

**COASTAL ZONE CONSISTENCY
COMPLIANCE WITH GOALS AND POLICIES - SECTION 501.25(a)-(f)
DREDGING AND DREDGED MATERIAL DISPOSAL AND PLACEMENT**

**HOUSTON SHIP CHANNEL EXPANSION
CHANNEL IMPROVEMENT PROJECT,
HARRIS, CHAMBERS, AND GALVESTON
COUNTIES, TEXAS**

Section 501.25 Dredging and Dredged Material Disposal and Placement

(a) Dredging and the disposal and placement of dredged material shall avoid and other-wise minimize adverse effects to coastal waters, submerged lands, critical areas, coastal shore areas, and Gulf beaches to the greatest extent practicable. The policies of this subsection are supplemental to any further restrictions or requirements relating to the beach access and use rights of the public. In implementing this subsection, cumulative and secondary adverse effects of dredging and the disposal and placement of dredged material and the unique characteristics of affected sites shall be considered.

Compliance: The Recommended Plan (RP) will require dredging the existing Houston Ship Channel (HSC), Bayport Ship Channel (BSC), and Barbours Cut Channel (BCC) to deepen and widen certain segments of these channels to improve the deep draft navigation of the HSC system to reduce transportation costs and increase the navigability and safety of future vessels anticipated to use the HSC. These modifications will provide a variety of features such as bend easings, channel widening, expanding existing and building new turning basins, improved flare turns, and channel deepening. These measures will help lift vessel pilot restrictions, increase efficient use of the channel, and increase navigability for vessels expected to use the HSC in the future, and for current vessels that experience significant delays and restrictions due to the current channel configuration.

This dredging will impact oyster reef, a Critical Area, which has accreted directly adjacent to the HSC and BSC. A practicable alternative with fewer adverse effects is not available, as the existing channels have to be widened directly adjacent in order to improve the existing channels and lift restrictions. The oyster reef will be mitigated through the restoration of reef impacted by Hurricane Ike at one or more of several sites initially identified by Texas Parks and Wildlife Department (TPWD) that are being coordinated with the resource agencies to identify the most optimal site(s) to restore. Dredged new work material will be beneficially used to help construct mitigation reef as discussed in the response below to Item (3)(C) below. Cumulative and secondary adverse effects of dredging have been considered and documented in Chapter 7 and Section 3 of Appendix G of the Draft Integrated Feasibility Report and Environmental Impact Statement (DIFR-EIS) prepared for the TSP.

The dredged material management plan (DMMP) places an emphasis on the beneficial use of dredged material (BUDM) in accordance with §501.25(d). The DMMP takes advantage of all existing placement areas (PA), including marsh cells and the existing approved

offshore placement site ODMDS 1, in use for the HSC system as much as practicable. The beneficial use and upland disposal sites have been established through coordination with the resource agencies and Beneficial Uses Group. As maintenance material from the existing HSC, BSC, and BCC are used for the ongoing construction and filling of BU marsh cells in Galveston Bay, maintenance material from the RP, which modifies the existing channels, would also be proposed for continued construction and filling of these marsh cells.

For the use of existing PAs and marsh cells, cumulative and secondary adverse effects are not expected as the sites are existing facilities receiving maintenance material periodically, and are managed to control discharge water quality. Cumulative and secondary adverse effects from the use of the offshore placement site ODMDS are not expected either as this site has already been evaluated, managed, monitored, and approved under Marine Protection and Sanctuary Act (MPRSA) Section 102. The DMMP has identified placement areas in order to use new work material beneficially as much as possible through the construction of innovative ecologically beneficial BU features such as marsh and bird islands, or using the suitable clays to raise or repair existing dikes, or build previously planned but never fully actualized marsh cell dikes

DMMP Site Summary			
Site	Status	Type	Description
6-acre Long Bird Island	New	Eco BU	Build new colonial waterbird island - longer version
8-acre Bird Island	New	Eco BU	Build new colonial waterbird island
3-Bird Island Marsh	New	Eco BU	Build marsh/bird island, and oyster wave trip complex
BW-8	New	Construction BU	Donate new work material to raise grade 5' on PH property being developed
East-east (E2) Clinton	New	Upland Placement	Use new work to construct dikes & upland CDF & place new work in interior on disturbed grazing & former borrow area property
Glendale	Existing	Upland Placement	Place new work in existing PA
Filterbed	Existing	Upland Placement	Place new work in old existing PA
Mid-Bay Expansion North	New – Expansion	Bay Upland Placement	Construct levee then partially fill new CDF expansion
Oyster pad mitigation	New – Mitigation	Eco BU	BU new work to elevate oyster cultch mitigation pads
M11	Previously Planned	Eco BU	Construct levee then partially fill already planned marsh cell expansion
Ocean Dredged Material Disposal Site (ODMDS)	Existing		Dispersive site used as disposal of last resort for material unfit for BU or construction

Currently, the resulting new work material quantity for constructing the RP is 29.9 million cubic yards (MCY). Maintenance material would be hydraulically placed in the interior of

existing PAs or marsh cells, or placed by hopper dredge (O&M only) in the MPRSA Section 102-approved Ocean Dredged Material Disposal Site (ODMDS) No. 1 near the Entrance Channel to the Bay.

