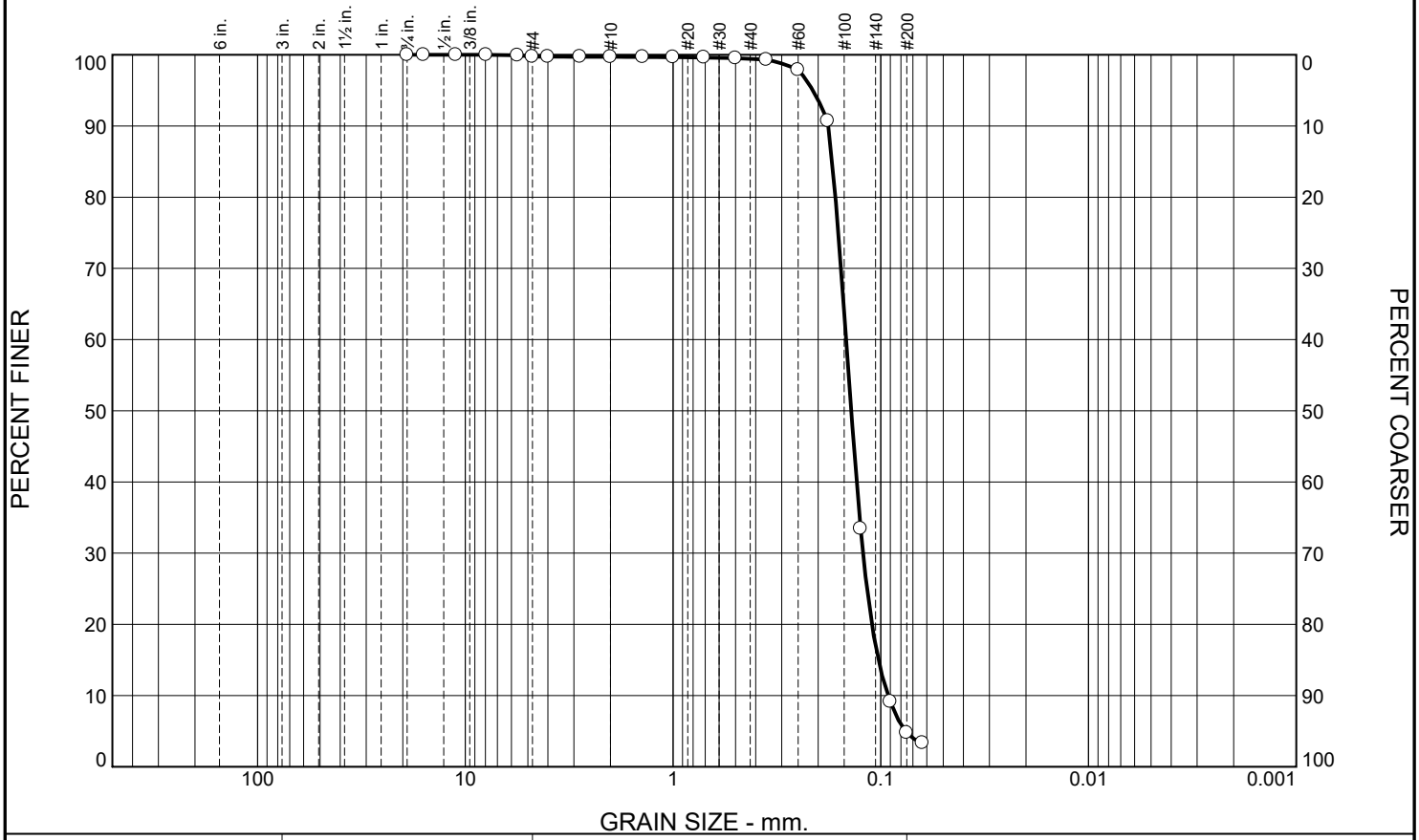
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.1	0.3	94.6	4.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	99.9		
#4	99.8		
#5	99.7		
#7	99.7		
#10	99.7		
#14	99.7		
#18	99.7		
#25	99.6		
#35	99.5		
#45	99.3		
#60	97.9		
#80	90.7		
#120	33.5		
#170	9.1		
#200	4.8		
#230	3.4		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1787 D_{85}= 0.1713 D_{60}= 0.1467
D_{50}= 0.1387 D_{30}= 0.1217 D_{15}= 0.1028
D_{10}= 0.0922 C_u= 1.59 C_c= 1.10

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.39

Source of Sample: SBSS 4
Sample Number: SBSS 4.116.5

Date: 7/17/18

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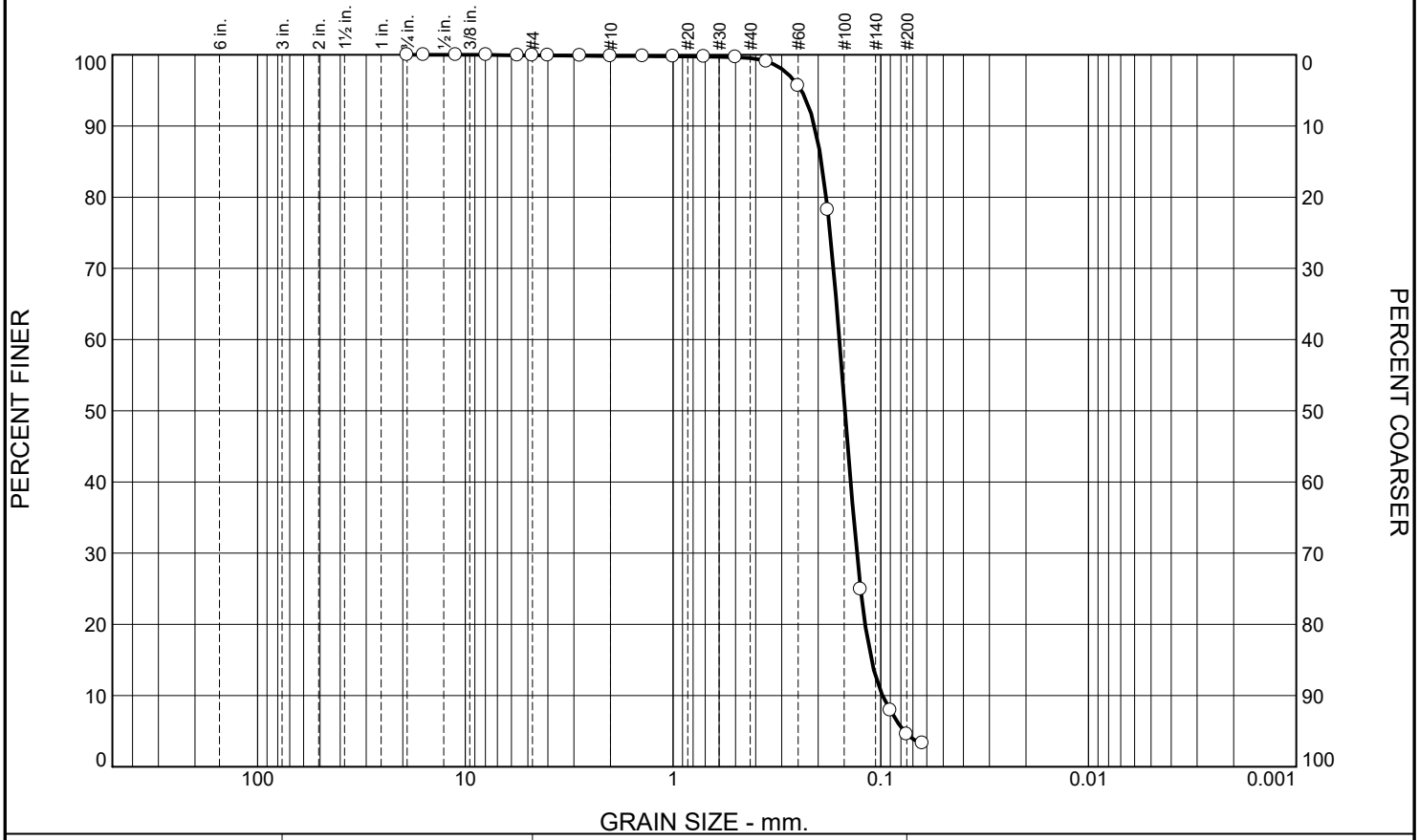
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.1	0.3	94.9	4.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	99.9		
#4	99.9		
#5	99.9		
#7	99.9		
#10	99.8		
#14	99.8		
#18	99.8		
#25	99.7		
#35	99.7		
#45	99.1		
#60	95.7		
#80	78.2		
#120	24.9		
#170	7.9		
#200	4.6		
#230	3.3		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2082 D_{85}= 0.1930 D_{60}= 0.1582
D_{50}= 0.1487 D_{30}= 0.1303 D_{15}= 0.1109
D_{10}= 0.0982 C_u= 1.61 C_c= 1.09

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.51

Source of Sample: SBSS 4
Sample Number: SBSS 4.120

Date: 7/17/18

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Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

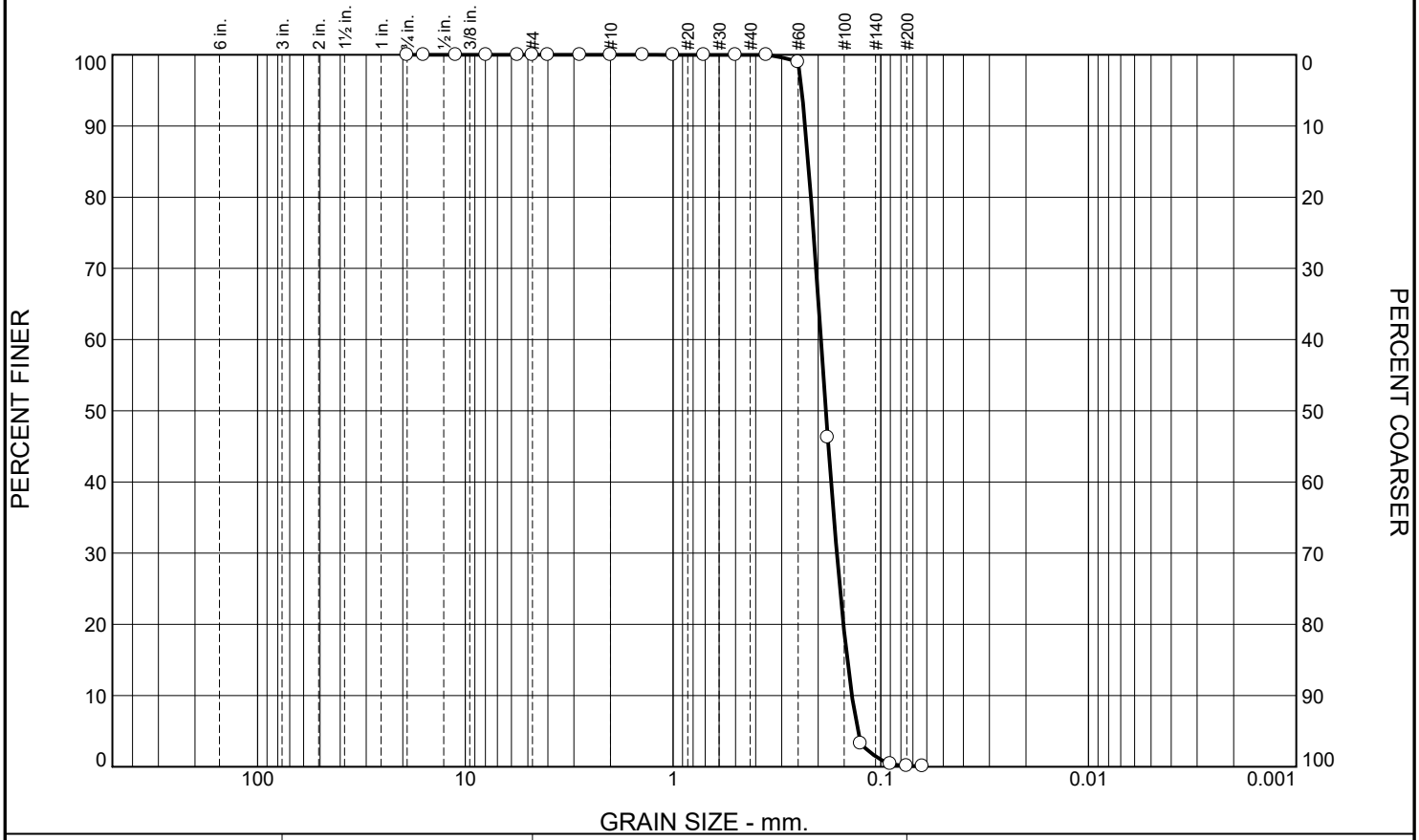
Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

PROFILE 8+00

PARTICLE SIZE DISTRIBUTION REPORTS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	99.9	0.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	100.0		
#35	100.0		
#45	100.0		
#60	99.0		
#80	46.3		
#120	3.3		
#170	0.4		
#200	0.1		
#230	0.1		

* (no specification provided)

Soil Description

Light Gray (10YR 7/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2311 D_{85}= 0.2235 D_{60}= 0.1940
D_{50}= 0.1838 D_{30}= 0.1628 D_{15}= 0.1448
D_{10}= 0.1377 C_u= 1.41 C_c= 0.99

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.81

Source of Sample: SBSS 8
Sample Number: SBSS 8.1

Date: 7/18/18

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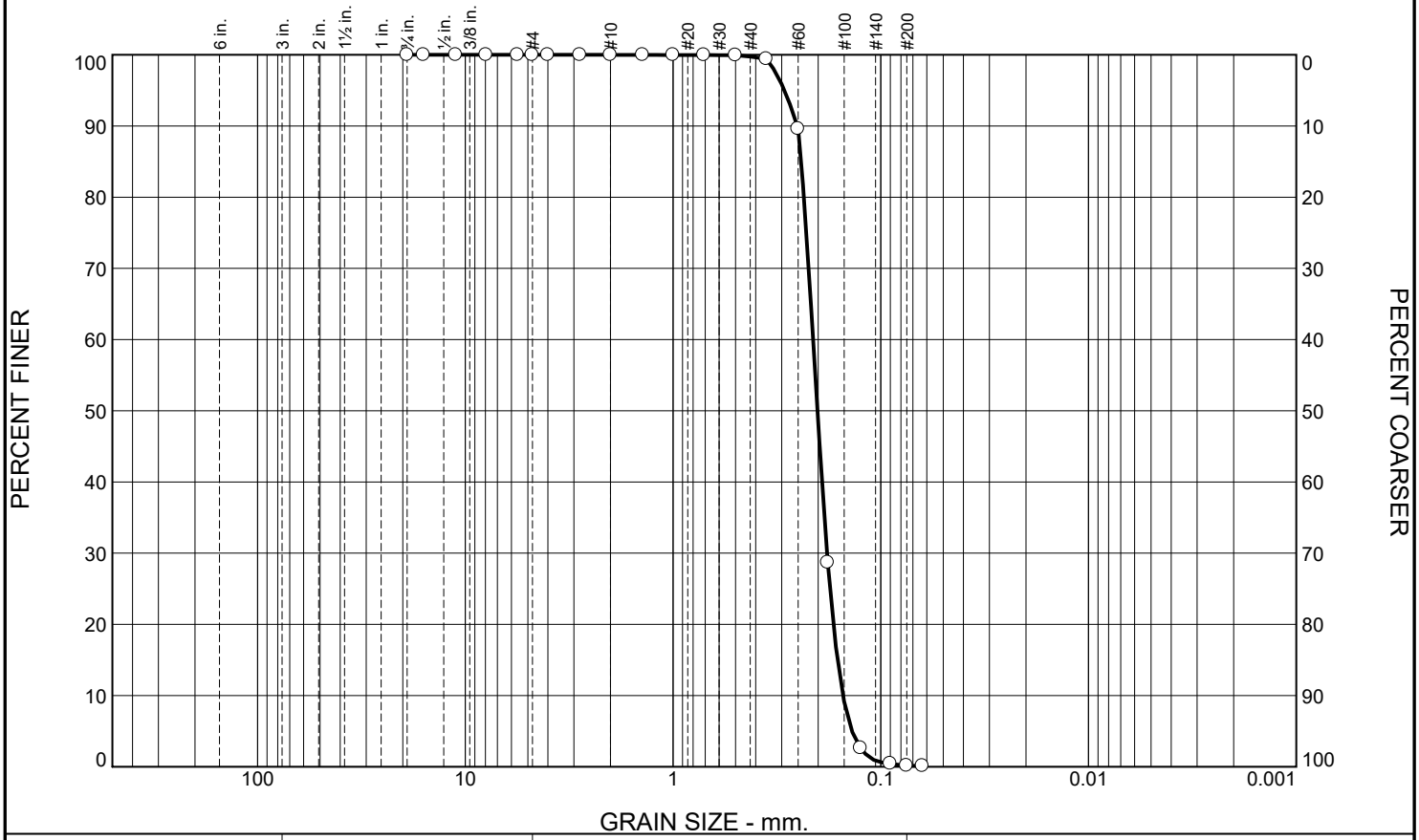
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.3	99.6	0.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	100.0		
#35	99.9		
#45	99.4		
#60	89.6		
#80	28.7		
#120	2.6		
#170	0.4		
#200	0.1		
#230	0.1		

* (no specification provided)

Soil Description

Light Gray (10YR 7/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2523 D_{85}= 0.2418 D_{60}= 0.2115
D_{50}= 0.2016 D_{30}= 0.1815 D_{15}= 0.1616
D_{10}= 0.1520 C_u= 1.39 C_c= 1.02

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.95

Source of Sample: SBSS 8
Sample Number: SBSS 8.2

Date: 7/18/18

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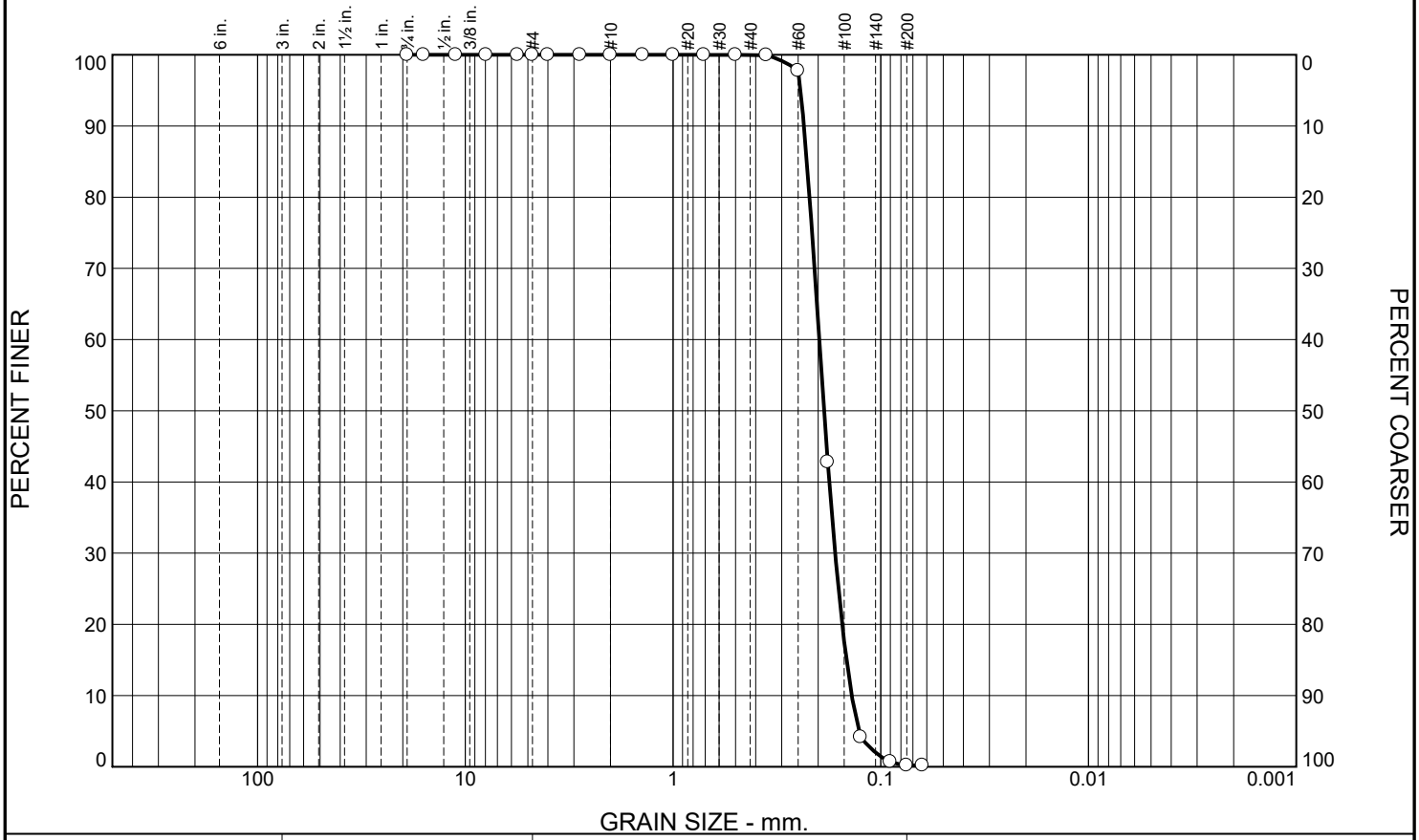
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	99.8	0.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	100.0		
#35	100.0		
#45	99.9		
#60	97.8		
#80	42.8		
#120	4.2		
#170	0.7		
#200	0.2		
#230	0.2		

* (no specification provided)

Soil Description

Light Gray (10YR 7/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2343 D_{85}= 0.2267 D_{60}= 0.1976
D_{50}= 0.1874 D_{30}= 0.1659 D_{15}= 0.1462
D_{10}= 0.1380 C_u= 1.43 C_c= 1.01

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.83

Source of Sample: SBSS 8
Sample Number: SBSS 8.3

Date: 7/18/18

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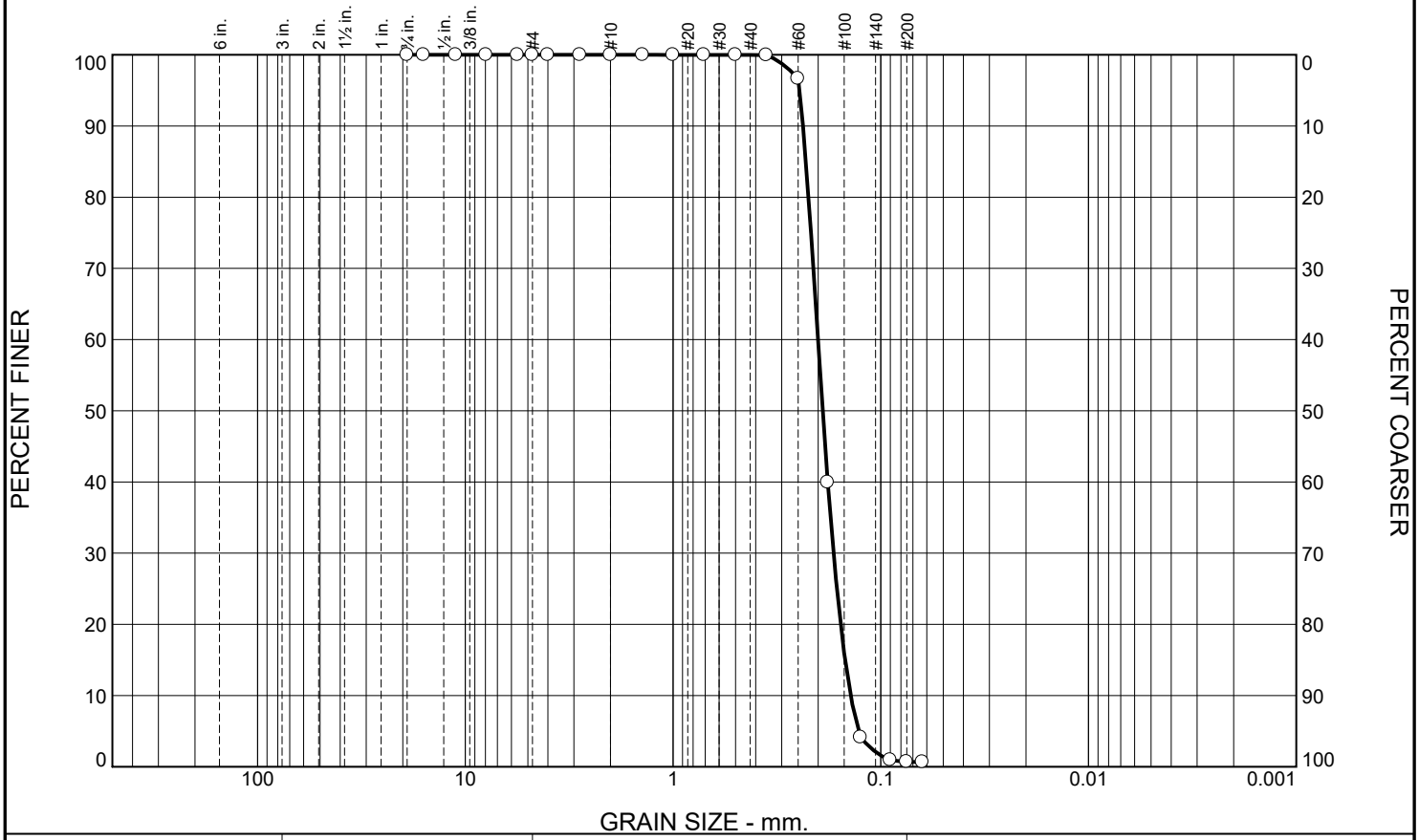
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	99.3	0.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	100.0		
#35	100.0		
#45	100.0		
#60	96.7		
#80	39.9		
#120	4.1		
#170	0.9		
#200	0.7		
#230	0.7		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2368 D_{85}= 0.2292 D_{60}= 0.2003
D_{50}= 0.1903 D_{30}= 0.1689 D_{15}= 0.1485
D_{10}= 0.1396 C_u= 1.44 C_c= 1.02

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.85

Source of Sample: SBSS 8
Sample Number: SBSS 8.4

Date: 7/18/18

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Phone: (910) 686-9114
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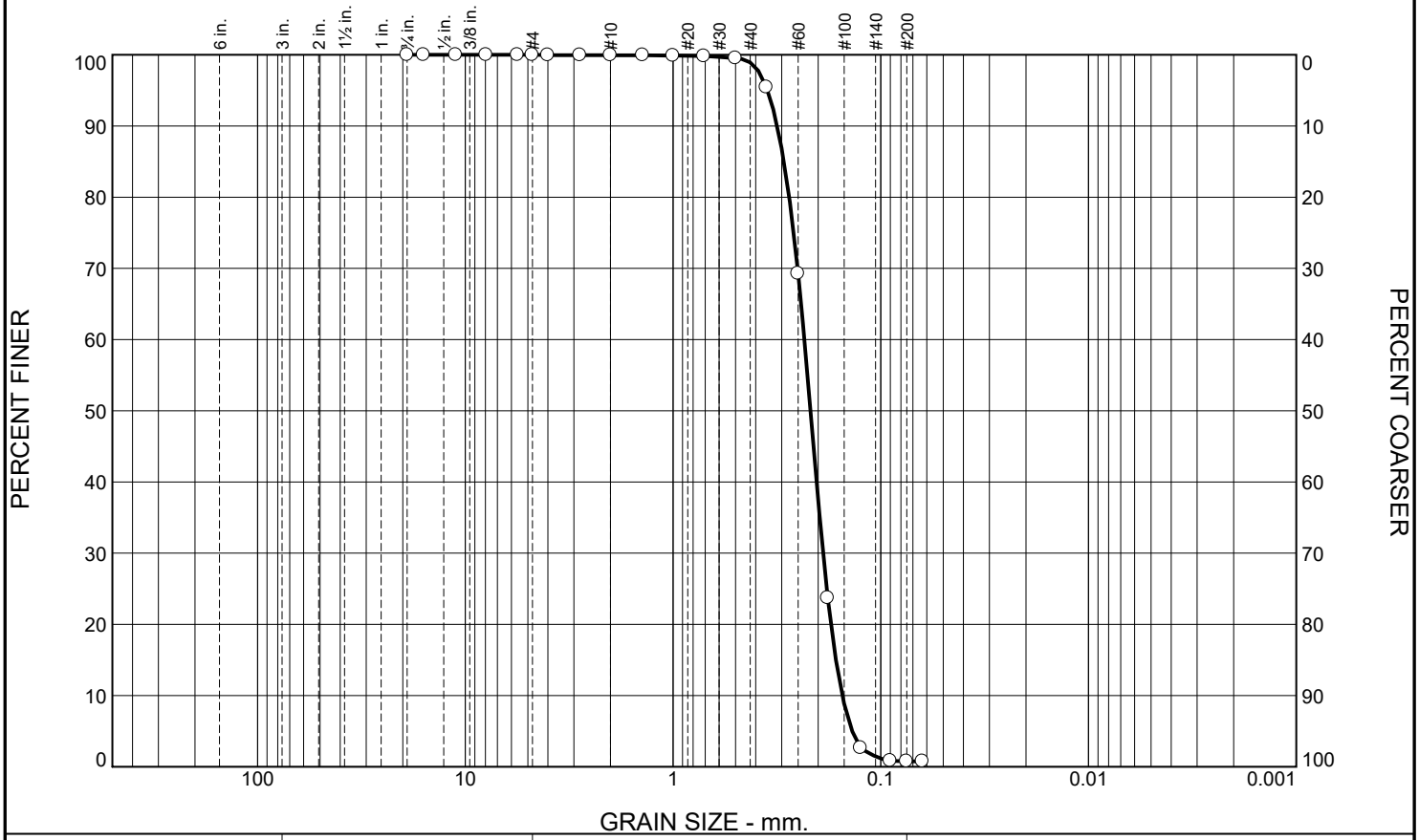
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.0	98.1	0.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	99.9		
#10	99.9		
#14	99.9		
#18	99.9		
#25	99.8		
#35	99.5		
#45	95.4		
#60	69.3		
#80	23.7		
#120	2.6		
#170	0.8		
#200	0.8		
#230	0.8		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3150 D_{85}= 0.2926 D_{60}= 0.2332
D_{50}= 0.2178 D_{30}= 0.1895 D_{15}= 0.1645
D_{10}= 0.1531 C_u= 1.52 C_c= 1.01

Classification

USCS= SP AASHTO=

Remarks

F.M.=1.05

Source of Sample: SBSS 8
Sample Number: SBSS 8.5

Date: 7/18/18

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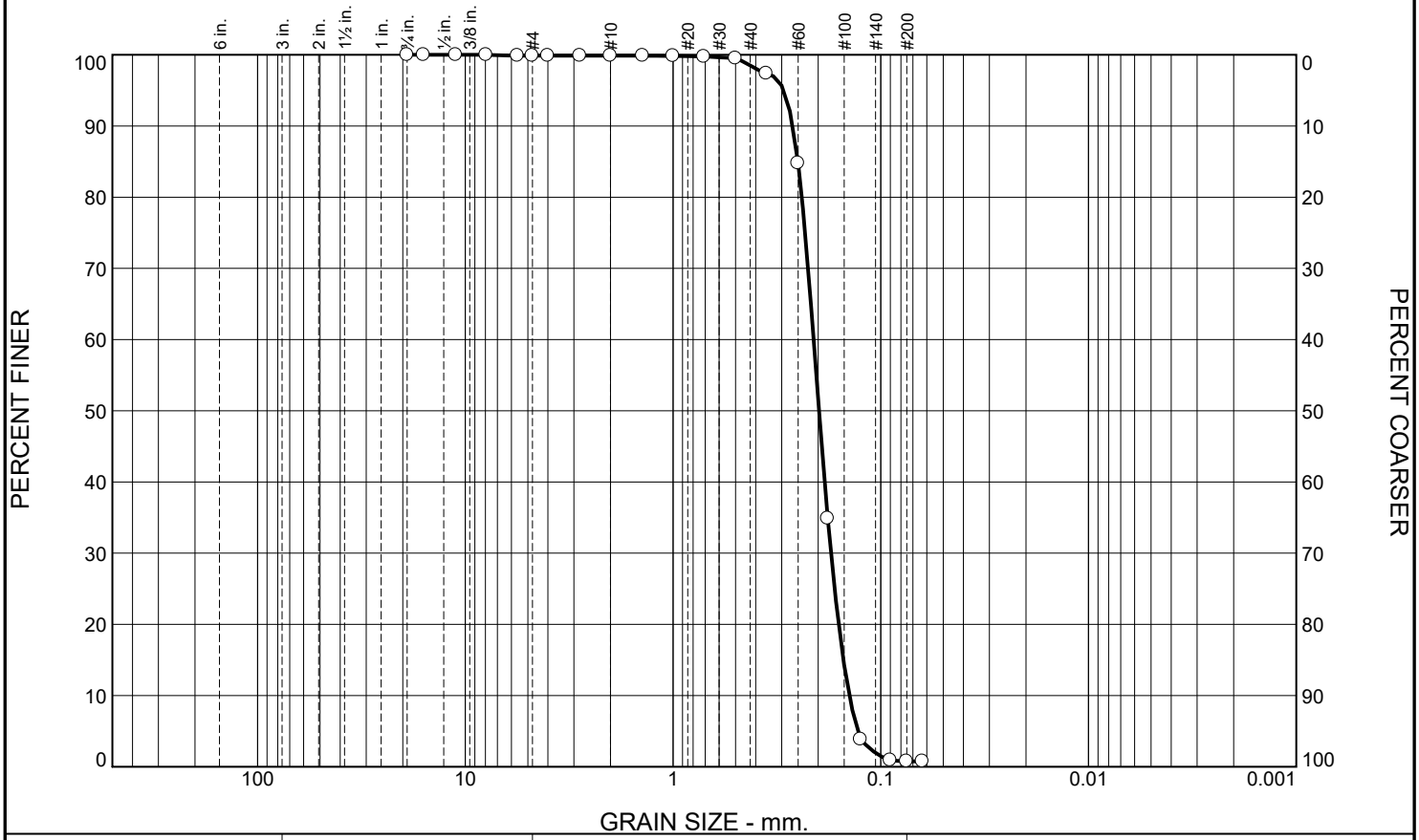
Fax: (910) 686-9666

Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.0	1.4	97.7	0.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	99.9		
#4	99.9		
#5	99.9		
#7	99.9		
#10	99.9		
#14	99.9		
#18	99.8		
#25	99.8		
#35	99.5		
#45	97.4		
#60	84.8		
#80	34.9		
#120	3.8		
#170	0.9		
#200	0.8		
#230	0.8		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2652 D_{85}= 0.2505 D_{60}= 0.2103
D_{50}= 0.1981 D_{30}= 0.1738 D_{15}= 0.1513
D_{10}= 0.1416 C_u= 1.48 C_c= 1.01

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.91

Source of Sample: SBSS 8
Sample Number: SBSS 8.6

Date: 7/18/18

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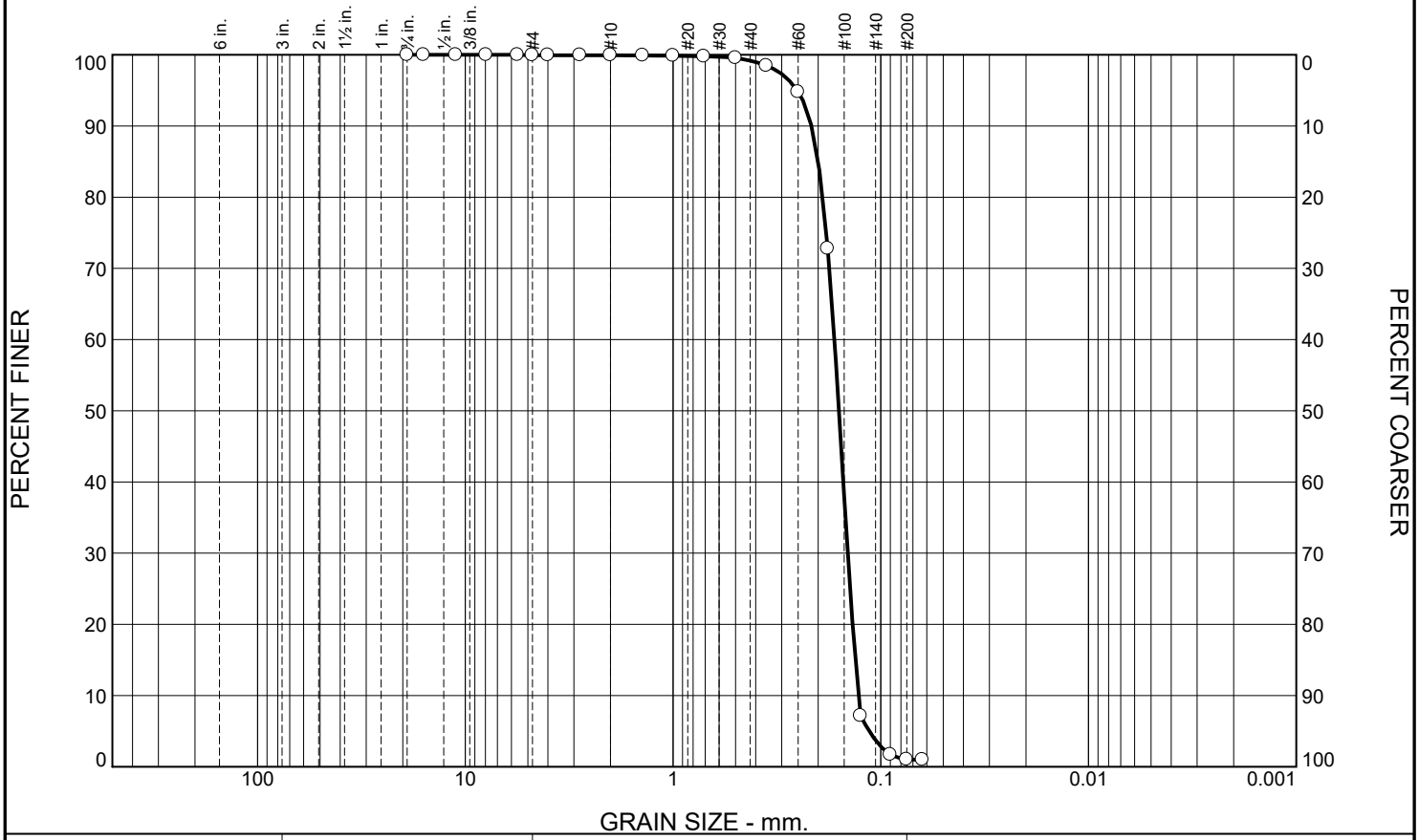
Wilmington, NC 28405
Phone: (910) 686-9114
Fax: (910) 686-9666

Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.0	0.7	98.2	1.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	99.9		
#5	99.9		
#7	99.9		
#10	99.9		
#14	99.9		
#18	99.9		
#25	99.8		
#35	99.5		
#45	98.5		
#60	94.8		
#80	72.8		
#120	7.2		
#170	1.7		
#200	1.0		
#230	1.0		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2155 D_{85}= 0.2001 D_{60}= 0.1672
D_{50}= 0.1590 D_{30}= 0.1441 D_{15}= 0.1326
D_{10}= 0.1280 C_u= 1.31 C_c= 0.97

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.65

Source of Sample: SBSS 8
Sample Number: SBSS 8.7

Date: 7/18/18

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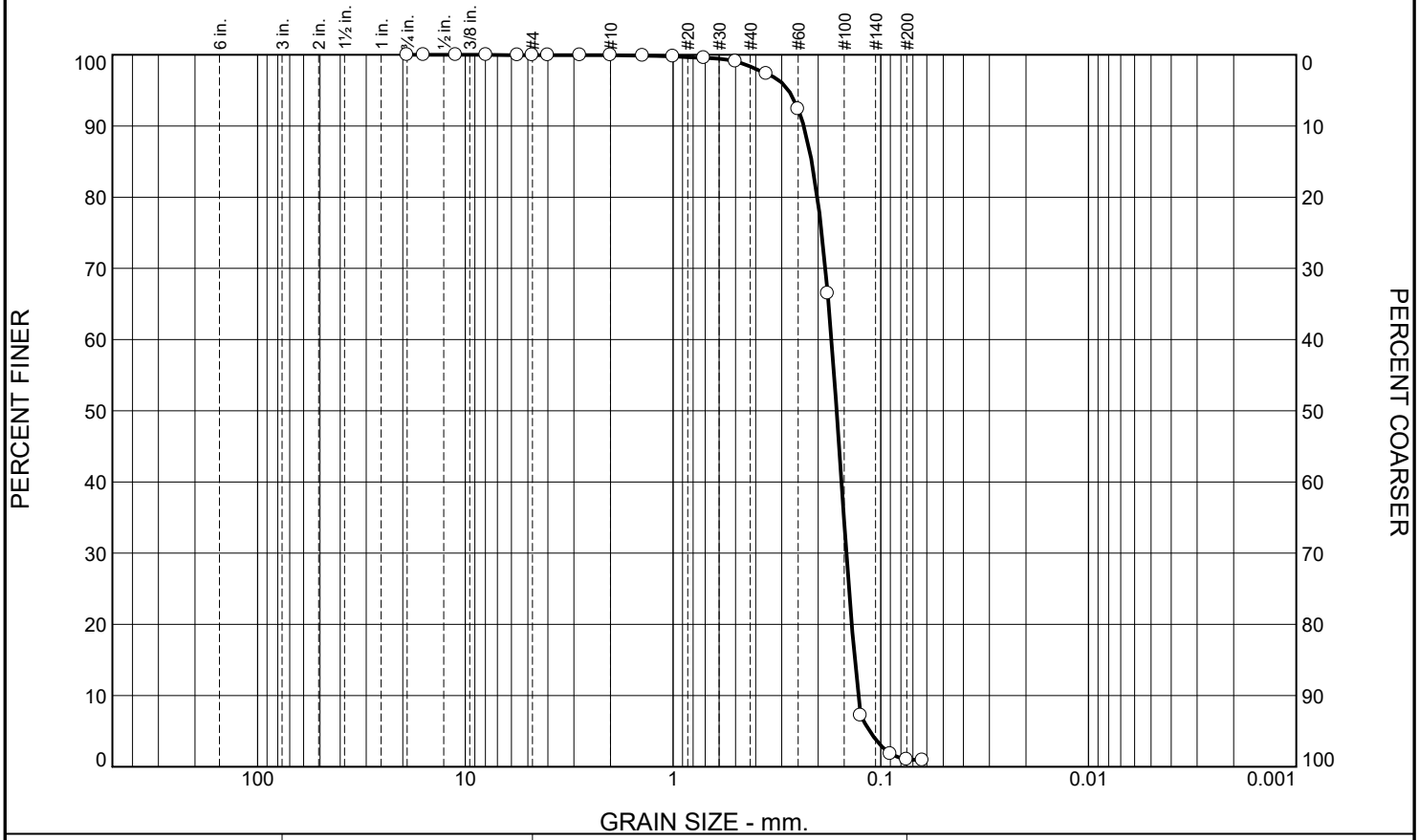
Fax: (910) 686-9666

Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.0	1.5	97.4	1.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	99.9		
#4	99.9		
#5	99.9		
#7	99.9		
#10	99.9		
#14	99.9		
#18	99.8		
#25	99.6		
#35	99.1		
#45	97.3		
#60	92.4		
#80	66.5		
#120	7.2		
#170	1.8		
#200	1.0		
#230	0.9		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2347 D_{85}= 0.2147 D_{60}= 0.1727
D_{50}= 0.1631 D_{30}= 0.1463 D_{15}= 0.1334
D_{10}= 0.1283 C_u= 1.35 C_c= 0.97

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.70

Source of Sample: SBSS 8
Sample Number: SBSS 8.TROUGH

Date: 7/18/18

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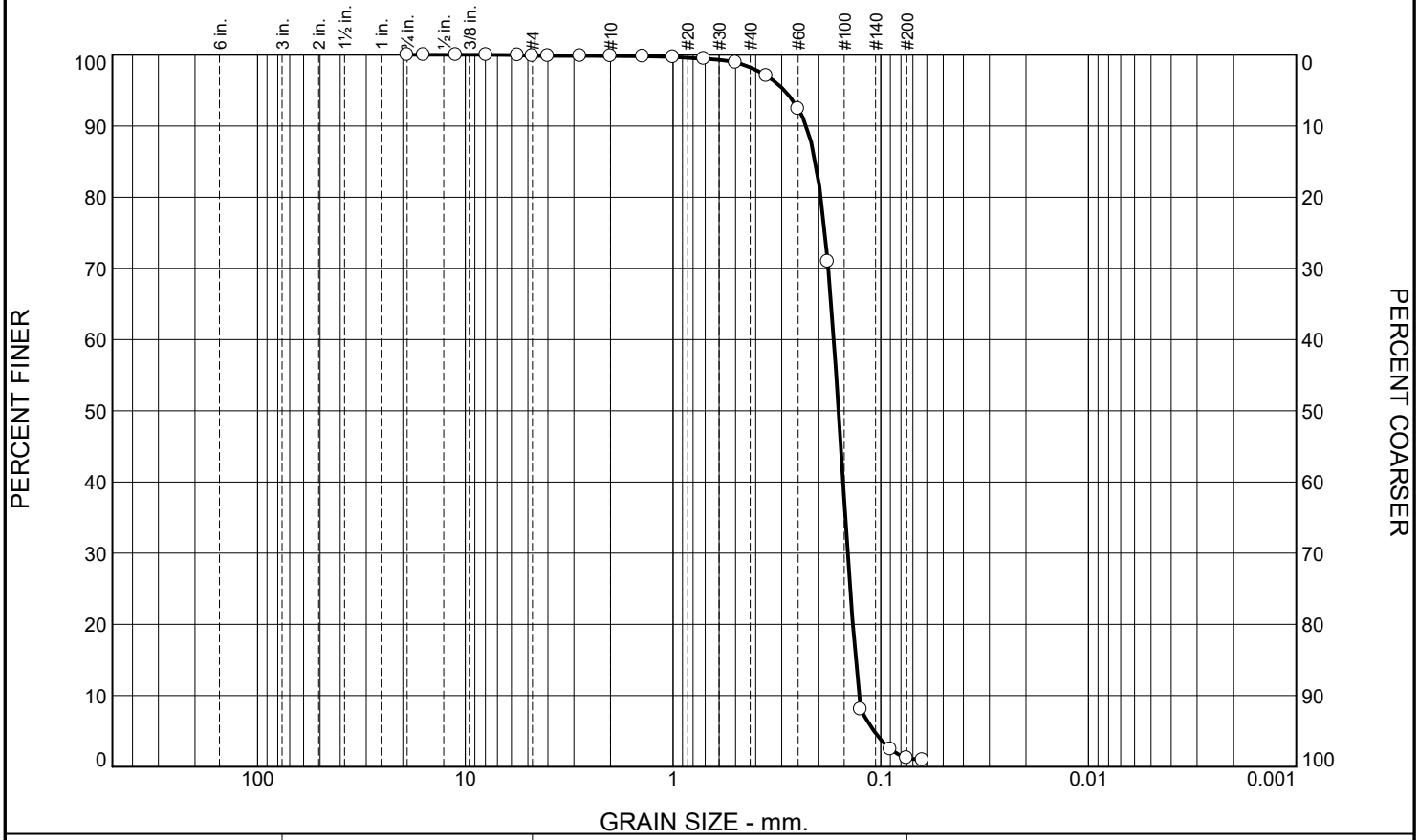
Phone: (910) 686-9114
Fax: (910) 686-9666

Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.0	1.6	97.0	1.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	99.8		
#5	99.8		
#7	99.8		
#10	99.8		
#14	99.8		
#18	99.7		
#25	99.4		
#35	98.9		
#45	97.0		
#60	92.4		
#80	70.9		
#120	8.1		
#170	2.5		
#200	1.2		
#230	0.9		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2282 D_{85}= 0.2063 D_{60}= 0.1684
D_{50}= 0.1597 D_{30}= 0.1442 D_{15}= 0.1321
D_{10}= 0.1272 C_u= 1.32 C_c= 0.97

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.68

Source of Sample: SBSS 8
Sample Number: SBSS 8.CREST

Date: 7/18/18

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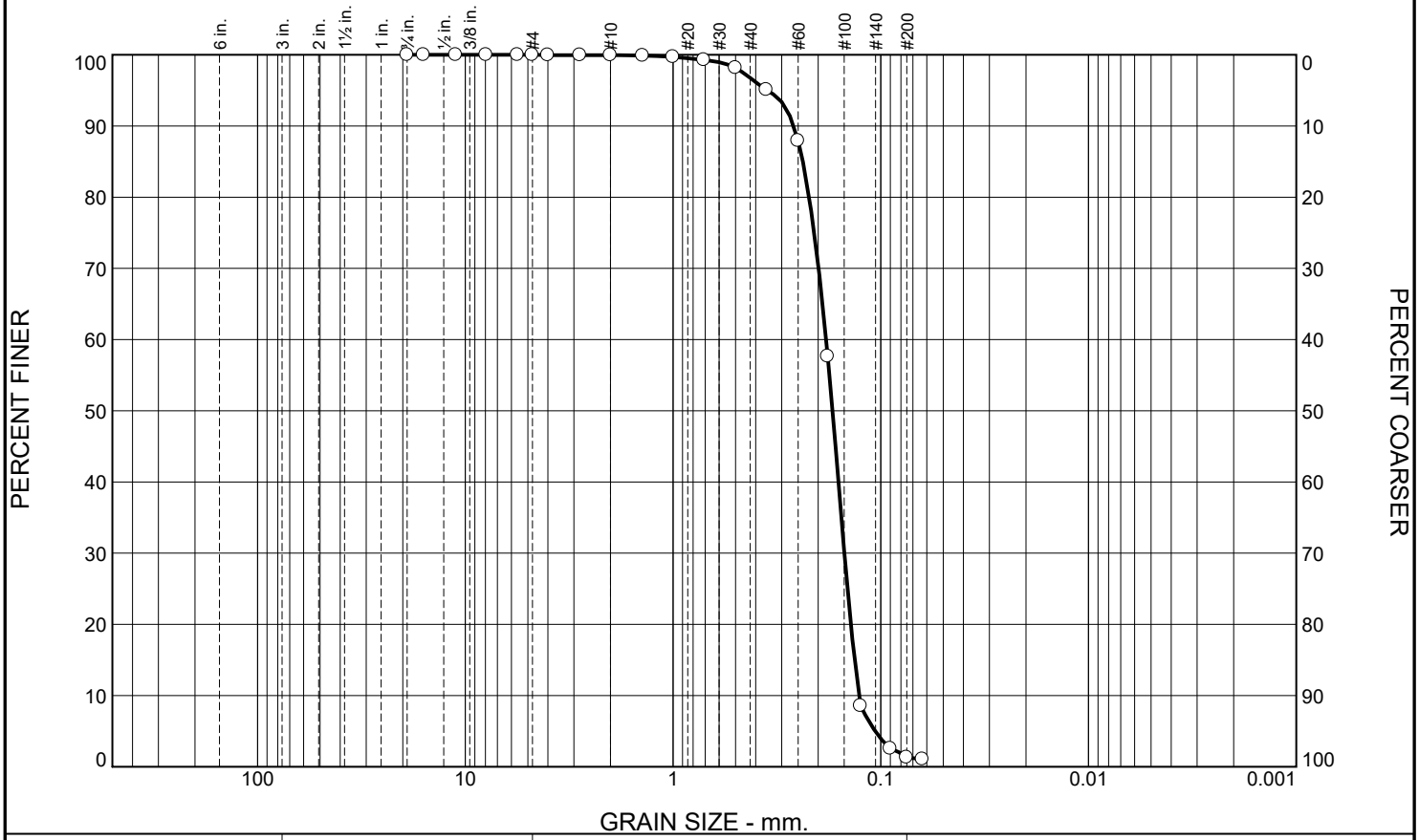
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	3.2	95.5	1.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	99.9		
#18	99.7		
#25	99.3		
#35	98.2		
#45	95.1		
#60	87.9		
#80	57.6		
#120	8.5		
#170	2.5		
#200	1.3		
#230	1.0		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2625 D_{85}= 0.2372 D_{60}= 0.1832
D_{50}= 0.1707 D_{30}= 0.1496 D_{15}= 0.1337
D_{10}= 0.1272 C_u= 1.44 C_c= 0.96

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.78

Source of Sample: SBSS 8
Sample Number: SBSS 8.106

Date: 7/18/18

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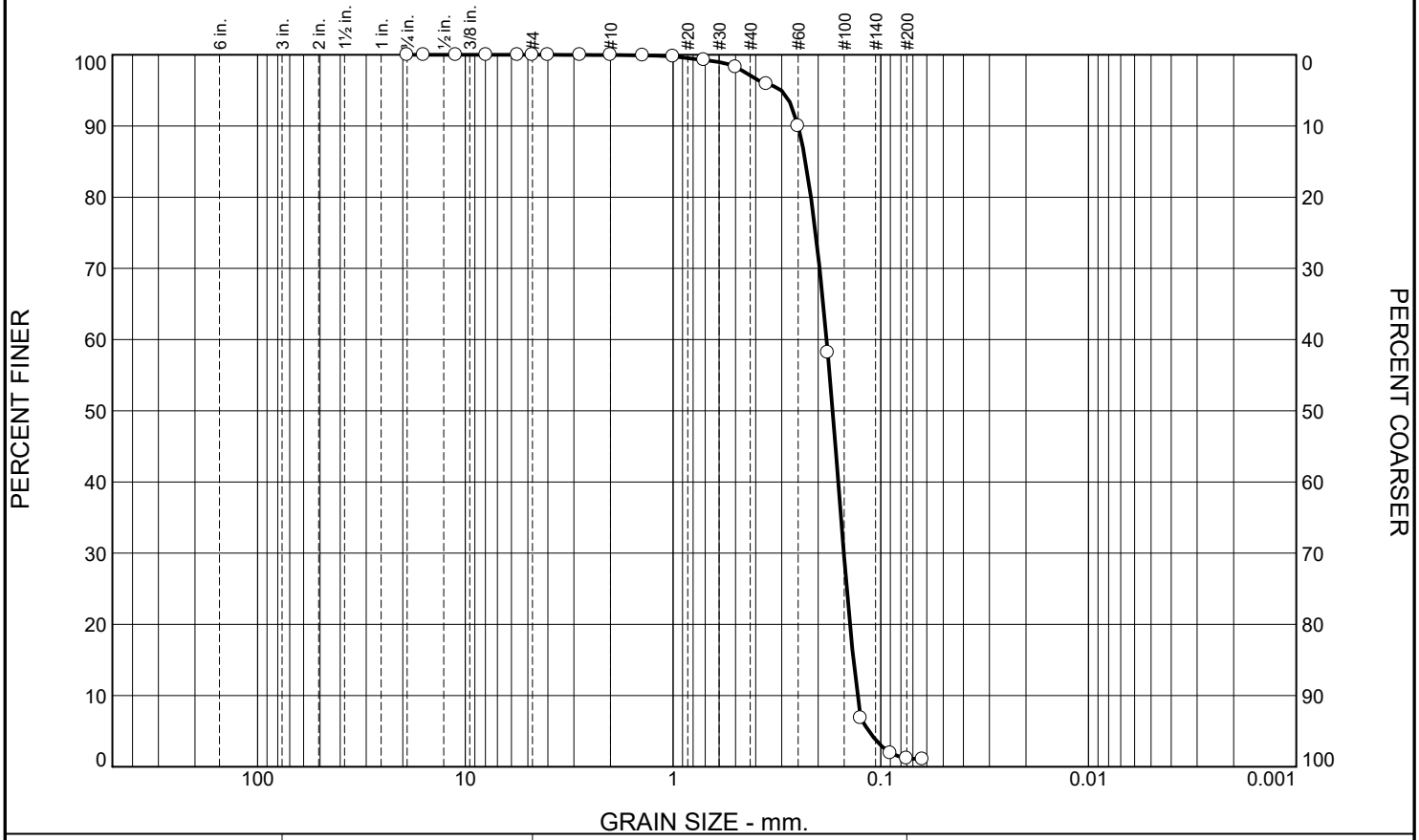
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	2.9	95.9	1.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	99.9		
#18	99.8		
#25	99.3		
#35	98.3		
#45	95.9		
#60	90.0		
#80	58.2		
#120	6.8		
#170	1.9		
#200	1.2		
#230	1.0		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2501 D_{85}= 0.2303 D_{60}= 0.1823
D_{50}= 0.1705 D_{30}= 0.1505 D_{15}= 0.1354
D_{10}= 0.1295 C_u= 1.41 C_c= 0.96

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.77

Source of Sample: SBSS 8
Sample Number: SBSS 8.109.5

Date: 7/18/18

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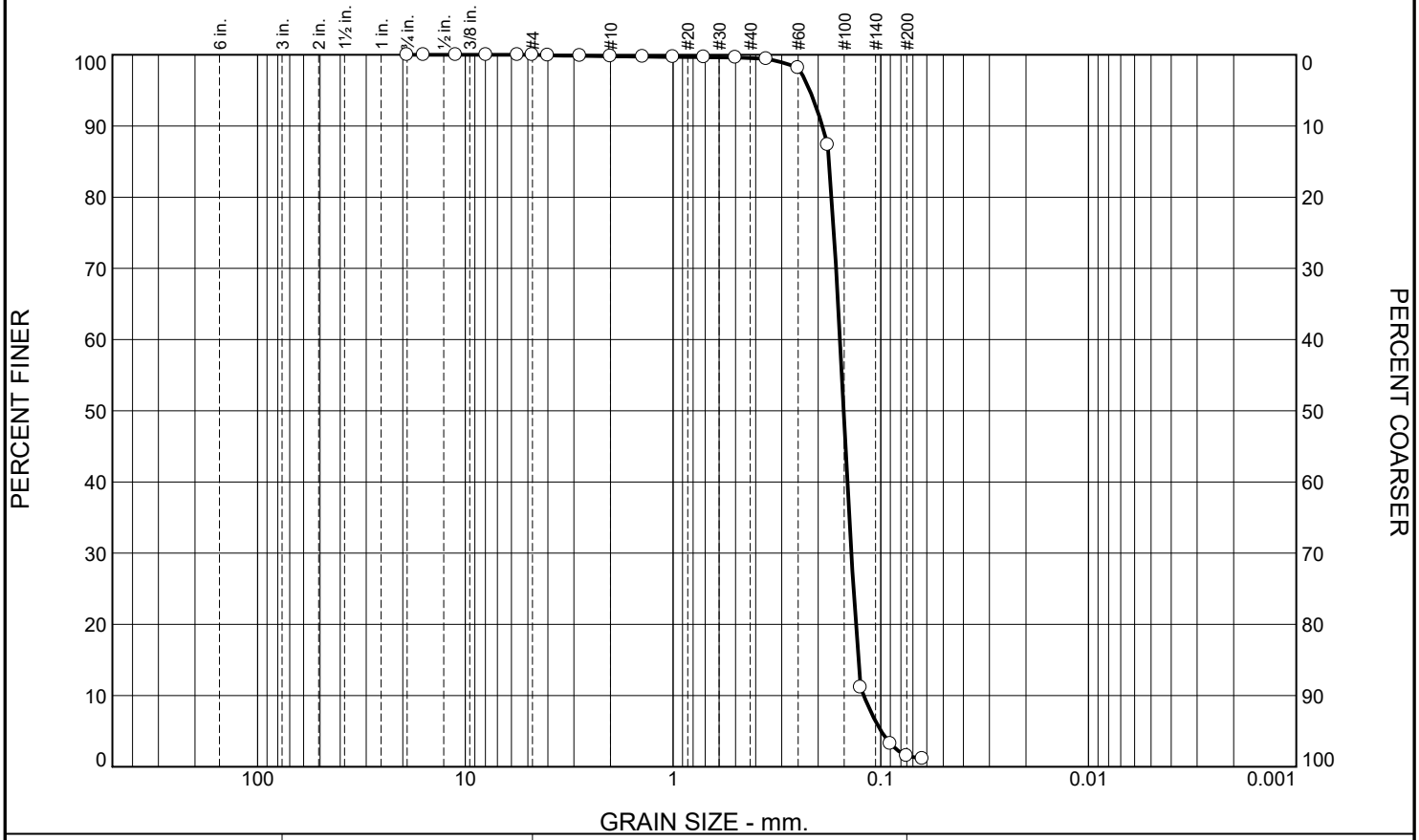
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	0.3	98.0	1.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	99.9		
#7	99.9		
#10	99.8		
#14	99.7		
#18	99.7		
#25	99.7		
#35	99.6		
#45	99.4		
#60	98.2		
#80	87.4		
#120	11.1		
#170	3.2		
#200	1.5		
#230	1.1		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1910 D_{85}= 0.1773 D_{60}= 0.1571
D_{50}= 0.1508 D_{30}= 0.1385 D_{15}= 0.1283
D_{10}= 0.1207 C_u= 1.30 C_c= 1.01

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.53

Source of Sample: SBSS 8
Sample Number: SBSS 8.113

Date: 7/18/18

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Wilmington, NC 28405
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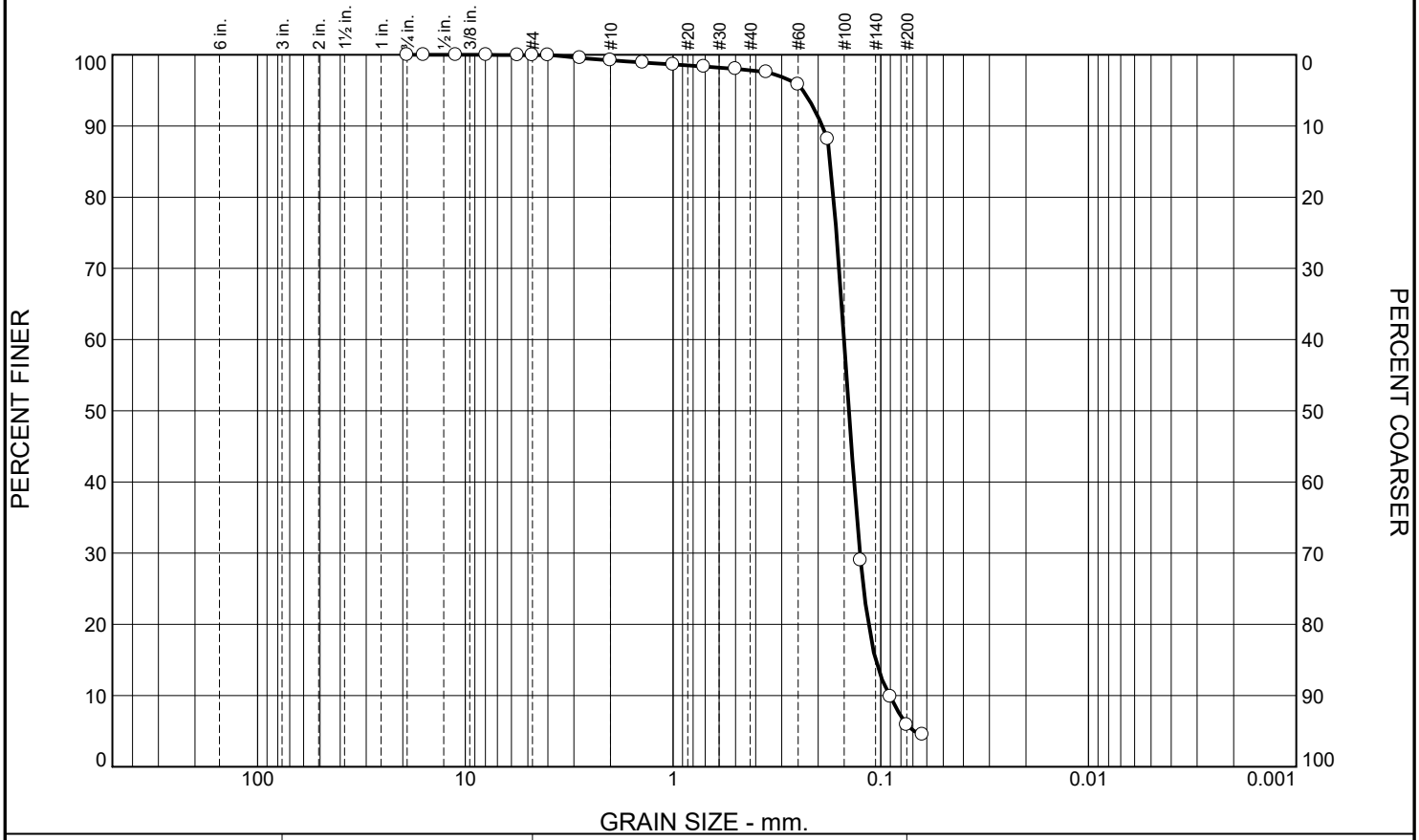
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.8	1.4	91.9	5.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	99.5		
#10	99.2		
#14	98.9		
#18	98.6		
#25	98.3		
#35	98.0		
#45	97.6		
#60	95.8		
#80	88.2		
#120	29.0		
#170	9.8		
#200	5.9		
#230	4.5		

* (no specification provided)

Soil Description

Grayish Brown (10YR 5/2), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1911 D_{85}= 0.1751 D_{60}= 0.1502
D_{50}= 0.1423 D_{30}= 0.1259 D_{15}= 0.1059
D_{10}= 0.0906 C_u= 1.66 C_c= 1.17

Classification

USCS= AASHTO=

Remarks

F.M.=0.47

Source of Sample: SBSS 8
Sample Number: SBSS 8.116.5

Date: 7/18/18

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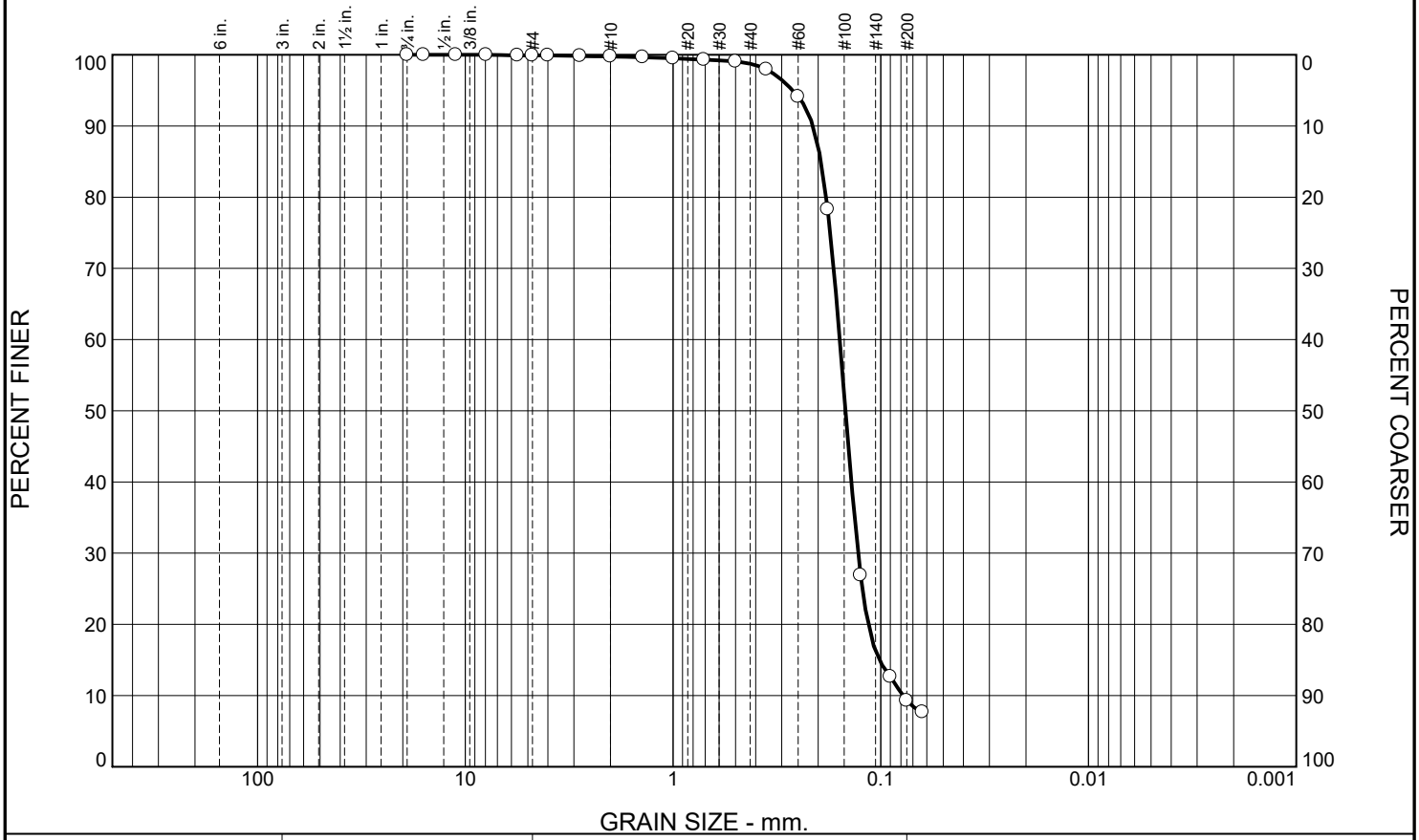
6714 Netherlands Drive
Wilmington, NC 28405
Phone: (910) 686-9114
Fax: (910) 686-9666

Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.1	1.1	89.4	9.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	99.9		
#4	99.9		
#5	99.9		
#7	99.8		
#10	99.8		
#14	99.7		
#18	99.5		
#25	99.3		
#35	99.1		
#45	97.9		
#60	94.1		
#80	78.3		
#120	26.9		
#170	12.7		
#200	9.3		
#230	7.7		

* (no specification provided)

Soil Description

Grayish Brown (10YR 5/2), Poorly Graded SAND, with Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2118 D_{85}= 0.1938 D_{60}= 0.1575
D_{50}= 0.1478 D_{30}= 0.1285 D_{15}= 0.1017
D_{10}= 0.0783 C_u= 2.01 C_c= 1.34

Classification

USCS= AASHTO=

Remarks

F.M.=0.53

Source of Sample: SBSS 8
Sample Number: SBSS 8.120

Date: 7/18/18

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Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

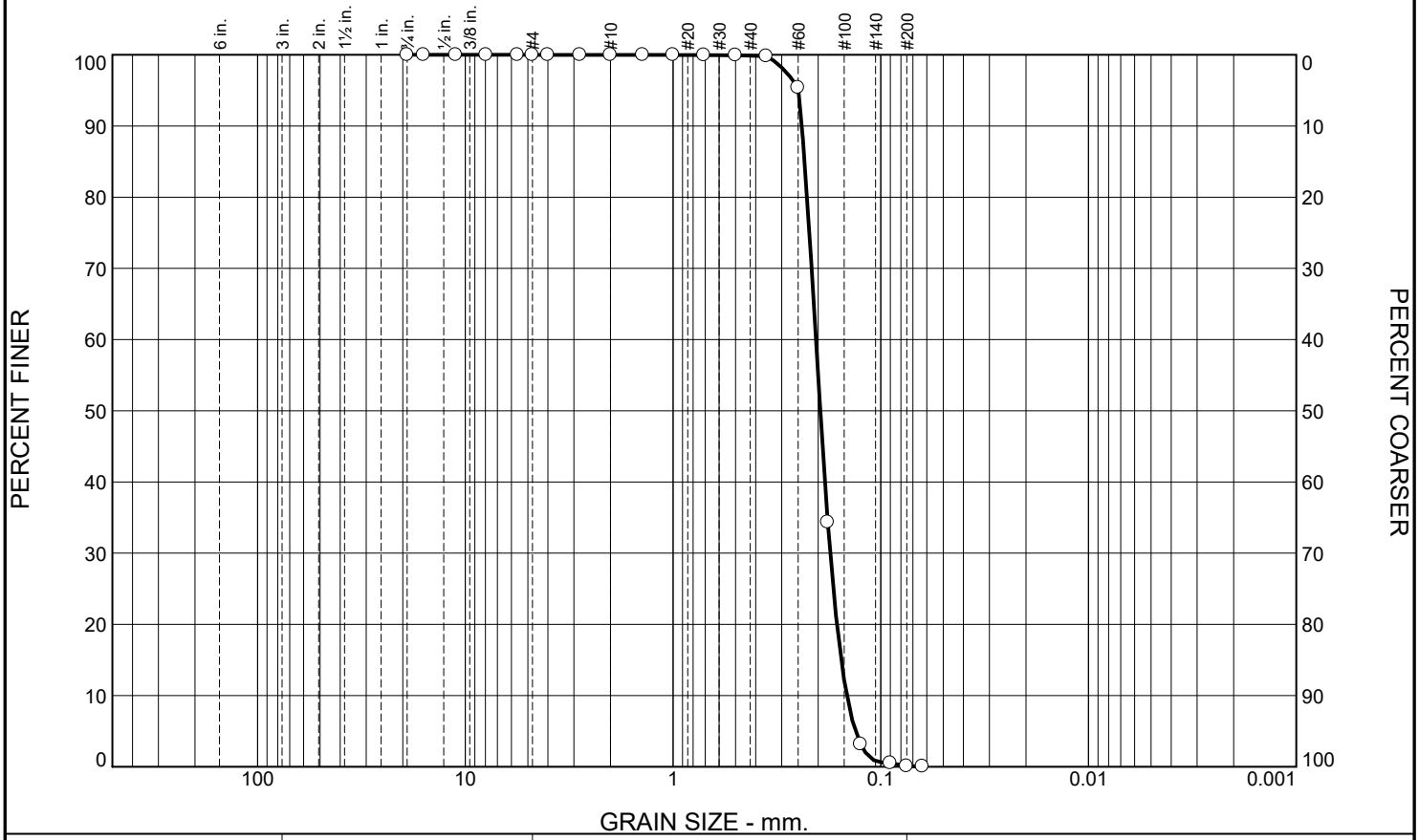
Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

PROFILE 12+00

PARTICLE SIZE DISTRIBUTION REPORTS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	99.8	0.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	100.0		
#35	99.9		
#45	99.8		
#60	95.4		
#80	34.3		
#120	3.2		
#170	0.5		
#200	0.1		
#230	0.0		

* (no specification provided)

Soil Description

Light Gray (10YR 7/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2400 D_{85}= 0.2326 D_{60}= 0.2049
D_{50}= 0.1954 D_{30}= 0.1753 D_{15}= 0.1551
D_{10}= 0.1457 C_u= 1.41 C_c= 1.03

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.90

Source of Sample: SBSS 12
Sample Number: SBSS 12.1

Date: 7/17/18

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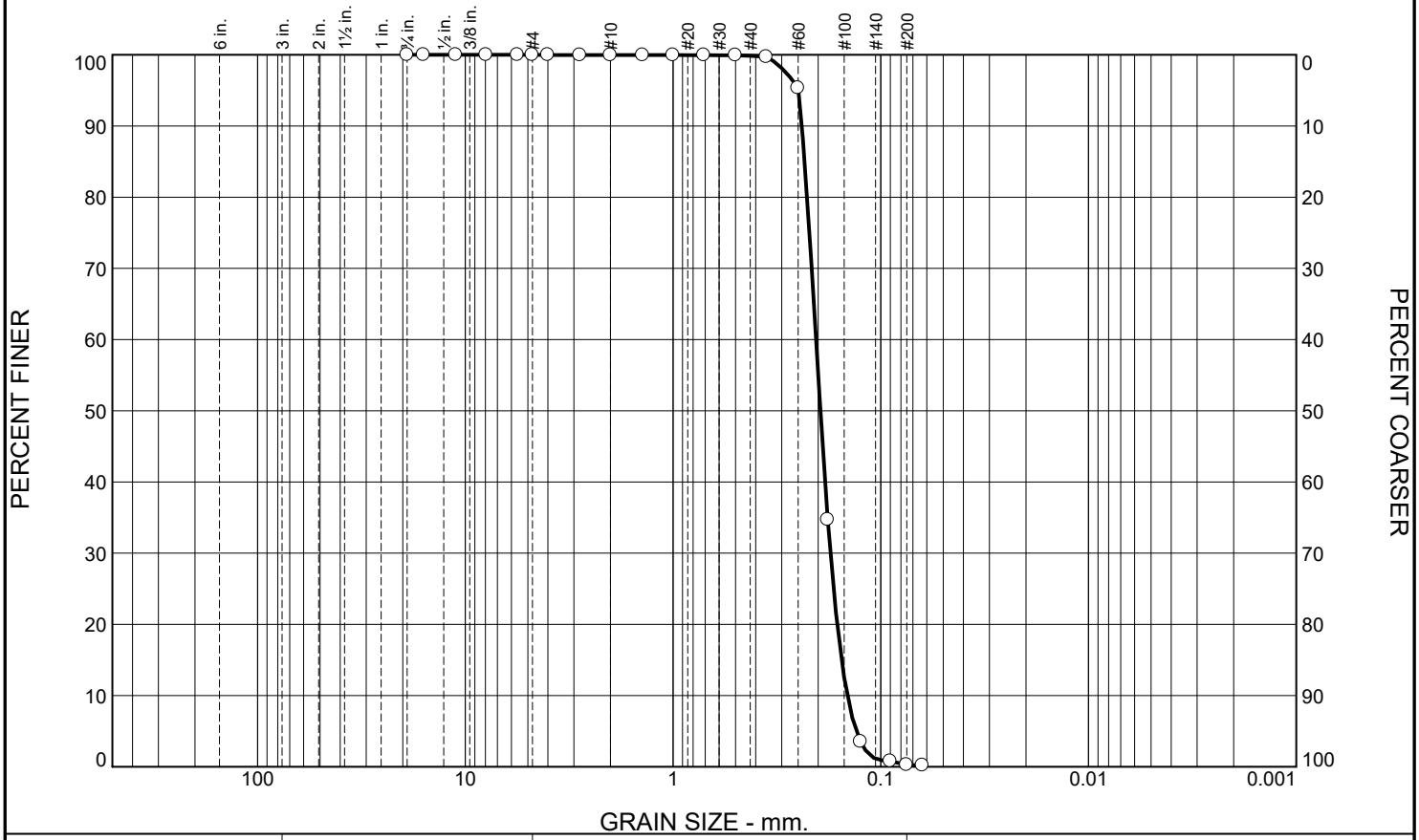
Phone: (910) 686-9114
Fax: (910) 686-9666

Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	99.6	0.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	100.0		
#35	99.9		
#45	99.7		
#60	95.3		
#80	34.7		
#120	3.5		
#170	0.8		
#200	0.3		
#230	0.2		

* (no specification provided)

Soil Description

Light Gray (10YR 7/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2400 D_{85}= 0.2326 D_{60}= 0.2047
D_{50}= 0.1951 D_{30}= 0.1749 D_{15}= 0.1544
D_{10}= 0.1448 C_u= 1.41 C_c= 1.03

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.89

Source of Sample: SBSS 12
Sample Number: SBSS 12.2

Date: 7/17/18

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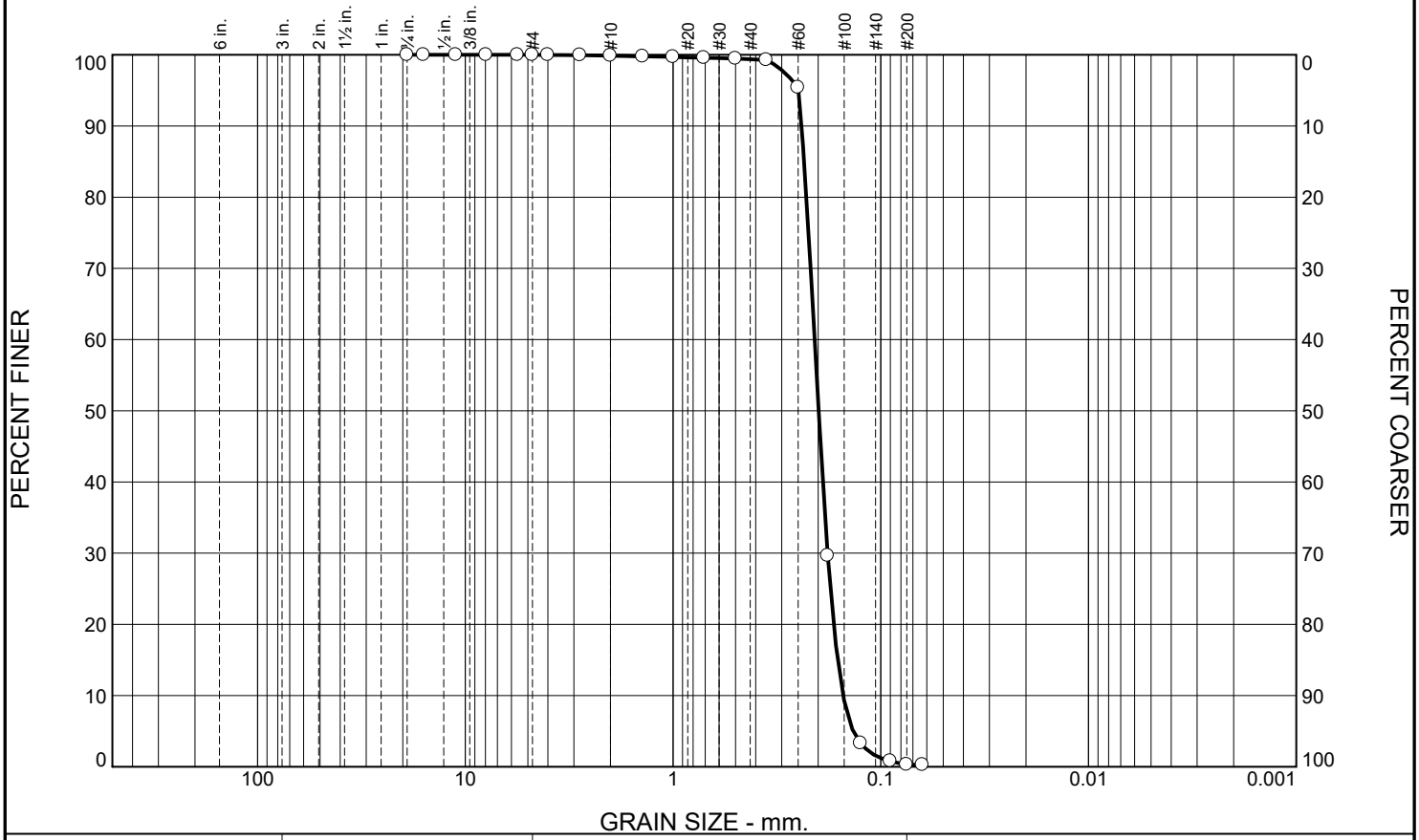
Wilmington, NC 28405
Phone: (910) 686-9114
Fax: (910) 686-9666

Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	0.5	99.1	0.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	99.9		
#10	99.9		
#14	99.8		
#18	99.7		
#25	99.6		
#35	99.5		
#45	99.3		
#60	95.4		
#80	29.6		
#120	3.3		
#170	0.8		
#200	0.3		
#230	0.3		

* (no specification provided)

Soil Description

Light Gray (10YR 7/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2407 D_{85}= 0.2339 D_{60}= 0.2079
D_{50}= 0.1990 D_{30}= 0.1804 D_{15}= 0.1613
D_{10}= 0.1517 C_u= 1.37 C_c= 1.03

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.94

Source of Sample: SBSS 12
Sample Number: SBSS 12.3

Date: 7/17/18

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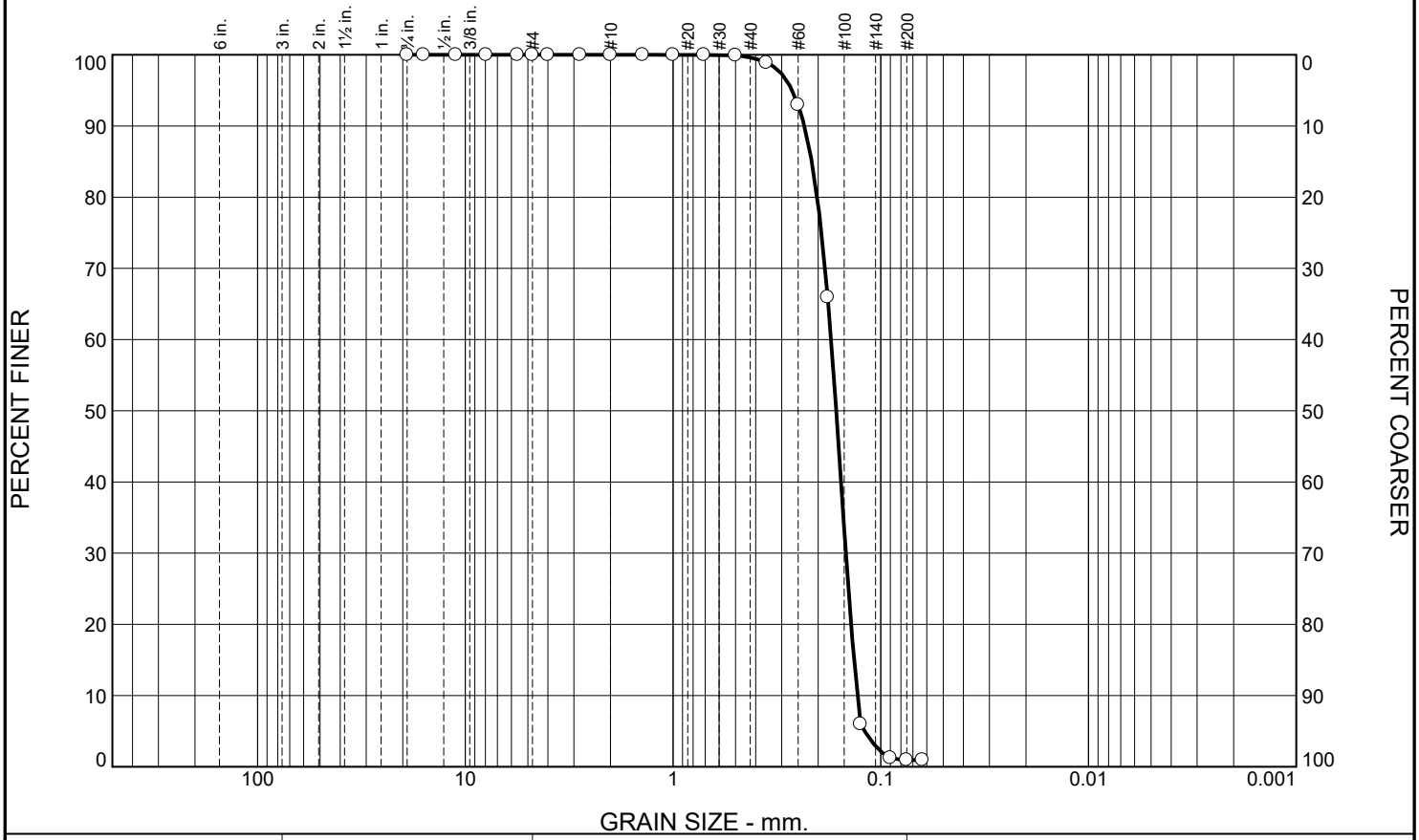
6714 Netherlands Drive
Wilmington, NC 28405
Phone: (910) 686-9114
Fax: (910) 686-9666

Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.4	98.7	0.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	100.0		
#35	99.9		
#45	98.9		
#60	93.0		
#80	65.9		
#120	6.0		
#170	1.2		
#200	0.9		
#230	0.9		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2331 D_{85}= 0.2146 D_{60}= 0.1734
D_{50}= 0.1638 D_{30}= 0.1472 D_{15}= 0.1345
D_{10}= 0.1296 C_u= 1.34 C_c= 0.96

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.69

Source of Sample: SBSS 12
Sample Number: SBSS 12.4

Date: 7/17/18

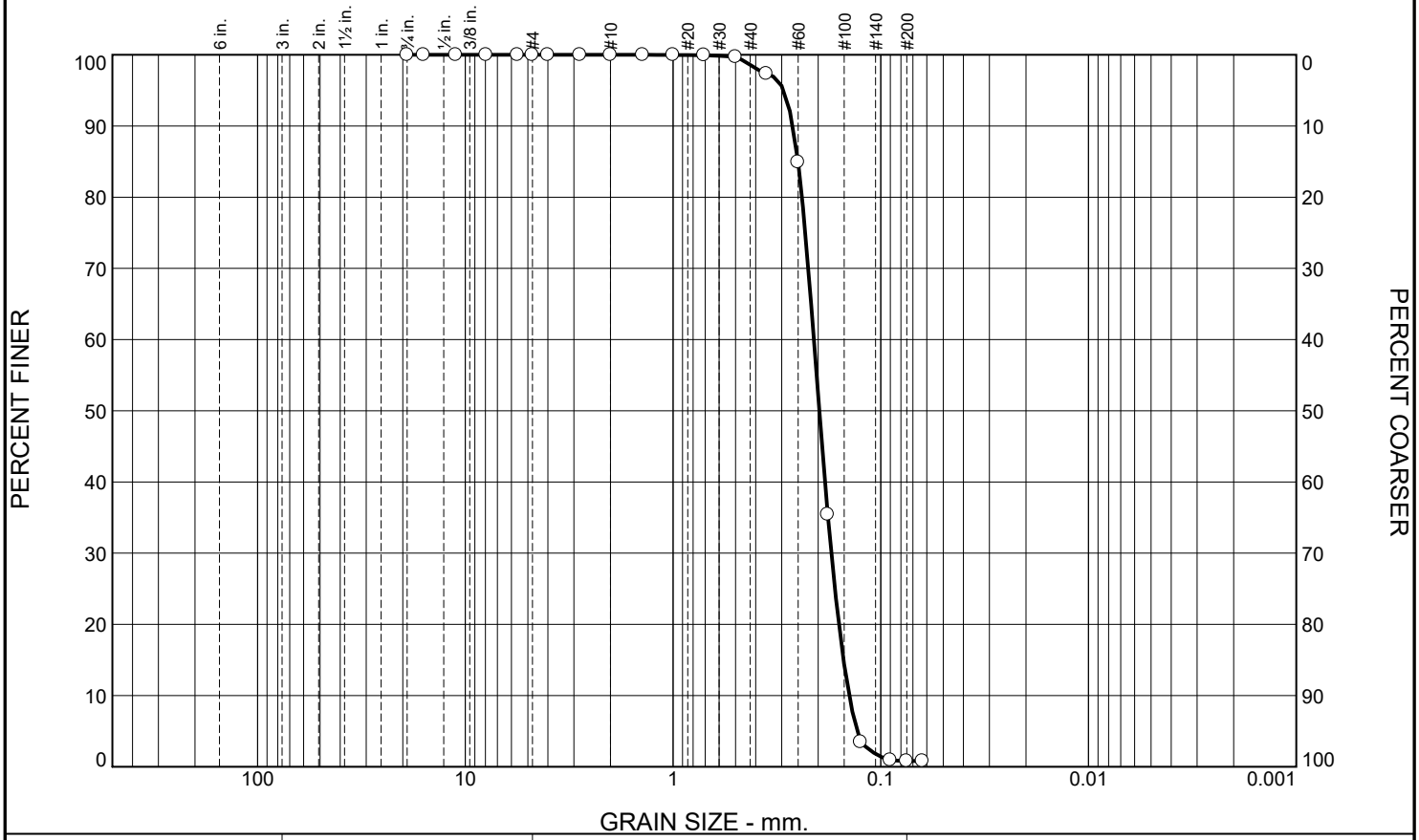
ECS SOUTHEAST, LLP
6714 Netherlands Drive
Wilmington, NC 28405
Phone: (910) 686-9114
Fax: (910) 686-9666

Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.4	97.8	0.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	99.9		
#35	99.7		
#45	97.3		
#60	84.9		
#80	35.4		
#120	3.5		
#170	0.9		
#200	0.8		
#230	0.8		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2651 D_{85}= 0.2502 D_{60}= 0.2097
D_{50}= 0.1974 D_{30}= 0.1731 D_{15}= 0.1511
D_{10}= 0.1418 C_u= 1.48 C_c= 1.01

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.90

Source of Sample: SBSS 12
Sample Number: SBSS 12.5

Date: 7/17/18

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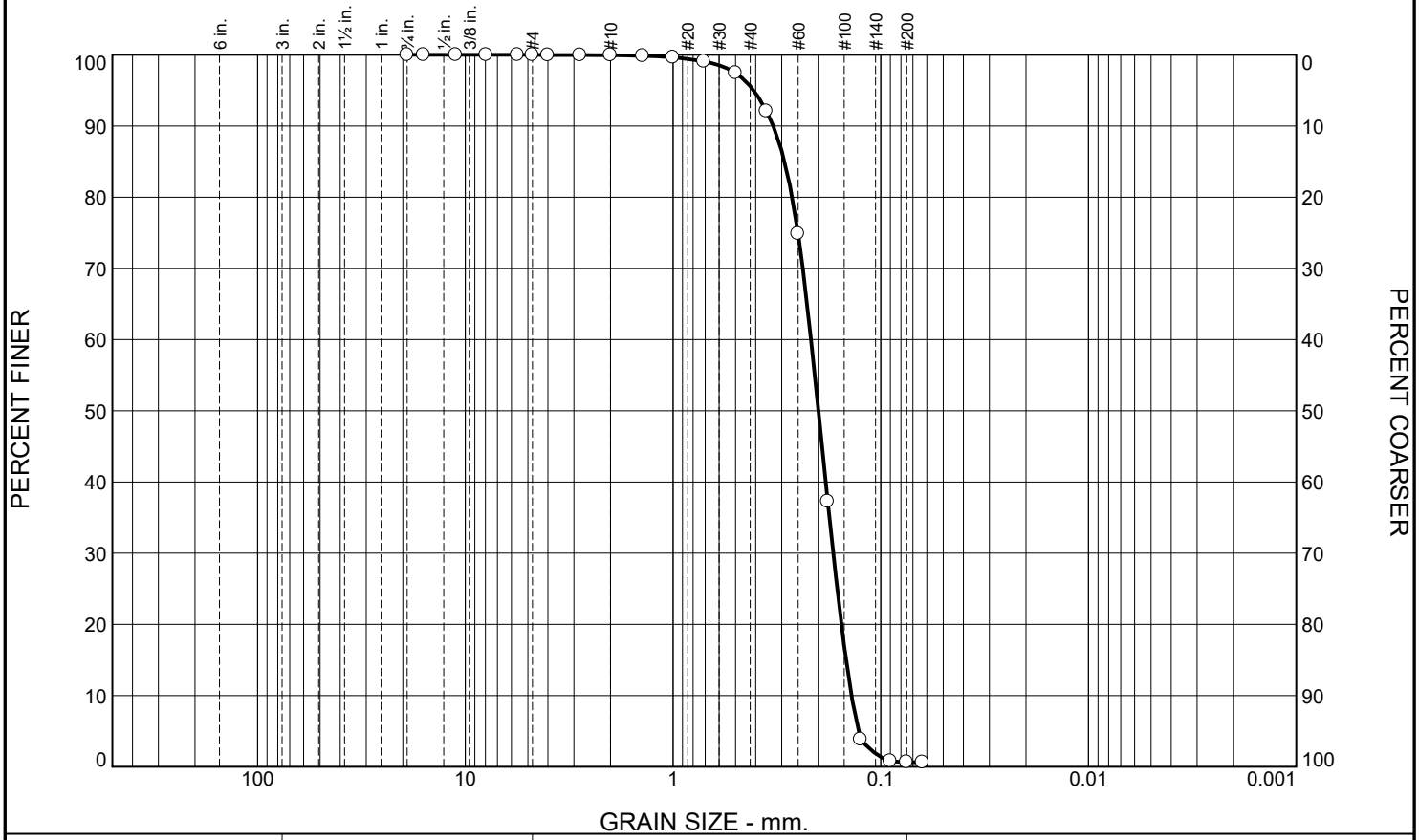
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	4.3	94.9	0.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	99.9		
#14	99.9		
#18	99.6		
#25	99.1		
#35	97.4		
#45	92.1		
#60	74.9		
#80	37.3		
#120	3.8		
#170	0.8		
#200	0.7		
#230	0.6		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3292 D_{85}= 0.2905 D_{60}= 0.2166
D_{50}= 0.1995 D_{30}= 0.1694 D_{15}= 0.1468
D_{10}= 0.1383 C_u= 1.57 C_c= 0.96

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.98

Source of Sample: SBSS 12
Sample Number: SBSS 12.6

Date: 7/17/18

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Wilmington, NC 28405
Phone: (910) 686-9114
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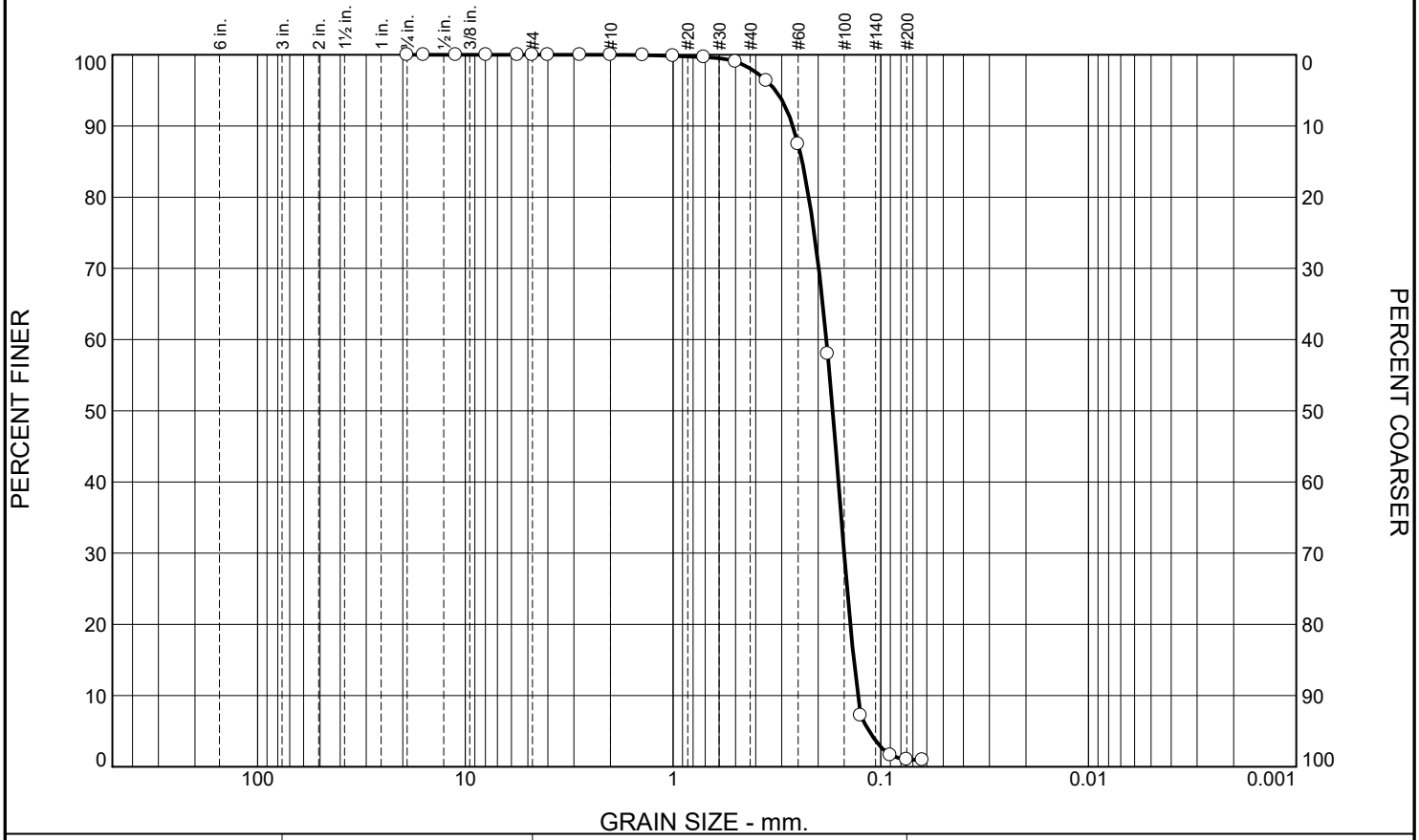
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.9	97.1	1.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	99.9		
#18	99.8		
#25	99.7		
#35	99.0		
#45	96.4		
#60	87.4		
#80	58.0		
#120	7.2		
#170	1.6		
#200	1.0		
#230	0.9		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2649 D_{85}= 0.2389 D_{60}= 0.1827
D_{50}= 0.1704 D_{30}= 0.1500 D_{15}= 0.1349
D_{10}= 0.1289 C_u= 1.42 C_c= 0.96

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.77

Source of Sample: SBSS 12
Sample Number: SBSS 12.7

Date: 7/17/18

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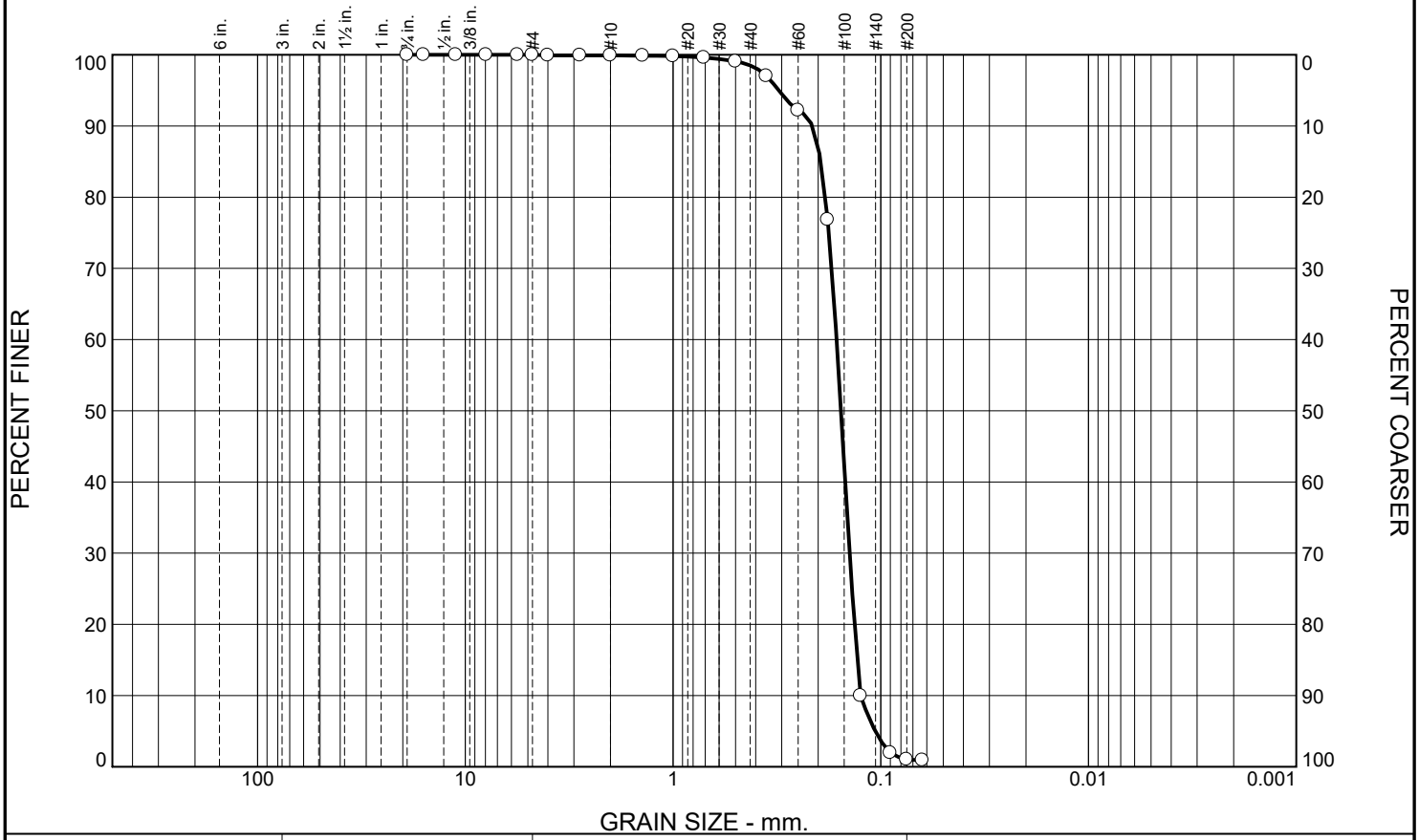
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.4	97.5	1.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	99.9		
#7	99.9		
#10	99.9		
#14	99.9		
#18	99.8		
#25	99.6		
#35	99.1		
#45	97.0		
#60	92.2		
#80	76.8		
#120	10.0		
#170	2.0		
#200	1.0		
#230	0.9		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2134 D_{85}= 0.1943 D_{60}= 0.1632
D_{50}= 0.1554 D_{30}= 0.1412 D_{15}= 0.1298
D_{10}= 0.1250 C_u= 1.30 C_c= 0.98

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.64

Source of Sample: SBSS 12
Sample Number: SBSS 12.TROUGH

Date: 7/17/18

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Wilmington, NC 28405
Phone: (910) 686-9114
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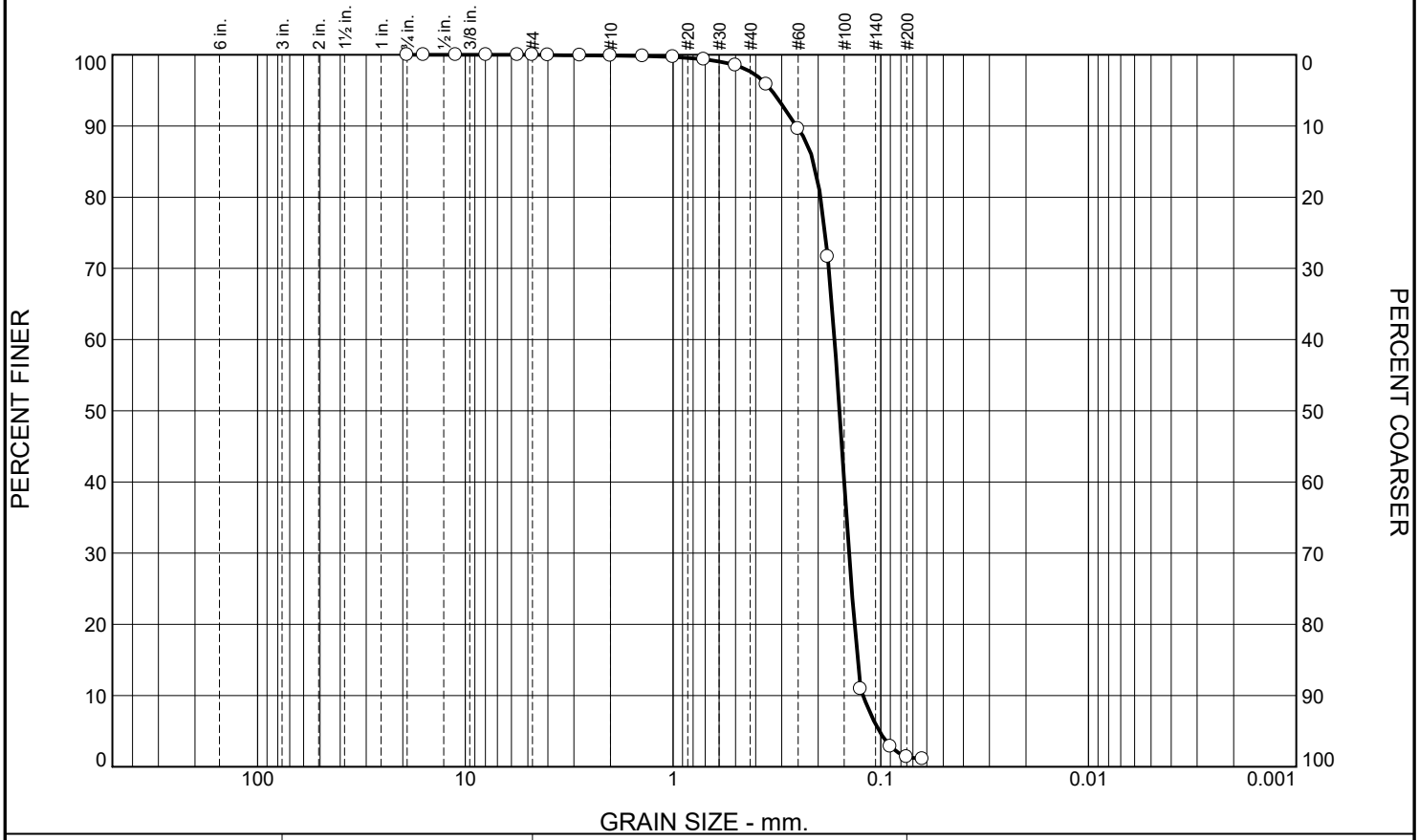
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	2.2	96.3	1.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	99.9		
#10	99.9		
#14	99.8		
#18	99.7		
#25	99.3		
#35	98.5		
#45	95.8		
#60	89.6		
#80	71.6		
#120	10.9		
#170	2.8		
#200	1.4		
#230	1.1		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2555 D_{85}= 0.2108 D_{60}= 0.1669
D_{50}= 0.1580 D_{30}= 0.1420 D_{15}= 0.1293
D_{10}= 0.1217 C_u= 1.37 C_c= 0.99

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.68

Source of Sample: SBSS 12
Sample Number: SBSS 12.CREST

Date: 7/17/18

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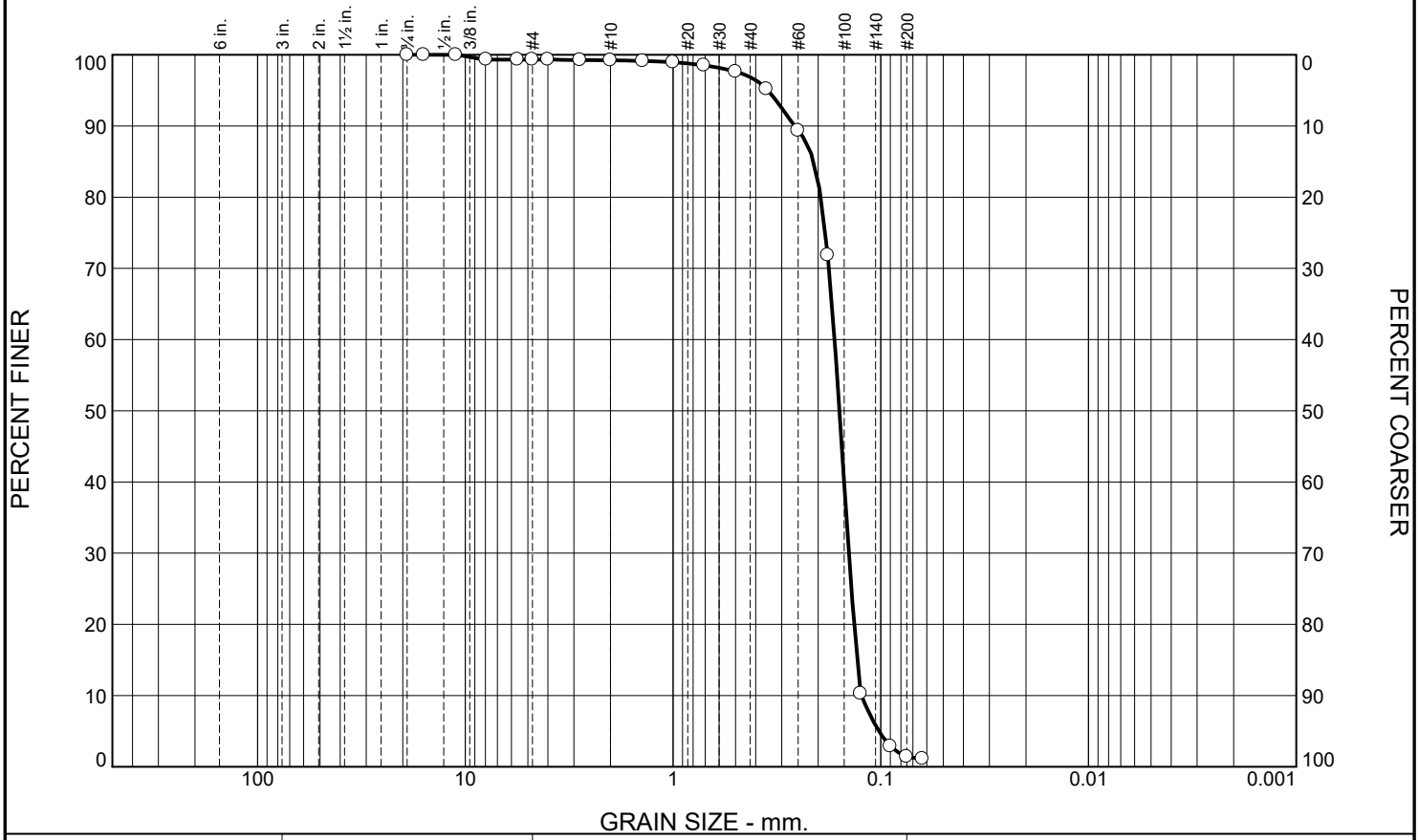
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.7	0.1	2.3	95.5	1.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	99.3		
#3.5	99.3		
#4	99.3		
#5	99.3		
#7	99.3		
#10	99.2		
#14	99.1		
#18	99.0		
#25	98.5		
#35	97.6		
#45	95.2		
#60	89.3		
#80	71.9		
#120	10.3		
#170	2.9		
#200	1.4		
#230	1.1		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2600 D_{85}= 0.2103 D_{60}= 0.1668
D_{50}= 0.1580 D_{30}= 0.1424 D_{15}= 0.1299
D_{10}= 0.1239 C_u= 1.35 C_c= 0.98

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.72

Source of Sample: SBSS 12
Sample Number: SBSS 12.106

Date: 7/17/18

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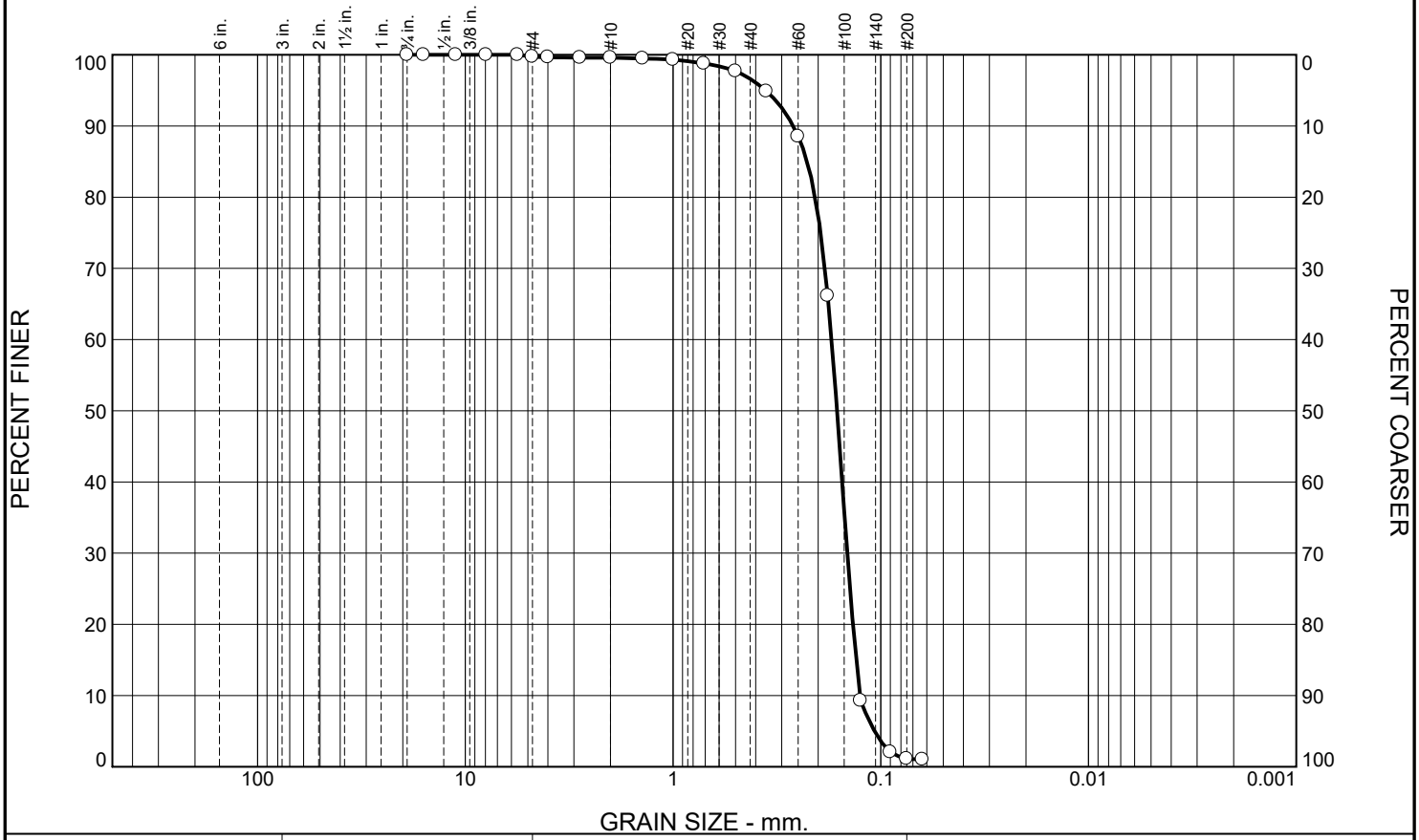
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.3	0.1	3.0	95.5	1.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	99.7		
#5	99.7		
#7	99.6		
#10	99.6		
#14	99.5		
#18	99.3		
#25	98.8		
#35	97.7		
#45	94.9		
#60	88.5		
#80	66.2		
#120	9.3		
#170	2.0		
#200	1.1		
#230	1.0		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2642 D_{85}= 0.2260 D_{60}= 0.1725
D_{50}= 0.1624 D_{30}= 0.1449 D_{15}= 0.1314
D_{10}= 0.1259 C_u= 1.37 C_c= 0.97

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.74

Source of Sample: SBSS 12
Sample Number: SBSS 12.109.5

Date: 7/17/18

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Wilmington, NC 28405
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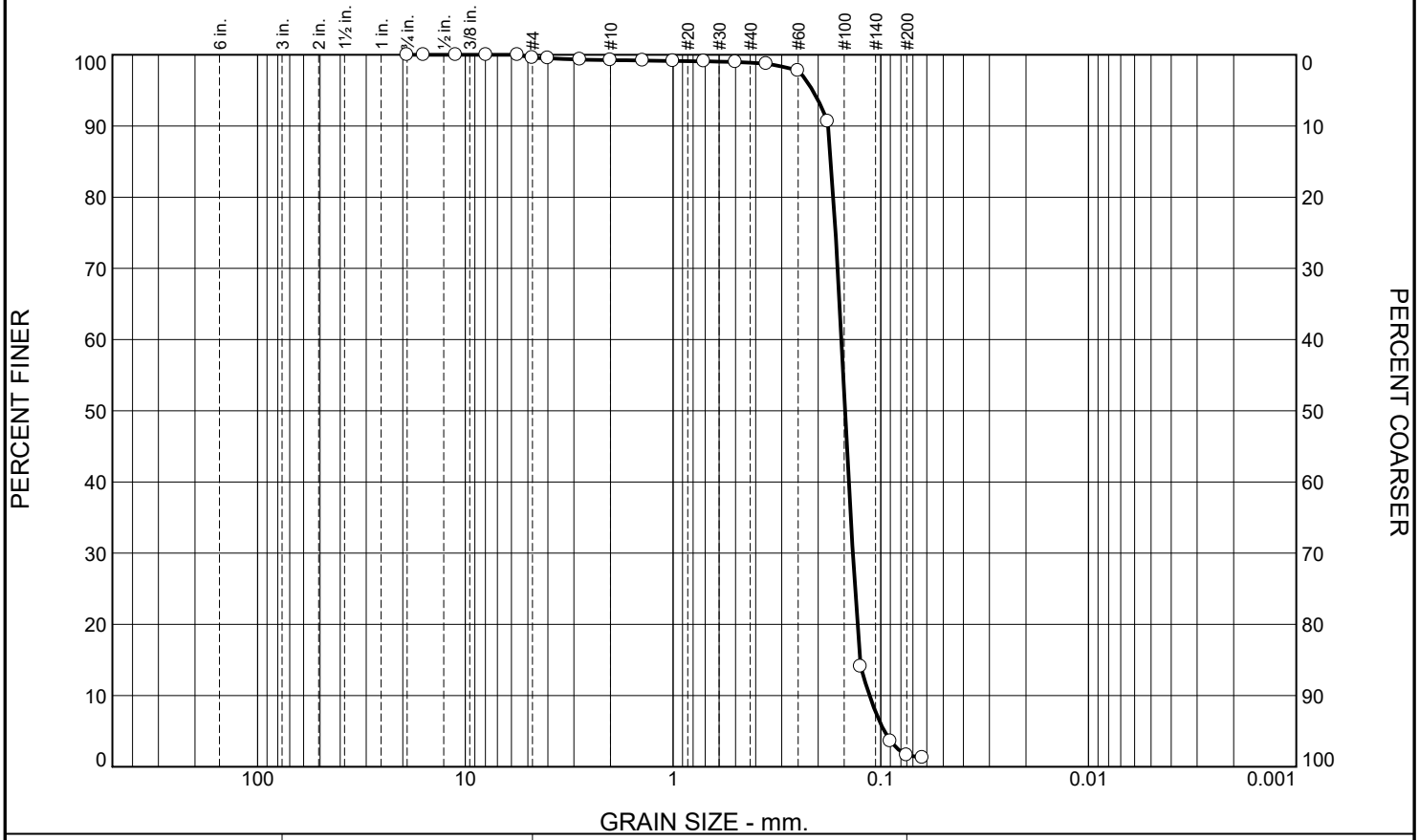
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.4	0.3	0.4	97.3	1.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	99.6		
#5	99.5		
#7	99.3		
#10	99.3		
#14	99.2		
#18	99.1		
#25	99.1		
#35	99.0		
#45	98.7		
#60	97.8		
#80	90.7		
#120	14.1		
#170	3.6		
#200	1.6		
#230	1.3		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1792 D_{85}= 0.1736 D_{60}= 0.1546
D_{50}= 0.1484 D_{30}= 0.1363 D_{15}= 0.1258
D_{10}= 0.1133 C_u= 1.36 C_c= 1.06

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.52

Source of Sample: SBSS 12
Sample Number: SBSS 12.113

Date: 7/17/18

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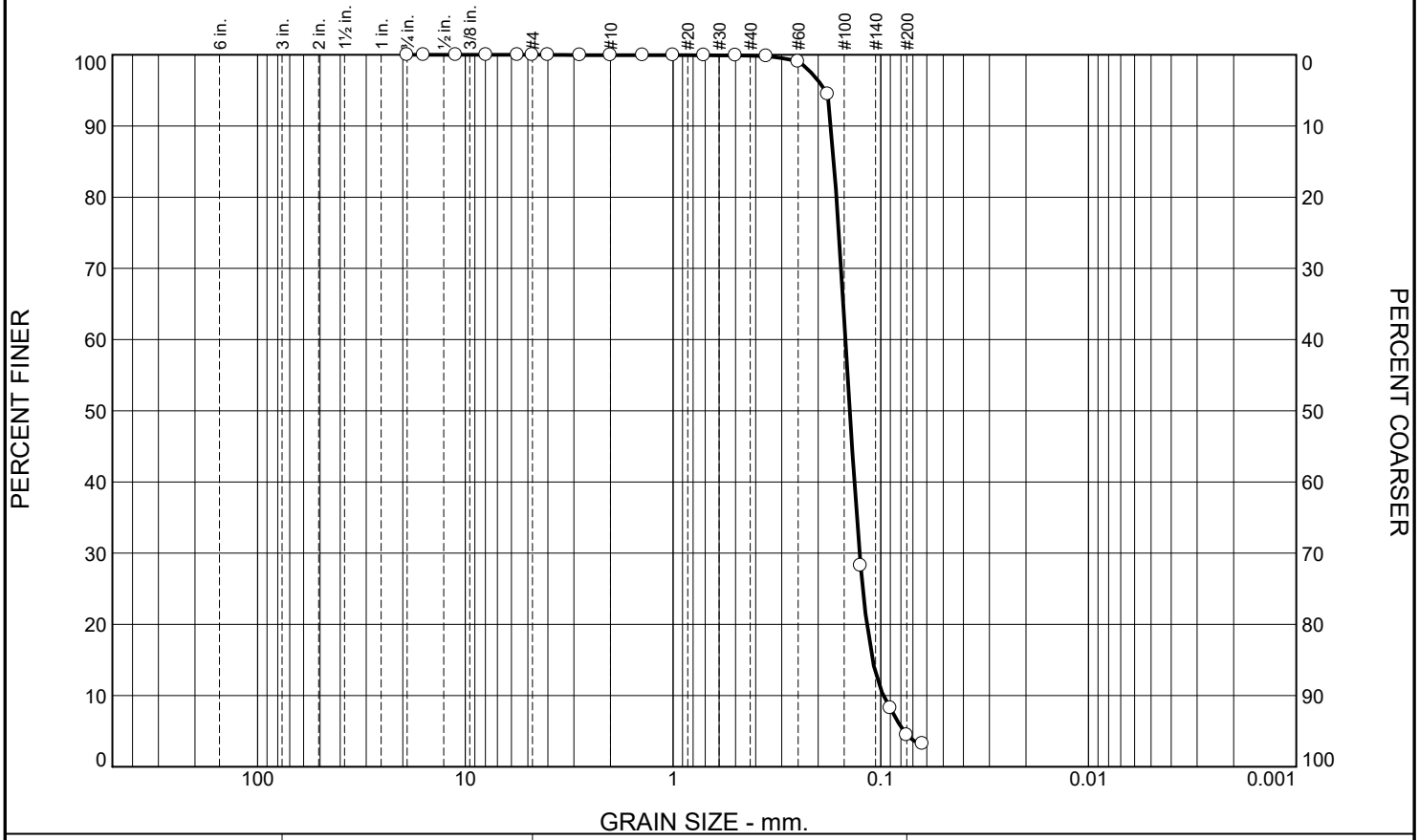
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	95.5	4.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	99.9		
#25	99.9		
#35	99.9		
#45	99.8		
#60	99.1		
#80	94.5		
#120	28.3		
#170	8.2		
#200	4.4		
#230	3.2		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1738 D_{85}= 0.1682 D_{60}= 0.1479
D_{50}= 0.1410 D_{30}= 0.1265 D_{15}= 0.1096
D_{10}= 0.0972 C_u= 1.52 C_c= 1.11

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.38

Source of Sample: SBSS 12
Sample Number: SBSS 12.116.5

Date: 7/17/18

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Wilmington, NC 28405
Phone: (910) 686-9114
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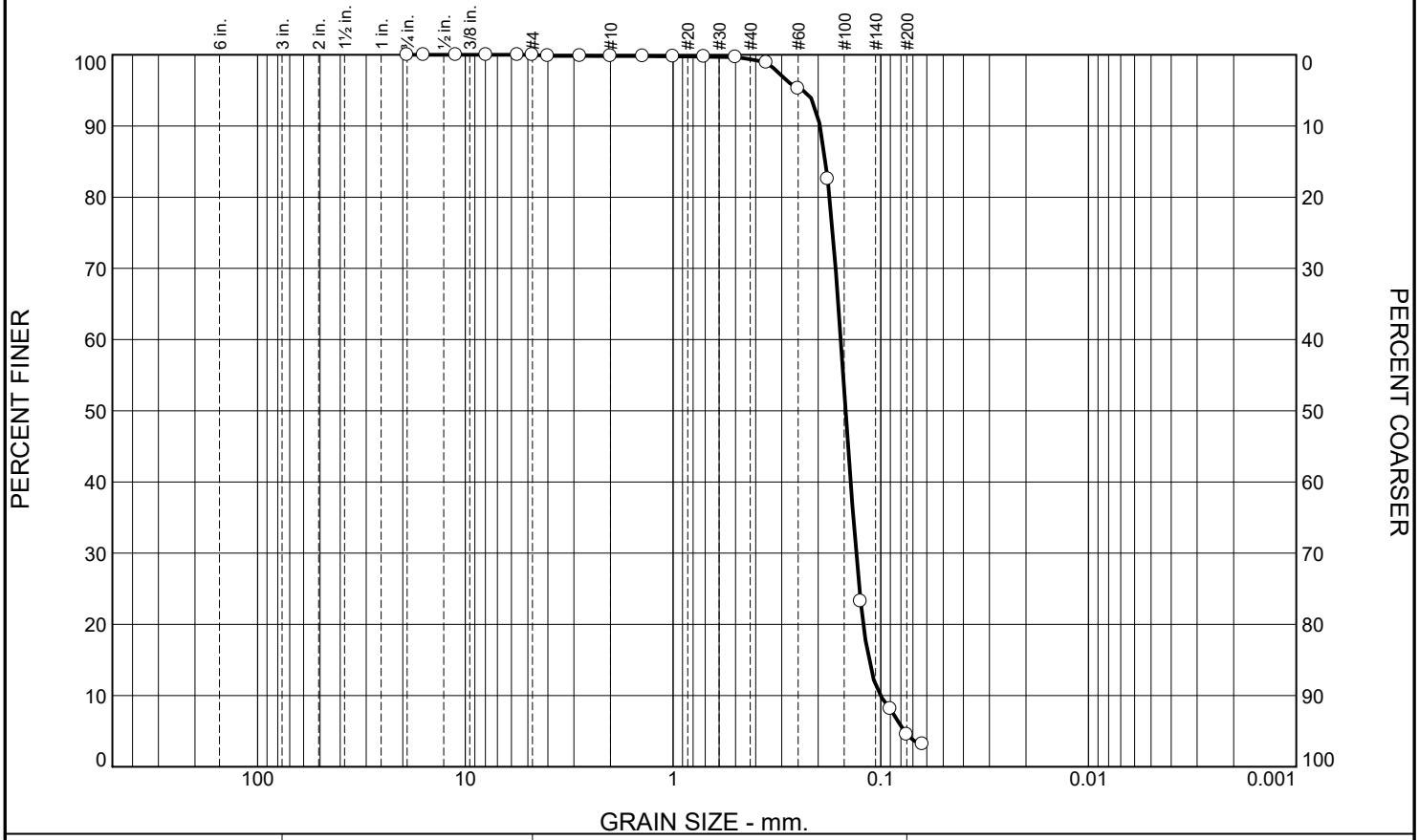
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	0.4	94.9	4.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	99.9		
#7	99.8		
#10	99.8		
#14	99.8		
#18	99.8		
#25	99.7		
#35	99.7		
#45	98.9		
#60	95.3		
#80	82.5		
#120	23.2		
#170	8.1		
#200	4.5		
#230	3.2		

