



NORTH CAROLINA
Environmental Quality

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

BRAXTON C. DAVIS
Director

January 31, 2020

MEMORANDUM

CRC-20-06

TO: Coastal Resources Commission
FROM: Ken Richardson, *Shoreline Management Specialist*
SUBJECT: 15A NCAC 07H .0312 Technical Standards for Beach Fill Projects

Background

The Coastal Resources Commission (CRC) adopted 15A NCAC 07H.0312 Technical Standards for Beach Fill Projects with an original effective date of February 1, 2007. The CRC adopted the rule to ensure that sand used for beach nourishment closely matches the sand on the existing beach. The rule requires that the sediment intended for beach placement as well as the sand on the existing beach be analyzed for grain size and composition, and be within defined ranges of similarity before the project begins.

The Technical Standards for Beach Fill Projects Rule sets forth the protocols for: a) characterizing the “native” or “recipient” beach sediments prior to a fill project, b) sampling and characterizing potential borrow area sediments, and c) ensuring that the two are compatible. Native beach sediment characterization is the process of defining the type of sand found on the beach prior to the construction of a beach fill project. Sediment standards ensure that material placed on beaches is not too fine (mud or clay), or too coarse (rocks and large shells), in order to construct a new beach that is generally made up of sediments similar to pre-project beach sediments. Sediment standards and compatibility requirements can impact the performance of a nourishment project over time, recreational and aesthetic values of the beach, and habitat values for beach infauna, shorebirds, sea turtles, and other species. This Rule also establishes general standards for excavation and beach placement of sediment.

Since 2007, this Rule has been amended to change the requirements for seafloor surveys and geophysical imaging of the seafloor in areas with water depths of less than 10 feet due to the technical challenges and physical limitations of surveying at these shallow depths. The rule has also been previously revised to reduce the required density of sediment cores and associated costs



in areas like Ocean Dredged Material Disposal Sites (ODMDSs), and in maintained navigation channels and associated sediment basins that have historically held and been re-filled with beach-quality sand.

The current sampling protocol associated with the sediment criteria rules is highly precise with regards to sample design, spacing, numbers of cores, etc. This precision can limit flexibility in sample design and can also limit the ability of communities to pursue small projects or respond to nourishment opportunities in a short period of time. The sampling protocol can also limit applicants' ability to use existing data from past projects. Additionally, the sampling protocol may eliminate the ability of communities to take advantage of beneficial use projects (e.g. inlet dredging) that present themselves late in the planning process (i.e. too late to be able to hire a firm and/or mobilize to take the extra samples required).

The proposed rule amendments were approved by the CRC in February 2018 and serve two purposes: 1) meet Session Law 2017-10 (S131) Section 3.15 mandate to exempt sediment characterization of beaches receiving the material from a cape shoal, and borrow areas within the cape shoal system (such as Frying Pan Shoals at Cape Fear, Cape Lookout Shoals, and Diamond Shoals), and; 2) to eliminate the rigid data sampling protocol in favor of a simpler process where the project's consultant or engineer is allowed flexibility to design a sampling protocol that assures sediment compatibility between the beach and borrow area. The rules will retain existing standards for the various grain sizes (e.g. the percentage of "fines" shall not exceed more than 5% over the recipient beach), but substitute language similar to that in the terminal groin legislation (Section 1. G.S. 113A-115.1(e)(4), which requires the applicant's consultant/engineer attest to sediment compatibility from borrow sites (*"Compatibility with these sediment standards shall be documented by a professional engineer licensed to practice pursuant to Chapter 89C of the General Statutes."*))

At the September 2019 meeting, the CRC approved the fiscal analysis associated with proposed rule amendments to 15A NCAC 07H.0312: Technical Standards for Beach Fill Projects. However, after reflecting on previous beach fill projects that resulted in large material (>3 inches in diameter) being placed on the beach, Staff became concerned that the proposed amendments still needed additional clarification and strengthened standards for recipient beach characterization, to help avoid challenges with enforcing the removal of large, incompatible material (e.g. rocks, rubble) during future beach fill projects. Staff's recommendation would require a single sampling event to characterize existing large diameter material on a recipient beach using the proposed methodology, which would then serve as the baseline for all subsequent projects at a particular beach. DCM recognizes that this additional sampling requirement would result in a one-time additional cost to communities, and this would be the subject of an amended fiscal analysis for consideration by the Commission for the proposed rule. Staff is seeking the CRCs approval to develop additional proposed amendments to 07H.0312, to add to the amendments approved by the CRC in February 2018. Staff specifically proposes to incorporate changes to the following rules to further strengthen the methodology for characterizing the recipient beach:



