

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 414

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: <u>0</u> (A) <u>0</u> (B) Prevalence Index = B/A = _____
				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Sapling/Shrub Stratum (Plot size: _____) 1. <i>Baccharis halimifolia</i> 5 Yes FAC 2. _____ - - - 3. _____ - - - 4. _____ - - - 5. _____ - - - 6. _____ - - - 7. _____ - - - 8. _____ - - - _____ = Total Cover 50% of total cover: 0% 20% of total cover: 0%				
Herb Stratum (Plot size: _____) 1. <i>Schizanthium scoparium divergens</i> 10 No NL 2. <i>Eleocharis cellulosa</i> 60 Yes OBL 3. <i>Juncus effusus</i> 10 No OBL 4. <i>Juncus acuminatus</i> 10 No OBL 5. <i>Diodia virginiana</i> 10 No FACW 6. <i>Rumex crispus</i> 5 No FAC 7. <i>Cyperus eritrenarius</i> 5 No FACW 8. <i>Ludwigia peploides</i> 2 No OBL 9. _____ - - - 10. _____ - - - 11. _____ - - - 12. _____ - - - _____ = Total Cover 50% of total cover: 58% 20% of total cover: 22%				
Woody Vine Stratum (Plot size: _____) 1. <i>Rubus suus</i> 5 Yes FAC 2. _____ - - - 3. _____ - - - 4. _____ - - - 5. _____ - - - _____ = Total Cover 50% of total cover: 3% 20% of total cover: 1%				
Remarks: (If observed, list morphological adaptations below). 				

SOIL

Sampling Point: 414

[illegible]

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Middleton Estate 241 ac JD Reference Site City/County: Chambers County Sampling Date: May 13, 2016
 Applicant/Owner: Billy York State: Texas Sampling Point: 415
 Investigator(s): Lee Sherrod Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): pasture Local relief (concave, convex, none): flat Slope (%): ~1
 Subregion (LRR or MLRA): LRR T, MLRA 150A Lat: 29.756836° Long: -94.380048° Datum: _____
 Soil Map Unit Name: Beaumont clay, 0 to 1 percent slopes, rarely flooded NWI classification: none
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Remarks:		

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9)		Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0-2</u> Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>2</u> (includes capillary fringe)		Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

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Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: <u>0</u> (A) <u>0</u> (B) Prevalence Index = B/A = _____
				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Sapling/Shrub Stratum (Plot size: _____) 1. <i>Sesbania drummondii</i> 5 Yes FACW 2. _____ - - - 3. _____ - - - 4. _____ - - - 5. _____ - - - 6. _____ - - - 7. _____ - - - 8. _____ - - - _____ = Total Cover 50% of total cover: 0% 20% of total cover: 0%				
Herb Stratum (Plot size: _____) 1. <i>Eleocharis cellulosa</i> 80 Yes OBL 2. <i>Juncus effusus</i> 25 Yes OBL 3. <i>Ludwigia peploides</i> 5 No OBL 4. <i>Peltandra hydropiperoides</i> 5 No OBL 5. <i>Cyperus eritranus</i> 5 No FACW 6. <i>Iva annua</i> 5 No FAC 7. _____ - - - 8. _____ - - - 9. _____ - - - 10. _____ - - - 11. _____ - - - 12. _____ - - - _____ = Total Cover 50% of total cover: 83% 20% of total cover: 25%				
Woody Vine Stratum (Plot size: _____) 1. <i>Rubus suus</i> 5 Yes FAC 2. _____ - - - 3. _____ - - - 4. _____ - - - 5. _____ - - - _____ = Total Cover 50% of total cover: 3% 20% of total cover: 1%				
Remarks: (If observed, list morphological adaptations below). 				

SOIL

Sampling Point: 415

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WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Middleton Estate 241 ac JD Reference Site City/County: Chambers County Sampling Date: May 13, 2016
 Applicant/Owner: Billy York State: Texas Sampling Point: 416
 Investigator(s): Lee Sherrod Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): pasture Local relief (concave, convex, none): flat Slope (%): ~1
 Subregion (LRR or MLRA): LRR T, MLRA 150A Lat: 29.759663° Long: -94.379396° Datum: _____
 Soil Map Unit Name: Labelle-Levac Complex, 0 to 1 percent slopes NWI classification: none
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Remarks:		

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)		Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

VEGETATION (Four Strata) – Use scientific names of plants.

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Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67%</u> (A/B)
				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: <u>0</u> (A) <u>0</u> (B) Prevalence Index = B/A = _____
				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Sapling/Shrub Stratum (Plot size: _____) 1. <i>Sesbania drummondii</i> 10 Yes FACW 2. <i>Rosa bracteata</i> 5 Yes UBL 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ _____ = Total Cover 50% of total cover: <u>0%</u> 20% of total cover: <u>0%</u>				
Herb Stratum (Plot size: _____) 1. <i>Schizanthium scoparium divergens</i> 20 No NL 2. <i>Stenotaphrum secundatum</i> 70 Yes FAC 3. <i>Sporobolus indicus</i> 10 No FACU 4. <i>Eleocharis cellulosa</i> 10 No OBL 5. <i>Iva annua</i> 5 No FAC 6. <i>Eupatorium compositifolium</i> 5 No FAC 7. <i>Ambrosia psilostachya</i> 5 No FAC 8. <i>Rhexia mariana</i> 5 No FACW 9. _____ 10. _____ 11. _____ 12. _____ _____ = Total Cover 50% of total cover: <u>85%</u> 20% of total cover: <u>26%</u>				
Woody Vine Stratum (Plot size: _____) 1. <i>Rubus suus</i> 5 Yes FAC 2. _____ 3. _____ 4. _____ 5. _____ _____ = Total Cover 50% of total cover: <u>3%</u> 20% of total cover: <u>1%</u>				
Remarks: (If observed, list morphological adaptations below). 				

SOIL

Sampling Point: 416

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ^a	Loc ^c		
0-5	10YR 4/2	95	10YR 5/6	5	C	PL	loamy clay	
B-24	10YR 5/2	80	10YR 5/8	20	C	Pl	clay	

^aType: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

^bLocation: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Mucky Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)
- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils^a:

- ☐ 1 cm Muck (A9) (LRR O)
- ☐ 2 cm Muck (A10) (LRR S)
- ☐ Reduced Vertic (F18) (outside MLRA 150A,B)
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

^aIndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:
Labelle-Levac Complex.

APPENDIX E – iHGM ANALYSIS

The following pages summarize the baseline iHGM functional capacity of the site as well as estimate the functional capacity that will result from implementing the project 1, 3, 5, and 7 years' post-construction and revegetation. For WAA 1 the analysis also shows the increase in functional capacity which will result from retiring the 94 acres of rice field from production and its conversion from prior converted status (assumed baseline of zero on the 94 acres). That is why there is a column labelled "Year 0" in the table for WAA 1.

The tract has been separated into four general Wetland Assessment Areas (WAAs): 1) Prior Converted (PC) and forested wetlands on the west tract; 2) Historic non-wetland areas on the west tract; 3) forested and herbaceous wetlands on the east tract; and 4) the two acre borrow pit (open water pond) located on the east tract. A map of the WAAs may be found as **Figure 21**. The following discussions are based on the general ability of the wetlands onsite to function relative to the U.S. Army Corps of Engineer's iHGM assessment methods.¹⁹ WAAs 1 and 2 will be assessed using the Riverine Herbaceous/Shrub iHGM, and WAAs 3 and 4 will be assessed using the Riverine Forested iHGM. Final iHGM submetric values for WAA 3 will be submitted with the draft mitigation banking instrument. The values for basal area, trees per acre, and species richness, etc. currently provided for WAA 3 are based on several pedestrian surveys of the site.

¹⁹ For Riverine Herbaceous/Shrub iHGM:
<http://www.swg.usace.army.mil/Portals/26/docs/regulatory/functional%20Assessment/SWGRiverineHerbaceousiHGM.pdf>
For Riverine Forested iHGM see:
<http://www.swg.usace.army.mil/Portals/26/docs/regulatory/functional%20Assessment/SWGRiverineForestediHGM.pdf>

WAA 1 Baseline Acres: 4.3
Type PEM Post-Construction Acres: 98.7

Function	Baseline	Year 0	Year 1	Year 3	Year 5	Year 7
V _{dur}	0.10	0.10	1.00	1.00	1.00	1.00
V _{freq}	0.25	0.25	0.75	0.75	0.75	0.75
V _{topo}	0.10	0.10	0.40	0.40	0.40	0.40
V _{wood}	0.10	0.10	0.10	0.10	0.10	0.10
V _{mid}	0.10	0.10	0.10	0.10	0.10	0.10
V _{herb}	0.10	0.10	0.50	0.75	1.00	1.00
V _{connect}	0.75	0.75	0.75	0.75	0.75	0.75
V _{detritus}	0.10	0.10	0.10	0.50	1.00	1.00
V _{redox}	0.10	0.10	0.10	0.10	0.10	0.10
V _{sorpt}	1.00	1.00	1.00	1.00	1.00	1.00

TSDSW	0.13	0.13	0.55	0.60	0.64	0.64
MPAC	0.32	0.32	0.45	0.53	0.62	0.62
RSEC	0.19	0.19	0.52	0.56	0.61	0.61

TSDSW	0.6	12.8	54.3	59.2	63.2	63.2
MPAC	1.4	31.6	44.4	52.3	61.2	61.2
RSEC	0.8	18.8	51.3	55.3	60.2	60.2

Functional Capacity Unit Gain						Total
TSDSW	12.2	41.5	4.9	4.0	0.0	62.6
MPAC	30.2	12.8	7.9	8.9	0.0	59.8
RSEC	18.0	32.5	4.0	4.9	0.0	59.4
Total	60.4	86.8	16.8	17.8	0.0	181.8
	33%	48%	9%	10%	0%	

WAA 2 Baseline Acres: 0.0
Type PEM Post-Construction Acres: 116.7

Function	Baseline	Year 1	Year 3	Year 5	Year 7
V _{dur}	0.10	0.50	0.50	0.50	0.50
V _{freq}	0.25	0.75	0.75	0.75	0.75
V _{topo}	0.10	0.70	0.70	0.70	0.70
V _{wood}	0.10	0.10	0.10	0.10	0.10
V _{mid}	0.10	0.10	0.10	0.10	0.10
V _{herb}	0.10	0.75	1.00	1.00	1.00
V _{connect}	0.75	0.75	0.75	0.75	0.75
V _{detritus}	0.10	0.10	0.50	1.00	1.00
V _{redox}	0.10	0.10	0.10	0.10	0.10
V _{sorpt}	1.00	1.00	1.00	1.00	1.00

TSDSW	0.13	0.59	0.62	0.62	0.62
MPAC	0.32	0.53	0.62	0.62	0.62
RSEC	0.19	0.45	0.50	0.53	0.53

TSDSW	0.0	68.9	72.4	72.4	72.4
MPAC	0.0	61.9	72.4	72.4	72.4
RSEC	0.0	52.5	58.4	61.9	61.9

Functional Capacity Unit Gain					Total
TSDSW	68.9	3.5	0.0	0.0	72.4
MPAC	61.9	10.5	0.0	0.0	72.4
RSEC	52.5	5.9	3.5	0.0	61.9
Total	183.3	19.9	3.5	0.0	206.7
	89%	10%	2%	0%	

WAA	<u>3</u>	Baseline Acres:	<u>27.2</u>		
Type	PFO	Post-Construction Acres:	<u>27.2</u>		
Function	Baseline	Year 1	Year 3	Year 5	Year 7
V _{dur}	0.25	0.25	0.25	0.25	0.25
V _{freq}	0.25	0.50	0.50	0.50	0.50
V _{topo}	0.40	0.40	0.40	0.40	0.40
V _{cwd}	0.30	0.30	0.50	1.00	1.00
V _{wood}	1.00	1.00	1.00	1.00	1.00
V _{tree}	0.30	0.50	0.50	0.50	0.50
V _{rich}	0.60	0.60	0.60	0.80	0.80
V _{basal}	0.60	0.60	0.60	0.80	1.00
V _{density}	1.00	1.00	1.00	1.00	1.00
V _{mid}	0.75	0.75	0.75	0.75	1.00
V _{herb}	0.30	1.00	1.00	1.00	1.00
V _{connect}	0.75	0.75	0.75	0.75	0.75
V _{detritus}	0.50	0.50	0.50	0.50	0.50
V _{redox}	0.10	0.10	0.10	0.10	0.10
V _{sorpt}	1.00	1.00	1.00	1.00	1.00

TSDSW	0.38	0.45	0.47	0.53	0.53
MPAC	0.55	0.64	0.67	0.80	0.84
RSEC	0.52	0.57	0.58	0.62	0.62

TSDSW	10.3	12.2	12.8	14.4	14.4
MPAC	15.0	17.4	18.2	21.8	22.8
RSEC	14.1	15.5	15.8	16.9	16.9

Functional Capacity Unit Gain					Total
TSDSW	1.9	0.6	1.6	0.0	4.1
MPAC	2.4	0.8	3.6	1.0	7.8
RSEC	1.4	0.3	1.1	0.0	2.8
Total	5.7	1.7	6.3	1.0	14.7
	39%	12%	43%	7%	

