

TECHNICAL SPECIFICATIONS

BEACH NOURISHMENT AT BUXTON AND AVON, DARE COUNTY, NORTH CAROLINA

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SECTION 1060 — REGULATORY REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY: This section contains the provisions for compliance with local, state and federal jurisdictional regulations and permit conditions affecting the work. Contractor is not relieved from requirements to comply with regulations, applicable permits, laws, codes, ordinances and regulations not identified in this section. It is the responsibility of the Contractor to comply with all applicable state, federal and local regulations affecting the work.

1.2 REFERENCES:

A. Owner Procured (attached to this specification):

1. North Carolina Department of Environment Quality, Approval of Individual 401 Water Quality Certification with Additional Conditions (pending).
2. Major CAMA permit (pending)
3. National Park Service Special Use Permit (pending)
4. U. S. Army Corps of Engineers, Department of the Army Permit Action ID #SAW-2025-01509 (for Buxton Nourishment) and SAW-2025-01508 (For Avon Renourishment) (pending).

B. Contractor Procured (at his expense):

1. Current business license.
2. Building permits, Dare County, North Carolina.
3. Current contractor's license for operations in the State of North Carolina.
4. Permit for hauling and disposal of debris and waste.
5. Permit to exceed load limits on certain bridges if they are on haul routes and have low load limits.
6. U.S. Coast Guard Certifications and licenses.

1.3 SUBMITTALS: Contractor shall provide reports, documents, plans and fees as required for obtaining all contractor procured permits at no additional cost to the Owner.

1.4 QUALITY ASSURANCE: Contractor shall conduct inspections of construction operations to insure compliance and report all violations to the Engineer.

1.5 SITE CONDITIONS:

- A. Contractor shall practice and be fully responsible for good housekeeping activities and procedures to prevent oil spills, hazardous waste contamination and spills, unauthorized environmental pollution and safety violations.
- B. The Contractor shall avoid any adverse impact to the identified sites through careful location of the submerged pipeline and pump-out. During the shaping and grading of the nourishment sand, the Contractor's equipment operators shall avoid known site locations along the beach. The Contractor shall also be aware that the possibility exists that the work may unearth a previously unknown beached shipwreck or shipwreck fragment. In the event that such occurs, the Contractor shall immediately stop work and notify the Engineer and the NC Underwater Archaeology Branch at 910-251-7320, so an archaeologist can be sent to assess the wreckage and determine the proper course of action. The NC Division of Coastal Management shall be notified immediately as well at 910-796-7302.

- C. There are no restroom facilities available to the Contractor on the site. Contractor shall make arrangements for restroom facilities for employees at no additional costs to the Owner. Disposal of waste from portable restroom facilities shall be in accordance with applicable local, state and federal regulations.
- D. Contractor shall assure reasonable access to the site for Owner's Site Representative, Engineer, and regulatory agency personnel.

1.6 SEQUENCING AND SCHEDULING:

- A. Contractor shall provide ample notification to regulatory agencies for scheduled construction activities and inspections, if a regulatory inspector is required for observation.
- B. Contractor shall conduct operations in accordance with the sequence of operations indicated in the Contract Documents and as required by the permit conditions. Deviations from the sequence of construction shall be reported to the Engineer.

1.7 USACE AND STATE PERMIT SPECIAL CONDITIONS:

Federal and state permits for the project specify detailed measures for protection of endangered species during project operations. In addition, the Contractor shall abide by all requirements of the 2020 South Atlantic Regional Biological Opinion (SARBO) relevant to hopper dredging and cutterhead-suction dredging. Special conditions are prescribed in permits for the project and shall be incorporated into the project.

In accordance with 33 U.S.C. 1341(d), all conditions of the North Carolina Division of Coastal Management Major Permit and the North Carolina Division of Water Resources 401 Water Quality Certification shall be incorporated as part of the Department of the Army permit. Therefore, they are not listed as special conditions in this section.

WORK LIMITS

- 1. All work authorized by the permit shall be performed in strict compliance with the plans illustrated on the permit application, which shall be a part of the permit. Any modification to these plans shall be approved by the U.S. Army Corps of Engineers (USACE) prior to implementation.
- 2. Except as authorized by the permit or any USACE approved modification to the permit, no excavation, fill, or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands. The permit shall not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area. This prohibition shall apply to all borrow and fill activities connected with this project.

3. Dredging activities authorized by the permit shall not in any way interfere with those operations of the USACE Civil Works dredging and navigation projects. Specifically, there shall not be any interference with the USACE maintenance dredging of Oregon Inlet or Federal channels in the vicinity of Oregon Inlet.
4. Except as specified in the plans attached to the permit, no excavation, fill, or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within waters or wetlands or to reduce the reach of waters or wetlands.
5. Dare County, as the Permittee, shall schedule a preconstruction meeting between its representatives, the Contractor's representatives, and the USACE prior to undertaking any work within jurisdictional waters and wetlands to ensure that there is a mutual understanding of all terms and conditions contained within the Department of the Army permit. The Permittee shall contact the USACE a minimum of thirty (30) days in advance of the scheduled meeting in order to provide that individual with ample opportunity to schedule and participate in the required meeting. Meeting participants may include, but are not limited to, representatives from the U.S. Fish and Wildlife Service (USFWS), the National Park Service (NPS), National Marine Fisheries Service (NMFS), N.C. Division of Coastal Management (NCDCM), N.C. Division of Water Resources (NCDWR), N.C. Wildlife Resource Commission (NCWRC), and the U.S. Coast Guard (USCG).
6. The permit will authorize beach fill activities to be undertaken only one (1) time along the entire project area. Any request to undertake additional maintenance beach fill activities within the project area where nourishment activities have already been completed under the permit would require prior written authorization from the USACE.

RELATED LAWS

7. All mechanized equipment shall be regularly inspected and maintained to prevent contamination of waters and wetlands from fuels, lubricants, hydraulic fluids, or other toxic materials. In the event of a spill of petroleum products or any other hazardous waste, the Contractor shall immediately report it to the N.C. Division of Water Quality at (919) 733-3300 or (800) 858-0368 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act will be followed.

CZMA

8. The Permittee shall fully abide by all conditions of the CAMA Major Permit, to be issued by the North Carolina Division of Coastal Management, which will be incorporated by reference. Permits for prior nourishment projects in the area are available for review; however, only the permit issued for the project herein (listed in Section 1.2) will apply to this project.

CULTURAL RESOURCES

9. The North Carolina State Historic Preservation Office (SHPO) determined that no significant historical resources will be impacted by the dredging of sand from the designated borrow areas for the Avon nourishment and Buxton renourishment project. Therefore, the borrow areas can be used without concern for effects on submerged historical resources. However; Contractor should note that a feature was present on the side-scan imagery near the northwestern corner of the southern Avon borrow area. The area has been excluded from the identified dredge area; however, Contractor should use caution when excavating in this vicinity and should avoid anchoring or placing subline around the identified feature. In the event that any project activities expose prehistoric or historic cultural material not identified during the survey, the dredging company under contract to Dare County shall immediately cease operations in that vicinity and notify the respective Point of Contact for Dare County and for the North Carolina SHPO. Notification shall address the exact location, where possible, the nature of material exposed by the project activities, and options for immediate archaeological inspection and assessment of the site.
10. Subline corridors have not been identified for the project. Contractor assumes all responsibility to equipment and impacts to resources for placement of sublimes. Contractor is encouraged to complete side-scan and multibeam surveys of proposed subline corridors prior to placement. Should surveys reveal features indicating hardbottom, cultural resources, or other anomalies, Contractor shall avoid laying pipe across these features.

PROJECT MAINTENANCE

11. The Contractor shall employ all sedimentation and erosion control measures necessary to prevent an increase in sedimentation or turbidity within waters and wetlands outside the permit area. Additionally, the project must remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4).
12. The Contractor shall coordinate the placement of all dredge pipelines along the beach with the NCDCM, the USACE, the USFWS Raleigh Field Office, and the NCWRC.

ENFORCEMENT

13. Violations of these conditions or violations of Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act must be reported in writing to the Project Manager of the Washington Regulatory Field Office, Wilmington District U.S. Army Corps of Engineers within 24 hours of the Permittee's discovery of the violation.
14. All reports, documentation, and correspondence required by the conditions of the permit shall be submitted to the following address: U.S. Army Corps of Engineers, Regulatory Division, Washington Regulatory Field Office, 2407 W. Fifth Street, Washington, North Carolina, 27889, and by telephone at: (910) 251-4610 (general number).
15. A representative of the USACE will periodically and randomly inspect the work for compliance with these conditions. Deviations from these procedures may result in an administrative financial penalty and/or directive to cease work until the problem is resolved to the satisfaction of the USACE.

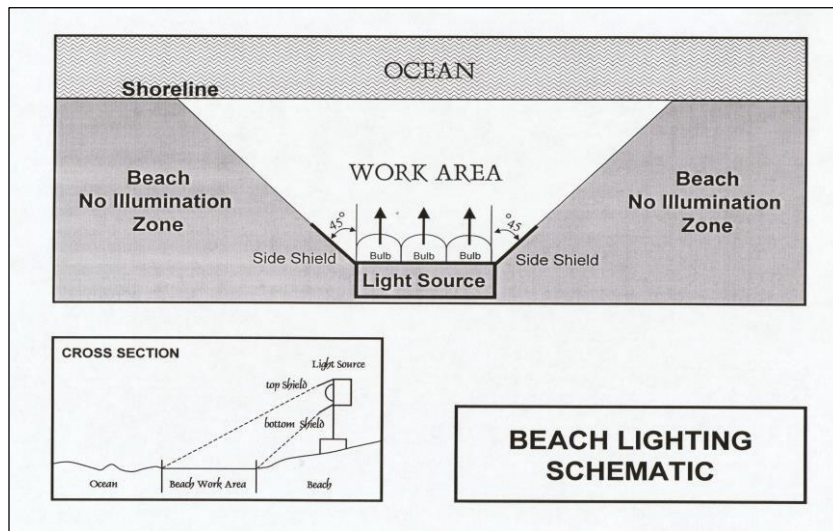
ENDANGERED SPECIES ACT (ESA)

