

**BAHIA GRANDE  
ATASCOSA NATIONAL WILDLIFE REFUGE**

**CONSTRUCTION SPECIFICATIONS FOR TIDAL EXCHANGE CHANNELS  
B2, C1 AND C2:**

June 23, 2006

Prepared for:

**UNITED STATES FISH AND WILDLIFE SERVICE AND  
TEXAS CORPORATE WETLAND RESTORATION PARTNERSHIP**

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TIDAL EXCHANGE CHANNELS  
B2, C1 AND C2:

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## I. SCOPE OF WORK

The Corporate Wetland Restoration Partnership in cooperation with the United States Fish and Wildlife Service need to construct three channels to connect the Bahia Grande with Laguna Madre and Laguna Larga. See sheet no. C1 and C2 for the location of these work areas. CONTRACTOR shall furnish (unless otherwise excepted) all supervision, labor, materials, tools, equipment, office, loading, unloading, hauling, storing, taxes, insurance, and all other things necessary to complete the following construction in accordance with the drawings and General Workmanship Specifications:

1. Install a 3700 ft long 60 ft wide channel from Laguna Larga to Bahia Grande (Channel B2); and
2. Install two channels to connect Laguna Madre to Bahia Grande (Channel C1, 600 ft, and Channel C2, 2150 ft, both 60 ft wide).

The CONTRACTOR shall develop and submit to the OWNER for review and approval the following documents prior to mobilization:

- 1) *Site-Specific Health and Safety Plan (HASP)*.
- 2) *Excavation Plan* that complies with the requirements contained in 29 CFR 1926, Subpart P.
- 3) *Traffic Control Plan (TCP)* indicating material haul routes and engineering controls proposed for maintaining safe transport activities during construction.
- 4) *Storm Water Pollution Prevention Plan (SWP3)* that meets the requirements of TPDES permit TXR150000 – General Permit Relating to Discharges from Construction Activities.

CONTRACTOR shall obtain a TPDES permit TXR150000 – General Permit Relating to Discharges from Construction Activities, and a special use permit from the United States Fish and Wildlife Service (USFWS), hereafter referred to as the OWNER, prior to construction (See Section V., Site Conditions).

CONTRACTOR shall meet all requirements of the United States Army Corps of Engineers 2002 Nationwide Permit, including the regional general conditions that apply only to Texas (See Section V., Site Conditions)

CONTRACTOR shall coordinate with USFWS (hereafter referred to as OWNER) and comply with all OWNER'S general site-specific safety plan and site usage policies.

CONTRACTOR shall take extreme care when performing activities in the vicinity of overhead power lines and support poles and shall not perform construction activities in such areas until lines are de-energized or until proper clearances are established. Work in high voltage areas shall not be initiated until approval has been obtained from the OWNER or OWNER's representative (hereafter referred to as ENGINEER).

CONTRACTOR shall identify the location of underground utilities in the vicinity of excavation work, take all necessary precautions to avoid damaging them and replace any damaged during construction. The OWNER shall provide the CONTRACTOR with a set of underground pipeline maps to assist this effort.

## SPECIAL NOTE TO CONTRACTORS

Each bidder shall prepare a "Work Plan" to describe the Bidder's approach to the project. The Work Plan shall clearly define the means and methods that shall be employed to complete the project and shall clearly describe the applications of safety controls and environmental management systems for each phase of the work. Discussions should include methods of compliance with regulatory requirements and the project specifications. The Work Plan should clearly outline the Bidder's plan for completing the project from Mobilization through Demobilization. The Work Plan must include the following information:

- A List of activities, including a clear written and pictorial representation of the phasing of excavation activities (construction drawings can be used for these purposes);
- A List of major equipment assigned to the Project;
- Manpower Projections for each week of the Project;
- Scheduled Shifts; and
- Drawings showing staging area, haul routes, fuel storage, and limits of construction.

Special care should be given to the preparation of the Work Plan. The fundamentals of hazard evaluations must include anticipation, recognition, evaluation and control of safety and environmental issues. These evaluations are critical to safely complete the construction project. The Work plan shall be a major factor in determining the successful Bidder.