WAA	<u>4</u>	Baseline Acres:	<u>2.0</u>		
Type	PFO	Post-Construction Acres:	<u>2.0</u>		
Function	Baseline	Year 1	Year 3	Year 5	Year 7
V _{dur}	1.00	1.00	1.00	1.00	1.00
V _{freq}	0.25	0.50	0.50	0.50	0.50
V _{topo}	0.40	0.40	0.40	0.40	0.40
V _{cwd}	0.10	0.10	0.10	0.10	0.30
V _{wood}	0.10	0.10	0.10	0.10	0.25
V _{tree}	0.10	0.10	0.10	1.00	1.00
V _{rich}	0.10	0.10	0.10	0.40	0.40
V _{basal}	0.10	0.10	0.10	0.40	0.40
V _{density}	0.10	0.10	0.10	0.40	0.60
V _{mid}	0.10	0.10	0.10	0.25	0.50
V _{herb}	1.00	1.00	1.00	1.00	1.00
V _{connect}	0.75	0.75	0.75	0.75	0.75
V _{detritus}	0.50	0.50	0.50	0.50	0.50
V _{redox}	0.10	0.10	0.10	0.10	0.10
V _{sorpt}	1.00	1.00	1.00	1.00	1.00

TSDSW	0.32	0.38	0.38	0.38	0.47
MPAC	0.28	0.28	0.28	0.55	0.62
RSEC	0.42	0.47	0.47	0.47	0.52

TSDSW	0.6	0.8	0.8	0.8	0.9
MPAC	0.6	0.6	0.6	1.1	1.2
RSEC	0.8	0.9	0.9	0.9	1.0

Functional Capacity Unit Gain					Total
TSDSW	0.2	0.0	0.0	0.1	0.3
MPAC	0.0	0.0	0.5	0.1	0.6
RSEC	0.1	0.0	0.0	0.1	0.2
Total	0.3	0.0	0.5	0.3	1.1
	27%	0%	45%	27%	

WAA 1: PEM – 98.7 Acres

V_{dur} : The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway

Criteria	Variable Sub index	Baseline	Year 0	Year 1	Year 3	Year 5	Year 7	Variable Sub index
In an average year at least 80% of the WAA either floods and/or ponds for at least 14 consecutive days	1.00			x	x	x	x	1.00
In an average year at least 80% of the WAA either floods and/or ponds for at least 7 consecutive days	0.75							0.75
In an average year 50-79% of the WAA either floods and/or ponds for at least 7 consecutive days	0.50							0.50
In an average year 25-50% of the WAA either floods and/or ponds for at least 7 consecutive days	0.25							0.25
In an average year all or portions of the WAA either floods and/or ponds for 1-7 consecutive days	0.10	x	x					0.10
The area is NOT subject to flooding	0.00							0.00

V_{freq} : The frequency that the WAA is flooded an/or ponded by nearby waterway.

Criteria	Variable Sub index	Baseline	Year 0	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Floods or ponds annually 5 out of 5 years (floodway)	1.00							1.00
Floods or ponds 3 or 4 out of 5 years (elevation data reveals in floodway and mapped w/n 100 yr floodplain)	0.75			x	x	x	x	0.75
Floods or ponds 2 out of 5 years (100-year floodplain)	0.50							0.50
Floods or ponds less than 2 out of 5 years (100-500 yr floodplain grey w/out elevations)	0.25	x	x					0.25
The area is not subject to flooding or ponding (500 yr floodplain)	0.00							0.00

V_{topo} : The roughness associated with the WAA

Criteria	Variable Sub index	Baseline	Year 0	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Greater than 30% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	1.00							1.00
15 - 30% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	0.70							0.70
Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	0.40			x	x	x	x	0.40
Smooth, flat, or very gentle undulating with little or no topographic features	0.10	x	x					0.10

V_{wood} : Percentage of the WAA that is covered by woody vegetation

Criteria	Variable Sub index	Baseline	Year 0	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Greater than 90% of the WAA is covered with woody vegetation	1.00							1.00
67 - 90% of the WAA is covered with woody vegetation	0.75							0.75
34 - 66% of the WAA is covered with woody vegetation	0.50							0.50
11 - 33% of the WAA is covered with woody vegetation	0.25							0.25
0 - 10% of the WAA is covered with woody vegetation	0.10	x	x	x	x	x	x	0.10

V_{mid} : The average/mean coverage of the midstory (shrub/sapling) layer in the WAA

Criteria	Variable Sub index	Baseline	Year 0	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Midstory coverage in the WAA is more than 75%	1.00							1.00
Midstory coverage in the WAA is more than 50-75%	0.75							0.75
Midstory coverage in the WAA is more than 25-50%	0.50							0.50
Midstory coverage in the WAA is more than 1-25%	0.25							0.25
Midstory coverage in the WAA is equal to or less than 1%	0.10	x	x	x	x	x	x	0.10

WAA 1: PEM – 98.7 Acres

V_{herb} : The average/mean coverage of the herbaceous layer in the WAA

Criteria	Variable Sub index	Baseline	Year 0	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Herbaceous cover in the WAA averages greater than 75%	1.00					x	x	1.00
Herbaceous cover in the WAA averages between 50-75%	0.75				x			0.75
Herbaceous cover in the WAA averages between 25-50%	0.50			x				0.50
Herbaceous cover in the WAA averages between 1-25%	0.25							0.25
Herbaceous cover in the WAA is equal to or less than 1% (barren soil or all shrub)	0.10	x	x					0.10

V_{connect} : The number of habitat types within 600' of the perimeter of the WAA
(Habitat to be counted has to be at a minimum 5% of the size of the WAA)

Habitat Types:	
Forested	Shrub/Sapling
Herbaceous/Prairie/Abandoned Ag. Field	Active Agricultural Field
Open Water	Wetland
Mud Flat	Lawn

Criteria	Variable Sub index	Baseline	Year 0	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Wetland plus four habitats and/or surrounded by forested	1.00							1.00
Wetland plus two or more habitat types (other than forested) OR three or more habitat types	0.75	x	x	x	x	x	x	0.75
Wetland plus one other habitat types or two other habitat types	0.50							0.50
One other habitat type other than urban habitat	0.25							0.25
Surrounded by urban (homes, lawn, concrete, etc.)	0.10							0.10

V_{detritus} : The amount of the detritus on the WAA
(A horizon has to have a value of 4 or less)

Criteria	Variable Sub index	Baseline	Year 0	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Greater than 85% of the area possesses an O or A horizon	1.00					x	x	1.00
From 11-84% of the area possesses an O or A horizon	0.50				x			0.50
Less than 10% of the area possesses an O or A horizon	0.30							0.30
Site is plowed	0.10	x	x	x				0.10

V_{redox} : The amount of the WAA that exhibits redox features an indication of the chemical exchange

Criteria	Variable Sub index	Baseline	Year 0	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Redox concentrations represent at least 20% of the pedon within the top 4 inches of the soil surface, or feature masked due to parent material but conditions are conducive to redoximorphic processes. (many mottles)	1.00							1.00
Redox features less than 20%	0.10	x	x	x	x	x	x	0.10

V_{soil} : The absorptive properties of the soils in the WAA

Criteria	Variable Sub index	Baseline	Year 0	Year 1	Year 3	Year 5	Year 7	Variable Sub index
The WAA is dominated by monmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic (2/1, 2/2, or 3/1)	1.00	x	x	x	x	x	x	1.00
WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non-montmorillonitic clays	0.50							0.50
The WAA is dominated by sands, loamy fine sands, loamy sands	0.10							0.10

WAA 2: PEM - 116.7 Acres

V_{dur} : The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
In an average year at least 80% of the WAA either floods and/or ponds for at least 14 consecutive days	1.00						1.00
In an average year at least 80% of the WAA either floods and/or ponds for at least 7 consecutive days	0.75						0.75
In an average year 50-79% of the WAA either floods and/or ponds for at least 7 consecutive days	0.50		x	x	x	x	0.50
In an average year 25-50% of the WAA either floods and/or ponds for at least 7 consecutive days	0.25						0.25
In an average year all or portions of the WAA either floods and/or ponds for 1-7 consecutive days	0.10	x					0.10
The area is NOT subject to flooding	0.00						0.00

V_{freq} : The frequency that the WAA is flooded an/or ponded by nearby waterway.

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Floods or ponds annually 5 out of 5 years (floodway)	1.00						1.00
Floods or ponds 3 or 4 out of 5 years (elevation data reveals in floodway and mapped w/n 100 yr floodplain)	0.75		x	x	x	x	0.75
Floods or ponds 2 out of 5 years (100-year floodplain)	0.50						0.50
Floods or ponds less than 2 out of 5 years (100-500 yr floodplain grey w/out elevations)	0.25	x					0.25
The area is not subject to flooding or ponding (500 yr floodplain)	0.00						0.00

V_{topo} : The roughness associated with the WAA

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Greater than 30% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	1.00						1.00
15 - 30% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	0.70		x	x	x	x	0.70
Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	0.40						0.40
Smooth, flat, or very gentle undulating with little or no topographic features	0.10	x					0.10

V_{wood} : Percentage of the WAA that is covered by woody vegetation

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Greater than 90% of the WAA is covered with woody vegetation	1.00						1.00
67 - 90% of the WAA is covered with woody vegetation	0.75						0.75
34 - 66% of the WAA is covered with woody vegetation	0.50						0.50
11 - 33% of the WAA is covered with woody vegetation	0.25						0.25
0 - 10% of the WAA is covered with woody vegetation	0.10	x	x	x	x	x	0.10

V_{mid} : The average/mean coverage of the midstory (shrub/sapling) layer in the WAA

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Midstory coverage in the WAA is more than 75%	1.00						1.00
Midstory coverage of the WAA is between 50-75%	0.75						0.75
Midstory coverage of the WAA is between 25-50%	0.50						0.50
Midstory coverage of the WAA is between 1-25%	0.25						0.25
Midstory coverage in the WAA is equal to or less than 1%	0.10	x	x	x	x	x	0.10

WAA 2: PEM - 116.7 Acres

V_{herb}: The average/mean coverage of the herbaceous layer in the WAA

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Herbaceous cover in the WAA averages greater than 75%	1.00			x	x	x	1.00
Herbaceous cover in the WAA averages between 50-75%	0.75		x				0.75
Herbaceous cover in the WAA averages between 25-50%	0.50						0.50
Herbaceous cover in the WAA averages is between 1-25%	0.25						0.25
Herbaceous cover in the WAA is equal to or less than 1% (barren soil or all shrub)	0.10	x					0.10

V_{connect}: The number of habitat types within 600' of the perimeter of the WAA
(Habitat to be counted has to be at a minimum 5% of the size of the WAA)

Habitat Types:	
Forested	Shrub/Sapling
Herbaceous/Prairie/Abandoned Ag. Field	Active Agricultural Field
Open Water	Wetland
Mud Flat	Lawn

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Wetland plus four habitats and/or surrounded by forested	1.00						1.00
Wetland plus two or more habitat types (other than forested) OR three or more habitat types	0.75	x	x	x	x	x	0.75
Wetland plus one other habitat types or two other habitat types	0.50						0.50
One other habitat type other than urban habitat	0.25						0.25
Surrounded by urban (homes, lawn, concrete, etc.)	0.10						0.10

V_{detritus}: The amount of the detritus on the WAA
(A horizon has to have a value of 4 or less)

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Greater than 85% of the area possesses an O or A horizon	1.00				x	x	1.00
From 11-84% of the area possesses an O or A horizon	0.50			x			0.50
Less than 10% of the area possesses an O or A horizon	0.30						0.30
Site is plowed	0.10	x	x				0.10

V_{redox}: The amount of the WAA that exhibits redox features an indication of the chemical exchange

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Redox concentrations represent at least 20% of the pedon within the top 4 inches of the soil surface, or feature masked due to parent material but conditions are conducive to redoximorphic processes. (many mottles)	1.00						1.00
Redox features less than 20%	0.10	x	x	x	x	x	0.10

V_{soil}: The absorptive properties of the soils in the WAA

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
The WAA is dominated by monmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic (2/1, 2/2, or 3/1)	1.00	x	x	x	x	x	1.00
WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non-montmorillonitic clays	0.50						0.50
The WAA is dominated by sands, loamy fine sands, loamy sands	0.10						0.10

WAA 3: PFO - 27.2 Acres

V_{dur}: The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
In an average year at least 80% of the WAA either floods and/or ponds for at least 14 consecutive days	1.00						1.00
In an average year at least 80% of the WAA either floods and/or ponds for at least 7 consecutive days	0.75						0.75
In an average year 50-79% of the WAA either floods and/or ponds for at least 7 consecutive days	0.50						0.50
In an average year 25-50% of the WAA either floods and/or ponds for at least 7 consecutive days	0.25	x	x	x	x	x	0.25
In an average year all or portions of the WAA either floods and/or ponds for 1-7 consecutive days	0.10						0.10
The area is NOT subject to flooding	0.00						0.00

V_{freq}: The frequency that the WAA is flooded an/or ponded by nearby waterway.

