

**ATTACHMENT NO. 23c**  
**CONSTRUCTION DETAILS**

## **ATTACHMENT NO. 23c CONSTRUCTION DETAILS**

The proposed Lido Key Hurricane and Storm Damage Reduction (HSDR) Project consists of the placement of approximately 775,000 cubic yards (cy) of sand along a 1.6 mile segment of the Lido Key coastline between FDEP monuments R-35 and R-44. The design beach is 80-ft wide (extension of the May 2000 MHW line according to the 2004 feasibility study) at +4-ft NAVD (+5-ft NGVD) with 5 years of advanced nourishment. The initial sand source for the project is Big Sarasota Pass, with New Pass being as a supplemental source upon availability. This project will also include the placement of two groin structures between R-42 and R-44.

A hydraulic cutterhead dredge will likely be used to excavate the proposed borrow areas. A floating pipeline from the dredge, connected to a submerged pipeline will transport sand to the beach. A water-sediment slurry will be pumped by the hydraulic dredge from the borrow area to the beach. Bulldozers will be used to construct a system of dikes to contain the water-sediment slurry on the beach to allow settlement of the sediment, and to shape the beach to the appropriate construction cross-section template. The dikes will be placed parallel to the coastline, and will be of sufficient length to allow settlement of the sediment on the beach. The contractor will utilize surveying techniques to ensure that the appropriate beach width, height, and beach slope are constructed. Seagrasses within the borrow areas will be buffered to avoid impact from the dredge activity. Please refer to the Dredge Plan below for details on the excavation of the borrow areas.

The two groins will be constructed as rubble mound structures with 12 inch foundation mats on geotextile fabric. The groin crest width will be 9 feet at +4.0-ft NAVD. The structure side slopes will be 1V:1.5H. The design depth varies. The first groin will be located north of R-42.5 and 170 feet in crest length and constructed in three sections. The landward section will be 50 feet in length, the transition section will be 50 feet in length and the seaward section will be 70 feet. The second groin will be located near R-43.2 and 345 feet in crest length and will also be constructed in three sections landward (140 feet), transition (50 feet) and seaward (155 feet). Adding the front slopes and 5-foot scour aprons at the end of each structure yields total lengths along the foundations of 187 feet and 362 feet, respectively. Details of the groins are included in the U.S. Army Corps of Engineers report entitled Sarasota County, Florida HSDR Project, Engineering Analysis, Lido Key Groin Field provided in Attachment No. 38.

The potential staging area and construction access is located at the Lido Beach Public Pool, near R-38, which is the same area currently being utilized for 2015 beach nourishment project. The final staging and construction access will be shown on the construction plans, to be provided. Project permit sketches are included with this application as Attachment No. 24. Project area aerial photographs are provided in Attachment No. 25.

## **DREDGE PLAN**

The conservation of sand resources was considered to maximize the available beach compatible sediments within the borrow areas identified for the proposed Lido Key Hurricane and Storm Damage Reduction (HSDR) Project. The dredge plan outlined below was developed to provide reasonable assurance that the proposed project will optimize the use of the sediments within the borrow areas to the greatest extent practicable.

The proposed project seeks a 15 year, multi-use permit. Given an anticipated 5 year renourishment interval, the project will likely include 3 sand placement events. The order of borrow area excavation will be specified to manage the sand resources throughout the duration of the permit. The intent is to limit dredging during the initial nourishment event to Borrow Areas B and C. Subsequent nourishments will occur on a 5 year interval in order to replace the advanced nourishment volume. With the design in place, the required volume will be less for subsequent nourishments. Borrow areas B and C are anticipated to recharge or infill at a rate such that the borrow areas can be re-used for subsequent events. If the rate of re-filling does not align with the nourishment cycle, Borrow Area D will be utilized. The New Pass borrow area that is permitted under FDEP Permit No. 0039755-003-JC may be used to supplement future events depending on the timing and availability of sand from this source. The future use of the borrow areas is dependent on the re-filling rates which will be determined by the annual physical monitoring data and analysis.

Efficient excavation of the sediment resources within the borrow areas can be improved by implementing the following best management practices.

- Sediment Disturbance Zone – The as-built elevation of the bathymetry is typically 2 feet higher than the elevation to which the dredging equipment extended. A sediment disturbance zone will be defined by specifying maximum depth of equipment below the borrow area cut depth. This will reduce the thickness of the lens of sand remaining above the cut depth that cannot be efficiently dredged during subsequent renourishments.
- Continuous Excavation – The contractor will be required to dredge in a continuous manner to the horizontal and vertical limits of the borrow area.
- Uniform Excavation – The contractor will be required to dredge in a uniform manner to avoid creating significant holes, valleys, or ridges within the borrow area.
- Borrow Area Check Surveys – The contractor will be required to provide check surveys collected as part of their routine dredging operations to demonstrate the limits of sediment removal.

The orientation and sequencing of dredge cuts within a particular borrow area are not specified as part of the dredge plan. These components of dredging are dictated by the contractor's construction means and methods, which can be influenced by several factors such as the following:

- Equipment mobilized to the project site.

- Installation of the submerged pipeline.
- Distance from the point of excavation within the borrow area to the discharge points on the beach.
- Sediment characteristics within the borrow areas.
- Cut depths within the borrow areas.
- Geometry of the borrow area.
- Exposure to currents and wave action.
- Environmental constraints.
- Navigational constraints.
- Fill densities on the beach.

P:\Sarasota\Lido Key\150252 City of Sarasota SPP Assist USACE with Permitting\FDEP Permit\RAI No. 1\_04152015\Attachment No. 23c - Construction Details.doc