- **07H .0312(1):** Clarify the intent to allow past recipient / native beach characterizations to serve as the baseline for all future projects; except that sediment characterization of material greater than 3 inches in diameter must adhere to amended standards that, once sampled one time, would serve as the baseline for all future projects.
- **07H .0312(1)(h):** The February 2018 proposed amendment reduces the maximum transect spacing from approximately one mile to one-half mile, and requires material greater than 3 inches in diameter to be counted for a 3 square meter area at each sample site between MLW and the front dune toe. This was an initial attempt to change the current method of sampling large materials within a single 50,000 sq. ft. area to a transect-based survey method. Although this would spread the sampling across the length of the beach fill project, a 3 square meter per sampling site standard would significantly reduce total area compared to the current requirement. Staff will propose amendments to require sampling at each transect, instead of at a single area.
- In addition, Staff is interested in gaining stakeholder input on differentiating between shell and rock material greater than 3 inches in diameter. Currently, all material greater than 3 inches in diameter is counted.

Staff is seeking the CRCs approval to provide additional draft amendments to the Technical Standards for Beach Fill Projects (15A NCAC 07H.0312) for the CRC to consider at their April meeting.



ATTACHMENT A: February 2018 Proposed Amendments to 15A NCAC 07H.0312

15A NCAC 07H .0312 TECHNICAL STANDARDS FOR BEACH FILL PROJECTS

Placement of sediment along the oceanfront shoreline is referred to in this Rule as "beach fill." Sediment used solely to establish or strengthen dunes shall conform to the standards contained in 15A NCAC 07H .0308(b), or Sediment used to re-establish state-maintained transportation corridors across a barrier island breach in a disaster area as declared by the Governor is not considered a beach fill project under this Rule. Beach fill projects including beach nourishment, dredged material disposal, habitat restoration, storm protection, and erosion control may be permitted under the following conditions:

- (1) The applicant shall characterize the recipient beach according to the following methodology. Initial characterization of the recipient beach shall serve as the baseline for subsequent beach fill projects:
 - (a) Characterization of the recipient beach is not required for the placement of sediment directly from and completely confined to a cape shoal system, or maintained navigation channel or associated sediment basins within the active nearshore, beach or inlet shoal system. system; For purposes of this rule, "cape shoal systems" include the Frying Pan Shoals at Cape Fear, Lookout Shoals at Cape Lookout, and Diamond Shoals at Cape Hatteras;
 - (b) Sediment sampling and analysis shall be used to capture the three-dimensional spatial variability of the sediment characteristics including grain size, sorting and mineralogy within the natural system;
 - (c) Shore-perpendicular transects shall be established for topographic and bathymetric surveying of the recipient beach. beach shall be conducted to determine the beach profile. Each transect shall extend from the frontal dune crest seaward to a depth of 20 feet (6.1 meters) or to the shore-perpendicular distance 2,400 feet (732 meters) seaward of mean low water, whichever is in a more landward position. Transect spacing shall not exceed one half mile 5,000 feet (1,524 meters) in the shore-parallel direction; direction. Elevation data for all transects shall be referenced to the North American Vertical Datum of 1988 (NAVD 88) and the North American Datum of 1983 (NAD 83);
 - (d) No fewer than 13 sediment samples shall be taken along each beach profile transect. Along each transect, at At least one sample shall be taken from each of the following morphodynamic zones where present: frontal dune, frontal dune toe, mid berm, mean high water (MHW), mid tide (MT), mean low water (MLW), trough, bar crest and at even depth increments from 6 feet (1.8 meters) to 20 feet (6.1 meters) or to a shore-perpendicular distance 2,400 feet (732 meters) seaward of mean low water, whichever is in a more landward position. The total number of samples taken landward of MLW shall equal the total number of samples taken seaward of MLW;
 - (e) For the purpose of this Rule, "sediment grain size categories" are defined as "fine" (less than 0.0625 millimeters), "sand" (greater than or equal to 0.0625 millimeters and less than 2 millimeters), "granular" (greater than or equal to 2 millimeters and less than 4.76 millimeters) and "gravel" (greater than or equal to 4.76 millimeters and less than 76 millimeters). Each sediment sample shall report percentage by weight of each of these four grain size categories;
 - (f) A composite of the simple arithmetic mean for each of the four grain size categories defined in Sub-Item (1)(e) of this Rule shall be calculated for each transect. A grand mean shall be established for each of the four grain size categories by summing the mean for each transect and dividing by the total number of transects. The value that characterizes grain size values for the recipient beach is the grand mean of percentage by weight for each grain size category defined in Sub-Item (1)(e) of this Rule;
 - (g) Percentage by weight calcium carbonate shall be calculated from a composite of all sediment samples. samples along each transect defined in Sub-Item (1)(d) of this Rule. The value that characterizes the carbonate content of the recipient beach is a grand mean calculated by summing the average percentage by weight calcium carbonate for each transect and dividing by the total number of transects. For beaches on which fill activities have taken place prior to the effective date of this Rule, the Division of Coastal



