Project Background

The Port of Corpus Christi Authority (PCCA) proposes to construct a liquid bulk terminal which includes a crude oil storage facility in the Inner Harbor of the Corpus Christi Ship Channel (CCSC) near the Tule Lake turning basin (project). The liquid bulk terminal will consist of three-vessel berths and one berth for barges. PCCA will dredge the vessel berths to -54ft mean lower low water (MLLW) and the barge berth to -20ft MLLW. PCCA will construct pile-supported docks for each berth. PCCA will place revetment and a sheet pile bulkhead wall along the shoreline for erosion control/stabilization. PCCA will build the upland storage facility on top of the dredge material placement area (DMPA) South Shore Cell C. PCCA will place clean, locally source structural fill material to provide a level construction site. PCCA will install vertical support piles to support the infrastructure of the upland facilities.

The approximate center of the project review area (PRA) is Latitude 27.82623° North and Longitude 97.48413° West (See **Exhibit A** – **Project Location Map**). The proposed project is located on the South Shore Cell C DMPA. All four sides of the PRA contain levees. A spill box remains in place on-site to control return water from dredge placement activities. A ditch bisects the PRA, oriented north-south. This ditch services the Joe Fulton Corridor conveying stormwater from roadside ditches to the Inner Harbor.

As a result of the dredging associated with the terminal construction, PCCA will impact 1.91 acres of estuarine wetlands, 0.01 acres of seagrass, and 0.03 acres of oyster reef. To serve as compensatory mitigation for unavoidable project-related impacts, PCCA proposes to create 2.87 acres of estuarine wetlands within the Nueces River Delta. The project will also impact 3.24 acres of non-jurisdictional wetlands. PCCA is not proposing to mitigate for impacts to non-jurisdictional wetlands as they are located within the levees of the DMPA and are hydrologically isolated from other water bodies.

1.0 Objectives

1.1 Method of Compensation

The objective of this mitigation plan is to provide sufficient in-kind habitat creation to ensure no net loss of wetland functions or values as a result of the proposed project. PCCA will utilize qualified construction contractors, engineers, and consultants to create wetlands as mitigation for permanent impacts at the proposed PRA. The 1.91 acres of estuarine wetlands at the PRA demonstrate reduced ecological value because it is located within a highly industrialized area. Furthermore, the 1.91 acres of estuarine wetlands are composed of 6 distinct wetland areas spread out along a shoreline approximately 1 mile long. The segmented nature of these wetlands demonstrates less ecological function when compared to a contiguous wetland of the same size. These wetlands are subject to constant wind/wake erosion activity from high winds as well as passing ship traffic and likely would be lost to bank erosion, regardless of PCCAs proposed project. Compensatory mitigation for proposed estuarine wetland impacts will be provided at a 1.5:1 ratio. PCCA will plant 2.87 acres of estuarine vegetation at suitable elevations and in unvegetated areas along the banks of Rincon Bayou within Coastal Bend Bays and Estuaries Program's (CBBEP) Nueces Delta Preserve complex. The proposed estuarine mitigation site is also within a previously degraded area managed by CBBEP. This area was formerly impacted by reduced freshwater inflows and hypersalinity (Hill et al., 2011). Regular freshwater diversions from the Nueces River into Rincon Bayou have, in recent years, created salinity levels conducive to the restoration, or reestablishment, of diverse salt marsh species. PCCA's proposed mitigation will result in no net loss in the quantity and quality of wetlands.

This project will also impact approximately 0.01 acres of seagrass. PCCA is not proposing to mitigate for impacts to seagrass because the mitigation of an area this small would prove too costly and difficult to

establish. PCCA also identified a 0.03-acre oyster reef that the project will impact. PCCA is not proposing direct mitigation for this oyster reef since the project will install revetment along the shoreline. This revetment will allow for new oyster recruitment after construction. PCCA observed oysters on the existing revetment adjacent to the PRA. These oysters will be the recruitment source for new establishment on the proposed revetment. This project will also impact 38.91 acres of open water with unvegetated bottoms. Section 2.2.1 of the Final Environmental Assessment, Finding of No Significant Impact and Regulatory Analysis of the 2008 Mitigation Rule states that "activities in open waters and certain other types of waters typically do not require compensatory mitigation." PCCA is not proposing mitigation for the conversion of non-vegetated shallow water habitat to open deep water.