It should be noted that the dredging and placement of resulting dredged materials is consistent with current and past practices for the construction and maintenance of dredged materials for the Houston-Galveston Navigation Channels, Texas Project. Dredged materials are planned to be placed in the aforementioned PAs for the Project. All other critical areas such as coastal wetlands, tidal sand or mud flats, submerged aquatic reef, shore areas, and Gulf beaches are avoided.

(1) Dredging and dredged material disposal and placement shall not cause or contribute, after consideration of dilution and dispersions, to violation of any applicable surface water quality standards established under subsection (f) of this section.

Compliance: All previous sediment testing results for the HSC, BSC, and BCC were reviewed to establish reasons to believe contaminants are or aren't present in the material to have the potential to cause an unacceptable adverse impact in order to identify additional testing requirements that was conducted in 2018. Past periodic testing results have indicated that quality of maintenance sediments has been suitable for placement in the upland confined PAs, and BU marsh cells in the system. Violation of applicable surface water quality from the use of existing placement facilities is not expected. See response to item (b)(2) below for more detail. The South of Morgans Point (SMP) analysis indicated sediments are suitable for open water placement. Elutriate testing indicated the need for offshore placement dilution modeling using STFATE at the ODMDS No. 1. STFATE results indicate initial conservative modeling of large hopper volume placement will need to be refined during Preconstruction Engineering Design (PED) for the now-current proposed technique of placement of mechanically dredged new work material by substantially smaller scow. The North of Morgans Point (NMP) results exhibit exceedances of lower NOAA and EPA Region 6 screening criteria for PAHs, pesticides, PCBs, and metals. Initial mixing zone calculations also indicate the need for refined calculations and design of placement dewatering and effluent. Full details of the sediment testing are summarized in Appendix G, Section 3.1.5 of the FIFR-EIS. The Upland Testing Manual refers to the USACE report ERDC/EL TR-03-1, *Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, or Upland Confined Disposal Facilities — Testing Manual*. The Inland Testing Manual refers to the joint USACE/EPA publication EPA 842-B-92-008, *Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Testing Manual*. The Ocean Testing Manual refers to the joint USACE/EPA publication EPA 503/8-91/001, *Evaluation of dredged material proposed for ocean disposal – Testing manual*. Elutriate results would be reviewed to ensure placement will not cause or contribute, after considering dilution and dispersion, to violation of any applicable surface water quality standards.

(2) Except as otherwise provided in subparagraph (D) of this paragraph, adverse effects on critical areas from dredging and dredged material disposal or placement shall be

avoided and otherwise minimized, and appropriate and practicable compensatory mitigation shall be required, in accordance with subsection (h) of this section.

Compliance: For use of existing placement sites, material will primarily be hydraulically dredged from the areas directly adjacent to the HSC, BSC, and BCC and pumped by pipeline to one of the existing PAs or marsh cells. Some material may be dredged by hopper dredging and placed at the approved offshore ODMDS No. 1. Other than reef that will be mitigated, discussed in response to the item (a) above, all other types of critical areas such as coastal wetlands, submerged aquatic vegetation (SAV), or tidal sand or mud flats, are avoided by the RP channel modifications. All types of critical areas are avoided when using the existing placement sites and will be avoided in the planning and siting of new placement features. The mitigation plan for oyster reef is provided as Attachment Q of the DIFR-EIS and is being coordinated with Texas Parks and Wildlife Department (TPWD) and other resource agencies.

(3) Except as provided in subparagraph (D) of this paragraph, dredging and the disposal and placement of dredged material shall not be authorized if:

(A) there is a practicable alternative that would have fewer adverse effects on coastal waters, submerged lands, critical areas, coastal shore areas, and Gulf beaches, so long as that alternative does not have other significant adverse effects;

Compliance: As explained in the response to item (a) above, a practicable alternative with fewer adverse effects is not available, as the existing channel has to be widened directly adjacent to in order to address the deep draft navigation problems of the existing HSC. Other alternatives evaluated do not provide substantially the same amount of National Economic Development (NED) benefits, a primary goal of the deep draft navigation study purpose. Other alternatives do not as comprehensively address the navigation improvement needs of the entire HSC system, as other alternatives only focus on one problem or area of the HSC system, which has many existing delays or limitations to efficient navigation system-wide related to channel constraints. The RP has currently been identified with 700 ft-wide channel, for the major component of widening in the Bay. The ship simulation has been completed and has contributed to the optimization of the width and facilitation of adequate navigation safety to allow the intended functions (e.g. 2-way vessel meeting) to be determined in coordination with the vessel pilots.

The RP attempts to address the local needs and desires as well as the economic and environmental criteria established by Federal and State law. The RP includes the following features:

- Four bend easings on main HSC channel with associated relocation of barge lanes (Segment 1);
- Widening (in whole or in part) the HSC main channel between Bolivar Roads and BCC from the existing 530-foot width to somewhere between 650-feet to 820 feet with associated relocation of barge lanes (Segment 1);
- Addition of a new multipurpose mooring on the HSC near the San Jacinto Monument (Segment 1);

- Flare expansion on BSC (Segment 2);
- Shoaling attenuation structure near the BSC Flare (Segment 2);
- Widen BSC from existing 300-400 feet to 455 feet (Segment 2);
- Widen BCC from existing 300 feet to 455 feet (Segment 3);
- Combination flare and turning basin on BCC (Segment 3); and
- Deepen the HSC main channel from Boggy Bayou to Sims Bayou from the existing 41.5-foot depth up to 46.5 feet (Segment 4);
- Widen the HSC main channel from Boggy Bayou to Greens Bayou from the existing 400-foot wide channel up to 530 feet (Segment 4);
- Deepen the HSC main channel from Sims Bayou to I-610 Bridge from the existing 37.5-foot depth up to 41.5 feet (Segment 5);

There also exists a proposal to build upon the foundation set by RP referred to as the Full Bay Widening Plan (FBWP). This plan includes components which the Project Delivery Team (PDT) believe are crucial to safe and efficient navigation in the HSC. These components are in addition to, or in place of certain components mentioned in the RP. Each of these serves to address concerns currently identified by the Houston Pilots Association and the local stakeholders.