## II. BASIS OF PAYMENT

Before submitting its bid, CONTRACTOR shall become familiar with the work, the Site and all factors affecting performance of the work. CONTRACTOR shall inspect the Site and completely inform itself relative to construction hazards, existing elevations, dimensions, structure locations, utility locations, facilities and routes for transportation of materials, and all other existing site conditions. CONTRACTOR shall carefully correlate its observations with the requirements of the drawings and specifications and otherwise satisfy itself regarding the expense and difficulties involved with performance of the work. The submission of a bid by the CONTRACTOR shall constitute a representation of compliance with these requirements. There shall be no subsequent financial adjustment for lack of such familiarization.

CONTRACTOR shall note that haul routes utilize both public and private roads that, on occasion, are subject to traffic by other vehicles. CONTRACTOR is responsible for anticipating potential transportation delays associated with existing traffic on the haul routes and shall prepare its bid accordingly. CONTRACTOR shall ensure that vehicles leaving the site on a daily basis, and at the end of the job during demobilization has been brushed down and freed of loose soil.

CONTRACTOR shall use the attached Basis of Payment spreadsheet to submit its bid for the work described on the drawings and in these specifications. A lump sum or unit rate-based figure shall be entered for each item to cover all costs associated with that item. The total contract price shall be the total price to complete the work described on the drawings and in these specifications.

### 1.0 Site-Specific Health and Safety Plan [Item No. 1 pay quantity is Lump Sum]

CONTRACTOR shall develop and submit to the OWNER for review a Site-Specific Health and Safety Plan conforming to USFWS requirements prior to beginning any on-site activity.

**2.0 Traffic Control Plan**  
[Item No. 2 pay quantity is Lump Sum]

CONTRACTOR shall develop and submit to the OWNER for review and approval a traffic control plan showing material and/or equipment haul routes and engineering controls proposed for each phase of construction that shall maintain safe transport activities throughout the project. This plan shall identify traffic flow routes, location and type of signage and barriers to be used, and the number and location flagmen for each phase of construction.

**3.0 Storm Water Pollution Prevention Plan (SWP3)**  
[Item No. 3 pay quantity is Lump Sum]

CONTRACTOR shall develop and submit a SWP3 to the OWNER for review and approval. CONTRACTOR shall utilize erosion control measures as described in the Texas Commission on Environmental Quality (TCEQ) Best Management Practices Erosion Control document (See Section V., Site Conditions)

The CONTRACTOR shall implement the approved SWP3 prior to beginning construction activities. CONTRACTOR shall erect storm water pollution prevent measures, and construct and maintain erosion control fence, silt curtains and other controls necessary to avoid impacts to environmentally sensitive areas in the vicinity of the work.

**4.0 Mobilization**  
[Item No. 4 pay quantity is Lump Sum]

CONTRACTOR shall prepare the work and staging area, erect necessary staking, fencing and signage, and construct temporary facilities, as necessary. CONTRACTOR shall make assessment of existing unpaved roads, unrated bridges, and culverts that shall be crossed with construction equipment. With concurrence by the ENGINEER and OWNER, CONTRACTOR may reinforce or upgrade these structures to suit his use. The CONTRACTOR shall provide electricity, potable water, sanitary services, and phone and internet lines. The OWNER shall make available a potable water connection. The CONTRACTOR must implement the SWPP prior to the beginning of construction activities.

**5.0 Site Clearing and Preparation**  
[Item No. 5 pay quantity is Lump Sum]

CONTRACTOR shall coordinate with the OWNER to define the limits of construction. This area shall be clearly staked and flagged. No construction activities shall take place outside of these limits. CONTRACTOR shall remove any brush necessary to access the job site and shall dispose of this material at an OWNER-specified location.

The technical specification that applies to this task is included in Section 02130 – Site Clearing and Preparation.

**6.0 Channel Construction**  
[Item No. 6 pay quantity is total cost per cubic yard]

CONTRACTOR shall construct three tidal exchange channels to the grades, dimensions, and elevations shown on the Drawings. CONTRACTOR shall cut three channels

with a bottom width of 60 ft and side slopes of 4(H):1(V). The flat channel bottom of each constructed channel shall be at -2.0 ft MSL, and the ends of the channels shall be flared into the respective basins. In cases where the existing channel bottom is already at a lower elevation, no further work is necessary.

Channel excavation will require removal and disposal of wet and dry material. Section IIA., Bid Table, contains estimates of the total volume to be excavated for each channel.