* (no specification provided)

Soil Description

Grayish Brown (10YR 5/2), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1960 D_{85}= 0.1841 D_{60}= 0.1558
D_{50}= 0.1475 D_{30}= 0.1314 D_{15}= 0.1141
D_{10}= 0.1005 C_u= 1.55 C_c= 1.10

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.51

Source of Sample: SBSS 12
Sample Number: SBSS 12.120

Date: 7/17/18

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Wilmington, NC 28405
Phone: (910) 686-9114
Fax: (910) 686-9666

Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

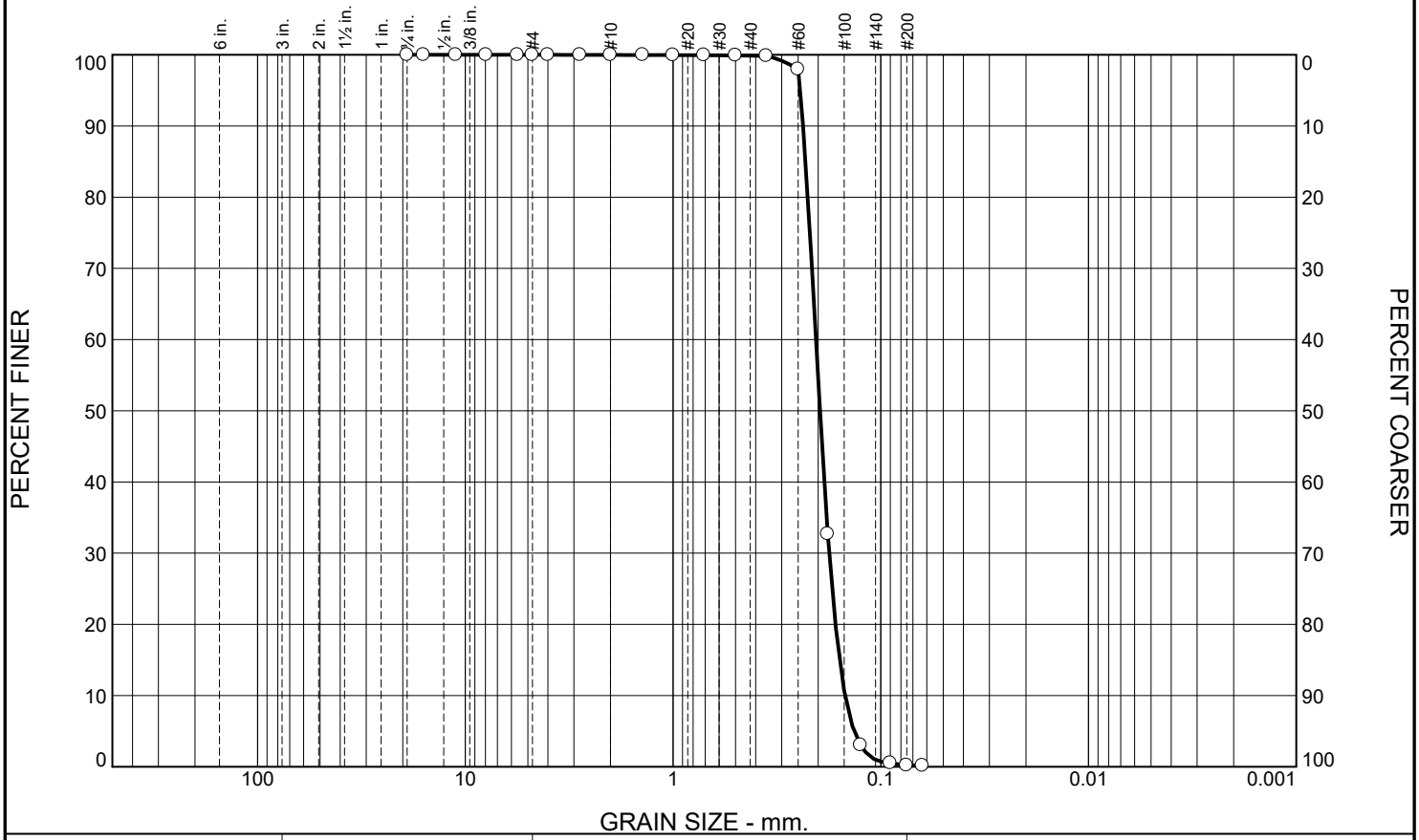
Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

PROFILE 16+00

PARTICLE SIZE DISTRIBUTION REPORTS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	99.7	0.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	99.9		
#35	99.9		
#45	99.8		
#60	98.0		
#80	32.7		
#120	3.0		
#170	0.5		
#200	0.2		
#230	0.2		

* (no specification provided)

Soil Description

Light Gray (10YR 7/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2367 D_{85}= 0.2302 D_{60}= 0.2049
D_{50}= 0.1960 D_{30}= 0.1772 D_{15}= 0.1579
D_{10}= 0.1485 C_u= 1.38 C_c= 1.03

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.90

Source of Sample: SBSS 16
Sample Number: SBSS 16.1

Date: 7/20/18

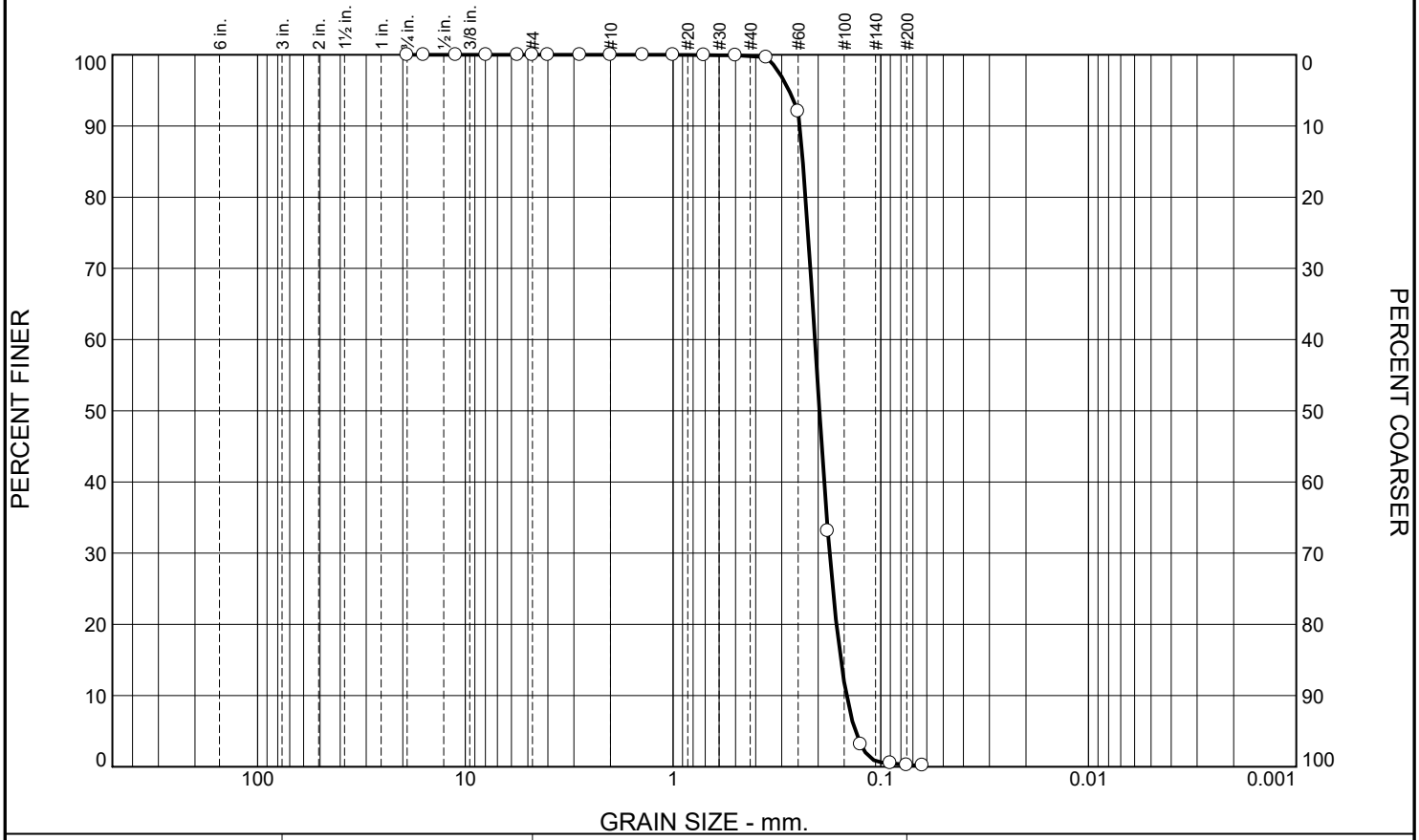
ECS SOUTHEAST, LLP
6714 Netherlands Drive
Wilmington, NC 28405
Phone: (910) 686-9114
Fax: (910) 686-9666

Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	99.6	0.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	100.0		
#35	99.9		
#45	99.6		
#60	92.1		
#80	33.1		
#120	3.1		
#170	0.5		
#200	0.2		
#230	0.2		

* (no specification provided)

Soil Description

Light Gray (10YR 7/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2458 D_{85}= 0.2374 D_{60}= 0.2074
D_{50}= 0.1973 D_{30}= 0.1765 D_{15}= 0.1557
D_{10}= 0.1461 C_u= 1.42 C_c= 1.03

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.91

Source of Sample: SBSS 16
Sample Number: SBSS 16.2

Date: 7/20/18

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Phone: (910) 686-9114
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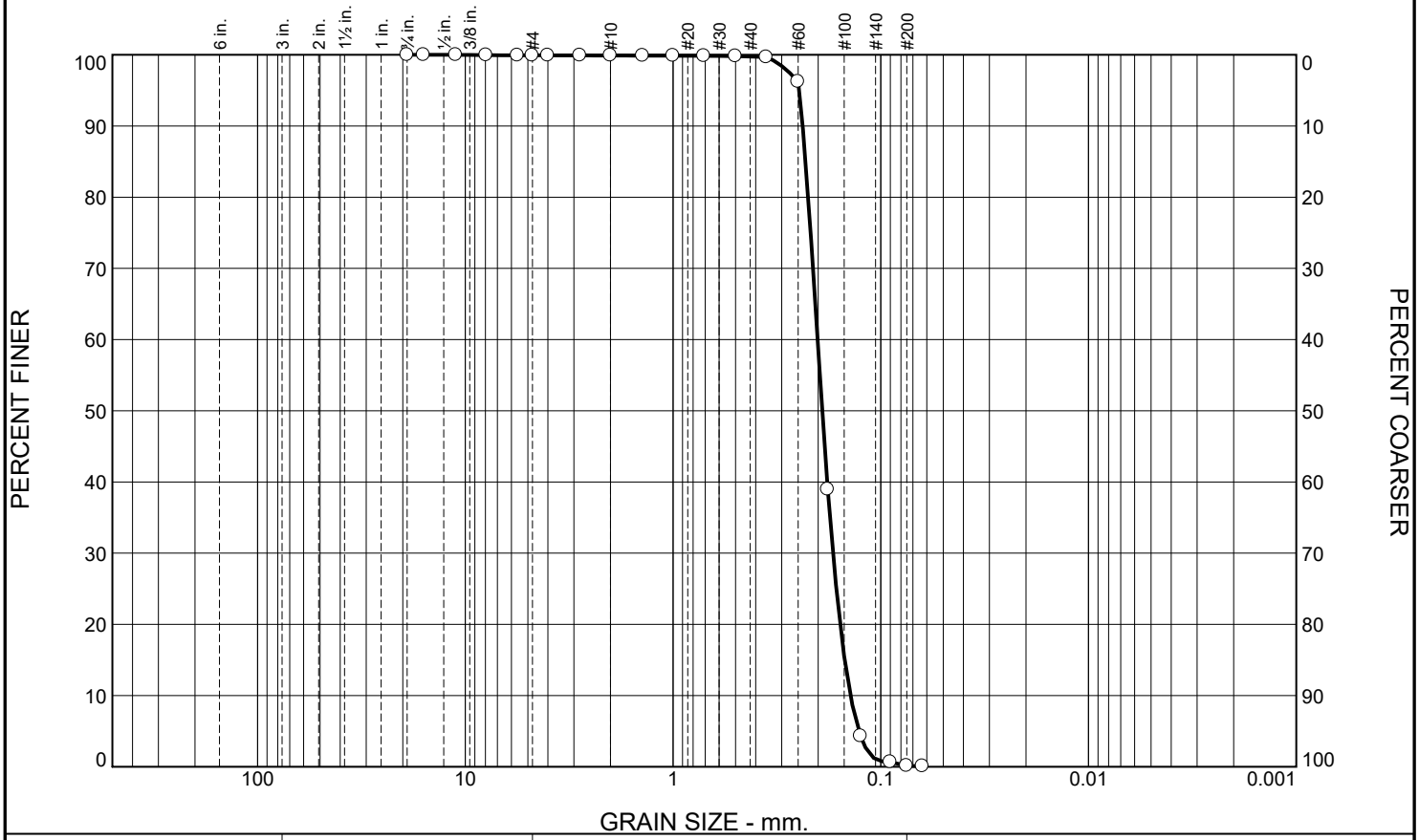
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.0	0.1	99.7	0.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	99.9		
#4	99.9		
#5	99.9		
#7	99.9		
#10	99.9		
#14	99.9		
#18	99.9		
#25	99.9		
#35	99.8		
#45	99.7		
#60	96.2		
#80	39.0		
#120	4.3		
#170	0.7		
#200	0.1		
#230	0.1		

* (no specification provided)

Soil Description

Light Gray (10YR 7/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2378 D_{85}= 0.2301 D_{60}= 0.2013
D_{50}= 0.1913 D_{30}= 0.1699 D_{15}= 0.1491
D_{10}= 0.1399 C_u= 1.44 C_c= 1.03

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.87

Source of Sample: SBSS 16
Sample Number: SBSS 16.3

Date: 7/20/18

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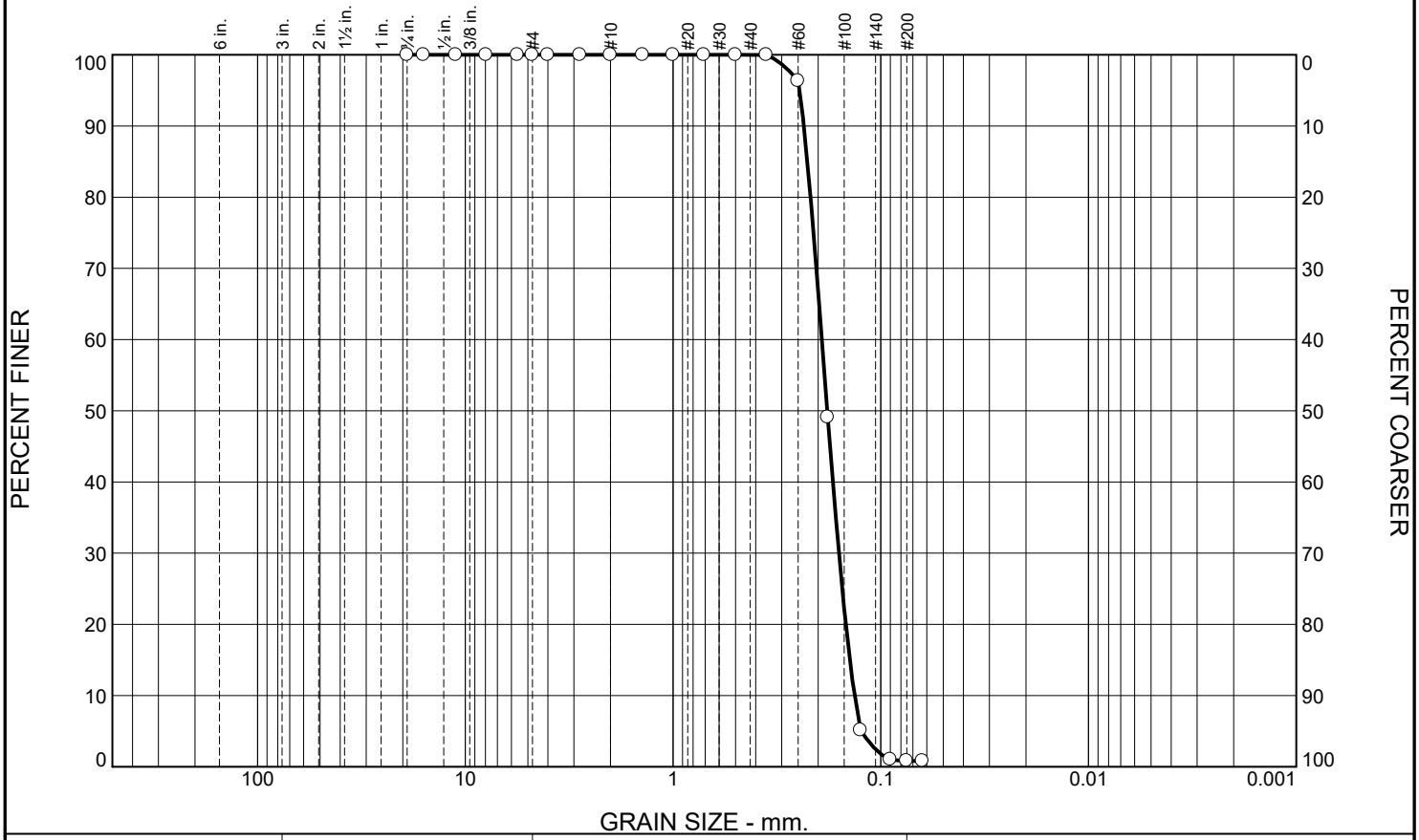
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	99.2	0.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	100.0		
#18	100.0		
#25	100.0		
#35	100.0		
#45	100.0		
#60	96.3		
#80	49.1		
#120	5.1		
#170	1.0		
#200	0.8		
#230	0.8		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2345 D_{85}= 0.2254 D_{60}= 0.1921
D_{50}= 0.1810 D_{30}= 0.1590 D_{15}= 0.1409
D_{10}= 0.1337 C_u= 1.44 C_c= 0.98

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.79

Source of Sample: SBSS 16
Sample Number: SBSS 16.4

Date: 7/20/18

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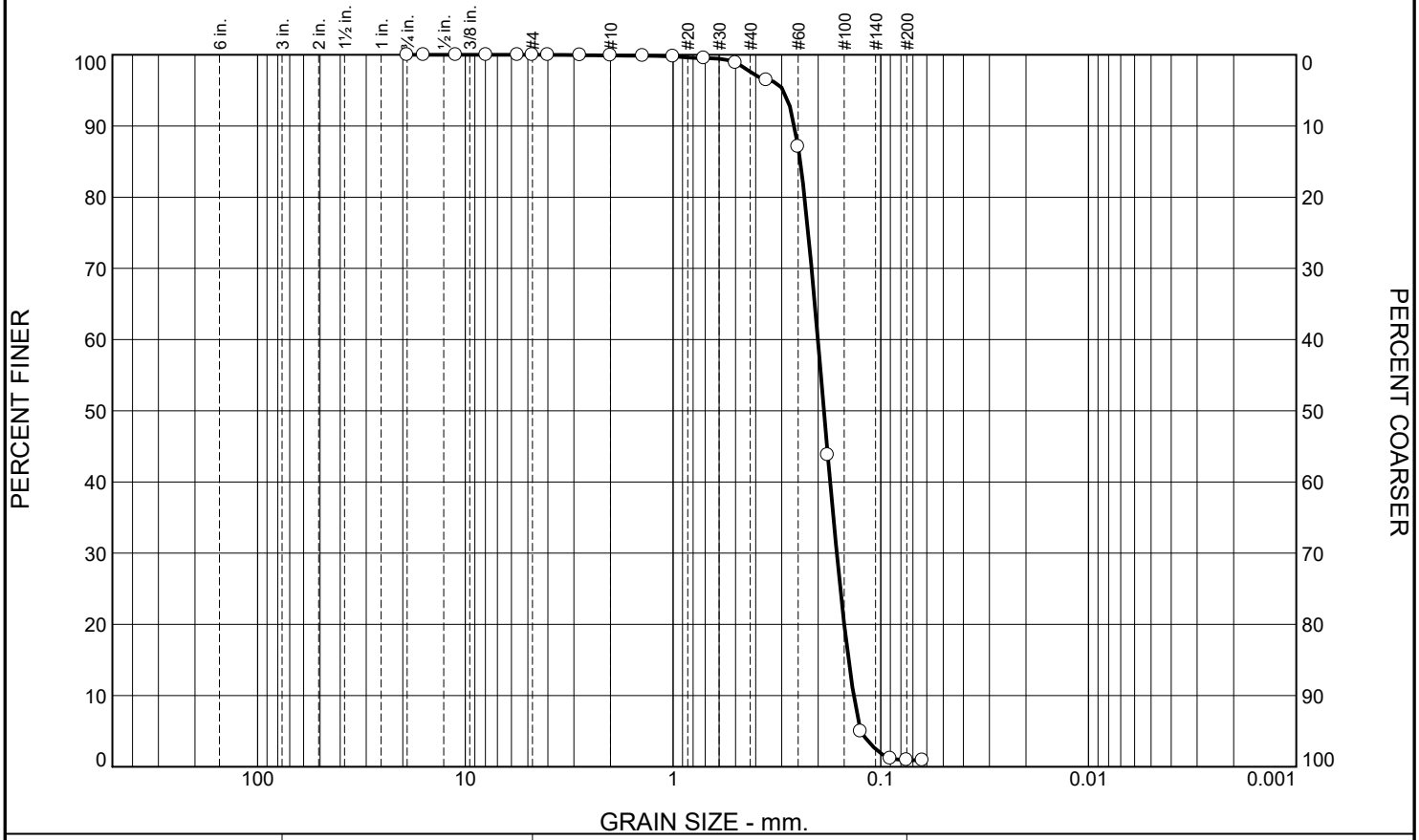
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	2.3	96.7	0.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	99.9		
#10	99.9		
#14	99.9		
#18	99.8		
#25	99.5		
#35	98.9		
#45	96.4		
#60	87.1		
#80	43.8		
#120	5.0		
#170	1.1		
#200	0.9		
#230	0.9		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2601 D_{85}= 0.2442 D_{60}= 0.2007
D_{50}= 0.1877 D_{30}= 0.1629 D_{15}= 0.1429
D_{10}= 0.1350 C_u= 1.49 C_c= 0.98

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.85

Source of Sample: SBSS 16
Sample Number: SBSS 16.5

Date: 7/20/18

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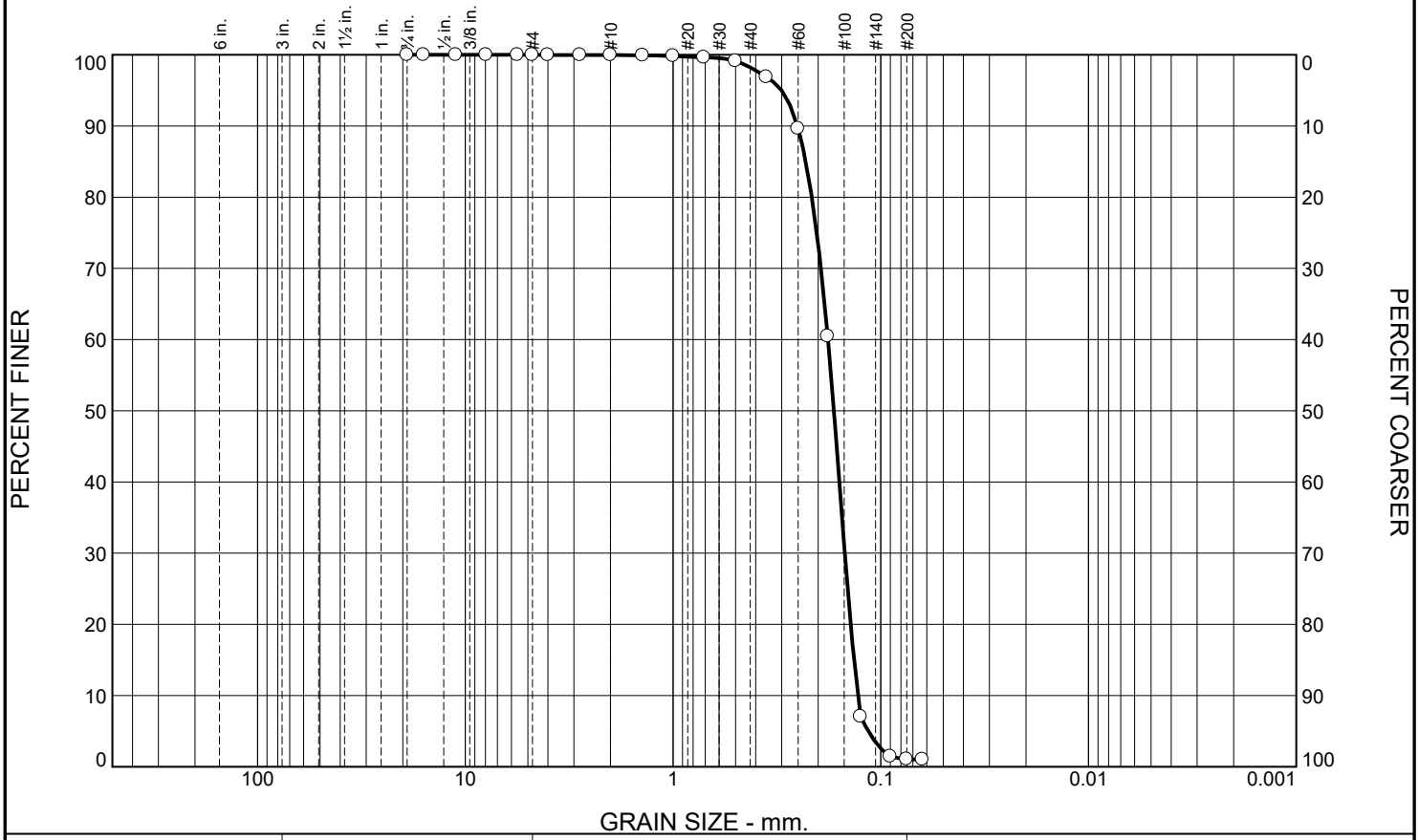
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.8	97.1	1.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	99.9		
#18	99.8		
#25	99.6		
#35	99.1		
#45	96.9		
#60	89.7		
#80	60.5		
#120	7.0		
#170	1.5		
#200	1.1		
#230	1.0		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2520 D_{85}= 0.2296 D_{60}= 0.1794
D_{50}= 0.1681 D_{30}= 0.1489 D_{15}= 0.1345
D_{10}= 0.1289 C_u= 1.39 C_c= 0.96

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.74

Source of Sample: SBSS 16
Sample Number: SBSS 16.6

Date: 7/20/18

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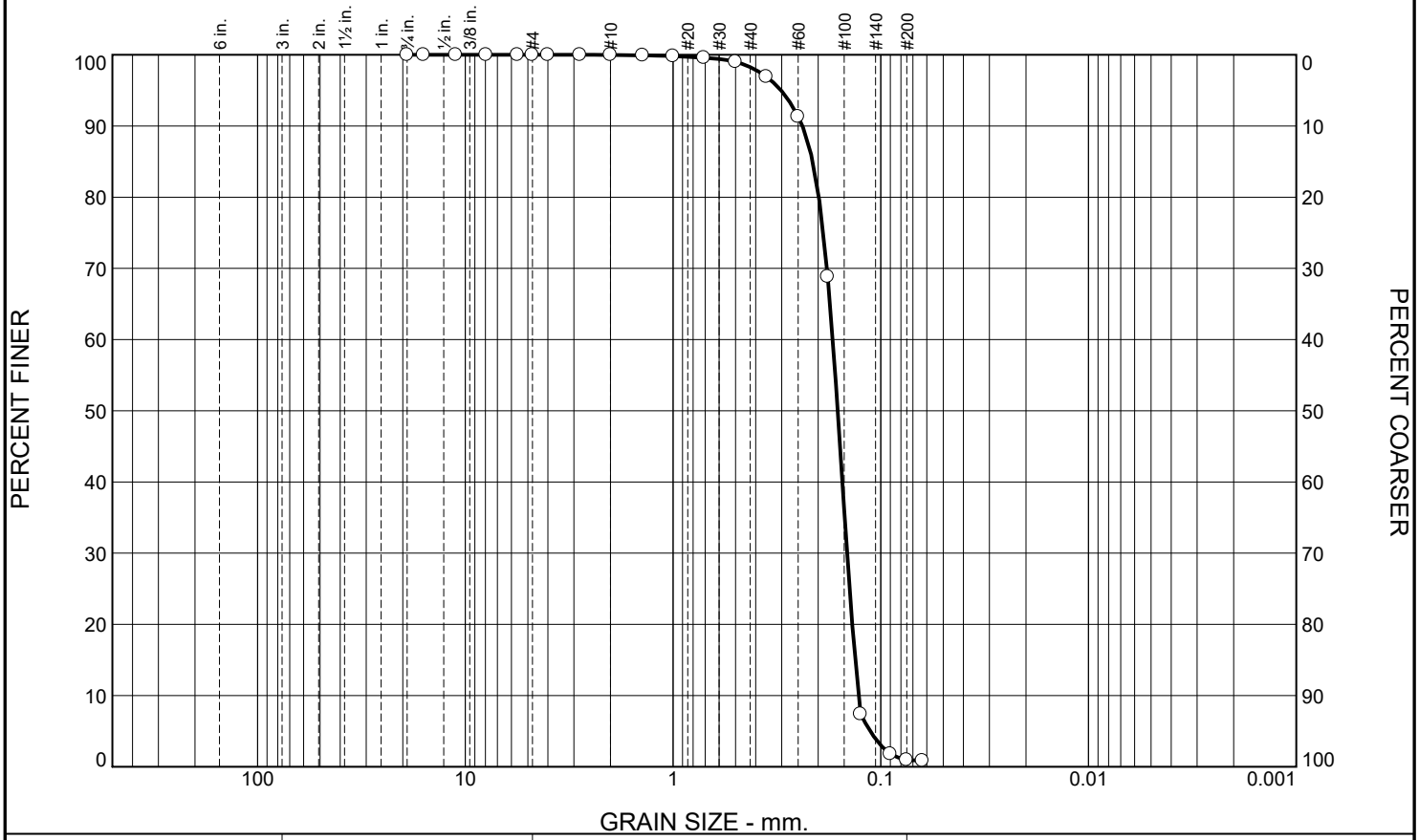
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.7	97.3	1.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	99.9		
#18	99.8		
#25	99.6		
#35	99.0		
#45	96.9		
#60	91.3		
#80	68.8		
#120	7.4		
#170	1.8		
#200	1.0		
#230	0.8		

* (no specification provided)

Soil Description

Gray (10YR 6/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2385 D_{85}= 0.2125 D_{60}= 0.1703
D_{50}= 0.1612 D_{30}= 0.1452 D_{15}= 0.1328
D_{10}= 0.1280 C_u= 1.33 C_c= 0.97

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.70

Source of Sample: SBSS 16
Sample Number: SBSS 16.7

Date: 7/20/18

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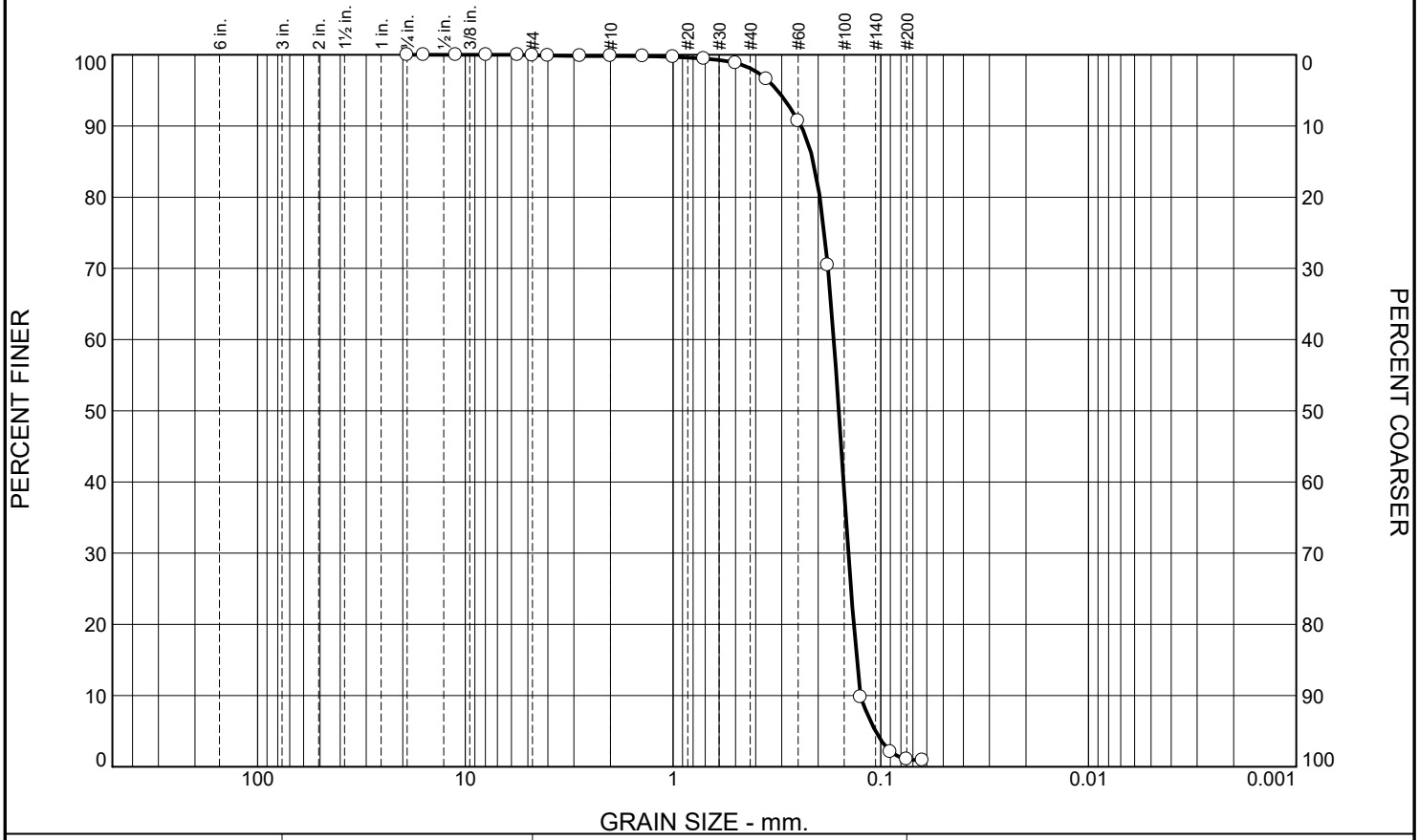
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.1	1.7	97.1	1.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	99.9		
#5	99.9		
#7	99.8		
#10	99.8		
#14	99.8		
#18	99.7		
#25	99.5		
#35	98.8		
#45	96.6		
#60	90.7		
#80	70.5		
#120	9.8		
#170	2.1		
#200	1.0		
#230	0.9		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2423 D_{85}= 0.2110 D_{60}= 0.1683
D_{50}= 0.1592 D_{30}= 0.1431 D_{15}= 0.1305
D_{10}= 0.1252 C_u= 1.34 C_c= 0.97

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.68

Source of Sample: SBSS 16
Sample Number: SBSS 16.TROUGH

Date: 7/20/18

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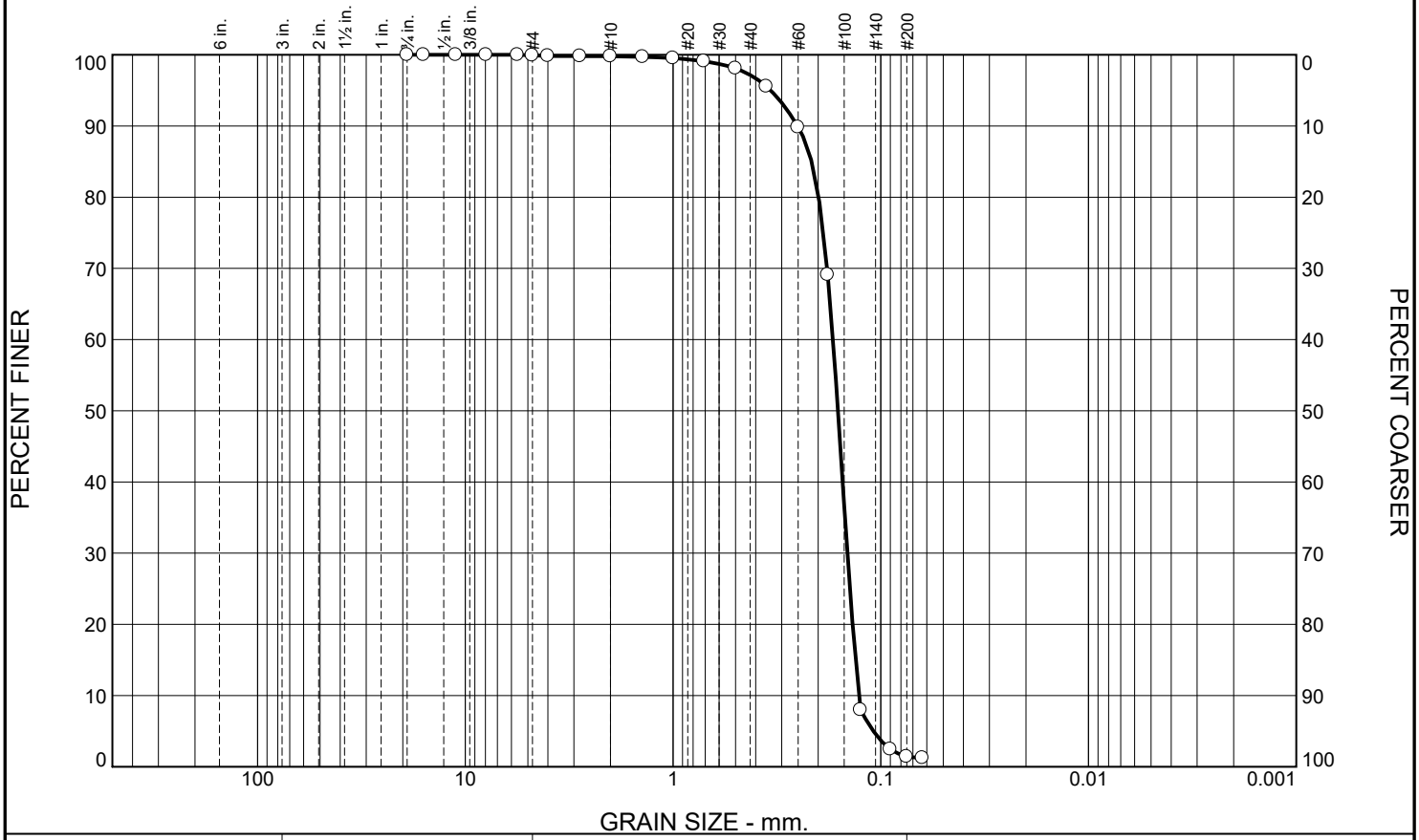
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.1	2.6	95.8	1.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	99.9		
#5	99.8		
#7	99.8		
#10	99.8		
#14	99.7		
#18	99.5		
#25	99.1		
#35	98.1		
#45	95.5		
#60	89.8		
#80	69.1		
#120	8.0		
#170	2.4		
#200	1.4		
#230	1.2		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2519 D_{85}= 0.2151 D_{60}= 0.1698
D_{50}= 0.1607 D_{30}= 0.1447 D_{15}= 0.1323
D_{10}= 0.1273 C_u= 1.33 C_c= 0.97

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.72

Source of Sample: SBSS 16
Sample Number: SBSS 16.CREST

Date: 7/20/18

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Wilmington, NC 28405
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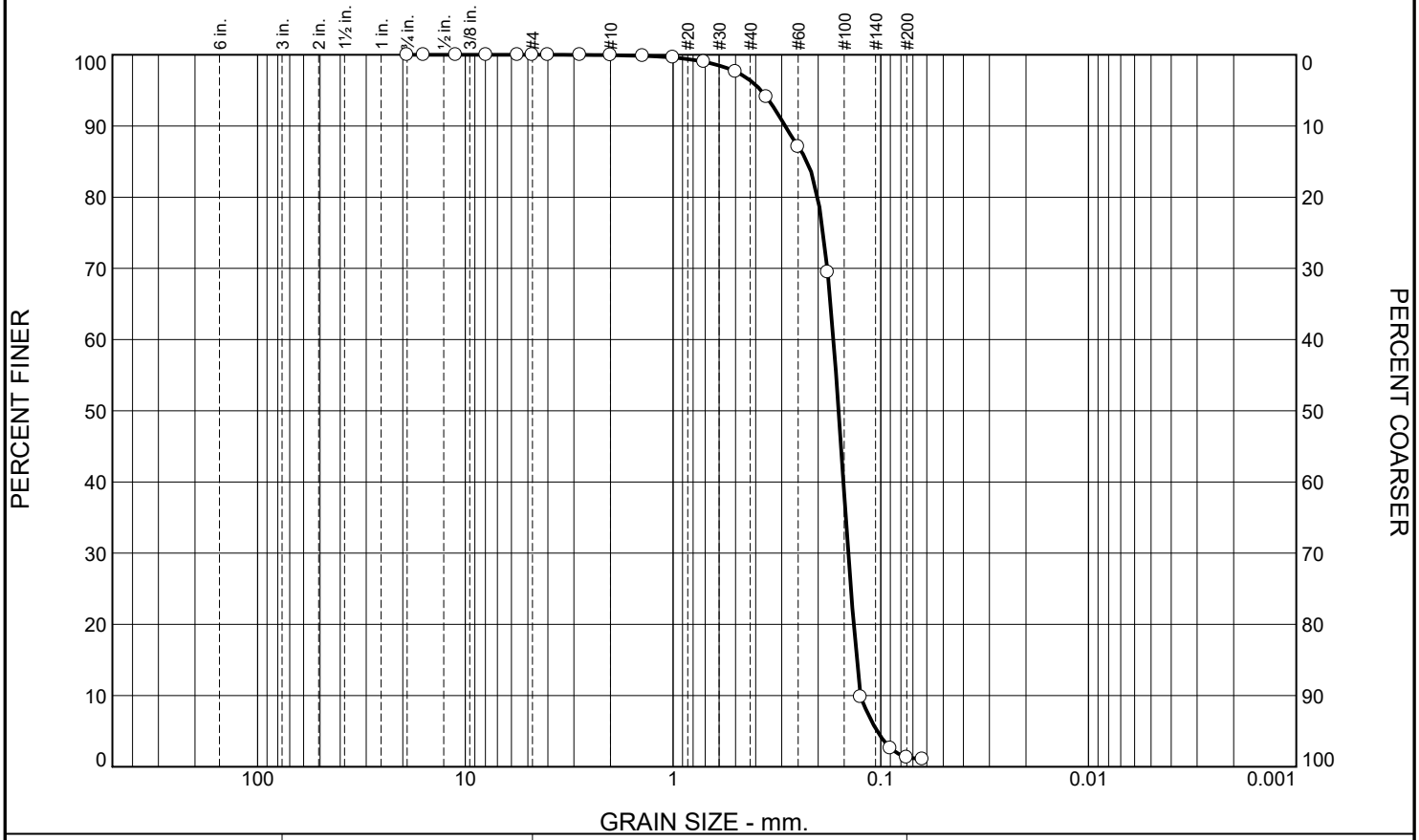
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	3.5	95.1	1.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	99.9		
#14	99.8		
#18	99.6		
#25	99.0		
#35	97.6		
#45	94.1		
#60	87.1		
#80	69.5		
#120	9.8		
#170	2.6		
#200	1.3		
#230	1.0		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2885 D_{85}= 0.2261 D_{60}= 0.1689
D_{50}= 0.1596 D_{30}= 0.1433 D_{15}= 0.1305
D_{10}= 0.1252 C_u= 1.35 C_c= 0.97

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.72

Source of Sample: SBSS 16
Sample Number: SBSS 16.106

Date: 7/20/18

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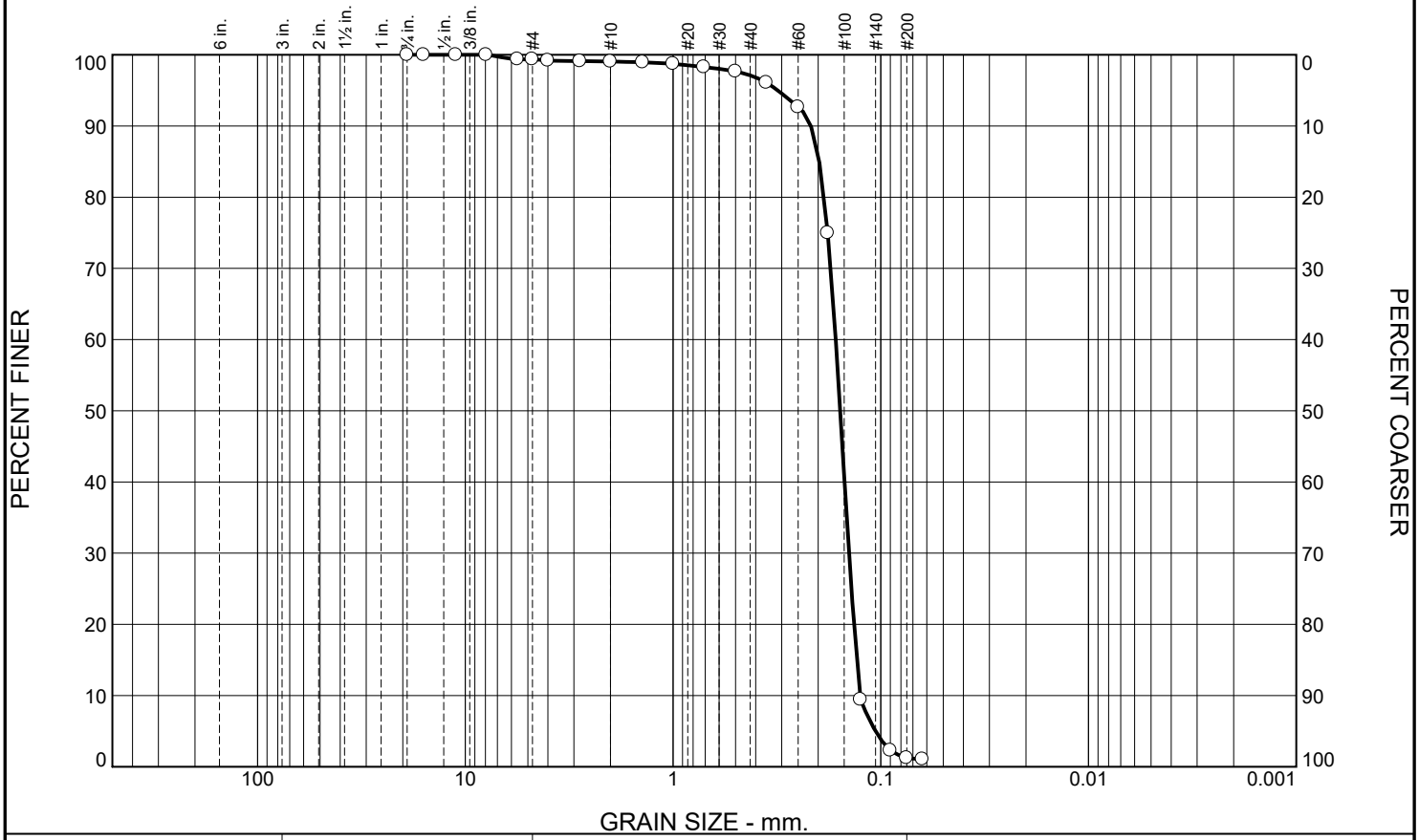
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.6	0.3	2.0	95.9	1.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	99.4		
#4	99.4		
#5	99.2		
#7	99.1		
#10	99.1		
#14	98.9		
#18	98.7		
#25	98.3		
#35	97.6		
#45	96.1		
#60	92.7		
#80	75.0		
#120	9.4		
#170	2.3		
#200	1.2		
#230	1.1		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2168 D_{85}= 0.1977 D_{60}= 0.1648
D_{50}= 0.1567 D_{30}= 0.1421 D_{15}= 0.1304
D_{10}= 0.1256 C_u= 1.31 C_c= 0.98

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.69

Source of Sample: SBSS 16
Sample Number: SBSS 16.109.5

Date: 7/20/18

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Wilmington, NC 28405
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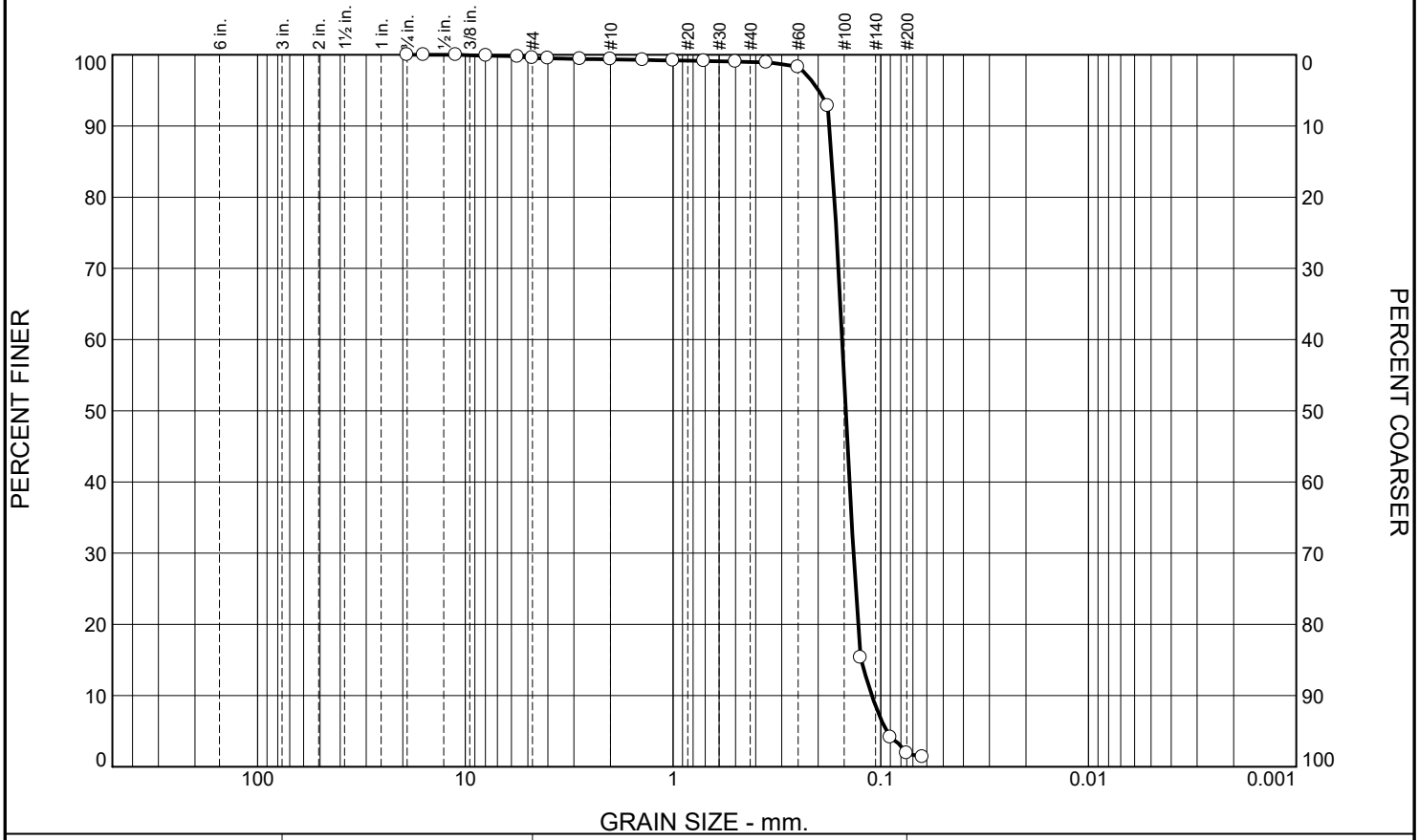
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.5	0.1	0.4	97.1	1.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	99.9		
#3.5	99.7		
#4	99.5		
#5	99.5		
#7	99.4		
#10	99.4		
#14	99.3		
#18	99.2		
#25	99.1		
#35	99.0		
#45	98.9		
#60	98.3		
#80	92.8		
#120	15.3		
#170	4.1		
#200	1.9		
#230	1.4		

* (no specification provided)

Soil Description

Gray (10YR 5/1), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1766 D_{85}= 0.1715 D_{60}= 0.1533
D_{50}= 0.1473 D_{30}= 0.1353 D_{15}= 0.1242
D_{10}= 0.1104 C_u= 1.39 C_c= 1.08

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.50

Source of Sample: SBSS 16
Sample Number: SBSS 16.113

Date: 7/20/18

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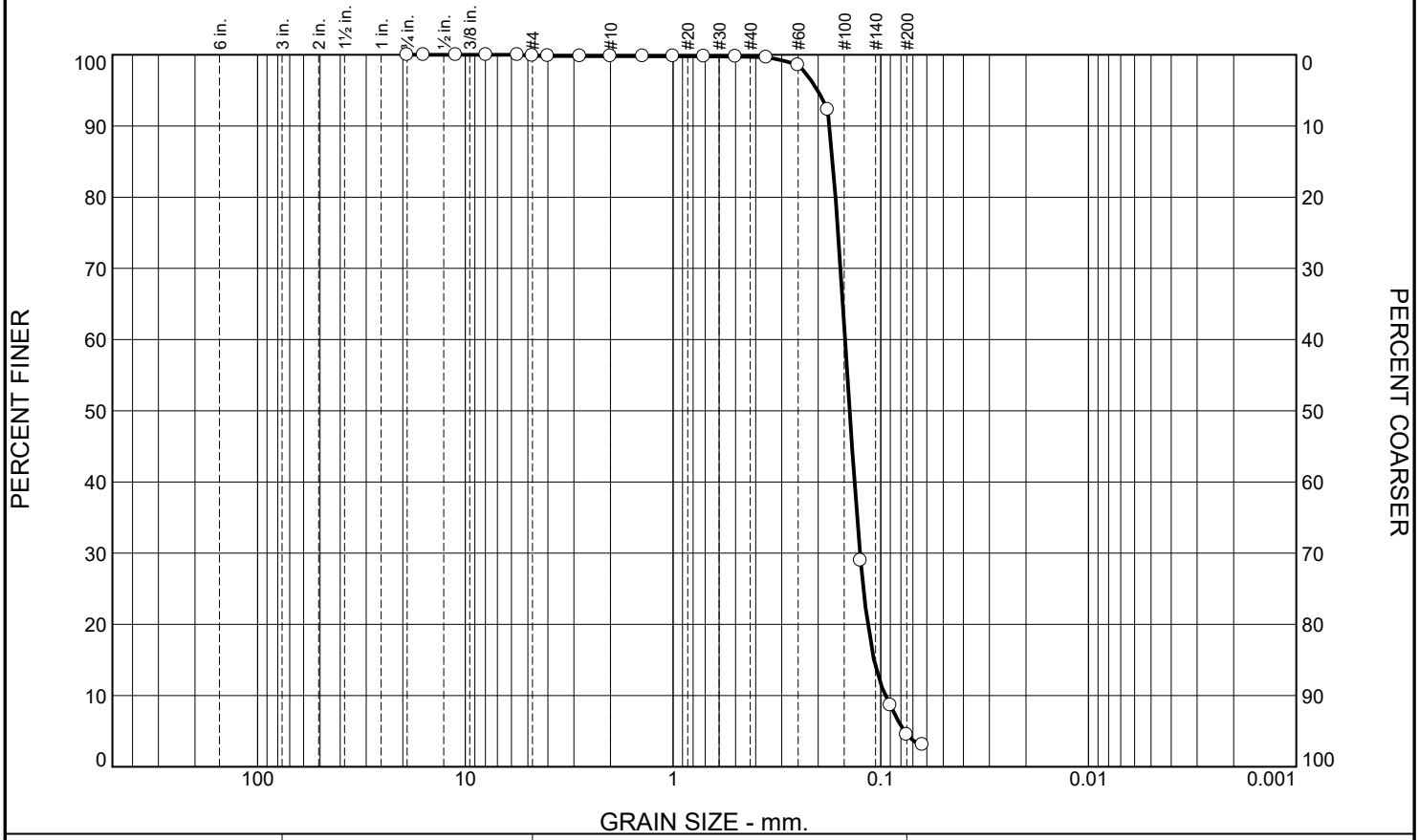
Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.1	0.1	95.2	4.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	99.9		
#5	99.8		
#7	99.8		
#10	99.8		
#14	99.8		
#18	99.8		
#25	99.8		
#35	99.8		
#45	99.6		
#60	98.5		
#80	92.3		
#120	29.0		
#170	8.6		
#200	4.5		
#230	3.1		

* (no specification provided)

Soil Description

Grayish Brown (10YR 5/2), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1765 D_{85}= 0.1703 D_{60}= 0.1485
D_{50}= 0.1412 D_{30}= 0.1259 D_{15}= 0.1079
D_{10}= 0.0949 C_u= 1.56 C_c= 1.12

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.39

Source of Sample: SBSS 16
Sample Number: SBSS 16.116.5

Date: 7/20/18

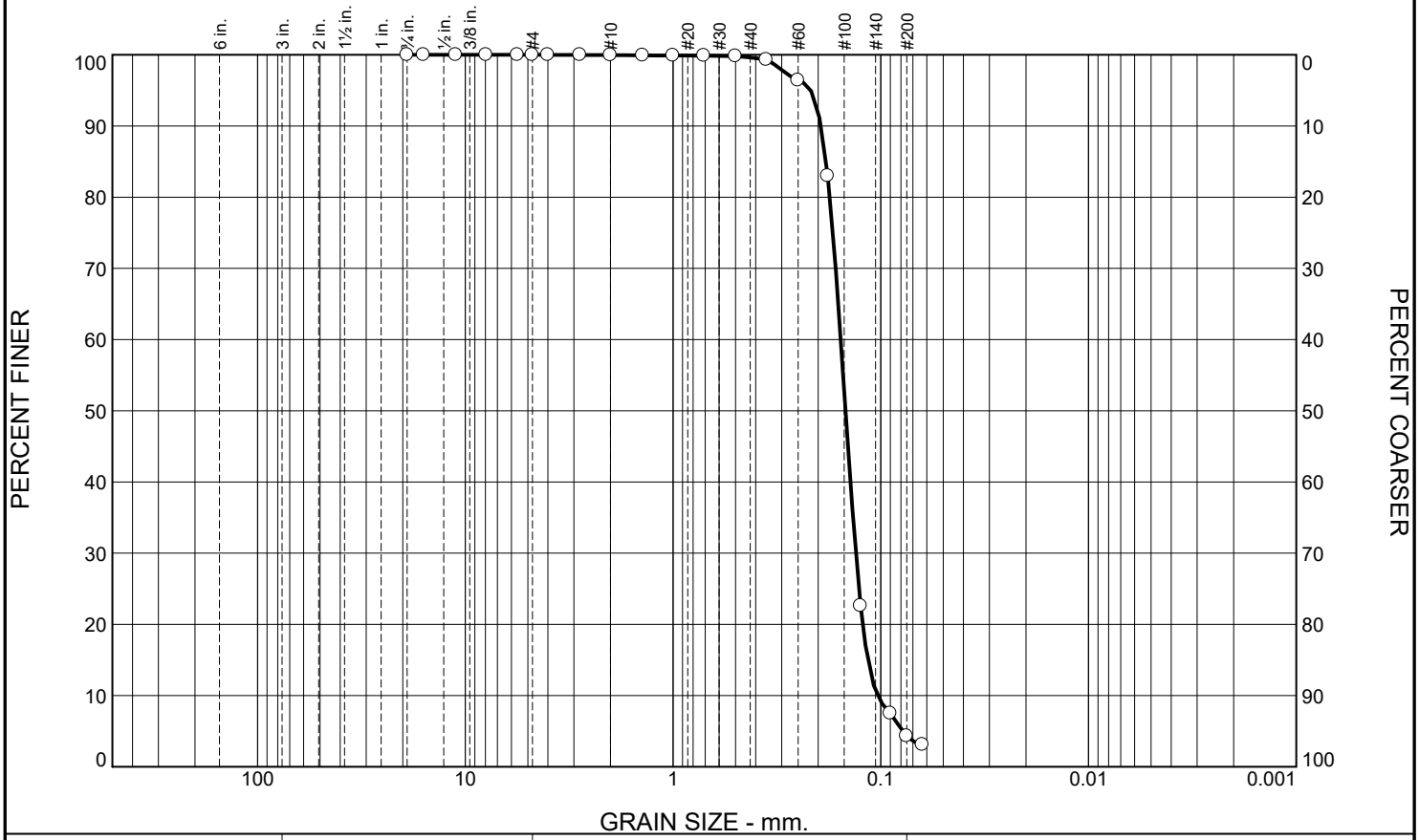
ECS SOUTHEAST, LLP
6714 Netherlands Drive
Wilmington, NC 28405
Phone: (910) 686-9114
Fax: (910) 686-9666

Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.4	95.3	4.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
5/8	100.0		
7/16	100.0		
5/16	100.0		
#3.5	100.0		
#4	100.0		
#5	100.0		
#7	100.0		
#10	100.0		
#14	99.9		
#18	99.9		
#25	99.9		
#35	99.8		
#45	99.3		
#60	96.4		
#80	83.0		
#120	22.6		
#170	7.5		
#200	4.3		
#230	3.1		

* (no specification provided)

Soil Description

Grayish Brown (10YR 5/2), Poorly Graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1939 D_{85}= 0.1832 D_{60}= 0.1558
D_{50}= 0.1477 D_{30}= 0.1318 D_{15}= 0.1154
D_{10}= 0.1037 C_u= 1.50 C_c= 1.08

Classification

USCS= SP AASHTO=

Remarks

F.M.=0.50

Source of Sample: SBSS 16
Sample Number: SBSS 16.120

Date: 7/20/18

ECS SOUTHEAST, LLP
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Phone: (910) 686-9114
Fax: (910) 686-9666

Client: Moffatt & Nichol
Project: Sunset Beach Shoreline Management

Project No: 25777 **Figure**

Tested By: EG **Checked By:** KEL

CALCITE COMPOSITE

ECS Southeast, LLP
6714 Netherlands Drive
Wilmington, NC 28405
Phone: (910) 686-9114
Fax: (910) 686-9666
www.ecslimited.com

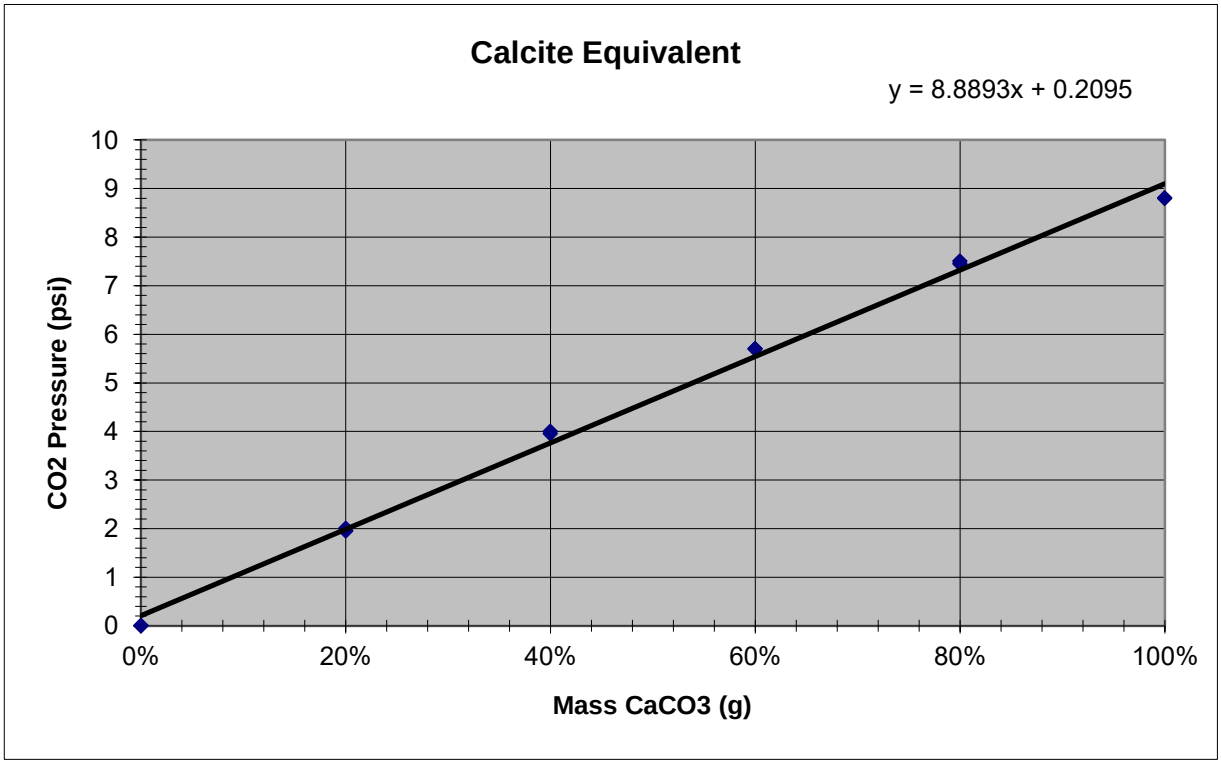
Standard Test Method for Rapid Determination of Carbonate Content of Soils
ASTM D 4373

PROJECT NAME: Sunset Beach Shoreline Management
PROJECT NUMBER: 25777
PROJECT MANAGER: K. Leimer
DATE: 7/20/2018

SAMPLE LOCATION: SBSS 0 Composite
SAMPLE DATE:
SAMPLE DESCRIPTION: Composite Sample (Light Gray to Gray to Grayish Brown, Poorly Graded SAND)

TEST DATA

Sample	Sample Size (g)	Gauge Reading (psi)	Correction Factor	Corrected Reading	Calcite Equivalent
SBSS 0 Composite	4.99	0.75	5.00	0.15	2%



Tested By: KEL

Reviewed By: KJS

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www.ecslimited.com

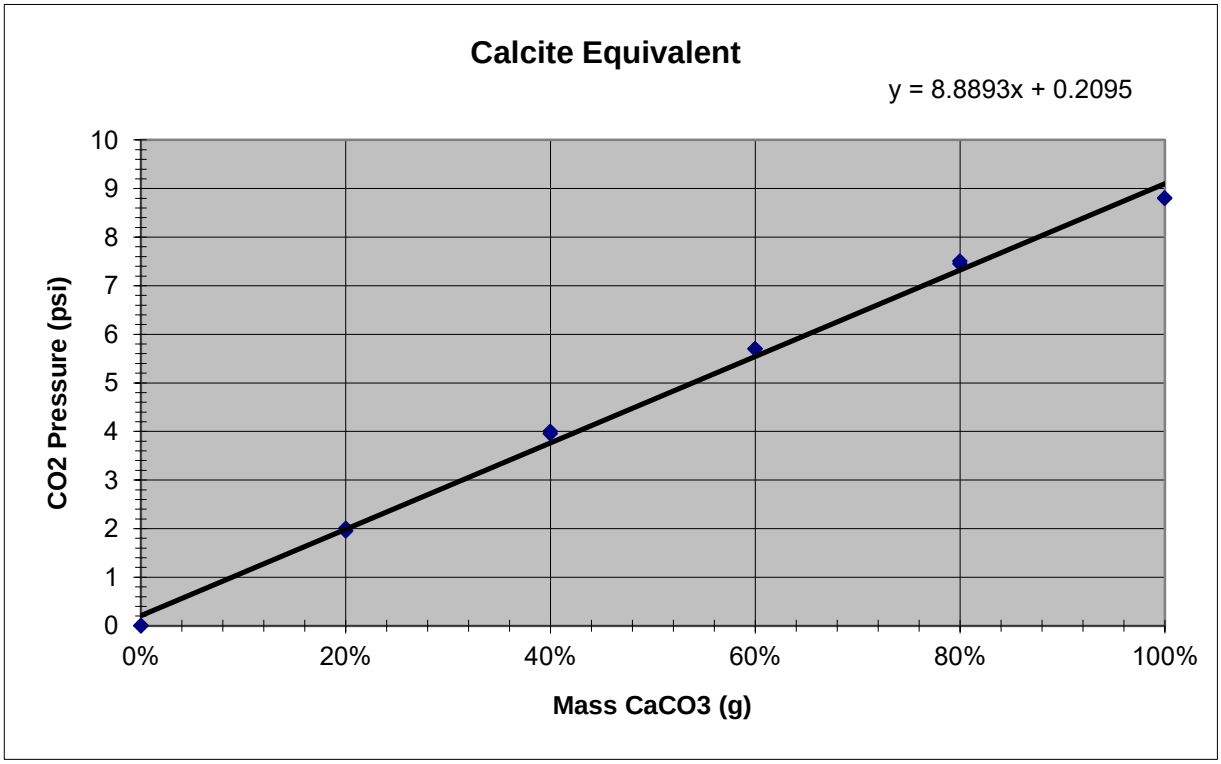
Standard Test Method for Rapid Determination of Carbonate Content of Soils
ASTM D 4373

PROJECT NAME: Sunset Beach Shoreline Management
PROJECT NUMBER: 25777
PROJECT MANAGER: K. Leimer
DATE: 7/20/2018

SAMPLE LOCATION: SBSS 4 Composite
SAMPLE DATE:
SAMPLE DESCRIPTION: Composite Sample (Light Gray to Gray to Grayish Brown, Poorly Graded SAND)

TEST DATA

Sample	Sample Size (g)	Gauge Reading (psi)	Correction Factor	Corrected Reading	Calcite Equivalent
SBSS 4 Composite	5.01	1.00	5.00	0.20	2%



Tested By: KEL Reviewed By: KJS

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Wilmington, NC 28405
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Fax: (910) 686-9666
www.ecslimited.com

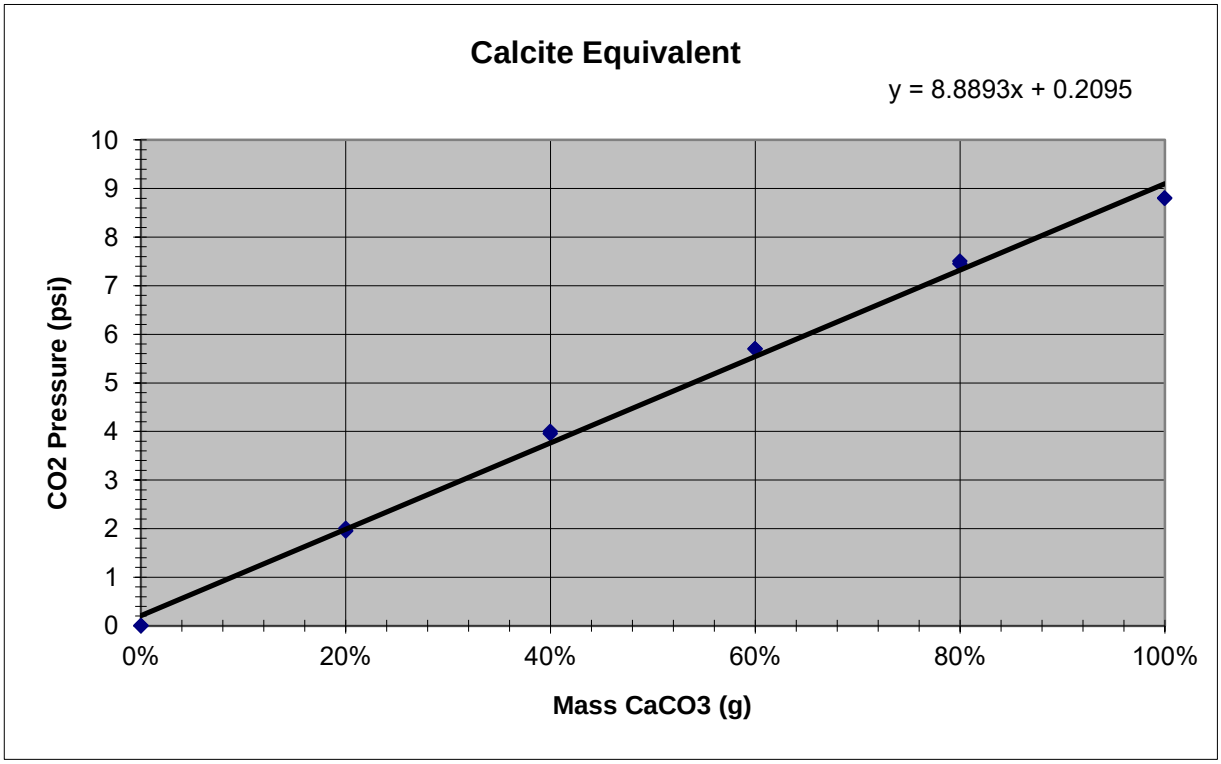
Standard Test Method for Rapid Determination of Carbonate Content of Soils
ASTM D 4373

PROJECT NAME: Sunset Beach Shoreline Management
PROJECT NUMBER: 25777
PROJECT MANAGER: K. Leimer
DATE: 7/20/2018

SAMPLE LOCATION: SBSS 8 Composite
SAMPLE DATE:
SAMPLE DESCRIPTION: Composite Sample (Light Gray to Gray to Grayish Brown, Poorly Graded SAND)

TEST DATA

Sample	Sample Size (g)	Gauge Reading (psi)	Correction Factor	Corrected Reading	Calcite Equivalent
SBSS 8 Composite	5.00	0.90	5.00	0.18	2%



Tested By: KEL

Reviewed By: KJS

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Wilmington, NC 28405
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www.ecslimited.com

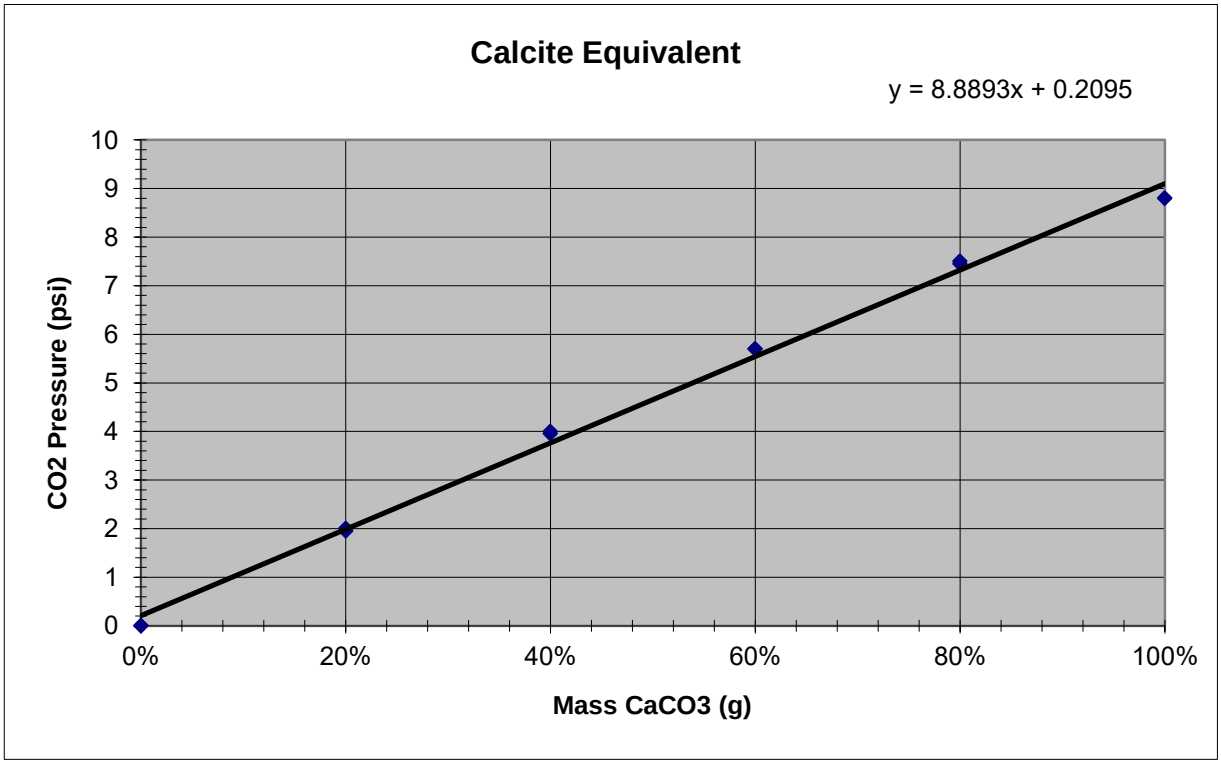
Standard Test Method for Rapid Determination of Carbonate Content of Soils
ASTM D 4373

PROJECT NAME: Sunset Beach Shoreline Management
PROJECT NUMBER: 25777
PROJECT MANAGER: K. Leimer
DATE: 7/20/2018

SAMPLE LOCATION: SBSS 12 Composite
SAMPLE DATE:
SAMPLE DESCRIPTION: Composite Sample (Light Gray to Gray to Grayish Brown, Poorly Graded SAND)

TEST DATA

Sample	Sample Size (g)	Gauge Reading (psi)	Correction Factor	Corrected Reading	Calcite Equivalent
SBSS 12 Composite	4.99	0.85	5.00	0.17	2%



Tested By: KEL

Reviewed By: KJS

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www.ecslimited.com

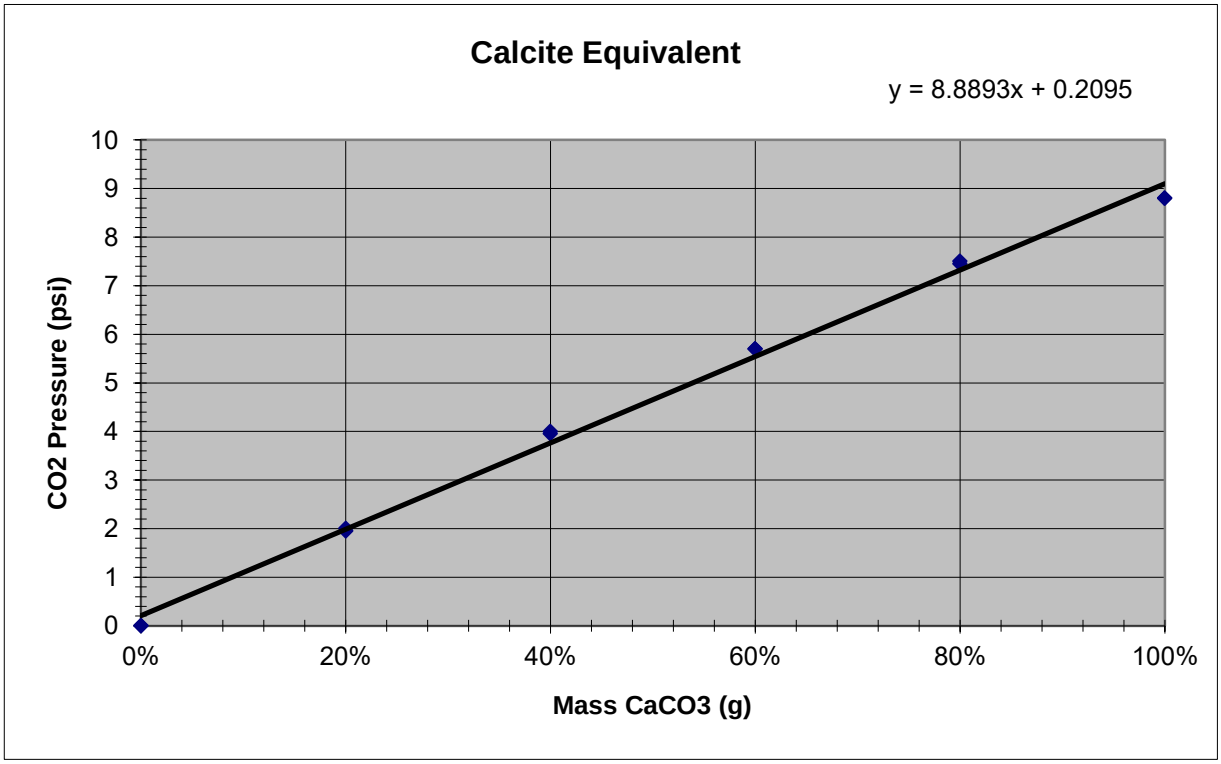
Standard Test Method for Rapid Determination of Carbonate Content of Soils
ASTM D 4373

PROJECT NAME: Sunset Beach Shoreline Management
PROJECT NUMBER: 25777
PROJECT MANAGER: K. Leimer
DATE: 7/20/2018

SAMPLE LOCATION: SBSS 16 Composite
SAMPLE DATE:
SAMPLE DESCRIPTION: Composite Sample (Light Gray to Gray to Grayish Brown, Poorly Graded SAND)

TEST DATA

Sample	Sample Size (g)	Gauge Reading (psi)	Correction Factor	Corrected Reading	Calcite Equivalent
SBSS 16 Composite	5.00	0.80	5.00	0.16	2%



Tested By: KEL Reviewed By: KJS

CLAST REPORT

CLAST FIELD INVESTIGATION

Purpose

As part of the State Sediment Criteria to ensure the compatibility of sand characteristics, the number of clasts (rocks and shells) greater than or equal to 3-inches in diameter present on the native beach is to be quantified. This value shall be calculated from observable clasts on the beach surface found between the frontal dune toe and mean low water (MLW) for a 50,000 square foot area. This representative sample will quantify the "background" value of the entire project area. As a result, the criteria stipulate that the borrow area material is considered incompatible if more than twice the background level that existed on the native beach is placed in the project area.

Method

The Sunset Beach project extends from 5th Street to 12th Street, Transects 0+00 – 16+00. Once onsite, a walkthrough was completed of the project area in order to determine a representative section to sample. The area identified was between 6th Street and 7th Street, over Transect 4+00.

Before the investigation began the timing of low tide was identified to allow easier survey of the area between the frontal dune toe and MLW. The length from the frontal dune toe to MLW was measured to be 350 feet. This length was marked with a rope that was staked at both ends with survey flags. The rope used was 100 feet long; the remaining 250 feet out to MLW was marked with survey flags every 50-100 feet. A tape measure was used to measure 25 feet from each survey flag to mark the boundaries of the next section. Following along the frontal dune toe survey flags staked at 25-foot spacing allowed for the continual creation of sections once the previous section was fully surveyed. General notes were made about the location, number, and type of clasts found (above MHW, rock, etc.). A picture of a representative clast(s) was taken from each section to document the findings.

Results

The survey area began at the 6th Street beach access. The length from the frontal dune toe to MLW was measured to be 350 feet; this allowed for the creation of six 25-foot wide sections to calculate a 52,500 square foot area. The survey area extended 150 feet east ending approximately 50 feet west of the 7th Street beach access. The 52,500 square foot area is shown in Figure 1. Photos of the section setup are documented in Figures 2 and 3.

Figure 1. Sunset Beach Survey Area

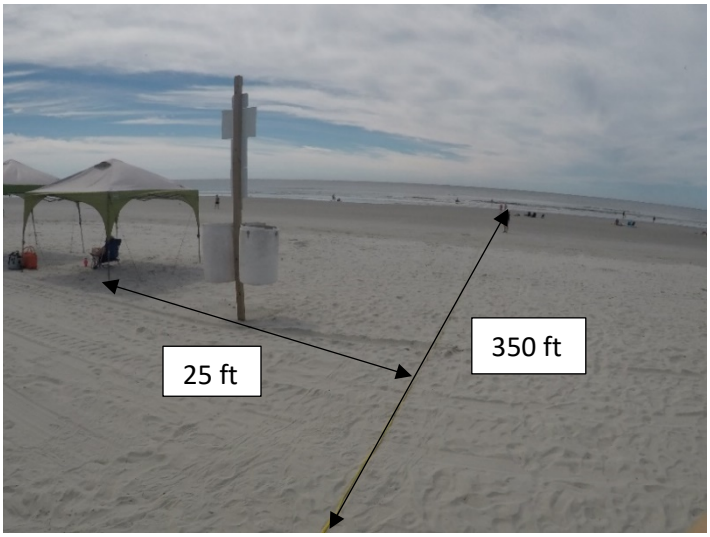


Figure 2. Sunset Beach setup - looking at MLW

Figure 3. Sunset Beach setup - looking at frontal dune toe

Table 1 shows the detailed results from the investigation; a total of 2 clasts greater than or equal to 3-inches in diameter were surveyed. Figure 4 shows the clasts found in the study area. The clasts surveyed were shells, no rocks were found. The beach had a gradual slope, with no berm drop off. All shells meeting size requirements were documented near MLW.

Table 1. Sunset Beach Results

Sunset Beach		
Section #	**# Clasts**	**Comments**
1	0	
2	0	
3	0	
4	0	
5	1	Found @ MLW
6	1	Found @ MLW
Total	**2**	

Figure 4. Section 5 and 6 documentation

Due to the lack of shells greater than 3-inches in diameter present in the project area, pictures were taken of clasts that were representative of the project area (Figure 5). The typical shells found in the project area were smaller than 3-inches in diameter. Overall, very few shells of any size were observed on the beach. While performing the investigation several locals from the area shared comments that very few shells had been on the shore in recent years. Another individual recalled there used to be a significant amount of shells when he was a child (approximately 30 years ago).

Figure 5. Representative Clasts

The lack of shells is thought to be influenced by observed nearshore shoaling. In Figure 6 the breaking of waves seen farther offshore from MLW indicate the presence of a shoaled bar. It is possible that the clasts were trapped on the outside of the bar and not drifting to the shore.

Figure 6. Shoaling offshore

APPENDIX E

CHEMICAL ANALYSIS

Sample Results

Report of Analysis

SGS Accutest

Report of Analysis

Client Sample ID:	V23242526		
Lab Sample ID:	FA36573-2	**Date Sampled:**	08/30/16
Matrix:	SO - Soil	**Date Received:**	08/31/16
Method:	SW846 8270D BY SIM SW846 3546	**Percent Solids:**	47.9
Project:	215122; Sunset Beach, NC		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W094790.D	1	09/07/16	MG	09/06/16	OP61755	SW4248
Run #2							

	Initial Weight	Final Volume
Run #1	15.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	0.14	0.055	mg/kg	
208-96-8	Acenaphthylene	ND	0.14	0.055	mg/kg	
120-12-7	Anthracene	ND	0.14	0.034	mg/kg	
56-55-3	Benzo(a)anthracene	ND	0.027	0.0068	mg/kg	
50-32-8	Benzo(a)pyrene	ND	0.027	0.0068	mg/kg	
205-99-2	Benzo(b)fluoranthene	ND	0.027	0.0068	mg/kg	
191-24-2	Benzo(g,h,i)perylene	ND	0.027	0.0068	mg/kg	
207-08-9	Benzo(k)fluoranthene	ND	0.027	0.0068	mg/kg	
218-01-9	Chrysene	ND	0.027	0.0068	mg/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	0.027	0.0068	mg/kg	
206-44-0	Fluoranthene	ND	0.14	0.034	mg/kg	
86-73-7	Fluorene	ND	0.14	0.055	mg/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.027	0.0068	mg/kg	
90-12-0	1-Methylnaphthalene	ND	0.14	0.055	mg/kg	
91-57-6	2-Methylnaphthalene	ND	0.14	0.055	mg/kg	
91-20-3	Naphthalene	ND	0.14	0.055	mg/kg	
85-01-8	Phenanthrene	ND	0.14	0.034	mg/kg	
129-00-0	Pyrene	ND	0.14	0.034	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	84%		40-105%
321-60-8	2-Fluorobiphenyl	83%		43-107%
1718-51-0	Terphenyl-d14	73%		45-119%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	V23242526		
Lab Sample ID:	FA36573-2	**Date Sampled:**	08/30/16
Matrix:	SO - Soil	**Date Received:**	08/31/16
Method:	MADEP VPH REV 1.1	**Percent Solids:**	47.9
Project:	215122; Sunset Beach, NC		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	UU017068.D	1	09/01/16	CG	n/a	n/a	GUU879
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.86 g	5.1 ml	100 ul
Run #2			

MADEP VPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.15	0.15	mg/kg	
100-41-4	Ethylbenzene	ND	0.29	0.15	mg/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	0.29	0.15	mg/kg	
91-20-3	Naphthalene	ND	0.73	0.44	mg/kg	
108-88-3	Toluene	ND	0.29	0.15	mg/kg	
	m,p-Xylene	ND	0.58	0.29	mg/kg	
95-47-6	o-Xylene	ND	0.29	0.15	mg/kg	
	C5- C8 Aliphatics (Unadj.)	ND	15	5.1	mg/kg	
	C9- C12 Aliphatics (Unadj.)	ND	15	5.1	mg/kg	
	C9- C10 Aromatics (Unadj.)	ND	15	5.1	mg/kg	
	C5- C8 Aliphatics	ND	15	5.1	mg/kg	
	C9- C12 Aliphatics	ND	15	5.1	mg/kg	
	C9- C10 Aromatics	ND	15	5.1	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	BFB	155% [a]		70-130%
460-00-4	BFB	159% [a]		70-130%

(a) Outside control limits due to moisture content.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	V23242526		
Lab Sample ID:	FA36573-2	**Date Sampled:**	08/30/16
Matrix:	SO - Soil	**Date Received:**	08/31/16
Method:	MADEP EPH REV 1.1 SW846 3546	**Percent Solids:**	47.9
Project:	215122; Sunset Beach, NC		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	NN016011.D	1	09/08/16	FS	09/06/16	OP61759	GNN794
Run #2							

	Initial Weight	Final Volume
Run #1	3.3 g	2.0 ml
Run #2		

MAEPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	2.5	1.3	mg/kg	
208-96-8	Acenaphthylene	ND	2.5	1.3	mg/kg	
120-12-7	Anthracene	ND	2.5	1.3	mg/kg	
56-55-3	Benzo(a)anthracene	ND	2.5	1.3	mg/kg	
50-32-8	Benzo(a)pyrene	ND	2.5	1.3	mg/kg	
205-99-2	Benzo(b)fluoranthene	ND	2.5	1.3	mg/kg	
191-24-2	Benzo(g,h,i)perylene	ND	2.5	1.3	mg/kg	
207-08-9	Benzo(k)fluoranthene	ND	2.5	1.3	mg/kg	
218-01-9	Chrysene	ND	2.5	1.3	mg/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	2.5	1.3	mg/kg	
206-44-0	Fluoranthene	ND	2.5	1.3	mg/kg	
86-73-7	Fluorene	ND	2.5	1.3	mg/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	2.5	1.3	mg/kg	
91-57-6	2-Methylnaphthalene	ND	2.5	1.3	mg/kg	
91-20-3	Naphthalene	ND	2.5	1.3	mg/kg	
85-01-8	Phenanthrene	ND	2.5	1.3	mg/kg	
129-00-0	Pyrene	ND	2.5	1.3	mg/kg	
	C11-C22 Aromatics (Unadj.)	ND	130	95	mg/kg	
	C11-C22 Aromatics	ND	130	95	mg/kg	
	C9-C18 Aliphatics	ND	130	63	mg/kg	
	C19-C36 Aliphatics	ND	130	63	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3386-33-2	1-Chlorooctadecane	78%		40-140%
580-13-2	2-Bromonaphthalene	94%		40-140%
84-15-1	o-Terphenyl	71%		40-140%
321-60-8	2-Fluorobiphenyl	81%		40-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	V23242526		
Lab Sample ID:	FA36573-2	**Date Sampled:**	08/30/16
Matrix:	SO - Soil	**Date Received:**	08/31/16
Method:	SW846 8081B SW846 3546	**Percent Solids:**	47.9
Project:	215122; Sunset Beach, NC		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK78609.D	1	09/14/16	NG	09/09/16	OP61809	GKK2537
Run #2 [a]	KK78589.D	10	09/14/16	NG	09/09/16	OP61809	GKK2537

	Initial Weight	Final Volume
Run #1	4.00 g	5.0 ml
Run #2	4.00 g	5.0 ml

Pesticide PPL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.013	0.0040	mg/kg	
319-84-6	alpha-BHC [b]	ND	0.013	0.0040	mg/kg	
319-85-7	beta-BHC [b]	ND	0.013	0.0040	mg/kg	
319-86-8	delta-BHC	ND	0.013	0.0038	mg/kg	
58-89-9	gamma-BHC (Lindane) [b]	ND	0.013	0.0040	mg/kg	
12789-03-6	Chlordane	ND	0.13	0.052	mg/kg	
60-57-1	Dieldrin	ND	0.013	0.0049	mg/kg	
72-54-8	4,4'-DDD [b]	ND	0.026	0.0045	mg/kg	
72-55-9	4,4'-DDE	ND	0.026	0.0042	mg/kg	
50-29-3	4,4'-DDT	ND [c]	0.26	0.051	mg/kg	
72-20-8	Endrin	ND	0.026	0.0049	mg/kg	
1031-07-8	Endosulfan sulfate	ND	0.026	0.0049	mg/kg	
7421-93-4	Endrin aldehyde	ND	0.026	0.0049	mg/kg	
959-98-8	Endosulfan-I	ND	0.013	0.0038	mg/kg	
33213-65-9	Endosulfan-II	ND	0.013	0.0048	mg/kg	
76-44-8	Heptachlor	ND	0.013	0.0044	mg/kg	
1024-57-3	Heptachlor epoxide	ND	0.013	0.0046	mg/kg	
72-43-5	Methoxychlor	ND [c]	0.26	0.067	mg/kg	
8001-35-2	Toxaphene	ND	0.65	0.26	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	101%	105%	50-122%
2051-24-3	Decachlorobiphenyl	92%	106%	50-133%

(a) Dilution required due to matrix interference.
(b) Associated CCV outside control limits.
(c) Result is from Run# 2

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID: V23242526
Lab Sample ID: FA36573-2
Matrix: SO - Soil
Project: 215122; Sunset Beach, NC

Date Sampled: 08/30/16
Date Received: 08/31/16
Percent Solids: 47.9

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Antimony	<1.8	1.8	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Arsenic	6.2	0.88	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Beryllium	<0.44	0.44	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Cadmium	<0.35	0.35	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Chromium	24.3	0.88	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Copper	7.5	2.2	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Lead	7.8	1.8	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Mercury	<0.079	0.079	mg/kg	1	09/08/16	09/08/16	JL	SW846 7471B [2]	SW846 7471B [4]
Nickel	4.6	3.5	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Selenium	<1.8	1.8	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Silver	<0.88	0.88	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Thallium	<0.88	0.88	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Zinc	23.8	1.8	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]

(1) Instrument QC Batch: MA13390
(2) Instrument QC Batch: MA13391
(3) Prep QC Batch: MP30803
(4) Prep QC Batch: MP30806

RL = Reporting Limit

SGS Accutest

Report of Analysis

Client Sample ID:	V23242526		
Lab Sample ID:	FA36573-2	**Date Sampled:**	08/30/16
Matrix:	SO - Soil	**Date Received:**	08/31/16
		Percent Solids:	47.9
Project:	215122; Sunset Beach, NC		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
HEM Oil and Grease	<960	960	mg/kg	1	09/10/16 15:00	KC	SW846 9071B
Solids, Percent	47.9		%	1	09/01/16 12:15	JL	SM19 2540G
Total Organic Carbon	65500	2100	mg/kg	1	09/12/16 13:38	FN	SW846 9060A M

RL = Reporting Limit

SGS Accutest

Report of Analysis

Client Sample ID:	V2022		
Lab Sample ID:	FA36573-3	**Date Sampled:**	08/30/16
Matrix:	SO - Soil	**Date Received:**	08/31/16
Method:	SW846 8270D BY SIM SW846 3546	**Percent Solids:**	35.8
Project:	215122; Sunset Beach, NC		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W094791.D	1	09/07/16	MG	09/06/16	OP61755	SW4248
Run #2							

	Initial Weight	Final Volume
Run #1	15.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	0.18	0.072	mg/kg	
208-96-8	Acenaphthylene	ND	0.18	0.072	mg/kg	
120-12-7	Anthracene	ND	0.18	0.045	mg/kg	
56-55-3	Benzo(a)anthracene	ND	0.036	0.0090	mg/kg	
50-32-8	Benzo(a)pyrene	ND	0.036	0.0090	mg/kg	
205-99-2	Benzo(b)fluoranthene	ND	0.036	0.0090	mg/kg	
191-24-2	Benzo(g,h,i)perylene	ND	0.036	0.0090	mg/kg	
207-08-9	Benzo(k)fluoranthene	ND	0.036	0.0090	mg/kg	
218-01-9	Chrysene	ND	0.036	0.0090	mg/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	0.036	0.0090	mg/kg	
206-44-0	Fluoranthene	ND	0.18	0.045	mg/kg	
86-73-7	Fluorene	ND	0.18	0.072	mg/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.036	0.0090	mg/kg	
90-12-0	1-Methylnaphthalene	ND	0.18	0.072	mg/kg	
91-57-6	2-Methylnaphthalene	ND	0.18	0.072	mg/kg	
91-20-3	Naphthalene	ND	0.18	0.072	mg/kg	
85-01-8	Phenanthrene	ND	0.18	0.045	mg/kg	
129-00-0	Pyrene	ND	0.18	0.045	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	96%		40-105%
321-60-8	2-Fluorobiphenyl	90%		43-107%
1718-51-0	Terphenyl-d14	89%		45-119%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	V2022		
Lab Sample ID:	FA36573-3	**Date Sampled:**	08/30/16
Matrix:	SO - Soil	**Date Received:**	08/31/16
Method:	MADEP VPH REV 1.1	**Percent Solids:**	35.8
Project:	215122; Sunset Beach, NC		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	UU017069.D	1	09/01/16	CG	n/a	n/a	GUU879
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	4.74 g	5.1 ml	100 ul
Run #2			

MADEP VPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.24	0.24	mg/kg	
100-41-4	Ethylbenzene	ND	0.48	0.24	mg/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	0.48	0.24	mg/kg	
91-20-3	Naphthalene	ND	1.2	0.72	mg/kg	
108-88-3	Toluene	ND	0.48	0.24	mg/kg	
	m,p-Xylene	ND	0.96	0.48	mg/kg	
95-47-6	o-Xylene	ND	0.48	0.24	mg/kg	
	C5- C8 Aliphatics (Unadj.)	ND	24	8.4	mg/kg	
	C9- C12 Aliphatics (Unadj.)	ND	24	8.4	mg/kg	
	C9- C10 Aromatics (Unadj.)	ND	24	8.4	mg/kg	
	C5- C8 Aliphatics	ND	24	8.4	mg/kg	
	C9- C12 Aliphatics	ND	24	8.4	mg/kg	
	C9- C10 Aromatics	ND	24	8.4	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	BFB	105%		70-130%
460-00-4	BFB	108%		70-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	V2022		
Lab Sample ID:	FA36573-3	**Date Sampled:**	08/30/16
Matrix:	SO - Soil	**Date Received:**	08/31/16
Method:	MADEP EPH REV 1.1 SW846 3546	**Percent Solids:**	35.8
Project:	215122; Sunset Beach, NC		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	NN016012.D	1	09/08/16	FS	09/06/16	OP61759	GNN794
Run #2							

	Initial Weight	Final Volume
Run #1	3.5 g	2.0 ml
Run #2		

MAEPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	3.2	1.6	mg/kg	
208-96-8	Acenaphthylene	ND	3.2	1.6	mg/kg	
120-12-7	Anthracene	ND	3.2	1.6	mg/kg	
56-55-3	Benzo(a)anthracene	ND	3.2	1.6	mg/kg	
50-32-8	Benzo(a)pyrene	ND	3.2	1.6	mg/kg	
205-99-2	Benzo(b)fluoranthene	ND	3.2	1.6	mg/kg	
191-24-2	Benzo(g,h,i)perylene	ND	3.2	1.6	mg/kg	
207-08-9	Benzo(k)fluoranthene	ND	3.2	1.6	mg/kg	
218-01-9	Chrysene	ND	3.2	1.6	mg/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	3.2	1.6	mg/kg	
206-44-0	Fluoranthene	ND	3.2	1.6	mg/kg	
86-73-7	Fluorene	ND	3.2	1.6	mg/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	3.2	1.6	mg/kg	
91-57-6	2-Methylnaphthalene	ND	3.2	1.6	mg/kg	
91-20-3	Naphthalene	ND	3.2	1.6	mg/kg	
85-01-8	Phenanthrene	ND	3.2	1.6	mg/kg	
129-00-0	Pyrene	ND	3.2	1.6	mg/kg	
	C11-C22 Aromatics (Unadj.)	ND	160	120	mg/kg	
	C11-C22 Aromatics	ND	160	120	mg/kg	
	C9-C18 Aliphatics	ND	160	80	mg/kg	
	C19-C36 Aliphatics	ND	160	80	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3386-33-2	1-Chlorooctadecane	63%		40-140%
580-13-2	2-Bromonaphthalene	89%		40-140%
84-15-1	o-Terphenyl	65%		40-140%
321-60-8	2-Fluorobiphenyl	78%		40-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	V2022		
Lab Sample ID:	FA36573-3	**Date Sampled:**	08/30/16
Matrix:	SO - Soil	**Date Received:**	08/31/16
Method:	SW846 8081B SW846 3546	**Percent Solids:**	35.8
Project:	215122; Sunset Beach, NC		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK78610.D	1	09/14/16	NG	09/09/16	OP61809	GKK2537
Run #2 [a]	KK78590.D	10	09/14/16	NG	09/09/16	OP61809	GKK2537

	Initial Weight	Final Volume
Run #1	4.30 g	5.0 ml
Run #2	4.30 g	5.0 ml

Pesticide PPL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.016	0.0049	mg/kg	
319-84-6	alpha-BHC [b]	ND	0.016	0.0050	mg/kg	
319-85-7	beta-BHC [b]	ND	0.016	0.0050	mg/kg	
319-86-8	delta-BHC	ND	0.016	0.0047	mg/kg	
58-89-9	gamma-BHC (Lindane) [b]	ND	0.016	0.0050	mg/kg	
12789-03-6	Chlordane	ND	0.16	0.065	mg/kg	
60-57-1	Dieldrin	ND	0.016	0.0061	mg/kg	
72-54-8	4,4'-DDD [b]	ND	0.032	0.0056	mg/kg	
72-55-9	4,4'-DDE	ND	0.032	0.0052	mg/kg	
50-29-3	4,4'-DDT	ND [c]	0.32	0.064	mg/kg	
72-20-8	Endrin	ND	0.032	0.0060	mg/kg	
1031-07-8	Endosulfan sulfate	ND	0.032	0.0061	mg/kg	
7421-93-4	Endrin aldehyde	ND	0.032	0.0060	mg/kg	
959-98-8	Endosulfan-I	ND	0.016	0.0047	mg/kg	
33213-65-9	Endosulfan-II	ND	0.016	0.0060	mg/kg	
76-44-8	Heptachlor	ND	0.016	0.0055	mg/kg	
1024-57-3	Heptachlor epoxide	ND	0.016	0.0057	mg/kg	
72-43-5	Methoxychlor	ND [c]	0.32	0.083	mg/kg	
8001-35-2	Toxaphene	ND	0.81	0.32	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	101%	110%	50-122%
2051-24-3	Decachlorobiphenyl	92%	110%	50-133%

(a) Dilution required due to matrix interference.
(b) Associated CCV outside control limits.
(c) Result is from Run# 2

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID: V2022
Lab Sample ID: FA36573-3
Matrix: SO - Soil
Project: 215122; Sunset Beach, NC

Date Sampled: 08/30/16
Date Received: 08/31/16
Percent Solids: 35.8

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Antimony	<2.5	2.5	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Arsenic	15.7	1.2	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Beryllium	0.94	0.62	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Cadmium	<0.50	0.50	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Chromium	48.7	1.2	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Copper	11.6	3.1	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Lead	23.9	2.5	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Mercury	<0.11	0.11	mg/kg	1	09/08/16	09/08/16	JL	SW846 7471B [2]	SW846 7471B [4]
Nickel	11.8	5.0	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Selenium	<2.5	2.5	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Silver	<1.2	1.2	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Thallium	<1.2	1.2	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Zinc	51.0	2.5	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]

(1) Instrument QC Batch: MA13390
(2) Instrument QC Batch: MA13391
(3) Prep QC Batch: MP30803
(4) Prep QC Batch: MP30806

RL = Reporting Limit

SGS Accutest

Report of Analysis

Client Sample ID:	V2022		
Lab Sample ID:	FA36573-3	**Date Sampled:**	08/30/16
Matrix:	SO - Soil	**Date Received:**	08/31/16
		Percent Solids:	35.8
Project:	215122; Sunset Beach, NC		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
HEM Oil and Grease	<550	550	mg/kg	1	09/10/16 15:00	KC	SW846 9071B
Solids, Percent	35.8		%	1	09/01/16 12:15	JL	SM19 2540G
Total Organic Carbon	111000	2800	mg/kg	1	09/12/16 14:34	FN	SW846 9060A M

RL = Reporting Limit

SGS Accutest

Report of Analysis

Client Sample ID: V1618
Lab Sample ID: FA36573-4
Matrix: SO - Soil
Method: SW846 8270D BY SIM SW846 3546
Project: 215122; Sunset Beach, NC

Date Sampled: 08/30/16
Date Received: 08/31/16
Percent Solids: 63.1

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W094792.D	1	09/07/16	MG	09/06/16	OP61755	SW4248
Run #2							

	Initial Weight	Final Volume
Run #1	15.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	0.10	0.041	mg/kg	
208-96-8	Acenaphthylene	ND	0.10	0.041	mg/kg	
120-12-7	Anthracene	ND	0.10	0.026	mg/kg	
56-55-3	Benzo(a)anthracene	ND	0.021	0.0052	mg/kg	
50-32-8	Benzo(a)pyrene	ND	0.021	0.0052	mg/kg	
205-99-2	Benzo(b)fluoranthene	ND	0.021	0.0052	mg/kg	
191-24-2	Benzo(g,h,i)perylene	ND	0.021	0.0052	mg/kg	
207-08-9	Benzo(k)fluoranthene	ND	0.021	0.0052	mg/kg	
218-01-9	Chrysene	ND	0.021	0.0052	mg/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	0.021	0.0052	mg/kg	
206-44-0	Fluoranthene	ND	0.10	0.026	mg/kg	
86-73-7	Fluorene	ND	0.10	0.041	mg/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.021	0.0052	mg/kg	
90-12-0	1-Methylnaphthalene	ND	0.10	0.041	mg/kg	
91-57-6	2-Methylnaphthalene	ND	0.10	0.041	mg/kg	
91-20-3	Naphthalene	ND	0.10	0.041	mg/kg	
85-01-8	Phenanthrene	ND	0.10	0.026	mg/kg	
129-00-0	Pyrene	ND	0.10	0.026	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	79%		40-105%
321-60-8	2-Fluorobiphenyl	82%		43-107%
1718-51-0	Terphenyl-d14	85%		45-119%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	V1618		
Lab Sample ID:	FA36573-4	**Date Sampled:**	08/30/16
Matrix:	SO - Soil	**Date Received:**	08/31/16
Method:	MADEP VPH REV 1.1	**Percent Solids:**	63.1
Project:	215122; Sunset Beach, NC		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	UU017070.D	1	09/01/16	CG	n/a	n/a	GUU879
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.28 g	5.1 ml	100 ul
Run #2			

MADEP VPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.11	0.11	mg/kg	
100-41-4	Ethylbenzene	ND	0.21	0.11	mg/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	0.21	0.11	mg/kg	
91-20-3	Naphthalene	ND	0.53	0.32	mg/kg	
108-88-3	Toluene	0.112	0.21	0.11	mg/kg	J
	m,p-Xylene	ND	0.42	0.21	mg/kg	
95-47-6	o-Xylene	ND	0.21	0.11	mg/kg	
	C5- C8 Aliphatics (Unadj.)	ND	11	3.7	mg/kg	
	C9- C12 Aliphatics (Unadj.)	ND	11	3.7	mg/kg	
	C9- C10 Aromatics (Unadj.)	ND	11	3.7	mg/kg	
	C5- C8 Aliphatics	ND	11	3.7	mg/kg	
	C9- C12 Aliphatics	ND	11	3.7	mg/kg	
	C9- C10 Aromatics	ND	11	3.7	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	BFB	104%		70-130%
460-00-4	BFB	106%		70-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID:	V1618		
Lab Sample ID:	FA36573-4	**Date Sampled:**	08/30/16
Matrix:	SO - Soil	**Date Received:**	08/31/16
Method:	MADEP EPH REV 1.1 SW846 3546	**Percent Solids:**	63.1
Project:	215122; Sunset Beach, NC		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	NN016013.D	1	09/08/16	FS	09/06/16	OP61759	GNN794
Run #2							

	Initial Weight	Final Volume
Run #1	3.2 g	2.0 ml
Run #2		

MAEPH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	2.0	0.99	mg/kg	
208-96-8	Acenaphthylene	ND	2.0	0.99	mg/kg	
120-12-7	Anthracene	ND	2.0	0.99	mg/kg	
56-55-3	Benzo(a)anthracene	ND	2.0	0.99	mg/kg	
50-32-8	Benzo(a)pyrene	ND	2.0	0.99	mg/kg	
205-99-2	Benzo(b)fluoranthene	ND	2.0	0.99	mg/kg	
191-24-2	Benzo(g,h,i)perylene	ND	2.0	0.99	mg/kg	
207-08-9	Benzo(k)fluoranthene	ND	2.0	0.99	mg/kg	
218-01-9	Chrysene	ND	2.0	0.99	mg/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	2.0	0.99	mg/kg	
206-44-0	Fluoranthene	ND	2.0	0.99	mg/kg	
86-73-7	Fluorene	ND	2.0	0.99	mg/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	2.0	0.99	mg/kg	
91-57-6	2-Methylnaphthalene	ND	2.0	0.99	mg/kg	
91-20-3	Naphthalene	ND	2.0	0.99	mg/kg	
85-01-8	Phenanthrene	ND	2.0	0.99	mg/kg	
129-00-0	Pyrene	ND	2.0	0.99	mg/kg	
	C11-C22 Aromatics (Unadj.)	ND	99	74	mg/kg	
	C11-C22 Aromatics	ND	99	74	mg/kg	
	C9-C18 Aliphatics	ND	99	50	mg/kg	
	C19-C36 Aliphatics	ND	99	50	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3386-33-2	1-Chlorooctadecane	69%		40-140%
580-13-2	2-Bromonaphthalene	102%		40-140%
84-15-1	o-Terphenyl	74%		40-140%
321-60-8	2-Fluorobiphenyl	90%		40-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID: V1618
Lab Sample ID: FA36573-4
Matrix: SO - Soil
Method: SW846 8081B SW846 3546
Project: 215122; Sunset Beach, NC

Date Sampled: 08/30/16
Date Received: 08/31/16
Percent Solids: 63.1

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK78611.D	1	09/14/16	NG	09/09/16	OP61809	GKK2537
Run #2 [a]	KK78591.D	10	09/14/16	NG	09/09/16	OP61809	GKK2537

	Initial Weight	Final Volume
Run #1	4.50 g	5.0 ml
Run #2	4.50 g	5.0 ml

Pesticide PPL List

CAS No.	Compound	Result	RL	MDL	Units	Q
309-00-2	Aldrin	ND	0.0088	0.0027	mg/kg	
319-84-6	alpha-BHC [b]	ND	0.0088	0.0027	mg/kg	
319-85-7	beta-BHC [b]	ND	0.0088	0.0027	mg/kg	
319-86-8	delta-BHC	ND	0.0088	0.0026	mg/kg	
58-89-9	gamma-BHC (Lindane) [b]	ND	0.0088	0.0027	mg/kg	
12789-03-6	Chlordane	ND	0.088	0.035	mg/kg	
60-57-1	Dieldrin	ND	0.0088	0.0033	mg/kg	
72-54-8	4,4'-DDD [b]	ND	0.018	0.0030	mg/kg	
72-55-9	4,4'-DDE	ND	0.018	0.0028	mg/kg	
50-29-3	4,4'-DDT	ND [c]	0.18	0.035	mg/kg	
72-20-8	Endrin	ND	0.018	0.0033	mg/kg	
1031-07-8	Endosulfan sulfate	ND	0.018	0.0033	mg/kg	
7421-93-4	Endrin aldehyde	ND	0.018	0.0033	mg/kg	
959-98-8	Endosulfan-I	ND	0.0088	0.0026	mg/kg	
33213-65-9	Endosulfan-II	ND	0.0088	0.0033	mg/kg	
76-44-8	Heptachlor	ND	0.0088	0.0030	mg/kg	
1024-57-3	Heptachlor epoxide	ND	0.0088	0.0031	mg/kg	
72-43-5	Methoxychlor	ND [c]	0.18	0.045	mg/kg	
8001-35-2	Toxaphene	ND	0.44	0.18	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	101%	116%	50-122%
2051-24-3	Decachlorobiphenyl	89%	113%	50-133%

(a) Dilution required due to matrix interference.
(b) Associated CCV outside control limits.
(c) Result is from Run# 2

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Client Sample ID: V1618
Lab Sample ID: FA36573-4
Matrix: SO - Soil
Project: 215122; Sunset Beach, NC

Date Sampled: 08/30/16
Date Received: 08/31/16
Percent Solids: 63.1

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Antimony	<1.2	1.2	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Arsenic	3.4	0.58	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Beryllium	0.30	0.29	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Cadmium	<0.23	0.23	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Chromium	17.0	0.58	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Copper	3.7	1.4	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Lead	6.0	1.2	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Mercury	<0.061	0.061	mg/kg	1	09/08/16	09/08/16	JL	SW846 7471B [2]	SW846 7471B [4]
Nickel	3.3	2.3	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Selenium	<1.2	1.2	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Silver	<0.58	0.58	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Thallium	<0.58	0.58	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]
Zinc	16.3	1.2	mg/kg	1	09/07/16	09/08/16	LM	SW846 6010D [1]	SW846 3050B [3]

(1) Instrument QC Batch: MA13390
(2) Instrument QC Batch: MA13391
(3) Prep QC Batch: MP30803
(4) Prep QC Batch: MP30806

RL = Reporting Limit

SGS Accutest

Report of Analysis

Client Sample ID:	V1618		
Lab Sample ID:	FA36573-4	**Date Sampled:**	08/30/16
Matrix:	SO - Soil	**Date Received:**	08/31/16
		Percent Solids:	63.1
Project:	215122; Sunset Beach, NC		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
HEM Oil and Grease	<310	310	mg/kg	1	09/10/16 15:00	KC	SW846 9071B
Solids, Percent	63.1		%	1	09/01/16 12:15	JL	SM19 2540G
Total Organic Carbon	33700	1600	mg/kg	1	09/12/16 15:04	FN	SW846 9060A M

RL = Reporting Limit

Piping Plover and Red Knot

1) All sand placement activities will be completed between 16 November and 30 April; thereby avoiding the majority of the piping plover breeding season, a portion of the piping plover migration period, and the peak red knot migration period in NC.
2) As a means of minimizing the extent and/or duration of adverse effects on habitats and benthic prey resources, all material placed on the beach and in associated dune systems will consist of beach compatible sediment. Beach compatible material will consist of sediments that are similar in composition, grain size distribution, and color to the native sediments of the recipient beaches.
3) Construction staging areas and pipeline routes will be located to avoid high-value inlet complex habitats for piping plovers and red knots to the maximum extent practicable.
4) Temporary storage areas for construction equipment and pipelines will be located off the beach to the maximum extent practicable.

Sea Turtles

1) All sand placement activities will be completed between 16 November and 30 April; thereby avoiding the sea turtle nesting and hatching season in NC.
2) All material placed on the beach and in associated dune systems will consist of beach compatible sediment that is suitable for sea turtle nesting. Beach compatible material will consist of sediments that are similar in composition, grain size distribution, and color to the native sediments of the recipient beaches.
3) Immediately after construction and to the maximum extent practicable prior to 1 May, surveys for escarpments will be conducted within the limits of construction areas. Identified escarpments that that may interfere with sea turtle nesting (>18 inches in height and ≥ 100 ft in length) will be leveled to the natural beach profile. If it is determined that escarpment leveling is required during the nesting season, leveling activities would be coordinated with the USFWS or NCWRC.
4) Immediately after construction and to the maximum extent practicable prior to 1 May, the limits of construction areas will be evaluated for compaction in coordination with the USFWS and NCWRC. If it is determined that tilling is required for sea turtle nesting habitat suitability, the construction areas will be tilled to a depth of 36 inches. All tilling activity shall be completed prior to 1 May to the maximum extent practicable. In the case of projects that run until the 30 April nesting window cutoff, any tilling activities required after 1 May would be coordinated with the USFWS or NCWRC.
5) Post-construction monitoring of sea turtle nesting activities will be conducted in sand placement areas to assess effects on nesting. Monitoring will include daily surveys from 1 May until 15 September. Nesting data will be included in annual monitoring reports to be provided to the NCWRC.

August 28, 2017
NC SPBO
Executive Summary

Seabeach Amaranth

1) All sand placement activities will be completed between 16 November and 30 April; thereby avoiding the majority of the seabeach amaranth growing season in NC.

REASONABLE AND PRUDENT MEASURES for:

B. Projects that are navigation maintenance dredging with beach placement shall include the following measures:

Historically, sand placement events associated with navigation maintenance dredging projects have no local sponsor, are smaller-scaled, conducted at closer time intervals, and the sand often does not remain on the beach for an extended period of time.

Post-construction requirements are listed in Reasonable and Prudent Measures B.11, B.12, B.13, B.15, and B.16. These post-construction requirements may be subject to congressional authorization and the allocation of funds. If the Corps or Permittee cannot fulfill these Terms and Conditions, the Corps must reinitiate consultation.

B.1. Conservation Measures included in the Corps' PBA that address protection of piping plovers, red knots, nesting sea turtles, and seabeach amaranth shall be implemented in the Corps' federally authorized project or regulated activity.

B.2. The Corps will notify the Service of the commencement of projects that utilize this SPBO for the purposes of tracking incidental take of all species.

B.3. For the life of the project, all sand placement activities above MHW must be conducted within the winter work window (November 16 to April 30).

B.4. Prior to sand placement, all derelict material, large amounts of rock, or other debris must be removed from the beach to the maximum extent possible.

B.5. During construction, trash and food items shall be disposed of properly either in predator-proof receptacles, or in receptacles that are emptied each night to minimize the potential for attracting predators of piping plovers, red knots, and sea turtles.

B.6. Pipeline placement must be coordinated with NCDCM, the Corps, the Service, and the NCWRC.

B.7. Access points for construction vehicles should be as close to the project site as possible. Construction vehicle travel down the beach should be limited to the maximum extent possible.

B.8. Beach quality sand suitable for sea turtle nesting, successful incubation, and hatchling emergence shall be used for sand placement.

B.9. A meeting between representatives of the Corps, Service, NCWRC, and NCDCM shall be held prior to the commencement of work on this project.

B.10. During dredging operations, material placed on the beach shall be inspected daily to ensure compatibility. If the inspection process finds that non-beach compatible material, including large amounts of shell or rock, is or has been placed on the beach, all work shall stop immediately and the NCDCM and the Corps will be notified by the permittee and/or its contractors to determine the appropriate plan of action.

B.11. For navigation projects with placement of at least 200,000 cubic yards of sand on the beach, sea turtle nesting surveys must be conducted within the project area between May 1 and November 15 of each year, for at least two consecutive nesting seasons after completion, if the sand remains on the beach. Acquisition of readily available sea turtle nesting data from qualified sources (volunteer organization, other agencies, etc.) is acceptable.

B.12. Sand compaction shall be monitored and tilling shall be conducted if needed to reduce the likelihood of impacting sea turtle nesting and hatching activities.

B.13. Escarpment formation shall be monitored and leveling shall be conducted if needed to reduce the likelihood of impacting nesting and hatchling sea turtles.

B.14. Construction equipment and materials shall be stored in a manner that will minimize impacts to piping plovers, red knots, and nesting shorebirds.

B.15. A report describing the actions taken shall be submitted to the Service work for each year when the activity has occurred.

B.16. The Corps Civil Works Program shall continue its annual seabeach amaranth monitoring program.

TERMS AND CONDITIONS for:

B. Projects that are navigation maintenance dredging with beach placement, or Corps civil works project shall include the following measures:

Historically, sand placement events associated with navigation maintenance dredging projects have no local sponsor, are smaller-scaled, conducted at closer time intervals, and the sand often does not remain on the beach for an extended period of time.

All conservation measures described in the Corps' Programmatic Biological Assessment are hereby incorporated by reference as Terms and Conditions within this document pursuant to 50 CFR §402.14(I) with the addition of the following Terms and Conditions. In order to be exempt from the prohibitions of section 9 of the Act, the Corps shall comply with the following Terms and Conditions, which implement the Reasonable and Prudent Measures, described above and outline reporting/monitoring requirements. These terms and conditions are non-discretionary.

Post-construction requirements are listed in Terms and Conditions B.11, B.12, B.13, B.15, B.16, B.17, B.18, and B.19. These post-construction requirements may be subject to congressional authorization and the allocation of funds. If the Corps or Permittee cannot fulfill these Terms and Conditions, the Corps must reinitiate consultation.

B.1. Conservation Measures included in the Corps' PBA that address protection of nesting sea turtles, piping plover, red knot, and seabeach amaranth listed on pages 10-11 of the SPBO shall be implemented in the Corps federally authorized project or regulated activity.

B.2. The Corps or the Permittee must provide the following information to the Service at least 10 business days prior to the commencement of work:

a) Project location (include latitude and longitude coordinates, as well as mile markers, cross streets, or street addresses if available);
b) Project description (including linear feet of beach, actual fill template, access points, and borrow areas);
c) Anticipated date of commencement and anticipated duration of construction

B.3. For the life of the permit/project, all sand placement activities above MHW must be conducted within the winter work window (November 16 to April 30), unless allowed after additional consultation with the Service.

B.4. Prior to sand placement, all derelict material, large amounts of rock, or other debris must be removed from the beach to the maximum extent possible. If debris removal activities take place during shorebird breeding season (April 1– August 31), the work shall be conducted during daylight hours only.

B.5. During construction, trash and food items shall be disposed of properly either in predator-proof receptacles, or in receptacles that are emptied each night to minimize the potential for attracting predators of piping plovers, red knots, and sea turtles.

B.6. Pipeline placement must be coordinated with NCDCM, the Corps, the Service, and the NCWRC.

B.7. Access points for construction vehicles should be as close to the project site as possible. Construction vehicle travel down the beach should be limited to the maximum extent possible.

B.8. Only beach compatible fill shall be placed on the beach or in any associated dune system. Beach compatible fill must be sand that is similar to a native beach in the vicinity of the site that has not been affected by prior sand placement activity. Beach compatible fill must be sand comprised solely of natural sediment and shell material, containing no construction debris, toxic material, large amounts of rock, or other foreign matter. The beach compatible fill must be similar in both color and grain size distribution (sand grain frequency, mean and median grain size and sorting coefficient) to the native material in the Action Area. Beach compatible fill is material that maintains the general character and functionality of the material occurring on the beach and in the adjacent dune and coastal system. In general, fill material that meets the requirements of the most recent version of the North Carolina Technical Standards for Beach Fill (15A NCAC 07H .0312) is considered compatible.

B.9. The Service must be invited to any pre-construction meetings held prior to the commencement of work. Advance notice (of at least 5 business days) must be provided prior to conducting this meeting. The meeting will provide an opportunity for explanation and/or clarification of the Conservation Measures and Terms and Conditions, and will include the following:

a) Staging locations, storing equipment including fuel stations;
b) Coordination with the surveyors on required species surveys;
c) Pipeline placement (between 5 to 10 feet from dune);
d) Minimizing driving;
e) Follow up coordination during construction and post construction;
f) Direction of the project including progression of sand placement along the beach;
g) Plans for compaction monitoring;

h) Plans for escarpment surveys; and
i) Names and qualifications of personnel involved in any required surveys.

B.10. During dredging operations, material placed on the beach shall be inspected daily to ensure compatibility. If the inspection process finds that non-beach compatible material, including large amounts of shell or rock exceeding the state sediment criteria (15A NCAC 07H .0312), is or has been placed on the beach, all work shall stop immediately, and the NCDCM and the Corps will be notified by the permittee and/or its contractors to determine the appropriate plan of action.

B.11. For navigation projects with placement of at least 200,000 cubic yards of sand on the beach, sea turtle nesting surveys must be conducted within the project area between May 1 and November 15 of each year, for at least two consecutive nesting seasons after completion of sand placement (2 years post-construction monitoring). Acquisition of readily available sea turtle nesting data from qualified sources (volunteer organizations, other agencies, etc.) is acceptable. Data collected for each nest should include, at a minimum, the information in the table, below. This information will be provided to the Raleigh Field Office in the annual report, and will be used to periodically assess the cumulative effects of these projects on sea turtle nesting and hatchling production and monitor suitability of post construction beaches for nesting. Please see REPORTING REQUIREMENTS, below.

Parameter	**Measurement**	**Variable**
Number of False Crawls	Visual Assessment of all false crawls	Number/location of false crawls in nourished areas; any interaction of turtles with obstructions, such as sand bags or scarps, should be noted.
False Crawl Type	Categorization of the stage at which nesting was abandoned	Number in each of the following categories: a) Emergence - no digging; b) Preliminary body pit; c) Abandoned egg chamber.
Nests	Number	The number of sea turtle nests in nourished areas should be noted. If possible, the location of all sea turtle nests should be marked on a project map, and approximate distance to scarps or sandbags measured in meters. Any abnormal cavity morphologies should be reported as well as whether turtle touched sandbags or scarps during nest excavation.
Nests	Lost Nests	The number of nests lost to inundation or erosion or the number with lost markers.

Nests	Relocated nests	The number of nests relocated and a map of the relocation area(s). The number of successfully hatched eggs per relocated nest.
Lighting Impacts	Disoriented sea turtles	The number of disoriented hatchlings and adults.

B.12. Sand compaction must be qualitatively evaluated at least twice after each sand placement event, once in the project area immediately after completion of any sand placement event and once after project completion between October 1 and May 1. Compaction monitoring and remediation are not required if the placed material no longer remains on the beach. Within 14 days of completion of sand placement and prior to any tilling (if needed), a field meeting shall be held with the Service, NCWRC, and the Corps to inspect the project area for compaction and determine whether tilling is needed.

a) If tilling is needed for sand suitability, the area must be tilled to a depth of 36 inches. All tilling activities shall be completed prior to May 1 of any year.
b) Tilling must occur landward of the wrack line and avoid all vegetated areas that are 3 square feet or greater, with a 3-foot buffer around all vegetation.
c) If tilling occurs during the shorebird nesting season or seabeach amaranth growing season (after April 1), shorebird surveys and/or seabeach amaranth surveys are required prior to tilling.
d) A summary of the compaction assessments and the actions taken shall be included in the annual report to NCDCM, the Corps, and the Service.
e) These conditions will be evaluated and may be modified if necessary to address and identify sand compaction problems.

B.13. Visual surveys for escarpments along the Action Area must be made immediately after completion of sand placement, and within 30 days prior to May 1, for two subsequent years after any construction or sand placement event. Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet must be leveled and the beach profile must be reconfigured to minimize scarp formation by the dates listed above. Any escarpment removal must be reported by location. The Service must be contacted immediately if subsequent reformation of escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet occurs during the nesting and hatching season to determine the appropriate action to be taken. If it is determined that escarpment leveling is required during the nesting or hatching season, the Service or NCWRC will provide a brief written authorization within 30 days that describes methods to be used to reduce the likelihood of impacting existing nests. An annual summary of escarpment surveys and actions taken must be submitted to the Service.

B.14. Piping plover habitat (sandy unvegetated habitat along inlet shoulders) shall be avoided to the maximum extent practicable when staging equipment, establishing travel corridors, and aligning pipeline.

B.15. A report describing the fate of observed sea turtle nests and hatchlings and any actions taken, must be submitted to the Service following completion of the proposed work for each year when a sand placement activity has occurred. Please see REPORTING REQUIREMENTS, below.

B.16. The Corps' annual seabeach amaranth monitoring program shall continue in accordance with April 19, 1993 Biological Opinion for various U.S. Army Corps of Engineers' projects.

B.17. The Corps should survey beach sand placement areas for at least five years following each placement event, to determine the status of the seabeach amaranth populations in the project areas and the effects that beach disposal has on this species. Surveys should be conducted in August or September so that the number of plants reaching reproductive age can be determined.

B.18. Suitable habitat along shoreline reaches that have received sand within the previous five years should be surveyed for the occurrence of seabeach amaranth. Documentation for each seabeach amaranth plant should include location (using a handheld GPS unit), unique features, abnormalities, or other relevant information. If multiple plants are observed in an area, a single representative GPS point may be logged with accompanying notes describing total plants associated with that point.

B.19. A Corps report describing the seabeach amaranth survey and results should be submitted to Service, the North Carolina Natural Heritage Program, and the North Carolina Plant Conservation Program, by December 31 of each year. The report should include a map showing locations of seabeach amaranth populations and the numbers of plants, with separate figures for those in flower or fruit, found in the sand placement areas.

