SEDIMENT QUALITY ASSURANCE/QUALITY CONTROL PLAN

DUVAL COUNTY BEACH NOURISHMENT PROJECT

FDEP Permit No. 0228528-005-JC

PERMITTEE: City of Jacksonville, Florida

20 July 2015

A. INTRODUCTION

The project will place beach-compatible sand fill along portions of the Duval County, Florida ocean shoreline from an offshore borrow source. Although the City of Jacksonville, as the project's local sponsor, is the Permittee for the FDEP Permit No. 0228528-005-JC, the U. S. Army Corps of Engineers (USACE) will administer the beach construction contract associated with this permit. Therefore, USACE and the USACE construction contractor will implement the appropriate actions described in this plan.

Pursuant to Fla. Admin. Code (FAC) r. 62B-41.008 (1) (k) 4.b., permit applications for inlet excavation, beach restoration, or nourishment shall include a quality assurance/control plan that will ensure that the sediment from the borrow areas to be used in the project will meet the standard in 62B-41.007(2)(j) FAC. To protect the environmental functions of Florida's beaches, only beach compatible fill shall be placed on the beach or in any associated dune system. Beach compatible fill is material that maintains the general character and functionality of the material occurring on the beach and in the adjacent dune and coastal system.

The USACE has conducted geotechnical investigations that provide adequate data concerning the character of the sediment and the quantities available within the spatial limits of the permitted borrow area(s). The Permittee has provided an analysis of the existing or native sediment and the sediment within the permitted borrow area(s) based upon USACE investigations that demonstrates its compatibility with the naturally occurring beach sediment in accordance with 62B-41.007(2)(j) FAC. The sediment analysis and volume calculations were performed using established industry standards.

Based upon this information and the design of the borrow area(s), the Department of Environmental Protection (Department) has determined that use of the sediment from the borrow area(s) will maintain the general character and functionality of the sediment occurring on the beach and in the adjacent dune and coastal system. Furthermore, this information and the borrow area design provides sufficient quality assurance/quality control (QA/QC) that the mean grain size and carbonate content of the sediment from the borrow area(s) will meet the requirements of 62B-41.007(2)(j) FAC; hence, additional QA/QC procedures are not required for these sediment parameters during construction.

This plan outlines the responsibilities of each stakeholder in the project as they relate to the placement of beach compatible material on the beach. These responsibilities are in response to the possibility that non-beach compatible sediments may exist within the borrow area(s) and could be unintentionally placed on the beach. **Section C - Quality Control (QC) Plan** specifies the minimum construction management,

inspection and reporting requirements placed on the Marine Dredging Contractor and enforced by the USACE, to ensure that the sediment from the borrow area(s) to be used in the project meet the compliance specifications. **Section D - Quality Assurance (QA) Plan** specifies the minimum construction oversight, inspection and reporting requirements to be undertaken by the USACE on behalf of the Permittee to observe, sample, and test the placed sediments to verify the sediments are in compliance.

B. SEDIMENT QUALITY SPECIFICATIONS

1. Beach fill material shall be beach compatible and meet the specifications required by Florida Administrative Codes 62B-41.007 (j). In addition the fill shall meet the following requirements.

2. Beach fill material shall be clean sand/ from a permitted source, free of construction debris, asphalt, clay balls, branches, leaves and other organics, oil, pollutants and any other non-beach-compatible materials. The sand shall be similar to the existing beach sediments in color and texture and shall not contain rocks or large shell or any other non-beach compatible material in excess of 50% of background of the existing beach.

3. The grain size of the fill material shall conform to the following, by weight measure (all sieve sizes refer to U.S. Std. sieves):
   (a) not more than 5% finer than the No. 230 sieve
   (b) not more than 5% coarser than the No. 4 sieve, and
   (c) not more than 0.5% coarser than 3/4-inch sieve.

4. The mean grain size shall be between 0.18 and 0.4 mm.

5. Carbonate content shall be less than or equal to 18%.

6. Sand color, based upon the Munsell Scale and when graded on the 2.5YR, 7.5YR or 10YR Hues, shall have a Value of at least 6 or higher and in moist sample conditions.

