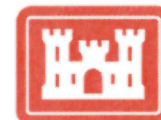


U.S. Army Corps of Engineers (USACE) Galveston District



DRAFT

Mitigation Plan

Part I: Project Information

Project Name: US 181 Harbor Bridge
SWG Permit No.: SWG-2014-00408
Project Location: Corpus Christi, TX
Mitigation Site Location(s) (if different):
Watershed(s): Nueces-Rio Grande watershed near boundaries of Nueces and San Antonio-Nueces watersheds, HUC 121102020107
County or Counties: Nueces

Part II: Avoidance and Minimization

1. Avoidance

All Alternatives, including the Preferred Alternative, included design that maximized bridging where feasible to avoid impacts to Waters of the U.S. that would occur from construction of an at-grade roadway. Bridge footings would be placed above mean high water. The preferred alternative impacts 5.41 acres less than another reasonable and feasible alternative considered.

2. Minimization

Bridging instead of culverting was incorporated into the project design wherever feasible to minimize impacts to waters of the U.S. Regarding minimization of water quality impacts, construction of any of the build alternatives would require authorization under the TCEQ Construction General Permit (CGP), TXR150000 as a Large Construction Activity. The proposed project would be eligible for authorization under the CGP for discharges to impaired surface waters, if applicable at the time of construction, because, as stated previously, the project would be consistent with the approved TMDL and TMDL Implementation Plan and would not cause or contribute to water quality impairment of any 303(d)-listed surface water. TxDOT would prepare and implement a Stormwater Pollution Prevention Plan (SW3P) describing the measures to be used to minimize pollutants in construction stormwater discharges. Temporary erosion and sediment control BMPs would be designed, put in place and maintained throughout the construction phase, as required by the CGP and by TxDOT Construction Specifications. In addition to the use of temporary BMPs, such as silt fences, sediment traps, rock filter dams and temporary revegetation, the required final stabilization measures would also be implemented.

Part III: Compensatory Mitigation

1. Goals and Objectives

In accordance with the goal of no net loss of wetlands, the proposed mitigation would replace the extent and functions of the waters of the U.S. that will be lost or degraded due to project impacts. On-site, in-kind creation of 2.0 acre of functional marine estuarine emergent wetland is proposed to

achieve this goal. Establishment of desired vegetation will be accomplished through removal of the existing roadway, control of invasive plant species and planting of desirable native wetland vegetation to achieve 60% hydrophytic vegetation (FACW or wetter) cover, following the fifth full growing season post- construction. Soil excavation and removal will occur to achieve bottom elevations necessary to attain tidal hydrology necessary for creation of high and low marsh habitat within the mitigation site.

2. Site Selection

The proposed mitigation site was chosen because it meets the requirements that would provide sufficient compensation for the proposed impacts. Additionally, the proposed mitigation/enhancement site is already tidally connected through culverts to the Rincon Channel and Nueces Bay. Through removal of the roadway and opening the drainage, this proposed site would provide in-kind, tidal wetlands in close proximity to the project site, on the same water that is to be impacted by the proposed project. The site will also allow a large enough area to accommodate the amount of mitigation needed for this project. Moreover, it has been verified during engineering design that the site would have reliable tidal hydrology. Also, the site location is within TxDOT right-of-way, which facilitates ease of access, thereby ensuring that the site will be protected in perpetuity. Overall, the site was chosen because it was the best choice for a mitigation area that will replace the functions and values of the wetlands to be impacted with the project.

3. Liens, Easements or Encumbrances

The mitigation site is located entirely within TxDOT-owned right-of-way. Accordingly, no liens, easements, or encumbrances exist for the project site.

4. Baseline Information / Site History

A delineation of waters of the U.S., including wetlands, within the project area was completed in accordance with the 1987 Corps of Engineers Wetland Delineation Manual (Technical Report Y-87-1 or 1987 Manual), including the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0). Permanent impacts would result from placement of structural fill. It was determined that a total of 0.88 acre of unavoidable permanent impacts to jurisdictional tidal fringe wetlands would occur.