REPORTING REQUIREMENTS

An annual report detailing the monitoring and survey data collected during the preceding year (required in the above Terms and Conditions) and summarizing all piping plover, red knot, shorebird, and sea turtle data must be provided to the Service's Raleigh Field Office by January 31 of each year for review and comment. In addition, any information or data related to a conservation measure or recommendation that is implemented should be included in the annual report. As in the past, the Corps should submit a separate annual monitoring report detailing seabeach amaranth monitoring and survey data for the preceding year. The contact for these reporting requirements is:

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Executive Summary

Pete Benjamin, Supervisor
Raleigh Field Office
U.S. Fish and Wildlife Service
Post Office Box 33726
Raleigh, North Carolina 27636-3726
(919) 856-4520

Upon locating a dead, injured, or sick individual of an endangered or threatened species, initial notification must be made to the Service's Law Enforcement Office below. Additional notification must be made to the Raleigh Ecological Services Field Office identified above and to the NCWRC at (252) 241-7367. Care should be taken in handling sick or injured individuals and in the preservation of specimens in the best possible state for later analysis of cause of death or injury.

Jason Keith
U.S. Fish and Wildlife Service
551-F Pylon Drive
Raleigh, NC 27606

September 28, 2018

Ike Williamson
PO Box 742
Shallotte, NC 28459-0742

Town of Sunset Beach
700 Sunset Blvd. N.
Sunset Beach, NC 28468

To Whom It May Concern,

This letter of consent is provided to satisfy the requirements of the CAMA Major Permit application for providing written authorization for material placement within an approximate 42 Ac site on State Road 1163 (Old Georgetown Road) in Brunswick County. As the underlying property owner for the referenced lands, I am willing to grant permission to the Town of Sunset Beach (Town) to use the parcel for material placement pertaining to the Town's navigation project (Project).

Please note, prior to the use of the parcel a formal agreement pertaining to additional terms and conditions (Agreement) will be executed with the Town. The Agreement shall document the terms and conditions of the use agreement for the duration and administration of the Project. The terms and conditions will stipulate a tipping fee of not more than $5.75 / CY for use of the placement islands.

Sincerely, Ike Z. Williamson

Ike Williamson

STATE OF NORTH CAROLINA
COUNTY OF BRUNSWICK
This Instrument has been filed for Registration on the Date, Time and in the Book and Page shown on the First Page hereof, and is being returned for your safekeeping.
Robert J. Robinson, Register of Deeds

Ray Williams 796-7408
Solid Waste

RET Reggie Hewett
TOTAL 20 REV _____ TC# 38
REC# _____ CK AMT _____ CK# _____
CASH 20 REF _____ BY thc

NCDENR

North Carolina Department of Environment and Natural Resources

Dexter R. Matthews, Director | Division of Waste Management | Michael F. Easley, Governor
William G. Ross Jr., Secretary

LAND CLEARING AND INERT DEBRIS LANDFILL NOTIFICATION

Pursuant to 15A NCAC 13B .0563(2)(a), the land owner(s) and operator(s) of any Land Clearing and Inert Debris Landfill under two (2) acres in size shall submit this notification form to the Division prior to constructing or operating the landfill. This form must be filed for recordation in the Register of Deeds' Office. The Register of Deeds shall index the notification under the name of the owner(s) of the land in the county or counties in which the land is located. The Register's seal and the date, book, and page number of recording must be included on this form when submitted to the Division. **This notification is not valid to authorize operation of a landfill unless complete, accurate, recorded, and submitted to the Division as required by 15A NCAC 13B .0563(2)(b).**

1. Facility Name: IKE Williamson Dump Site
2. Facility location (street address): State RD 1154
   City: Shallotte County: Brunswick Zip: 28459
3. Directions to Site: Take Hwy 179 to SR 1154 First paved Rd on Right
4. *The land on which this landfill* is located is described in the deed recorded in:
   deed book: # 1095 page: 335 county: Brunswick.
5. Name of land owner: Glen Norwood AKA Ike Williamson
6. Mailing address of land owner: P.O. Box 1602
   City: Shallotte State: NC Zip: 28459
7. Telephone number of land owner: (910) 443-4874
   If the land is owned by more than one person, attach additional sheets with the name, address, and phone number of all additional land owners.
8. Name of operator: IKE Williamson
9. Trade or business name of operator: Clearing + Grading
10. Mailing address of operator: P.O. Box 1602
    City: Shallotte State: NC Zip: 28459
11. Telephone number of operator: (910) 443-4874
    If the landfill is operated by more than one person, attach additional sheets with the name, address, and phone number of all additional operators.
12. Projected use of land after completion of landfill operations: Green Space

B2519 P0094 12-07-2006 10:47:13.000
Robert J. Robinson
Brunswick County, NC Register of Deeds page 2 of 3

(8) The facility shall be adequately secured by means of gates, chains, berms, fences, etc. to prevent unauthorized access except when an operator is on duty. An attendant shall be on duty at all times while the landfill is open for public use to assure compliance with operational requirements and to prevent acceptance of unauthorized wastes.
(9) Access roads shall be of all-weather construction and properly maintained.
(10) Surface water shall be diverted from the working face and shall not be impounded over waste.
(11) Solid waste shall not be disposed of in water.
(12) Open burning of solid waste is prohibited.
(13) The concentration of explosive gases generated by the facility shall not exceed:
  (a) Twenty-five percent of the lower explosive limit for the gases in facility structures.
  (b) The lower explosive limit for the gases at the property boundary.
(14) Leachate shall be properly managed on site through the use of current best management practices.
(15) Should the Division deem it necessary, ground water or surface water monitoring, or both, may be required as provided for under Rules .0601 and .0602 of this Subchapter.
(16) A sign shall be posted at the facility entrance showing the contact name and number in case of an emergency and the permit number. The permit number requirement is not applicable for facilities not requiring an individual permit.

Certification by Land Owner:

I certify that the information provided by me in this notification is true, accurate, and complete to the best of my knowledge. The facility siting and disposal operations of this Land Clearing & Inert Debris landfill will comply with the requirements of Sections .0563, .0564 and .0566 of 15A NCAC 13B, North Carolina Solid Waste Management Rules. The facility and operations of this landfill will also comply with all applicable Federal, State, and Local laws, rules, regulations, and ordinances. Where the operator is different from the land owner, I, the land owner, have knowledge of the operator's plans to dispose of solid waste on the land and I specifically grant permission for the operation of the landfill. I understand that both the land owner and operator are jointly and severally liable for improper operations and proper closure of the landfill as provided for by North Carolina General Statute 130A-309.27. I further understand that North Carolina General Statute 130A-22 provides for administrative penalties of up to five thousand dollars ($5,000.00) per day per each violation of the Solid Waste Management Rules. I further understand that the Solid Waste Management Rules may be revised or amended in the future and that the facility siting and operations of this landfill will be required to comply with all such revisions or amendments.

G.N. AKA IKE Williamson — Print Name (Owner)
G.N. AKA Ike Williamson — Signature (Owner)
12-7-06 — Date

North Carolina

Brunswick County

I, Quida H Hewett, a Notary Public for said County and State, do hereby certify that G.N. aka IKE Williamson personally appeared before me this day and acknowledged the due execution of the foregoing instrument.

Witness my hand and official seal, this the 7 day of Dec, 2006.

Quida H Hewett
Notary Public

(Official Seal)

QUIDA H. HEWETT NOTARY PUBLIC BRUNSWICK COUNTY, N.C.

My commission expires May 2, 2010.

NORTH CAROLINA
BRUNSWICK COUNTY

SPECIAL EXCEPTION PERMIT #07-02S GRANTED

Applicant: Glen N. Williamson

Record Owners: Glen and Sarah Williamson

Location: 5399 Oak Tree Lane SW, Shallotte, Brunswick County, NC

Tax Parcel: 2290001402

Acreage: 44.54 acres

Proposed Use of Property: Non-Hazardous Solid and Liquid Waste Disposal Site

Board Meeting Date: January 11, 2007

Approval Date: January 11, 2007

SECTION 1. FINDINGS: Having heard all of the evidence presented at the hearing, the Board finds that the application is complete and finds:

I. That the proposed use is in keeping with the statement of intent of the zoning district. This is based upon sworn testimony and evidence submitted during the hearing which shows the following:

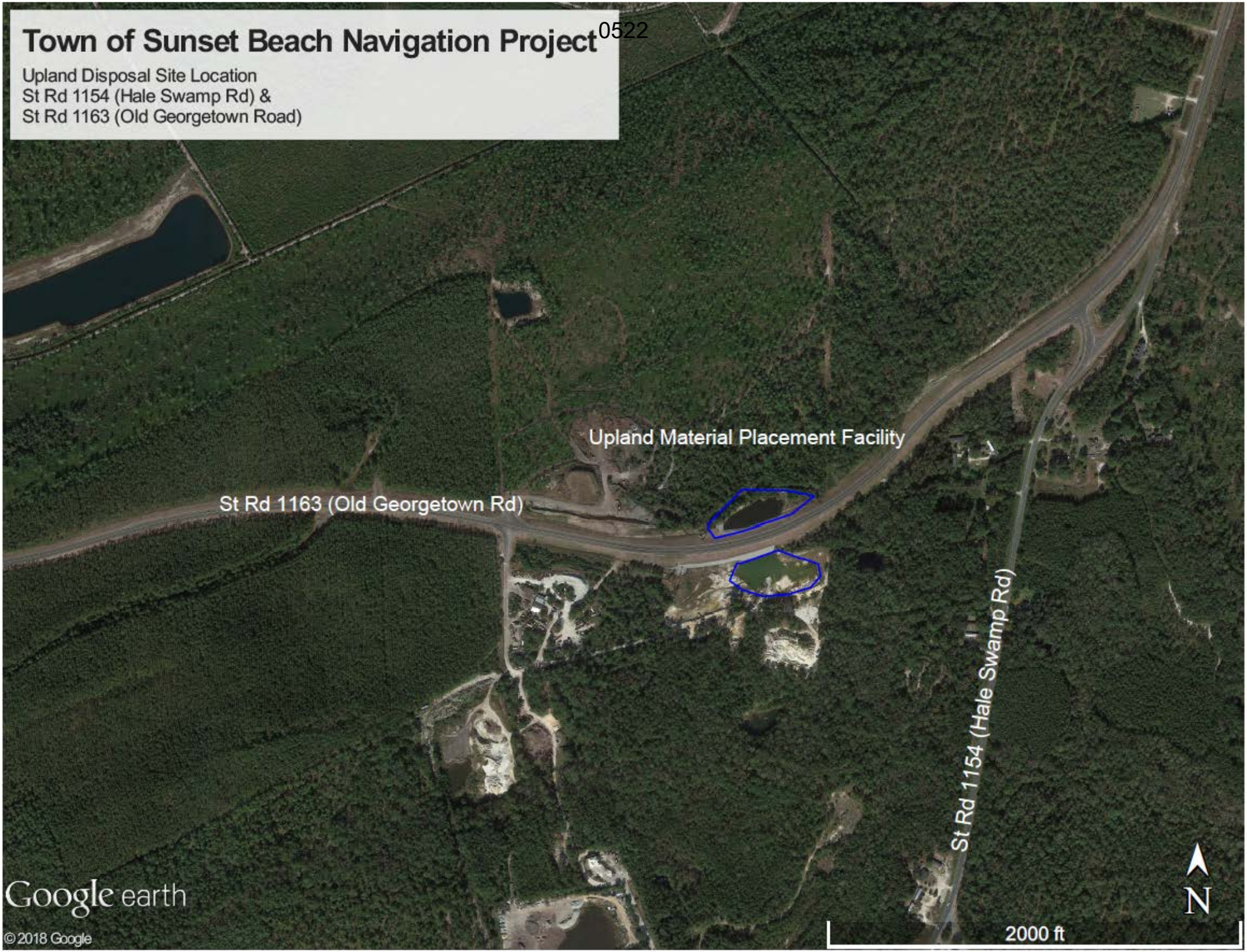
- A "Non-Hazardous Solid and Liquid Waste Disposal Site" is permissible within the Rural (RU) zoning district with special exception permits. No specific evidence or testimony was presented that this use will not be in harmony with the surrounding development.

II. The use, if developed as proposed, will not substantially injure the value of adjoining or abutting property. This is based upon sworn testimony and evidence

Town of Sunset Beach Navigation Project

0522

Upland Disposal Site Location
St Rd 1154 (Hale Swamp Rd) &
St Rd 1163 (Old Georgetown Road)



BK 1095 PG 0335

PREPARED BY: WILLIAM A. POWELL

RECORD OF POOR QUALITY DUE TO CONDITION OF ORIGINAL DOCUMENT

FILED FOR REGISTRATION [illegible] 1095 PAGE 336

96 JUN 21 AM 9:42

[illegible] J. ROBINSON REGISTER OF DEEDS BRUNSWICK COUNTY, N.C.

BRUNSWICK COUNTY NC 06/21/96 $3.00

STATE OF NORTH CAROLINA Real Estate Excise Tax

STATE OF NORTH CAROLINA

COUNTY OF BRUNSWICK

THIS DEED, Made this 15th day of April, 1991, between WILLIAM A. POWELL and wife, DARLENE P. POWELL, of Brunswick County, North Carolina; and SAMUEL THOMAS INMAN, unmarried, of Columbus County, North Carolina, hereinafter called "Grantor" (whether one or more); and GLEN N. WILLIAMSON and wife, SARAH S. WILLIAMSON, of Post Office Box 1602, Shallotte, Brunswick County, North Carolina 28459, hereinafter called "Grantee" (whether one or more).

W I T N E S S E T H :

That the Grantor, for a valuable consideration, paid by the Grantee, the receipt of which is hereby acknowledged, has and by these presents does hereby grant, bargain, sell and convey unto the Grantee in fee simple, all that certain lot or parcel of land situated in Shallotte Township, Brunswick County, North Carolina, and more particularly described as follows:

BEGINNING at an iron pipe, said pipe being further located by the following tie traverse: Commencing at a spike in the intersection of centerlines of SR 1155 and SR 1154 and runs with said SR 1154 north 15 degrees 55 minutes 25 seconds east 559.00 feet to a railroad spike in the centerline of said road and where said road crosses Jennie's Branch; thence with the centerline of said road north 12 degrees 35 minutes 05 seconds east 724.73 feet to a railroad spike; thence leaving said SR 1154 and runs to and with an old farm road north 84 degrees 11 minutes 43 seconds west 826.41 feet to an iron pipe on the south edge of said farm road; thence south 3 degrees 49 minutes 05 seconds west 290.02 feet to the point and place of beginning and proceeds from said beginning south 3 degrees 49 minutes 28 seconds west 87.01 feet to an iron pipe in the run of Jennie's Branch; thence with the run of said branch the following 15 courses: (1) south 77 degrees 35 minutes 25 seconds west 1153.67 feet; (2) north 81 degrees 10 minutes 47 seconds west 105.35 feet; (3) south 35 degrees 13 minutes 39 seconds west 43.09 feet; (4) north 63 degrees 49 minutes 21 seconds west 46.81 feet; (5) south 61 degrees 10 minutes 20 seconds west 57.09 feet; (6) north 89 degrees 21 minutes 21 seconds west 111.04 feet; (7) north 52 degrees 14 minutes 18 seconds west 30.90 feet; (8) south 63 degrees 45 minutes 43 seconds west 32.83 feet; (9) south 28 degrees 01 minute 42 seconds west 88.23 feet; (10) south 70 degrees 40 minutes 36 seconds west 77.12 feet; (11) north 69 degrees 33 minutes 32 seconds west 000003

RET Sarah Williamson
TOTAL 10.00 REV 3.00
TC# 50 REC# 44428
CK AMT [illegible] # 2110
CASH REF
BY

6 10 2290 0 012 0200 [illegible]

BK1095 PG0336

25.80 feet; (12) north 75 degrees 02 minutes 00 seconds west 49.42 feet; (13) south 56 degrees 20 minutes 10 seconds west 101.89 feet; (14) south 84 degrees 50 minutes 57 seconds west 22.47 feet to a rebar; (15) south 84 degrees 50 minutes 57 seconds west 9.80 feet to a point in said run; thence north 13 degrees 16 minutes 41 seconds west 563.43 feet to an iron pipe; thence with an old marked line north 65 degrees 39 minutes 52 seconds east 444.48 feet to an iron pipe; thence south 0 degrees 31 minutes 13 seconds west 495.00 feet to an iron pipe; thence north 80 degrees 30 minutes 00 seconds east 1572.00 feet to the beginning and contains 9.02 acres more or less.

TO HAVE AND TO HOLD the aforesaid lot or parcel of land and all privileges and appurtuenances thereto belonging to the Grantee as fully as Grantor has the power to convey.

IN WITNESS WHEREOF, the Grantor has hereunto set his hand and seal the day and year first above written.

WILLIAM A. POWELL (SEAL)

Darlene P. Powell (SEAL)
DARLENE P. POWELL

Samuel Thomas Inman (SEAL)
SAMUEL THOMAS INMAN

STATE OF NORTH CAROLINA

COUNTY OF BRUNSWICK

I Patricia J Hewett, NOTARY PUBLIC, do hereby certify that WILLIAM A. POWELL and wife, DARLENE P. POWELL, and SAMUEL THOMAS INMAN, personally appeared before me this day and acknowledged the due execution of the foregoing instrument.

Witness my hand and official seal, this 19th day of April, 1991.

Patricia J Hewett
NOTARY PUBLIC

My commission expires:
10/29/95

STATE OF NORTH CAROLINA
COUNTY OF BRUNSWICK

The Foregoing (or annexed) Certificate(s) of Patricia J Hewett

Notary(ies) Public is (are) Certified to be Correct.
This Instrument was filed for Registration on this 21 Day of June, 1996,
in the Book and Page shown on the First Page hereof.

Robert J Robinson Jr
ROBERT J ROBINSON Register of Deeds

Permit Class
NEW

0525

Permit Number
45-02

STATE OF NORTH CAROLINA
Department of Environment and Natural Resources
and
Coastal Resources Commission

Permit

for

X Major Development in an Area of Environmental Concern pursuant to NCGS 113A-118

X Excavation and/or filling pursuant to NCGS 113-229

Issued to **Town of Sunset Beach, 220 Shoreline Drive, Sunset Beach, NC 28459**

Authorizing development in Brunswick County at man-made canal system adj. to Jinks Creek , as requested in the permittee's application dated 1/7/02 (MP-1) and 1/10/02 (MP-2), including attached workplan drawings 3 through 32 of 32, all dated revised 12/31/01

This permit, issued on April 10, 2002 , is subject to compliance with the application (where consistent with the permit), all applicable regulations, special conditions and notes set forth below. Any violation of these terms may be subject to fines, imprisonment or civil action; or may cause the permit to be null and void.

Excavation

1) In order to protect juvenile shrimp and finfish populations, no excavation or filling will be permitted between April 1 and September 30 of any year without the prior approval of the Division of Coastal Management, in consultation with the Division of Marine Fisheries.

2) Excavation will not exceed –5.2 feet below the mean low water level. In no case shall the depth of excavation exceed that of the connecting waters.

3) No dredging may take place within 10 feet of any area of coastal wetland.

4) The temporary placement or double handling of fill materials within waters or vegetated wetlands is not authorized

(See attached sheets for Additional Conditions)

This permit action may be appealed by the permittee or other qualified persons within twenty (20) days of the issuing date. An appeal requires resolution prior to work initiation or continuance as the case may be.

This permit must be accessible on-site to Department personnel when the project is inspected for compliance.

Any maintenance work or project modification not covered hereunder requires further Division approval.

All work must cease when the permit expires on

December 31, 2005

In issuing this permit, the State of North Carolina agrees that your project is consistent with the North Carolina Coastal Management Program.

Signed by the authority of the Secretary of DENR and the Chairman of the Coastal Resources Commission.

Donna D. Moffitt, Director
Division of Coastal Management

This permit and its conditions are hereby accepted.

Signature of Permittee

ADDITIONAL CONDITIONS

5) No vegetated wetlands or marsh grass will be excavated or filled.

6) No excavation will take place outside of the alignment of the area indicated on the workplan drawing(s).

7) The permittee shall adhere to the attached list of US Coast Guard regulations.

Spoil Disposal

8) The authorized spoil disposal area must be inspected and approved on-site by a representative of the Division of Coastal Management prior to the initiation of any dredging activities.

9) The permittee shall notify the Division of Environmental Health, Shellfish Sanitation Section at (252) 726-6827 at least 7 days prior to the commencement of any dredging activities so that the area surrounding the disposal area can be temporarily closed to the harvesting of shellfish.

10) All excavated materials will be confined above mean high water and landward of regularly or irregularly flooded marsh behind adequate dikes or other retaining structures to prevent spillover of solids into any marsh or surrounding waters.

11) The disposal area effluent will be contained by pipe, trough, or similar device to a point at or beyond the mean low/normal water level to prevent gully erosion and unnecessary siltation.

12) The terminal end of the pipeline will be positioned at or greater than 50 feet from any part of the dike and a maximum distance from spillways to allow settlement of suspended sediments.

13) A water control structure will be installed at the intake end of the effluent pipe to assure compliance with water quality standards.

14) The diked disposal area will be constructed a sufficient distance from the mean high water level or any marsh to eliminate the possibility of dike erosion into surrounding wetlands or waters.

Sedimentation and Erosion Control

NOTE: An Erosion and Sedimentation Control Plan will be required for this project. This plan must be filed at least thirty (30) days prior to the beginning of any land disturbing activity. Submit this plan to the Department of Environment and Natural Resources, Land Quality Section, 127 Cardinal Drive Extension, Wilmington, NC 28405.

15) Appropriate sedimentation and erosion control devices, measures or structures must be implemented to ensure that eroded materials do not enter adjacent wetlands, watercourses and property (e.g. silt fence, diversion swales or berms, sand fence, etc.).

ADDITIONAL CONDITIONS

16) All disturbed areas shall be properly graded and provided a ground cover sufficient to restrain erosion within thirty days of project completion.

General

17) The permittee understands and agrees that, if future operations by the United States requires the removal, relocation, or other alteration of the structure or work authorized by this permit, or if in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove relocate or alter the structural work or obstructions caused thereby, without expense to the United States or the state of North Carolina. No claim shall be made against the United States or the state of North Carolina on account of any such removal or alteration.

18) This permit does not authorize the interference with any existing or proposed Federal project, and the permittee will not be entitled to compensation for damage to the authorized structure or work, or injury which may be caused from existing or future operations undertaken by the United States in the public interest.

19) No attempt will be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the authorized work.

20) The authorized structure and associated activity must not cause an unacceptable interference with navigation.

21) The permitted activity will be conducted in such a manner as to prevent a significant increase in turbidity outside of the area of construction or construction-related discharge. Increases such that the turbidity in the waterbody is 25 NTU's or less in all saltwater classes are not considered significant.

NOTE: This permit does not eliminate the need to obtain any additional state, federal or local permits, approvals or authorizations that may be required.

NOTE: The permittee is encouraged to contact the Brunswick County mosquito control office at (910) 253-2515 to schedule a pre-construction conference to discuss mosquito control measures.

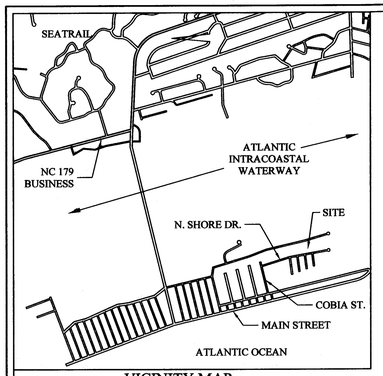
NOTE: This permit does not convey any rights, either in real estate or material.

NOTE: The U.S. Army Corps of Engineers has assigned the proposed project COE Action Id. No. 200200391.

COAST GUARD REGULATIONS APPLICABLE TO DREDGE OPERATIONS

Below is a list of regulations which are applicable to dredge operations in the COTP Wilmington zone. This list is not all inclusive. We encourage dredge companies to schedule a meeting with members of the USCG staff, in order to be provided amplifying information or answers to any questions that may exist. We also strongly encourage all Uninspected Towing Vessels (UTV) associated with each dredging operation to participate in the USCG's Voluntary Commercial Dockside Examination program. Please contact LT Dave Brown of the USCG staff at (910) 815-4895, extension 108, to coordinate a meeting or dockside exam.

1. Lights on dredge pipelines (33 CFR 88.15)
2. Lights on barges at a bank or dock (33 CFR 88.13)
3. Lights and Shapes (33 CFR 84.11-13)
4. Mooring Buoys (33 CFR 62.35)
5. Special Marks (33 CFR 62.31)
6. Uninspected Towing Vessel's (UTV) Licensing Requirements (46 CFR 15.910 & 15.815)
7. UTV Drug Testing Requirements (33 CFR 4.06 & 4.03-2)
8. UTV Marine Radar Requirement (33 CFR 164.01(b) & 164.72)
9. UTV Certificate of Documentation (33 CFR 173.21)
10. UTV Marine Casualty Reporting Criteria (46 CFR 4.05-1)
11. Dredge or UTV Advance Notice of T



VICINITY MAP
NO SCALE

GLOBAL POSITIONING SYSTEMS CERTIFICATE

I, CHRISTOPHER D. STANLEY, CERTIFY THAT THE GRID TIE TO THE BOUNDARY CORNER SHOWN WAS PERFORMED UNDER MY SUPERVISION FROM AN ACTUAL GPS SURVEY MADE UNDER MY SUPERVISION AND THE FOLLOWING INFORMATION WAS USED TO PERFORM THIS SURVEY:

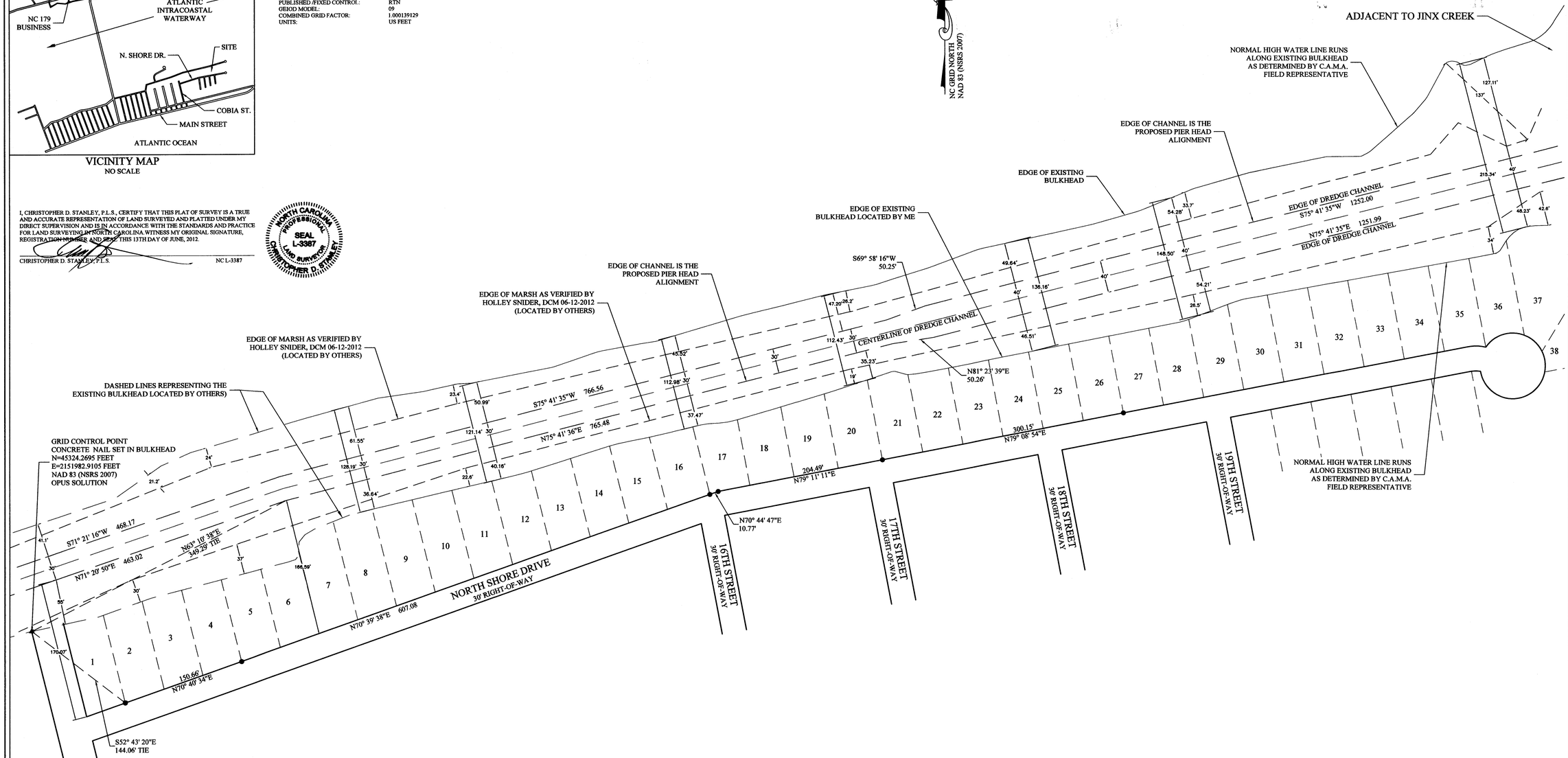
CLASS OF SURVEY:	A
POSITIONAL ACCURACY:	0.022 METERS
TYPE OF GPS FIELD PROCEDURE:	RTN
DATES OF SURVEY:	11/15/2011 - 11/17/2011
DATUM/EPOCH:	NAD 83
PUBLISHED /FIXED CONTROL.:	RTN
GEIOD MODEL:	09
COMBINED GRID FACTOR:	1.000139129
UNITS:	US FEET

I, CHRISTOPHER D. STANLEY, P.L.S., CERTIFY THAT THIS PLAT OF SURVEY IS A TRUE AND ACCURATE REPRESENTATION OF LAND SURVEYED AND PLATTED UNDER MY DIRECT SUPERVISION AND IS IN ACCORDANCE WITH THE STANDARDS AND PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS 13TH DAY OF JUNE, 2012.

CHRISTOPHER D. STANLEY, P.L.S. NC L-3387

NORTH CAROLINA PROFESSIONAL SEAL L-3387 LAND SURVEYOR CHRISTOPHER D. STANLEY

NC GRID NORTH NAD 83 (NSRS 2007)



NOTES:

1. ALL BEARINGS ARE BASED ON NC GRID NORTH (NAD83-NSRS 2007); ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES.
2. COMBINED GRID FACTOR= 1.000164075
3. LOCATION OF DREDGED CHANNEL TAKEN FROM AN AS-BUILT SURVEY PREPARED BY GBA ENGINEERS & SURVEYORS ENTITLED" EAST END RESIDENTIAL CANALS MAINTENANCE DREDGING FOR TOWN OF SUNSET BEACH, DATED MAY 13, 2003.
4. THIS PLAT IS NOT FOR RECORDING.

LEGEND		
LABEL	SYM.	DESCRIPTION
IPF/IRF	●	IRON PIPE /ROD FOUND
IRS	○	5/8" REBAR SET
MAG	▲	MAG NAIL FOUND
CMF	■	CONC. MON. FOUND
CMS	□	CONC. MON. SET
NCGS	⊗	GEODETIC MONUMENT
PKF	▲	P.K. NAIL FOUND
PKS	△	P.K. NAIL SET
RRS	⊕	RAILROAD SPIKE
PNS	✖	POINT NOT SET

SCALE: 1" = 60'
0 30 60 120 180

Revisions
06-13-2012: Revised to show marsh grass alignment and add dimensions.

East Coast Engineering & Surveying, P.C.
ENGINEERS•PLANNERS•SURVEYORS
Phone: 910.754.8029
Fax: 910.754.8406
Post Office Box 2467
Shallotte, North Carolina 28459
Firm License Number C-3014

PROPOSED FEEDER CANAL PIER ALIGNMENT SURVEY FOR:

SAMMY VARNAM

NORTH SHORE DRIVE EAST
SUNSET BEACH, NORTH CAROLINA

Date: 06-13-2012
Scale: 1"=60'
Drawn By: CDS
Checked By:

TOWNSHIP: SHALLOTTE
COUNTY: BRUNSWICK
STATE: NC
CREW: KS, JA, CS
FB/PG: 27-52

ECES PROJECT NO. 12-1163

Jinks Creek Shellfish Survey Report
Sunset Beach, NC

FEBRUARY 2018

Prepared By: Moffatt & Nichol
272 N. Front Street, Ste. 204
Wilmington, NC 28401

Prepared For: Town of Sunset Beach
700 Sunset Boulevard North
Sunset Beach, NC 28468

moffatt & nichol

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APPENDICES

1.0 INTRODUCTION

Moffatt & Nichol conducted a shellfish survey of Jinks Creek in support of a navigation dredging project sponsored by the Town of Sunset Beach. Jinks Creek serves as a connecting navigation channel for two (2) residential canals and additional residential lots on the east end of Sunset Beach. With the current shoaling condition of Tubbs Inlet, Jinks Creek provides the only navigable access to the Atlantic Intracoastal Waterway (AIWW) for the east end of Sunset Beach. The two (2) residential canals connecting with Jinks Creek entail the Feeder Canal and the Bay Area as shown in Figure 1. Figure 1 also shows the location of Jinks Creek in relation to the AIWW and Tubbs Inlet, which provides a tidal connection to the Atlantic Ocean.

Figure 1. Jinks Creek Location

The creation of both the Feeder Canal and Bay Area occurred through man-made dredging operations during the early 1970's (Cleary & Marden, 1999). Figures 2 & 3 show aerial photographs of the southern portion of Jinks Creek near the Feeder Canal and Bay Area. The images show the pre- and post-project conditions of southern Jinks Creek for the referenced circa 1970 dredging event. However, there are no records of any previous dredging events occurring in Jinks Creek north of the residential canal systems.

The NC Division of Marine Fisheries (DMF) and the National Marine Fisheries Service (NMFS) requried the shellfish survey to help evaluate the potenital for impacts as a result from the navigation dredging project. The survey concentrated on identifiying clam and oyster species of all development levels within the project area.

The survey results should help the resource agencies quantify the shellfish presence and evaluate their productivitiy potential.

The DMF has designated the boundary of Jinks Creek as primary nursery area (PNA) due to the adjacents habitats potential to support shellfish and juvenile fish species. Based on local observations, significant shellfish resources could also be expected within the waters of Jinks Creek. Therefore, any action that may alter or impact the area's ability to support shellfish must be reviewed by the resource agencies prior to implementation. The survey results may aslo help identify if avoidance or minimization measures may help decrease the impact potential for any shellfish found within the dredging footprint.

Figure 2. Southern Jinks Creek 1966 (Originally printed in Cleary & Marden, 1999)

Figure 3. Southern Jinks Creek 1974 (Originally printed in Cleary & Marden, 1999)

The shellfish survey included sampling approximately 1,182 sites over 55 transects in an approximate 42-acre area covering the general undisturbed section of Jinks Creek. The survey followed a protocol provided by DMF for conducting the assessment, which stipulated the density of sample sites required. The protocol requires a minimum of 25 sample sites per acre with no less than 10 samples for any specific project. The survey limits and acreage were identified through consultation with DMF and the NMFS with additional review provided by the North Carolina Division of Coastal Management (DCM), and the US Army Corps of Engineers (USACE). After determining the survey limits, a desktop GIS application assisted to divide the site into transects with

randomly spaced sample sites. Figure 4 shows an overview of survey limits in Jinks Creek along with the identified transects and sampling locations.

Figure 4. Jinks Creek Shellfish Survey Site Plan

2.0 METHODOLOGY

Moffatt & Nichol staff conducted the shellfish survey on July 18th-20th, September 5th-8th (excluding September 6th), and October 2nd-5th, 2017. Weather conditions remained favorable throughout most of the sampling period, but heavy rains prevented the survey efforts planned for October 4th. Generally, the shellfish sampling occurred in approximate 4-hour windows balanced around the most accessible predicted low tide event of each day. Scheduling the work around low tide maximized the exposed ground cover within the intertidal region and helped expedite the survey efforts.

The survey methodology required a visual count or estimate of the shellfish present at each sampling location. The sampling plan randomly distributed the sites along each transect, but generally provided an average of 22 sites per transect. The maximum number of samples assigned to an individual transect equaled 32 sites and the minimum number of sites equaled 11. The survey intent strived to provide a depth stratified layout by distributing the sample sites across the transect in random variation.

In the field, the survey team navigated to within an approximate 3-foot radius of each pre-estalished sample site to observe and docuent the shellfish presence. In the subtidal locations, the survey team used a clam rake to sample an approximate 1-meter square area and document the shellfish presence. Along most of the intertidal and supratidal areas, the survey team conducted a visual count of any identified live shellfish within the 1-meter square sample site. When shellfish presence covered greater than 50% of the 1-meter square site, the survey team extrapolated the full shellfish presence from visual counts of either ½ or ¼ of the sample area. When the shellfish presence provided greater than 90% coverage of the 1-meter square site, the survey team extrapolated the overall shellfish presence from visual counts of approximately ¼ of the site.

Along with the shellfish presence, the survey noted the depth and general bottom type (e.g. mud, sandy mud, muddy sand, sand, shell hash) for each sampling site. The survey also provided general water quality parameters such as dissolved oxygen, pH, salinity, and temperature observed during the survey period. The data gathering included the referenced information to help identify if any anomalies existed during the sampling period that might affect the shellfish presence or absence.

- Survey date
- Surveyor's names
- Water quality (DO, pH, salinity, and temperature)
- Site elevation (MLW)
- Sediment type
- Water depth
- Presence/absence of shellfish
- Number of shellfish
- Category of size

3.0 RESULTS & DISCUSSION

The survey results discuss multiple aspects of the findings related to the different type of shellfish identified during the work. The survey focused on identifying the presence of clam and oyster resources; however, the results also noted additional environmental resources as observed in the field.

3.1 Oyster Resources

The survey results indicate the proposed navigation project will most likely not be able to avoid potential impacts to the oyster resources present in Jinks Creek. Appendix A shows a summary of the survey results in planview. As shown in the planview summary, the oyster resources located in the northern most 1,400 ft of Jinks Creek extended throughout the channel cross-section. Generally, the survey identified oyster colonies ranging up to 100 species within multiple sample sites established in the creek's subtidal region. The survey also identified larger oyster clusters within the intertidal regions adjacent to the shoreline. The work would most likely not create any direct impacts to the resources established along the shoreline, but could be expected to impact resources in the subtidal region.

Based on the survey results, Jinks Creek supports approximately 1,195 oyster species per acre between the AIWW confluence and the Feeder Canal entrance. These results include the spat, sublegal, and legal size categories sampled during the survey efforts. The following list shows a summary of oyster species identified from the 1,182 sites and 55 transects in the approximate 42-acre Jinks Creek survey area. For reference, Appendix B shows the summary results of the shellfish sampled by transect during the survey effort.

- 6,388 Spat Classification (152 / acre)
- 34,186 Sublegal Classification (812 / acre)
- 9,730 Legal Classification (231 / acre).
  Total – 50,304 (1,195 / acre)

Based on the calculated density of oyster potentially within Jinks Creek, the navigation project may create impacts to approximately 12,810 oyster based on the proposed dredge footprint. The navigation project may disturb an estimated 10.72 acres within Jinks Creek between the AIWW confluence and the Feeder Canal system. Therefore, with an estimated potential of 1,195 oyster per acre, the total impact could reach approximately 12,810 oyster species. Table 1 provides a summary of the estimated impacts feasible for the spat, sublegal and legal categories of oyster.

Table 1. Potential Oyster Impacts Based on Species Size & Density

Size Category	Shellfish Survey Results	Potential Impacts (10.72 Ac. Dredge Area)
Spat	152 / Acre	1,629
Sublegal	812 / Acre	8,705
Legal	231 / Acre	2,476
Total	**1,195 / Acre**	**12,810**

The calculated impacts account for previously proposed minimization efforts supported within the northern section of Jinks Creek. The minimization efforts include reducing the proposed navigation channel to a 40-ft width along the initial 1,200 ft from the AIWW confluence. As referenced above, the oyster resources in the central portion of Jinks Creek extend an additional 200-ft (1,400-ft total) from the limits of the minimized channel. However, the channel approaches an S-curve alignment beyond the 1,200 ft range and a wider channel seemed more appropriate for boater safety. The proposed channel widens to a 50-ft width through the S-curve alignment.

This northern area of Jinks Creek includes the most environmentally sensitive habitat observed during the survey efforts, where oyster habitat generally consisted throughout the channel profile. Beyond this northern area, the oyster resources appeared to colonize along the shoreline beyond the dredging limits. For reference, Appendix A shows the proposed dredging footprint along with the identified oyster resources throughout Jinks Creek. Additional minimization or relocation efforts may also help reduce the impact potential. However, complete avoidance appears unlikely due to the identified locations and stratifications of the oyster resource.

3.2 Clam Resources

The survey also identified several clam species within the northern section of Jinks Creek. The results indicate a concentration of clams within the northern most portion of Jinks Creek with a diminishing presence extending throughout the proposed work area. The results show the majority of the clam species exist north of the S-curve in Jinks Creek, or Transect 28 as shown in Appendix A. The area in north Jinks Creek, where the survey identified the clam resources, appeared to contain a substrate of fine grained or clayey material and organics mixed together. South of this area, the sediment transitions to a coarser grain size material typical of an open beach and less conducive for clam habitat. However, the survey identified at least two (2) clam resources along the southern most transect in the study area. Therefore, the subaqueous terrain within Jinks Creek south of the S-curve most likely provides some degree of suitable habitat for clam resources. In total, the survey identified 1,288 clam resources within the Jinks Creek survey area for an average density of 31 clams per acre. Appendix B provides a list of the clam species sampled along each of the 55 transects, with a summary shown below.

- Large Clam – 1,008 (24 / acre)
- Small Clam – 280 (7 / acre)
  Total – 1,288 (31/ acre)

Based on the proposed dredge alignment, the navigation project will most likely create impacts to the clam resource within Jinks Creek. Similar to the identified oyster resources, minimization or relocation efforts will be unlikely to alleviate all potential impacts to the clam resources. The survey identified clams buried within the subaqueous substrate of Jinks Creek and relocation efforts could not ensure complete removal of the resource. Table 2 shows the project may affect approximately 328 clams inclusive of the small and large sized species. The calculated potential impacts account for the overall resource density observed within the survey area and do not consider the potential for relocation efforts.

Table 2. Potential Clam Impacts Based on Species Size & Density

Size Category	Shellfish Survey Results	Potential Impacts (10.72 Ac. Dredge Area)
Small	24 /Acre	257
Large	7 / Acre	71
Total	**31 /Acre**	**328**

3.3 Mussel Resources

Although efforts did not concentrate on identifying mussel resources, the survey located approximately 836 species within the Jinks Creek sample area. This translates to an average value of approximately 20 mussel species per acre. The survey efforts generally located the mussel species within the northern survey area, between Transect 1 and Transect 25. The survey located approximately 740 (89%) species within this northern area of Jinks Creek. The remaining 96 (11%) species occurred in the southern portion of Jinks Creek between Transect 30 and Transect 41.

The survey identified the mussel resources generally integrated along the channel's edge with the colonized oyster species. Based on the density observed during the survey efforts, the project may affect approximately 213 species during the construction event. Although the species generally resides within the intertidal zone, the

survey cannot conclude the shoreline provides the only utilized habitat for the resource. Therefore, the survey results include the impact potential for the mussel resource based on the observed density throughout Jinks Creek. Table 3 shows the results of the potential impacts calculated for the mussel resource.

Table 3. Potential Mussel Impacts Based on Density

Shellfish Survey Results	Potential Impacts (10.72 Ac. Dredge Area)
20 /Acre	213

3.4 Water Quality

The water quality data collected during the survey efforts matched well with anticipated results for similar water bodies. Therefore, the Jinks Creek system should not contain any anomalous features that may impair the presense or recruitment of shellfish. The DMF includes Jinks Creek in the Stream Classification Schedule for the Lumber River Basin as SA, HWQ (commercial shellfishing, High Quality Waters) (DMF, 2018). Results of the water quality collected during the sampling events met all applicable state water quality standards for SA waters. Table 4 shows the reported water quality data, including water temperature, salinity, dissolved oxygen (DO), and pH.

Table 4. Water Quality Measurements

Date / Time	Temp. ˚F	Salinity	DO (mg/L)	pH
NC Standard(1)	-	-	≥ 5.0 mg/L	6.8 to 8.5
07/18/17 09:15	79.54	35.95	3.95	5.7
07/18/17 11:15	83.59	30.55	5.81	6.25
07/19/17 10:00	81.23	35.91	6.19	6.88
07/19/17 12:15	84.52	36.47	7.93	7.27
07/20/17 10:00	80.96	36.42	4.66	7.19
09/05/17 15:30	85.14	35.9	10.22	7.04
09/07/17 13:00	80.83	28.46	6.74	6.96
09/08/17 13:30	80.42	31.96	9.92	7.47
10/02/17 09:30	72.16	32.43	7.29	6.91
10/02/17 13:30	75.78	34.69	9.87	6.98
10/03/17 10:00	72.36	33.69	7.44	7.2
10/03/17 14:00	75.34	34.79	10.16	7.22
10/05/17 13:00	76.24	35.25	8.96	7.01
10/05/17 15:00	76.73	24.85	10.21	7.3

1. NC water quality standards provided by DEQ (2018).

4.0 SUMMARY

The shellfish survey helped to identify numerous resources within Jinks Creek, including oyster, clam, and mussel. The survey covered approximately 42.11 acres in support of a navigation project proposed to dredge Jinks Creek. In accordance with the recommendations provided by the NC Division of Marine Fisheries (DMF), the survey included 1,182 sample sites across 55 transects spaced through Jinks Creek. The recommended protocol required a minimum of 25 sample locations for every acre within the project area. The primary focus of the survey concentrated on identifying the risk for potential impacts to occur to the existing Jinks Creek oyster habitat. The survey also identified other environmental resources such as clam and mussel species.

The survey found Jinks Creek supports on the order of 1,200 oysters per acre ranging from spat (152), sublegal (812), and legal (231) size classifications. The majority of the oyster resources fall along the shoreline in the intertidal region. However, the survey identified several oyster resources within the subtidal region of northern Jinks Creek. Generally, the oyster identified within the deeper regions of the creek occurred within the northern 1,400 ft of Jinks Creek. In this area of northern Jinks Creek, the resource density most likely prohibits the navigation project from avoiding all potential impacts. Minimization efforts can help reduce the potential for impacts; however, the survey results show the oyster resources may be too diverse to avoid.

Within the remaining portion of Jinks Creek, outside of the northern 1,400 ft, oyster species generally coagulate along the shoreline and should not face any direct impacts from the navigation project. The oyster resources in south Jinks Creek exist a sufficient distance from the proposed dredging footprint so direct impacts would remain unlikely. However, the creek substrate through the southern portion of the work area seems capable of sustaining oyster habitat. Based on these findings, the proposed navigation project could affect an estimated 12,810 oyster by dredging the 10.7-acre footprint currently proposed. Reviewing the overall densities for each oyster size category, the potential impacts could affect approximately 1,629 spat species, 8,705 sublegal and 2,476 legal species.

The shellfish survey also identified approximately 1,288 clam resources, including 1,008 small species and 280 large classifications across the complete 42.11-acre survey site. The clam resources extended further south within the subtidal region of Jinks Creek compared to the oyster species identified. The survey identified clam resources through the complete survey area; however, the placement density became significantly lower in southern Jinks Creek compared to the northern region. Relocation efforts would minimize the potential for adverse impacts to the clam resources. However, with the low water visibility and the clams tendency to bury within the sediment, complete removal of all clam resources seems unlikely.

The survey identified several mussel resources in addition to the clam and oyster species. The mussel species generally existed underneath oyster clumps located along the shoreline or channel banks. Direct impacts to the mussel species appears unlikely due to their presence along the shoreline. The proposed navigation project strives to avoid the shoreline region and generally follows the existing thalweg of Jinks Creek. However, the survey results recognize the project may potentially affect approximately 213 mussel resources during the construction process.

The survey results provide a foundation for evaluating potential impacts feasible for the shellfish resources in Jinks Creek. Review of the findings by NMFS and DMF, along with other project stakeholders should foster discussion on the path forward to provide suitable minimization or avoidance efforts to complete the navigation project. In addition, agency review and consultation should also help facilitate any necessary mitigation requirements to offset the direct impacts feasible from the dredging event.

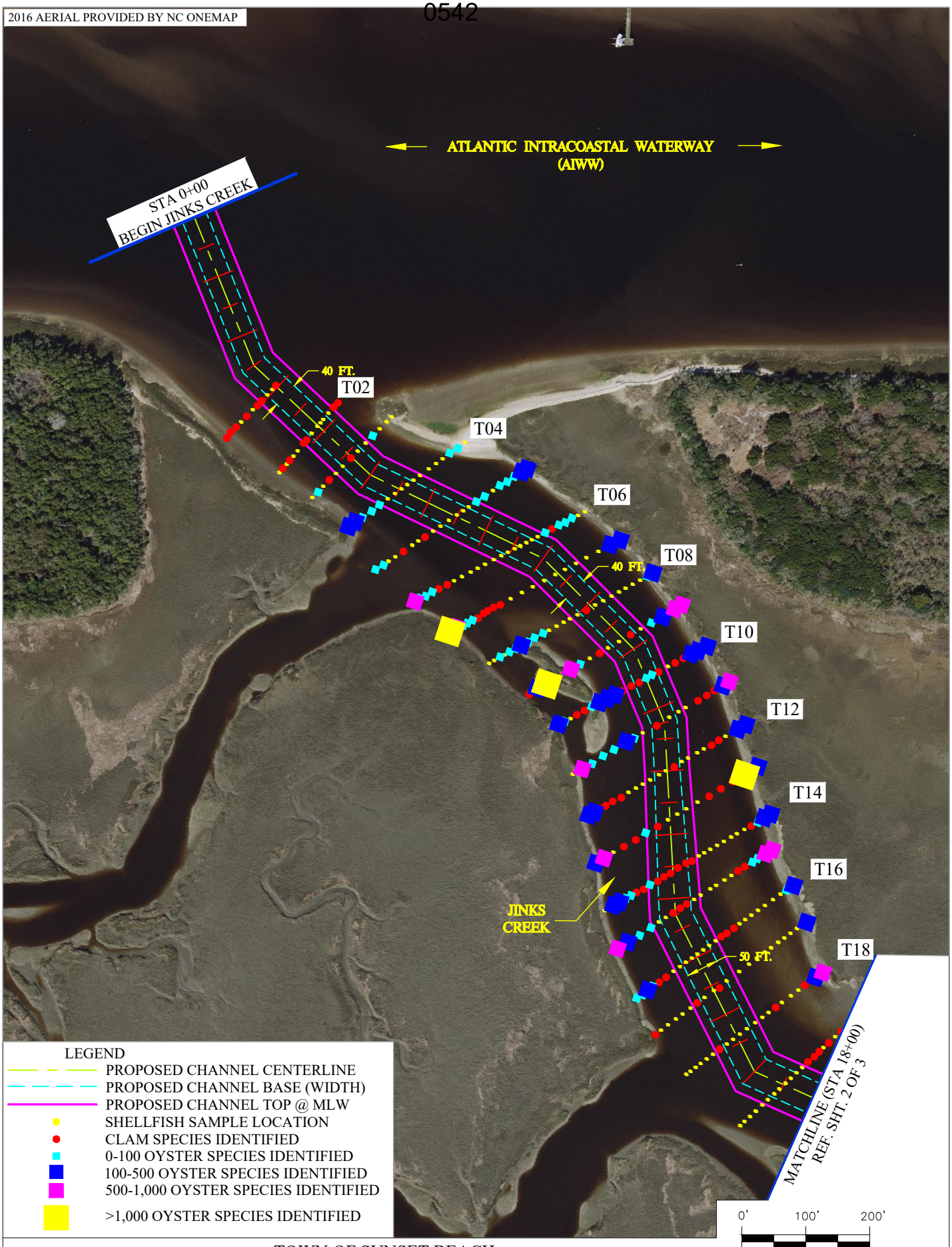
5.0 REFERENCES

Cleary, W. J. and Marden, T. P. 1999. Shifting Shorelines: A Pictorial Atlas of North Carolina Inlets. North Carolina Sea Grant. Raleigh, North Carolina.

DMF (2018). Habitat protection, strategic habitat areas. URL. http://portal.ncdenr.org/web/mf/habitat/SHAs Accessed February 15, 2018.

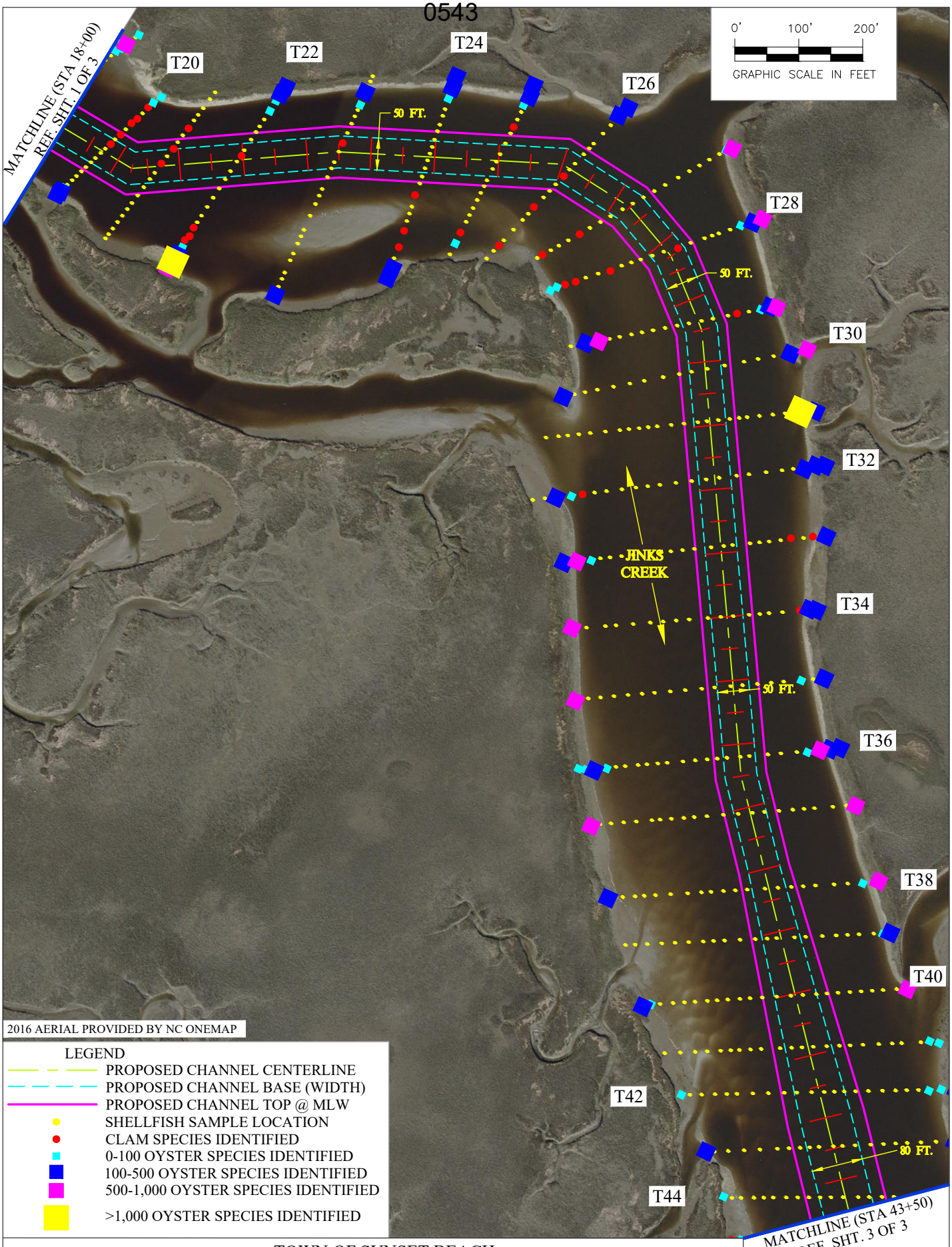
NCDEQ (2018). NC surface water classifications. URL. https://ncdenr.maps.arcgis.com/apps/webappviewer/index.html?id=6e125ad7628f494694e259c80dd64265. Accessed February 15, 2018

Appendix A
Planview Summary Results

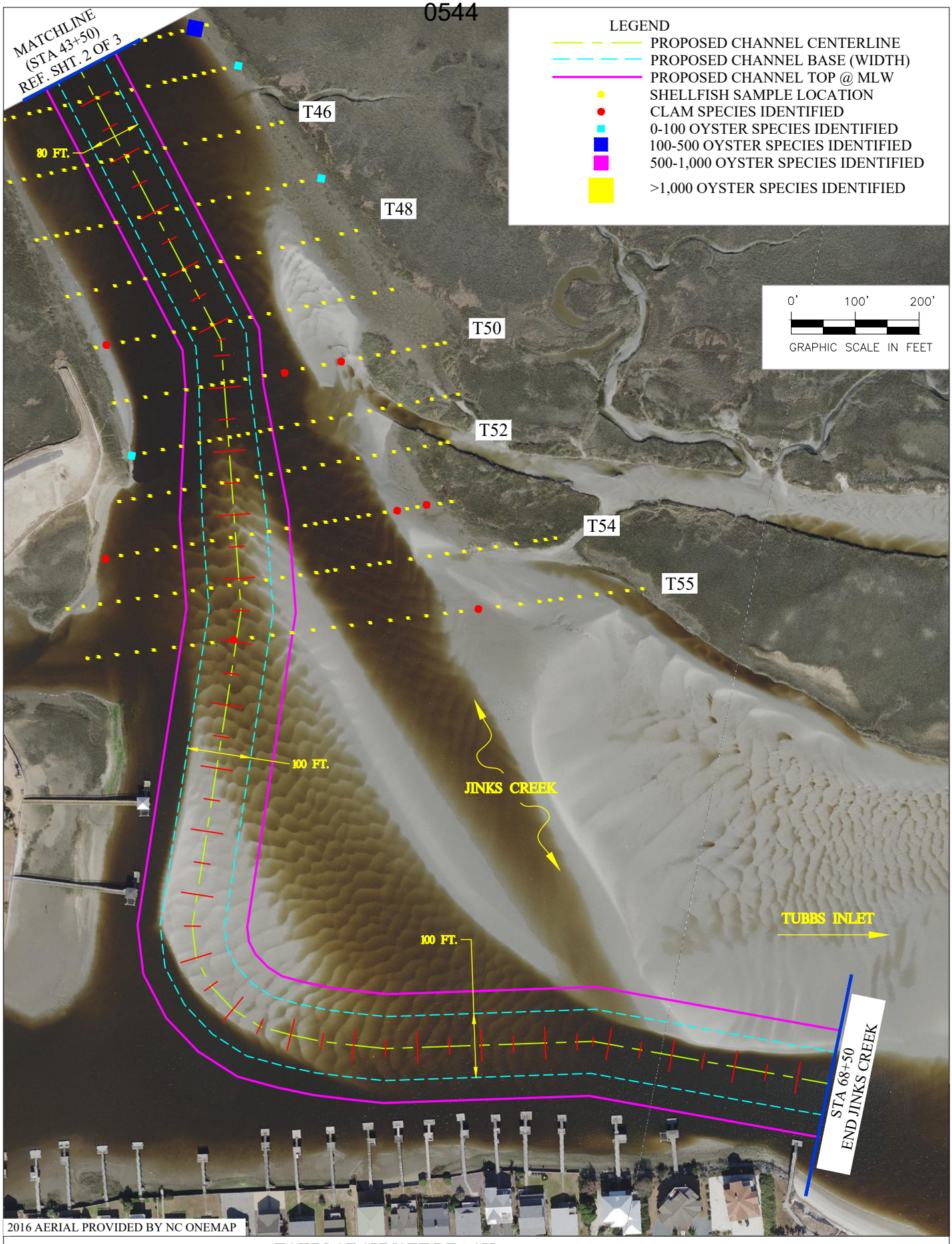


TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK SHELLFISH SURVEY
PLAN VIEW

A-1



TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK SHELLFISH SURVEY
PLAN VIEW



TOWN OF SUNSET BEACH
NAVIGATION PROJECT
JINKS CREEK SHELLFISH SURVEY
PLAN VIEW

Appendix B

Survey Summary by Transect

Transect	# of Sites Sampled	Acreage	Shellfish Located							
			Mussel	Clam			Oyster			
				Large	Small	Total	Spat/Recruit	Sublegal	Legal	Total
1	11		0	44	0	44	0	0	0	0
2	13		0	44	4	48	0	0	0	0
3	13		0	8	0	8	8	52	80	140
4	17		0	4	0	4	120	272	172	564
5	22		0	40	8	48	56	300	80	436
6	26		0	44	0	44	100	348	256	704
7	17		0	92	8	100	256	3272	60	3588
8	25		0	12	0	12	0	290	544	834
9	16		480	124	24	148	892	3084	80	4056
10	21		0	92	24	116	472	1600	20	2092
11	17		96	64	28	92	216	1240	180	1636
12	23		0	44	0	44	0	60	680	740
13	16		8	48	24	72	480	2584	80	3144
14	27		0	92	28	120	160	1472	4	1636
15	22		0	32	8	40	320	1832	20	2172
16	26		0	32	0	32	16	148	256	420
17	20		0	8	4	12	40	160	8	208
18	22		28	8	4	12	48	800	116	964
19	27		0	24	4	28	175	844	126	1145
20	22		0	8	16	24	44	160	408	612
21	22		0	4	16	20	0	0	0	0
22	25		104	12	8	20	288	2208	128	2624
23	28		0	0	4	4	48	496	16	560
24	23		0	36	24	60	0	288	468	756
25	22		24	12	8	20	132	600	0	732
26	22		0	8	8	16	180	480	52	712
27	21		0	8	0	8	0	532	40	572
28	21		0	16	4	20	0	52	680	732
29	20		0	4	0	4	480	1700	104	2284
30	16		8	0	0	0	260	752	292	1304
31	24		0	0	0	0	160	1220	140	1520
32	23		0	4	0	4	0	244	848	1092
33	23		0	4	4	8	100	936	120	1156
34	19		4	4	4	8	80	1200	80	1360
35	19		16	0	0	0	72	620	32	724
36	24		0	0	0	0	128	500	1108	1736
37	22		40	8	0	8	400	1060	300	1760
38	21		24	0	0	0	80	1060	792	1932
39	22		0	0	0	0	160	288	104	552
40	24		0	0	0	0	128	300	876	1304
41	23		4	0	0	0	21	20	52	93
42	23		0	0	0	0	32	160	12	204
43	20		0	0	0	0	160	700	60	920
44	23		0	0	0	0	76	200	180	456
45	21		0	8	0	8	0	48	40	88
46	19		0	0	0	0	0	0	0	0
47	19		0	0	0	0	0	4	0	4
48	17		0	0	0	0	0	0	0	0
49	18		0	0	4	4	0	0	0	0
50	22		0	4	4	8	0	0	0	0
51	24		0	0	0	0	0	0	36	36
52	21		0	0	0	0	0	0	0	0
53	25		0	8	4	12	0	0	0	0
54	31		0	0	0	0	0	0	0	0
55	32		0	4	4	8	0	0	0	0
TOTAL	**1,182**	**42.11**	**836**	**1,008**	**280**	**1,288**	**6,388**	**34,186**	**9,730**	**50,304**
Density / Acre			**20**	**24**	**7**	**31**	**152**	**812**	**231**	**1,195**

Appendix C

Site Pictures

Photo Appendix

Photo 1: *Oysters along the edge of Jinks Creek.*

Photo 2: *Typical oyster patch found.*

Photos 3 and 4: *High tide conditions when oysters are not visible.*

Photos 5 and 6: *Typical rake samples, one with shell, the other with mucky substrate.*

Photos 7 and 8: *Typical sand-mud intertidal areas near Transect T-55.*

Photo 9: *Northern end of Jinks Creek, looking east.*

Photo 10: *Tributary to Jinks Creek near Transect 25 (S-Curve).*

Photo 11: *Oyster shell near Transect T14 in northern Jinks Creek.*

Photo 12: *Oyster shell near Transect T10 in northern Jinks Creek.*

Appendix D
Field Data Collection Forms

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal						**Date:** 7-18-17			**Adjacent Shoreline:**			
Start of Day								**End of Day**				
Temp (°C):	26.41	**Sample Site Location**			**DO & pH:**	60.11%, 3.95 mg/L	5.7	**Temp (°C):**	28.66	**DO & pH:**	89.7%, 5.81 mg/L	6.25
Salinity (ppt):	35.95	State Plane NAD83; Feet			**Tide Level:**	Low (9:15 a.m.)		**Salinity (ppt):**	30.55	**Tide Level:**	2 hours past low (11:15 a.m.)	
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Category of Oyster Length (1 = small, 2 = mid, 3 = large)**	**Sediment(s)**	**Notes**
T-1	1-01	48,553.13	2,150,794.41	1.74		2"	0.05	3 clams	12 clams		Shell, sand	
	1-02	48,561.80	2,150,798.56	1.27		3'	0.91	0	0		Shell, sand	
	1-03	48,573.27	2,150,804.06	0.27		5'	1.52	0	0		Shell, sand	
	1-04	48,583.88	2,150,809.14	-0.75		4' 7"	1.40	2 clams	8 clams		Shell, sand	
	1-05	48,595.63	2,150,814.77	-1.92		4'	1.22	1 clam	4 clams		Shell, sand	
	1-06	48,607.69	2,150,820.55	-2.93		2.5'	0.76	0	0		Shell, sand	
	1-07	48,617.19	2,150,825.10	-3.60		8"	0.20	2 clams	8 clams		Shell, sand	
	1-08	48,625.57	2,150,829.12	-4.08		3"	0.08	0	0		Shell, sand	
	1-09	48,637.04	2,150,834.61	-4.63		0"	0.00	1 clam	4 clams		Shell, sand	
	1-10	48,647.12	2,150,839.44	-4.41		0"	0.00	1 clam	4 clams		Shell, sand	
	1-11	48,654.90	2,150,843.17	-3.85	9:15 a.m.	0"	0.00	1 clam (L)	4 clams (L)		Shell, sand	
T-2	2-1	48,527.38	2,150,890.49	1.21		0"	0.00	0			Shell, sand	
	2-2	48,543.07	2,150,897.28	-0.13		2"	0.05	1 clam (S)	4 clams (S)		Shell, sand	
	2-3	48,558.71	2,150,903.30	-1.92		4"	0.10	1 clam (L)	4 clams (L)		Shell, sand	
	2-4	48,568.79	2,150,907.20	-3.13		7"	0.18	0	0		Shell, sand	
	2-5	48,583.29	2,150,912.10	-4.15		15"	0.38	0	0		Shell, sand	
	2-6	48,589.02	2,150,914.38	-4.12		26"	0.66	0	0		Sand	
	2-7	48,601.54	2,150,919.36	-3.99		34"	0.86	6 clams	24 clams		Sand	
	2-8	48,614.48	2,150,924.50	-3.28		42"	1.07	1 clam	4 clams		Sand	
	2-9	48,621.49	2,150,927.28	-2.72		4'	1.22	0	0		Sand	
	2-10	48,627.72	2,150,929.76	-2.27		4'3"	1.30	0	0		Sand	
	2-11	48,639.59	2,150,934.47	-1.42		4'	1.22	0	0		Sand	
	2-12	48,651.99	2,150,939.40	-0.77		3'5"	1.04	0	0		Sand	
	2-13	48,660.28	2,150,942.70	-0.44		6"	0.15	0	0		Shell, sand	
	2-14	-	-	-		3"	0.08	1 clam	4 clams		Shell, sand	Extra point
	2-15	-	-	-		0"	0.00	2 clams	8 clams		Shell, sand	Extra point
T-3	3-1	48,506.60	2,150,951.57	1.16		0"	0.00	0			Sand, muck	
	3-2	48,517.27	2,150,956.85	0.46		0"	0.00	24 oysters	96 oysters	56 C3, 40 C2	Sand, shell	
	3-3	48,528.55	2,150,962.43	-1.05		0"	0.00	0	0		Sand	
	3-4	48,540.66	2,150,968.42	-2.71		22"	0.56	1 clam	4 clams		Sand, muck	
	3-5	48,553.81	2,150,974.93	-3.66		3'5"	1.04	0	0		Mucky	
	3-6	48,567.60	2,150,981.75	-3.40		3'9"	1.14	0	0		Mucky	
	3-7	48,583.67	2,150,989.70	-3.11		3'	0.91	1 clam	4 clams		Mucky	
	3-8	48,597.44	2,150,996.51	-2.75		2'5"	0.74	0	0		Mucky	
	3-9	48,613.11	2,151,004.26	-1.83		2'5"	0.74	0	0		Mucky	
	3-10	48,627.51	2,151,011.38	-0.51		8"	0.20	11 oysters	44 oysters	24 C3, 12 C2, 8 C1	Mucky	
	3-11	48,641.51	2,151,018.30	0.00		0"	0.00	0	0		Mucky	
	3-12	48,655.08	2,151,025.01	0.64		0"	0.00	0	0		Mucky	
	3-13	48,665.00	2,151,029.92	1.19		0"	0.00	0	0		Mucky	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal					**Date:** 7-18-17			**Adjacent Shoreline:**				
Start of Day								**End of Day**				
Temp (°C):	26.41	**Sample Site Location**			**DO & pH:**	60.11%, 3.95 mg/L	5.7	**Temp (°C):**	28.66	**DO & pH:**	89.7%, 5.81 mg/L	6.25
Salinity (ppt):	35.95	State Plane NAD83; Feet			**Tide Level:**	Low (9:15 a.m.)		**Salinity (ppt):**	30.55	**Tide Level:**	2 hours past low (11:15 a.m.)	
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Category of Oyster Length (1 = small, 2 = mid, 3 = large)**	**Sediment(s)**	**Notes**
T-4	4-01	48,481.60	2,151,021.59	1.47		0"	0.00	43 oysters	172 oysters	28 C3, 80 C2, 64 C1	Mucky, sand	
	4-02	48,491.32	2,151,028.57	0.32		0"	0.00	36 oysters	144 oysters	112 C3, 32 C2	Mucky, sand	
	4-03	48,501.61	2,151,035.95	-1.26		27"	0.69	8 oysters	32 oysters	All C3	Mucky, sand	
	4-04	48,515.02	2,151,045.56	-2.79		3'1"	0.94	9 oysters	36 oysters	All C2	Mucky, sand	
	4-05	48,528.22	2,151,055.03	-2.78		3'5"	1.04	2 oysters	8 oysters	All C2	Mucky, sand	
	4-06	48,541.26	2,151,064.38	-2.69		2'10"	0.86	0	0		Mucky, sand	
	4-07	48,552.66	2,151,072.55	-2.64		2'6"	0.76	0	0		Mucky, sand	
	4-08	48,562.87	2,151,079.87	-2.59		2'7"	0.79	0	0		Mucky, sand	
	4-09	48,571.93	2,151,086.37	-2.52		2'9"	0.84	0	0		Mucky, sand	
	4-10	48,581.73	2,151,093.40	-2.30		2'8"	0.81	0	0		Mucky, sand	
	4-11	48,591.82	2,151,100.63	-2.09		30"	0.76	0	0		Mucky, sand	
	4-12	48,605.84	2,151,110.69	-2.09		30"	0.76	0	0		Mucky, sand	
	4-13	48,617.20	2,151,118.83	-1.53		29"	0.74	0	0		Mucky, sand	
	4-14	48,627.57	2,151,126.27	-0.33		27"	0.69	0	0		Mucky, sand	
	4-15	48,637.87	2,151,133.65	0.74		17"	0.43	1 clam 18 oysters	4 clams 72 oysters	52 C2, 20 C1	Mucky, sand	
	4-16	48,650.37	2,151,142.62	1.37		0"	0.00	25 oysters	100 oysters	64 C2, 36 C1	Mucky, sand	
	4-17	48,662.64	2,151,151.42	-		0"	0.00	0			Mucky, sand	
T-5	5-01	48,430.04	2,151,081.35	-		1'7"	0.48	3 oysters	12 oysters	All C2	Mucky, sand	
	5-02	48,439.84	2,151,088.93	-0.72		1'4"	0.41	8 oysters	32 oysters	All C2	Mucky, sand	
	5-03	48,449.13	2,151,096.12	-1.09		1'5"	0.43	0	0		Mucky, sand	
	5-04	48,459.07	2,151,103.81	-1.55		1'8"	0.51	0	0		Mucky, sand	
	5-05	48,471.63	2,151,113.53	-1.96		2'1"	0.64	2 clams (1 small)	8 clams	4 clams (S) 4 clams (L)	Muck	
	5-06	48,484.42	2,151,123.43	-2.18		2'8"	0.81	0	0		Muck	
	5-07	48,493.50	2,151,130.46	-2.19		2'5"	0.74	0	0		Muck	
	5-08	48,503.11	2,151,137.90	-2.15		2'9"	0.84	1 clam	4 clams		Muck	
	5-09	48,515.39	2,151,147.40	-2.05		2'7"	0.79	0	0		Muck	
	5-10	48,526.44	2,151,155.95	-1.94		2'7"	0.79	0	0		Muck	
	5-11	48,539.06	2,151,165.72	-2.01		2'9"	0.84	0	0		Muck	
	5-12	48,550.95	2,151,174.92	-2.21		3'	0.91	0	0		Muck	
	5-13	48,560.28	2,151,182.14	-2.29		3'	0.91	0	0		Muck	
	5-14	48,568.65	2,151,188.62	-2.40		3'1"	0.94	0	0		Muck	
	5-15	48,580.03	2,151,197.43	-2.51		3'3"	0.99	2 oysters	8 oysters	All C2	Muck	
	5-16	48,591.80	2,151,206.53	-2.57		3'3"	0.99	2 oysters	8 oysters	All C2	Muck	
	5-17	48,604.87	2,151,216.65	-2.54		3'2"	0.97	0	0		Muck	
	5-18	48,614.71	2,151,224.27	-2.38		3'4"	1.02	2 clams (1 small) 11 oysters	8 clams 44 oysters	All C2 4 clams (S) 4 clams (L)	Muck	
	5-19	48,625.45	2,151,232.58	-1.78		3'1"	0.94	6 clams	24 clams		Muck	
	5-20	48,635.66	2,151,240.48	-		17"	0.43	1 clam 1 oyster	4 clams 4 oysters	All C3	Muck	
	5-21	48,646.08	2,151,248.54	-		1"	0.03	55 oysters	220 oysters	76 C3, 92 C2, 44 C1	Muck	
	5-22	48,654.43	2,151,255.01	-		0"	0.00	29 oysters	116 oysters	104 C2, 12 C1	Sand, muck	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal						**Date:** 7-18-17			**Adjacent Shoreline:**			
Start of Day								**End of Day**				
Temp (°C):	26.41	**Sample Site Location**			**DO & pH:**	60.11%, 3.95 mg/L	5.7	**Temp (°C):**	28.66	**DO & pH:**	89.7%, 5.81 mg/L	6.25
Salinity (ppt):	35.95	State Plane NAD83; Feet			**Tide Level:**	Low (9:15 a.m.)		**Salinity (ppt):**	30.55	**Tide Level:**	2 hours past low (11:15 a.m.)	
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Category of Oyster Length (1 = small, 2 = mid, 3 = large)**	**Sediment(s)**	**Notes**
T-6	6-1	48,402.12	2,151,154.48	-		3"	0.08	127 oysters	508 oysters	152 C3, 256 C2, 100 C1	Mucky, sand	
	6-2	48,408.43	2,151,160.59	-1.13		1'9"	0.53	1 clam 12 oysters	4 clams 48 oysters	All C2	Mucky, sand	
	6-3	48,415.48	2,151,167.41	-1.31		2'6"	0.76	1 clam 2 oysters	4 clams 8 oysters	All C2	Mucky, sand	
	6-4	48,423.22	2,151,174.89	-1.67		2'5"	0.74	1 clam 1 oyster	4 clams 4 oysters	All C2	Mucky, anoxic	
	6-5	48,432.48	2,151,183.85	-2.55		4'4"	1.32	2 clams	8 clams		Mucky, anoxic	
	6-6	48,443.07	2,151,194.10	-3.55		4'3"	1.30	2 clams	8 clams		Mucky, anoxic	
	6-7	48,452.11	2,151,202.84	-3.24		3'3"	0.99	0	0		Mucky, anoxic	
	6-8	48,462.04	2,151,212.44	-2.72		2'7"	0.79	0	0		Mucky, anoxic	
	6-9	48,473.07	2,151,223.11	-2.41		3'	0.91	0	0		Mucky, anoxic	
	6-10	48,482.09	2,151,231.84	-2.08		2'9"	0.84	0	0		Mucky, anoxic	
	6-11	48,491.38	2,151,240.82	-1.86		3'2"	0.97	0	0		Mucky, anoxic	
	6-12	48,502.62	2,151,251.69	-1.57		3'7"	1.09	0	0		Mucky, anoxic	
	6-13	48,512.11	2,151,260.87	-1.38		3'8"	1.12	0	0		Mucky, anoxic	
	6-14	48,520.50	2,151,268.99	-1.44		4'4"	1.32	0	0		Mucky, anoxic	
	6-15	48,529.13	2,151,277.34	-1.87		4'4"	1.32	0	0		Mucky, anoxic	
	6-16	48,536.41	2,151,284.37	-2.36		4'5"	1.35	0	0		Mucky, anoxic	
	6-17	48,543.90	2,151,291.62	-2.89		4'5"	1.35	0	0		Mucky, anoxic	
	6-18	48,550.73	2,151,298.22	-3.33		4'6"	1.37	0	0		Mucky, anoxic	
	6-19	48,558.24	2,151,305.49	-3.45		4'7"	1.40	0	0		Mucky, anoxic	
	6-20	48,567.08	2,151,314.04	-3.19		4'9"	1.45	1 oyster	4 oysters		Sand	
	6-21	48,576.33	2,151,322.99	-2.47		4'2"	1.27	3 clams	12 clams		Sand	
	6-22	48,584.49	2,151,330.88	-1.71		2'6"	0.76	8 oysters	32 oysters	All C2	Sand	
	6-23	48,593.74	2,151,339.83	-0.88		19"	0.48	1 clam 25 oysters	4 clams 100 oysters	All C3	Sand	
	6-24	48,602.11	2,151,347.93	-0.40		26"	0.66	1 oyster	4 oysters	All C3	Mucky, sand, shell	
	6-25	48,609.63	2,151,355.20	-		0"	0.00	Dead shell	N/A		Mucky, sand, shell	
	6-26	48,618.25	2,151,363.54	-		0"	0.00	Dead shell	N/A		Mucky, sand, shell	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Brandon Grant, Rebeckah Hollowell					**Date: 9**-8-17			**Adjacent Shoreline:**				
Start of Day								**End of Day**				
Temp (°C):	26.9	**Sample Site Location**			**DO & pH:**	9.92 mg/L; 150%	7.47	**Temp (°C):**			**DO & pH:**	
Salinity (ppt):	31.96	State Plane NAD83; Feet			**Tide Level:**	2 hours prior (1:30 p.m.)		**Salinity (ppt):**			**Tide Level:**	
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**		**Sediment(s)**	**Notes**
T-7	7-01	48,375.04	2,151,221.71		2:37 p.m.	0.03	0.01	1 clam (large) 30 C1, 500 C2, 15 C3	4 clams (large) 120 C1, 2,000 C2, 60 C3		Muck, shell	Edge of marsh
	7-02	48,383.94	2,151,230.14	0.86	2:46 p.m.	1.64	0.50	20 C1, 200 C2	80 C1, 800 C2		Muck, shell	
	7-03	48,396.40	2,151,241.95	-0.01	2:49 p.m.	2.62	0.80	10 C2	40 C2		Muck, shell	
	7-04	48,410.00	2,151,254.84	-0.85	2:51 p.m.	3.61	1.10	2 clams (large) 2 C2	8 clams (large) 8 C2		Muck, shell	
	7-05	48,423.51	2,151,267.65	-0.65	2:52 p.m.	4.92	1.50	1 clam (small)	4 clams (small)		Muck, shell	
	7-06	48,439.19	2,151,282.51	-0.21	2:54 p.m.	4.26	1.30	0	0		Muck, shell	
	7-07	48,453.05	2,151,295.66	-0.23	2:55 p.m.	3.28	1.00	7 clams (large)	28 clams (large)		Muck	
	7-08	48,467.69	2,151,309.53	-0.41	2:57 p.m.	3.28	1.00	0	0		Muck, shell	
	7-09	48,481.55	2,151,322.67	-0.71	3:00 p.m.	2.62	0.80	0	0		Muck, shell	
	7-10	48,496.23	2,151,336.58	-1.20	3:01 p.m.	2.30	0.70	0	0		Muck, shell	
	7-11	48,510.55	2,151,350.16	-2.51	3:02 p.m.	1.97	0.60	2 clams (large)	8 clams (large)		Muck, shell	
	7-12	48,522.99	2,151,361.95	-3.73	3:04 p.m.	3.28	1.00	5 clams (large), 1 clam (small)	20 clams (large), 4 clams (small)		Muck, shell	
	7-13	48,537.28	2,151,375.50	-4.11	3:06 p.m.	4.59	1.40	4 clams (large)	16 clams (large)		Muck, shell	
	7-14	48,550.80	2,151,388.31	-3.03	3:08 p.m.	5.25	1.60	0	0		Pluff mud	
	7-15	48,566.11	2,151,402.82	-1.26	3:09 p.m.	5.90	1.80	2 clams (large)	8 clams (large)		Pluff mud	
	7-16	48,581.09	2,151,417.03	0.09								Too deep
	7-17	48,593.94	2,151,429.20									Too deep
	7-18	-	-	-								Too deep
	7-19	-	-	-								Too deep
	7-20	-	-	-								Too deep
	7-21	-	-	-	2:31 p.m.						Pluff mud	Too deep
	7-22	-	-	-	2:29 p.m.						Pluff mud	Too deep
	7-23	-	-	-	2:27 p.m.	5.90	1.80				Muck, shell	Too deep
	7-24	-	-	-	2:25 p.m.	0.98	0.30	0	0		Muck, shell	
	7-25	-	-	-	2:23 p.m.	0.33	0.10	6 C1, 40 C2	24 C1, 160 C2		Muck, shell	
	7-26	-	-	-	2:17 p.m.	0.16	0.05	8 C1, 66 C2	32 C1, 264 C2		Muck, shell	*Storm surge, tides were higher longer Edge of marsh

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal						**Date:** 7-20-17		**Adjacent Shoreline:**				
Start of Day								**End of Day**				
Temp (°C):	27.2	**Sample Site Location**			**DO & pH:**	71.9%, 4.66 mg/L	7.19	**Temp (°C):**		**DO & pH:**		
Salinity (ppt):	36.42	State Plane NAD83; Feet			**Tide Level:**	1 hour, 15 minutes before (10:00 a.m.)		**Salinity (ppt):**		**Tide Level:**		
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Category of Oyster Length (1 = small, 2 = mid, 3 = large)**	**Sediment(s)**	**Notes**
T-08	8-1	48,346.63	2,151,295.19	0.97		0"	0.00	0	0		Muck	
	8-2	48,353.21	2,151,301.34	0.61		0"	0.00	0	0		Muck	
	8-3	48,360.34	2,151,308.00	0.06		3"	0.08	8 oysters	32 oysters	8 C3, 24 C2	Muck, shell	
	8-4	48,366.85	2,151,314.08	-0.44		9"	0.23	0	0		Muck, shell	
	8-5	48,373.31	2,151,320.11	-0.66		12"	0.30	1 oyster	4 oysters	All C2	Muck, shell	
	8-6	48,381.18	2,151,327.46	-0.08		0"	0.00	15 oysters	60 oysters	44 C3, 16 C2	Muck, shell	
	8-7	48,389.03	2,151,334.80	0.52		0"	0.00	35 oysters	140 oysters	100 C3, 40 C2	Muck, shell	
	8-8	48,397.35	2,151,342.56	0.54		0"	0.00	22 oysters	88 oysters	64 C3, 24 C2	Muck, shell	
	8-9	48,405.90	2,151,350.55	0.27		0"	0.00	20 oysters	80 oysters	36 C3, 44 C2	Muck, shell	
	8-10	48,415.31	2,151,359.34	0.31		0"	0.00	22 oysters	88 oysters	20 C3, 68 C2	Muck, shell	
	8-11	48,424.71	2,151,368.12	0.14		0"	0.00	0	0		Muck, shell	
	8-12	48,434.59	2,151,377.35	-0.18		0"	0.00	0	0		Muck, shell	
	8-13	48,443.76	2,151,385.91	-0.41		0"	0.00	0	0		Muck, shell	
	8-14	48,451.83	2,151,393.45	-0.69		3"	0.08	0	0		Muck, shell	
	8-15	48,461.72	2,151,402.69	-1.06		16"	0.41	0	0		Muck, shell	
	8-16	48,473.39	2,151,413.59	-1.98		26"	0.66	3 clams	12 clams		Muck, shell	
	8-17	48,484.88	2,151,424.32	-3.58		3'2"	0.97	0	0		Muck, shell	
	8-18	48,495.19	2,151,433.95	-4.83		3'9"	1.14	0	0		Mucky	
	8-19	48,506.04	2,151,444.09	-4.88		4'	1.22	0	0		Mucky	
	8-20	48,515.93	2,151,453.33	-3.98		4'2"	1.27	0	0		Mucky	
	8-21	48,524.45	2,151,461.28	-2.73		4'4"	1.32	0	0		Mucky	
	8-22	48,533.86	2,151,470.08	-1.11		5'	1.52	0	0		Mucky	
	8-23	48,543.45	2,151,479.03	0.22		5'3"	1.60	0	0		Mucky	
	8-24	48,552.23	2,151,487.23	0.92		2'9"	0.84	4 oysters	16 oysters	4 C3, 12 C2	Mucky	
	8-25	48,560.06	2,151,494.54	-		0"	0.00	79 oysters	316 oysters	268 C3, 48 C2	Mucky	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, Brandon Grant, Rebeckah Hollowell					**Date:** 9-7-17			**Adjacent Shoreline:**			
Start of Day							**End of Day**				
Temp (°C):	27.13	**Sample Site Location**		**DO & pH:**	6.74 mg/L; 99.5%	6.96	**Temp (°C):**		**DO & pH:**		
Salinity (ppt):	28.46	State Plane NAD83; Feet		**Tide Level:**	2 hours prior (1:00 p.m.)		**Salinity (ppt):**		**Tide Level:**		
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-9	9-1	48,320.75	2,151,369.31	0.37	4:44 p.m.	0.00	0.00	12 clams (large)	48 clams (large)	Muck	
	9-2	48,332.58	2,151,379.84	0.27	4:47 p.m.	1.64	0.50	1 clam (small) 3 C1, 13 C2	4 clams (small) 12 C1, 52 C2	Muck, shell	
	9-3	48,344.98	2,151,390.89	0.71	4:48 p.m.	0.00	0.00	120 mussels 35 C1, 290 C2, 20 C3	480 mussels 140 C1, 1,160 C2, 80 C3	Muck, shell	
	9-4	48,361.65	2,151,405.73	-							Top of island, in the marsh
	9-5	48,377.41	2,151,419.78	-	4:54 p.m.	0.33	0.10	60 C1, 150 C2	240 C1, 600 C2	Muck, shell	
	9-6	48,390.84	2,151,431.75	0.41	4:57 p.m.	1.31	0.40	1 C2	4 C2	Muck, shell	
	9-7	48,402.95	2,151,442.53	-0.55	4:58 p.m.	1.31	0.40	0	0	Muck, shell	
	9-8	48,415.74	2,151,453.92	-1.37	4:59 p.m.	1.80	0.55	5 clams (large)	20 clams (large)	Muck, shell	
	9-9	48,427.45	2,151,464.36	-2.45	5:01 p.m.	3.61	1.10	0	0	Muck	
	9-10	48,442.18	2,151,477.47	-3.54	5:02 p.m.	4.92	1.50	0	0	Muck	
	9-11	48,457.98	2,151,491.55	-4.70	3:22 p.m.	5.58	1.70	3 clams (large)	12 clams (large)	Muck	Finished this transect on 9/8/17
	9-12	48,471.42	2,151,503.52	-4.87							Too deep
	9-13	48,486.23	2,151,516.72	-3.21	3:42 p.m.	4.92	1.50	1 clam (large) 6 C2	4 clams (large) 24 C2	Muck, shell	
	9-14	48,501.48	2,151,530.30	-0.89	3:40 p.m.	2.30	0.70	3 clams (large), 1 clam (small) 2 C2	12 clams (large), 4 clams (small) 8 C2	Muck, shell	
	9-15	48,517.06	2,151,544.18	1.11	3:35 p.m.	0.33	0.10	45 C1, 130 C2	180 C1, 520 C2	Muck, shell	
	9-16	48,526.45	2,151,552.55	-	3:30 p.m.	0.00	0.00	1 clam (small) 80 C1, 180 C2	4 clams (small) 320 C1, 720 C2	Muck, shell	
T-10	10-01	48,290.41	2,151,429.99	0.07							In the marsh
	10-02	48,296.69	2,151,435.98	-0.15	4:40 p.m.	0.00	0.00	15 C1, 45 C2	60 C1, 180 C2	Muck, shell	
	10-03	48,304.25	2,151,443.20	-0.32	4:39 p.m.	1.64	0.50	1 clam (small) 3 C1, 1 C2	4 clams (small) 12 C1, 4 C2	Muck, shell	
	10-04	48,312.66	2,151,451.23	-0.33	4:37 p.m.	2.30	0.70	0	0	Muck, shell	
	10-05	48,322.46	2,151,460.60	-0.07	4:36 p.m.	2.62	0.80	4 clams (large)	16 clams (large)	Muck, shell	
	10-06	48,332.22	2,151,469.92	-	4:34 p.m.	2.62	0.80	1 clam (large)	4 clams (large)	Muck, shell	
	10-07	48,341.32	2,151,478.60	-	4:32 p.m.	1.64	0.50	4 C2	16 C2	Muck, shell	
	10-08	48,350.83	2,151,487.69	-0.17	4:29 p.m.	0.00	0.00	1 clam (large) 35 C1, 75 C2, 5 C3	4 clams (large) 140 C1, 300 C2, 20 C3	Muck, shell	
	10-09	48,361.07	2,151,497.47	-1.31	4:26 p.m.	0.00	0.00	25 C1, 85 C2	100 C1, 340 C2	Muck, shell	
	10-10	48,370.18	2,151,506.17	-1.61	4:25 p.m.	0.33	0.10	12 C1, 46 C2	48 C1, 184 C2	Muck, shell	
	10-11	48,381.46	2,151,516.95	-2.32	4:24 p.m.	0.66	0.20	2 clams (large)	8 clams (large)	Muck, shell	
	10-12	48,391.88	2,151,526.90	-2.86	4:21 p.m.	1.97	0.60	1 clam (large), 1 clam (small)	4 clams (large), 4 clams (small)	Muck, shell	Whip coral found
	10-13	48,400.38	2,151,535.01	-3.17	4:19 p.m.	2.62	0.80	4 clams (large), 1 clam (small)	16 clams (large), 4 clams (small)	Muck, shell	
	10-14	48,408.60	2,151,542.87	-3.30	4:18 p.m.	3.28	1.00	3 C2	12 C2	Muck, shell	
	10-15	48,417.48	2,151,551.35	-3.30	4:16 p.m.	4.26	1.30	2 clams (large) 8 C2	8 clams (large) 32 C2	Muck	
	10-16	48,429.22	2,151,562.56	-3.09	4:13 p.m.	4.26	1.30	1 clam (large)	4 clams (large)	Muck	
	10-17	48,438.06	2,151,571.00	-2.92	4:12 p.m.	3.61	1.10	0	0	Muck	
	10-18	48,448.93	2,151,581.39	-1.82	4:11 p.m.	3.61	1.10	1 clam (large)	4 clams (large)	Pluff mud	
	10-19	48,458.29	2,151,590.33	-0.21	4:07 p.m.	3.61	1.10	5 clams (large), 1 clam (small)	20 clams (large), 4 clams (small)	Pluff mud	
	10-20	48,467.13	2,151,598.77	1.05	4:05 p.m.	0.98	0.30	1 clam (large), 2 clams (small) 3 C1, 23 C2	4 clams (large), 8 clams (small) 12 C1, 92 C2	Muck, shell	
	10-21	48,478.90	2,151,610.01	-	4:03 p.m.	0.00	0.00	1 clam (large) 15 C1, 85 C2	4 clams (large) 60 C1, 340 C2	Muck, shell	
	10-22				4:01 p.m.	0.00	0.00	10 C1, 25 C2	40 C1, 100 C2	Muck, shell	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, Brandon Grant, Rebeckah Hollowell					**Date:** 9-7-17			**Adjacent Shoreline:**			
Start of Day							**End of Day**				
Temp (°C):	27.13	**Sample Site Location**		**DO & pH:**	6.74 mg/L; 99.5%	6.96	**Temp (°C):**		**DO & pH:**		
Salinity (ppt):	28.46	State Plane NAD83; Feet		**Tide Level:**	2 hours prior (1:00 p.m.)		**Salinity (ppt):**		**Tide Level:**		
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-11	11-01	48,222.67	2,151,473.41	-	2:48 p.m.	0.00	0.00	0	0	Muck	
	11-02	48,235.95	2,151,485.08	0.56	2:43 p.m.	0.00	0.00	25 C1, 130 C2, 8 C3	100 C1, 520 C2, 32 C3	Muck, shell	
	11-03	48,248.86	2,151,496.43	-0.14	2:42 p.m.	1.31	0.40	1 clam (small) 1 C2	4 clams (small) 4 C2	Muck, shell	
	11-04	48,265.15	2,151,510.74	-0.22	2:41 p.m.	1.31	0.40	1 clam (large) 6 C2	4 clams (large) 24 C2	Muck, shell	
	11-05	48,279.33	2,151,523.20	-1.06	2:38 p.m.	1.31	0.40	2 clams (large) 1 C1, 9 C2	8 clams (large) 4 C1, 36 C2	Muck, shell	
	11-06	48,296.66	2,151,538.42	-1.30	2:35 p.m.	1.97	0.60	2 clams (large) 13 C2, 21 C3	8 clams (large) 52 C2, 84 C3	Muck, shell	
	11-07	48,307.26	2,151,547.74	-1.47	2:34 p.m.	2.62	0.80	1 C1, 6 C2, 1 C3	4 C1, 24 C2, 4 C3	Muck, shell	
	11-08	48,318.21	2,151,557.36	-1.75	2:32 p.m.	2.95	0.90	0	0	Muck, shell	
	11-09	48,337.20	2,151,574.04	-2.22	2:30 p.m.	2.95	0.90	1 clam (large)	4 clams (large)	Muck, shell	
	11-10	48,354.43	2,151,589.18	-2.54	2:29 p.m.	3.28	1.00	0	0	Muck, shell	
	11-11	48,367.04	2,151,600.26	-2.27	2:27 p.m.	3.61	1.10	0	0	Muck	
	11-12	48,376.71	2,151,608.75	-2.04	2:26 p.m.	3.61	1.10	0	0	Muck	
	11-13	48,393.98	2,151,623.93	-1.44	2:16 p.m.	2.95	0.90	2 clams (large), 1 clam (small)	8 clams (large), 4 clams (small)	Pluff mud	
	11-14	48,405.22	2,151,633.80	-0.31	2:13 p.m.	4.26	1.30	3 clams (large), 1 clam (small)	12 clams (large), 4 clams (small)	Pluff mud	
	11-15	48,416.20	2,151,643.45	0.96	2:09 p.m.	1.64	0.50	5 clams (large), 3 clams (small)	20 clams (large), 12 clams (small)	Muck, shell	
	11-16	48,427.99	2,151,653.81	-	2:05 p.m.	0.33	0.10	1 clam (small) 12 C1, 80 C2, 7 C3	4 clams (small) 48 C1, 320 C2, 28 C3	Muck, shell	
	11-17	48,436.48	2,151,661.27	-	1:59 p.m.	0.00	0.00	24 mussels 15 C1, 65 C2, 8 C3	96 mussels 60 C1, 260 C2, 32 C3	Muck, shell	Edge of marsh

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal						**Date:** 7-20-17				**Adjacent Shoreline:**		
Start of Day								**End of Day**				
Temp (°C):	27.2	**Sample Site Location**			**DO & pH:**	71.9%, 4.66 mg/L	7.19	**Temp (°C):**		**DO & pH:**		
Salinity (ppt):	36.42	State Plane NAD83; Feet			**Tide Level:**	1 hour, 15 minutes before (10:00 a.m.)		**Salinity (ppt):**		**Tide Level:**		
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Category of Oyster Length (1 = small, 2 = mid, 3 = large)**	**Sediment(s)**	**Notes**
T-12	12-1	48,169.99	2,151,517.99	0.68		0"	0.00	45 oysters	180 oysters	168 C3, 12 C2	Muck, shell	
	12-2	48,176.83	2,151,524.09	0.09		2"	0.05	60 oysters	240 oysters	All C3	Muck, shell	
	12-3	48,184.50	2,151,530.94	-0.58		22"	0.56	1 clam	4 clams		Muck, shell	
	12-4	48,192.23	2,151,537.85	-1.16		28"	0.71	1 clam	4 clams		Muck, shell	
	12-5	48,201.59	2,151,546.21	-1.68		26"	0.66	2 clams	8 clams		Sand, shell	
	12-6	48,212.37	2,151,555.83	-2.00		25"	0.64	1 clam	4 clams		Sand, shell	
	12-7	48,222.91	2,151,565.25	-2.14		25"	0.64	0	0		Sand, shell	
	12-8	48,232.96	2,151,574.23	-2.16		25"	0.64	0	0		Sand, shell	
	12-9	48,242.11	2,151,582.39	-2.14		26"	0.66	0	0		Sand, shell	
	12-10	48,251.97	2,151,591.20	-2.13		26"	0.66	0	0		Sand, shell	
	12-11	48,263.96	2,151,601.91	-2.17		26"	0.66	0	0		Sand, shell	
	12-12	48,273.00	2,151,609.98	-2.16		26"	0.66	0	0		Sand, shell	
	12-13	48,284.26	2,151,620.04	-2.06		26"	0.66	1 clam	4 clams		Mucky	
	12-14	48,294.56	2,151,629.23	-1.74		15"	0.38	0	0		Mucky	
	12-15	48,303.00	2,151,636.78	-1.36		13"	0.33	0	0		Mucky	
	12-16	48,315.34	2,151,647.80	-1.02		13"	0.33	0	0		Mucky	
	12-17	48,324.18	2,151,655.69	-0.91		13"	0.33	0	0		Mucky	
	12-18	48,334.48	2,151,664.89	-0.91		17"	0.43	3 clams	12 clams		Mucky	
	12-19	48,343.72	2,151,673.14	-0.89		14"	0.36	2 clams	8 clams		Mucky	
	12-20	48,353.56	2,151,681.93	-0.20		15"	0.38	0	0		Mucky	
	12-21	48,361.39	2,151,688.92	0.62		5"	0.13	0	0		Mucky	
	12-22	48,370.36	2,151,696.94	-		0"	0.00	31 oysters	124 oysters	All C3	Mucky	
	12-23	48,380.77	2,151,706.23	-		0"	0.00	49 oysters	196 oysters	148 C3, 48 C2	Mucky	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, Brandon Grant, Rebeckah Hollowell					**Date: 9**-8-17			**Adjacent Shoreline:**			
Start of Day							**End of Day**				
Temp (°C):	26.9	**Sample Site Location**		**DO & pH:**	9.92 mg/L; 150%	7.47	**Temp (°C):**		**DO & pH:**		
Salinity (ppt):	31.96	State Plane NAD83; Feet		**Tide Level:**	2 hours prior (1:30 p.m.)		**Salinity (ppt):**		**Tide Level:**		
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-13	13-1	48,102.72	2,151,551.49	0.74	3:58 p.m.	0.00	0.00	15 C1, 65 C2	60 C1, 260 C2	Muck, shell	Edge of marsh
	13-2	48,113.89	2,151,561.19	0.32	3:59 p.m.	0.33	0.10	20 C1, 130 C2, 5 C3	80 C1, 520 C2, 20 C3	Muck, shell	
	13-3	48,126.46	2,151,572.10	-0.72	4:06 p.m.	1.97	0.60	0	0	Muck, shell	
	13-4	48,140.38	2,151,584.19	-1.94	4:08 p.m.	2.62	0.80	2 clams (small)	8 clams (small)	Muck, shell	
	13-5	48,157.06	2,151,598.66	-2.65	4:09 p.m.	3.28	1.00	1 clam (large), 3 clams (small)	4 clams (large), 12 clams (small)	Muck, shell	
	13-6	48,171.61	2,151,611.30	-2.44	4:11 p.m.	2.95	0.90	1 C2	4 C2	Muck, shell	
	13-7	48,186.86	2,151,624.53	-2.07	4:13 p.m.	2.30	0.70	2 clams (large), 1 clam (small)	8 clams (large), 4 clams (small)	Muck, shell	
	13-8	48,201.36	2,151,637.12	-1.68	4:14 p.m.	1.64	0.50	0	0	Muck	
	13-9	48,214.28	2,151,648.34	-1.48	4:15 p.m.	0.98	0.30	0	0	Muck	
	13-10	48,226.65	2,151,659.07	-1.26	4:16 p.m.	0.66	0.20	0	0	Muck	
	13-11	48,242.05	2,151,672.44	-0.91	4:17 p.m.	0.66	0.20	0	0	Muck	
	13-12	48,257.64	2,151,685.97	-0.43	4:18 p.m.	1.31	0.40	3 clams (large)	12 clams (large)	Pluff mud	
	13-13	48,273.86	2,151,700.06	-0.60	4:18 p.m.	1.64	0.50	3 clams (large)	12 clams (large)	Pluff mud	
	13-14	48,290.85	2,151,714.80	-0.97	4:19 p.m.	1.31	0.40	3 clams (large)	12 clams (large)	Muck, shell	
	13-15	48,306.43	2,151,728.33	1.01	4:21 p.m.	0.00	0.00	80 C1, 390 C2, 15 C3	320 C1, 1,560 C2, 60 C3	Muck, shell	
	13-16	48,325.52	2,151,744.91	-	4:25 p.m.	0.00	0.00	2 mussels 5 C1, 60 C2	8 mussels 20 C1, 240 C2	Muck, shell	Edge of marsh
T-14	14-01	48,035.67	2,151,587.46		5:13 p.m.	0.00	0.00	10 C1, 60 C2, 1 C3	40 C1, 240 C2, 4 C3	Muck, shell	
	14-02	48,041.30	2,151,592.47		5:02 p.m.	0.33	0.10	15 C1, 105 C2	60 C1, 420 C2	Muck, shell	
	14-03	48,048.17	2,151,598.58	-0.75	5:00 p.m.	1.31	0.40	2 C1, 18 C2	8 C1, 72 C2	Muck, shell	
	14-04	48,055.55	2,151,605.14	-1.08	4:59 p.m.	2.95	0.90	0	0	Muck, shell	
	14-05	48,063.98	2,151,612.64	-1.40	4:57 p.m.	3.94	1.20	1 clam (small) 5 C2	4 clams (small) 20 C2	Muck, shell	
	14-06	48,072.17	2,151,619.93	-1.84	4:56 p.m.	3.61	1.10	1 clam (large)	4 clams (large)	Muck, shell	
	14-07	48,079.30	2,151,626.27	-2.33	4:55 p.m.	3.61	1.10	3 clams (large)	12 clams (large)	Muck, shell	
	14-08	48,088.35	2,151,634.32	-2.55	4:54 p.m.	3.61	1.10	2 C2	8 C2	Muck, shell	
	14-09	48,097.88	2,151,642.80	-2.33	4:52 p.m.	3.28	1.00	3 clams (large), 1 clam (small)	12 clams (large), 4 clams (small)	Muck, shell	
	14-10	48,107.17	2,151,651.07	-2.25	4:50 p.m.	2.95	0.90	1 clam (large), 1 clam (small)	4 clams (large), 4 clams (small)	Muck, shell	
	14-11	48,114.90	2,151,657.95	-2.11	4:49 p.m.	2.95	0.90	4 clams (large), 1 clam (small)	16 clams (large), 4 clams (small)	Muck	
	14-12	48,124.81	2,151,666.76	-1.82	4:47 p.m.	2.30	0.70	4 clams (large), 2 clams (small)	16 clams (large), 8 clams (small)	Muck	
	14-13	48,134.70	2,151,675.55	-1.45	4:46 p.m.	2.13	0.65	3 clams (large), 1 clam (small)	12 clams (large), 4 clams (small)	Muck	
	14-14	48,145.04	2,151,684.75	-1.07	4:45 p.m.	1.97	0.60	1 clam (large)	4 clams (large)	Muck, shell	
	14-15	48,153.39	2,151,692.18	-0.79	4:45 p.m.	1.64	0.50	0	0	Muck	
	14-16	48,162.81	2,151,700.57	-0.59	4:44 p.m.	1.31	0.40	0	0	Muck	
	14-17	48,170.19	2,151,707.13	-0.52	4:44 p.m.	0.66	0.20	0	0	Muck	
	14-18	48,178.35	2,151,714.39	-0.38	4:43 p.m.	0.66	0.20	0	0	Muck	
	14-19	48,187.51	2,151,722.53	-0.20	4:43 p.m.	0.33	0.10	0	0	Muck	
	14-20	48,196.69	2,151,730.70	0.01	4:42 p.m.	0.33	0.10	0	0	Muck	
	14-21	48,206.55	2,151,739.47	-0.09	4:42 p.m.	0.33	0.10	0	0	Muck	
	14-22	48,214.36	2,151,746.42	-0.39	4:40 p.m.	0.49	0.15	0	0	Muck	
	14-23	48,224.46	2,151,755.40	-0.88	4:37 p.m.	1.64	0.50	1 clam (large)	4 clams (large)	Muck	
	14-24	48,233.34	2,151,763.31	-0.48	4:35 p.m.	0.66	0.20	1 clam (large) 3 C2	4 clams (large) 12 C2	Muck, shell	
	14-25	48,242.01	2,151,771.03	0.59	4:33 p.m.	0.00	0.00	1 clam (large) 8 C1, 65 C2	4 clams (large) 32 C1, 260 C2	Muck, shell	
	14-26	48,251.66	2,151,779.60	1.62	4:30 p.m.	0.00	0.00	5 C1, 110 C2	20 C1, 440 C2	Muck, shell	Marsh extends ~6m beyond this point

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, Brandon Grant, Rebeckah Hollowell					**Date: 9**-8-17			**Adjacent Shoreline:**			
Start of Day							**End of Day**				
Temp (°C):	26.9	**Sample Site Location**			**DO & pH:**	9.92 mg/L; 150%	7.47	**Temp (°C):**		**DO & pH:**	
Salinity (ppt):	31.96	State Plane NAD83; Feet			**Tide Level:**	2 hours prior (1:30 p.m.)		**Salinity (ppt):**		**Tide Level:**	
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-15	15-1	47,986.60	2,151,625.63		5:16 p.m.	0.00	0.00	20 C1, 125 C2	80 C1, 500 C2	Muck, shell	Edge of marsh
	15-2	48,001.30	2,151,637.62		5:22 p.m.	0.66	0.20	10 C1, 64 C2, 1 C3	40 C1, 256 C2, 4 C3	Muck, shell	
	15-3	48,018.18	2,151,651.38	-2.70	5:23 p.m.	3.61	1.10	1 C2	4 C2	Muck, shell	Whip coral found
	15-4	48,034.33	2,151,664.56	-2.55	5:24 p.m.	3.28	1.00	1 clam (small) 2 C2	4 clams (small) 8 C2	Muck, shell	
	15-5	48,045.18	2,151,673.40	-2.31	5:25 p.m.	3.28	1.00	0	0	Muck, shell	
	15-6	48,055.33	2,151,681.69	-2.10	5:27 p.m.	3.28	1.00	0	0	Muck, shell	
	15-7	48,066.34	2,151,690.67	-1.95	5:27 p.m.	2.95	0.90	1 clam (large)	4 clams (large)	Muck, shell	
	15-8	48,076.63	2,151,699.06	-1.79	5:28 p.m.	2.95	0.90	1 clam (small)	4 clams (small)	Muck, shell	
	15-9	48,086.34	2,151,706.97	-1.60	5:29 p.m.	2.62	0.80	1 clam (large)	4 clams (large)	Muck	
	15-10	48,095.92	2,151,714.79	-1.36	5:30 p.m.	2.30	0.70	0	0	Muck	
	15-11	48,105.50	2,151,722.60	-1.13	5:30 p.m.	1.64	0.50	0	0	Muck	
	15-12	48,119.29	2,151,733.85	-0.74	5:30 p.m.	1.48	0.45	0	0	Muck	
	15-13	48,127.61	2,151,740.64	-0.51	5:30 p.m.	0.98	0.30	0	0	Muck	
	15-14	48,139.57	2,151,750.39	-0.16	5:31 p.m.	0.66	0.20	0	0	Muck	
	15-15	48,149.72	2,151,758.67	0.08	5:31 p.m.	0.98	0.30	0	0	Muck	
	15-16	48,159.39	2,151,766.56	0.38	5:31 p.m.	0.98	0.30	3 clams (large)	12 clams (large)	Muck	
	15-17	48,168.85	2,151,774.27	0.23	5:32 p.m.	1.64	0.50	3 clams (large)	12 clams (large)	Muck	
	15-18	48,180.28	2,151,783.59	-0.51	5:34 p.m.	1.64	0.50	1 C2	4 C2	Muck, shell	
	15-19	48,187.70	2,151,789.65	-0.57	5:35 p.m.	0.98	0.30	25 C2	100 C2	Muck, shell	
	15-20	48,199.45	2,151,799.22	0.57	5:35 p.m.	0.33	0.10	25 C1, 110 C2, 4 C3	100 C1, 440 C2, 8 C3	Muck, shell	
	15-21	48,208.19	2,151,806.35	1.44	5:42 p.m.	0.00	0.00	25 C1, 130 C2, 2 C3	100 C1, 520 C2, 8 C3	Muck, shell	Edge of marsh
	15-22	48,215.94	2,151,812.67								In the marsh

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal						**Date:** 7-20-17		**Adjacent Shoreline:**				
Start of Day								**End of Day**				
Temp (°C):	27.2	**Sample Site Location**			**DO & pH:**	71.9%, 4.66 mg/L	7.19	**Temp (°C):**		**DO & pH:**		
Salinity (ppt):	36.42	State Plane NAD83; Feet			**Tide Level:**	1 hour, 15 minutes before (10:00 a.m.)		**Salinity (ppt):**		**Tide Level:**		
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Category of Oyster Length (1 = small, 2 = mid, 3 = large)**	**Sediment(s)**	**Notes**
T-16	16-01	47,921.75	2,151,677.36	-		0"	0.00	13 oysters	52 oysters	36 C3, 16 C2	Muck, shell	
	16-02	47,929.77	2,151,683.22	-		0"	0.00	6 oysters	24 oysters	All C3	Muck, shell	
	16-03	47,938.90	2,151,689.87	-		4"	0.10	29 oysters	116 oysters	40 C3, 60 C2, 16 C1	Muck, shell	
	16-04	47,947.39	2,151,696.06	-2.39		25"	0.64	2 oysters	8 oysters	All C2	Sand, shell	
	16-05	47,957.19	2,151,703.20	-2.61		3'2"	0.97	2 clams	8 clams		Sand, shell	
	16-06	47,967.32	2,151,710.59	-2.72		3'2"	0.97	1 clam	4 clams		Sand, shell	
	16-07	47,979.26	2,151,719.29	-2.64		3'1"	0.94	0	0		Sand, shell	
	16-08	47,989.24	2,151,726.57	-2.40		3'	0.91	0	0		Sand, shell	
	16-09	47,998.65	2,151,733.43	-2.18		32"	0.81	0	0		Sand, shell	
	16-10	48,007.73	2,151,740.05	-2.01		30"	0.76	0	0		Sand, shell	
	16-11	48,016.49	2,151,746.44	-1.82		29"	0.74	0	0		Sand, shell	
	16-12	48,025.49	2,151,753.00	-1.63		29"	0.74	0	0		Sand, shell	
	16-13	48,034.90	2,151,759.86	-1.42		25"	0.64	0	0		Sand, shell	
	16-14	48,044.86	2,151,767.12	-1.18		2'	0.61	0	0		Sand, shell	
	16-15	48,054.01	2,151,773.79	-0.85		2'	0.61	2 clams	8 clams		Sand, shell	
	16-16	48,062.83	2,151,780.22	-0.58		16"	0.41	2 clams	8 clams		Sand, muck	
	16-17	48,073.14	2,151,787.74	-0.34		16"	0.41	1 clam	4 clams		Sand, muck	
	16-18	48,081.87	2,151,794.10	-0.07		0"	0.00	0	0		Sand, muck	
	16-19	48,090.84	2,151,800.64	0.14		0"	0.00	0	0		Muck	
	16-20	48,100.46	2,151,807.65	0.35		0"	0.00	0	0		Muck	
	16-21	48,110.85	2,151,815.23	0.42		0"	0.00	0	0		Muck	
	16-22	48,121.60	2,151,823.07	0.35		0"	0.00	0	0		Muck	
	16-23	48,134.00	2,151,832.11	0.35		0"	0.00	0	0		Muck	
	16-24	48,145.64	2,151,840.59	0.70		0"	0.00	0	0		Muck	
	16-25	48,155.51	2,151,847.79	1.20		0"	0.00	3 oysters	12 oysters	All C3	Muck	
	16-26	48,165.80	2,151,855.29	-		0"	0.00	52 oysters	208 oysters	144 C3, 64 C2	Muck	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal, Rebeckah Hollowell					**Date:** 10-2-17			**Adjacent Shoreline:**				
Start of Day								**End of Day**				
Temp (°C):	22.31	**Sample Site Location**		**DO & pH:**	101.1%; 7.29 mg/L	6.91		**Temp (°C):**	24.32	**DO & pH:**	142.9%; 9.87 mg/L	6.98
Salinity (ppt):	32.43	State Plane NAD83; Feet		**Tide Level:**	2 hours prior to low tide (9:30 a.m.)			**Salinity (ppt):**	34.69	**Tide Level:**	2 hours after low tide (1:30 p.m.)	
Tansect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**	
T-17	17-01	47,876.02	2,151,722.78	-		0.4	0.12	0	0	Muck, shell	Edge of marsh (bank undercutting)	
	17-02	47,885.49	2,151,729.42	-0.03		2	0.61	1 clam (large)	4 clams (large)	Muck, shell		
	17-03	47,896.82	2,151,737.35	-0.63		2.9	0.88	0	0	Muck, shell		
	17-04	47,909.49	2,151,746.23	-1.61		4	1.22	0	0	Muck, shell		
	17-05	47,920.19	2,151,753.72	-2.29							Too deep	
	17-06	47,932.60	2,151,762.42	-2.83							Too deep	
	17-07	47,943.85	2,151,770.30	-2.59	12:20 p.m. 10/4/17						Too deep	
	17-08	47,955.20	2,151,778.25	-2.33		4.9	1.49	1 clam (large)	4 clams (large)	Muck, shell		
	17-09	47,970.20	2,151,788.76	-2.02		4.8	1.46	0	0	Muck, shell		
	17-10	47,990.59	2,151,803.04	-1.54		4.5	1.37	1 clam (small)	4 clams (small)	Muck, shell	Hermit crab	
	17-11	48,010.76	2,151,817.17	-0.88		4.3	1.31	0	0	Muck, shell		
	17-12	48,026.35	2,151,828.09	-0.38		4.2	1.28	0	0	Muck		
	17-13	48,038.86	2,151,836.86	-0.11		2.8	0.85	0	0	Muck		
	17-14	48,052.02	2,151,846.08	0.21		2.8	0.85	0	0	Muck		
	17-15	48,061.65	2,151,852.82	0.45		2.1	0.64	0	0	Muck		
	17-16	48,073.22	2,151,860.93	0.57		1.9	0.58	0	0	Muck		
	17-17	48,082.76	2,151,867.61	0.70		1.5	0.46	0	0	Muck		
	17-18	48,092.70	2,151,874.57	0.87		1.8	0.55	0	0	Muck		
	17-19	48,103.00	2,151,881.79	0.99		2	0.61	0	0	Muck		
	17-20	48,118.44	2,151,892.61	-		2	0.61	0	0	Muck, shell		
	17-21	-	-	-	10:40 a.m.	0.9	0.27	10 C1, 40 C2, 2 C3	40 C1, 160 C2, 8 C3	Muck, shell	~6 feet from edge of marsh	
T-18	18-01	47,832.34	2,151,788.59	-		3.3	1.01	0	0	Muck	In mouth of creek	
	18-02	47,838.92	2,151,793.18	-4.83		4.7	1.43	0	0	Muck		
	18-03	47,847.29	2,151,799.02	-4.61							Too deep	
	18-04	47,855.40	2,151,804.68	-4.40							Too deep	
	18-05	47,865.19	2,151,811.52	-4.26	12:30 p.m.10/4/17						Too deep	
	18-06	47,875.10	2,151,818.44	-4.03		4.8	1.46	0	0	Muck, shell		
	18-07	47,885.74	2,151,825.87	-3.40		4.7	1.43	1 clam (small)	4 clams (small)	Muck, shell		
	18-08	47,897.41	2,151,834.01	-2.73		4.8	1.46	0	0	Muck, shell		
	18-09	47,907.26	2,151,840.89	-2.65		4.7	1.43	0	0	Muck, shell		
	18-10	47,918.20	2,151,848.52	-2.59		4.6	1.40	0	0	Muck, shell		
	18-11	47,929.57	2,151,856.46	-2.44		4.6	1.40	0	0	Muck, shell		
	18-12	47,942.77	2,151,865.68	-2.05		4.2	1.28	0	0	Muck, shell	Whip coral	
	18-13	47,954.23	2,151,873.68	-1.56		3.8	1.16	0	0	Muck, shell		
	18-14	47,964.41	2,151,880.79	-1.03		3.5	1.07	0	0	Muck		
	18-15	47,975.25	2,151,888.36	-0.47		2.6	0.79	1 clam (large)	4 clams (large)	Muck		
	18-16	47,985.81	2,151,895.73	-0.07		2	0.61	0	0	Muck		
	18-17	48,000.12	2,151,905.72	0.29		1.5	0.46	0	0	Muck		
	18-18	48,011.99	2,151,914.00	0.59		1.5	0.46	0	0	Muck		
	18-19	48,021.96	2,151,920.96	0.78		2	0.61	1 clam (large)	4 clams (large)	Muck, pluff mud		
	18-20	48,031.55	2,151,927.66	1.13		1.8	0.55	0	0	Muck, pluff mud		
	18-21	48,040.15	2,151,933.66	1.60		1.5	0.46	12 C1, 42 C2, 7 C3	48 C1, 336 C2, 28 C3	Muck, shell		
	18-22	48,050.61	2,151,940.97	-	11:01 a.m.	0	0.00	116 C2, 22 C3 7 Mussels	464 C2, 88 C3 28 Mussels	Muck, shell	Edge of marsh	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal, Rebeckah Hollowell					**Date:** 10-2-17			**Adjacent Shoreline:**				
Start of Day								**End of Day**				
Temp (°C):	22.31	**Sample Site Location**		**DO & pH:**	101.1%; 7.29 mg/L	6.91		**Temp (°C):**	24.32	**DO & pH:**	142.9%; 9.87 mg/L	6.98
Salinity (ppt):	32.43	State Plane NAD83; Feet		**Tide Level:**	2 hours prior to low tide (9:30 a.m.)			**Salinity (ppt):**	34.69	**Tide Level:**	2 hours after low tide (1:30 p.m.)	
Tansect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**	
T-19	19-01	47,782.40	2,151,893.71	-		1.5	0.46	0	0	Mucky sand	In mouth of creek	
	19-02	47,790.58	2,151,898.19	-		3.3	1.01	0	0	Mucky sand		
	19-03	47,800.89	2,151,903.83	-2.06		4.2	1.28	0	0	Mucky sand		
	19-04	47,811.58	2,151,909.68	-3.17						Muck, pluff mud	Too deep	
	19-05	47,823.92	2,151,916.43	-4.52							Too deep	
	19-06	47,834.53	2,151,922.24	-5.79							Too deep	
	19-07	47,846.44	2,151,928.76	-6.63							Too deep	
	19-08	47,855.88	2,151,933.93	-6.41							Too deep	
	19-09	47,867.83	2,151,940.46	-5.40							Too deep	
	19-10	47,877.49	2,151,945.75	-4.05	12:40 p.m.10/4/17						Too deep	
	19-11	47,888.33	2,151,951.69	-3.39		4.9	1.49	0	0	Muck, shell		
	19-12	47,898.94	2,151,957.49	-2.80		4.1	1.25	0	0	Muck, shell		
	19-13	47,910.85	2,151,964.01	-2.10		3.8	1.16	1 clam (small)	4 clams (small)	Muck, shell		
	19-14	47,920.91	2,151,969.52	-1.57		3.25	0.99	1 clam (large)	4 clams (large)	Muck, shell		
	19-15	47,930.66	2,151,974.85	-0.88		2.8	0.85	2 clams (large)	8 clams (large)	Muck, shell		
	19-16	47,938.96	2,151,979.39	-0.62		2.5	0.76	0	0	Muck, shell		
	19-17	47,948.19	2,151,984.45	-0.22		2	0.61	2 clams (large)	8 clams (large)	Muck		
	19-18	47,960.99	2,151,991.45	0.34		1.6	0.49	0	0	Muck		
	19-19	47,972.02	2,151,997.49	0.76		1.2	0.37	1 clam (large)	4 clam (large)	Muck		
	19-20	47,982.92	2,152,003.46	0.87		1	0.30	0	0	Muck		
	19-21	47,992.83	2,152,008.88	1.07		0.8	0.24	0	0	Muck, shell		
	19-22	48,002.74	2,152,014.30	1.35		0.6	0.18	16 C2, 4 C3	64 C2, 16 C3	Muck, shell		
	19-23	48,009.51	2,152,018.01	1.53		0.5	0.15	11 C2	44 C2	Muck, shell		
	19-24	48,017.65	2,152,022.47	-		0	0.00	40 C1, 172 C2, 25 C3	160 C1, 688 C2, 100 C3	Muck, shell		
	19-25	48,026.07	2,152,027.07	-		0.3	0.09	0	0	Pluff mud		
	19-26	48,035.01	2,152,031.97	-		0.1	0.03	0	0	Pluff mud		
	19-27	48,040.67	2,152,035.06	-	11:30 a.m.	0	0.00	15 C1, 48 C2, 10 C3	15 C1, 48 C2, 10 C3	Muck, shell		