7. The compliance specifications take into account the variability of sediment on the native or existing beach, and are values which may reasonably be attained given what is known about the borrow area sediment. Beach fill material which falls outside of these limits will be considered unacceptable and subject to remediation, excepting to the extent that it is determined through sampling that the natural beach exceeds any of the limiting parameters listed in **Table 1**, then the fill material shall not exceed the naturally occurring level for that parameter.

8. The compliance values described above and summarized in **Table 1** refer to the average values assessed over 10,000 square feet area of the placed fill material in accordance with 62B-41.007(2)(j) FAC. Owing to the natural variability of the fill material, it is recognized that individual samples may deviate from the specified compliance values.

Table 1- Sediment Compliance Specifications

Sediment Parameter	Parameter Definition	Compliance Value
Max. Silt Content	passing #230 sieve	**≤ 5%**
Max. Gravel Content*	retained on #4 sieve	**≤ 5%**
Large whole shell & lag content	wt. retained on ¾" sieve	**≤ 0.5%**
Munsell Color Value	moist Hue - Value/chroma	**2.5-7.5 YR 6/2 or lighter (≥ 5.0 Value; ≤ 2.0 Chroma)**
Mean grain size		**0.18 to 0.4 mm**
Carbonate Content		**≤ 18%**
The beach fill material shall not contain construction debris, toxic material, other foreign matter, coarse gravel or rocks.		

*Gravel Content is used as the indicator of shell content for the implementation of quality control/quality assurance procedures.

C. QUALITY CONTROL PLAN

The contract documents shall incorporate the following technical requirements, or equivalent language that addresses the location of dredging, sediment quality monitoring on the beach, and, if necessary, remedial actions. The USACE will seek to enforce these contract requirements during the execution of work.

1. **Electronic Positioning and Dredge Depth Monitoring Equipment**. Dredge plants will be equipped with horizontal and vertical control systems that provide the operator with the position of the excavation device, as appropriate. The electronic positioning equipment will be continuously operated to monitor the positioning of the dredge location(s) and depths. The dredge positioning equipment will have a horizontal accuracy equal to or better than plus/minus 5 feet. Vertical positioning shall account for tides and have an accuracy of plus/minus 0.5 foot. If a known permit violation occurs, the dredge positioning data will be made available for review at the USACE District Office.

2. **Dredge Location Control**. The Contractor is required to have, in continuous operation on the dredge, electronic positioning equipment that will accurately compute and plot the position of the dredge. Such fixes, and the accompanying plots, will be furnished to the USACE Quality Assurance Representative (QAR) daily as part of the QC Reports. The electronic positioning equipment will be installed on the dredge so as to monitor, as closely as possible, the actual location of the excavation device(s). A printout of the excavation device positions in State Plane Coordinates, the excavation device depths corrected for tide elevation and referenced to the North American Vertical Datum of 1988 (NAVD 88) and the time, will be maintained using an interval of two (2) minutes for each printed fix. A printed and computer file (in ASCII format) copy of the position data will be provided to the USACE as part of the daily report. The Contractor will prepare a plot of the data that includes the State Plane Coordinate grid system and the borrow area limits. The format of the plot may be subject to approval by the USACE. No dredging will take place outside of the borrow area limits (horizontal and vertical limits) as shown on the drawings.

3. **Dredging Observation.** The Contractor will be responsible for establishing such control as may be necessary to insure that the allowable excavation depths and spatial limits are not exceeded. If the Contractor observes obviously noncompliant sediment during dredging, the Contractor will cease dredging,

and will verbally notify the QAR providing the time, location, and description of the noncompliant sediment and relocate the dredge into compliant sediment. The Contractor will also report any encounters with noncompliant sediment in the Contractor's Daily Report, providing depth and location in State Plane Coordinates of said materials within the borrow area. The Contractor and USACE will use the dredge positioning records, plans, and vibracore descriptions to determine where the Contractor may dredge to avoid additional placement of noncompliant sediment. The Contractor will adjust his or her construction operation to avoid the noncompliant sediment to the greatest extent practicable.