The mitigation site would establish a 2.0 acre area of functional marine estuarine emergent wetland under the proposed US 181 Harbor Bridge, adjacent to the area of wetland impacts described above. Currently the proposed mitigation area is not a wetland and consists of paved roadway and graveled roadway shoulder (to be removed in conjunction with the proposed project) with very sparse upland vegetation. The goal of the soil removal will be to match the bottom elevation necessary to create high and low marsh habitat within the mitigation site that is tidally connected through existing culverts to the Rincon Channel. To properly build features within the wetland mitigation site, sandy loam material is recommended for construction of island features within the proposed wetland mitigation site. The sandy loam soil will promote better drainage and gas exchange and ultimately maximize vegetation propagation. The constructed feature will also enhance the effect of shoreline interface in the wetland. The shoreline interface is that area between a terrestrial and aquatic ecosystem that is optimum for vegetation and also acts as a nursery for numerous species of marine biota. In addition, the

proposed vegetation species typically cultivate better in higher tidal flow areas due to improved drainage, nutrient availability, and gas exchange through the sediment. Attachment A depicts the impacted wetlands and the area identified for on-site mitigation.

5. Mitigation Work Plan

Mitigation site excavation and grading will be performed to ensure appropriate tidal hydrology, followed by establishment of suitable soil substrate as described previously.

Vegetation Planting

Hydrophytic vegetation species were selected based on dominant species within high and low marsh plant communities of tidally influenced wetlands typically found in coastal regions of South Texas. In addition, the plant selection was based on the dominant plant species found within the surrounding area of the proposed wetland mitigation site. It was determined based on the layout of the mitigation site that the area would contain 1.0 acre of high marsh and 1.0 acre of low marsh habitat. To optimize the chances for successful establishment of high and low marsh plant communities, the following methods will be employed. For seeded species, seeds will be distributed at a density sufficient to establish a total cover of 60% of the planted species by the end of the monitoring period. For sprigged and transplanted species, close spacing of plants is required to attain the same 60% cover; high planting density results in faster recruitment of desirable species both by propagation from seed and rhizomal advancement. The recommended method for planting is species-specific and is described in Tables 1.1 and 1.2. The recommended spacing is 0.5 meter between plants, which translates to 16,196 plants per acre. Therefore, once the soil equilibrates to desired salinity levels (determined through monthly measurement of soil salinity until equivalent values are seen in two sequential samples), the initial planting would require approximately 16,196 plants in the high marsh habitat and 16,196 plants in the low marsh habitat. Newly planted areas will be irrigated weekly for eight weeks or longer if deemed necessary, to maximize initial germination, growth, and survival. Exotic and nuisance species identified during monitoring events will be removed as necessary to achieve the success criteria described below.

In the event that performance standard 9. a) below has not been met at the end of a 6-month period immediately after planting, planting will be repeated according to the live plant densities and seeding rates of the original plan.

Table 1.1 Low Marsh Hydrophytic Vegetation Cover

Common Name	Species Name	Planting Method	Percent Planting Cover
Sea Lavender	<i>Limonium carolinianum</i>	Transplant	15%
Black Mangrove	<i>Avicennia germinans</i>	Transplant or Seed	10%
Shoregrass	<i>Distichlis littoralis</i>	Transplant	10%
Marshhay Cordgrass	<i>Spartina patens</i>	Sprigging	15%
Sea Blite	<i>Suaeda linearis</i>	Broadcast seeding	5%
Glasswort	<i>Salicornia depressa</i>	Transplant	10%
Saltwort	<i>Batis maritima</i>	Transplant with runners	10%
Sea Purslane	<i>Sesuvium maritimum</i>	Broadcast seeding	5%

Oystergrass	<i>Spartina alterniflora</i>	Transplant	20%
Saltmarsh Bulrush	<i>Bolboschoenus maritimus</i>	Transplant rhizomes	40%

Table 1.2 High Marsh Hydrophytic Vegetation Cover

Common Name	Species Name	Planting Method	Percent Planting Cover
Carolina wolfberry	<i>Lycium carolinianum</i>	Transplant winter	15%
Stinkweed	<i>Pluchea odorata</i>	Broadcast seeding	5%
Gulf Cordgrass	<i>Spartina spartinae</i>	Transplant	40%

See **Attachment A** for mitigation site figures. Natural tidal flow would provide site hydrology through existing maintained roadside drainage channels draining northward to Nueces Bay.