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal						**Date:** 7-20-17		**Adjacent Shoreline:**				
Start of Day								**End of Day**				
Temp (°C):	27.2	**Sample Site Location**			**DO & pH:**	71.9%, 4.66 mg/L	7.19	**Temp (°C):**		**DO & pH:**		
Salinity (ppt):	36.42	State Plane NAD83; Feet			**Tide Level:**	1 hour, 15 minutes before (10:00 a.m.)		**Salinity (ppt):**		**Tide Level:**		
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Category of Oyster Length (1 = small, 2 = mid, 3 = large)**	**Sediment(s)**	**Notes**
T-20	20-01	47,760.23	2,152,023.12	1.44		0"	0.00	50 oysters	200 oysters	All C3	Sand, shell	
	20-02	47,767.52	2,152,026.03	1.20		0"	0.00	59 oysters	236 oysters	152 C3, 84 C2	Sand, shell	
	20-03	47,774.70	2,152,028.89	0.46		3"	0.08	17 oysters	68 oysters	56 C3, 12 C2	Sand, shell	
	20-04	47,781.21	2,152,031.50	-0.30		2'8"	0.81	0	0		Sand, shell	
	20-05	47,790.79	2,152,035.32	-1.47		3'4"	1.02	0	0		Sand, shell	
	20-06	47,799.48	2,152,038.79	-2.57		4'6"	1.32	0	0		Sand, shell	
	20-07	47,809.36	2,152,042.74	-3.86		4'7"	1.40	0	0		Sand, shell	
	20-08	47,818.26	2,152,046.29	-4.97		4'7"	1.40	0	0		Sand, shell	
	20-09	47,828.52	2,152,050.39	-5.95		Over 6'		N/A	N/A		Sand, shell	Too deep
	20-10	47,837.42	2,152,053.95	-5.89		Over 6'		N/A	N/A		Sand, shell	Too deep
	20-11	47,847.90	2,152,058.13	-5.53		Over 6'		N/A	N/A		Sand, shell	Too deep
	20-12	47,857.18	2,152,061.84	-5.05		4'6"	1.37	0	0		Sand, shell	
	20-13	47,865.72	2,152,065.25	-4.21		3'8"	1.12	1 clam	4 clams		Sand, shell	
	20-14	47,876.72	2,152,069.64	-3.40		3'	0.91	0	0		Sand, shell	
	20-15	47,887.87	2,152,074.10	-2.62		25"	0.64	1 clam (S)	4 clams (S)		Sand, shell	
	20-16	47,898.05	2,152,078.16	-2.01		2'	0.61	0	0		Sand, shell	
	20-17	47,907.78	2,152,082.05	-1.76		2'3"	0.69	2 clams (S)	8 clams (S)		Sand, shell	
	20-18	47,920.28	2,152,087.04	-1.51		1'9"	0.53	1 clam (S)	4 clams (S)		Shell	
	20-19	47,931.66	2,152,091.59	-1.28		14"	0.36	0	0		Shell	
	20-20	47,942.14	2,152,095.77	-0.79		3"	0.08	1 clam	4 clams		Shell	
	20-21	47,952.84	2,152,100.05	0.01		0"	0.00	18 oysters	72 oysters	28 C2, 44 C1	Shell	
	20-22	47,965.83	2,152,105.24	-		0"	0.00	9 oysters	36 oysters	All C2	Shell	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal, Rebeckah Hollowell					**Date:** 10-2-17			**Adjacent Shoreline:**				
Start of Day							**End of Day**					
Temp (°C):	22.31	**Sample Site Location**		**DO & pH:**	101.1%; 7.29 mg/L	6.91	**Temp (°C):**	24.32	**DO & pH:**	142.9%; 9.87 mg/L	6.98	
Salinity (ppt):	32.43	State Plane NAD83; Feet		**Tide Level:**	2 hours prior to low tide (9:30 a.m.)		**Salinity (ppt):**	34.69	**Tide Level:**	2 hours after low tide (1:30 p.m.)		
Tansect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**	
T-21	21-01	47,729.99	2,152,120.60	-		0	0.00	0	0	Muck	~7 feet from edge of marsh	
	21-02	47,738.01	2,152,122.33	0.48		0.6	0.18	0	0	Muck, pluff mud		
	21-03	47,748.64	2,152,124.63	-0.19		1	0.30	0	0	Muck, pluff mud		
	21-04	47,761.12	2,152,127.32	-1.06		2	0.61	0	0	Muck, pluff mud		
	21-05	47,773.12	2,152,129.92	-1.93		4	1.22	0	0	Muck, pluff mud		
	21-06	47,785.77	2,152,132.65	-2.84		4.5	1.37	0	0	Muck, pluff mud		
	21-07	47,797.45	2,152,135.18	-3.56		5	1.52	0	0	Muck, pluff mud		
	21-08	47,811.85	2,152,138.29	-3.73								
	21-09	47,827.61	2,152,141.69	-3.52								
	21-10	47,843.19	2,152,145.06	-3.38	12:55 p.m.10/4/17							
	21-11	47,855.25	2,152,147.67	-3.22		4.6	1.40	0	0	Muck, shell		
	21-12	47,871.73	2,152,151.23	-2.54		3.7	1.13	1 clam (large)	4 clams (large)	Muck, shell		
	21-13	47,886.90	2,152,154.51	-2.27		3.6	1.10	0	0	Muck, shell	Too deep	
	21-14	47,900.44	2,152,157.44	-2.11		3.5	1.07	1 clam (small)	4 clams (small)	Muck, shell	Too deep	
	21-15	47,913.86	2,152,160.34	-2.04		3.6	1.10	0	0	Muck, shell	Too deep	
	21-16	47,926.81	2,152,163.13	-1.94		3.6	1.10	0	0	Muck, shell		
	21-17	47,939.93	2,152,165.97	-1.82		3.8	1.16	3 clams (small)	12 clams (small)	Muck, shell		
	21-18	47,955.19	2,152,169.27	-1.50		3.2	0.98	0	0	Muck, shell		
	21-19	47,965.95	2,152,171.59	-0.49		2	0.61	0	0	Muck, shell		
	21-20	47,978.69	2,152,174.35	0.62		1.5	0.46	0	0	Muck, shell		
	21-21	47,995.79	2,152,178.04	-		0	0.00	0	0	Shell		
	21-22	48,008.99	2,152,180.90	-	11:52 a.m.	0	0.00	0	0	Shell	In marsh	
T-22	22-01	47,732.47	2,152,228.60	-	12:35 p.m.	0	0.00	165 C2, 10 C3 8 Mussels	660 C2, 40 C3 32 Mussels	Muck, shell	Edge of marsh	
	22-02	47,744.59	2,152,230.38	0.94		0	0.00	30 C1, 260 C2, 22 C3	120 C1, 1,040 C2, 88 C3	Shell		
	22-03	47,756.69	2,152,232.17	0.56		2	0.61	4 C1, 22 C2	16 C1, 88 C2	Muck, pluff mud		
	22-04	47,768.87	2,152,233.96	0.14		3	0.91	18 C2	72 C2	Muck, pluff mud		
	22-05	47,779.80	2,152,235.57	-0.47		3	0.91	1 clam (large)	4 clams (large)	Muck, pluff mud		
	22-06	47,789.05	2,152,236.94	-0.92		3	0.91	1 clam (large)	4 clams (large)	Muck, pluff mud		
	22-07	47,802.41	2,152,238.91	-1.15		3	0.91	1 clam (large)	4 clams (large)	Muck, pluff mud		
	22-08	47,812.89	2,152,240.45	-1.26		3	0.91	0	0	Muck, pluff mud		
	22-09	47,824.94	2,152,242.23	-1.46		3.2	0.98	0	0	Muck, pluff mud		
	22-10	47,841.16	2,152,244.62	-1.77		3	0.91	0	0	Muck		
	22-11	47,858.06	2,152,247.11	-2.10		3.5	1.07	0	0	Muck		
	22-12	47,875.07	2,152,249.62	-2.32		3.8	1.16	0	0	Muck		
	22-13	47,892.31	2,152,252.16	-2.25		3.8	1.16	0	0	Muck, shell		
	22-14	47,907.17	2,152,254.35	-2.25		3.7	1.13	0	0	Muck, shell		
	22-15	47,924.96	2,152,256.97	-2.27		3.7	1.13	0	0	Muck, shell		
	22-16	47,935.82	2,152,258.58	-2.30		3.7	1.13	2 clams (small)	8 clams (small)	Muck, shell		
	22-17	47,946.03	2,152,260.08	-2.33		3.7	1.13	0	0	Muck, shell		
	22-18	47,965.50	2,152,262.95	-2.37		3.7	1.13	0	0	Muck, shell		
	22-19	47,979.47	2,152,265.01	-2.41		3.5	1.07	0	0	Muck, shell		
	22-20	47,989.59	2,152,266.50	-2.29		3.4	1.04	0	0	Muck, shell		
	22-21	48,002.67	2,152,268.43	-2.12		3.7	1.13	0	0	Muck, shell	Whip coral	
	22-22	48,019.80	2,152,270.96	-1.31		3	0.91	7 C2	28 C2	Muck, shell		
	22-23	48,038.38	2,152,273.70	0.04		1.6	0.49	3 C1, 20 C2	12 C1, 80 C2	Muck, shell		
	22-24	48,050.09	2,152,275.42	-		1	0.30	20 C1, 50 C2	80 C1, 200 C2	Muck, shell		
	22-25	48,064.10	2,152,277.49	-	12:05 p.m.	0	0.00	15 C1, 10 C2 18 Mussels	60 C1, 40 C2 72 Mussels	Muck, shell	In the marsh	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal, Rebeckah Hollowell					**Date:** 10-2-17			**Adjacent Shoreline:**				
Start of Day								**End of Day**				
Temp (°C):	22.31	**Sample Site Location**		**DO & pH:**	101.1%; 7.29 mg/L	6.91		**Temp (°C):**	24.32	**DO & pH:**	142.9%; 9.87 mg/L	6.98
Salinity (ppt):	32.43	State Plane NAD83; Feet		**Tide Level:**	2 hours prior to low tide (9:30 a.m.)			**Salinity (ppt):**	34.69	**Tide Level:**	2 hours after low tide (1:30 p.m.)	
Tansect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**	
T-23	23-1	47,760.92	2,152,398.02	0.65	12:41 p.m.	0	0.00	12 C1, 85 C2, 4 C3	48 C1, 340 C2, 16 C3	Muck, shell		
	23-2	47,774.51	2,152,397.89	0.75		2.8	0.85	0	0	Muck, shell		
	23-3	47,788.13	2,152,397.75	0.83		2.5	0.76	0	0	Pluff mud		
	23-4	47,798.66	2,152,397.65	0.88		2.2	0.67	0	0	Pluff mud		
	23-5	47,819.59	2,152,397.45	1.00		2	0.61	0	0	Pluff mud		
	23-6	47,831.34	2,152,397.33	1.08		2	0.61	0	0	Pluff mud		
	23-7	47,848.55	2,152,397.16	1.19		1	0.30	0	0	Pluff mud		
	23-8	47,861.05	2,152,397.04	1.13		1	0.30	0	0	Pluff mud		
	23-9	47,871.91	2,152,396.93	0.96		0.5	0.15	0	0	Muck		
	23-10	47,896.07	2,152,396.70	0.14		0.5	0.15	0	0	Muck		
	23-11	47,916.19	2,152,396.50	-0.75		1.5	0.46	0	0	Muck		
	23-12	47,930.28	2,152,396.36	-1.50		1.8	0.55	0	0	Muck		
	23-13	47,941.91	2,152,396.25	-2.16		2	0.61	0	0	Muck		
	23-14	47,962.06	2,152,396.05	-2.63		4.2	1.28	0	0	Muck		
	23-15	47,977.17	2,152,395.90	-2.73		4.5	1.37	0	0	Muck, shell		
	23-16	47,987.83	2,152,395.80	-2.82		4.6	1.40	0	0	Muck, shell		
	23-17	48,005.54	2,152,395.62	-2.91		4.8	1.46	0	0	Muck, shell	Whip coral	
	23-18	48,020.84	2,152,395.47	-2.87		4.7	1.43	1 clam (small)	4 clams (small)	Muck, shell		
	23-19	48,037.75	2,152,395.31	-2.90		4.8	1.46	0	0	Muck, shell		
	23-20	48,053.84	2,152,395.15	-3.05		4.8	1.46	0	0	Muck, shell	Whip coral	
	23-21	48,066.22	2,152,395.03	-3.02		4.8	1.46	0	0	Muck, shell		
	23-22	48,077.17	2,152,394.92	-2.71		4.8	1.46	0	0	Muck, shell		
	23-23	48,087.05	2,152,394.82	-1.89		3	0.91	3 C2	12 C2	Muck, shell		
	23-24	48,098.92	2,152,394.71	-0.59		2	0.61	0	0	Muck, shell		
	23-25	48,106.34	2,152,394.63	0.18		1	0.30	36 C2	144 C2	Muck, shell		
	23-26	48,117.43	2,152,394.53	-	1:00 p.m.	0	0.00	0	0	Shell		
	23-27	48,126.11	2,152,394.44	-							In marsh	
	23-28	48,135.18	2,152,394.35	-							In marsh	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal						**Date:** 7-20-17		**Adjacent Shoreline:**				
Start of Day								**End of Day**				
Temp (°C):	27.2	**Sample Site Location**			**DO & pH:**	71.9%, 4.66 mg/L	7.19	**Temp (°C):**		**DO & pH:**		
Salinity (ppt):	36.42	State Plane NAD83; Feet			**Tide Level:**	1 hour, 15 minutes before (10:00 a.m.)		**Salinity (ppt):**		**Tide Level:**		
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Category of Oyster Length (1 = small, 2 = mid, 3 = large)**	**Sediment(s)**	**Notes**
T-24	24-1	47,858.20	2,152,547.09	0.90		0"	0.00	27 oysters	108 oysters	76 C3, 32 C2	Muck	
	24-2	47,873.61	2,152,545.50	1.46		0"	0.00	53 oysters	212 oysters	128 C3, 84 C2	Muck	
	24-3	47,890.59	2,152,543.75	1.41		15"	0.38	0	0		Muck, shell	
	24-4	47,910.99	2,152,541.65	0.78		3'	0.91	3 clams (1 small)	12 clams	4 clams (S) 8 clams (L)	Muck, shell	
	24-5	47,934.97	2,152,539.18	0.37		2'8"	0.81	7 clams (1 small)	28 clams	4 clams (S) 24 clams (L)	Muck, shell	
	24-6	47,951.70	2,152,537.46	-0.24		2"	0.05	0			Muck, shell	
	24-7	47,964.11	2,152,536.18	-0.79		3"	0.08	0			Muck, shell	
	24-8	47,975.46	2,152,535.01	-1.28		12"	0.30	0			Muck, shell	
	24-9	47,995.37	2,152,532.96	-2.21		3'1"	0.94	5 clams (4 small)	20 clams	16 clams (S) 4 clams (L)	More sandy	
	24-10	48,013.53	2,152,531.09	-3.07		4'	1.22	0			Deadshell, sand	
	24-11	48,024.83	2,152,529.93	-3.43		4'	1.22	0			Deadshell, sand	
	24-12	48,038.55	2,152,528.51	-3.56		4'1"	1.24	0			Deadshell, sand	
	24-13	48,051.33	2,152,527.20	-3.60		4'1"	1.24	0			Deadshell, sand	
	24-14	48,062.70	2,152,526.03	-3.64		4'2"	1.27	0			Deadshell, sand	
	24-15	48,073.40	2,152,524.93	-3.70		4'4"	1.32	0			Deadshell, sand	
	24-16	48,085.41	2,152,523.69	-3.78		4'2"	1.27	0			Deadshell, sand	
	24-17	48,099.27	2,152,522.26	-3.82		4'	1.22	0			Deadshell, sand	
	24-18	48,110.03	2,152,521.15	-3.65		4'1"	1.24	0			Deadshell, sand	
	24-19	48,124.54	2,152,519.66	-3.33		3'7"	1.09	0			Deadshell, sand	
	24-20	48,135.52	2,152,518.53	-2.67		2'9"	0.84	0			Deadshell, sand	
	24-21	48,151.31	2,152,516.90	-0.92		2'8"	0.81	4 oysters	16 oysters	12 C3, 4 C2	Deadshell, sand	
	24-22	48,169.79	2,152,515.00	0.60		17"	0.43	77 oysters	308 oysters	236 C3, 72 C2	Deadshell, sand	
	24-23	48,188.77	2,152,513.04	-		0"	0.00	28 oysters	112 oysters	16 C3, 96 C2	Deadshell, sand	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, Robert Neal, Rebeckah Hollowell					**Date:** 10-2-17			**Adjacent Shoreline:**			
Start of Day							**End of Day**				
Temp (°C):	22.31	**Sample Site Location**		**DO & pH:**	101.1%; 7.29 mg/L	6.91	**Temp (°C):**	24.32	**DO & pH:**	142.9%; 9.87 mg/L	6.98
Salinity (ppt):	32.43	State Plane NAD83; Feet		**Tide Level:**	2 hours prior to low tide (9:30 a.m.)		**Salinity (ppt):**	34.69	**Tide Level:**	2 hours after low tide (1:30 p.m.)	
Tansect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-25	25-01	47,932.68	2,152,620.27	0.69	1:20 p.m.	1.5	0.46	8 C1, 8 C2	32 C1, 32 C2	Muck, shell	Edge of marsh
	25-02	47,954.08	2,152,620.98	0.15		2	0.61	2 clams (large)	8 clams (large)	Muck, shell	Edge of marsh
	25-03	47,971.83	2,152,621.56	-0.27		3.2	0.98	0	0	Muck, shell	
	25-04	47,989.36	2,152,622.14	-0.49		4	1.22	0	0	Muck	
	25-05	48,001.13	2,152,622.52	-0.49		3	0.91	0	0	Muck	
	25-06	48,013.59	2,152,622.93	-0.95		3	0.91	0	0	Muck	
	25-07	48,027.64	2,152,623.40	-1.65		3	0.91	0	0	Muck	
	25-08	48,040.24	2,152,623.81	-2.47		4.9	1.49	0	0	Muck	
	25-09	48,051.68	2,152,624.19	-3.34	1:04 p.m.10.4.17	3	0.91	0	0	Muck	
	25-10	48,061.90	2,152,624.52	-3.82		5	1.52	0	0	Muck	
	25-11	48,081.97	2,152,625.18	-4.12		5	1.52	0	0	Muck	
	25-12	48,094.43	2,152,625.59	-4.23							Too deep
	25-13	48,107.81	2,152,626.03	-4.28							Too deep
	25-14	48,126.34	2,152,626.64	-4.42							Too deep
	25-15	48,143.90	2,152,627.22	-4.36		4.8	1.46	2 clams (small)	8 clams (small)	Muck, shell	
	25-16	48,155.35	2,152,627.59	-3.89	1:40 p.m.10/4/17	4	1.22	0	0	Muck, shell	
	25-17	48,168.13	2,152,628.01	-3.19		4.8	1.46	0	0	Muck, shell	
	25-18	48,181.34	2,152,628.45	-1.68		3	0.91	13 C2	52 C2	Muck, shell	
	25-19	48,192.38	2,152,628.81	-0.22		0.5	0.15	25 C1, 45 C2	100 C1, 180 C2	Muck, shell	
	25-20	48,206.86	2,152,629.29	-		0	0.00	60 C2 1 clam (large)	240 C2 4 clams (large)	Muck, shell	
	25-21	48,217.88	2,152,629.65	-	1:06 p.m.	0	0.00	24 C2 6 Mussels	96 C2 24 Mussels	Muck, shell	In the marsh
	25-22	48,226.84	2,152,629.95	-							In the marsh
T-26	26-1	47,950.70	2,152,675.26	-	1:22 p.m.	0.5	0.15	0	0	Muck	Edge of marsh
	26-2	47,965.98	2,152,680.29	0.62		1	0.30	0	0	Muck	
	26-3	47,978.47	2,152,684.40	0.43		1.6	0.49	2 clams (small)	8 clams (small)	Muck	
	26-4	47,987.97	2,152,687.53	0.39		1.8	0.55	0	0	Muck	
	26-5	48,009.25	2,152,694.53	0.26		1.6	0.49	0	0	Muck	
	26-6	48,029.08	2,152,701.06	-0.37		2.5	0.76	0	0	Muck	
	26-7	48,041.51	2,152,705.15	-1.20		3	0.91	0	0	Muck	
	26-8	48,054.23	2,152,709.33	-1.93		3.5	1.07	1 clam (large)	4 clams (large)	Muck	
	26-9	48,074.79	2,152,716.10	-2.89		4.6	1.40	0	0	Muck	
	26-10	48,087.97	2,152,720.44	-3.24	1:34 p.m. 10/4/17	4.5	1.37	0	0	Muck	
	26-11	48,101.15	2,152,724.77	-3.50		4.7	1.43	0	0	Muck	
	26-12	48,119.29	2,152,730.74	-4.01		5	1.52	1 clam (large)	4 clams (large)	Muck	
	26-13	48,131.15	2,152,734.65	-4.40							Too deep
	26-14	48,143.22	2,152,738.62	-4.82							Too deep
	26-15	48,162.33	2,152,744.91	-5.72							Too deep
	26-16	48,174.03	2,152,748.76	-6.06							Too deep
	26-17	48,183.84	2,152,751.99	-5.60							Too deep
	26-18	48,204.40	2,152,758.75	-3.61		4	1.22	0	0	Muck, shell	
	26-19	48,221.09	2,152,764.25	-1.49		3.1	0.95	0	0	Muck, shell	
	26-20	48,230.98	2,152,767.50	-0.19		1.8	0.55	0	0	Muck, shell	
	26-21	48,239.21	2,152,770.21	0.26		0.4	0.12	15 C1, 45 C2, 10 C3	60 C1, 180 C2, 40 C3	Muck, shell	
	26-22	48,258.15	2,152,776.44	-		0	0.00	30 C1, 75 C2, 3 C3	120 C1, 300 C2, 12 C3	Muck, shell	Edge of marsh

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, Robert Neal, Rebeckah Hollowell						**Date:** 10-3-17		**Adjacent Shoreline:**			
Start of Day								**End of Day**			
Temp (°C):	22.42	**Sample Site Location**			**DO & pH:**	103.52%; 7.44 mg/L	7.2	**Temp (°C):**	24.08	**DO & pH:**	148.6%; 10.16 mg/L 7.22
Salinity (ppt):	33.69	State Plane NAD83; Feet			**Tide Level:**	2 hours prior to low tide (10:00 a.m.)		**Salinity (ppt):**	34.79	**Tide Level:**	2 hours after low tide (2:00 p.m.)
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-27	27-01	47984.63	2152746.74	0.95		0	0.00	0	0	Muck	Hermit crab, purple sea sponge
	27-02	47992.45	2152752.33	0.55		0.1	0.03	1 clam (large)	4 clams (large)	Muck	
	27-03	48004.48	2152760.93	-0.07		0.6	0.18	0	0	Muck, shell	
	27-04	48016.28	2152769.36	-0.63		1.8	0.55	0	0	Muck	
	27-05	48030.13	2152779.26	-1.15		2	0.61	0	0	Mucky sand	
	27-06	48046.89	2152791.24	-1.26		1.9	0.58	1 clam (large)	4 clams (large)	Mucky sand	
	27-07	48061.81	2152801.9	-1.23		1.8	0.55	0	0	Muck	
	27-08	48077.04	2152812.78	-1.04		1.6	0.49	0	0	Muck	
	27-09	48091.96	2152823.45	-1.49		1.6	0.49	0	0	Muck	
	27-10	48109.62	2152836.07	-4.35	1:45 p.m.	2.8	0.85	0	0	Muck	
	27-11	48124.55	2152846.74	-6.59							Too deep, mouth of feeder creek
	27-12	48140.23	2152857.95	-9.06							Too deep
	27-13	48156.14	2152869.32	-11.29							Too deep
	27-14	48171.98	2152880.64	-10.24							Too deep
	27-15	48191.09	2152894.3	-7.50							Too deep
	27-16	48207.31	2152905.89	-5.78							Too deep
	27-17	48222.23	2152916.55	-4.30							Too deep
	27-18	48236.78	2152926.94	-							Too deep
	27-19	48251.32	2152937.34	-		3	0.91	0	0	Muck	
	27-20	48261.14	2152944.35	-		2	0.61	8 C2	32 C2	Muck, shell	
	27-21	48269.64	2152950.43	-	11:50 a.m.	0	0.00	125 C2, 10 C3	500 C2, 40 C3	Muck, shell	~1 foot from edge of marsh

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal						**Date:** 7-20-17			**Adjacent Shoreline:**			
Start of Day								**End of Day**				
Temp (°C):	27.2	**Sample Site Location**			**DO & pH:**	71.9%, 4.66 mg/L	7.19	**Temp (°C):**		**DO & pH:**		
Salinity (ppt):	36.42	State Plane NAD83; Feet			**Tide Level:**	1 hour, 15 minutes before (10:00 a.m.)		**Salinity (ppt):**		**Tide Level:**		
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Category of Oyster Length (1 = small, 2 = mid, 3 = large)**	**Sediment(s)**	**Notes**
T-28	28-1	47,948.34	2,152,785.88	0.91		0"	0.00	12 oysters	48 oysters	All C3	Muck, shell	
	28-2	47,955.88	2,152,793.92	0.80		9"	0.23	3 oysters	12 oysters	All C3	Muck	
	28-3	47,965.65	2,152,804.33	0.47		20"	0.51	2 clams (1 small)	8 clams	4 clams (S) 4 clams (L)	Muck	
	28-4	47,976.60	2,152,816.01	-0.04		28"	0.71	1 clam	4 clams		Muck	
	28-5	47,988.30	2,152,828.48	-0.51		29"	0.74	0			Muck	
	28-6	48,002.34	2,152,843.45	-0.96		30"	0.76	0			Muck	
	28-7	48,015.62	2,152,857.61	-0.98		31"	0.79	1 clam	4 clams		Muck	
	28-8	48,028.83	2,152,871.69	-0.87		20"	0.51	0			Muck	
	28-9	48,039.76	2,152,883.34	-0.84		21"	0.53	0			Muck	
	28-10	48,050.25	2,152,894.53	-0.94		20"	0.51	0			Sand, muck	
	28-11	48,063.51	2,152,908.67	-1.29		27"	0.69	0			Sand, muck	
	28-12	48,076.27	2,152,922.27	-1.77		29"	0.74	0			Sand, muck	
	28-13	48,091.84	2,152,938.87	-2.82		3'	0.91	1 clam	4 clams		Sand, muck	
	28-14	48,106.66	2,152,954.66	-4.08		3'8"	1.12	0			Sand, muck	
	28-15	48,122.28	2,152,971.32	-5.23		4'5"	1.35	0			Sand, muck	
	28-16	48,130.86	2,152,980.47	-6.15		4'7"	1.40	0			Sand, muck	
	28-17	48,138.32	2,152,988.42	-6.31		Over 6'		N/A	N/A		Sand, muck	
	28-18	48,151.13	2,153,002.08	-3.86		Over 6'		N/A	N/A		Sand, muck	
	28-19	48,163.56	2,153,015.33	-0.80		3'2"	0.97	1 oyster	4 oysters	All C3	Sand, muck	
	28-20	48,176.06	2,153,028.66	-		3"	0.08	34 oysters	136 oysters	All C3	Sand, muck	
	28-21	48,187.52	2,153,040.88	-		0"	0.00	133 oysters	532 oysters	480 C3, 52 C2	Sand, muck	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, Robert Neal, Rebeckah Hollowell						**Date:** 10-3-17			**Adjacent Shoreline:**		
Start of Day								**End of Day**			
Temp (°C):	22.42	**Sample Site Location**			**DO & pH:**	103.52%; 7.44 mg/L	7.2	**Temp (°C):**	24.08	**DO & pH:**	148.6%; 10.16 mg/L 7.22
Salinity (ppt):	33.69	State Plane NAD83; Feet			**Tide Level:**	2 hours prior to low tide (10:00 a.m.)		**Salinity (ppt):**	34.79	**Tide Level:**	2 hours after low tide (2:00 p.m.)
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-29	29-01	47881.35	2152852.18	1.63	1:30 p.m.	0	0.00	50 C2, 10 C3	200 C2, 40 C3	Muck, shell	~1 foot from edge of marsh
	29-02	47888.9	2152862.67	0.36		0.2	0.06	65 C1, 125 C2, 15 C3	260 C1, 500 C2, 60 C3	Muck, shell	
	29-03	47896.12	2152872.7	-0.33		2.4	0.73	0	0	Muck, pluff mud	
	29-04	47906.83	2152887.6	-0.75		2.3	0.70	0	0	Muck	
	29-05	47917.26	2152902.11	-0.90		1.9	0.58	0	0	Muck	
	29-06	47926.77	2152915.33	-0.98		2	0.61	0	0	Muck	
	29-07	47937.65	2152930.45	-0.92		1.7	0.52	0	0	Muck	
	29-08	47947.47	2152944.12	-0.85		1.6	0.49	0	0	Mucky sand	
	29-09	47957.7	2152958.33	-0.96		1.5	0.46	0	0	Mucky sand	
	29-10	47969	2152974.05	-1.41		1.8	0.55	0	0	Mucky sand	
	29-11	47980.31	2152989.78	-1.84		2.4	0.73	0	0	Muck	
	29-12	47991.13	2153004.82	-2.65		3	0.91	0	0	Mucky sand	
	29-13	48002.88	2153021.15	-3.91		3.3	1.01	0	0	Mucky sand	
	29-14	48013.37	2153035.75	-5.07		4.2	1.28	1 clam (large)	4 clams (large)	Mucky sand	
	29-15	48027.47	2153055.35	-5.97							Too deep
	29-16	48036.11	2153067.36	-4.90		4	1.22	1 C3	4 C3	Muck, shell	
	29-17	48046.93	2153082.4	-3.77		0.4	0.12	10 C1, 35 C2	40 C1, 140 C2	Muck, shell	
	29-18	48057.74	2153097.45	-1.43	11:35 a.m.	0	0.00	20 C1, 215 C2	80 C1, 860 C2	Muck, shell	Edge of marsh
	29-19	48066.17	2153109.16	0.56							In the marsh
	29-20	48072.69	2153118.23	-							In the marsh
T-30	30-01	47815.69	2152888.6	1.61		0	0.00	33 C2, 4 C3	132 C2, 12 C3	Muck, shell	Edge of marsh
	30-02	47825.49	2152902.32	1.11		0.3	0.09	0	0	Muck	
	30-03	47836.81	2152918.17	0.41		1.5	0.46	0	0	Mucky sand	
	30-04	47851.83	2152939.19	-0.49		1.8	0.55	0	0	Mucky sand	
	30-05	47866.97	2152960.37	-0.92		1.5	0.46	0	0	Mucky sand	
	30-06	47880.28	2152979.01	-1.11		1.6	0.49	0	0	Mucky sand	
	30-07	47897.77	2153003.48	-1.54		1.6	0.49	0	0	Mucky sand	
	30-08	47912.73	2153024.41	-2.05		2	0.61	0	0	Mucky sand	
	30-09	47923.99	2153040.18	-2.36		2.5	0.76	0	0	Muck	
	30-10	47938.6	2153060.62	-3.19		3	0.91	0	0	Muck	
	30-11	47954.61	2153083.04	-4.43	1:16 p.m.	3.5	1.07	0	0	Muck	
	30-12	47972.62	2153108.24	-4.76							Too deep
	30-13	47985.59	2153126.39	-3.52							Too deep
	30-14	48000.02	2153146.58	-1.53							Too deep
	30-15	48015.1	2153167.69	0.96		3.6	1.10	0	0	Muck	
	30-16	48031.04	2153190	-		1.5	0.46	30 C1, 45 C2	120 C1, 180 C2	Muck, shell	
	30-17	-	-	-	11:23 a.m.	0	0.00	35 C1, 110 C2, 70 C3 2 Mussels	140 C1, 440 C2, 280 C3 8 Mussels	Shell	Reef line, mouth of another channel

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, Robert Neal, Rebeckah Hollowell						**Date:** 10-3-17			**Adjacent Shoreline:**		
Start of Day								**End of Day**			
Temp (°C):	22.42	**Sample Site Location**			**DO & pH:**	103.52%; 7.44 mg/L	7.2	**Temp (°C):**	24.08	**DO & pH:**	148.6%; 10.16 mg/L 7.22
Salinity (ppt):	33.69	State Plane NAD83; Feet			**Tide Level:**	2 hours prior to low tide (10:00 a.m.)		**Salinity (ppt):**	34.79	**Tide Level:**	2 hours after low tide (2:00 p.m.)
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-31	31-01	47735.37	2152876.5	-	1:06 p.m.	1	0.30	0	0	Muck	
	31-02	47745.47	2152893.62	-0.07		0.6	0.18	0	0	Mucky sand	
	31-03	47752.79	2152906.05	-0.14		0.4	0.12	0	0	Mucky sand	
	31-04	47761.66	2152921.08	-0.29		0.3	0.09	0	0	Mucky sand	
	31-05	47770.81	2152936.6	-0.49		0.1	0.03	0	0	Mucky sand	
	31-06	47782.92	2152957.12	-0.90		0.4	0.12	0	0	Mucky sand	
	31-07	47794.38	2152976.56	-1.06		1	0.30	0	0	Muck, pluff mud	
	31-08	47801.58	2152988.76	-1.09		1.8	0.55	0	0	Muck, pluff mud	
	31-09	47809.81	2153002.72	-1.04		1.7	0.52	0	0	Muck	
	31-10	47817.08	2153015.05	-1.10		1.5	0.46	0	0	Muck	
	31-11	47824.21	2153027.12	-1.24		1.6	0.49	0	0	Mucky sand	
	31-12	47835.44	2153046.18	-1.75		2	0.61	0	0	Mucky sand	
	31-13	47845.63	2153063.45	-2.12		2.2	0.67	0	0	Mucky sand	
	31-14	47856.55	2153081.97	-2.52		2.4	0.73	0	0	Mucky sand	
	31-15	47863.96	2153094.53	-2.91		3	0.91	0	0	Mucky sand	
	31-16	47873.04	2153109.92	-3.67		4	1.22	0	0	Muck	
	31-17	47882.12	2153125.32	-4.38		4.5	1.37	0	0	Muck	
	31-18	47889.73	2153138.21	-5.18		4.8	1.46	0	0	Muck	
	31-19	47895.97	2153148.8	-4.99		4.9	1.49	0	0	Muck	
	31-20	47905.87	2153165.58	-3.90							Too deep
	31-21	47916.52	2153183.65	-2.33							Too deep
	31-22	47926.3	2153200.22	-0.77		4.5	1.37	0	0	Muck	
	31-23	47939.04	2153221.83	1.72		3	0.91	0	0	Muck	
	31-24	47949.99	2153240.39	-		0	0.00	40 C1, 280 C2, 25 C3	160 C1, 1,120 C2, 100 C3	Muck, shell	
	31-25	-	-	-	11:10 a.m.	0	0.00	25 C2, 10 C3	100 C2, 40 C3	Muck, shell	Edge of marsh

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal						**Date:** 7-19-17			**Adjacent Shoreline:**			
Start of Day								**End of Day**				
Temp (°C):	-27	**Sample Site Location**			**DO & pH:**	93.11%, 6.19 mg/L	6.88	**Temp (°C):**	29.18	**DO & pH:**	126.4%, 7.93 mg/L	7.27
Salinity (ppt):	-36	State Plane NAD83; Feet			**Tide Level:**	Low (10:00)		**Salinity (ppt):**	36.47	**Tide Level:**	2 hours past low (12:15 a.m.)	
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Category of Oyster Length (1 = small, 2 = mid, 3 = large)**	**Sediment(s)**	**Notes**
T-32	32-1	47,638.38	2,152,898.50	-		0"	0.00	0	0		Muck	
	32-2	47,648.42	2,152,914.90	0.99		0"	0.00	0	0		Muck	
	32-3	47,656.59	2,152,928.25	0.82		0"	0.00	73 oysters	292 oysters	240 C3, 52 C2	Muck	
	32-4	47,670.48	2,152,950.93	0.23		3"	0.08	3 oysters	12 oysters	All C2	Muck	
	32-5	47,679.33	2,152,965.38	-0.27		7"	0.18	1 clam	4 clams		Muck	
	32-6	47,689.23	2,152,981.56	-0.85		25"	0.64	0	0		Muck	
	32-7	47,699.05	2,152,997.60	-1.38		2'8"	0.81	0	0		Mucky, sand	
	32-8	47,711.73	2,153,018.30	-1.69		2'6"	0.76	0	0		Mucky, sand	
	32-9	47,723.16	2,153,036.97	-1.56		2'3"	0.69	0	0		Mucky, sand	
	32-10	47,732.93	2,153,052.93	-1.47		2'1"	0.64	0	0		Mucky, sand	
	32-11	47,742.93	2,153,069.26	-1.63		2'2"	0.66	0	0		Mucky, sand	
	32-12	47,756.07	2,153,090.72	-2.09		2'3"	0.69	0	0		Mucky, sand	
	32-13	47,769.06	2,153,111.94	-2.58		3'2"	0.97	0	0		Mucky, sand	
	32-14	47,780.94	2,153,131.34	-2.95		3'2"	0.97	0	0		Mucky, sand	
	32-15	47,791.71	2,153,148.92	-3.28		3'5"	1.04	0	0		Mucky, sand	
	32-16	47,806.03	2,153,172.31	-3.83		3'9"	1.14	0	0		Mucky, sand	
	32-17	47,816.12	2,153,188.79	-4.11		4'2"	1.27	0	0		Mucky, sand	
	32-18	47,830.18	2,153,211.76	-3.81		4'5"	1.35	0	0		Mucky, sand	
	32-19	47,843.36	2,153,233.29	-2.09		2'10"	0.86	0	0		Mucky, sand	
	32-20	47,852.68	2,153,248.50	-0.63		1'9"	0.53	0	0		Mucky, sand	
	32-21	47,862.02	2,153,263.75	1.00		3"	0.08	43 oysters	172 oysters	140 C3, 32 C2	Mucky, sand	
	32-22	47,869.64	2,153,276.21	-		0"	0.00	125 oysters	500 oysters	352 C3, 148 C2	Mucky, sand	
	32-23	47875.91	2153286.44	-		0"	0.00	29 oysters	116 oysters	All C3	Mucky, sand	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, Robert Neal, Rebeckah Hollowell					**Date:** 10-3-17			**Adjacent Shoreline:**			
Start of Day							**End of Day**				
Temp (°C):	22.42	**Sample Site Location**		**DO & pH:**	103.52%; 7.44 mg/L	7.2	**Temp (°C):**	24.08	**DO & pH:**	148.6%; 10.16 mg/L	7.22
Salinity (ppt):	33.69	State Plane NAD83; Feet		**Tide Level:**	2 hours prior to low tide (10:00 a.m.)		**Salinity (ppt):**	34.79	**Tide Level:**	2 hours after low tide (2:00 p.m.)	
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-33	33-01	47570.86	2152983.73	-	11:10 a.m.	0	0.00	35 C2, 3 C3	140 C2, 12 C3	Muck	In/edge of marsh
	33-02	47580.9	2153000.83	0.99		0	0.00	25 C1, 145 C2, 15 C3	100 C1, 580 C2, 60 C3	Muck, shell	
	33-03	47592.49	2153020.56	-0.55		1	0.30	3 C2, 5 C3	12 C2, 20 C3	Muck, shell	
	33-04	47599.64	2153032.71	-1.33		3.2	0.98	0	0	Pluff mud	
	33-05	47607.3	2153045.76	-1.96		3.1	0.95	0	0	Muck	
	33-06	47616.47	2153061.37	-1.92		3	0.91	0	0	Muck	
	33-07	47625.71	2153077.11	-1.89		2.8	0.85	0	0	Mucky sand	
	33-08	47639.44	2153100.48	-1.87		2.5	0.76	0	0	Mucky sand	
	33-09	47647.96	2153114.99	-1.97		2.5	0.76	0	0	Mucky sand	
	33-10	47655.72	2153128.18	-2.13		2.7	0.82	0	0	Muck	
	33-11	47665.08	2153144.13	-2.37		2.9	0.88	0	0	Muck	
	33-12	47674.58	2153160.29	-2.72		3	0.91	0	0	Muck	
	33-13	47687.81	2153182.83	-3.27		3.1	0.95	0	0	Muck	
	33-14	47697.86	2153199.93	-3.56		3.6	1.10	0	0	Muck	
	33-15	47704.89	2153211.9	-3.73		3.9	1.19	0	0	Muck	
	33-16	47718.76	2153235.51	-3.91		4.5	1.37	0	0	Muck	
	33-17	47726.31	2153248.36	-3.73		4.5	1.37	0	0	Muck	
	33-18	47734.01	2153261.46	-2.88		4.6	1.40	0	0	Muck	
	33-19	47743.16	2153277.05	-1.54		4.2	1.28	0	0	Muck, shell	
	33-20	47751.66	2153291.52	-0.47		3	0.91	1 clam (large)	4 clams (large)	Muck, shell	
	33-21	47761.35	2153308.01	0.54		2.5	0.76	0	0	Muck, shell	
	33-22	47768.25	2153319.76	0.94		1.6	0.49	9 C2 1 clam (small)	36 C2 4 clams (small)	Muck, shell	
	33-23	47779.19	2153338.38	-	11:00 a.m.	0	0.00	42 C2, 7 C3	168 C2, 28 C3	Muck, shell	In/edge of marsh
T-34	34-01	47481.69	2153039.63	1.99	12:30 p.m.	0	0.00	10 C1, 160 C2, 18 C3 1 Mussel	40 C1, 640 C2, 72 C3 4 Mussels	Muck, shell	~1 foot from edge of marsh
	34-02	47492.22	2153058.43	1.23		1	0.30	1 clam (large)	4 clams (large)	Muck, pluff mud	
	34-03	47506.73	2153084.33	-0.14		2.5	0.76	0	0	Muck	
	34-04	47514.8	2153098.74	-0.83		2.3	0.70	0	0	Muck	
	34-05	47527.98	2153122.29	-1.51		2.4	0.73	0	0	Muck	
	34-06	47541.13	2153145.76	-1.69		2.5	0.76	0	0	Muck	
	34-07	47550.96	2153163.31	-1.91		2.9	0.88	0	0	Mucky sand	
	34-08	47560.91	2153181.09	-2.25		3	0.91	0	0	Mucky sand	
	34-09	47570.82	2153198.79	-2.59		3.4	1.04	0	0	Mucky sand	
	34-10	47585.24	2153224.53	-3.09		3.5	1.07	0	0	Mucky sand	
	34-11	47595.15	2153242.22	-3.38		3.9	1.19	0	0	Mucky sand	
	34-12	47604.6	2153259.11	-3.67							Too deep
	34-13	47616.81	2153280.91	-3.97							Too deep
	34-14	47625.03	2153295.58	-4.10							Too deep
	34-15	47632.14	2153308.27	-3.27							Too deep
	34-16	47642.5	2153326.77	-1.76		4.7	1.43	0	0	Muck, shell	
	34-17	47655.94	2153350.77	1.05		3.1	0.95	1 clam (small)	4 clams (small)	Muck, shell	
	34-18	47662.52	2153362.48	1.96		1.5	0.46	10 C1, 65 C2	40 C1, 260 C2	Muck, shell	
	34-19	47668.49	2153373.13	-	10:51 a.m.	0.1	0.03	75 C2, 2 C3	300 C2, 8 C3	Shell	Reef line, ~7 to 8 feet from edge of marsh

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, Robert Neal, Rebeckah Hollowell						**Date:** 10-3-17		**Adjacent Shoreline:**			
Start of Day								**End of Day**			
Temp (°C):	22.42	**Sample Site Location**			**DO & pH:**	103.52%; 7.44 mg/L	7.2	**Temp (°C):**	24.08	**DO & pH:**	148.6%; 10.16 mg/L 7.22
Salinity (ppt):	33.69	State Plane NAD83; Feet			**Tide Level:**	2 hours prior to low tide (10:00 a.m.)		**Salinity (ppt):**	34.79	**Tide Level:**	2 hours after low tide (2:00 p.m.)
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-35	35-01	47382.08	2153088.38	-		0	0.00	10 C1, 115 C2, 8 C3 4 Mussels	40 C1, 460 C2, 32 C3 16 Mussels	Muck, shell	Edge of marsh
	35-02	47392.79	2153107.21	1.43		0.5	0.15	0	0	Muck, pluff mud	
	35-03	47402.32	2153123.95	0.73		1.5	0.46	0	0	Pluff mud	
	35-04	47412.74	2153142.26	0.08		2	0.61	0	0	Muck	
	35-05	47423.66	2153161.45	-0.57		2.5	0.76	0	0	Muck	
	35-06	47434.62	2153180.71	-1.10		2.2	0.67	0	0	Muck	
	35-07	47444.25	2153197.63	-1.52		2.5	0.76	0	0	Muck	
	35-08	47456.39	2153218.98	-2.00		3	0.91	0	0	Muck	
	35-09	47468.05	2153239.47	-2.27		3	0.91	0	0	Muck	
	35-10	47480.89	2153262.04	-2.58		3.25	0.99	0	0	Muck	
	35-11	47490.91	2153279.65	-2.78		3.8	1.16	0	0	Muck	
	35-12	47503.31	2153301.44	-3.19		4	1.22	0	0	Muck	
	35-13	47512.54	2153317.66	-3.29	12:15 p.m.	4.7	1.43	0	0	Muck	
	35-14	47524.05	2153337.89	-3.33							Too deep
	35-15	47534.87	2153356.9	-3.35							Too deep
	35-16	47544.5	2153373.82	-2.44							Too deep
	35-17	47557.49	2153396.65	-0.78		3.8	1.16	5 C2	20 C2	Muck, shell	
	35-18	47567.46	2153414.18	-		2.5	0.76	0	0	Muck, shell	
	35-19	47575.47	2153428.25	-	10:40 a.m.	0.2	0.06	8 C1, 35 C2	32 C1, 140 C2	Muck, shell	~1 foot from edge of marsh

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal						**Date:** 7-19-17			**Adjacent Shoreline:**			
Start of Day								**End of Day**				
Temp (°C):	-27	**Sample Site Location**			**DO & pH:**	93.11%, 6.19 mg/L	6.88	**Temp (°C):**	29.18	**DO & pH:**	126.4%, 7.93 mg/L	7.27
Salinity (ppt):	-36	State Plane NAD83; Feet			**Tide Level:**	Low (10:00)		**Salinity (ppt):**	36.47	**Tide Level:**	2 hours past low (12:15 a.m.)	
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Category of Oyster Length (1 = small, 2 = mid, 3 = large)**	**Sediment(s)**	**Notes**
T-36	36-1	47,285.10	2,153,140.51	-		0"	0.00	21 oysters	84 oysters	60 C3, 24 C2	Muck	
	36-2	47,290.18	2,153,149.51	1.99		0"	0.00	11 oysters	44 oysters	36 C3, 8 C2	Muck	
	36-3	47,296.67	2,153,161.02	1.41		2"	0.05	39 oysters	156 oysters	64 C3, 92 C2	Muck	
	36-4	47,305.85	2,153,177.29	0.71		28"	0.71	3 oysters	12 oysters	All C2	Muck	
	36-5	47,313.68	2,153,191.17	0.17		2'8"	0.81	0	0		Muck	
	36-6	47,320.86	2,153,203.90	-0.25		3'7"	1.09	0	0		Muck	
	36-7	47,330.81	2,153,221.55	-0.87		3'6"	1.07	0	0		Muck	
	36-8	47,337.58	2,153,233.55	-1.04		3'3"	0.99	0	0		Muck	
	36-9	47,345.97	2,153,248.42	-1.22		2'8"	0.81	0	0		Muck	
	36-10	47,353.24	2,153,261.31	-1.38		2'8"	0.81	0	0		Muck	
	36-11	47,365.41	2,153,282.89	-1.79		2'6"	0.76	0	0		More sand, but still mucky	
	36-12	47,374.86	2,153,299.64	-2.14		2'3"	0.69	0	0		More sand, but still mucky	
	36-13	47,384.13	2,153,316.09	-2.57		1'9"		0	0		Mucky, sand	
	36-14	47,391.80	2,153,329.67	-2.99		1'9"		0	0		Mucky, sand	
	36-15	47,399.28	2,153,342.93	-2.93		15"		0	0		Mucky, sand	
	36-16	47,409.69	2,153,361.40	-3.00		13"		0	0		Mucky, sand	
	36-17	47,416.61	2,153,373.67	-3.03		11"		0	0		Mucky, sand	
	36-18	47,430.88	2,153,398.96	-3.10		8"		0	0		Mucky, sand	
	36-19	47,440.86	2,153,416.66	-3.10		7"		0	0		Mucky, sand	
	36-20	47,453.22	2,153,438.57	-2.43		3"		0	0		Mucky, sand	
	36-21	47,461.10	2,153,452.54	-1.92		0"	0.00	5 oysters	20 oysters	All C3	Mucky, sand	
	36-22	47,471.62	2,153,471.20	0.25		0"	0.00	197 oysters	788 oysters	472 C3, 240 C2, 76 C1	Mucky, sand	
	36-23	47,484.56	2,153,494.13	-		0"	0.00	109 oysters	436 oysters	320 C3, 76 C2, 40 C1	Mucky, sand	
	36-24	47,479.22	2,153,484.67	-		0"	0.00	49 oysters	196 oysters	136 C3, 48 C2, 12 C1	Mucky, sand	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, John Dorney, Rebeckah Hollowell					**Date:** 10-5-17			**Adjacent Shoreline:**			
Start of Day							**End of Day**				
Temp (°C):	24.58	**Sample Site Location**		**DO & pH:**	131.5%; 8.96 mg/L	7.01	**Temp (°C):**	24.85	**DO & pH:**	150.5%; 10.21 mg/L	7.13
Salinity (ppt):	35.25	State Plane NAD83; Feet		**Tide Level:**	r prior to low tide (1:00 p.m.)		**Salinity (ppt):**	35.48	**Tide Level:**	1 hour past low tide (3:00 p.m.)	
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-37	37-01	47,215.65	2,153,194.57	2.07		0	0.00	2 clams (large)	8 clams (large)	Muck, shell	~5 feet from edge of marsh
	37-02	47,221.99	2,153,205.99	1.93		0	0.00	0	0	Muck	
	37-03	47,230.41	2,153,221.18	1.55		0.1	0.03	0	0	Muck	
	37-04	47,240.07	2,153,238.61	1.12		0.5	0.15	0	0	Muck	
	37-05	47,249.62	2,153,255.84	0.55		0.8	0.24	0	0	Muck	
	37-06	47,261.53	2,153,277.31	-0.14	2:05 p.m.	0.8	0.24	0	0	Muck	
	37-07	47,267.77	2,153,288.57	-0.46		0.7	0.21	0	0	Muck	
	37-08	47,276.32	2,153,303.99	-0.81		1	0.30	0	0	Muck	
	37-09	47,285.77	2,153,321.02	-1.04		1.6	0.49	0	0	Mucky sand	
	37-10	47,293.69	2,153,335.30	-1.55		2	0.61	0	0	Mucky sand	
	37-11	47,303.35	2,153,352.73	-2.06		2.4	0.73	0	0	Mucky sand	
	37-12	47,315.87	2,153,375.31	-2.47		2.9	0.88	0	0	Mucky sand	
	37-13	47,327.06	2,153,395.50	-2.73		3	0.91	0	0	Mucky sand	
	37-14	47,338.01	2,153,415.25	-2.90		3.5	1.07	0	0	Mucky sand	
	37-15	47,347.09	2,153,431.63	-2.84		3.8	1.16	0	0	Mucky sand	
	37-16	47,358.11	2,153,451.49	-2.80		4	1.22	0	0	Mucky sand	
	37-17	47,368.68	2,153,470.56	-2.75		3.8	1.16	0	0	Mucky sand, shell	
	37-18	47,377.14	2,153,485.82	-2.59		3.5	1.07	0	0	Mucky sand	
	37-19	47,385.12	2,153,500.21	-2.29		3	0.91	0	0	Mucky sand	
	37-20	47,399.10	2,153,525.42	-0.79		4.5	1.37	0	0	Muck, shell	
	37-21	47,409.44	2,153,544.09	-		1.8	0.55	0	0	Muck, shell	
	37-22	47,417.04	2,153,557.78	-	10:45 a.m.	1.5	0.46	70 C1, 150 C2	280 C1, 600 C2	Muck, shell	Edge of marsh
T-38	38-01	47,127.46	2,153,274.98	1.46	2:14 p.m.	0	0	6 Mussels	24 Mussels	Mucky sand, shell	Edge of marsh
	38-02	47,133.42	2,153,286.11	1.33		0	0	0	0	Mucky sand	
	38-03	47,142.56	2,153,303.20	1.05		0	0	0	0	Mucky sand	
	38-04	47,149.26	2,153,315.72	0.82		0	0	0	0	Mucky sand	
	38-05	47,157.60	2,153,331.29	0.38		0	0	0	0	Mucky sand	
	38-06	47,168.79	2,153,352.21	-0.18		0.1	0.03	0	0	Mucky sand	
	38-07	47,181.35	2,153,375.68	-0.64		0.8	0.24	0	0	Mucky sand	
	38-08	47,191.53	2,153,394.71	-1.15		1.5	0.46	0	0	Mucky sand	
	38-09	47,198.60	2,153,407.92	-1.58		1.6	0.49	0	0	Mucky sand	
	38-10	47,207.84	2,153,425.19	-2.15		2	0.61	0	0	Mucky sand	
	38-11	47,216.67	2,153,441.69	-2.47		2.5	0.76	0	0	Mucky sand	
	38-12	47,225.36	2,153,457.93	-2.78		2.8	0.85	0	0	Mucky sand	
	38-13	47,238.49	2,153,482.47	-2.96		3.25	0.99	0	0	Mucky sand	
	38-14	47,248.13	2,153,500.47	-3.27		3.8	1.16	0	0	Mucky sand	
	38-15	47,257.96	2,153,518.85	-3.13		4	1.22	0	0	Mucky sand	
	38-16	47,266.83	2,153,535.42	-2.81		3.8	1.16	0	0	Mucky sand, shell	
	38-17	47,275.83	2,153,552.25	-2.59		3.5	1.07	0	0	Mucky sand, shell	
	38-18	47,289.58	2,153,577.93	-2.51		3	0.91	0	0	Mucky sand	
	38-19	47,299.69	2,153,596.82	-1.79		3.25	0.99	0	0	Mucky sand	
	38-20	47,310.69	2,153,617.39	0.23		4.6	1.40	0	0	Muck, shell	
	38-21	47,322.40	2,153,639.27			3	0.91	5 C2, 3 C3	20 C2, 12 C3	Muck, shell	
	38-22	-	-	-	11:00 a.m.	1.5	0.46	20 C1, 200 C2, 15 C3	80 C1, 800 C2, 60 C3	Muck, shell	Edge of marsh

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, John Dorney, Rebeckah Hollowell					**Date:** 10-5-17			**Adjacent Shoreline:**			
Start of Day								**End of Day**			
Temp (°C):	24.58	**Sample Site Location**			**DO & pH:**	131.5%; 8.96 mg/L	7.01	**Temp (°C):**	24.85	**DO & pH:**	150.5%; 10.21 mg/L 7.13
Salinity (ppt):	35.25	State Plane NAD83; Feet			**Tide Level:**	r prior to low tide (1:00 p.m.)		**Salinity (ppt):**	35.48	**Tide Level:**	1 hour past low tide (3:00 p.m.)
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-39	39-01	47,067.15	2,153,321.37	1.30	2:30 p.m.	0	0	0	0	Mucky sand	~4 feet from edge of marsh
	39-02	47,074.08	2,153,334.78	1.13		0	0	0	0	Mucky sand	
	39-03	47,082.79	2,153,351.60	0.88		0	0	0	0	Mucky sand	
	39-04	47,093.27	2,153,371.85	0.43		0	0	0	0	Mucky sand	
	39-05	47,102.75	2,153,390.18	0.11		0	0	0	0	Mucky sand	
	39-06	47,112.63	2,153,409.28	-0.19		0.1	0.03	0	0	Mucky sand	
	39-07	47,123.11	2,153,429.52	-0.53		0.5	0.15	0	0	Mucky sand	
	39-08	47,130.50	2,153,443.81	-0.95		1.5	0.46	0	0	Mucky sand	
	39-09	47,138.43	2,153,459.13	-1.53		2.3	0.70	0	0	Mucky sand	
	39-10	47,149.54	2,153,480.60	-2.27		2.5	0.76	0	0	Mucky sand	
	39-11	47,160.54	2,153,501.87	-2.74		3.2	0.98	0	0	Mucky sand	
	39-12	47,169.05	2,153,518.31	-3.18		3.9	1.19	0	0	Mucky sand	
	39-13	47,175.87	2,153,531.48	-3.55		4.3	1.31	0	0	Mucky sand	
	39-14	47,188.72	2,153,556.32	-3.42		4.5	1.37	0	0	Mucky sand	
	39-15	47,196.69	2,153,571.73	-3.20		4	1.22	0	0	Mucky sand, shell	
	39-16	47,208.68	2,153,594.91	-2.71		3.5	1.07	0	0	Mucky sand, shell	
	39-17	47,218.68	2,153,614.22	-2.56		3.5	1.07	0	0	Mucky sand	
	39-18	47,226.82	2,153,629.96	-2.87		3.5	1.07	0	0	Mucky sand	
	39-19	47,235.10	2,153,645.96	-2.58		3.5	1.07	0	0	Mucky sand	
	39-20	47,245.78	2,153,666.60	-0.37		4.8	1.46	0	0	Mucky sand	
	39-21	47,252.80	2,153,680.17	-		3	0.91	7 C2, 1 C3	28 C2, 4 C3	Muck, shell	
	39-22	47,256.53	2,153,687.38	-	11:07 a.m.	1.7	0.52	40 C1, 65 C2, 25 C3	160 C1, 260 C2, 100 C3	Muck, shell	Edge of marsh

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal					**Date:** 7-19-17			**Adjacent Shoreline:**				
Start of Day								**End of Day**				
Temp (°C):	-27	**Sample Site Location**			**DO & pH:**	93.11%, 6.19 mg/L	6.88	**Temp (°C):**	29.18	**DO & pH:**	126.4%, 7.93 mg/L	7.27
Salinity (ppt):	-36	State Plane NAD83; Feet			**Tide Level:**	Low (10:00)		**Salinity (ppt):**	36.47	**Tide Level:**	2 hours past low (12:15 a.m.)	
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Category of Oyster Length (1 = small, 2 = mid, 3 = large)**	**Sediment(s)**	**Notes**
T-40	40-01	46,993.41	2,153,385.18	-		0"	0.00	42 oysters	168 oysters	88 C3, 56 C2, 24 C1	Muck	
	40-02	46,999.37	2,153,396.24	0.88		3"		16 oysters	64 oysters	28 C3, 36 C2	Muck	
	40-03	47,006.22	2,153,408.97	0.85		15"		0	0		Muck	
	40-04	47,015.91	2,153,426.97	0.69		2'8"		0	0		Muck	
	40-05	47,024.29	2,153,442.52	0.44		3'3"		0	0		Muck	
	40-06	47,032.15	2,153,457.12	0.22		3'2"		0	0		Muck	
	40-07	47,041.38	2,153,474.26	0.05		3'3"		0	0		Muck	
	40-08	47,048.56	2,153,487.60	-0.40		3'3"		0	0		Muck	
	40-09	47,056.55	2,153,502.44	-1.04		3'8"		0	0		Muck	
	40-10	47,065.57	2,153,519.19	-1.76		4'1"		0	0		Muck	
	40-11	47,073.09	2,153,533.16	-2.28		3'5"		0	0		Muck	
	40-12	47,082.14	2,153,549.96	-2.67		3'2"		0	0		Muck	
	40-13	47,092.87	2,153,569.89	-3.19		2'6"		0	0		Muck	
	40-14	47,103.34	2,153,589.33	-3.61		1'7"		0	0		Muck	
	40-15	47,112.26	2,153,605.89	-3.74		13"		0	0		Muck	
	40-16	47,122.34	2,153,624.61	-3.96		4"		0	0		Muck	
	40-17	47,130.20	2,153,639.21	-3.86		2"		0	0		Muck	
	40-18	47,138.37	2,153,654.38	-3.80				0	0		Muck	
	40-19	47,147.23	2,153,670.84	-3.80				0	0		Muck	
	40-20	47,155.61	2,153,686.40	-3.06				0	0		Muck	
	40-21	47,163.78	2,153,701.57	-2.09				0	0		Muck	
	40-22	47,171.84	2,153,716.55	-1.05				0	0		Muck	
	40-23	47,182.06	2,153,735.51	0.02		0"	0.00	0	0		Muck	
	40-24	47,189.63	2,153,749.58	0.21		0"	0.00	268 oysters	1,072 oysters	760 C3, 208 C2, 104 C1	Muck	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, John Dorney, Rebeckah Hollowell					**Date:** 10-5-17			**Adjacent Shoreline:**			
Start of Day							**End of Day**				
Temp (°C):	24.58	**Sample Site Location**		**DO & pH:**	131.5%; 8.96 mg/L	7.01	**Temp (°C):**	24.85	**DO & pH:**	150.5%; 10.21 mg/L	7.13
Salinity (ppt):	35.25	State Plane NAD83; Feet		**Tide Level:**	r prior to low tide (1:00 p.m.)		**Salinity (ppt):**	35.48	**Tide Level:**	1 hour past low tide (3:00 p.m.)	
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-41	41-01	46,939.31	2,153,447.66	-	2:46 p.m. 10/5/17	0	0	0	0	Mucky sand	Edge of marsh
	41-02	46,950.55	2,153,469.55	0.98		0	0	0	0	Mucky sand	
	41-03	46,961.16	2,153,490.24	0.74		0.1	0.03	0	0	Mucky sand	
	41-04	46,969.71	2,153,506.90	0.39		0.25	0.08	0	0	Mucky sand	
	41-05	46,979.24	2,153,525.48	0.00		0.5	0.15	0	0	Mucky sand	
	41-06	46,986.53	2,153,539.69	-0.34		0.7	0.21	0	0	Mucky sand	
	41-07	46,992.73	2,153,551.77	-0.85		1	0.30	0	0	Mucky sand	
	41-08	47,000.63	2,153,567.16	-1.71		1.5	0.46	0	0	Mucky sand	
	41-09	47,008.30	2,153,582.12	-2.31		2.2	0.67	0	0	Mucky sand	
	41-10	47,021.79	2,153,608.41	-3.48		2.8	0.85	0	0	Mucky sand	
	41-11	47,030.06	2,153,624.52	-3.59		3	0.91	0	0	Mucky sand	
	41-12	47,037.40	2,153,638.82	-3.86		4	1.22	0	0	Mucky sand	
	41-13	47,045.49	2,153,654.61	-4.17	2:45 p.m.	4.9	1.49	0	0	Mucky sand	
	41-14	47,055.10	2,153,673.33	-4.30		5.1	1.55	0	0	Mucky sand	
	41-15	47,064.21	2,153,691.08	-4.24		5.5	1.68	0	0	Mucky sand	
	41-16	47,071.77	2,153,705.82	-4.15		4.9	1.49	0	0	Mucky sand	Sand bar
	41-17	47,081.00	2,153,723.82	-4.04		4.9	1.49	0	0	Mucky sand	Sand bar
	41-18	47,092.29	2,153,745.82	-3.31		4.6	1.40	0	0	Mucky sand	Sand bar
	41-19	47,101.87	2,153,764.48	-2.34		3.9	1.19	0	0	Mucky sand	Sand bar
	41-20	47,108.60	2,153,777.61	-1.60		4.5	1.37	0	0	Muck, shell	
	41-21	47,122.42	2,153,804.53	-0.54		3.5	1.07	0	0	Muck	
	41-22	47,129.19	2,153,817.73	-		3	0.91	3 C3	12 C3	Muck, shell	
	41-23	47,134.43	2,153,827.94	-	11:15 a.m.	2	0.61	5 C1, 5 C2, 10 C3 1 Mussel	20 C1, 20 C2, 40 C3 4 Mussels	Muck, shell	~7 feet from edge of marsh In/near mouth of feeder creek channel
T-42	42-01	46,891.66	2,153,500.32	-		0	0.00	3 C1, 8 C2	12 C1, 32 C2	Muck	Edge of marsh (eroding bank)
	42-02	46,896.74	2,153,510.77	0.93		0	0.00	0	0	Muck	
	42-03	46,904.75	2,153,527.23	0.64		0.2	0.06	0	0	Muck	
	42-04	46,914.00	2,153,546.24	0.21		0.8	0.24	0	0	Muck	
	42-05	46,921.99	2,153,562.67	-0.04		0.8	0.24	0	0	Mucky sand	
	42-06	46,928.93	2,153,576.94	-0.39		0.4	0.12	0	0	Mucky sand	
	42-07	46,939.80	2,153,599.28	-1.16		1	0.30	0	0	Mucky sand	
	42-08	46,950.40	2,153,621.08	-2.18		1.9	0.58	0	0	Mucky sand	
	42-09	46,961.28	2,153,643.43	-2.95		2.5	0.76	0	0	Mucky sand	
	42-10	46,969.83	2,153,661.02	-3.28		3.5	1.07	0	0	Mucky sand	
	42-11	46,980.01	2,153,681.95	-3.67		4.2	1.28	0	0	Mucky sand	
	42-12	46,988.56	2,153,699.53	-4.10		4.8	1.46	0	0	Mucky sand	
	42-13	46,995.49	2,153,713.78	-4.57		5	1.52	0	0	Mucky sand	
	42-14	47,002.30	2,153,727.77	-4.55	10/5/17	5.5	1.68	0	0	Mucky sand	
	42-15	47,010.03	2,153,743.66	-4.34							Too deep
	42-16	47,018.86	2,153,761.81	-4.29	10/5/17	5.2	1.59	0	0	Mucky sand	
	42-17	47,028.52	2,153,781.68	-4.05		4.7	1.43	0	0	Mucky sand	
	42-18	47,037.48	2,153,800.09	-3.01		3.5	1.07	0	0	Mucky sand	Sand bar
	42-19	47,045.09	2,153,815.74	-1.97		4.25	1.30	0	0	Mucky sand, shell	
	42-20	47,053.11	2,153,832.22	-0.81	10/5/17	3.1	0.95	0	0	Muck	
	42-21	47,060.71	2,153,847.84	0.07		4	1.22	2 C2	8 C2	Mucky sand	
	42-22	47,068.86	2,153,864.59	0.88		2.2	0.67	12 C2	48 C2	Muck, shell	
	42-23	47,078.29	2,153,883.99	-	11:25 a.m.	1.2	0.37	5 C1, 18 C2, 3 C3	20 C1, 72 C2, 12 C3	Muck	Edge of marsh

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, John Dorney, Rebeckah Hollowell						**Date:** 10-5-17			**Adjacent Shoreline:**		
Start of Day								**End of Day**			
Temp (°C):	24.58	**Sample Site Location**			**DO & pH:**	131.5%; 8.96 mg/L	7.01	**Temp (°C):**	24.85	**DO & pH:**	150.5%; 10.21 mg/L 7.13
Salinity (ppt):	35.25	State Plane NAD83; Feet			**Tide Level:**	r prior to low tide (1:00 p.m.)		**Salinity (ppt):**	35.48	**Tide Level:**	1 hour past low tide (3:00 p.m.)
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-43	43-01	46,831.90	2,153,582.48		10/5/17	0	0.00	15 C1, 35 C2	60 C1, 140 C2	Muck, shell	Edge of marsh, near mouth of creek
	43-02	46,841.99	2,153,602.02	-0.53		3	0.91	0	0	Muck, shell	
	43-03	46,853.38	2,153,624.09	-0.85		1.7	0.52	0	0	Mucky sand	
	43-04	46,864.75	2,153,646.11	-1.67		2	0.61	0	0	Mucky sand	
	43-05	46,877.23	2,153,670.30	-2.39		2.5	0.76	0	0	Mucky sand	
	43-06	46,885.58	2,153,686.46	-2.92		3	0.91	0	0	Mucky sand	
	43-07	46,893.65	2,153,702.10	-3.28		3.2	0.98	0	0	Mucky sand	
	43-08	46,900.54	2,153,715.46	-3.71		3.5	1.07	0	0	Mucky sand	
	43-09	46,907.16	2,153,728.28	-4.03		4.8	1.46	0	0	Mucky sand	
	43-10	46,917.50	2,153,748.31	-4.45	10/5/17	5	1.52	0	0	Mucky sand	
	43-11	46,924.03	2,153,760.97	-4.59							Too deep
	43-12	46,933.13	2,153,778.60	-4.60							Too deep
	43-13	46,944.26	2,153,800.15	-4.42							Too deep
	43-14	46,953.45	2,153,817.96	-4.35							Too deep
	43-15	46,962.12	2,153,834.76	-4.19	10/5/17	5.5	1.68	0	0	Mucky sand	
	43-16	46,970.52	2,153,851.04	-3.24		5	1.52	0	0	Mucky sand	
	43-17	46,980.29	2,153,869.97	-2.12		4.4	1.34	0	0	Mucky sand	
	43-18	46,991.16	2,153,891.01	-0.16	10/5/17	3	0.91	0	0	Mucky sand, shell	
	43-19	47,004.38	2,153,916.63	1.85		4	1.22	0	0	Mucky sand	
	43-20	47,013.05	2,153,933.42			1.5	0.46	5 C1, 25 C2, 5 C3	20 C1, 100 C2, 20 C3	Muck, shell	
	43-21	-	-	-	11:35 a.m.	0.5	0.15	20 C1, 115 C2, 10 C3	80 C1, 460 C2, 40 C3	Muck, shell	Edge of marsh

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal						**Date:** 7-19-17			**Adjacent Shoreline:**			
Start of Day								**End of Day**				
Temp (°C):	-27	**Sample Site Location**			**DO & pH:**	93.11%, 6.19 mg/L	6.88	**Temp (°C):**	29.18	**DO & pH:**	126.4%, 7.93 mg/L	7.27
Salinity (ppt):	-36	State Plane NAD83; Feet			**Tide Level:**	Low (10:00)		**Salinity (ppt):**	36.47	**Tide Level:**	2 hours past low (12:15 a.m.)	
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Category of Oyster Length (1 = small, 2 = mid, 3 = large)**	**Sediment(s)**	**Notes**
T-44	44-01	46,772.08	2,153,625.41	-		0"	0.00	14 oysters	56 oysters	8 C3, 40 C2, 8 C1	Mucky	
	44-02	46,777.92	2,153,637.89	1.29		0"	0.00	0	0		Mucky	
	44-03	46,783.96	2,153,650.81	0.79		6"	0.15	0	0		Mucky	
	44-04	46,792.52	2,153,669.09	-0.42		13"	0.33	0	0		Mucky	
	44-05	46,798.97	2,153,682.88	-1.52		4'8"	1.42	0	0		Mucky, sand	
	44-06	46,805.28	2,153,696.37	-2.59		2'	0.61	0	0		Mucky, sand	
	44-07	46,813.89	2,153,714.76	-2.67		2'8"	0.81	0	0		Mucky, sand	
	44-08	46,821.48	2,153,730.99	-3.07		2'7"	0.79	0	0		Mucky, sand	
	44-09	46,828.89	2,153,746.83	-3.79		3'1"	0.94	0	0		Mucky, sand	
	44-10	46,836.40	2,153,762.86	-3.98		3'8"	1.12	0	0		Mucky, sand	
	44-11	46,843.53	2,153,778.10	-4.27		4'4"	1.32	0	0		Mucky, sand	
	44-12	46,851.55	2,153,795.24	-4.40		4'4"	1.32	0	0		Mucky, sand	
	44-13	46,861.56	2,153,816.63	-4.22		4'1"	1.24	0	0		Mucky, sand	
	44-14	46,868.94	2,153,832.40	-3.88		3'9"	1.14	0	0		Mucky, sand	
	44-15	46,877.36	2,153,850.41	-3.87		3'3"	0.99	0	0		Mucky, sand	
	44-16	46,885.28	2,153,867.32	-3.76		3'	0.91	0	0		Mucky, sand	
	44-17	46,893.42	2,153,884.72	-3.63		3'2"	0.97	0	0		Muck	
	44-18	46,901.72	2,153,902.47	-3.39		3'5"	1.04	0	0		Mucky	
	44-19	46,911.59	2,153,923.56	-3.13		2'9"	0.84	0	0		Muck	
	44-20	46,919.33	2,153,940.09	-2.72		3'2"	0.97	0	0		Mucky	
	44-21	46,927.20	2,153,956.93	-0.69		26"	0.66	0	0		Muck	
	44-22	46,935.52	2,153,974.71	-		0"	0.00	95 oysters	380 oysters	172 C3, 160 C2, 68 C1	Mud, shell	
	44-23	46,943.81	2,153,992.42	-		0"	0.00	0	0		Muck, mud, shell	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, John Dorney, Rebeckah Hollowell					**Date:** 10-5-17			**Adjacent Shoreline:**			
Start of Day							**End of Day**				
Temp (°C):	24.58	**Sample Site Location**		**DO & pH:**	131.5%; 8.96 mg/L	7.01	**Temp (°C):**	24.85	**DO & pH:**	150.5%; 10.21 mg/L	7.13
Salinity (ppt):	35.25	State Plane NAD83; Feet		**Tide Level:**	r prior to low tide (1:00 p.m.)		**Salinity (ppt):**	35.48	**Tide Level:**	1 hour past low tide (3:00 p.m.)	
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-45	45-01	46,724.32	2,153,679.64	1.66	10/5/17	0	0.00	1 clam (large)	4 clams (large)	Muck	In/edge of marsh
	45-02	46,731.07	2,153,694.71	0.91		0	0.00	1 clam (large)	4 clams (large)	Muck	
	45-03	46,737.66	2,153,709.43	-0.28		0.5	0.15	0	0	Muck	
	45-04	46,743.96	2,153,723.47	-1.41		1	0.30	0	0	Muck	
	45-05	46,754.28	2,153,746.49	-2.90		2.5	0.76	0	0	Muck	
	45-06	46,761.08	2,153,761.67	-3.64		2.8	0.85	0	0	Mucky sand	
	45-07	46,767.75	2,153,776.56	-3.47		3.2	0.98	0	0	Mucky sand	
	45-08	46,777.57	2,153,798.46	-3.69		3.8	1.16	0	0	Mucky sand	
	45-09	46,787.26	2,153,820.09	-4.28		4.6	1.40	0	0	Mucky sand	
	45-10	46,799.06	2,153,846.41	-4.82		5	1.52	0	0	Mucky sand	
	45-11	46,811.99	2,153,875.27	-3.75		5.5	1.68	0	0	Mucky sand	
	45-12	46,821.63	2,153,896.80	-3.30							Too deep
	45-13	46,832.40	2,153,920.82	-2.90							Too deep
	45-14	46,843.30	2,153,945.15	-2.59							Too deep
	45-15	46,849.66	2,153,959.33	-2.49	10/5/17						Too deep
	45-16	46,856.60	2,153,974.81	-2.35		4.5	1.37	0	0	Mucky sand	
	45-17	46,862.61	2,153,988.23	-2.02		4.4	1.34	0	0	Mucky sand	
	45-18	46,868.94	2,154,002.36	-1.07		4.2	1.28	0	0	Mucky sand	
	45-19	46,875.32	2,154,016.60	-0.01		3.9	1.19	0	0	Mucky sand	
	45-20	46,882.41	2,154,032.42	0.91		3.5	1.07	0	0	Mucky sand	
	45-21	46,891.23	2,154,052.09	-		1.9	0.58	0	0	Mucky sand	
	45-22	-	-	-	11:43 a.m.	1	0.30	5 C2, 10 C3	20 C2, 40 C3	Muck, shell	Edge of marsh
T-46	46-01	46,643.34	2,153,737.98	-	10/5/17	0	0.00	0	0	Muck	In/edge of marsh
	46-02	46,652.02	2,153,757.92	0.69		0.2	0.06	0	0	Muck	
	46-03	46,661.79	2,153,780.37	-0.86		1.6	0.49	0	0	Muck	
	46-04	46,669.70	2,153,798.54	-2.12		2.5	0.76	0	0	Mucky sand	
	46-05	46,677.82	2,153,817.18	-2.54		2.8	0.85	0	0	Mucky sand	
	46-06	46,684.36	2,153,832.19	-3.27		3.4	1.04	0	0	Mucky sand	
	46-07	46,692.55	2,153,851.01	-3.69		4	1.22	0	0	Mucky sand	
	46-08	46,701.58	2,153,871.75	-3.83		4.8	1.46	0	0	Mucky sand	
	46-09	46,708.08	2,153,886.68	-4.25		5.5	1.68	0	0	Mucky sand	
	46-10	46,718.50	2,153,910.60	-4.50							Too deep
	46-11	46,730.33	2,153,937.77	-3.76							Too deep
	46-12	46,742.33	2,153,965.34	-2.59	10/5/17						Too deep
	46-13	46,755.41	2,153,995.36	-2.06		4.5	1.37	0	0	Muck	
	46-14	46,767.63	2,154,023.45	-1.45		4.4	1.34	0	0	Muck	
	46-15	46,777.53	2,154,046.18	-0.89		3.5	1.07	0	0	Muck	
	46-16	46,789.31	2,154,073.23	-0.22		3.2	0.98	0	0	Muck	
	46-17	46,801.94	2,154,102.23	0.72		2	0.61	0	0	Muck	
	46-18	46,810.59	2,154,122.10	1.32		1.6	0.49	0	0	Muck	
	46-19	46,816.86	2,154,136.50	-		1.2	0.37	0	0	Muck	
	46-20	-	-	-	11:50 a.m.	0.5	0.15	0	0	Muck	Edge of marsh

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, John Dorney, Rebeckah Hollowell					**Date:** 10-5-17			**Adjacent Shoreline:**			
Start of Day								**End of Day**			
Temp (°C):	24.58	**Sample Site Location**			**DO & pH:**	131.5%; 8.96 mg/L	7.01	**Temp (°C):**	24.85	**DO & pH:**	150.5%; 10.21 mg/L 7.13
Salinity (ppt):	35.25	State Plane NAD83; Feet			**Tide Level:**	r prior to low tide (1:00 p.m.)		**Salinity (ppt):**	35.48	**Tide Level:**	1 hour past low tide (3:00 p.m.)
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-47	47-01	46,562.32	2,153,796.36	-	10/5/17	0	0.00	0	0	Muck	In the marsh
	47-02	46,567.59	2,153,808.41	1.34		0	0.00	0	0	Muck	
	47-03	46,574.92	2,153,825.16	0.41		1	0.30	0	0	Muck	
	47-04	46,581.41	2,153,839.99	-0.53		2.4	0.73	0	0	Mucky sand	
	47-05	46,588.46	2,153,856.12	-1.69		2	0.61	0	0	Mucky sand	
	47-06	46,595.63	2,153,872.49	-2.05		3	0.91	0	0	Mucky sand	
	47-07	46,603.21	2,153,889.82	-2.72		3.5	1.07	0	0	Mucky sand	
	47-08	46,613.22	2,153,912.70	-3.89		4	1.22	0	0	Mucky sand	
	47-09	46,627.89	2,153,946.23	-4.65		5.1	1.55	0	0	Mucky sand	
	47-10	46,641.19	2,153,976.62	-4.67	1:34 p.m. 10/5/17	5.5	1.68	0	0	Mucky sand	
	47-11	46,652.37	2,154,002.18	-3.63							Too deep
	47-12	46,666.14	2,154,033.66	-2.28							Too deep
	47-13	46,675.28	2,154,054.55	-1.85		4	1.22	0	0	Sand	
	47-14	46,686.06	2,154,079.20	-1.16		2.6	0.79	0	0	Sand	
	47-15	46,698.07	2,154,106.63	-0.12		0.9	0.27	0	0	Sand	
	47-16	46,710.62	2,154,135.32	0.78		0	0.00	0	0	Sand	Sand bar
	47-17	46,721.65	2,154,160.54	1.09		0	0.00	0	0	Sand	Sand bar
	47-18	46,732.56	2,154,185.47	1.40		0.5	0.15	0	0	Muck, shell	
	47-19	46,744.58	2,154,212.94	-	12:00 p.m.	0.2	0.06	1 C2	4 C2	Muck, shell	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal						**Date:** 7-19-17			**Adjacent Shoreline:**			
Start of Day								**End of Day**				
Temp (°C):	-27	**Sample Site Location**			**DO & pH:**	93.11%, 6.19 mg/L	6.88	**Temp (°C):**	29.18	**DO & pH:**	126.4%, 7.93 mg/L	7.27
Salinity (ppt):	-36	State Plane NAD83; Feet			**Tide Level:**	Low (10:00)		**Salinity (ppt):**	36.47	**Tide Level:**	2 hours past low (12:15 a.m.)	
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Category of Oyster Length (1 = small, 2 = mid, 3 = large)**	**Sediment(s)**	**Notes**
T-48	48-1	46,484.79	2,153,860.34	-		0"	0.00	0	0		Mucky, sand	
	48-2	46,492.24	2,153,877.06	1.08		0"	0.00	0	0		Mucky, sand	
	48-3	46,503.54	2,153,902.41	-0.83		0"	0.00	0	0		Mucky, sand	
	48-4	46,515.78	2,153,929.89	-2.77		0"	0.00	0	0		Mucky, sand	
	48-5	46,525.02	2,153,950.62	-4.06		0"	0.00	0	0		Mucky, sand	
	48-6	46,535.55	2,153,974.27	-5.85		0"	0.00	0	0		Mucky, sand	
	48-7	46,547.88	2,154,001.94	-5.36		27"	0.69	0	0		Mucky, sand	
	48-8	46,560.84	2,154,031.03	-4.29		2'7"	0.79	0	0		Mucky, sand	
	48-9	46,569.54	2,154,050.55	-3.79		4'3"	1.30	0	0		Mucky, sand	
	48-10	46,584.88	2,154,084.96	-2.47		4'7"	1.40	0	0		Mucky, sand	
	48-11	46,596.13	2,154,110.22	-1.58		4'7"	1.40	0	0		Mucky, sand	
	48-12	46,610.12	2,154,141.62	-0.05		4'9"	1.45	0	0		Mucky, sand	
	48-13	46,625.14	2,154,175.34	2.30		6'	1.83	N/A	N/A		Mucky, sand	
	48-14	46,638.77	2,154,205.93	2.46		6'	1.83	N/A	N/A		Mucky, sand	
	48-15	46,648.10	2,154,226.86	2.01		6'	1.83	N/A	N/A		Mucky, sand	
	48-16	46,663.84	2,154,262.19	1.77		6'	1.83	N/A	N/A		Mucky, sand	
	48-17	46,673.40	2,154,283.65	-		6'	1.83	N/A	N/A		Mucky, sand	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, John Dorney, Rebeckah Hollowell					**Date: 9**-5-17			**Adjacent Shoreline:**			
Start of Day								**End of Day**			
Temp (°C):		**Sample Site Location**		**DO & pH:**	*Battery Dead*			**Temp (°C):**	29.52	**DO & pH:**	10.22 mg/L; 166% 7.04
Salinity (ppt):		State Plane NAD83; Feet		**Tide Level:**				**Salinity (ppt):**	35.9	**Tide Level:**	Low, two hours past (3:30 p.m.)
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-49	49-01	46,415.24	2,153,919.28	2.10	2:38 p.m.	0.82	0.25	0 oysers 1 clam (S)	0 oysers 4 clams (S)	Sand	
	49-02	46,421.96	2,153,935.78	0.98	2:39 p.m.	0.00	0.00	0	0	Sand	
	49-03	46,431.46	2,153,959.11	-1.83	2:40 p.m.	0.00	0.00	0	0	Sand	
	49-04	46,440.21	2,153,980.58	-4.38	2:40 p.m.	0.00	0.00	0	0	Sand	
	49-05	46,450.10	2,154,004.85	-5.26	2:41 p.m.	0.00	0.00	0	0	Sand	
	49-06	46,462.26	2,154,034.70	-6.27	2:42 p.m.	0.00	0.00	0	0	Sand	
	49-07	46,474.35	2,154,064.37	-5.44	2:45 p.m.	1.48	0.45	0	0	Sand	
	49-08	46,485.22	2,154,091.05	-4.45	2:46 p.m.	3.61	1.10	0	0	Sand	
	49-09	46,495.87	2,154,117.17	-3.40	2:48 p.m.	4.76	1.45	0	0	Sand	
	49-10	46,507.95	2,154,146.81	-2.75	2:50 p.m.	5.25	1.60	0	0	Sand	
	49-11	46,519.21	2,154,174.46	-1.34							Too deep, sand substrate, no shell
	49-12	46,531.59	2,154,204.86	1.79							Too deep, sand substrate, no shell
	49-13	46,542.01	2,154,230.43	2.83							Too deep, sand substrate, no shell
	49-14	46,552.36	2,154,255.83	2.83							Too deep, sand substrate, no shell
	49-15	46,561.93	2,154,279.30	2.19							Too deep, sand substrate, no shell
	49-16	46,569.68	2,154,298.33	1.50							Too deep, sand substrate, no shell
	49-17	46,582.99	2,154,331.00	-	2:24 p.m.	0.00	0.00	0	0	Sand, silt	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, John Dorney, Rebeckah Hollowell					**Date: 9**-5-17			**Adjacent Shoreline:**				
Start of Day								**End of Day**				
Temp (°C):		**Sample Site Location**			**DO & pH:**	*Battery Dead*		**Temp (°C):**	29.52	**DO & pH:**	10.22 mg/L; 166%	7.04
Salinity (ppt):		State Plane NAD83; Feet			**Tide Level:**			**Salinity (ppt):**	35.9	**Tide Level:**	Low, two hours past (3:30 p.m.)	
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**	
T-50	50-1	46,335.70	2,153,964.67	-	2:22 p.m.	0.00	0.00	0	0	Sand		
	50-2	46,342.91	2,153,983.03	1.11	2:22 p.m.	0.00	0.00	0	0	Sand		
	50-3	46,353.75	2,154,010.63	-5.51							Too deep	
	50-4	46,365.82	2,154,041.39	-6.71							Too deep	
	50-5	46,377.38	2,154,070.83	-4.80	3:14 p.m.	5.25	1.60	0	0	Sand		
	50-6	46,386.08	2,154,092.99	-4.38	3:12 p.m.	4.43	1.35	0	0	Sand		
	50-7	46,392.47	2,154,109.28	-3.95	3:12 p.m.	3.28	1.00	0	0	Sand		
	50-8	46,398.50	2,154,124.64	-3.53	3:11 p.m.	3.61	1.10	0	0	Sand		
	50-9	46,404.04	2,154,138.76	-3.08	3:07 p.m.	3.94	1.20	0	0	Sand		
	50-10	46,411.62	2,154,158.06	-2.96	3:06 p.m.	3.94	1.20	0	0	Sand		
	50-11	46,423.04	2,154,187.14	-2.54	3:05 p.m.	3.94	1.20	0	0	Sand		
	50-12	46,434.15	2,154,215.44	-1.94	3:03 p.m.	1.97	0.60	0 oysters 1 clam (S)	0 oysters 4 clams (S)	Sand		
	50-13	46,444.98	2,154,243.04	-0.96	3:02 p.m.	1.31	0.40	0	0	Sand		
	50-14	46,457.28	2,154,274.36	1.47	3:01 p.m.	0.49	0.15	0	0	Sand		
	50-15	46,467.50	2,154,300.42	2.11	3:00 p.m.	0.33	0.10	0 oysters 1 clam (L)	0 oysters 4 clams (L)	Sand		
	50-16	46,478.79	2,154,329.16	-	2:59 p.m.	0.00	0.00	0	0	Sand	Marsh edge	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, John Dorney, Rebeckah Hollowell					**Date: 9**-5-17			**Adjacent Shoreline:**				
Start of Day								**End of Day**				
Temp (°C):		**Sample Site Location**			**DO & pH:**	*Battery Dead*		**Temp (°C):**	29.52	**DO & pH:**	10.22 mg/L; 166%	7.04
Salinity (ppt):		State Plane NAD83; Feet			**Tide Level:**			**Salinity (ppt):**	35.9	**Tide Level:**	Low, two hours past (3:30 p.m.)	
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**	
T-51	51-06	46,305.83	2,154,121.69	-2.27	1:46 p.m.	0.00	0.00	0	0	Sand	Edge of marsh	
	51-07	46,312.06	2,154,137.31	-1.09	1:47 p.m.	0.00	0.00	0	0	Sand		
	51-08	46,318.04	2,154,152.29	-1.21	1:48 p.m.	0.00	0.00	0	0	Sand		
	51-09	46,323.18	2,154,165.20	-1.81	1:48 p.m.	0.66	0.20	0	0	Sand		
	51-10	46,328.73	2,154,179.09	-2.39	1:49 p.m.	1.31	0.40	0	0	Sand		
	51-11	46,335.87	2,154,197.02	-2.33	1:50 p.m.	2.62	0.80	0	0	Sand		
	51-12	46,341.61	2,154,211.40	-2.39	1:51 p.m.	3.61	1.10	0	0	Sand		
	51-13	46,348.26	2,154,228.08	-2.56	1:53 p.m.	3.94	1.20	0	0	Sand		
	51-14	46,357.59	2,154,251.48	-1.68	1:54 p.m.	4.26	1.30	0	0	Sand		
	51-15	46,367.22	2,154,275.62	-0.52	1:55 p.m.	3.61	1.10	0	0	Sand		
	51-16	46,377.67	2,154,301.82	0.18	1:55 p.m.	2.30	0.70	0	0	Sand		
	51-17	46,388.72	2,154,329.52	0.90	1:56 p.m.	2.13	0.65	0	0	Sand		
	51-18	46,400.36	2,154,358.72	2.21	1:57 p.m.	2.30	0.70	0	0	Sand		
	51-19	46,408.13	2,154,378.19	-	1:58 p.m.	3.28	1.00	0	0	Sand		
	51-20	46,418.36	2,154,403.83	-	1:59 p.m.	4.59	1.40	0	0	Sand		
	51-21	46,428.58	2,154,429.46	-							Too deep	
	51-22	46,437.09	2,154,450.80	-							Too deep	
	51-23	46,444.93	2,154,470.46	-	2:16 p.m.		0.50	0	0	Sand, shell		
	51-24	46,452.56	2,154,489.59	-	2:16 p.m.		0.00	9 C3 oysters	36 C3 oysters	Sand, shell		

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey												
Crew: Adam Efird, Robert Neal						**Date:** 7-19-17				**Adjacent Shoreline:**		
Start of Day								**End of Day**				
Temp (°C):	-27	**Sample Site Location**			**DO & pH:**	93.11%, 6.19 mg/L	6.88	**Temp (°C):**	29.18	**DO & pH:**	126.4%, 7.93 mg/L	7.27
Salinity (ppt):	-36	State Plane NAD83; Feet			**Tide Level:**	Low (10:00)		**Salinity (ppt):**	36.47	**Tide Level:**	2 hours past low (12:15 a.m.)	
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Category of Oyster Length (1 = small, 2 = mid, 3 = large)**	**Sediment(s)**	**Notes**
T-52	52-01	46,185.77	2,154,001.68	-0.46		0"	0.00	0	0		Mucky, sand	
	52-02	46,194.06	2,154,022.88	-0.80		30"	0.76	0	0		Mucky, sand	
	52-03	46,203.59	2,154,047.27	-2.14		3'6"	1.07	0	0		Mucky, sand	
	52-04	46,214.38	2,154,074.84	-3.79		4'6"	1.37	0	0		Mucky, sand	
	52-05	46,223.49	2,154,098.13	-4.09		3'1"	0.94	0	0		Mucky, sand	
	52-06	46,234.65	2,154,126.69	-1.91		30"	0.76	0	0		Mucky, sand	
	52-07	46,245.14	2,154,153.48	-1.03		15"	0.38	0	0		Mucky, sand	
	52-08	46,254.53	2,154,177.50	-0.60		4"	0.10	0	0		Mucky, sand	
	52-09	46,265.25	2,154,204.92	-1.04		0"	0.00	0	0		Mucky, sand	
	52-10	46,273.54	2,154,226.11	-1.72		28"	0.71	0	0		Mucky, sand	
	52-11	46,283.81	2,154,252.38	-1.88		29"	0.74	0	0		Mucky, sand	
	52-12	46,293.06	2,154,276.03	-2.08		28"	0.71	0	0		Mucky, sand	
	52-13	46,303.54	2,154,302.82	-1.71		2'	0.61	0	0		Mucky, sand	
	52-14	46,313.16	2,154,327.42	-0.96		27"	0.69	0	0		Mucky, sand	
	52-15	46,323.94	2,154,354.99	0.33		0"	0.00	0	0		Mucky, sand	
	52-16	46,333.56	2,154,379.58	1.87		0"	0.00	0	0		Mucky, sand	
	52-17	46,344.86	2,154,408.47	-		0"	0.00	0	0		Mucky, sand	
	52-18	46,353.23	2,154,429.87	-		0"	0.00	0	0		Mucky, sand	
	52-19	46,362.76	2,154,454.25	-		0"	0.00	0	0		Mucky, sand	
	52-20	46,371.73	2,154,477.17	-		0"	0.00	0	0		Mucky, sand	
	52-21	46,375.94	2,154,487.94	-		0"	0.00	0	0		Mucky, sand	

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, John Dorney, Rebeckah Hollowell					**Date: 9**-5-17			**Adjacent Shoreline:**			
Start of Day								**End of Day**			
Temp (°C):		**Sample Site Location**			**DO & pH:**	*Battery Dead*		**Temp (°C):**	29.52	**DO & pH:**	10.22 mg/L; 166% 7.04
Salinity (ppt):		State Plane NAD83; Feet			**Tide Level:**			**Salinity (ppt):**	35.9	**Tide Level:**	Low, two hours past (3:30 p.m.)
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-53	53-1	46,094.69	2,153,998.15	0.04	1:18 p.m.	1.15	0.35	0 oysters 1 clam (S)	0 oysters 4 clams (S)	Sand	
	53-2	46,103.05	2,154,020.61	-1.50	1:19 p.m.	2.30	0.70	0	0	Sand	
	53-3	46,112.18	2,154,045.12	-2.26	1:20 p.m.	3.12	0.95	0	0	Sand, shell	
	53-4	46,122.94	2,154,074.05	-2.38	1:21 p.m.	2.62	0.80	0	0	Sand	
	53-5	46,132.87	2,154,100.71	-1.91	1:22 p.m.	2.46	0.75	0	0	Sand	
	53-6	46,142.44	2,154,126.42	-1.04	1:23 p.m.	2.30	0.70	0	0	Sand	
	53-7	46,153.46	2,154,156.06	-0.40	1:24 p.m.	1.97	0.60	0	0	Sand	
	53-8	46,163.74	2,154,183.67	0.16	1:25 p.m.	1.31	0.40	0	0	Sand	
	53-9	46,175.39	2,154,214.97	0.85	1:26 p.m.	0.00	0.00	0	0	Sand	
	53-10	46,184.96	2,154,240.68	0.17	1:27 p.m.	0.00	0.00	0	0	Sand	
	53-11	46,194.80	2,154,267.10	-0.86	1:29 p.m.	0.82	0.25	0	0	Sand	
	53-12	46,204.85	2,154,294.12	-1.44	1:30 p.m.	2.30	0.70	0	0	Sand	
	53-13	46,210.66	2,154,309.72	-1.57	1:31 p.m.	2.62	0.80	0	0	Sand	
	53-14	46,216.19	2,154,324.60	-1.69	1:32 p.m.	2.95	0.90	0	0	Sand	
	53-15	46,221.51	2,154,338.89	-1.79	1:32 p.m.	2.95	0.90	0	0	Sand	
	53-16	46,228.07	2,154,356.49	-1.66	1:33 p.m.	2.46	0.75	0	0	Sand	
	53-17	46,234.53	2,154,373.85	-1.58	1:34 p.m.	2.46	0.75	0	0	Sand, shell	
	53-18	46,240.03	2,154,388.63	-1.08	1:35 p.m.	1.97	0.60	0	0	Sand	
	53-19	46,249.11	2,154,413.03	0.66	1:36 p.m.	0.00	0.00	0	0	Sand	
	53-20	46,255.74	2,154,430.83	1.84	1:37 p.m.	0.00	0.00	0 oysters 1 clam (L)	0 oysters 4 clams (L)	Sand	
	53-21	46,261.43	2,154,446.12	2.06	1:38 p.m.	0.00	0.00	0	0	Sand	
	53-22	46,267.14	2,154,461.46	2.05	1:39 p.m.	0.00	0.00	0	0	Sand	
	53-23	46,271.93	2,154,474.34	1.98	1:40 p.m.	0.00	0.00	0 oysters 1 clam (L)	0 oysters 4 clams (L)	Sand	Edge of marsh

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, John Dorney, Rebeckah Hollowell					**Date: 9**-5-17			**Adjacent Shoreline:**			
Start of Day								**End of Day**			
Temp (°C):		**Sample Site Location**			**DO & pH:**	*Battery Dead*		**Temp (°C):**	29.52	**DO & pH:**	10.22 mg/L; 166% 7.04
Salinity (ppt):		State Plane NAD83; Feet			**Tide Level:**			**Salinity (ppt):**	35.9	**Tide Level:**	Low, two hours past (3:30 p.m.)
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-54	54-1	46,005.51	2,153,954.87		12:15 p.m.	0.00	0.00	0	0	Sand	
	54-2	46,013.78	2,153,978.40	1.55	12:21 p.m.	1.64	0.50	0	0	Sand	
	54-3	46,022.42	2,154,002.99	0.35	12:23 p.m.	2.30	0.70	0	0	Sand	
	54-4	46,032.19	2,154,030.81	-1.23	12:24 p.m.	3.61	1.10	0	0	Sand	
	54-5	46,042.32	2,154,059.66	-1.95	12:25 p.m.	4.26	1.30	0	0	Sand	
	54-6	46,051.90	2,154,086.91	-1.85	12:27 p.m.	3.61	1.10	0	0	Sand	
	54-7	46,061.67	2,154,114.74	-1.14	12:29 p.m.	3.28	1.00	0	0	Sand	
	54-8	46,071.21	2,154,141.89	-0.56	12:30 p.m.	1.64	0.50	0	0	Sand	
	54-9	46,080.65	2,154,168.75	-0.15	12:31 p.m.	1.97	0.60	0	0	Sand	
	54-10	46,090.22	2,154,196.00	-0.03	12:32 p.m.	1.64	0.50	0	0	Sand	
	54-11	46,098.86	2,154,220.59	0.38	12:33 p.m.	1.64	0.50	0	0	Sand	
	54-12	46,109.43	2,154,250.69	0.80	12:34 p.m.	0.33	0.10	0	0	Sand	
	54-13	46,117.95	2,154,274.94	0.47	12:35 p.m.	0.00	0.00	0	0	Sand	
	54-14	46,127.29	2,154,301.51	-0.07	12:36 p.m.	0.16	0.05	0	0	Sand	
	54-15	46,135.83	2,154,325.81	-0.32	12:37 p.m.	1.64	0.50	0	0	Sand	
	54-16	46,141.64	2,154,342.36	-0.68	12:37 p.m.	2.79	0.85	0	0	Sand	
	54-17	46,145.70	2,154,353.93	-0.96	12:38 p.m.	3.12	0.95	0	0	Sand	
	54-18	46,154.92	2,154,380.16	-1.30	12:39 p.m.	3.61	1.10	0	0	Sand	
	54-19	46,163.68	2,154,405.09	-1.28	12:40 p.m.	3.61	1.10	0	0	Sand	
	54-20	46,169.12	2,154,420.59	-1.24	12:41 p.m.	3.61	1.10	0	0	Sand	
	54-21	46,174.03	2,154,434.56	-1.05	12:42 p.m.	3.77	1.15	0	0	Sand	
	54-22	46,185.18	2,154,466.31	0.71	12:43 p.m.	1.64	0.50	0	0	Sand	
	54-23	46,195.20	2,154,494.81	2.17	12:44 p.m.	1.64	0.50	0	0	Sand	
	54-24	46,204.30	2,154,520.71	2.56	12:45 p.m.	0.00	0.00	0	0	Sand	
	54-25	46,213.15	2,154,545.93	2.69	12:45 p.m.	0.00	0.00	0	0	Sand	Edge of marsh, ended here

*All transects align from the west side of Jinks Creek to the east side.

Sunset Beach Shellfish Survey											
Crew: Adam Efird, John Dorney, Rebeckah Hollowell					**Date: 9**-5-17			**Adjacent Shoreline:**			
Start of Day								**End of Day**			
Temp (°C):		**Sample Site Location**			**DO & pH:**	*Battery Dead*		**Temp (°C):**	29.52	**DO & pH:**	10.22 mg/L; 166% 7.04
Salinity (ppt):		State Plane NAD83; Feet			**Tide Level:**			**Salinity (ppt):**	35.9	**Tide Level:**	Low, two hours past (3:30 p.m.)
Transect	**Transect #, point**	**Northing (Ft)**	**Easting (Ft)**	**Elevation (MLW)**	**Time**	**Depth (ft)**	**Depth (m)**	**Number of Shellfish**	**Extrapolated # of Shellfish**	**Sediment(s)**	**Notes**
T-55	55-1	45,935.20	2,154,000.01	-1.34	11:59 a.m.	3.61	1.10	0	0	Silt, muck	
	55-2	45,940.86	2,154,017.16	-2.09	12:03 p.m.	3.61	1.10	0	0	Silt, muck	
	55-3	45,949.79	2,154,044.21	-2.60	12:05 p.m.	4.10	1.25	0	0	Silt, muck	
	55-4	45,959.58	2,154,073.87	-3.46	12:07 p.m.	5.41	1.65	0	0	Silt, muck	
	55-5	45,968.08	2,154,099.60	-2.62	12:09 p.m.	5.25	1.60	0	0	Sand, silt, shell	
	55-6	45,977.98	2,154,129.58	-2.00	1:05 p.m.	2.95	0.90	0	0	Sand	
	55-7	45,987.12	2,154,157.27	-0.55	1:05 p.m.	0.98	0.30	0	0	Sand	
	55-8	45,996.91	2,154,186.93	0.10	1:04 p.m.	1.48	0.45	0	0	Sand	
	55-9	46,007.23	2,154,218.20	-0.01	1:03 p.m.	1.31	0.40	0 oysters 1 clam (L)	0 oysters 4 clams (L)	Sand	
	55-10	46,016.59	2,154,246.56	0.10	1:021 p.m.	0.66	0.20	0	0	Sand	
	55-11	46,026.71	2,154,277.19	0.35	1:01 p.m.	0.33	0.10	0	0	Sand	
	55-12	46,036.49	2,154,306.84	0.92	1:00 p.m.	0.00	0.00	0	0	Sand	
	55-13	46,046.93	2,154,338.44	1.35	1:00 p.m.	0.00	0.00	0	0	Sand	
	55-14	46,056.93	2,154,368.74	1.34	12:59 p.m.	0.66	0.20	0	0	Sand	
	55-15	46,065.96	2,154,396.11	-0.11	12:58 p.m.	1.80	0.55	0	0	Sand	
	55-16	46,075.11	2,154,423.80	-0.93	12:57 p.m.	2.13	0.65	0	0	Sand	
	55-17	46,085.00	2,154,453.78	-0.87	12:56 p.m.	2.13	0.65	0	0	Sand	
	55-18	46,093.73	2,154,480.19	-0.66	12:55 p.m.	1.97	0.60	0	0	Sand	
	55-19	46,102.86	2,154,507.87	-0.21	12:54 p.m.	1.31	0.40	0	0	Sand	
	55-20	46,112.12	2,154,535.91	0.83	12:53 p.m.	0.66	0.20	0	0	Sand	
	55-21	46,119.97	2,154,559.69	1.80	12:53 p.m.	0.00	0.00	0	0	Sand	
	55-22	46,128.68	2,154,586.07	2.44	12:51 p.m.	0.00	0.00	0 oysters 1 clam (S)	0 oysters 4 clams (S)	Sand	
	55-23	46,138.25	2,154,615.07	2.67	12:51 p.m.	0.00	0.00	0	0	Sand	55-24 through 55-32 were beyound the edge of the salt marsh

*All transects align from the west side of Jinks Creek to the east side.

Essential Fish Habitat (EFH) Assessment – Feeder Channel & Bay Area, Sunset Beach, Brunswick County, North Carolina

Prepared for:
Town of Sunset Beach, Brunswick County, NC

Submitted to:
The North Carolina Division of Coastal Management (DCM)

November 2018

Prepared by:

MOFFATT & NICHOL
4700 Falls of Neuse Road, Suite 300
Raleigh, NC 27609

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1.0 INTRODUCTION

The Town of Sunset Beach is proposing to maintenance dredge South Jinks Creek, the Feeder Channel, inclusive of finger canals A-D, and the Bay Area in Sunset Beach, Brunswick County, NC. Sunset Beach lies in Brunswick County, along the southern coastal border of North Carolina, adjacent to Ocean Isle Beach. The proposed project will occur along the eastern border of Sunset Beach, within the interior waters of Tubbs Inlet. Figure 1 shows the proposed project area in relation to Brunswick County.

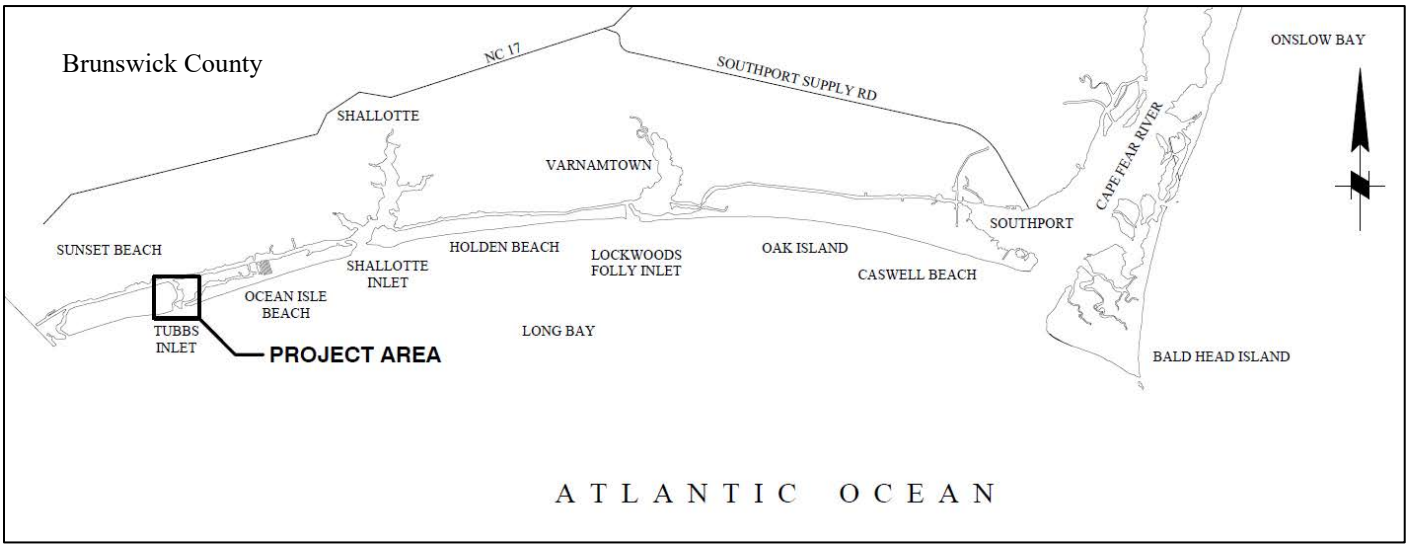

Figure 1. Project Vicinity Map

The following analysis evaluates the potential for impacts to essential fish habitat (EFH) to occur as a result from the project. The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (16 USC 1801 et seq.) requires the U.S. Secretary of Commerce to develop guidelines assisting regional fisheries management councils on the identification and creation of management and conservation plans for EFH. Each council is required to amend existing fisheries management plans (FMP) to include EFH designations and conservation requirements. The Act also requires federal agencies to consult with the Secretary of Commerce on all actions, or proposed actions, authorized, funded, or undertaken by the agency that might adversely affect EFH.

The US Code (USC) defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 USC 1802(10)). "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate. "Substrate" includes sediment, hard bottom structures underlying the waters, and associated biological communities. "Necessary" refers to the habitat that is required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem. "Spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle.

1.1 Summary of Proposed Project

South Jinks Creek comprises a portion of the Jinks Creek connector channel that extends from the Atlantic Intracoastal Waterway (AIWW) to Tubbs Inlet and the Atlantic Ocean. The navigation project will connect the Bay Area and Feeder Channel systems along the southeast portion of Sunset Beach to south Jinks Creek. The Bay Area entails one (1) residential canal and the Feeder Channel system includes one (1) main channel connected to four (4) residential finger canals referenced as Canals A – D. The proposed project will help restore navigation access within these systems while also helping to restore access along Jinks Creek's eastern most shoreline within the Town's jurisdictional limits.

An estimated 40,500 cubic yards (CY) of beach compatible material will be dredged from S. Jinks Creek, and an additional 48,600 CY of non-compatible material will be removed from the Feeder Channel system and Bay Area. The beach compatible material will be hydraulically placed as beneficial reuse along approximately 1,600-ft of shoreline between 5th Street and 12th Street on Sunset Beach. The beneficial reuse material will provide an approximate 275-ft wide average berm with a maximum height of +9.0 MLW (6.1 NAVD). The non-compatible substrate will be mechanically dredged and placed at a permitted upland landfill facility.

South Jinks Creek, the Bay Area, and the Feeder Channel systems have been dredged previously, with the original event occurring approximate to 1970 (Cleary & Marden, 1999). Figures 2 and 3 show aerial photographs from 1966 and 1974 depicting before and after conditions of the initial dredging event. The initial dredging presumably occurred as part of a relocation project for Tubbs Inlet and the development of Sunset Beach. The action occurred prior to 1974 and the establishment of the Coastal Area Management Act (CAMA), so the action did not receive a CAMA Major permit authorization.

The first maintenance event for the feeder channel system occurred in 1985 under CAMA permit 211-85 and a subsequent maintenance occurred in 2002 under CAMA permit 45-02. The proposed action will be the first known maintenance event for south Jinks Creek and the Bay Area since the initial dredging approximate to 1970.

The proposed maintenance dredging will help establish and maintain a navigational channel for access to the residential docks along the east end of Sunset Beach. Sediment runoff from storm events has most likely impaired access through the Bay Area and Feeder Channel while shoaling from sediment transport has impaired navigation in south Jinks Creek. As a result, the Town of Sunset Beach has proposed the maintenance operations as part of a long-term management strategy to maintain navigation access for small recreational vessels through the waterbodies. However, future maintenance operations will be requested through separate permit applications.

Figure 2. Tubbs Inlet 1966 (Originally printed in Cleary & Marden, 1999)

Figure 3. Tubbs Inlet 1974 (Originally printed in Cleary & Marden, 1999)

Figure 4 provides a planview of the proposed maintenance dredging project as described above. The design template for the Feeder Channel follows the same alignment as proposed under permit 45-02 with small adjustments to avoid the existing marsh grass. In addition, the design depth for the proposed action has been raised from -5.27 MLW to -5 MLW. Raising of the design depth should help to simplify the construction process and reduce the potential for adverse impacts. The dredging proposal includes a 1-ft allowable overdredge template to provide a buffer for maneuvering the construction equipment within the work area. Therefore, the maximum dredge depth in the Feeder Channel extends to -6-ft MLW, inclusive of the proposed 1-ft allowable overdredge template. Within the finger canals the maximum dredge depth raises to -5-ft MLW, inclusive of the 1-foot overdredge tolerance.

The proposed template for the finger canals maintains a constant 20-ft width. This represents a reduction from the 2002 permitted template, which provided a varying width between 20-ft & 30-ft. The reduction in width helps provide adequate clearance between the proposed channel and the existing residential docks. In many instances, the navigable waterway through finger canals A-D remains even less than 20-ft wide. Therefore, the dredge equipment most likely will not be able to access the full channel even with the reduced 20-foot width. Although the docks may be moved

by the private homeowners to help facilitate construction, expectations suggest the docks would be returned to their original position after the maintenance event. Therefore, there would be little public benefit in providing more than a 20-foot channel through the residential waterway.

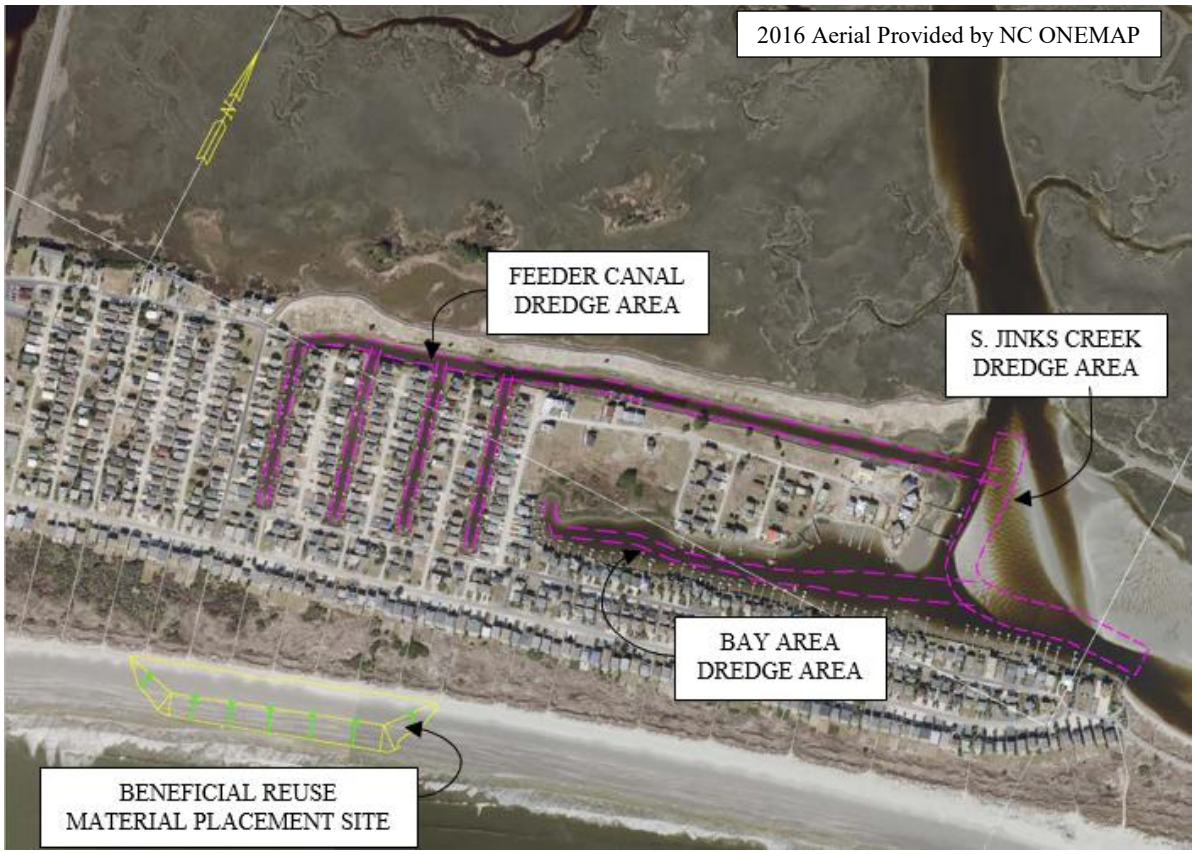

Figure 4. South Jinks Creek, the Bay Area, and Feeder Channel Work Areas

The dredge template for the Bay Area initiates with an 80-ft width at the connection with South Jinks Creek. The template reduces gradually to 20-ft progressing towards the Bay Area terminus. The larger width proposed for the Bay Area entrance should help control sediment shoaling during tidal influences by providing additional storage capacity within the dredge alignment. The template decreases in width to approximately 40-ft roughly 800-ft into the Bay Area. The minimized template helps reduce the potential for unexpected impacts while also attempting to balance the navigational need of the Bay Area residents. The maximum dredge depth for the Bay Area matches the Feeder Channel at -6-ft MLW for the complete system. The maximum dredge depth includes the 1-ft overdredge allowance provided from the design depth (-5 MLW) for maneuvering the dredge equipment. A summary of the dredge templates are provided in Table 1.

The dredge material from the Feeder Channel and Bay Area will be mechanically dredged and trucked to a permitted landfill facility. Sediment tests show the material is not beach compatible in accordance with the North Carolina Administrative Code (NCAC). As a result, the upland landfill facility entails the most practical end use location identified for the dredge spoil. The template for south Jinks Creek also maintains the -6 MLW maximum dredge depth. The south

Jinks Creek material meets the NCAC criterial for beneficial reuse and will be hydraulically dredged and placed between 5th Street and 12th Street on Sunset Beach.

The dredging operations will be conducted during the months of November 16th thru April 30th to reduce the potential for environmental impacts. In addition, the dredge footprint will be minimized to provide a minimum 10-ft buffer from any coastal marsh identified at the time of construction. The 6,500-ft hydraulic pipeline carrying the beneficial reuse material dredged from S. Jinks Creek will also be positioned away from any established dune or beach vegetation. These items are a few of the precautions proposed to help minimize the potential for environmental impacts on this project.

Table 1. Dredge Template Description

Area	Existing Avg. Depth (MLW-ft)	Proposed Depth (MLW-ft)	Length (ft)	Width (ft)	Side Slope (H:V)	Est. Volume (CY)	Placement Location
Feeder Channel	-3 MLW	-6 (-5+1) MLW	3,500	30 – 40	3:1	22,000	Landfill
Finger Canals A-D	-2 MLW	-5 (-4+1) MLW	3,200	20	3:1	10,700	Landfill
Bay Area	-2 MLW	-6 (-5+1) MLW	2,200	20 – 80	3:1	15,900	Landfill
S. Jinks Creek	- 1.5 MLW	-6 (-5+1) MLW	1,750	100	5:1	40,500	Beneficial Reuse (5th–12th St)
TOTAL			**10,650**	**Varies**	**Varies**	**89,100**	**Varies**

2.0 ESSENTIAL FISH HABITAT

Pursuant to the MSFMCA (Public Law 94-265) and the 1996 amendments to the Act, known as the Sustainable Fisheries Act (Public Law 104-297), an EFH consultation was requested by NOAA Fisheries for the proposed project. For the North Carolina coast, Sunset Beach location, this requires that EFH be identified for all fish species managed by the South Atlantic Fisheries Management Council (SAFMC), and NOAA National Marine Fisheries Service (NMFS). This EFH assessment's objective is to determine whether the actions for the proposed project "may adversely affect" designated EFH for relevant managed fisheries species within the proposed project area. Table 2 provides a list of EFH habitat types and their presence or absence in the project area. Habitats are described in more detail in following sections.

Table 2. EFH Types Present in the Project Area

EFH Type
Marine Unvegetated Sandy Bottom
Oyster Reef and Shell Banks
Estuarine Emergent Wetlands
Aquatic Bed (Tidal Freshwater)
Estuarine Water Column/Creek

2.1 Marine Unvegetated Sandy Bottom

Regional sediment grain size influences the wind, wave, and tidal interactions that shape and manage the development and movement of sub- and intertidal flats (SAFMC 1998a). These sub- and intertidal EFH locations provide feeding grounds for predators and forage fish species as well as refuge, juvenile nurseries, and feeding grounds for many species (SAFMC 1998a). Animals that move from a pelagic larval to a benthic juvenile existence make use of these EFH flats for life stage development. Species such as summer flounder, red drum, spotted seatrout (*Cynoscion nebulosus*), striped mullet (*Mugil cephalus*), gray snapper (*Lutjanus griseus*), blue crab (*Callinectes sapidus*), and shrimp use these marine/estuarine EFHs as nurseries. These flats also serve as refuge areas for avoiding predators, which use the tide cycles for access to feeding grounds.

Associated benthic species dominating NC's bays and sounds include bivalves, polychaetes, and amphipods. The dominant coastal research indicator species include mole crabs (*Emerita talpoida*), coquina clams (*Donax variabilis*, *D. parvula*), some amphipods (Haustoriids), and polychaetes (mostly *Capitella capitata* and *Scolelepis squamata*), all of which can be found in NC's intertidal beaches (Peterson et al. 2006, 2000a, and 2000b; Street et al. 2005; and USFWS 2002). Most oceanfront shoreline benthic species are found in the substrate's upper 3.3 ft. maximizing oxygen concentrations, pore space, and variable grain sizes (USFWS 2002).

2.2 Oyster Reef and Shell Banks

Shell bottom habitats include oyster reefs, aggregations of non-reef building shellfish species [e.g., clams and scallops (*Argopecten irradians*, *A. gibbus*)], and surface concentrations of broken shells (shell hash). Oysters (*Crassostrea virginica*) are the dominant reef-building species of estuarine shell bottom habitats in North Carolina. Non-reef building shellfish species that occur at densities sufficient to provide structural habitat for other organisms include scallops, pen shells (*Atrina seratta*, *A. rigida*), and rangia clams (*Rangia cuneata*) (SAFMC 2009). The distribution of shell bottom and other estuarine benthic habitats in the vicinity of the proposed project has been mapped and quantified by the NCDMF in collaboration with Moffatt and Nichol (Appendix A – Jinks Creek Shellfish Survey Report). Mapped areas are concentrated in the northern portion of Jinks Creek. Shell bottom habitats perform a number of important ecological functions such as water filtration, benthic-pelagic coupling, sediment stabilization, and erosion reduction (Deaton et al. 2010, SAFMC 2009, and Coen et al. 2007). Oysters and other suspension feeding bivalves reduce turbidity in the water column by filtering particulate matter, phytoplankton, and microbes. The consumption of particulates also results in the transfer of material and energy from the water column to the benthic community (i.e., benthic-pelagic coupling). Shell bottom structural relief alters currents and traps and stabilizes suspended solids, thus further reducing turbidity. By moderating waves and currents, oyster reefs and other shell bottom habitats reduce shoreline erosion.

The hard surfaces provided by existing oyster reefs and shell hash function as important larval settlement and accumulation sites for recruiting oysters, hard clams, and other shellfish (NCDMF 2008). Studies summarized by Deaton et al. (2010) have described the importance of shell bottom as foraging, spawning, and nursery habitat for numerous species of invertebrates and fish. Shell bottom structure concentrates macroinvertebrates [e.g., grass shrimp (*Palaemonetes* spp.) and mud crabs (*Scylla* spp.)] and small forage fishes (pinfish and gobies), which in turn attract larger

predatory fish such as Atlantic croaker, black drum, pigfish, southern and summer flounder, and spotted seatrout. Shell bottom habitats are utilized as spawning areas by a number of finfish and decapod crustaceans; including anchovies, blennies (Blennidae), gobies, mummichog (*Fundulus heteroclitus*), oyster toadfish (*Opsanus tau*), sheepshead minnow (*Cyprinodon variegatus*), grass shrimp, and blue crab. Numerous finfish and decapod crustaceans also utilize shell bottom habitats as a nursery area; including anchovies, black sea bass, blennies, gobies, oyster toadfish, pinfish, red drum, sheepshead, spot, weakfish, penaeid shrimp, blue crabs, and stone crabs (*Menippe mercenaria*).

2.3 Estuarine Emergent Wetlands

Estuarine Emergent Wetlands includes all tidal wetlands dominated by erect, rooted, herbaceous hydrophytes (excluding mosses and lichens). These wetlands occur in tidal areas where salinity due to ocean-derived salts is equal to or greater than 0.5 percent and that are present for most of the growing season during most years. Perennial plants usually dominate these wetlands and vegetation cover is typically above 80 percent. These wetlands are typically dominated by marsh grasses such as *Spartina* species, needlerush (*Juncus* spp.), and narrow leaved cattail (*Typha angustifolia*). Estuarine emergent wetlands are nutrient-rich with high primary productivity, allowing these habitats to support a diversity of fish, invertebrates, and coastal birds. Managed fish species use these marshes during multiple life stages because they provide nursery habitat for juveniles and foraging habitat for adults. Estuarine emergent wetland habitat is expected on the fringe of the channels, near the marsh.

2.4 Aquatic Bed (Tidal Freshwater)

Aquatic bed habitats in the project area include the soft bottom substrate occurring in Sunset Beach. This habitat type is comprised of sand as well as inorganic muds, organic muds, and peat. Nutrients are typically provided by riverine sources and transported via wind tides in addition to lunar tidal exchange. The abundance of benthic macroalgae in this habitat supports a high diversity of invertebrates that are an important fishery food source.

2.5 Estuarine Water Column/Creeks

The estuarine water column extends from the estuarine bottom to the surface waters and is especially important as it directly affects all other estuarine aquatic habitats (NCWRC, 2005). This habitat is characterized by the oligohaline (estuarine) waters present in Sunset Beach with seasonally variable salinity levels. Distinct zones within the water column can be defined by parameters such as salinity, temperature, and dissolved oxygen. Water column zonation continually fluctuates and is a function of tidal dynamics, season, nutrient levels, and ocean proximity. Fish and shellfish often exploit distinct resources within the water column based on species-specific diet, behavior, and morphology. For example, pelagic fishes live higher in the water column compared to demersal fishes, which are bottom dwelling. These distinct types of fishes have adapted to take advantage of these differing habitats, and favorable spawning and feeding conditions occur at varying locations at differing times of the year.

2.6 Primary Nursery Areas

While not a single specific EFH type, Primary Nursery Areas (PNA) are composed of several EFH types and are state-designated waters that are used by marine and estuarine fishes and invertebrates during early development. Nursery areas are designated and regulated by the North Carolina Division of Marine Fisheries (NCDMF) and North Carolina Wildlife Resources Commission (NCWRC) in some areas. These areas are typically shallow waters with soft bottom substrate that are surrounded by marshes and wetlands. The abundance of refuge, foraging habitat, and food resources present in these areas result in the successful development of many sub-adult organisms (Beck *et al.*, 2001). Nursery areas are also considered HAPC for several managed fish species. Marshes adjacent to the channels, not including the channels in consideration for this EFH assessment, have been designated as primary nursery areas.

3.0 MANAGED SPECIES

Multiple environmental agencies have interest in the potential impacts dredging projects may cause. The primary resource organizations include the following:

- South Atlantic Fisheries Management Council (SAFMC)
- National Marine Fisheries Service (NMFS)
- Atlantic States Marine Fisheries Commission (ASMFC
- North Carolina Division of Marine Fisheries (DMF)

The following provides a discussion on the species managed by each agency with a potential presence of EFH within the project area.

3.1 SAFMC and NMFS-managed Species

SAFMC have developed FMPs for several species, or species units (SAFMC, 2008), although not all of these species are found in the project area. Highly migratory species' FMPs and Atlantic billfish FMPs were developed by the Highly Migratory Species Management Unit, Office of Sustainable Fisheries, NMFS (NMFS, 1999, 1999a, 1999b; NOAA, 2016). As part of each FMP, the council designates not only EFH, but also High Areas of Potential Concern (HAPC), a subset of EFH that refers to specific locations required by a life stage(s) of that managed species. Table 3 presents the species or species units potentially present in the project area for which EFH and/or HAPC exist.

3.1.1 Penaeid Shrimp (*Penaeus* spp.)

Penaeid shrimp (white, pink, and brown shrimp) are estuarine-dependent species of commercial and ecological significance. Penaeid shrimp spawn offshore where both larval and post-larval development occurs. Currents carry post-larval shrimp into estuaries, where they are distributed based on salinity and substrate preferences. As shrimp grow, they migrate to higher salinity areas before returning to offshore spawning areas. All tidal and estuarine waters within the project area, including estuarine emergent wetlands and aquatic beds, are designated as EFH for penaeid shrimp.

3.1.2 Snapper-Grouper Management Unit

The Snapper-Grouper Management Group includes more than 70 species that are managed by the SAFMC. Atlantic Spadefish, and Black Sea Bass are species within this group that have been documented near or within the project area. Atlantic Spadefish are opportunistic bottom feeders that utilize a variety of brackish water and nearshore habitats. Spawning occurs from May to September and juveniles are typically found in estuarine waters while adults are typically found in nearshore areas. Atlantic Spadefish have been documented in local fishing reports in or near the project area.

The Black Sea Bass is a demersal species found from Maine to Florida that are opportunistic feeders and accept a variety of food sources. As juveniles and adults, this species is associated with submerged structures in estuarine and marine waters. Spawning occurs offshore from May to October along the continental shelf in an area extending from southern New England to North Carolina. Eggs are generally hatched on the continental shelf near large estuaries, but eggs have also been found in bays in North Carolina. Juvenile Black Sea Bass enter estuaries during late spring and early summer to forage on invertebrate prey and small fish. This species is typically not found in the project area, but fishing reports from NCDEQ-DMF have shown presence of this species in the last 10 years. All tidal and estuarine waters, including emergent wetlands, and estuarine water column habitat are designated EFH for this species.

3.1.3 Spiny Lobster

Spiny Lobster have EFH for all life stages within the project area. EFH includes estuarine water column/creeks, aquatic bed, and SAV (NOAA, 2016). The Spiny Lobster larvae are typically found in open ocean in the epipelagic zone of the Caribbean Sea, Gulf of Mexico, and the Straits of Florida. Post-larvae and juveniles occupy shallow waters of bays, lagoons, and reef flats, habitats supported by the production of seagrasses, benthic algae, phytoplankton, and detritus. As the lobsters increase in size, they move towards deeper waters in bays, reefs, and nearshore areas. As adults, they can be found in deeper waters both nearshore and offshore.

Table 3. Managed Species Potentially Present in the Project Area

Species Present	Life Stages Present in Project Area	Designated EFH in Project Area	HAPC in Project Area
South Atlantic Fisheries Management Council (SAFMC)			
Penaeid Shrimp (*Penaeus* spp.)	Larvae, Juveniles, Adults	Estuarine Water Column/Creeks, Aquatic Beds, Estuarine Emergent Wetlands	Estuarine Water Column/Creeks, Aquatic Beds, Estuarine Emergent Wetlands
Snapper-Grouper Management Unit	Larvae, Juveniles, Adults	Estuarine Water Column/Creeks, Estuarine Emergent Wetlands	Estuarine Water Column/Creeks, Estuarine Emergent Wetlands
Spiny Lobster (*Panulirus argus*)	Eggs, Larvae, Juveniles, Adults	Estuarine Water Column/Creeks, Aquatic Beds, Estuarine Emergent Wetlands	Estuarine Water Column/Creeks, Aquatic Beds, Estuarine Emergent Wetlands
Coastal Migratory Pelagic Species	Larvae, Juveniles, Adults	Estuarine Water Column/Creeks, Aquatic Beds	Estuarine Water Column/Creeks, Aquatic Beds
Atlantic Highly Migratory Species (HMS) National Marine Fisheries Service (NMFS)			
Blacktip Shark (*Carcharhinus limbatus*)	Juveniles, Adults	Estuarine Water Column/Creeks	None
Sandbar Shark (*Carcharhinus plumbeus*)	Juveniles, Adults	Estuarine Water Column/Creeks	None
Spinner Shark (*Carcharhinus brevipinna*)	Neonates, Juveniles, Adults	Estuarine Water Column/Creeks	None
Tiger Shark (*Galeocerdo cuvier*)	Neonates, Juveniles, Adults	Estuarine Water Column/Creeks	None
Blacknose Shark (*Carcharhinus acronotus*)	Neonates, Juveniles	Estuarine Water Column/Creeks	None
Bonnethead Shark (*Sphyrna tiburo*)	Juveniles, Adults	Estuarine Water Column/Creeks, Aquatic Beds	None
Atlantic Sharpnose Shark (*Rhizoprionodon terraenovae*)	Neonates, Juveniles, Adults	Estuarine Water Column/Creeks	None
Smooth Dogfish Shark (*Mustelus canis*)	Neonates, Juveniles, Adults	Estuarine Water Column/Creeks	None
Dusky Shark (*Carcharhinus obscurus*)	Neonates, Juveniles, Adults	Estuarine Water Column/Creeks	None
Sand Tiger Shark (*Carcharhinus taurus*)	Neonates, Juveniles, Adults	Estuarine Water Column/Creeks	None

Source: SAFMC, 2008; NMFS, 1999, 1999a, 1999b; NOAA, 2006, 2009, 2016

3.1.4 Coastal Migratory Pelagic Species

Coastal Migratory Pelagic species found near the project area are the Spanish Mackerel and King Mackerel. Spanish Mackerel and King Mackerel spawn from May to September (SAFMC, 1998), with eggs and larvae using pelagic habitats and juveniles moving into estuaries for use as nursery areas. While typically not found in oligohaline waters, these Mackerels do occur in the area based

on commercial fishing data. Estuarine water column/creek habitats are designated as EFH by SAFMC in the management of this unit because prey items for species in this unit are typically estuarine dependent. There are no HAPCs designated by SAFMC for these Mackerels in the project area.

3.1.5 Highly Migratory Species

The Blacktip Shark inhabits circumtropical waters that are shallow as well as offshore surface waters. The coastal islands of the Carolinas are prime nursery areas due to the variety of habitat conditions available at the shallow water depths. Sandbar Sharks are a slow growing species, utilizing shallow coastal waters for its nurseries, until migrating to deeper waters. The Spinner Shark is a migratory species common to coastal-pelagic waters. EFH presents nursery areas to reproduce and rear the young. Tiger Sharks are both shallow coastal water and deep oceanic inhabitants utilizing EFH for refuge during their year-long gestation periods. Blacknose Sharks are common to coastal waters creating nursery areas for the reproducing females and young in shallow waters. The Bonnethead Shark is a fast-growing species, reproducing each year; this species is abundant in the shallow, coastal waters of the Atlantic. The females and young are found in estuarine waters often for the variety of habitat and food resources available. Atlantic Sharpnose Sharks are smaller in size, common in the waters along the coasts of the Carolinas. Often these sharks tend to congregate in schools of uniform sex and size. EFH is utilized as nursery areas for neonates and pups. The Smooth Dogfish Shark is a migratory species, moving north to south in the Atlantic Ocean. It is small in size, inhabiting estuarine, shallow waters to feed on the variety of food resources available. Dusky Sharks are a larger, migratory species, moving north to south depending on the season. These sharks inhabit inshore waters as well as outer reach of the continental shelf. EFH is prime nursery areas for births occurring in the spring months. The Sand Tiger Shark prefers very shallow waters, common to the inshore estuarine waters of the Carolinas. These sharks reproduce in warmer, temperate waters, followed by neonates migrating northward to summer nurseries.

3.2 ASMFC-Managed Species

The Atlantic States Marine Fisheries Commission (ASMFC) coordinates additional conservation and management of states' shared nearshore fishery resources (ASMFC, 2017). Member states include North Carolina, South Carolina, Georgia, Florida, Virginia, Maryland, Delaware, Pennsylvania, New Jersey, Connecticut, Rhode Island, Massachusetts, New Hampshire, and Maine. Species managed by the ASMFC that are found in the waters off Sunset Beach include: American Eel (*Anguilla rostrata*), Atlantic Croaker (*Micropogonias undulates*), Atlantic Menhaden (*Brevoortia tyrannus*), Atlantic Striped Bass (*Morone saxatillis*), Atlantic Sturgeon (*Acipenser oxyrhynchus*), Black Drum (*Pogonias cromis*), Black Sea Bass (*Centropristis striata*), Bluefish (*Pomatomus saltatrix*), Red Drum (*Sciaenops ocellatus*), Blueback Herring (*Alosa aestivalis*), American Shad (*Alosa sapidissima*), Spanish Mackerel (*Scomberomorus maculatus*), Spot (*Leiostomus xanthums*), Spotted Seatrout (*Cynoscion nebulosus*), Summer Flounder (*Parlichthys dentalus*), and Weakfish (*Cynoscion regalis*).

3.3 NCDEQ-DMF Managed Species

The Fisheries Reform Act of 1997 (FRA) prompted NCDEQ-DMF to begin the process of developing FMPs for all commercially or recreationally important species and fisheries that are present in state marine or estuarine waters, with the goal of ensuring the long-term sustainability of these fisheries (NCDEQ-DMF, 2001). Species with existing or in-development management plans include: Bay Scallop (*Argopecten irradians*), Blue Crab (*Callinectes sapidus*), Estuarine Striped Bass (*Morone saxatilis*), Hard Clam (*Mercenaria mercenaria*), Kingfish (*Menticirrhus americanus*), Oyster (*Crassostrea virginica*), Red Drum (*Sciaenops occelatus*), River Herring (*Alosa pseudoharengus*), Shrimp (*Penaeus* spp.), Southern Flounder (*Achiropsettidae*), Spotted Seatrout (*Cynoscion nebulosus*), and Striped Mullet (*Mugil cephalus*).

4.0 POTENTIAL IMPACTS TO EFH

Potential impacts to EFH may occur as short-term / temporary measures or they may provide permanent or long-term measures. The discussion below illustrates the potential impacts considered likely as a result of the project. The discussion provides avoidance and minimization efforts planned for the project to help alleviate the potential damage.