16. The Contractor shall comply with the USFWS Biological Opinion (BO) and the 2020 NMFS South Atlantic Regional Biological Opinion (SARBO), which contains mandatory terms and conditions to implement the Reasonable and Prudent Measures (RPM) that are associated with “incidental take” that is also specified in the BOs. The authorization under the USACE permit shall be conditional upon the Contractor’s compliance with all of the mandatory terms and conditions associated with incidental takes of the Biological Opinions, which terms and conditions are incorporated by reference in the federal permit. Failure to comply with the terms and conditions associated with incidental take of the BO, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute non-compliance with your USACE permit. The USFWS and NMFS are the appropriate authorities to determine compliance with the terms and conditions of their BOs, and with the ESA.
17. The Contractor shall immediately notify the Owner, Engineer, and the USACE Regulatory Project Manager that an incidental take has occurred. Dredging operations shall immediately cease upon incidental take of any sea turtle species or Atlantic Sturgeon until the Wilmington District Commander, or his designee, notifies the Contractor to resume dredging. The Sea Turtle or Atlantic sturgeon incidental take data form shall be filled out by the Observer within 6 hours of the take event and e-mailed in pdf format to takereport.nmfsser@noaa.gov and the USACE Regulatory Project Manager.
18. All necessary precautions and measures shall be implemented so that any activity would not kill, injure, capture, harass, or otherwise harm any protected federally listed species (sea turtles, whales, manatee, Atlantic sturgeon, red knots, and piping plover). While accomplishing the authorized work, if the Contractor discovers or observes a damaged or hurt listed endangered or threatened species, the USACE shall be immediately notified so that required coordination can be initiated with the USFWS and/or the NMFS.
19. The Contractor shall conduct routine beach surveillance during construction to prevent unintentional damage to sea turtles and their nesting areas. If a nest or a turtle crawl is identified in the project area, the Contractor would immediately stop all beach disposal activities and contact the USACE to determine appropriate action. Specific night time and morning monitoring requirements will be identified in the USFWS Biological Opinion.
20. Contractor shall work around exposed debris, house pilings, sandbags and other material that may be present within the fill area. Sandbags may be buried by fill in the berm and/or dune sections. No fill shall be placed under houses within the fill template. Contractor will not be responsible for damage to sandbags within the fill template if fill is placed over them. Contractor should make effort to remove trash and debris within the fill template; but will not be required to remove pilings, foundations, septic tanks, sandbags, or large embedded debris.
21. Conservation Measures included in the permit application/project plans shall be implemented in the Avon and Buxton project. If a RPM and Term and Condition address the same requirement, the requirements of the RPM and Term and Condition shall take precedent over the Conservation Measure.

22. Information required to be sent to the USFWS shall be submitted to:
- Mr. Pete Benjamin, Supervisor Raleigh Field Office
U.S. Fish and Wildlife Service Post Office Box 33726
Raleigh, North Carolina 27636–3726 (919) 856–4520
23. Predator-proof trash receptacles shall be installed and maintained at all beach access points used for the project construction, to minimize the potential for attracting predators of piping plovers, red knots, and sea turtles.
24. A meeting between representatives of the Contractor, USFWS, NCWRC, the sea turtle surveyor, and other species surveyors, as appropriate, shall be held prior to the commencement of work on this project. Notification of the meeting shall be at least 10 business days in advance.
25. All personnel involved in the construction or sand placement process along the beach shall be trained to recognize the presence of piping plovers and red knots prior to initiation of work on the beach. Before start of work each morning, a visual survey shall be conducted in the area of work for that day, to determine if piping plovers or red knots are present. If plovers or red knots are present in the work area, careful movement of equipment in the early morning hours shall allow those individuals to move out of the area. Construction operations shall not begin until individual plovers or red knots have exited the work area for the day. If piping plovers or red knots are observed, the observer shall make a note on the Quality Assurance form for that day, and submit the information to the USACE and the USFWS’s Raleigh Field Office the following day. See REPORTING REQUIREMENTS below.
26. Only beach compatible fill shall be placed on the beach or in any associated dune system. Beach compatible fill shall 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 shall be sand solely of natural sediment and shell material, containing no construction debris, toxic material, or other foreign matter, or large amounts of granular material, gravel, or rock. The beach compatible fill shall 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 shall be material that maintains the general character and functionality of the material occurring on the beach and in the adjacent dune and coastal system.
27. During dredging operations, material placed on the beach shall be visually inspected daily to ensure compatibility. If during the inspecting process 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 Engineer, NCDCM, and the USACE shall be notified by the Contractor to determine the appropriate plan of action.
28. From May 1 through November 15, to the maximum extent practicable, excavations and temporary alteration of beach topography (outside of the active construction zone) shall be filled or leveled to the natural beach profile prior to 9:00 pm each day.

29. If any nesting turtles are sighted on the beach during construction, construction activities shall cease immediately until the turtle has returned to the water, and the sea turtle permit holder responsible for nest monitoring has marked for avoidance or relocated any nest(s) that may have been laid. If a nesting sea turtle is observed at night, all work on the beach shall cease and all lights will be extinguished (except for those absolutely necessary for safety) until after the female has finished laying eggs and returned to the water.
30. During the sea turtle nesting season, the Contractor shall not extend the beach fill more than the USFWS allowed length along the shoreline and shall confine work activities within this area between dusk and dawn of the following day until the daily nesting survey has been completed and the beach cleared for fill advancement. A permitted sea turtle surveyor shall be present on-site to ensure no nesting and hatchling sea turtles are present within the work area. Once the beach has been cleared and the necessary nest relocations have been completed, the Contractor will be allowed to proceed with the placement of fill and work activities during daylight hours until dusk at which time the allowed length limitation would apply. If a nesting sea turtle is sighted on the beach within the immediate construction area, activities shall cease immediately until the turtle has returned to the water and the sea turtle permit holder responsible for nest monitoring has relocated the nest.
31. If movement of equipment up or down the beach (outside of the active nighttime construction area) is required between dusk and dawn, an additional nighttime monitor shall accompany vehicles operating on the beach, watching for signs of turtle activity ahead of the vehicle. If activity is discovered, the vehicle shall stop or reverse direction until the activity ceases and the monitor clears the forward progress of the vehicle. Movement of the equipment up or down the beach during nighttime operations shall be conducted from the off-beach access point to the construction area and vice-versa.
32. If any work on the beach is conducted during the sea turtle nesting season (May 1 through November 15), the Contractor shall submit a lighting plan for the equipment and dredge that will be used in the project. The plan shall include a description of each light source that will be visible on or from the beach and measures implemented to minimize this lighting. The plan shall be reviewed for approval by the USFWS.

33. Direct lighting of the beach and nearshore waters shall be limited to the immediate construction area during the nesting season and must comply with safety requirements. Lighting on all equipment shall be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the water's surface and nesting beach while meeting all USCG, USACE EM 385-1-1, and OSHA requirements. Light intensity of lighting equipment shall be reduced to the minimum standard required by OSHA for General Construction areas, in order to not misdirect sea turtles. Shields shall be affixed to the light housing and be large enough to block light from all on-beach lamps from being transmitted outside the construction area or to the adjacent sea turtle nesting beach.



34. Daily (before 9:00 am) nesting surveys and egg relocation shall be conducted by the Owner if any portion of the sand placement occurs during the period from May 1 through November 15. If sand is placed on the beach at night, a nighttime monitor shall survey the beach area that is affected that night, prior to the morning's normal nesting activity survey. No daytime movement of equipment up or down the beach (outside of the active nighttime construction area described in number 30, above) may commence until completion of the sea turtle nesting survey each morning. If nests are constructed in the project area, the nests shall be marked and either avoided until completion of the project or relocated.
- a. Nesting surveys shall be initiated by May 1 and must continue by the Owner through the end of the project. If nests are constructed in areas where they may be affected by construction activities, the eggs shall be relocated to minimize sea turtle nest burial, crushing of eggs, or nest excavation.
 - b. Nesting surveys and nest marking shall only be conducted by personnel with prior experience and training in these activities, and who are duly authorized to conduct such activities through a valid permit issued by the USFWS or the NCWRC. Nesting surveys shall be conducted daily between sunrise and 9:00 am.
 - c. Only those nest that may be affected by construction or sand placement activities shall be relocated. Nest relocation shall not occur upon completion of the project. For demobilization, nests shall be marked and avoided. Nests requiring relocation shall be moved no later than 9:00 am the morning following deposition to a nearby self-release beach site in a secure setting where artificial lighting will not interfere with hatchling orientation. Relocated nests shall not be placed in organized groupings. Relocated nests shall be randomly staggered along the length and width of the beach in settings that are not expected to experience daily inundation by high tides or known to routinely experience severe erosion and egg loss, predation, or subject to artificial lighting. Nest relocations in association with construction activities shall cease when construction activities no longer threaten nests.
 - d. Nests deposited within areas where construction activities have ceased or will not occur for 65 days shall be marked for avoidance and left in situ unless other factors threaten the success of the nest. Nests shall be marked with four stakes at a 10-foot distance around the perimeter of the nest for the buffer zone. The turtle permit holder shall install an on-beach marker at the nest site and a secondary marker at a point as far landward as possible to assure that future location of the nest will be possible should the on-beach marker be lost. No activities that could result in impacts to the nest shall occur within the marked area. Nest sites shall be inspected daily to assure nest markers remain in place and the nest has not been disturbed by the project activity.
35. From May 1 through November 15, staging areas for construction equipment shall be located off the beach. Nighttime storage of construction equipment not in use shall be off the beach to minimize disturbance to sea turtle nesting and hatching activities. In addition, all construction pipes placed on the beach shall be located as far landward as possible without compromising the integrity of the dune system. Pipes placed parallel to the dune shall be 5 to 10 feet away from the toe of the dune if the width of the beach allows. If pipes are stored on the beach, they shall be placed in a manner that will minimize the impact to nesting habitat and shall not compromise the integrity of the dune systems.

36. Demobilization of equipment from the beach shall be conducted only during daylight hours, after the daily survey for sea turtle nests has been completed. Any nests that are identified shall be marked for avoidance during all demobilization activities.
37. Visual surveys for escarpments along the project area shall be made immediately after completion of sand placement. Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet shall be leveled and the beach profile shall be reconfigured to minimize scarp formation by the dates listed above. Any escarpment removal shall be reported by location. If the sand placement activities are completed during the early part of the sea turtle nesting and hatching season (May 1 through May 30), escarpments shall be leveled immediately, while protecting nests that have been relocated or left in place. The USFWS shall be contacted immediately if subsequent reformation of escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a longshore 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 USFWS or NCWRC shall provide a brief written authorization within 30 days that describes methods to be used to reduce the likelihood of impacting existing nests.
38. Within 7 days of completion of sand placement and prior to any tilling (if needed), a field meeting shall be held with the USFWS, NCWRC and the USACE to inspect the project area for compaction and determine whether tilling is needed.
 - a. If tilling is needed, the area shall be tilled to a depth of 36 inches. All tilling activities shall be completed prior to May 1 of any year.
 - b. Tilling shall occur landward of the wrack line and avoid all vegetated areas that are 3 square feet or greater, with a 3 square feet buffer around all vegetation.
 - c. If tilling occurs during the shorebird nesting season after April 1, shorebird surveys shall be required prior to tilling per the Migratory Bird Treaty Act).
39. Upon locating a dead, injured, or sick individual of an endangered or threatened species, initial notification shall be made to the USFWS's Law Enforcement Office below. Additional notification shall be made to the USFWS's Ecological Services Field Office identified above and to the NCWRC at (252) 241-7367. Care would 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.