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Floods or ponds annually 5 out of 5 years (floodway)	1.00						1.00
Floods or ponds 3 or 4 out of 5 years (elevation data reveals in floodway and mapped w/n 100 yr floodplain)	0.75						0.75
Floods or ponds 2 out of 5 years (100-year floodplain)	0.50		x	x	x	x	0.50
Floods or ponds less than 2 out of 5 years (100-500 yr floodplain grey w/out elevations)	0.25	x					0.25
The area is not subject to flooding or ponding (500 yr floodplain)	0.00						0.00

V_{topo}: The roughness associated with the WAA

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Greater than 30% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	1.00						1.00
15 - 30% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	0.70						0.70
Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	0.40	x	x	x	x	x	0.40
Smooth, flat, or very gentle undulating with little or no topographic features	0.10						0.10

V_{cwd}: The roughness associated with the WAA

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
More than 7 pieces of cwd greater than 3" diameter along 100' transect	1.00				x	x	1.00
From 3-7 pieces of cwd greater than 3" diameter along 100' transect	0.50			x			0.50
Less than 3 pieces of cwd greater than 3" diameter along 100' transect	0.30	x	x				0.30
Area is openland (pasture or cropland)	0.10						0.10

V_{wood}: Percentage of the WAA that is covered by woody vegetation

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Greater than 90% of the WAA is covered with woody vegetation	1.00	x	x	x	x	x	1.00
67 - 90% of the WAA is covered with woody vegetation	0.75						0.75
34 - 66% of the WAA is covered with woody vegetation	0.50						0.50
11 - 33% of the WAA is covered with woody vegetation	0.25						0.25
0 - 10% of the WAA is covered with woody vegetation	0.10						0.10

WAA 3: PFO - 27.2 Acres

V_{tree}: Percentage of trees in the WAA that are mast producers

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
At least 60% of the stand is oak, hickory, cypress, maple and/or elm. Black willow, cottonwood, tallow and sycamore do not represent more than 5% of the stand.	1.00						1.00
At least 40% of the stand is oak, hickory, cypress, maple and/or elm. Black willow, cottonwood, tallow and sycamore do not represent more than 10% of the stand.	0.80						0.80
More than 20% of the stand is oak, hickory, cypress, maple and/or elm. Black willow, cottonwood, tallow and sycamore do not represent more than 15% of the stand.	0.50		x	x	x	x	0.50
Less than 20% of the stand is oak, hickory, cypress, maple and/or elm.	0.30	x					0.30
The site is openland (non-forested)	0.10						0.10

V_{dbh}: The diversity of the species within the WAA

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Five or more tree species present	1.00						1.00
Four tree species present	0.80				x	x	0.80
Three tree species present	0.60	x	x	x			0.60
One-two tree species present	0.40						0.40
The site is openland (non-forested)	0.10						0.10

V_{basal}: The average/mean basal area of the trees in the WAA per acre

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
The average basal area of the WAA is greater than 100 square ft/acre	1.00					x	1.00
The average basal area of the WAA is between 80-100 square ft/acre	0.80				x		0.80
The average basal area of the WAA is between 60-80 square ft/acre	0.60	x	x	x			0.60
The average basal area of the WAA is less than 60 square ft/acre	0.40						0.40
The site is openland (non-forested)	0.10						0.10

V_{density}: The average density of the WAA stand (Tree is woody with over 3" dbh)

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
The WAA averages a tree density of 100-250 trees/acre	1.00	x	x	x	x	x	1.00
The WAA averages a tree density of 250-500 trees/acre OR 50-100 trees/acre	0.60						0.60
The WAA averages less than 49 trees/acre or greater than 500 trees/acre	0.40						0.40
The site is openland (non-forested)	0.10						0.10

V_{mid}: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Midstory coverage of the WAA is more than 50%	1.00					x	1.00
Midstory coverage of the WAA is between 31-50%	0.75	x	x	x	x		0.75
Midstory coverage of the WAA is between 11-30%	0.50						0.50
Midstory coverage in the WAA is less than 10%	0.25						0.25
The site is openland (non-forested)	0.10						0.10

WAA 3: PFO - 27.2 Acres

V_{herb} : The average/mean coverage of the herbaceous layer in the WAA

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Herbaceous cover in the WAA averages between 5-30%	1.00		x	x	x	x	1.00
Herbaceous cover in the WAA averages between 31-50%	0.50						0.50
Herbaceous cover in the WAA is less than 5% or greater than 50%	0.30	x					0.30
The WAA is dominated by tem pasture species or is active cropland	0.10						0.10

V_{connect} : The number of habitat types within 600' of the perimeter of the WAA
(Habitat to be counted has to be at a minimum 5% of the size of the WAA)

Habitat Types:	
Forested	Shrub/Sapling
Herbaceous/Prairie/Abandoned Ag. Field	Active Agricultural Field
Open Water	Wetland
Mud Flat	Lawn

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Wetland plus four habitats and/or surrounded by forested	1.00						1.00
Wetland plus two or more habitat types (other than forested) OR three or more habitat types	0.75	x	x	x	x	x	0.75
Wetland plus one other habitat types or two other habitat types	0.50						0.50
One other habitat type other than urban habitat	0.25						0.25
Surrounded by urban (homes, lawn, concrete, etc.)	0.10						0.10

V_{detritus} : The amount of the detritus on the WAA
(A horizon has to have a value of 4 or less)

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Greater than 85% of the area possesses an O or A horizon	1.00						1.00
From 11-84% of the area possesses an O or A horizon	0.50	x	x	x	x	x	0.50
Less than 10% of the area possesses an O or A horizon	0.30						0.30
Site is plowed	0.10						0.10

V_{redox} : The amount of the WAA that exhibits redox features an indication of the chemical exchange

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Redox concentrations represent at least 20% of the pedon within the top 4 inches of the soil surface, or feature masked due to parent material but conditions are conducive to redoximorphic processes. (many mottles)	1.00						1.00
Redox features less than 20%	0.10	x	x	x	x	x	0.10

V_{soilpt} : The absorptive properties of the soils in the WAA

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
The WAA is dominated by monmorillontic clayey soils (clay, clay loams, silty clay loams) or soils with high organic (2/1, 2/2, or 3/1)	1.00	x	x	x	x	x	1.00
WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non-montmorillonitic clays	0.50						0.50
The WAA is dominated by sands, loamy fine sands, loamy sands	0.10						0.10

WAA 4: PFO - 2.0 Acres

V_{dur} : The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
In an average year at least 80% of the WAA either floods and/or ponds for at least 14 consecutive days	1.00	x	x	x	x	x	1.00
In an average year at least 80% of the WAA either floods and/or ponds for at least 7 consecutive days	0.75						0.75
In an average year 50-79% of the WAA either floods and/or ponds for at least 7 consecutive days	0.50						0.50
In an average year 25-50% of the WAA either floods and/or ponds for at least 7 consecutive days	0.25						0.25
In an average year all or portions of the WAA either floods and/or ponds for 1-7 consecutive days	0.10						0.10
The area is NOT subject to flooding	0.00						0.00

V_{freq} : The frequency that the WAA is flooded an/or ponded by nearby waterway.

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Floods or ponds annually 5 out of 5 years (floodway)	1.00						1.00
Floods or ponds 3 or 4 out of 5 years (elevation data reveals in floodway and mapped w/n 100 yr floodplain)	0.75						0.75
Floods or ponds 2 out of 5 years (100-year floodplain)	0.50		x	x	x	x	0.50
Floods or ponds less than 2 out of 5 years (100-500 yr floodplain grey w/out elevations)	0.25	x					0.25
The area is not subject to flooding or ponding (500 yr floodplain)	0.00						0.00

V_{topo} : The roughness associated with the WAA

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Greater than 30% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	1.00						1.00
15 - 30% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	0.70						0.70
Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	0.40	x	x	x	x	x	0.40
Smooth, flat, or very gentle undulating with little or no topographic features	0.10						0.10

V_{cwd} : The roughness associated with the WAA

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
More than 7 pieces of cwd greater than 3" diameter along 100' transect	1.00						1.00
From 3-7 pieces of cwd greater than 3" diameter along 100' transect	0.50						0.50
Less than 3 pieces of cwd greater than 3" diameter along 100' transect	0.30					x	0.30
Area is openland (pasture or cropland)	0.10	x	x	x	x		0.10

V_{wood} : Percentage of the WAA that is covered by woody vegetation

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Greater than 90% of the WAA is covered with woody vegetation	1.00						1.00
67 - 90% of the WAA is covered with woody vegetation	0.75						0.75
34 - 66% of the WAA is covered with woody vegetation	0.50						0.50
11 - 33% of the WAA is covered with woody vegetation	0.25					x	0.25
0 - 10% of the WAA is covered with woody vegetation	0.10	x	x	x	x		0.10

WAA 4: PFO - 2.0 Acres

V_{tree}: Percentage of trees in the WAA that are mast producers

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
At least 60% of the stand is oak, hickory, cypress, maple and/or elm. Black willow, cottonwood, tallow and sycamore do not represent more than 5% of the stand.	1.00				x	x	1.00
At least 40% of the stand is oak, hickory, cypress, maple and/or elm. Black willow, cottonwood, tallow and sycamore do not represent more than 10% of the stand.	0.80						0.80
More than 20% of the stand is oak, hickory, cypress, maple and/or elm. Black willow, cottonwood, tallow and sycamore do not represent more than 15% of the stand.	0.50						0.50
Less than 20% of the stand is oak, hickory, cypress, maple and/or elm.	0.30						0.30
The site is openland (non-forested)	0.10	x	x	x			0.10

V_{rich}: The diversity of the species within the WAA

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Five or more tree species present	1.00						1.00
Four tree species present	0.80						0.80
Three tree species present	0.60						0.60
One-two tree species present	0.40				x	x	0.40
The site is openland (non-forested)	0.10	x	x	x			0.10

V_{basal}: The average/mean basal area of the trees in the WAA per acre

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
The average basal area of the WAA is greater than 100 square ft/acre	1.00						1.00
The average basal area of the WAA is between 80-100 square ft/acre	0.80						0.80
The average basal area of the WAA is between 60-80 square ft/acre	0.60						0.60
The average basal area of the WAA is less than 60 square ft/acre	0.40				x	x	0.40
The site is openland (non-forested)	0.10	x	x	x			0.10

V_{density}: The average density of the WAA stand (Tree is woody with over 3" dbh)

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
The WAA averages a tree density of 100-250 trees/acre	1.00						1.00
The WAA averages a tree density of 250-500 trees/acre OR 50-100 trees/acre	0.60					x	0.60
The WAA averages less than 49 trees/acre or greater than 500 trees/acre	0.40				x		0.40
The site is openland (non-forested)	0.10	x	x	x			0.10

V_{mid}: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Midstory coverage of the WAA is more than 50%	1.00						1.00
Midstory coverage of the WAA is between 31-50%	0.75						0.75
Midstory coverage of the WAA is between 11-30%	0.50					x	0.50
Midstory coverage in the WAA is less than 10%	0.25				x		0.25
The site is openland (non-forested)	0.10	x	x	x			0.10

WAA 4: PFO - 2.0 Acres

V_{herb} : The average/mean coverage of the herbaceous layer in the WAA.

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Herbaceous cover in the WAA averages between 5-30%	1.00	x	x	x	x	x	1.00
Herbaceous cover in the WAA averages between 31-50%	0.50						0.50
Herbaceous cover in the WAA is less than 5% or greater than 50%	0.30						0.30
The WAA is dominated by tem pasture species or is active cropland	0.10						0.10

V_{connect} : The number of habitat types within 600' of the perimeter of the WAA
(Habitat to be counted has to be at a minimum 5% of the size of the WAA)

Habitat Types:	
Forested	Shrub/Sapling
Herbaceous/Prairie/Abandoned Ag. Field	Active Agricultural Field
Open Water	Wetland
Mud Flat	Lawn

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Wetland plus four habitats and/or surrounded by forested	1.00						1.00
Wetland plus two or more habitat types (other than forested) OR three or more habitat types	0.75	x	x	x	x	x	0.75
Wetland plus one other habitat types or two other habitat types	0.50						0.50
One other habitat type other than urban habitat	0.25						0.25
Surrounded by urban (homes, lawn, concrete, etc.)	0.10						0.10

V_{detritus} : The amount of the detritus on the WAA
(A horizon has to have a value of 4 or less)

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Greater than 85% of the area possesses an O or A horizon	1.00						1.00
From 11-84% of the area possesses an O or A horizon	0.50	x	x	x	x	x	0.50
Less than 10% of the area possesses an O or A horizon	0.30						0.30
Site is plowed	0.10						0.10

V_{redox} : The amount of the WAA that exhibits redox features an indication of the chemical exchange

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
Redox concentrations represent at least 20% of the pedon within the top 4 inches of the soil surface, or feature masked due to parent material but conditions are conducive to redoximorphic processes. (many mottles)	1.00						1.00
Redox features less than 20%	0.10	x	x	x	x	x	0.10

V_{soil} : The absorptive properties of the soils in the WAA

Criteria	Variable Sub index	Baseline	Year 1	Year 3	Year 5	Year 7	Variable Sub index
The WAA is dominated by monmorillontic clayey soils (clay, clay loams, silty clay loams) or soils with high organic (2/1, 2/2, or 3/1)	1.00	x	x	x	x	x	1.00
WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non-montmorillonitic clays	0.50						0.50
The WAA is dominated by sands, loamy fine sands, loamy sands	0.10						0.10

APPENDIX F – USFWS OFFICIAL SPECIES LIST



United States Department of Interior
Fish and Wildlife Service

Project name: Sea Breeze Mitigation Bank

Official Species List

Provided by:

Texas Coastal Ecological Services Field Office

17629 EL CAMINO REAL, SUITE 211

HOUSTON, TX 77058

(281) 286-8282

<http://www.fws.gov/southwest/es/TexasCoastal/>

http://www.fws.gov/southwest/es/ES_Lists_Main2.html

Consultation Code: 02ETTX0-2016-SLI-0079

Event Code: 02ETTX0-2016-E-00082

Project Type: LAND - RESTORATION / ENHANCEMENT

Project Name: Sea Breeze Mitigation Bank

Project Description: Approximately 300 acre wetland restoration and rehabilitation project adjacent to Spindletop Bayou that is currently in the pre-application phase with the USACE.