4.1 Short-term and Temporary Impacts

Construction activities will produce noise, turbidity, and siltation, thereby creating short-term, localized impacts to EFH identified in the Feeder Channel system and Bay Area and possibly to targeted management species. Dredging activities could create a short-term decrease in dissolved oxygen. Many, if not all, of the fish species with EFH within the project area would be expected to escape the area during construction activities, and construction disturbances would not be expected to be lethal to any fish species with EFH within the project area.

At the ecosystem level, increased turbidity could result in temporary, reduced ecosystem productivity (ability of the ecosystem to produce and export energy) and nursery value by elimination of organisms that cannot easily flee construction activities, and the displacement of mobile organisms. For individual organisms, turbidity can impair visual predation success, predator avoidance, and an organism's ability to take in oxygen through clogging of respiratory organs. Siltation could alter invertebrate animal communities within the project area. Again, these potential impacts are expected to be short-term and temporary in nature. Mobile animals would likely avoid the area during the construction phase, but likely return once construction is complete and pre-construction conditions return. Benthic organisms would likely recover rapidly post-construction, as most benthic communities are resilient and recolonize quickly after short-term impacts (Ellis, 2009; Dernie 2003). In addition, the dredging activities will occur inclusive of November 16th through April 30th, outside the general spawning and migration period for most species.

4.2 Permanent and Long-Term Impacts

While dredging construction activities and placement of dredged material will create short-term and localized impacts on EFH within the project area, long-term and permanent impacts are expected to be minimal for the Preferred Alternative. The Feeder Channel system and Bay Area

have previously been dredged multiple times dating back to approximately 1970 without noticeable long-term or permanent impacts.

4.3 Managed Species Effects Determination

The maintenance dredging of the Feeder Channel and Bay Area should create minimal localized and short-term effects within the project. Most species are mobile and should be able to avoid the construction activities. This section evaluates impacts to SAFMC, NMFS, and NCDEQ-DMF managed species, but does not included an evaluation of impacts to ASMFC-managed species. ASMFC is primarily a deliberative body, coordinating the conservation and management of states' shared fishery resources.

In general, short-term impacts include potential mortality in earlier life stages for managed species, and some limited displacement and habitat disturbance in later life stages. Long-term impacts are minimal and generally involve the potential disruption of dispersion of early life stage populations (larval and juvenile individuals) within the Feeder Channel and Bay Area. Table 4 provides a summary of both short-term and long-term potential impacts for SAFMC, and NMFS-managed species within the project area.

4.3.1 NCDEQ-DMF Managed Species Impacts

In addition to the SAFMC and NMFS-managed EFH species, NCDEQ-DMF has developed, or is in the process of developing, FMPs for many species found in North Carolina waters, including Bay Scallop, Blue Crab, Estuarine Striped Bass, Hard Clam, Kingfish, Oyster, Red Drum, River Herring, Shrimp, Southern Flounder, Spotted Seatrout, and Striped Mullet. Potential impacts to Red Drum, Kingfish, River Herring, Estuarine Striped Bass, Hard Clams, Bay Scallops, Oysters, Blue Crabs, and Striped Mullet are addressed below.

The Red Drum is an estuarine-dependent species with foraging areas throughout Sunset Beach waters. Red Drum typically arrive in the area in the spring, with a second arrival often occurring in the fall as fish begin a southerly migration from the Mid-Atlantic States. Both juvenile and adult Red Drum may occur in the project area but are mobile enough to avoid construction activities. Kingfish have a similar life history to Red Drum. Juveniles and adult kingfish may occur in the project area, but are a highly mobile species, therefore impacts will be minimal.

River Herring and Estuarine Striped Bass are anadromous (move from the ocean to freshwater to spawn) fish whose adult life stages live in lower estuaries and marine waters. Juveniles and adults are mobile enough to avoid construction disturbance in the project area.

Potential impacts to Hard Clams include increased short-term turbidity and siltation that could clog the respiratory and feeding structures of these bivalve mollusks; limited mortality may occur. In the dredge footprint, habitat alteration for the Hard Clam will be permanent. Mitigation will be offered that will minimize or reduce adverse impacts with a goal of no net loss to Hard Clam populations in the project area.

Table 4. Potential Short-Term and Long-Term Impacts to Project Area EFH Species

Species	Impact Type	Eggs	Larvae	Juveniles	Adults
Penaeid Shrimp (*Penaeus* spp.)	Short-Term Impacts	N/A	Mortality from construction; Displacement and habitat disturbance		Displacement and habitat disturbance
	Long-Term Impacts	N/A	Limited potential disruption of dispersion in waters of Sunset Beach	N/A	
Snapper-Grouper Management Unit	Short-Term Impacts	N/A	Mortality from construction; Displacement and habitat disturbance		Displacement and habitat disturbance
	Long-Term Impacts	N/A	Limited potential disruption of dispersion in waters of Sunset Beach	N/A	
Spiny Lobster	Short-Term Impacts	Mortality from construction		Mortality, displacement and habitat disturbance	
	Long-Term Impacts	Limited potential disruption of dispersion in waters of Sunset Beach		N/A	
Coastal Migratory Pelagic Species	Short-Term Impacts	N/A	Mortality from construction	Displacement and habitat disturbance	
	Long-Term Impacts	N/A	Limited potential disruption of dispersion in waters of Sunset Beach	N/A	
Highly Migratory Species (Sharks, Tuna, Swordfish)	Short-Term Impacts	N/A		Displacement and habitat disturbance	
	Long-Term Impacts	N/A			

Impacts to Oysters and Bay Scallops are expected to be similar to those experienced by Hard Clam populations. However, no Bay Scallops were observed during a field visit in July of 2017 and the sites surveyed did not contain live oyster populations.

Blue Crabs occupy various marine and estuarine habitats throughout their life cycle. Mating occurs in estuaries, followed by spawning near coastal inlets from April to June and August to September in North Carolina. Weather, water quality conditions, proximity to inlets, hours of dark flood tide, and wind direction may impact breeding productivity in Blue Crabs. Short term impacts may occur to eggs and larvae from turbidity and siltation. Juveniles and adults are mobile and would be able to escape construction disturbance.

Striped Mullet is a catadromous (move from freshwater to the ocean to spawn) species that live in fresh and estuarine waters until moving to high salinity estuarine and nearshore marine waters to spawn in winter and early spring. Larvae develop in marine offshore environments, and would not be present within Sunset Beach waters. Immature Striped Mullet move to estuaries during the winter and generally occupy estuarine waters until spawning. Juveniles and adults may be present

near the project area, but are mobile and would be minimally impacted by turbidity, siltation, and noise resulting from construction activities.

5.0 SUMMARY

The maintenance dredging of the Feeder Channel and Bay Area and proposed dredging in south Jinks Creek could likely result in primarily short-term, localized, and temporary adverse effects to EFH and managed species. However, the avoidance of dredging within northern Jinks Creek and ensuring construction measures proposed should keep temporary and localized impacts to a minimum. The proposed maintenance dredging project should not create any permanent, long-term impacts to federally- or state-managed species or EFH. Short-term impacts will include increased localized turbidity, siltation, and noise from construction activities, but most managed species found in this area are highly mobile and likely be able to escape construction disturbance temporarily, eventually returning to the area post-construction. Similarly, impacts to EFH areas such as the water column, benthic substrate, and emergent wetlands may experience short term impacts which will recover over time. Limiting the dredging activities from November 16th through April 30th should also limit the potential for impacts to occur.

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DRAFT BIOLOGICAL ASSESSMENT

Town of Sunset Beach - Navigation Project
Maintenance Dredging of South Jinks Creek,
the Bay Area & the Feeder Canal

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November 2018

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1.0 BACKGROUND

This Biological Assessment (BA) addresses the potential effects of the maintenance dredging and beneficial use placement proposed for South Jinks Creek, the Bay Area, and the Feeder Canal, inclusive of finger canals A-D, in Sunset Beach, NC. The BA evaluates the potential impacts the project may yield on federally protected resources, listed as endangered or threatened under the Endangered Species Act (ESA), and/or their designated critical habitat. Section 7 of the ESA requires a BA if a project, or action, could potentially jeopardize the continued existence of any threatened or endangered species. This includes the potential degradation or destruction of critical habitat believed to support a threatened or endangered species.

The Town of Sunset Beach is proposing to maintenance dredge South Jinks Creek, the Feeder Channel, inclusive of finger canals A-D, and the Bay Area in Sunset Beach, Brunswick County, NC. Sunset Beach lies in Brunswick County, along the southern coastal border of North Carolina, adjacent to Ocean Isle Beach. The proposed project will occur along the eastern border of Sunset Beach, within the interior waters of Tubbs Inlet. Figure 1 shows the proposed project area in relation to Brunswick County.

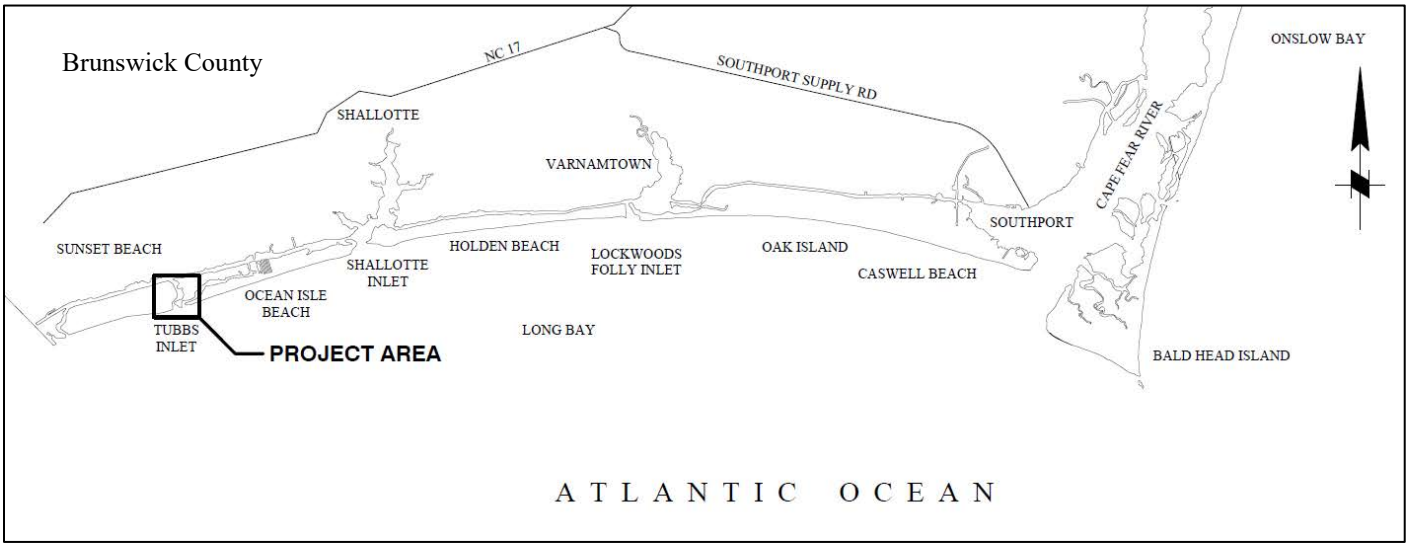

Figure 1. Project Vicinity Map

1.1 Summary of Proposed Project

In recent years, south Jinks Creek has incurred significant shoaling perceivably from tidal flows entering Tubbs Inlet. In addition, the Bay Area and Feeder Channel system, which were developed for recreational boating access, have been subject to infilling from adjacent upland run-off and erosion as well as wind and wave action. The shoaling and material infilling experienced by each waterbody has constricted navigable access in regards to the available width and depth. The current governing width of south Jinks Creek for navigation equals approximately 10 feet and the governing depth is above MLW. The Feeder Canal system and Bay Area are generally not constricted by width, but both maintain a governing depth between -2-ft and -3-ft MLW. The

current shoaling patterns appear likely to continue and could potentially sever recreational access in each of the referenced work areas.

South Jinks Creek comprises a portion of the Jinks Creek connector channel that extends from the Atlantic Intracoastal Waterway (AIWW) to Tubbs Inlet and the Atlantic Ocean. The navigation project will connect the Bay Area and Feeder Channel systems along the southeast portion of Sunset Beach to south Jinks Creek. The Bay Area entails one (1) residential canal and the Feeder Channel system includes one (1) main channel connected to four (4) residential finger canals referenced as Canals A – D. The proposed project will help restore navigation access within these systems while also helping to restore access along Jinks Creek's eastern most shoreline within the Town's jurisdictional limits.

An estimated 40,500 cubic yards (CY) of beach compatible material will be dredged from S. Jinks Creek, and an additional 48,600 CY of non-compatible material will be removed from the Feeder Channel system and Bay Area. The beach compatible material will be hydraulically placed as beneficial reuse along approximately 1,600-ft of shoreline between 5th Street and 12th Street on Sunset Beach. The beneficial reuse material will provide an approximate 275-ft wide average berm with a maximum height of +9.0 MLW (6.1 NAVD). The non-compatible substrate will be mechanically dredged and placed at a permitted upland landfill facility.

South Jinks Creek, the Bay Area, and the Feeder Channel systems have been dredged previously, with the original event occurring approximate to 1970 (Cleary & Marden, 1999). Figures 2 and 3 show aerial photographs from 1966 and 1974 depicting before and after conditions of the initial dredging event. The initial dredging presumably occurred as part of a relocation project for Tubbs Inlet and the development of Sunset Beach. The action occurred prior to 1974 and the establishment of the Coastal Area Management Act (CAMA), so the action did not receive a CAMA Major permit authorization.

The first maintenance event for the feeder channel system occurred in 1985 under CAMA permit 211-85 and a subsequent maintenance occurred in 2002 under CAMA permit 45-02. The proposed action will be the first known maintenance event for south Jinks Creek and the Bay Area since the initial dredging approximate to 1970.

The proposed maintenance dredging will help establish and maintain a navigational channel for access to the residential docks along the east end of Sunset Beach. Sediment runoff from storm events has most likely impaired access through the Bay Area and Feeder Channel while shoaling from sediment transport has impaired navigation in south Jinks Creek. As a result, the Town of Sunset Beach has proposed the maintenance operations as part of a long-term management strategy to maintain navigation access for small recreational vessels through the waterbodies. However, future maintenance operations will be requested through separate permit applications.

Figure 2. Tubbs Inlet 1966 (Originally printed in Cleary & Marden, 1999)

Figure 3. Tubbs Inlet 1974 (Originally printed in Cleary & Marden, 1999)

Figure 4 provides a planview of the proposed maintenance dredging project as described above. The design template for the Feeder Channel follows the same alignment as proposed under permit 45-02 with small adjustments to avoid the existing marsh grass. In addition, the design depth for the proposed action has been raised from -5.27 MLW to -5 MLW. Raising of the design depth should help to simplify the construction process and reduce the potential for adverse impacts. The dredging proposal includes a 1-ft allowable overdredge template to provide a buffer for maneuvering the construction equipment within the work area. Therefore, the maximum dredge depth in the Feeder Channel extends to -6-ft MLW, inclusive of the proposed 1-ft allowable overdredge template. Within the finger canals the maximum dredge depth raises to -5-ft MLW, inclusive of the 1-foot overdredge tolerance.

The proposed template for the finger canals maintains a constant 20-ft width. This represents a reduction from the 2002 permitted template, which provided a varying width between 20-ft & 30-ft. The reduction in width helps provide adequate clearance between the proposed channel and the existing residential docks. In many instances, the navigable waterway through finger canals A-D remains even less than 20-ft wide. Therefore, the dredge equipment most likely will not be able to access the full channel even with the reduced 20-foot width. Although the docks may be moved

by the private homeowners to help facilitate construction, expectations suggest the docks would be returned to their original position after the maintenance event. Therefore, there would be little public benefit in providing more than a 20-foot channel through the residential waterway.

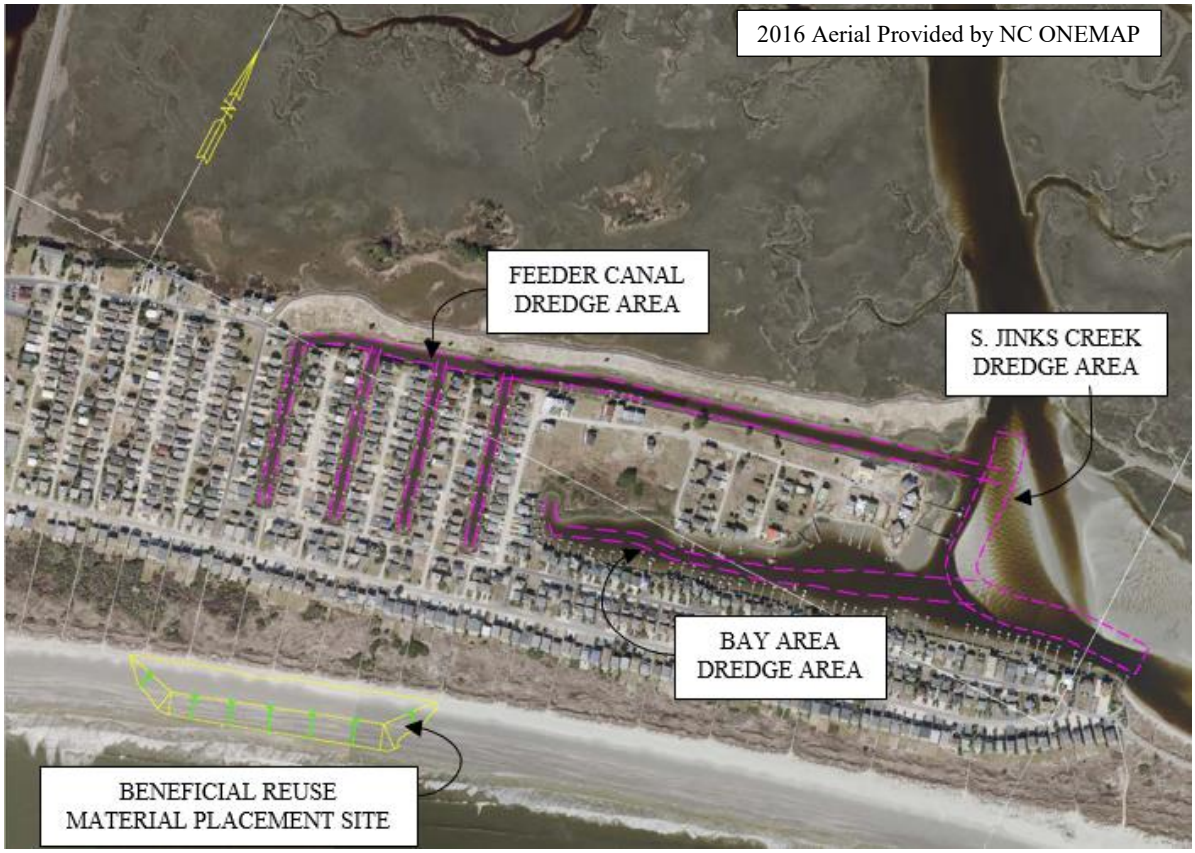

Figure 4. South Jinks Creek, the Bay Area, and Feeder Channel Work Areas

The dredge template for the Bay Area initiates with an 80-ft width at the connection with South Jinks Creek. The template reduces gradually to 20-ft progressing towards the Bay Area terminus. The larger width proposed for the Bay Area entrance should help control sediment shoaling during tidal influences by providing additional storage capacity within the dredge alignment. The template decreases in width to approximately 40-ft roughly 800-ft into the Bay Area. The minimized template helps reduce the potential for unexpected impacts while also attempting to balance the navigational need of the Bay Area residents. The maximum dredge depth for the Bay Area matches the Feeder Channel at -6-ft MLW for the complete system. The maximum dredge depth includes the 1-ft overdredge allowance provided from the design depth (-5 MLW) for maneuvering the dredge equipment. A summary of the dredge templates is provided in Table 1.

The dredge material from the Feeder Channel and Bay Area will be mechanically dredged and trucked to a permitted landfill facility. Sediment tests show the material is not beach compatible in accordance with the North Carolina Administrative Code (NCAC). As a result, the upland landfill facility entails the most practical end use location identified for the dredge spoil. The template for south Jinks Creek also maintains the -6 MLW maximum dredge depth. The south Jinks Creek material meets the NCAC criterial for beneficial reuse and will be hydraulically dredged and placed between 5th Street and 12th Street on Sunset Beach.

The dredging operations will be conducted during the months of November 16th thru April 30th to reduce the potential for environmental impacts. In addition, the dredge footprint will be minimized to provide a minimum 10-ft buffer from any coastal marsh identified at the time of construction. The 6,500-ft hydraulic pipeline carrying the beneficial reuse material dredged from S. Jinks Creek will also be positioned away from any established dune or beach vegetation. These items are a few of the precautions proposed to help minimize the potential for environmental impacts on this project.

Table 1. Dredge Template Description

Area	Existing Avg. Depth (MLW-ft)	Proposed Depth (MLW-ft)	Length (ft)	Width (ft)	Side Slope (H:V)	Est. Volume (CY)	Placement Location
Feeder Channel	-3 MLW	-6 (-5+1) MLW	3,500	30 – 40	3:1	22,000	Landfill
Finger Canals A-D	-2 MLW	-5 (-4+1) MLW	3,200	20	3:1	10,700	Landfill
Bay Area	-2 MLW	-6 (-5+1) MLW	2,200	20 – 80	3:1	15,900	Landfill
S. Jinks Creek	- 1.5 MLW	-6 (-5+1) MLW	1,750	100	5:1	40,500	Beneficial Reuse (5th–12th St)
TOTAL			**10,650**	**Varies**	**Varies**	**89,100**	**Varies**

The maintenance dredging will remove approximately 89,100 CY of mixed beach compatible and non-compatible material. The beach compatible material will be placed as beneficial reuse along approximately 1,600-ft of shoreline between 5th Street and 12th Street to enhance an approximate 275-ft wide berm at elevation +9 MLW (+6.1 NAVD) on Sunset Beach. However, the non-compatible material will be excavated and trucked to an upland permitted landfill facility. Table 2 shows the material quantity estimated for removal from each work area.

Table 2. Estimated Dredge Volumes and Placement Locations

Work Area	Dredge Quantity	Sediment Classification	Placement Location
Feeder Channel & Finger Canals	32,700 CY	Non-Compatible	Upland
Bay Area	15,900 CY	Non-Compatible	Upland
South Jinks Creek	40,500 CY	Beneficial Reuse	Between 5th & 12th St on the Sunset Beach shoreline
TOTAL	89,100 CY		

Note: Estimated volumes include the 1-ft tolerance for maneuvering the dredge equipment.

The dredge template provides a 1-ft tolerance below the design depths to maneuver the dredge equipment in a manner sufficient to complete the work. Therefore, the maximum dredge depth for the maintenance operations equals – 6-ft (-5+1) MLW within south Jinks Creek, the Bay Area, and the Feeder Channel. The maximum dredge depth decreases to -5-ft (-4+1) MLW within finger canals A-D, which adjoin to the Feeder Channel.

1.2 Construction Methods

The construction methodology will vary for each work area based on the dredge material composition. The methods implemented for south Jinks Creek will vary from the methods used for the Feeder Channel system and the Bay Area as described below.

South Jinks Creek

The material within south Jinks Creek will be hydraulically dredged and placed along the shoreline between 5th Street and 12th Street on Sunset Beach. The material will be used to enhance a 1,600-ft long and 275-ft wide beach berm system and will be placed to a maximum elevation of +9.0-ft MLW (+6.1-ft NAVD). The south Jinks Creek material meets the minimum standards required for beneficial reuse in accordance with the NC standards for beach compatibility. A total of 26 sediment samples were collected from the proposed dredge area (borrow area) in efforts to define the beach compatible material. The calculated sediment characteristics from the dredge area were compared with composite characteristics of 65 samples analyzed from the recipient beach. Table 3 below shows the analysis results for the dredge material and recipient beach in accordance with the NCAC 15a 07h.0312.

Table 3. Sediment Comparison (South Jinks Creek & Recipient Beach)

Analysis Area	Gravel (%)	Granular (%)	Sand (%)	Fines (%)	Calcium Carbonate
South Jinks Creek	0.00%	0.00%	96.63%	3.37 %	16%
Recipient Beach	0.07 %	0.55 %	98.15%	1.23%	2%

Note: Sediment classifications determined in accordance with NCAC 15a07h.0312.

The hydraulic dredging work will be conducted on a 24-hr per day schedule by a cutterhead dredge between November 16th and April 30th, in accordance with the USFWS August 2017 Statewide Programmatic Biological Opinion (SPBO). The beneficial reuse material will be transported through an approximate 6,500-ft hydraulic pipeline for beach placement. Floating pipeline will most likely be required immediately behind the hydraulic dredge plant and will have reflectors or lights as recommended by the USCG. Once the floating pipeline traverses landward of the MHW line, it will not be allowed to meander back into navigable waters. However, the shore pipe may be forced to cross navigable waterways at the Bay Area and Feeder Channel confluence with Jinks Creek. The pipeline will be anchored to the channel bottom to avoid a marine hazard at each crossing. The pipeline will also cross the waterways perpendicular to the directions of travel to minimize the pipeline length within the navigation channel. The pipeline will be anchored in the deepest depth available to not block navigation and will have buoys attached approximately every 25-feet along each crossing. Signage will also be provided and visible from both directions of travel to mark the pipeline crossing.

Along the beachfront, the pipeline will be located as close to the dune as reasonable without traversing over beach grass or other established vegetation. Markings shall be installed along the pipe to warn beach goers to use caution around the pipeline and to remain off the equipment. Sand ramps will also be constructed at each designated beach access for pedestrian crossings. The ramps may also be used for emergency beach access by the Town or construction related access for the Contractor.

The beneficial reuse material placement will occur directly on the sandy beach, seaward of the primary dune system. Sand dikes, or berms will be constructed as needed to help limit turbidity. The dikes will be constructed parallel to the beach front to direct the dredge slurry along the beach. This process will allow the beneficial reuse material to settle on the beach instead of entering the Atlantic Ocean. In addition, the project will implement the recommended SPBO conservation measures.

1.3 Feeder Channel, Finger Canals, & Bay Area

Dredging operations in the Feeder Channel, including the adjoining finger canals A-D, and the Bay Area will be conducted by a clamshell or bucket dredge / excavator also between November 16th and April 30th. Dredging activities for the mechanical equipment will extend through day light hours but will not entail night time operations. Material will be dredged from the respective waterbody and placed on a barge or other floating work plant. The material will be transported to an offloading site designated at the end of Cobia Street within the Feeder Channel. The material will then be placed in a truck or carrying apparatus for transportation to the upland landfill facility.

A backhoe or excavator will move the material from the barge to the truck or other hauling equipment. The trucks or hauling equipment shall be configured to prohibit spillage during material transport. The roadways or travel ways used for material transport shall be inspected during and after each delivery to the landfill site. Any spillage noted shall be immediately cleaned and removed from the roadways. In addition, any equipment found to be continuously leaking material onto public roadways shall be removed from the project until such time repairs or modifications can be made to facilitate clean and spill fill material transport.

2.0 LISTED SPECIES AND CRITICAL HABITAT IN THE PROJECT AREA

This assessment considers federally listed species that may occur within the project area; including the North Atlantic right whale, humpback whale, West Indian manatee, piping plover, red knot, wood stork, sea turtles (loggerhead, green, leatherback, Kemp's ridley, and hawksbill), Atlantic and shortnose sturgeon, and seabeach amaranth. This BA also addresses effects on designated and proposed critical habitats within the action area; including critical habitat for the piping plover Atlantic Coast wintering population, terrestrial and marine critical habitats for the loggerhead sea turtle and proposed North Atlantic right whale critical habitat. Based on a detailed evaluation of the effects of beneficial use sand placement on Sunset Beach and dredging operations within South Jinks Creek, the Feeder Canals and Bay Area; determinations of effect for the species and critical habitats considered are as follows:

Table 4. Threatened & Endangered Species that may occur within the project area

Species		Listing Status			Effects Determination
Scientific Name	**Common Name**	**Federal Status**	**Record Status**	**Habitat Present**	
Chelonia mydas	Green sea turtle	T	Current	Yes	NE
Eretmochelys imbricate	Hawksbill sea turtle	T	Historic	Yes	NE
Lepidochelys kempii	Kemp's (Atlantic) ridley sea turtle	E	Current	Yes	MANLAA
Dermochelys coriacea	Leatherback sea turtle	E	Current	Yes	MANLAA
Caretta caretta	Loggerhead sea turtle	T	Current	Yes	MANLAA
Charadrius melodus	Piping plover	T	Current	Yes	MANLAA
Picoides borealis	Red-cockaded woodpecker	E	Current	No	NE
Calidris canutus rufa	Red knot	T	Current	Yes	MANLAA
Trichechus manatus	West Indian manatee	E	Current	Yes	NE
Mycteria americana	Wood stork	T	Current	Yes	NE
Thalictrum cooleyi	Cooley's meadowrue	E	Current	No	NE
Lysimachia asperulaefolia	Rough-leaved loosestrife	E	Current	No	NE

Species		Listing Status			Effects Determination
Scientific Name	**Common Name**	**Federal Status**	**Record Status**	**Habitat Present**	
Amaranthus pumilus	Seabeach amaranth	T	Current	Yes	MANLAA
Acipenser oxyrinchus oxyrinchus	Atlantic sturgeon (Carolina DPS)	E	Current	No	NLAM
Acipenser brevirostrum	Shortnose sturgeon	E	Current	No	NE
Eubalaena glacialis	North Atlantic right whale	E	Current	No	NE
Loggerhead Marine and Terrestrial CH					NE
Piping Plover Wintering CH					NLAM
Proposed North Atlantic Right Whale CH					NLAM

Source: USFWS, 2015; NMFS, 2017; KEY: E = endangered, T = threatened; MANLAA = may affect, not likely to adversely affect; LAA = likely to adversely affect; NLAM = Not likely to adversely modify; NE = no effect

3.0 SPECIES NOT LIKELY TO OCCUR IN THE PROJECT AREA

The following discussion addresses the listed species considered not likely to occur within the project site due to lack of appropriate habitat. This includes the following species:

- Red-Cockaded Woodpeckers
- Cooley's Meadowrue
- Rough-leaf loosestrife
- Shortnose sturgeon
- North Atlantic Right Whale

3.1 Red-Cockaded Woodpecker

Red-Cockaded Woodpeckers (*Picoides borealis*) require open, mature, and old growth pine habitats. Roosting trees generally must be at least 60-120 years old, depending on species of pine. Foraging habitat is provided in pine and pine hardwood stands 30 years old or older with foraging preference for pine trees 10 inches or larger in diameter. In good, moderately-stocked, pine habitat, sufficient foraging substrate can be provided on 80 to 125 acres (USFWS 2003). Since these types of terrestrial habitat are found well inland of the proposed project area, the analysis does not consider impacts to the red-cockaded woodpecker likely to occur because of project construction.

3.2 Vegetative Species

Cooley's meadowrue (*Thalictrum cooleyi*) is known from North Carolina, Georgia, and Florida. The North Carolina populations are located in Brunswick, Columbus, Onslow, and Pender counties. Cooley's meadowrue occurs on circumneutral soils in grass-sedge bogs and wet pine savannahs and savannah-like areas. It may also grow along fire-plow lines, in roadside ditches,

woodland clearings, and powerline rights-of-way. Disturbance of some kind is usually required to maintain open habitat for Cooley's meadowrue (USFWS 1994). The habitat within the Feeder Canal and Bay Area generally consists of fine grain sediment, muck, and coastal marsh. These areas generally do not meet the documented criteria for the Cooley meadowrue habitat. Therefore, the species most likely will not occur within the project area and has been removed from further analysis.

Rough-leaf loosestrife (*Lysimachia asperulaefolia*) is endemic to the coastal plain and sand hills of North Carolina and South Carolina. Habitat for rough-leaf loosestrife generally occurs in the ecotone between longleaf pine or oak savannas and wet, shrubby areas containing moist, sandy, or peaty soils and low vegetation. The grass-shrub ecotone, where rough-leaf loosestrife generally occurs, is fire-maintained, as are the adjacent plant communities (longleaf pine – scrub oak, savanna, flatwoods, and pocosin). Several populations are known from roadsides and power line rights-of-way where regular maintenance mimics fire and maintains vegetation so that herbaceous species are open to sunlight (USFWS 1995). The habitat within the Feeder Canal and Bay Area consists of fine grain sediment, muck, and coastal marsh and generally does not meet the documented criteria for the rough-leaf loosestrife habitat. Therefore, the species most likely will not occur within the project area and has been removed from further analysis.

3.3 Shortnose sturgeon

The shortnose sturgeon *(Acipenser brevirostrum)* was listed as endangered under the Endangered Species Preservation Act in March 1967 (32 FR 4001) (ESA). The species inhabits large Atlantic coast rivers from New Brunswick, Canada south to northeastern Florida. Adults in southern rivers are estuarine anadromous, foraging at the freshwater-saltwater interface and moving upstream to spawn in the early spring. Shortnose sturgeons spend most of their life in their natal river systems and rarely migrate to marine environments. Spawning habitats include river channels with gravel, gravel/boulder, rubble/boulder, and gravel/sand/log substrates.

Shortnose sturgeon are not expected to be present in the areas where the proposed action is occurring. Prior assumptions were that shortnose sturgeon tended not to leave riverine waters (i.e., venture beyond the freshwater-saltwater interface); however, in a recent report by the South Carolina Division of National Resources (DNR) and Georgia DNR, the species was detected as far as 12.4 mi from the mouths of their spawning rivers in those states. While spawning data is lacking for the rivers in North Carolina, the project area is located much greater than 12.4 mi from the mouth of any major river that may be used for spawning (i.e., Neuse River and Cape Fear River). Therefore, we believe the proposed action will have no effect on shortnose sturgeon.

3.4 North Atlantic Right Whale

Right whales were listed as endangered under the Endangered Species Conservation Act in June 1970 and were subsequently listed as endangered under the ESA in 1973. Based on a census of individual whales identified through photo-identification techniques, the best estimate of catalogued North Atlantic right whales in 2012 was 510 individuals (Pettis 2013). North Atlantic right whales calve in warm subtropical waters during winter and migrate to feed in highly productive cold temperate and subpolar waters in spring and summer (Green and Pershing 2004). Waters along the southeastern US coast constitute the only known calving habitat for North Atlantic right whales (Kraus et al. 1986, Knowlton et al. 1994, Reeves et al. 2001). Based on effort-corrected sightings data, the densest distribution of observed right whale mother-calf pairs

is generally in waters of the inner shelf between St. Augustine, Florida and just south of Savannah, Georgia. However, recent aerial survey data indicate calving and nursing occur as far north as NC (Good 2008, McLellan et al. 2004). Reproductive females typically arrive in the calving areas during late November and early December after migrating south from feeding grounds in the northeastern US and Canada (Fujiwara and Caswell 2001, Garrison 2007, Hamilton et al. 2007). Mothers and newborn calves reside within the southeast through winter and generally depart the calving grounds by the end of March or early April (Reeves et al. 2001). There is relatively little information on the geographic and temporal extent of the migratory corridor (Firestone et al. 2008, Schick et al. 2009). A review of sightings data collected in the mid-Atlantic found that 94 percent of all right whale sightings were within 56 kilometers from shore (Knowlton et al. 2002).

Currently designated critical habitat units for the right whale include northeastern feeding grounds in the Gulf of Maine/Georges Bank region, and southeastern nearshore ocean calving habitats from central Florida to Cape Fear, NC [81 Federal Register (FR) 4838] (Figure 5). The essential features of the southeastern calving critical habitat area include physical oceanographic conditions that support calving and nursing; including calm sea surface conditions, sea surface temperatures of 45 degrees (°) Fahrenheit (F) to 63°F, and water depths of 20 ft to 92 ft. The essential features of the northern critical habitat areas include physical and biological features that provide optimal foraging areas with an abundance of the right whales' preferred copepod prey.

Proposed dredging operations within the project area would coincide with migration and calving periods along the NC coast. Project-related dredging could potentially affect right whale through vessel strikes and/or acoustic disturbance. However, dredging operations would be confined to waters inshore of the COLREGS line, and thus would not be expected to result in any direct or indirect interactions with right whales, therefore the right whale is not considered further in this assessment. Underwater noise produced by dredging in South Jinks Creek and the Bay Area may propagate into the open ocean but would not be expected to reach the thresholds described above for injurious (≥180 dB re 1µPa rms) or behavioral (≥120 dB re 1µPa rms) effects on cetaceans.

The essential features of proposed right whale critical habitat within the project area are those associated with optimal calving habitat; including calm sea surface conditions, sea surface temperatures of 45°F to 63°F, and water depths of 20 ft to 92 ft. Proposed inshore dredging and beach fill placement operations would not affect any of these essential features.

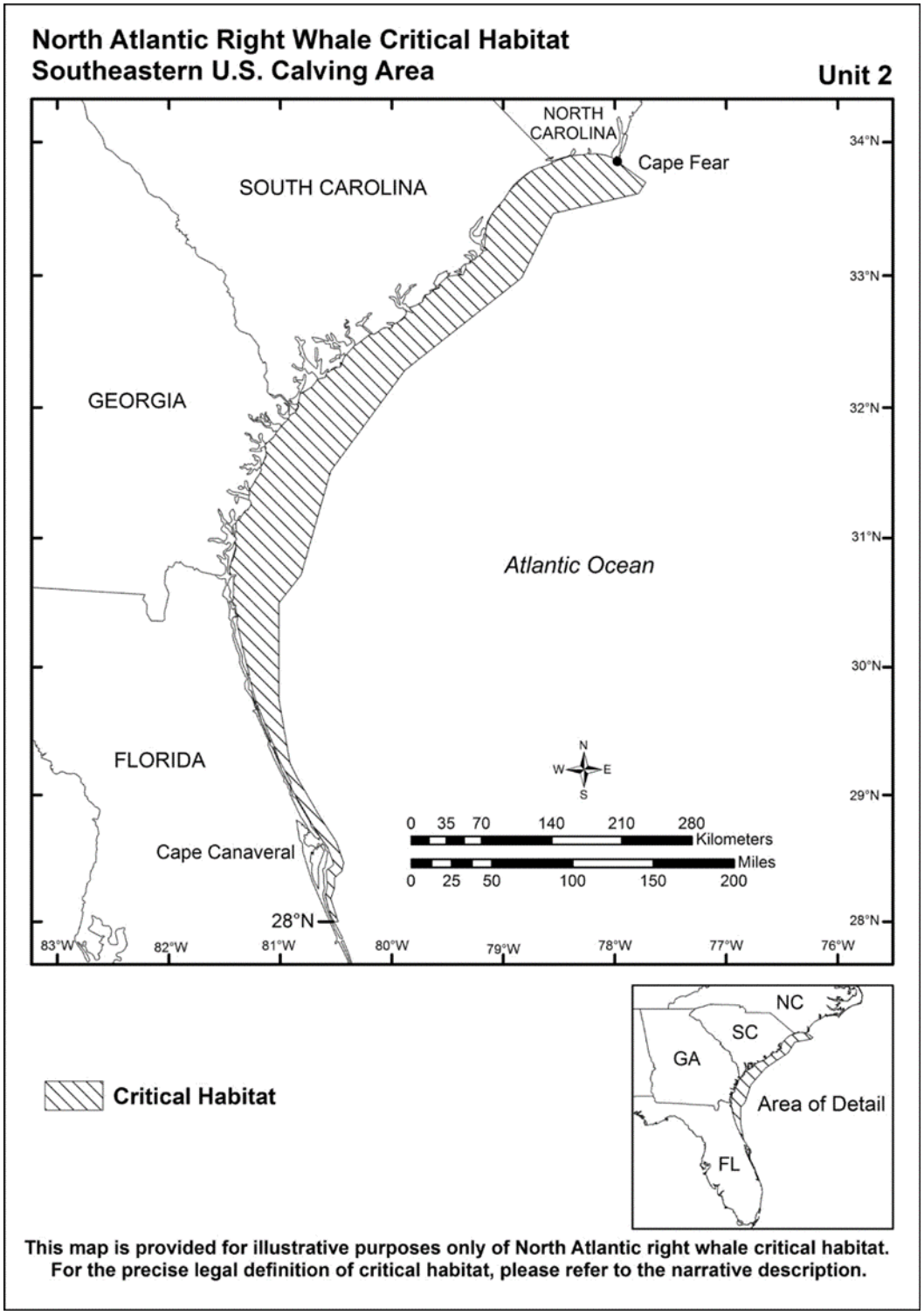

Figure 5. North Atlantic Right Whale Southeastern Calving Critical Habitat (Source: 81 FR 4838).

4.0 SPECIES THAT MAY OCCUR IN THE PROJECT AREA

The following discussion addresses listed, or endangered species generally considered likely to frequent the project site along with general construction practices proposed to help minimize potential impacts. This includes the following species:

- Sea Turtles
- Piping plover
- Red knot
- Wood Stork
- Atlantic sturgeon
- West Indian Manatee
- Seabeach amaranth

4.1 Sea Turtles

Green Sea Turtle (*Chelonia mydas*)

The green sea turtle (*Chelonia mydas*) has been documented to occur in coastal areas of Dare, Onslow, New Hanover, and Brunswick Counties of North Carolina. Green sea turtles are generally found in shallow waters (except when migrating) inside reefs, bays, and inlets. The green turtle is attracted to lagoons and shoals with an abundance of marine grass and algae. No SAV beds have been identified in Brunswick County, including the project area. Inspections of the project area occurred during October 2016 as part of alternate field work efforts to conduct a shellfish survey. Open beaches with a sloping platform and minimal disturbance are required for nesting.

Green sea turtles nest in relatively small numbers along the NC coast, with reported nesting from 2000 through 2016 averaging 18 nests per year. According to the SPBO (USFWS 2017), no green sea turtles have nested within the project area, however, 13 nests have been documented along southern NC beaches to Caswell Beach (approximately 31 shoreline miles) between 2000 and 2016 (4% statewide).

Critical habitat for the green sea turtle has been designated for the waters surrounding Culebra Island, Puerto Rico, and its outlying keys (63 FR 46693). No designated critical habitat is present in the project area.

Hawksbill sea turtle (*Eretmochelys imbricate*)

The hawksbill sea turtle was listed as endangered throughout its range on 2 June 1970 (35 FR 8491). Nesting occurs on sandy beaches throughout the tropical and subtropical regions of the Atlantic, Pacific, and Indian Oceans. Nesting in the US is primarily limited to Florida and the US Caribbean on beaches throughout Puerto Rico and the US Virgin Islands (NMFS and USFWS 1993). Marine and nesting critical habitat for the hawksbill sea turtle have been designated in Puerto Rico along the islands of Mona, Monito, Culebrita, and Culebra (63 FR 46693). Rare nesting events in the continental US are essentially restricted to the southeastern coast of Florida and the Florida Keys (Meylan 1992; Meylan et al. 1995), although two hawksbill nests were recently confirmed in NC (NPS 2015d). Sightings have been recorded from a handful of counties in North Carolina, but the turtle is not known to breed in the state, and there are no known occurrences of this species recorded from Brunswick County or near the project area (NCNHP 2017).

Kemp's ridley sea turtle (*Lepidochelys kempii*)

While sightings of the Kemp's ridley sea turtle (*Lepidochelys kempii*) in North Carolina remain rare, the occurrences may be on the rise. This species prefers shallow coastal waters. USFWS indicates sightings of this species has only occurred in Pamlico County within the past 20 years (USFWS, 2003). As a result, no sightings of this species have been recorded in the vicinity of the project area (NCNHP 2017).

Leatherback sea turtle (*Dermochelys coriacea*)

Leatherbacks (*Dermochelys coriacea*) are distributed world-wide in tropical waters of the Atlantic, Pacific, and Indian oceans. They are generally open-ocean species and may be common off the North Carolina coast during certain times of the year. However, in northern waters leatherbacks are reported to enter bays, estuaries, and other inland bodies of water. Major nesting areas occur mainly in tropical regions. In the United States, primary nesting areas are in Florida; however, nests are known from Georgia, South Carolina, and North Carolina as well. The project area consists of two small interior channels and most likely could not support habitat suitable for a Leatherback. No known sightings of the Leatherback have been recorded near the project area (NCNHP 2017).

Loggerhead sea turtle (*Caretta caretta*)

The loggerhead sea turtle (*Caretta caretta*) is distributed widely in its range, including the entire North Carolina coast. It is often found hundreds of miles out to sea but can also be found in inshore areas such as bays, lagoons, salt marshes, creeks, ship channels, and the mouths of large rivers. Feeding areas are typically coral reefs, rocky places, and ship wrecks (USFWS 2003). The substrate of the Feeder Canal and Bay Area generally consist of soft muck or fine sediment and most likely would not be considered ideal habitat for the loggerhead. Young loggerheads are often found in SAV beds and nesting occurs mainly on open beaches or along narrows bays with suitable soil (USFWS 2003). Loggerhead sightings near the project area have occurred over the past several decades (NCNHP 2017). Individual turtles may utilize the Feeder Canal and Bay Area temporarily during migration events. However, the species generally would not be expected during the colder winter months of October through March, when the proposed dredging will occur.

Loggerhead nesting occurs along the entire NC coast; however, nesting is concentrated along three sections of the coast: the Cape Fear region (Holden Beach, Oak Island, Caswell Beach, Bald Head Island, and Fort Fisher), Topsail Island and Onslow Beach, and the barriers that comprise from Shackleford Banks north to Bodie Island. Collectively, these three sections of the coast accounted for 83% of all loggerhead nesting in NC from 2000 through 2016. Based on data provided by NCWRC approximately 225 loggerhead nests have been laid on Sunset Beach between 2000 and 2018 with 2000 as a peak year with 28 nests (Appendix A – Sunset Beach Sea Turtle Data). Average annual density (nests/mile) along the 10 miles of oceanfront shoreline of Sunset Beach is 3.4. Beneficial placement of beach compatible material will take place during the environmental window of 16 November – 30 April, thereby avoiding nesting period of 1 May to 15 September. No designated critical habitat is present in the project area.

4.2 Shorebirds

Piping Plover

Piping Plovers (*Charadrius melodus*) have nests consisting of shallow scraped depressions in the sand lined with shell fragments and little or no adjacent vegetation (Cohen *et al*., 2008; USFWS 1996). Piping plovers breed in three discrete geographic areas: the Atlantic Coast from NC to Newfoundland, the Great Lakes region, and the Northern Great Plains region. Members of the Atlantic Coast breeding population arrive on the breeding grounds and initiate courtship in late March and early April. In NC, the breeding season extends from April through August. Nests in NC may be found mid-to-late April and continue to nest through late May and early June. Chicks and fledglings may be found May through August. Wintering plovers on the Atlantic coast are found at accreting ends of barrier islands, along sandy peninsulas, and near coastal inlets. Preferred foraging habitats include sandflats adjacent to inlets or passes, sandy mudflats along prograding spits, and overwash areas. Roosting sites generally include inlet and adjacent ocean and estuarine shorelines and nearby exposed tidal flats (USFWS 1996). Since the project area excludes these types of habitat, construction impacts most likely will not occur to piping plover. In addition, construction will occur between October 1st and March 31st, outside the species general nesting period.

Red Knot

Red knots (*Calidris canutus rufa*) breed in the central Canadian Arctic and occur in three main wintering groups: short distance migrants that winter in the southeastern U.S., medium distance migrants that winter on the northern coast of Brazil, and long-distance migrants that winter in Tierra del Fuego (southern tip of South America) (Niles *et al*., 2012). In the southeastern U.S., red knots overwinter primarily in FL and GA (Niles *et al.*, 2008). However, red knots are known to winter as far north as VA (Niles *et al*., 2012). Major stopover sites during the southbound migration include MA, CT, and RI. During the northbound migration, stopover sites along the U.S. Atlantic coast include the primary stopover in Delaware Bay although some red knots stop farther south between VA and FL (Gillings *et al*., 2009; Niles *et al*., 2008). In NC, red knots use the Outer Banks as a stopover site during spring and fall migrations. In some cases the Outer Banks has also served as an overwinter site to migrating red knots (Niles *et al*., 2012; Dinsmore *et al*., 1998). Red knots are most abundant in NC during the spring migration (April-June), with the highest concentration generally observed in May.

Preferred wintering and migration habitats include muddy or sandy coastal areas, particularly the mouths of bays and estuaries and unimproved tidal inlets and tidal flats. Wintering habitat in the southeastern U.S. also includes peat banks, salt marshes, brackish lagoons, and mangroves. In this region, red knots forage along sandy beaches, in tidal mudflats, along peat banks, and along barrier islands (Niles *et al*., 2008). Preferred prey in nonbreeding habitats include horseshoe crab eggs, snails, clams, and crustaceans (Cohen *et al.,* 2010; Niles *et al*., 2008; Tsipoura and Burger, 1999).

Although the project area contains habitat suitable for red knot foraging activities, the construction operations will generally occur below mean low water (MLW) during the months of October through March. Occurrence of the red knot within the construction area remains unlikely considering the activities timing and location. Sediment deposition will occur within an upland

material management site through hydraulic discharge of dredge spoil. However, impacts to the red knot remain unlikely due to the slow velocity and accumulation of the effluent material.

4.3 Wood Stork

Wood storks (*Mycteria americana*) are not true migrants, but they generally disperse following breeding. Beginning in late May, following breeding in FL, most fledglings, immatures, and adults disperse in peninsular FL and northward (Coulter *et al*., 1999). The non-breeding season range extends to eastern MS and includes the above-mentioned areas as well as the rest of FL and the coastal plains and large river systems of AL (79 FR 37078). Wood storks sighted farther west are likely part of the Mexican/Guatemalan populations. However, some population mixing may occur (Bryan *et al*., 2008).

Wood storks use a wide variety of freshwater and estuarine wetlands for nesting, feeding, and roosting sites. Nesting colony sites are in freshwater and marine-estuarine forested habitats, primarily in cypress swamps. However, depending on the location, colony sites may consist of other plants, such as dead oaks, mangroves, cactus, black gum, willow, and buttonbush (Coulter *et al*., 1999). Feeding habitat consists of natural and artificial wetlands where prey species are available and water depths are appropriate (<50 cm) (Coulter *et al*., 1999). However, wood storks are also known to feed in shallow brackish and saltwater pools and channels (LeGrand, 2013). Wood storks also use man-made wetlands for foraging and breeding. Some of these man-made wetlands include storm water treatment areas and ponds, golf course ponds, borrow pits, reservoirs, roadside ditches, agricultural ditches, drainages, flow-ways, mining and mine reclamation areas, and dredge spoil sites (USFWS 2007). Roosting sites are generally in trees over water, but storks may also rest on the ground close to feeding sites (Coulter *et al.,* 1999).

Sightings of wood storks made during the summer of 2017 confirms the species presence near the project area. However, the dredging activities will occur during the months of October through March, outside of the general migration period for wood storks in NC. In addition, recreational water vessels utilize the construction area on frequent basis and further discourage the constant presence of the wood stork. Therefore, this analysis considers impacts to this species not likely to occur.

4.4 West Indian Manatee

West Indian manatees (*Trichechus manatus*) occur in shallow waters generally close to shore in estuarine and river mouth habitats (Rathbun et al., 1982). Preferred feeding habitats include shallow seagrass beds close to deep channels in coastal and riverine habitats (e.g., Lefebvre et al., 2000; USFWS 2001a). West Indian manatees are frequently located in secluded canals, creeks, embayments, and lagoons near the mouths of coastal rivers and sloughs. These areas serve as locations of feeding, resting, mating, and calving (USFWS 2001). Estuarine and brackish waters, including natural and artificial freshwater sources, are typical West Indian manatee habitat (USFWS 2001a). West Indian manatees rarely occur in offshore waters where abundant seagrass and vegetation are not available (Reynolds III and Odell, 1991); however, sighting and tracking

data indicate that some animals have ventured offshore (e.g., Reynolds III and Ferguson, 1984; Lefebvre et al., 2001; Alvarez-Alemán et al., 2010). Critical habitat is designated for the West Indian manatee in FL (41 FR 41914).

The West Indian manatee occurs in warm, subtropical, and tropical waters of the western North Atlantic from the southeastern U.S. to Central America, northern South America, and the West Indies (Lefebvre *et al*., 2001). During winter months, the FL population confines itself to inshore and inner shelf waters of the southern half of peninsular FL where they utilize warm-water springs, heated industrial effluents, and other warm-water sites (Laist *et al*., 2013; Lefebvre *et al.,* 2001). As water temperatures rise in spring, West Indian manatees disperse from winter aggregation areas. West Indian manatees are frequently reported in coastal rivers of GA and SC during warmer months (Lefebvre *et al*., 2001), and have been sighted as far north as MA (Beck 2006).

The project area does not provide potential foraging habitat for manatees. Although, NCNHP shows sporadic occurrences of manatee in the project vicinity over the past several decades (NCNHP 2017). The northern limit of the manatee's range extends to North Carolina, but low temperatures prevent this species from commonly occurring in the area. The rarity of its occurrence in the vicinity of the project area makes impacts to this species unlikely (USFWS 2008). In addition, construction operations will occur during the months of October through March, when cooler water temperatures will further discourage the manatee presence. Further precautions to be implemented to help avoid impacts to the West Indian manatee include following the manatee avoidance measures published by USFWS. Appendix B provides the referenced precautionary measures.

4.5 Atlantic sturgeon

The Atlantic sturgeon (*A.* oxyrinchus oxyrinchus) was listed under the ESA on 6 February 2012 (77 FR 5914, 77 FR 5880). The NMFS recognizes five Distinct Population Segments (DPSs); including four that are listed as endangered (New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs) and one (Gulf of Maine DPS) that is listed as threatened. The Carolina DPS encompasses Atlantic sturgeons from the Roanoke, Tar/Pamlico, Cape Fear, Waccamaw, Pee Dee, and Santee-Cooper Rivers. The spawning population in each of these river systems is thought to number less than 300 adults [Atlantic Sturgeon Status Review Team (ASSRT) 2007]. Atlantic sturgeons spawn in freshwater but spend most of their adult life in the marine environment. Spawning adults generally migrate upriver in the spring/early summer (Smith and Clugston 1997). Spawning is believed to occur in flowing water between the salt front and fall line of large rivers. Post-larval juveniles move downstream into brackish waters and eventually move to estuarine waters where they reside for a period of months or years (Moser and Ross 1995). Subadult and adult Atlantic sturgeons emigrate from rivers into coastal waters where they may undertake long range migrations. Migratory subadult and adult sturgeon are typically found in shallow (10 to 50 m) nearshore waters with gravel and sand substrates (Collins and Smith 1997, Stein et al. 2004). Although extensive mixing occurs in coastal waters, Atlantic sturgeons return to their natal river to spawn (ASSRT 2007). In NC, spawning occurs in the Roanoke, Tar-Pamlico, and Cape Fear River systems and possibly in the Neuse River (ASSRT 2007).

The Atlantic sturgeon occurs in the Cape Fear River system east of the project area. Based on incidental capture data from tagging cruises, shallow nearshore ocean waters along the NC coast

may represent a winter (January-February) aggregation site for Atlantic sturgeons (Laney et al. 2007). Incidental captures typically occurred over sand substrate in nearshore waters that were less than 59 ft deep. Based on previous communication with NOAA Fisheries, occurrences of Atlantic sturgeons are not expected in the inshore waters of the action area; however, the species may use Tubbs inlet and nearshore ocean along Sunset Beach as a feeding/staging area during coastal migrations.

4.6 Seabeach amaranth

Seabeach amaranth (*Amaranthus pumilus*) is an annual plant found only along the Atlantic coastal plain where it inhabits barrier island beaches. Its primary habitat includes overwash flats at the accreting ends of the islands, lower foredunes, and upper strands of noneroding beaches (at the wrackline). Seabeach amaranth is usually found on a nearly pure silica sand substrate that is sparsely vegetated with annual herbs (forbs) and, less commonly, perennial herbs (mostly grasses) and scattered shrubs. In NC, seeds germinate from April through July and flowering begins as early as June. Seabeach amaranth seed production begins in July or August and peaks in September. The reproductive season may extend into January (USFWS 1996b). The construction window for each sand placement event (16 November - 30 April) would avoid the majority of the seabeach amaranth growing season in NC, thereby minimizing the likelihood of direct impacts on actively growing plants. Although, the habitat within the Feeder Canal and Bay Area consists of fine grain sediment, muck, and coastal marsh and generally does not meet the documented criteria for seabeach amaranth habitat, it may occur on the oceanfront shoreline of Sunset Beach within the beneficial use placement area.

Sand placement activities may directly impact seabeach amaranth through the destruction or burial of plants and/or through the transfer of seeds to unsuitable habitats. The construction of stabilizing berms and dunes may have long-term indirect negative effects on the quality or availability of seabeach amaranth habitat. Wider beaches may induce additional recreational activities that impact seabeach amaranth through trampling or crushing and/or habitat modification. Based on these potential impacts, it is determined that the proposed action may affect, and is likely to adversely affect seabeach amaranth.

5.0 EFFECTS OF THE ACTION

Potential effects considered as a direct result of the maintenance dredging project primarily occur as temporary and localized impacts. These potential impacts include injury from entrainment or burial, behavioral effects caused by temporarily altered estuarine conditions such as dissolved oxygen reductions, increases in turbidity and suspended sediments, and effects on movement of certain species through the waterways. Construction best management practices (BMP)'s and turbidity controls will be utilized during construction activities to minimize impacts where possible.

The BMP's proposed include limiting the dredging activities to the months of October through March when colder temperatures discourage an abundance of environmental activity. In addition, marine vessels associated with the project will follow the precautionary measures recommended by the USFWS for minimizing impacts to manatee. The guidelines published by the NMFS for minimizing potential impacts to sea turtle and Smalltooth sawfish will also be followed. Appendix B provides a copy of the referenced precautionary measures and guidelines.

Turbidity controls will be implemented at the material placement site to minimize the suspended sediment re-introduced into the coastal waters surrounding the site. The effluent waters will be detained within the material placement site through the use of a weir system to allow settling time for the dredge effluent. Visual monitoring will also occur to help monitor the discharge waters and limit the turbidity effects. The settling time for the dredge effluent will be increased at any point when an increased turbidity plume becomes evident at the discharge location. Water quality testing may also occur at the discharge location of the material placement site to help monitor potential increases in turbidity. The tests, when considered necessary, will monitor the increase in NTU's provided by the effluent discharge compared to a background or control site adjacent to the project area.

The proposed maintenance dredging activities most likely will not create any long-term permanent effects to the project site. Both the Feeder Canal and Bay Area have previously been dredged and the current project does not exceed the original project footprint. Therefore, the project should not create any changes to the overall sedimentology or hydrology of the water bodies. The most recent maintenance dredging for the Feeder Canal occurred in 2002 and the initial dredging of both the Feeder Canal and Bay Area occurred in early 1970's.

6.0 CONCLUSION

This biological assessment concludes the proposed maintenance dredging of South Jinks Creek, the Feeder Canal and Bay Area and beneficial use placement of beach compatible material on the oceanfront shoreline of Sunset Beach should have little to no effect on the listed species/designated critical habitat within the vicinity of the project area. The dredge activities will be limited to the months of November through April to help minimize potential impacts. All sand placement activities will be completed between 16 November and 30 April; thereby avoiding the majority of the seabeach amaranth growing season in NC. In addition, published guidelines and precautionary measures from the USFWS SPBO and the NMFS will be implemented during the construction process to reduce the potential for impacts.

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APPENDIX A

SUNSET BEACH SEA TURTLE DATA

County	Activity	Activity Date	Year	Month	Week	Dayofyear	Species	Latitude	Longitude	Relocation	Total Eggs	Relocation Da	Relocation	Relocation	Emerge Date	Hatch Succ
Brunswick	N	5/28/2000	2000	5	22	149	Cc	33.87227	-78.4861	relocated	132	5/28/2000	33.8724	-78.4862	8/2/2000	93.94
Brunswick	N	6/4/2000	2000	6	23	156	Cc	33.85597	-78.5328	relocated	120	6/4/2000	33.856	-78.5327	8/6/2000	2.5
Brunswick	N	6/6/2000	2000	6	23	158	Cc	33.8681	-78.5021	in situ					8/18/2000	61.2245
Brunswick	N	6/6/2000	2000	6	23	158	Cc	33.8707	-78.4921	in situ					8/10/2000	60.9091
Brunswick	N	6/7/2000	2000	6	23	159	Cc	33.86223	-78.5188	in situ					8/21/2000	88.4615
Brunswick	N	6/9/2000	2000	6	23	161	Cc	33.87208	-78.4873	in situ					8/14/2000	89.4366
Brunswick	N	6/9/2000	2000	6	23	161	Cc	33.855	-78.5347	in situ					8/8/2000	71.6667
Brunswick	N	6/9/2000	2000	6	23	161	Cc	33.85343	-78.5385	in situ					8/26/2000	94.898
Brunswick	N	6/11/2000	2000	6	24	163	Cc	33.87015	-78.4952	in situ					8/13/2000	97.8261
Brunswick	N	6/15/2000	2000	6	24	167	Cc	33.85568	-78.5333	in situ					8/17/2000	93.3884
Brunswick	N	6/20/2000	2000	6	25	172	Cc	33.8638	-78.5144	in situ					8/27/2000	98.1651
Brunswick	N	6/21/2000	2000	6	25	173	Cc	33.8698	-78.4968	in situ					9/1/2000	72.2222
Brunswick	N	6/22/2000	2000	6	25	174	Cc	33.86982	-78.4969	in situ					9/5/2000	63.8889
Brunswick	N	7/2/2000	2000	7	27	184	Cc	33.87085	-78.4921	in situ					9/8/2000	97.8261
Brunswick	N	7/2/2000	2000	7	27	184	Cc	33.85148	-78.5422	in situ					9/9/2000	97.6
Brunswick	N	7/4/2000	2000	7	27	186	Cc	33.8716	-78.4872	in situ					9/4/2000	93.1818
Brunswick	N	7/8/2000	2000	7	27	190	Cc	33.87185	-78.488	in situ					10/9/2000	75.7576
Brunswick	N	7/9/2000	2000	7	28	191	Cc	33.86932	-78.4984	in situ					9/20/2000	78.3951
Brunswick	N	7/13/2000	2000	7	28	195	Cc	33.85638	-78.532	in situ					9/25/2000	96.9697
Brunswick	N	7/16/2000	2000	7	29	198	Cc	33.856	-78.5327	in situ					9/26/2000	94.3548
Brunswick	N	7/19/2000	2000	7	29	201	Cc	33.8719	-78.488	in situ					9/24/2000	94.1176
Brunswick	N	7/23/2000	2000	7	30	205	Cc	33.87135	-78.4906	in situ					10/9/2000	32.5
Brunswick	N	7/27/2000	2000	7	30	209	Cc	33.86827	-78.5017	in situ					10/9/2000	89.8551
Brunswick	N	7/27/2000	2000	7	30	209	Cc	33.85365	-78.5378	in situ					10/5/2000	95.9677
Brunswick	N	7/30/2000	2000	7	31	212	Cc	33.87098	-78.492	in situ					10/19/2000	92.0792
Brunswick	N	7/30/2000	2000	7	31	212	Cc	33.87105	-78.492	in situ					10/25/2000	84.9624
Brunswick	N	8/1/2000	2000	8	31	214	Cc	33.8707	-78.492	in situ					11/6/2000	73.0769
Brunswick	N	8/9/2000	2000	8	32	222	Cc	33.85457	-78.5358	in situ					11/10/2000	83.6066
Brunswick	N	8/11/2000	2000	8	32	224	Cc	33.85457	-78.5358	in situ						0
Brunswick	N	5/30/2001	2001	5	21	150	Cc	33.86787	-78.5037	in situ					8/17/2001	95.2381
Brunswick	N	6/16/2001	2001	6	23	167	Cc	33.85511	-78.5347	relocated	24	6/16/2001			8/22/2001	7.2
Brunswick	N	6/20/2001	2001	6	24	171	Cc	33.86945	-78.4981	in situ					8/17/2001	87.8571
Brunswick	N	6/26/2001	2001	6	25	177	Cc	33.85567	-78.5334	relocated	109	6/26/2001			8/30/2001	65.8
Brunswick	N	7/8/2001	2001	7	27	189	Cc	33.87072	-78.4928	relocated	126	7/8/2001	33.871	-78.493	9/5/2001	94.44
Brunswick	N	7/12/2001	2001	7	27	193	Cc	33.8678	-78.504	in situ					9/8/2001	97.0149
Brunswick	N	7/21/2001	2001	7	28	202	Cc	33.87077	-78.4927	in situ					9/25/2001	95.283
Brunswick	N	7/26/2001	2001	7	29	207	Cc	33.86835	-78.502	in situ					9/24/2001	98.7342
Brunswick	N	5/18/2002	2002	5	19	138	Cc	33.8707	-78.492	in situ					8/10/2002	75.3165
Brunswick	N	5/29/2002	2002	5	21	149	Cc	33.8593	-78.5259	relocated	138	5/29/2002			8/1/2002	92.75
Brunswick	N	6/1/2002	2002	6	21	152	Cc	33.85297	-78.5399	in situ					7/31/2002	98.9651
Brunswick	N	6/2/2002	2002	6	22	153	Cc	33.87235	-78.4851	in situ					7/29/2002	84.0336
Brunswick	N	6/11/2002	2002	6	23	162	Cc	33.86477	-78.5122	relocated	136	6/11/2002			8/15/2002	95.59
Brunswick	N	6/13/2002	2002	6	23	164	Cc	33.87125	-78.4891	in situ					8/13/2002	92.8571
Brunswick	N	6/16/2002	2002	6	24	167	Cc	33.87085	-78.4912	in situ					8/12/2002	90

Brunswick N	6/17/2002	2002	6	24	168	Cc	33.87125	-78.4892	relocated	104	6/17/2002			8/13/2002	95.19
Brunswick N	6/26/2002	2002	6	25	177	Cc	33.87287	-78.4848	in situ					8/23/2002	70.8333
Brunswick N	7/1/2002	2002	7	26	182	Cc	33.85565	-78.5337	relocated	96	7/1/2002			8/24/2002	98.96
Brunswick N	7/1/2002	2002	7	26	182	Cc	33.8727	-78.4853	in situ					8/25/2002	98.5185
Brunswick N	7/8/2002	2002	7	27	189	Cc	33.86975	-78.4967	relocated	115	7/8/2002			9/1/2002	97.39
Brunswick N	7/14/2002	2002	7	28	195	Cc	33.8674	-78.5046	relocated	140	7/14/2002			9/7/2002	97.14
Brunswick N	7/14/2002	2002	7	28	195	Cc	33.85253	-78.5401	relocated	129	7/14/2002			9/6/2002	96.9
Brunswick N	7/28/2002	2002	7	30	209	Cc	33.8704	-78.4934	relocated	87	7/28/2002			9/19/2002	95.4
Brunswick N	5/13/2003	2003	5	19	133	Cc	33.8714	-78.4885	in situ					8/2/2003	82.4324
Brunswick N	5/28/2003	2003	5	21	148	Cc	33.8703	-78.4939	in situ					8/3/2003	94.9275
Brunswick N	6/3/2003	2003	6	22	154	Cc	33.8584	-78.5279	in situ					8/2/2003	95.5556
Brunswick N	6/5/2003	2003	6	22	156	Cc	33.8578	-78.5289	in situ					8/3/2003	84.058
Brunswick N	6/12/2003	2003	6	23	163	Cc	33.856	-78.5332	in situ					8/17/2003	93.3333
Brunswick N	6/23/2003	2003	6	25	174	Cc	33.8718	-78.487	in situ					8/25/2003	96.9925
Brunswick N	6/26/2003	2003	6	25	177	Cc	33.8725	-78.4846	in situ					8/28/2003	96.5986
Brunswick N	6/28/2003	2003	6	25	179	Cc	33.8679	-78.5029	in situ					8/22/2003	99.3197
Brunswick N	7/1/2003	2003	7	26	182	Cc	33.8603	-78.5231	in situ					8/27/2003	100
Brunswick N	7/10/2003	2003	7	27	191	Cc	33.8696	-78.4965	in situ					9/13/2003	94.8905
Brunswick N	7/16/2003	2003	7	28	197	Cc	33.8611	-78.5213	in situ					9/10/2003	97.1698
Brunswick N	7/17/2003	2003	7	28	198	Cc	33.8718	-78.487	in situ					9/12/2003	91.9355
Brunswick N	7/20/2003	2003	7	29	201	Cc	33.8726	-78.4843	in situ					9/19/2003	91.2752
Brunswick N	7/22/2003	2003	7	29	203	Cc	33.858	-78.5285	relocated	145	7/22/2003	33.85645	-78.5321	10/7/2003	93.79
Brunswick N	7/27/2003	2003	7	30	208	Cc	33.8719	-78.4863	in situ					9/24/2003	94.5205
Brunswick N	8/1/2003	2003	8	30	213	Cc	33.8721	-78.4856	in situ					9/30/2003	97.9592
Brunswick N	8/3/2003	2003	8	31	215	Cc	33.8698	-78.4956	in situ					9/30/2003	95.6522
Brunswick N	6/4/2005	2005	6	22	155	Cc	33.8579	-78.5283	in situ					8/7/2005	100
Brunswick N	6/13/2005	2005	6	24	164	Cc	33.8716	-78.4871	in situ					8/10/2005	98.9247
Brunswick N	6/21/2005	2005	6	25	172	Cc	33.871	-78.4909	in situ					8/19/2005	90.678
Brunswick N	6/27/2005	2005	6	26	178	Cc			in situ					8/27/2005	29.9145
Brunswick N	7/2/2005	2005	7	26	183	Cc	33.8601	-78.5234	relocated	113	7/2/2005			8/26/2005	97.35
Brunswick N	7/4/2005	2005	7	27	185	Cc	33.8713	-78.4879	in situ					8/29/2005	100
Brunswick N	7/4/2005	2005	7	27	185	Cc	33.8581	-78.5278	relocated	125	7/4/2005			8/26/2005	100
Brunswick N	7/14/2005	2005	7	28	195	Cc	33.8536	-78.5382	relocated	115	7/14/2005			9/9/2005	41.74
Brunswick N	7/18/2005	2005	7	29	199	Cc	33.8547	-78.5357	relocated	136	7/18/2005			9/18/2005	97.79
Brunswick N	8/14/2005	2005	8	33	226	Cc	33.8722	-78.4851	in situ						0
Brunswick N	6/8/2006	2006	6	23	159	Cc	33.8718	-78.4865	in situ					8/7/2006	98.1366
Brunswick N	6/14/2006	2006	6	24	165	Cc	33.8591	-78.526	in situ					8/9/2006	85.3933
Brunswick N	6/17/2006	2006	6	24	168	Cc	33.8715	-78.488	in situ					8/9/2006	88.8889
Brunswick N	6/18/2006	2006	6	25	169	Cc	33.8718	-78.486	relocated	93	6/18/2006			8/14/2006	44.09
Brunswick N	6/18/2006	2006	6	25	169	Cc	33.8591	-78.526	in situ					8/13/2006	96.6443
Brunswick N	7/3/2006	2006	7	27	184	Cc	33.8716	-78.4871	in situ					8/27/2006	94.1667
Brunswick N	7/3/2006	2006	7	27	184	Cc	33.8714	-78.487	in situ					8/31/2006	96.6887
Brunswick N	7/8/2006	2006	7	27	189	Cc	33.8553	-78.5345	in situ					8/28/2006	96.4912
Brunswick N	7/9/2006	2006	7	28	190	Cc	33.8712	-78.4894	in situ					9/3/2006	95.7627
Brunswick N	7/11/2006	2006	7	28	192	Cc	33.8621	-78.5189	in situ					8/30/2006	90.4762

Brunswick	N	7/11/2006	2006	7	28	192	Cc	33.8718	-78.4866	in situ					8/30/2006	92.3077
Brunswick	N	8/10/2006	2006	8	32	222	Cc	33.8717	-78.4871	relocated	125	8/10/2006			10/29/2006	62.4
Brunswick	N	6/5/2007	2007	6	22	156	Cc	33.87055	-78.4928	in situ					8/2/2007	95.2381
Brunswick	N	6/9/2007	2007	6	22	160	Cc	33.87116	-78.49	in situ					8/9/2007	79.7872
Brunswick	N	6/12/2007	2007	6	23	163	Cc	33.87084	-78.492	in situ					8/12/2007	94.3925
Brunswick	N	6/24/2007	2007	6	25	175	Cc	33.86836	-78.5014	in situ					8/18/2007	90.7143
Brunswick	N	6/25/2007	2007	6	25	176	Cc	33.86914	-78.4987	in situ					8/17/2007	91.8367
Brunswick	N	6/26/2007	2007	6	25	177	Cc	33.86953	-78.4973	in situ						0
Brunswick	N	6/26/2007	2007	6	25	177	Cc	33.871	-78.491	in situ					8/21/2007	88.4892
Brunswick	N	7/6/2007	2007	7	26	187	Cc	33.86047	-78.5227	in situ					9/5/2007	18
Brunswick	N	7/7/2007	2007	7	26	188	Cc	33.85858	-78.5269	in situ					9/7/2007	97.1429
Brunswick	N	8/18/2007	2007	8	32	230	Cc	33.855	-78.5349	in situ					10/11/2007	100
Brunswick	N	6/13/2008	2008	6	23	165	Cc	33.8502	-78.5436	in situ					8/17/2008	88.806
Brunswick	N	6/21/2008	2008	6	24	173	Cc	33.8642	-78.5139	in situ					8/17/2008	71.519
Brunswick	N	6/22/2008	2008	6	25	174	Cc	33.863	-78.5168	in situ					9/1/2008	80.1724
Brunswick	N	6/26/2008	2008	6	25	178	Cc	33.8603	-78.5232	in situ					?	
Brunswick	N	7/16/2008	2008	7	28	198	Cc	33.8697	-78.4964	in situ						0
Brunswick	N	7/21/2008	2008	7	29	203	Cc	33.86974	-78.4964	in situ					9/30/2008	56.8966
Brunswick	N	7/26/2008	2008	7	29	208	Cc	33.87039	-78.4938	in situ					9/18/2008	100
Brunswick	N	7/27/2008	2008	7	30	209	Cc	33.86259	-78.5181	in situ					9/23/2008	59.7826
Brunswick	N	6/4/2009	2009	6	22	155	Cc	33.8671	-78.5053	in situ					8/1/2009	94.2029
Brunswick	N	6/13/2009	2009	6	23	164	Cc	33.87	-78.4953	in situ					8/9/2009	75
Brunswick	N	6/15/2009	2009	6	24	166	Cc	33.8604	-78.5233	in situ					8/5/2009	93.3824
Brunswick	N	6/18/2009	2009	6	24	169	Cc	33.8576	-78.5296	in situ						97.3913
Brunswick	N	7/7/2009	2009	7	27	188	Cc	33.8643	-78.5137	in situ					9/3/2009	92.1986
Brunswick	N	7/15/2009	2009	7	28	196	Cc	33.8615	-78.5207	in situ					9/10/2009	95.2756
Brunswick	N	7/22/2009	2009	7	29	203	Cc	33.8695	-78.4973	in situ					9/17/2009	98.0769
Brunswick	N	7/25/2009	2009	7	29	206	Cc	33.8559	-78.5329	in situ					9/21/2009	91
Brunswick	N	5/25/2010	2010	5	21	145	Cc	33.8676	-78.504	in situ					7/14/2010	?
Brunswick	N	6/1/2010	2010	6	22	152	Cc	33.8649	-78.5122	in situ					8/1/2010	91.9643
Brunswick	N	6/14/2010	2010	6	24	165	Cc	33.8712	-78.4901	relocated	134	6/14/2010	33.8714	-78.4902	8/7/2010	99.25
Brunswick	N	6/28/2010	2010	6	26	179	Cc	33.8648	-78.5125	in situ					8/22/2010	97.2973
Brunswick	N	7/5/2010	2010	7	27	186	Cc	33.8726	-78.4839	in situ					8/29/2010	85.1351
Brunswick	N	7/12/2010	2010	7	28	193	Cc	33.8578	-78.5292	in situ					8/28/2010	98.5185
Brunswick	N	5/27/2011	2011	5	21	147	Cc	33.8554	-78.5342	relocated	120	5/27/2011	33.8582	-78.5284	7/28/2011	90
Brunswick	N	5/28/2011	2011	5	21	148	Cc	33.8691	-78.4987	in situ					7/28/2011	86.3946
Brunswick	N	5/31/2011	2011	5	22	151	Cc	33.854	-78.5375	in situ						0
Brunswick	N	6/8/2011	2011	6	23	159	Cc	33.8586	-78.527	in situ					8/9/2011	86.4865
Brunswick	N	6/10/2011	2011	6	23	161	Cc	33.866	-78.5091	in situ					8/8/2011	95
Brunswick	N	6/29/2011	2011	6	26	180	Cc	33.8582	-78.5284	in situ						0
Brunswick	N	7/1/2011	2011	7	26	182	Cc	33.868	-78.5021	in situ					8/22/2011	97.4359
Brunswick	N	7/1/2011	2011	7	26	182	Cc	33.8583	-78.5275	relocated	6	7/1/2011	33.8584	-78.5275		0
Brunswick	N	7/2/2011	2011	7	26	183	Cc	33.8579	-78.5283	in situ					8/21/2011	65.8537
Brunswick	N	7/17/2011	2011	7	29	198	Cc	33.8717	-78.4883	in situ					9/8/2011	96.9697
Brunswick	N	7/17/2011	2011	7	29	198	Cc	33.8539	-78.5373	in situ					9/16/2011	90.5109

Brunswick N	7/21/2011	2011	7	29	202 Cc	33.8619	-78.5194	in situ							0
Brunswick N	7/25/2011	2011	7	30	206 Cc	33.8546	-78.5359	in situ						9/20/2011	97.0149
Brunswick N	7/29/2011	2011	7	30	210 Cc	33.8584	-78.527	in situ						9/29/2011	82.2917
Brunswick N	5/29/2012	2012	5	22	150 Cc	33.852	-78.5413	relocated	132	5/29/2012	33.8701	-78.4949		7/25/2012	77.27
Brunswick N	6/3/2012	2012	6	23	155 Cc	33.8538	-78.5378	relocated	133	6/3/2012	33.8539	-78.538		7/29/2012	97.74
Brunswick N	6/10/2012	2012	6	24	162 Cc	33.8724	-78.4847	relocated	93	6/10/2012	33.8724	-78.4847		8/5/2012	87.1
Brunswick N	6/19/2012	2012	6	25	171 Cc	33.8521	-78.5415	in situ						8/14/2012	94.8276
Brunswick N	7/3/2012	2012	7	27	185 Cc	33.8524	-78.5408	relocated	137	7/3/2012	33.8523	-78.541		8/23/2012	98.54
Brunswick N	7/4/2012	2012	7	27	186 Cc	33.8698	-78.4961	in situ						8/27/2012	94.9495
Brunswick N	7/6/2012	2012	7	27	188 Cc	33.871	-78.4909	in situ						8/30/2012	97.1223
Brunswick N	7/16/2012	2012	7	29	198 Cc	33.8606	-78.5223	relocated	131	7/16/2012	33.8607	-78.5223		9/17/2012	96.18
Brunswick N	6/5/2013	2013	6	22	156 Cc	33.87063	-78.4927	in situ						8/6/2013	92.8571
Brunswick N	6/6/2013	2013	6	22	157 Cc	33.8536	-78.5384	in situ						8/1/2013	94.697
Brunswick N	6/6/2013	2013	6	22	157 Cc	33.85361	-78.5385	in situ						8/7/2013	86.1314
Brunswick N	6/15/2013	2013	6	23	166 Cc	33.8687	-78.5001	in situ						8/11/2013	89.6226
Brunswick N	6/21/2013	2013	6	24	172 Cc	33.8714	-78.4892	in situ						8/17/2013	91.0345
Brunswick N	6/21/2013	2013	6	24	172 Cc	33.8687	-78.5001	in situ						8/19/2013	70.122
Brunswick N	7/4/2013	2013	7	26	185 Cc	33.86786	-78.5032	in situ						8/29/2013	89.8438
Brunswick N	7/5/2013	2013	7	26	186 Cc	33.87066	-78.4919	relocated	142	7/5/2013	33.87083	-78.4919		8/26/2013	89.44
Brunswick N	7/7/2013	2013	7	27	188 Cc	33.87066	-78.4923	relocated	108	7/7/2013	33.87072	-78.4923		8/29/2013	97.22
Brunswick N	7/14/2013	2013	7	28	195 Cc	33.86005	-78.5241	in situ						9/5/2013	86.0294
Brunswick N	7/15/2013	2013	7	28	196 Cc	33.85984	-78.5241	relocated	109	7/15/2013	33.85963	-78.5247		9/9/2013	98.17
Brunswick N	7/17/2013	2013	7	28	198 Cc	33.8701	-78.4948	in situ						9/8/2013	92.1053
Brunswick N	7/18/2013	2013	7	28	199 Cc	33.86068	-78.5221	relocated	107	10/9/2013	33.86071	-78.5222		9/9/2013	93.46
Brunswick N	7/19/2013	2013	7	28	200 Cc	33.8677	-78.5031	relocated	95	7/19/2013	33.86779	-78.5033		9/11/2013	92.63
Brunswick N	7/27/2013	2013	7	29	208 Cc	33.87158	-78.4884	relocated	125	7/27/2013	33.87162	-78.4887		9/22/2013	44
Brunswick N	7/28/2013	2013	7	30	209 Cc	33.85769	-78.5292	relocated	107	7/28/2013	33.85769	-78.5293		9/20/2013	97.2
Brunswick N	7/28/2013	2013	7	30	209 Cc	33.8608	-78.5221	in situ						9/23/2013	98.7013
Brunswick N	7/31/2013	2013	7	30	212 Cc	33.85742	-78.5297	relocated	115	7/31/2013	33.85749	-78.5298		9/25/2013	90.43
Brunswick N	8/16/2013	2013	8	32	228 Cc	33.8602	-78.5232	in situ						10/19/2013	95.1807
Brunswick N	6/9/2014	2014	6	23	160 Cc	33.85544	-78.5341	relocated	151	6/9/2014	33.85703	-78.5307		8/10/2014	86.09
Brunswick N	6/23/2014	2014	6	25	174 Cc	33.85448	-78.5363	relocated	126	6/23/2014	33.85704	-78.5307		8/22/2014	73.81
Brunswick N	6/24/2014	2014	6	25	175 Cc	33.86176	-78.5198	in situ						8/24/2014	91.0569
Brunswick N	5/25/2015	2015	5	21	145 Cc	33.86194	-78.5194	relocated	122	5/25/2015				7/20/2015	94.26
Brunswick N	5/27/2015	2015	5	21	147 Cc	33.86278	-78.5175	in situ						8/1/2015	97.7099
Brunswick N	6/3/2015	2015	6	22	154 Cc	33.86222	-78.5186	in situ						7/31/2015	98.9691
Brunswick N	6/10/2015	2015	6	23	161 Cc	33.8616	-78.5201	in situ						8/3/2015	97.3684
Brunswick N	6/17/2015	2015	6	24	168 Cc	33.85833	-78.5275	in situ						8/15/2015	93.8776
Brunswick N	7/1/2015	2015	7	26	182 Cc	33.85306	-78.5397	in situ							0
Brunswick N	7/6/2015	2015	7	27	187 Cc	33.85944	-78.5253	in situ						8/25/2015	98.3051
Brunswick N	7/6/2015	2015	7	27	187 Cc	33.86972	-78.4967	in situ						8/26/2015	92.029
Brunswick N	7/7/2015	2015	7	27	188 Cc	33.87222	-78.485	in situ						8/31/2015	52.4752
Brunswick N	7/10/2015	2015	7	27	191 Cc	33.87111	-78.49	in situ						9/4/2015	100
Brunswick N	7/12/2015	2015	7	28	193 Cc	33.85528	-78.5344	relocated	114	8/29/2015	33.85531	-78.5349		9/4/2015	98.25
Brunswick N	7/19/2015	2015	7	29	200 Cc	33.86972	-78.4961	in situ						9/11/2015	92.5926

Brunswick	N	7/19/2015	2015	7	29	200	Cc	33.86306	-78.5164	in situ					9/11/2015	98.8889	
County	Activity	Activity Date	Year	Month	Week	Dayofyear	Species	Latitude	Longitude	Relocation	Total Eggs	Relocation Da	Relocation	Relocation	Emerge Date	Hatch Succ	
Brunswick	N	5/28/2000	2015.441	6.558845	26.13762	183.0331	Cc	33.8625	-78.5158	relocated	117.1632	5/28/2000	33.86139	-78.5187	8/2/2000	84.7932	
Brunswick	N	6/4/2000	2015.538	6.559496	26.14006	183.056	Cc	33.86248	-78.5159	relocated	117.1861	6/4/2000	33.86136	-78.5188	8/6/2000	84.81773	
Brunswick	N	6/6/2000	2015.634	6.560146	26.1425	183.0788	Cc	33.86246	-78.516	in situ	117.2091		33.86134	-78.5188	8/18/2000	84.84226	
Brunswick	N	6/6/2000	2015.73	6.560796	26.14494	183.1016	Cc	33.86244	-78.516	in situ	117.232		33.86132	-78.5189	8/10/2000	84.8668	
Brunswick	N	6/7/2000	2015.826	6.561446	26.14738	183.1245	Cc	33.86242	-78.5161	in situ	117.2549		33.86129	-78.519	8/21/2000	84.89133	
Brunswick	N	6/9/2000	2015.923	6.562097	26.14982	183.1473	Cc	33.8624	-78.5162	in situ	117.2779		33.86127	-78.5191	8/14/2000	84.91586	
Brunswick	N	6/9/2000	2016.019	6.562747	26.15226	183.1702	Cc	33.86237	-78.5162	in situ	117.3008		33.86125	-78.5191	8/8/2000	84.94039	
Brunswick	N	6/9/2000	2016.115	6.563397	26.15471	183.193	Cc	33.86235	-78.5163	in situ	117.3237		33.86122	-78.5192	8/26/2000	84.96493	
Brunswick	N	6/11/2000	2016.212	6.564047	26.15715	183.2158	Cc	33.86233	-78.5163	in situ	117.3467		33.8612	-78.5193	8/13/2000	84.98946	
Brunswick	N	6/15/2000	2016.308	6.564697	26.15959	183.2387	Cc	33.86231	-78.5164	in situ	117.3696		33.86118	-78.5193	8/17/2000	85.01399	
Brunswick	N	6/20/2000	2016.404	6.565348	26.16203	183.2615	Cc	33.86229	-78.5165	in situ	117.3925		33.86115	-78.5194	8/27/2000	85.03853	
Brunswick	N	6/21/2000	2016.5	6.565998	26.16447	183.2843	Cc	33.86227	-78.5165	in situ	117.4155		33.86113	-78.5195	9/1/2000	85.06306	
Brunswick	N	6/22/2000	2016.597	6.566648	26.16691	183.3072	Cc	33.86225	-78.5166	in situ	117.4384		33.86111	-78.5195	9/5/2000	85.08759	
Brunswick	N	7/2/2000	2016.693	6.567298	26.16936	183.33	Cc	33.86223	-78.5167	in situ	117.4613		33.86108	-78.5196	9/8/2000	85.11213	
Brunswick	N	7/2/2000	2016.789	6.567949	26.1718	183.3528	Cc	33.86221	-78.5167	in situ	117.4843		33.86106	-78.5197	9/9/2000	85.13666	
Brunswick	N	7/4/2000	2016.886	6.568599	26.17424	183.3757	Cc	33.86218	-78.5168	in situ	117.5072		33.86104	-78.5198	9/4/2000	85.16119	
Brunswick	N	7/8/2000	2016.982	6.569249	26.17668	183.3985	Cc	33.86216	-78.5169	in situ	117.5301		33.86101	-78.5198	10/9/2000	85.18573	
Brunswick	N	7/9/2000	2017.078	6.569899	26.17912	183.4213	Cc	33.86214	-78.5169	in situ	117.5531		33.86099	-78.5199	9/20/2000	85.21026	
Brunswick	N	7/13/2000	2017.174	6.57055	26.18156	183.4442	Cc	33.86212	-78.517	in situ	117.576		33.86097	-78.52	9/25/2000	85.23479	
Brunswick	N	7/16/2000	2017.271	6.5712	26.184	183.467	Cc	33.8621	-78.5171	in situ	117.5989		33.86094	-78.52	9/26/2000	85.25933	
Brunswick	N	7/19/2000	2017.367	6.57185	26.18645	183.4898	Cc	33.86208	-78.5171	in situ	117.6219		33.86092	-78.5201	9/24/2000	85.28386	
Brunswick	N	7/23/2000	2017.463	6.5725	26.18889	183.5127	Cc	33.86206	-78.5172	in situ	117.6448		33.8609	-78.5202	10/9/2000	85.30839	
Brunswick	N	7/27/2000	2017.559	6.57315	26.19133	183.5355	Cc	33.86204	-78.5172	in situ	117.6677		33.86087	-78.5202	10/9/2000	85.33293	
Brunswick	N	7/27/2000	2017.656	6.573801	26.19377	183.5583	Cc	33.86201	-78.5173	in situ	117.6907		33.86085	-78.5203	10/5/2000	85.35746	
Brunswick	N	7/30/2000	2017.752	6.574451	26.19621	183.5812	Cc	33.86199	-78.5174	in situ	117.7136		33.86083	-78.5204	10/19/2000	85.38199	
Brunswick	N	7/30/2000	2017.848	6.575101	26.19865	183.604	Cc	33.86197	-78.5174	in situ	117.7365		33.8608	-78.5205	10/25/2000	85.40652	
Brunswick	N	8/1/2000	2017.945	6.575751	26.20109	183.6268	Cc	33.86195	-78.5175	in situ	117.7595		33.86078	-78.5205	11/6/2000	85.43106	
Brunswick	N	8/9/2000	2018.041	6.576402	26.20354	183.6497	Cc	33.86193	-78.5176	in situ	117.7824		33.86076	-78.5206	11/10/2000	85.45559	
Brunswick	N	8/11/2000	2018.137	6.577052	26.20598	183.6725	Cc	33.86191	-78.5176	in situ	117.8053		33.86073	-78.5207		85.48012	
Brunswick	N	5/30/2001	2018.233	6.577702	26.20842	183.6953	Cc	33.86189	-78.5177	in situ	117.8283		33.86071	-78.5207	8/17/2001	85.50466	
Brunswick	N	6/16/2001	2018.33	6.578352	26.21086	183.7182	Cc	33.86187	-78.5178	relocated	117.8512	6/16/2001	33.86069	-78.5208	8/22/2001	85.52919	
Brunswick	N	6/20/2001	2018.426	6.579002	26.2133	183.741	Cc	33.86185	-78.5178	in situ	117.8741		33.86066	-78.5209	8/17/2001	85.55372	
Brunswick	N	6/26/2001	2018.522	6.579653	26.21574	183.7638	Cc	33.86182	-78.5179	relocated	117.8971	6/26/2001	33.86064	-78.5209	8/30/2001	85.57826	
Brunswick	N	7/8/2001	2018.619	6.580303	26.21818	183.7867	Cc	33.8618	-78.518	relocated	117.92	7/8/2001	33.86062	-78.521	9/5/2001	85.60279	
Brunswick	N	7/12/2001	2018.715	6.580953	26.22063	183.8095	Cc	33.86178	-78.518	in situ	117.9429		33.86059	-78.5211	9/8/2001	85.62732	
Brunswick	N	7/21/2001	2018.811	6.581603	26.22307	183.8323	Cc	33.86176	-78.5181	in situ	117.9659		33.86057	-78.5212	9/25/2001	85.65186	
Brunswick	N	7/26/2001	2018.907	6.582254	26.22551	183.8552	Cc	33.86174	-78.5181	in situ	117.9888		33.86055	-78.5212	9/24/2001	85.67639	
Brunswick	N	5/18/2002	2019.004	6.582904	26.22795	183.878	Cc	33.86172	-78.5182	in situ	118.0117		33.86052	-78.5213	8/10/2002	85.70092	
Brunswick	N	5/29/2002	2019.1	6.583554	26.23039	183.9008	Cc	33.8617	-78.5183	relocated	118.0347	5/29/2002	33.8605	-78.5214	8/1/2002	85.72546	
Brunswick	N	6/1/2002	2019.196	6.584204	26.23283	183.9237	Cc	33.86168	-78.5183	in situ	118.0576		33.86048	-78.5214	7/31/2002	85.74999	
Brunswick	N	6/2/2002	2019.293	6.584854	26.23527	183.9465	Cc	33.86165	-78.5184	in situ	118.0805		33.86045	-78.5215	7/29/2002	85.77452	
Brunswick	N	6/11/2002	2019.389	6.585505	26.23772	183.9693	Cc	33.86163	-78.5185	relocated	118.1035	6/11/2002	33.86043	-78.5216	8/15/2002	85.79905	
Brunswick	N	6/13/2002	2019.485	6.586155	26.24016	183.9922	Cc	33.86161	-78.5185	in situ	118.1264		33.86041	-78.5216	8/13/2002	85.82359	

Brunswick N	6/16/2002	2019.581	6.586805	26.2426	184.015	Cc	33.86159	-78.5186	in situ	118.1493		33.86038	-78.5217	8/12/2002	85.84812

APPENDIX B

CONSTRUCTION CONDITIONS PROPOSED TO HELP MINIMIZE POTENTIAL IMPACTS TO MANATEE, SEA TURTLES, & SMALLTOOTH SAWFISH

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

GUIDELINES FOR AVOIDING IMPACTS TO THE WEST INDIAN MANATEE
Precautionary Measures for Construction Activities in North Carolina Waters

The West Indian manatee (*Trichechus manatus*), also known as the Florida manatee, is a Federally-listed endangered aquatic mammal protected under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) and the Marine Mammal Protection Act of 1972, as amended (16 U.S.C 1461 *et seq.*). The manatee is also listed as endangered under the North Carolina Endangered Species Act of 1987 (Article 25 of Chapter 113 of the General Statutes). The U.S. Fish and Wildlife Service (Service) is the lead Federal agency responsible for the protection and recovery of the West Indian manatee under the provisions of the Endangered Species Act.

Adult manatees average 10 feet long and weigh about 2,200 pounds, although some individuals have been recorded at lengths greater than 13 feet and weighing as much as 3,500 pounds. Manatees are commonly found in fresh, brackish, or marine water habitats, including shallow coastal bays, lagoons, estuaries, and inland rivers of varying salinity extremes. Manatees spend much of their time underwater or partly submerged, making them difficult to detect even in shallow water. While the manatee's principal stronghold in the United States is Florida, the species is considered a seasonal inhabitant of North Carolina with most occurrences reported from June through October.

To protect manatees in North Carolina, the Service's Raleigh Field Office has prepared precautionary measures for general construction activities in waters used by the species. Implementation of these measure will allow in-water projects which do not require blasting to proceed without adverse impacts to manatees. In addition, inclusion of these guidelines as conservation measures in a Biological Assessment or Biological Evaluation, or as part of the determination of impacts on the manatee in an environmental document prepared pursuant to the National Environmental Policy Act, will expedite the Service's review of the document for the fulfillment of requirements under Section 7 of the Endangered Species Act. These measures include:

1. The project manager and/or contractor will inform all personnel associated with the project that manatees may be present in the project area, and the need to avoid any harm to these endangered mammals. The project manager will ensure that all construction personnel know the general appearance of the species and their habit of moving about completely or partially submerged in shallow water. All construction personnel will be informed that they are responsible for observing water-related activities for the presence of manatees.

2. The project manager and/or the contractor will advise all construction personnel that

there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act and the Endangered Species Act.

3. If a manatee is seen within 100 yards of the active construction and/or dredging operation or vessel movement, all appropriate precautions will be implemented to ensure protection of the manatee. These precautions will include the immediate shutdown of moving equipment if a manatee comes within 50 feet of the operational area of the equipment. Activities will not resume until the manatee has departed the project area on its own volition (i.e., it may not be herded or harassed from the area).

4. Any collision with and/or injury to a manatee will be reported immediately. The report must be made to the U.S. Fish and Wildlife Service (ph. 919.856.4520 ext. 16), the National Marine Fisheries Service (ph. 252.728.8762), and the North Carolina Wildlife Resources Commission (ph. 252.448.1546).

5. A sign will be posted in all vessels associated with the project where it is clearly visible to the vessel operator. The sign should state:

> CAUTION: The endangered manatee may occur in these waters during the warmer months, primarily from June through October. Idle speed is required if operating this vessel in shallow water during these months. All equipment must be shut down if a manatee comes within 50 feet of the vessel or operating equipment. A collision with and/or injury to the manatee must be reported immediately to the U.S. Fish and Wildlife Service (919-856-4520 ext. 16), the National Marine Fisheries Service (252.728.8762), and the North Carolina Wildlife Resources Commission (252.448.1546).

6. The contractor will maintain a log detailing sightings, collisions, and/or injuries to manatees during project activities. Upon completion of the action, the project manager will prepare a report which summarizes all information on manatees encountered and submit the report to the Service's Raleigh Field Office.

7. All vessels associated with the construction project will operate at "no wake/idle" speeds at all times while in water where the draft of the vessel provides less than a four foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

8. If siltation barriers must be placed in shallow water, these barriers will be: (a) made of material in which manatees cannot become entangled; (b) secured in a manner that they cannot break free and entangle manatees; and, (c) regularly monitored to ensure that manatees have not become entangled. Barriers will be placed in a manner to allow manatees entry to or exit from essential habitat.

Prepared by (rev. 06/2003):
U.S. Fish and Wildlife Service
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726
919/856-4520

Figure 1. The whole body of the West Indian manatee may be visible in clear water; but in the dark and muddy waters of coastal North Carolina, one normally sees only a small part of the head when the manatee raises its nose to breathe.

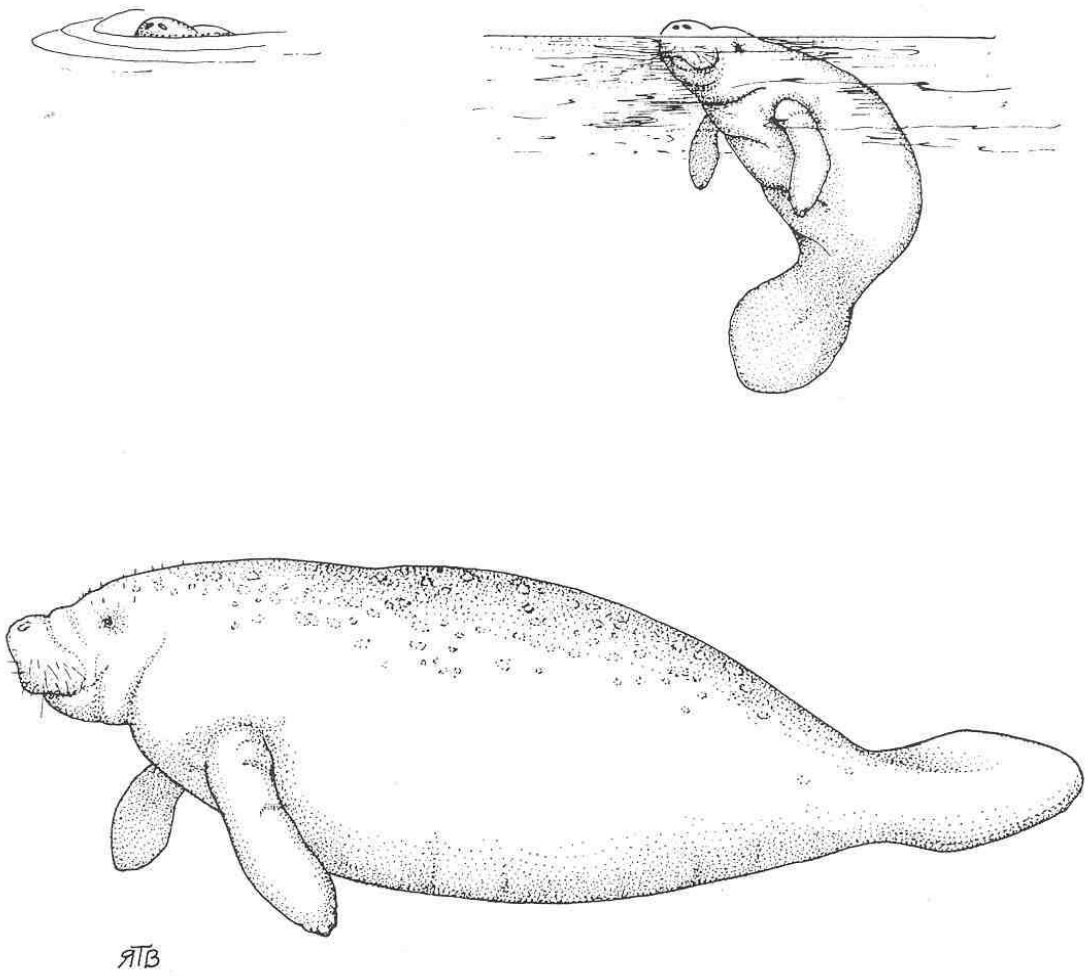

Illustration used with the permission of the North Carolina State Museum of Natural Sciences. Source: Clark, M. K. 1987. Endangered, Threatened, and Rare Fauna of North Carolina: Part I. A re-evaluation of the mammals. Occasional Papers of the North Carolina Biological Survey 1987-3. North Carolina State Museum of Natural Sciences. Raleigh, NC. pp. 52.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

The permittee shall comply with the following protected species construction conditions:

a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.

c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006
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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
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GUIDELINES FOR AVOIDING IMPACTS TO THE WEST INDIAN MANATEE
Precautionary Measures for Construction Activities in North Carolina Waters

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Adult manatees average 10 feet long and weigh about 2,200 pounds, although some individuals have been recorded at lengths greater than 13 feet and weighing as much as 3,500 pounds. Manatees are commonly found in fresh, brackish, or marine water habitats, including shallow coastal bays, lagoons, estuaries, and inland rivers of varying salinity extremes. Manatees spend much of their time underwater or partly submerged, making them difficult to detect even in shallow water. While the manatee's principal stronghold in the United States is Florida, the species is considered a seasonal inhabitant of North Carolina with most occurrences reported from June through October.

To protect manatees in North Carolina, the Service's Raleigh Field Office has prepared precautionary measures for general construction activities in waters used by the species. Implementation of these measure will allow in-water projects which do not require blasting to proceed without adverse impacts to manatees. In addition, inclusion of these guidelines as conservation measures in a Biological Assessment or Biological Evaluation, or as part of the determination of impacts on the manatee in an environmental document prepared pursuant to the National Environmental Policy Act, will expedite the Service's review of the document for the fulfillment of requirements under Section 7 of the Endangered Species Act. These measures include:

1. The project manager and/or contractor will inform all personnel associated with the project that manatees may be present in the project area, and the need to avoid any harm to these endangered mammals. The project manager will ensure that all construction personnel know the general appearance of the species and their habit of moving about completely or partially submerged in shallow water. All construction personnel will be informed that they are responsible for observing water-related activities for the presence of manatees.

2. The project manager and/or the contractor will advise all construction personnel that

there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act and the Endangered Species Act.

3. If a manatee is seen within 100 yards of the active construction and/or dredging operation or vessel movement, all appropriate precautions will be implemented to ensure protection of the manatee. These precautions will include the immediate shutdown of moving equipment if a manatee comes within 50 feet of the operational area of the equipment. Activities will not resume until the manatee has departed the project area on its own volition (i.e., it may not be herded or harassed from the area).

4. Any collision with and/or injury to a manatee will be reported immediately. The report must be made to the U.S. Fish and Wildlife Service (ph. 919.856.4520 ext. 16), the National Marine Fisheries Service (ph. 252.728.8762), and the North Carolina Wildlife Resources Commission (ph. 252.448.1546).

5. A sign will be posted in all vessels associated with the project where it is clearly visible to the vessel operator. The sign should state:

> CAUTION: The endangered manatee may occur in these waters during the warmer months, primarily from June through October. Idle speed is required if operating this vessel in shallow water during these months. All equipment must be shut down if a manatee comes within 50 feet of the vessel or operating equipment. A collision with and/or injury to the manatee must be reported immediately to the U.S. Fish and Wildlife Service (919-856-4520 ext. 16), the National Marine Fisheries Service (252.728.8762), and the North Carolina Wildlife Resources Commission (252.448.1546).

6. The contractor will maintain a log detailing sightings, collisions, and/or injuries to manatees during project activities. Upon completion of the action, the project manager will prepare a report which summarizes all information on manatees encountered and submit the report to the Service's Raleigh Field Office.

7. All vessels associated with the construction project will operate at "no wake/idle" speeds at all times while in water where the draft of the vessel provides less than a four foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

8. If siltation barriers must be placed in shallow water, these barriers will be: (a) made of material in which manatees cannot become entangled; (b) secured in a manner that they cannot break free and entangle manatees; and, (c) regularly monitored to ensure that manatees have not become entangled. Barriers will be placed in a manner to allow manatees entry to or exit from essential habitat.

Prepared by (rev. 06/2003):
U.S. Fish and Wildlife Service
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726
919/856-4520

Figure 1. The whole body of the West Indian manatee may be visible in clear water; but in the dark and muddy waters of coastal North Carolina, one normally sees only a small part of the head when the manatee raises its nose to breathe.

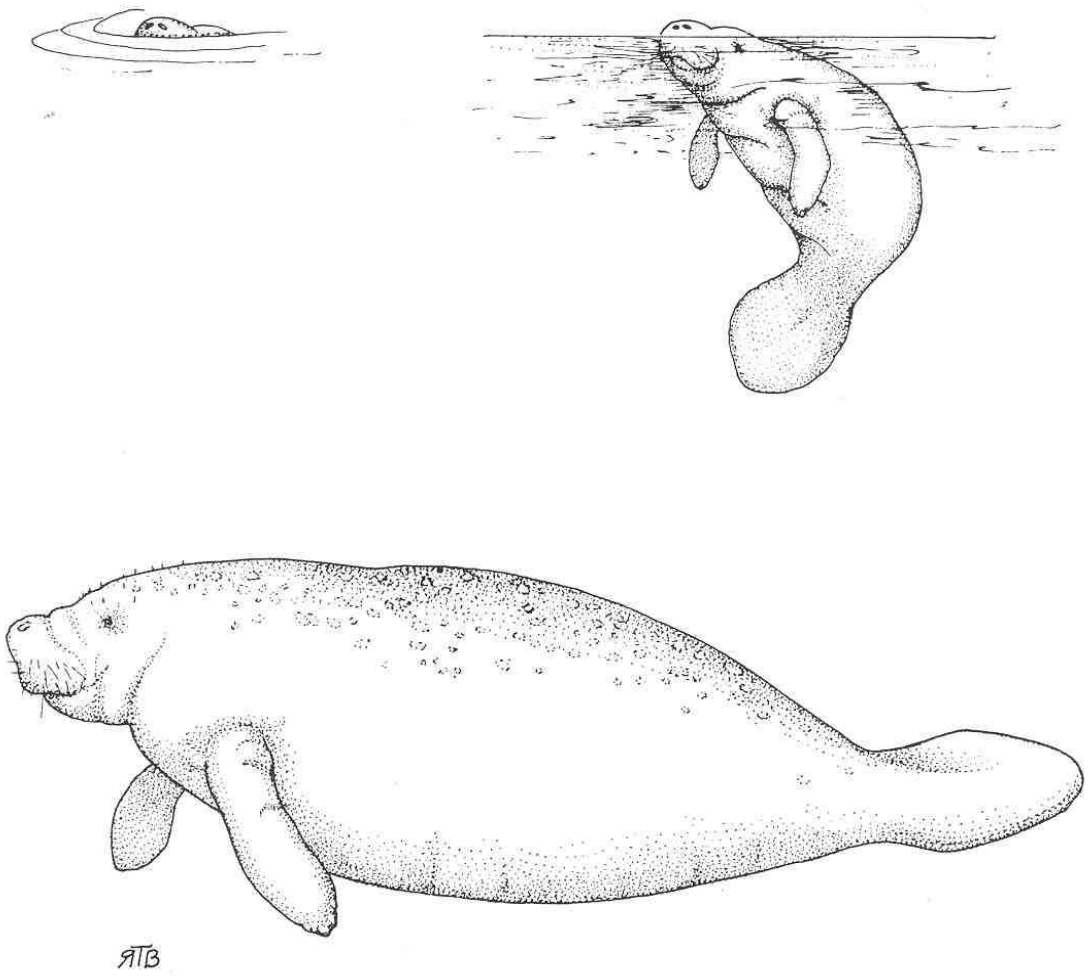

Illustration used with the permission of the North Carolina State Museum of Natural Sciences. Source: Clark, M. K. 1987. Endangered, Threatened, and Rare Fauna of North Carolina: Part I. A re-evaluation of the mammals. Occasional Papers of the North Carolina Biological Survey 1987-3. North Carolina State Museum of Natural Sciences. Raleigh, NC. pp. 52.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

The permittee shall comply with the following protected species construction conditions:

a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.

c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006
O:\forms\Sea Turtle and Smalltooth Sawfish Construction Conditions.doc

North Carolina Department of Natural and Cultural Resources
State Historic Preservation Office
Ramona M. Bartos, Administrator

Governor Roy Cooper
Secretary Susi H. Hamilton

Office of Archives and History
Deputy Secretary Kevin Cherry

October 3, 2017

Rebeckah Hollowell rhollowell@moffattnichol.com
Moffatt & Nichol
272 N. Front Street, Suite 204
Wilmington, NC 28401

Re: Town of Sunset Beach Jinks Creek Channel Dredging Project, Brunswick County, ER 17-1757

Dear Ms. Hollowell:

Thank you for your letter of September 12, 2017, concerning the above project.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or renee.gledhill-earley@ncdcr.gov. In all future communication concerning this project, please cite the above-referenced tracking number.

Sincerely,

Ramona M. Bartos

MARCH 19, 2019

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
FEEDER CHANNEL MARSH EXTENTS
PLAN VIEW

SHT 1 OF 3

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MARCH 19, 2019

SHT 2 OF 3

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
FEEDER CHANNEL MARSH EXTENTS
PLAN VIEW

moffatt & nichol

MARCH 19, 2019

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
FEEDER CHANNEL MARSH EXTENTS
PLAN VIEW

SHT 3 0F 3

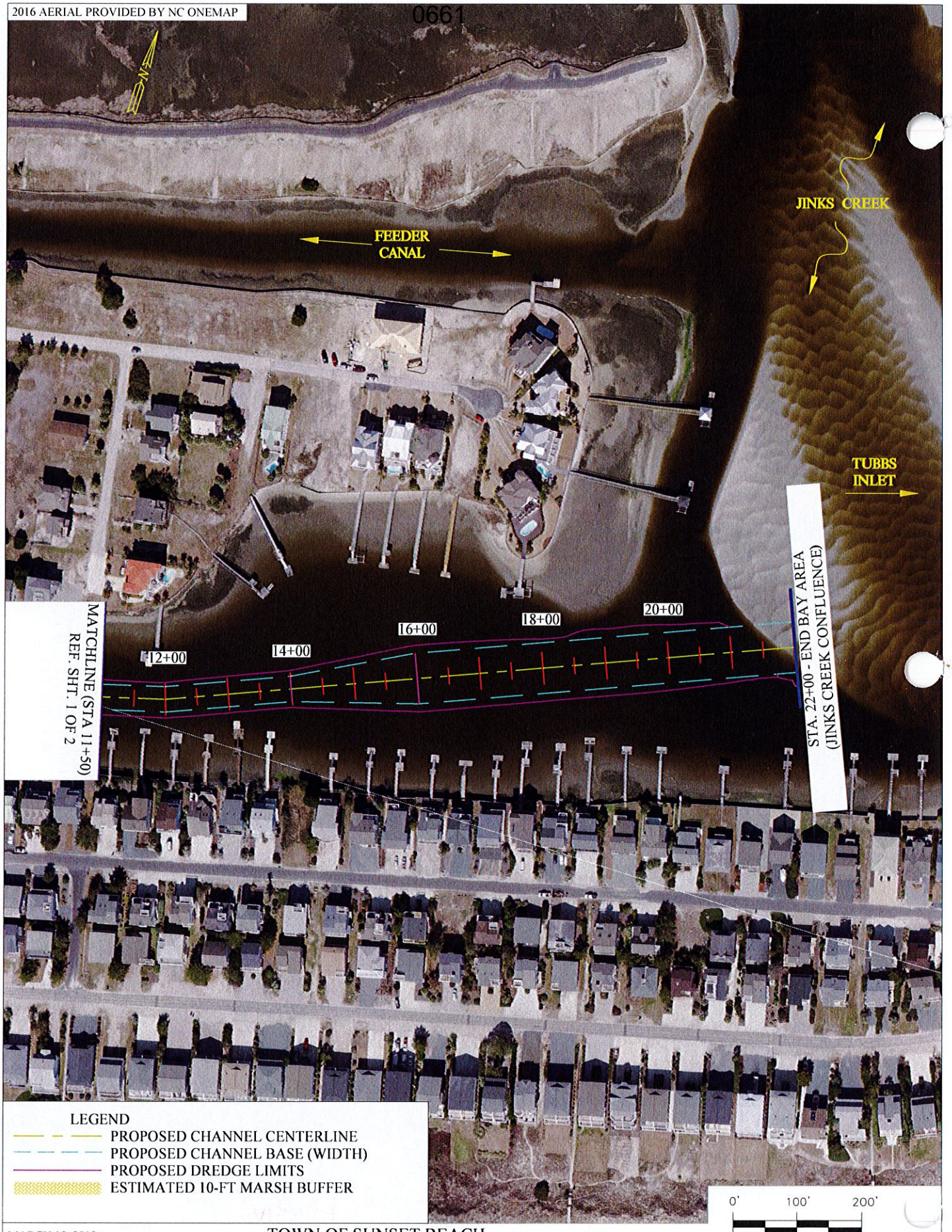
moffatt & nichol

MARCH 19, 2019

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
BAY AREA MARSH EXTENTS
PLAN VIEW

SHT 1 OF 2

moffatt & nichol



MARCH 19, 2019

SHT 2 OF 2

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
BAY AREA MARSH EXTENTS
PLAN VIEW

moffatt & nichol

MARCH 19, 2019

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
FEEDER CHANNEL MARSH EXTENTS
PLAN VIEW

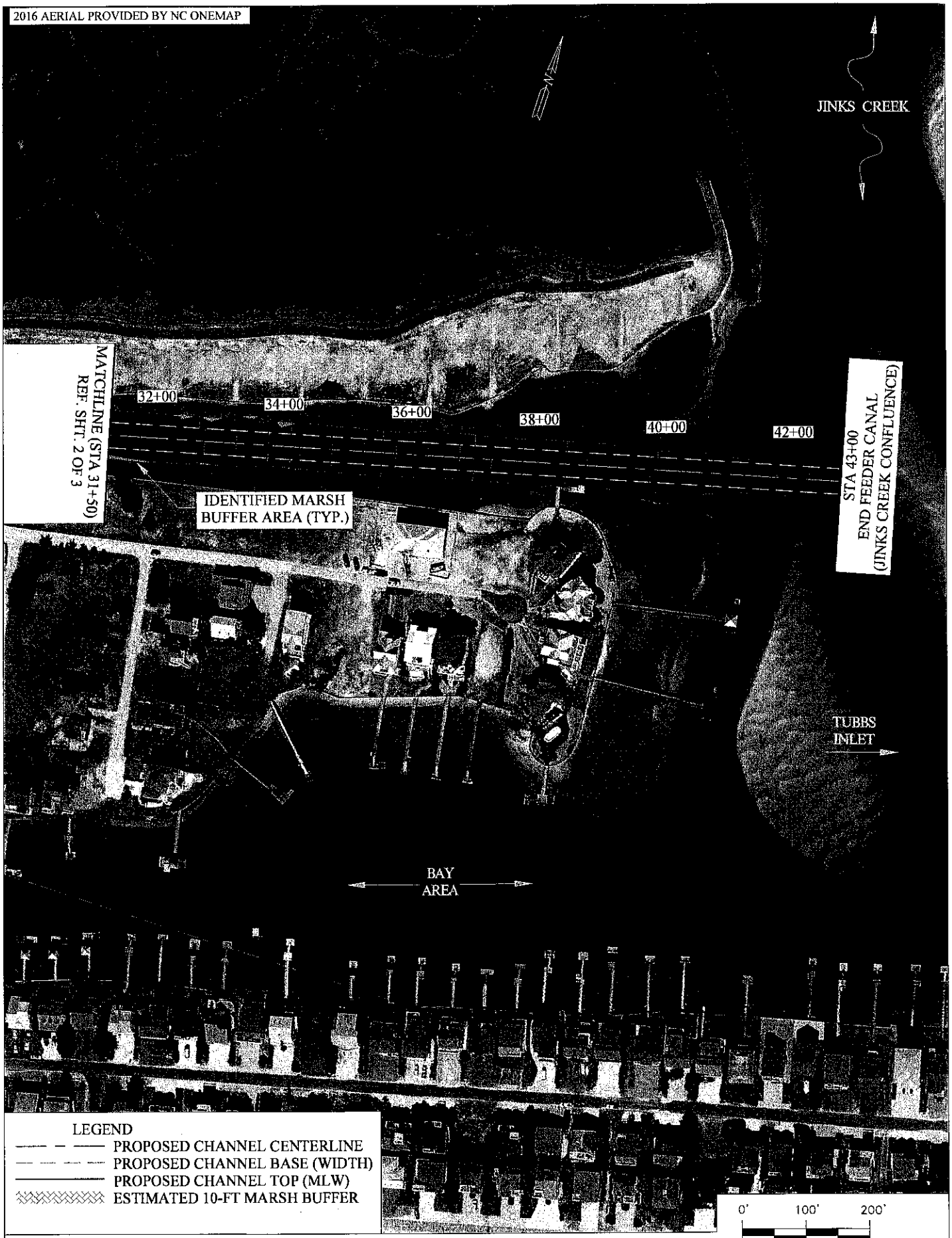
moffatt & nichol

MARCH 19, 2019

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
FEEDER CHANNEL MARSH EXTENTS
PLAN VIEW

SHT 2 OF 3

moffatt & nichol

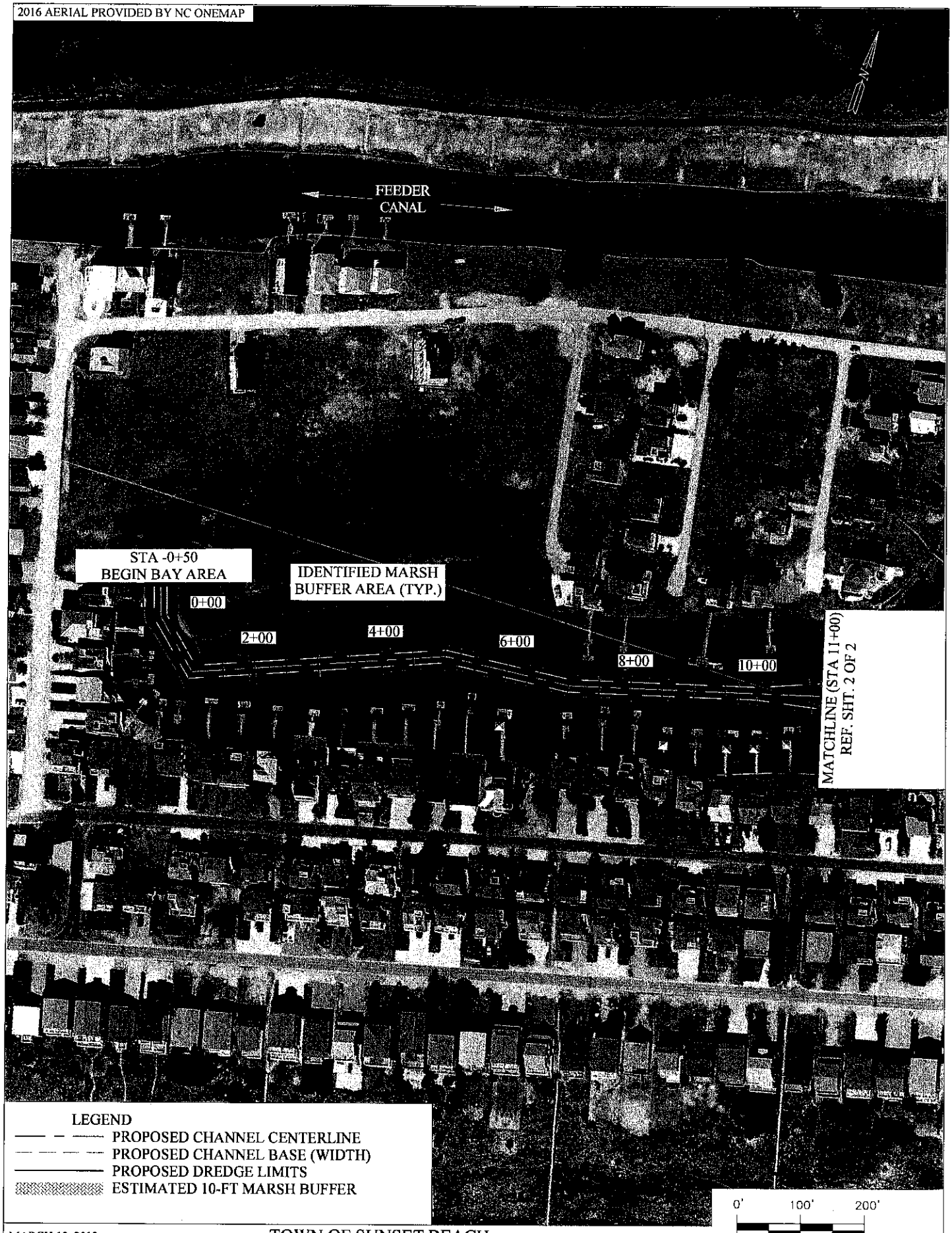


MARCH 19, 2019

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
FEEDER CHANNEL MARSH EXTENTS
PLAN VIEW

SHT 3 OF 3

moffatt & nichol

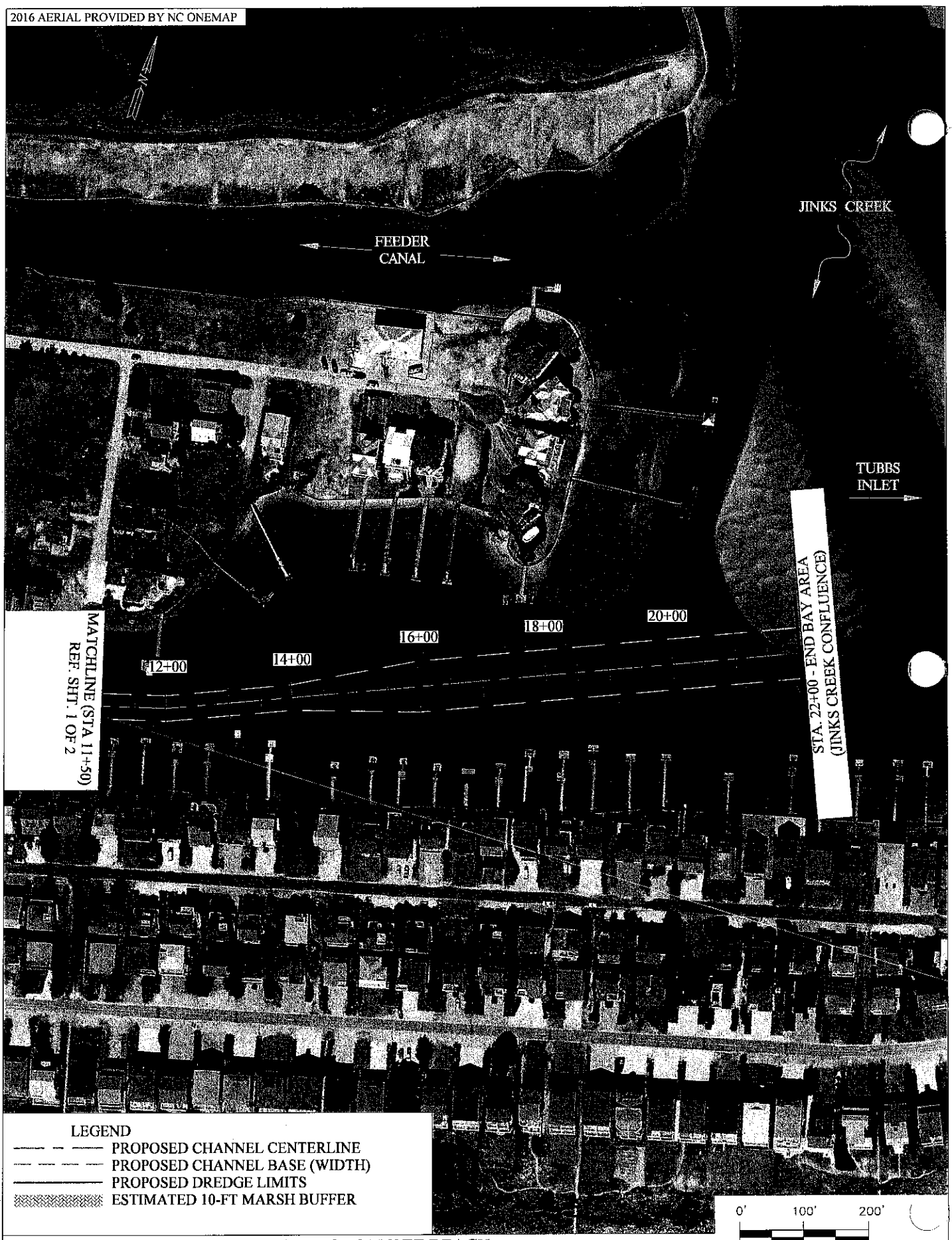


MARCH 19, 2019

SHT 1 OF 2

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
BAY AREA MARSH EXTENTS
PLAN VIEW

moffatt & nichol



MARCH 19, 2019

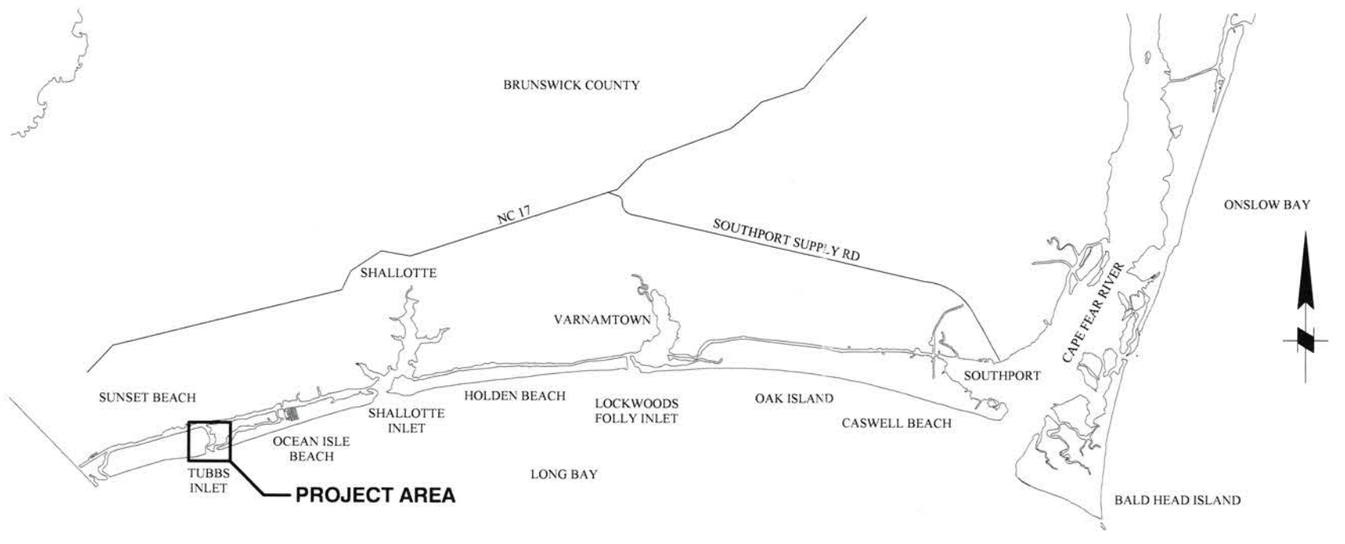
SHT 2 OF 2

TOWN OF SUNSET BEACH
NAVIGATION PROJECT
BAY AREA MARSH EXTENTS
PLAN VIEW

moffatt & nichol

0 10 20
5 15 25
SCALE IN MILES

VICINITY MAP



0 2 4
1 3 5
SCALE IN MILES

LOCATION MAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL** *DATUM:* **MLW** *PREPARED BY:* **MOFFATT & NICHOL**	*PREPARED FOR:* **TOWN OF SUNSET BEACH NORTH CAROLINA** *DATE:* **JANUARY 31, 2019**	*SHEET TITLE:* **VICINITY AND LOCATION MAPS**	*SHEET* **1** *OF* **25**

UPLAND MATERIAL PLACEMENT SITE (LANDFILL FACILITY)

- THE UPLAND MATERIAL PLACEMENT SITE MUST BE INSPECTED AND APPROVED ON-SITE BY A DIVISION OF COASTAL MANAGEMENT (DCM) REPRESENTATIVE PRIOR TO INITIATING ANY MECHANICAL DREDGING ACTIVITIES.
- ALL TRANSFER EQUIPMENT (TRUCKS) SHALL BE MAINTAINED TO PREVENT SPILLAGE DURING MATERIAL TRANSPORT. EQUIPMENT FOUND TO REPEATEDLY ALLOW LEAKAGE DURING TRANSPORT SHALL BE REMOVED FROM THE PROJECT UNTIL SUCH MODIFICATIONS ARE MADE TO ALLOW SPILL FREE TRANSPORT OF THE DREDGE MATERIAL.
- WATER QUALITY CONTROL DEVICES SUCH AS TURBIDITY CURTAINS SHALL BE EFFECTIVELY MAINTAINED SURROUNDING THE MATERIAL OFFLOADING SITE.
- ALL MEASURES SHALL BE TAKEN TO ENSURE EFFLUENT WATERS DO NOT RE-ENTER THE ADJACENT WATERBODY DURING MATERIAL TRANSPORT TO THE LANDFILL FACILITY.
- MATERIAL SPILLAGE OCCURRING OUTSIDE OF THE LANDFILL FACILITY SHALL BE CLEANED IMMEDIATELY UPON DISCOVERY. ALL TRAVEL CORRIDORS AND ROADWAYS SHALL BE INSPECTED AFTER EACH USE TO HELP KEEP THE TRAVEL LANES CLEAN AND MATERIAL FREE.
- AN ATTENDANT SHALL BE PRESENT AT THE MATERIAL OFFLOADING SITE AT ALL TIMES DURING MECHANICAL DREDGING ACTIVITIES. THE ATTENDANT SHALL MONITOR THE PROGRESS OF THE WORK AND SHALL DIRECT INCOMING/OUTGOING TRUCKS TO PLACEMENT LOCATIONS.
- PEDESTRIAN ACCESS SHALL BE PROHIBITED INTO THE MATERIAL OFFLOADING SITE BY A FENCE OR OTHER BARRIER DURING CONSTRUCTION. THE ON-SITE ATTENDANT SHALL MONITOR THE BARRIER AND SHALL STOP WORK IMMEDIATELY IF THE BARRIER FAILS OR APPEARS TO BE FAILING.