1.2 Needs of the Watershed

PCCA proposes to provide mitigation for estuarine wetland impacts by planting 2.87 acres of estuarine vegetation in an unvegetated portion of the Rincon Bayou within the Nueces River Delta. This area is believed to be unvegetated due to the lack of sufficient freshwater influx as a result of historic modification to the Nueces River. Recent water diversions from the Nueces River support natural revegetation. This mitigation will further serve to restore habitat within the Rincon Bayou. The Nueces River Delta is an estuary, in that it is a transition zone between the freshwater habitat of the Nueces River and the saltwater habitat of Nueces Bay. Estuaries provide vital nursery grounds to marine organisms and foraging grounds to shorebirds. The Nueces River Delta is an extensive area of low and high emergent marsh, as well as submerged aquatic vegetation and intertidal flats in the low-lying areas, which are thought to provide the primary nursery habitat function for the estuary (Tolan, 2008). PCCA's mitigation will provide high-value intertidal vegetation communities to marine and avian species, further supporting the biodiversity of the region.

2.0 Site Selection

PCCA selected this site because it is located within the Nueces River Delta Preserve, managed by CBBEP. PCCA and CBBEP have a long-standing partnership for habitat creation and restoration. PCCA and CBBEP have successfully created multiple mitigation sites within the Nueces River Delta and surrounding area. PCCA decided to continue this partnership and track record for success by utilizing CBBEP land as opposed to other off-site locations. Ultimately PCCA selected the location within the Delta, Rincon Bayou, due to the proximity to the freshwater diversion channel from the Nueces River as well as existing access to the site.

PCCA was unable to design on-site mitigation for estuarine wetlands as the majority of the shoreline for the proposed project would be armored with revetment and bulkhead. While this will provide recruitment areas for oysters, it would prevent the creation of estuarine wetlands. PCCA determined that attempts to create estuarine wetlands on-site along the shoreline would be eroded during operations of the terminal as ships make call at the proposed docks. Additionally, PCCA did not consider a mitigation bank because no authorized mitigation banks exist within the region.

As mentioned in the permit application cover letter, PCCA is designing a shoreline restoration project along Nueces Bay. PCCA has proposed beneficial placement of new work dredge material from the project to create a living shoreline, for the purpose of restoring hurricane-caused erosion. PCCA is pursuing this shoreline restoration separately from the proposed project and as a result, does not wish to consider it mitigation for project-related impacts.

3.0 Site Protection Instrument

The proposed mitigation site is located within the Nueces River Delta Preserve, which is owned and managed by CBBEP as well as protected in perpetuity. CBBEP is a non-profit organization whose mission is to restore and protect the bays and estuaries of the Texas Coastal Bend. Its program area encompasses 75 square miles of estuarine habitat, including Rincon Bayou (CBBEP, 2014).

4.0 Baseline Information

4.1 Ecological Characterization of the PRA

PCCA contracted Mott McDonald and Triton Environmental Services to conduct a wetland delineation and aquatic survey at the proposed PRA (see **Attachment C – Wetland Delineation Report** and **Attachment D – Aquatic Survey Report**). The site was created from the placement of dredge material from the construction of the Corpus Christi Ship Channel. Dredge material placement is evident on-site and throughout historical imagery as demonstrated by containment levees, dewatering structures, placement spoils, and borrow pits. Vegetation has occurred over time, on-site but includes a significant amount of invasive plant species.