- Minor widening of the channel in the bayou portion of the HSC main channel in the Hog Island stretch (Segment 1),
- The alleviation of a channel restriction in Segment 4 by widening from the existing 400-feet to 530-feet for a distance of approximately 1.3 miles from just west of the San Jacinto Monument and Boggy Bayou (Segment 1);
- A turning basin requested by the pilots to provide for additional turning opportunities at the BSC in Segment 2 at the mouth of the BSC land cut (Segment 2);
- Turning Basin at Station 775+00 would be the most upstream location for Aframax vessels to turn (Segment 4);
- Hunting Turning Basin to ensure continued Federal maintenance (Segment 4);
- Improvement of and consideration of federalizing an existing turning basin located near Brady's Landing in Segment 6 (Segment 6);

These components will minimize or nearly eliminate traffic concerns that have arisen in light of the lack of full channel widening under the RP. After significant design review and operational observation, the PDT holds that these aspects identified currently as the FBWP are worth further exploration and consideration for integration into the RP.

(B) all appropriate and practicable steps have not been taken to minimize adverse effects on coastal waters, submerged lands, critical areas, coastal shore areas, and Gulf beaches; or

Compliance: All practicable steps to minimize the channel footprint to meet the project objectives are being taken to minimize adverse effects on these resources. As discussed

previously, ship simulation was conducted on September 19, 2016, and November 17, 2017 at San Jacinto College Vessel simulator and waterway user coordination occurred July 2019. This allowed the PDT to choose adequate navigable widths for the main channel and barge lanes. During the development of the DMMP, utilization of existing PA's and BU was attempted as much as practicable.

(C) significant degradation of critical areas under §501.23(a)(7)(E) would result.

Compliance: 410 acres of oyster reef would be impacted by the RP channel modifications comprising approximately 1.4 percent of the 28,000 acres of historically mapped reef in Galveston Bay (Powell et al. 1994). TPWD estimated that between 50 and 60 percent of reefs in the Bay were impacted by Hurricane Ike. Conservatively assuming a remaining unaffected portion of 40 percent, the RP oyster reef impacts would represent up to 3.6 percent of the unaffected reef. Though the amount is a relatively small percentage, it is an impact that will be mitigated. The reef acreage is proposed to be mitigated by restoring reef at 2 of 5 sites in Galveston Bay by beneficially using dredged material to provide an elevated relief off the bottom capped by a layer of suitable cultch material to naturally recruit oysters. The sites are primarily areas of Hurricane Ike impacted reef that TPWD is focusing restoration efforts on. The restoration amount is being determined by use of the USACE-certified Oyster Habitat Suitability Index Model (OHSIM), a functional model for oyster reef. For the currently expected impact of 410 acres, the mitigation considering the most optimal quality sites with respect to the OHSIM model is 376 acres. Coordination with the resource agencies and consideration of public comments received during the public and agency review period for the Draft IFR-EIS were used to select San Leon and Dollar reef from the 5 candidate sites. With mitigation, significant degradation of oyster reef will not occur. Two wetlands within 1 mile of the mean high tide line will be impacted by the placement of material. Both the Beltway 8 and East 2 Clinton sites are classified as containing minimal amounts of Palustrine forested wetlands that lie above the 100-year floodplain. The impacted wetland areas in these PA's will be mitigated for through the acquisition of mitigation credits.

(4) A dredging or dredged material disposal or placement project that would be prohibited solely by application of subparagraph (C) of this paragraph may be allowed if it is determined to be of overriding importance to the public and national interest in light of economic impacts on navigation and maintenance of commercially navigable waterways.

Compliance: Dredging and placement should not be precluded by paragraph (C), as noted above. However, the proposed action under the RP is of public and national interest due to the fact that the HSC, BSC, and BCC serve the Port of Houston (POH) which was the 2nd ranked port in the Nation in 2015 for total tonnage, and for 2016, the 1st ranked in foreign tonnage, 3rd ranked in total foreign cargo value, and 6th in total container twenty-foot equivalent units (TEU), for the Nation. It is the largest Gulf Coast container port, handling approximately 68 percent of Gulf Coast TEUs, and the largest Texas Port, handling 46 percent of total tonnage and 95 percent of container TEUs.

According to the Economic Impact of Marine Cargo Activity at the Port of Houston Executive Summary, in 2018 the POH accounted for \$339 Billion of total economic value, equating to 20.6% of the States \$1.6 trillion dollar Gross Domestic Product. Of the 1,350,695 jobs held by Texas residents that are generated by cargo and vessel activity, 698,177 of them are directly influenced by activity at the Port of Houston Authority owned, leased or operated terminals. The RP channel modifications are necessary to prepare the HSC system for the future, larger vessels that are an industry trend occurring presently, and to alleviate the current delays in the system that exacerbate congestion and increase transportation costs. These modifications are needed in order to maintain the efficiency and competitiveness of this port vital to the Nation's, State of Texas' and Houston economies.

