32. Description of the overall project and each activity in or affecting US waters or state critical areas

The proposed activity is a sand scraping and transfer project on Seabrook Island, SC. The project is intended to restore a dry sand beach along an exposed seawall for the purposes of erosion mitigation as well as habitat restoration.

The applicant proposes to harvest sand from the intertidal beach along an accretional portion of the beach between the placement area and Capt Sams Inlet. The harvest area shown in Sheets 2 and 3 of the permit drawings has accreted over the past several years and is sufficiently distant from any upland property to protect developed areas.

Sand naturally moves from Capt Sams Inlet to North Edisto River Inlet under predominant northeast waves. Because of the proximity to Capt Sams Inlet, migrating shoals provide excess beach volume along much of Seabrook Island. Periodic relocations of the inlet deliver pulses of sand to the excavation area, which migrate to other portions of Seabrook Island. This process has been continually ongoing with regular maintenance of the inlet channel's location by the application, SIPOA, since 1983.

The applicant proposed to pursue periodic sand scraping from along the beach between central Seabrook Island and Capt Sams Inlet, and placement along the critically eroded area near the Beach Club. Sand scraping and transfers along Seabrook Island are considered a useful management tool for addressing localized erosion during the years between inlet relocations (CSE 2002). They are an integral part of Seabrook's long-term beach management strategy, and are consistent with the soft engineering approach to erosion that the community has followed since the early 1980s (SI 2014).

Up to 25 acres of exposed intertidal beach will be utilized to harvest up to a cumulative total of 300,000 cubic yards (cy) of sand in three discrete events over the course of five years.

All work under this alternative will be performed by land-based equipment working between low water and high water along the intertidal beach to minimize impacts to dry-beach habitat. As the project progresses, the dry beach area will expand, and exposure of the seawall will decline. The proposed borrow area will likely be restored naturally as shallow bars from the migrating delta of Capt Sams Inlet shift downcoast into the project area. This, in turn, will help maintain the ephemeral washover habitat upcoast of the borrow area.

Another inlet relocation is anticipated between 2025 and 2030, so the proposed project will be scaled to provide an interim solution to the chronic erosion along portions of Seabrook Island. It will also reduce the offset in shoreline position between the placement and borrow areas, thereby increasing shoreline stability in the near term and allowing the applicant to improve natural beach-dune habitats.

33. Overall project purpose and the basic purpose of each activity in or affecting US waters

The purpose of the project is for sand management along the Seabrook Island shoreline, wherein excess sand in accreting sections of the island (ie – North Beach) is shifted mechanically to eroding areas (ie – South Beach) (Figure 33.1). The project seeks to augment the natural flow of sand from upcoast (Capt Sams Inlet) to downcoast (North Edisto River Inlet) and restore a viable profile along a segment of the island that presently is backed by an exposed seawall.

FIGURE 33.1. Project map showing proposed borrow area along North Beach ('A') and fill area between the Seabrook Beach Club area and Beach Court ('B').

The applicant closely monitors erosion and accretion along Seabrook Island because of the natural variability in rates. Virtually the entire shoreline is influenced by tidal inlets and their associated shoals, which modify wave heights and directions alongshore. This leads to irregular rates of cross-shore and longshore sediment transport.

Processes of erosion at the confluence of the North Edisto River Inlet and its northern marginal channel are further complicated by an exposed section of seawall that exacerbates wave reflection. Commonly, the junction of large tidal creeks creates zones of extra scour near the mouth of the tributary channel.

At Seabrook, a deep scour hole persists at the downcoast end of the northern marginal flood channel within the general boundaries of the North Edisto River Inlet channel. This leads to instability of the channel slope and contributes to periodic underwater slumping and collapse of the beach along the inlet margins. The applicant has documented at least eight underwater slope failures since 2015 in the project area, whereby a 100–300 foot (ft) segment of the intertidal beach has slumped into the main channel of North Edisto River Inlet (Figures 33.2-33.4). While the erosion arcs in the beach caused by slumping tend to heal naturally by longshore transport from the upcoast, each event produces a significant loss of sand volume on the visible beach, narrowing the profile and lowering the elevation of the wet-sand beach.