Mr. Jason Keith
U.S. Fish and Wildlife Service
551-F Pylon Drive
Raleigh, North Carolina 27606
919-856-4786, Extension 34

NAVIGATION

40. The Contractor shall not authorize the interference with any existing or proposed Federal project, and the Contractor shall not be entitled to compensation for damage or injury to the authorized structure or work which may be caused from existing or future operations undertaken by the United States in the public interest.
41. No attempt shall be made by the Contractor to prevent the full and free use by the public of all navigable waters at or adjacent to the authorized work. Use of the permitted activity shall not interfere with the public's right to free navigation on all navigable waters of the United States.
42. The Contractor shall install and maintain, at its expense, any signal lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, on all authorized facilities constructed within navigable waters of the United States.
43. The Contractor shall comply with all U.S. Coast Guard regulations for dredging operations and contact Mr. Tom Flynn, United States Coast Guard, District 5 Waterways at telephone, (757) 398-6229, at least thirty (30) days prior to construction. Contact with the U.S. Coast Guard shall initiate the Local Notice for Mariners procedures to ensure all safety precautions for aids to navigation are implemented. The Contractor shall notify the USACE when this coordination with the USCG has commenced and provide updates as requested.
44. The Contractor, upon receipt of a notice of revocation of the permit or upon its expiration before completion of the work shall, without expense to the United States and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the waterway to its former conditions. If the Contractor fails to comply with this direction, the Secretary or his representative may restore the waterway, by contract or otherwise, and recover the cost from the Contractor.

EXCAVATION/DREDGING

45. Hopper dredging is being approved under the NMFS South Atlantic Regional Biological Opinion (SARBO) dated 2020. The SARBO includes an Incidental Take Statement (ITS) issued to the USACE. Under the RBO/ITS, incidental takes are authorized on a Fiscal Year (FY) (October 1 - September 30) basis to be metered out by the Division Commander, South Atlantic Division, U.S. Army Corps of Engineers for the southeastern United States for Corps' Civil and Military projects. The Contractor shall avoid any incidental take in that such take may trigger the cessation of hopper dredging for the remainder of that FY. The Contractor understands and agrees that, even where it is in full compliance with the terms and conditions of the RBO/ITS, incidental take by the Contractor may require suspension of the permit by the USACE. The amount of incidental take that will trigger suspension, and the need for any such suspension, will be determined at the discretion of the USACE. The Contractor understands and agrees on behalf of itself, its subcontractors, and other representatives, that no claim, legal action in equity or for damages, adjustment, or other entitlement against the USACE shall arise as a result of such suspension or related action.

46. The Contractor shall immediately notify the USACE Regulatory Project Manager that an incidental take has occurred. Dredging operations shall immediately cease upon incidental take of any sea turtle species or Atlantic Sturgeon until the Wilmington District Commander, or his designee, notifies the Contractor to resume dredging. The Sea Turtle or Atlantic sturgeon incidental take data form shall be filled out by the Observer within 6 hours of the take event and e-mailed in pdf format to takereport.nmfsser@noaa.gov and the USACE Regulatory Project Manager. In accordance with the RBO, all hopper dredges shall have an Observer on board who meets the guidelines as established on the website listed in Special Condition 57 below.
47. Pre-Dredging Submittals.
- a. No dredging shall be performed by a hopper dredge without the inclusion of a rigid sea turtle deflector device. The Contractor shall electronically submit drawings to the USACE Regulatory Project Manager prior to commencement of dredging, showing the proposed device and its attachment. These drawings shall include the approach angle for any and all depths to be dredged during the dredging. The Contractor shall not commence hopper dredging until approval of the sea turtle deflector device has been granted by the USACE.
 - b. The Contractor shall electronically submit detailed drawings showing the proposed drag head grating system(s) and drag head(s), and documentation that supports grate sizing such as dredge pump manufacturer's recommended maximum particle size dimension(s), etc.
 - c. The Contractor shall electronically submit an operational plan to achieve protection of sea turtles during the hopper dredging operation. These operational procedures are intended to stress the importance of balancing the suction pipe densities and velocities in order to keep from taking sea turtles.
 - d. During turning operations, the pumps shall either be shut off or reduced in speed to the point where no suction velocity or vacuum exists. No dredging work shall be allowed to commence until approval of the turtle deflector device has been granted by the USACE, Wilmington District. Sample Turtle Deflector Design Details are available on the website listed in Special Condition 57 below. A copy of the approved drawings and calculations shall be available on the vessel during dredging operations.
48. Within 10 days from the date of initiating the authorized work, the Contractor shall provide to the USACE, the completed Hopper Dredge Startup Inspection Checklist form with a written notification of the date of commencement of work authorized by this permit. An inspection of the hopper dredge shall be scheduled and performed by the Wilmington District inspector after receipt of the notification of commencement. Inspection checklists are located on the website listed in Special Condition 57 below.
49. Hopper dredge drag heads shall be equipped with sea turtle deflectors which are rigidly attached. Deflectors shall be solid with no openings in the face. No dredging shall be performed by a hopper dredge without an installed

turtle deflector device approved by the Wilmington District inspector. Sample Turtle Deflector Design Details are on the website indicated in Special Condition 57 below.

a. Deflector Design.

- 1) The leading V-shaped portion of the deflector shall have an included angle of less than 90 degrees. Internal reinforcement shall be installed in the deflector to prevent structural failure of the device. The leading edge of the deflector shall be designed to have a plowing effect of at least 6 inches in depth when the drag head is being operated. Appropriate instrumentation or indicator shall be used and kept in proper calibration to insure the critical "approach angle." (Information Only Note: The design "approach angle", or the angle of lower drag head pipe relative to the average sediment plane, is very important to the proper operation of a deflector. If the lower drag head pipe angle in actual dredging conditions varies tremendously from the design angle of approach used in the development of the deflector, the 6-inch plowing effect does not occur. Therefore, every effort shall be made to insure this design "approach angle" is maintained with the lower drag pipe.)
- 2) If adjustable depth deflectors are installed, they shall be solidly attached to the drag head using either a hinged aft attachment point or an aft trunnion attachment point in association with an adjustable pin front attachment point or cable front attachment point with a stop set to obtain the 6-inch plowing effect. This arrangement allows fine-tuning the 6-inch plowing effect for varying depths. After the deflector is properly adjusted there shall be no openings between the deflector and the drag head that are more than 4-inches by 4-inches.

b. In-flow baskets and overflow screening.

- 1) The Contractor shall ensure that baskets or screening are installed over the hopper inflow(s) and overflow (s) with no greater than 4-inch by 4-inch openings. The method selected shall depend on the construction of the dredge used and shall be approved by the Wilmington District inspector prior to commencement of dredging. The screening shall provide 100% screening of the hopper inflow(s) and overflow(s). The screens and/or baskets would remain in place throughout the performance of the work. The turtle deflector device and inflow/overflow screens shall be maintained in operational condition for the entire dredging operation. If during dredging operations, the Contractor cannot meet the requirements of the inflow and overflow screening, the USACE Regulatory Project Manager shall be contacted immediately.
- 2) The Contractor shall install and maintain floodlights suitable for illumination of the baskets or screening to allow the Observer to safely monitor the hopper baskets or screening during non-daylight hours or other periods of poor visibility. Safe access shall be provided to the inflow and

overflow baskets or screens to allow the Observer to inspect for turtles and Atlantic sturgeon, or parts thereof, clean the baskets or screens for the next loading cycle, and document any screening deficiencies. During periods of time when observers are performing inspections of inflow and overflow baskets or screening, proper lockout/tag out procedures and fall protection shall be implemented.

c. Drag head grating.

- 1) Drag head grating may be used to prevent over-sized objects (relative to respective pump and distribution system designs) from reaching and becoming lodged or damaging, the dredge pump and/or slurry distribution system. The Contractor may not use a drag head grating system that will prevent turtle remains from entering the hopper inflow screening. Detailed drawings showing the proposed drag head grating system(s) and drag head(s), and documentation that supports grate sizing (such as dredge pump manufacturer's recommended maximum particle size dimension(s), etc.) shall be submitted. No dredging shall begin until the Wilmington District inspector has approved all grating and screening.

50. Hopper Dredge Operation.

- a. The Contractor shall operate the hopper dredge to minimize the possibility of taking sea turtles or sturgeon and to comply with the requirements stated in the Incidental Take Statement provided by the NMFS in its RBO.
- b. The turtle deflector device and inflow/overflow screens shall be maintained in operational condition for the entire dredging operation.
- c. When initiating dredging, suction through the drag heads shall be allowed just long enough to prime the pumps, and then the drag heads would be placed firmly on the bottom. When lifting the drag heads from the bottom, suction through the drag heads shall be allowed just long enough to clear the lines, and then must cease. Pumping water through the drag heads shall cease while maneuvering or during travel to/from the disposal area. If the required dredging section includes compacted fine sands or stiff clays, a properly configured arrangement of teeth may enhance dredge efficiency, which reduces total dredging hours, and turtle takes. The operation of a drag head with teeth shall be monitored for each dredged section to insure that excessive material is not forced into the suction line. When excess high-density material enters the suction line, suction velocities drop to extremely low levels causing conditions for plugging of the suction pipe. Dredge operators shall configure and operate their equipment to eliminate all low-level suction velocities. Pipe plugging in the past was easily corrected, when low suction velocities occurred, by raising the drag head off the bottom until the suction velocities increased to an appropriate level. Pipe plugging cannot be corrected by raising the drag head off the

bottom. Arrangements of teeth and/or the reconfiguration of teeth shall be made during the dredging process to optimize the suction velocities.