The Natural Resource Conservation Service's (NRCS) Web Soil Survey lists the soils at the proposed PRA as Ijam clay loam. The parent material of this stratum is sandy dredge spoils and/or loamy dredge spoils. NRCS classifies this soil as poorly drained, rarely flooding, and very slightly to moderately saline (Web Soil Survey, 2021). The tidal wetlands at the proposed PRA contain mangroves (*Avicennia germinans*), smooth cordgrass (*Spartina alterniflora*), and other high marsh species, primarily sea oxeye daisy (*Borrichia frutescens*), salt-meadow cordgrass (*Spartina patens*), gulf cordgrass (*Spartina spartinae*), and glassworts (*Salicornia bigelovii*), as well as 0.08 acres of unvegetated sand flats. These wetlands are situated within a highly industrialized shipping area. Tidal action dictates the hydrology for these wetlands via Corpus Christi Bay and the Corpus Christi Ship Channel. These wetlands likely provide a small number of nursery areas for various fish species, as well as feeding and roosting habitats for birds and other wildlife.

4.2 Ecological Characterization of the Mitigation Site

The proposed estuarine mitigation site is situated adjacent to estuarine wetlands that are dominated by sea ox-eye daisy, gulf cordgrass, shoregrass (*Distichlis littoralis*), coastal saltgrass (*Distichlis spicata*), and glasswort. The area along Rincon Bayou where the proposed estuarine mitigation site is situated was previously degraded and is currently unvegetated due to the hypersaline environment created by historical freshwater deprivation. However, the regular diversions from the Nueces River into Rincon Bayou have, in recent years, created salinity levels conducive to the re-establishment of salt marsh species, such as smooth cordgrass (Stachelek & Dunton , 2013). According to the director of the CBBEP, many unvegetated areas have colonized with species that have nearby seed sources. The proposed estuarine mitigation site likely has not colonized in the intertidal zones because of the absence of upstream smooth cordgrass seed sources, the location within the upper reaches of the Nueces Delta, and the length of time it can take this species to colonize naturally.

The Web Soil Survey lists two soil series at the proposed mitigation site: Aransas clay, saline, and 30% Narta fine sandy loam (Web Soil Survey, 2021). The NRCS reports that Aransas clay is subject to flooding by saltwater during periods of high tides, typically 2-3 times in 10 years, with saturation to the surface during most of the year. Both soil types possess very low water capacity and very slow permeability. Surface runoff is very slow to pond. Narta fine sandy loam soils are subject to periodic flooding by saltwater during high tides caused by storms (USDA Soil Survey, 1979). The average rainfall near this location is approximately 32 inches (NWS, 2021). Since the elevation range for the proposed estuarine mitigation site

is between 0.60 and 2.60 feet NAVD88, tidal and freshwater inundation will occur regularly, contributing to the nursery habitat function for marine organisms in the Delta.

5.0 Determination of Credits

Tidal influence and a dominance of low/high marsh vegetation characterize the estuarine wetlands at the proposed PRA. Despite the segmented nature and location within an industrial area, the estuarine wetlands at the location provide moderate-value habitat for fisheries as well as bird feeding and roosting. The low-lying intertidal flats and high marsh at the proposed estuarine mitigation site are of higher quality than those on-site because they are located within a larger wetland complex (Nueces River Delta). PCCA's project will impact 1.71 acres of high marsh wetlands and 0.20 acres of low marsh wetlands. PCCA proposes to mitigate project impacts to estuarine wetlands at a ratio of 1.5:1 since the created wetlands will be a higher value than those impacted. PCCA will restore and create 2.87 acres of estuarine habitat in previously degraded, unvegetated areas along the banks of Rincon Bayou in CBBEP's Nueces Delta Preserve. PCCA will plant approximately 0.30 acres of smooth cordgrass and 2.57 acres of suitable high marsh vegetation, like that at the PRA. The 1.5:1 mitigation ratio will more than compensate for the estuarine impacts because the moderate salinities and regular inundation will encourage rapid re-establishment of the estuarine marsh. Also, the 2.87-acre mitigation site will be within a very large and managed ecologically valued area, as opposed to the industrial setting of the PRA.