Construction Schedule

Construction is scheduled to begin in June 2016 and end in summer 2021.

6. Determination of Credits

The proposed 2.0 acre mitigation site would provide compensation for 0.88 acre of permanent wetland impacts at a ratio of 2.3:1.

7. Maintenance Plan

TxDOT maintenance of drainage channels would include inspection of hydrology and repair of damaged drainage structures (for example, from storm events) and would result in assurance of appropriate hydrology maintained in perpetuity. Newly planted areas would be irrigated weekly for eight weeks or as deemed necessary to maximize initial germination, growth, and survival. Because the site is located in an urbanized setting, substantial grazing pressure on mitigation plantings is not anticipated; however, some seed predation from rodents is likely. Invasive species control measures may be implemented on an ongoing basis as necessary to achieve performance standard 9. b) below.

8. Perpetual Site Protection Instrument

TxDOT, as the mitigation site owner, would provide perpetual site protection.

9. Performance Standards

The following success criteria would be observed:

- a. To assure successful establishment of the plantings, an initial survival survey would be completed within 6 months following the completion of planting activities. The initial planting would be considered successful if 50% or more of the transplants and sprigs have survived after one year, and native hydrophytic species with an indicator

status of facultative wetland (FACW) cover has established in 50% or more of the seeded areas. If the target of 50% survival and cover is not reached, then the mitigation site would be replanted to achieve the live plant densities and seeding rates of the original planting plan.

- b. The final success criteria for the mitigation site are as follows: 1) 60% or greater areal cover of desirable native wetland vegetation (FACW or wetter), and 2) less than 15% areal cover of nuisance, invasive, noxious and exotic plant species, as identified by TPWD at http://www.texasinvasives.org/plant_database/index.php.
- c. The mitigation requirement will be considered to be complete when the site has met the success criteria five years after the initial planting or any required re-planting events. If the success criteria have not been met at the end of the five-year monitoring period, or if it becomes obvious at any time during the monitoring period that the criteria will not be met, a corrective action plan will be proposed to the USACE. Once a corrective action plan is approved by the USACE, the plan will immediately be implemented. Upon completion of the terms of the plan, the USACE will be notified and a determination will be requested regarding success of the mitigation. Additional corrective action plan details are provided in Step 12 below.

The goal of the mitigation site is to achieve 60% coverage of desirable native wetland vegetation (FACW or wetter) by the end of the fifth full growing season post-construction, and to minimize invasive species cover to less than 15%. Maintenance of wetland hydrology will be assured through monitoring.

10. Monitoring Requirements

Initial Monitoring: An initial monitoring event to assess transplant survival will be performed within 6 months following the completion of planting activities. If performance standard 9. a) above is not met, then corrective action will be implemented as described in Step 7 above and the monitoring period will reset to the time of initial planting.

Annual monitoring: After the initial planting effort has met the success criteria described in Step 9 a) above, annual monitoring events will be conducted. Monitoring events will take place at the end of the growing season. The first event will serve as a baseline survey for subsequent events. Each monitoring event will consist of assessing total cover, percent cover by species of native hydrophytic vegetation, invasive species cover and soil salinities.

Photo documentation will also be included. In addition, the Contractor will monitor the exchange of tidal flow in and out of the mitigation site to maintain the presence of wetland hydrology and prevent ponding. Monitoring reports will be submitted to the USACE within 30 days of the conclusion of the event.