- d. Raising the drag head off the bottom to increase suction velocities shall not be acceptable. The primary adjustment for providing additional mixing water to the suction line should be through water ports. To insure that suction velocities do not drop below appropriate levels, the Contractor shall monitor production meters throughout the job and adjust primarily the number and opening sizes of water ports. Water port openings on top of the drag head or on raised standpipes above the drag head shall be screened before they are utilized on the dredging project. If a dredge section includes sandy shoals on one end of a tract line and mud sediments on the other end of the tract line, the equipment shall be adjusted to eliminate drag head pick-ups to clear the suction line.
- e. The drag head shall be buried a minimum of 6 inches in the sediment at all times to maintain drag head efficacy in reducing incidental takes. Maximum borrow area dredge depths identified in the attached plans shall not be exceeded to achieve this effective plowing depth.
- f. During turning operations, the pumps shall either be shut off or reduced in speed to the point where no suction velocity or vacuum exists.

51. Dredging Quality Management. Dredging and dredged material disposal and monitoring of dredging projects using the Dredging Quality Management (DQM) system shall be implemented for this DA permit. The Contractor shall ensure that each hopper dredge assigned to the work authorized by this DA permit is equipped with DQM, previously known as 'Silent Inspector', for hopper dredge monitoring. The Contractor's DQM system shall have been certified by the DQM Support Team within one calendar year prior to the initiation of the dredging/disposal. Questions regarding certification shall be addressed to the DQM Support Center at 251-690-3011. Additional information about the DQM System can be found at <http://dqm.usace.army.mil>. The Contractor shall be responsible for insuring that the DQM system is operational throughout the dredging and disposal project and that project data are submitted to the DQM National Support Center in accordance with the specifications provided at the aforementioned website. The Contractor shall contact the National Dredging Quality Management (DQM) program (<http://dqm.usace.army.mil/>) to assure that project information is loaded and data is being appropriately transferred prior to project commencement.

52. Sea Turtle Non-Capture Trawl Sweeping. In order to minimize or reduce taking of turtles during dredging, non-capture trawling will be required by the USACE to reduce entrainment risk. This type of trawling is designed to use non-capture type trawling equipment to sweep in the proximity of the dredging operations in order to stimulate sea turtles to move out of the dredge path. No sea turtles shall be captured using this trawling technique. Non-capture trawl sweeping may be performed 48 hours prior to initiating dredging and may continue throughout dredging operations. Conduct non-capture trawl sweeping operations in the vicinity of dredge operations, but maintain a safe distance from the dredge. Trawl equipment used (e.g. trawling nets) and trawl sweeping operations shall be conducted such that no sea turtles or other marine organism by-catch are captured. As much

as possible, non-capture trawl sweeping shall be conducted to maximize the amount of time during each 24-hour trawl day that the trawl equipment (e.g. trawling nets) sweeps the bottom sediment in the vicinity of the dredging operation (i.e. maximize the bottom time with the trawling equipment). Such trawling in the vicinity of the dredge shall be conducted continuously, stopping after every 4 to 6 hours to check the condition of the trawl equipment and assure that no turtles have been captured.

- a. Non-capture Trawl Sweeping Period. Non-capture trawl sweeping shall be conducted as described below:
 - 1) A day of non-capture trawl sweeping shall be defined as 24 hours of continuous trawling.
 - 2) Non-capture trawl sweeping may be conducted as 24-hours of trawling as a continuous trawl; however, two separate crews must be available on board to work two 12-hour shifts.
- b. Turtle Handling and Endangered Species Permits. No sea turtles are to be intentionally captured during non-capture trawl sweeping operations. No endangered species permits to handle sea turtles are required for non-capture trawl sweeping. Should a sea turtle become entangled in the trawling nets; the nearest marine facility shall be notified for arrangements to be made to transfer the animal as needed.
- c. Reporting. A daily log shall be kept for each non-capture trawl sweeping operations. The non-capture trawl sweeping log shall be submitted to the USACE Regulatory Project Manager at the completion of the project. Data to be included with this log daily shall include:
 - 1) GIS coordinates of trawl locations at the start and end of each sweep.
 - 2) Times recorded for the duration of each trawl sweep.
 - 3) Description of dredge proximity during each sweep.
 - 4) General notes as appropriate (e.g. condition of equipment at the end of each sweep, snags occurring during each sweep, incidental debris, etc.).
 - 5) Water Quality and Physical Measurements: Water temperature measurements shall be taken at the water surface each day using a laboratory thermometer. Weather conditions shall be recorded from visual observations and instruments on the trawler. Weather conditions, air temperature, wind velocity and direction, high and low tides, sea state-wave height, and precipitation shall be recorded on the Trawling Form on the website indicated in Special Condition 57 below.
- d. Non-Capture Trawl Sweeping Equipment:
 - 1) To reduce the chances of sea turtles becoming entangled and caught in the net webbing during non-capture trawl sweeping, the Contractor shall use standard flat-style shrimp trawling nets. Nets shall have one to two-inch webbing holes, the webbing shall be made of nylon material (preferably dipped.)

- 2) The bag end of these nets shall be completely cut out so that the nets remaining on the rigging are approximately 30 to 50-feet long. The nets shall be long enough to provide a trailing length of net in the water to “stimulate turtles” to move but not be long enough to be able to twist when: i) being pulled in the water; ii) being pulled up and onto the deck; iii) the vessel is stationary; or iv) the trawl vessel turns while trawling. This net length may be shorter or longer depending on the specific configurations of the trawler and its rigging, but shall be set up to specifically prevent the twisting of the net. The nets shall be installed and adjusted such that organisms are not being collected (turtles and other by-catch).
- 3) The bag end of the nets would be cut away to create a large open end on the nets. The webbing shall be monitored so that tears and rips do not occur in the remaining webbing that might entangle and capture organisms (particularly turtles).
- 4) To ensure that the lead line and mouth of the trawl nets maintain contact with the seafloor as best as possible, the lead line of each net shall be rigged with weights, mud rollers, tickler chains and/or trawling cookies (as appropriate for the environmental conditions and sediment type).

For the first 48 hours after beginning non-capture trawling operations, pull and check the nets every hour to evaluate and document the:

- a. Status of the nets (particularly twisting of the tail end).
 - b. Net contents (turtles and other by catch) and, after the first 48-hours and appropriate net configuration has been established, gradually increase trawling times to a maximum of 2–3 hours.
 - c. Trawler Equipment Breakdown: Should there be a breakdown of trawler equipment that would cause the trawler to leave the area where dredging is underway during any period of time when non-capture trawl sweeping is required, the dredge may continue to operate for up to 48 hours, as long as no turtles are taken, and subject to the discretion of the USACE Regulatory Project Manager. Should there be dangerously high seas that would cause the trawler to leave the dredging area when non-capture trawl sweeping is required, the dredge may continue to operate, as long as no turtles are taken; subject to the discretion of the USACE Regulatory Project Manager.
53. Endangered Species Observers: During dredging operations, observers approved by the NMFS for sea turtles, Atlantic sturgeon and whales shall be aboard to monitor for the presence of the species. Observer coverage shall be 100 percent (24hr/day) and shall be conducted year round. During transit to and from the disposal area, the observer shall monitor from the bridge during daylight hours for the presence of endangered species, especially the Northern right whale, during the period December through March. Records shall be kept of the date, time, and approximate location of all marine mammal sightings. Care shall be taken not to closely approach any whales or manatees observed during dredging. The observer shall serve as a lookout to alert the vessel pilot of the occurrence of these animals. If any are observed, collisions shall be avoided either through reduced vessel speed, course alteration, or both. During the evening hours, when there is limited visibility due to fog, or when there are

sea states of greater than Beaufort 3, the dredge shall slow down to 5 knots or less when transiting between areas if whales have been spotted within 15 nm of the vessel's path within 24 previous hours. If a right whale is sighted, the dredge operator shall maintain a 500-yard buffer between the vessel and any whale.

During dredging operations, while drag heads are submerged, the observer shall continuously monitor the inflow and/or overflow screening for turtles and/or turtle parts and Atlantic sturgeon and/or Atlantic sturgeon parts. Upon completion of each load cycle, drag heads shall be monitored as the drag head is lifted from the sea surface and is placed on the saddle in order to assure that sea turtles that may be impinged within drag head are not lost and un-accounted for. Observers shall physically inspect drag heads and inflow and overflow screening/boxes for threatened and endangered species take. Other abiotic and biotic debris found in the screens during their examination for sea turtle or sturgeon parts shall be recorded and then disposed of so as not to impede the functioning of the screens during the next load cycle.

- a. **Monitoring Reports.** The results of the monitoring shall be recorded on the appropriate observation sheets. There is a sheet for each load, a daily summary sheet, and a weekly summary sheet. In addition, there shall be a post dredging summary sheet. Observations sheets shall be completed regardless of whether any takes of Atlantic sturgeon, whales, or sea turtles occur. In the event of any sea turtle or Atlantic Sturgeon take by the dredge, appropriate incident reporting forms shall be completed. Additionally, all specimens shall be photographed with a digital camera. These photographs shall be attached to respective reports for documentation. Dredging of subsequent loads shall not commence until all appropriate reports are completed from the previous dredging load to ensure completeness and thoroughness of documentation associated with the incidental take. Reports shall be submitted to the USACE within 24-hours of the take. Copies of the forms shall be legible. Observer forms may be accessed on the website indicated in Special Condition 57 below.
- b. **Endangered Species Observer(s).** A list of endangered species observer-biologists (ESOs) that have been NMFS-approved to monitor threatened/endangered species takes by hopper dredges can be obtained by contacting NOAA Fisheries' Northeast Region, Protected Resources Division. The main contact is Ms. Julie Crocker; she can be reached at julie.crocker@noaa.gov or 978-281-9300 ext.6530.
- c. **Manatee, Sea Turtle, Atlantic Sturgeon and Whale Sighting Reports.** Any take concerning a manatee, sea turtle, Atlantic sturgeon, or whale; or sighting of any injured or incapacitated manatees, sea turtles, or whales shall be reported immediately to the USACE by notifying the personnel indicated in the list in Special Condition 64 below. A copy of the incidental take report shall be provided within 24 hours of the incident. The Contractor shall also immediately report any collision with and/or injury to a manatee to the USFWS, the NMFS, and the NCWRC. If a sea turtle and/or Atlantic sturgeon is taken by the dredge (live or dead), the Contractor shall email a PDF version of the incidental take report to NOAA-Fisheries Southeast Region at the following email address within 24 hours of the take: takereport.nmfsser@noaa.gov, also providing a copy to the USACE Regulatory Project Manager.