- (b) *Adverse effects from dredging and dredged material disposal and placement shall be minimized as required in subsection (a) of this section. Adverse effects can be minimized by employing the techniques in this subsection where appropriate and practicable.*

Compliance: Adverse effects of dredging and dredged material placement as described in the DIFR-EIS would be minimized as described in the Compliance response to item (a) above.

(1) Adverse effects from dredging and dredged material disposal and placement can be minimized by controlling the location and dimensions of the activity. Some of the ways to accomplish this include:

- (A) locating and confining discharges to minimize smothering of organisms;*
- (B) locating and designing projects to avoid adverse disruption of water inundation patterns, water circulation, erosion and accretion processes, and other hydrodynamic processes;*
- (C) using existing or natural channels and basins instead of dredging new channels or basins, and discharging materials in areas that have been previously disturbed or used for disposal or placement of dredged material;*
- (D) limiting the dimensions of channels, basins, and disposal and placement sites to the minimum reasonably required to serve the project purpose, including allowing for reasonable overdredging of channels and basins, and taking into account the need for capacity to accommodate future expansion without causing additional adverse effects;*
- (E) discharging materials at sites where the substrate is composed of material similar to that being discharged;*
- (F) locating and designing discharges to minimize the extent of any plume and otherwise control dispersion of material; and*
- (G) avoiding the impoundment or drainage of critical areas.*

Compliance: With regard to the suggested methods to minimize adverse effect in item (1) and its sub-items, dredge discharge for use at existing PA facilities would be to existing upland and marsh cell containment dikes that would (A) avoid or minimize smothering organisms, would not disrupt bay inundation patterns, and (B) water circulation, erosion and accretion processes, and other hydrodynamic processes. Use of material at existing confined PAs, existing marsh cell dikes or the ODMDS No. 1, is consistent with items (C),

(E), and (F) since they are previously used placement sites with previously dredged materials from the same vicinity of the channel proposed for corrective action, that controls material discharge and dispersion. Using the material to continue construction of PA features already planned and approved, such as the partially-built PA 14/15 connection, or future marsh cell M11, would also be consistent with (C), (E), and (F). The effects for smothering benthic organisms would be minimized, limited to the dike footprint, and these PA features were already covered under the NEPA process by the *Final Environmental Assessment, Expansion of Placement Areas 14 and 15, Houston Ship Channel, Chambers County, Texas*. Construction of these planned and approved features would use placement techniques that have been successful in creating thousands of acres of existing marsh cells and placement areas in the Bay. The minimization of impacts on benthic organisms and indirect impacts on surrounding communities would be facilitated for newly created PA's as well. This would be achieved through the utilization of containment dikes and other traditionally environmental dredging techniques. Submerged downspouts, multi-tremmies, and submerged diffusers would all be employed as necessary in order to limit turbidity and the overall impact of hydraulic dredge material placement. BU efforts in some cases will utilize material to convert featureless bay bottom into oyster reef or bay marsh, providing environmental uplift. This conversion will have a nominal impact to the environment as the benthic community within the featureless bay bottom will recover within 1-2 years and the ecological diversity and contribution of the area would have been increased thanks to now functioning as a marsh or oyster reef. The new work material will be used for future PA dike raising, repair, or continued construction to create capacity and a standard channel over-dredge tolerance would be employed, for consistency with item (D). No impoundment or drainage of critical areas would occur during placement at these existing sites.

(2) Dredging and disposal and placement of material to be dredged shall comply with applicable standards for sediment toxicity. Adverse effects from constituents contained in materials discharged can be minimized by treatment of or limitations on the material itself. Some ways to accomplish this include:

- (A) disposal or placement of dredged material in a manner that maintains physicochemical conditions at discharge sites and limits or reduces the potency and availability of pollutants;*
- (B) limiting the solid, liquid, and gaseous components of material discharged;*
- (C) adding treatment substances to the discharged material; and*
- (D) adding chemical flocculants to enhance the deposition of suspended particulates in confined disposal areas,*

Compliance: Dredged materials, in the existing HSC system, especially maintenance sediments, have been extensively tested and evaluated against available marine sediment screening thresholds. These results have indicated that quality has been suitable for placement in the upland confined PAs, and BU marsh cells in the system. Additionally, the ODMDS No. 1 in the Gulf of Mexico near the Entrance Channel was approved under Section 102 of the Marine Protection, Research, and Sanctuaries Act in 2016 to accept

material from all reaches of the HSC, subject to the periodic testing and verification requirements in the Site Management & Monitoring Plan (SMMP). Maintenance material for the RP will come from the same channels that currently have maintenance material placed at the existing sites and would reflect the same sources of shoaled material. The past testing results are being reviewed pursuant to Subpart G of the Clean Water Act (CWA) Section 404(b)(1) and in accordance with the guidelines in USACE Regulatory Guidance Letter (RGL) 06-02 to determine the need for additional sampling in areas of new work dredging. Further testing was conducted in 2018, and is summarized in the response to (a)(1) above.