Dry and wet material excavated from the upland section of the each channel shall be stockpiled adjacent to the channel. After construction, a 10-ft wide road is needed on both sides of channels C2 and B2, for their entire lengths. CONTRACTOR shall provide a graded, relatively flat surface adjacent to these channels, on both sides, for these purposes. Material placed within the road footprint shall be graded smooth. Alternately, material can be placed outside the road footprint. Material placed outside the road footprint shall be graded to a maximum height of 5 ft above the channel crest, with side slopes of 4(H):1(V).

Wet material excavated from the mouth of each channel shall be placed in locations designated by the USFWS. If wet material is to be stockpiled for drying adjacent to ponded areas, USFWS will define minimum distance requirements. Erosion control BMPs defined in Section V. shall be used for any stockpiles adjacent to open waters as defined by USFWS.

This item shall be measured for payment by the OWNER's topographic surveys taken before and after the channel is excavated. Pay is dependant upon meeting the required channel depths and dimensions as shown on the Drawings. Excavation outside of the channel boundaries, as defined on the Drawings, shall not be financially compensated.

The technical specifications that apply to this task are included in Section 02130 – Site Clearing and Preparation, Section 023000 – Earthwork.

## 7.0 Demobilization

[Item No. ~~8~~ pay quantity is Lump Sum]  
7

Upon completion of the work, all plant, including ranges, stakes, piles, and other markers or obstructions placed by or for CONTRACTOR shall be promptly removed. Staging areas shall be restored to pre-construction conditions. Temporary facilities shall be dismantled and entirely removed. All erosion control fence shall be removed. CONTRACTOR shall restore any damage that his operations may have caused to existing roads, bridges, and culverts. All contractor vehicles and machinery shall be brushed down to remove loose soil prior to exiting the site.

**IIA. BASIS OF PAYMENT**

Item	Section	Description	Quantity	Units	Unit Cost	Cost
1	1.0	Site-Specific Health and Safety Plan	1	Lump Sum		
2	2.0	Traffic Control Plan	1	Lump Sum		
3	3.0	Storm Water Pollution Plan (SWPP)	1	Lump Sum		
4	4.0	Mobilization	1	Lump Sum		
5	5.0	Site Clearing and Preparation	1	Lump Sum		
6	6.0	Channel Construction				
6A		Channel B2 (~3700 LF)	29,050	CY		
6B		Channel C1 (~625 LF)	5,450	CY		
6C		Channel C2 (~2175 LF)	15,230	CY		
7	7.0	Demobilization	1	Lump Sum		

**TOTAL:** \_\_\_\_\_

### III. CONSTRUCTION SCHEDULE

All work shall be initiated by July 17, 2006 and completed by October 31, 2006.

The CONTRACTOR shall research historical weather information to determine conditions that can be expected at this particular project site during the timeframe stipulated for this work. CONTRACTOR is advised that there shall be some days or periods of time when weather conditions are not favorable to perform work. CONTRACTOR shall schedule work and resources so that all work is completed on or before October 31, 2006 despite weather conditions encountered.

A schedule for project completion shall be submitted by CONTRACTOR with the CONTRACTOR's bid. The OWNER is seeking a CONTRACTOR who shall complete the project within the specified time at a reasonable cost.

Site visits will be held at Bahia Grande on Thursday, June 29 and Friday, June 30, 2006. CONTRACTOR is responsible for ensuring that all personnel needed to develop its bid are in attendance at the Site Visit. Please contact Thor Lassen (703-450-9852; [Tjlassen@cs.com](mailto:Tjlassen@cs.com)) or Sonny Perez (956-748-3607, [sonny\\_perez@fws.gov](mailto:sonny_perez@fws.gov)) for details.