54. The Contractor is required to participate in the Right Whale Early Warning System to protect North Atlantic right whales. If a right whale or any other species of whale is reported within the area, then the Contractor shall be required to follow the enclosed NMFS's Southeast Region Vessel Strike Avoidance Measures and Reporting for Mariners (revised February 2008) (Appendix B), except where specific measures below are in conflict, in which case the measures in this Opinion govern (e.g., a speed restriction to a maximum of 10 knots (kt) at all times in right whale calving areas [i.e., federally-protected areas off the southeastern U.S. coast designated and implemented for the protection of right whales and their calves during their calving/migration season] for vessels 65 ft in length or greater). By law, vessels shall maintain a 500-yd buffer between the vessel and any North Atlantic right whale [as required by federal regulation 50 CFR 224.103 (c)].
55. Turtles take by hopper dredge. Upon removal of sea turtle and/or parts from the drag head or screening, observers shall take photographs to sufficiently document major characteristics of the turtle or turtle parts including but not limited to dorsal, ventral, anterior, and posterior views. For all photographs taken, a backdrop shall be prepared to document the dredge name, observer company name, contract title, time, date, species, load number, location of dredging, and specific location taken (drag head, screening, etc.). Carcass/turtle parts shall also be scanned for flipper and Passive Integrated Transponder (PIT) tags. Any identified tags shall be recorded on the "Sea Turtle Incidental Take Form" that is included in the "Endangered Species Observer Program Forms" located on the website indicated in Special Condition number 57 below. Turtle parts which cannot be positively identified to species would be preserved by the observer(s) for later identification. A tissue sample shall be collected from any lethally taken sea turtle and submitted under the process stated in the Protocol for Collecting Tissue Samples from Turtles for Genetic Analysis found in the website listed in Special Condition 57 below. All genetic samples collected shall be submitted to NMFS within 30 days of collection and verification of submittal to NMFS shall be provided to the USACE Regulatory Project Manager. After all data collection is complete, the sea turtle parts shall be placed in plastic bags, labeled as to the time, date, and dredged reach of collection, kept frozen and transported to the NMFS Laboratory in Beaufort, North Carolina. If no local facility is capable of receiving the sea turtle/parts, they shall be marked (spray paint works well), weighted down and disposed of under the direction of the USACE Regulatory Project Manager.
56. Observer(s) would measure, weigh, scan for Passive Integrated Transponder (PIT) tags, and photograph any live turtle(s) incidentally taken by the dredge. If no tagging was identified, observers shall tag the turtle using Inconel flipper and PIT tags if they are qualified to do so. Observer(s) or their authorized representative shall coordinate with the USACE Regulatory Project Manager and NMFS to transport, as soon as possible, the live turtle(s) taken by the dredge to an approved rehabilitation facility in the project area.
57. The Contractor shall maintain a log detailing all incidents, including sightings, collisions with, injuries, or killing of manatees, sea turtles, Atlantic sturgeon, or whales occurring during the contract period. The data shall be recorded on forms available on the website as indicated in Special Condition number 15. All data in original form shall be forwarded directly to Wilmington District within 10 days of collection. Following project completion, a report summarizing the above incidents and sightings shall be submitted to the following:

a. Wilmington District Regulatory Contact: Josh.R.Pelletier@usace.army.mil

b. South Atlantic Dredging Projects: Jennifer.L.Owens@usace.army.mil

c. National Marine Fisheries Service

Protected Resources Branch

264th Avenue South

St. Petersburg, Florida 33701

d. North Carolina Wildlife Resources Commission

Matthew Godfrey

307 Live Oak Street

Beaufort, North Carolina 28516

58. Reporting Forms. In order to avoid use of outdated forms, the Contractor shall be directed to the following website for forms and attachments required under this permit. Links to these forms are under the heading Turtle Information, <http://dqm.usace.army.mil/odess/#/download>, (List of forms required under this permit include: Sea Turtle/Pre and Post-Hopper Dredging Project Checklist, Endangered Species Observer Program Forms and Sea Turtle Trawling Report).

1.8 NPS MITIGATION MEASURES:

GENERAL CONDITIONS

1. Dare County, as the Permittee, in coordination with USACE and the NPS, shall notify the FWS of the commencement of projects for the purposes of tracking incidental take of all listed species. If project-related activities will potentially adversely affect nesting shorebirds or active nesting habitat, the Permittee shall coordinate with the NPS, FWS, and NCWRC prior to proceeding. If the project is ongoing and shorebirds begin territorial or other nesting behaviors within the project area, the NPS shall implement no-work buffers around this activity.
2. The Permittee shall organize a meeting between representatives of the Contractor, FWS, NCWRC, NPS, the trained sea turtle monitor if it is other than the NPS and other species surveyors, as appropriate, to be held prior to the commencement of the work on any project. The meeting shall provide an opportunity for explanation and/or clarification of the conservation measures and T&Cs, and shall include the following, as appropriate:
 - Staging locations, and storing of equipment, including fuel stations;
 - Coordination with the surveyors on required species surveys;
 - Pipeline placement;
 - Minimization of driving within and around the Action Area;

- Follow up coordination during construction and post construction;
 - Direction of the work including progression of beach nourishment along the beach;
 - Plans for compaction monitoring;
 - Plans for escarpment surveys and
 - Names and qualifications of personnel involved in any required species surveys.
3. The Contractor's access points for construction vehicles shall be as close to the project site as possible. Construction vehicle travel down the beach shall be limited to the maximum extent possible.
- The Contractor may only use vehicles on the beach at night if escorted by trained endangered species observers.
 - The Contractor shall reduce the use of bulldozers at night to the minimum use required for safe operations as sand is being discharged.
 - During construction, the Contractor shall properly dispose of trash and food items 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.
 - Prior to sand placement, the Contractor shall remove to the maximum extent possible all derelict material, large amounts of rock, or other debris from the project fill area.
 - The Contractor shall coordinate pipeline placement with the NPS, NCDCM, USACE, FWS, and the NCWRC.
 - During dredging operations, the Contractor shall inspect material placed on the beach daily to ensure compatibility. If during the inspecting process non-beach compatible material, including large amounts of shell or rock, is or has been placed on the beach the Contractor shall stop work immediately and the NPS shall be notified by the Permittee and/or its contractors to determine the appropriate plan of action.
 - The Contractor shall advise construction personnel that there are civil and criminal penalties for harming, harassing, or killing ESA-listed species, which are protected under the Endangered Species Act of 1973.
 - The Contractor shall not use siltation barriers during construction due to high tidal flows and coarse sediment present within the action area so that ESA-listed species cannot become entangled or entrapped.

SEA TURTLES

- The Owner, Dare County, shall be responsible for ensuring continuous nightly beach patrols are performed by trained sea turtle monitors to locate any turtles that are stranded behind the dredge pipe on the beach and relocate them to the water's edge or resolve the situation according to directions by and in consultation with NPS.
- No-work buffers along the beach shall be established around sea turtle nests by trained sea turtle monitors in coordination with NPS.
- Within 14 days of completion of beach nourishment and prior to any tilling (if needed), a field meeting shall be held between the Owner, Contractor, and NPS, FWS and/or NCWRC to inspect the project area for compaction and determine whether tilling is needed. If it is determined that tilling is required for sea turtle nesting habitat suitability, the construction areas shall be tilled to a depth of 36 inches. Tilling shall occur landward of the wrack line and avoid all vegetated areas that are three square feet or greater, with a three-foot buffer around all vegetation. All tilling activity shall be completed prior to May 1 to the maximum extent practicable. In the case of projects that run until the April 30 nesting timeframe, any tilling activities required after May 1 shall be coordinated with the NPS, FWS, or NCWRC. If tilling occurs during shorebird nesting season, shorebird surveys shall be required prior to tilling.
- Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet shall be leveled and the beach profile shall be reconfigured to minimize scarp formation by the dates listed above. If the sand placement activities are completed during the early part of the sea turtle nesting and hatching season (May 1 through May 30), escarpments shall be leveled immediately, while protecting nests that have been relocated or left in place. If it is determined that escarpment leveling is required during the nesting or hatching season, the FWS or NCWRC shall provide a brief written authorization to the NPS within 30 days that describes methods to be used to reduce the likelihood of impacting existing nests.
- Sea turtle nesting surveys will be conducted by the NPS 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 (FWS 2017).
- The Contractor shall coordinate any sediment management activities with the NPS, regarding the need to restrict construction in the vicinity of active nest building by sea turtles.
- The Contractor shall only place beach compatible fill on the beach or in any associated dune system.
 - Beach compatible fill shall be sand comprised solely of natural sediment and shell material, containing no construction debris, toxic material, or other foreign matter, or large amounts of granular material, gravel, or rock. The beach compatible fill shall 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 area of proposed action. Beach compatible fill maintains the general character and functionality of the material occurring on the beach and in the adjacent dune and coastal system and meets the following criteria:
 - Beach compatible fill containing less than or equal to 5% fine-grained sediment (less than 0.0625 mm, considered silt, clay and colloids) by weight, unless sufficient sampling of the project area

indicates that the native sediment grain size distribution contains greater than 5% fine grained material, in which case compatible material would be considered the percentage of fine-grained native material plus no more than an additional 5% by weight;

- Beach compatible fill containing coarse gravel, cobbles or material retained on a .75-inch sieve in a percentage or size not greater than found on the native beach; and
 - Beach compatible fill that does not contain carbonate (i.e., shell) material that exceeds the average percentage of carbonate material on the native beach by more than 15% by weight.
- From May 1 through November 15, to the maximum extent practicable, excavations and temporary alteration of beach topography (outside of the active construction zone) by the Contractor shall be filled or leveled to the natural beach profile prior to 9:00 p.m. each day. This would help make the beach suitable for the sea turtles trying to nest.
 - During the sea turtle nesting season, the Contractor shall not extend the beach fill more than a certain length along the shoreline and shall confine work activities to this area between dusk and dawn of the following day until the daily nesting survey has been completed and the beach cleared for fill advancement. A trained sea turtle monitor shall be present on-site to ensure no nesting and hatchling sea turtles are present within the work area. Once the beach has been cleared and the necessary nest relocations have been completed, the Contractor will be allowed to proceed with the placement of fill and work activities during daylight hours until dusk, at which time the certain length limitation would apply. If a nesting sea turtle is sighted on the beach within the immediate construction area, activities shall cease immediately until the turtle has returned to the water and the party responsible for nest monitoring has relocated the nest.
 - If any work on the beach is conducted during the sea turtle nesting season (May 1 through November 15), the Contractor shall submit a lighting plan for the equipment and dredge that would be used in the project. The plan shall include a description of each light source that would be visible on or from the beach and the measures implemented to minimize this lighting. The plan shall be reviewed for approval by the NPS. During the nesting season, lighting associated with the project shall be minimized to reduce the possibility of disrupting and misdirecting nesting and/or hatchling sea turtles.
 - If any nesting turtles are sighted on the beach during construction by the NPS or the Permittee's trained sea turtle monitor, construction activities shall cease immediately until the turtle has returned to the water, and the site has been marked for avoidance or any nest(s) that may have been laid has been relocated. All sea turtle nests within the proposed work areas shall be relocated by the NPS. If a nesting sea turtle is observed at night, all work on the beach shall cease and all lights would be extinguished (except for those absolutely necessary for safety) until after the female has finished laying eggs and returned to the water.
 - Daily (before 9:00 am) nesting surveys and egg relocation shall be conducted by the NPS if any portion of the sand placement occurs during the period from May 1 through November 15. If sand is placed on the beach at night, a nighttime monitor shall survey the beach area that is affected that night, prior to the morning's normal nesting

activity survey. No daytime movement of equipment up or down the beach shall commence until completion of the sea turtle nesting survey each morning. If nests are laid within the project area, the nests shall be marked by the NPS and either avoided by the Contractor until completion of the project or relocated by the NPS. Daily coordination shall be conducted between sea turtle volunteers, the Contractor, and NPS to ensure that the beach has been adequately surveyed and nests marked, prior to beginning of work.