TAC Title 31, Part 16, Chapter 501, Subchapter B, Rule §501.25(a)(1) states dredging and dredged material disposal and placement shall not cause or contribute, after consideration of dilution and dispersion, to violation of any applicable surface water quality standards established under §501.21 of this title.

The existing upland PAs and BU marsh cells have been designed to maintain water quality at their discharge points to address items (A) and (B). Treatment or flocculants have not been necessary for these facilities, to address (C) and (D)

(3) Adverse effects from dredging and dredged material disposal or placement can be minimized through control of the materials discharged. Some ways of accomplishing this include:

(A) use of containment levees and sediment basins designed, constructed, and maintained to resist breaches, erosion, slumping, or leaching;

(B) use of lined containment areas to reduce leaching where leaching of chemical constituents from the material is expected to be a problem;

(C) capping in-place contaminated material or, selectively discharging the most contaminated material first and then capping it with the remaining material;

(D) properly containing discharged material and maintaining discharge sites to prevent point and nonpoint pollution; and

(E) timing the discharge to minimize adverse effects from unusually high water flows, wind, wave, and tidal actions.

Compliance: See response to the preceding item. Adverse effects are not expected in the use of existing PAs and BU marsh cells or the ODMDS. New work dredged material would be placed on dikes of existing confined PAs for raising or repair, and similarly on marsh cell dikes for construction or repair. Hopper dredging would only be utilized in the removal of maintenance material; cutterhead suction and mechanical dredges will be utilized in all new work extraction. At the lower end of the HSC, material would be placed at the approved ODMDS No. 1 consistent with its current use for the existing HSC. Maintenance material would be placed in these facilities, each of which is a maintained discharge sites with earthen containment, that is currently used for new work and maintenance dredged material placement for the existing Federal project. Hydraulic placement would be achieved in a controlled manner under the appropriate wind, wave, and current conditions to properly repair or construct containment dikes and minimize

material loss. Traditional open pipe hydraulic placement can result in turbidity increase, benthic organism impacts, and mudline scouring. To avoid such negative impacts some environmental dredging techniques and technology will be employed. Namely the multi-tremie and submerged diffuser, both of which are engineered to slow the velocity at the point of discharge and to diffuse the slurry in a controlled manner allowing for more precise placement with minimal resuspension of solids. This approach will allow for beneficial use oyster reefs to be constructed relatively near existing oyster reefs, which will result in greater recruitment rates and increase the chance of success.

(4) Adverse effects from dredging and dredged material disposal or placement can be minimized by controlling the manner in which material is dispersed. Some ways of accomplishing this include:

- (A) where environmentally desirable, distributing the material in a thin layer;*
- (B) orienting material to minimize undesirable obstruction of the water current or circulation patterns;*
- (C) using silt screens or other appropriate methods to confine suspended particulates or turbidity to a small area where settling or removal can occur;*
- (D) using currents and circulation patterns to mix, disperse, dilute, or otherwise control the discharge;*
- (E) minimizing turbidity by using a diffuser system or releasing material near the bottom;*
- (F) selecting sites or managing discharges to confine and minimize the release of suspended particulates and turbidity and maintain light penetration for organisms; and*
- (G) setting limits on the amount of material to be discharged per unit of time or volume of receiving waters.*

Compliance: Each of the existing placement facilities are maintained discharge sites with earthen containment, that are currently used for new work and maintenance dredged material placement for the existing Federal project and implement techniques or avoid concerns in items (A), (B), (D), (E) and (F). The new features that are proposed herein will be constructed using environmental dredging techniques and technology that have been proven effective in other CAD Cell placement projects and contaminated material disposal where precise placement and minimization of turbidity is paramount. Placement of dredged materials in any of the described PAs implements techniques or avoids concerns of those items as material would be placed where dike material was already previously placed or planned (including evaluation of Coastal Zone Consistency) for initial construction. Regarding item (G), effluent from the existing PAs is controlled to minimize the introduction of Total Suspended Solids (TSS) into the receiving water to comply with applicable water quality standards. The material will primarily be dredged hydraulically which involves use of a hydraulic suction cutterhead that minimizes dispersion at the dredge site. To enhance the efficacy of hydraulic dredging multi-tremies and submerged diffusers will be employed. This equipment is engineered to slow the velocity of the material and redirect it so that the placement is more controlled. This allows material to be placed uniformly with little mounding and when paired with precise

operations can create highly exact. This placement strategy will facilitate the creation of the beneficial use oyster reefs with minimal impact to the nearby historic oysters, as well as the dikes used to contain less stable material that could otherwise spread great distances smothering benthic organisms. While there is no means of avoiding benthic organisms all together this delicate approach will minimize the impacts and allow the creation of reefs, marshes, and upland PA features all designed similarly to existing. For hopper dredging which may be used in dredging associated with operations and maintenance, hydraulic suction minimizes dispersion at the dredge site, and hopper basin controls such as inflow screens and skimmers minimize overflow turbidity. Silt screens would not be needed, nor would they be practical for the RP site conditions due to size, water depths, and vessel traffic. Placement of maintenance dredged materials in the PAs and marsh cells, and the resulting effluent is contained by rock and earthen dikes.

(5) Adverse effects from dredging and dredged material disposal or placement operations can be minimized by adopting technology to the needs of each site. Some ways of accomplishing this include:

(A) using appropriate equipment, machinery, and operating techniques for access to sites and transport of material, including those designed to reduce damage to critical areas;

(B) having personnel on site adequately trained in avoidance and minimization techniques and requirements; and

(C) designing temporary and permanent access roads and channel spanning structures using culverts, open channels, and diversions that will pass both low and high water flows, accommodate fluctuating water levels, and maintain circulation and faunal movement.