- Management shall consider visual estimates of shell content as a proxy for carbonate weight percent;
- (h) The ~~total~~ number of sediments and shell material greater than or equal to three inches (76 millimeters) in diameter shall be calculated through visual observation at each transect within the beach fill project boundaries for an observable 3 square meter surface area of the beach for each sample point between mean low (MLW) and the front dune toe as defined in Sub-Item (1)(d) of this rule. ~~diameter, observable on the surface of the beach between mean low water (MLW) and the frontal dune toe, shall be calculated for an area of 50,000 square feet (4,645 square meters) within the beach fill project boundaries. This area is considered a representative sample of the entire project area. A grand mean shall be calculated for all transects~~ and referred to as the "background" value;
 - (i) Beaches that received sediment prior to the effective date of this Rule shall be characterized in a way that is consistent with Sub-Items (1)(a) through (1)(h) of this Rule and shall use data collected from the recipient beach prior to the addition of beach fill. If such data were not collected or are unavailable, a dataset best reflecting the sediment characteristics of the recipient beach prior to beach fill shall be developed in coordination with the Division of Coastal Management; and
 - (j) All data used to characterize the recipient beach shall be provided in digital and hardcopy format to the Division of Coastal Management upon request.
- (2) Characterization of borrow areas is not required if completely confined to a cape shoal system. For purposes of this rule, "cape shoal systems" include the Frying Pan Shoals at Cape Fear, Lookout Shoals at Cape Lookout, and Diamond Shoals at Cape Hatteras. The applicant shall characterize the sediment to be placed on the recipient beach according to the following methodology:
- (a) The characterization of borrow areas including submarine sites, upland sites, and dredged material disposal areas shall be designed to capture the three-dimensional spatial variability of the sediment characteristics including grain size, sorting and mineralogy within the natural system or dredged material disposal area;
 - (b) The characterization of borrow sites shall include historical sediment characterization data collected using methods consistent with Sub-Items (2)(c) through (2)(g) of this Rule; (sediment characterization data provided by the Division of Coastal Management where available. These data can be found in individual project reports and studies, and shall be provided by the Division of Coastal Management upon request and where available;
 - (c) Seafloor surveys shall measure elevation and capture acoustic imagery of the seafloor. Measurement of seafloor elevation shall cover 100 ~~percent, percent~~ percent or the maximum extent practicable, of each submarine borrow site and use survey-grade swath sonar (e.g. multibeam or similar ~~technologies, technologies~~) in accordance with current US Army Corps of Engineers standards for navigation and dredging. Seafloor imaging without an elevation component (e.g. sidescan sonar or similar technologies) shall also cover 100 ~~percent, percent~~ percent or the maximum extent practicable, of each borrow ~~site, site and be performed in accordance with US Army Corps of Engineers standards for navigation and dredging.~~ Because shallow submarine areas can provide technical challenges and physical limitations for acoustic measurements, seafloor imaging without an elevation component may not be required for water depths less than 10 feet (3 meters). Alternative elevation surveying methods for water depths less than 10 feet (3 meters) may be evaluated on a case-by-case basis by the Division of Coastal Management. Elevation data shall be tide- and motion-corrected and referenced to NAVD 88 and NAD 83. Seafloor imaging data without an elevation component shall be referenced to the NAD 83. All final seafloor survey data shall conform to standards for accuracy, quality control and quality assurance as set forth by the US Army Corps of Engineers (USACE). The current surveying standards for navigation and dredging can be obtained from the Wilmington District of the US Army Corps of Engineers (USACE), USACE. For offshore dredged material disposal sites, only one set of imagery without elevation is required. Sonar imaging of the seafloor without elevation is not required for borrow sites completely confined to maintained navigation channels, sediment deposition basins within the active nearshore, beach or inlet shoal system;
 - (d) Geophysical imaging of the seafloor subsurface shall be used to characterize each borrow site, site and shall use survey grids with a line spacing not to exceed 1,000 feet (305