Control Table – Feeder Channel & Canal A Centerline		
Station	Easting	Northing
+50	2151045.33	44197.19
7+50	2150846.12	44972.00
8+00	2150869.56	45016.17
9+00	2150957.75	45063.31
10+00	2151048.02	45106.35
13+00	2151338.41	45181.64
18+00	2151817.54	45324.62
20+00	2152003.06	45399.32
23+00	2152287.23	45495.47
43+00	2154225.20	45989.72
	Estimated Volume	
	Design:	15,600 CY
	Overdepth:	9,100 CY
	Total:	24,700 CY

Control Table – Canal B Centerline		
Station	Easting	Northing
-0+25	2151390.58	44287.50
7+00	2151215.60	44991.07
8+50	2151193.87	45139.49
	Estimated Volume	
	Design:	1,400 CY
	Overdepth:	1,400 CY
	Total:	2,800 CY

Control Table – Canal C Centerline		
Station	Easting	Northing
0+00	2151719.24	44405.73
0+50	2151699.58	44451.71
8+50	2151512.98	45229.64
	Estimated Volume	
	Design:	1,300 CY
	Overdepth:	1,200 CY
	Total:	2,500 CY

Control Table – Canal D Centerline		
Station	Easting	Northing
0+00	2152049.19	44472.02
8+75	2151831.87	45319.60
	Estimated Volume	
	Design:	1,500 CY
	Overdepth:	1,300 CY
	Total:	2,800 CY

Control Table – Bay Area Centerline		
Station	Easting	Northing
-0+50	2152308.03	44861.22
0+00	2152323.62	44813.73
1+00	2152397.46	44746.29
5+00	2152770.06	44891.83
7+00	2152969.42	44907.77
12+00	2153451.23	45041.41
22+00	2154376.04	45421.84
	Estimated Volume	
	Design:	11,000 CY
	Overdepth:	4,900 CY
	Total:	15,900 CY

Control Table – South Jinks Creek Centerline		
Station	Easting	Northing
51+00	2154181.90	46199.77
52+50	2154221.68	46055.14
57+50	2154242.07	45555.56
58+00	2154257.39	45507.96
58+50	2154288.65	45468.93
59+00	2154329.49	45440.10
59+50	2154376.04	45421.84
60+00	2154425.91	45418.24
60+50	2154475.91	45417.58
61+00	2154525.78	45421.20
61+50	2154575.57	45425.73
64+75	2154892.10	45499.44
68+50	2155267.05	45505.52
	Estimated Volume	
	Design:	32,300 CY
	Overdepth:	8,200 CY
	Total:	40,500 CY

NOTE:
COORDINATES IN CONTROL TABLES REFERENCE STATE PLANE NAD83 (FEET)

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

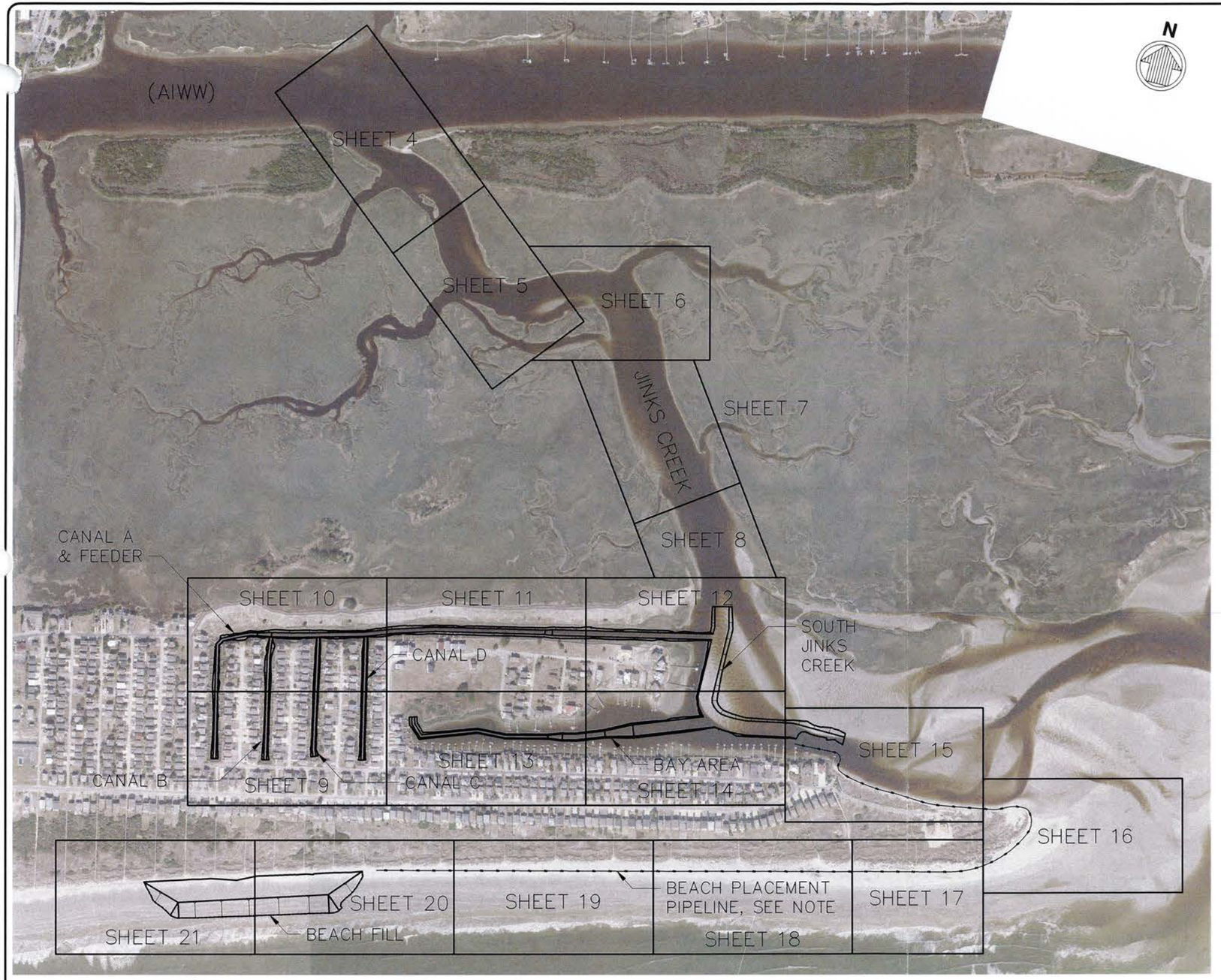
PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

GENERAL NOTES

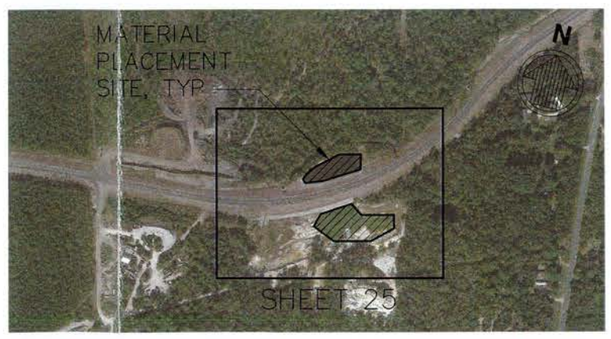
SHEET **2** *OF* **25**



2016 AERIALS BY NC ONEMAP

NOTES: (BEACH PLACEMENT)

- BEACH PLACEMENT PIPELINE SHALL BE POSITIONED WITHIN 20–FT OF THE DUNE TOE ADJACENT TO THE VEGETATION LINE. THE PIPELINE SHALL NOT BE ALLOWED TO COVER VEGETATION. THE PIPELINE SHALL BE COVERED BY A SAND RAMP AT DESIGNATED BEACH ACCESS CROSSINGS TO HELP FACILITATE PEDESTRIAN ACCESS.
- THE CONTRACTOR SHALL INSPECT THE BEACH PLACEMENT PIPELINE A MINIMUM OF ONCE EVERY 4 HOURS OF OPERATION FOR LEAKS OR MATERIAL SPILLS. WHEN A LEAK IS DISCOVERED ALL OPERATIONS SHALL CEASE UNTIL REPAIRS ARE COMPLETED TO STOP THE MATERIAL SPILLAGE.
- ALONG NAVIGABLE WATERWAYS, OR BAY SIDE OF SUNSET BEACH, THE PIPELINE SHALL BE POSITIONED ABOVE MHW AND AS LANDWARD AS POSSIBLE WITHOUT TRAVERSING OVER VEGETATION OR THE DUNE FEATURE.
- IF THE PIPELINE CANNOT BE POSITIONED ABOVE MHW DUE TO DOCKS OR OTHER STRUCTURES, THE PIPELINE SHALL BE MARKED WITH BUOYS AND LIGHTS A MINIMUM OF EVERY 500–FT, OR AS RECOMMENDED BY THE USCG.
- THE PIPELINE WILL CROSS ALL NAVIGABLE WATERWAYS PERPENDICULAR TO THE DIRECTIONS OF TRAVEL TO MINIMIZE THE PIPELINE LENGTH WITHIN THE NAVIGATION CHANNEL. THE PIPELINE WILL BE ANCHORED IN THE DEEPEST DEPTH AVAILABLE TO NOT BLOCK NAVIGATION AND WILL HAVE BUOYS ATTACHED APPROXIMATELY EVERY 25–FEET ALONG EACH CROSSING TO IDENTIFY ITS PRESENCE. THE PIPELINE SHALL NOT BE ALLOWED TO CROSS NAVIGABLE WATERS WITH LESS THAN FOUR (4) FEET OF DRAFT REMAINING OVER THE SUBMERGED LINE.
- SIGNAGE SHALL ALSO BE PROVIDED AND VISIBLE FROM BOTH DIRECTIONS OF TRAVEL TO MARK ALL NAVIGATION CROSSINGS.



PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

KEY MAP

400' 0' 400' 800'

SCALE: 1"=800'

SHEET **3** *OF* **25**

LEGEND

— — (-5) — — MAJOR CONTOUR

– – – – – – – – MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL** *DATUM:* **MLW** *PREPARED BY:* **MOFFATT & NICHOL**	*PREPARED FOR:* **TOWN OF SUNSET BEACH NORTH CAROLINA** *DATE:* **JANUARY 31, 2019**	*SHEET TITLE:* **N. JINKS CREEK EXISTING CONDITIONS - SHEET 1 OF 5** 50' 0' 50' 100' SCALE: 1"=100'	*SHEET* **4** *OF* **25**

MATCHLINE, SHEET 6

MATCHLINE, SHEET 4

N

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APR 12 2019
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LEGEND

— — (-5) — — MAJOR CONTOUR

– – – – – – – – MINOR CONTOUR

NOTES:

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2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL** *DATUM:* **MLW** *PREPARED BY:* **MOFFATT & NICHOL**	*PREPARED FOR:* **TOWN OF SUNSET BEACH NORTH CAROLINA** *DATE:* **JANUARY 31, 2019**	*SHEET TITLE:* **N. JINKS CREEK EXISTING CONDITIONS -SHEET 2 OF 5** 50' 0' 50' 100' SCALE: 1"=100'	*SHEET* **5** *OF* **25**

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— — (-5) — — MAJOR CONTOUR

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2016 AERIALS BY NC ONEMAP

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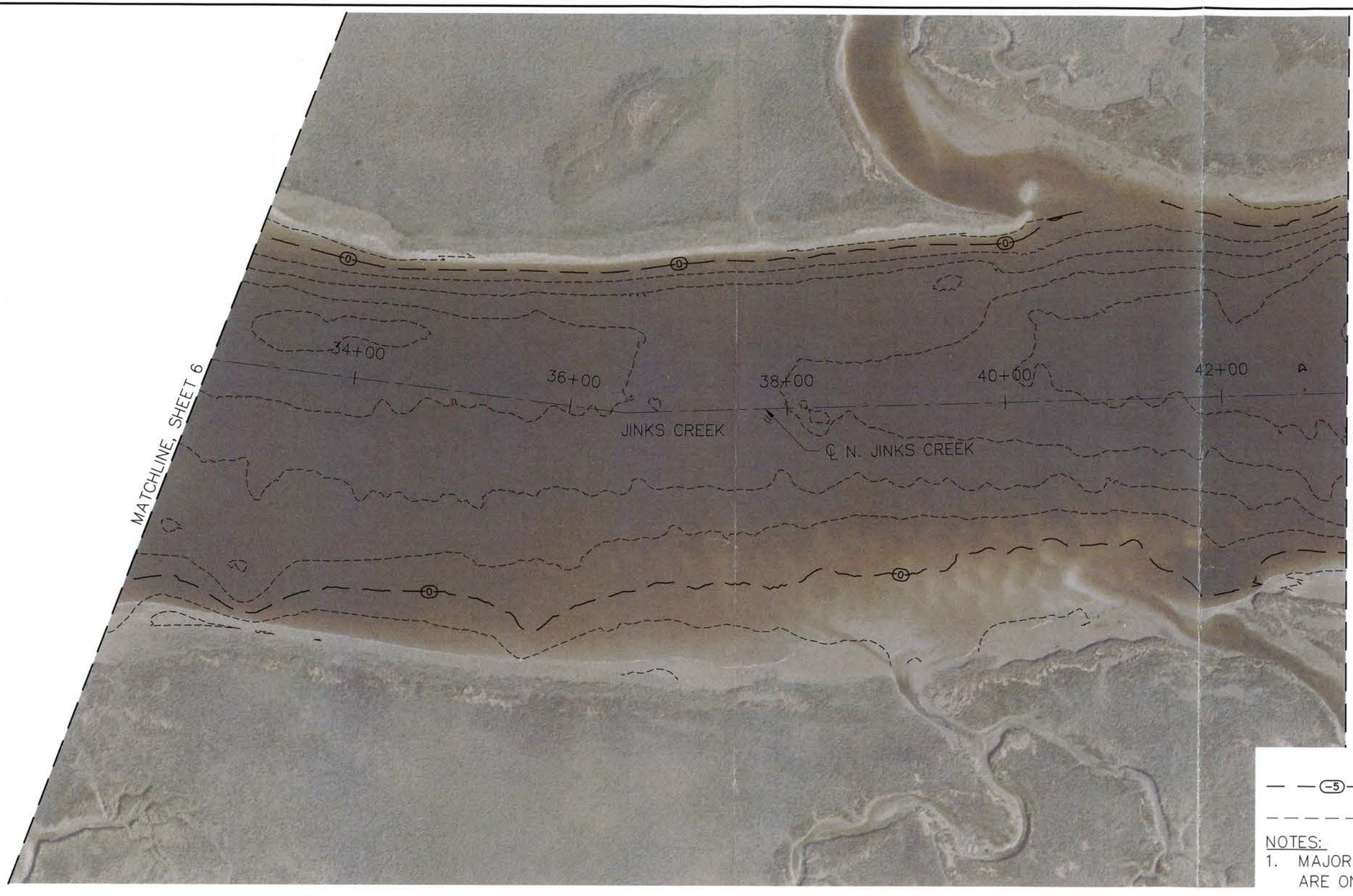

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LEGEND

— — -5 — — MAJOR CONTOUR

– – – – – – – – MINOR CONTOUR

NOTES:

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2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

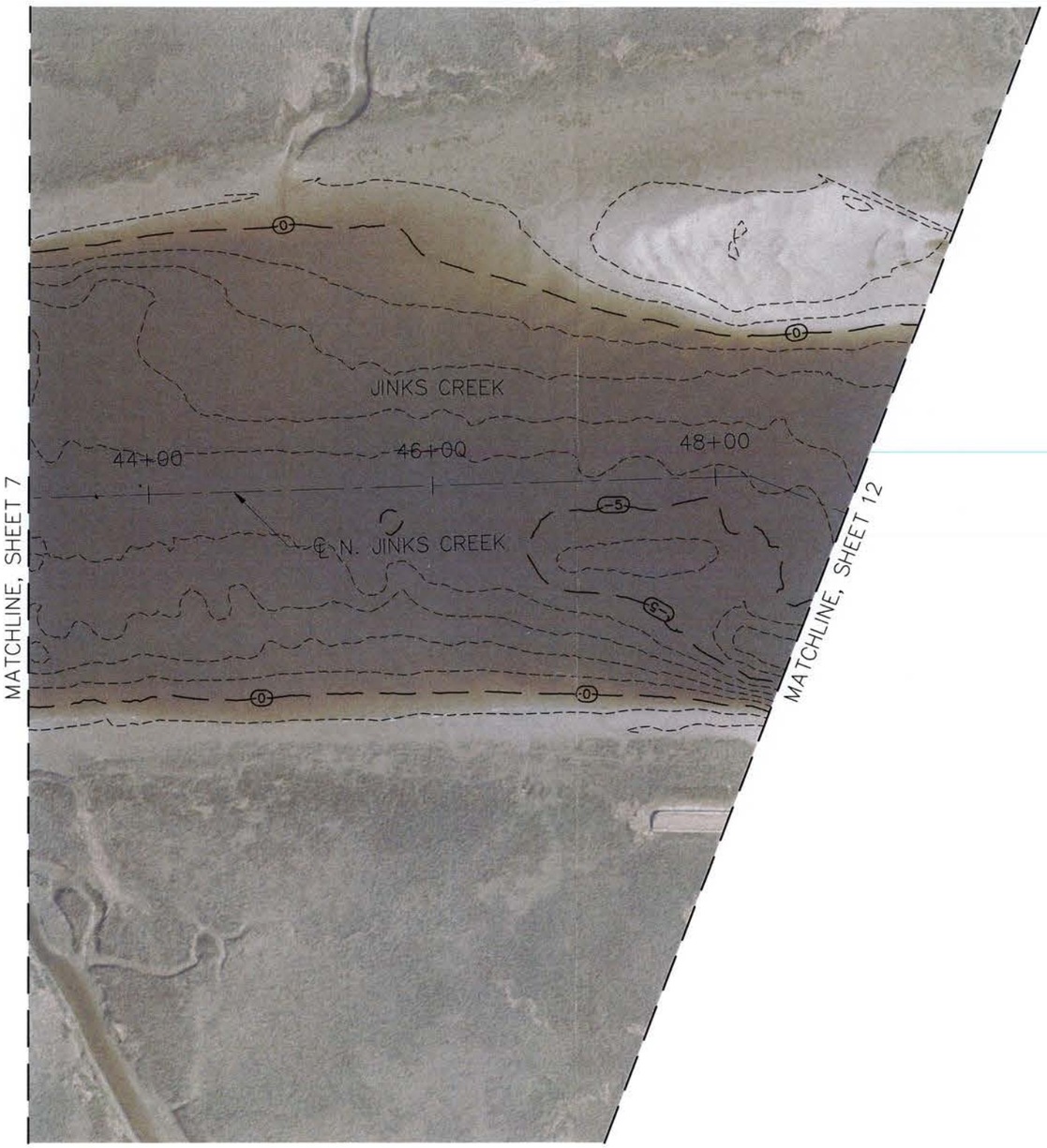
SHEET TITLE:

N. JINKS CREEK EXISTING CONDITIONS - SHEET 4 OF 5

50' 0' 50' 100'

SCALE: 1"=100'

SHEET **7** *OF* **25**



RECEIVED

APR 12 2019

DCM WILMINGTON, NC

LEGEND

— —(-5)— — MAJOR CONTOUR

– – – – – – – – MINOR CONTOUR

NOTES:

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2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

N. JINKS CREEK EXISTING CONDITIONS - SHEET 5 OF 5

50' 0' 50' 100'

SCALE: 1"=100'

SHEET **8** *OF* **25**

LEGEND

— — (-5) — — MAJOR CONTOUR

– – – – – – – – MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

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2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

DREDGE AREA WORK PLAN - SHEET 1 OF 13

50' 0' 50' 100'

SCALE: 1"=100'

SHEET **9** *OF* **25**

2016 AERIALS BY NC ONEMAP

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2016 AERIALS BY NC ONEMAP

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APR 12 2019
DCM WILMINGTON, NC

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL** *DATUM:* **MLW** *PREPARED BY:* **MOFFATT & NICHOL**	*PREPARED FOR:* **TOWN OF SUNSET BEACH NORTH CAROLINA** *DATE:* **JANUARY 31, 2019**	*SHEET TITLE:* **DREDGE AREA WORK PLAN - SHEET 3 OF 13** 80' 0' 80' 160' SCALE: 1"=160'	*SHEET* **11** *OF* **25**

MATCHLINE, SHEET 8

MATCHLINE, SHEET 11

RIVERSIDE DR

34+00

36+00

38+00

40+00

42+00

43+00

50+00

51+00

53+00

55+00

40'

100'

FEEDER CHANNEL
3:1 SIDE SLOPES
BOTTOM EL -5.0

DREDGE
LIMITS, TYP

C
22

G
23

N SHORE DR

19TH ST

SOUTH JINKS CREEK
5:1 SIDE SLOPES
BOTTOM EL -5.0

N

LEGEND

-5 MAJOR CONTOUR

MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

MATCHLINE, SHEET 14

2016 AERIALS BY NC ONEMAP

RECEIVED
APR 12 2019
DCM WILMINGTON, NC

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

DREDGE AREA WORK PLAN - SHEET 4 OF 13

80' 0' 80' 160'

SCALE: 1"=160'

SHEET **12** *OF* **25**

MATCHLINE, SHEET 11

N

BAY AREA
3:1 SIDE SLOPES
BOTTOM EL -5.0

DREDGE LIMITS, TYP

0+00
2+00
4+00
6+00
8+00
10+00
12+00
20'
40'

D
22

E
23

MATCHLINE, SHEET 9

MATCHLINE, SHEET 14

CANAL DR

E MAIN ST

2016 AERIALS BY NC ONEMAP

LEGEND

— —(-5)— — MAJOR CONTOUR

– – – – – – – – MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

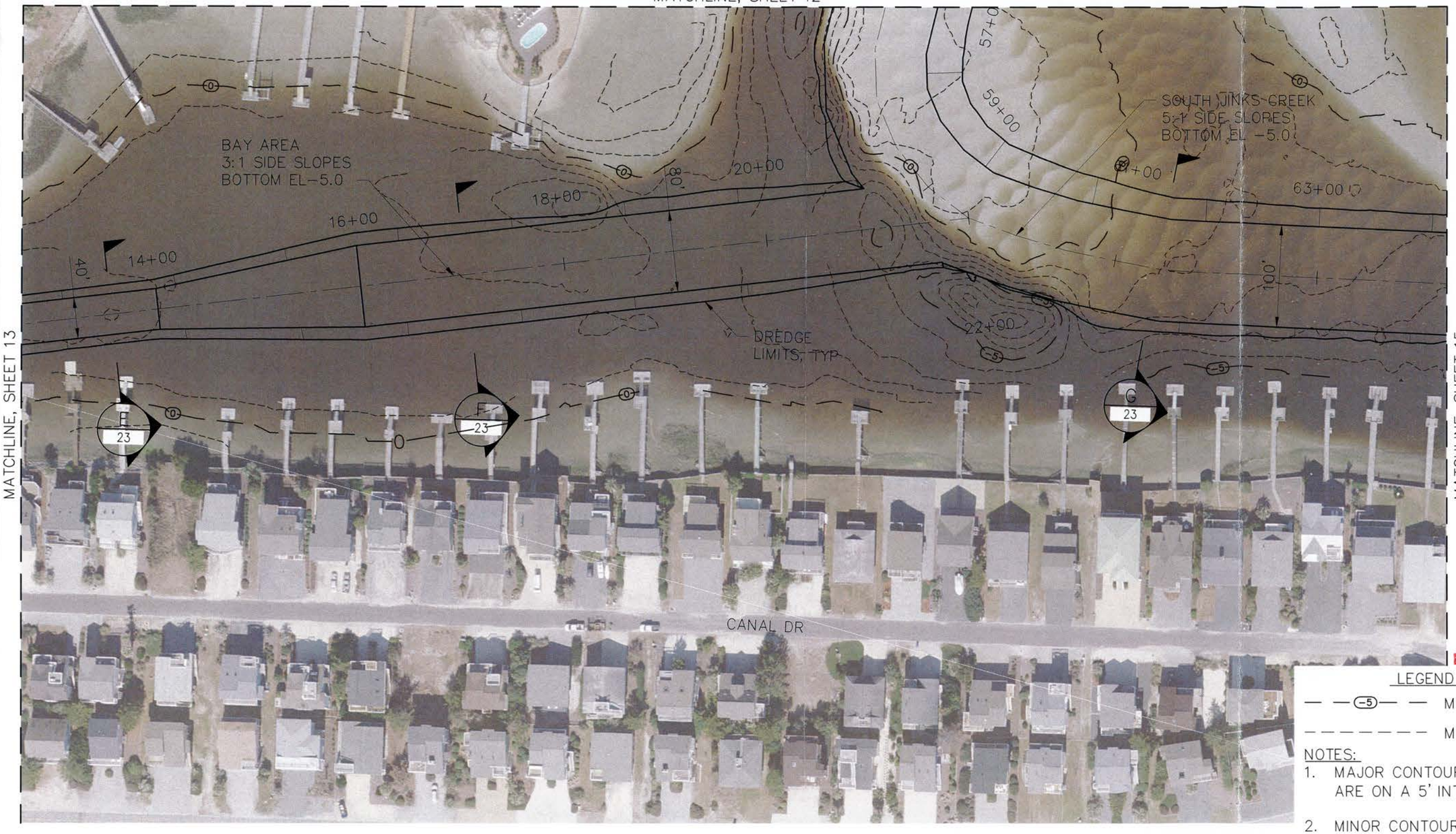
DREDGE AREA WORK PLAN - SHEET 5 OF 13

80' 0' 80' 160'

SCALE: 1"=160'

SHEET **13** *OF* **25**

MATCHLINE, SHEET 12



MATCHLINE, SHEET 13

MATCHLINE, SHEET 15

N

RECEIVED
APR 12 2019
DCM WILMINGTON, NC

LEGEND

— — (-5) — — MAJOR CONTOUR

– – – – – – – – MINOR CONTOUR

NOTES:

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2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL** *DATUM:* **MLW** *PREPARED BY:* **MOFFATT & NICHOL**	*PREPARED FOR:* **TOWN OF SUNSET BEACH NORTH CAROLINA** *DATE:* **JANUARY 31, 2019**	*SHEET TITLE:* **DREDGE AREA WORK PLAN - SHEET 6 OF 13** 80' 0' 80' 160' SCALE: 1"=160'	*SHEET* **14** *OF* **25**

LEGEND

— — (-5) — — MAJOR CONTOUR

– – – – – – – – MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

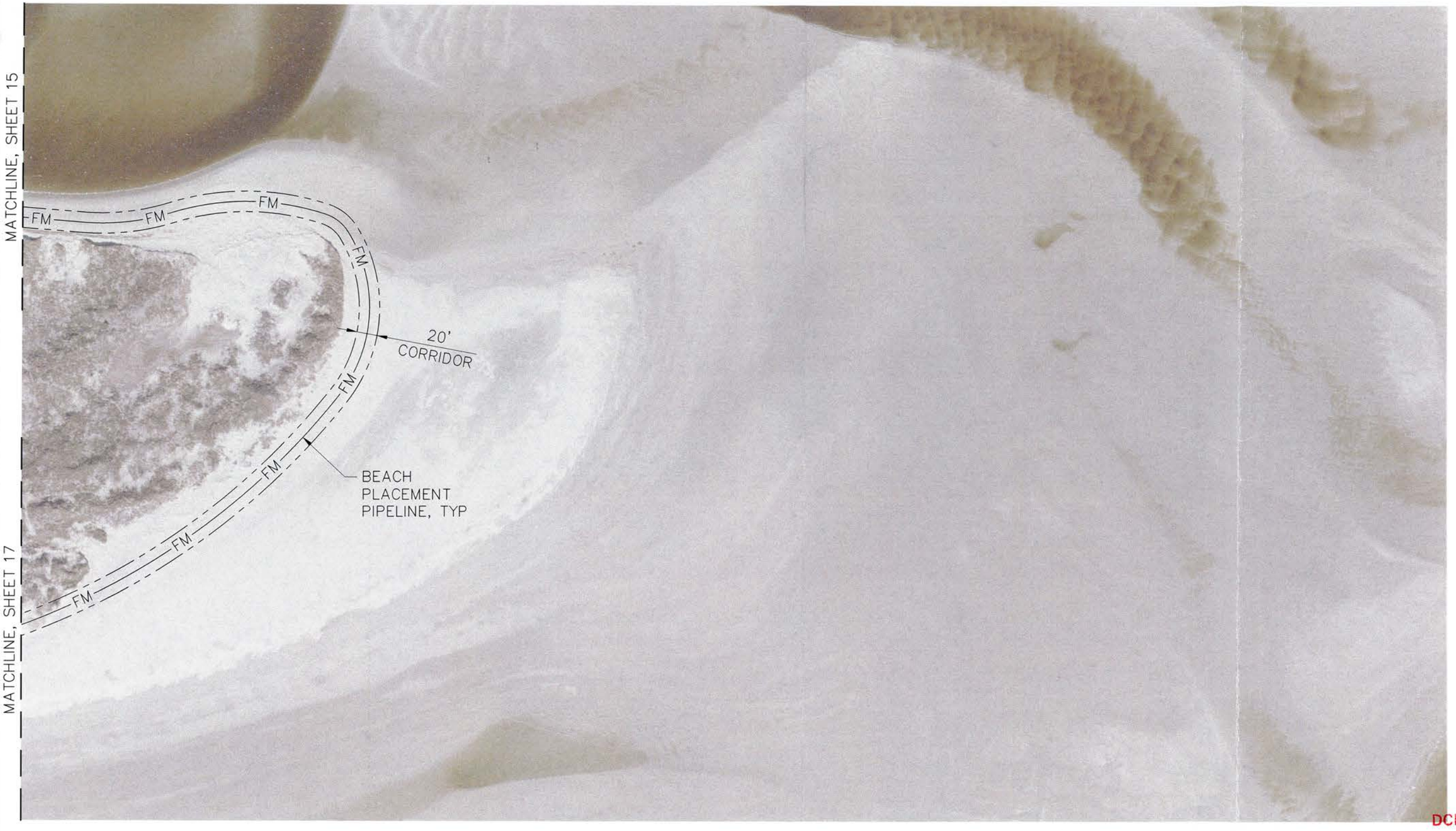
2016 AERIALS BY NC ONEMAP

RECEIVED

APR 12 2019

DCM WILMINGTON, NC

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL** *DATUM:* **MLW** *PREPARED BY:* **MOFFATT & NICHOL**	*PREPARED FOR:* **TOWN OF SUNSET BEACH NORTH CAROLINA** *DATE:* **JANUARY 31, 2019**	*SHEET TITLE:* **DREDGE AREA WORK PLAN - SHEET 7 OF 13** 80' 0' 80' 160' SCALE: 1"=160'	*SHEET* **15** *OF* **25**



2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

DREDGE AREA WORK PLAN - SHEET 8 OF 13

80' 0' 80' 160'

SCALE: 1"=160'

SHEET **16** *OF* **25**

2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

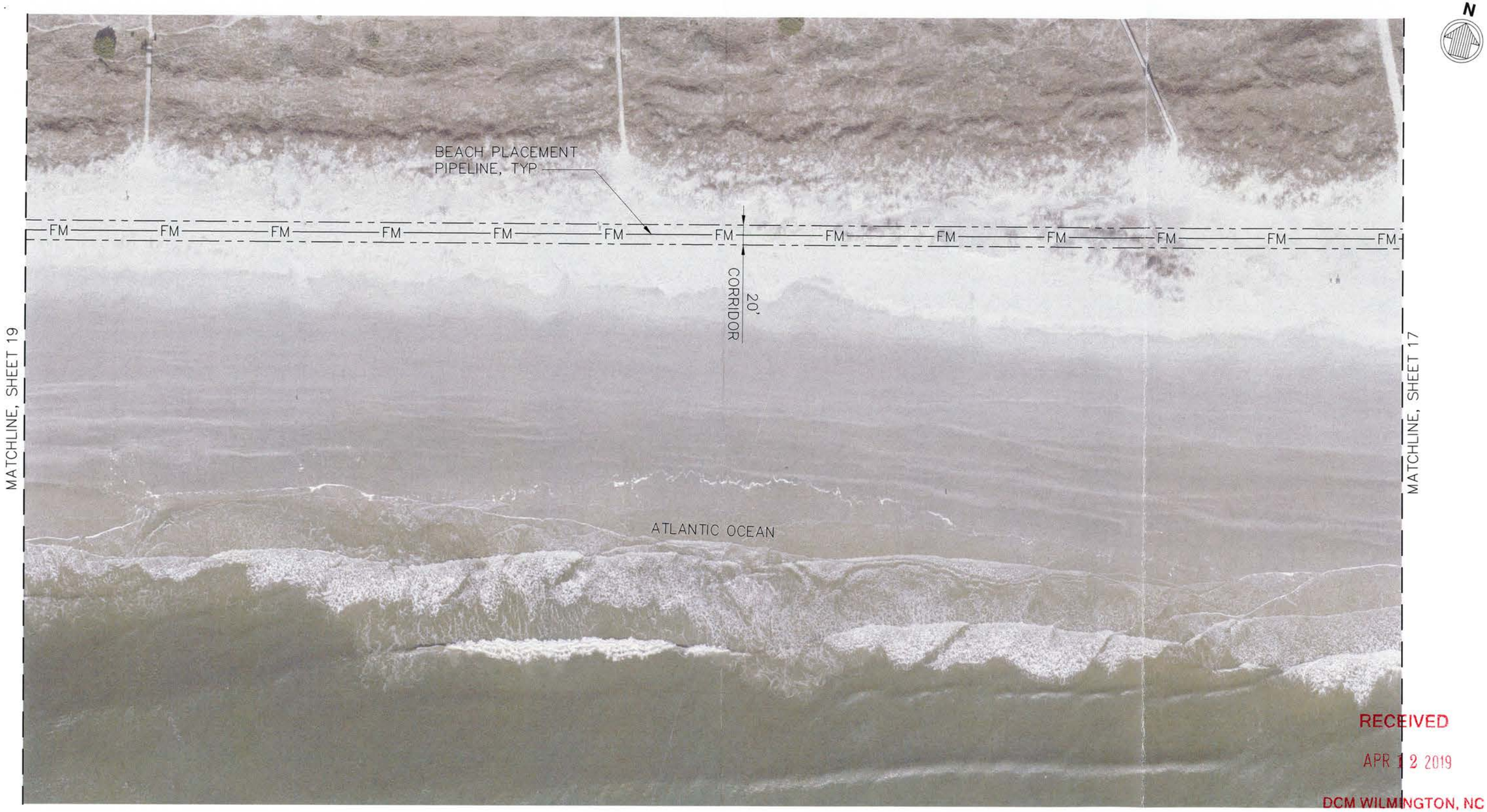
SHEET TITLE:

DREDGE AREA WORK PLAN - SHEET 9 OF 13

50' 0' 50' 100'

SCALE: 1"=100'

SHEET **17** *OF* **25**



2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

DREDGE AREA WORK PLAN - SHEET 10 OF 13

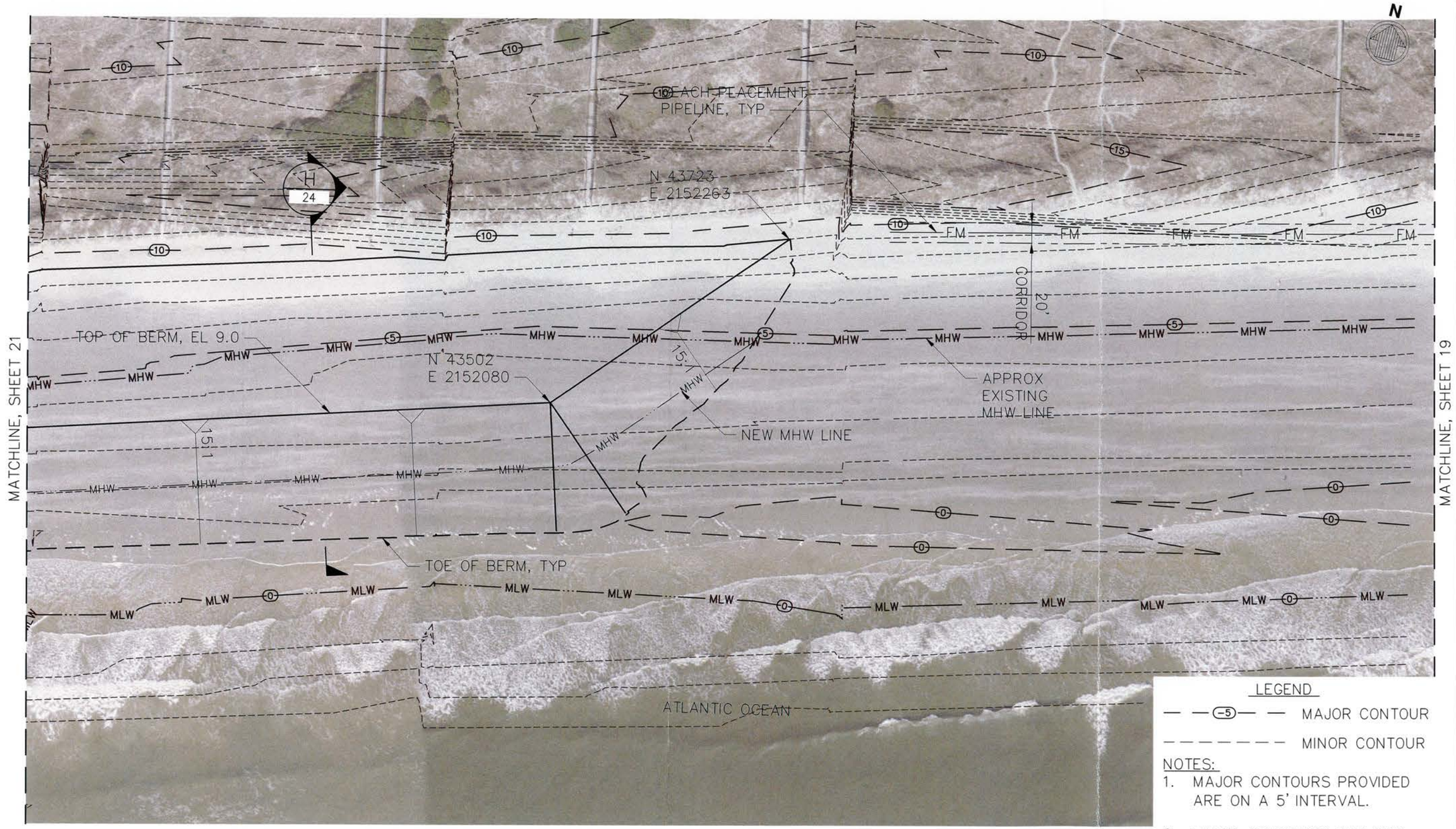
50' 0' 50' 100'

SCALE: 1"=100'

SHEET **18** *OF* **25**

2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL** *DATUM:* **MLW** *PREPARED BY:* **MOFFATT & NICHOL**	*PREPARED FOR:* **TOWN OF SUNSET BEACH NORTH CAROLINA** *DATE:* **JANUARY 31, 2019**	*SHEET TITLE:* **DREDGE AREA WORK PLAN - SHEET 11 OF 13** 50' 0' 50' 100' SCALE: 1"=100'	*SHEET* **19** *OF* **25**



LEGEND

— — (-5) — — MAJOR CONTOUR

– – – – – – – – MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

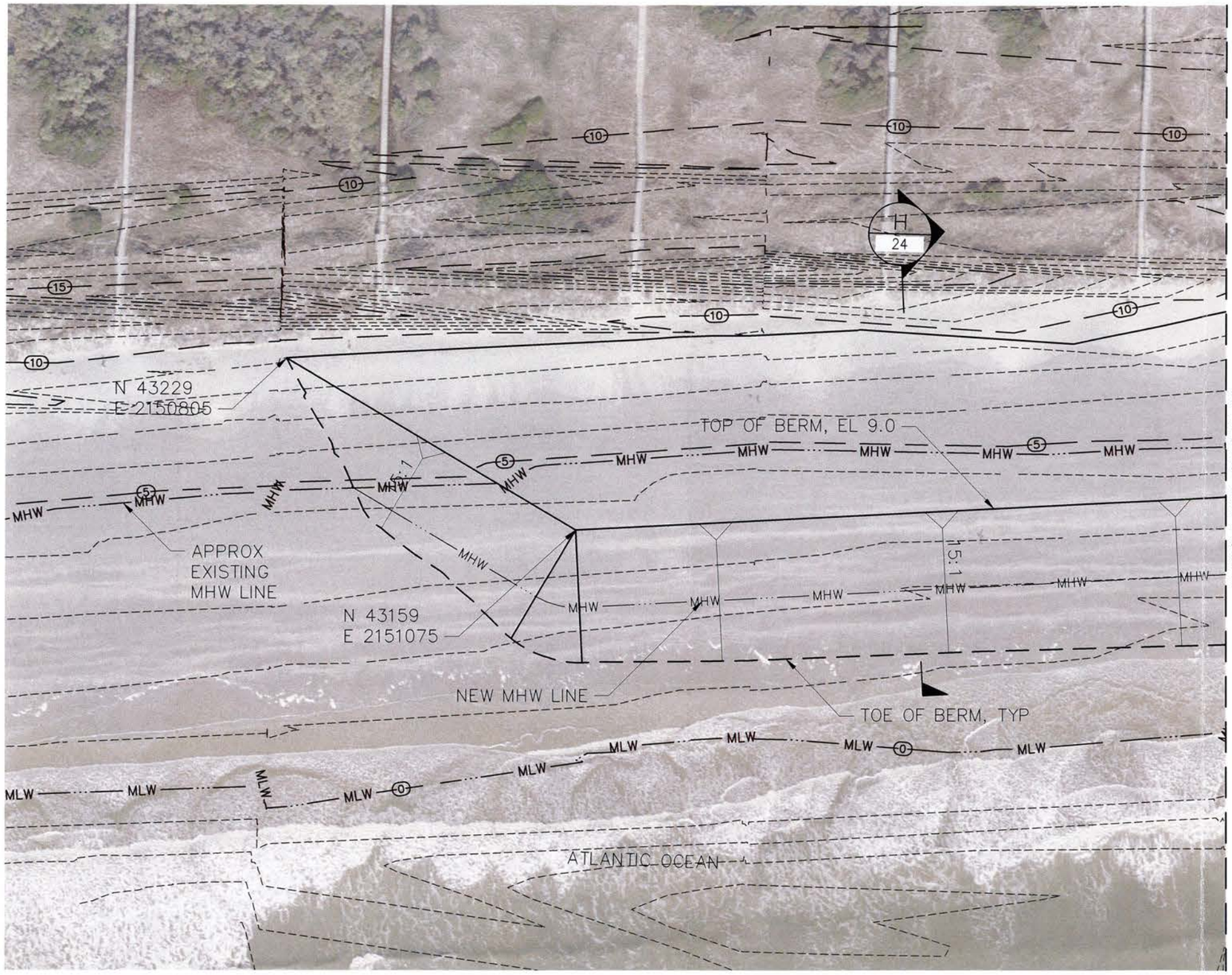
SHEET TITLE:

DREDGE AREA WORK PLAN - SHEET 12 OF 13

50' 0' 50' 100'

SCALE: 1"=100'

SHEET **20** *OF* **25**



LEGEND

— — -5 — — MAJOR CONTOUR

– – – – – – – – MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

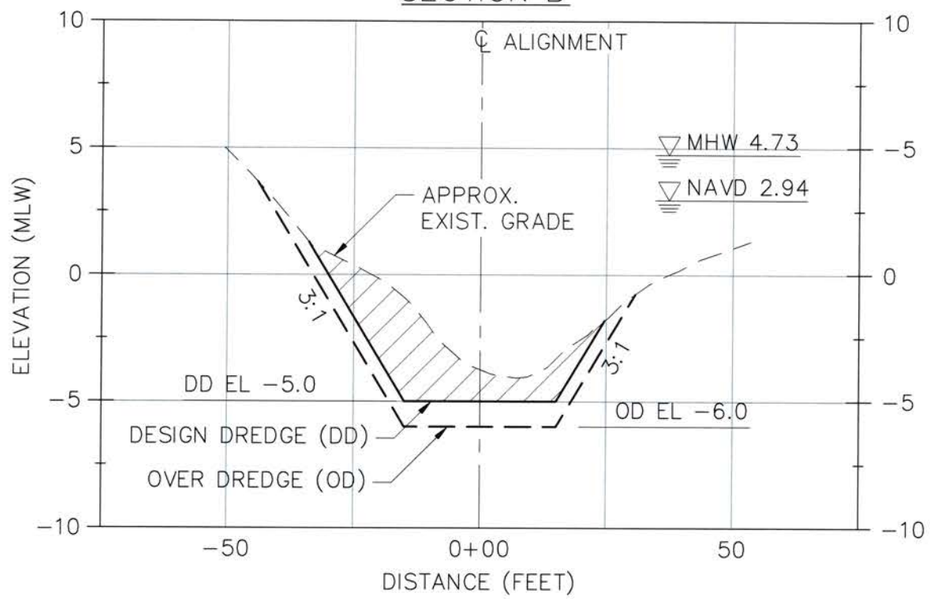
DREDGE AREA WORK PLAN - SHEET 13 OF 13

50' 0' 50' 100'

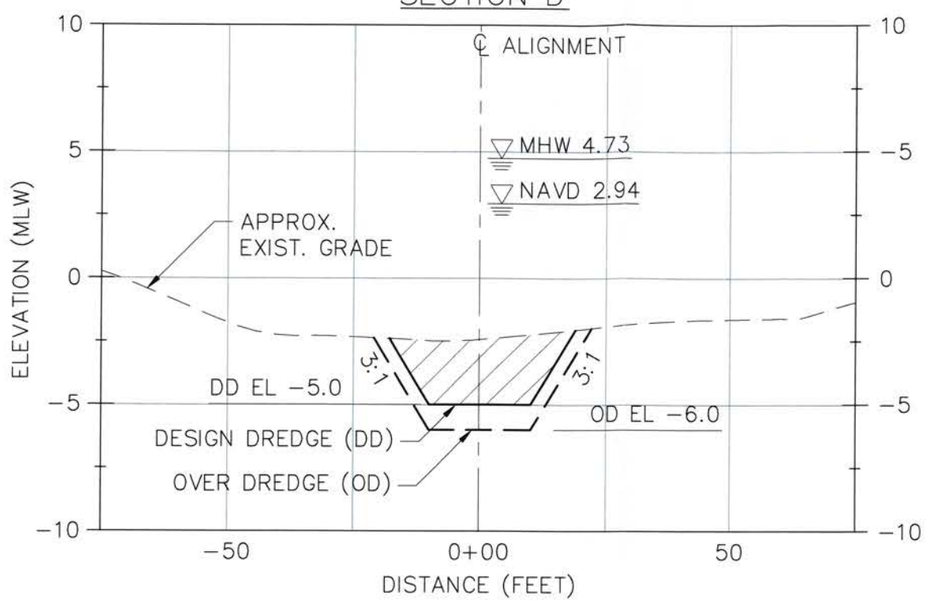
SCALE: 1"=100'

SHEET **21** *OF* **25**

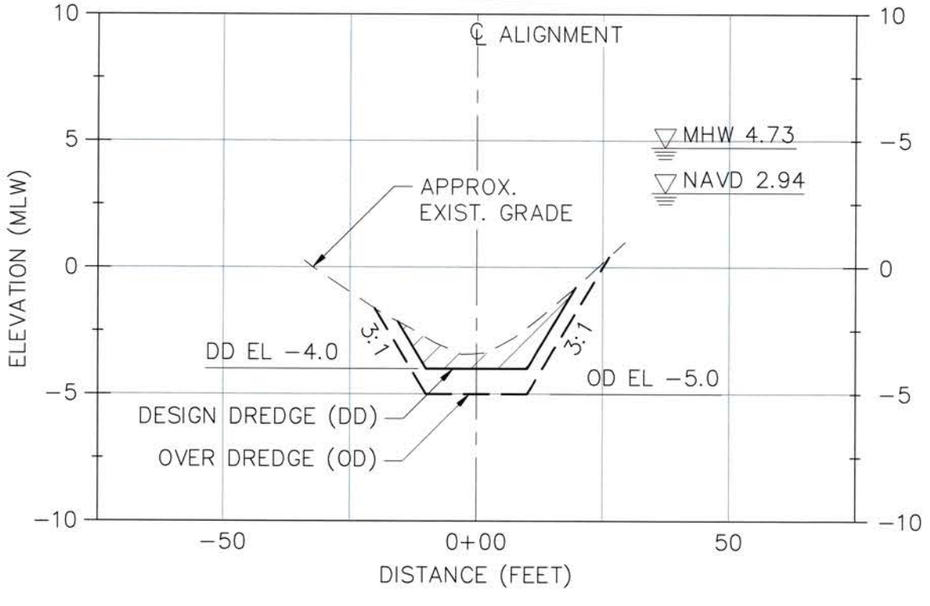
SECTION B



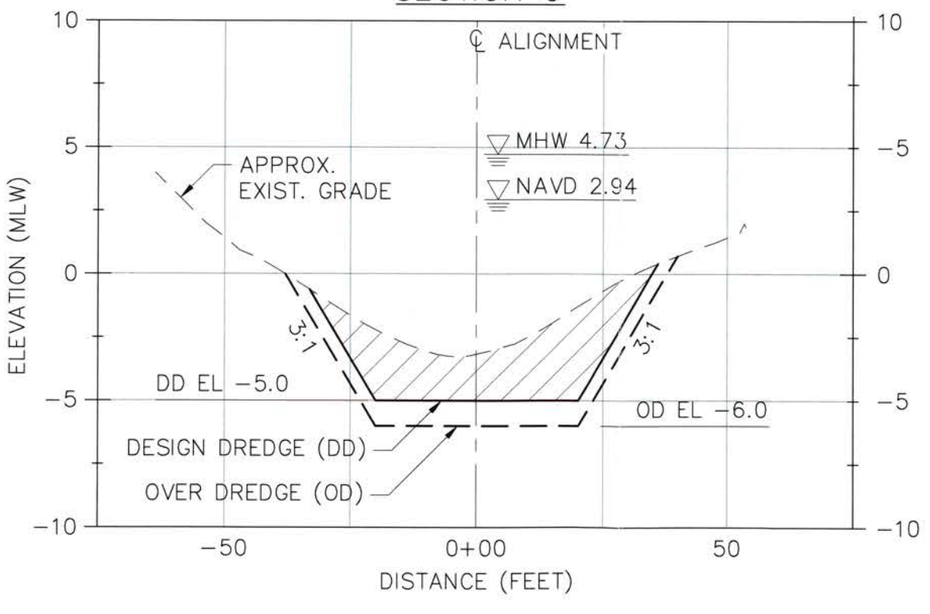
SECTION D



SECTION A



SECTION C



PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

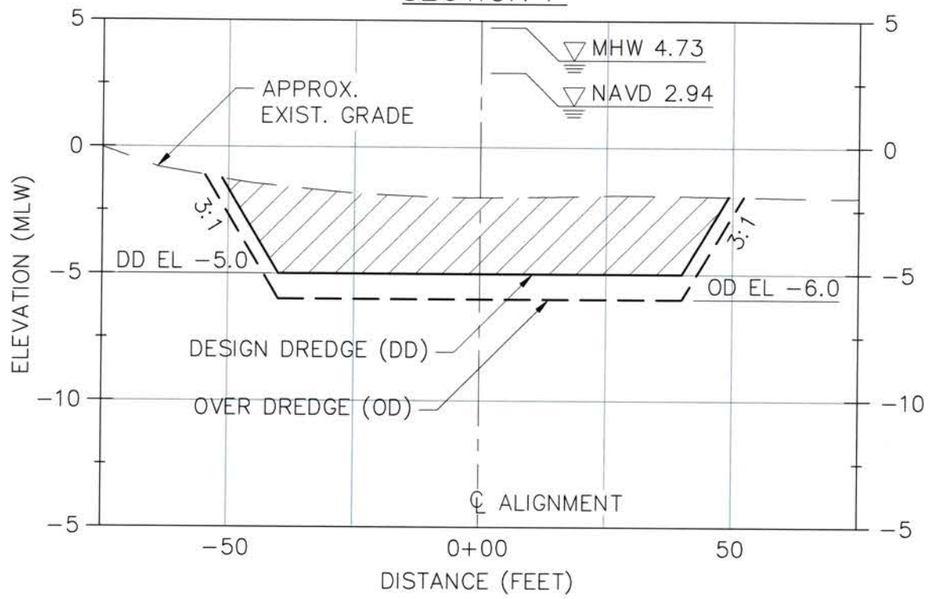
TYPICAL SECTIONS - SHEET 1 OF 3

3' 0' 3' 6' VERTICAL: 1"=6'

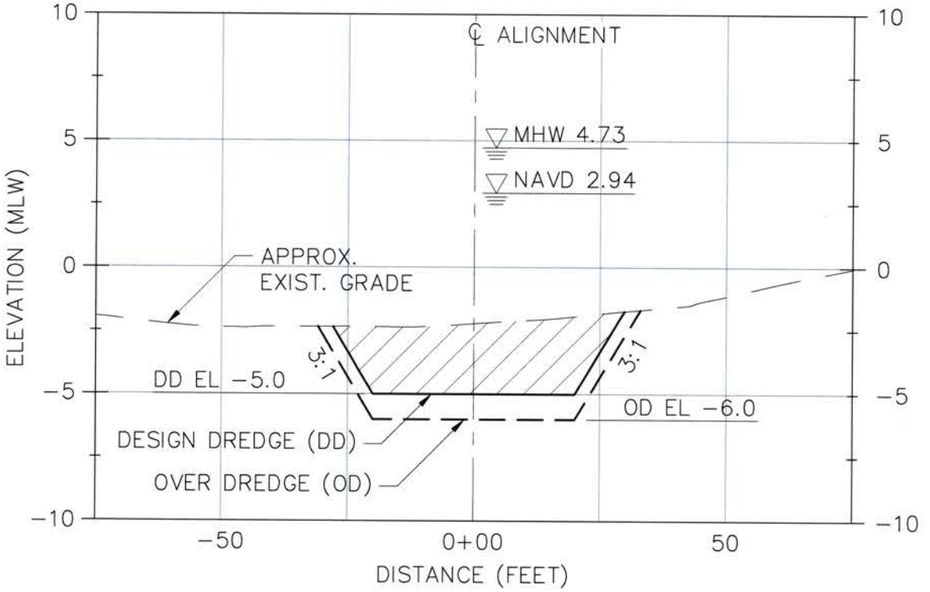
15' 0' 15' 30' HORIZONTAL: 1"=30'

SHEET **22** *OF* **25**

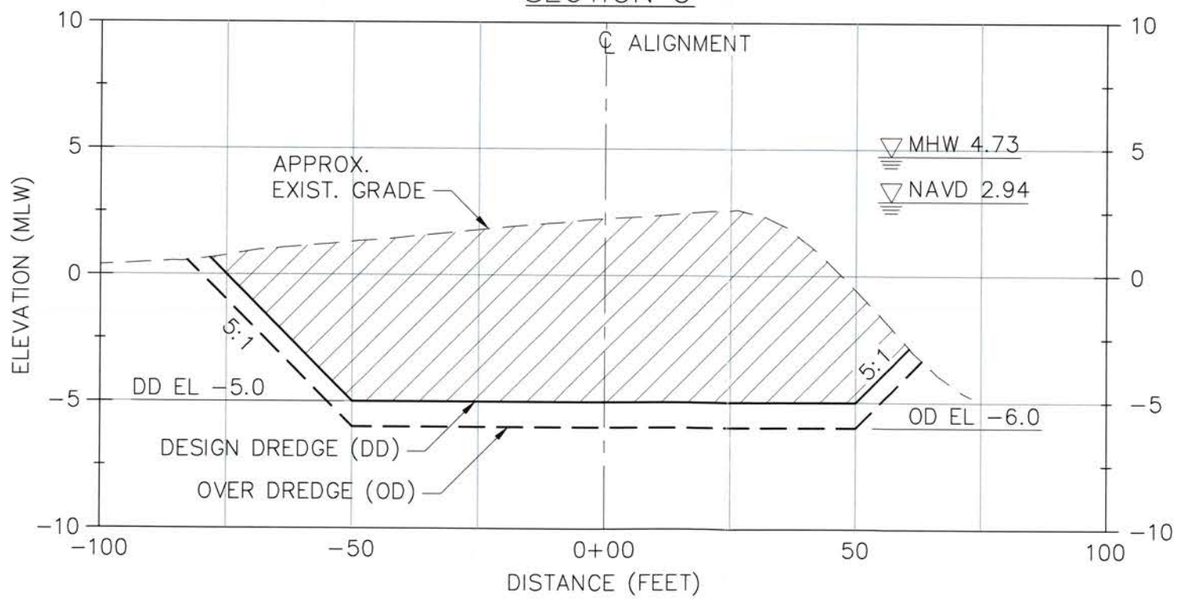
SECTION F



SECTION E



SECTION G



PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

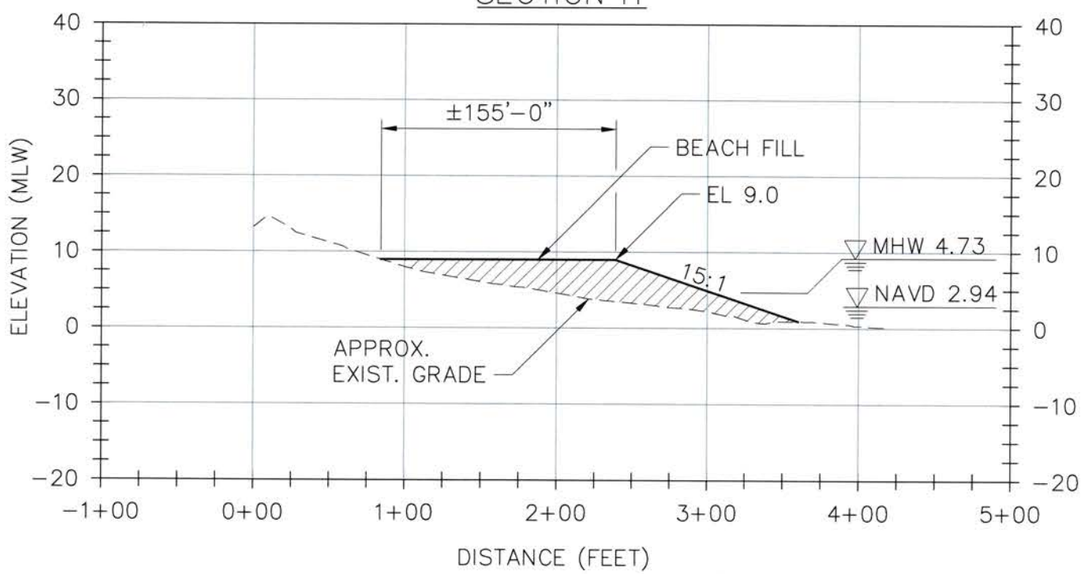
TYPICAL SECTIONS - SHEET 2 OF 3

3' 0' 3' 6' VERTICAL: 1"=6'

15' 0' 15' 30' HORIZONTAL: 1"=30'

SHEET **23** *OF* **25**

SECTION H



PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL** *DATUM:* **MLW** *PREPARED BY:* **MOFFATT & NICHOL**	*PREPARED FOR:* **TOWN OF SUNSET BEACH NORTH CAROLINA** *DATE:* **JANUARY 31, 2019**	*SHEET TITLE:* **TYPICAL SECTIONS - SHEET 3 OF 3** 50' 0' 50' 100' SCALE: 1"=100'	*SHEET* **24** *OF* **25**

MATERIAL PLACEMENT VICINITY MAP
1"=3000'

2016 AERIALS BY NC ONEMAP

MATERIAL PLACEMENT SITE PLAN
1"=500'

TRANSPORTATION NOTES:

- CONTRACTOR SHALL PREVENT SPILLAGE OF MATERIAL ONTO PUBLIC LANDS, INCLUDING HIGHWAYS, ROADS, AND PRIVATE PROPERTY.
- THE CONTRACTOR SHALL INSPECT THE TRAVEL ROUTE USED TO TRANSPORT MATERIAL TO THE MATERIAL PLACEMENT SITE AFTER EACH USE. ANY SPILLS OR DREDGE SEDIMENT FOUND ALONG THE TRAVEL ROUTE SHALL BE IMMEDIATELY CLEANED AND REMOVED FROM THE ROADWAY AND TRANSPORTED TO THE MATERIAL PLACEMENT SITE.
- THE CONTRACTOR SHALL ABIDE BY ALL NCDOT STANDARDS FOR HAULING SPOIL MATERIAL ALONG THE ROADWAYS.
- THE CONTRACTOR SHALL CLEAN ALL TRUCKS, WHEELS, AND HAULING EQUIPMENT AS NECESSARY TO PREVENT TRACKING MATERIAL ONTO THE ROADWAYS.

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

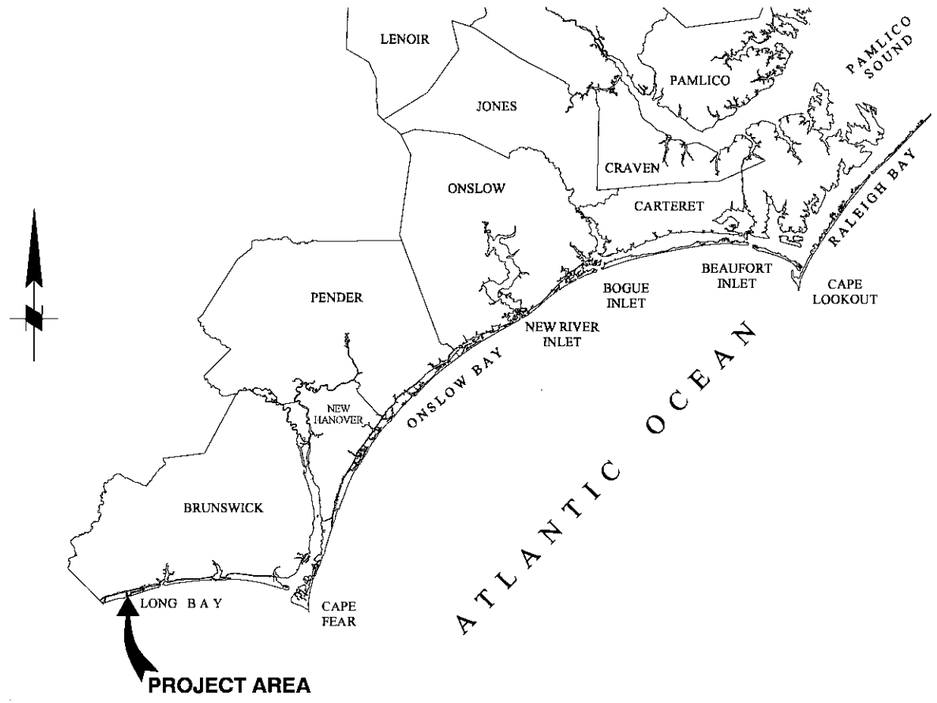
SHEET TITLE:

MATERIAL PLACEMENT SITE PLAN

1500' 0' 1500' 3000'
SCALE: 1"=3000'

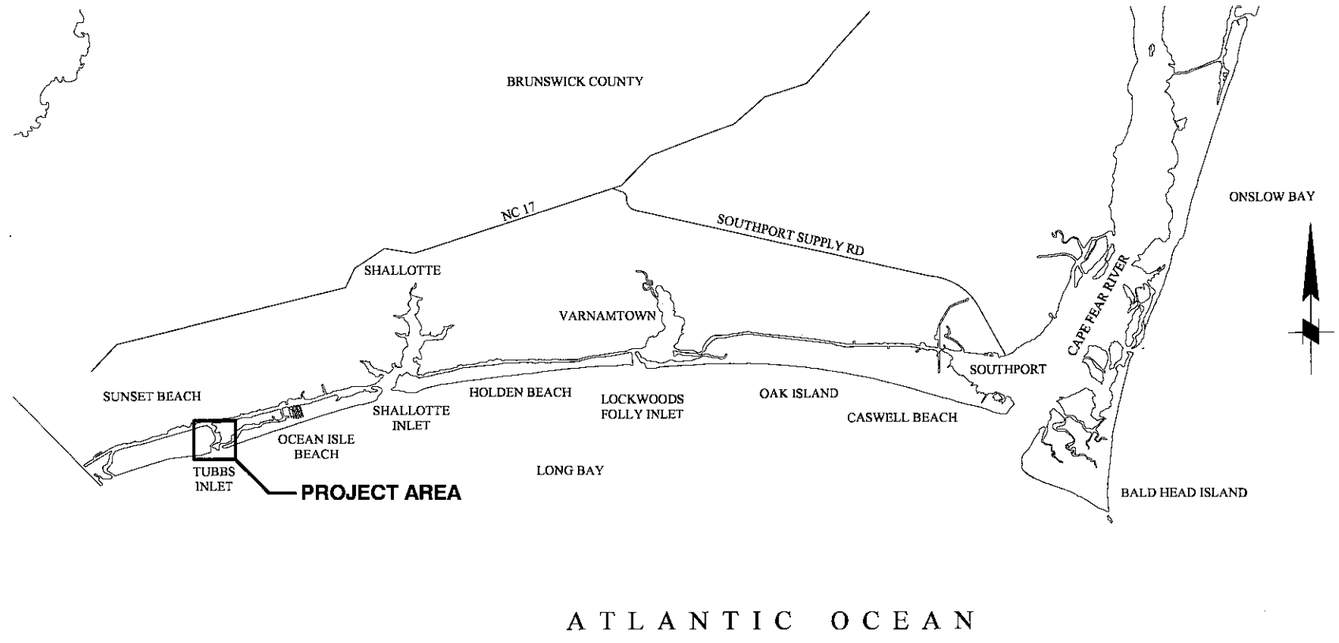
250' 0' 250' 500'
SCALE: 1"=500'

SHEET **25** *OF* **25**



0 10 20
5 15 25
SCALE IN MILES

VICINITY MAP



0 2 4
1 3 5
SCALE IN MILES

LOCATION MAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

VICINITY AND LOCATION MAPS

SHEET **1** *OF* **25**

UPLAND MATERIAL PLACEMENT SITE (LANDFILL FACILITY)

- THE UPLAND MATERIAL PLACEMENT SITE MUST BE INSPECTED AND APPROVED ON-SITE BY A DIVISION OF COASTAL MANAGEMENT (DCM) REPRESENTATIVE PRIOR TO INITIATING ANY MECHANICAL DREDGING ACTIVITIES.
- ALL TRANSFER EQUIPMENT (TRUCKS) SHALL BE MAINTAINED TO PREVENT SPILLAGE DURING MATERIAL TRANSPORT. EQUIPMENT FOUND TO REPEATEDLY ALLOW LEAKAGE DURING TRANSPORT SHALL BE REMOVED FROM THE PROJECT UNTIL SUCH MODIFICATIONS ARE MADE TO ALLOW SPILL FREE TRANSPORT OF THE DREDGE MATERIAL.
- WATER QUALITY CONTROL DEVICES SUCH AS TURBIDITY CURTAINS SHALL BE EFFECTIVELY MAINTAINED SURROUNDING THE MATERIAL OFFLOADING SITE.
- ALL MEASURES SHALL BE TAKEN TO ENSURE EFFLUENT WATERS DO NOT RE-ENTER THE ADJACENT WATERBODY DURING MATERIAL TRANSPORT TO THE LANDFILL FACILITY.
- MATERIAL SPILLAGE OCCURRING OUTSIDE OF THE LANDFILL FACILITY SHALL BE CLEANED IMMEDIATELY UPON DISCOVERY. ALL TRAVEL CORRIDORS AND ROADWAYS SHALL BE INSPECTED AFTER EACH USE TO HELP KEEP THE TRAVEL LANES CLEAN AND MATERIAL FREE.
- AN ATTENDANT SHALL BE PRESENT AT THE MATERIAL OFFLOADING SITE AT ALL TIMES DURING MECHANICAL DREDGING ACTIVITIES. THE ATTENDANT SHALL MONITOR THE PROGRESS OF THE WORK AND SHALL DIRECT INCOMING/OUTGOING TRUCKS TO PLACEMENT LOCATIONS.
- PEDESTRIAN ACCESS SHALL BE PROHIBITED INTO THE MATERIAL OFFLOADING SITE BY A FENCE OR OTHER BARRIER DURING CONSTRUCTION. THE ON-SITE ATTENDANT SHALL MONITOR THE BARRIER AND SHALL STOP WORK IMMEDIATELY IF THE BARRIER FAILS OR APPEARS TO BE FAILING.

Control Table – Feeder Channel & Canal A Centerline		
Stotion	Easting	Northing
+50	2151045.33	44197.19
7+50	2150846.12	44972.00
8+00	2150869.56	45016.17
9+00	2150957.75	45063.31
10+00	2151048.02	45106.35
13+00	2151338.41	45181.64
18+00	2151817.54	45324.62
20+00	2152003.06	45399.32
23+00	2152287.23	45495.47
43+00	2154225.20	45989.72
	Estimated Volume	
	Design:	15,600 CY
	Overdepth:	9,100 CY
	Total:	24,700 CY

Control Table – Canal B Centerline		
Station	Easting	Northing
-0+25	2151390.58	44287.50
7+00	2151215.60	44991.07
8+50	2151193.87	45139.49
	Estimated Volume	
	Design:	1,400 CY
	Overdepth:	1,400 CY
	Total:	2,800 CY

Control Table – Canal C Centerline		
Stotion	Easting	Northing
0+00	2151719.24	44405.73
0+50	2151699.58	44451.71
8+50	2151512.98	45229.64
	Estimated Volume	
	Design:	1,300 CY
	Overdepth:	1,200 CY
	Total:	2,500 CY

Control Table – Canal D Centerline		
Station	Easting	Northing
0+00	2152049.19	44472.02
8+75	2151831.87	45319.60
	Estimated Volume	
	Design:	1,500 CY
	Overdepth:	1,300 CY
	Total:	2,800 CY

Control Table – Bay Area Centerline		
Station	Easting	Northing
-0+50	2152308.03	44861.22
0+00	2152323.62	44813.73
1+00	2152397.46	44746.29
5+00	2152770.06	44891.83
7+00	2152969.42	44907.77
12+00	2153451.23	45041.41
22+00	2154376.04	45421.84
	Estimated Volume	
	Design:	11,000 CY
	Overdepth:	4,900 CY
	Total:	15,900 CY

Control Toble – South Jinks Creek Centerline		
Stotion	Easting	Northing
51+00	2154181.90	46199.77
52+50	2154221.68	46055.14
57+50	2154242.07	45555.56
58+00	2154257.39	45507.96
58+50	2154288.65	45468.93
59+00	2154329.49	45440.10
59+50	2154376.04	45421.84
60+00	2154425.91	45418.24
60+50	2154475.91	45417.58
61+00	2154525.78	45421.20
61+50	2154575.57	45425.73
64+75	2154892.10	45499.44
68+50	2155267.05	45505.52
	Estimated Volume	
	Design:	32,300 CY
	Overdepth:	8,200 CY
	Total:	40,500 CY

NOTE:
COORDINATES IN CONTROL TABLES REFERENCE STATE PLANE NAD83 (FEET)

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

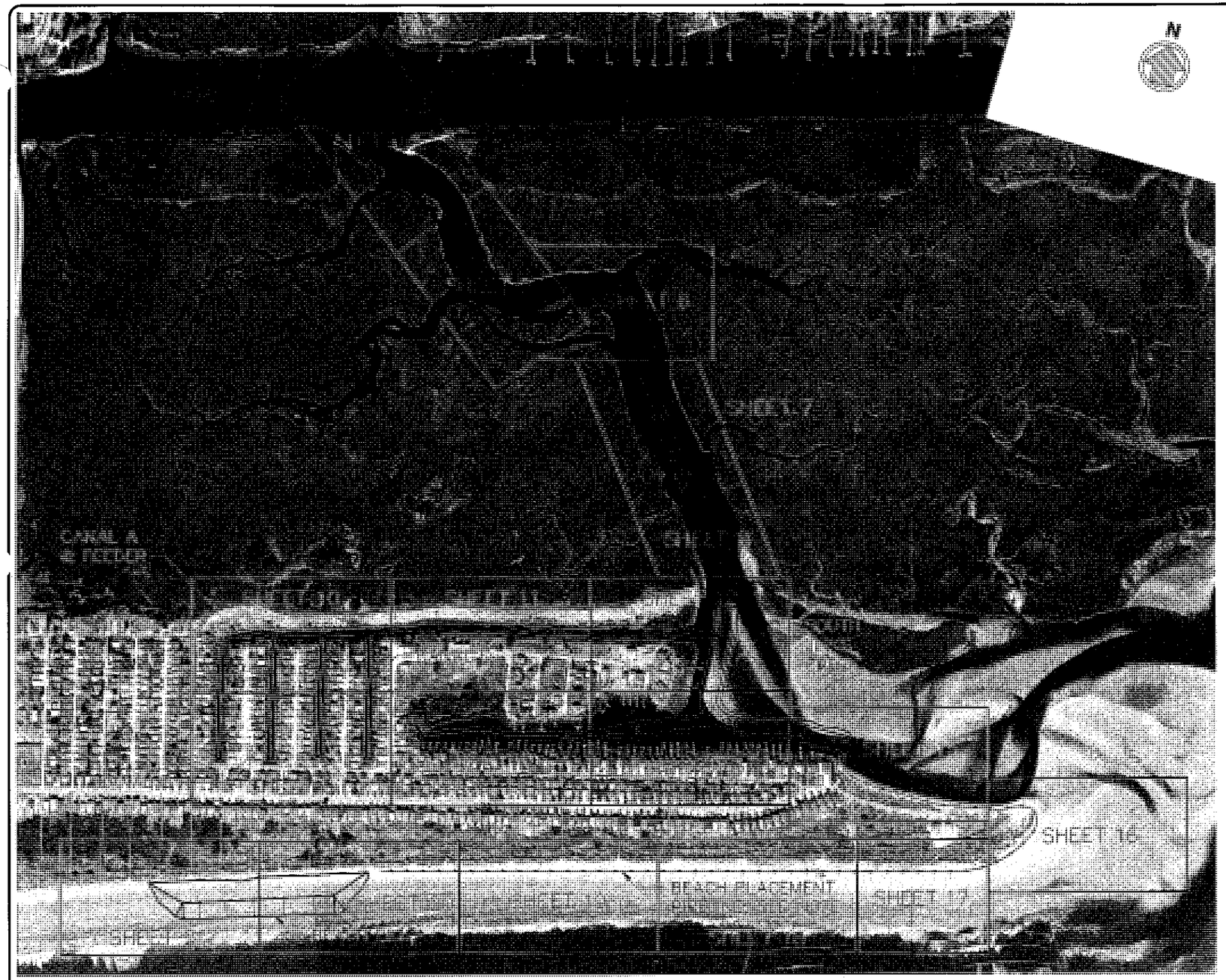
PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

GENERAL NOTES

SHEET **2** *OF* **25**



2016 AERIALS BY NC ONEMAP

NOTES: (BEACH PLACEMENT)

- BEACH PLACEMENT PIPELINE SHALL BE POSITIONED WITHIN 20-FT OF THE DUNE TOE ADJACENT TO THE VEGETATION LINE. THE PIPELINE SHALL NOT BE ALLOWED TO COVER VEGETATION. THE PIPELINE SHALL BE COVERED BY A SAND RAMP AT DESIGNATED BEACH ACCESS CROSSINGS TO HELP FACILITATE PEDESTRIAN ACCESS.
- THE CONTRACTOR SHALL INSPECT THE BEACH PLACEMENT PIPELINE A MINIMUM OF ONCE EVERY 4 HOURS OF OPERATION FOR LEAKS OR MATERIAL SPILLS. WHEN A LEAK IS DISCOVERED ALL OPERATIONS SHALL CEASE UNTIL REPAIRS ARE COMPLETED TO STOP THE MATERIAL SPILLAGE.
- ALONG NAVIGABLE WATERWAYS, OR BAY SIDE OF SUNSET BEACH, THE PIPELINE SHALL BE POSITIONED ABOVE MHW AND AS LANDWARD AS POSSIBLE WITHOUT TRAVERSING OVER VEGETATION OR THE DUNE FEATURE.
- IF THE PIPELINE CANNOT BE POSITIONED ABOVE MHW DUE TO DOCKS OR OTHER STRUCTURES, THE PIPELINE SHALL BE MARKED WITH BUOYS AND LIGHTS A MINIMUM OF EVERY 500-FT, OR AS RECOMMENDED BY THE USCG.
- THE PIPELINE WILL CROSS ALL NAVIGABLE WATERWAYS PERPENDICULAR TO THE DIRECTIONS OF TRAVEL TO MINIMIZE THE PIPELINE LENGTH WITHIN THE NAVIGATION CHANNEL. THE PIPELINE WILL BE ANCHORED IN THE DEEPEST DEPTH AVAILABLE TO NOT BLOCK NAVIGATION AND WILL HAVE BUOYS ATTACHED APPROXIMATELY EVERY 25-FEET ALONG EACH CROSSING TO IDENTIFY ITS PRESENCE. THE PIPELINE SHALL NOT BE ALLOWED TO CROSS NAVIGABLE WATERS WITH LESS THAN FOUR (4) FEET OF DRAFT REMAINING OVER THE SUBMERGED LINE.
- SIGNAGE SHALL ALSO BE PROVIDED AND VISIBLE FROM BOTH DIRECTIONS OF TRAVEL TO MARK ALL NAVIGATION CROSSINGS.

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

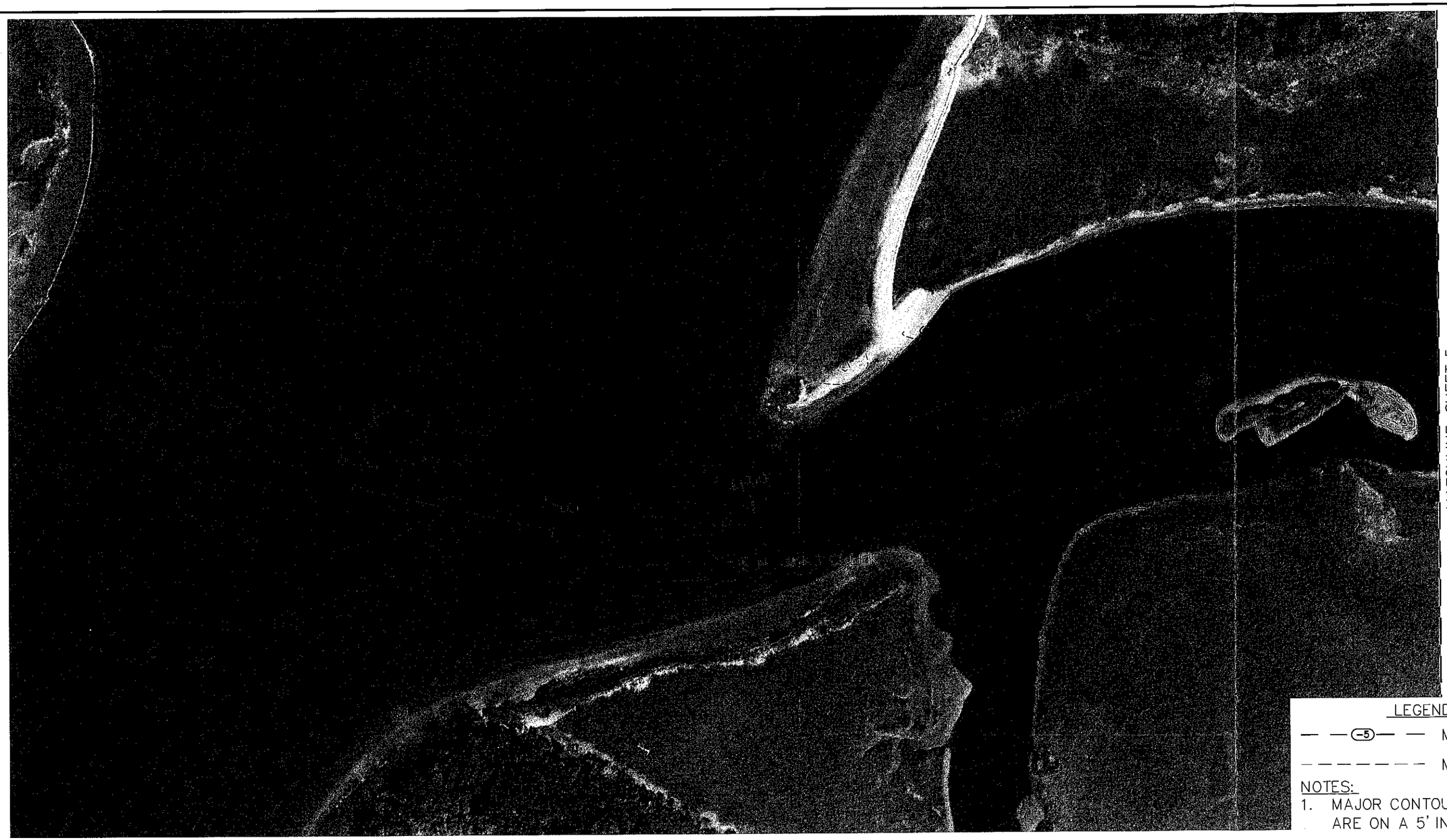
SHEET TITLE:

KEY MAP

400' 0' 400' 800'

SCALE: 1"=800'

SHEET **3** *OF* **25**



MATCHLINE, SHEET 5

N

LEGEND

— —(-5)— — MAJOR CONTOUR

– – – – – – – MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

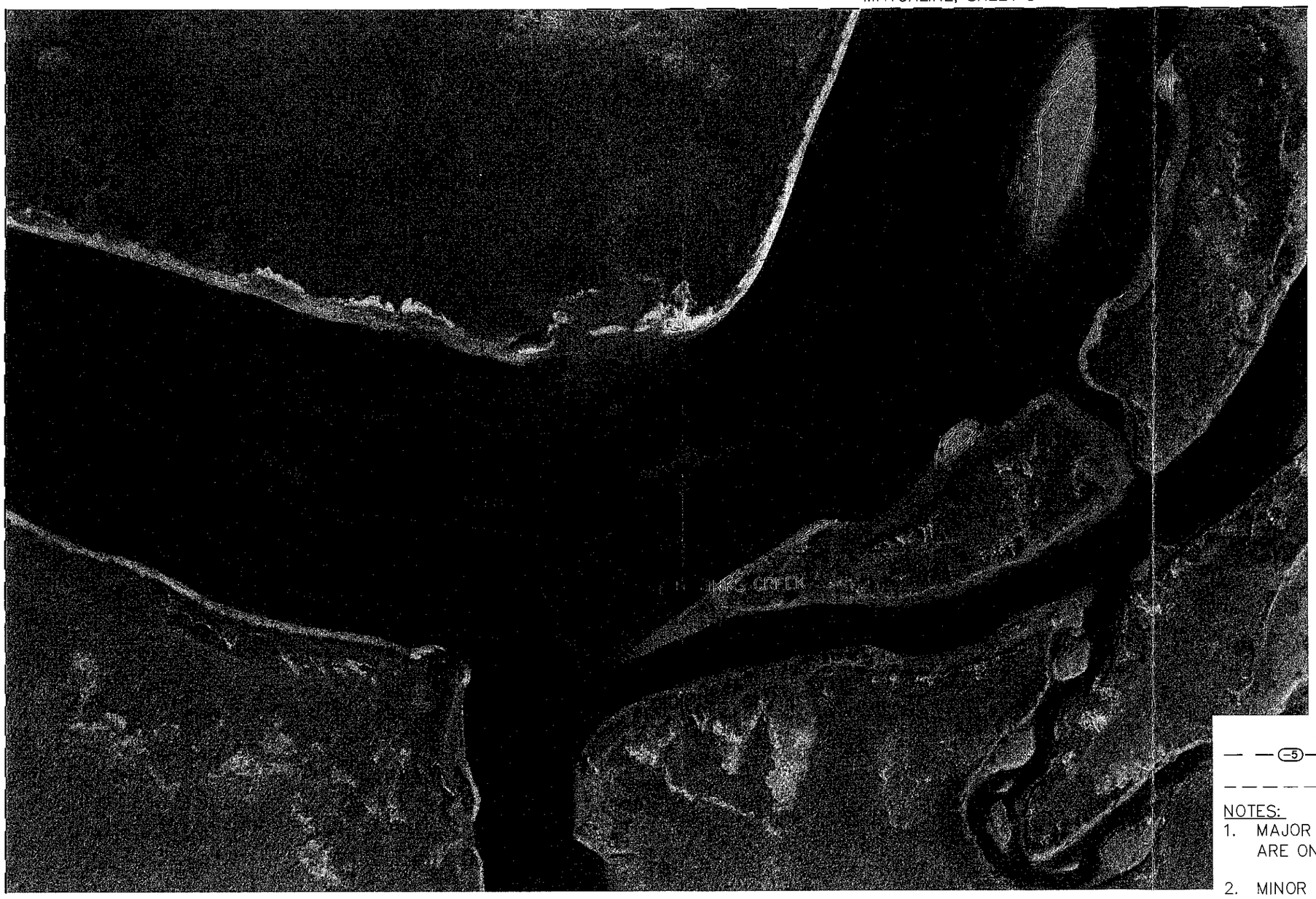
N. JINKS CREEK EXISTING CONDITIONS - SHEET 1 OF 5

50' 0' 50' 100'

SCALE: 1"=100'

SHEET **4** *OF* **25**

MATCHLINE, SHEET 6



MATCHLINE, SHEET 4

N

LEGEND

— — (-5) — — MAJOR CONTOUR

– – – – – – – – MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

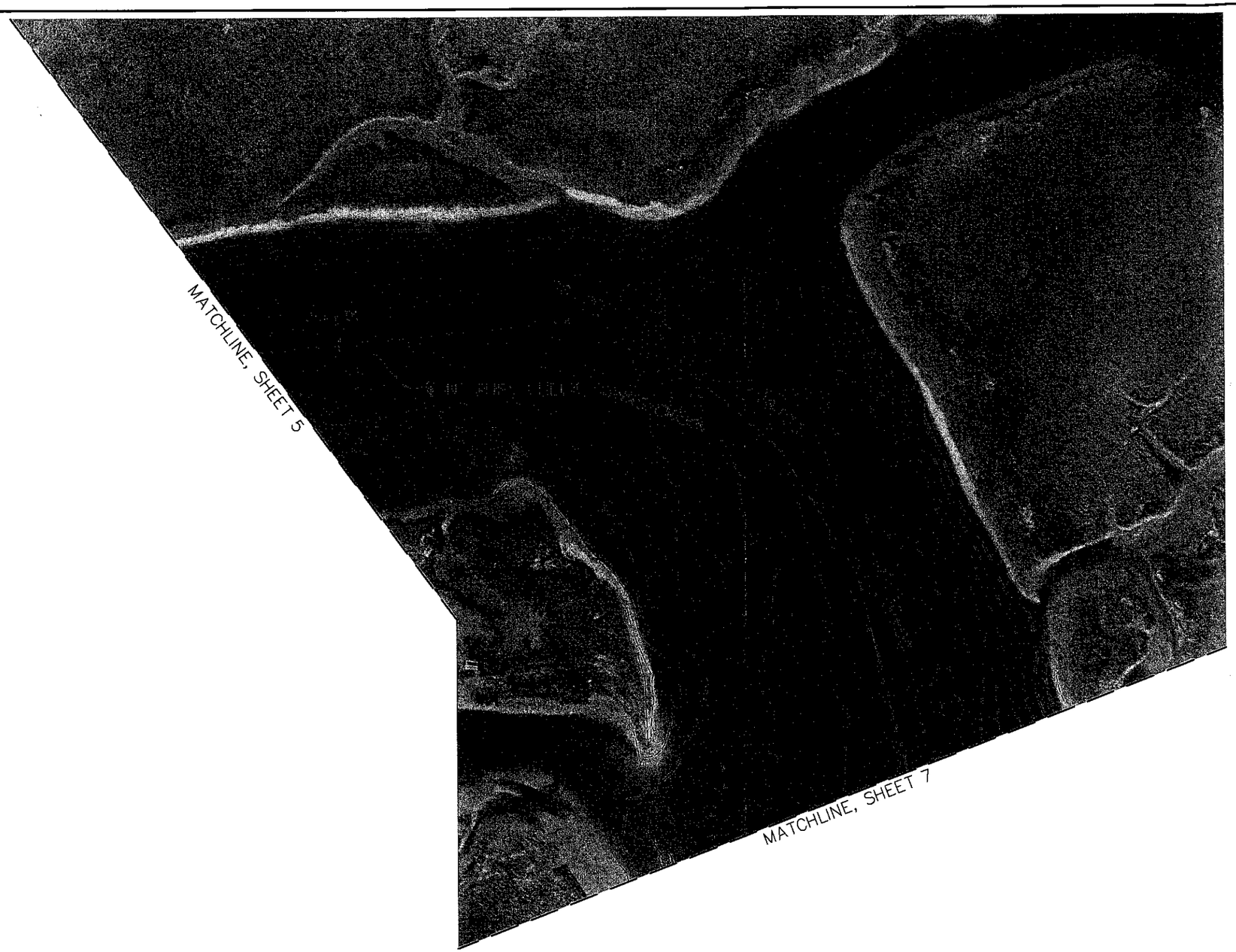
SHEET TITLE:

N. JINKS CREEK EXISTING CONDITIONS -SHEET 2 OF 5

50' 0' 50' 100'

SCALE: 1"=100'

SHEET **5** *OF* **25**



N

LEGEND

— —(-5)— — MAJOR CONTOUR

– – – – – – – MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

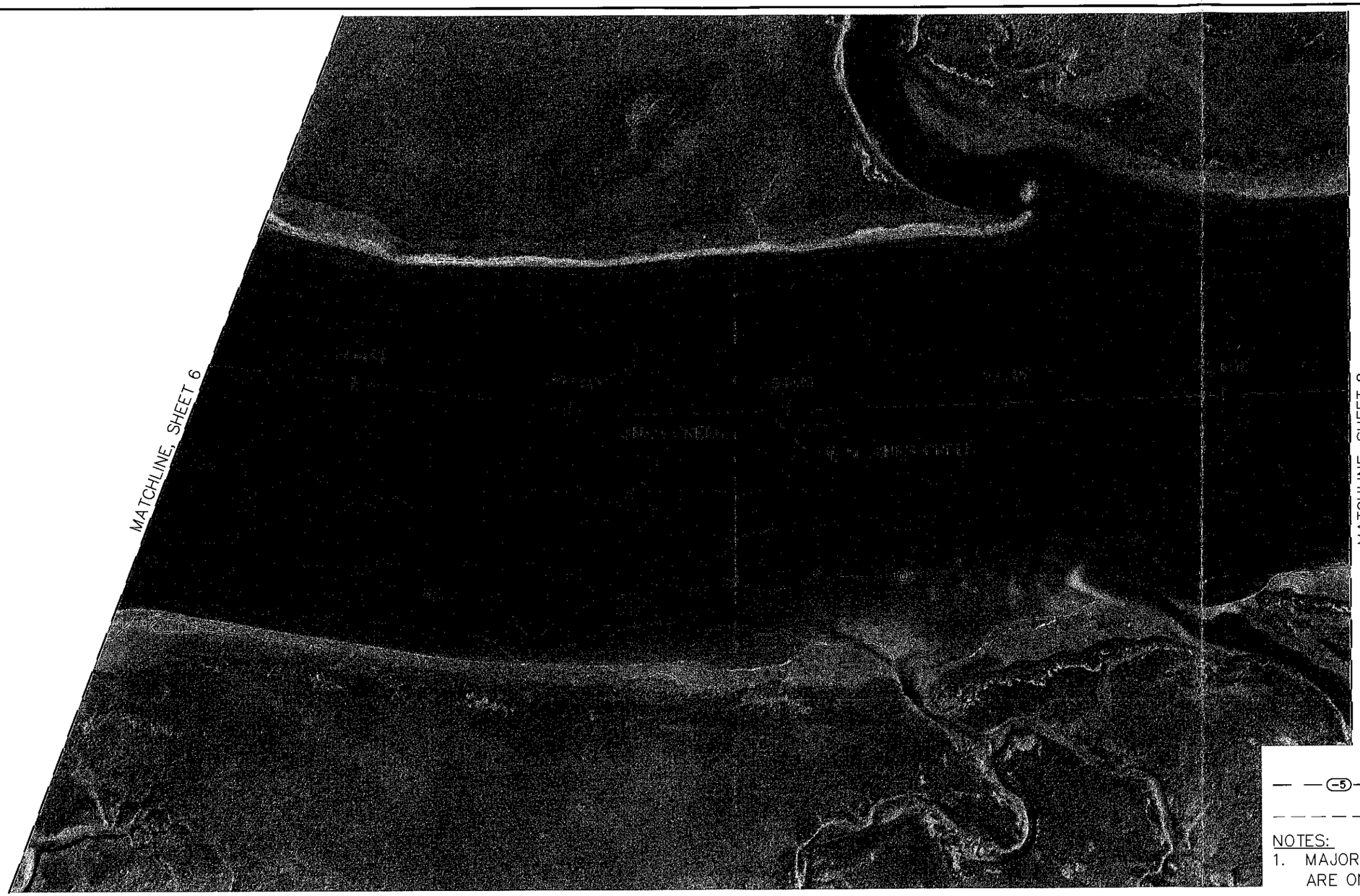
SHEET TITLE:

N. JINKS CREEK EXISTING CONDITIONS - SHEET 3 OF 5

50' 0' 50' 100'

SCALE: 1"=100'

SHEET **6** *OF* **25**



LEGEND

— —(-5)— — MAJOR CONTOUR

– – – – – – – – MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

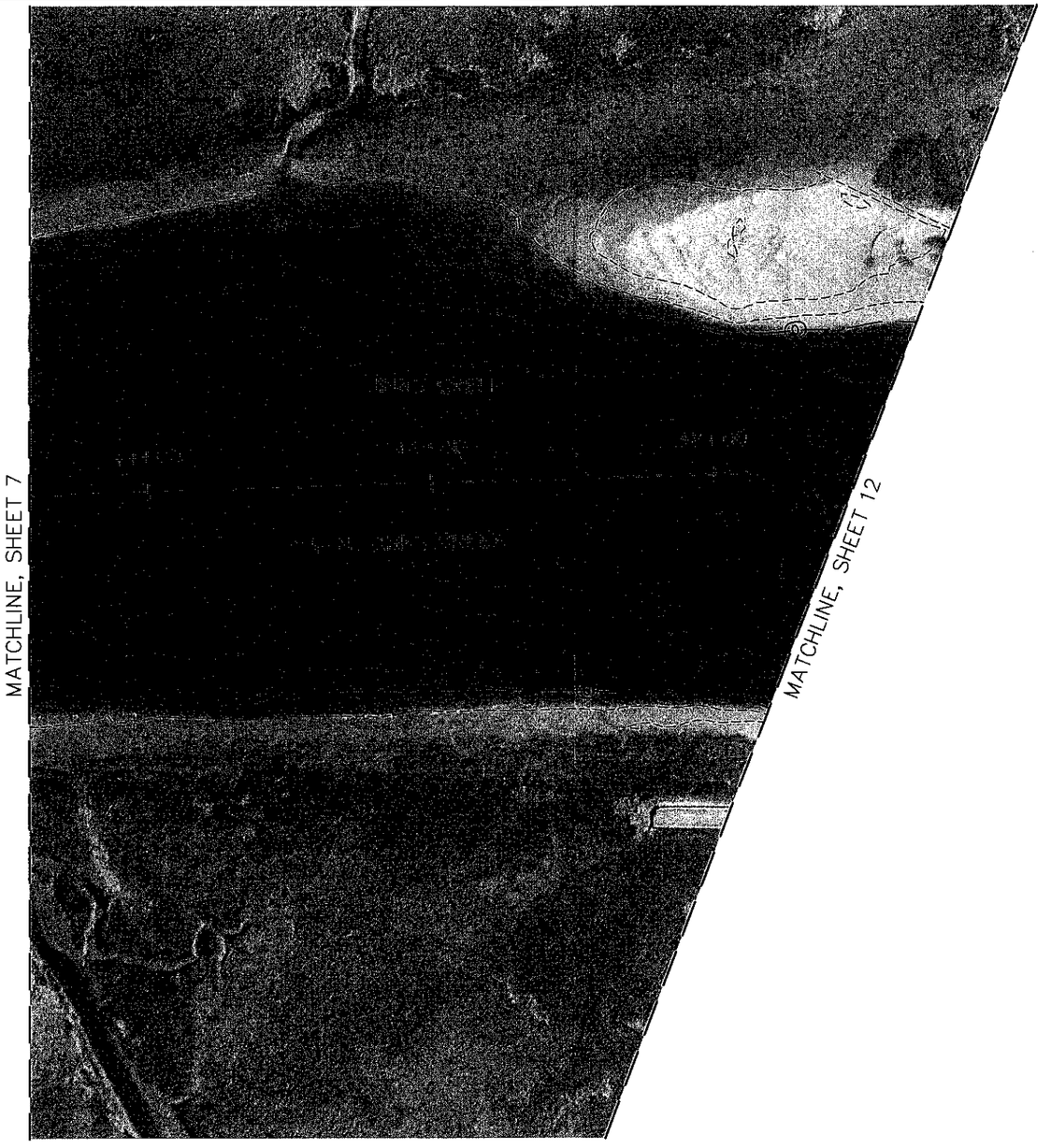
SHEET TITLE:

N. JINKS CREEK EXISTING CONDITIONS - SHEET 4 OF 5

50' 0' 50' 100'

SCALE: 1"=100'

SHEET **7** *OF* **25**



LEGEND

— —(-5)— — MAJOR CONTOUR

– – – – – – – – MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

N. JINKS CREEK EXISTING CONDITIONS - SHEET 5 OF 5

50' 0' 50' 100'

SCALE: 1"=100'

SHEET **8** *OF* **25**

MATCHLINE, SHEET 10

MATCHLINE, SHEET 13

N

LEGEND

— — — MAJOR CONTOUR

— — — MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

DREDGE AREA WORK PLAN - SHEET 1 OF 13

50' 0' 50' 100'

SCALE: 1"=100'

SHEET **9** *OF* **25**

LEGEND

MAJOR CONTOUR

MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

DREDGE AREA WORK PLAN -SHEET 2 OF 13

50' 0' 50' 100'

SCALE: 1"=100'

SHEET **10** *OF* **25**

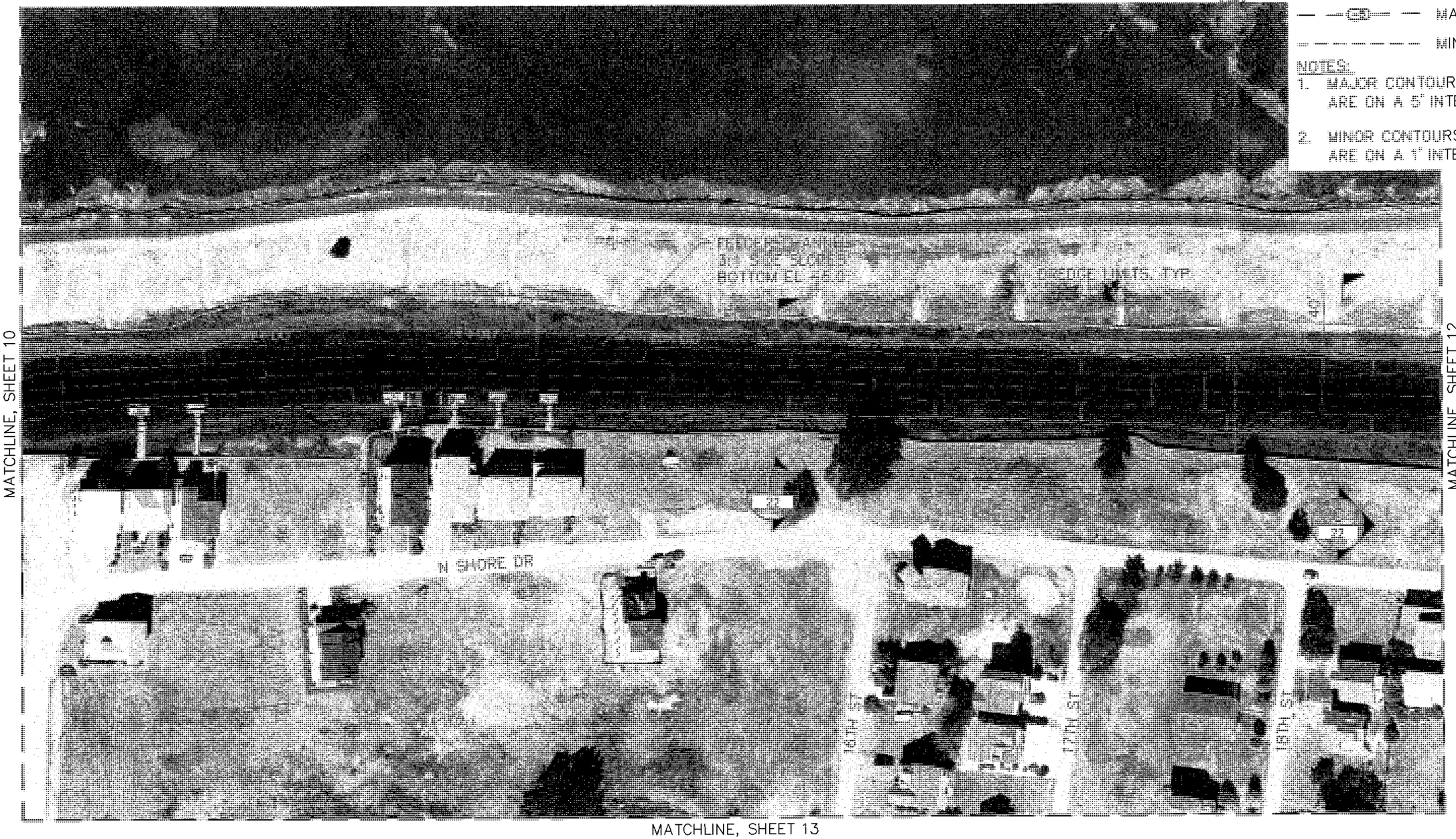
N

LEGEND

— — — MAJOR CONTOUR

— — — MINOR CONTOUR

NOTES:
1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.



MATCHLINE, SHEET 10

MATCHLINE, SHEET 12

MATCHLINE, SHEET 13

2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

DREDGE AREA WORK PLAN - SHEET 3 OF 13

80' 0' 80' 160'

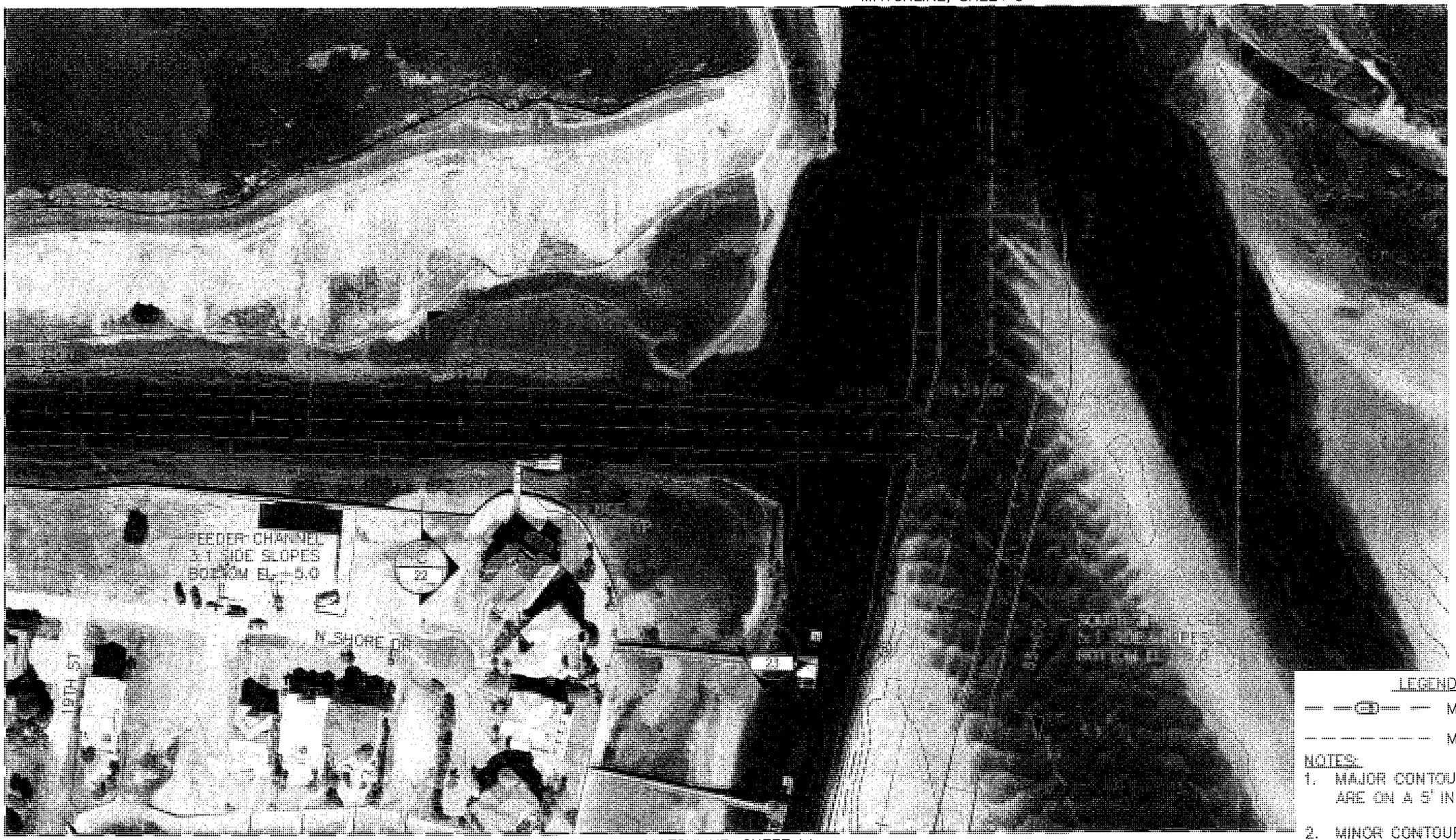
SCALE: 1"=160'

SHEET **11** *OF* **25**

MATCHLINE, SHEET 8

N

MATCHLINE, SHEET 11



LEGEND

MAJOR CONTOUR

MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

MATCHLINE, SHEET 14

2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

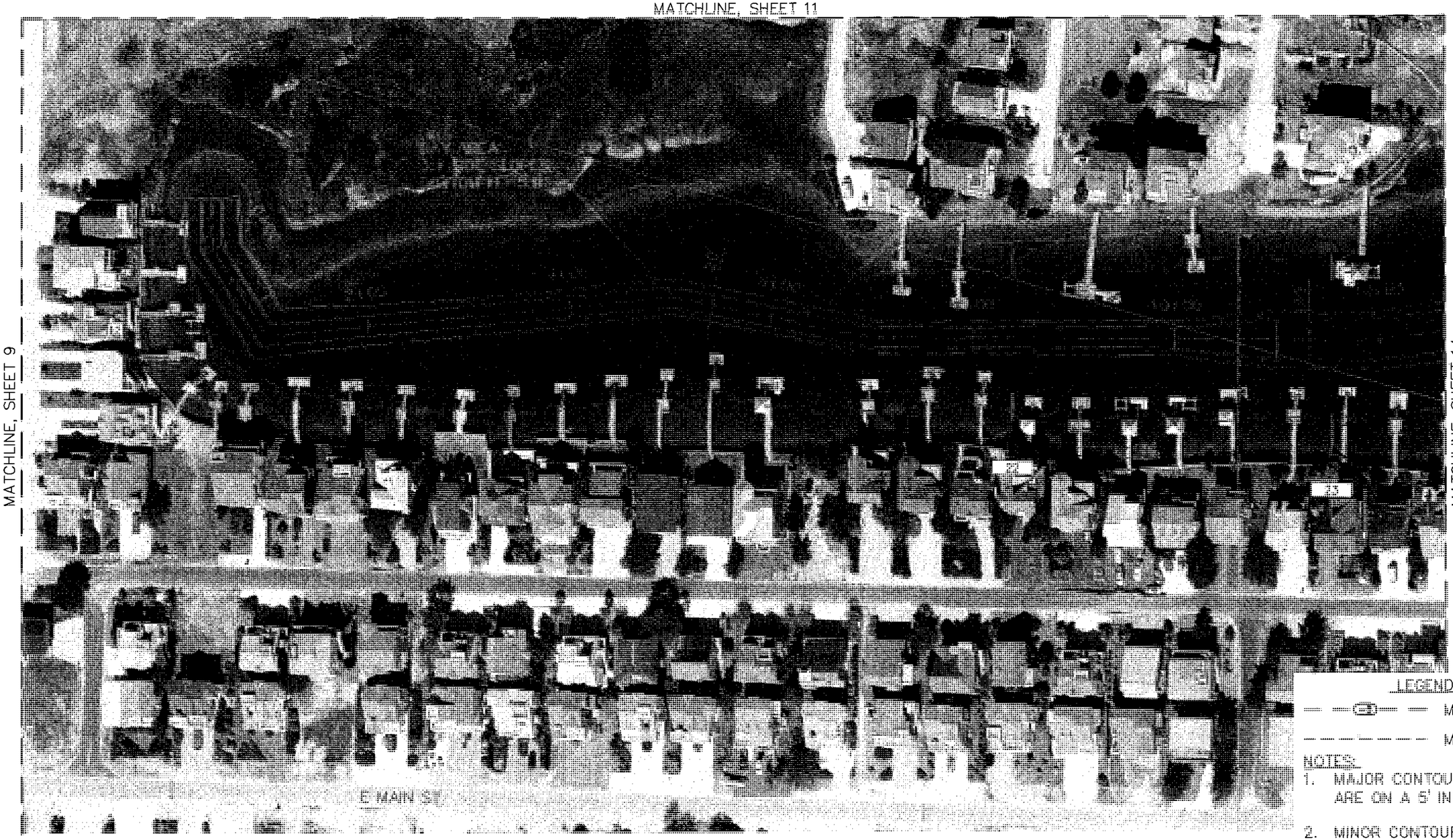
DREDGE AREA WORK PLAN - SHEET 4 OF 13

80' 0' 80' 160'

SCALE: 1"=160'

SHEET **12** *OF* **25**

MATCHLINE, SHEET 11



MATCHLINE, SHEET 9

MATCHLINE, SHEET 14

N

LEGEND

MAJOR CONTOUR

MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

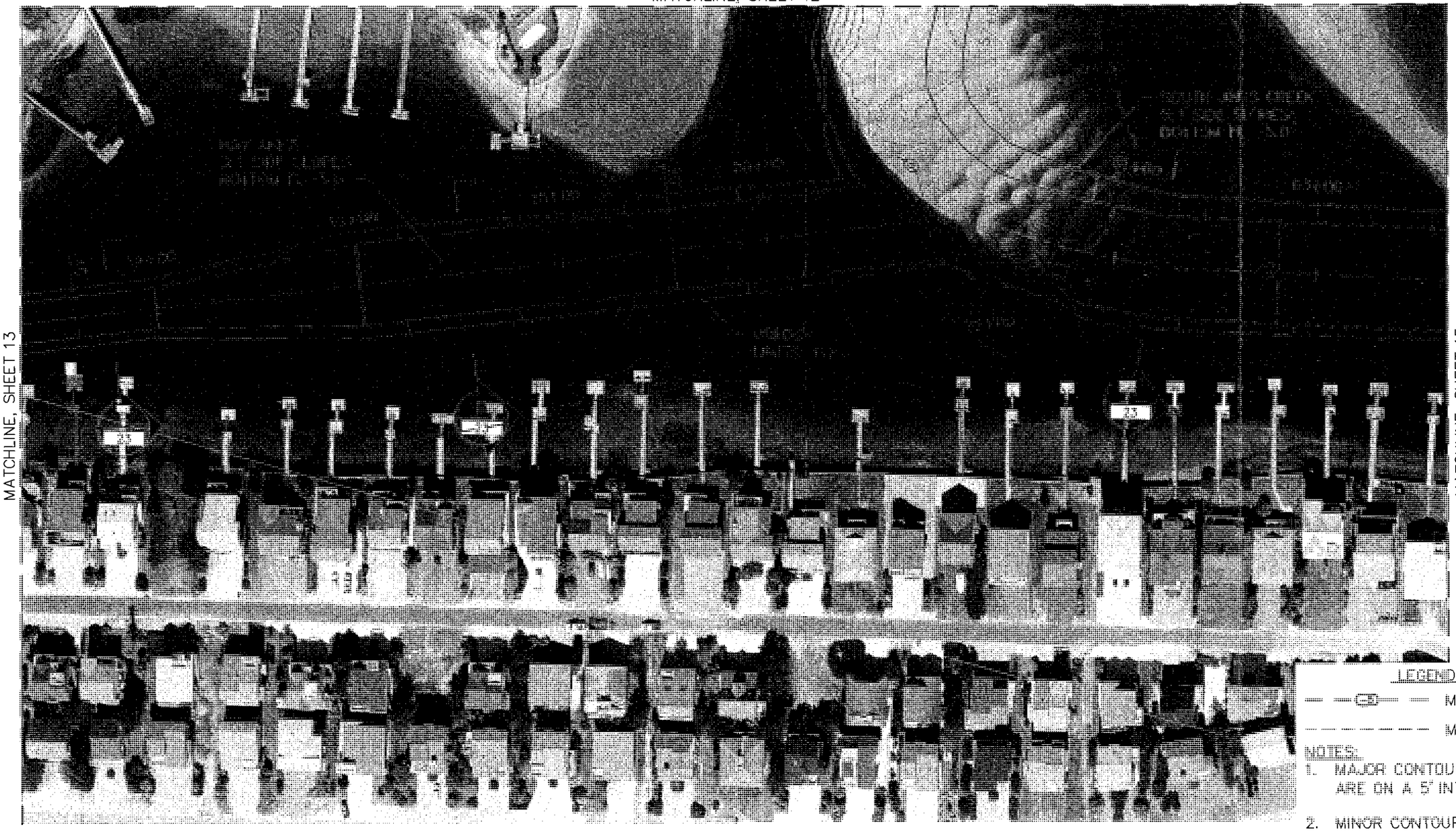
DREDGE AREA WORK PLAN - SHEET 5 OF 13

80' 0' 80' 160'

SCALE: 1"=160'

SHEET **13** *OF* **25**

MATCHLINE, SHEET 12



MATCHLINE, SHEET 13

MATCHLINE, SHEET 15

N

LEGEND

— — — MAJOR CONTOUR

— — — MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

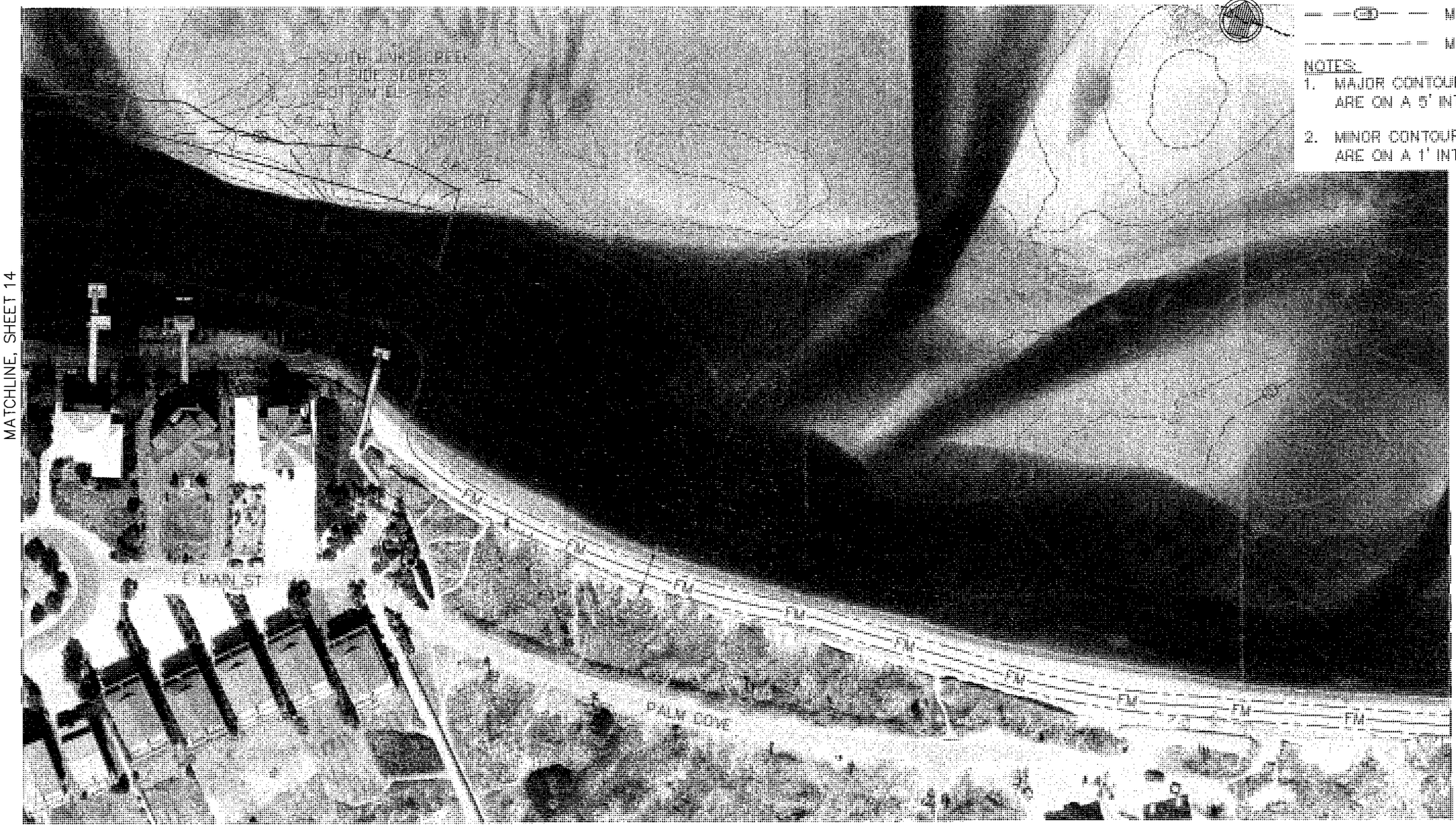
SHEET TITLE:

DREDGE AREA WORK PLAN - SHEET 6 OF 13

80' 0' 80' 160'

SCALE: 1"=160'

SHEET **14** *OF* **25**



N

LEGEND

MAJOR CONTOUR

MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

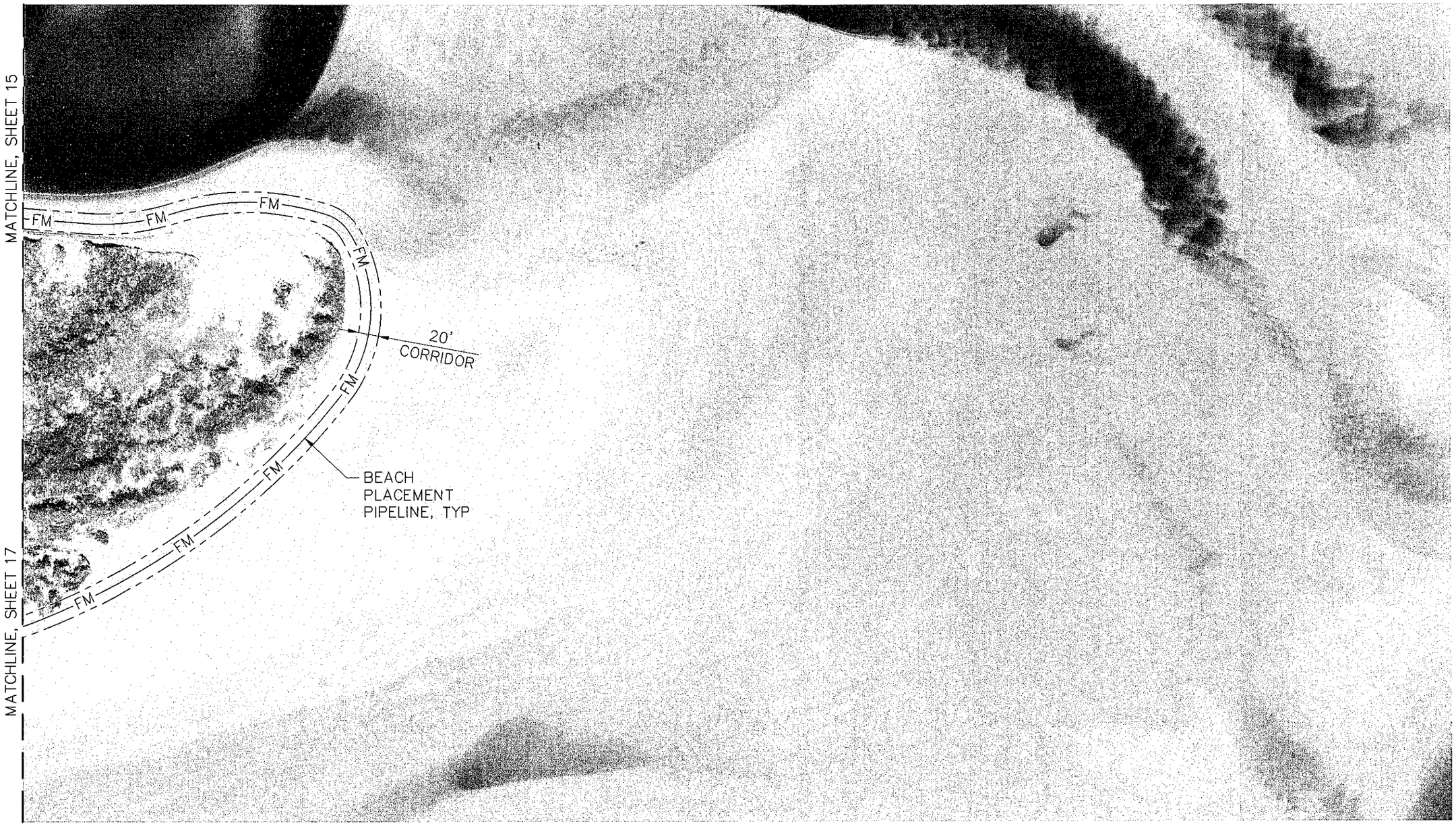
SHEET TITLE:

DREDGE AREA WORK PLAN - SHEET 7 OF 13

80' 0' 80' 160'

SCALE: 1"=160'

SHEET **15** *OF* **25**



2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

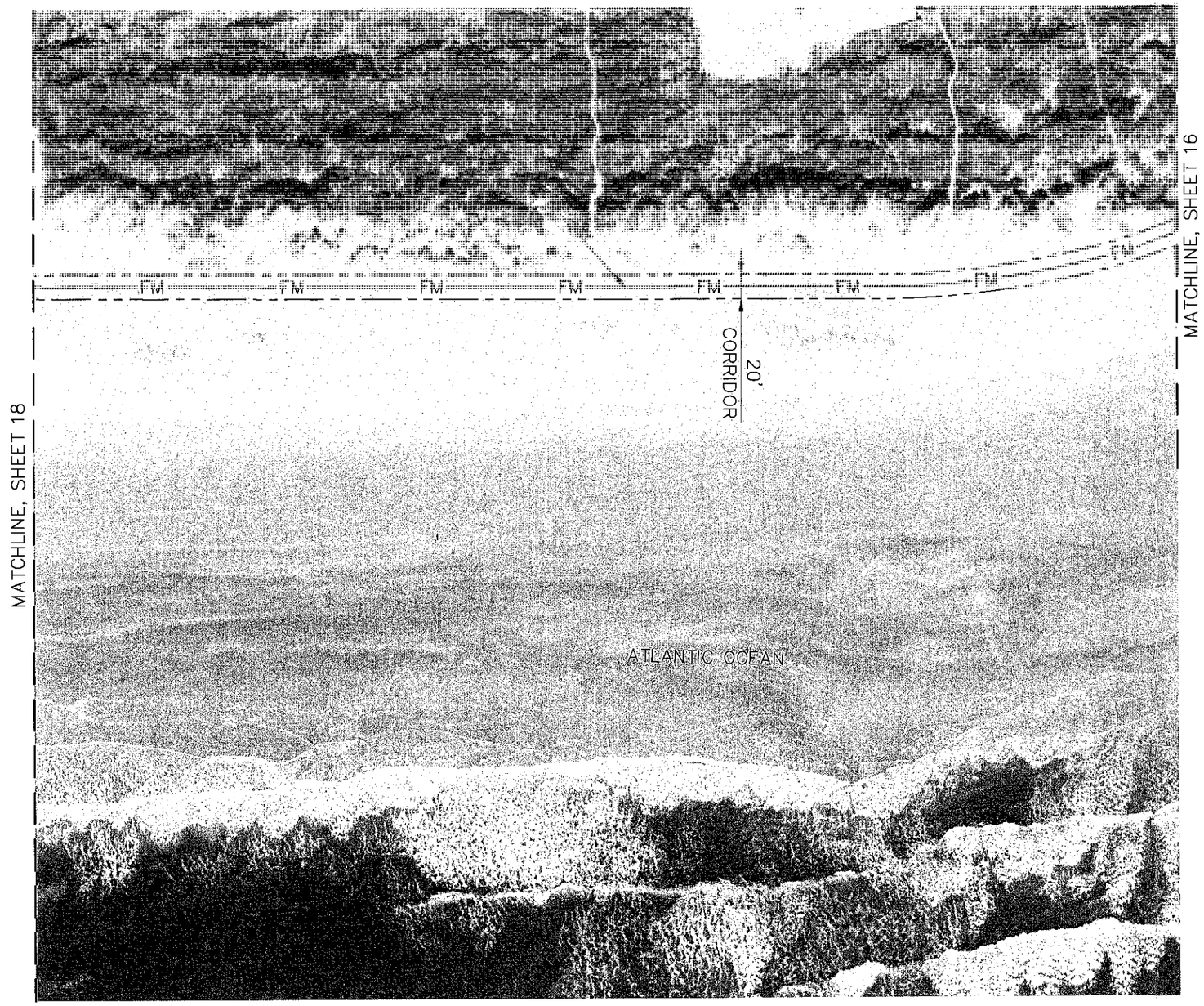
SHEET TITLE:

DREDGE AREA WORK PLAN - SHEET 8 OF 13

80' 0' 80' 160'

SCALE: 1"=160'