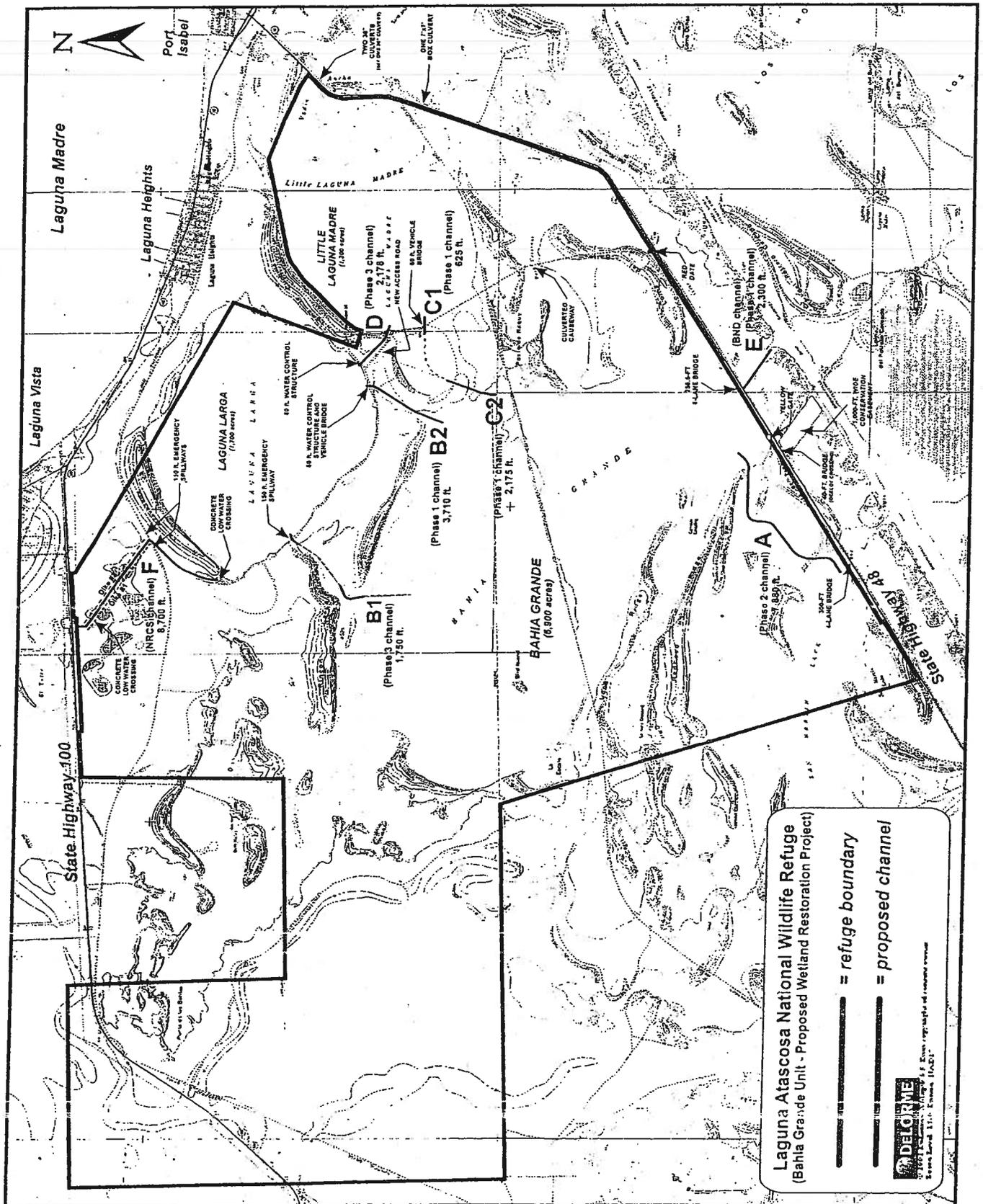
All inquiries regarding this specification shall be made to Thor Lassen, in writing, via e-mail, on or before, 2006.

Bids shall be submitted by Friday, July 7, 2006 by noon Central Standard Time.

IV. LIST OF DRAWINGS

No.	Title
C1	Cover Sheet
C2	Project Location Map
C3	B2 – Enlarged Plan & Sections STA. 0+00 – STA. 14+00
C4	B2 – Enlarged Plan & Sections STA. 14+00 – STA. 26+00
C5	B2 – Enlarged Plan & Sections STA. 26+00 – STA. 37+10
C6	C1 – Enlarged Plan & Sections STA. 0+00 – STA. 6+25
C7	C2 – Enlarged Plan & Sections STA. 0+00 – STA 11+00
C8	C2 – Enlarged Plan & Sections STA. 11+00 – STA21+75

Figure - 1 Site Map Bahia Grande



## VI. ENGINEERING, INSPECTION AND TESTING

Engineering, inspection and testing requirements for the work covered by these specifications shall be in accordance with accepted engineering and environmental practice and the applicable technical standard.

The owner has provided two survey control points at the site that apply to surveying for the purpose of construction or dredging.