Compliance: Dredging will be accomplished through standard practice hydraulic cutterhead dredging from the water. Hydraulically dredged material will be placed via pipeline to existing engineer-designed PAs and marsh cells that are currently used for new work and maintenance material placement for the existing Federal project. PAs and marsh cells in Galveston Bay, and the island and nearshore PAs above Morgans Point (Spilmans, M11, M12, bird islands, Mid Bay Expansion North, etc.) are currently accessed by water, and pipeline placement is achieved, without damaging critical areas during routine maintenance, and will be similarly accessed during placement for the RP. Upland terrestrial PAs (e.g. East-East Clinton, Glendale, Filterbed) are well established, long time use PAs accessed by established pipeline systems serviced by permanent roads. Maintenance dredging may be accomplished through trailing suction hopper dredges, which similarly minimizes turbidity at the dredging point through suction, and control water overflow turbidity through controls such as adjustable inflow screens and skimmers. Hopper dredging is anticipated only for maintenance in the lower segment of the HSC where materials are more appropriate for this method.

(6) Adverse effects on plant and animal populations from dredging and dredged material disposal or placement can be minimized by:

(A) avoiding changes in water current and circulation patterns that would interfere with the movement of animals;

(B) selecting sites or managing discharges to prevent or avoid creating habitat conducive to the development of undesirable predators or species that have a competitive edge ecologically over indigenous plants or animals;

(C) avoiding sites having unique habitat or other values including habitat of endangered species;

(D) using planning and construction practices to institute habitat development and restoration to produce a new or modified environmental state of higher ecological value by displacement of some or all of the existing environmental characteristics;

(E) using techniques that have been demonstrated to be effective in circumstances similar to those under consideration whenever possible and, when proposed development and restoration techniques have not yet advanced to the pilot demonstration stage, initiating their use on a small scale to allow corrective action if unanticipated adverse effects occur;

(F) timing dredging and dredged material disposal or placement activities to avoid spawning or migration seasons and other biologically critical time periods; and

(G) avoiding the destruction of remnant natural sites within areas already affected by development.

Compliance: Adverse effects on plant and animal populations from dredging to construct the RP is discussed in Section 7.2.1 to 7.2.2 of the DIFR-EIS for this project and detailed in Section 2.2.1 to 2.2.2 of Appendix G of the DIFR-EIS. Regarding item (A), effects, including those to pelagic and benthic marine organisms during construction and maintenance will be minor and temporary. Changes to water current and circulation patterns that would interfere with the movement of animals will be temporary, minor and very localized to the vicinity of the dredge vessel and cutterhead and cease with dredging. These effects are discussed under Section 7.1.5.1 of the DIFR-EIS. Regarding item (B), use of the existing PAs and marsh cells will not result in creating habitat conducive to the development of undesirable predators or species that have a competitive edge ecologically over indigenous plants or animals. The new work and maintenance materials which are being dredged are similar to the materials found in the areas in which they are being deposited. This will help ensure that invasive species do not become introduced into an area beneficial to native species. The design of the features also reflects a desire to create an ecologically stable environment, the bird islands have been designed to have an area no larger than 12 acres and to have at least one mile lie between the mainland and the island. These design considerations will allow birds to flock to the area without significant risk of having mainland predators stocking the area. Regarding item (C), coordination with the U.S. Fish and Wildlife Service (USFWS) under the Fish and Wildlife Coordination Act, and the USFWS and the National Marine Fisheries Service (NMFS), under the requirements of the Endangered Species Act, is being conducted with the release of the DIFR-EIS, and documented in Section 6.9.4 and 6.9.8 of that report, and the Biological Assessment developed for the RP, included as Appendix K of the DIFR-EIS. Coordination is also being done with these agencies during multiple resource agency meetings held during the planning process resulting in the RP. A determination that will be coordinated with both agencies has been made that the RP may affect, but not adversely affect Loggerhead turtles and critical habitat when using the existing offshore placement site ODMDS No. 1.

Regarding items (D) and (E), for the use of existing placement sites, the proposed work would be conducted with standard hydraulic cutterhead and placement techniques that will involve placement to the offshore placement site, existing Pas (Glendale, and Filterbed), existing marsh cells (Mid Bay Expansion North), previously planned marsh cells (M11) or newly created marsh cells and bird islands (3-bird island, or long bird island), or beneficial use oyster reefs. When placed in marsh cells and oyster reefs, this would result in a new or modified state of higher ecological value. Mitigation of oyster reef will be achieved through proven beneficial use placement of clay material with a cultch layer. This is a restoration technique successful on previous projects, including restoration of the reef for the Slaughter Creek project in the Chesapeake Bay. Regarding items (F) and (G), localized effects of hydraulic dredging with placement into existing PAs will not substantially interfere with fish or oyster spawning and migration, and no remnant natural sites are involved in this RP footprint or existing PAS and marsh cells. The placement of material will be controlled using submerged discharge and multi-tremie technology. This will allow controlled discharge of material with minimized impact to the surrounding reef and benthic organisms. The beneficial reefs, marshes and upland sites will be constructed in a manner to minimize impacts and maximize the uplift that they bring to the local ecology. Placement in the established offshore placement site ODMDS 1 involves an already-established, evaluated, and approved offshore site whose configuration and stipulations for use minimizes impacts to aquatic fauna, including movement. Managed lands, such as wildlife management areas are not affected.