FIGURE 33.2. Aerial images of Reaches 1 and 2 from Camp St Christopher to Deveaux Villas. **[UPPER]** Conditions on 28 July 2016—note horseshoe-shaped scour in beach at Deveaux Villas (right side of image) [SB Traynum]. **[MIDDLE]** A recurring scour hole after Hurricane *Matthew* at Deveaux Villas on 12 October 2016 [SB Traynum]. **[LOWER]** Conditions on 15 May 2020 showing no scour hole but a more eroded section of beach along the seawall. [J Hair]

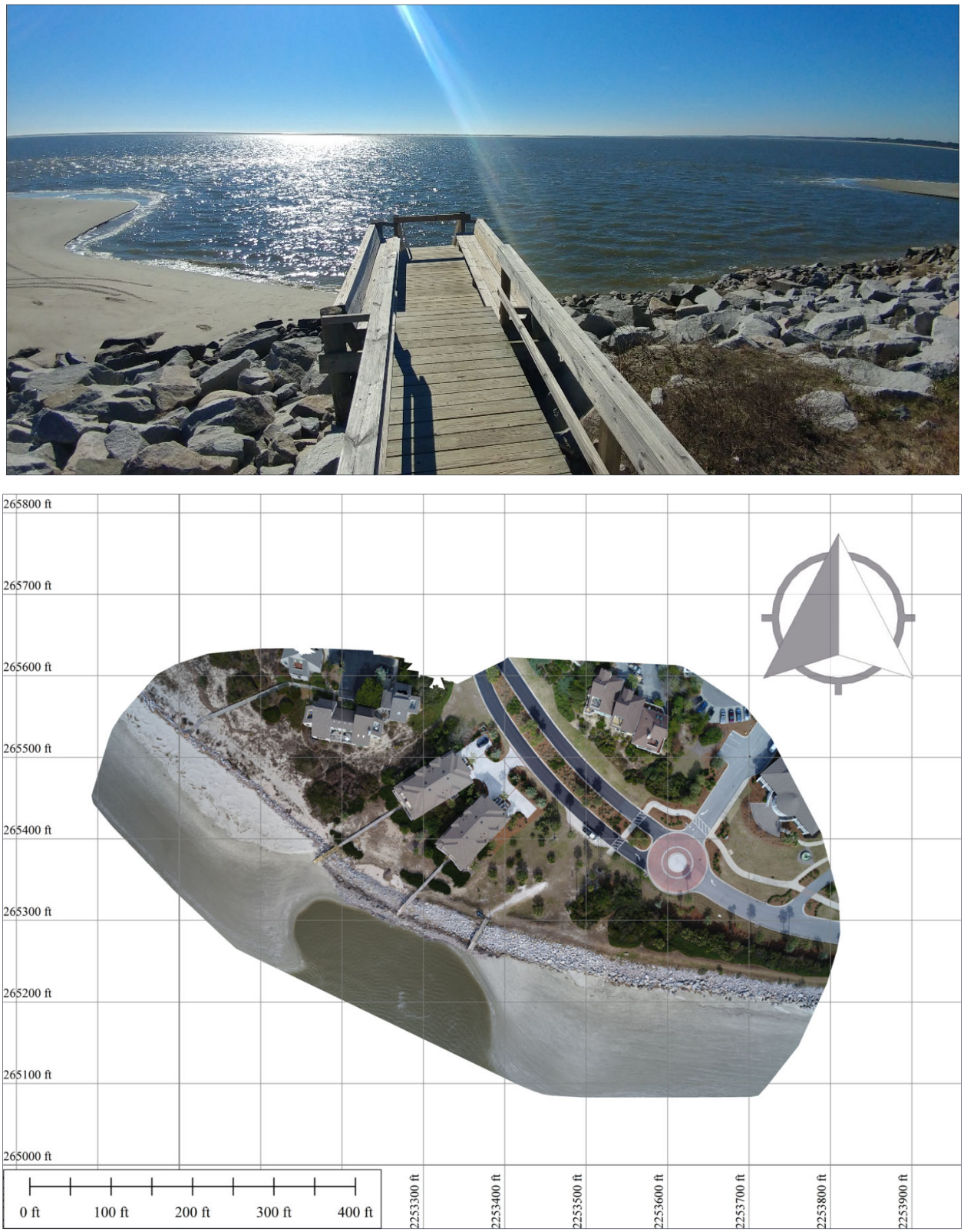
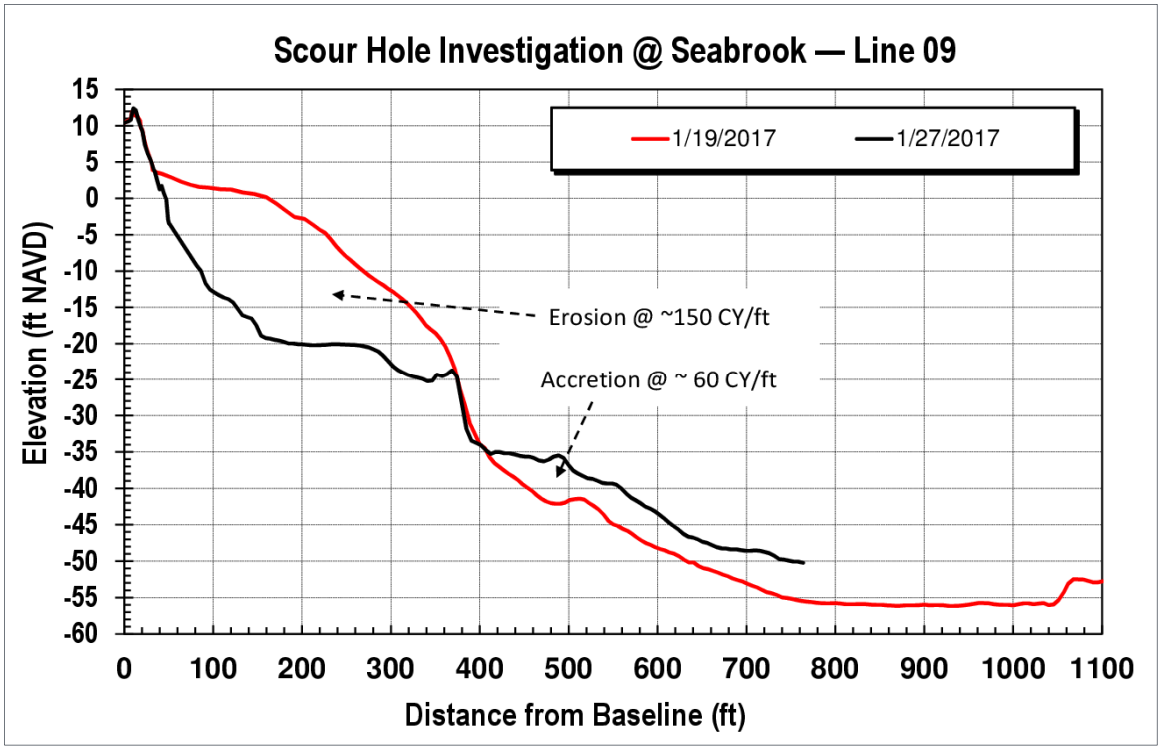


