

PORT LAVACA LIVING SHORELINE PROJECT



DIRECTIONS

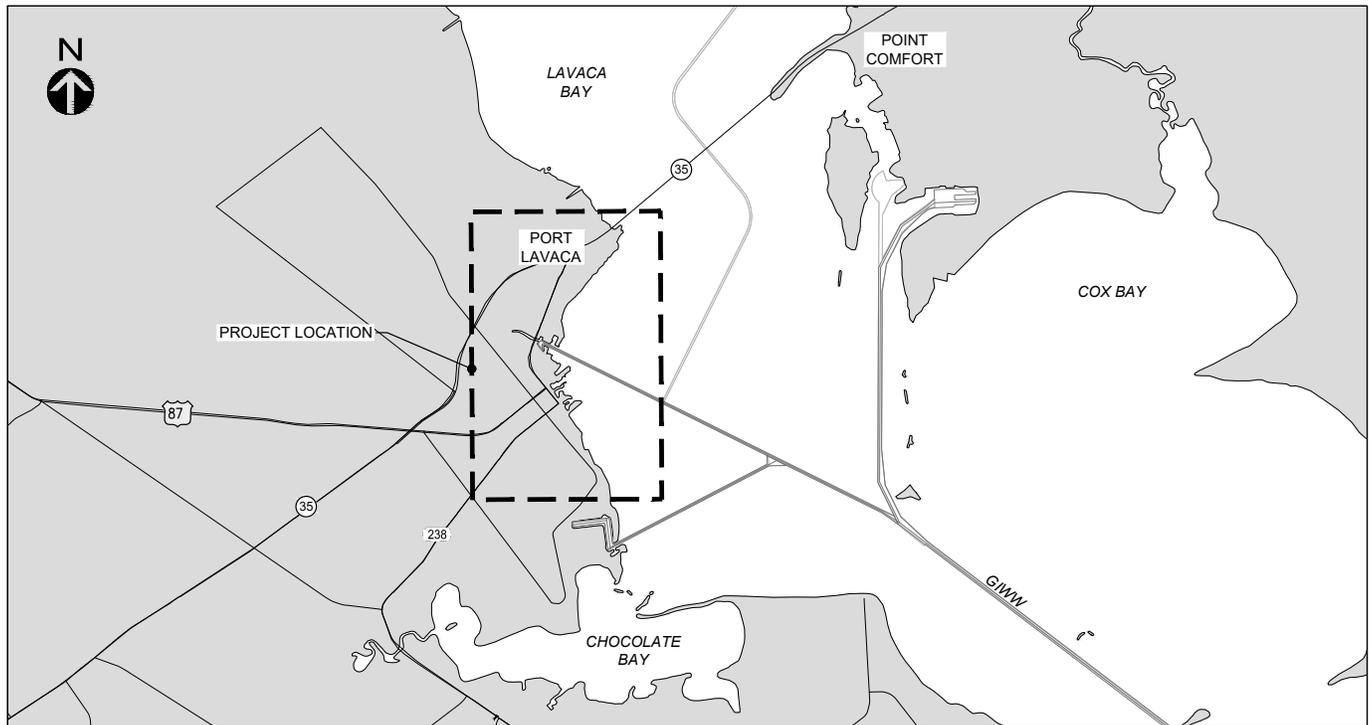
THE PROJECT SITE CAN BE ACCESSED VIA LAVACA BAY TO THE OFFSHORE BREAKWATER AREA OR VIA HIGHWAY 238, EXITING HARBOR ST TO ACCESS THE HAUL ROUTE TO THE MARSH CREATION AREA. THE BORROW SITE AND MARSH CREATION AREA CAN BE ACCESSED THROUGH THE BAYFRONT PENINSULA PARK HAUL ROUTE.

NATURE OF ACTIVITY

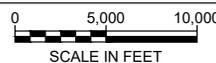
THE PURPOSE OF THIS PROJECT IS TO PROVIDE OFFSHORE PROTECTION TO THE DOWNTOWN PORT LAVACA, TX SHORELINE BY REDUCING ONSHORE WAVE ENERGY AND IMPROVING AQUATIC HABITAT CONDITIONS FOR MARINE LIFE, COASTAL MARSH, AND SUBMERGED AQUATIC RESOURCES IN THE PROJECT VICINITY.

SHEET INDEX

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LOCATION MAP



PERMIT

APPLICANT: CITY OF PORT LAVACA

MAY 24, 2024

SHEET 1 OF 12

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THESE PLANS ARE INTENDED FOR PERMITTING PURPOSES ONLY AND ARE NOT TO BE USED FOR BIDDING OR CONSTRUCTION.

SITE LOCATION:
28°37'15.46"N
96°37'19.32"W

VERIFY SCALE

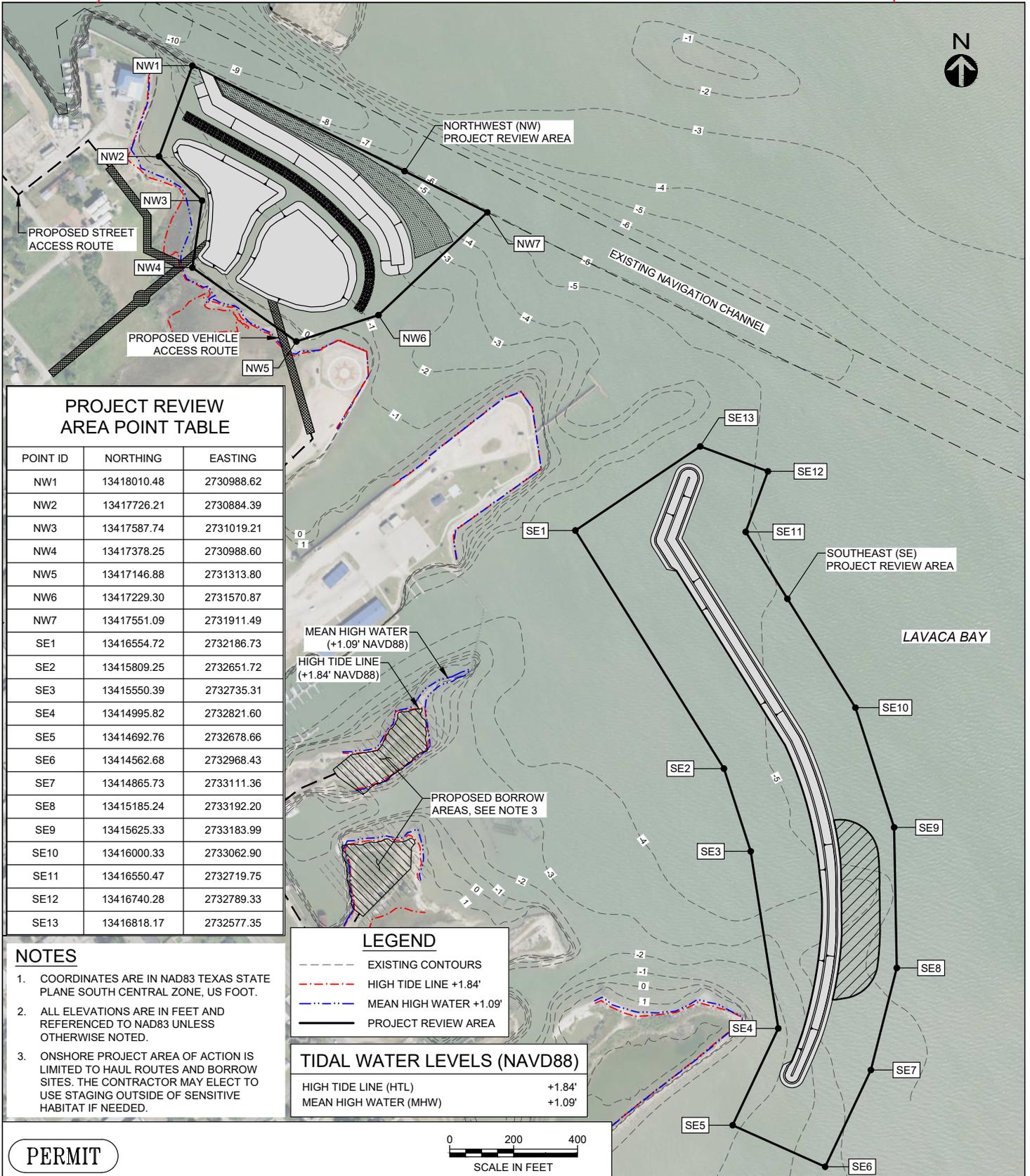
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CLIENT: CITY OF PORT LAVACA
IN: LAVACA BAY
ADJACENT: CHOCOLATE BAY
COUNTY: CALHOUN
STATE: TEXAS
VERTICAL DATUM: NAVD88
HORIZ. DATUM: NAD83 TEXAS STATE PLAN, SOUTH CENTRAL ZONE, US FT