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

<http://ecos.fws.gov/ipac>, 10/27/2015 03:51 PM



United States Department of Interior
Fish and Wildlife Service

Project name: Sea Breeze Mitigation Bank

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-94.38581943511963 29.7621793823917, -94.38448905944824 29.760949975577333, -94.38328742980957 29.76031663890734, -94.38230037689209 29.759944086055086, -94.38182830810547 29.75849111669676, -94.38174247741699 29.75782050834906, -94.38144207000732 29.757112639113622, -94.38066959381104 29.756069454284816, -94.38028335571289 29.75536157268127, -94.37946796417236 29.754728200692696, -94.37805175781249 29.75398305205243, -94.37676429748534 29.75361047565491, -94.37560558319092 29.753573217938975, -94.37461853027344 29.75342418693678, -94.37384605407715 29.752157414471654, -94.37294483184814 29.748990413269453, -94.3721294403076 29.748543299157753, -94.37131404876709 29.748468779945267, -94.37135696411133 29.747388245139685, -94.38573360443115 29.747388245139685, -94.38581943511963 29.7621793823917)))

Project Counties: Chambers, TX

<http://ecos.fws.gov/ipac>, 10/27/2015 03:51 PM



United States Department of Interior
Fish and Wildlife Service

Project name: Sea Breeze Mitigation Bank

Endangered Species Act Species List

There are a total of 9 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Birds	Status	Has Critical Habitat	Condition(s)
Piping Plover (<i>Charadrius melodus</i>) Population: except Great Lakes watershed	Threatened		
Red Knot (<i>Calidris canutus nufa</i>)	Threatened		
Sprague's Pipit (<i>Anthus spragueii</i>)	Candidate		
Mammals			
West Indian Manatee (<i>Trichechus manatus</i>) Population: Entire	Endangered	Final designated	
Reptiles			
Green sea turtle (<i>Chelonia mydas</i>) Population: Except where endangered	Threatened	Final designated	
Hawksbill sea turtle (<i>Eretmochelys imbricata</i>) Population: Entire	Endangered	Final designated	
Kemp's Ridley sea turtle (<i>Lepidochelys kempi</i>) Population: Entire	Endangered		

<http://ecos.fws.gov/ipac>, 10/27/2015 03:51 PM



United States Department of Interior
Fish and Wildlife Service

Project name: Sea Breeze Mitigation Bank

Leatherback sea turtle (<i>Dermochelys coriacea</i>) Population: Entire	Endangered	Final designated	
Loggerhead sea turtle (<i>Caretta caretta</i>) Population: Northwest Atlantic Ocean DPS	Threatened	Proposed, Final designated	

<http://ecos.fws.gov/ipac>, 10/27/2015 03:51 PM



United States Department of Interior
Fish and Wildlife Service

Project name: Sea Breeze Mitigation Bank

Critical habitats that lie within your project area

There are no critical habitats within your project area.

<http://ecos.fws.gov/ipac>, 10/27/2015 03:51 PM

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**APPENDIX G – TRINITY BAY CONSERVATION DISTRICT EASEMENT ON SPINDLETOP
BAYOU**

57

THE STATE OF TEXAS |
 | KNOW ALL MEN BY THESE PRESENTS:
COUNTY OF CHAMBERS |
 | 196

That I, Edith A. Marshall, a widow, of Jefferson County, Texas, hereinafter called grantor, whether one or more, in consideration of the sum of One Dollar (\$1.00) in hand paid by Trinity Bay Conservation District, a body corporate organized under the laws of the State of Texas, and having its office in the City of Anahuac, Chambers County, Texas, hereinafter called grantee, and other good and sufficient consideration the grantor hereunto moving, the receipt and sufficiency whereof are hereby expressly acknowledged and confessed, including, among other things, the benefits to accrue to the lands hereinafter described, and any other lands the grantor may own in the vicinity thereof, by reason of the construction and/or operation, by grantee of a drainage ditch or canal in said vicinity, have granted, bargained, sold and conveyed, and by these presents do grant, bargain, sell and convey unto the said Trinity Bay Conservation District, forever, subject only to the terms and conditions hereinafter set out, the perpetual, free, exclusive and uninterrupted right, use, liberty, privilege and easement of constructing and/or maintaining or repairing a drainage ditch, drainage canal, levees, borrow pits, floodways and any and all other uses and purposes which are or may be necessary or desirable in the building and maintaining of any system of levees or drainage over, across and upon the following lands and premises situated in the County of Chambers, State of Texas, to-wit:

Deed Record 151 Page 57

CERTIFIED TO BE A TRUE AND CORRECT
COPY OF THE ORIGINAL DOCUMENT



HEATHER H. HAWTHORNE,
County Clerk,
Chambers County, Texas

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[Handwritten signature]

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All those certain tracts or parcels of land owned by me, situated in Chambers County, Texas, abutting upon Spindletop Bayou, and being portions of Lots 4, 9, 6, 7 and 8 of the Stratford Subdivision of T&NO Rr. Co. Survey Sec. No. 80, Abstract 423, and portions of HT&B Rr. Co. Survey Sec. No. 98, Abstract 438, and portions of HT&B Rr. Co. Survey Sec. No. 99, Abstract 141;

together with free ingress and egress at all times for the purpose of constructing and/or maintaining said drainage ditch, drainage canal, levees, borrow-pits and floodways.

Said drainage ditch, drainage canal, levees, borrow-pits and floodways shall be constructed and/or maintained and operated only upon the following described parts or part of the above mentioned lands and premises, to-wit:

A strip of land not more than one hundred ninety (190) feet wide measuring from the present center line of the present channel of Spindletop Bayou, on both sides of said Bayou; said ditch to be constructed and excavated to have a bottom width of forty-six (46) feet with a thirteen (13) foot cut and a 2-to-1 slope; together with an adjoining one hundred forty (140) feet for berm, floodway and spoil area; said ditch to have as its center line the center line of the present channel of Spindletop Bayou, and to follow all the meanders of the center line of the present channel of Spindletop Bayou as reflected upon the attached map or plat, marked 'Exhibit 1' and initialed by grantor herein for identification.

And as a part of the consideration for this grant, grantee agrees that the spoil excavated from said ditch will be so placed as to form a continuous flood protection levee across grantor's lands.

To Have and To Hold unto the said Trinity Bay Conservation District, its successors and assigns, forever, all and singular the said right, use, liberty, privilege and easement, and right of ingress and egress, together with all appurtenances thereto, but upon and subject to the following terms and conditions:

This instrument conveys to the grantee only an easement or right-of-way, and grantee acquires hereunder no right, title or interest in the oil, gas or other minerals lying in, under or pertaining to the above described land and premises, and the grant herein is subject to any valid and subsisting mineral lease or other conveyance of minerals, or right of way for pipeline, powerline, or other utility heretofore made by the grantor or the grantor's predecessors in title, or that may be hereafter made, and to the use of said land and premises by grantor, her heirs and assigns, so long as such use does not interfere with or obstruct the easement and right-of-way herein granted.

And in consideration of the sum of \$ 4170.00 this day paid by grantee to grantor in cash, the receipt of which is hereby acknowledged, and other good and valuable considerations, grantor, for herself, her heirs and assigns, does hereby remise, release and forever discharge Trinity Bay Conservation District, its successors and assigns, and all of its agents and employees, of and from any and all claims, demands and liabilities to grantor, her heirs and assigns, except claims, demands and liabilities for damages to growing crops, that may occur on account of the drainage improvement work being done by the said District on Spindletop

Deed Record 151 Page 58

CERTIFIED TO BE A TRUE AND CORRECT
COPY OF THE ORIGINAL DOCUMENT



HEATHER H. HAWTHORNE,
County Clerk,
Chambers County, Texas

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Bayou; the intention hereof being to completely, absolutely and finally release Trinity Bay Conservation District, its successors and assigns, and its agents and employees, from all liability arising wholly or partially from the cause aforesaid, except such as may accrue by reason of damages to growing crops upon the lands of grantor.

Executed on this the 3rd day of June, A. D. 1953.

Edith A. Marshall
Edith A. Marshall

THE STATE OF TEXAS {
COUNTY OF JEFFERSON {

Before me, the undersigned authority, on this day personally appeared Edith A. Marshall, a widow, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that she executed the same for the purposes and consideration therein expressed.

Given under my hand and seal of office, this the 3rd day of

June, A. D. 1953.

Nettie L. Plumb
Nettie L. Plumb
A Notary Public in and for
Jefferson County, Texas

PLAT ON FILE IN PLAT DRAWER # 1 IN CLERK'S OFFICE.

FILED for Record the 25 day of June A. D. 1953 at
9:00 o'clock A. M., and duly Recorded the 1 day of July
A.D. 1953, at 9:45 o'clock A. M.

J. B. WOOLDRIDGE, COUNTY CLERK
CHAMBERS COUNTY, TEXAS.

BY: Joanne McElhiney
DEPUTY

(SEAL)

I CERTIFY THIS AS A TRUE COPY
Witness my Hand and Seal of Office
Heather H. Hawthorne, County Clerk
Chambers County, Texas

OCT 27 2016

Heather H. Hawthorne
by: Heather H. Hawthorne, Deputy

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**APPENDIX H – PROPOSED AMMENDMENT TO TRINITY BAY CONSERVATION
DISTRICT EASEMENT**

AMENDMENT OF EASEMENT

STATE OF TEXAS §

COUNTY OF CHAMBERS §

WHEREAS, Edith A. Marshall, a widow, executed an easement to Trinity Bay Conservation District on June 3, 1953 as recorded in Volume 151, Page 57 of the Deed Records of Chambers County, Texas (the “Easement”) granting rights and agreements as to the following described lands, in Chambers County, Texas:

All those certain tracts or parcels of land situated in Chambers County Texas abutting upon Spindletop Bayou, and being portions of Lots 4, 9, 6, 7 and 8 of the Stratford Subdivision of T&NO Rr. Co. Survey No. 80, Abstract 423, and portions of HT&B Rr. Co. Survey No. 98, Abstract 438 and portions of HT&B Rr. Co. Survey No. 99, Abstract 141 (the “Property”).

WHEREAS, the **Estate of John Gregg Middleton**, hereinafter called GRANTOR, whose address is 4306 Yoakum, Suite 540, Houston, TX 77006, is the current owner of the Property which is affected by the Easement;

WHEREAS, **Trinity Bay Conservation District** continues to be the GRANTEE of the Easement; and

WHEREAS, it is the desire of the GRANTOR and GRANTEE to amend the Easement as set forth herein.

NOW, THEREFORE, for Ten Dollars (\$10.00) and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, GRANTOR and GRANTEE hereby agree to amend the Easement as stated herein:

1. The following language shall be deleted from the Easement:

“And as part of the consideration for this grant, grantee agrees that the spoil excavated from said ditch will be so placed as to form a continuous flood protection levee across grantor’s land,”

The following language shall be added to the Easement to replace the hereinabove deleted language:

“And as part of the consideration for this grant, grantee agrees that the spoil excavated from said ditch will be so placed as to form a continuous flood protection levee across

grantor's land except that portion falling within the boundaries of the south bank of Spindletop Bayou as described herein.”

2. The following language shall be added to the Easement:

“Grantee agrees it will not place any spoil, will not create flood protection levees onto or along, and will not change the elevation or topography of those areas designated as a “Levee Breach Area and Side Slope Transition Area” with a calculated slope of (8:1) ‘8 foot horizontal to 1 foot vertical’ on the south bank of Spindletop Bayou as described in the plats of the mitigation plan that is a part of the Mitigation Banking Instrument for the Sea Breeze Mitigation Bank, U.S. Army Corps of Engineers Permit Number SWG-2016-00086 issued on _____.”

The GRANTOR does hereby adopt, ratify and confirm the Easement as to all of the terms and provisions therein, and does hereby grant, bargain, sell and convey the interest of the GRANTOR in and to all of the Property covered by the Easement to the GRANTEE, its successors and assigns, in accordance with all of the terms and provisions of the Easement as amended hereby.

GRANTOR and GRANTEE have executed this Amendment of Easement as of the date of their acknowledgements with this Amendment of Easement to be effective upon the issuance of the U.S. Army Corps of Engineers Permit No. SWG-2016-00086 for the Sea Breeze Mitigation Bank.

GRANTOR:

GRANTEE:

Estate of John Gregg Middleton
By: David Mayes Middleton II
Its: Executor

Trinity Bay Conservation District
By: Jeffrey Jenkins
Its: Board President

STATE OF TEXAS §

ACKNOWLEDGEMENT

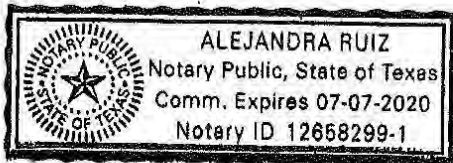
COUNTY OF CHAMBERS §

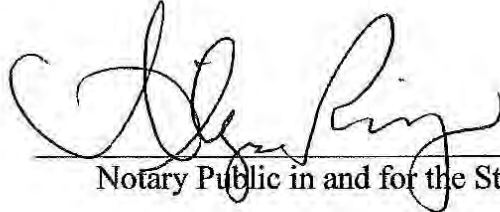
This instrument was acknowledged before me this _____ day of _____, 2016, by David Mayes Middleton II as Executor of the Estate of John Gregg Middleton.

Notary Public in and for the State of Texas

STATE OF TEXAS §
ACKNOWLEDGEMENT
COUNTY OF CHAMBERS §

This instrument was acknowledged before me this 28th day of November, 2016, by Jeffrey Jenkins the Board President of Trinity Bay Conservation District.