FIGURE 33.3. **[UPPER]** Ground image of the scour-hole event on 25 January 2017 viewed from the community boardwalk next to Deveaux Villas (D Giles). **[LOWER]** Orthorectified mosaic of drone images of the third scour hole obtained at low tide on 27 January 2017 (D Giles).



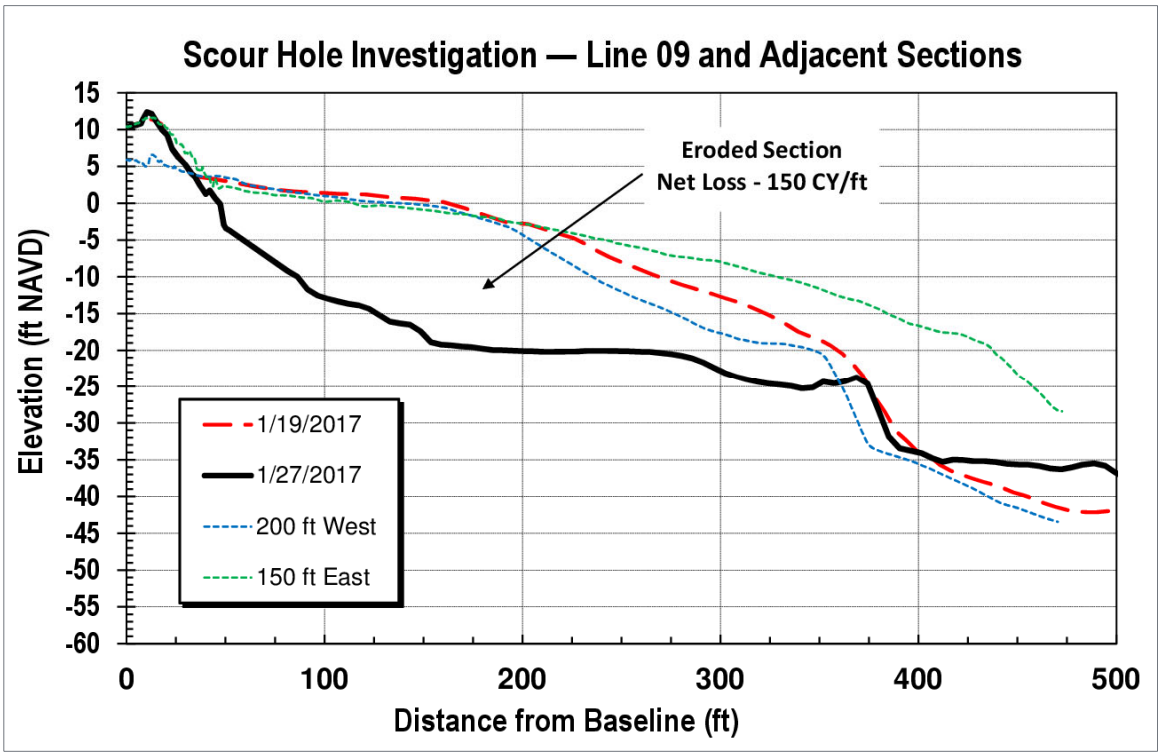


FIGURE 33.4. Representative profiles obtained on 19 and 27 January 2017 before and after formation of the third scour hole. Profile 9 (near the boardwalk of Fig 33.3) shows extensive sand loss above the 25-ft depth contour and buildup along the margin of the inlet channel between 35 ft and 55 ft depths. The zone between 25 ft and 35 ft did not change, presumably because this area consists of denser consolidated sediments that hold the inlet in place (Moslow 1980, Imperato et al 1988).