4. **Beach Observation**. The Contractor will continuously visually monitor the material being placed on the beach for unacceptable material. If occasional debris, trash, rocks, large shell, gravel or silty materials appear on the beach during dredging operations and appear to exceed background or existing levels, the Contractor will remediate as specified in the contract. The excavation location of unacceptable material will be provided with the FDEP notification required in the Remediation Action section, below. If the contractors QC personnel observe a significant pattern of non-compliant material, such as streaking, a lens or non-compliant material, they will contact the QAR within 60 minutes. If significant sediment exceeding the project target values is placed on the beach, the contractor shall notify the USACE QAR or designated alternate and proceed as described in Section E.5, Remediation, below.

If the material exhibits an unusual color, abnormally foul odor or produces a petroleum sheen, dredging shall be discontinued immediately by lifting or moving the excavation device and the discharge pipe flushed clean by continuing to pump water only through the line. Once the line has been flushed clear of solids, pumping may be discontinued. The QAR shall be notified immediately in this situation.

5. **Excavation Requirements**. The Contractor will excavate within the approved boundaries and maximum depths of the borrow area(s) in a uniform and continuous manner. If directed by the USACE, the Contractor will change the location and/or depth of excavation within the borrow area limits.

6. **Vibracore Logs and Grain Size Data.** The Contractor will be provided with all descriptions of sediment vibracore borings collected within the borrow area(s), and will acknowledge that he is aware of the quality of the sediment as described in the sediment vibracore logs. These logs and grain size data will be presented in the construction specifications.

7. **Noncompliant Material Handling Provision.** The Contractor shall have plans and equipment available for use to handle noncompliant material encountered during dredging. Any debris placed on the beach shall be handled under the guidelines set forth in Section E. below.

D. QUALITY ASSURANCE PLAN

The USACE may use the contractor's daily reports, plans, and sample descriptions to determine where the Contractor may dredge to avoid placement of unacceptable materials. The USACE will adjust the construction operation to avoid placement of the unacceptable material on the beach to the greatest extent practicable. The USACE will determine where non-beach compatible material will be disposed of if encountered. Remediation actions are discussed in Section E below.

The USACE will enforce the construction contract and the requirements for sediment quality. The Permittee shall be responsible for submitting the information required by the Department permits related to sediment quality. In order to do so, the following steps shall be followed:

1. **Construction Observation.** Construction observation by the USACE Quality Assurance Representative (QAR) will be performed during periods of active dredging and sand placement. Most observations will be conducted during daylight hours; however, random nighttime observations will be conducted.

2. **On-Site Representative.** The USACE will provide a QAR with training or experience in beach nourishment and construction inspection and testing, and who are knowledgeable of the project design and permit conditions.

3. **Pre-Construction Meeting.** The project QC provisions to be implemented by the Contractor will be discussed as a matter of importance at the pre-construction and/or coordination meetings. The Contractor will be required to acknowledge the goals and intent of the above described QA/QC Plan at the pre-construction and/or coordination meetings, prior to commencement of construction.

4. **Contractor's Daily Reports.** The USACE will review the Contractor's Daily Reports which characterize the nature of the sediments encountered at the borrow area and placed along the project shoreline with specific reference to moist sand color and the occurrence of rock, rubble, shell, silt or debris that exceeds acceptable limits. The USACE will review the dredge positions in the Contractor's Daily Report.

5. **On Call.** The USACE QAR will be continuously on call during the period of construction for the purpose of making decisions regarding issues that involve QA/QC Plan compliance.

6. **Modifications.** Any modification to the Contract between the USACE and the Contractor will be evaluated to determine whether or not the change in scope will potentially affect the QA\QC Plan.