PORT LAVACA
LIVING SHORELINE PROJECT
CALHOUN COUNTY, TEXAS

VICINITY - LOCATION MAP



PROJECT REVIEW AREA POINT TABLE

POINT ID	NORTHING	EASTING
NW1	13418010.48	2730988.62
NW2	13417726.21	2730884.39
NW3	13417587.74	2731019.21
NW4	13417378.25	2730988.60
NW5	13417146.88	2731313.80
NW6	13417229.30	2731570.87
NW7	13417551.09	2731911.49
SE1	13416554.72	2732186.73
SE2	13415809.25	2732651.72
SE3	13415550.39	2732735.31
SE4	13414995.82	2732821.60
SE5	13414692.76	2732678.66
SE6	13414562.68	2732968.43
SE7	13414865.73	2733111.36
SE8	13415185.24	2733192.20
SE9	13415625.33	2733183.99
SE10	13416000.33	2733062.90
SE11	13416550.47	2732719.75
SE12	13416740.28	2732789.33
SE13	13416818.17	2732577.35

NOTES

- COORDINATES ARE IN NAD83 TEXAS STATE PLANE SOUTH CENTRAL ZONE, US FOOT.
- ALL ELEVATIONS ARE IN FEET AND REFERENCED TO NAD83 UNLESS OTHERWISE NOTED.
- ONSHORE PROJECT AREA OF ACTION IS LIMITED TO HAUL ROUTES AND BORROW SITES. THE CONTRACTOR MAY ELECT TO USE STAGING OUTSIDE OF SENSITIVE HABITAT IF NEEDED.

LEGEND

- - - - - EXISTING CONTOURS
- . - . - HIGH TIDE LINE +1.84'
- MEAN HIGH WATER +1.09'
- PROJECT REVIEW AREA

TIDAL WATER LEVELS (NAVD88)

HIGH TIDE LINE (HTL)	+1.84'
MEAN HIGH WATER (MHW)	+1.09'

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APPLICANT: CITY OF PORT LAVACA

MAY 24, 2024 SHEET 2 OF 12

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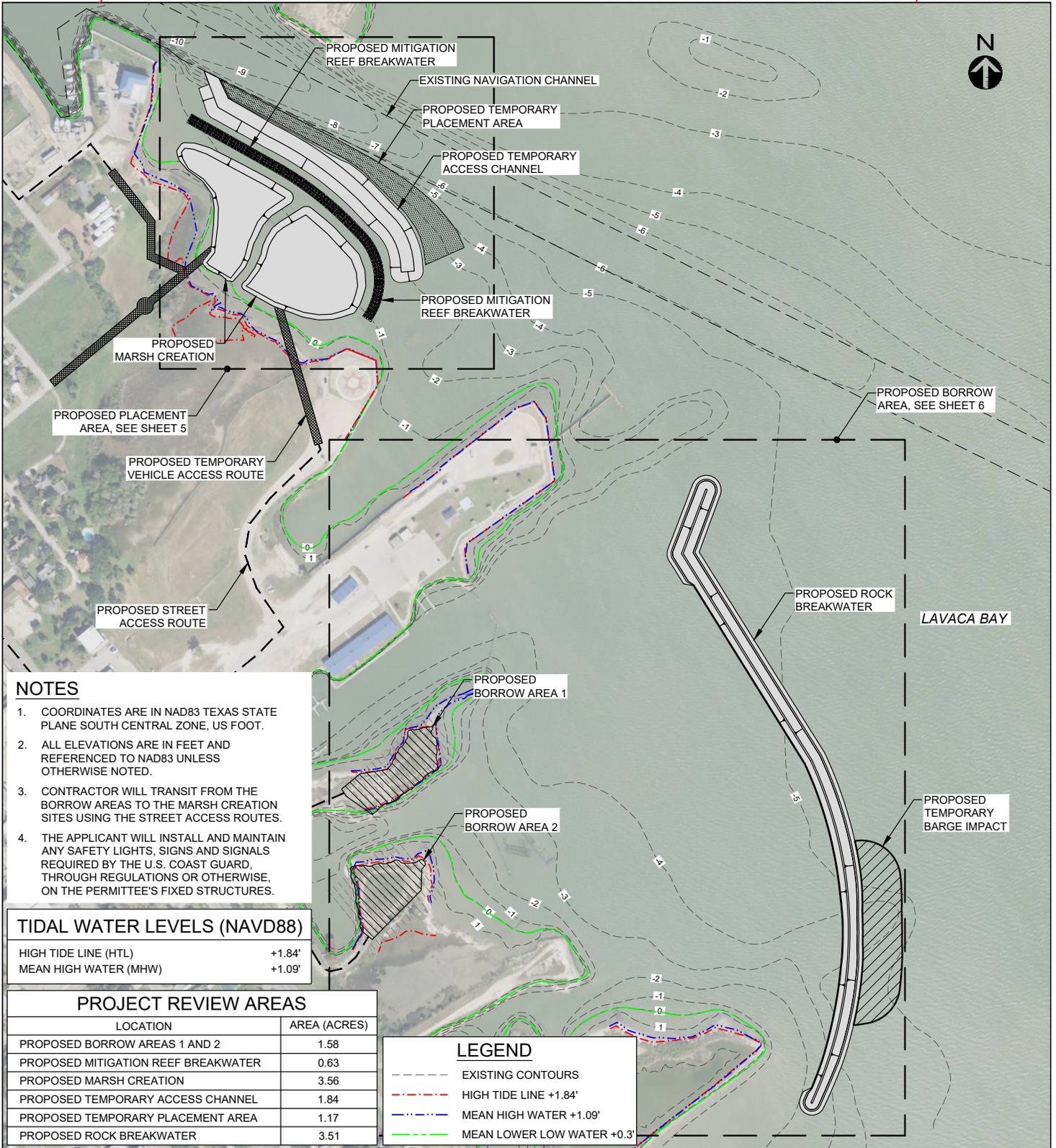
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PROJECT REVIEW AREA



NOTES

- COORDINATES ARE IN NAD83 TEXAS STATE PLANE SOUTH CENTRAL ZONE, US FOOT.
- ALL ELEVATIONS ARE IN FEET AND REFERENCED TO NAD83 UNLESS OTHERWISE NOTED.
- CONTRACTOR WILL TRANSIT FROM THE BORROW AREAS TO THE MARSH CREATION SITES USING THE STREET ACCESS ROUTES.
- THE APPLICANT WILL INSTALL AND MAINTAIN ANY SAFETY LIGHTS, SIGNS AND SIGNALS REQUIRED BY THE U.S. COAST GUARD, THROUGH REGULATIONS OR OTHERWISE, ON THE PERMITTEE'S FIXED STRUCTURES.