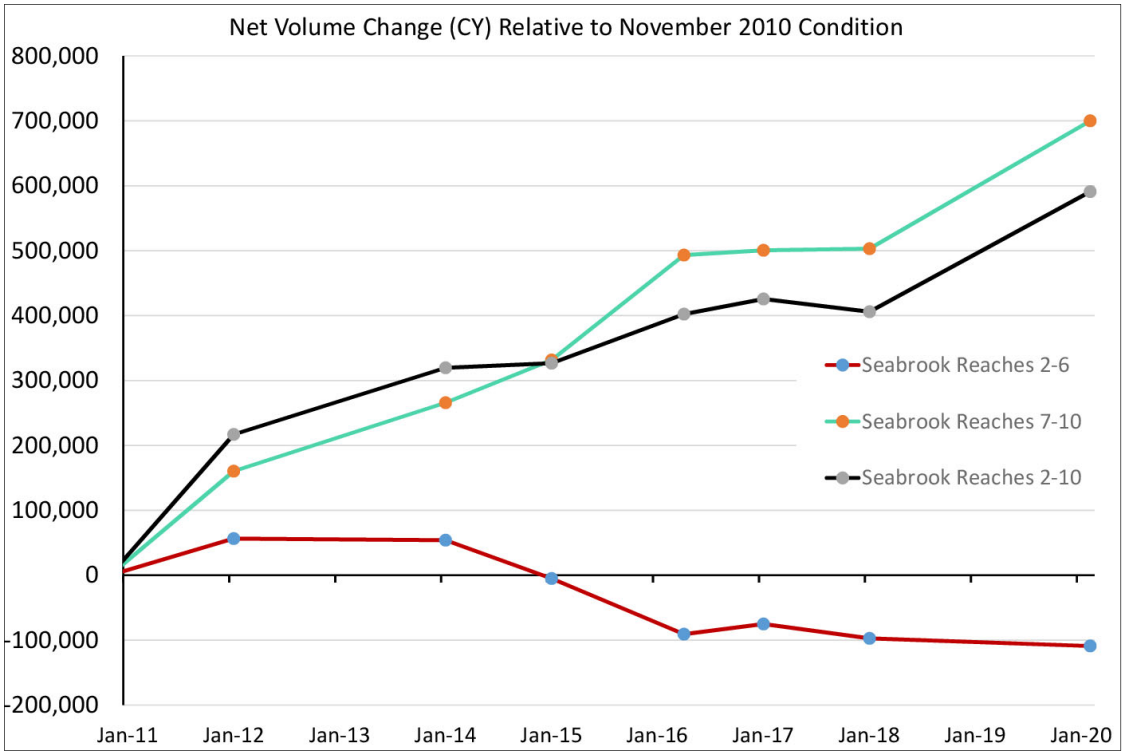


FIGURE 33.5. Seabrook Island has a net positive sand budget but the accumulation is concentrated along North Beach (reaches 7–10). The proposed project seeks to redistribute some of the surplus sand in North Beach to severely eroded sections of South Beach, particularly reaches 3 and 4.

Seabrook Island has a positive sediment budget because of the ample sand supply from Kiawah Island (Town of Seabrook Island 2014 p. 112) (Figure 33.5). In fact, Seabrook Island in 2022 contains more sand seaward of the seawall than it had in 1980, around the time seawalls were first constructed (Kana et al 2013). The distribution of sand alongshore is highly uneven. Some areas (eg – North Beach) contain over four times the minimum volume required for a healthy beach, while other areas lack a dry-sand beach.

Sand naturally moves from Capt Sams Inlet to North Edisto River Inlet under predominant northeast waves. Because of the proximity to Capt Sams Inlet, migrating shoals provide excess beach volume along much of Seabrook Island. Periodic relocations of the inlet, described in Table 2.1 of the Biological Assessment for the proposed project, deliver pulses of sand to the excavation area, which migrate to other portions of Seabrook Island. This process has been continually ongoing with regular maintenance of the inlet channel's location by SIPOA since 1983.

Another inlet relocation is anticipated between 2025 and 2030, so the proposed project will be scaled to provide an interim solution to the chronic erosion along portions of Seabrook Island. It will also reduce the offset in shoreline position between the placement and borrow areas, thereby increasing shoreline stability in the near term and allowing the community to improve natural beach-dune habitats.

The primary goals of the project are:

- Mitigate erosion hot spots along South Beach associated with sudden slope failures along margins of North Edisto River Inlet and the northern marginal channel.
- Artificially increase the transfer of sand from accreting sections of North Beach to eroding sections of South Beach.
- Maintain a viable wet-sand beach along all exposed sections of the seawall to facilitate downcoast sand transport.
- Accomplish multiple small-scale sand transfer events via land-based equipment during winter months when biological productivity is low, and there will be minimal disruption to beach use.
- Lessen the need for seawall reinforcement or maintenance of failed sections.

Based on an alternatives analysis included as part of this permit application package, the applicant has determined the Preferred Alternativge to be sand scraping from along North Beach and placement along the critically eroded area near the Beach Club. Sand scraping and transfers along Seabrook Island are considered a useful management tool for addressing localized erosion during the years between inlet relocations (CSE 2002). They are an integral part of Seabrook's long-term beach management strategy, and are consistent with the soft engineering approach to erosion that the community has followed since the early 1980s (SI 2014).