meters). Offshore dredged material disposal sites shall use a survey grid not to exceed 2,000 feet (610 meters) and only one set of geophysical imaging of the seafloor subsurface is required. Survey grids shall incorporate at least one tie point per survey line. Because shallow submarine areas can pose technical challenges and physical limitations for geophysical techniques, subsurface data may not be required in water depths less than 10 feet (3 meters), and the Division of Coastal Management shall evaluate these areas on a case-by-case basis. Subsurface geophysical imaging shall not be required for borrow sites completely confined to maintained navigation channels, sediment deposition basins within the active nearshore, beach or inlet shoal system, or upland sites. All final subsurface geophysical data shall use accurate sediment velocity models for time-depth conversions and be referenced to NAD 83;

- (e) Sediment sampling of all borrow sites shall use a vertical sampling device no less than 3 inches (76 millimeters) in diameter. Characterization of each borrow site shall use no fewer than ~~one core every 23 acres, five evenly spaced cores or one core per 23 acres (grid spacing of 1,000 feet or 305 meters), whichever is greater.~~ Characterization of borrow sites completely confined to maintained navigation channels or sediment deposition basins within the active nearshore, beach or inlet shoal system shall use no fewer than five evenly spaced vertical samples per channel or sediment basin, or sample spacing of no more than 5,000 linear feet (1,524 meters), whichever is greater. Two sets of sampling data (with at least one dredging event in between) from maintained navigation channels or sediment deposition basins within the active nearshore, beach or inlet shoal ~~system, or offshore dredged material disposal site (ODMDS)~~ system may be used to characterize material for subsequent nourishment events from those areas if the sampling results are found to be compatible with Sub-Item (3)(a) of this Rule. In submarine borrow sites other than maintained navigation channels or associated sediment deposition basins within the active nearshore, beach or inlet shoal system where water depths are no greater than 10 feet (3 meters), geophysical data of and below the seafloor are not ~~required, required, and~~ sediment sample spacing shall be no less than one core per six acres (grid spacing of 500 feet or 152 meters). Vertical sampling shall penetrate to a depth equal to or greater than permitted dredge or excavation depth or expected dredge or excavation depths for pending permit applications. All sediment samples shall be integrated with geophysical data to constrain the surficial, horizontal and vertical extent of lithologic units and determine excavation volumes of compatible sediment as defined in Item (3) of this Rule; ~~Because shallow submarine areas completely confined to maintained navigation channel or associated sediment basins within the active nearshore, beach or inlet shoal system can pose technical challenges and physical limitations for vertical sampling techniques, geophysical data of and below the seafloor may not be required in water depths less than 10 feet (3 meters), and the Division of Coastal Management shall evaluate these areas on a case by case basis;~~
- (f) For offshore dredged material disposal sites, the grid spacing shall not exceed 2,000 feet (610 meters). Characterization of material deposited at offshore dredged material disposal sites after the initial characterization are not required if all of the material deposited complies with Sub-Item (3)(a) of this Rule as demonstrated by at least two sets of sampling data with at least one dredging event in between;
- (g)(f) Grain size distributions shall be reported for all sub-samples taken within each vertical sample for each of the four grain size categories defined in Sub-Item (1)(e) of this Rule. Weighted averages for each core shall be calculated based on the total number of samples and the thickness of each sampled interval. A simple arithmetic mean of the weighted averages for each grain size category shall be calculated to represent the average grain size values for each borrow site. Vertical samples shall be geo-referenced and digitally imaged using scaled, color-calibrated photography;
- (h)(g) Percentage by weight of calcium carbonate shall be calculated from a composite sample of each core. A weighted average of calcium carbonate percentage by weight shall be calculated for each borrow site based on the composite sample thickness of each core. Carbonate analysis is not required for sediment confined to maintained navigation channels or associated sediment deposition basins within the active nearshore, beach or inlet shoal system; and