TIDAL WATER LEVELS (NAVD88)

HIGH TIDE LINE (HTL)	+1.84'
MEAN HIGH WATER (MHW)	+1.09'

PROJECT REVIEW AREAS

LOCATION	AREA (ACRES)
PROPOSED BORROW AREAS 1 AND 2	1.58
PROPOSED MITIGATION REEF BREAKWATER	0.63
PROPOSED MARSH CREATION	3.56
PROPOSED TEMPORARY ACCESS CHANNEL	1.84
PROPOSED TEMPORARY PLACEMENT AREA	1.17
PROPOSED ROCK BREAKWATER	3.51

LEGEND

- EXISTING CONTOURS
- - - - HIGH TIDE LINE +1.84'
- · - · - MEAN HIGH WATER +1.09'
- · - · - MEAN LOWER LOW WATER +0.3'

PERMIT



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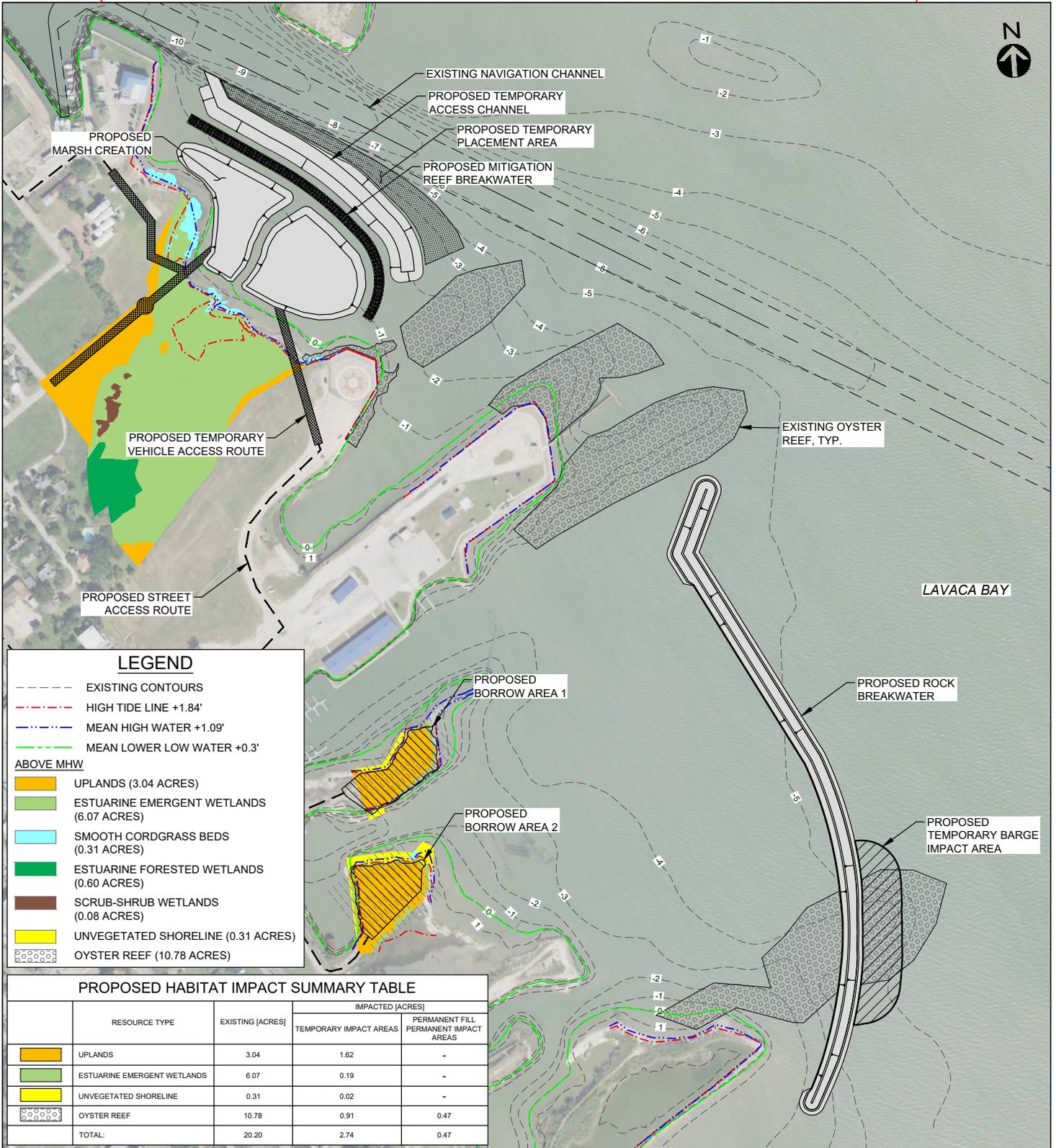
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OVERALL PROJECT LOCATION