Invasive Species:

Invasive species control measures will be implemented as part of each monitoring event, immediately after the event, or ongoing between events, as determined necessary to achieve and maintain performance standard 9. b) above.

Methods:

The initial monitoring event to assess transplant and sprig survival will be conducted using a standard random sampling method sufficiently robust to extrapolate sample data to the overall site.

Annual monitoring will be conducted using a standard method for assessing total aerial plant cover, such as the Line Transect Test Method (University of Nebraska Cooperative Extension, Institute of Agriculture and Natural Resources).

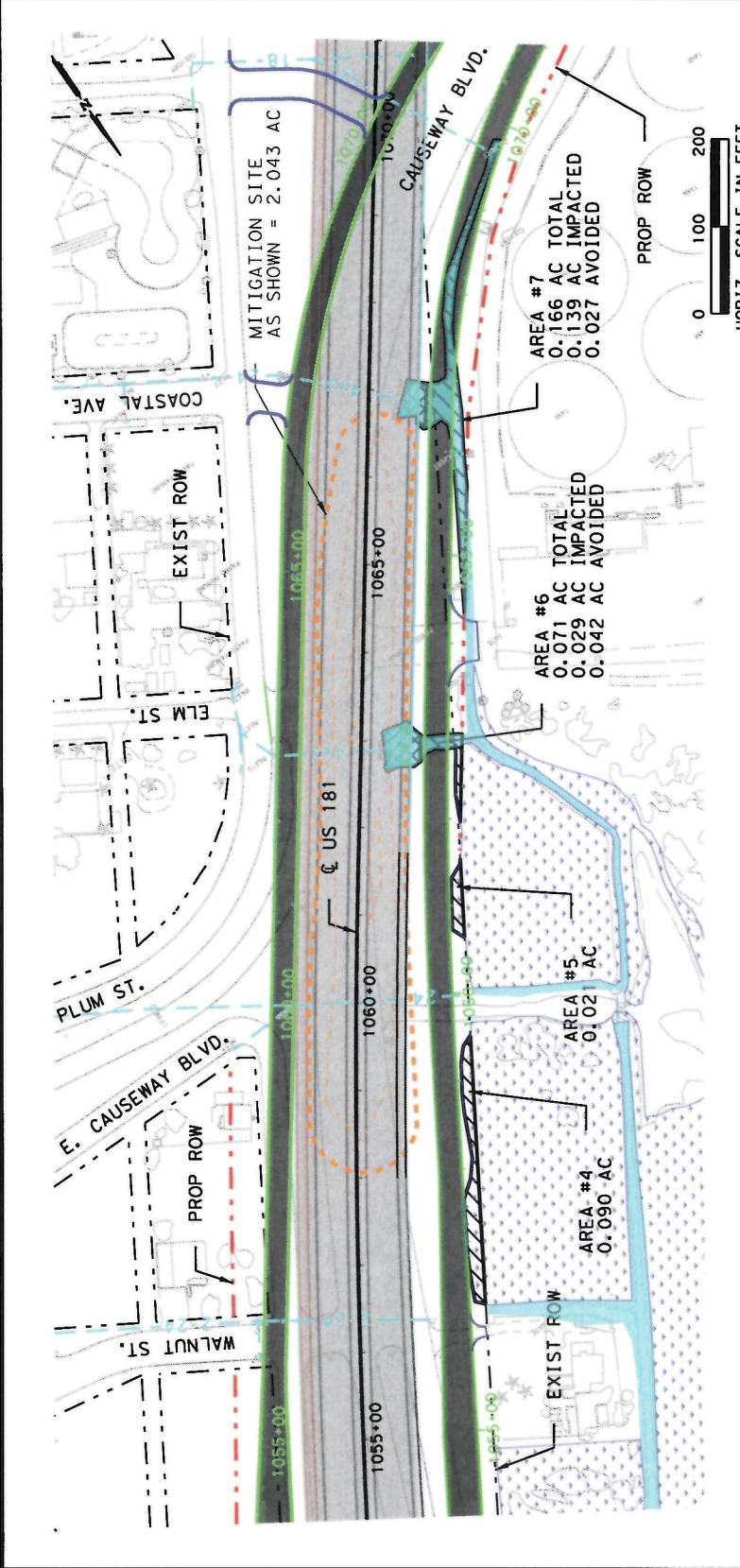
11. Long-term Management Plan

TxDOT, as the site owner, would provide perpetual maintenance of drainage channels and repair of damaged drainage structures, assuring long-term appropriate hydrology is maintained. Moreover, TxDOT ownership would provide perpetual site protection from encroachments or disturbances.