- (1)(h) All data used to characterize the borrow site shall be provided in digital and hardcopy format to the Division of Coastal Management upon request.
- (3) Compliance with these sediment standards shall be certified by an individual licensed pursuant to Chapter 89C or 89E of the N.C. General Statutes. The Division of Coastal Management shall determine sediment compatibility is determined according to the following criteria:
- Sediment completely confined to the permitted dredge depth of a maintained navigation channel or associated sediment deposition basins within the active nearshore, beach or inlet shoal system is considered compatible if the average percentage by weight of fine-grained (less than 0.0625 millimeters) sediment is less than 10 percent;
 - The average percentage by weight of fine-grained sediment (less than 0.0625 millimeters) in each borrow site shall not exceed the average percentage by weight of fine-grained sediment of the recipient beach characterization plus five percent;
 - The average percentage by weight of granular sediment (greater than or equal to 2 millimeters and less than 4.76 millimeters) in a borrow site shall not exceed the average percentage by weight of coarse-sand sediment of the recipient beach characterization plus 10 percent;
 - The average percentage by weight of gravel (greater than or equal to 4.76 millimeters and less than 76 millimeters) in a borrow site shall not exceed the average percentage by weight of gravel-sized sediment for the recipient beach characterization plus five percent;
 - The average percentage by weight of calcium carbonate in a borrow site shall not exceed the average percentage by weight of calcium carbonate of the recipient beach characterization plus 15 percent; and
 - Techniques that take incompatible sediment within a borrow site or combination of sites and make it compatible with that of the recipient beach characterization shall be evaluated on a case-by-case basis by the Division of Coastal Management.
- (4) Excavation and placement of sediment shall conform to the following criteria:
- ~~Sediment excavation depths for all borrow sites shall not exceed the maximum depth of recovered core at each coring location;~~
 - (a)(b) In order to protect threatened and endangered species, and to minimize impacts to fish, shellfish and wildlife resources, no excavation or placement of sediment shall occur within the project area during any moratoriums times designated by the Division of Coastal Management in consultation with other State and Federal agencies, unless specifically approved by the Division of Coastal Management in consultation with other State and Federal agencies, agencies. The time limitations shall be established during the permitting process and shall be made known prior to permit issuance; and
 - (b)(c) A post-placement grand mean for sediment Sediment and shell material with a diameter greater than or equal to three inches (76 millimeters) shall be re-calculated according to the methodology described in Sub-Item (1)(h) of the Rule, and is considered incompatible if it has been placed on the beach during the beach fill project, is observed between MLW and the frontal dune toe, and is in excess of twice the grand mean background value of material within the boundaries of the beach fill project as observed, measured and calculated prior to the beach fill project, of the same size along any 50,000 square foot (4,645 square meter) section of beach. In the event that more than twice the background value of incompatible material is placed on the beach, it shall be the permittee's responsibility to remove the incompatible material in coordination with the Division of Coastal Management and other State and Federal resource agencies.

History Note: Authority G.S. 113-229; 113A-102(b)(1); 113A-103(5)(a); 113A-107(a); 113A-113(b)(5) and (6); 113A-118; 113A-124;
 Eff. February 1, 2007;
 Amended Eff. August 1, 2014; September 1, 2013; April 1, 2008.