Notary Public in and for the State of Texas

APPENDIX I – TITLE REVIEW

Dixon Services Inc. Limited Certificate of Title

This Certificate of Title concerns the Surface Ownership of the below described tract of land:

**Being the South half of the D.L. Broussard Survey, Abstract No. 423, on and South of
Spindletop Bayou, Chambers County, Texas.**

This is to certify that a diligent and careful search of all pertinent records and instruments pertaining to the surface title to the above captioned property in the offices of the County and District Clerks of Chambers County, Texas, Texasfile.com, from the acquisition of the owner of the Surface Title of the above captioned property as of September 6, 1979 through January 2, 2016 12:00AM.

Based on our examination of the above said records through said period we find the Surface Title in and to said tract to be as follows, subject to the limitations set forth below.

Fee Title

I. Fee Simple Ownership

Owner	The John Gregg
Interest	Middleton Estate
100.00%	4265 San Felipe, Suite
	510, Houston, Texas
	77027

II. Easements

Document Type	Vol/Page	Instr Date	Grantor	Grantee
Right of Way Agmt.	61/73	11/23/1937	W.L. Ponder, Ind. Exec.	Sun Oil Company
Easement	136/166	9/14/1951	Ms. Courtenay Marshall	Trinity Bay Conservation District
Easement	151/57	6/3/1953	Edith A. Marshall	Trinity Bay Conservation District
Easement	292/565	12/18/1967	Chilton O'Brien, Ind. Exec.	Trinity Bay Conservation District
Right of Way Easement	349/406	9/15/1972	Chilton O'Brien	Trinity Bay Conservation District

Liens, Mortgages and Lis Pendens

Document Type	Vol/Page	Instr Date	Grantor	Grantee
No current liens and/or mortgages.				

Dixon Services, Inc. - Title Certificate - continued

This Certificate is rendered for the sole use of The Estate of John Gregg Middleton, and may not be relied upon by any third party without prior written consent. Except as discrepancies in area, conflicts in boundary lines or survey lines, rights of parties in possession, and/or rules and regulations of governmental agencies having or asserting Jurisdiction are Not Reflected within the materials examined in connection with this certificate.



Title Examiner: Steve Brand



Steve Brand
Petroleum Landman

12559 CR 192 P. O. Box 6602
Tyler, TX 75703 Tyler, TX 75711
903-579-9300 (office) 903-579-9399 (fax)

August 7, 2016

Mr. Cliff Sunda
Wildwood Environmental
Tyler, Texas 75703

Mr. Sunda,

Dixon Services, Inc. (DSI) is a professional land services company based in Tyler, Texas. We provide due diligence, mineral and royalty ownership research and reporting, survey notification, pipeline route selection, environmental site assessment, survey maps, metes and bounds descriptions and property plats as well as title search and owner notification for survey permission.

I was asked to search for easements and rights of way across the Figridge property, the Estate of John Gregg Middleton in Chambers County, Texas, specifically the lands abutting Spindletop Bayou, East and West of Highway 124, South of Winnie, Texas. I researched online websites such as Texasfile.com and the Chambers County Clerk and District Clerk records online for information to satisfy this requirement. I also traveled to the Chambers County Courthouse and spent time there researching the Land Records over these tracts of land.

Concerning the Sun Oil Easement- I made multiple calls and had conversations with Sunoco Oil and Kinder-Morgan Oil Companies. We also requested and had a dig test performed on the areas of this project. No pipelines were discovered in the proposed project area. Kinder-Morgan also said if there was a pipeline, it was abandoned.

If you have any questions, please don't hesitate to call me at my office, 903-579-9330 or on my mobile number 903-721-2347.

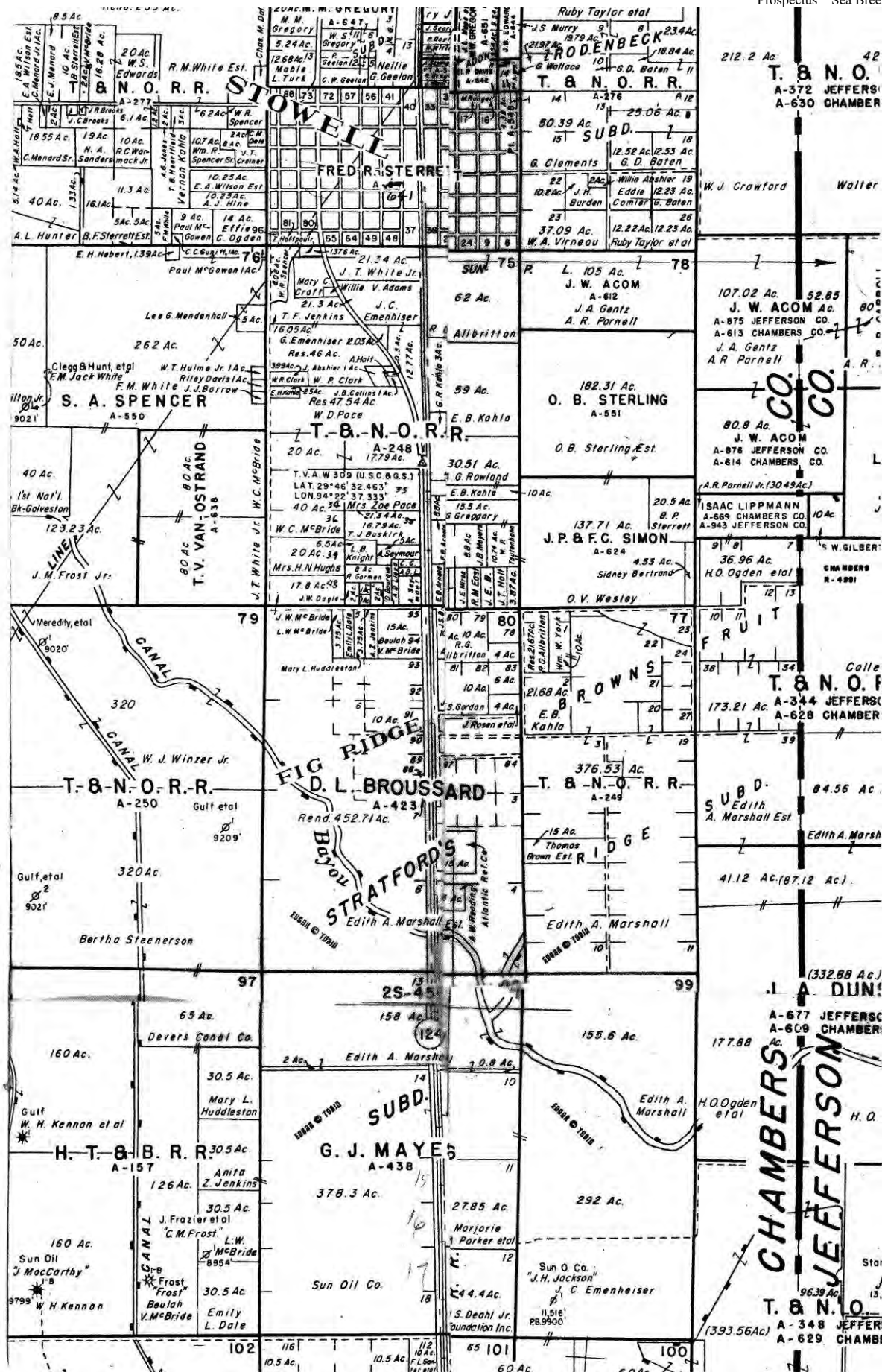
Sincerely,

A handwritten signature in blue ink that reads "Steve Brand".

Steve Brand
Dixon Services, Inc.

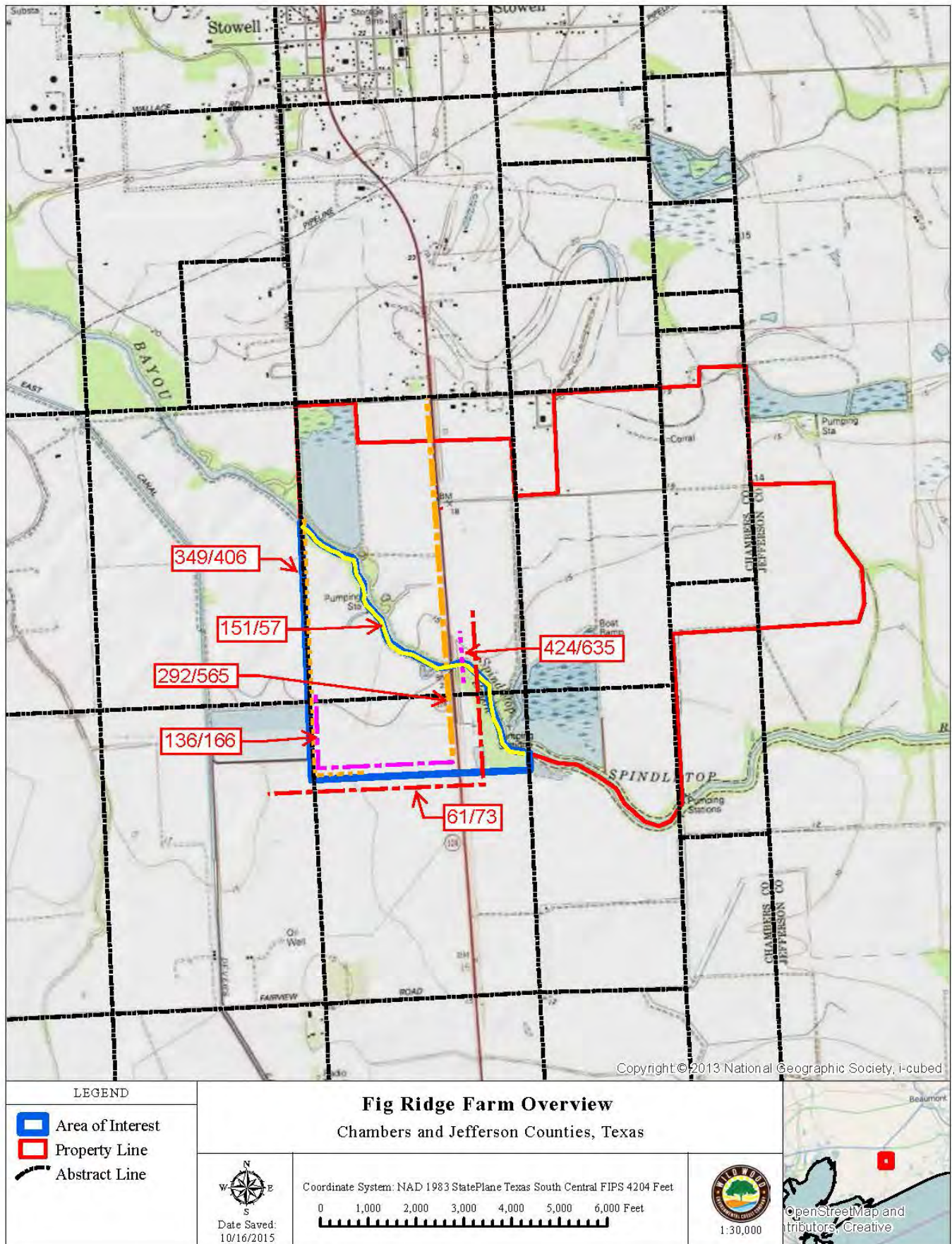


Enclosures:
Limited Certificate of Title
Cover Letter
Tobin
Runsheets Index and Runsheets
Instruments
Title Policy 1979



Runsheets Index
John Gregg Middleton Estate
Figridge Property
Chambers County, Texas A-423

Index #	Vol/Page	Inst. Type	Inst. Date	File Date	Grantor	Grantee
1	61/73	Right of Way Agreement	11/23/1937	3/14/1938	W.L. Pondrom, Independent Executor of the Estate of John H. Jackson	Sun Oil Co.
2	136/166	Easement	9/14/1951	2/24/1951	Mrs. Courtenay Marshall, a widow	Trinity Bay Conservation District
3	151/57	Easement	6/3/1953	6/25/1953	Edith A. Marshall	Trinity Bay Conservation District
4	292/565	Easement	12/18/1967	12/19/1967	Chilton O'Brien, Independent Executor and Trustee for Edith Diane Brown, under the Will of Edith A. Marshall, deceased	Gulf States Utilities Company
5	349/406	Right of Way Easement	9/15/1972	9/11/1973	Chilton O'Brien, acting as Independent Executor and Trustee of the Will and Estate of Edith A. Marshall, deceased	Trinity Bay Conservation District
6	424/635	Right of Way Easement	10/12/1978	10/17/1978	Chilton O'Brien, Trustee for Diane Fertitta under the Will of Mrs. Edith A. Marshall, Deceased	United Texas Transmission Company



**John Gregg Middleton Estate
Figridge Property
Chambers County, Texas A-423**

Index # 1 W.L. Pondrom, Independent to Sun Oil Co.
61/73 Executor of the Estate of John H.
Right of Way Agreement Jackson
Inst. Date: 11/23/1937
File Date: 03/14/1938

REMARKS: As stated in the instrument: Conveys a right of way across Sections 98 & 99, H.T. & B. RR. Survey and section 77, T & N.O. Survey.
No description of length or width of ROW. The right of way to lay, maintain and operate and remove a pipeline for the transportation of oil, gas, water or other fluids and substances, and to erect, maintain and operate a telegraph or telephone line in connection therewith, on, over and through said lands.

Sun Oil Co. may lay, maintain and operate an additional pipeline or pipelines alongside of the first line as herein provided, upon successors or assigns, shall have the right to change the size of the pipes in said line or lines whenever and as often as it may so desire.

Contacted Sun Oil. They have no records of any such line. Contacted local offices, they agreed. Performed a dig test in 2015, no line was located. Contacted Kinder Morgan and If there is a line, it is abandoned.