12. Adaptive Management Plan

An adaptive management strategy will be adopted to facilitate site development so that final performance standards and permit conditions are met in a timely manner. The adaptive management process includes development of performance standards and management actions, monitoring of the response of the resource (plant survival), and evaluation and adjustment of management actions if performance standards are not being achieved. The contractor will complete a survey at the end of each growing season including the first year as a baseline survey. The mitigation site survey will include photo documentation; percent cover analysis (by species), identification of dominant species, and hydric soil descriptions. During the surveys, TxDOT will also evaluate the propagation and recruitment of hydrophytic vegetation through identification of dominant species and their USFWS-designated wetland indicator status.

A plant survival survey will be completed 6 months following the completion of planting activities. Initial planting will have been considered successful if 50% of the plantings and broadcasted areas have survived after 6 months. If the target of 50% survival is not reached, then the mitigation site will be replanted to match the original desired density. If post-construction planting has not resulted in 60% vegetation cover, with less than 15% areal cover of invasive plant species, by the end of the fifth full growing season, or if it becomes obvious at any time during the monitoring period that the success criteria will not be met, the permittee will develop and submit to the USACE a plan that evaluates deficient areas and proposes specific corrective actions. Actions may include re-planting with selected species, adjusting conditions to improve site hydrology, improving erosion control by implementing BMPs or other measures, and increasing control measures to reduce invasive species coverage at the site. See Step 9. c) above for additional details.



AREA #7
0.166 AC TOTAL
0.139 AC IMPACTED
0.027 AC AVOIDED

AREA #6
0.071 AC TOTAL
0.029 AC IMPACTED
0.042 AC AVOIDED

AREA #5
0.02 AC

AREA #4
0.090 AC

MITIGATION SITE
AS SHOWN = 2.043 AC



HORIZ. SCALE IN FEET

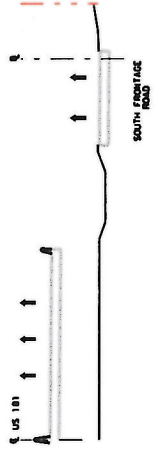
Texas Department of Transportation
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**JURISDICTIONAL WETLANDS
AND WATERS OF THE U.S.**
US 181: HARBOR BRIDGE
AREAS #4, #5, #6 & #7 PLAN VIEW

CSJ: 0101-06-095 County: Nueces State: Texas
Application By:
Texas Department of Transportation
Sheet: 4 of 7 USACE Project No:
Date: 06/2016

HNTB
HNTB Corporation
The HNTB Companies
Engineers Architects Planners
TYPE FIRM REGISTRATION NO.: 420

INTERIM REVIEW ONLY
Document prepared not intended for
construction. Prepared by
Engineer: RAMIRO M. GARCIA
P.E. Serial No. 181951
Date: 6/24/2016



AREA LABEL	PERMANENT FILL (AC)	FILL CY
#4	0.090 AC	146 CY
#5	0.021 AC	35 CY
#6	0.029 AC	27 CY
#7	0.139 AC	246 CY

LEGEND

---	US 181	▨	WETLANDS
- - -	EXIST ROW	▩	IMPACTED AREA
---	PROP ROW	▧	AVOIDED AREA
---	BULKHEAD LINE	▤	TEMPORARY LIMITS
---	EXISTING DRAINAGE	▥	COFFERDAM LIMITS
---	MITIGATION SITE	▦	
---	WATER		

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