SHEET **16** *OF* **25**



2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

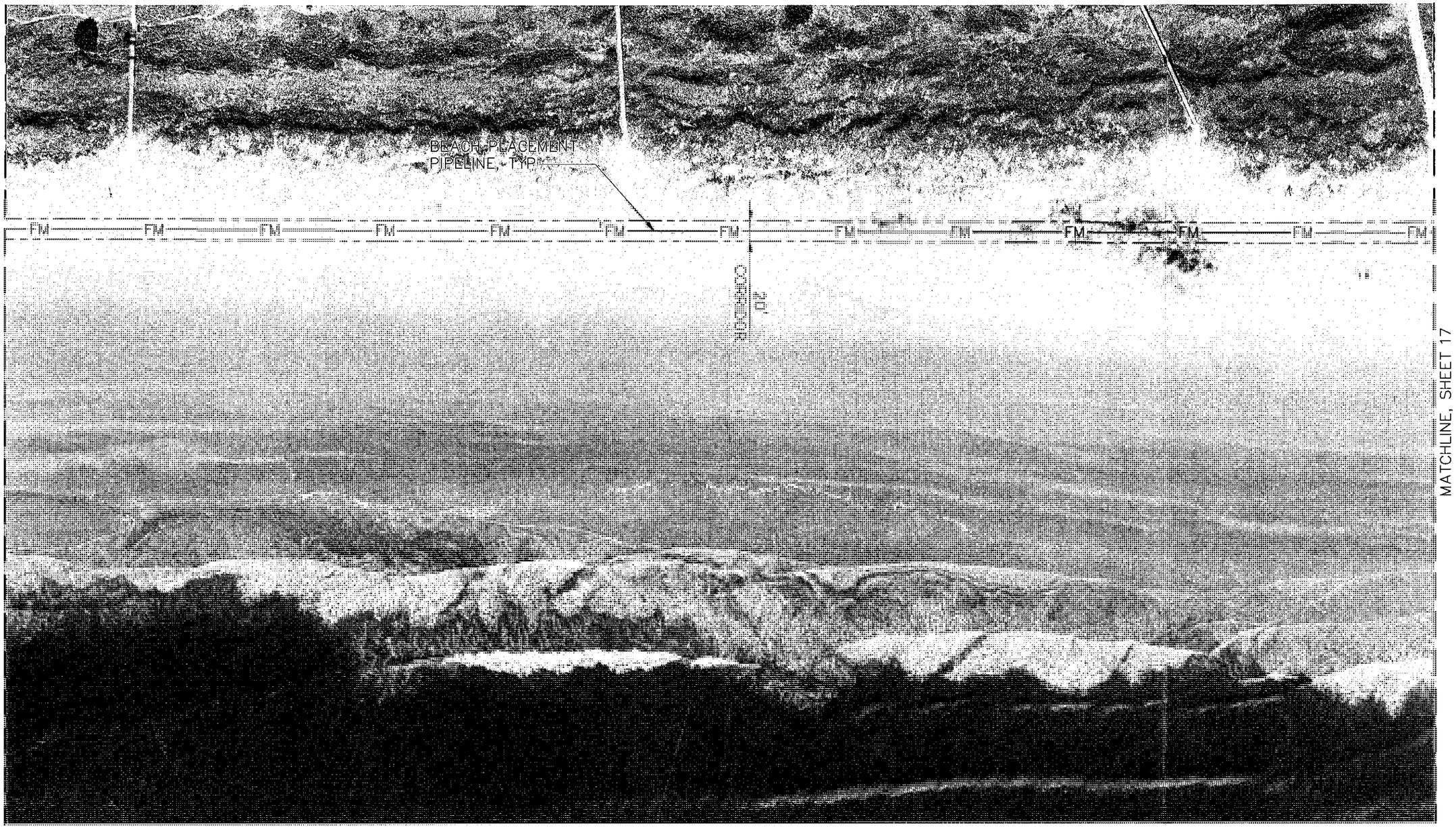
SHEET TITLE:

DREDGE AREA WORK PLAN - SHEET 9 OF 13

50' 0' 50' 100'

SCALE: 1"=100'

SHEET **17** *OF* **25**



2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

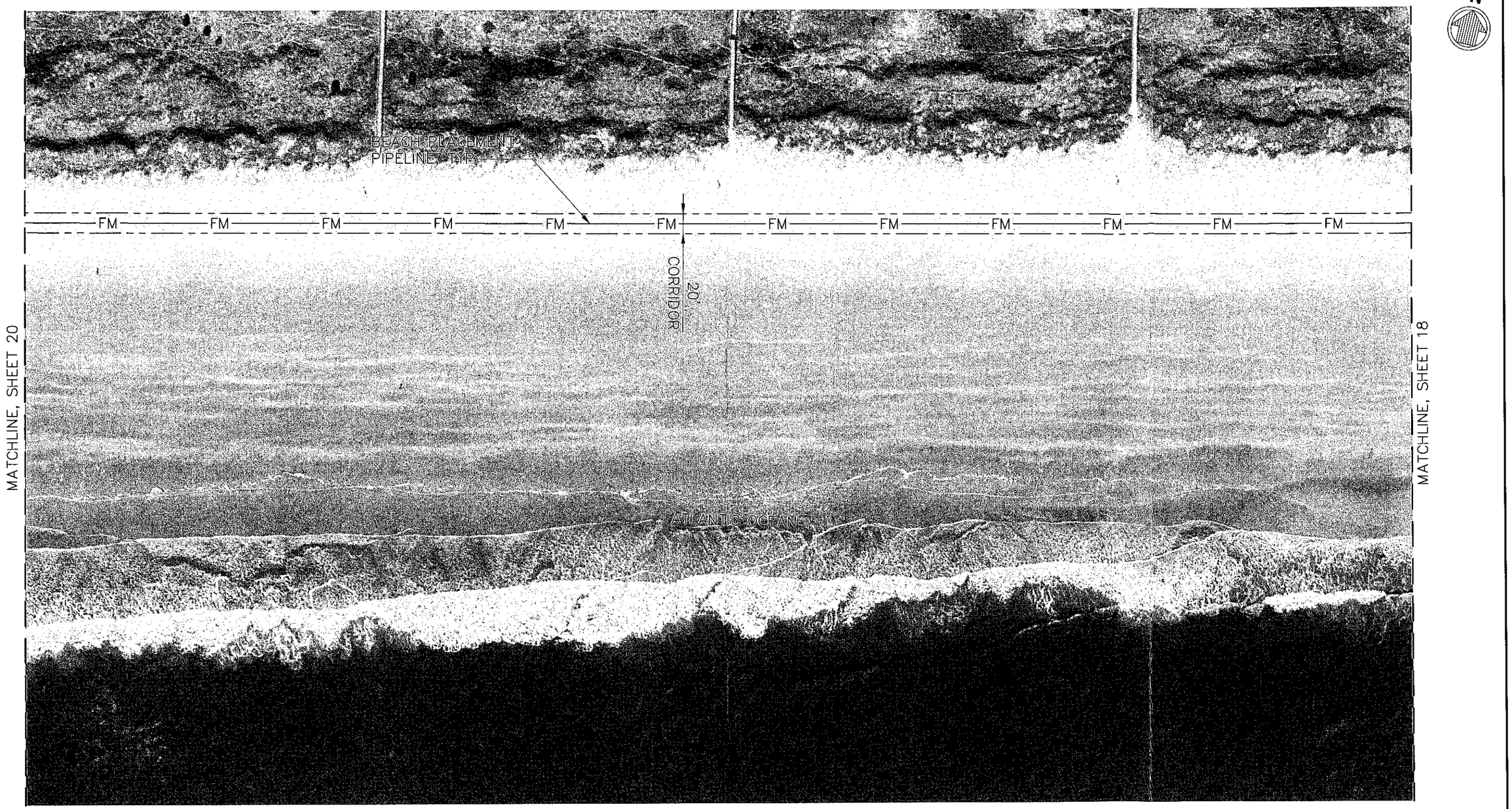
SHEET TITLE:

DREDGE AREA WORK PLAN - SHEET 10 OF 13

50' 0' 50' 100'

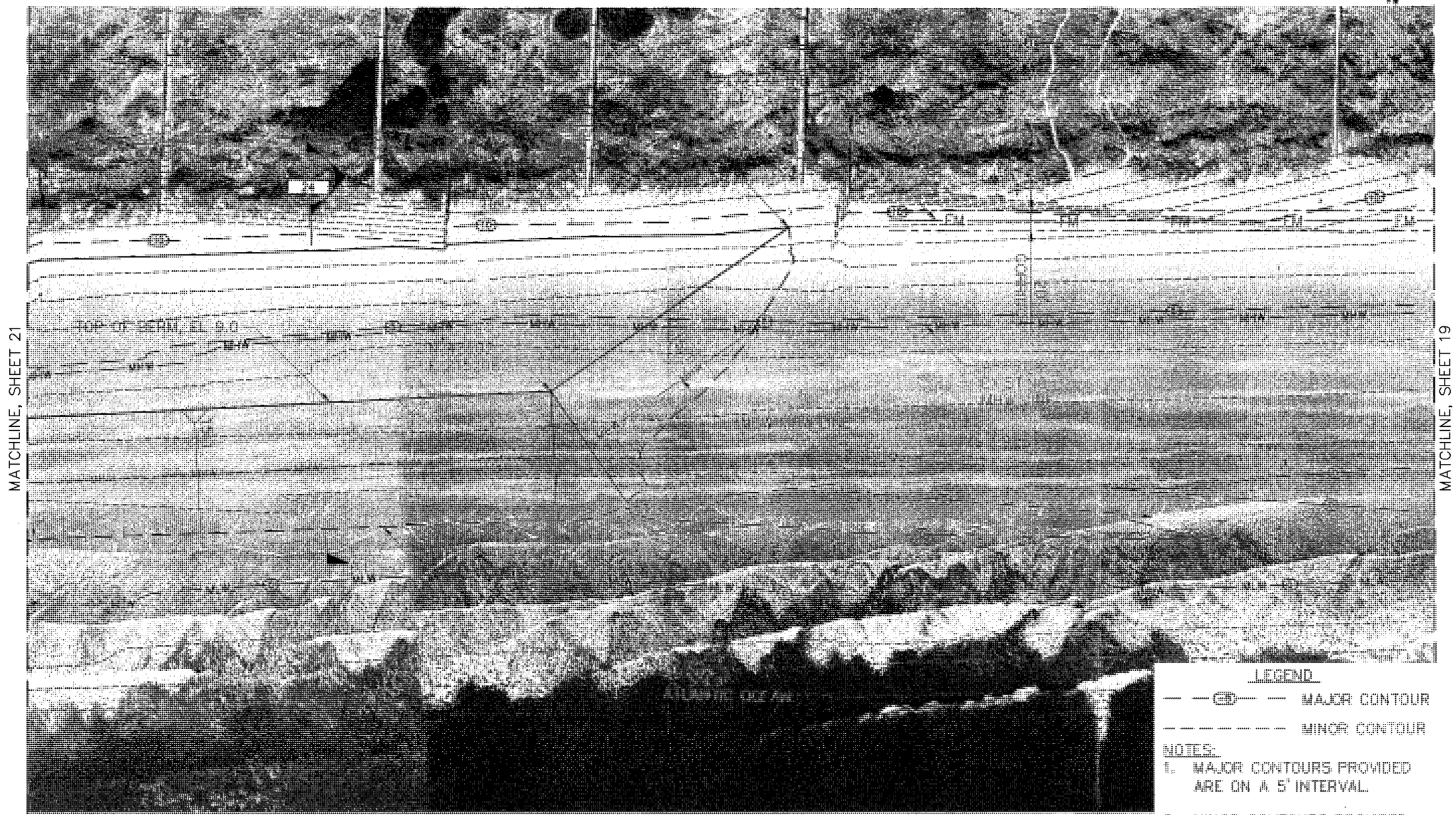
SCALE: 1"=100'

SHEET **18** *OF* **25**



2016 AERIALS BY NC ONEMAP

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL** *DATUM:* **MLW** *PREPARED BY:* **MOFFATT & NICHOL**	*PREPARED FOR:* **TOWN OF SUNSET BEACH NORTH CAROLINA** *DATE:* **JANUARY 31, 2019**	*SHEET TITLE:* **DREDGE AREA WORK PLAN - SHEET 11 OF 13** 50' 0' 50' 100' SCALE: 1"=100'	*SHEET* **19** *OF* **25**



LEGEND

— — — MAJOR CONTOUR

— — — MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

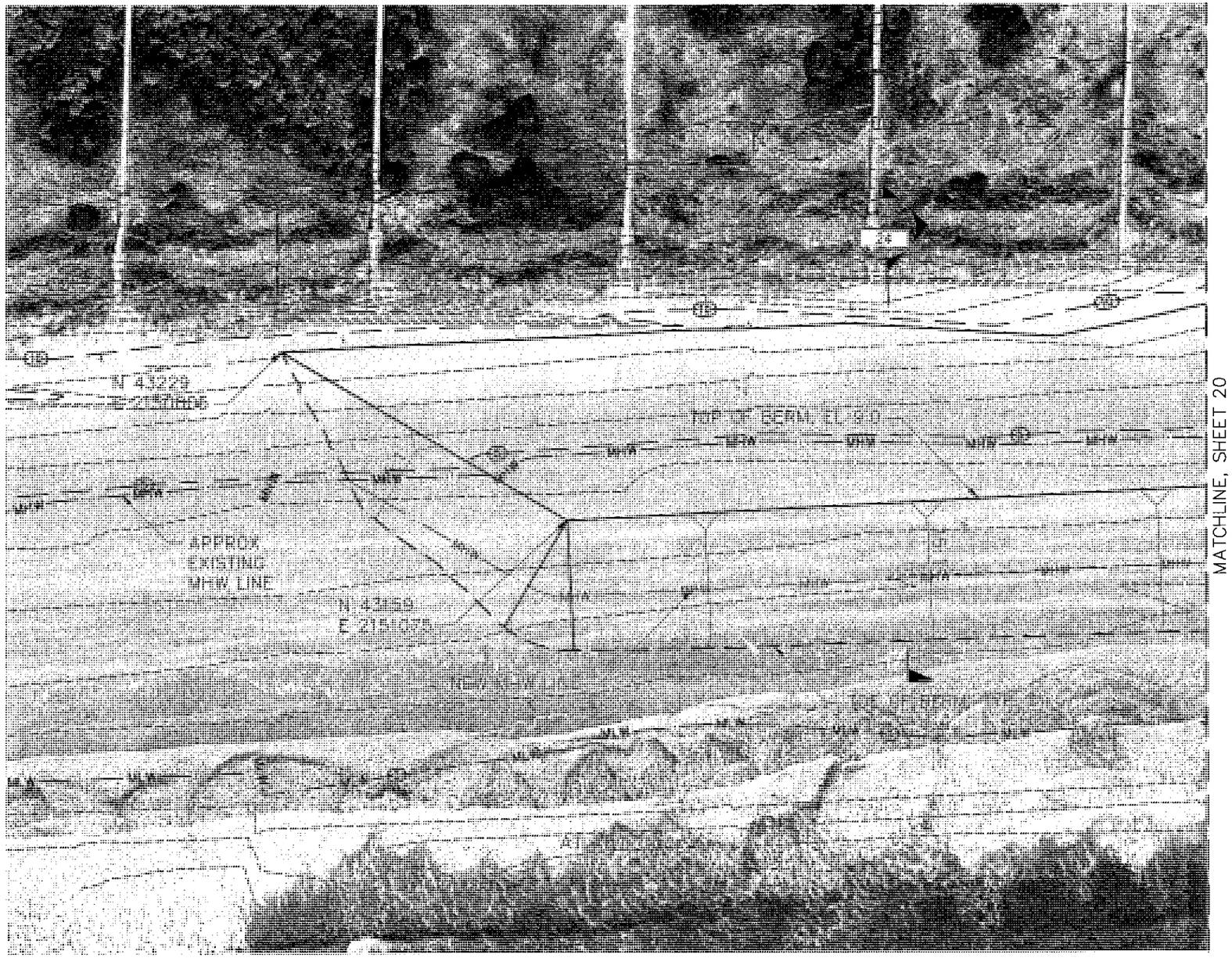
SHEET TITLE:

DREDGE AREA WORK PLAN - SHEET 12 OF 13

50' 0' 50' 100'

SCALE: 1"=100'

SHEET **20** *OF* **25**



LEGEND

— — (-5) — — MAJOR CONTOUR

– – – – – – – – MINOR CONTOUR

NOTES:

1. MAJOR CONTOURS PROVIDED ARE ON A 5' INTERVAL.
2. MINOR CONTOURS PROVIDED ARE ON A 1' INTERVAL.

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

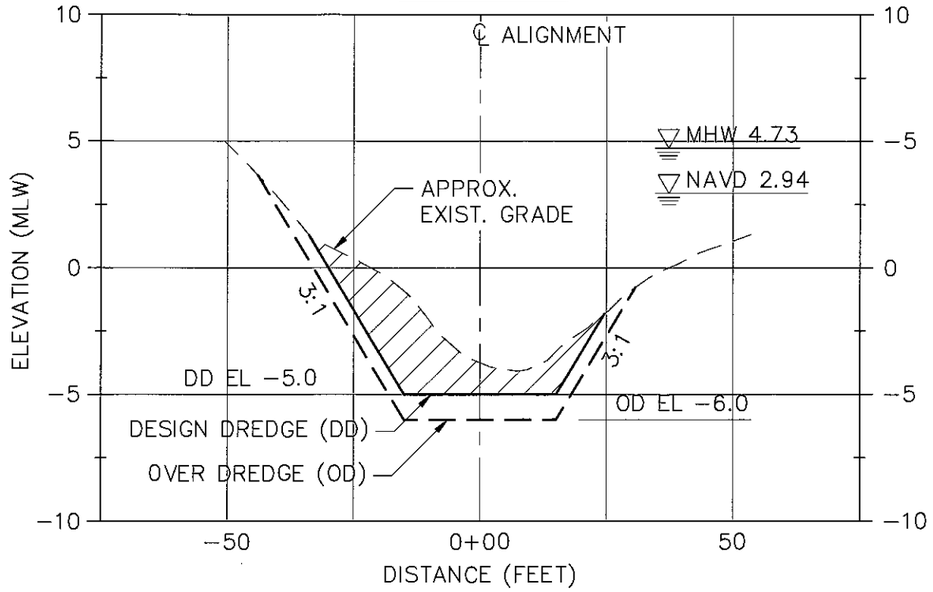
DREDGE AREA WORK PLAN - SHEET 13 OF 13

50' 0' 50' 100'

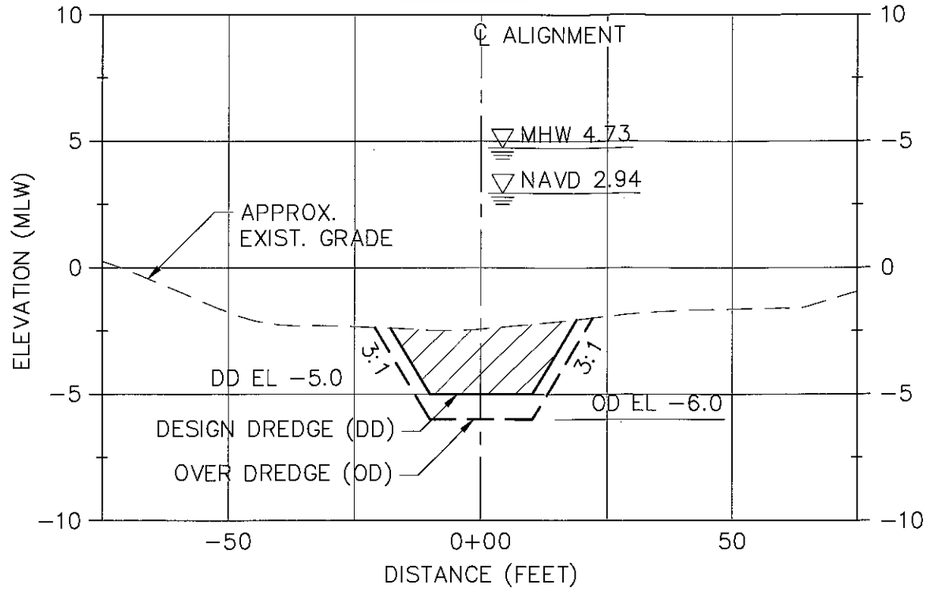
SCALE: 1"=100'

SHEET **21** *OF* **25**

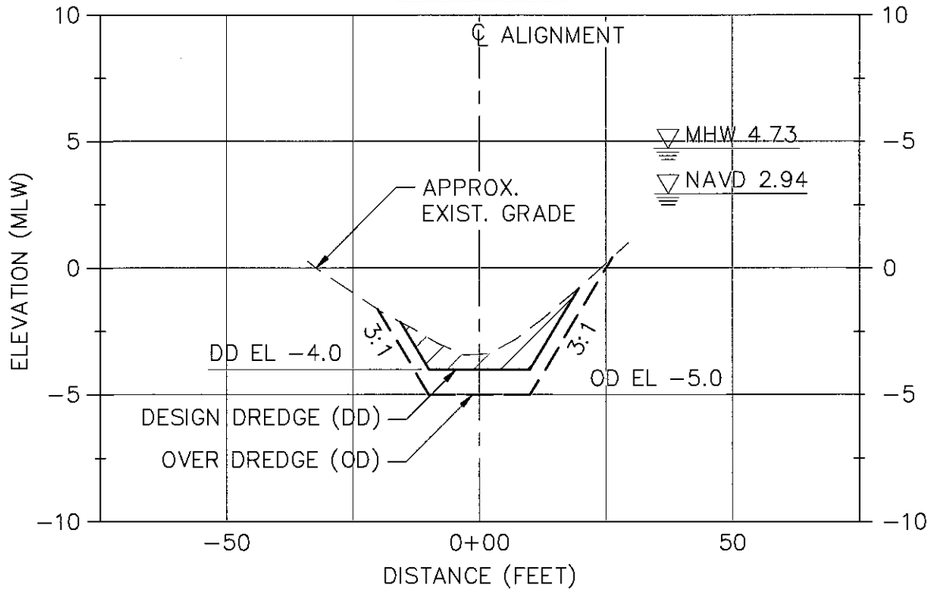
SECTION B



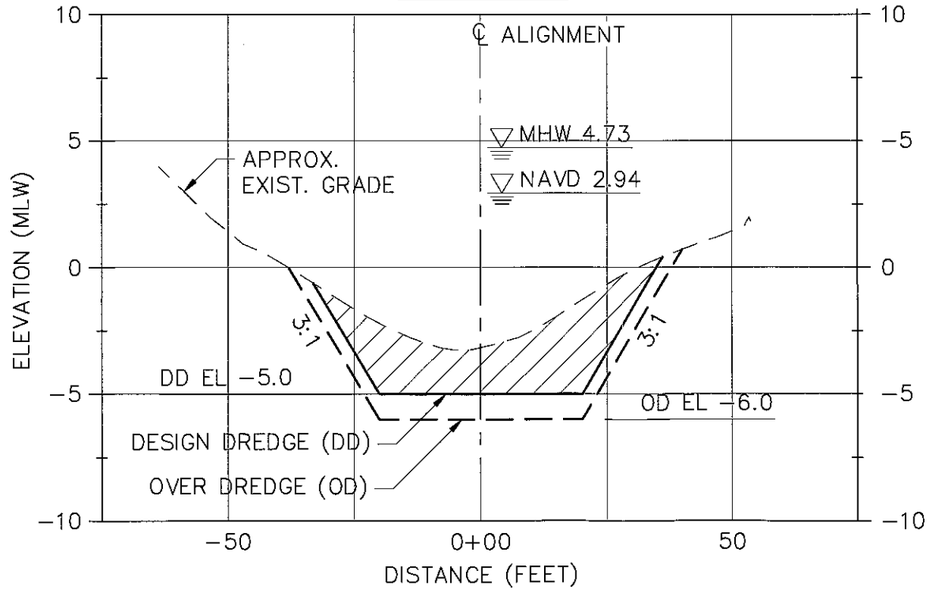
SECTION D



SECTION A



SECTION C



PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

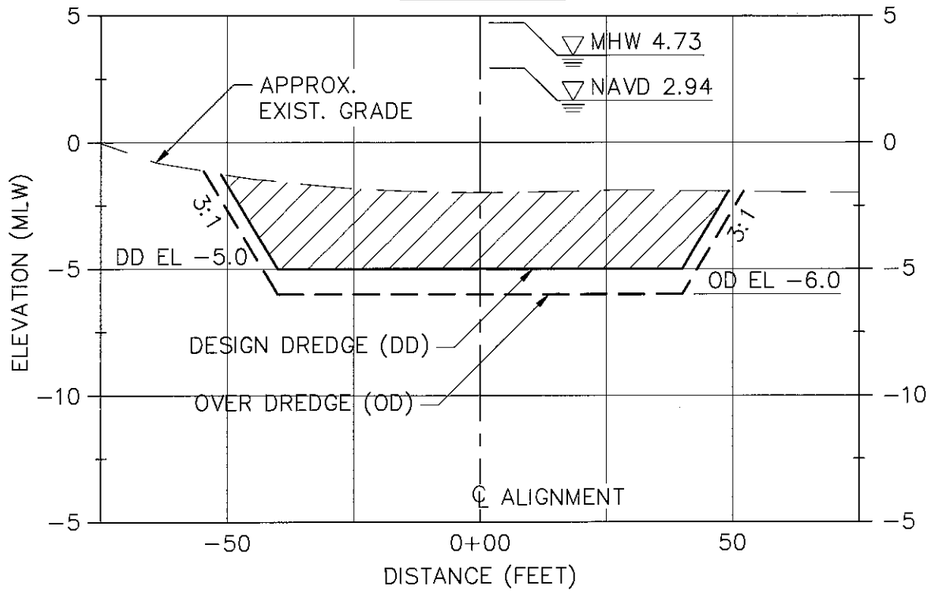
TYPICAL SECTIONS - SHEET 1 OF 3

3' 0' 3' 6' VERTICAL: 1"=6'

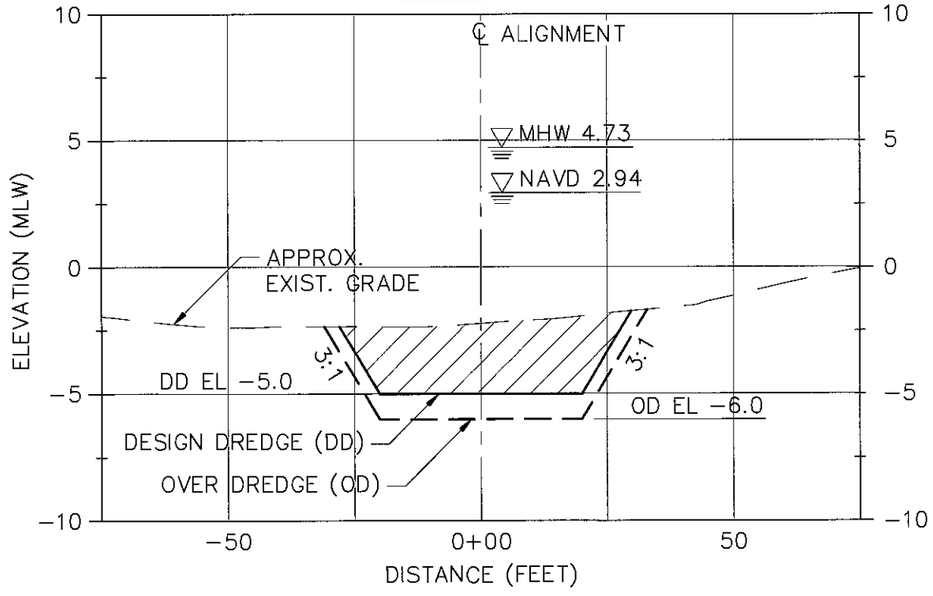
15' 0' 15' 30' HORIZONTAL: 1"=30'

SHEET **22** *OF* **25**

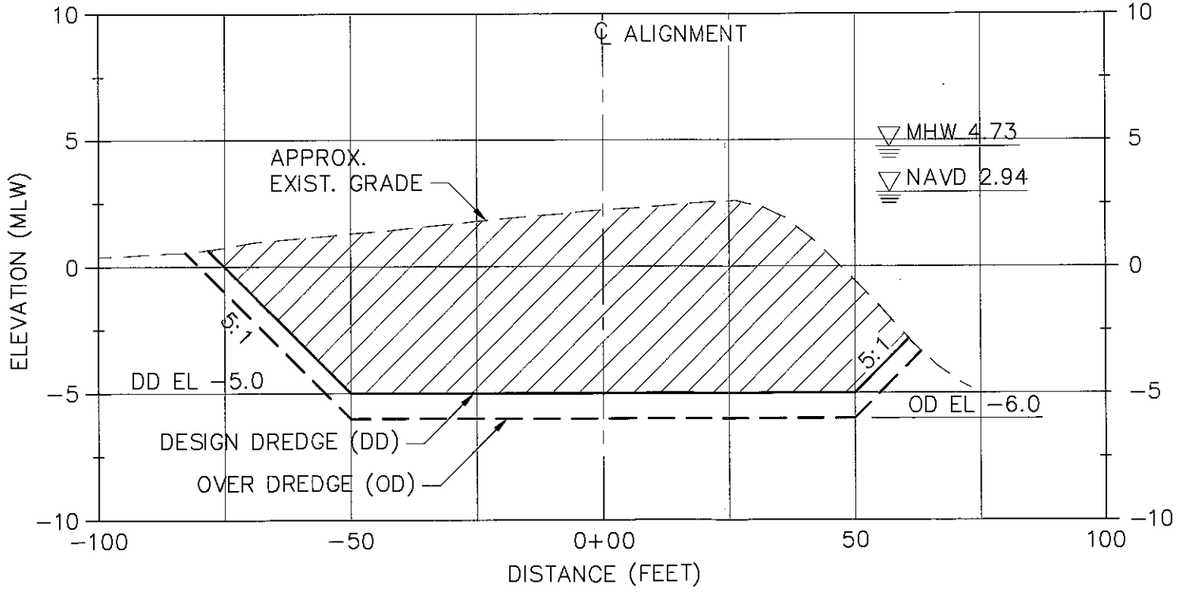
SECTION F



SECTION E



SECTION G



PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

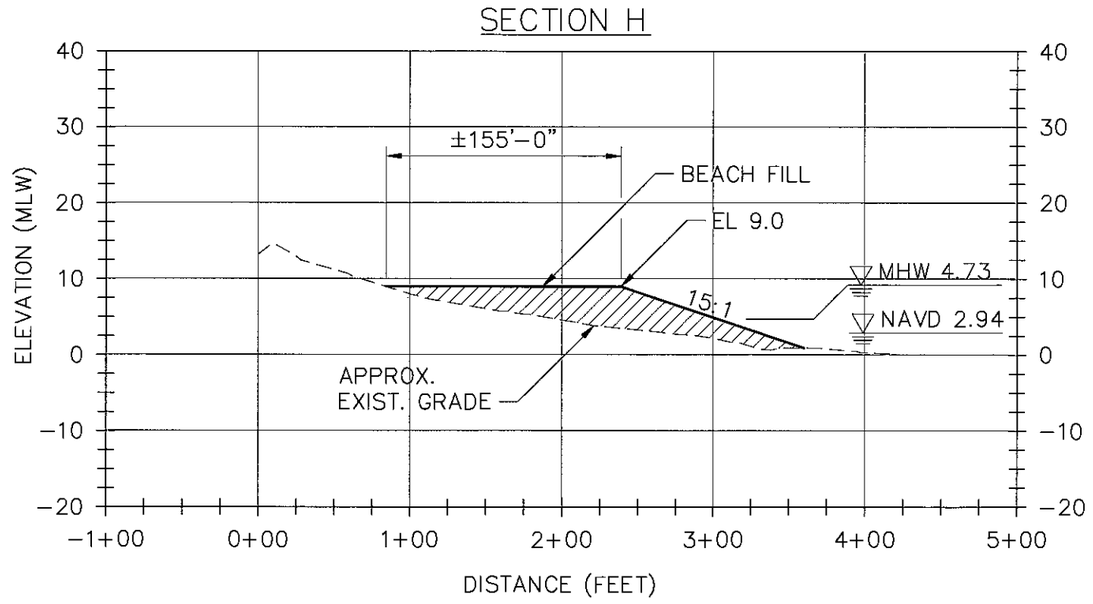
SHEET TITLE:

TYPICAL SECTIONS - SHEET 2 OF 3

3' 0' 3' 6' VERTICAL: 1"=6'

15' 0' 15' 30' HORIZONTAL: 1"=30'

SHEET **23** *OF* **25**



PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

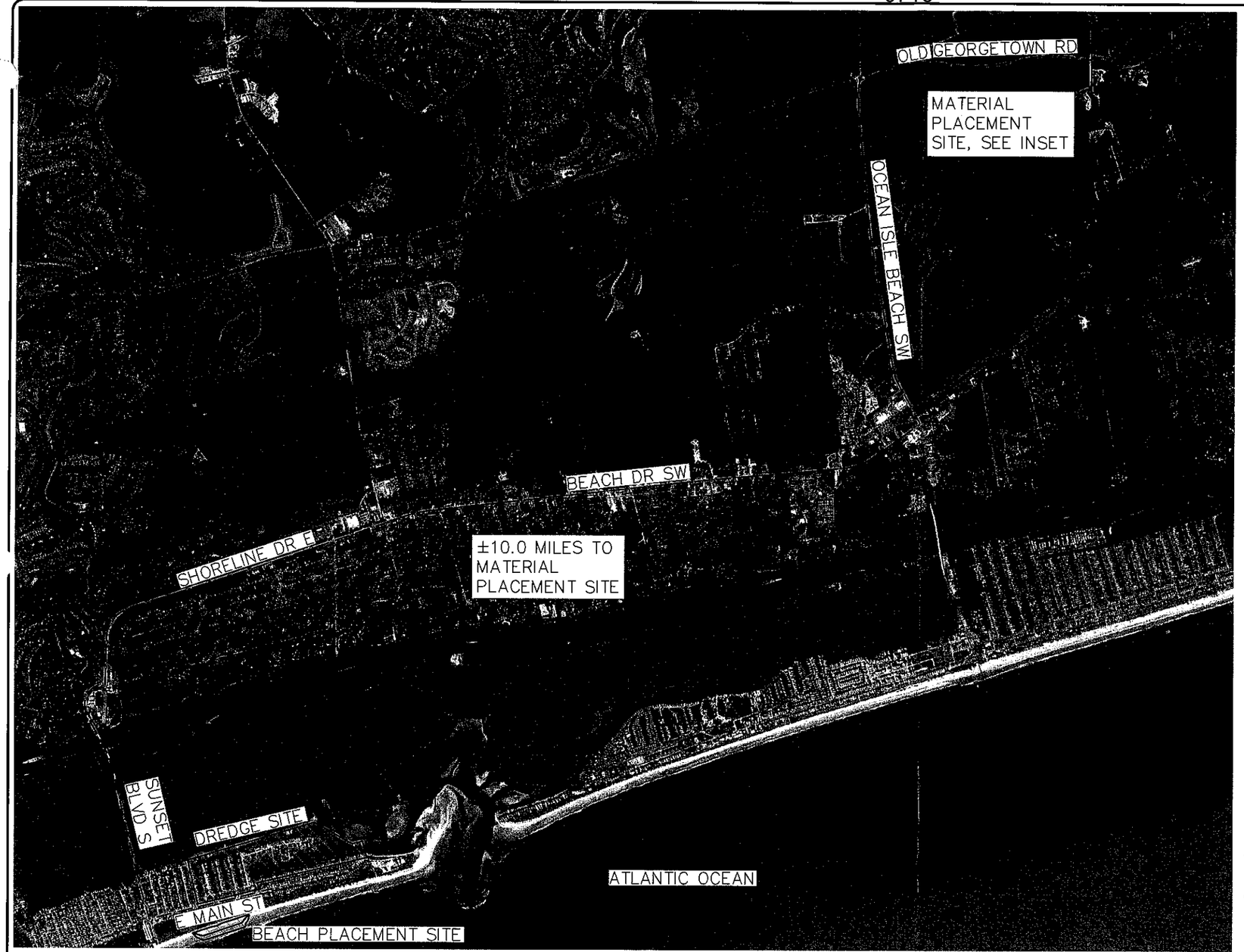
SHEET TITLE:

TYPICAL SECTIONS - SHEET 3 OF 3

50' 0' 50' 100'

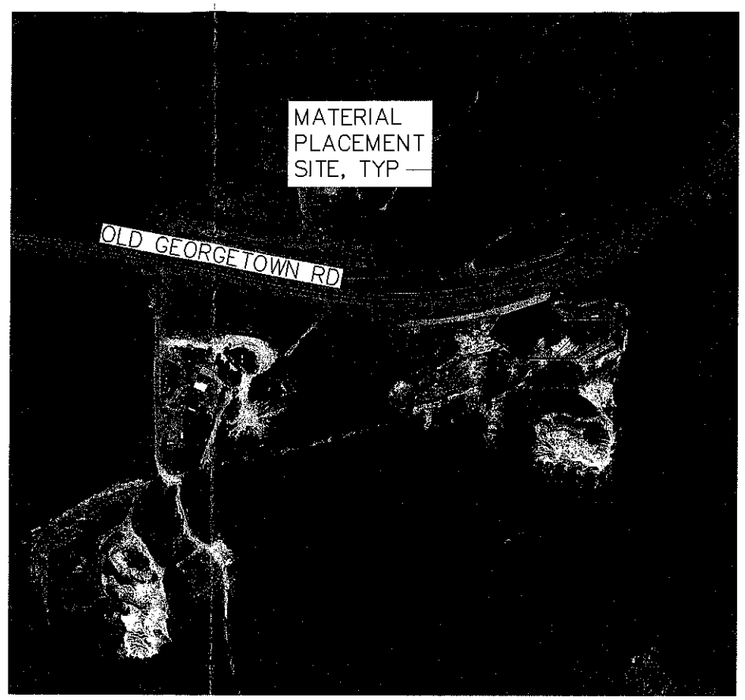
SCALE: 1"=100'

SHEET **24** *OF* **25**



MATERIAL PLACEMENT VICINITY MAP
1"=3000'

2016 AERIALS BY NC ONEMAP



MATERIAL PLACEMENT SITE PLAN
1"=500'

TRANSPORTATION NOTES:

- CONTRACTOR SHALL PREVENT SPILLAGE OF MATERIAL ONTO PUBLIC LANDS, INCLUDING HIGHWAYS, ROADS, AND PRIVATE PROPERTY.
- THE CONTRACTOR SHALL INSPECT THE TRAVEL ROUTE USED TO TRANSPORT MATERIAL TO THE MATERIAL PLACEMENT SITE AFTER EACH USE. ANY SPILLS OR DREDGE SEDIMENT FOUND ALONG THE TRAVEL ROUTE SHALL BE IMMEDIATELY CLEANED AND REMOVED FROM THE ROADWAY AND TRANSPORTED TO THE MATERIAL PLACEMENT SITE.
- THE CONTRACTOR SHALL ABIDE BY ALL NCDOT STANDARDS FOR HAULING SPOIL MATERIAL ALONG THE ROADWAYS.
- THE CONTRACTOR SHALL CLEAN ALL TRUCKS, WHEELS, AND HAULING EQUIPMENT AS NECESSARY TO PREVENT TRACKING MATERIAL ONTO THE ROADWAYS.

PROJECT TITLE: **TOWN OF SUNSET BEACH NAVIGATION PROJECT: MAINTENANCE DREDGING OF SOUTH JINKS CREEK THE BAY AREA AND THE FEEDER CHANNEL**

DATUM: **MLW**

PREPARED BY: **MOFFATT & NICHOL**

PREPARED FOR: **TOWN OF SUNSET BEACH NORTH CAROLINA**

DATE: **JANUARY 31, 2019**

SHEET TITLE:

MATERIAL PLACEMENT SITE PLAN

1500' 0' 1500' 3000'
SCALE: 1"=3000'

250' 0' 250' 500'
SCALE: 1"=500'

SHEET **25** *OF* **25**

NHC

Spears, Courtney

From: Richard Hilderman <richardhilderman@gmail.com>
Sent: Monday, June 10, 2019 12:24 PM
To: Spears, Courtney; Huggett, Doug; Richard Hilderman
Cc: Davis, Braxton C; Geoff Gisler; Len Pietrafesa; Ted; John Pagels; Barry Lentz; Gary Merritt; Nina Marable; Rich Cerrato; Janice Harris; Editor; Laura Lewis
Subject: [External] Alternative SSB Dredging Analysis
Attachments: Alternative Dredging Proposal.docx; Airal photo of proposed dredging of South Jinks Creek.docx; Drs. Pietrafesa, Bao and Gayes Memorandum.docx

Doug and Courtney,

I know Courtney is out of the office until June 17th and you are the contact person in her absence. Per Courtney's email below attached is my alternative SSB dredging analysis along with its two attachments to be considered during the permit review process. I am hoping you can add it to the file for consideration otherwise will have to wait until Courtney returns?

Thanks
Richard Hilderman, Ph.D.

Good afternoon Dr. Hilderman,

Thank you for the information on your proposal. At this time, the application has still not been accepted as complete. We would welcome you to submit any alternatives analyses in writing to be considered during the permit review process. If you submit prior to the application's complete acceptance I can add them to the file for consideration. Please let me know if there are any questions.

Kind regards,

Courtney Spears

Assistant Major Permits Coordinator

Division of Coastal Management

Department of Environmental Quality

910 796 7426 office

courtney.spears@ncdenr.gov

127 Cardinal Drive Ext.

Wilmington, NC 28405

MH

The Sunset Beach dredging permit does not include dredging of North Jinks Creek which bisects PNAs. It only proposes to dredge South Jinks Creek, the feeder/finger canal system and the Canal Bay Area near Tubbs Inlet. Since the main objective of dredging South Jinks Creek is to give Canal Bay Area boaters access to the ICWW, it seems to me that the dredging depth of South Jinks Creek, the feeder/finger canal system, and Canal Bay Area needs to be only to the current or historical depth of North Jinks Creek; not to 5 feet below MLW as the Town is proposing in the permit application.

The only time any part of Jinks Creek has been dredged dates back to 1969 when Tubbs Inlet was relocated. It was moved from approximately today's 12th Street on East end of the island, to its current location which separated Ocean Isle Beach from Sunset Beach. In order to remain attached to Tubbs Inlet, Jinks Creek had to be relocated along with Tubbs Inlet. This relocation extended the length of Jinks Creek from the ICWW to Tubbs Inlet. But the extended distance disrupted the tidal prism which triggered the shoaling that is occurring in both Tubbs Inlet and South Jinks as Mother Nature tries to bring the system back into equilibrium.

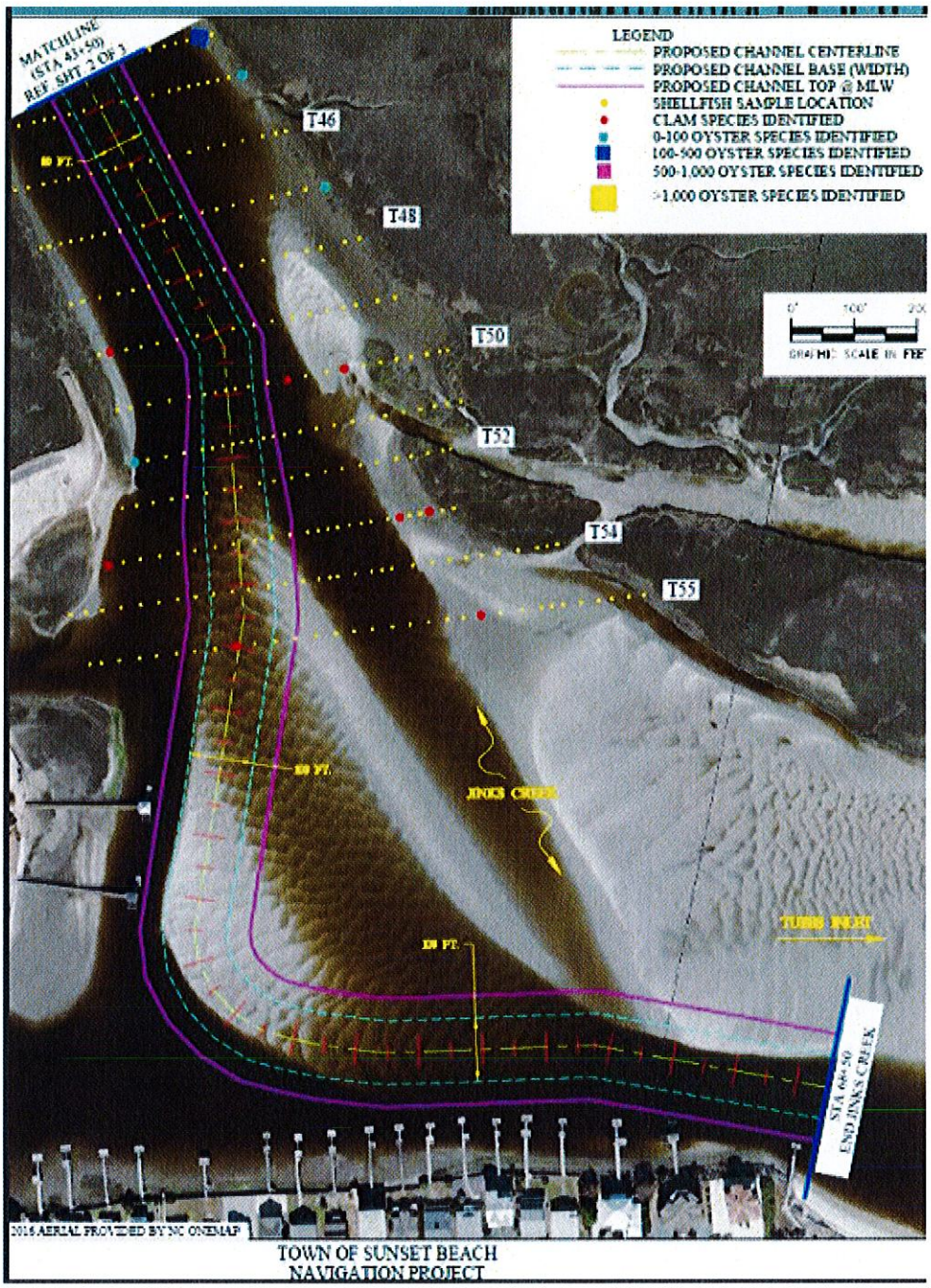
The current proposal is to dredge a 1750 foot long navigational channel that is 80 feet wide and 5 feet below MLW in South Jinks Creek (see attached photo). According to Mr. Neal of Moffatt and Nichol the depth of North Jinks Creek is 2 feet below MLW. Thus there is no reason to dredge South Jinks Creek, the feeder/finger canal system and Canal Bay Area deeper than 2 feet below MLW. Drs. Pietrafesa, Bao and Gayes have expressed concerns this navigational channel will increase the risk of flooding and erosion after storms when the surging water is attempting to get back out to the ocean (see attachment). In other words, will all the outgoing, surging water make a left hand turn when it approaches the East end of the island or will some of it over wash onto the island triggering erosion and flooding? What will be the effect of disturbing the existing massive flood tide delta in South Jinks Creek?

DCM has five specific criteria regarding whether to approve dredging permits. Criteria number 2 is "**that there will be significant adverse effect on public health, safety, and welfare."** Will the potential increase risk in flooding and erosion created by the navigational channel have an adverse effect on public health, safety and welfare?

Criteria number 5 is **"that there will be significant adverse effect on wildlife or fresh water, estuarine or marine fisheries."** Dredging an 80 foot wide navigational channel in South Jinks Creek that is 5 feet below MLW will increase the sediment load deposited in North Jinks Creek. This increased sediment will eventually bury the large density of oyster beds in North Jinks Creek. Will this have an adverse effect on the ecosystems in North Jinks Creek and the surrounding PNAs?

Please consider that dredging the feeder/finger canal system, Canal Bay Area and South Jinks Creek only to the depth of North Jinks Creek, instead of 5 feet below MLW, will decrease the risk of flooding/erosion on the East end of the island after storm surges. Dredging only to the depth on North Jinks Creek will also reduce the potential adverse effect the channel will have on the ecosystems of both North Jinks Creek and the surrounding PNAs.

Richard Hilderman, Ph.D.



TOWN OF SUNSET BEACH
NAVIGATION PROJECT

MH

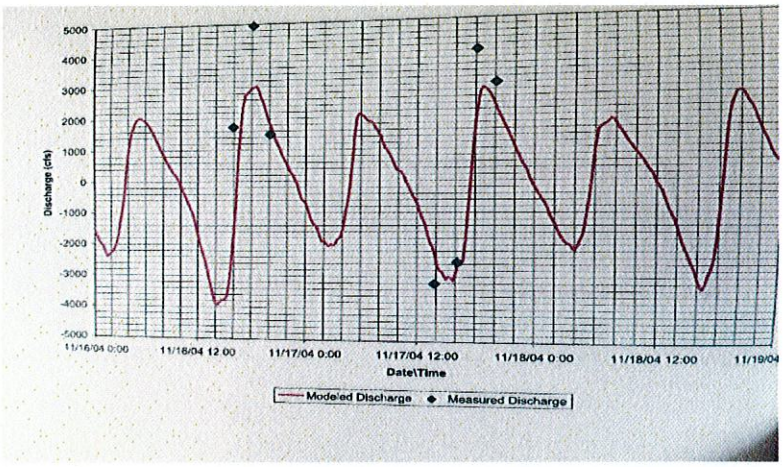
March 25 2018

Memorandum to Dr. Richard Hilderman

Subject: Comments Regarding Jinks Creek South and Other Issues

From Dr. Len Pietrafesa - Professor Emeritus NC State U, Dr. Shaowu Bao –Assistant Professor Coastal Carolina U, Dr. Paul Gayes – Chaired Professor and Center Director, Coastal Carolina U

1) Photographic Evidence dating back to 1938 (Masterson et. al, 1973. Sediment Movement through Tubbs Inlet), shows clearly that Jinks Creek South has been open for free flowing volumetric flux from at least 1938 to 1973. More recently, in other aerial views, from 1973 to 2018 the Creek is open.
2) Therefore, given # (1) one can conclude that from 1938 to the present, there has not been nor is there presently a threat to Jinks Creek South not remaining open to flow from the Intracoastal Waterway to/from Tubbs Inlet. The Intracoastal and Tubbs Inlet communicate hydro-dynamically via Jinks Creek South.
3) The RMA-2 hydrodynamic model utilized by Moffat & Nichol is a finite element code and is vertically averaged.
4) Because of # (3), the vertical profile of the horizontal velocities and the bottom boundary layer cannot be explicitly modeled.
5) Because of #'s (3 and 4), the Bottom Shear Stress cannot be explicitly calculated. Thus sediment transport under any external non-local or local forcing conditions cannot be explicitly determined, either deterministically or probabilistically.
6) The horizontal eddy coefficients (taken as 500 in Moffat & Nichols) in these kinds of environments and platforms, have not actually been determined and should be considered only as a best guess to yield numerically stable and reasonable looking model output results.
7) The RMA-2 model runs conducted by Moffat & Nichol only used Astronomical Tidal Forcing at the mouth; which is located at Tubbs Inlet but is also communicated via the Intracoastal Waterway.
8) We now consider some Actual Observations versus Moffat & Nichols RMA-2 Model Output. Examples of these are shown clearly in the Moffat & Nichol Report.
9) From reviewing Report model results, one finds that the Moffat & Nichols RMA-2 model generally under predicts the actual Volumetric Flux. An example of this is shown in the Figure below (12), where the model predicts a 3000 ft^3/sec flux (the red line), while the observations show a 5000 ft^3/sec flux (shown explicitly as a black diamond). This is an underestimate of the volumetric flux of approximately 2000 ft^3/sec.
10) Thus, in this representative example [the figure in (12)], the model estimate versus the actual volumetric flux of water through the system is an underestimate of about 40 %. Many other examples of the differences between model output and actual observations are documented in the Report.
11) Why are there differences presented in #'s (9, 10), such as that shown in the Figure in # (12) below, at 11/16/20:00?



12) Moffat & Nichols RMA-2 Model Output (red line) Versus Actual Observations (black diamonds).
13) Finding: The differences in Moffat & Nichols model output and Actual Observations, shown above in # (12), demonstrate the importance of the consideration of Atmospheric Wind Forcing.
14) For example, at the time of the observations alluded to in #'s (9, 10, 11 and 12) the local winds were from the Northwest and West at ~ 7 to 12 mph; as observed by the U.S. National Weather Service. These are not excessive or unusual wind speeds for this area as shown by the monthly averaged winds derived by the National Weather Service as shown in the upper two rows of Table # (16) below.
15) Further, according to Weisberg and Pietrafesa (1983), [W&P in the bottom row in the Table in # (16) below], they found that the alongshore winds along the Southeast coast are actually 20% higher than those at the National Weather Service site. While the Astronomical Tides are persistent and regular, a little bit of coastal wind can go a long way in creating stronger Floods and stronger Ebbs through Jinks Creek South.

16) Here are the NOAA NWS documented average winds in the region of Tubbs Inlet:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave
NWS	10.4 mph	10.5 mph	11.6 mph	11.5 mph	11.5 mph	10.4 mph	10.4 mph	10.4 mph	9.3 mph	10.4 mph	10,4 mph	10.4 mph	10.6 mph
W&P	12.5	12.6	13.9	13.8	13.8	12.5	12.5	12.5	11.2	12.5	12.5	12.5	12.7

17) Given #'s (8), (9), (10), (11), (12) and (13) above, and the actual facts presented in the Table in # (16) regarding the wind speeds for the locale, one can clearly state that the Moffat & Nichols RMA-2 Model output needs to be increased by at least 40%- 60% in terms of the true Volumetric Flux through Jinks Creek South. This is a significant Flux of water and explains why Jinks Creek South has remained open and functional from, at least, 1938 to the Present; as documented.
18) No Wind Forcing was imposed in the RMA-2 model runs either non-locally at Tubbs Inlet or upon any part of the system directly. However, it has been shown by numerous publications in the peer reviewed literature that Wind generated effects can be significant in these coastal

systems; resulting in considerably higher and lower flows and water levels throughout such coastal systems.

19) Wind generated waves were not considered in the RMA-2 model system model runs by Moffat & Nichols. These can contribute to water flux and sediment transport as well.
20) The lack of consideration of Wind Forcing in the Moffat & Nichols model runs resulted in underestimates of flow velocities and thus of volumetric flux estimates through Jinks Creek South.
21) Conclusion: Wind Effects cannot be ignored in computing the Hourly, Daily, Weekly, Monthly, Yearly or Inter-annually Averaged Volumetric Flux through Jinks Creek South.
22) Conclusion: The Moffat & Nichols RMA-2 Model Runs, as configured, are basically "first approximations" to the actual fluxes of water into and out of (through) the system and are limited by the absence of some significant influences on flow velocity, tidal prism and sediment availability. The more limited representation of higher flux events by the model should be recognized as a significant limitation in real world model applications.
23) Anyone who lives on Sunset Beach and has Whirly-Gigs on their front or back decks knows well that Coastal Atmospheric Winds are Omni-Present, in addition to the Astronomical Tides and Precipitation events; all of which contribute to fluxes of water through Jinks Creek South.
24) To avoid the stagnation of waters in the Sunset Beach Tributaries which abut and feed the Intracoastal Water Way and Jinks CreekSouth, the Tributaries should not be dredged to depths deeper than either of the two major water bodies.
25) In the present situation of heavy mainland upstream nutrient loading, the entirety of the coastal marsh areas must be allowed to flush themselves naturally. They are fluid systems which must be allowed to move laterally and vertically with storms, and that is why they have survived over time. The only waterbody that should be dredged is the Intracoastal Water Way; and that is for reasons of shipping related Commerce.
26) If the enormous Natural Marsh areas of Sunset Beach are to be maintained as living ecological coastal resources, and the natural habitats used for the early stage lives of estuarine and coastal marsh dependent finfish, birds and other life forms, the natural system should not be disrupted by dredging or any other in-kind disruptive activities.
27) Dredging carries with it the reintroduction of heavy metals, which are buried in the sediments of Jinks Creek South, back into the water column. We ourselves do not have chemical expertise, but we do know from the prior studies of S. Riggs (ECU), D. DeMaster (NCSU), W. Showers (NCSU), J. Ramus (DUML), H. Paerl (UNC-IMS) and others that heavy metals are a bane to fish, fowl and humans in these types of watersheds. Fortunately there is chemical expertise on site (R. Hilderman, Clemson) who could speak to this.

Spears, Courtney

From: Davis, Braxton C
Sent: Monday, July 1, 2019 11:45 AM
To: Spears, Courtney
Subject: Fw: [External] CAMA Major Permit Application - Sunset Beach Dredging

****

Braxton Davis
Director, Division of Coastal Management
NC Department of Environmental Quality
Morehead City, NC 28557
(252) 808-2808 x202

From: John Wells <jdwells01@gmail.com>
Sent: Sunday, June 30, 2019 10:11 PM
To: Davis, Braxton C
Subject: [External] CAMA Major Permit Application - Sunset Beach Dredging

CAUTION: External email. Do not click links or open attachments unless you verify. Send all suspicious email as an attachment to report.spam@nc.gov<mailto:report.spam@nc.gov>

Dear Mr. Davis,

This letter is to express my vehement opposition to the current dredging plan that would result in placing an enormous volume of sand along the eastern oceanfront of Sunset Beach from 5th Street to 12th Street. This plan fails to adequately consider the significant, irreversible, immediate and long term practical and commercial impacts to property owners, rental guests, tourists and Town employees.

My family has owned the oceanfront lot at 604 Main Street East for more than 50 years. Over this period, the distance from Main Street to MHW has more than tripled from 150 feet to 491 feet. Based on the current plan, this would be increased to over an eighth of a mile. People staying in 2nd row homes and further away would be even more negatively affected. This additional inconvenience could drive down rental occupancy and property values in this large area, which is certainly not a "beneficial reuse" of beach compatible material.

In contrast with the 1960's, when Tubbs Inlet was slicing through the east end of the island and causing owners to move houses to safety, a dredging plan was executed to close the inlet and move it back to where it had been before the instability. That plan involved a truly beneficial reuse of beach compatible material. The current plan appears to be a cheaper and riskier alternative to the more prudent solution of disposal on the mainland.

The flow of sand due to wind, water currents and storms is indeterminate at best. The act of establishing a huge 'tabletop' mound of sand over 1,600 feet long and up to 9 feet of elevation in this oceanfront location is unconscionable. From Tab H of the application, "…the sand often does not remain on the beach for an extended period of time." Uncontrollable sand movements would no doubt cause significant issues for decades, in unpredictable and detrimental ways. Trying to maintain this pile of sand would be a costly and never-ending expense to the Town.

In addition, the slope of the beach from the existing frontal dune to the water would be noticeably and significantly changed from what is normal and historical for this island, destroying the beach's natural beauty, continuity and character.

Sunset Beach continues to be mentioned in many publications as one of the best beach vacation destinations in the country, due to its unspoiled beauty. Why would anyone approve a project that would make such a tremendous change to this marvelous and desirable oceanfront?

I ask that you demand an alternate solution to this disastrous and irresponsible disposal plan. I'm sure that there are other suitable options that would do much less damage.

Don't spoil Sunset Beach with Jinks Creek sand!

Sincerely,
John D. Wells

Owner- Sunset Beach Music, LLC
604 Main Street East
Sunset Beach, NC 28468
(813)230-0962

MH

Spears, Courtney

From: MacPherson, Tara
Sent: Tuesday, July 30, 2019 3:00 PM
To: Spears, Courtney
Subject: FW: [External] Additional Comments- Sunset Beach Dredging Project

Tara MacPherson
Field Specialist
NC Division of Coastal Management
Department of Environmental Quality

910 796-7425 office
910 395-3964 fax
tara.macpherson@ncdenr.gov

127 Cardinal Drive Ext
Wilmington, NC 28405

Nothing Compares

From: John Wells <jdwells01@gmail.com>
Sent: Tuesday, July 30, 2019 10:57 AM
To: MacPherson, Tara <tara.macpherson@ncdenr.gov>; Davis, Braxton C <Braxton.Davis@NCDENR.Gov>
Subject: [External] Additional Comments- Sunset Beach Dredging Project

Dear Ms. MacPherson and Mr. Davis,

The Sunset Beach oceanfront is a very unique stretch of beach. Unlike many, if not most islands on the east coast, the oceanfront at Sunset Beach receives an almost continuous flow of sand, deposited consistently along the entire strand. There has never been a need for renourishment, unlike the significant erosion problems encountered on neighboring islands. Now the Town of Sunset Beach has requested permission to deposit compatible sand from the Jinks Creek areas to the oceanfront, altering the coastline along a section of beach bordered by vacation and rental homes.

History would suggest that the accretion will continue, although it is impossible to predict how the flow would be altered. Having built the house at 604 E. Main Street in 1977, our family has witnessed and benefitted from the

accretion of over 300% of original lot size. Now we are faced with this unnatural and dangerous plan to extend the beach further by up to ±155 feet at MHW, a 30% increase over current conditions.

Proponents of dredging have indicated that the deposited sand will be moved naturally away, eventually returning to a similar profile as now. There is no reason to expect that this would occur. Surely the ocean currents, winds and rain/storms would affect the shape of the berm, but it seems likely that accretion will continue on this unusual island.

We are opposed to this plan for the following reasons:

1. Property Values for oceanfront homes as well as homes away from the ocean will be negatively impacted due to the additional distance to the ocean as well as the loss of the natural contour of the beach.
2. Rental Occupancy and resulting income is likely to decrease for the same reasons as #1.
3. An informal search of legal judgments concerning accretion and beach renourishment indicates a very contentious and litigious situation. In the most undesirable situation for our family and the others adjacent to the berm, the dredged sand may establish a property line at the berm-to-current-MHW line interface. As a result, the Town could be an additional property owner of the new berm and whatever accretion occurs from that point. Since this is berm would not be distributed over the entire beach, the riparian owners would be unfairly targeted, and owners of adjacent properties could be affected as well. Property owners could be in a position to buy this berm property back from the Town in order to retain ownership to MHW.

For these reasons as well as those previously submitted, we implore you to reject this disposal plan and demand a plan that doesn't add more sand to the oceanfront! We are thankful for the natural accretion, and don't want to disturb the natural processes that have created this wonderful beach.

Thank you for your consideration, and for your service to our community!

Sincerely,
John Wells
604 East Main Street
Sunset Beach, NC 28468

MC

Spears, Courtney

From: Davis, Braxton C
Sent: Tuesday, July 16, 2019 3:56 PM
To: Spears, Courtney
Subject: FW: [External] Town of Sunset Beach Shallow Draft Navigation Project

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Braxton C. Davis
Director
NC Division of Coastal Management
Department of Environmental Quality

252 808 2808 x202
Braxton.Davis@ncdenr.gov

Morehead City, NC 28557

From: Lorraine Hoke <lhoke3310@aol.com>
Sent: Tuesday, July 16, 2019 3:55 PM
To: Davis, Braxton C <Braxton.Davis@NCDENR.Gov>; MacPherson, Tara <tara.macpherson@ncdenr.gov>
Subject: [External] Town of Sunset Beach Shallow Draft Navigation Project

Dear Dr. Davis & Ms. MacPherson:

For reference purposes only:

The Department may deny an application for a dredge or fill permit upon finding: 1) that there will be significant adverse effect of the proposed dredging and filling on the use of the water by the public; or (2) that there will be significant adverse effect on the value and enjoyment of the property of any riparian owners; or (3) that there will be significant adverse effect on public health, safety, and welfare; or (4) that there will be significant adverse effect on the conservation of public and private water supplies; or (5) that there will be significant adverse effect on wildlife or fresh water, estuarine or marine fisheries.

We are property owners on one of the finger canals affected by the proposed dredging. We have many questions and concerns that have not been answered to our satisfaction. Our canals are home to oysters, fish, crabs and a feeding ground for many birds. We were not given a vote to whether we wanted canal dredging, and the Town plans to add a tax to our property tax to build up funds for future maintenance dredging, again without our vote. We are not totally opposed to the finger and feeder canal being dredged. However, (Item 5) the Town of Sunset Beach storm water system directs all street runoff into the canals. Shouldn't this be remedied to reduce maintenance dredging (paid by the property owners) and pollution of the waterways? We had to get a CAMA permit just to build a small deck on the street side of our home, but they can pollute the canal with polluted runoff perpetually? Perhaps if the storm water runoff wasn't being put in the canals they wouldn't need as much dredging.

The waterways affected by the proposed dredging project have always been used by shallow boats with boaters taking the tidal fluctuations into account. Our little island waters are not meant for deep water boats. There is a public boat ramp on the ICW available for larger boats.

Jinks Creek is a naturally occurring, meandering, shallow water tidal creek consisting of both North Jinks Creek at the ICW, and South Jinks Creek in the Bay area leading to Tubbs Inlet and the ocean. North Jinks at the ICW has a 2' MLW. Why are we proposing to dredge South Jinks to 5' MLW instead of the depth of North Jinks Creek? How will this deeper water help boaters if they cannot access it at the ICW? How will water flow in and out of the creek with only 2' MLW at one end? (Item 5) Will there be an increase in sediment deposited in North Jinks impacting the ecosystem? How will the increased flow of a 100' wide channel affect the entire creek and the surrounding primary nursery areas (PNAs)? If dredged to the proposed depth and width, continuous maintenance dredging will be required to keep the channel open putting constant stress on the organisms that inhabit Jinks Creek and the surrounding PNAs.

(Items 2 & 3) Will there be an increase in flooding and/or erosion on the east end of the island from storms and king tides when the surging water is attempting to get back into the ocean? Furthermore, the proposed dredging will remove part of the tidal delta in South Jinks Creek, which could increase the rate of shoreline erosion.

On another subject, the sediment being removed from South Jinks Creek is destined to be piped to the oceanfront (at a major cost) impacting (Item 1) the use of the water by the public, and (Item 2) having an adverse effect on the value and enjoyment of the property owners. Our oceanfront has a long history of sand accretion and we see no need to risk pumping in unknown sediment to add more sand to the oceanfront. This oceanfront has never had a refurbishment effort. Why not move the removed sediment to the east end of the island which loses sand during storms, is much closer to the dredge site, and has only three houses nearby?

In summary, it is our opinion important dredging details have not been thoroughly thought out, and the potential consequences could affect our waterways for many years to come. Thank you for your time.

Lorraine & Ron Hoke

421 Marlin Street

Sunset Beach, NC

Spears, Courtney

From: Davis, Braxton C
Sent: Tuesday, July 16, 2019 1:28 PM
To: Barry Lentz
Cc: Richard Hilderman; Richard Hilderman; Nina Marable; Spears, Courtney
Subject: RE: [External] Comments to Dr. Braxton C. Davis, Director, Division of Coastal Management on Sunset Beach application

Confirming receipt, thank you for your comments.

Braxton C. Davis
Director
NC Division of Coastal Management
Department of Environmental Quality

252 808 2808 x202
Braxton.Davis@ncdenr.gov

Morehead City, NC 28557

From: Barry Lentz <uncbrl@gmail.com>
Sent: Tuesday, July 16, 2019 12:56 PM
To: Davis, Braxton C <Braxton.Davis@NCDENR.Gov>
Cc: Richard Hilderman <doggenome@gmail.com>; Richard Hilderman <richardhilderman@gmail.com>; Nina Marable <ninam20136mine@gmail.com>; Barry R Lentz <uncbrl@gmail.com>
Subject: [External] Comments to Dr. Braxton C. Davis, Director, Division of Coastal Management on Sunset Beach application

Dear Dr. Davis:

I write to offer comments on Sunset Beach's application for a permit to dredge part of Jinks Creek, the adjoining canals and feeder canal, and what is referred to as the "Canal Bay" area on the eastern end of Sunset Beach Island, NC. Jinks Creak is a natural salt-water creek joining the man-made Inland Waterway to the north and the Atlantic Ocean by way of Tubbs Inlet to the south. I own a property on the west end of Sunset Beach Island on another natural salt-water creek (Blair Creek). It has never been dredged, and I would oppose dredging it even though it leaves me without "deep-water" access to the Inland Waterway. As for most low-land residents along the southern coast, I live at the pleasure of the tides that determine when I can access deep water. I would have it no other way.

I have two primary concerns about the Town's current CAMA application: 1] It will disturb a natural salt-water creek that is critical to an extensive Primary Nursery Area (PNA). 2] It presents potential risks to public health, safety and welfare have not been adequately addressed.

In its application, the Town of Sunset Beach claims that the southern portion of Jinks Creek was dredged 50 years ago, so that this project is a "maintenance dredging". This is untrue. A bit of history demonstrates this. Mannon Gore purchased Bald Beach (later Sunset Beach Island) in 1955 and invested heavily to realize his dream of making it a popular resort. He installed the famed "floating bridge" and began selling property in 1958. However, Gore saw his plans threatened as a result of the natural instability of NC's barrier islands. As you can see (Figure 2 in attached "Budde and Cleary, MS Thesis of L.E. Budde"), Tubbs Inlet (eastern inlet of Sunset Beach Island) migrated west over the period between 1949 (earliest arial photos) to 1970. By 1963 there was a mere spit of sand existed between Tubbs Inlet (at that time located roughly at current 10th Street) and the partially closed 1949 inlet (still visible at the right edge of Figure 2B of Budde and Cleary). The 1963 inlet (Figure 2C) linked to a tidal creek (Jinks Creek) that nourished and draining the extensive PNA that had long surrounded eastern Sunset Beach Island. Another inlet around Sunset Beach Island (then Madd Inlet, now filled) also supplied a west-end PNA *via* another salt-water creek ("Salt Boiler" Creek in Civil War days). A small wooden bridge spanned Salt Boiler Creek to link the more stable west end of Sunset Beach Island to what is now the Bird Island Coastal Preserve. Around 1970, this small bridge mysteriously burned and fell into the creek (several local folk-tales recount this episode). This opened the old Salt Boiler Creek route to the Atlantic Ocean, and Mr. Gore was then able to move several barges of rock and fill through Madd Inlet to fill the migrated Tubbs Inlet, thereby increasing the area of his island by roughly 20%. The current east end of Sunset Beach Island was thus born. Jinks Creek still had to reach the Atlantic Ocean. With the assistance of Mr. Gore, who moved sand from the partially filled 1949 inlet to further close the 1954 inlet, it made a sharp left turn, which became "South" Jinks Creek; the remains of the 1954 inlet became the current "Canal Bay". Both were created by blocking the natural western migration of Tubbs Inlet. This permitted Gore to fill PNA areas and develop the current canal area and the feeder canal that reaches it from Jinks Creek (Figure 2D of Budde and Cleary). Dredging of these canals is properly permitted under CAMA as "maintenance dredging". This highly unstable hydraulic system is subject to future redesign by Nature, which must react to the misdeeds of men. It is very difficult to accurately predict what will be Nature's response to deepening the southern portion of Jinks creek and the "Canal Bay" area to a depth ~5 ft below MLW, well below the depth of the natural salt-water creek system of which they are both a part (~ 2ft below MLW). Because we cannot accurately simulate the effects of wave sheer stress on the mud at the bottom of a salt creek, it impossible to estimate the potentially disastrous effects of tidal creek infill during severe (and increasingly frequent) coastal storms. In-filling of the northern portions of Jinks Creek could prove disastrous to numerous species, including oysters, shrimp, fish and shell fish that depend on the PNAs for their survival. This would likely be irreversible. In order to address the legitimate concerns of owners of property in the canal region and "Canal Bay", some residents of Sunset Beach (led by Dr. Richard Hilderman) suggested that a safer path would be to dredge "South" Jinks and "Canal Bay" to the depth of the rest of Jinks Creek in the PNA. This was rejected by the Sunset Beach Town Council by a 3-2 vote, with one of the "3" having the clear conflict of owning water-front property in the affected area. The concerned citizens of Sunset Beach appeal to you to protect our natural PNA areas by rejecting a project that has a high probability of doing irreparable damage to one of them.

My second objection to the Town's application derives from the potential risk its approval could present to lives and property at the east end of Sunset Beach island. We simply have NO reliable estimate of what the resulting greatly increased tidal and storm flow could accomplish. Simulations presented by the town (prepared by its "engineering" firm Moffatt and Nichol) purported to show that there will be no increase in flooding and erosion in the eastern portion of Sunset Beach Island or its PNAs. Such simulations are based on mathematical models of very complex and marginally understood natural processes. This simulation uses a well-known algorithm that of course must rely on input from the scientists running it. Three eminent coastal scientists (Len Pietrafesa - Professor Emeritus NC State U, Shaowu Bao – Assistant Professor Coastal Carolina U, and Paul Gayes – Chaired Professor and Center Director, Coastal Carolina University) examined this simulation and found it lacking in accounting for measured flow through Jinks Creek and Tubbs Inlet. It routinely underestimated actual flow. Delving into the assumptions and input of Moffatt and Nichol, these three scientists hypothesized that this could reflect both inadequate modelling of the influences of wind as well as M&N's approximation of a system open on two ends (the ocean and Inland waterway) by a system open on only one end (Atlantic Ocean). When properly considering these factors, these scientist predicted that the risk of serious flooding would be significantly greater than predicted by Moffatt and Nichols. When asked, a representative of Moffatt and Nichols refused to address these inconsistencies. This is too important a decision to be made in the absence of an adequate answer to such a serious question.

In summary, I urge youth reject this permit application in order to remain in compliance with both the spirit and letter of CAMA. The Town could then search for a more appropriate redress of the concerns of the few east-end water-front property owners and developers who would benefit from this massive dredging project. Thank you for your attention.

Sincerely, Barry R. Lentz/62

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Spears, Courtney

From: Davis, Braxton C
Sent: Tuesday, July 16, 2019 2:43 PM
To: Spears, Courtney
Subject: FW: [External] Comments to Dr. Braxton C. Davis, Director, Division of Coastal Management on Sunset Beach application
Attachments: Budde_and_Cleary_Manuscript.pdf; signature boat.pdf

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From: Lentz, Barry R <barry_lentz@med.unc.edu>
Sent: Tuesday, July 16, 2019 1:36 PM
To: Davis, Braxton C <Braxton.Davis@NCDENR.Gov>
Cc: Richard Hilderman <richardhilderman@gmail.com>; Nina Marable <ninam20136mine@gmail.com>; Barry R Lentz <uncbrl@gmail.com>
Subject: [External] Comments to Dr. Braxton C. Davis, Director, Division of Coastal Management on Sunset Beach application

Dr. Davis: My apologies for forgetting to attach the document I referenced in my comments. Here it is.
Barry Lentz

Journal of Coastal Research	SI 39	117 - 121	ICS 2004 (Proceedings)	Brazil	ISSN 0749-0208

Barrier Progradation Related to Inlet Spacing and Migration Patterns

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ABSTRACT

BUDDE, L. E. and CLEARY, W. J., 2006. Barrier progradation related to inlet spacing and migration patterns. Journal of Coastal Research, SI 39 (Proceedings of the 8th International Coastal Symposium), 117 - 121. Itajaí, SC, Brazil, ISSN 0749-0208.

The majority of the barrier islands in southeastern North Carolina are eroding at relatively rapid rates. Brunswick County beaches, located in the southernmost portion of North Carolina, have some of the highest erosion rates in the state despite the relatively low energy environment in which they are situated. The exception is Sunset Beach, a small ~5 km long prograding barrier, located approximately 40 km west of Cape Fear. This is the only barrier in Brunswick County that has been prograding within the last century. Sunset Beach is bordered by two locationally unstable inlets; Tubbs Inlet to the east, and Mad Inlet (now closed) to the west. It is hypothesized that the complex behavioral patterns and the associated sediment by-passing events of these small, closely spaced, unstable inlet systems are responsible for the shoreline progradation. Data shows that throughout recent history, as these inlets moved towards each other, the shoreline of the island prograded. Conversely, when the inlets moved apart, the oceanfront shoreline eroded, particularly along the eastern portion of Sunset beach near Tubbs Inlet.

ADDITIONAL INDEX WORDS: *Inlet relocation, inlet closure, ebb tidal delta.*

INTRODUCTION

Almost all major shoreline reaches in southeastern North Carolina are situated within chronic erosion zones. During the past seven years the shoreline recession has been greatly exacerbated by four landfalling hurricanes and numerous winter storms. The worst of the critical erosion zones are associated with contemporary inlets or historic inlets that have been artificially closed. However there are some small, isolated shoreline reaches that are stable or accreting slightly and include coastal cells in the vicinity of forelands and those located immediately downdrift of stable inlets. The only barrier island that is the exception to this generalization is Sunset Beach, a 5 km long barrier located in western Brunswick County, ~ 40 km west of Cape Fear (Figure 1). Two unstable inlets border the barrier, Tubbs Inlet to the east and Mad Inlet (now closed) to the west. Sunset Beach is an exemplary setting to study the influence of multiple inlets on the adjacent barrier's planform. It is hypothesized that the complex migration patterns of the two closely spaced, unstable inlets and the associated sediment by-passing events of the inlet systems are responsible for the observed barrier progradation. The intent of this paper is to provide an overview of the variability in the migration histories of Mad and Tubbs Inlets and their influence on the Sunset Beach shoreline change patterns during the past eight decades.

Geologic Setting

The 550 km long North Carolina coastline consists of a diverse group of barrier spits and islands separated by three major forelands (Capes Hatteras, Lookout and Fear). Between these cuspate forelands, major coastal reaches are further separated into distinct littoral cells by small subaerial and submarine headlands that have exerted a considerable influence on the evolution of the local barrier system. Within the southeastern portion of North Carolina the headland-bounded reaches are comprised of several reaches where the evolution of the barriers are influenced by a diverse group of migrating and stable inlets.

Sunset Beach is part of a low-mesotidal barrier system that extends between two Pleistocene headlands at Yaupon Beach, NC and Myrtle Beach, SC in Long Bay located along the low energy flank of Cape Fear (HAYES, 1994 and MARDEN and CLEARY, 1999). Hardbottoms dominate a major portion of this sediment-poor shelf sector, primarily in the central and eastern portion of Long Bay. Although hardbottoms are present in the western portion of the area the modern sediment cover is more extensive, particularly seaward of the barriers in the vicinity of Little River, SC (MARDEN and CLEARY, 1999). The physiography of Waites Is. (SC) and Sunset Beach (NC) reflect the more sand rich nature of the western portion of the shoreface. The morphology of Sunset Beach is characterized by a sequence of 3 4 m high dune ridges that front an extensive field of vegetated, 5 - 9 m high parabolic dunes.

Tubbs Inlet

Tubbs Inlet is small, relatively shallow (6 m), unstable inlet that forms the eastern boundary of Sunset Beach and separates the island from adjacent Ocean Isle (Figure 1). Throughout much of its history over the past 100 years the inlet has migrated westward along a 2.0 km wide pathway (Figure 2). Between 1856 and 1970 the average migration rate was ~ 20 m/yr (MARDEN and CLEARY, 1999). The migration rate increased to an average of 40 m/yr for the period between 1938 and 1970. In order to mitigate the rapid erosion of the Sunset Beach shoulder the inlet was artificially relocated in December 1969 to a position 1.0 km eastward that approximated the inlet's 1938 location (MASTERSON, 1973). After about a seven year period of adjustment to the new hydrodynamic conditions, Tubbs Inlet reversed its migration direction in the late 1970s and since that period of time has been migrating to the east at variable rates (MARDEN and CLEARY, 1999).

The reversal in migration direction is opposite the direction of the net regional littoral drift and the change is most likely due to alterations in the back barrier channel dominance. Prior to relocation, Eastern Channel located behind Ocean Isle, was the major feeder channel (Figure 2A). The dredging of Jinks Creek, the western and historically minor feeder channel, during the relocation effort and subsequent maintenance cycles has allowed it to become the dominant channel, while Eastern Channel has shoaled considerably. Since the dominance of Jinks Creek was established, the inlet's ebb channel shifted position within the throat and is currently located along the Ocean Isle shoulder where erosion is now the norm (Figure 3). The inlet's migration pattern since 1980 may also have been influenced by the construction of the dual jetties at sediment-

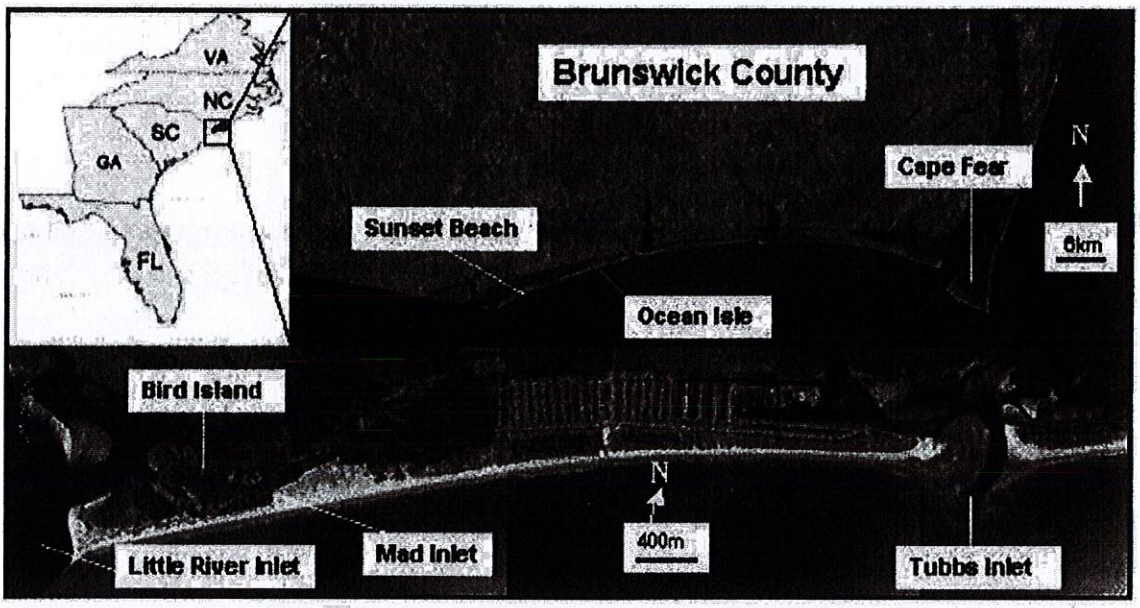

Figure 1. Location map of Sunset Beach, North Carolina and study area.

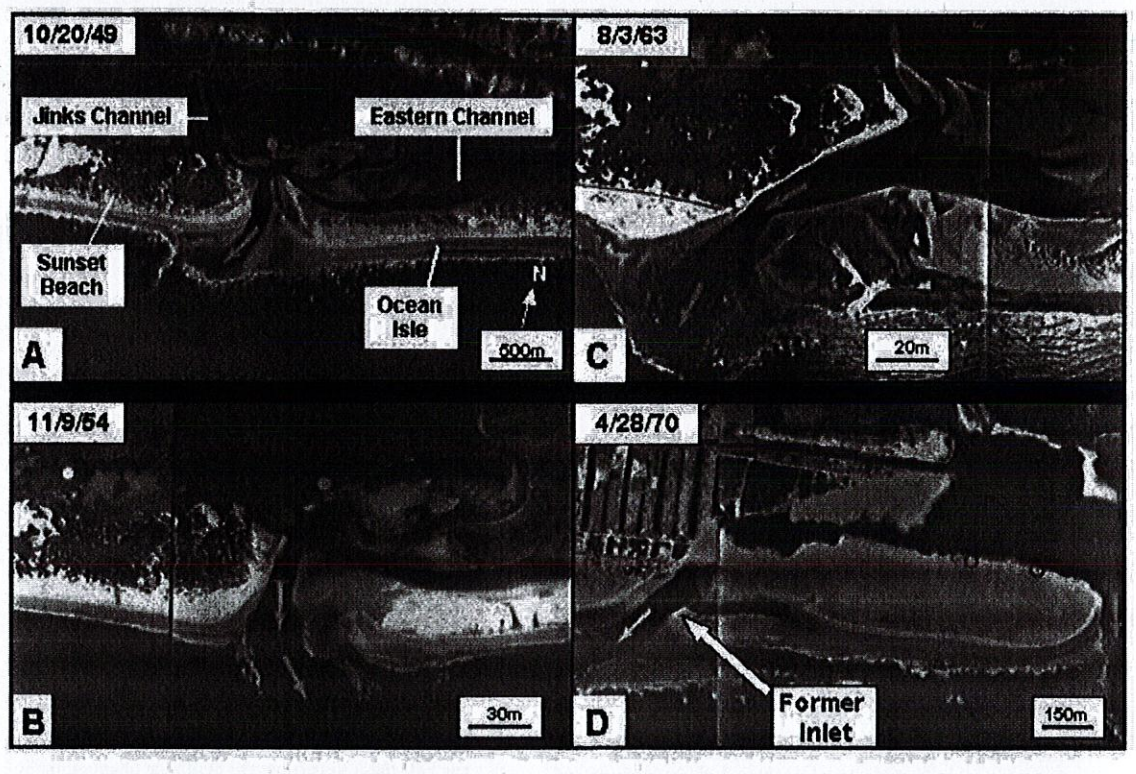

Figure 2. Westward migration of Tubbs Inlet 1949 to 1970. (A). 1949. Tubbs Inlet borders Ocean Isle and Sunset beach both undeveloped barriers. The inlet's migration pathway extends across the majority of the field of view. (B). 1954. The barriers and inlet are affected by Hurricane Hazel. (C). 1963. The inlet has reached the approximate western margin of the migration pathway. Note the bulbous shape of Sunset Beach margin. (D). 1970. The inlet has been relocated eastward to approximately its 1938 position and the old inlet channel has been infilled. Note dredging within backbarrier area of Sunset Beach.

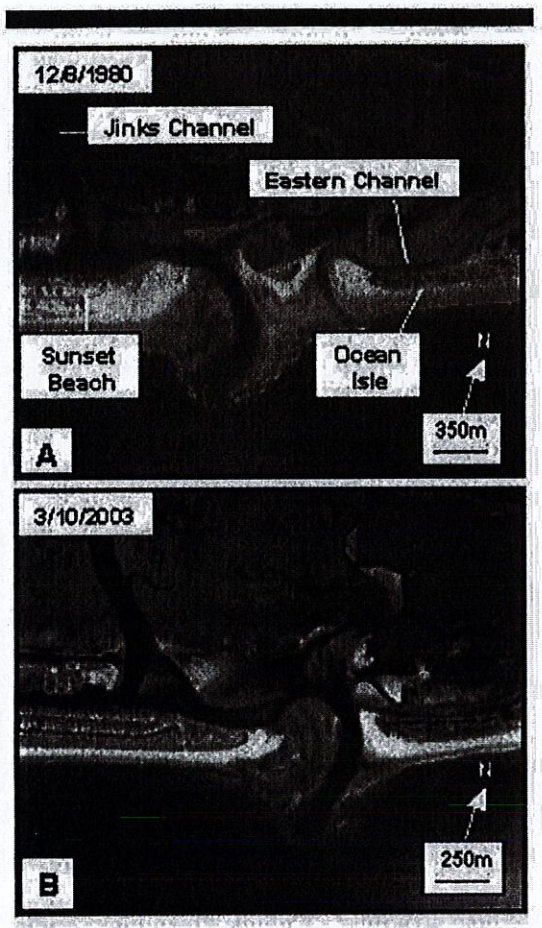

Figure 3. Tubbs Inlet 1980 and 2003 (A). 1980. The inlet was relatively stable at this time. Two marginal flood channels flank the ebb channel. (B). 2003. The ebb channel has been repositioned along the Ocean Isle margin. A primary flood channel remains on the Sunset Beach margin. The inlet begins its eastward migration and erosion of Ocean Isle.

rich Little River Inlet, which forms the western boundary of Bird Island, approximately 6 km to the west.

It has been postulated that the inlet's migration rate will increase as the flood channel continues to transport sediment into the throat, reducing the tidal prism and destabilizing the inlet (CLEARY and MARDEN, 1999). However, future manipulation of Eastern Channel for development purposes may result in a reversal in migration direction (MARDEN and CLEARY, 1999).

Mad Inlet

Mad Inlet, now closed, formed the western boundary of Sunset Beach and separated the barrier from undeveloped Bird Island, near the South Carolina border (Figure 1). The very small, migrating inlet has been recognized on maps that date from the 18th century (CLEARY and MARDEN, 1999). The inlet was highly unstable and ultimately closed in 1998, joining Sunset Beach to undeveloped Bird Island (Figure 4). The cyclic migration pattern of Mad Inlet consisted of westward movement and the development of a long narrow spit extending from the western extremity of Sunset Beach. Between 1938 - 1954, Mad Inlet migrated westward at an average rate of 13 m/yr. Hurricane Hazel (October, 1954) breached the westward extending Sunset Beach spit at the point of attachment on Sunset Beach, approximately 915 meters east of the inlet's 1954 position. By 1956 the old ebb channel had infilled and the new breach assumed the dominant role. From 1956 1998 the inlet once again migrated to the west an average rate of ~ 21 m/yr. In the late 1980's the migration rate increased to 31 m/yr due to infilling of the backbarrier area and the system's reduced tidal prism. The dramatic reduction in the tidal exchange capacity ultimately led to inlet closure in 1998 and the formation of a contiguous barrier stretching from Tubbs Inlet to Little River Inlet (Figure 4 - f).

METHODS

The GIS database for this investigation consisted of approximately 10 sets of historic aerial photographs dating from 1938 to 2003. The historic aerial photographs were digitized and rectified for each inlet and measurements made along a series of baselines and shore-normal transects for the determination of inlet and oceanfront shoreline changes. These data were integrated for each inlet for the purpose of tracking the linkage between the position of the inlet and oceanfront shoreline changes.

RESULTS AND DISCUSSION

The large volume of data collected during the conduct of this study are summarized for five distinct periods that reflect the relocation of Tubbs Inlet in 1970 and its eventual eastward migration and the closure of Mad Inlet in 1998. Inspection of the various data sets derived from digitized aerial photographs indicated significant changes in the planform of the barriers, as well as the configuration of the inlet systems, have occurred since the late 1940s. During the period 1949 to 1970, when the inlets converged and major storms impacted the area, the island's length was decreased by ~1.7 km. During this interval of time, when the inlet systems approached each other at variable rates, almost the entire oceanfront shoreline of Sunset Beach with the exception of the extreme eastern end of the island, prograded an average of 60m and as much as 115 m along the central portion of the barrier (Figure 5-A). During westward migration of Tubbs Inlet large swash bar complexes welded onto the downdrift Sunset Beach shoreline promoting buildup of the central portion of the island. Additionally, periodic ebb delta breaching events also by passed large segments of the ebb-tidal delta that migrated onshore and attached to the Sunset Beach oceanfront. By contrast the eastern end of the island remained relatively stable, experiencing only a net gain of ~ 8 m during this 22 year period.

Following the eastward artificial relocation of Tubbs Inlet, an additional 1.0 km length of shoreline was added to the eastern end of Sunset Beach. Subsequently the island entered into a period of relative stability from 1971 - 1979. During this period, Tubbs Inlet was still adjusting to the new hydrodynamic conditions and consequently the island only elongated an additional ~140 m. During this time interval erosion rates as high as 3 m/yr characterized the central segment of Sunset Beach. Only the eastern end of the barrier showed evidence of extensive buildup (20 m/yr) due to inlet-related accretion.

From 1979 to 1989, the planform of Sunset Beach was altered considerably as the barrier lengthened and subsequently eroded along the mid-barrier portion as the inlets continued to diverge (Figure 5 - B). During this interval of time Tubbs Inlet began a more rapid eastward migration while Mad Inlet migrated westward, lengthening Sunset Beach by ~550 meters during this decade. Minor erosion continued along the center of the island at a rate of ~2.5 m/yr. The eastern portion of the spit updrift of Tubbs Inlet was characterized by a slightly higher erosion rate (4.0 m/yr), due to the fact that the reach no longer was nourished by bar bypassing events as Tubbs Inlet moved eastward.

From 1989 to 1998 Sunset Beach exhibited net progradation along the entirety of the barrier. This island-wide trend was unique and dissimilar to the erosion trend normally associated with inlet divergence. The western end of Sunset Beach and the Bird Island section experienced up to 120 meters of accretion during this period. The coastwise accretion was due in part to

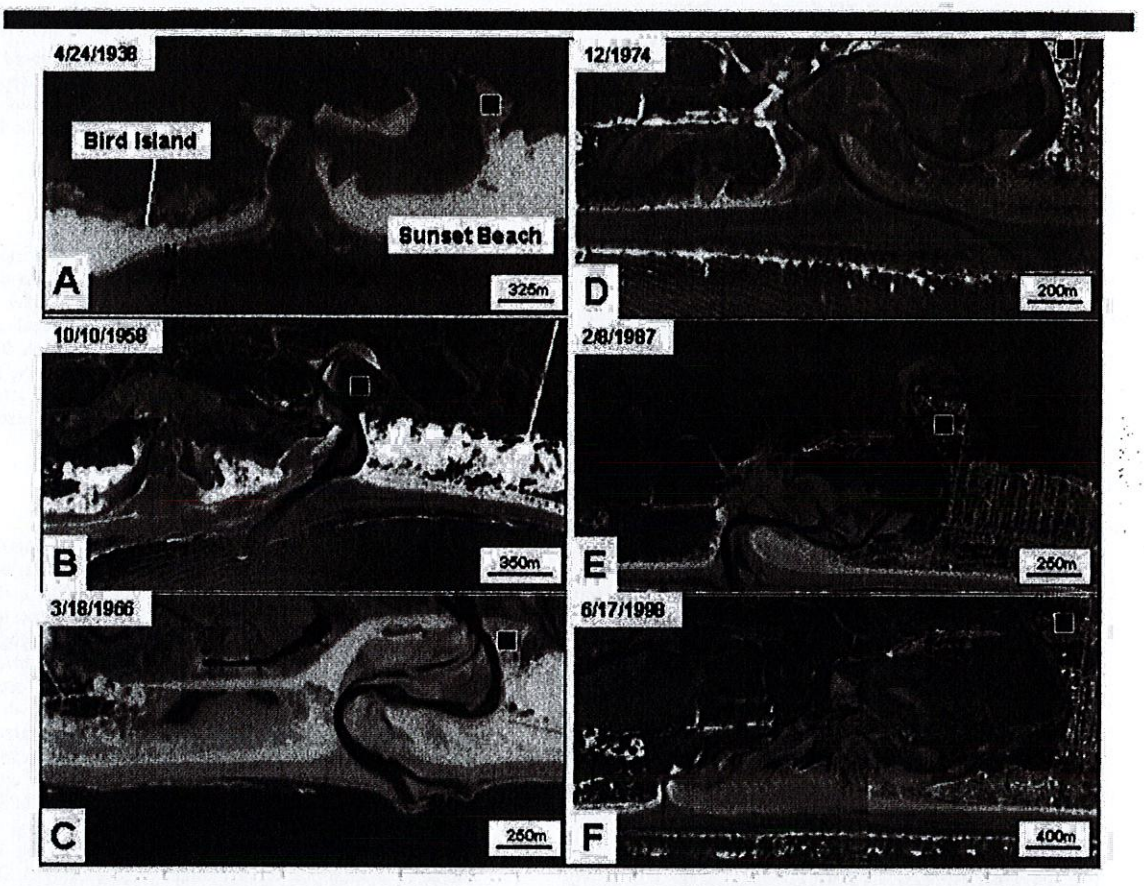

Figure 4. Mad Inlet (1938 1998). Black box denotes common reference point. (A). 1938. A relatively wide Mad Inlet separates Sunset Beach from undeveloped Bird Island. (B). 1958. New breach (Hurricane Hazel (1954) becomes dominant (C).1966. Former ebb channel is now closed. Note sinuous nature of existing ebb channel D.1974. Ebb channel continued to migrate westward. Note alignment of outer bar channel. (E).1987. The spit attched to Sunset beach extends in a westward direction. Note infilling of backbarrier. The inlet continues to shoal. (F).1998. Mad Inlet ultimately closes due to extensive shoaling and lack of sufficient tidal prism.

the closure of Mad Inlet and the subsequent attachment of swash bars as the ebb tidal delta was reworked. The remainder of the island by contrast prograded only ~ 20 m. Other factors that may have contributed to the accretion were the three hurricanes that made landfall near Cape Fear during the two-year period between 1996 - 1998.

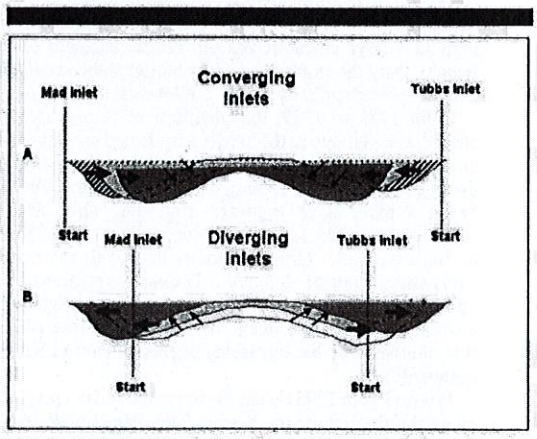

Figure 5. Generalized shoreline response to inlet migration patterns. (A). Shortening of the barrier resulting in shoreline progradation. (B). Lengthening of the barrier due to inlet divergence resulting in erosion of the ocenafront shoreline.

During the recent period between 1998 and 2002 Sunset Beach became contiguous with Bird Island to the west following the closure of Mad Inlet in 1998. This event effectively produced a composite barrier comprised of several spits and the core segments of Sunset Beach and Bird Island. The newly formed barrier measured ~ 6.0 km in length. During this period the newly formed barrier experienced erosion as the shoreline in the vicinity of Mad Inlet's closure zone was reconfigured, and Tubbs Inlet continued to migrate in an easterly direction. The shoreline segment in the Mad Inlet closure zone eroded ~10 m while the shoreline segment along the eastern end of Sunset Beach eroded an additional 19 m.

OVERVIEW

The combined influence of the spacing and migration habits of Mad and Tubbs Inlets has dictated the observed shoreline change patterns on Sunset Beach. The data clearly show that between 1949 and 2002 the mid-barrier portion of the island exhibited a net progradation of as much as 120 m, a trend unique to southeastern North Carolina barrier islands. Shoreline accretion increased toward the western portion of the barrier, east of the Mad Inlet closure zone, where as much as 130 m of accretion occurred along the western spit extension of Sunset Beach. The shoreline change patterns west of the core of Sunset Beach may have been influenced by the dual jetty system at Little River Inlet ~2 km to the west.

In contrast, along the Sunset Beach shoreline farther to the east (towards Tubbs Inlet), net accretion has decreased

dramatically due to the truncation of the oceanfront shoreline as the inlet-influenced erosion hot-spot shifts in an eastward direction. Net erosion has become the norm along the realigned shoreline of the elongating spit immediately west of Tubbs Inlet. Erosion along this shoreline reach is predicted to increase as the inlet continues to track in an easterly direction and the island lengthens. These results show that during periods of inlet convergence the island experienced net accretion, while showing net erosion during episodes of inlet divergence.

ACKNOWLEDGEMENTS

This paper is the University of North Carolina at Wilmington's Center for Marine Science Research contribution #295. Special thanks are extended to the students in the coastal geology laboratory at UNCW CMSR. A debt of gratitude is owed to the Army Corps of Engineers Wilmington District and especially Mr. Lynn Jack for supplying the aerial photographs.

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Spears, Courtney

From: Davis, Braxton C
Sent: Tuesday, July 16, 2019 8:09 AM
To: Spears, Courtney
Subject: FW: [External] CAMA Permit Application, Sunset Beach NC - Public Comment

Importance: High

Braxton C. Davis
Director
NC Division of Coastal Management
Department of Environmental Quality

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Morehead City, NC 28557

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Sent: Monday, July 15, 2019 3:46 PM
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Cc: 'Environmental Friend' <beatpres@gmail.com>
Subject: [External] CAMA Permit Application, Sunset Beach NC - Public Comment
Importance: High

Dr. Braxton C. Davis
Director, Division of Coastal Management
400 Commerce Avenue
Moorhead City, NC 28557-3421

Reference: CAMA permit application
Sunset Beach, NC

Good People:

The Brunswick Environmental Action Team (BEAT) is a nonprofit, nonpartisan organization that focuses on the environment. Our mission, vision, and core values all embrace conservation and preservation in personal, business, and government decision making. bcbeat.org. A core value includes the use of scientific data and explanations in

understanding environmental issues. With this in mind, we respectfully offer the following comments for the Sunset Beach CAMA permit dredge application now before you.

Concern # 1. The South Jinks Creek portion of the project, near Tubbs Inlet, has not been dredged in the 50 years since it was relocated, when Tubbs was moved by the developer. The proposed dredging, at the depth and width planned, raises concerns. How will the change in the velocity and volume of water, especially during storm surges (recently Mathew and Florence) affect the tidal marsh system? These two storms took out the man-made dike at Palm Cove exposing the newly constructed homes. Both storms put Riverside Drive under water. We feel future storms and erosion be considered based on the proposed dredge profile. This concern goes to public health, safety, and welfare.

Concern # 2. The dredge profile submitted by the contractor Moffat & Nichol (M&N) shows a substantial alteration to the massive Flood Tide Delta which provides an important "metering" function. M&N, in a public forum, stated there would be no specific change. But scientists and coastal experts using the same model with additional input came up with different conclusions and concerns. These concerns go to the potential for damage to life & property and the estuary marsh system.

Concern # 3. The tidal marsh ecosystem behind the barrier island. There is a fundamental concern that the proposed dredge profile will change the water, sediment volume, and flow of the currently balanced system in North Jinks Creek which bisects, close at hand, a Primary Nursery Area. Dredging to 6 feet below MLW brings well-documented disturbance of contaminates and harmful sedimentation to the PNA areas. North Jinks Creek has never been dredged. We have not seen a study that explores the effects of changed flow and volume rate caused by altering the Tubbs Inlet Flood Tide Delta. With the proposal before you, what do we really know about the potential for damage to this unique, fragile estuary, its oyster population health and filtering function, and all the marine life that gets its start here? All these concerns affect public welfare, and wildlife and freshwater estuarine and marine fisheries.

Concern # 4. Setting a Precedent. Without further study or permit provisions applied to the concerns, issues, facts, and data submitted to you by coastal experts and scientists, but not deliberated in the SB public forum, to go ahead and permit the dredging of South Jinks Creek is to put at risk: 1. Tubbs Inlet (Ocean Isle Beach & Sunset Beach). 2. The Flood Tide Delta being restored after man moved the inlet nearly 50 years ago. 3. The welfare of Palm Cove. 4. The section of Jinks Creek (North Jinks) never-before-dredged that bisects the PNA. Furthermore, deep draft boats (M&N "used a 35' Grady White as an average for our study") have never been a part of the marsh system or public boating behind the barrier island of Sunset Beach. Sunset Beach has a public boat ramp beneath the bridge on the ICWW for a reason.

The Board of Directors of BEAT respectfully ask you to consider our concerns regarding South Jinks Creek during your review. Above all we do not want a precedent set that could lead to consequences for our neighbor Ocean Isle or the future dredging of North Jinks Creek which many know, under a completed study, should and would be a PNA- a fact acknowledged by several leading coastal experts. Finally, we do not oppose dredging the other application-named areas known as channels, feeder/finger canals if they have been

previously maintenance dredged, and the Bay Area. However, we have questioned without getting answers, why is there a need to dredge South Jinks Creek any deeper than North Jinks Creek which is 2 feet below MLW and not part of the proposal?
Boats of all sizes and shapes find their way from the ICW to Palm Cove near Tubbs Inlet and back on most nice weekends, with enough respect for the tides.

Signed:
Brunswick County Environmental Action Team, Board of Directors

Pete Key – President
Dan George – Vice President
Dr. Sybil Burgess Murray
Linda Eastman
Bob Jakus
Ted Janes
Teddy Altreuter
Jennifer Swift

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BEATPres@gmail.com
www.bcbeat.org

JMC

Spears, Courtney

From: rcerrato@sunsetbeachnc.gov
Sent: Thursday, June 27, 2019 11:33 AM
To: MacPherson, Tara; Spears, Courtney
Subject: [External] Sunset Beach -Comment Period
Attachments: June 27.doc

Hi Tara & Courtney,
Hope your well! I have enclosed for your review and submittal are my comments for the Sunset Beach dredging proposal. I wish to thank you both for your assistance and rapid responses regarding this matter.

Rich

June 27, 2019

To: Tara MacPherson & Courtney Spears
From: Sunset Beach Councilman, Rich Cerrato
Subject: Comment Period for the Sunset Beach Dredging Permit application

Ms. MacPherson & Ms. Spears

There are many concerns that need to be addressed and questioned before this permit is approved. Unfortunately, as a minority member of the Sunset Beach Council they have been intentionally ignored by 3 to 2 vote tallies.

My concerns are primarily directed towards the majority council's effort to dredge what is now called South Jinks Creek. As you know South Jinks Creek is adjacent to the fragile ecosystem of Tubbs Inlet that impacts both North and South Jinks Creek.

The Scoping Committee thankfully removed North Jinks Creek from the program. However, my anxiety remains knowing this was the major intent for this program just have uninterrupted deep water access during low- tide for a developer's boating development (67 plats) located on Riverside Drive.
This $5.8 million dollar project paid for by taxpayer funds defies both business logic and will also create environmental risks reported by coastal scientists.

I am deeply concerned that dredging any portion of South Jinks Creek could negatively impact North Jinks Creek and in later years could be used as a future catalyst in an another attempt to dredge North Jinks Creek.

Scientists have claimed that dredging South Jinks Creek will have an adverse impact on the entire ecosystem. The west-end of Ocean Isle which is adjacent to South Jinks Creek and Tubbs Inlet is already fortified with sand bags.

Coastal Scientists, such as Dr. Pietrafesa, Dr. Gayes and Dr. Pagels have clearly warned the council that any disturbance to this fragile area will increase flooding and property erosion. Also, eliminating the dredging of South Jinks Creek would also be a major cost savings.

My Questions:

1. Why is it necessary to dredge South Jinks Creek when recreational boaters can easily navigate this region during high tide?

2. Why would DCM permit the dredging of South Jinks Creek knowing the risks of property erosion and flooding warned by scientists?

3. Why are the proposed depth levels of South Jinks Creek five feet below MLW, rather than same depth levels of North Jinks Creek?

4. Other than getting stuck for attempting to navigate during low-tide, what is the benefit to dredge South Jinks Creek?

5. Why can't this the tiny fraction of the population simply navigate during high tide, which is customary boating practice?

The dredging South Jinks Creek has no useful purpose nor is it a health or safety matter in its present condition. Moreover, dredging South Jinks Creek does NOT benefit the majority of the property owners (80) that live on the narrow canals. As DCM is aware, they are restricted from purchasing larger boats. As you know, they have small shallow boats or kayaks and have successfully navigated this area during low tide for many years.

I trust that the DCM will thoroughly examine these concerns before allowing the Town to proceed in this endless and costly venture.

My Best Regards,
Councilman, Rich Cerrato, Sunset Beach.

MNC

Spears, Courtney

From: doggenome@gmail.com
Sent: Friday, May 10, 2019 11:32 AM
To: Spears, Courtney
Subject: [External] Fwd: SSB Dredging Project

Hi Courtney,

Will my email below which Dr. Davis was copied be placed in the SSB dredging project Public Comment File or must I resubmit once the public comment period is announced?
Hope you have a great Mother's Day weekend.
Richard

Sent from my iPhone

Begin forwarded message:

From: Richard Hilderman <richardhilderman@gmail.com>
Date: May 10, 2019 at 10:51:33 AM EDT
To: Mark Benton <mbenton1@comcast.net>, Rich Cerrato <rplcerrato@atmc.net>, John Corbett <jcorbett@sunsetbeachnc.gov>, Janice Harris <janharris@atmc.net>, Charles Nern <cnern@sunsetbeachnc.gov>, pvanwormer@sunsetbeachnc.gov, Richard Hilderman <doggenome@gmail.com>
Cc: "Davis, Braxton C" <braxton.davis@ncdenr.gov>, Corley.cordeiro@ncdenr.gov, Len Pietrafesa <ljpietra@ncsu.edu>, Editor <editor@brunswickbeacon.com>, Laura Lewis <llewis@brunswickbeacon.com>, mbennett@wwaytv3.com, John Pagels <jpagels@vcu.edu>, Ted Janes <ewjanes2@gmail.com>, Barry Lentz <uncbrl@gmail.com>, Nina Marable <ninam@atmc.net>, Gary Merritt <gmerr946@aol.com>, "<N4Gilbert@aol.com>" <N4Gilbert@aol.com>, Duane <dlewis1007@aol.com>
Subject: SSB Dredging Project

Council:

In 2016 the Town of SSB was awarded a matching grant from DWR to dredge Mary's/Turtle Creeks, the feeder/finger canal systems, Canal Bay Area and Jinks Creek. The justification for this dredging was **"The proposed project would significantly improve access through the referenced waterways and establish a long-term template for maintaining the navigation depths. The project would also assist in managing the construction of future piers or docks by establishing a fixed deep water path through the water bodies."**

In 2018 the Town did not ask for an extension of the 2016 grant and thus the grant expired before any dredging had been accomplished. In November 2018, the Town submitted a new matching proposal to DWR which is currently pending. This grant does not include dredging Jinks Creek in its entirety. It only proposes to dredge 1,750 feet of South Jinks Creek but none of North Jinks Creek. The justification for this dredging is **"The project will significantly improve navigation access through the project area and help establish a long-term template for maintaining the navigation depths."**

I believe all SSB taxpayers and citizens who come to SSB to enjoy its environment and wildlife deserve answers to the following questions:

1. In 2016 the Town stated the need to dredged Jinks Creek in its entirety to **"significantly improve access through the referenced waterways."** But in 2018 it only needs to dredge 1750 feet of South Jinks Creek to **"significantly improve navigation access through the project area."** Why is it now necessary to only dredge South Jinks Creek in order **to significantly improve water access?** The only potential problem boaters have using the 1750 foot area of South Jinks Creek is around low tide. The tide in Jinks Creek is 4 to 6 feet. Can't boaters plan their activities so they are not using this 1750 foot area around low tide?
2. The 2016 grant states **"establishing a fixed deep water path through the water bodies."** However, the 2018 proposal does not mention a fixed deep water path through the water bodies. If the Town now deems it not necessary to dredge for a deep water access why is South Jinks Creek beginning dredged to 5 feet below MLW? At high tide the depth would be 9 to 11 feet! Jinks Creek is a naturally occurring shallow water tidal creek. Dredging to this depth will have an impact on the ecosystems of North Jinks Creek because the dredging will increase the sediment load deposited in North Jinks Creek.
3. Is dredging a 1750 foot deep channel in South Jinks Creek worth the potential increase risk in flooding and erosion on the east end of the island or the potential damage to the ecosystems of North Jinks Creek and the surrounding PNAs that various scientists have expressed concerns but the council has so far failed to address?

Richard Hilderman, Ph.D.

MHC

Spears, Courtney

From: Jon L Gorney <jon@gorneymail.com>
Sent: Friday, April 05, 2019 9:48 AM
To: Cordeiro, Coley H
Cc: Tyler.Crumbley@usace.army.mil; Fritz.Rohde@noaa.gov; DGraham66@atmc.net; Sean.Farrell@ncdenr.gov; JMcCrain@moffattnichol.com; Hall, Rhonda B; Maria.Dunn@ncwildlife.or; kathryn_matthews@fws.gov; Ken.Riley@noaa.gov; rneal@moffattnichol.com; Bodnar, Gregg; Wilson, Debra; Coburn, Chad; Weaver, Cameron
Subject: [External] Sunset Beach Dredging
Attachments: South Jinks Boat.PNG; Sunset Inlet 02.PNG; Sunset Inlet 03.PNG

Dr. Cordeiro

The purpose of this correspondence is to respond to the letters you have received on dredging from four Sunset Beach residents and one councilperson who oppose dredging. It is important that you receive all of the facts and information before making a decision. Before I go further I think it might be appropriate to provide you some background on our family's history at Sunset Beach. We have been coming to Sunset for 35 years and purchased property in 2001. We are boaters and know the waters very well. Our children basically grew up here in the summers and now our seven grandchildren are excited to be spending time here. We own a house that overlooks South Jinks and Tubbs Inlet so we have a great view and understanding of what is really happening with the waters. The main channel to all of the houses on the bay goes directly behind our dock. We also have a very good understanding of how these waters are utilized.

I have been very active in the dredging situation at Sunset and have been in regular contact with all of the people who live on the water as well as others across the Sunset community throughout this process. Let me start by simply stating that there is widespread support for dredging. Listed below are many of the reasons driving the need for dredging which have been shared with council as well as the community:

- The channels and canals are filling in fast with sand; there has been a noticeable change in the last few years with the sandbars growing and expanding rapidly
- Boating is now limited to high tide with some spots being extremely difficult to navigate even at high tide; at or near low tide one can no longer navigate through the channel out to the ICW
- The channel directly behind our house has narrowed to the point that if our boat is tied to the floating dock I shut down the entire channel of any boat traffic
- Many docks now sit on sand at low tide and even at mid-tide; many docks have been damaged and additional damage will result if nothing is done soon
- At the current pace the channel behind my house will close within 12 months or perhaps sooner which will completely shut off boating and other water activities in the back bay
- This back bay area at one time was an outstanding fishing spot for the entire community; fishing has deteriorated dramatically in the last few years; it is a very noticeable change with a significant drop in those even attempting to fish in the back bay

- If dredging is not done the impact to marine life in the back bay will be dramatic and not reversible; those arguing against dredging suggest there will be impact to the ecosystem by dredging but not dredging will destroy the marine life as we know it; very sad and it has already started

- Property values will go down dramatically and this is simply a fact; with little to no water access the values will decline not only for the property owners on the water but for all the residents across Sunset; it will also have a significant impact on local business owners

- Without dredging rental income will decline; many homeowners have already stated that their rentals are down this year because of a lack of water for boating; overtime this will occur at a more rapid pace making Sunset must less attractive for visitors and renters

- I would also suggest that it has become a significant safety concern; many boaters are getting stuck on a daily basis; and these are experienced boaters who know these waters; at the end of the message I will share a few pictures of the situation including a boater who was stuck for over 10 hours

- We have also seen increased flooding in the back area as the sandbars have grown simply because there is no place for the water to go

There are additional comments I could make but I think this states the situation we are facing. I would now like to respond to the messages you have received from the four residents and the one council person who have written you and are against dredging. I will start by commenting that none of these residents live on the water, they are not boaters and are not familiar with the waterways, they do not have to pay for dredging given that the property owners on the water will be paying, and dredging has no impact on them. They also receive the benefits of dredging by insuring healthy and free flowing waterways which will return the waterways to where they were many years ago. It will ensure that the revenue streams will be maintained and that the Sunset community will not see a decline in property values.

With this said, let me attempt to respond to the various statements made in the letters opposing dredging:

- Let's start with the conflict of interest statement which seems to be the basis of their argument – this issue has been thoroughly discussed and addressed numerous times by legal counsel indicating that there is no conflict of interest; this has been publicly discussed throughout the process; the Town of Sunset Beach will be responding directly to this issue

- There is much said in the letters about the dysfunction of council – I agree with these statements; the conflicts evolve around one person who constantly causes disruption, doesn't follow the meeting rules, consistently interrupts people, and has been thrown out of numerous meetings for inappropriate behavior; I would further state it is the same person who says in public that everyone on council is in support of dredging but then behind the scenes writes letters stating he isn't; in my view this is disturbing and unethical

- There are statements made that there are only a few who benefit from dredging; one letter states 13 boats and another states less than 50 – the fact is that dredging benefits the entire community in many ways; I have already mentioned the use of these waterways by many people across the region; it has been a great fishing area for all and it has been utilized by many; it is also utilized by many of our visitors and renters; to say it only benefits a few is disingenuous and misleading

- The letters state that information hasn't been shared and vetted – this is also wrong and not true; there have been countless meetings, information has been shared and continues to be shared; there have been open discussions and clear debate; actually it is beyond the point of needing more discussion; the comment by Mr. Cerrato that all of this has been done without citizens input is just wrong; it has been discussed and debated enough; it is time to move forward before it is too late

- There are comments made about dredging and increasing property values by 20% - the fact is if dredging is not done property values will be impacted across Sunset Beach; revenues streams will decline forcing increases in tax rates by all property owners; Mr. Cerrato further indicates that property values will go up 20% for those on the water if dredging is done; this is simply not true and was never stated by the tax officers; what is true is that those that live on the water have already paid a premium for being on the water and further pay higher tax rates and will be paying for dredging if approved

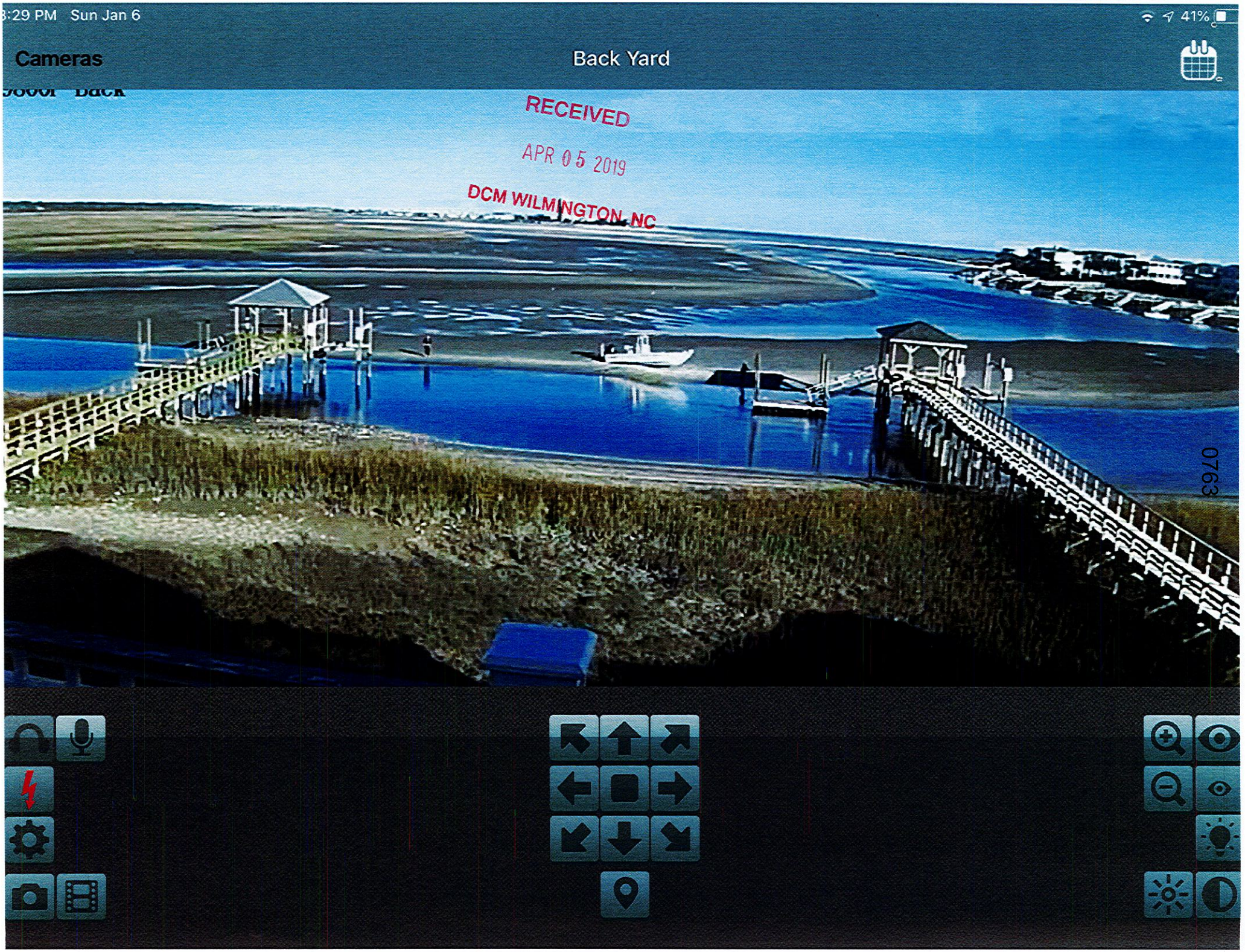
Dr. Cordeiro, I very much appreciate you and your colleagues taking the time to review this situation. I have also attached a number of pictures below that give you a better sense of what is occurring. I encourage you to reach out if you have any questions or need anything further. I would also welcome a visit to see for yourself what is occurring. Thank you.

Sincerely,

Jon and Nancy Gorney
1526 North Shore Drive
Sunset Beach

I have attached three pictures for your awareness

- South Jinks picture shows a boater that got stuck behind the house; local boater who got stuck before mid-tide while the tide was falling and had to wait for nearly 10 hours; only missed the channel by a few feet
- Inlet 02 picture shows South Jinks as it is approaching low tide; notice the massive sand bar
- Inlet 03 picture shows the channel immediately behind our house and how narrow that channel has become
- These pictures are from a drone that were taken in 2017; the situation is clearly worse today
- I will be sending just a couple more pictures in another message which were from last week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DCM WILMINGTON, NC
0763

Done

RECEIVED

APR 05 2019

DCM WILMINGTON, NC

MRC

Spears, Courtney

From: MacPherson, Tara
Sent: Monday, July 15, 2019 3:39 PM
To: Spears, Courtney
Subject: FW: [External] Dredge Slurry on Sunset Beach

Tara MacPherson
Field Specialist
NC Division of Coastal Management
Department of Environmental Quality

910 796-7425 office
910 395-3964 fax
tara.macpherson@ncdenr.gov

127 Cardinal Drive Ext
Wilmington, NC 28405

Nothing Compares

From: Lynn Nesmith <LynnNesmith@mchsi.com>
Sent: Monday, July 15, 2019 3:26 PM
To: MacPherson, Tara <tara.macpherson@ncdenr.gov>
Subject: [External] Dredge Slurry on Sunset Beach

Dear Ms. McPherson:

When will man learn that it's not nice to mess with Mother Nature?

I've been coming to Sunset Beach since 1958 and I've witnessed many changes, both natural and engineered. I fear Sunset Beach's proposed Beach Navigation Project Maintenance Dredging project will seriously damage the natural environment and the pristine quality of our dunes, sand, shoreline, and water. Compromising the beach experience will negatively affect everyone's property values.

Much attention has been given to the dredging itself, but very little seems to have been said about where the spoil would be deposited. I urge you to carefully consider the ramifications to our beloved island if the dredge spoil is deposited on the beach. The proposed disposal plan fails to adequately consider the immediate and long-term impact on our coastal lifestyle, our landscape, and our tourist-driven economy.

Please do NOT rush through this ill-conceived plan that calls for depositing approximately 40,500 cubic yards of dredge spoil onto a 1,600 foot stretch of the beach between 5th and 12th Streets East. The current scheme calls for a huge 'tabletop' style plateau of sand up to 9 feet above the Mean Low Water (MLW) level, which could raise the current elevation of the beach by four feet. This unnatural plateau would extend 155 feet from the frontal dune, and then slope toward and into the water for another 100 feet.

It is impossible to predict what will happen to this spoiled sand / slush over time. One thing is certain. There will be wind, water currents and hurricanes. Sand moves. It will not stay in-place as designed by man.

The permit application states that the deposit of this material is a "beneficial reuse," which is NOT defined in the documentation. Along Sunset Beach, there is no established need of beach re-nourishment. Our beachfront has accreted land at a rate of over 300% over the last fifty years. Although the beach material has been determined to be aesthetically "compatible" by paid experts, there is no guarantee it will be truly consistent with current conditions. Taking that risk is unacceptable.

Sunset Beach is not just a summer resort anymore. It's a year-round destination for tourists and home to a growing year-round population. The dredging will be conducted from November 16-April 16, which will cause hardship for everyone who enjoys the beach in fall, winter and spring. The application states, "Sand dikes, or berms will be constructed as needed to help limit turbidity. The dikes will be constructed parallel to the beach front to direct the dredge slurry along the beach." I can't imagine that a "dredge slurry" is a good thing to behold.

My family has owned property in Sunset Beach since 1958. I purchase my own home here in 2015. As a taxpayer and an lover of this unique place, I beg you to reconsider pumping the dredge spoils along our beautiful Sunset Beach.

We have weathered many changes over the past six decades. Please don't let the demands of a few property owners and developers ruin Sunset Beach for all the rest of us. Please slow down and acknowledge the consequences of dumping the spoils of greed and entitlement on our beloved beach.

I look forward to hearing from you.

Sincerely, Lynn

Eleanor Lynn Nesmith
210 Shoreline Drive East
Sunset Beach, North Carolina 28468
www.30ALivingBook.com

MHC

Spears, Courtney

From: Richard Hilderman <richardhilderman@gmail.com>
Sent: Sunday, June 16, 2019 9:34 AM
To: Mark Benton; Rich Cerrato; John Corbett; Janice Harris; Charles Nern; VanWormer Paul; Richard Hilderman
Cc: Davis, Braxton C; Spears, Courtney; rneal@moffattnichol.com; John Pagels; Ted Janes; jtrovato@atmc.net; Len Pietrafesa; Editor; Laura Lewis
Subject: [External]
Attachments: South Jinks Creek Low Tide.jpg; South Jinks-Bay Area.jpg; South Jinks Creek-Navigating Tubbs.jpg; South Jinks Creek-sail boat.jpg; South Jinks Creek-Bay Area.jpg; South Jinks Creek-Tubbs Inlet Beach.jpg

SSB Council: June 16, 2019

Why is it necessary to dredge South Jinks Creek in order to give Canal Bay Area boaters access to the ICWW? The first attached photo was taken on 5/25/19 from the end of Riverside Drive of South Jinks Creek at low tide. Clearly there is a channel in South Jinks Creek at low tide. What is the depth of this channel in South Jinks Creek at MLW? Has the depth of Jinks Creek ever been at least 5 feet below MLW? Drs. Pietrafesa (Emeritus Professor North Carolina State University and Burroughs & Chaplin Scholar, Coastal Carolina University), Bao (Assistant Professor, Coastal Science, Coastal Carolina University) and Gayes (Director and Professor, School of Coastal and Marine Science, Coastal Carolina University) sent the Council, in March a 2018, documentation which stated dredging an 80 foot wide and 5 feet below MLW channel would be risky business. To date, Mr. Neal has not attempted to counter this conclusion.

The other attached photos were taken on 5/27/19 between noon and 1 PM. **The tide in the SSB area is 4 to 6 feet**. On 5/27/19 high tide was four feet at 3:07 PM. Clearly, Canal Bay boaters can navigate South Jinks Creek. The only potential issue would be around dead low tide when care is needed.

If you, as council members, disagree and believe South Jinks Creek needs to be dredged, we have offered the Town a compromise dredging proposal. Again, the Town's proposal is to create a 1750 foot long, 80 foot wide and 5 feet below MLW navigational channel in South Jinks Creek. North Jinks Creek is not part of the dredging proposal and its depth is only 2 feet below MLW. **Our compromise is to dredge only to 2 feet below MLW.** Mr. Neal's email of 6/12/19, in response to Councilman Cerrato's 5 questions, expresses concerns about why it is necessary to dredge 5 feet instead of 2 feet below MLW. Respectfully, we would like to now address the concerns he raises.

1. Mr. Neal states **"My understanding is the navigational project intent is to provide safe and reasonable access during all tidal stages."** Clearly there is safe and reasonable access except around low tide where additional skill and care are needed. Why is it necessary to provide additional access around low tide?
2. Mr. Corbett states that the dredging must be at least 5 feet below MLW because of "technical issues." Mr. Neal's response **"In my opinion, the -5 depth follows the minimum safety recommendations from established professional organizations for general navigation."** A general statement about safety is NOT explaining "technical issues!" Further, is boating on a tidal creek in a saltwater marsh considered "general navigation" when following the meandering of the creek is the only form of navigation?
3. Mr. Neal states **"If we do not dredge to -5 depth, we can expect to dredge more often in order to maintain the navigation access. Therefore the project cost would increase over the project life or the project benefit would decrease for the 1 time event."** How can one predict the frequency of maintenance dredging when there

are so many variables that need to be studied and understood? Example: the frequency and severity of storms. Furthermore, how can he make this statement without a shoaling study?

4. Mr. Neal states **"By not dredging to -5 depth we increase the dredging frequency and therefore increase the potential for impacts to marine life, etc. in the area."** Mr. Neal is an engineer NOT a marine ecologist! In formulating his opinion did Mr. Neal consult with marine ecologists? What scientific data does he have to support this statement? A few questions that should be answered are: Would dredging to 5 feet instead of 2 feet have a greater negative impact? What are the long term effects to the environment and ecosystems in Jinks Creek by continued maintenance
dredging regardless of depth? How long does it take for recovery after dredging? Would the recovery period be different for 5 feet vs 2 feet dredging? Would the negative impact be only close to South Jinks Creek or throughout North Jinks Creek and the PNA system?

5. Mr. Neal states **"I believe any potential impact to N. Jinks Creek resulting from the dredging event will be temporary in the terms of some suspended sediment from the construction event."** This is simply an opinion! What scientific data does he base this opinion on? It is axiomatic that both initial and maintenance dredging result in high levels of sediment and sedimentation that negatively impact organisms, both plant and animal, in the associated ecosystems.

6. Mr. Neal states **"The potential impact to N. Jinks for dredging S. Jinks would be the same regardless of how deep the Town decides to dredge in S. Jinks Creek."** Again, what scientific information does he have to support this statement. While we are not engineers, common sense tells us that both initial and maintenance dredging will result in greater sediment load and subsequent sedimentation in North Jinks Creek and the surrounding PNAs.

Finally, we would like to share with you the information below.

Oysters are filter feeders and remove pollutants from the water. Oysters also provide habitat and cover for small fish species- protecting them from predators. If the oyster population declines in Jinks Creek, so will the population of other species thus leading to an undeniable, negative impact on the Jinks Creek/PNA ecosystem. At the very least oysters can serve as sentinels, factors that damage them must be of great concern. Dr. Curtis Rose investigated the mortality of market-sized oysters (Crassostrea virginica) in the vicinity of a dredging operation. The results of this investigation strongly suggest that sedimentation resulting from dredging caused an increased oyster mortality of 40% within 595 meters of the spoils bank when compared to a non-dredged area (Rose, C. D. 1973. Chesapeake Sci. 14 (2). 135-138. Although oysters are adapted to highly turbid environments, they are physiologically stressed by sediment resuspension and deposition by human activities such as dredging, coastal development and vessel traffic (Wilber, D., Hadley, N.H. and Clarke, D.G. 2012. North American J. of Fisheries Management, 32: 838-847). Will perpetual maintenance dredging in order to keep a deep water navigational channel open put additional stress on the oysters?

As sea level rises, shallow water and intertidal habitats will likely become limited or fragmented. Further loss of the remaining habitat from dredging and shoreline alterations may surpass ecological thresholds, leading to irreversible productivity losses (Bilkovic, D.M. 2011. Estuaries & Coast 34(1): 129-147).

Before proceeding with this expensive (total current cost is $5.6M with the State's share $3.8M and the Town's share $1.8M) and controversial dredging project, shouldn't the Council expect better factual justifications from the engineering firm they hired?

Respectfully,

Richard H. Hilderman, Ph.D.

Edwin W. Janes II

John F. Pagels, Ph.D.