(7) Adverse effects on human use potential from dredging and dredged material disposal or placement can be minimized by:

(A) selecting sites and following procedures to prevent or minimize any potential damage to the aesthetically pleasing features of the site, particularly with respect to water quality;

(B) selecting sites which are not valuable as natural aquatic areas;

(C) timing dredging and dredged material disposal or placement activities to avoid the seasons or periods when human recreational activity associated with the site is most important; and

(D) selecting sites that will not increase incompatible human activity or require frequent dredge or fill maintenance activity in remote fish and wildlife areas.

Compliance: Use of existing placement sites for construction and maintenance material would involve discharge directly into existing confined PAs, BU marsh cells, partially-constructed PAs, or the offshore placement site, that are currently used or already designated for maintenance dredging of the existing Federal project. The human use factors in items (A) through (D) would not be affected by the use of these existing placement features.

The new PA's and BU sites have been selected carefully to ensure that they maximize uplift and minimize any potential adverse effects. They are designed in keeping with the natural ecology and landscape found in the area, ensuring that they are aesthetically

pleasing and serving as proper ecological habitat. The addition of the BU marsh, oyster reef, and bird islands will enhance the area while being unseen from the mainland. The areas selected are currently featureless bay bottom, the benthic organisms in the area recover within 1-2 years and the footprint impacted will be exchanged for a higher biologically productive and more diverse area.

Both the existing and new PA's and BU sites are not remote and will be able to be accessed for an annual use should the anticipated frequency for use hold true. These are areas that will be an asset to the surrounding ecosystem and serve a pivotal role in the maintenance and continued growth of the ship channel. They are also designed in such a manner as to not impact recreational boaters, fishermen or oystermen. Impacted vessel channels will be relocated, not eliminated and the placement of pipelines will be strategic as to create as minimal of an impact as possible. The ultimate goal of these placement areas is to benefit the bay and those who use it, the stakeholders of the area cannot be precluded when planning projects such as this.

(8) Adverse effects from new channels and basins can be minimized by locating them at sites:

(A) that ensure adequate flushing and avoid stagnant pockets; or

(B) that will create the fewest practicable adverse effects on CNRAs from additional infrastructure such as roads, bridges, causeways, piers, docks, wharves, transmission line crossings, and ancillary channels reasonably likely to be constructed as a result of the project; or

(C) with the least practicable risk that increased vessel traffic could result in navigation hazards, spills, or other forms of contamination which could adversely affect CNRAs;

(D) provided that, for any dredging of new channels or basins subject to the requirements of §501.15 of this title (relating to Policy for Major Actions), data and information on minimization of secondary adverse effects need not be produced or evaluated to comply with this subparagraph if such data and information is produced and evaluated in compliance with §501.15(b)(1) of this title (relating to Policy for Major Actions).

Compliance: The RP involves widening submerged navigation channel features in an open water environment and will not result in creating any new segments of dead-end channels; therefore, inherently it will not involve the flushing and stagnation concerns in item (A). The channel modifications are to the existing HSC system which already has a highly developed port infrastructure around it; therefore, the RP itself will not involve or induce any of the land or shore-side structures and ancillary channel concerns in item (B). The RP is being implemented specifically to reduce navigation risks that address concerns in item (C). Regarding item (D), the HSC ECIP and resulting RP constitute a Federal action subject to the Coastal Management Program under §501.15 and is, therefore, a major action, and is also an activity for which a Federal environmental impact statement is required. Therefore, the information on evaluation and minimization of secondary adverse effects is already addressed and provided in the DIFR-EIS and not repeated here.

(c) Disposal or placement of dredged material in existing contained dredge disposal sites identified and actively used as described in an environmental assessment or environmental impact statement issued prior to the effective date of this chapter shall be presumed to comply with the requirements of paragraph (a) of this subsection unless modified in design, size, use, or function.

Compliance: The existing PAs and marsh cells, and ocean disposal site that would receive dredged material from the RP project, will not be modified in overall design, horizontal extent, use, or function as part of the RP. All these sites have been evaluated by prior NEPA documents under the *Houston-Galveston Navigation Channels, Texas (HGNC) Limited Reevaluation Report (LRR) and Supplemental Environmental Impact Statement (EIS)*, or the *Final Environmental Assessment, Expansion of Placement Areas 14 and 15, Houston Ship Channel, Chambers County, Texas*. The only potential size dimension change is the usable vertical capacity, as new work material would be used to raise dikes, to increase placement capacity without impacting new horizontal footprint area. Other uses may involve repairing dikes for the existing extent of constructed marsh cells, continue construction of PA or marsh cell features already planned and approved, or place material in an existing approved ocean disposal site (ODMDS No. 1). As such, the environmental impact evaluation performed for use of these existing PAs, marsh cells, and ODMDS, will not be affected in terms of new aquatic ecological resources being impacted. Therefore, the proposed use complies with the requirements of paragraph (a) of this subsection.

(d) Dredged material from dredging projects in commercially navigable waterways is a potentially reusable resource and must be used beneficially in accordance with this policy.

(1) If the costs of the beneficial use of dredged material are reasonably comparable to the costs of disposal in a non-beneficial manner, the material shall be used beneficially.