- Nesting surveys and nest marking shall only be conducted by personnel with prior experience and training in these activities, and who are duly authorized to conduct such activities through a valid permit issued by the FWS or the NCWRC.
 - Nesting surveys shall be initiated by the NPS or the Permittee's trained sea turtle monitor by May 1 and shall continue through the end of the project. If nests are constructed in areas where they may be affected by construction activities, the eggs shall be relocated to minimize sea turtle nest burial, crushing of eggs, or nest excavation.
 - Site selection for the relocated nest and methodology shall follow the Handbook for Sea Turtle Volunteers in North Carolina.
 - Only those nests that may be affected by construction or sand placement activities shall be relocated by the NPS or Permittee's trained sea turtle monitor. Nest relocation shall not occur upon completion of the project. For demobilization, nests shall be marked and avoided, if possible. Nests requiring relocation shall be moved no later than 9:00 am the morning following deposition to a nearby self-release beach site in a secure setting where artificial lighting shall not interfere with hatchling orientation. Relocated nests shall not be placed in organized groupings. Relocated nests shall be randomly staggered along the length and width of the beach in settings that are not expected to experience daily inundation by high tides or known to routinely experience severe erosion and egg loss, predation, or are subject to artificial lighting.
 - Nests deposited within areas where construction activities have ceased or will not occur for 65 days shall be marked for avoidance and left in situ unless other factors threaten the success of the nest by the NPS or Permittee's trained sea turtle monitor. Nests shall be marked with four stakes at a 10-foot distance around the perimeter of the nest for the buffer zone. The turtle permit holder shall install an on-beach marker at the nest site and a secondary marker at a point as far landward as possible to assure that future location of the nest would be possible should the on beach marker be lost. No activities that could result in impacts to the nest would occur within the marked area. Nest sites Contractor shall be inspected daily to assure nest markers remain in place and the nest has not been disturbed by the project activity.
- The Contractor shall ensure, from May 1 through November 15, staging areas for construction equipment shall be located off the beach to the maximum extent possible. Nighttime storage of construction equipment not in use shall be off the beach unless it is stored within 500 feet of the active construction zone, to minimize disturbance

to sea turtle nesting and hatching activities. In addition, all construction pipes placed on the beach shall be located as far landward as possible without compromising the integrity of the dune system. Pipes placed parallel to the dune shall be 5 to 10 feet away from the toe of the dune if the width of the beach allows. If pipes are stored on the beach, they shall be placed in a manner that would minimize the impact to nesting habitat and would not compromise the integrity of the dune systems.

- The Contractor shall conduct demobilization of equipment from the beach only during daylight hours, after the daily survey for sea turtle nests has been completed. Any nests that are identified shall be marked by NPS for avoidance and avoided during all demobilization activities. If it is expected that a nest cannot be avoided during demobilization, then it would be relocated by the NPS.

SHOREBIRDS

- The order of work (sections to be filled by the Contractor) shall be accomplished so that there would be the least practicable disruption to bird-nesting activities along the Seashore.
- Before start of work each morning, a visual survey will be conducted by the NPS or in the area of work for that day, to determine if piping plovers and red knots are present.
- If shorebirds are present in the work area, the Contractor shall ensure careful movement of equipment in the early morning hours to allow those individuals to move out of the area.
- The Contractor's construction operations shall always be carried out in a manner as to avoid negatively impacting shorebirds and allowing them to exit the area.
- The NPS will implement standard wildlife protection buffers around piping plover nests and chicks and exclude sediment management activities within those protection areas as authorized in the 2010 ORV Management Plan and BO.
- Additional mitigation measures may include surveys, monitoring, research studies, and construction methodologies. Allowance to work within the migratory and nesting seasons may include only a portion of the season.
- 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 by the Contractor shall consist of beach compatible sediment. Beach compatible material shall consist of sediments that are similar in composition, grain size distribution, and color to the native sediments of the recipient beaches.
- The Contractor's construction staging areas and pipeline routes shall be located to avoid high value inlet complex habitats for piping plovers and red knots to the maximum extent practicable.

- The Contractor’s personnel involved in the construction or sand placement process along the beach shall be trained to recognize the presence of piping plovers and red knots prior to initiation of work on the beach. Before start of work each morning, a visual survey shall be conducted in the area of work for that day, to determine if piping plovers and red knots are present. If piping plovers or red knots are present in the work area, careful movement of equipment in the early morning hours will allow those individuals to move out of the area. Construction operations shall not begin until individual plovers have exited the work area for the day
- Work areas within piping plover critical habitat, such as dredge footprint(s), pipeline corridors, travel corridors, and access points shall be clearly delineated. Disturbance within those delineated work areas shall be limited to the maximum extent possible, thereby minimizing effects to sandy, sparsely vegetated habitat within the project footprint. Driving on the beach for construction shall be limited to the minimum necessary within the designated travel corridor.

WORK LIMITS AND OTHER CONDITIONS

- Contractor work shall limit the creation of pits and steep side slopes by ploughing immediately following nourishment and selecting nourishment techniques based on site features to minimize the impact on benthic communities and the time for recovery.
- Project sites shall be surveyed for cultural resources by the NPS or other trained specialists if sites have not been previously surveyed.
- No-work buffers shall be established by the NPS around known cultural resources, in consultation with the SHPO.
- Should permitted sediment management activities unearth previously undiscovered archeological resources, work shall be stopped immediately in the area of such discovery, and the Contractor shall immediately contact the NPS. The NPS shall consult with the SHPO and the Advisory Council on Historic Preservation as necessary.
- The Contractor shall locate any temporary storage areas for construction equipment and pipelines off the beach to the maximum extent practicable.
- The Contractor shall provide to the NPS’s POC all daily and weekly reports that it may receive from any entity pertaining to any of the project’s operational and/or permitting requirements while the project is ongoing, including but not limited to: the Contractor’s daily quality control report, the daily and weekly dredging quality management report, the daily and weekly endangered species observation report, and the daily trawling report, including daily and weekly day-time turtle and bird monitoring reports, and daily and weekly night-time turtle monitoring reports.
- Additional mitigation measures which may be required and enforced by other agencies include:
 - The Contractor shall provide protected species observers to be stationed on dredges to alert dredging personnel and record encounters. This shall include authority to suspend operations while wildlife resources officials are contacted in the event of a take as defined under any consultation requirements.

- The Contractor shall ensure that if a North Atlantic right whale is spotted or reported within 28 nautical miles of a vessel, all vessels would slow to 10 knots or slowest safe navigable speed for 36 hours.
- The Contractor shall retain trained trawlers to trawl for sea turtles ahead of operating hopper dredges and relocate turtles if encountered or operate as non-capture trawling per final recommendations of NMFS.
- The Contractor shall be required to ensure proper installation and function of a rigid draghead deflector.
- The Contractor shall follow the FWS Guidelines for Avoiding Impacts to the West Indian Manatee-Precautionary Measures for Construction Activities in North Carolina Waters.
- Prior to any permitted dredging activities, proposed dredge areas shall be surveyed for hard bottom habitat, and no-dredge buffers shall be established around it, if found.
- Borrow areas shall be subject to state requirements which include a survey for the borrow site and pipeline location.

END OF SECTION

SECTION 2230 — BEACH NOURISHMENT

PART 1 — GENERAL

Work described in this Project Manual includes the provision of labor, materials, equipment, and services required to complete the Avon Village beach renourishment and Buxton beach renourishment, Dare County, North Carolina.

1.1 APPLICABLE PUBLICATIONS:

1.1.1 American Society for Testing and Materials (ASTM) publications:

A123 Zinc (hot galvanized) Coatings on Products Fabricated from Rolled, Presses and Forged Steel Shapes, Plates, Bars and Strip.

A153 Zinc Coating (Hot Dip) on Iron and Steel Hardware

1.1.2 American Wood Preservers Association (AWPA) Publications:

C18 Standard or Softwood Pressure Treated Material in Marine Construction

1.2 CONSTRUCTION CONTRACT: The project construction will be under a single Contract with the Owner (Dare County, North Carolina). The Owner expects all awarded portions of this Project to proceed with deliberate speed. Suspension of work on this project, in order to perform work on other projects, will not be allowed, unless otherwise provided for in these specifications due to safety considerations.

1.3 SUMMARY OF WORK:

Work consists of the following:

- A. Dredging by ocean-certified hopper dredge and/or cutterhead suction dredge, placement, grading, and environmental protection as specified under federal and state permits of up to 1,000,000 cubic yards on 13,200 linear feet of the Cape Hatteras National Seashore in front of the Village of **Avon** in two reaches identified as follows:
- 1) Reach 3 (4,000 linear feet from Stations 1550+00 to 1590+00) – Up to 200,000 cubic yards (Base Bid plus awarded unit-price quantities).
 - 2) Reach 4 (9,200 linear feet from Stations 1590+00 to 1682+00) – Up to 800,000 cubic yards (Base Bid awarded unit-price quantities).
- B. Dredging by ocean-certified hopper dredge and/or cutterhead suction dredge, placement, grading, and environmental protection as specified under federal and state permits of up to 2,500,000 cubic yards on 15,500 linear feet of the Cape Hatteras National Seashore including the portion in front of the Village of **Buxton** in two reaches identified as follows:
- 1) Reach 1 (4,500 linear feet from Stations 1880+50 to 1925+50) – Up to 1,250,000 cubic yards (Base Bid plus awarded unit-price quantities).
 - 2) Reach 2 (11,000 linear feet from Stations 1770+50 to 1880+50) – Up to 1,250,000 cubic yards (Base Bid plus awarded unit-price quantities).
- C. For the **Avon** nourishment project, sand is to be dredged from the designated offshore borrow areas situated approximately 2-3 miles offshore of Avon within state waters. The borrow areas encompasses a total of ~250

acres, and the maximum-allowed excavation depth of the southern ~180 acres is 8 ft below the existing grade and 6 ft below the existing grade in the remaining ~70 acres of area. The maximum volume available in the borrow area is ~2.9 million cubic yards.