Index # 2 Mrs. Courtenay Marshall, a to Trinity Bay Conservation District
136/166 widow
Easement
Inst. Date: 09/14/1951
File Date: 02/24/1951

REMARKS: As stated in this instrument: Conveys a 30' wide easement along the West line of Section extending from the North line thereof to the south line of the Courtenay Marshall tract of land in said Section, thence East along said South line to the West line of the ROW of the Beaumont-High Island Highway.

Grants the perpetual, free, exclusive and uninterrupted right, use, liberty, privilege and easement of constructing and or maintaining or repairing a drainage ditch, drainage canal, levees, borrow pits, floodways and any and all other uses and purposes which are or may be necessary or desirable in the building and maintaining of any system of levees or drainage.

(Abstract Number and Survey name are described incorrectly.)

**John Gregg Middleton Estate
Figridge Property
Chambers County, Texas A-423**

Index # 3 Edith A. Marshall to Trinity Bay Conservation District
151/57
Easement
Inst. Date: 06/03/1953
File Date: 06/25/1953

REMARKS: As stated in this instrument: Conveys an easement, strip of land not more than 190' wide measuring from the present center line of the present channel of Spindletop Bayou covering all that certain land in the T & NO RR. Co., Survey Section 80, Chambers County, Texas.

Grants the perpetual, free, exclusive and uninterrupted right, use, liberty, privilege and easement of constructing and or maintaining or repairing a drainage ditch, drainage canal, levees, borrow pits, floodways and any other uses and purposes which are or may be necessary or desirable in the building and maintaining of any system of levees or drainage over and across and upon said land.

Index # 4 Chilton O'Brien, Independent to Gulf States Utilities Company
292/565 Executor and Trustee for Edith
Easement Diane Brown, under the Will of
Inst. Date: 12/18/1967 Edith A. Marshall, deceased
File Date: 12/19/1967

REMARKS: As stated in this instrument: Conveys an easement 6,751 lineal feet in the D.L. Broussard, Abstract No. 423, Chambers County, Texas and being the same land described in Volume 8, Page 169 of the Deed Records of Chambers County, Texas.
25' wide at the North End and 30' wide at the South End of this line.

Conveys the Right, privilege and easement to enter upon and to construct, maintain, operate, inspect, patrol, replace, repair and remove a line of wood or metal structures for one or more circuits with lines of wires, crossarms, guy wires, stubs, foundations, anchors and other usual fixtures for the transmission of electricity and communications.

Index # 5 Chilton O'Brien, acting as to Trinity Bay Conservation District
349/406 Independent Executor and
Right of Way Easement Trustee of the Will and Estate of
Inst. Date: 09/15/1972 Edith A. Marshall, deceased
File Date: 09/11/1973

REMARKS: As stated in this instrument: Conveys a 20' wide strip of land, off the West side at the South bank of Spindletop Bayou where it intersects the West line of the Marshall Figridge Farm property, extending South parallel and adjacent to the West line of T. & N.O. RR., Survey No. 80, Abstract No. 423, Chambers County, Texas.

This easement appears to overlap and lay on top of Volume 136, Page 349.

Grants a perpetual easement, privilege and right of way for the purpose of constructing and maintaining a ditch across and upon said lands, together with free ingress and egress at all times for the purpose of constructing, protecting, keeping up and maintaining such ditch.

**John Gregg Middleton Estate
Figridge Property
Chambers County, Texas A-423**

Index # 6
424/635
Right of Way Easement
Inst. Date: 10/12/1978
File Date: 10/17/1978

Chilton O'Brien, Trustee for to United Texas Transmission
Diane Fertitta under the Will of Company
Mrs. Edith A. Marshall, Deceased

REMARKS: As stated in the instrument: Conveys a right of way and easement 25' in width and containing 0.195 acres, more or less, in the D.L. Broussard Survey, Abstract No. 423, Chamber County, Texas. Said right of way and easement being further defined as beginning 100' South of the intersection of the East right of way line of the C.G. & S.F. Railroad and the centerline of Spindletop Bayou and being 12' East of a common line between C.G. & S.F. Railroad Company's East right of way line and the West property line of said 52.47 acre tract. Thence in a northerly direction a distance of 340'.

The easement herein granted shall be used for the purposes herein granted, with ingress to and egress from the premises, for the purposes of constructing, inspecting, repairing, maintaining and replacing the property herein granted.

There is no description as to the size of this pipeline.

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NO. 352

RIGHT-OF-WAY AGREEMENT

THE STATE OF TEXAS

COUNTY OF CHAMBERS

KNOW ALL MEN BY THESE PRESENTS, That W. L. Pondrom, independent executor

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of the estate of John H. Jackson, deceased, and as trustee under the will of John H. Jackson, deceased, for and in consideration of the sum of One and No/100 Dollars paid by Sun Oil Company, the receipt of which is hereby acknowledged, do hereby grant and convey unto the said Sun Oil Company, with its principal office at Beaumont, Texas, the right-of-way to lay, maintain and operate and remove a pipe line for the transportation of oil, gas, water or other fluids and substances, and to erect, maintain and operate a telegraph or telephone line in connection therewith, on, over and through the following described land situated in Chambers County, Texas, to-wit:

Sections 98 and 99, H. T. & B. R.R. Survey, and Section 77, T. & N. O. Survey.

TO HAVE AND TO HOLD said right-of-way or easement unto the said Sun Oil Company, its successors and assigns. But it is understood that the grantor, his heirs or assigns retain the right to use and enjoy the said premises for all purposes not inconsistent with the rights herein granted to Sun Oil Company, its successors or assigns. Sun Oil Company agrees to bury said line below plow depth when and where the land is in cultivation.

Said Sun Oil Company, its successors or assigns hereby agree to pay any damages to crops and fences which may arise from the laying, maintaining, operating and removing said pipe line, and to pay any damage to land from leakage of oil from said line; such damages, if not agreed upon to be determined by three disinterested persons as arbitrators, one of whom to be appointed by the grantor his heirs or assigns, and one by the grantee, its successors or assigns, and the third by the two appointed as aforesaid, and the award of such three persons shall be final and conclusive.

It is further understood and agreed that the said Sun Oil Company, its successors or assigns, subject to the same rights and conditions, may lay, maintain and operate an additional pipe line or pipe lines alongside of the first line as herein provided, upon the payment of a like consideration for each additional line. And Sun Oil Company, its successors or assigns, shall have the right to change the size of the pipes in said line or lines whenever and as often as it may so desire.

It is understood that the party securing this grant in behalf of grantee has no authority to make any agreement not expressed herein.

WITNESS the signature of grantor this the 23rd day of November A. D. 1937.

W. L. Pondrom, as independent executor
of the Estate of John H. Jackson, deceased
and as trustee under the will
of John H. Jackson, deceased.

THE STATE OF TEXAS

COUNTY OF _____

Before me, the undersigned authority, on this day personally appeared W. L. Pondrom known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein expressed, and in the capacity therein stated.

Given under my hand and seal of office, this the 23rd day of November A. D. 1937.

(SEAL)

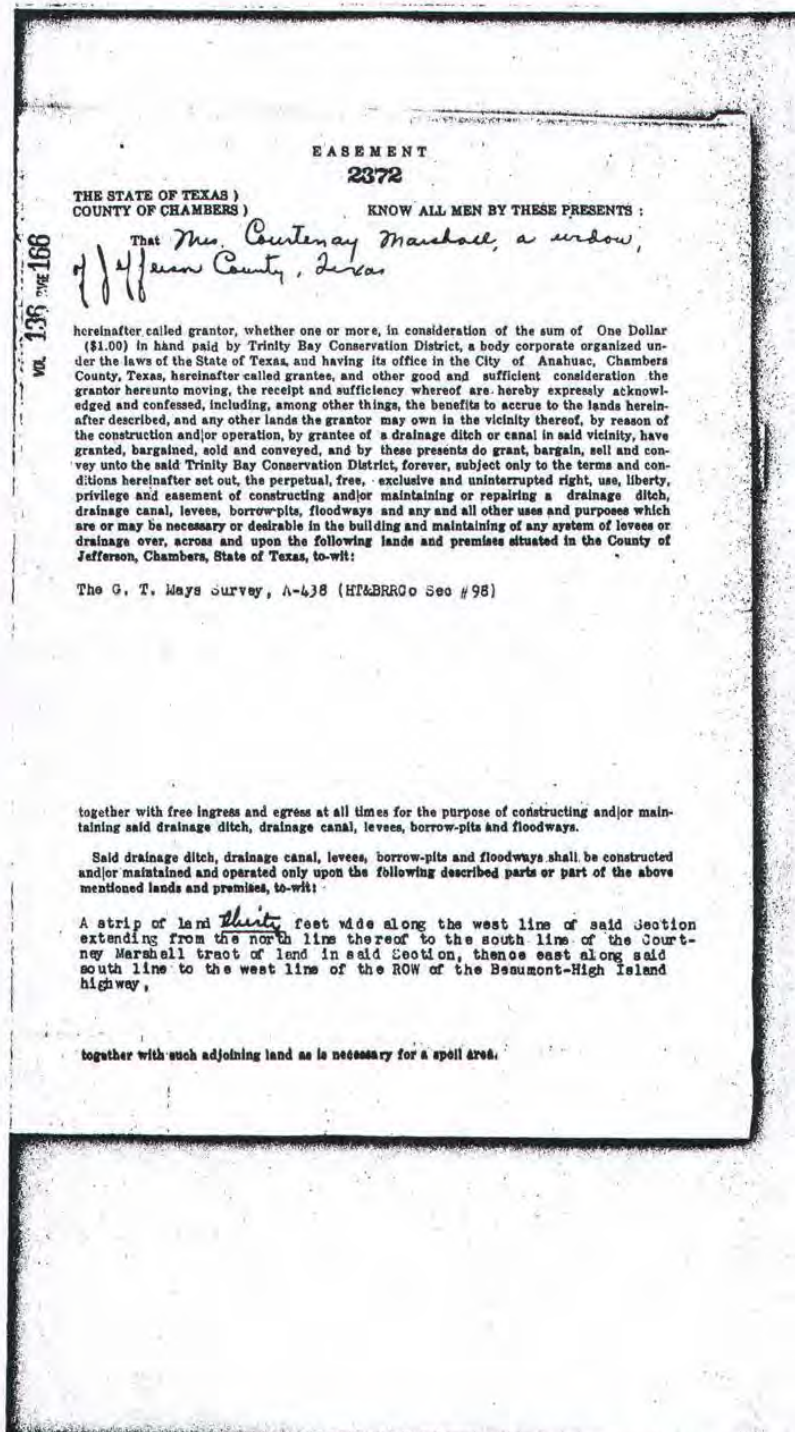
Jo. Arnett Notary Public in and
for Jefferson County, Texas.

Filed for Record the 14th day of March, A. D. 1938, at 8:00 o'clock, A.M.,
and duly Recorded the 14th day of March, A. D. 1938, at 2:00 o'clock, P.M.

(SEAL)

A. L. Scherer
COUNTY CLERK, CHAMBERS COUNTY, TEXAS.

Sec 98+99 are
E+W of Each other



EASEMENT
2372

THE STATE OF TEXAS)
COUNTY OF CHAMBERS)

KNOW ALL MEN BY THESE PRESENTS :

That Mrs. Courtenay Marshall, a widow,
of Jefferson County, Texas

hereinafter called grantor, whether one or more, in consideration of the sum of One Dollar (\$1.00) in hand paid by Trinity Bay Conservation District, a body corporate organized under the laws of the State of Texas, and having its office in the City of Anahuac, Chambers County, Texas, hereinafter called grantee, and other good and sufficient consideration the grantor hereunto moving, the receipt and sufficiency whereof are hereby expressly acknowledged and confessed, including, among other things, the benefits to accrue to the lands hereinafter described, and any other lands the grantor may own in the vicinity thereof, by reason of the construction and/or operation, by grantee of a drainage ditch or canal in said vicinity, have granted, bargained, sold and conveyed, and by these presents do grant, bargain, sell and convey unto the said Trinity Bay Conservation District, forever, subject only to the terms and conditions hereinafter set out, the perpetual, free, exclusive and uninterrupted right, use, liberty, privilege and easement of constructing and/or maintaining or repairing a drainage ditch, drainage canal, levees, borrow-pits, floodways and any and all other uses and purposes which are or may be necessary or desirable in the building and maintaining of any system of levees or drainage over, across and upon the following lands and premises situated in the County of Jefferson, Chambers, State of Texas, to-wit:

The G. T. Mays Survey, A-438 (H&BRRCo Sec #98)

together with free ingress and egress at all times for the purpose of constructing and/or maintaining said drainage ditch, drainage canal, levees, borrow-pits and floodways.

Said drainage ditch, drainage canal, levees, borrow-pits and floodways shall be constructed and/or maintained and operated only upon the following described parts or part of the above mentioned lands and premises, to-wit:

A strip of land thirty feet wide along the west line of said Section extending from the north line thereof to the south line of the Courtenay Marshall tract of land in said Section, thence east along said south line to the west line of the ROW of the Beaumont-High Island highway,

together with such adjoining land as is necessary for a spoil area.

See 399/406

136/166

To have and to hold unto the said Trinity Bay Conservation District, its successors and assigns, forever, all and singular the said right, use, liberty, privilege and easement, and right of ingress and egress, together with all appurtenances thereto, but upon and subject to the following terms and conditions:

This instrument conveys to the Grantee no right, title or interest in the oil, gas or other minerals lying in, under or pertaining to the above described lands and premises, and is subject to any valid and subsisting mineral lease or other conveyance of minerals, or right of way for pipeline, powerline, or other utility heretofore made by the Grantor or the Grantor's predecessors in title.