7. **During Construction Sampling for Visual Inspection.** To assure that the fill material placed on the beach is in compliance with the permit, the USACE will conduct assessments of the beach fill material as follows:

a. During excavation and fill placement activities, the USACE shall direct the QAR, Contractor and/or Permittee's on-site representative to collect a sediment sample at not less than 200-foot intervals of newly constructed berm to visually assess grain size, Munsell color, shell content, and silt content. The sample shall be a minimum of 1 U.S. pint (approximately 200 grams). This assessment will consist of handling the fill material to ensure that it is predominantly sand, to note the physical characteristics and assure the material meets the sediment compliance parameter specified in this Plan. If deemed

necessary, quantitative assessments of the sand will be conducted for grain size, silt content, shell content and Munsell color using the methods outlined in Section F.2. Each sample will be archived with the date, time, and location of the sample. The results of these daily inspections, regardless of the quality of the sediment, will be appended to or notated on the Contractor's Daily Report. All samples will be stored by the USACE for at least 60 days after the project's physical completion.

b. If the USACE determines that the beach fill material does not comply with the sediment compliance specifications in this QA/QC Plan, the USACE will promptly instruct the Contractor to cease material excavation operations and take whatever actions necessary to avoid further discharge of noncompliant sediment. The Contractor, in cooperation with the USACE, will use the dredge positioning records, plans, and vibracore descriptions to determine where the Contractor may dredge to avoid additional placement of noncompliant sediment. The Contractor will adjust his or her construction operation to avoid the noncompliant sediment to the greatest extent practicable. The sediment inspection results will be reported to the Department.

E. REMEDIATION

1. **Compliance Area:**

a. If a sample contains unacceptable material such as construction debris, asphalt, clay balls, oil, pollutants and any other foreign materials the area shall be remediated regardless of the areal extent of the noncompliant material.

b. If a sample is noncompliant for the silt content, shell content, or Munsell color and the areal extent exceeds 10,000 square feet the area shall be remediated.

c. Should rocks or excessive amounts of large shell or other non-beach compatible material be identified in excess of 50% of background in any 10,000 square ft area, then the non-compatible material shall be removed from the beach fill or remediated to the satisfaction of the Contracting Officer.

2. Notification. If an area of newly constructed beach does not meet the sediment compliance specifications, then the Department (JCPCompliance@dep.state.fl.us) will be notified. Notification will indicate the areal extent and location of any areas of noncompliant beach fill material and remediation planned. As outlined in Section E.4 below, the USACE will immediately undertake remediation actions without additional approvals from the Department. The results of any remediation will be reported to the Department following completion of the remediation activities and shall indicate the volume of noncompliant fill material removed and replaced.

3. Sampling to determine extent. In order to determine if an area greater than 10,000 square feet of beach fill is noncompliant, the following procedure will be performed by USACE:

d. Upon determination that the first sediment sample is noncompliant, at minimum, five (5) additional sediment samples will be collected at approximate 25-foot spacing in all directions and assessed. If the additional samples are also noncompliant, then additional samples will be collected at approximate 25-foot spacing in all directions until the areal extent is identified.

e. The samples will be visually compared to the acceptable sand criteria. If deemed necessary by USACE, quantitative assessments of the sand will be conducted for grain size, silt content, shell content, and Munsell color using the methods outlined in section F.2. Samples will be archived by USACE.

f. A site map will be prepared depicting the location of all samples and the boundaries of all areas of noncompliant fill.

g. The total square footage will be determined.

h. The site map and analysis will be included in the Contractor's Daily Report.

4. **Remedial Actions.** USACE shall have the authority to determine whether the material placed on the beach is compliant or noncompliant. If placement of noncompliant material occurs, the Contractor will be directed by USACE on the necessary corrective actions. Methods of remediation may include, but are not limited to

a. Blending of non-compliant material (i.e. when exceeding compliance values for silt, fine gravel, shell, or Munsell color) with compliant material to achieve a sand mixture that acceptably complies with the compliance criteria.

b. Excavating unacceptable material such as debris, asphalt, toxic material, or pollutants, disposing of the material, and replacing the material with sand that complies with the compliance criteria.

c. Screening unacceptable materials such as rocks greater than 3/4 inch or clay balls from the fill and disposing of the material.

d. Notwithstanding the above, burial of non-compliant fill within the existing beach or beach fill is not permitted.

All material to be disposed shall be hauled off-site to a disposal area approved by the USACE.