PERMIT

0 200 400
SCALE IN FEET

APPLICANT: CITY OF PORT LAVACA MAY 24, 2024 SHEET 4 OF 12

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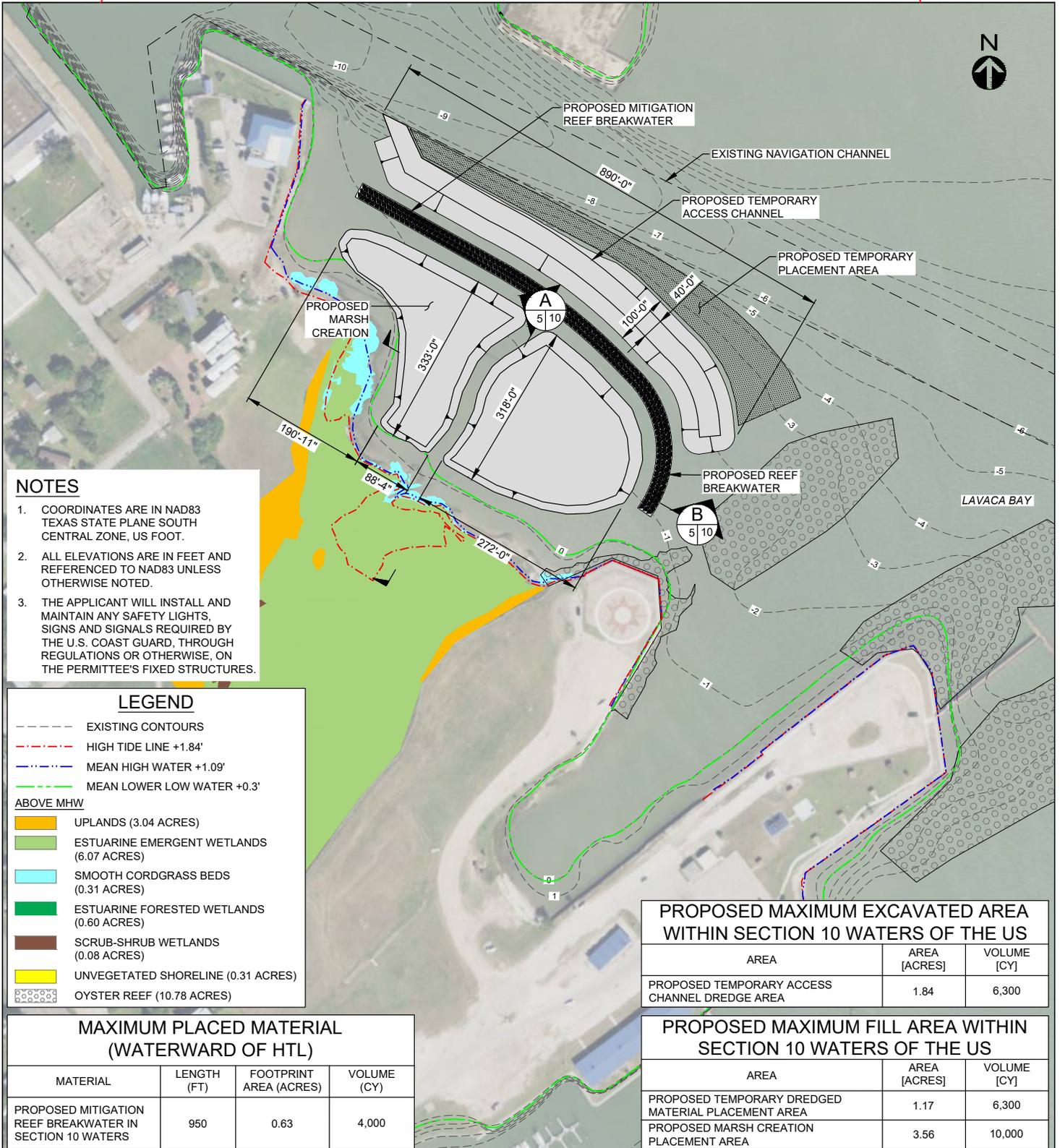
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**PORT LAVACA
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CALHOUN COUNTY, TEXAS**

**OVERALL WETLAND
DELINEATION MAP**



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LEGEND

- EXISTING CONTOURS
- - - - HIGH TIDE LINE +1.84'
- · - · - MEAN HIGH WATER +1.09'
- · - · - MEAN LOWER LOW WATER +0.3' ABOVE MHW

- UPLANDS (3.04 ACRES)
- ESTUARINE EMERGENT WETLANDS (6.07 ACRES)
- SMOOTH CORDGRASS BEDS (0.31 ACRES)
- ESTUARINE FORESTED WETLANDS (0.60 ACRES)
- SCRUB-SHRUB WETLANDS (0.08 ACRES)
- UNVEGETATED SHORELINE (0.31 ACRES)
- OYSTER REEF (10.78 ACRES)

MAXIMUM PLACED MATERIAL (WATERWARD OF HTL)

MATERIAL	LENGTH (FT)	FOOTPRINT AREA (ACRES)	VOLUME (CY)
PROPOSED MITIGATION REEF BREAKWATER IN SECTION 10 WATERS	950	0.63	4,000

PROPOSED MAXIMUM EXCAVATED AREA WITHIN SECTION 10 WATERS OF THE US

AREA	AREA [ACRES]	VOLUME [CY]
PROPOSED TEMPORARY ACCESS CHANNEL DREDGE AREA	1.84	6,300

PROPOSED MAXIMUM FILL AREA WITHIN SECTION 10 WATERS OF THE US

AREA	AREA [ACRES]	VOLUME [CY]
PROPOSED TEMPORARY DREDGED MATERIAL PLACEMENT AREA	1.17	6,300
PROPOSED MARSH CREATION PLACEMENT AREA	3.56	10,000

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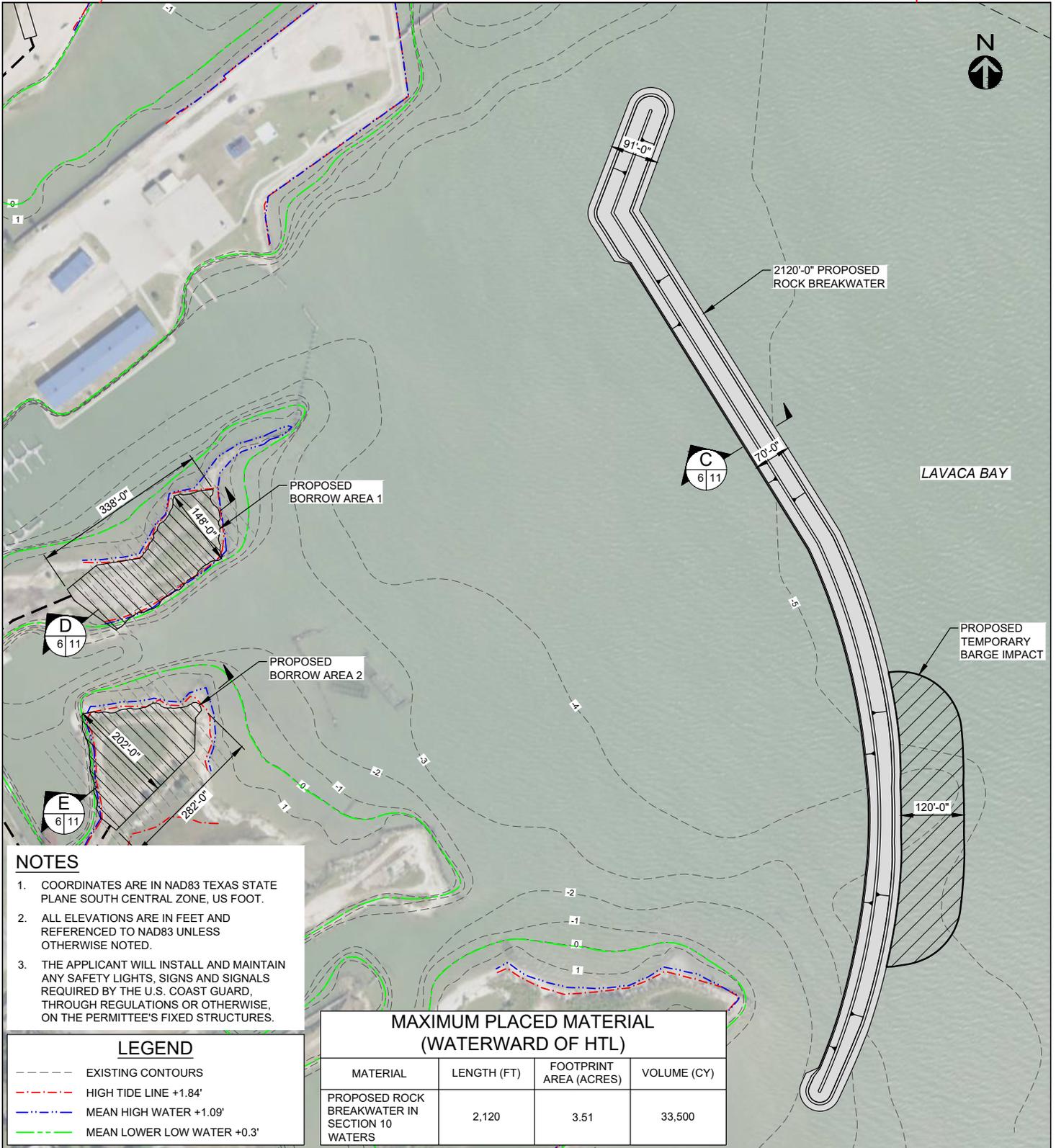
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SITE PLAN - MARSH CREATION AND ACCESS CHANNEL