The project survey was tied to the North Monument of Sherwin Plant monuments fixed on the U.S.C.&G. coordinates N 808,690.99 feet; E 2,401,512.96 feet and NGVD 29 elevation of 26.17 feet as shown on Sherwin Alumina Company Drawing YA-0034.

### PROJECT CONTROLS:

Control Point	NAD 83 Northing (Y)	NAD 83 Easting (X)	NGVD 29 Elevation	Description
1	16549798.5	1388271.884	19.6 ft	U.S. Coast & Geodetic Survey Marker
2	16548316.75	1388089.29	7.89 ft	40 D nail in 10-in treated brace

NOTE: Unless otherwise noted, all survey tolerances shall be to 0.25 ft (H) and 0.125 ft (V).

The OWNER'S representative may conduct a separate check of the lines and grades of the work prior to acceptance. The OWNER'S representatives will periodically observe the work while it is in progress. The CONTRACTOR'S work will be monitored for compliance with the drawings and specifications. At the request of the OWNER or ENGINEER, the CONTRACTOR shall provide laborers and materials necessary for the OWNER or ENGINEER to observe the work.

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**VII. GENERAL WORKMANSHIP SPECIFICATIONS**

**Division 1 – General Requirements**

Section 01000 - Supplemental Project Requirements

**Division 2 – Sitework**

Section 02130 - Site Clearing and Preparation

Section 02300 - Earthwork

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**DIVISION 1**

**GENERAL REQUIREMENTS**

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**Section 01000**  
**Supplemental Project Requirements**

**PART 1 – GENERAL**

1.1 DESCRIPTION

- A. This section describes supplemental requirements for the CONTRACTOR as part of the work. The activities described in this section supplement and are in addition to any other requirements described elsewhere in the specifications and on the drawings.

1.2 CONSTRUCTION STORM WATER PERMIT

- A. CONTRACTOR shall comply with all requirements for coverage under TCEQ General Permit Number TXR150000 Relating To Discharges From Construction Activities, including, but not limited to, the following:
1. Develop a storm water pollution prevention plan (SWP3) according to the provisions of the general permit that covers the entire Site and implement the SWP3 prior to commencing construction activities;
  2. Sign a completed construction site notice similar to the example shown in the general permit; and,
  3. Post a signed copy of the construction site notice at the construction site in a location where it is readily available for viewing by the general public and local, state, and federal authorities, prior to commencing construction activities, and maintain the notice in that location until completion of the construction activity.

1.3 TEMPORARY STOCKPILE/STAGING AREA

- A. All CONTRACTOR temporary stockpile/staging areas shall be constructed as follows:
1. Existing ground shall be leveled as necessary to provide a stable, flat area;
  2. Earthen berms a minimum of 12 inches high shall be constructed around the entire perimeter of the stockpile/staging area to prevent storm water run-on and sediment erosion. Berms shall be constructed/reinforced to allow for vehicle access at designated points; and,
  3. Erosion control fence shall be installed around the entire perimeter of the stockpile/staging area. Erosion control fence shall be provided and installed as specified in the OWNER-provided Construction Storm Water Pollution Prevention Plan
- B. CONTRACTOR shall maintain and repair the stockpile/staging area as necessary throughout the construction period. At the completion of the work, CONTRACTOR shall remove all stockpiled/staged materials, regrade the earthen berms and restore/vegetate the area to preconstruction conditions.

## 1.4 CONTRACTOR MEETINGS AND PROGRESS DOCUMENTATION

- A. Pre-Construction Meeting. OWNER shall schedule a mandatory pre-construction meeting prior to initiating the work. All CONTRACTOR supervisory personnel shall attend the pre-construction meeting. The purpose of the pre-construction meeting is to:
1. Review and resolve any questions associated with the design documents; and,
  2. Ensure that all parties understand OWNER's expectations relative to environmental health and safety, including the HASP and any addenda, the scope of work, site conditions, permits, training, accident reporting, etc.

A written record (meeting minutes) shall be prepared by the OWNER to document the pre-construction meeting. A copy of the written record shall be provided to CONTRACTOR.

- B. Weekly Quality Assurance Meetings. CONTRACTOR shall attend weekly quality assurance meetings with OWNER and/or ENGINEER to review the previous week's results, the effort anticipated for the coming week, the overall project schedule and any potential quality assurance problems. The weekly meetings may include the following topics:
1. Review of previous week's activities;
  2. Review of compliance with quality assurance items and corrections to be done, if necessary;
  3. Review of the construction plan for the coming week;
  4. Review of any testing to be performed for the coming week;
  5. Review of submittal status;
  6. Review of overall project schedule and status; and,
  7. Discussion of any potential construction or quality assurance problems.