6.0 Mitigation Work Plan

The proposed mitigation will restore the existing site, which has previously been degraded and is currently unvegetated. PCCA will plant 2.87 acres of appropriate vegetation at the proposed estuarine mitigation site. Species planted/seeded at this site will include approximately 0.30 acres of smooth cordgrass and 2.57 acres of suitable high marsh vegetation, including gulf dune cordgrass, coastal salt grass, marsh hay cordgrass, dwarf saltwort, sea-side club rush, seashore dropseed, and associated species. Vegetation will be planted at existing corresponding elevations suitable for each species (see **Exhibit B – Plan View**).

Previous surveys have been conducted near the site to determine proper elevations. One study cites smooth cordgrass growing between 0.33 to 1.6 feet NAVD88 (Rasser et al, 2013). A small clump or sprig of each species will be planted on 3-foot centers and a transplanting permit from TPWD will be obtained before harvesting, transplanting, and replanting. **Exhibit C** shows the section drawings of the proposed estuarine mitigation site.

Planting and/or seeding of all species will be initiated during the first September 15th – November 15th after impacts to estuarine marsh occurs. Planting/seeding will occur in the fall to avoid the summer heat and to take advantage of cool winter weather and typical fall rains. The normal rainfall for this area is approximately 10.43 inches during September – November (NWS, 2021); these three months account for 1/3 of the rainfall for the entire year. Planting/seeding will be completed within 60 days of starting the planting effort. No heavy equipment, fill material, or excavation will be required to plant the estuarine site. Construction of the estuarine mitigation site will be completed within 90 days of impacts to the existing estuarine wetlands at the PRA.

7.0 Maintenance Plan

Highly productive estuaries are generally associated with nutrient loadings from freshwater input. The City of Corpus Christi continues to divert water from the Nueces River into Rincon Bayou periodically, which will assist the growth of the transplanted vegetation. PCCA will monitor the vegetation growth quarterly

the first year after planting to ensure transplant survival. PCCA will consider a 50% or greater survival rate, 60 days after the planting, successful. Should it be determined planting was unsuccessful, PCCA will replant the mitigation site. Any invasive species found during the monitoring events will be controlled so they comprise less than 5% of the vegetative cover at the mitigation sites.

8.0 Performance Standards

If vegetation survival does not achieve 50% during the 60-day monitoring, the mitigation sites will be replanted to original specifications within 60 days. Replanting will also occur if the sites have not achieved 70% vegetative coverage at the time of the three and five-year monitoring events. If this is the case, the sites will be replanted to original specifications within 60 days. The invasives control will be considered successful if less than 5% of the vegetation coverage is comprised of invasive species at the time of the 5-year monitoring event. Written monitoring reports will be submitted within 45 days of either the monitoring event or the replanting effort if deemed necessary. If mitigation monitoring reports describe any difficulties of performance standards not being met, PCCA and the USACE will identify potential remedial actions including a timetable. Each mitigation site will be considered to have met performance standards if there are at least two consecutive monitoring events that document 70% vegetative cover within the site.

9.0 Monitoring Requirements

The 2008 Mitigation Rule and the USACE's October 10, 2008 Regulatory Guidance Letter "Minimum Monitoring Requirements for Compensatory Mitigation Projects Involving the Restoration, Establishment, and/or Enhancement of Aquatic Resources" (RGL No. 08-03) govern compensatory mitigation for activities authorized by USACE (33 CFR, Parts 325 & 332), including monitoring success criteria. The RGL states that "the monitoring period must be sufficient to demonstrate that the compensatory mitigation project has met performance standards, but not less than five years (33 CFR, 332.6(b)). If a compensatory mitigation project has met its performance standards in less than five years, the monitoring period length can be reduced, if there are at least two consecutive monitoring reports that demonstrate that success. Monitoring requirements may be waived upon a determination that the compensatory mitigation project has achieved its performance standards."