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LEGEND

- EXISTING CONTOURS
- - - - - HIGH TIDE LINE +1.84'
- · - · - MEAN HIGH WATER +1.09'
- · - · - MEAN LOWER LOW WATER +0.3'

**MAXIMUM PLACED MATERIAL
(WATERWARD OF HTL)**

MATERIAL	LENGTH (FT)	FOOTPRINT AREA (ACRES)	VOLUME (CY)
PROPOSED ROCK BREAKWATER IN SECTION 10 WATERS	2,120	3.51	33,500

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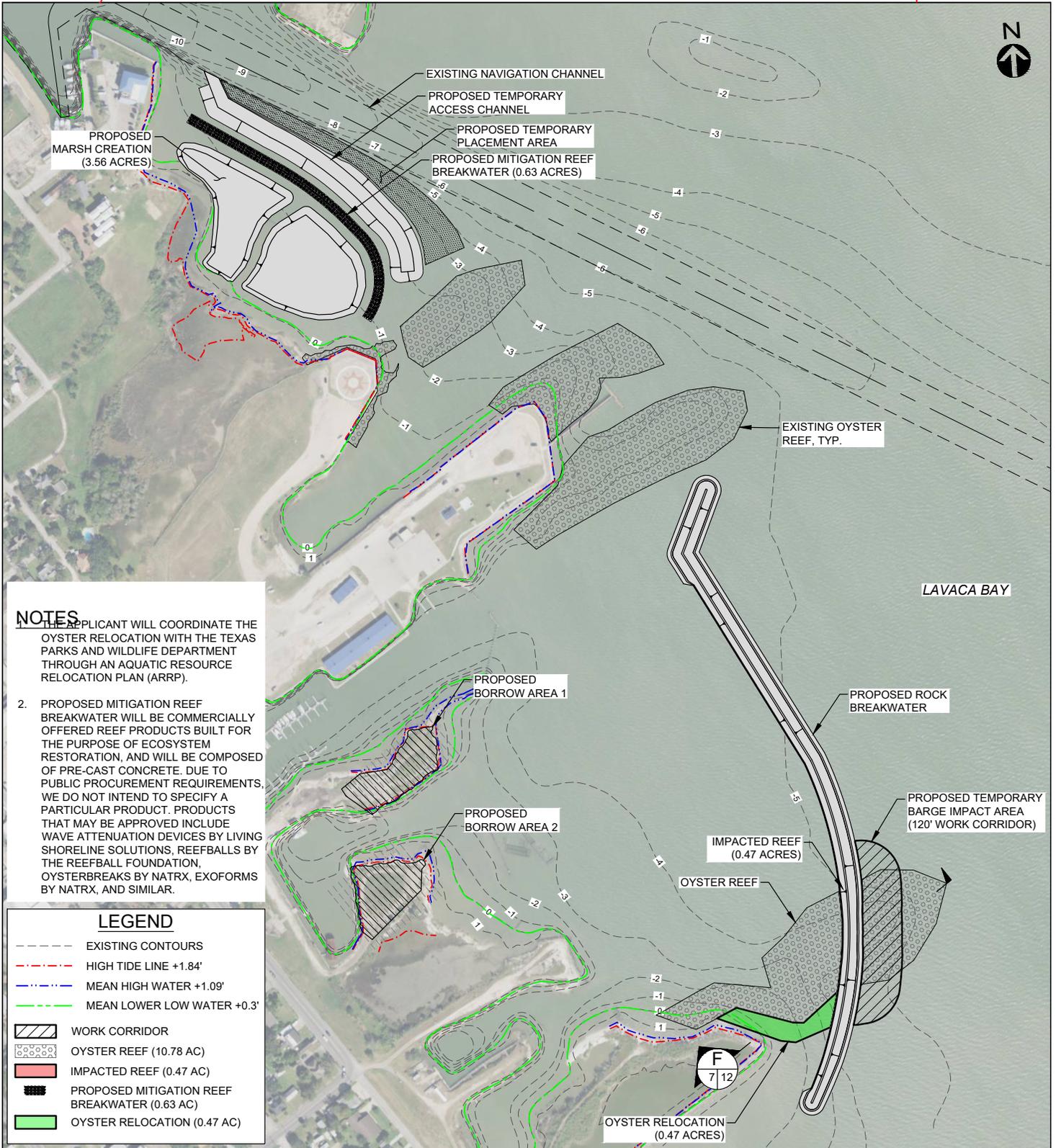
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LIVING SHORELINE PROJECT
CALHOUN COUNTY, TEXAS**

**SITE PLAN - BORROW AREAS
AND ROCK BREAKWATER**



NOTES

1. THE APPLICANT WILL COORDINATE THE OYSTER RELOCATION WITH THE TEXAS PARKS AND WILDLIFE DEPARTMENT THROUGH AN AQUATIC RESOURCE RELOCATION PLAN (ARRP).
2. PROPOSED MITIGATION REEF BREAKWATER WILL BE COMMERCIALY OFFERED REEF PRODUCTS BUILT FOR THE PURPOSE OF ECOSYSTEM RESTORATION, AND WILL BE COMPOSED OF PRE-CAST CONCRETE. DUE TO PUBLIC PROCUREMENT REQUIREMENTS, WE DO NOT INTEND TO SPECIFY A PARTICULAR PRODUCT. PRODUCTS THAT MAY BE APPROVED INCLUDE WAVE ATTENUATION DEVICES BY LIVING SHORELINE SOLUTIONS, REEFBALLS BY THE REEFBALL FOUNDATION, OYSTERBREAKS BY NATRX, EXOFORMS BY NATRX, AND SIMILAR.