A written record (meeting minutes) shall be prepared by the OWNER to document the weekly quality assurance meeting. A copy of the written record shall be provided to CONTRACTOR.

- C. CONTRACTOR'S Daily Log. CONTRACTOR shall keep a contractor's daily log. The log shall record, at a minimum, the following:
1. Identification of personnel on site;
  2. Activities completed;
  3. Any change to environmental controls;
  4. Materials delivered and used;
  5. Surveys completed;
  6. Problems encountered and resolution of problems; and,
  7. Any OWNER-authorized deviations from the final design.

CONTRACTOR shall submit one copy of the daily log to ENGINEER.

END OF SECTION

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**DIVISION 2 – SITEWORK**

Section 02130 - Site Clearing and Preparation

Section 02300 - Earthwork

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**SECTION 02130  
SITE CLEARING AND PREPARATION**

**PART 1 – GENERAL**

**1.1 SUMMARY**

- A. Site clearing and preparation includes, but is not limited to:
1. Protection of trees outside of the Work area.
  2. Removal of trees and stripping of grass, shrubs and other vegetation within the Work area with a trunk or stem diameter equal to or greater than  $\frac{3}{4}$ -in.
  3. Installing markers for the limits of construction and installing grade stakes.

**1.2 RELATED SECTIONS**

- A. Sections of these Specifications related to Work of this Section include but are not limited to:
1. Section 02300 – Earthwork

**1.3 CONDITIONS**

- A. Examine areas for conditions under which work is to be performed. Report to ENGINEER all conditions contrary to those shown on the Drawings or specified herein and all other conditions that will affect satisfactory execution of the work. Do not proceed with the Work until unsatisfactory conditions have been corrected and ENGINEER has given authorization.
- B. Provide protection necessary to prevent damage to existing improvements indicated to remain in place on OWNER's property. Restore damaged improvements to their original condition, as acceptable to parties having jurisdiction, without additional cost to OWNER.
- C. Keep dirt, dust, noise and other objectionable nuisances to a minimum. Use sprinkling as necessary to limit dust to lowest practicable level, do not use water to the extent of causing flooding or erosion.
- D. Protect existing trees and other vegetation indicated to remain in place against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, foot or vehicular traffic, or parking of vehicles within drip line.
- E. Benchmarks, utilities, monitor wells, and iron pipe and/or monuments, shall be located and protected before beginning clearing operations.

**1.4 QUALITY CONTROL**

- A. Perform all work in accordance with requirements of OSHA, the Environmental Protection Agency in addition to State and local requirements.

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## PART 2 – PRODUCTS

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(Not used)

## PART 3 – EXECUTION

### 3.1 SITE CLEARING

- A. The CONTRACTOR shall clear all areas within designated limits of construction as shown on the Drawings.

### 3.2 DISPOSAL OF MATERIAL

- A. The CONTRACTOR shall dispose of cleared vegetation and debris in the areas designated by USFWS.

### 3.3 SITE PREPARATION

- A. The limits of construction for all tasks shall be staked and coded prior to construction.
- B. Grade stakes shall be placed in excavation areas prior to excavation. The entire area to be excavated shall be staked prior to beginning excavation.

END OF SECTION

**SECTION 02300  
EARTHWORK**

**PART 1 – GENERAL**

**1.1 SUMMARY**

This section contains provisions for the following project components:

1. Channels B2, C1 and C2,

All earthwork must be conducted in conformance with requirements contained in the United State Army Corps of Engineers 2002 Nationwide Permit and the special provisions that apply to Texas. See Section V., Site Conditions.

**1.2 RELATED SECTIONS**

A. Sections of these Specifications related to the Work of this Section include but are not limited to:

1. Section 02130 – Site Clearing and Preparation

**1.3 DEFINITIONS**

A. Excavation – the removal of soil by manual or mechanical means.

**1.4 SUBMITTALS**

Not Applicable.

**1.5 SAFETY**

- A. Slope or otherwise shore and protect excavations in accordance with OSHA, local, state and federal regulations, laws and ordinances to ensure worker safety.
- B. Comply with the applicable requirements of OSHA.
- C. CONTRACTOR shall be fully responsible for the health and safety of all CONTRACTOR personnel on the Site, at all times, and shall take all necessary precautions to protect such health and safety.