All work under this alternative will be performed by land-based equipment working between low water and high water along the intertidal beach to minimize impacts to dry-beach habitat. As the project progresses, the dry beach area will expand, and exposure of the seawall would decline. The proposed borrow area will likely be restored naturally as shallow bars from the migrating delta of Capt Sams Inlet shift downcoast into the project area. This, in turn, will help maintain the ephemeral washover habitat upcoast of the borrow area.

Sand scraping will transfer excess sand accumulating on the Seabrook side of Capt Sams Inlet along North Beach to downcoast eroding areas. The anticipated buildup of sand around Oystercatcher beach access will provide a renewable source for transfer downcoast to areas lacking a dry-sand beach. By transferring a portion of the accreting bars to downcoast areas (via trucks), this alternative will potentially offset the reduction in longshore transport, which occurs as Capt Sams Inlet shifts south(west) (Kana 1989).

FIGURE 33.6. Beach erosion along North Beach led to exposed seawalls, no recreational beach, and severe damage to structures in 1983. View north along Renken Point in 1985 at low tide. [After CSE 1989]

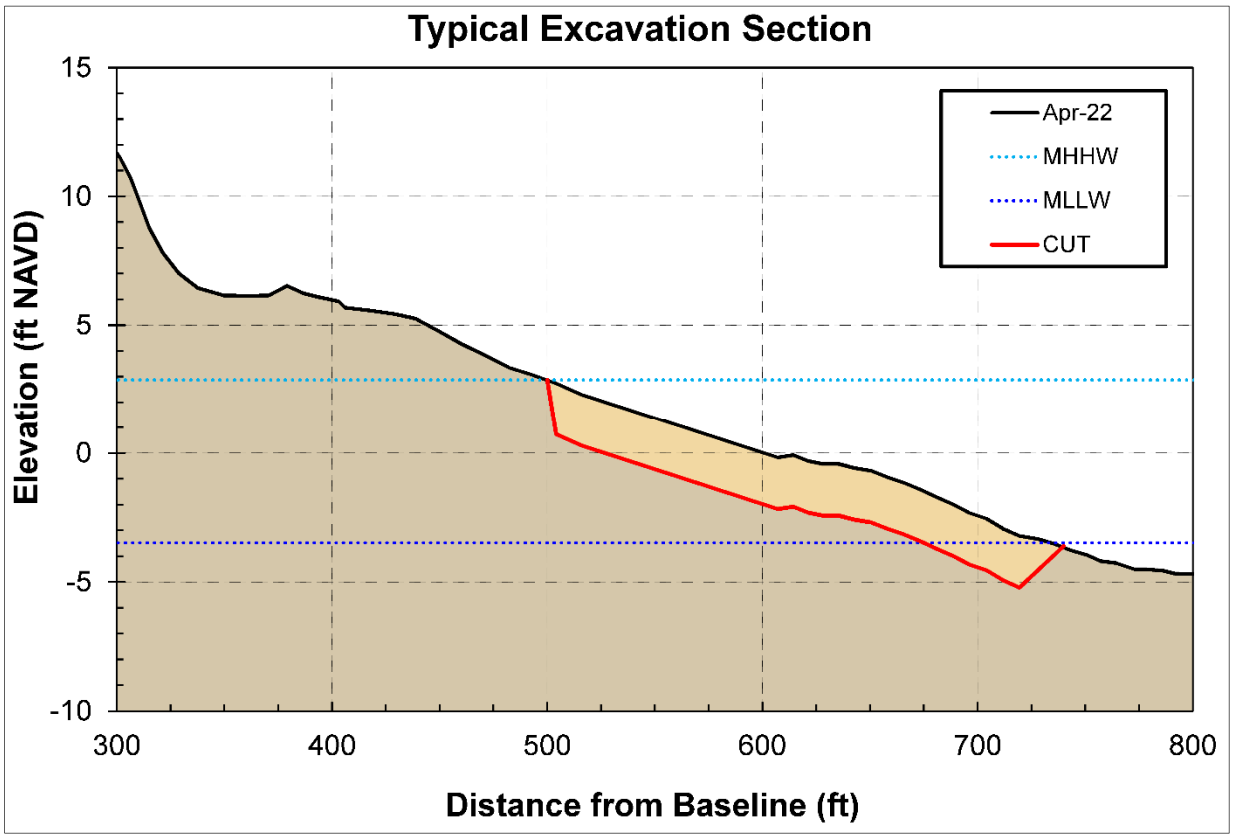
Sand scraping and transfer along North Beach was implemented in 1981 and 1982 prior to the relocation of Capt Sams Inlet in 1983 (Kana et al 1984). Additional sand transfers were performed after the 1983 inlet relocation because of the severely degraded conditions along North Beach north of Renken Point. At that point in time, seawalls were exposed and failing along upward of 8,000 ft of oceanfront (Figure 33.6). Since 1981, approximately 855,000 cy have been transferred in ten events by trucks from accreting areas around Capt Sams Inlet to eroding areas of Seabrook Island (SI 2014).