(2) If the costs of the beneficial use of dredged material are significantly greater than the costs of disposal in a non-beneficial manner, the material shall be used beneficially unless it is demonstrated that the costs of using the material beneficially are not reasonably proportionate to the costs of the project and benefits that will result. Factors that shall be considered in determining whether the costs of the beneficial use are not reasonably proportionate to the benefits include, but are not limited to:

(A) environmental benefits, recreational benefits, flood or storm protection benefits, erosion prevention benefits, and economic development benefits;

(B) the proximity of the beneficial use site to the dredge site; and

(C) the quantity and quality of the dredged material and its suitability for beneficial use.

(3) Examples of the beneficial use of dredged material include, but are not limited to:

(A) projects designed to reduce or minimize erosion or provide shoreline protection;

(B) projects designed to create or enhance public beaches or recreational areas;

- (C) projects designed to benefit the sediment budget or littoral system;
- (D) projects designed to improve or maintain terrestrial or aquatic wildlife habitat
- (E) projects designed to create new terrestrial or aquatic wildlife habitat, including the construction of marshlands, coastal wetlands, or other critical areas;
- (F) projects designed and demonstrated to benefit benthic communities or aquatic vegetation;
- (G) projects designed to create wildlife management areas, parks, airports, or other public facilities;
- (H) projects designed to cap landfills or other waste disposal areas;
- (I) projects designed to fill private property or upgrade agricultural land, if cost-effective public beneficial uses are not available; and
- (J) projects designed to remediate past adverse impacts on the coastal zone.

Compliance: For the use of existing PAs, new work material would be used to raise PA dikes that will extend the life of the PA to avoid having to build new PAs sooner. The use of material beneficially for dike construction is consistent with Beneficial Use Category 6, Construction/Industrial Development, in Appendix A of the joint EPA/USACE beneficial use (BU) manual, *Identifying, Planning, and Financing Beneficial Use Projects Using Dredged Material: Beneficial Use Planning Manual*, which lists levee and dike construction. Similarly, the use of new work material to repair dikes at existing marsh cells would enable the filling of the cells for subsequent tidal marsh creation, fulfilling an ecological BU purpose, consistent with item (E). These uses would also be consistent with item (G), using the material for a public facility, which the PAs and marsh cells are public facilities built to maintain a Federal channel. Wherever it is possible BU sites have been given preference over other disposal methods. Where it is not feasible, practicable or is against USACE policy the utilization of upland placement sites has been used as the alternative, but this has been minimized (mid-bay North expansion). As per Section 102 MPRSA, the disposal alternative of last resort is the ODMDS, which as a dispersive sight has renewable capacity but does not result in ecological uplift.

(e) If dredged material cannot be used beneficially as provided in paragraph (4) (B) of this subsection, to avoid and otherwise minimize adverse effects as required in paragraph (1) of this subsection, preference will be given to the greatest extent practicable to disposal in:

- (1) contained upland sites;*
- (2) other contained sites; and*
- (3) open water areas of relatively low productivity or low biological value.*

Compliance: Dredged materials will be used beneficially to create additional dredged material placement capacity at Upland PAs and/or to repair dikes for ecological beneficial use at Marsh Cells. When not being used beneficially, placement of dredged materials at the existing placement sites would be within the confines of earthen and rock dikes. No open water disposal exists in the DMMP, the utilization of the aforementioned controlled dispersal methods hinge on the utilization of containment dikes and the minimization of resuspension of solids.

(f) For new sites, dredged materials shall not be disposed of or placed directly on the boundaries of submerged lands or at such location so as to slump or migrate across the boundaries of

submerged lands in the absence of an agreement between the affected public owner and the adjoining private owner or owners that defines the location of the boundary or boundaries affected by the deposition of the dredged material.

Compliance: When using existing PAs and BU marsh cells, new construction and maintenance material will be discharged directly within the boundaries of existing dredged material PAs. When used to continue construction of already-planned PAs or marsh cells, it would be discharged to the dike templates of sites that have already been planned and coordinated with respect to the acquisition of the proper lands and interests.

Regarding the new PA's and BU sites submerged land rights on neighboring areas are being accounted for. The placement will be contained, and the discharge controlled as to ensure the footprint of the placement is as precise as possible and does not impede unknowingly onto private or lease-held land. As this is a federal navigation project where the new features are in the middle of the bay the surrounding submerged lands are subject to navigation servitude.



TEXAS GENERAL LAND OFFICE
GEORGE P. BUSH, COMMISSIONER

November 13, 2019

Department of the Army
Galveston District, Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553-1229

Re: Houston Ship Channel Expansion
CMP#: 20-1029-F2

Dear Applicant:

Based on information provided to the Texas Coastal Management Program (TCMP) on the above project, it has been determined that it will likely not have adverse impacts on coastal natural resource areas (CNRAs) in the coastal zone and is consistent with the goals and policies of the TCMP. However, siting and construction should avoid and minimize impacts to CNRAs. If a U. S. Army Corps of Engineers permit is required, it will be subject to consistency review under the Texas Coastal Management Program.

Please forward this letter to applicable parties. If you have any questions or concerns, please contact me at (409) 741-4057 or at federal.consistency@glo.texas.gov.

Sincerely,

Allison Buchtien
Federal Consistency - Coastal Resources
Texas General Land Office