Vol. 135
Page 167

Executed on this 14th day of September, 1951.

Mrs. Courtney Marshall

THE STATE OF TEXAS)
COUNTY OF Jefferson)

Before me, the undersigned authority, on this day personally appeared _____

Mrs. Courtney Marshall, a widow

known to me to be the person— whose name— are is subscribed to the foregoing instrument, and acknowledged to me that She executed the same for the purposes and consideration therein expressed.

Given under my hand and seal of office, this the 14th day of Sept, A. D.



John A. Plunk

Notary Public in and for Jefferson
County, Texas.

THE STATE OF TEXAS
COUNTY OF CHAMBERS

KNOW ALL MEN BY THESE PRESENTS:

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That I, Edith A. Marshall, a widow, of Jefferson County, Texas, hereinafter called grantor, whether one or more, in consideration of the sum of One Dollar (\$1.00) in hand paid by Trinity Bay Conservation District, a body corporate organized under the laws of the State of Texas, and having its office in the City of Anahuac, Chambers County, Texas, hereinafter called grantee, and other good and sufficient consideration the grantor hereunto moving, the receipt and sufficiency whereof are hereby expressly acknowledged and confessed, including, among other things, the benefits to accrue to the lands hereinafter described, and any other lands the grantor may own in the vicinity thereof, by reason of the construction and/or operation, by grantee of a drainage ditch or canal in said vicinity, have granted, bargained, sold and conveyed, and by these presents do grant, bargain, sell and convey unto the said Trinity Bay Conservation District, forever, subject only to the terms and conditions hereinafter set out, the perpetual, free, exclusive and uninterrupted right, use, liberty, privilege and easement of constructing and/or maintaining or repairing a drainage ditch, drainage canal, levees, borrow pits, floodways and any and all other uses and purposes which are or may be necessary or desirable in the building and maintaining of any system of levees or drainage over, across and upon the following lands and premises situated in the County of Chambers, State of Texas, to-wit:

Yes

58

Vol. 151 Page 58

All those certain tracts or parcels of land owned by me, situated in Chambers County, Texas, abutting upon Spindletop Bayou, and being portions of Lots 4, 9, 6, 7 and 8 of the Stratford Subdivision of T&NO Rr. Co. Survey Sec. No. 80, Abstract 423, and portions of HT&B Rr. Co. Survey Sec. No. 98, Abstract 438, and portions of HT&B Rr. Co. Survey Sec. No. 99, Abstract 141;

together with free ingress and egress at all times for the purpose of constructing and/or maintaining said drainage ditch, drainage canal, levees, borrow-pits and floodways.

Said drainage ditch, drainage canal, levees, borrow-pits and floodways shall be constructed and/or maintained and operated only upon the following described parts or part of the above mentioned lands and premises, to-wit:

A strip of land not more than one hundred ninety (190) feet wide measuring from the present center line of the present channel of Spindletop Bayou, on both sides of said Bayou; said ditch to be constructed and excavated to have a bottom width of forty-six (46) feet with a thirteen (13) foot cut and a 2-to-1 slope; together with an adjoining one hundred forty (140) feet for berm, floodway and spoil area; said ditch to have as its center line the center line of the present channel of Spindletop Bayou, and to follow all the meanders of the center line of the present channel of Spindletop Bayou as reflected upon the attached map or plat, marked 'Exhibit 1' and initialed by grantor herein for identification.

And as a part of the consideration for this grant, grantee agrees that the spoil excavated from said ditch will be so placed as to form a continuous flood protection levee across grantor's lands.

To Have and To Hold unto the said Trinity Bay Conservation District, its successors and assigns, forever, all and singular the said right, use, liberty, privilege and easement, and right of ingress and egress, together with all appurtenances thereto, but upon and subject to the following terms and conditions:

This instrument conveys to the grantee only an easement or right-of-way, and grantee acquires hereunder no right, title or interest in the oil, gas or other minerals lying in, under or pertaining to the above described land and premises, and the grant herein is subject to any valid and subsisting mineral lease or other conveyance of minerals, or right-of-way for pipeline, powerline, or other utility heretofore made by the grantor or the grantor's predecessors in title, or that may be hereafter made, and to the use of said land and premises by grantor, her heirs and assigns, so long as such use does not interfere with or obstruct the easement and right-of-way herein granted.

And in consideration of the sum of \$ 4170⁰⁰ this day paid by grantee to grantor in cash, the receipt of which is hereby acknowledged, and other good and valuable considerations, grantor, for herself, her heirs and assigns, does hereby remise, release and forever discharge Trinity Bay Conservation District, its successors and assigns, and all of its agents and employees, of and from any and all claims, demands and liabilities to grantor, her heirs and assigns, except claims, demands and liabilities for damages to growing crops, that may occur on account of the drainage improvement work being done by the said District on Spindletop

1953

59

VOL 151 PAGE 59

Bayou; the intention hereof being to completely, absolutely and finally release Trinity Bay Conservation District, its successors and assigns, and its agents and employees, from all liability arising wholly or partially from the cause aforesaid, except such as may accrue by reason of damages to growing crops upon the lands of grantor.

Executed on this the 32^d day of June, A. D. 1953.

Edith A. Marshall
Edith A. Marshall

THE STATE OF TEXAS |
COUNTY OF JEFFERSON |

Before me, the undersigned authority, on this day personally appeared Edith A. Marshall, a widow, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that she executed the same for the purposes and consideration therein expressed.

Given under my hand and seal of office, this the 32^d day of



Nettie L. Plumb
Nettie L. Plumb
A Notary Public in and for
Jefferson County, Texas

PLAT ON FILE IN PLAT DRAWER # 1 IN CLERK'S OFFICE.

FILED for Record the 25 day of June A. D. 1953 at
9:00 o'clock A. M., and duly Recorded the 1 day of July
A.D. 1953, at 9:45 o'clock A. M.

J. B. WOOLDRIDGE, COUNTY CLERK
CHAMBERS COUNTY, TEXAS.

BY: Jeanne McLaughlin
DEPUTY

{SEAL}

GSU1148-11-85

GULF STATES UTILITIES COMPANY

3382

LVOL 292 PAGE 565

EASEMENT

State of Texas

County of Chambers

KNOW ALL MEN BY THESE PRESENTS:

THAT the Undersigned Chilton O'Brien, Independent Executor and Trustee for Edith Diane Brown, under the Will of Edith A. Marshall, Deceased

hereinafter called Grantor, for and in consideration of Ten Dollars and valuable consideration Dollars in hand paid by GULF STATES UTILITIES COMPANY, the receipt of which is hereby acknowledged, has granted, and by these presents does grant unto said GULF STATES UTILITIES COMPANY, hereinafter called Grantee, a corporation duly incorporated and existing under the laws of the State of Texas, the RIGHT, PRIVILEGE AND EASEMENT to enter upon and to construct, maintain, operate, inspect, patrol, replace, repair and remove a line of wood or metal structures for one or more circuits

composed of wood, metal or other type or types of material with lines of wires, crossarms, guy wires, stubs, foundations, anchors and other usual fixtures for the transmission of electricity and communications, said facilities to be erected simultaneously or at different future times, with the right to replace structures or fixtures composed of one type of material or materials with structures or fixtures of any other type of material or materials at any time and from time to time without

Further payment, upon, over and across that certain tract or parcel of land owned by Grantor, situated in the T.&N.O. & R.R. Co. D. L. Broussard Survey, in Chambers County, Texas, fully described in Vol. 8

Page 169, Deed Records of Chambers County, Texas to which reference is hereby made for description, said facilities to be located within the easement strip except that at angle points, if any, Grantee may place guy wires, stubs and anchors outside said easement strip in sufficient number so as to adequately brace its structures at any place where said easement strip makes an angle, which easement strip and continuations or projections thereof, insofar as same may be embraced within said tract, shall extend 25 ft. W. 6 ft. E. of the following described center line:

Centerline entering on the north line of the above referred to property, said point of entry being 2 feet west of said north property line's intersection with the west line of State Highway No. 124.

THENCE S 1° -24' E for a distance of 3,816 feet to an angle point;

THENCE S 4° -20' E for a distance of 300 feet to an angle point;

THENCE S 1° -24' E for a distance of 2,605 feet to an angle point;

THENCE S 7° -08' E for a distance of 30 feet to a point of exit on the west right of way line of State Highway No. 124, said point of exit being 251 feet north of property's southeast corner.

The above described centerline has an overall length of 6,751 lineal feet.

This line shall be of single pole construction with poles spaced no closer than 250 feet on centers except that if distribution service is required, intermediate poles may be installed for this purpose.

GRANTOR grants unto Grantee the right at any time, and from time to time (a) to trim, cut or remove all trees, underbrush and other obstructions located upon said easement strip, without further payment, and (b) to trim, cut or remove from the land outside of said easement strip any and all trees which in falling could come within ten feet of the electric lines of Grantee, upon payment of reasonable market value of such trees.

GRANTOR RETAINS the right to use for Grantor's own purposes the land covered by said easement as long as such use does not interfere with the easement and rights herein granted. However, Grantor shall not erect, locate or permit the erection or location of any structure or object of any type whatever within the easement strip described above, but Grantor may fence any or all of said property. Grantee shall have ingress and egress at any time to, from and along the land covered by this easement.

GRANTEE SHALL pay Grantor for damages to Grantor's buildings, other structures and trees where located outside said easement strip; and to Grantor's growing annual crops, roads, bridges and fences caused by the construction, operation and maintenance of said electric lines.

TO HAVE and to hold the above granted rights, easement and right-of-way unto the said Grantee, its successors and assigns, until the use of said easement by Grantee is commenced, and so long thereafter as the same shall be useful for the above named purposes.

GRANTOR hereby covenants with Grantee, that Grantor has title to said land, and has the right to grant the privileges herein contained.

ALL THE AGREEMENTS and stipulations herein contained, and all of the obligations herein assumed, shall inure to the benefit of and be binding upon the heirs, successors and assigns of the respective parties hereto. Whenever the word "Grantor" is used herein it shall be construed to include "Grantors".

WITNESS the signature of Grantor this 18th day of December A. D. 1967

Chilton O'Brien
Independent Executor and Trustee for
Edith Diane Brown, under the Will of
Edith A. Marshall, deceased

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SINGLE ACKNOWLEDGMENT

State of Texas

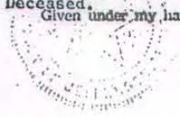
County of Jefferson

Before me, the undersigned authority in and for said State and County, on this day personally appeared

Chilton O'Brien

known to me to be the person whose name is subscribed to the above and foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein expressed, as the act and deed as Independent Executor and Trustee under the Will of Edith A. Marshall, Deceased.

Given under my hand and seal of office this 18th day of December A. D. 1967.



Walter L. Bland
Notary Public in and for Jefferson County, Texas

FILED for Record the 19 day of December, A. D. 1967 at 10:10 A. M.
RECORDED the 2nd day of January, A. D. 1968.

J. B. WOOLDRIDGE, COUNTY CLERK
CHAMBERS COUNTY, TEXAS

BY Donna M. Cullum DEPUTY

DEED RECORD

3513-B

VOL 349 PAGE 406

RIGHT-OF-WAY EASEMENT

THE STATE OF TEXAS §
COUNTY OF CHAMBERS § KNOW ALL MEN BY THESE PRESENTS:

That the undersigned, Chilton O'Brien, acting as Independent Executor and Trustee of the Will and Estate of Edith A. Marshall, Deceased, hereinafter called Grantor, for and in consideration of the sum of One Dollar (\$1.00) to him in hand paid by Trinity Bay Conservation District, with its office in the City of Anahuac, Chambers County, Texas, the receipt of which is hereby acknowledged, and the covenants and undertakings by the said District hereinafter contained, has this day granted and by these presents does grant, bargain and sell unto the Trinity Bay Conservation District, subject to the provisions, conditions and reservations hereinafter set out a perpetual easement, privilege and right-of-way for the purpose of constructing and maintaining a ditch across and upon the following lands and premises, situated in Chambers County, State of Texas, to wit:

All those certain tracts or parcels of land being further identified as Tracts 5, 6, 7, and 8 of Stratford's Subdivision of T. & N. O. Survey 80, Abstract No. 423, and Tract 13 out of H. & T. B. RR. Survey 98,

together with free ingress and egress at all times for the purpose of constructing, protecting, keeping up and maintaining such ditch.

The ditch shall be constructed and maintained only upon the following described part or parts of the above mentioned lands and premises, to wit:

Being a strip of land 20 feet in width off the West side of the above described property, beginning at the South bank of Spindletop Bayou where it intersects the West line of the Marshall Figridge Farm property, extending South parallel and adjacent to the West line of T. & N. O. RR. Survey 80, and H. & T. B. RR.

VOL 349 PAGE 407

Survey 98, to the Southwest corner of the said Marshall Figridge Farm properties;

Thence along the South line of said Farm properties and the South line of Tract 13 above referred to in H. & T. B. RR. Survey 98 to the existing field road.

Grantee agrees to place the soil from the said ditch upon the Eastern and Northern boundaries of the ditch on the adjoining land, and further agrees to install all necessary outfalls for field drainage into the ditch, and bridges over the said ditch as requested by Grantor.

TO HAVE AND TO HOLD the said easement, privilege and right-of-way, together with all and singular the rights and appurtenances thereto in anywise belonging, unto the said Trinity Bay Conservation District, and its successors and assigns, so long as the right-of-way is used for a ditch, and if the same should ever be abandoned for such purposes, then the above granted easement, privilege and right-of-way shall terminate and be of no further force or effect.