Figure 33.7 illustrates typical sections for the Preferred Alternative – Sand Scraping from accreting areas of North Beach and transfer by land-based equipment to eroding areas along South Beach. Figure 33.1 shows the maximum excavation footprint and fill areas along Seabrook Island. Up to 25 acres of exposed intertidal beach will be utilized to harvest up to a cumulative total of 300,000 cy of sand in up to three discrete events over the course of five years.

Sand will be transferred by off-road truck along the high intertidal beach to the fill area. Trucks will be required to stay within designated haul paths established with the applicant, USFWS, and SCDNR. Excavation of the intertidal sand will result in the mortality of benthic infauna within the areas excavated; however, the infauna are expected to recover quickly based on prior studies (Jutte et al 1999a,b, CZR 2014) and limited excavation zone. Typical excavations will be 2 ft deep, and occur primarily between MHHW and MLLW. Bars and shoals associated with Capt Sams Inlet are constantly migrating onshore near the excavation area, so depressions left following excavation are expected to fill quickly.

Following each recycling event, the project area will evolve as the system equilibrates with the newly-placed fill and excavated borrow area. It is likely some native vegetation may establish in the placement area, allowing for the establishment of vegetated beach habitat. It is also likely the excavated area will fill quickly with sand migrating onshore from bars and shoals associated with Capt Sams Inlet.

As the placement area equilibrates to wind and wave conditions, sand is expected to migrate to the west and along the North Edisto River Inlet-facing shoreline. This will increase beach volumes within areas immediately downcoast of the placement area, which have experienced chronic erosion in recent years.