LEGEND

- EXISTING CONTOURS
- - - - - HIGH TIDE LINE +1.84'
- · - · - MEAN HIGH WATER +1.09'
- · · · - MEAN LOWER LOW WATER +0.3'
- WORK CORRIDOR
- OYSTER REEF (10.78 AC)
- IMPACTED REEF (0.47 AC)
- PROPOSED MITIGATION REEF BREAKWATER (0.63 AC)
- OYSTER RELOCATION (0.47 AC)



PERMIT

APPLICANT: CITY OF PORT LAVACA

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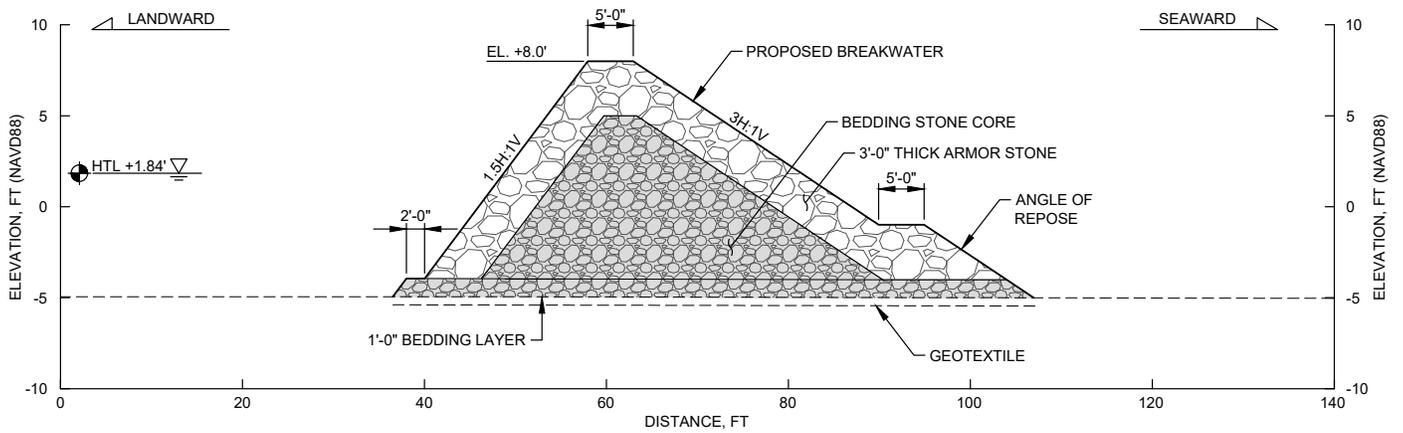
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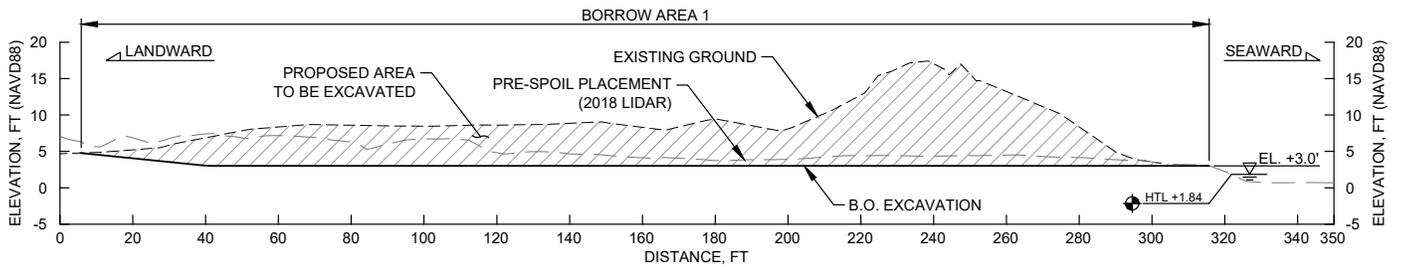
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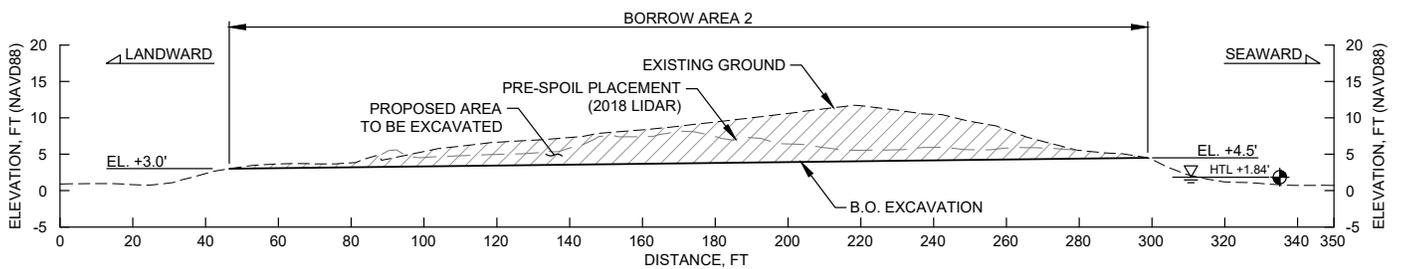
OYSTER MITIGATION AND RELOCATION PLAN



C
SECTION
BREAKWATER
HORIZ. 0 10 20
VERT. 0 5 10
SCALE IN FEET



D
SECTION
BORROW AREA 1
HORIZ. 0 25 50
VERT. 0 12.5 25
SCALE IN FEET



E
SECTION
BORROW AREA 2
HORIZ. 0 25 50
VERT. 0 12.5 25
SCALE IN FEET

PERMIT

APPLICANT: CITY OF PORT LAVACA

MAY 24, 2024

SHEET 11 OF 12

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CALHOUN COUNTY, TEXAS

SECTIONS 2

PERMIT

APPLICANT: CITY OF PORT LAVACA

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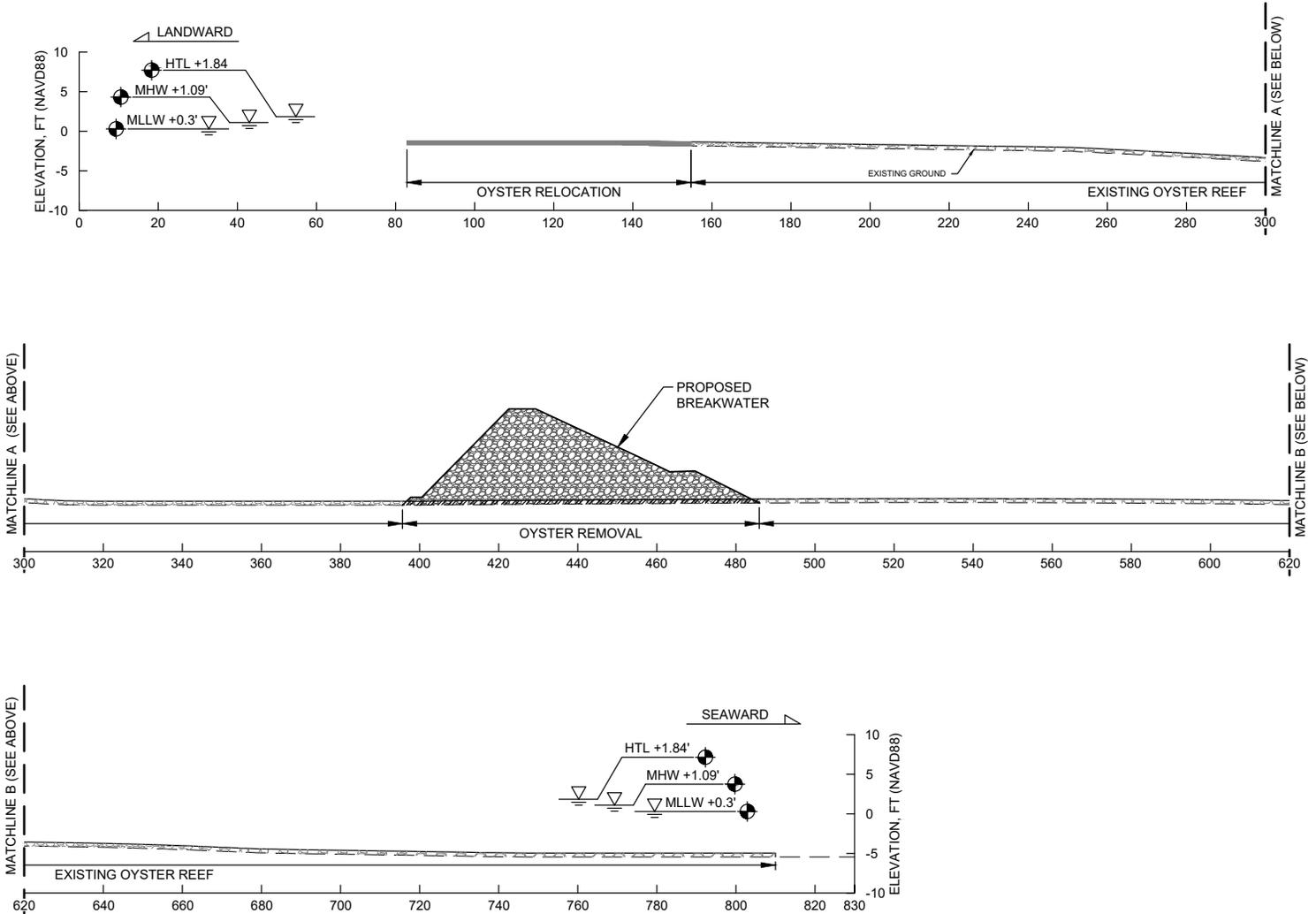
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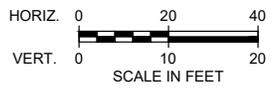
SECTIONS 3