- D. For the **Buxton** renourishment project, sand is to be dredged from the designated offshore borrow areas situated approximately 2-3 miles offshore of Buxton within state waters. The borrow areas encompasses a total of ~375 acres, and the maximum-allowed excavation depth is 8 ft below the existing grade. The maximum volume available in the borrow area is ~4.8 million cubic yards. These cut depths are the maximum permitted. In areas notated on sheet B9, the cut depth shall be restricted to the maximum depth of beach-quality material. As notated on sheet B9, that depth may be shallower than the maximum permitted depth.
- E. Underwater archaeological survey of the Avon and Buxton borrow areas confirm that no significant historical resources will be impacted by dredging operations within these areas. However; Contractor should note that a feature was present on the side-scan imagery near the northwestern corner of the southern Avon borrow area. The area has been excluded from the identified dredge area; however, Contractor should use caution when excavating in this vicinity and should avoid anchoring or placing subline around the identified feature.
- F. The Work shall to the extent practicable be conducted during fair-weather months. Dredging and placement operations will be subject to environmental protection measures as required in the state and federal permits, including open-net trawling for turtles ahead of the hopper dredge(s) during designated periods, use of deflectors and equipment modification onboard hopper dredges, use of Dredging Quality Management (DQM) onboard dredges, and use of certified endangered species monitors onboard dredges. Contractor must implement protection measures as specified in federal and state permits for the project (terms and conditions incorporated in Technical Specifications 01060 Regulatory Requirements of this Manual). Contractor's price to accomplish all Work is to include the cost of required environmental protection measures.
- G. The Owner reserves the right to revise the fill schedule before or during construction in order to establish a uniform beach for the designated lengths of the project reaches. Specifically, quantity may be shifted from the Reach 2 to Reach 1 should conditions warrant at the time of construction. Such alterations will not change the total awarded quantities to be placed. Should a shift occur, a minimum fill volume of 30 cy/ft will apply to any section to ensure efficient shoreside operations, excluding taper sections.
- H. Reach 4 (stations 1590+00 to 1682+00) of **Avon** and portion of Reach 1 (stations 1880+50 to 1915+00) of **Buxton** include construction of initial dunes as specified in the Drawings.
- I. If required, tilling of the beach in accordance with requirements specified in the Project Manual.
- J. Restoration of access, staging areas, and infrastructure to conditions existing before construction.
- K. Notice of Award will be issued on or before 22 March 2026.
- L. Notice to Proceed will be issued on or before 1 April 2026.
- M. Substantial Completion of Work under Bid A will be by 31 December 2026. All equipment must be removed from the beach by 31 December 2026.

1.4 OWNER'S SITE REPRESENTATIVE:

- A. Contractors shall cooperate with Owner's Site Representative to minimize conflict, and to facilitate Owner's operations.
- B. Contractor will provide all safety fencing, signage, barricades and other measurers required to ensure protection to public.

- 1.5 CRITERIA FOR BIDDING:** Bids shall be based on the total quantity of material to be dredged from the borrow area and placed on the beach to the final grades and quantities within the time period indicated in the Contract Documents, and meeting the environmental protection requirements under federal and state permits. Bids shall be based on the material to be dredged having the borrow area sediment characteristics, depth and location indicated in the Contract Documents. Fill quantities will be verified by survey of in-place fill within the design template. Compensating slopes will be allowed.

PART 2 – PROTECTION

2.1 DUNE RESTORATION AND PROTECTION:

- A. The Contractor shall exercise extreme care in conducting filling and equipment moving activities on the beach so that existing dunes and dune vegetation are protected to the greatest extent possible. Designated access areas are indicated on the Drawings. These areas include dune crossing routes and paved and unpaved areas behind the dunes for storage of equipment and materials. Restoration is required by the Contractor in the upland areas of any beach access used by equipment.
- B. If the Contractor wishes to place a new access anywhere other than existing accesses or dune escarpments at the designated staging-areas, he must first obtain approval from the Engineer.
- C. Any temporary pavement, stone or other temporary road base materials placed in the dunes or on any portion of the beach for the purposes of providing access roads for equipment shall be completely removed and the dune and beach area restored to pre-project grades. Debris from removal shall be the property of the Contractor and shall be disposed of in a manner meeting all local, state and federal regulations. Damage done to dune vegetation and existing elevation contours shall be restored to the pre-project conditions by the Contractor at no additional cost to the Owner. This restoration may include grading and replacement of vegetation including sprigging of beach grasses in the areas as directed by the Engineer.

- 2.2 ENVIRONMENTAL PROTECTION:** The Contractor shall provide all the necessary plant, equipment, labor and materials to provide the protection to environmental resources as required by the state and federal permits as incorporated in Section 1060, entitled “Regulatory Requirements.”

- 2.3 PROTECTION AND RESTORATION OF SHORE PROTECTION AND ACCESS STRUCTURES:** The Contractor shall be responsible for protecting existing structures located in or contiguous to the beach areas to be filled. Structures in the beach and adjacent areas include but are not limited to foundations, emergency sandbags, paved and unpaved roads, walkovers, and vegetation located along the shoreline as shown on the Drawings. The Contractor shall work seaward of existing structures and sufficiently away from each side of the existing structures to avoid damaging the structures.

- A. *Timber Repairs.* Repairs shall be made with stress rated, No. 1 structural, S4S, southern yellow pine of the dimensions required for replacement of the damaged structure to its pre-project condition. Treatment shall be 0.8 pounds per cubic foot CCA in accordance with AWPA C18 for timber subject to saltwater splash and 2.5 pound per cubic foot for timber subject to saltwater submersion. Hardware including nuts, bolts, nails, screws, and washers shall conform to ASTM A307 and shall be galvanized in accordance with requirements of ASTM A 123 and/or ASTM A 153, as applicable after fabrication.

PART 3 – PRODUCTS

3.1 BORROW MATERIAL: Only the borrow sites indicated in the Contract Documents shall be used for the Project. The Contractor shall endeavor to utilize the area within the permitted borrow areas as shown on the Drawings unless otherwise directed by the Engineer. The character of the borrow area materials to be used and the location of the borrow areas to be excavated are shown on the Drawings. If directed by the Engineer, the Contractor shall change the location and/or depth of excavation within the borrow limits when necessary to provide the best fill material available. Based on the analysis of the borings within the designated borrow areas off Avon and the borings within the designated borrow areas off Buxton, the materials to be excavated from the borrow areas are believed to be predominantly medium, clean sand with a mean grain size of ~0.25 to ~0.50 millimeters. The Contractor is responsible for monitoring the characteristics of the sand pumped to the beach on a continuous basis. If the Contractor discovers that material being pumped onto the beach contains mud, mud balls, gravel, or organic materials, the Contractor shall stop dredging immediately and relocate dredging to a different part of the borrow area where acceptable material is available.

One magnetic anomaly was identified in the Avon borrow areas. The anomaly appears to represent a modern signature and is not considered to be of historical significance.

The maximum depth of excavation allowed is **8 ft in the southern ~180 acres of the Avon borrow area and 4 to 6 ft in the northern ~70 acres of the Avon borrow area as notated on sheet A8**. The maximum aggregate volume in the Avon borrow area is **~2.9 million cubic yards**. The maximum depth of excavation allowed is **8 ft in the Buxton borrow areas**, and the maximum aggregate volume in the Buxton borrow area is **~4.8 million cubic yards**. In the southern borrow area off Buxton, there are variable recommended cut depths due to the presence of shelly material deeper than ~4 ft below grade. In those areas, notated on sheet B9, the Contractor shall follow the recommended cut depth in consultation with the Engineer. The Contractor shall not exceed the cut depth and allowance indicated on the plans for the borrow areas. If dredging is stopped by the Engineer or Owner because of unacceptable material being pumped to the beach, the Contractor is responsible for all associated delay costs. The Contractor is advised that geotechnical data in the designated borrow areas are limited to the information shown on the plans.

3.2 SUBSURFACE INVESTIGATIONS: The borrow area sediment characteristics shown on the Drawings are classified in accordance with the Wentworth Classification System. The borrow area location and depth of sediments information shown on the Drawings is to be used by the Contractor to maximize the quality of the fill materials and to optimize dredging operations to the benefit of the Contractor and the Owner.

PART 4 - EXECUTION

4.1 ORDER OF THE WORK: The Contractor is requested to submit the work plan prior to the commencement of dredging operations. The plan will be reviewed and approved by the Owner and the Engineer.

4.2 BEACH NOURISHMENT: Prior to placement of fill, the Contractor shall remove from the site of the work all snags, driftwood, and similar debris lying within the foundation limits of the beach fill that may interfere with his execution of the project section. All materials removed shall become the property of the Contractor and shall be disposed of in accordance with all applicable local, state and federal regulations. The excavated fill material shall be placed and brought to rest on the beach approximately to the lines, grades, and cross-sections indicated on the project Drawings, unless otherwise indicated by the Engineer. The beach is subject to changes, and the elevations on the beach at the time the work is performed may vary from the elevations

shown on the Drawings. The Engineer reserves the right to vary the width and grade of the beach from the lines and grades shown on the plans in order to establish a uniform beach for the designated lengths of the project reaches. Such alterations of grades by the Engineer will not change the total quantities to be dredged. The Contractor will not be required to grade the fill below the mid tide elevation. Grading and other construction equipment will not be permitted outside the construction limits of the project except for ingress and egress to and from the site.