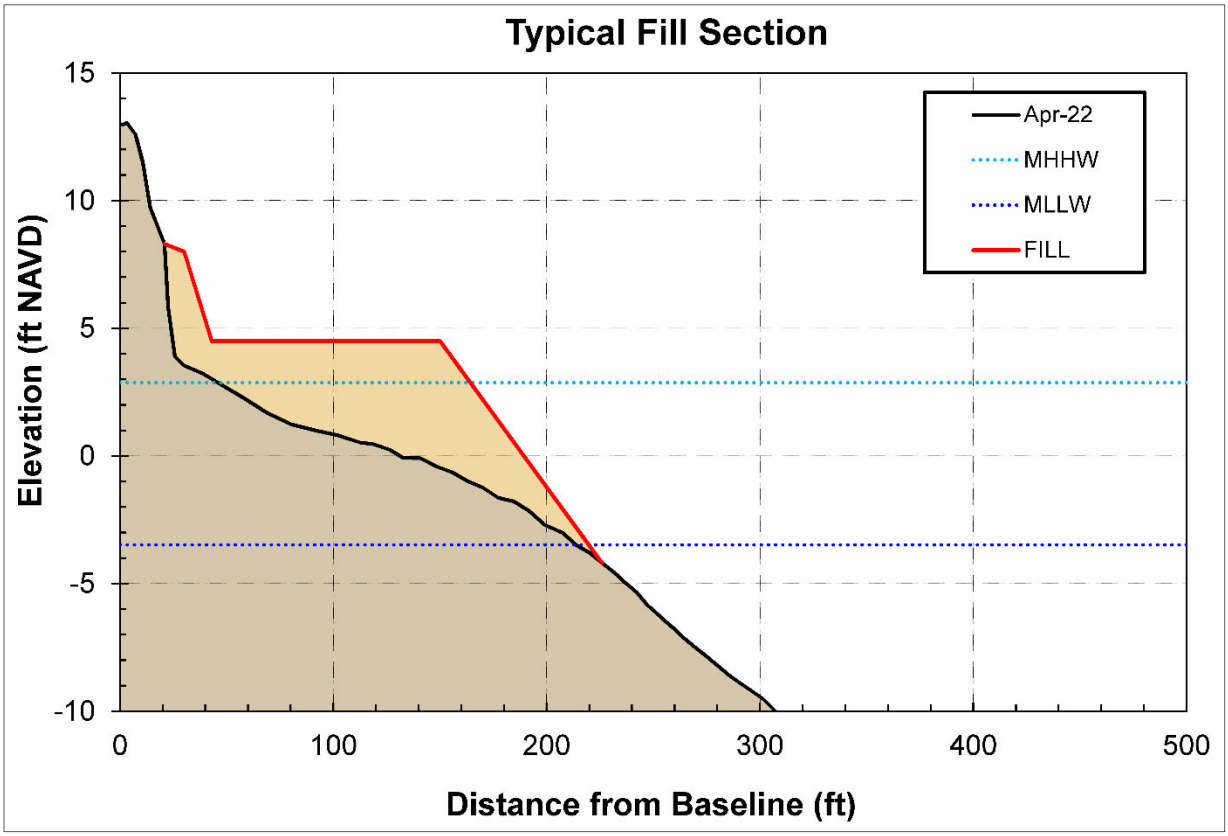


FIGURE 33.7. Typical excavation **[UPPER]** and fill **[LOWER]** sections for the proposed project to be performed in the dry via land-based equipment working around low tide. Excavations of the wet-sand beach would be shallow and expected to heal quickly under daily tidal action.

39. Describe measures taken to avoid and minimize impacts to waters of the US

The applicant held an informational pre-application meeting with representatives of environmental resource agencies to discuss the site-specific concerns of the proposed project and other alternatives for dike layout and harvest areas. The primary concern identified at the meeting was impacts to the ponded area between the proposed excavation area and Capt Sams Inlet. The applicant has included the following design criteria to reduce impacts to waters of the United States.

- Minimizing project footprint to avoid heavy equipment in the marsh, dunes, or areas used by shorebirds
- Maintaining designated haul paths between the excavation site and fill site to limit impacts to shorebirds and beach infauna
- Constructing the project on a schedule set by USFWS to limit impacts to sea turtles and shorebirds
- Implementing a short construction window to reduce project impacts
- Implementing site safety/environmental protection measures to prevent spills and/or other pollution

40. Provide a brief description of the proposed mitigation plan to compensate for impacts to aquatic resources or provide justification as to why mitigation should not be required

The proposed project is designed to mitigate beach erosion along an exposed seawall on Seabrook Island. The project will improve storm protection, restore the wet sand beach, and restore dune habitat for sea turtle nesting. The applicant believes that the restorative nature of the project offsets temporary impacts during construction and requests that no additional mitigation be required. To document the recovery of the system following construction, the applicant proposes the following monitoring plan:

- Annual orthophotography of the project area pre- and post-project and for three (3) years following the project. Photography will include coverage of all of Capt Sams Inlet and the ocean-facing and North Edisto River Inlet shorelines of Seabrook Island. Photo resolution will be greater than three (3) inches per pixel. The applicant will provide digital files of the orthophotography to regulatory and resource agencies upon request.
- Limited habitat mapping of the Capt Sams Inlet areas of subtidal creeks, intertidal flats, vegetated marsh, and beach for each annual orthophotograph. Areas of each of these habitats will be delineated, and the total area sizes for each habitat will be calculated in GIS software. Letter reports will be prepared following each monitoring event that provide graphical and tabular accounts of habitat changes over time. Reports will be provided to regulatory and resource agencies within 90 days of data collection.

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