MAY 24, 2024

SHEET 12 OF 12



F
7 12
SECTION



PROPOSED OYSTER REEF RELOCATION & MITIGATION SITE CONSTRUCTION AND MONITORING U.S. ARMY CORPS OF ENGINEERS (USACE) PERMIT APPLICATION NO. SWG-2024-00114

PROPOSED OYSTER REEF RELOCATION & MITIGATION:

1. THE PROPOSED LIVING SHORELINE PROJECT MAY PERMANENTLY IMPACT 0.47-ACRES OF OYSTER REEF IN THE PORT LAVACA BAY SYSTEM. TO MAXIMIZE AVOIDANCE AND MINIMIZATION OF IMPACTS TO SENSITIVE AQUATIC RESOURCES, THE APPLICANT IS PROPOSING A SYNERGISTIC APPROACH FOR TEMPORARY AND/OR PERMANENT IMPACTS TO OYSTER REEF. AS A COMPONENT OF THE PORT LAVACA LIVING SHORELINE PROJECT, THE APPLICANT IS PROPOSING TO RELOCATE THE 0.47-ACRES OF REEF WITHIN THE CONSTRUCTION FOOTPRINT, BUT ALSO CONSTRUCT A 0.63-ACRE OYSTER MITIGATION REEF BREAKWATER. THE OBJECTIVE OF THIS APPROACH IS TO NOT ONLY ASSURE NO NET LOSS OF AQUATIC RESOURCES, BUT A SURPLUS IN SURFACE AREA OF AQUATIC RESOURCES RESULTING FROM THE PROJECT. OVERALL OBJECTIVE OF IMPLEMENTING A BENEFICIAL PROJECT INCREASING THE ECOLOGICAL FUNCTION AND VALUE OF THE SURROUNDING SYSTEM. CONSTRUCTION OF THE 0.63-ACRE OYSTER MITIGATION REEF BREAKWATER WILL INCORPORATE PLACEMENT OF ARTIFICIAL REEF STRUCTURES ALONG THE BAY BOTTOM. THE RELOCATION INITIATIVE WILL INVOLVE PLACEMENT OF LOOSE, LIVE OYSTER AND DEAD SHELL FROM THE IMPACT SITE TO AN ADJACENT, EXISTING OYSTER REEF AT THE SOUTHERNMOST END OF THE PROJECT AREA. THE APPLICANT WILL COORDINATE WITH THE TEXAS PARKS AND WILDLIFE DEPARTMENT (TPWD) AND ATTAIN AUTHORIZATION TO RELOCATE LOOSE OYSTER SHELL WITHIN THE ROCK BREAKWATER FOOTPRINT (APPROXIMATELY 0.47-ACRES). AUTHORIZATION WILL OCCUR VIA TPWD'S AQUATIC RESOURCE RELOCATION PLAN (ARRP).

CONSTRUCTION:

1. AGENCIES SHALL BE NOTIFIED IN WRITING AS TO THE DATE OF ACTUAL REEF CREATION ACTIVITIES A MINIMUM OF FOUR WEEKS BEFORE THE COMMENCEMENT OF THESE OPERATIONS.
2. GEOTECHNICAL TESTING WILL BE PERFORMED TO ENSURE THE IN-SITU SEDIMENT WILL SUPPORT ALL HARD STRUCTURES, INCLUDING THE 0.63-ACRE MITIGATION REEF BREAKWATER.
3. THE MITIGATION REEF BREAKWATER WILL BE COMPRISED OF COMMERCIALY OFFERED ARTIFICIAL REEF PRODUCTS. THE DIMENSIONS OF EACH ARTIFICIAL REEF ARE APPROXIMATELY 30-FEET BY 950-FEET AND WILL BE PLACED LINEARLY WITHIN THE FOOTPRINT OF THE MITIGATION REEF BREAKWATER. THE MITIGATION REEF BREAKWATER HAS BEEN DESIGNED ADJACENT TO THE MARSH CREATION AREA TO PROVIDE BENEFICIAL HABITAT PROTECTION FROM EROSION FORCES.
4. PRIOR TO CONSTRUCTION OF THE 3.51-ACRE ROCK BREAKWATER, THE APPLICANT WILL REMOVE ALL LOOSE LIVE AND DEAD OYSTER SHELL WITHIN THE BREAKWATER FOOTPRINT (APPROXIMATELY 0.47-ACRES) AND PLACE THEM ALONG THE SOUTH EDGE OF AN ADJACENT, EXISTING REEF. ALL RELOCATION EFFORTS WILL BE CONDUCTED IN STRICT ACCORDANCE WITH THE ARRP.
5. THE TIMING OF CONSTRUCTION OF THE MITIGATION AND RELOCATION EFFORTS WILL BE COORDINATED WITH TPWD.
6. THE OYSTER MITIGATION REEF BREAKWATER AND OYSTER RELOCATION AREA WILL BE GEO-REFERENCED PRE- AND POST-CONSTRUCTION.