PCCA proposes to monitor the mitigation site once every quarter for the first year following the planting, and then annually for the next four years or until vegetative coverage of 70% is documented for two consecutive years. Monitoring reports will be submitted in writing to the USACE, Corpus Christi Regulatory Field Office within 45 days of completion of each monitoring event. These reports will list the monitoring requirements, performance standards, and evaluate whether the compensatory mitigation sites have achieved these goals. A general statement will be included describing the condition of the sites and any invasive plants found will be discussed. If performance standards are not being met, PCCA will explain the difficulties and potential remedial actions, including a timetable.

10.0 Long-term Management Plan

Once the mitigation sites have reached success criteria and the USACE issues concurrence on the completion of the monitoring effort, PCCA expects that the planted areas will be self-sustaining. Because of the sites' location in the Nueces Delta Preserve, which is owned by a conservation organization (CBBEP), it is preserved in perpetuity and not subject to damage from recreational or other activities. The purpose of the five-year monitoring is to ensure that the site is successful in the long term. Should the mitigation site fail to meet the established success criteria, PCCA will intervene as specified in section 8.0 Performance Standards.

11.0 Adaptive Management

Should the mitigation site fail to meet the established success criteria, PCCA will intervene as specified in section 8.0 Performance Standards. Should the mitigation site be significantly impacted by a natural disaster or determined unsuccessful for an unforeseen event, PCCA will coordinate with USACE to determine corrective actions. If corrective actions are not feasible to restore the initial mitigation site, PCCA will work with CBBEP to locate and design a comparable alternative mitigation site.

12.0 Financial Assurances

Financial Assurances for the mitigation site will be provided before project impacts via either an escrow account or bond and will be financially based on the costs associated with the mitigation plan as outlined above. PCCA will work with qualified contractors, to determine an appropriate escrow account amount or bond amount to ensure the completion of the mitigation plan, and the short- and long-term monitoring requirements that are outlined above.

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Legend

Project Location

- Tule Lake Project Review Area (87 acres)
- Mitigation Planting (2.85 acres)
- Existing Access

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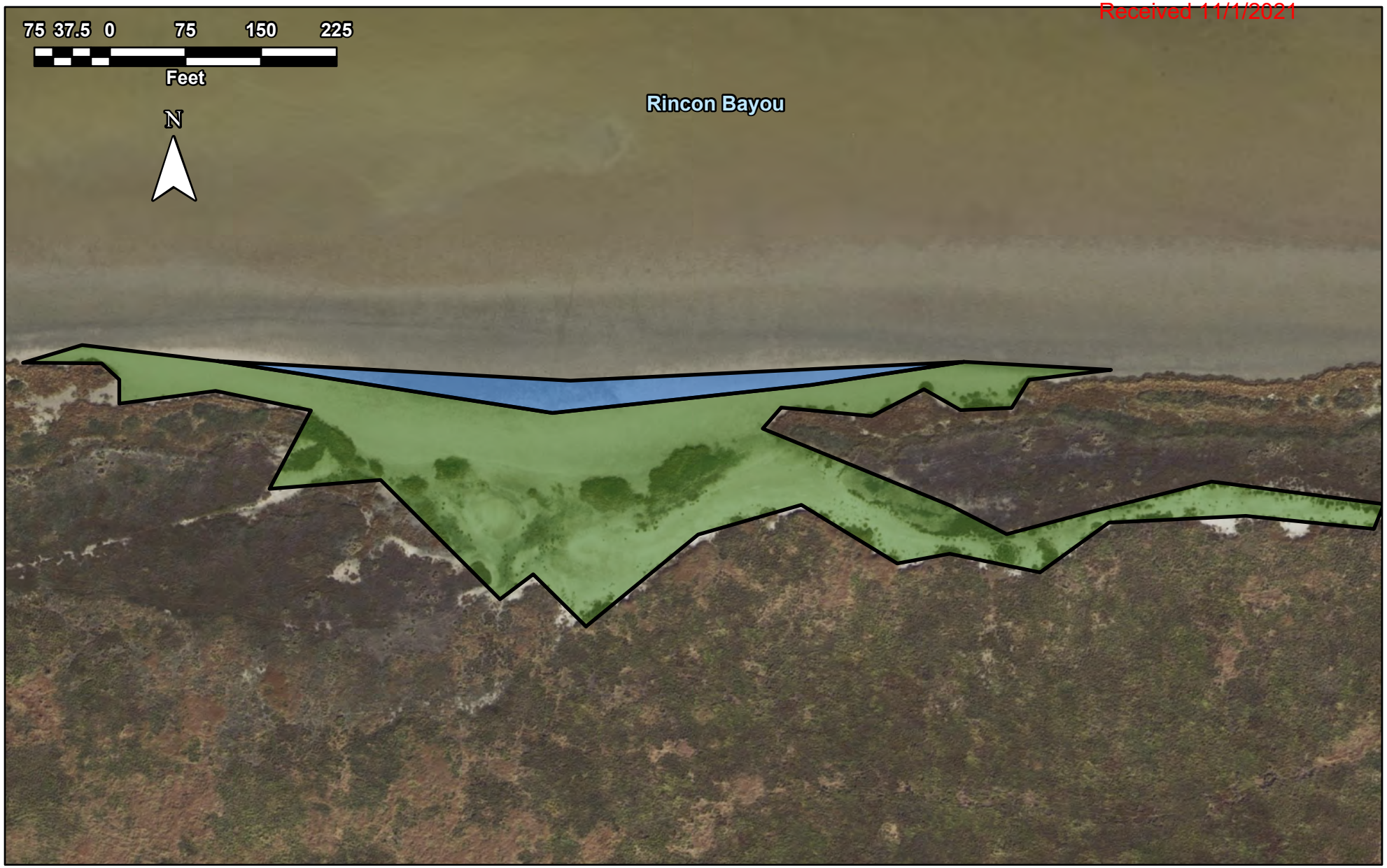
Exhibit A - Location Map