**1.6 ENVIRONMENTAL PROTECTION**

- A. Take precautions to prevent the creation of fugitive dust emissions during performance of the Work.
- B. Control erosion and release of sediment from excavated or otherwise disturbed areas during performance of the Work by utilizing erosion control measure described in the TCEQ best management practice erosion control document found in Section V., Site Conditions.
- C. All trees outside of specified construction areas should be preserved where practicable.

## 1.7 QUALITY CONTROL

- A. Use an adequate number of properly trained, competent and skilled workers experienced in the type of work to be performed.
- B. OWNER may perform quality control surveying during construction
- E. CONTRACTOR shall cooperate with Quality Assurance/Quality Control (QA/QC) firm and provide incidental labor and other assistance necessary to perform construction QA/QC surveying
- F. Perform field instrument construction surveys to ensure that the lines and grades of all excavations and graded surfaces are in accordance with the design requirements and as directed by ENGINEER. Unless otherwise specified, construction tolerances for all placed material shall be 0.125 foot (vertical) and 0.25 foot (horizontal). All quantities will be measured based on the horizontal projected area.

## PART 2 PRODUCTS

Not Applicable.

## PART 3 – EXECUTION

### 3.1 GENERAL

- A. Unless otherwise specified, finished elevations shall be within 0.125 ft (1.5 inches) of the elevations shown on the Drawings.
- B. Unless otherwise specified, horizontal coordinates and/or dimensions of earthwork shall be within plus or minus 0.25 ft (3 inches) of the coordinates or dimensions shown on the Drawings.

### 3.2 Channel Excavation

- A. General: Prior to channel excavation:
  - 1. The centerline of each channel shall be staked at 100-ft intervals
  - 2. Grade stakes and other location and elevation controls shall be installed as needed.
- B. Excavation
  - 1. Excavation shall be conducted in a phased manner that minimizes or eliminates creation of confined spaces due to trenching.
  - 2. Surface water control structures shall be installed, as needed, to increase excavation rate efficiency.

3. Material excavated from the upland portion of each channel shall be disposed adjacent to the channel crest.
4. Dry and wet material excavated from the upland section of the each channel shall be stockpiled adjacent to the channel. After construction, a 10-ft wide road is needed on both sides of channels C2 and B2, for their entire lengths. CONTRACTOR shall provide a graded, relatively flat surface adjacent to these channels, on both sides, for these purposes. Material placed within the road footprint shall be graded smooth. Alternately, material can be placed outside the road footprint. Material placed outside the road footprint shall be graded to a maximum height of 5 ft above the channel crest, with side slopes of 4(H):1(V).
5. Wet material excavated from the mouth of each channel shall be placed in locations designated by the USFWS. If wet material is to be stockpiled for drying adjacent to ponded areas, USFWS will define minimum distance requirements. Erosion control BMPs defined in Section V. shall be used for any stockpiles adjacent to open waters as defined by USFWS.

END OF SECTION

## Bahia Grande Engineering Design Tasks

<u>Project</u>	<u>Sub-Project (estimated dimensions)</u>	<u>Presented in Work Priority Order</u>
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### 1. Channel C-2

- 1.1. Excavate basin section of channel (60' bottom width x 600' long)
- 1.2. Excavate upland section of channel (60' bottom width x 1,550' long) - will need finishing excavation to final MSL specs
- 1.3. Shape and stabilize upland spoil material (32,700 cu. yds. or 4.8 acres) – upland spoil to be used for road fill
- 1.4. Removal, storage, or stabilization of basin spoil material (3,000 cu. yds. or 0.7 acres)
- 1.5. Survey and staking of upland section of channel - temporary staking done needs permanent benchmark for future work
- 1.6. Survey and staking of basin section of channel - temporary staking done needs permanent benchmark for future work