5. **Post-Remediation Testing and Reporting:** Re-sampling shall be conducted following any remediation actions in accordance with the following protocols:

a. Within the boundaries of the remediation actions, samples will be taken at maximum of 100-foot spacing.

b. The samples will be visually compared to the acceptable sand criteria. If deemed necessary by USACE, quantitative assessments of the sand will be conducted for grain size, silt content, and Munsell color using the methods outlined in Section F.2. Samples will be archived by USACE.

c. A post-remediation report containing the site map, sediment analysis if applicable, and volume of noncompliant fill material removed and/or replaced will be submitted to the Department within 30 days following completion of remediation activities.

F. POST-CONSTRUCTION SAMPLING FOR LABORATORY TESTING

To assure that the fill material placed on the beach was adequately assessed by the borrow area investigation and design, the USACE will conduct assessments of the sediment as follows:

1. Post-construction sampling of each acceptance section and testing of the fill material will be conducted to verify that the sediment placed on the beach meets the expected criteria/characteristics provided during the geotechnical investigation and borrow area design process. Upon completion of an acceptance section of constructed beach, the USACE will collect two (2) replicate sand samples at each Department reference monument profile line to quantitatively assess the grain size distribution, moist Munsell color, shell content, and silt content for compliance. The sediment samples shall be of a minimum of 1 U.S. pint (at least 200 grams) each from the bottom of a test hole 6 to 18 inches deep within the limits of the constructed berm. The USACE will visually assess grain size, Munsell color, shell content, and silt content of the material by handling the fill material to ensure that it is predominantly sand, and further to note the physical characteristics and to note the existence of any layering or rocks within the test hole. One sample will be sent for laboratory analysis and the other will be archived by the Permittee. All samples and laboratory test

results will be labeled with the Project name, FDEP Reference Monument Profile Line designation, State Plane (X,Y) Coordinate location, date sample was obtained, and "Construction Berm Sample."

2. All samples will be evaluated for visual attributes (Munsell color and shell content), sieved in accordance with the applicable sections of ASTM D422-63 (Standard Test Method for Particle-Size Analysis of Soils), ASTM D1140 (Standard Test Method for Amount of Material in Soils Finer than No. 200 Sieve), and ASTM D2487 (Classification of Soils for Engineering Purposes), and analyzed for carbonate content. The samples will be sieved using the following U.S. Standard Sieve Numbers: 3/4", 5/8", 3.5, 4, 5, 7, 10, 14, 18, 25, 35, 45, 60, 80, 120, 170, 200 and 230. Testing shall be performed by a USACE-validated or equivalently certified laboratory.

3. A summary table of the sediment samples and test results for the sediment compliance parameters shall accompany the complete set of laboratory testing results. The column headings will include: Sample Number; Mean Grain Size (mm); Sorting Value: Silt Content (%); Shell Content (%); Munsell Color Value; and a column stating whether each sample MET or FAILED the compliance values found in Table 1. The sediment testing results will be certified by a P.E or P.G. from the testing laboratory. A statement of how the placed fill material compares to the sediment analysis and volume calculations from the sand search investigation and borrow area design shall be included in the sediment testing results report. The Permittee will submit sediment testing results and analysis report to the Department within 90 days following beach construction.

4. In the event that a section of beach contains fill material that is not in compliance with the sediment compliance specifications, then the Department will be notified. Notification will indicate the volume, aerial extent and location of any unacceptable beach areas and remediation planned pursuant to those procedures outlined in Section E (Remediation), above.

All reports or notices relating to this permit shall be emailed and sent to the Department at the following locations:

DEP Bureau of Beaches & Coastal Systems
JCP Compliance Officer
Mail Station 3566
2600 Blair Stone RoadTallahassee, Florida 32399
phone: (850) 245-7591
e-mail: JCPCompliance@dep.state.fl.us

End of Plan

[Adapted for Duval County Shore Protection Project from FDEP Version dated September 4, 2009 and USACE Version dated September 29, 2010, and the most recent Sediment QA/QC Plan previously approved for Duval County dated 11 November 2010.]