Attachment F - Mitigation Plan
Tule Lake Terminal
Rincon Bayou, Nueces County, Texas



Legend

Mitigation Planting

Habitat Type

- High Marsh (2.57 acres)
- Smooth Cordgrass (0.30 acres)

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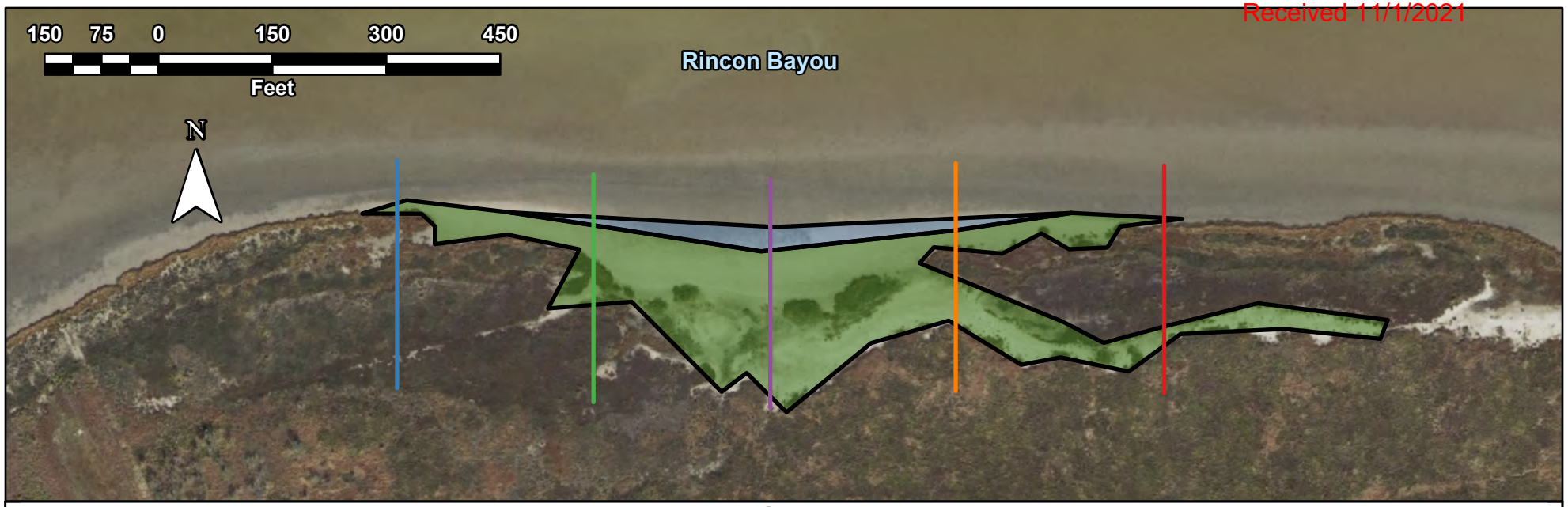
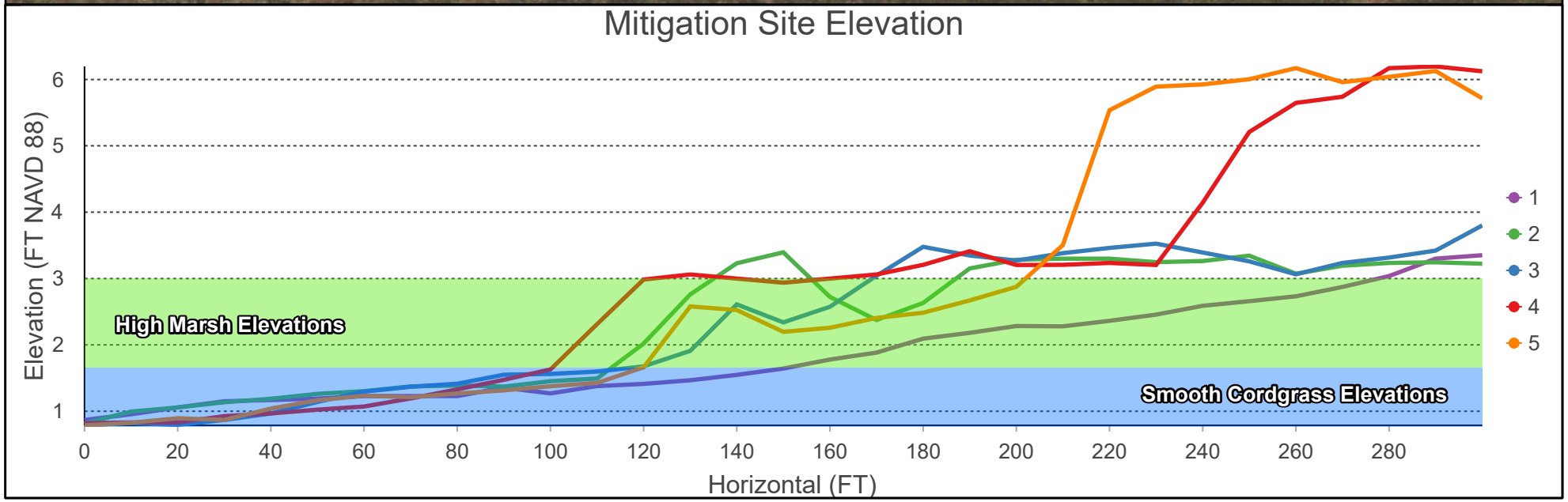
Exhibit B: Mitigation Plan View

Attachment F - Mitigation Plan
Tule Lake Terminal
Rincon Bayou, Nueces County, Texas





Legend

Cross Section

Mitigation Planting

Habitat Type

- High Marsh (1.75 acres)
- Smooth Cordgrass (0.26 acres)

SectionName

- C1
- C2
- C3
- C4
- C5

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Exhibit C - Cross Section View

Attachment F - Mitigation Plan
Tule Lake Terminal
Rincon Bayou, Nueces County, Texas

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