- 4.2.1 *Distribution of Borrow Materials.* The Contractor is to utilize the area within the permitted borrow areas as shown on the Drawings. The Contractor shall dredge only within the boundaries of the designated offshore borrow areas unless otherwise directed by the Engineer. Relocation of dredging within the confines of the designated borrow areas may be required as indicated in section 3.1 of this specification.
- 4.2.2 *Work Area.* The beach areas where the beach nourishment is to be accomplished are shown on the Drawings. The Contractor shall accomplish the work in such a manner as to minimize disruption to beach activity. The Contractor will be permitted to exclude the public for safety purposes from the work areas in the immediate vicinity of his fill placement operations. Construction access is provided as shown on the Drawings. Procurement of additional access routes for ingress and egress to the construction area and/or temporary stockpiling of material shall be obtained by and at the expense of the Contractor and with consent of the Owner and the Engineer.
- 4.2.3 *Dikes and Confinement.* The Contractor may, at his discretion, construct temporary dikes, spillways and channelization on the beach as necessary to construct beach fill. All such diking shall be constructed above the mean low water elevation. Such diking as may be required to aid in controlling the seaward flow of material at discharge points shall also be provided when the material is discharged directly into the fill section. At the end of the beach fill placement operation, any back diking or embankments that are not incorporated in the work shall be graded to the existing surrounding elevations. If any material is deposited elsewhere than in places indicated on the Drawings, the Contractor may be required to remove such misplaced material and redeposit it where directed at his expense.
- 4.2.4 *Pipeline Discharge.* If the beach fill material is placed by discharging the material directly into the fill section, the dredge discharge points shall be manipulated and controlled by the Contractor in such a manner to minimize the direct discharge of material into the surf zone. The discharge shall be controlled by temporary diking, embankments, channeling, or other methods required to prevent damage to or erosion of the existing beach berm and dune.
- 4.2.5 *Submerged Pipelines.* In the event the Contractor elects to submerge his pipeline, the location of the submerged pipeline shall be marked with signs, buoys, and flags to comply with U. S. Coast Guard regulations.
 - 4.2.5.1 *Pipeline leakage.* A tight dredge discharge pipeline shall be maintained along all sections of the pipeline to prevent spilling of dredged effluent outside of the beach fill section or stockpiling area. The Contractor shall insure that the pipeline remains free of leaks. Should leaks in the pipeline occur, the Contractor shall immediately cease pumping operations until the pipeline leak is repaired.
 - 4.2.5.2 *Booster pumps.* In the event booster pumps are required along the dredge pipeline, they shall be located so as to minimize the disturbance of beach residents.

- 4.2.6 *Work Around Existing Structures (Piers, Outfalls, House Foundations, Sandbags and Beach Access Structures).* The Contractor shall exercise extreme caution around existing structures.
- 4.2.6.1 Piers. There is the Avon fishing pier along the project area near station 1590+00. Pipeline may be placed under the pier. Equipment ingress and egress is allowed where feasible under the pier. The Contractor shall fill under the pier to the extent practicable, without risking damage to the structure.
- 4.2.6.2 House Foundations. The Contractor shall exercise particular care near existing houses. No fill shall be placed directly under houses or landward of houses within the fill limits.
- 4.2.6.3 Sandbags. No sand shall be placed on any exposed sandbags.
- 4.2.6.4 Beach Access Structures. The Owner has identified public beach accesses and staging areas as shown on the Drawings. After completing the nourishment work, the Contractor is responsible for restoring the beach accesses, staging area(s), and any other disturbed infrastructure to original or better-than-original condition.
- 4.2.7 *Monitoring of Beach Fill Operations.* The Contractor shall provide full-time monitoring of the placement of the beach fill material to assure work is in accordance with the Contract Documents. Monitoring shall be provided until all work has been accomplished and clean-up of the premises has been completed. Full-time monitoring shall be defined as having a minimum of one Contractor representative in the area of the pipe discharge at all times during construction. This monitor shall have a portable radio with them at all times while monitoring the site. This radio will be used to issue instructions to the dredge(s) which are working within the borrow area.
- 4.2.8 *Protective Dune Construction.* The Contractor will be required to construct a protective dune above the normal fill berm elevation along all or a portion of Reach 4 in Avon (stations 1590+00 to 1682+00) and Reach 1 in Buxton (stations 1880+50 to 1915+00). The maximum elevation of the protective dune will be +13 ft NAVD. The typical crest width of the protective dune will be 20 ft, and the seaward slope will be at **1 on 3** (vertical versus horizontal). The protective dune will tie into the existing profile but in no circumstance encroach on existing vegetation or house foundations.
- 4.3 FINAL GRADING:** Upon completion of all filling operations, the beach fill shall be graded to eliminate any undrained pockets and abrupt humps and depressions in the beach fill surfaces. Any bank or escarpment caused by ocean wave erosion of the fill berm shall be graded down to a smooth slope as directed by the Engineer.
- 4.3.1 *Tolerances.* A tolerance of five-tenths (0.5) of one foot is provided for the berm elevations indicated on the Drawings. These tolerances are not applicable for payment. The Contractor will be responsible for final grading of material above the mean tide elevation. The Contractor may, at his discretion, place beach fill initially at higher berm elevations to facilitate handling and control of volumes. However, final berm elevations shall be as indicated on the Drawings.
- Note: Project beach is subject to high wave energy during certain periods of the year. The Engineer may modify the design berm elevation for any portion of the project if it results in greater efficiency of project execution. The Contractor is to complete the fill berm at elevations shown on the Plans unless otherwise instructed by the Engineer.*

Compensating slopes will be allowed for payment purposes. Contractor may construct a wider berm with steeper slope than identified in the plans to facilitate efficient construction. Compensating slopes should seek to place the design fill quantity at each section, and not exceed the volume tolerance (plus or minus 10%) for each fill section. Sand placed above the fill template along the slope will be considered pay quantity, up to 10% above the design fill volume for that section. Any sand placed seaward of the design toe of fill will not be considered pay quantity.

- 4.4 TILLING OF COMPLETED BEACH:** If required by the state and federal agencies, the completed beach shall be tilled from the high water mark to the landward extent of the beach fill, or, in the event the existing beach has been disturbed by construction equipment moving along the beach, to the landward extent of that disturbance. Tilling shall be to a depth of thirty-six (36) inches and the beach shall be raked smooth prior to final acceptance.
- 4.5 MEASUREMENT AND PAYMENTS:** The Contractor will survey beach fill volume changes between Before-Dredging (BD) conditions and After-Dredging (AD) profiles on the nourished beach. A preconstruction survey (BD) at the scheduled fill area shall be performed prior to construction but no more than one month prior to construction, to be paid for by the Contractor. Such survey may be performed as soon as possible after Notice to Proceed. No fill may be placed between any two stations until after those stations have a preconstruction survey performed and the survey is presented to and approved by the Engineer. Surveying shall be completed by a surveyor licensed to practice in the State of North Carolina and shall meet the requirements of this specification. The Engineer will perform spot-check surveys for verification.
- 4.5.1 *Acceptance and Payment.* Monthly and final applications for payment shall be accompanied with results of a beach survey, sealed and signed by a registered North Carolina Professional Land Surveyor.
- 4.5.2 *Payment Limits.* Placed volumes are shown in the Drawings at each station. If the cubic yards per foot placed falls more than 10 percent below the design volume at any station, the Contractor may be required to return to that station and place additional material. If the placed cubic yards per foot exceed the design volume in the Drawings, the Contractor will not be paid for more than 10 percent overage. In addition to this restriction, Final Payment may not exceed the total Awarded volume including the Base Bid and Alternates awarded. The Contractor may include in volume calculations for designated reaches of beach, documented volumes of fill material on the beach beyond the ends of the taper sections in each designated reach to a maximum of 500 linear feet in either direction. Survey of extended reaches shall meet the specifications for survey of the designated project fill areas. Such volumes will be made part of, but not additional to, the indicated reach volume.
- 4.5.3 *Compensating Slope Adjustment.* The Contractor will not be required to grade the fill below the mid tide elevation (around -0.45 ft NAVD). Material placed above the portion of the fill template above the mid tide level can be used to offset deficiencies in filling the template below that level. Compensating volume will only be paid up to the volume contained landward of the toe of the template shown in the Drawings and specified in Section 4.5.2.
- 4.5.4 *Survey Control and Baseline Reference:* All surveying by the Contractor and survey data provided to the Engineer shall be referenced to the project baseline shown on the Drawings. Beach transect stations shall be referenced to the baseline by baseline station and offsets based on the baseline as the zero (0.0) offset point. Elevations in all data sets shall be in feet relative to National American Vertical Datum of 1988 (NAVD'88). Data provided to the Engineer not in accordance with these requirements shall be rejected. If professional time is required by the Engineer to reconcile data provided not meeting these requirements,

fees for that time shall be billed to the Contractor. Progress and final payments will not be approved until survey data and computed volumes have been received and approved by the Engineer.

- 4.5.5 *Survey Limits:* Survey beach transects shall be at minimum 100-ft spacing between transects. In the cross-shore direction, surveys shall extend backshore to at least the dune crest at the time of construction or to a point a minimum of 50 ft beyond the landward extent of the fill section. In the offshore direction, no payment will be made for fill claimed (1) seaward of the Contractor's AD survey limit on that station or (2) deeper than 20 ft below NAVD.

4.6 REPORTING REQUIREMENTS:

- 4.6.1 *Surveying Reporting Requirements.* Survey documentation shall be submitted with each pay request and shall consist of the following:
- a. Before- and After-Dredging electronic data files for each line containing station number, survey date, and ordered distance/elevation pairs. Elevations will be in feet relative to the datum shown on the Drawings.
 - b. Survey records and volume computation sheets.
 - c. A sheet listing volume changes at each station.
- 4.6.2 *Progress Surveying Submittal Requirements.* The Contractor shall submit the raw, non-processed, survey data to the Engineer within 24 hours after each survey. The Contractor shall submit draft electronic Excel-spreadsheet data files by noon after each day of dredging, in the form of 4.6.1.a above. The Engineer will provide email addresses for transmission. This file will contain Before- and After-Dredging profiles for each 100-ft section completed the previous day. These draft data files need not necessarily have been checked by a licensed surveyor, but are the Contractor's best available information for determining volumes placed during the previous day's work. The purpose of this immediate reporting requirement is to allow for monitoring of placement volumes and adjustments in the placement rate (cubic yards/linear foot of beach) by the Engineer when significant under or over filling is discovered.
- 4.6.3 *Construction Photographs.* Provide periodic construction photographs in a digital format of the project area showing the specific reach of beach filled before and after filling operations are completed. Provide prints and digital files of photographs with print labeled to identify date and the work area by station and reach corresponding to the stations and reaches defined in the Drawings. Deliver prints and digital files to the Engineer.

4.7 QUALITY CONTROL:

- 4.7.1 *Reporting Requirements:* The Contractor shall maintain records of daily estimated production, both pumping and surveyed in-place (may be unofficial based on non-certified BD and AD surveys), delays, and other interruptions in the work. A record of each day (24-hour period) shall be submitted to the Engineer on the Quality Control form attached to this specification or on a form utilized by the Contractor that provides the same information.

END OF SECTION