POST-CONSTRUCTION MONITORING:

1. AGENCIES SHALL BE NOTIFIED IN WRITING UPON COMPLETION OF THE REEF CREATION AND RELOCATION EFFORT.
2. COMPLETE PHOTOGRAPHIC COVERAGE OF THE REEF RELOCATION AND CREATION EFFORT SHALL BE SUBMITTED IMMEDIATELY PRIOR TO AND FOLLOWING CONSTRUCTION ACTIVITIES.
3. MONITORING EFFORTS ON THE OYSTER MITIGATION BREAKWATER AND RELOCATION SITE WILL OCCUR 60 DAYS AFTER PLACEMENT, AND ANNUALLY FOR FIVE YEARS.
4. EACH ANNUAL MONITORING REPORT WILL BE PROVIDED TO THE USACE AND TPWD UPON COMPLETION. MONITORING REPORTS WILL LIST THE MONITORING REQUIREMENTS AND PERFORMANCE STANDARDS AND EVALUATE WHETHER THE 0.63-ACRE MITIGATION REEF BREAKWATER IS SUCCESSFULLY ACHIEVING THE APPROVED PERFORMANCE STANDARDS OR TRENDING TOWARD SUCCESS. SUMMARY DATA WILL BE PROVIDED TO SUBSTANTIATE THE SUCCESS AND/OR POTENTIAL CHALLENGES ASSOCIATED WITH THE COMPENSATORY MITIGATION PROJECT. PHOTO DOCUMENTATION SHALL BE PROVIDED TO SUPPORT THE FINDINGS. MAPS WILL BE PROVIDED INDICATING THE LOCATION OF TRANSECTS, SAMPLING DATA POINTS, AND/OR OTHER PERTINENT FEATURES. A GENERAL STATEMENT WILL BE INCLUDED DESCRIBING THE CONDITION OF THE COMPENSATORY MITIGATION SITE. IF PERFORMANCE STANDARDS ARE NOT BEING MET, AN EXPLANATION OF THE DIFFICULTIES AND POTENTIAL REMEDIAL ACTIONS PROPOSED BY THE PERMITTEE, INCLUDING A TIMETABLE WILL BE PROVIDED.
5. THE 0.47-ACRE RELOCATION SITE WILL BE MONITORING IN ACCORDANCE WITH THE ARRP.

PERMIT

APPLICANT: CITY OF PORT LAVACA

MAY 24, 2024 SHEET 8 OF 12

 <p>110 Wild Basin Road Suite 100 Austin, Texas 78746 Texas Registered Firm No. 7429 T +1 (512) 342 9516 www.mottmac.com</p>	<p>SITE LOCATION: 28°37'15.46"N 96°37'19.32"W</p> <p>VERIFY SCALE</p> <p>BAR IS ONE INCH ON ORIGINAL DRAWINGS IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY</p> 	<p>CLIENT: CITY OF PORT LAVACA IN: LAVACA BAY ADJACENT: CHOCOLATE BAY COUNTY: CALHOUN STATE: TEXAS VERTICAL DATUM: NAVD88 HORIZ. DATUM: NAD83 TEXAS STATE PLAN, SOUTH CENTRAL ZONE, US FT</p>	<p>PORT LAVACA LIVING SHORELINE PROJECT CALHOUN COUNTY, TEXAS</p>
<p>THESE PLANS ARE INTENDED FOR PERMITTING PURPOSES ONLY AND ARE NOT TO BE USED FOR BIDDING OR CONSTRUCTION.</p>			<p>NOTES 1 OF 2</p>

SAMPLING METHODS:

1. THE FIRST SAMPLING EFFORT WILL OCCUR 60 DAYS AFTER THE CONSTRUCTION OF THE 0.63-ACRE MITIGATION REEF BREAKWATER. TEN SAMPLES WILL BE TAKEN AT THE OYSTER MITIGATION BREAKWATER AND TEN SAMPLES WILL BE TAKEN AT THE RELOCATED REEF. THE TOTAL DEPTH OF THE REEF OFF THE BAY BOTTOM WILL BE RECORDED. OTHER DATA RECORDED INCLUDE SAMPLE COLLECTION TIME, TIDE, SALINITY, TEMPERATURES, AND ANY OTHER HYDROLOGICAL INFORMATION (I.E., FLOOD CONDITIONS, TIDE STAGES (FLOOD, SLACK, EBB), TURBIDITY, RAINFALL, ETC.).
2. THE CONTRACTOR WILL UTILIZE THE NEAREST TIDE STATION AND METEOROLOGICAL STATION FOR TIDE AND PRECIPITATION DATA.
3. THE LIVE OYSTER DENSITY (#/FT²) WILL BE MONITORED AT EACH SAMPLE STATION. THE APPLICANT WILL MONITOR BY USING QUADRATS. PHOTOGRAPHS WILL DOCUMENT EACH SAMPLE.
4. THE APPLICANT WILL EXAMINE THE REEF MATERIAL FOR SPAT SET. SPAT WILL BE IDENTIFIED (0.3MM TO 26MM), COUNTED AND RECORDED. *CREPIDULA* (JINGLE SHELLS) OR BARNACLES SHOULD NOT BE NOTED AND WILL NOT COUNT AS OYSTER SPAT SET.
5. ALL MATERIAL, LIVE AND DEAD WILL BE RETURNED TO THE REEF AFTER EXAMINATION.
6. DURING THE INITIAL AND ANNUAL MONITORING EVENTS WATER QUALITY WILL BE DOCUMENTED BY EVALUATING TURBIDITY, SALINITY, WATER TEMPERATURE, AND DISSOLVED OXYGEN AT EACH SAMPLE STATION.
7. THE MITIGATION REEF BREAKWATER WILL BE CONSIDERED SUCCESSFUL IF SPAT SET ON THE ARTIFICIAL REEF UNITS AND THE RELOCATED LOOSE SHELL PRESENTS BOTH LIVE OYSTER AND SPAT SET.
8. THE GOAL FOR THE SUCCESS OF THE OYSTER REEF BREAKWATER IS MAINTAINING VERTICAL INTEGRITY ALONG THE BAY BOTTOM. THE REEF BREAKWATER SHOULD ALSO BEGIN TO SUCCESSFULLY REPRODUCE OR PROVIDE HABITAT FOR SPAT AND OTHER ORGANISMS. IN AN ATTEMPT TO DOCUMENT SPECIES DIVERSITY AND ECOLOGICAL LIFE, THE APPLICANT WILL NOTE AND COUNT SESSILE ORGANISMS, CRUSTACEANS, AND OTHER MARINE LIFE COLLECTED IN SAMPLES.

ACCESS:

1. THE APPLICANT WILL TRAIN ALL PERSONNEL, INCLUDING VESSEL OPERATORS, ON THE VARIOUS TECHNIQUES AND PROCEDURES REQUIRED TO MAINTAIN THE PRESCRIBED VESSEL CLEARANCE.
2. THE CONTRACTOR WILL BE REQUIRED TO ASSIGN A QUALIFIED INDIVIDUAL WHO IS RESPONSIBLE FOR (A) CLEARING EACH VESSEL MOVEMENT IN ADVANCE BASED ON TIDE LEVEL AND VESSEL DRAFT; (B) EVALUATING TIDE PREDICTIONS TO ENSURE THAT PLANNING FOR VESSEL AND CARGO MOVEMENTS INCLUDE PROVISIONS FOR LIGHTENING BARGES OR COMING UP WITH SHALLOWER DRAFT FOR TUGS AS WARRANTED; (C) INSPECTING CHANNEL AND TIDE STAFF MARKERS DAILY AND REPLACING ALL MISSING MARKERS AND TIDE STAFF WITHIN 12 HOURS. (D) VESSELS MUST MAINTAIN A MINIMUM OF 1-FOOT VERTICAL CLEARANCE FOR CONSTRUCTION ACCESS.
3. IF NECESSARY, THE APPLICANT WILL STAKE THE DESIGNATED ACCESS ROUTES WITH REFLECTIVE PVC PIPE OR OTHER SUITABLE MATERIAL AND WITH NUMERIC LABELING, TO ASSURE THAT VESSEL OPERATORS CAN EASILY FOLLOW THE ACCESS ROUTES.

PERMIT

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