### 2. Channel B-2

- 2.1. Excavate basin section of channel (60' bottom width x 550' long)
- 2.2. Excavate upland section of channel (60' bottom width x 3,150' long) – will need final excavation to MSL specs
- 2.3. Shape and stabilize upland spoil material (38,900 cu. yds. or 6.3 acres) – upland spoil to be used for road fill
- 2.4. Removal, storage, or stabilization of basin spoil material (2,800 cu. yds. or 0.6 acres)
- 2.5. Construct 60-foot bridge (12' by 120' long road crossing) – for loaded dual axel dump or fire truck
- 2.6. Construct 60-foot wide, multi-gate water control structure
- 2.7. Soil testing/boring at bridge/WCS/road crossing
- 2.8. Engineering design and construction plans for 60' bridge and 120' road crossing for loaded dual axel dump or fire truck
- 2.9. Engineering design and construction plans for 60' wide, multi-gate water control structure

### 3. Channel C-1

- 3.1. Excavate basin sections of channel (60' bottom width x 350' long)
- 3.2. Excavate upland section of channel (60' bottom width x 250' long)
- 3.3. Removal, storage, or stabilization of all spoil material (8,600 cu. yds. or 1.4 acres)
- 3.4. Construct 60-foot bridge (12' wide by 100' long road crossing)
- 3.5. Survey and staking of basin sections of channel - temporary staking done needs permanent benchmark for future work
- 3.6. Survey and staking of upland section of channel - ditto – needs permanent benchmark for future maintenance
- 3.7. Soil testing/boring at bridge/road crossing
- 3.8. Engineering design and construction plans for 60' bridge and 100' road crossing

### 4. Channel B-1

- 4.1. Excavate emergency spillway and road crossing (12' wide x 150' long at 4.7' elev.)
- 4.2. Removal, storage, or stabilization of spoil material (100 cu. yds.)
- 4.3. Reinforce emergency spillway/road crossing with interlocking articulated concrete block mats

### 5. Channel D

- 5.1. Excavate upland section of channel (60' bottom width x 2,150' long)
- 5.2. Removal, storage, or stabilization of all spoil material (60,200 cu. yds. or 8.6 acres)
- 5.3. Survey and staking of basin sections of channel - temporary staking done needs permanent benchmark for future work
- 5.4. Survey and staking of upland section of channel - temporary staking done needs permanent benchmark for future work
- 5.5. Engineering design and construction plans for 60' wide, multi-gate water control structure
- 5.6. Soil testing/boring at bridge/WCS/road crossing
- 5.7. Construct 60-foot wide, multi-gate water control structure

### 6. Channel E (BND Main Channel Enlargement)

- 6.1 Review BND engineering specifications and cost estimate

### 7. Channel G (Vadia Aneha/NE Little Laguna Madre & Hwy 48 Enlargement only after Channels C & B completed)

- 7.1 Review BND engineering specifications and cost estimate
- 7.2 Conduct feasibility/engineering study to extend channel into refuge, length, width, depth needed to improve circulation

**8. Channel F (NRCS Channel) Status: To be conducted by NRCS**

- 8.1. Construct Dikes 1 and 2 (27,480 cu. yds. compacted fill and 10,530 cu. yds. topsoil)
- 8.2. Channel F construction (8,700' by 40-50' wide or 39,700 cu. yds.)
- 8.3. Excavation of eight 6-foot deep kidney-shaped ponds (8,024 cu. yds.)
- 8.4. Excavation of fifteen 2-foot deep kidney-shaped ponds (7,605 cu. yds.)
- 8.5. Excavation 1,500' of the old railroad grade to include 300' of emergency spillways (2,333 cu. yds.)
- 8.6. Construct two reinforced low water crossings (14' wide by 7" thick)
- 8.7. Establish vegetative cover on Dikes 1 and 2 (10 acres)

**9. Access Roads Status: Being conducted by LANWR and Foremost Paving**

- 9.1. Rehabilitate "Red Gate Entry Road" segment (315' and two 24" culverts)
- 9.2. Rehabilitate "Loma del Ballo-South Road" segment (4,600')
- 9.3. Rehabilitate "Loma del Ballo-North Road" segment (1,750' and one 18" culvert)
- 9.4. Rehabilitate "Little Laguna Madre-South Road" segment (3,100' and two 24" culverts)
- 9.5. Rehabilitate "Little Laguna Madre-North Road" segment (1,550')
- 9.6. Construct new "Channel D Road" segment (1,850' and three 18" culverts)
- 9.7. Rehabilitate "Laguna Larga Road" segment (1,800')
- 9.8. Rehabilitate "Paso Corvinas Road" segment (800' and twelve 24" culverts)

**10. Channel A (To be considered only if hydrodynamics determine it will aid circulation)**