Attachments: 6 photos

Spears, Courtney

From: janharris@atmc.net
Sent: Sunday, June 16, 2019 6:35 PM
To: Richard Hilderman; Mark Benton; Rich Cerrato; John Corbett; Charles Nern; VanWormer Paul; Richard Hilderman
Cc: Davis, Braxton C; Spears, Courtney; rneal@moffattnichol.com; John Pagels; Ted Janes; jtrovato@atmc.net; Len Pietrafesa; Editor; Laura Lewis
Subject: [External] Re:

Dear Dr. Hilderman

I agree with you. Your comments are fair and balanced. And I believe will serve the entire community well. It is my position that your suggestions should be heard and considered.

Jan Harris
Sunset Beach Councilwoman

Sent from my Verizon LG Smartphone

------ Original message------
From: Richard Hilderman
Date: Sun, Jun 16, 2019 9:34 AM
To: Mark Benton;Rich Cerrato;John Corbett;Janice Harris;Charles Nern;VanWormer Paul;Richard Hilderman;
Cc: Davis, Braxton C;Spears, Courtney;rneal@moffattnichol.com;John Pagels;Ted Janes;jtrovato@atmc.net;Len Pietrafesa;Editor;Laura Lewis;
Subject:

SSB Council: & nbsp; June 16, 2019

Why is it necessary to dredge South Jinks Creek in order to give Canal Bay Area boaters access to the ICWW? The first attached photo was taken on 5/25/19 from the end of Riverside Drive of South Jinks Creek at low tide. Clearly there is a channel in South Jinks Creek at low tide. What is the depth of this channel in South Jinks Creek at MLW? Has the depth of Jinks Creek ever been at least 5 feet below MLW? Drs. Pietrafesa (Emeritus Professor North Carolina State University and Burroughs & Chaplin Scholar, Coastal Carolina University), Bao (Assistant Professor, Coastal Science, Coastal Carolina University) and Gayes (Director and Professor, School of Coastal and Marine Science, Coastal Carolina University) sent the Council, in March a 2018, documentation which stated dredging an 80 foot wide and 5 feet below MLW channel would be risky business. To date, Mr. Neal has not attempted to counter this conclusion.

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If you, as council members, disagree and believe South Jinks Creek needs to be dredged, we have offered the Town a compromise dredging proposal. Again, the Town's proposal is to create a 1750 foot long, 80 foot wide and 5 feet below MLW navigational channel in South Jinks Creek. North Jinks Creek is not part of the dredging proposal and its depth is only 2 feet below MLW. **Our compromise is to dredge only to 2 feet below MLW.** Mr. Neal's email of 6/12/19, in response to Councilman Cerrato's 5 questions, expresses concerns about why it is necessary to dredge 5 feet instead of 2 feet below MLW. Respectfully, we would like to now address the concerns he raises.

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3. Mr. Neal states **"If we do not dredge to -5 depth, we can expect to dredge more often in order to maintain the navigation access. Therefore the project cost would increase over the project life or the project benefit would decrease for the 1 time event."** How can one predict the frequency of maintenance dredging when there are so many variables that need to be studied and understood? Example: the frequency and severity of storms. Furthermore, how can he make this statement without a shoaling study?
4. Mr. Neal states **"By not dredging to -5 depth we increase the dredging frequency and therefore increase the potential for impacts to marine life, etc. in the area."** Mr. Neal is an engineer NOT a marine ecologist! In formulating his opinion did Mr. Neal consult with marine ecologists? What scientific data does he have to support this statement? A few questions that should be answered are: Would dredging to 5 feet instead of 2 feet have a greater negative impact? What are the long term effects to the environment and ecosystems in Jinks Creek by continued maintenance
dredging regardless of depth? How long does it take for recovery after dredging? Would the recovery period be different for 5 feet vs 2 feet dredging? Would the negative impact be only close to South Jinks Creek or throughout North Jinks Creek and the PNA system?
5. Mr. Neal states **"I believe any potential impact to N. Jinks Creek resulting from the dredging event will be temporary in the terms of some suspended sediment from the construction event."** This is simply an opinion! What scientific data does he base this opinion on? It is axiomatic that both initial and maintenance dredging result in high levels of sediment and sedimentation that negatively impact organisms, both plant and animal, in the associated ecosystems.
6. Mr. Neal states **"The potential impact to N. Jinks for dredging S. Jinks would be the same regardless of how deep the Town decides to dredge in S. Jinks Creek."** Again, what scientific information does he have to support this statement. While we are not engineers, common sense tells us that both initial and maintenance dredging will result in greater sediment load and subsequent sedimentation in North Jinks Creek and the surrounding PNAs.

Finally, we would like to share with you the information below.

Oysters are filter feeders and remove pollutants from the water. Oysters also provide habitat and cover for small fish species- protecting them from predators. If the oyster population declines in Jinks Creek, so will the population of other species thus leading to an undeniable, negative impact on the Jinks Creek/PNA ecosystem. At the very least oysters can serve as sentinels, factors that damage them must be of great concern. Dr. Curtis Rose investigated the mortality of market-sized oysters (Crassostrea virginica) in the vicinity of a dredging operation. The results of this investigation strongly suggest that sedimentation resulting from dredging caused an increased oyster mortality of 40% within 595 meters of the spoils bank when compared to a non-dredged area (Rose, C. D. 1973. Chesapeake Sci. 14 (2). 135-138. Although oysters are adapted to highly turbid environments, they are physiologically stressed by sediment resuspension and deposition by human activities such as dredging, coastal development and vessel traffic (Wilber, D., Hadley, N.H. and Clarke, D.G. 2012. North American J. of Fisheries Management, 32: 838-847). Will perpetual maintenance dredging in order to keep a deep water navigational channel open put additional stress on the oysters?

As sea level rises, shallow water and intertidal habitats will likely become limited or fragmented. Further loss of the remaining habitat from dredging and shoreline alterations may surpass ecological thresholds, leading to irreversible productivity losses (Bilkovic, D.M. 2011. Estuaries & Coast 34(1): 129-147).

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RECEIVED

JUN 16 2019

MP SECTION WIRO

MHC

NCV

Spears, Courtney

From: Davis, Braxton C
Sent: Monday, July 1, 2019 11:48 AM
To: Spears, Courtney
Subject: Fw: [External] dredging jinks

****

Braxton Davis
Director, Division of Coastal Management
NC Department of Environmental Quality
Morehead City, NC 28557
(252) 808-2808 x202

From: Duane <dlewis1007@aol.com>
Sent: Wednesday, June 26, 2019 4:24 PM
To: Davis, Braxton C
Cc: richardhilderman@gmail.com; dblythe@atmc.net; sweetobie@atmc.net; rplcerrato@atmc.net; dlewis1007@aol.com; jsteinke0868@gmail.com; jamesemcneil@atmc.net; janharris@atmc.net; llewis@brunswickbeacon.com
Subject: [External] dredging jinks

Dear Dr. Braxton: I have been a resident of Sunset Beach for 16+ years. Dredging has never been an issue with me until I began following Dr Hilderman's concerns and objections to dredging, especially S. Jinks Creek. I find his questions, concerns and requests have caused a reaction by Sunset Beach Town Council that border on insolence, arrogance and unbright thinking. This is not foreign to the Council, past mayors and even their legal Counsel. They have a history, and even brag about how unfair they have been to the public, and defend going forward with this attitude of unfairness to be fair to those they have taken advantage of for the past 25 years. I call it SunetLogic. It is thinking like this that causes me to support Dr Hilderman, Mr. Janes, and Mr. Pagels, PhD and their body of concerned citizens to take measured responses and requests to be careful. Sometimes, we get only one chance to get it right. If the purpose is to spend money before it runs out, send some to fix potholes in streets and roads where citizens have paid for the service and never received the quid pro quo. My opinion is that the gentlemen that have presented "logical," not SunsetLogic, questions and concerns need to be heard. Thank you for the opportunity to express my thoughts.

"If it ain't broke don't fix it."

Duane Lewis,
dlewis1007@aol.com
704-902-6319 Private Cell

Spears, Courtney

From: Davis, Braxton C
Sent: Monday, July 1, 2019 11:48 AM
To: Spears, Courtney
Subject: Fw: [External] Sunset Beach dredging project

****

Braxton Davis
Director, Division of Coastal Management
NC Department of Environmental Quality
Morehead City, NC 28557
(252) 808-2808 x202

From: Mac Nelson <mac.nelson7810@gmail.com>
Sent: Wednesday, June 26, 2019 11:26 AM
To: Davis, Braxton C
Subject: [External] Sunset Beach dredging project

As a 30+ years resident of Sunset Beach, I am strongly opposed to the Sunset Beach dredging project as it applies to North and South Jinks Creek. There is substantial scientific evidence, produced by Dr. Richard Hilderman and others, that this project will have a significant detrimental effect on the environment and that effect may be permanent. The Town Council and Mayor of Sunset Beach have chosen to ignore that evidence, for their own personal reasons, and I hope that your agency is more concerned with the obvious public good. The project as it is now presented will benefit a handful of boat owners without consideration to the interests of other Sunset Beach residents.

Regards, Mac Nelson, 401 30h Street, Sunset Beach, NC

Spears, Courtney

From: Davis, Braxton C
Sent: Monday, July 1, 2019 11:48 AM
To: Spears, Courtney
Subject: Fw: [External] Sunset Beach Dredging Project

****

Braxton Davis
Director, Division of Coastal Management
NC Department of Environmental Quality
Morehead City, NC 28557
(252) 808-2808 x202

From: Mike Evans <michaelrevans1948@icloud.com>
Sent: Wednesday, June 26, 2019 12:25 PM
To: Davis, Braxton C
Subject: [External] Sunset Beach Dredging Project

CAUTION: External email. Do not click links or open attachments unless you verify. Send all suspicious email as an attachment to report.spam@nc.gov<mailto:report.spam@nc.gov>

Dear Dr. Davis,

I own a home in Sunset Beach and pay taxes in Brunswick County and the town of Sunset Beach. For many reasons I do not support the dredging project in Jinks Creek. I feel that any benefits of the project are not worth the estimated costs. And only a few property owners on the island really want this project to be continued.

So please count my vote a Big No!

Thank you.

Michael Evans
908 Resort Circle
Sunset Beach

Sent from my iPhone

MNC

Spears, Courtney

From: MacPherson, Tara
Sent: Monday, July 1, 2019 8:27 AM
To: Spears, Courtney
Subject: FW: [External] Dredging at Sunset Beach, NC

Tara MacPherson
Field Specialist
NC Division of Coastal Management
Department of Environmental Quality

910 796-7425 office
910 395-3964 fax
tara.macpherson@ncdenr.gov

127 Cardinal Drive Ext
Wilmington, NC 28405

Nothing Compares

From: John Acton <glenwod@aol.com>
Sent: Thursday, June 27, 2019 5:00 PM
To: MacPherson, Tara <tara.macpherson@ncdenr.gov>
Subject: [External] Dredging at Sunset Beach, NC

I have owned my cottage at 1801 Canal Drive since 1987. We have raised two children who enjoyed the bay and have five grandchildren that now enjoy the bay. In fact, our oldest granddaughter lives around the bay while she is at 1801 Canal Drive.

We love the bay, but it is not the bay that it was in 1987. It has filled in and boating is now not safe. I had a boat but sold it several years ago because of the bay and other reasons.

Mother Nature is building up sand in the bay, but Mother Nature also needs the waters to flow freely for the benefit of the environment, and those little fish and others that need a good and healthy environment in which to live and produce offspring.

Please assist us in restoring the bay to way it was in 1987 and allow the dredging to occur to make boating safe again in bay.

I want it restored so that my grandchildren's children can enjoy it in years to come and to benefit Mother Nature!

Thank you for your assistance.

Should you have any questions of me, please feel free to call me!

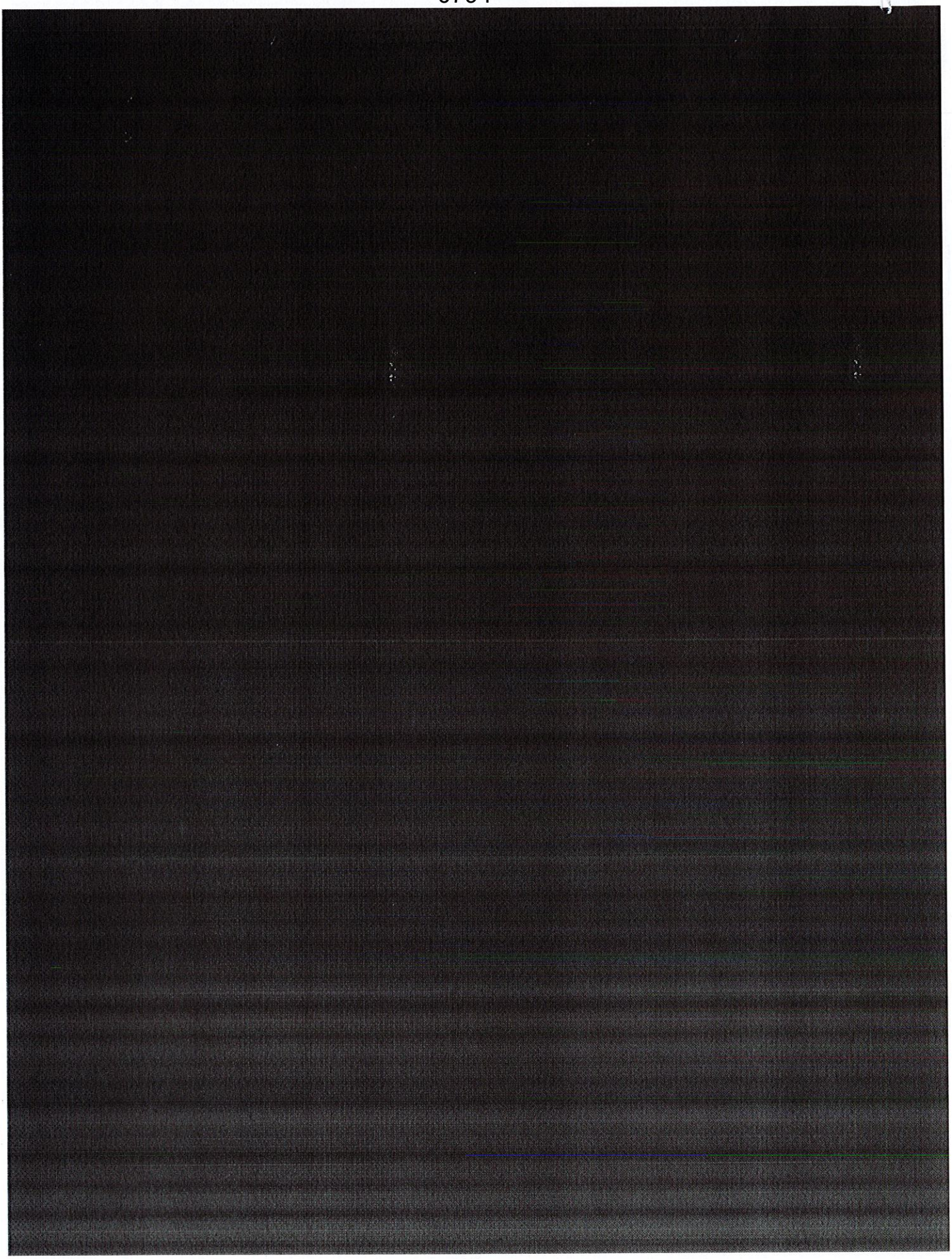
Sandy

John "Sandy" Acton, CCIM
President
Glenwood Properties, Inc.
919-880-8989-Cell
glenwod@aol.com-E-mail

MHC

Spears, Courtney

From: Edwin W Janes <ewjanes@yahoo.com>
Sent: Thursday, June 27, 2019 9:37 AM
To: Davis, Braxton C
Cc: Spears, Courtney; Pietila, Tanya K
Subject: [External] Sunset Beach Dredge Permit DCM public comment



You are looking at South Jinks Creek as it accesses Canal Bay and then Palm Cove and Tubbs Inlet. It is 1.5 feet below MLW (mean low water) with a tide of 4-6 feet. But North Jinks Creek is 2 feet below MLW. Canal Bay Area boaters need to use both South and North Jinks Creek to access the Intracoastal Waterway while feeder/finger canal boaters need only North Jinks to do the same. So why is the Town proposing to dredge South Jinks to 5 feet below MLW instead of to the depth of North Jinks Creek ? A citizen request to discuss this alternative was voted down 3-2 by Town Council. This picture, taken near low tide as evidenced by the sand bars and the beach, shows that 17 plus boats, with more on the way, have managed to navigate from the Inter-coastal waterway the entire length of Jinks Creek to the Public Trust Beach at the East end of Sunset Beach even with low tide in mind. Navigating the entire length of Jinks Creek today is a simple matter of planning your boating, with low tide in mind, and knowing the deep channels in the creek- as these weekend boaters obviously do. Tides are a way of life for ICWW and coastal boaters. Should we be engineering our way around this reality at the expense of our marsh ecosystems?

Edwin W. Janes
403 37th Street
Sunset Beach, NC

MM

Spears, Courtney

From: MacPherson, Tara
Sent: Monday, July 1, 2019 10:08 AM
To: Spears, Courtney
Subject: FW: [External] Sunset Beach CAMA Permit

Tara MacPherson
Field Specialist
NC Division of Coastal Management
Department of Environmental Quality

910 796-7425 office
910 395-3964 fax
tara.macpherson@ncdenr.gov

127 Cardinal Drive Ext
Wilmington, NC 28405

Nothing Compares

From: Denise Williams <dcwbeachgirl@gmail.com>
Sent: Saturday, June 29, 2019 8:41 AM
To: MacPherson, Tara <tara.macpherson@ncdenr.gov>
Subject: [External] Sunset Beach CAMA Permit

Dear Ms. MacPherson,

I thrilled to learn that the Division of Coastal Management is in receipt of the CAMA Application for the Dredging Project in Sunset Beach. This has been a long time coming! I am a permanent resident of the Sunset Beach mainland and am in complete support of this project. I have been working on a project to gather names via petition of many more that also support this project. I would be happy to share them with you if you like.

We look forward to the start of the actual dredging project!!

Thank you for all of your efforts to make that happen!

Sincerely,

Denise Williams
301 Waterway Dr. SW
Sunset Beach, NC 28468
919-931-7037

Spears, Courtney

From: MacPherson, Tara
Sent: Monday, July 1, 2019 10:09 AM
To: Spears, Courtney
Subject: FW: [External] CAMA Major Permit Application - Sunset Beach Dredging

Tara MacPherson
Field Specialist
NC Division of Coastal Management
Department of Environmental Quality

910 796-7425 office
910 395-3964 fax
tara.macpherson@ncdenr.gov

127 Cardinal Drive Ext
Wilmington, NC 28405

-----Original Message-----
From: John Wells <jdwells01@gmail.com>
Sent: Sunday, June 30, 2019 10:06 PM
To: MacPherson, Tara <tara.macpherson@ncdenr.gov>
Subject: [External] CAMA Major Permit Application - Sunset Beach Dredging

Dear Ms. MacPherson,

This letter is to express my vehement opposition to the current dredging plan that would result in placing an enormous volume of sand along the eastern oceanfront of Sunset Beach from 5th Street to 12th Street. This plan fails to adequately consider the significant, irreversible, immediate and long term practical and commercial impacts to property owners, rental guests, tourists and Town employees.

My family has owned the oceanfront lot at 604 Main Street East for more than 50 years. Over this period, the distance from Main Street to MHW has more than tripled from 150 feet to 491 feet. Based on the current plan, this would be

increased to over an eighth of a mile. People staying in 2nd row homes and further away would be even more negatively affected. This additional inconvenience could drive down rental occupancy and property values in this large area, which is certainly not a "beneficial reuse" of beach compatible material.

In contrast with the 1960's, when Tubbs Inlet was slicing through the east end of the island and causing owners to move houses to safety, a dredging plan was executed to close the inlet and move it back to where it had been before the instability. That plan involved a truly beneficial reuse of beach compatible material. The current plan appears to be a cheaper and riskier alternative to the more prudent solution of disposal on the mainland.

The flow of sand due to wind, water currents and storms is indeterminate at best. The act of establishing a huge 'tabletop' mound of sand over 1,600 feet long and up to 9 feet of elevation in this oceanfront location is unconscionable. From Tab H of the application, "...the sand often does not remain on the beach for an extended period of time." Uncontrollable sand movements would no doubt cause significant issues for decades, in unpredictable and detrimental ways. Trying to maintain this pile of sand would be a costly and never-ending expense to the Town.

In addition, the slope of the beach from the existing frontal dune to the water would be noticeably and significantly changed from what is normal and historical for this island, destroying the beach's natural beauty, continuity and character.

Sunset Beach continues to be mentioned in many publications as one of the best beach vacation destinations in the country, due to its unspoiled beauty. Why would anyone approve a project that would make such a tremendous change to this marvelous and desirable oceanfront?

I ask that you demand an alternate solution to this disastrous and irresponsible disposal plan. I'm sure that there are other suitable options that would do much less damage.

Don't spoil Sunset Beach with Jinks Creek sand!

Sincerely,
John D. Wells

Owner- Sunset Beach Music, LLC
604 Main Street East
Sunset Beach, NC 28468
(813)230-0962

MHC

Spears, Courtney

From: MacPherson, Tara
Sent: Wednesday, June 19, 2019 8:30 AM
To: Spears, Courtney; Goebel, Christine A
Subject: FW: [External] Sunset Beach Dredging Project

Tara MacPherson
Field Specialist
NC Division of Coastal Management
Department of Environmental Quality

910 796-7425 office
910 395-3964 fax
tara.macpherson@ncdenr.gov

127 Cardinal Drive Ext
Wilmington, NC 28405

Nothing Compares

From: rcerrato@sunsetbeachnc.gov <rcerrato@sunsetbeachnc.gov>
Sent: Tuesday, June 18, 2019 4:52 PM
To: MacPherson, Tara <tara.macpherson@ncdenr.gov>
Subject: [External] Sunset Beach Dredging Project

Hi Ms. Macpherson,
My name is Rich Cerrato and I am a Councilman for the Town of Sunset Beach. I was requested by our Town Clerk, Lisa Anglin to file a FOIA to you in order obtain the dredging affective owners comments as part of the recent mailing notification.

You should also know that this program was NOT recommended by the property owners, but rather a developer for his new boating development. My efforts to survey the impacted owners in order to determine if they would be interested in this legally required mandated program was rejected by three members of the council. Additionally they also refused to survey the impacted owners to determine how many of the

impacted owners have boats? According to the Brunswick County tax records only 11 of the 350 people have registered boats.

Would you please provide me all of the comments from regarding this matter. I look forward to your favorable response.
Thank-you!
Rich Cerrato (910-579-1418)

Spears, Courtney

From: MacPherson, Tara
Sent: Wednesday, June 19, 2019 11:33 AM
To: Spears, Courtney
Subject: FW: [External] Fw: Sunset Beach Dredging Project

Importance: High

Tara MacPherson
Field Specialist
NC Division of Coastal Management
Department of Environmental Quality

910 796-7425 office
910 395-3964 fax
tara.macpherson@ncdenr.gov

127 Cardinal Drive Ext
Wilmington, NC 28405

Nothing Compares

From: rcerrato@sunsetbeachnc.gov <rcerrato@sunsetbeachnc.gov>
Sent: Wednesday, June 19, 2019 11:22 AM
To: MacPherson, Tara <tara.macpherson@ncdenr.gov>
Subject: [External] Fw: Sunset Beach Dredging Project
Importance: High

From: rcerrato@sunsetbeachnc.gov
Sent: Wednesday, June 19, 2019 10:56 AM
To: tara.macpherson@ncdner.gov
Subject: Fw: Sunset Beach Dredging Project

Hi Tara,

I enclosed my previous email that I sent to you. I just received an email from our town clerk indicating that the Sunset Beach comment period for the dredging project has started. Would you please provide me the reporting contact and the dates for this comment period.
Thank-you!
Rich Cerrato
Councilman, Sunset Beach

From: rcerrato@sunsetbeachnc.gov
Sent: Tuesday, June 18, 2019 4:51 PM
To: tara.macpherson@ncdenr.gov
Subject: Sunset Beach Dredging Project

Hi Ms. Macpherson,
My name is Rich Cerrato and I am a Councilman for the Town of Sunset Beach. I was requested by our Town Clerk, Lisa Anglin to file a FOIA to you in order obtain the dredging affective owners comments as part of the recent mailing notification.

You should also know that this program was NOT recommended by the property owners, but rather a developer for his new boating development. My efforts to survey the impacted owners in order to determine if they would be interested in this legally required mandated program was rejected by three members of the council. Additionally they also refused to survey the impacted owners to determine how many of the impacted owners have boats? According to the Brunswick County tax records only 11 of the 350 people have registered boats.

Would you please provide me all of the comments from regarding this matter. I look forward to your favorable response.
Thank-you!
Rich Cerrato (910-579-1418)

MHL

Spears, Courtney

From: Davis, Braxton C
Sent: Monday, July 1, 2019 11:49 AM
To: Spears, Courtney
Subject: Fw: [External] dredging

****

Braxton Davis
Director, Division of Coastal Management
NC Department of Environmental Quality
Morehead City, NC 28557
(252) 808-2808 x202

From: Jackie Lewis <art_byfayej@yahoo.com>
Sent: Tuesday, June 25, 2019 5:18 PM
To: Davis, Braxton C
Subject: [External] dredging

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Mr Braxton,
I am against the dredging for the reasons stated. How can we vote on this - or does the city do what they desire for their own conflict of interest gain?
Jackie Lewis

NMC

Spears, Courtney

From: doggenome@gmail.com
Sent: Thursday, June 6, 2019 12:41 PM
To: Spears, Courtney
Cc: Richard Hilderman; Davis, Braxton C; Geoff Gisler; Len Pietrafesa; Ted; John Pagels; Gary Merritt; Nina Marable; Barry Lentz; Rich Cerrato; Janice Harris; Editor; Laura Lewis
Subject: Re: [External] Compromise Dredging Proposal for SSB

Courtney,

As usual I am impressed with your rapid and factual emails! T I will work on my alternative proposal and send it to you in the next couple of days to add to the file for consideration.
Richard

Sent from my iPhone

On Jun 6, 2019, at 12:16 PM, "Spears, Courtney" <courtney.spears@ncdenr.gov> wrote:

> Good afternoon Dr. Hilderman,
>
> Thank you for the information on your proposal. At this time, the application has still not been accepted as complete. We would welcome you to submit any alternatives analyses in writing to be considered during the permit review process. If you submit prior to the application's complete acceptance I can add them to the file for consideration. Please let me know if there are any questions.
>
> Kind regards,
>
> **Courtney Spears**
> Assistant Major Permits Coordinator
> Division of Coastal Management
> Department of Environmental Quality
>
> 910 796 7426 office
> courtney.spears@ncdenr.gov
>
> 127 Cardinal Drive Ext.
> Wilmington, NC 28405
>
> ---
>
> **From:** Richard Hilderman [mailto:richardhilderman@gmail.com]
> **Sent:** Tuesday, June 4, 2019 10:53 AM
> **To:** Davis, Braxton C <Braxton.Davis@NCDENR.Gov>; Richard Hilderman <doggenome@gmail.com>
> **Cc:** Spears, Courtney <courtney.spears@ncdenr.gov>; Geoff Gisler <ggisler@selcnc.org>; Len Pietrafesa <ljpietra@ncsu.edu>; Ted <ewjanes@yahoo.com>; John Pagels <jpagels@vcu.edu>; Gary Merritt <gmerr946@aol.com>; Nina Marable <ninam@atmc.net>; Barry Lentz <uncbrl@gmail.com>; Rich Cerrato <rplcerrato@atmc.net>; Janice Harris <janharris@atmc.net>; Editor <editor@brunswickbeacon.com>; Laura Lewis <llewis@brunswickbeacon.com>
> **Subject:** [External] Compromise Dredging Proposal for SSB

Dr. Davis:

The SSB pending CAMA dredging permit does not include dredging of North Jinks Creek. It only proposes to dredge South Jinks Creek, feeder/finger canal system and the Canal Bay Area. Since the main objective of dredging South Jinks Creek is to give Canal Bay Area boaters access to the IGW, it seems to me that the dredging depth of South Jinks Creek, feeder/finger canal system and Canal Bay Area needs to only be to the current or historical depth of North Jinks Creek and not to 5 feet below MLW as proposed in the permit application. Dredging only to the depth of North Jinks Creek would decrease the risk of flooding/erosion on the east end of the island after storm surges and also decrease the potential negative impact dredging and the navigational channel would have on the ecosystems of North Jinks Creek and the surrounding PNAs.

Two SSB council members (Cerrato and Harris) requested that I make a presentation to the council regarding my compromise. They felt it was important for the council to have as much information as possible regarding the dredging project. Last night the council voted 3 to 2 to reject allowing me to make a presentation. The main reason given was that it is upto the State to decide. With this in mind do you feel CAMA and/or DCM would be interested in reviewing my proposal?

Richard Hilderman, Ph.D.

MHC

Spears, Courtney

From: rcerrato@sunsetbeachnc.gov
Sent: Saturday, June 8, 2019 1:10 PM
To: Richard Hilderman
Cc: Davis, Braxton C; Spears, Courtney; Len Pietrafesa; Ted; John Pagels; Gary Merritt; Barry Lentz; Nina Marable; Editor; Laura Lewis; Mark Benton; jcorbett@sunsetbeachnc.gov; jharris@sunsetbeachnc.gov; cnern@sunsetbeachnc.gov; Paul VanWormer; Hiram Marziano
Subject: [External] Re: Dredging to the Depth of North Jinks Creek

Dr. Hilderman,
First of all, please accept my apology for the governing body's vote not to allow you to make this presentation to the council and taxpayers. Based on what I have observed and was reported by our State and Federal Officials and I am am confident that their due-diligence will not leave any matter to guess work. In addition to what you have reported below, the coastal officials also discovered that North Jinks Creek has never been dredged, when the Town claimed it was maintenance dredged and they also removed North Jinks Creek from the program.

My major concern in addition to cost, flooding and erosion is the environmental impact related to North Jinks Creek if South Jinks Creek is permitted to be dredged? As most know, in order to have uninterrupted deep water access the dredging of North Jinks Creek appears to have been the thrust of this program. I would like to be assured by our Federal and State Authorities that what ever is decided, that it will NOT cause the eventual dredging of North Jinks Creek.

Again, I am confident that our coastal experts will continue to perform their due-diligence.
Thank you again for sharing your knowledge and concerns.
Rich

Among

From: Richard Hilderman
Sent: Saturday, June 08, 2019 8:42 AM
To: Mark Benton ; Rich Cerrato ; John Corbett ; Janice Harris ; Charles Nern ; VanWormer Paul ; Richard Hilderman
Cc: Davis, Braxton C ; Spears, Courtney ; Len Pietrafesa ; Ted ; John Pagels ; Gary Merritt ; Barry Lentz ; Nina Marable ; Editor ; Laura Lewis
Subject: Dredging to the Depth of North Jinks Creek

Council:

I know some of you think I don't have enough expertise to be discussing a compromise dredging proposal. However, I would like to refer you to Mr. Neal's June progress report. Below is a part of the report under "Agency Coordination Meeting"

"The 3rd Agency Coordination Meeting was held on April 9, 2018. The main outcome form the meeting was as follows:
o DCM confirmed any dredging in the Feeder Canal or Bay Area could not exceed the governing depth of Jinks Creek or Tubbs Inlet. A connection at least as deep as the dredging depths must extend either to the Atlantic Ocean or to the AIWW. However, DCM also stated they would support a variance to this requirement (15 NCAC 07H.0208.b.1.f) if the Town requested one from the CRC.
o DCM noted that other agencies such as DWR may also have concerns about dredging the Feeder Canal or Bay Area deeper than Jinks Creek, which is currently at -2MLW."

They have concerns similar concerns to mine. Since DCM also noted other agencies may have concerns about dredging below 2 MLW level the variance request may be denied by the CRC. Thus my suggestion would be to request another Agency Corrdination Meeting to get a better understanding about the other agencies concerns about dredging below 2 MLW and get their input on my compromise dredging proposal. This may save the Town a lot of money and time!

Richard Hilderman, Ph.D.

C0813

Chalmers L. Glenn, AAMS®, MBA
First Vice President/Investments

12/16/19

Mr. Braxton Davis
RE: Sunset Beach Dredging

This issue is actually very simple. For 50 years Sunset Beach has been ~~going~~ gaining sand. Dredging will always be required to maintain the existing waterways.

Previous dredgings never harmed the beach and only served to enhance the joy and beauty of Sunset. Dredging down 5ft clearly is a better option than 2ft.

We have delayed too long. Let's do what we know needs to be done.

Sincerely
Chal

STIFEL

460 West Wesmark Boulevard | Sumter, South Carolina 29150
(803) 469-7070 main | (800) 743-4522 toll-free | (803) 469-6003 fax | chal.glenn@stifel.com
Stifel, Nicolaus & Company, Incorporated | Member SIPC & NYSE | www.stifel.com

Glenn
830 Oak Brook
Sumter SC 29150

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16 DEC '19
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DEC 18 2019
DCM-MHD CITY

Mr. Braxton Davis, Director
NC Division of Coastal Management
400 Commerce Avenue
Morehead City, NC 28557

28557-355055

STIFEL

Chalmers L. Glenn, AAMS®, MBA
First Vice President/Investments

460 West Wesmark Blvd.
Sumter, SC 29150
Phone: (803) 469-7070
Fax: (803) 469-6003
Toll Free: (800) 743-4522
chal.glenn@stifel.com

431 Dolphin St
Sunset Beach NC

Chalmers L. Glenn, AAMS®, MBA
First Vice President/Investments

0814

12/16/19

Mr. Braxton Davis
RE: Sunset Beach Dredging

This issue is actually very simple. For 50 years Sunset Beach has been ~~going~~ gaining sand. Dredging will always be required to maintain the existing waterways.

Previous dredgings never harmed the beach and only served to enhance the joy and beauty of Sunset. Dredging down 5ft clearly is a better option than 2ft.

We have delayed too long. Let's do what we know needs to be done.

Sincerely
Chal

STIFEL

460 West Wesmark Boulevard | Sumter, South Carolina 29150
(803) 469-7070 main | (800) 743-4522 toll-free | (803) 469-6003 fax | chal.glenn@stifel.com
Stifel, Nicolaus & Company, Incorporated | Member SIPC & NYSE | www.stifel.com

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DCM-MHD CITY

Glenn
930 Oak Brook
Sumter, SC 29150

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Mr. Braxton Davis, Director
NC Division of Coastal Management
400 Commerce Avenue
Morehead City, NC 28557

28557-858038

431 Dolphin St
Sunset Beach NC

Chalmers L. Glenn, AAMS®, MBA
First Vice President/Investments

460 West Wesmark Blvd.
Sumter, SC 29150
Phone: (803) 469-7070
Fax: (803) 469-6003
Toll Free: (800) 743-4522
chal.glenn@stifel.com

From: Davis, Braxton C
To: Simmons, Christy
Subject: Fw: [External] Comments regarding Variance Request for Dredging South Jinks Creek
Date: Wednesday, December 18, 2019 2:16:40 PM
Attachments: Screen Shot 2018-09-16 at 1.21.01 PM.png

From: jtrovato@atmc.net <jtrovato@atmc.net>
Sent: Wednesday, December 18, 2019 1:48 PM
To: Davis, Braxton C <Braxton.Davis@NCDENR.Gov>
Cc: JIM THOMAS (HUSBAND ICE) <haggler@erols.com>
Subject: [External] Comments regarding Variance Request for Dredging South Jinks Creek

Dear Mr. Davis,

My husband (James C. Thomas, Jr..) and I are concerned about the variance request to dredge S. Jinks Creek only to the depth of North Jinks Creek (thought to be about 2 feet at MLW).

According to simulations by three respected coastal marine scientists, creating such a high volume basin will likely increase the risk of flooding at the east end of Sunset Beach (where we reside). The flawed simulations performed by Sunset Beach's engineering firm (Moffat-Nichol) have been shown to have underestimated tidal flow through Tubbs Inlet and thus to underestimate the risk of flooding.o

Thank you for your consideration of our concerns, and best wishes for a Merry Christmas and Holiday Season.

Jacqueline M. Trovato

From: jtrovato@atmc.net
To: DEQ_DCMComments
Subject: [External] Concerns regarding dredging variance Sunset Beach
Date: Thursday, December 19, 2019 9:31:21 AM
Attachments: Screen Shot 2018-09-16 at 1.21.01 PM.png

My husband (James C. Thomas, Jr..) and I are concerned about the variance request to dredge S. Jinks Creek only to the depth of North Jinks Creek (thought to be about 2 feet at MLW).

According to simulations by three respected coastal marine scientists, creating such a high volume basin will likely increase the risk of flooding at the east end of Sunset Beach (where we reside). The flawed simulations performed by Sunset Beach's engineering firm (Moffat-Nichol) have been shown to have underestimated tidal flow through Tubbs Inlet and thus to underestimate the risk of flooding.o

Thank you for your consideration of our concerns.

Jacqueline M. Trovato

Jacqueline Trovato
202.549.3663 | jtrovato@atmc.net
www.commongroundseminars.com | Skype: jacqueline.trovato
1520 North Shore Drive Sunset Beach NC 28468

December 15, 2019

to: Members of the Coastal Resources Commission

thank you for allowing comments to be made on the pending town of Sunset Beach application for a variance for the dredging of Jinks Creek. We would ask that this petition be granted for two reasons. First, it would allow more access to watercraft at low tide, especially in the canals. Second, it would allow more time before dredging would be necessary again.

Respectfully,

Richard + Peggy Lyle
407 Sailfish Street
Sunset Beach, NC
28468

LYCR
407 SAILFISH ST.
SUNSET BEACH, NC
28468

GREENSBORO NC 270
PIEDMONT TRIAD AREA
16 DEC 2019 PM 3 L

BRAXTON DAVIS
400 COMMERCE AVENUE
MOREHEAD CITY, NC
28557

RECEIV
DEC 19 2
DCM-MHD

28557-295599

From: Richard Hilderman
To: DEQ_DCMComments; Richard Hilderman
Cc: Davis, Braxton C; Crumbley, Tyler A CIV USARMY CESAW (USA)
Subject: [External] Sunset Beach Variance
Date: Friday, December 20, 2019 1:31:29 PM

To Whom It May Concern:

I am writing to express my concerns pertaining to the Sunset Beach request for a CRC variance to dredged South Jinks Creek (SJC) to -5 feet mean low water level (MLW) instead of the -2 feet approved by the Department of Coastal Management (DCM).

Jinks Creek is a naturally occurring shallow water tidal creek that connects the Atlantic Ocean to the Intracoastal Waterway (AIWW). Jinks Creek has been arbitrarily subdivided into SJC and North Jinks Creek (NJC). North Jinks Creek is surrounded and bisected by primary nursey areas. The original dredging project (funded by DWR in 2016) proposed to dredge the entire Jinks Creek to -5 feet. An oyster survey demonstrated a high density of oyster beds in NJC. I suspect this high density oyster beds is the reason NJC was removed from the current dredging project.

Feeder/finger canals and Canal Bay boaters must use Jinks Creek to access the AIWW. The feeder/finger canal boaters only use NJC while the Canal Bay boaters must use both SJC and NJC.

Moffat and Nichol estimated the mean low water level (MLW) of SJC to be – 1 foot. However, I measured a portion of SJC at dead low tide and the depth was 3 feet. I also watched a shallow water recreational fishing boat transcend the entire length of SJC at low tide! Also, keep in mind the tide in this area is 4 to 6 feet. Thus the only time boaters will navigate the 1700 foot long SJC at the DCM proposed -2 feet MLW is around low tide. Furthermore, dredging SJC to -5 feet instead

of -2 feet will have a negative impact on the oyster beds in NJC because the sediment loaded deposited by a -5 foot dredging will be significant greater than that deposited by a -2 foot dredging.

Finally, I take exception to the Town's statement "Jinks Creek serves as a primary navigation route between the Atlantic Ocean and the AIWW." As stated above the feeder/finger canal and Canal Bay boaters access the AIWW by Jinks Creek and then the Little River Inlet to gain access to the Atlantic Ocean. What documentation does the Town have for their claim that Jinks Creek is a **primary** navigational route between the Atlantic Ocean and the AIWW?

Richard Hilderman, Ph.D.

From: Rollin Tarter
To: DEQ_DCMComments
Cc: Davis, Braxton C
Subject: [External] Sunset Beach"s CRC Application
Date: Saturday, December 21, 2019 12:46:01 PM

The Sunset Beach waiver request for the dredging of Jinks Creek for the purpose of allowing 5' instead of the approved 2' is without technical merit. I urge disapproval of the request. The long-labored compromise previously reached is more than adequate both for boaters and for ecological stewardship. The protection of primary nursery areas is the correct concern, not the protection of recreational privilege.
Thank you for your careful and responsive work for this generation and for those to come.

Ann & Rollin Tarter
410 37th Street
Sunset Beach, NC 28468

From: Edwin W Janes
To: DEQ_DCMComments
Cc: Davis, Braxton C; Tyler.A.Crumbley@usace.army.mil
Subject: [External] Sunset Beach Variance
Date: Saturday, December 21, 2019 1:31:24 PM
Attachments: DCM comment 12-2019 PDF.pdf

From: Mac Nelson
To: DEQ_DCMComments; Davis, Braxton C
Cc: richardhilderman@gmail.com
Subject: [External] Sunset Beach CRC Variance Application
Date: Saturday, December 21, 2019 12:08:27 PM

Ladies and Gentlemen:

I am a 30+ year resident of Sunset Beach. I am concerned that the Town Council of Sunset Beach has requested a variance to permit dredging of South Jinks Creek to -5 feet mean water level. I believe that this application is being submitted without proper consideration of the environmental impact of the proposed dredging. The variance if approved would benefit a handful of large boat owners and one particular real estate developer at the uncertain cost to Sunset Beach taxpayers of both future dredging and environmental quality.

I support the position of Dr. Richard Hilderman on this issue and urge you to reject the variance application.

Very truly yours, Mac Nelson, 401 30th Street, Sunset Beach, NC 28468

From: Kelly Harris
To: DEQ_DCMComments
Subject: [External] Sunset Beach Varience
Date: Saturday, December 21, 2019 9:20:06 PM

As waterfront property owner in Sunset Beach I strongly support the variance requested by the Town Council.
If necessary to keep the entire Jinks Creek the same depth I would propose dredging North Jinks creek also.
I have personally observed many boaters stuck in Jinks Creek. It in practically impassible at mid and low tides.
This passage way from the waterway to Tubbs Inlet is used by many boaters and fishermen. Many more non homeowners use this than homeowners.
Safety of our citizens should come first and dredging will definitely make the Jinks Creek area safer
Thank you for your consideration.

W. Kelly Harris

Sent from my iPhone

From: gmerr946@aol.com
To: DEQ_DCMComments
Cc: Davis, Braxton C; Tyler.A.Crumbley@usace.army.mil
Subject: [External] Sunset Beach Variance
Date: Sunday, December 22, 2019 8:05:29 PM

Thank you for the opportunity to comment on this important issue.

I know you have heard from people who are much more qualified to submit expert opinions and facts regarding the Sunset Beach dredging project. I would like to present my opinion from the standpoint of an average resident, vacationer for over thirty five (35) years and a native of New Hanover beaches for sixty five (65) years. Following are what I consider the pros and cons of approving or denying the variance proposal to the currently approved dredging proposal.

But first a little history concerning the Sunset Beach dredging project. I was a charter member of the SSB Environmental Resource Committee (ERC). During my service, I learned from research requested by the then SSB Town Council that Jinks Creek is a naturally occurring shallow water tidal creek surrounded by primary nursery areas containing many oyster beds. In fact this small creek bisects PNA. The SSB ERC submitted information from 17 scientists and coastal experts expert testimony expressing concern regarding the plan to dredge Jinks Creek as proposed by M&N without an EIS.

I also learned a similar dredging proposal was made in 2010. At that time, a 50% plus 1 approval by affected property owners was required for approval of the permit. The SSB Town Council was unable to obtain the required approval so the project was dropped. Subsequently the SSB Town Council changed the ordinance so that the SSB Town Council has the authority to determine who has to pay for a Special Assessment and approve a dredging project.

Here are the reasons a very small **minority** of SSB residents would approve of the **variance proposal that would include dredging South Jinks creek to 5'-6' deep, 80'-100' wide:**

1. It would allow larger, deep draft, boats to navigate South Jinks Creek to the mouth of North Jinks Creek during low tide. Currently the average pleasure boat can navigate during low tide if they know where the channel is and with the completion of the currently approved dredging project could navigate at any time.

2. It would increase the value of homes with water frontage on the dredged areas (according to a Brunswick County tax expert). I think it is important to note that, of five

council members, there are currently two (2) council members and one (1) former council member who stand to gain property value.

3. It would provide for deep water docks and access to the mouth of North Jinks Creek to benefit the developer and owners of properties on the man-made peninsula area known as Riverside Drive- previously created by driving piling into the marsh and backfilling with previous dredge spoils. This was a promise made when the properties were recently offered for sale with photos showing a 35' boat deep draft boat. Film of the developer advertising is available on line.

Here are the reasons a **majority** of SSB residents would prefer the **currently approved dredging project go forward and the variance proposal be denied:**

1. The previously dredged areas such as the feeder/finger canals are way overdue to be dredged because the addition of Jinks Creek to the original proposal has delayed the project for four (4) to (5) years. The affected property owners need and deserve relief.

2. Owners of boats larger than average already have access to the ICWW using the SSB boat ramp, Little River Inlet or the opportunity to dock their boat within 10-15 miles of SSB at deep water marinas.

3. The residents who want the variance approved are a very small minority of taxpayers in SSB or on the island.

4. Jinks Creek has never been dredged.

5. There is a major concern among residents that in the future the costs of perpetual maintenance dredging will be paid by **all** SSB residents. Having observed costs for maintenance of beaches in New Hanover County for 60 years, I can say this is a definite possibility especially since the SSB Town Council now has the authority to approve special assessments/tax districts at their will.

In closing, I would ask the Sunset Beach Variance request be denied. If approved, it should include a required EIS to insure minimal potential damage to this delicate area and a fair and unbiased resolution to the many concerns and issues that presently are unresolved. I would suggest completing the project as already approved.

Thank you,
Gary Merritt
646 Oyster Bay Drive
Sunset Beach, N.C, 28468
336.829.0102

December 16, 2019

Mr. Braxton Davis, Director
NC Division of Coastal Management
400Commerce Avenue
Morehead City, N.C. 28557

Dear Mr. Davis:

As waterfront property owners at Sunset Beach, we strongly support the variance requested by the Town Council of Sunset Beach.

Furthermore, we request that North Jinks Creek also be dredged thus providing access to the waterway at all tide levels without fear of getting stuck in the sand.

This slightly deeper dredging and including North Jinks only makes sense to allow safe access for boaters and to make the results of the dredging project last longer.

Thank you for your consideration.

Sincerely,

Kelly and Leigh Harris
859 Chartier Court
Asheboro, NC 27205

1809 Canal Drive
Sunset Beach, NC

From: Richard Hilderman
To: DEQ_DCMComments; Richard Hilderman
Cc: Davis, Braxton C; Crumbley, Tyler A CIV USARMY CESAW (USA); Len Pietrafesa; Goebel, Christine A
Subject: [External] Sunset Beach Variance
Date: Tuesday, December 24, 2019 9:33:58 AM
Attachments: Pietrafesa et al update document.docx

To Whom It May Concern:

I have read the Sunset Beach Variance application and have several concerns.

1. The Town states " Maintaining S. Jinks Creek, the Bay Area and the Feeder System at the elevation of only -2-ft MLW under the Subject Rule also does not allow the Town to provide a navigable waterway in accordance with recommended standards from national engineering agencies. The ASCE1 (American Society of Civil Engineers) and PIANC2 (The Association for Waterborne Transport Infrastructure) recommends 3-ft under keel (MLLW) clearance plus 10% as a design depth in sheltered waters for vessel motion**." Jinks Creek is a naturally occurring shallow water tidal creek. What type of vessel needs -3 feet under keel (MLLW) plus 10% as a design depth? What is a design depth? Does the design recognize the type of boats that actually use these waters? What history has the Town supplied for these types of boats in S. Jinks Creek, the feeder canal system and Canal Bay? The area in question of S. Jinks Creek, already approved for -2 feet MLW, has a known deeper channel, which even at or near low tide is currently being used by a variety of typical recreational boats. Furthermore, the tide in this area is 4 to 6 feet. Thus the only time boaters will navigate S. Jinks Creek at -2 feet is around low tide.**

2. The Town states "The hardships in this case result from the fact that Jinks Creek serves as a primary navigation route between the Atlantic Ocean and the AIWW and also provides a beneficial shellfish and juvenile fish habitat similar to a Primary Nursery Area (PNA)." **I not aware of any evidence that Jinks Creek is a primary navigation route between the Atlantic Ocean and the AIWW. What documentation does the Town have that boats have in the past, do presently, or will in the future, use the requested variance depth in S. Jinks Creek, the feeder canal system or Canal Bay for navigating to the Atlantic Ocean via Tubbs Inlet? Boaters from the feeder canal system and Canal Bay can access the AIWW, at low tide, via Jinks Creek if they use the natural deeper channels in the creek. These channels are close to shore and not in the center of the creek. Again, the tide is this area is 4 to 6 feet!**

claim?

Furthermore, the Town states that Jinks Creek provides a benefit similar to PNAs for shellfish and juvenile fish habitat. This is supported by Dr. Fritz Rohde, a NOAA scientists and member of the Scoping Committee selected to advise the Town about the dredging project. Dr. Rohde believes Jinks Creek is a functional PNA. Dr. Rohde worked 25 years for Marine Fisheries where he was involved in sampling various areas of Brunswick County including Jinks Creek. His sampling data of Jinks Creek showed a comparable level of diversity in different species of fish, shrimps and crabs to the diversity of areas that have been designated PNAs. Jinks Creek and the surrounding PNAs are elaborately interconnected throughout the entire length of N. Jinks Creek and the animal species can move freely between the two areas. If dredging is prohibited in PNAs why should the dredging of S. Jinks Creek be increased from 2 feet to 5 feet?

3. The Town states "Portions of the site have a documented history of being maintained since approximately 1985." **This statement is true only for the feeder canal system not S. Jinks Creek. In 1969 Tubbs Inlet was moved from its previous location on the east end of Sunset Beach to its current location. The southern part of Jinks Creek which joined the Eastern Channel at this time, also had to be moved in order to remain connected to Tubbs Inlet. Is this maintenance dredging?**

4. The Town states "The Town, as Petitioner, has requested the variance in an attempt to preserve the ecological benefit provide by the shellfish and juvenile fish habitat present in N. Jinks Creek**." What evidence does the Town have to support this claim? How does dredging the 1700 foot S. Jinks Creek to 5 feet instead of to 2 feet preserve the ecological benefits in N. Jinks Creek? If anything, it will have a negative impact because it will increase the sediment load deposited in N. Jinks Creek.**

5. The Town states "Additionally, the project will not increase flooding potential because it will not modify the tidal entrance at Tubbs Inlet or Jinks Creek's confluence with the AIWW." **The concern for a potential increase risk of flooding is not due to the tidal entrance at Tubbs or the confluence with the AIWW. The issue is storm surge water, from the Atlantic Ocean, during storms and hurricanes entering Tubbs Inlet, then Jinks Creek, followed by the PNAs and AIWW. After the storm, this storm surge water must get back out to the ocean. Will all this**

surging water make a left hand turn when it approaches the east end of Sunset Beach to enter Tubbs Inlet or will some of it overwash onto Sunset Beach? Will a 5 foot deep channel instead of a 2 foot channel concentrate more surging water? Using a computer model Moffatt and Nichol says a 5 foot navigational channel will not increase the risk of flooding and erosion. However, using the same model but adding additional input data three independent academic scientists (Pietrafesa, Bao and Gayes) disagree. See the attached document. At a Sunset Beach Council Meeting Mr. Neal was asked to explain this discrepancy and said he could not!

Richard Hilderman, Ph.D.

From: Brad Moock
To: DEQ_DCMComments
Subject: [External] Sunset Beach Variance
Date: Thursday, December 26, 2019 8:59:32 AM

We want to voice our support for the depth variance request for South Jinks Creek. This area has rapidly filled in and is close to cutting off all access to the Bay waterfront owners. By granting this variance to the already approved dredging, the water will have improved flow and enable navigation for a longer period (until the next dredging cycle).

Thank you

Brad and Nina Moock
415 Marlin Street
Sunset Beach, NC

John & Linda Morgan
4600 Esherwood Lane
Charlotte, NC 28270
704-771-9004

Braxton Davis
Director
NC Division of Coastal Management
400 Commerce Avenue
Morehead City, NC 28557

Dear Braxton Davis:

We are in the process of designing and building a home in Ocean Club Estates on Riverside Drive in Sunset Beach and thus would be affected by the proposed dredging of Jinks Creek and will soon be permanent residents of Brunswick County. We want to put on the record that we are fully in support of the proposed dredging and to the proposed variance.

Sincerely,

John Morgan

From: David Rucker
To: DEQ_DCMComments
Cc: Davis, Braxton C
Subject: [External] Sunset Beach Variance
Date: Saturday, January 4, 2020 10:47:42 AM

North Carolina Coastal Resources Commission,

As a full-time resident of Sunset Beach island and a canal waterfront property owner, I wish to strongly voice my support of the town of Sunset Beach's CAMA Variance Request to increase the dredging depth.

If the variance is not approved, the dredging project effectiveness and longevity will decrease. The town of Sunset Beach could expect to be dredging a lot more frequently to maintain navigation. Over time the project costs will certainly increase due to repetitive mobilizations.

All the Best,

David Rucker
1509 North Shore Drive
Sunset Beach, NC 28468

From: Greg Rich
To: DEQ_DCMComments
Subject: [External] Sunset Beach Variance
Date: Saturday, January 4, 2020 12:24:31 PM

To Whom It May Concern:
As a new Sunset Beach full-time resident, I have been making an effort to get up to speed about the dredging issues facing the town. My wife and I have chosen to make our new home on the marsh side of the island. I am very concerned about the Sunset Beach Variance Application requesting permission to dredge South Jinks Creek to -5 feet as opposed to the -2 feet previously approved by DCM. My primary concerns are with the potential impacts of flooding and damage to the marsh ecosystem by degrading the habitat for juvenile fish and shellfish with the deeper dredging depths. My understanding is that while the Moffatt and Nicol engineering firm's computer model predicts no future impacts on erosion control and flooding, competing models which take into account historical data available on Jinks Creek, indicate the likelihood of negative flooding and erosion impacts with increasing levels of disturbance. Similarly, greater disruption of South Jinks Creek will negatively impact the nearby aquatically connected Primary Nursery Areas due its effects on sediment load and the stirring up of heavy metals inevitable in the dredging process.

I understand the desire by, what appears to me to be, the relatively small boating portion of this community to maintain navigable routes to the Intercoastal Waterway. Having spent my career as a psychologist, I also know that if you provide the means to use bigger and bigger watercraft, human nature will fill those lanes with larger and larger boats. At what point do we need to take other concerns for quality of life into account by saying, "Enough."

Respectfully submitted,
Greg Rich, Ph.D.

From: laura mahoney
To: DEQ_DCMComments
Subject: [External] Oppose Variance
Date: Sunday, January 5, 2020 11:56:15 AM

DCM Staff,

As reported by many scientist and valued Federal and State Staff, approving the variance will have severe environmental consequences to the echo system of both Jinks Creek and Tubbs' Inlet. Moreover, approving this variance has no direct benefit knowing boats will still be unable to navigate this environmentally sensitive tidal creek during low tide. Scientists have predicted increase flooding, erosion and the environmental destruction of the PNA functions in this area. Please so "no" to greed.
Rich Cerrato
Sunset Beach

From: Edwin W Janes
To: DEQ_DCMComments
Subject: [External] Sunset Beach Variance
Date: Sunday, January 5, 2020 1:58:31 PM
Attachments: Pietrafesa et al update document.docx

TO: CRC 4 January, 2020
Ref: Sunset Beach Variance

Dear Sir,

The citizens of Sunset Beach were not afforded the opportunity to read and comment on the Variance Request application **BEFORE** it was forwarded to The CRC. Authored by the Town Attorney and Moffat & Nichol, the application, after being sent to you, was finally posted on the Town web-site.

With appreciation for the task before you, I respectfully ask you to consider the following issues and concerns about **miss-representations** as presented in the Town's application:

First. The Town's application states ***" Portions of the site have a documented history of being maintained since approximately 1985 "***

This does not apply to the proposed dredging of 1700 feet of the Southern part of Jinks Creek. In 1968-69 Tubbs Inlet was moved from its previous location on the East end of Sunset Beach to its present location. At that time, the Southern part of Jinks Creek which joined the Eastern Channel behind Ocean Isle also had to be moved in order to remain connected to Tubbs Inlet. Prior to CAMA restrictions, the developer did this. Is this, therefore, maintenance dredging? By definition this is not maintenance dredging as suggested in the application. There is no evidence presented that there is a history of South Jinks Creek "being maintained" by dredging. Nature has and continues to this day to maintain Jinks Creek. So the above application statement only applies to the feeder canal and finger canal system. The Bay Area has never been maintenance dredged.

Second. The Town's application states ***"The Town, as Petitioner, has requested the variance in an attempt to preserve the ecological benefit provided by the shellfish and juvenile fish habitat present in N. Jinks Creek."***

What evidence does the Town have to support this claim? How does dredging the 1700 foot S. Jinks Creek to 5 feet instead of to 2 feet preserve the ecological benefits in N. Jinks Creek? As posited by Coastal Scientists it will have a negative impact because it will increase the sediment load deposited in N. Jinks Creek. *(see Pietrafesa document attached)*

Since Jinks Creek, which has never been dredged and bisects a PNA healthy ecosystem on either side, **it is indeed noteworthy** that the Town as a variance applicant petitions ***"…..in an attempt to preserve the ecological benefit provided by the shellfish and juvenile fish habitat present in N. Jinks Creek.***"
Since the above statement by the Town suggests a healthy environmental respect and acknowledgement of the PNA ecosystem bisected by Jinks Creek which has never been

dredged, why would we want to now dredge a healthy, tidal creek ? Let alone to 5 feet? It's a creek not a river.

Third. The Town's application states ***"Additionally, the project will not increase flooding potential because it will not modify the tidal entrance at Tubbs Inlet or Jinks Creek's confluence with the AIWW."*** The obvious and ever-present storm- validated concern for increase in flooding is not based, as stated above, on the "tidal entrance" at Tubbs Inlet or the "confluence" of Jinks with the AIWW. The reality is that storm surge water from the Atlantic Ocean, as with any barrier island, enters the inlet, services the PNA marshes via Jinks Creek which bisects them, and continues on to the AIWW. When this surge volume of water finds its way back to the ocean via Jinks Creek it must make a left hand turn towards Tubbs Inlet. I have already seen massive erosion at Palm Cove at this turn and I have the pictures to prove it. How does the applicant's requested 5 foot variance depth not increase the erosion component ? Others have documented that Moffat & Nichol, using a computer model, are on record as saying a 5 foot (originally 6-8 feet) will not increase the risk of flooding and erosion. But scientists Gayes, Bao, and Pietrafesa disagree and when *asked to explain this at a SSB council meeting, Mr. Robert Neal could not. (see Pietrafesa document attached)*

Fourth. The Town's application states ***"The hardships in this case result from the fact that Jinks Creek serves as a primary navigation route between the Atlantic Ocean and the AIWW and also provides a beneficial shellfish and juvenile fish habitat similar to a Primary Nursery Area (PNA).***"
This is an extraordinary statement to make ! As a life-long mariner and sailor with 45 years of experience at Sunset Beach, and an island homeowner and taxpayer for over 35 years, I have yet to witness the use of a small, fragile, creek known as Jinks- as a ***"primary navigation route between the Atlantic Ocean and AIWW"***. Without evidence, this is a total, self-serving miss-representation of reality. Where is the Town documentation that supports this statement and its purported "hardships" ? Jinks is a small creek not a river. Recreational boaters know the difference and have successfully navigated Jinks at or near low tide for the 45 years I've been at Sunset . It has never been used to access the Atlantic Ocean; its far too dangerous. Boaters use the Little River Jetty for this purpose.
Again in this application statement, the reference to Primary Nursery Area in association with Jinks Creek and its proposed dredging suggests a contradiction in terms if not an arrogant hypocrisy.

I would ask that you carefully review the verbiage and intent of the Town's, (my town), application for a depth variance and deny it for unfounded and undocumented generalizations about navigation on a small, delicate, very unique, tidal creek.

Respectfully,
Ted Janes
403 37th Street
Sunset Beach

302 Roling Knoll Dr.
Bel Air, MD 21014

From: Annette Smith
To: DEQ_DCMComments
Subject: [External] Sunset Beach Variance
Date: Monday, January 6, 2020 3:40:15 PM

We support the variance request.

Annette & Charles Smith
502 E Main St.

From: Bill Bradford
To: DEQ_DCMComments
Subject: [External] Sunset Beach Variance IN FAVOR
Date: Monday, January 6, 2020 9:15:47 PM

As a taxpayer and a full time resident on the island of Sunset Beach, I am FULLY IN FAVOR of the VARIANCE. Thank you.

Bill Bradford
416 Marlin Street

From: R S
To: DEQ_DCMComments
Subject: [External] Sunset Beach Dredging Variance Request
Date: Monday, January 6, 2020 5:02:38 PM

I appreciate the opportunity to comment on the Sunset Beach dredging project.
It's unfortunate this project was not completed years ago to prevent the deterioration of our waterways, estuaries and property. This project should not be in question.

The town's guiding documents as written by the Town Council and approved by the citizens are very clear.
Included in the town's goals are the Key Goals of CAMA " Maintain, protect and where possible enhance water quality in all coastal wetlands, rivers, streams, and estuaries." This is accomplished thru the proper flow and flushing of our water systems. As stated in the Sunset Beach Land Use Plan " The Town will support those projects which will increase the productivity of the estuary such as oyster reseeding or dredging projects which will increase the flushing actions of tidal movements in Jinks and Blane Creeks, and any other creeks or water bodies which may have the potential for shellfish harvesting."

Furthermore, not to proceed with this project will most certainly promote the further decline in town revenues and growth to support town improvement projects.

Mr Waters, a highly respected business owner and resident very accurately described this decline.

> "Without a navigable Jinks Creek, the canal and bay property values will continue to lag behind neighboring island
>
> properties. For the past 12 months ending March 30, 2018, the average selling price of a Sunset Beach canal home was
>
> 25.5% ($154,671) less than those at Ocean Isle Beach. WOW! In addition to the huge price discrepancy, the average time
>
> of selling a canal home on Sunset Beach was 33% more compared to Ocean Isle. Unfortunately, the situation is only going
>
> to worsen if the Town does not vote in favor of the comprehensive dredging project. Fully navigable waters and access to
>
> the Intracoastal Waterway are major factors for the typical waterfront home buyer. "

> Eddie Walters
>
> Managing Partner

> Sunset Properties, Inc.

I strongly endorse a comprehensive dredging project that will provide fully navigable waters and access to the intracoastal Waterway and comply with the town's guiding documents to "support those projects which will increase the productivity of the estuary such as oyster reseeding or dredging projects which will increase the flushing actions of tidal movements in Jinks and Blane Creeks, and any other creeks or water bodies which may have the potential for shellfish harvesting."

Ron Smith
411 6th St
Sunset Beach

From: Joe Singletary
To: Davis, Braxton C
Cc: DEQ_DCMComments
Subject: [External] Sunset Beach Dredging
Date: Monday, January 6, 2020 6:28:19 PM

January 6, 2020

Dear Dr. Davis,

I am writing in support of dredging the finger canals, feeder canal, Tubbs Inlet, North and South Jinks creek to a depth of 5 feet below low tide levels here at Sunset Beach.

I've lived on a canal here since 1998. Currently my 14 foot Jon boat is unable to navigate the end of my canal or Jinks except within 2 hours of high tide. It is a major safety issue for me to be able to make it to and from from the ICW without running aground. I'm not a marine biologist, however I do recognize that there is also a smell at low tide now and that the fishing of this area has fallen off significantly. I can't help but think it's all due to the lack of fresh water from the ocean being able to flow in and out due to the build up of sand. I also believe that a lot of the beach nourishment being done over the years at Ocean Isle Beach has caused some of it. The sand they are using is courser and different in color. You can actually see it mixed in with our normal sand on the beach and Inlet here at Sunset Beach.

Please help us restore the health and navigability of our waterways by approving the variance for dredging 5 feet below low tide.

Sincerely,

Joe Singletary
431 Sailfish St
Sunset Beach, NC. 28468

From: Davis, Braxton C
To: Brian
Cc: Richardson, Ken
Subject: Re: [External] Inlet Hazard Area
Date: Tuesday, January 7, 2020 9:19:46 AM

Good morning Brian. Yes, we have scheduled a workshop at Holden Beach Town Hall on Thursday, January 16th at 2pm. We've added this information to our website (https://files.nc.gov/ncdeq/Coastal%20Management/documents/PDF/Public-Hearing-Schedule-Inlet-Hazard-Area-Update-2019--Jan2020v3.pdf). We are about to do a press release/media advisory - I'm not sure if or how the Town has advertised this additional public meeting.

> Public Hearing Schedule Inlet Hazard Area Update 15A NCAC 7H .0304, .0306, .0309,
>
> Public Hearing Schedule Inlet Hazard Area Update 15A NCAC 7H .0304, .0306, .0309, .0310 January 7, 2020 3:00 p.m. January 8, 2020 10:00 a.m. January 14, 2020 11:00 a.m.
>
> files.nc.gov

Please let me know if you need anything further,
Braxton

****

Braxton Davis
Director, Division of Coastal Management
NC Department of Environmental Quality
Morehead City, NC 28557
(252) 808-2808 x202

From: Brian <vccbrian@atmc.net>
Sent: Monday, January 6, 2020 6:37 PM
To: Davis, Braxton C <Braxton.Davis@NCDENR.Gov>
Subject: [External] Inlet Hazard Area

Braxton,
I was following up with you to see if any further meetings were scheduled in the near future and if so, when?
Thank you,
Brian Murdock
Town of Holden Beach

From: Wade Harris
To: DEQ_DCMComments
Cc: Davis, Braxton C
Subject: [External] Sunset Beach Dredging Project
Date: Monday, January 6, 2020 6:29:44 PM

Hello,

We are in support of the 5 foot variance as proposed by the Sunset Beach town council. This Is critical to the Bay Area at Sunset Beach for boating and other activities.
Please get this to pass. As a home owner on the Bay this is very important to me and my family.

Thank you very much,

Wade Harris

From: Ginny Taylor
To: DEQ_DCMComments
Subject: [External] Comments re Variance for Dredging SSB
Date: Monday, January 6, 2020 5:49:22 PM

Hello,

From the research I have done regarding this decision, it makes sense to dredge the full 5 ft. The deeper the better in terms of less ongoing maintenance and future dredging. Two feet will not be deep enough to solve this long overdue issue.

We have a home on the island and on the canal and we have been watching our dock and small boats be stuck in the mud for many years. We need our boating capabilities back.

Ginny and Don Taylor
433 Sailfish St.
Sunset Beach, NC 28468

From: Davis, Braxton C
To: kharris72@triad.rr.com
Subject: Re: [External] Sunset Beach dredging variance
Date: Tuesday, January 7, 2020 9:21:32 AM

Mr. and Mrs. Harris,
Thank you for your email. We will include your comments in the official record for consideration by the NC Coastal Resources Commission.

Sincerely,
Braxton

****

Braxton Davis
Director, Division of Coastal Management
NC Department of Environmental Quality
Morehead City, NC 28557
(252) 808-2808 x202

From: kharris72@triad.rr.com <kharris72@triad.rr.com>
Sent: Monday, January 6, 2020 8:16 PM
To: OCMcomments@ncdenr.gov <OCMcomments@ncdenr.gov>
Cc: Davis, Braxton C <Braxton.Davis@NCDENR.Gov>
Subject: [External] Sunset Beach dredging variance

We fully support the variance proposed by the Sunset Beach town council.
We have been waterfront property owners at Sunset Beach for 29 years. We now own on the Bay near the South Jinks Creek.
We have seen may boaters stuck in this area and have rescued some ourselves.
Many recreational boaters and fishermen routinely use this area. It is not safe and nearly impassible around mid and low tide.
I would estimate 95 percent of boaters are not property owners but other boaters who enjoy the area.
Why dredge to -2 feet and have to repeat the process in a few short years. Let's dredge to -5 feet despite the protests of a very vocal few who have fought this badly needed project every step of the way. The most effect thing and long term most cost effective thing to do is to do it right when it is done!
Thank you!
Kelly and Leigh Harris

From: Barry Wishon
To: DEQ_DCMComments
Cc: Davis, Braxton C
Subject: [External] Sunset Beach Dredging
Date: Tuesday, January 7, 2020 9:03:58 AM

Hi,
My wife and I are canal lot owners at Sunset Beach. We are very much in favor of the dredging and the variance. We have owned property here for 20 years and we have seen first hand how the dredging improved the boating access and water quality.
Thanks,
Barry Wishon
919 349 8289

From: Davis, Braxton C
To: Monica Vogel
Subject: Re: [External] Dredging Variance Sunset Beach
Date: Tuesday, January 7, 2020 8:53:29 AM

Ms. Vogel,

Thank you for your comments. We will include your letter in the official record for consideration by the NC Coastal Resources Commission.

****

Braxton Davis
Director, Division of Coastal Management
NC Department of Environmental Quality
Morehead City, NC 28557
(252) 808-2808 x202

From: Monica Vogel <rubybegonias@att.net>
Sent: Tuesday, January 7, 2020 1:03 AM
To: DCMCComments@ncdenr.gov <DCMCComments@ncdenr.gov>; Davis, Braxton C <Braxton.Davis@NCDENR.Gov>
Subject: [External] Dredging Variance Sunset Beach

Monica Vogel
Bleu
720 Sunset Blvd. N.
Sunset Beach, NC 28468
910-579-5628

From: Denise Williams
To: DEQ_DCMComments; Davis, Braxton C
Subject: [External] Sunset Beach Variance
Date: Wednesday, January 8, 2020 11:29:47 AM

Good morning,

I am writing to give my support for the 5-foot variance that is being requested by Sunset Beach. I'm sure you are aware that the Town Council has recently been changed. My husband is a newly elected councilperson. While campaigning it became clear that the majority of Sunset Beach Citizens and Visitors absolutely support dredging to the maximum depth. Please grant the variance so that we can all finally put this behind us and proceed at the next opportunity with this project.

Thank you!

Denise Williams

Braxton Davis, Director
NC Div. Coastal Management
400 Commerce Avenue
Morehead City, NC 28557

Jan. 6, 2020

Dear Mr. Davis:

I am writing to protest the application by the Town of Sunset Beach for a variance to the dredging project on the island at Sunset Beach.

I am a retired professor of geology and have owned property on the island of Sunset Beach for over 30 years. During my 30+ years I have carefully watched the movement of sand along Sunset Beach.

People disrupted the natural sand flow along Sunset Beach by relocating Tubbs Inlet. Inlet relocation promoted development on "made land" and construction of canals. Canal construction at Sunset Beach is unique in North Carolina, the canals connect to a tidal creek (Jinks Creek) for their outlet. All of the other canals constructed on barrier islands in North Carolina have outlets to the Atlantic Intarcoastal Waterway. The lack of a viable drainage outlet for the Sunset Beach canals is responsible for the shoaling cited by the Petitioners.

The proposed variance requests a deepening of the permitted dredging depth (-2ft MLW). The application sites several justifications for the request. Comments below are directed to the Petitioner's response to the CRC criteria as given in Attachment 3 - The Town's Position.

I. **Will strict application of the applicable development rules, standards, or orders issued by the Commission cause the petitioner unnecessary hardships ? If so, the petitioner must identify the hardships.**

Petitioner's response: "strict application of the rule in question would prevent the Town, as Petitioner, *from maintaining the navigable areas...*"

The navigation of the Jinks Creek channel remains unchanged. Small craft can navigate through Jinks Creek to the canals during some periods of the tidal cycle. This has always been the case.

What has changed is the Petitioner is now requesting deeper water access from the canals. But where does this access go ? The Petitioner states that none of the potential outlets for the canals (N. Jinks Creek, Tubbs Inlet, Eastern Channel) provide viable (deep) access out of the project area. The Petitioner also acknowledges that deepening any of these outlets is not practical. The Petitioner requests deepening "navigational" channels that go nowhere.

I., cont.
Petitioner response: "the connecting channel at Shallotte Inlet, Lockwoods Folly Inlet, Carolina Beach Inlet, Mason Creek, Topsail Creek, and Cedar Bluff Cut are all authorized to a depth equal or greater (deeper) than -6-ft MLW...."

The cited locations are not comparable to the proposed project area.

II. Do such hardships result from conditions peculiar to the Petitioner's property, such as the location, size, or topography of the property ? Explain.

Petitioner's response: " Jinks Creek serves as a primary navigation route between the Atlantic Ocean and the AIWW..."

No one except the most aggressive developer would consider Jinks Creek a primary navigation route. This was the problem with construction canals that connect to Jinks Creek, it is not a viable navigation route and proposed dredging will not change this fact.

III. Do the hardships result from actions taken by the Petitioner ? Explain.

Petitioner's response: No

The "hardships" are based on a poorly designed canal system that the Petitioner now includes within their area of responsibility. The original developer built a canal system that would never be permitted today and the Petitioner assumes responsibility for the canals. The Petitioner is responsible for the "hardship".

Petitioner's response: "Portions of the site have a documented history of being maintained since approximately 1985..."

The access channels (N. Jinks Creek, Tubbs Inlet, Eastern Channel) from the project area have never been maintained within the cited timeframe. Only the canals-to-nowhere show any history of maintenance.

IV. Will the variance requested by the Petitioner (1) be consistent with the spirit, purpose, and intent of the rules, standards or orders issued by the commission; (2) secure the public safety and welfare; and (3) preserve substantial justice ? Explain.

Petitioner's response: Yes.

No. The deepened canals-to nowhere will not drain adequately. This is the reason the Commission established the drainage rule.

IV., cont.
Petitioner's response: "The proposed variance will secure the public's safety, health, and welfare of the recreational boaters..."

No. The proposed project gives boaters a bit more water in the canals to float their boats. It does nothing to improve navigational safety. Canals-to-nowhere do not promote safety.

Petitioner's response: " the project will not increase flooding potential..."

This is not true. Increased flooding associated with storm surge is the real issue. Storm surge currently floods through Jinks Creek/Tubbs Inlet. Shoals in the Bay Area slow down this storm surge. Removal of even a portion of the Bay Area shoals will promote higher rates of storm surge flooding through Jinks Creek/Tubbs Inlet. Inlet relocation is a possibility during periods of storm surge flooding.

In summary, the canals at Sunset Beach are unique in North Carolina. The canals do not connect to a viable outlet. The proposed project does nothing to change this. Instead the proposed deepening will increase the threat of storm surge flooding to an already dangerous inlet hazard area. The requested variance should not be granted.

Thank you for your consideration.

Sincerely,

Sam Swanson
29 Hunters Lane
Hendersonville, NC 28791

From: JAMES DAVIS
To: DEQ_DCMComments
Subject: [External] Sunset Beach Variance.
Date: Wednesday, January 8, 2020 3:24:17 PM

I support the variance changing the dredging depth to -5 feet. It just makes sense to do it right and make it all navigable.

Jim Davis.

From: Jessica Harris
To: DEQ_DCMComments
Subject: [External] 5 foot variance at sunset beach
Date: Wednesday, January 8, 2020 9:15:47 AM

Hello,

My family and I have enjoyed vacationing on the bay at sunset beach for many summers now. We are in support of the 5 foot variance for the dredging project so that we can continue to enjoy the bay. Thank you!

Jessica

From: Davis, Braxton C
To: Ann Harrell
Subject: RE: [External] Sunset Beach Dredging
Date: Friday, January 10, 2020 8:30:09 AM

Thank you for your email. Your comments will be included in the official record for consideration by the NC Coastal Resources Commission.

Sincerely,
Braxton

****

Braxton Davis
Director, Division of Coastal Management
NC Department of Environmental Quality
Morehead City, NC 28557
(252) 808-2808 x202

-----Original Message-----
From: Ann Harrell [mailto:aineeharrell@gmail.com]
Sent: Thursday, January 9, 2020 8:56 PM
To: Davis, Braxton C <Braxton.Davis@NCDENR.Gov>
Subject: [External] Sunset Beach Dredging

Dear Mr. Davis ,

I am writing this letter to you in an effort to encourage the dredging at Sunset Beach to a level of five feet below low tide. I owned a home on one of the canals for 30 years. I had the opportunity to experience boating and other water recreational activities and it is crucial to have adequate water in the canals and feeder canal as well as Jinks Creek and Tubbs Inlet in order to navigate to the ICW and the Ocean. It seems futile to go two feet below low tide since the equipment will already be in operation. Going two feet will make it necessary to dredge again in a shorter length of time which will be much more costly in the long term. Sunset Beach is such a desirable area and access to the open waters is crucial to our tourist and residents. Please consider five feet depth at low tide in the dredging decision. Ann Harrell 141 Talbot Ct. Sunset Beach N.C. 28468

From: Richard Allen Dickey
To: DEQ_DCMComments
Subject: [External] SUnset Beach Variance
Date: Thursday, January 9, 2020 2:27:34 PM

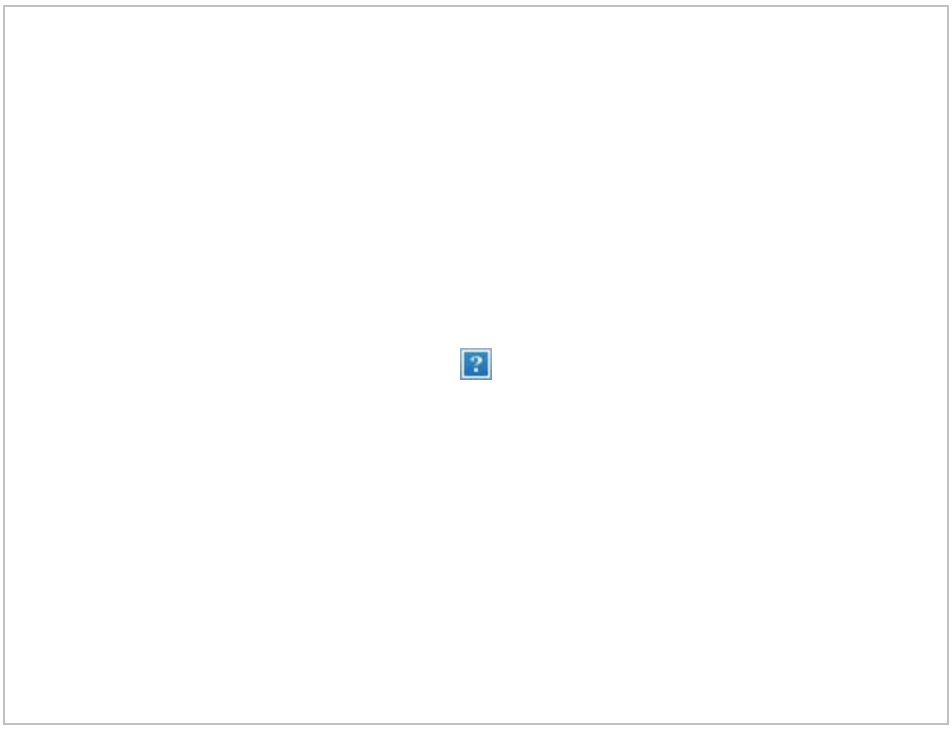
As property owners on the beach at Sunset, we wish to express our opposition to the variance application which would dredge SJC to -5 feet instead of to -2 feet. This variance would increase the risks of flooding and unnecessary damage to the beach property and is unjustified. We prefer you reject this variance request.
Richard and Margie Dickey
Owners at 707 W Main on the island

Sent from my iPhone

From: jtrovato@atmc.net
To: DEQ_DCMComments
Subject: Re: [External] Concerns regarding dredging variance Sunset Beach
Date: Saturday, January 11, 2020 10:52:22 AM
Attachments: Screen Shot 2020-01-11 at 10.48.00 AM.png

Ms Simmons, please include this photo along with my comments. This is on Tubbs Inlet connecting to S Jinks Creek. We already have property washing away there (on Palm Cove). I believe this just happened over the past few weeks. Extensive dredging will increase the velocity of the water flow of Jinks Creek could acerbate erosion along the fragile shifting sands of our barrier island.

Thank you, Jacqueline Trovato and James Thomas, Jr.



> On Jan 9, 2020, at 4:21 PM, DEQ_DCMComments <DCMComments@ncdenr.gov> wrote:
>
> Mr. and Mrs. Trovato,
> Thank you for your email. We will include your comments in the official record for consideration by the NC Coastal Resources Commission.
> Respectfully,
> Christy Simmons
> Public Information Officer
> Division of Coastal Management
> NC Department of Environmental Quality
> Morehead City, NC 28557
>
> **From:** jtrovato@atmc.net <jtrovato@atmc.net>

Sent: Thursday, December 19, 2019 9:31 AM

To: DEQ_DCMComments <DCMComments@ncdenr.gov>

Subject: [External] Concerns regarding dredging variance Sunset Beach

My husband (James C. Thomas, Jr..) and I are concerned about the variance request to dredge S. Jinks Creek only to the depth of North Jinks Creek (thought to be about 2 feet at MLW).

According to simulations by three respected coastal marine scientists, creating such a high volume basin will likely increase the risk of flooding at the east end of Sunset Beach (where we reside). The flawed simulations performed by Sunset Beach's engineering firm (Moffat-Nichol) have been shown to have underestimated tidal flow through Tubbs Inlet and thus to underestimate the risk of flooding.o

Thank you for your consideration of our concerns.

Jacqueline M. Trovato

<image001.png>

From: jtrovato@atmc.net
To: DEQ_DCMComments
Subject: Re: [External] Concerns regarding dredging variance Sunset Beach
Date: Saturday, January 11, 2020 5:01:12 PM
Attachments: IMG_5416.jpeg
IMG_5419.jpeg
IMG_5418.jpeg
IMG_5408.jpeg
IMG_5407.png
IMG_5412.jpeg
Screen Shot 2018-09-16 at 1.21.01 PM.png

Here are some more photos of the S Jinks Creek area adjacent to Tubbs Inlet...

On Jan 9, 2020, at 4:21 PM, DEQ_DCMComments <DCMComments@ncdenr.gov> wrote:

Mr. and Mrs. Trovato,
Thank you for your email. We will include your comments in the official record for consideration by the NC Coastal Resources Commission.
Respectfully,
Christy Simmons

Public Information Officer

Division of Coastal Management
NC Department of Environmental Quality
Morehead City, NC 28557

From: jtrovato@atmc.net <jtrovato@atmc.net>
Sent: Thursday, December 19, 2019 9:31 AM
To: DEQ_DCMComments <DCMComments@ncdenr.gov>

Subject: [External] Concerns regarding dredging variance Sunset Beach

My husband (James C. Thomas, Jr..) and I are concerned about the variance request to dredge S. Jinks Creek only to the depth of North Jinks Creek (thought to be about 2 feet at MLW).
According to simulations by three respected coastal marine scientists, creating such a high volume basin will likely increase the risk of flooding at the east end of Sunset Beach (where we reside). The flawed simulations performed by Sunset Beach's engineering firm (Moffat-Nichol) have been shown to have underestimated tidal flow through Tubbs Inlet and thus to underestimate the risk of flooding.o
Thank you for your consideration of our concerns.
Jacqueline M. Trovato

From: Lynn Nesmith
To: DEQ_DCMComments; MacPherson, Tara; Davis, Braxton C
Subject: [External] Variance Request - Sunset Beach dredging
Date: Saturday, January 11, 2020 4:20:11 PM
Attachments: image0.png
image3.jpeg
image1.jpeg
image8.jpeg
image7.jpeg
image5.jpeg
image2.jpeg

Thank you for your service to the state of North Carolina and your efforts to protect our fragile environment.

I am writing to ask you to deny the Sunset Beach variance request to increase the deep of the South Jinks Creek dredging from two to five feet.

When will man learn that it's not nice to mess with Mother Nature?

I am a native of Eastern North Carolina and spent my summers on Sunset Beach starting in 1959. There is no way to predict the impact of dredging Jinks Creek to a depth of five feet. I was around in the 1960s when the East End was eroding at an alarming rate. Witnessing that erosion as a child instilled in me a life-long respect for the power of Mother Nature.

I currently own a home at 210 Shoreline Drive East along the Intracoastal Waterway and the terminus of North Jinks Creek in Sunset Beach.

Today January 11, 2020, I walk along the far east end of Sunset Beach following the ever-changing arc of Tubbs Inlet and around the back side of the island along South Jinks Creek covering the stretch Palm Cove that is within an Inlet Hazard Area.

The natural migration of Jinks Creek/Tubbs Inlet is cutting into the back side of Palm Cove and eroding this precarious strip of narrow land at an alarming rate.

As you know, this land was underwater in the 1960s before Mr. Mannon Gore relocated Tubbs Inlet. I fear dredging to five feet will significant increase the velocity of the tidal water flow of Jinks Creek. This manmade engineered disruption to the natural tidal forces will acerbate erosion along the fragile shifting sands this Inlet Hazard Area of a barrier island on a twice daily basis.

Changing the depth of the naturally meandering

Jinks Creek by dredging to a depth of five feet will surely affect the amount of water and strength of the currents.

Attached please find These photos taken along South Jinks Creek on January 11, 2020.

Screen shot of the approximate location of these photos. My feet were in the water and it was two hours past high tide.

Palm Cove fire Hydrant.

I'm sure sure when the original developer installed the hydrant and how far it was from the water's edge, but I assume there is some minimal distance for utilities.

Today I saw that at least two of the palms planted in Palm Cove had fallen into a Jinks Creek and a third one is barely hanging on.

I don't have documentation but I seem to recall those palms were at least 15-20 yards from the edge of Jinks Creek at high tide ten years ago. The private road is currently less than 5 feet from the scarf / eroded shoreline at some points. I can't imagine the developers placed the road so close to the water.

With South Jinks Creek eroding so rapidly and dramatically into this narrow strip of land, it seems foolish to allow a variance that will most likely acerbate the erosion of Palm Cove.

There are already numerous examples of illegal dumping of riffraff and rocks along the shoreline of Jinks Creek, obviously placed there to slow down the erosion. Isn't that prohibited in an Inlet Hazard Zone?

Does your governing authority want to take a chance that in a few years the owners of Palm Cove will be clamoring to build seawalls or other hard armoring along this fragile stretch of Inlet. And demanding public funding since you authorized the variance.

The maintenance dredging has been approved and will move ahead. Please limit the possibility of even further erosion and more manmade manipulation. Please deny the variance for the five foot depth.

Sunset Beach has been blessed for more than half a century with an unprecedented accretion of sand. Please don't disturb the natural processes that have created this wonderful place.

Thank you for your consideration. Please feel feel to contact me if you have questions or comments.

Sincerely,

Lynn Nesmith

210 Shoreline Drive East
Sunset Beach, NC
850.814.0210

Lynn Nesmith
30A Living
850.814.0210

From: Lynn Nesmith
To: Davis, Braxton C; DEQ_DCMComments
Subject: [External] Variance Request Comment - Sunset Beach Dredging Project - Jan 2020
Date: Saturday, January 11, 2020 2:41:39 PM

To whom it may concern:

Thank you for your service to the state of North Carolina and your efforts to protect our fragile environment.

I am writing to ask you to Deny the variance request to increase the deep of the South Jinks Creek dredging from two to five feet.

Sunset Beach has been blessed for more than half a century natural accretion of sand. Please don't disturb the natural processes that have created this wonderful beach.

The Sunset Beach oceanfront is a unique stretch of beach. Unlike most islands along the east coast, Sunset Beach receives an almost continuous flow of sand, deposited consistently along the entire oceanfront strand. There has never been a need for renourishment, unlike the significant erosion problems encountered on neighboring islands. Now the Town of Sunset Beach has requested permission to deposit "compatible" sand from the Jinks Creek areas to the oceanfront, altering the quality and condition along a section of beach enjoyed by locals and tourist.

It is impossible to predict how the flow of natural sand would be altered by this Unnatural engineering feat.

Proponents of dredging have argued the deposited sand will be moved naturally away, eventually returning to a similar profile as now. There is scientific back-up or common sense reasoning that this will occur. Ocean currents, winds and rain/storms will surely affect the shape of the berm, but it is impossible to predict that how it will affect accretion on this unique

From: Barry Lentz
To: DEQ_DCMComments
Cc: richard Hilderman; Jan & Butch Harris; Barry R Lentz
Subject: [External] Sunset Beach Variance
Date: Sunday, January 12, 2020 2:54:03 PM
Attachments: clip_image001.gif
barrysboat3.jpg

To Whom It May Concern:

I write to comment on the Sunset Beach Variance application. Several claims made in the application are either false or quite questionable.

1} The Town states that "The hardships in this case result from the fact that Jinks Creek serves as a primary navigation route between the Atlantic Ocean and the AIWW…". The northern portion of Jinks Creek connects to the AIWW, not the southern portion that the Town proposes to dredge. South Jinks Creek empties into the Atlantic Ocean at Tubbs Inlet, which is not safely navigable. It is a designated an "inlet Hazard Zone" whose channel is unstable. Very few if any local boaters use this for Ocean access for the simple reason that both this instability and strong currents make it unsafe. In 2017, the town justified its 2016 proposal to dredge all of Jinks Creek as such: "Jinks Creek is included to provide a navigable connection from the Bay Area and Feeder Canal to the AIWW. The design assumes the Tubbs Inlet complex does not provide a reliable or safe passage for connecting with the Atlantic Ocean or the AIWW. Therefore, Jinks Creek was included to provide vessels within the Bay Area or Feeder Canal navigable access to the AIWW." After it became clear that the dredging of North Jinks Creek might have required an EIS because of its importance to the adjoining PNAs, the Town backed off this proposal and submitted the current (2018) proposal from which proposed dredging of North Jinks Creek was removed. If South Jinks Creek and Tubbs Inlet did not "provide a reliable or safe passage for connecting with the Atlantic Ocean" in 2016, how is it now a "hardship" to limit dredging South Jinks Creek to a depth that is not below the level of North Jinks Creek that feeds sensitive PNAs? Is the Town suggesting that dredging South Jinks Creek to –5ft will improve the navigability of Jinks Inlet? Exactly the opposite may be the case (see point {4} below).

2} The current proposal was permitted on October 29, 2019 with 31 Conditions to ameliorate significant concerns noted by NC DEQ. A major Condition was "Excavation shall not exceed -2 feet below the mean low water. In no case shall the depth of excavation exceed the depth of connecting waters." Granting this Variance would do just that.

North Jinks Creek is a natural tidal creek that is navigable by knowledgeable mariners even at low tide, as indicated by the following 2016 thread:

<!--[if !vml]-->  <!--[endif]--> **Access to Tubb's Inlet via ICW?**

Looking at google maps I'm not sure, but is there a way to fish Tubbs without going around through the ocean? Reliable way in and out or will I get stuck as soon as the tide drops?

08-04-2016, 01:31 P2

lilsahara

Member

Join Date: Jun 2013

Posts: 41

Likes: 0

Received 23 Likes on 4 Posts

<!--[if !vml]-->  <!--[endif]-->

You can get into tubbs from the waterway. The entrance is right before or right after Sunset bridge depending on which way you are traveling the waterway. There is a channel that is navigable even at dead low IF you know the channel. Any boat over 21 ft.is dicecy at best except high tide. I would try and catch someone going in and follow them, if your GPS tracks you'll be able to get in and out following your track, otherwise just pay attention to the people who know. 08-04-2016, 01:32 PM

#3

drivebyjustin

Member

Thread Starter

That's good news. It looks very dicey on the map. I'm in a 19 foot carolina skiff. Thanks for the reply. 08-04-2016, 03:21 PM

#4

saltfever

Senior Member

Join Date: Jun 2004

Posts: 2,264

Likes: 0

Received 42 Likes on 27 Posts

<!--[if !vml]-->  <!--[endif]-->

Your skiff is fine. We can make it in our 22bay boat. As the other post states the channel is tricky. Right side in then left right left , straight, oops Slow and careful. Mark your gps. Once in a ways it's not too bad. Careful near the houses. Study google maps at the last low tide photos. if the tide is ripping out watch the inlet as the current can be tough.

5

SeaLand

Senior Member

This thread indicates a channel that may be deeper than -2 ft at low tide, but the Town actually has no idea what the navigable depth of North Jinks Creek is, since it has never done the survey it promised to perform in its 2016 application for dredging the full length of Jinks Creek. The Town should not be granted a Variance to dredge South Jinks Creek below -2 ft until it completes mapping the depth of North Jinks Creek. This would unambiguously establish the appropriate depth to which South Jinks Creek might be dredged without violating CAMA regulations that forbid exposing North Jinks Creek to potential silt infill and pollution (15A NCAC 7H .0208(b)).

3} The Town also claims a hardship in that Jinks Creek "provides a beneficial shellfish and juvenile fish habitat similar to a Primary Nursery Area (PNA)." It is abjectly ludicrous to claim that dredging South Jinks Creek to depths below the level permitted by CAMA regulations would decrease the value to the Town of the PNAs that CAMA regulations are designed to protect, and further that this would create a hardship for the Town. The CAMA regulation in question is designed to protect natural creeks and PNAs from the pollution and sediment infill that deeper dredging promotes!

4} The Town equally ridiculously states "Additionally, the project will not increase flooding potential because it will not modify the tidal entrance at Tubbs Inlet or Jinks Creek's confluence with the AIWW." It is precisely because the proposed project will not modify Tubbs Inlet that dredging out a deep basin on the Island side of Tubbs Inlet presents a possibility of over-wash of properties on the west end of Sunset Beach Island following the types of severe storm surges that are common in this region of the Atlantic Coast. How is this added volume of tidal surge water to return to the Atlantic Ocean? If over-wash were to occur, the Town and its citizens could be held liable for improving the Tubbs Inlet channel to improve water exit after a storm surge. Town leaders have repeated stated they do not intend to maintain Tubbs Inlet. So where would this leave West-end property owners?

As you can see, the Town of Sunset Beach has not established a hardship associated with following CAMA regulations and does not even know to what depth dredging could occur to make it compatible with the natural depth of North Jinks Creek. Further it has not considered the very real possible hardships its actions may present to residents and property owners on the east end of Sunset Beach Island.

Thank you for your attention.

Barry R Lentz, Professor Emeritus UNC -Chapel Hill

Barry R. Lentz
Professor Emeritus Department of Biochemistry & Biophysics, UNC-CH
Director Emeritus, Program in Molecular and Cellular Biophysics, UNC-CH
HOME: 179 Tradescant Dr
Chapel Hill, NC 27517
uncbrl@gmail.com
home: 919-933-0484: mobile: 919-824-8807

From: 855mainave
To: DEQ_DCMComments
Subject: [External] Sunset Beach Dredging
Date: Sunday, January 12, 2020 4:59:11 PM

Dredging at a two foot Dept is stupid because it doesn't do anything to solve the problem. If you are going to spend all that money you need to do the job correctly. If you are going to dredge, what difference does it make to go three more feet? It changes nothing with regard to the environment. We need access to the ocean or the ICW. I don't get what the problem is. I live in NJ and we just dredged over 22 miles of ocean without half the concerns.
Get on with it. This has taken more than 4 years to resolve.
Tony DelDuca
1303 & 1606 Canal Dr.
Sunset Beach
908 309-1177

From: Lynn Nesmith
To: DEQ_DCMComments
Subject: [External] Variance Sunset Beach Dredging / Dumping of rocks in an Inlet Hazard Area / Potential liability to Sunset Beach
Date: Sunday, January 12, 2020 10:34:37 PM
Attachments: image7.png
image12.jpeg
image10.jpeg
image8.jpeg
image0.jpeg
image3.jpeg
image14.jpeg
image15.jpeg
image17.jpeg
image18.jpeg
image0.jpeg
image2.jpeg
image20.jpeg
image21.jpeg
image1.jpeg
image4.jpeg

To Whom It May Concern:

Although I sent comments on Friday, if possible I'd like to submit a second comment regarding the variance request for Sunset Beach. I hope that is ok.

This email provides additional photographs of the current situation at South Jinks Creek. I am opposed to the town's request for a variance to dredge 5 feet deep. I wanted you to be aware of the current situation as if January 12, 2020.

It is my understanding that dumping of rocks and introducing armaments are not allowed in an Inlet Hazard Area. I have no idea if the timing or who dumped this load of rocks along South Jinks Creek. I would imagine it would be difficult if not impossible to remove. That said, the inability to prosecute this action should not condone such behavior.

Blue dot is approximate location of dumped rocks.

These rocks extend more than ten feet into South Jinks Creek at high tide. Here's a photo taken Sunday January 12, 2020 at 10:35am appropriately two hour past high tide.
The size of the rocks/riprap are as large as 3-4 inches.
My foot to see scale of the rocks.

What government agency is authorized to watch over and try to prevent future dumping of illegal rocks or introducing additional illegal materials?

If these unnatural rocks and riprap extend to areas in the proposed dredging, could that cause issues since they wouldn't be "compatible" to beach sand? Has that been addressed?

Five years ago this area along South Jinks Creek was a beautiful stretch of sandy shore along Jinks Creek.
Drone photo from Summer 2016.

Note wide sandy shoreline, numerous palms, and the distance between the private road and shoreline.

Of the cluster of three palms north of the private road in the 2016 photo, two have already collapsed into the water. As of January 12, 2020, the last one is barely hanging on.

Today the area includes downed power lines, rusty survey poles, precarious public utilities, sharp-edged obstructions in the water, tangled sand fences, and trees falling into the creek. It's a big ugly mess. Can a developer "cut and run," leaving the taxpayers to clean up the mess? Granted Palm Cove is private property, but if dangerous objects fall into the water who is responsible?

The fire hydrant installed by the original developer extends over the water several feet beyond the natural scarf.

Sharp/edge pvc pipe and rusty sand fences are hazards for walkers in the wet sand along the shore and swimmers in Jinks Creek/ Back Bay.

All these hazardous objects in the Inlet Hazard Area appear to have been placed by the developer. Will the taxpayers of Sunset Beach be responsible for any liabilities for foreign objects protruding into Jinks Creek/ Back Bay?

On another liability topic as we move forward with dredging. What happens if the owners in Palm Cove start clamoring for protection against this dramatic erosion along the north side of Palm Cove.

I ask you to considered the potential liability to the town of Sunset Beach if once the dredging commences the Palm Cove owners blame the dredging for their erosion and demand some type of armament at taxpayers expense? Or worst reimbursement for lose of property?

Looking towards the future and hoping to protect the town and taxpayers from potential liability, I would like to introduce these photos of the erosion that is currently (as of January 2020) cutting deep into Palm Cove, the majority of which is within the Inlet Hazard Area.

Palm Cove's private road at points is approximately four-five feet from the edge of the scarf as of January 12, 2020. (I wasn't able to measure the exact distance because I kept my feet in the wet sand so I wasn't trespassing.)

Standing below scarf looking west opposite Lot 8 in Palm Cove.

As you know, it will be impossible to determine if a change in the tidal patterns and erosion should be blamed (or credited) to Man or Mother Nature. Either way, isn't erring on the side of caution something to consider when the potential liability is basically limitless.

I ask you review these photographs and address the question of what could happen. And be prepared.
I certainly don't want to see the wall of sand bags that define Ocean Isle be placed on Sunset Beach.

The East End is a unique asset to all the people Sunset Beach. I beg you to consider what is best for all the residents and visitors who love this special place called Sunset Beach.

Thank you for your consideration of these issues. I look forward to hearing from you.

Sincerely, Lynn

Eleanor Lynn Nesmith
210 Shoreline Drive East
Sunset Beach, NC 28468
850.814.0210

Begin forwarded message:

From: jharris <jharris@sunsetbeachnc.gov>
Date: January 11, 2020 at 12:38:35 PM EST
To: Lynn Nesmith <LynnNesmith@mchsi.com>
Cc: Hmarziano@sunsetbeachnc.gov
Subject: Re: Best way to ask questions

Lynn
I can't tell exactly what area of Palm Cove the photos were taken. However, I can tell you that except for lot one, all of the shoreline on the backside is classified High Hazard Ocean Erodible. The same classification is applied to the ocean front. That means that anything placed there must be Beach compatible sand. And must be done with a permit. Estuarine Shoreline Classification which is from lot 1 back through the bay, canals and S. Jinks Creek allows for hardening and also requires a permit.

My recommendation to you is that you report this to our Town Administrator, our CAMA officer, and the Division of Coastal Management -Wilmington Office.

Hope this helps. And thank you for your diligence in protecting our beautiful Beach.

Jan Harris

10-Jan-20

Braxton Davis, Director
NC Division of Coastal Management
400 Commerce Avenue
Morehead City, NC 28557

Dear Mr Braxton:

Enclosed is an objection the the variance request by the Town of Sunset Beach to its proposed dredging of South, Jenks Creek, in Brunswick County. Seychelles East, LLP owns a beach House at 1106 East Main Street, Sunset Beach and is directly affected by the disposition plan for materials from Jenks Creek. Please give our opjections serious consideration as we fear that this project will spoil the pristine beaches in front of our house and decrease the value of our investment. A second and more serious concern is that as a property owner at the east end of the planned disposition, tidal surges during storms become concentrated at the end of the proposed beach elevation and raise the danger of damage to our property and potentially persons. Thank you for your consideration of our objection.

Sencerely,

Michael F Ryan
President, Seychelles East, LLP
100 Sutters Place Court
Winston Salem, NC 27104

OBJECTION TO TOWN OF SUNSET BEACH DREDGING VARIANCE

As a beachfront property owner on the 1100 block of East Main Street, Sunset Beach, we are directly affected by the proposed dredging project on Jenks Creek, etc. and more specifically the variance request to dredge Jenks Creek to a greater depth than allow under the original permit. The project ,as approved, requires that all materials deposited on the beach between 5th and 12th Streets be of equal desirability as the existing beach sand. Our concern is that if the dredging depth is increased that the additional materials will not meet the quality requirements required in the original permit. Given the pristine sand on our beaches today, we believe that several test borings should be done to insure that dredged material not pollute the beach as it is today. If the borings do not confirm that the dredging material meets the permit requirements that the variance be denied. Michael F Ryan, President of the Seychelles East, LLP. My contact information is 336 403- 7259, e-mail mfrloaner@bellsouth.net

PUBLIC NOTICE OF VARIANCE REQUEST TO THE NORTH CAROLINA COASTAL RESOURCES COMMISSION (CRC)

Town of Sunset Beach Navigation Project
Maintenance Dredging of South Jinks Creek, the Bay Area, & the Feeder Channel

The Town of Sunset Beach (Town) has applied to the CRC for a variance to Coastal Area Management Act (CAMA) 15 NCAC 07H.0208(b)1(f) for the dredging of a portion of Jinks Creek, in Brunswick County. The referenced rule requires "*any canal or boat basin shall be excavated no deeper than the depth of the connecting waters*". Prior to presenting the variance request, the Town must provide this notification in accordance to 15A N.C.A.C. 07J.0701(c)(7) to adjacent property owners and objectors. The complete variance application may be obtained in digital format from the Town's website at www.sunsetbeachnc.gov. In addition, a hard copy may be provided upon request to Mr. Hiram Marziano, Town Administrator, Town of Sunset Beach, 700 Sunset Blvd. N. Sunset Beach, NC 28468, (910) 579-6297, or via email at hmarziano@sunsetbeachnc.gov.

The variance application should be presented and reviewed at the CRC's February 2020 meeting. No action is required from you. However, if you would like to file written comments or objections, you may submit them by January 15, 2020 to:

Braxton Davis, Director
NC Division of Coastal Management
400 Commerce Avenue
Morehead City, NC 28557
(252) 808-2808

RECEIVED

JAN 13 2020

DCM-MHD CITY

Mr Davis,

We have needed to have Tubbs Inlet dredged for years! We need to remove the sand and have a route to the intracoastal waterway. Owners, renters and the entire county will benefit from this. Please do not allow a few people to keep this from getting done! We need the 5 foot dredging done soon! Thanks

Getz Dove
1011 Canal Dr
SSB

704-609-4902

From: Grant Shipley
To: DEQ_DCMComments; Davis, Braxton C
Subject: [External] Sunset Beach Variance
Date: Tuesday, January 14, 2020 10:24:38 AM
Attachments: Shipley to CRC Sunset Beach Variance 011420 signed.pdf

Please accept the attached comments in opposition to the proposed Sunset Beach variance.

From: bonefish0204@sc.rr.com
To: DEQ_DCMComments
Cc: bonefish0204@sc.rr.com
Subject: [External] Sunset Beach Variance
Date: Tuesday, January 14, 2020 4:00:13 PM

First let me state that I agree that dredging must be done. I do not agree that it has to be done to the extent that is being proposed. In fact I have seen no proof that moving the dredging from two feet to five feet would be of little benefit. In fact from what I have seen it would only cause more harm to the environment.

Lastly in my opinion this is just about greed. It would only benefit a very few. Developers have told potential buyers that this would allow them to dock bigger boats. Also keep in mind that these are the same folks that were somehow allowed to build on land that that was filled in from a previous dredging. Please do the right thing for the environment and not approve this variance.

James Skiff
414 33rd st
Sunset Beach, NC 28468

From: Vicki Booth
To: DEQ_DCMComments
Cc: Davis, Braxton C
Subject: [External] Sunset Beach Variance
Date: Tuesday, January 14, 2020 10:50:05 PM

Dear Madam and Sirs:

Forty years ago, taking Jinks Creek and Tubbs Inlet from the intracoastal waterway to the ocean was the preferred choice for commercial fishing vessels. A CAMA official who was inspecting a dock landing at 1701 Canal Drive on the bay told me that about 3 years ago. It is our duty to others to **maintain navigable inlets** for fishing, and recreational purposes, and for the local economy.

Tubbs Inlet is one of only 3 inlets between South Carolina and Cape Fear Inlet near Southport. Jinks Creek, which is part of Tubbs Inlet, must be dredged deep enough to keep the waters flowing, and the boats able to navigate. Twice a day, this daily flow of seawater between the ocean and the intracoastal waterway delivers nourishment from the ocean to the water life living in Tubbs Inlet, Jinks Creek, the bay, marsh, sand, intracoastal water, and wherever the tidewater touches.

We have stayed on the bay fed by Jinks Creek since the 1980's, and in 2005, we bought our home on the bay. We rent it all summer to families who love staying on the bay. They get the best of both worlds, the beach and the bay. That is 12 - 16 weeks each summer, our house is occupied by families. We are only one house on the bay, and our visitors, love the Bay and being able to swim and boat in the bay. We have watched The bay fill in, so boats must now travel through it very carefully. Our visitors need not bring their boats, because it is too difficult to get their boat to our dock. We are on the verge of an economic downturn if Jinks Creek is not properly **dredged to - 5 feet,** and not just - 2 feet. Please put our tax dollars to work efficiently. We work hard for our money. And we are depending on a government that looks out for us, and our visitors.
We are the economy.

We are fortunate that people who have property along the water are **willing to pay the cost** to have Jinks Creek dredged. All the others - the local people and those who come to use the waterways for recreation or fishing will benefit. But also the local businesses, restaurants, realty companies, homeowners, and service industries depend on a wholesome flow of tourists. This is what **creates a good Sunset Beach economy.** And it is all built around the **waterways, and the open flow of water.**

All the tourists, visitors, and more are depending on us to keep the waterways deep enough so boats can use them for travel, and people can enjoy water sports and recreation.

Thanks for your help in this most important matter.

Vicki & Larry Booth

Mavericks Java & Bistro

Mavericks Pointe
Coffee/ Breakfast & Family Bar & Grill
303 & 307 Sunset Blvd. North
Sunset Beach, NC 28468
910.575.JAVA (910.575.5282)
facebook.com/MavericksPointe

From: Janice Harris
To: DEQ_DCMComments; Davis, Braxton C; tyler.a.crumbley@usace.army.mil
Subject: [External] Fwd: Dredging Variance
Date: Tuesday, January 14, 2020 1:36:43 PM

To Whom It May Concern

I would like to submit the below email to me as Comments on the Sunset Beach Dredging Variance proposal.

I sit on the Sunset Beach Town Council and was the "no" vote to apply for this variance request.

Thank you for your consideration of these comments.

Kind regards
Jan Harris
Sunset Beach Councilwoman
206 North Shore Dr. W
Sunset Beach, NC. 28368

From: **jharris** <jharris@sunsetbeachnc.gov>
Date: Sun, Jan 12, 2020, 10:05 AM
Subject: Fwd: Dredging Variance
To: <Jkmharris45@gmail.com>
Cc: <Janharris@atmc.net>

---- Original Message ----
From: "don o"
Sent: 1/11/2020 12:23:13 PM
To: "jharris@sunsetbeachnc.gov"
Subject: Dredging Variance

Sent from Mail for Windows 10

Dear Mrs. Harris, my wife and I are property owners at Sunset Beach (Sea Trail). We will soon fulfill our thirty year old dream of moving here permanently. We have been coming to Sunset Beach for more than thirty years, and during this time have seen many changes made, both good and bad. We are deeply disturbed that some council members chose to ignore the advice of experts and wishes of many citizens on the negative impact of dredging. These

same councilmen have now chosen ignore the CAMA ruling by asking for a variance in dredging depth. I urge you to do all that you can to prevent said variance from being granted. I would also like to know what we as private citizens can do to help. Sunset Beach needs to remain the unspoiled haven that it has always been for everyone, and not just a private playground for a privileged few. We deeply appreciate the honesty, transparency, and voice of reason that you bring to the City Council, and look forward to voting for you in future elections. Please keep up the good work.

Sincerely, Don Oakley

From: tfcnch@aol.com
To: DEQ_DCMComments
Cc: Davis, Braxton C
Date: Tuesday, January 14, 2020 9:31:40 PM

Please accept this email in support of the Sunset Beach request for a dredging depth variance.

I have a home on the bay and this project and the associated variance are very important to Sunset Beach, my neighbors, and me.

Thank you.

Nancy Craven
1305 Canal Drive
Sunset Beach, NC

From: Tommy Craven
To: DEQ_DCMComments
Subject: [External] Sunset Beach Variance
Date: Tuesday, January 14, 2020 9:24:43 PM

I am writing to support the variance request for a dredging depth of 5 feet that has been submitted by the Town of Sunset Beach.
I believe that it is necessary in order for the full benefits of the project to be realized.
Thank you for your consideration,
Thomas Craven
1305 Canal Drive Sunset Beach

From: Dwight Willis
To: DEQ_DCMComments
Subject: [External] Sunset Beach Variance
Date: Wednesday, January 15, 2020 1:23:48 PM

TO: CRC 4 January, 2020
Ref: Sunset Beach Variance

Dear Sir,

I believe that the Town of Sunset Beach's application for a variance does not give an accurate assessment of all of the facts in this matter.

The Town's application states parts of the site have been maintained (dredged) since 1985. This does not apply to the proposed dredging of 1700 feet of the Southern part of Jinks Creek. There is no evidence presented that there is a history of South Jinks Creek being maintained by dredging. So the above application statement only applies to the feeder canal and finger canal system. The Bay Area has never been maintenance dredged.

The Town's application also states that the town requested the variance in an attempt "to preserve the ecological benefit provided by the shellfish and juvenile fish habitat present in N. Jinks Creek." The town has no evidence to support this claim. There would be no reason to dredge a healthy, tidal creek. This is a ridiculous claim on the town's behalf.

The Town's application states the dredging project "will not increase flooding potential because it will not modify the tidal entrance at Tubbs Inlet or Jinks Creek's confluence with AIWW." Storm surge water from the Atlantic Ocean, as with any barrier island, enters the inlet, services the PNA marshes via Jinks Creek which bisects them, and continues on to the AIWW. There is significant evidence that erosion will occur as a result of the dredging which will increase the flooding potential.

The Town's application further states that "the hardships in this case result from the fact that the Jinks Creek serves as a primary navigation route between the Atlantic Ocean and the AIWW." This is simply not true. Jinks Creek is a small creek not a river. Recreational boaters know the difference and have successfully navigated Jinks at or near low tide for the past 50 years or more. It has never been used to access the Atlantic Ocean.

Please review the variance request from the Town of Sunset Beach and deny this request. Their rational is undocumented, unfounded, unscientifically proven, uninformed, and in several instances untrue.

Sincerely,

Dwight Willis
140 Carolina Ave.
Holden Beach, NC 28462

From: glen
To: DEQ_DCMComments; Davis, Braxton C
Subject: [External] Sunset Beach Dredging Variance
Date: Wednesday, January 15, 2020 3:42:04 PM

Sir:

I have had a second home on Sunset Beach since the early 70's and have been located at 1801 Canal Drive since the mid 80's.

The "back bay" at Sunset Beach provides an enormous amount of fishing and boating pleasure to those of us who live on the bay, but more importantly also to others who frequent the area from neighboring towns and counties and even from states far away.

I am very much in favor of the dredging as that will enable more people to SAFELY use the "back bay!" It is truly a treasure that needs to be preserved for future generations which include my five grandchildren. It should be noted that I have informed the two older granddaughters, that my desire is that they sit on the deck at age 85 and watch their grandchildren fishing and boating in the bay.

God gave us these waters to utilize and that should be done, but in an environmentally sound manner. The Intra Coastal Waterway was dredged in the thirties and it still works today.

I don't have a degree in the environmental sciences, but I trust you and your staff can find a reasonable solution to our situation.

Sandy

John "Sandy" Acton, CCIM
President
Glenwood Properties, Inc.
919-880-8989-Cell
glenwod@aol.com-E-mail

SOUTHERN ENVIRONMENTAL LAW CENTER

Telephone 919-967-1450 | 601 WEST ROSEMARY STREET, SUITE 220 CHAPEL HILL, NC 27516-2356 | Facsimile 919-929-9421

January 15, 2020

By U.S. and Electronic Mail
Dr. Braxton Davis, Director
N.C. Division of Coastal Management
400 Commerce Avenue
Morehead City, NC 28557
braxton.davis@ncdenr.gov

Re: Variance Request, Town of Sunset Beach Navigation Project - Maintenance Dredging of South Jinks Creek, the Bay Area, and the Feeder Channel

Director Davis:

Please accept the following comments on the Town of Sunset Beach's variance request to the North Carolina Coastal Resources Commission to dredge to depths deeper than -2 feet mean low water in south Jinks Creek, the Bay Area, and the Feeder Channel system. As issued, the conditioned major permit serves as an excellent example of balancing uses within the coastal environment and the variance should be denied.

On October 28th 2019, the North Carolina Division of Coastal Management (DCM) issued a major development permit (No. 79-19) to allow the Town of Sunset Beach to conduct navigational dredging in the water bodies known as south Jinks Creek, the Bay Area, and the Feeder Channel in Brunswick County, North Carolina. One of several conditions placed on this permit prohibits excavation from exceeding -2 feet below the mean low water (MLW). This conditioned permit represents an appropriate compromise that recognizes the potential for negative environmental effects, as described more fully in the North Carolina Coastal Federation's comments on the project, which are attached. Yet because the Town desires to dredge to deeper depths, it has requested a variance.

The proposed dredging project, which would not connect to deeper water in Jinks Creek and Tubbs Inlet, threatens to have significant effects on local water quality, ecological functions, and shellfish resources. Most notably, and the cause for the current variance request, the Town seeks final project depths ranging from -5 feet MLW in the Finger Canals to - 6 feet MLW in the Feeder Channel, Bay Area, and south Jinks Creek.

As a result, the proposed dredging of the Sunset Beach Finger Canals, Feeder Channel, Bay Area, and south Jinks Creek lacks an adequate deep-water connection, as is required by Coastal Area Management Act (CAMA) rules. Under the rules, "any canal or boat basin shall be excavated no deeper than the depth of the connecting waters."[1] Dredging canals or boat basins

[1] 15A N.C. Admin. Code 07H .0208(b)(F), http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2007%20%20coastal%20management/subchapter%20h/15a%20ncac%2007h%20.0208.pdf.

deeper than adjoining channels can allow sediment and pollution to build up in the basin.[2] Per CAMA rules, connecting waterbodies of a maintained navigational channel must be at least as deep as the dredge area.

As a threshold matter, any applicant for a variance must demonstrate an "unnecessary hardship" resulting from the application of the rule.[3] Sunset Beach has not made such a showing. The variance request states simply that prohibiting the proposed dredging would leave Tubbs Inlet at a depth that is "not consistent" with other inlets on the North Carolina coast. That is not, in and of itself, a hardship.

The implied "hardship" is that larger boats may not be able to navigate Tubbs Inlet at low tide. The initial variance request does not identify this purported hardship, the effect of such a limitation, or explain how limitations presented by low tide are "conditions peculiar" to Tubbs Inlet, the second requirement for a variance.[4] Those limitations are plainly not peculiar to Tubbs Inlet; therefore, the Applicant cannot meet the second requirement for a variance request.

The Applicant also fails to meet the final variance requirement, that granting the variance will "preserve substantial justice."[5] To the contrary, because low tide limits navigation across the state's 300 miles of coastline, granting this variance without a demonstrated hardship will open the Commission to numerous variance requests, creating a regulatory system that operates on a case-by-case analysis rather than according to rule.

The Applicant's justifications for the variance requests do not meet the criteria required by CAMA rules. The town has requested a variance from state rules by assuming previous dredging, said to have occurred in 1970 and 2002, that would also have dredged deeper than connecting waters. The original application states "since no known impacts were recorded from that event, indications suggest the current maintenance operations will also not create any adverse impacts." There are two major flaws with operating under this premise.

First, this will be the first known maintenance event for south Jinks Creek and the Bay Area since original dredging, believed to have occurred in the early 1970's (2002 dredging was isolated to the Feeder Channel system). Since the dredging occurred prior to the establishment of CAMA in 1974, it did not require a CAMA major permit authorization and is not thoroughly documented. Lack of documentation does not substantiate lack of impact. Without thorough evaluation and documentation of previous dredging events and their impact on surrounding environments, the Applicant cannot make such a claim.

Second, the Applicant cites shoaling and infill within south Jinks Creek, the Bay Area, and Feeder Channel system as primary justification for this project. The application also states that current shoaling patterns appear likely to continue and could potentially sever recreational access in each of the referenced work areas. If shoaling and material infilling have indeed

[2] https://deq.nc.gov/about/divisions/coastal-management/coastal-management-permit-guidance/project-rules/excavation-channels-canals-boat-basins
[3] 15A N.C. Admin. Code 07J .0701(C)(8)(A).
[4] *Id.* 07J .0701(C)(8)(B).
[5] *Id.* 07J .0701(C)(8)(D).

constricted navigable access in regards to the available width and depth of each waterbody, we question the Applicant's intent to dredge deeper than the adjacent navigational channel, which could further exacerbate the buildup of sediment in the basin. DCM's permit condition reducing dredge depths to -2 feet MLW serves to both minimize impacts to the resource as well as reduce the potential for increased shoaling and infill within the Feeder Channel system.

When basins are dredged deeper than adjoining waters, decreases in circulation can lead to pollutants and debris concentrating in poorly flushed corners of the canals. The water may become stagnant and biological activity may decrease, likening the probability of the canal becoming devoid of aquatic life.[6] In addition to such dissolved oxygen deficiencies from poorly flushed waterways, pollutants discharged from boats or transported in stormwater runoff from surrounding development can accumulate within the basin, and can result in adverse environmental impacts.[7] Buildup of contaminated sediments in these areas act as a source from which these contaminants can be released into overlying waters, exposing benthic organisms to bacteria and heavy metals. These pollutants become increasingly concentrated in animal tissue as the pollutants are passed up the food chain, and thus can reach levels dangerous for human consumption, oftentimes leading to fish advisories and closures.[8]

Residents and visitors of Sunset Beach have long demonstrated their ability to adapt to a changing coastline. As any visitor to the island can observe, shallow depths within the channel system have not prevented users from accessing local waters. Regardless of the tide, responsible watermen and women can and do access the system by utilizing the natural deeper channels in the creek. While dredging to deeper depths may prove convenient for a small number of property owners, it does not serve the community as a whole, nor does it prevent property owners from using and enjoying the resource. Moreover, limiting dredge depths to -2 feet MLW will decrease initial project costs and allow tax-payer monies to be spent on projects that benefit all town residents.

Given the relative complexity, scope and potential for direct, secondary and cumulative impacts to the natural and water resources of Jinks Creek and surrounding waters, the Commission should **deny** the proposed variance request. By upholding the conditioned permit, the Coastal Resources Commission is setting an example that will benefit our coast and its residents for many years to come.

[6] https://www.in.gov/idem/lakemichigan/files/clean_marina_guidebook_sect_02.pdf
[7] https://www.epa.gov/sites/production/files/2015-09/documents/czara_chapter5_marinas.pdf
[8] https://www.epa.gov/sites/production/files/2015-09/documents/2001_10_30_nps_mmsp_section2.pdf

Thank you for your careful attention to this matter and for taking these comments into consideration. We strive to support and enhance the coastal natural environment and trust the Coastal Resources Commission to do the same.

Sincerely,

Geoffrey R. Gisler
Senior Attorney

Attachment

North Carolina
Coastal Federation
Working Together for a Healthy Coast

July 15, 2019

Dr. Braxton Davis, Director
Division of Coastal Management
400 Commerce Avenue
Morehead City, NC 28557

Re: CAMA Major Permit Application: Town of Sunset Beach Maintenance Dredging of South Jinks Creek, the Bay Area and the Feeder Channel

Director Davis:

On behalf of the North Carolina Coastal Federation, please accept the following comments on the Town of Sunset Beach's application to conduct navigational dredging in the water bodies known as south Jinks Creek, the Bay Area, and the Feeder Channel in Brunswick County, North Carolina. As proposed, this project poses impacts that are not compatible with the letter and intent of the Coastal Area Management Act (CAMA) and associated rules governing these activities, and lacks thorough evaluation as well as mitigation measures.

The federation is a non-profit organization dedicated to protecting and restoring the North Carolina coast. Our organization represents 16,000 supporters statewide. We work with the public, agencies and local governments to communicate and collaborate wherever possible towards solutions that lead to the stewardship and resiliency of our coast. Since 1982, the federation has been working with coastal communities and other partners to improve and protect coastal water quality and natural habitats, which are intricately tied to our coastal economy. By focusing primarily, but not exclusively on natural and productive estuarine shorelines, oyster and marsh restoration, coastal management and cleaning the estuaries of marine debris, we strive to support and enhance the coastal natural environment.

Specific concerns about the ecosystem impacts of the proposed maintenance dredging project are as follows:

1) The Applicant seeks final project depths from -5 feet MLW in the Finger Canals to -6 feet MLW in the Feeder Channel, Bay Area, and south Jinks Creek, and would not connect to deeper water within Jinks Creek and Tubbs Inlet. The proposed dredging of the Sunset Beach Finger Canals, Feeder Channel, Bay Area and south Jinks Creek lacks an adequate deep-water connection, as is required by CAMA rules. Section 15A NCAC 07H .0208(b)(F) states, "any canal or boat basin shall be excavated no deeper than the depth of the connecting waters." Dredging canals or boat basins deeper than adjoining channels can allow sediment and pollution to build up in the basin.

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Per CAMA rules, connecting waterbodies of a maintained navigational channel must be at least as deep as the dredge area.

The Applicant justifies this proposed violation of state statute/rules by assuming previous dredging, said to have occurred in 1970 and 2002, would also have dredged deeper than connecting waters. The application states "since no known impacts were recorded from that event, indications suggest the current maintenance operations will also not create any adverse impacts." The federation sees two major flaws with operating under this premise.

First, this will be the first known maintenance event for south Jinks Creek and the Bay Area since original dredging, believed to have occurred in the early 1970's (2002 dredging was isolated to the Feeder Channel system). Since the action occurred prior to the establishment of CAMA in 1974, the action did not require a CAMA major permit authorization and is not thoroughly documented. Lack of documentation does not substantiate lack of impact. Without thorough evaluation and documentation of previous dredging events and their impact on surrounding environments, the Applicant cannot make such a claim.

Second, the Applicant cites shoaling and infill within south Jinks Creek, the Bay Area, and Feeder Channel system as primary justification for this project. The application also states that current shoaling patterns appear likely to continue and could potentially sever recreational access in each of the referenced work areas. If shoaling and material infilling have indeed constricted navigable access in regards to the available width and depth of each waterbody, we question the Applicant's intent to dredge deeper than the adjacent navigational channel, which could further exacerbate the buildup of sediment in the basin.

In order to meet state statute and minimize possible adverse impacts, we ask if the Applicant has considered reducing dredge depths to -2 feet MLW. A discussion of reduced dredge depths was not found in the application materials submitted in March of this year. In addition to minimizing impacts to the resource, reducing dredge depths could also reduce the potential for increased shoaling and infill within the Feeder Channel system.

As stands, the project proposal is in clear violation of state regulations regarding dredging depths, and DCM staff plainly term this finding as INCONSISTENT within the application package.

2) Moreover, this Feeder Channel system is ecologically unique in that it connects to a tidal creek, and not the Atlantic Intracoastal Waterway (AIWW) or a natural bay. The North Carolina Division of Marine Fisheries (DMF) has designated the boundary of Jinks Creek as primary nursery area (PNA) due to adjacent habitats potential to support shellfish and juvenile fish species.

PNAs are those areas in the estuarine and ocean system where initial post-larval development of finfish and crustaceans takes place. The North Carolina Marine Fisheries Commission designates PNAs to protect habitat, particularly the bottom structure, including sea grasses, oyster rocks, sand and mud, as well as adjacent wetlands. In addition, the North Carolina Environmental Management Commission designates all PNAs as High Quality Waters, limiting point source discharges and stormwater runoff.

Dredging is restricted in PNAs to protect water quality and fisheries, and limit stormwater runoff. As written in 15A NCAC 07H .0208(b)(1), "navigation channels, canals, and boat basins shall be aligned or located so as to avoid primary nursery areas, shellfish beds, beds of submerged aquatic vegetation as defined by the Marine Fisheries Commission."

Jinks Creek proper is not currently designated PNA. In the 1970's when nursery area designations were determined from state surveys, Jinks Creek surveyors did not collect sufficient data to merit a written report and therefore Jinks Creek was deemed non-PNA by default.

DMF's published *Fishery Nursey Area* map clearly designates all marshes and tidal creeks in and around Sunset and Ocean Isle beaches as PNA, with Jinks Creek being the only exception. Given the knowledge that Jinks Creek is completely surrounded by PNA habitat and is the connection between PNA and the Atlantic Ocean and AIWW, it is highly likely that Jinks Creek also functions as PNA.

As deemed necessary by the Coastal Resources Commission, PNAs serve to protect the resource values identified in the designation including, but not limited to, those values contributing to the continued productivity of estuarine and marine fisheries and thereby promoting the public health, safety and welfare.

With strong supposition that Jinks Creek may meet PNA designation, the federation encourages DCM to further assess the ecological functions of the tidal creek before approving a project that would permanently alter the landscape of this essential estuarine environment.

3) In order to ascertain the direct, secondary, and long-term cumulative impacts of the proposed project, it is important to thoroughly review case history. The Applicant has submitted a major permit application for maintenance dredging of south Jinks Creek, the Bay Area, and the Feeder Canal, although it is unclear whether the southern end of Jinks Creek has been previously dredged.

   As documented in the application and in this letter, dredging of south Jinks Creek and the Bay Area is *believed* to have occurred in 1970, but since this took place prior to the establishment of CAMA, the action did not require a CAMA major permit authorization and is thus undocumented. Support for the 1970 dredging action is

found within a pictorial atlas of North Carolina inlets depicting "before and after" conditions from 1966 and 1974, respectively.

The negative environmental impacts of dredging a natural channel are well-documented, although any dredging, including maintenance, can result in significant adverse impacts. Acting upon the assumption that dredging *did* occur in 1970, it is important to consider the impacts that additional dredging may have after nearly a half-century. Without further manmade alterations, a highly dynamic tidal system such as Jinks Creek is likely to have reestablished sensitive habitat after five decades without disturbance.

4) Based on local observations and findings documented within the Applicant's February 2018 *Shellfish Survey Report,* significant shellfish resources occur within the waters of Jinks Creek.

   If the proposed dredging project is approved, there will be unavoidable adverse impacts. As is required by state and federal rules and statutes, compensatory mitigation is required to replace the loss of wetland and aquatic resource functions in the watershed. While the amount and quality of compensatory mitigation does not substitute for avoiding and minimizing impacts, appropriate and practicable compensatory mitigation seeks to restore, establish, and/or preserve aquatic resources to offset the unavoidable adverse impacts that remain.

   As stated in the application, the survey results indicate the proposed navigation project will most likely not be able to avoid potential impacts to the oyster resources present in Jinks Creek. Based on the calculated density of oyster potentially within Jinks Creek, the navigation project may create impacts to approximately 12,810 oysters based on the proposed dredge footprint. The dredging project is estimated to disturb 10.72 acres within Jinks Creek and is expected to have the highest impact to resources in the subtidal region.

   In addition to 12,810 oyster resources, the proposed project is also expected to impact approximately 328 clams and 213 mussels, in addition to short-term impacts on local water quality and fish species.

   The Applicant states that "minimization efforts can help reduce the potential for impacts; however, the survey results show the oyster resources may be too diverse to avoid." If and when DCM is satisfied with the avoidance and minimization efforts in place, mitigation efforts are the logical next step. As such, the federation asks that such actions be reviewed and evaluated prior to implementation to establish adequate mitigation requirements to offset direct impacts from project dredging.

Given the relative complexity, scope and potential for direct, secondary and cumulative impacts to the natural and water resources of Jinks Creek and surrounding waters, the federation recommends DCM **deny** the proposed major permit application.

Thank you for your careful attention to this matter and for taking these comments into consideration.

Sincerely,

Kerri Allen

Kerri Allen,
Coastal Advocate

cc: Todd Miller, Executive Director
cc: Tracy Skrabal, Coastal Scientist and Southeast Regional Manager