Executed this the 15th day of September, 1972.

Chilton O'Brien

VOL 349 PAGE 408

Chilton O'Brien
Independent Executor and Trustee of
the Will and Estate of Edith A. Marshall,
Deceased

THE STATE OF TEXAS §
COUNTY OF JEFFERSON §

Before me, the undersigned authority, on this day personally appeared Chilton O'Brien, Independent Executor and Trustee of the Will and Estate of Edith A. Marshall, Deceased, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same for the purposes and consideration therein expressed.



Given under my hand and seal of office this 15th day of
September, 1972.

Kathleen C. McMahon
Notary Public
Jefferson County, Texas

FILED FOR RECORD

This the 11 day of Sept

A. D. 19 73 at 10 O'clock A. M.

NORMA W. ROWLAND
County Clerk, Chambers County, Texas

Norma W. Rowland Deputy

STATE OF TEXAS
COUNTY OF CHAMBERS

I, NORMA W. ROWLAND, hereby certify that this instrument was filed on the date and at the time stamped hereon by me; and was duly RECORDED, in the Volume and Page of the named RECORDS of Chambers County, Texas, as stamped hereon by me, on SEP 18 1973



Norma W. Rowland
COUNTY CLERK
CHAMBERS COUNTY, TEXAS

Deed Record 349 Page 408

4647-B

RIGHT-OF-WAY EASEMENT

DEED RECORD

THE STATE OF TEXAS X
COUNTY OF CHAMBERS X

VOL 424 PAGE 635

KNOW ALL MEN BY THESE PRESENTS:

That for and in consideration of Ten and No/100 (\$10.00) Dollars to the undersigned (herein styled Grantor, whether one or more), paid the receipt of which is hereby acknowledged, the said Grantor, does hereby Grant and Convey unto UNITED TEXAS TRANSMISSION COMPANY (herein styled Grantee), its successors and assigns, a right-of-way and easement to construct, maintain, operate, repair, replace, change the size of and remove a pipe line and appurtenances thereto, over and through the following described land situated in Chambers County, State of Texas, to-wit:

825/35
OGML
Wrong v/p

A right-of-way and easement twenty-five (25) feet in width and containing 0.195 acres, more or less, out of the D. L. Brossard Survey, Abstract 423, located in Chambers County, Texas, and also out of a 52.47 acre tract conveyed by W. L. Pondrom to Courtenay Marshall by deed dated September 9, 1942, recorded in Volume 825, Page 35, of the Deed Records of Jefferson County, Texas; the centerline of said right-of-way and easement being: further defined as beginning one hundred (100) feet south of the intersection of the East right-of-way line of the C.G. & S.F. Railroad and the centerline of Spindletop Bayou and being twelve (12) feet East of a common line between C.G. & S.F. Railroad Company's East right-of-way line and the West property line of said 52.47 acre tract.

Thence in a Northerly direction twelve (12) feet East of and parallel to said property line a distance of three hundred forty (340) feet to a point marking the end of this description.

TO HAVE AND TO HOLD unto Grantee, its successors and assigns, so long as the rights and easements herein granted, or any of them, shall be used by, or useful to, Grantee for the purposes herein granted, with ingress to and egress from the premises, for the purposes of constructing, inspecting, repairing, maintaining, and replacing the property of Grantee herein described, and the removal of same at will, in whole or in part.

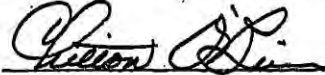
The said Grantor is to fully use and enjoy the said premises, except for the purposes herein granted to the said Grantee and provided the said Grantor shall not construct or maintain nor permit to be constructed or maintained any house, structures or obstructions, on or over, or that will interfere with the maintenance or operation of any pipe line or appurtenances constructed hereunder, and will not change the grade over such pipe line. Grantee hereby agrees to bury said pipe line to a depth of not less than thirty (30) inches below the surface of the soil and to pay any damages which may arise to growing crops, fences or timber from the construction, maintenance and operation of said pipe line. Said damages, if not mutually agreed upon, to be ascertained and determined by three disinterested

VOL 424 PAGE 636

persons one thereof to be appointed by the said Grantor, one by the said Grantee, and the third by the two so appointed as aforesaid, and the written award of such three persons shall be final and conclusive.

It is hereby understood that the party securing this grant in behalf of Grantee is without authority to make any covenant or agreement not herein expressed.

WITNESS THE EXECUTION hereof on this the 12th day of October, 1978.



Chilton O'Brien
Trustee for Diane Fertitta
Under the Will of Mrs. Edith
~~A. Marshall, Deceased~~

Deed Record 424 Page 636

THE STATE OF Texas

COUNTY OF Jefferson

VOL 424 PAGE 637

Before me, the undersigned authority, a Notary Public in and for said County and State,
on this day personally appeared Chilton O'Brien
known to me to be the person(s) whose name(s) he subscribed to the foregoing instrument,
and acknowledged to me that he executed the same for the purposes and consideration
therein expressed, and in the capacity therein stated.



Given under my hand and seal of office on this the 12th day of October, 19

Rowena Levy
Notary Public in and for
Jefferson County, Texas
Rowena Levy

THE STATE OF _____

COUNTY OF _____

Before me, the undersigned authority, a Notary Public in and for said County and State,
on this day personally appeared _____
known to me to be the person(s) whose name(s) _____ subscribed to the foregoing instrument,
and acknowledged to me that he executed the same for the purposes and consideration
therein expressed.

Given under my hand and seal of office on this the _____ day of _____, 19__

Notary Public in and for

County, Texas

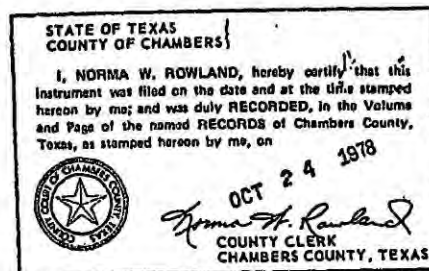
FILED FOR RECORD

This the 17 day of Oct.

A. D. 19 2012 at 2:20 o'clock P. M.

NORMA W. ROWLAND
County Clerk, Chambers County, Texas

By John King Deputy



SCHEDULE A

Commitment No. C-91078	Effective Date of Commitment: September 5, 1979 7 o'clock a.m.
GF No. or File No.	

1. Policies or Policy to be issued:

(a) ☒ Form T-1: Owner Policy of Title Insurance
Proposed Insured:
John Gregg Middleton

Amount: [REDACTED]

(b) ☐ Form T-2: Mortgagee Policy of Title Insurance
Proposed Insured:

Amount: _____

(c) ☐ Form T-11: Policy of Title Insurance (USA)
Proposed Insured:

Amount: _____

2. The estate or interest in the land described or referred to in this Commitment and covered herein: (Fee simple, leasehold, easement, etc. - - identify or describe) Fee Simple

3. Record Title thereto at the effective date hereof appears to be vested in: See Below:

4. The land referred to in the Commitment is described as follows:

Situated in Chambers and Jefferson Counties, Texas, being a part of T. & N. O. RR Co. Section No. 77, Abstract No. 249, Chambers County, Texas; T. & N. O. RR Co. Section No. 80, Abstract No. 423, Chambers County, Texas; H. T. & B. RR Co. Section No. 98, Abstract No. 438, Chambers County, Texas; H. T. & B. RR Co. Section No. 99, Abstract No. 141, Chambers County, Texas; T. & N. O. RR Co. Section No. 179, Abstract No. 628, Chambers County, Texas and Abstract No. 344 in Jefferson County, Texas, and T. & N. O. RR Co. Section No. 180, Abstract No. 609, Chambers County, Texas, and Abstract No. 677 in Jefferson County, Texas, and described under Thirty-eight (38) Tracts in Exhibit "A" attached hereto and made a part hereof.

OWNERSHIPS:

Chilton O'Brien, Trustee - Surface and 1/2 Minerals; Courtenay D. Marshall - 1/2 of the Minerals in and to Tracts Seven (7) to Twenty-seven (27), both inclusive, and Tract No. Thirty-eight (38)...

Chilton O'Brien, Trustee - Surface & 3/4 of Minerals; Courtenay D. Marshall - 1/4 Minerals in and to Tracts 36 and 37.

Edith Diane Brown Fertitta- Surface & 1/2 Minerals; Courtenay D. Marshall- 1/2 Minerals in and to Tracts One (1) to Six (6), both inclusive and Tracts Twenty-eight (28) to Thirty-five (35), both inclusive.

POLICY COMMITMENT NO. C-91078

SCHEDULE B

Schedule B of the policy or policies to be issued will also contain the following exclusions and exceptions:

The policy will be subject to the Conditions and Stipulations thereof, the terms and conditions of the instrument creating the estate insured, if any, shown in Schedule A, and to the following matters which will be additional exceptions from the coverage of the policy:

1. Restrictive covenants affecting the land described or referred to above, but in any mortgagee policy of title insurance, the Company will guarantee that any such restrictive covenants have not been violated so as to affect, and that a future violation thereof will not affect the validity or priority of the insured mortgage.
2. Any discrepancies, conflicts, or shortages in area or boundary lines, or any encroachments, or any overlapping of improvements.
3. Taxes for the year 19 79 and subsequent years.
4. Usury or claims of usury, (Mortgagee Policy only)
5. Any right of rescission contained in any CONSUMER CREDIT PROTECTION or TRUTH-IN-LENDING laws. (Mortgagee Policy only)
6. The following lien(s) and all terms, provisions and conditions of the instrument(s) creating or evidencing said lien(s):

No Liens of Record

Rights of parties in possession

See Continuation of Exceptions in EXHIBIT "B" attached hereto and made a part hereof.

Policy Commitment No: C-91078

SCHEDULE C

Schedule B of the policy to be issued will also contain exceptions with respect to the following matters supposed to affect title to the hereinabove described property unless the following matters are disposed of to the satisfaction of the Company at or prior to the date of the issuance of the policy:

1. Instrument(s) creating the estate or interest to be insured must be approved by the Company, executed and filed for record.
2. Satisfactory evidence that no person occupying the property or any portion thereof owns or claims any interest therein, either personally or by right of another, adverse to the present record owner as shown in Schedule A.
3. Payment of the full consideration to, or for the account of, the grantors or mortgagors.
4. Payment of all taxes, charges and assessments levied or assessed against the subject estate or interest, which are currently due and payable.
5. Satisfactory evidence that all improvements and/or repairs and/or alterations thereto are completed and that all contractors, subcontractors, laborers and materialmen have been paid in full.
6. Any defect, lien, encumbrance or other matter affecting or supposed to affect title to the estate or interest to be insured which may be filed or which may arise subsequent to the effective date hereof.
7. If a mortgagee policy of title insurance is to be issued, satisfactory evidence that restrictions and restrictive covenants, if any, have not been violated so as to affect, and that a future violation thereof will not affect the validity or priority of the insured mortgage.
8. Purchaser to sign "Waiver of Inspection" at closure.
9. Deed from Chilton O'Brien, Trustee to Edith Diane Brown Fertitta, dated October 28, 1976 must be recorded in Chambers and Jefferson Counties, Texas.

CHAMBERS COUNTY ABSTRACT CO., INC.

BY: 

5854 Rev 7-1-79

Page 4

STEWART TITLE
GUARANTY COMPANY

COMMITMENT FOR TITLE INSURANCE
ISSUED BY



STEWART TITLE
GUARANTY COMPANY

STEWART TITLE GUARANTY COMPANY, A Texas Corporation, herein called "the Company," hereby commits to issue its policy or policies of title insurance, as identified in Schedule A, in the form now promulgated by the State Board of Insurance, in favor of the proposed insured(s) named in Schedule A, as owner or mortgagee of the estate or interest described in Schedule A in the land described in Schedule A, upon payment of the premium and charges therefor, all subject to the provisions of Schedules A, B and C and to the Conditions and Stipulations hereof.

This commitment shall be effective only when the identity of the proposed insured(s) and the amount of the policy or policies committed for have been inserted in Schedule A hereof by the Company.

This commitment is solely preliminary to the issuance of such policy or policies of title insurance and the liability and obligation of the Company to the proposed insured shall be limited to the express terms of this commitment. All liability and obligations hereunder shall cease and terminate ninety (90) days after the effective date hereof, or when the the policy committed for shall issue, whichever occurs first, provided that the failure to issue such policy is not the fault of the Company.

In witness whereof, the Company has caused this commitment to be signed and sealed as of the effective date of commitment as shown in Schedule A, the commitment to become valid and binding only when countersigned by an authorized signatory.



STEWART TITLE
GUARANTY COMPANY

Carlos Morris

Chairman of the Board

Stewart Morris

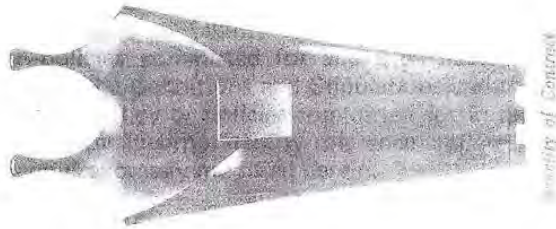
President

Countersigned:
CHAMBERS COUNTY ABSTRACT CO., INC.

By *Betty Simanton*
Authorized Signature

Serial No. C 91078

COMMITMENT
FOR
TITLE INSURANCE



Issued by
STEWART TITLE
GUARANTY COMPANY

EXHIBIT "A"

DESCRIPTION OF PROPERTY

5 - FIRST TRACT: Containing 21.0 acres of land, more or less, being all of Lot No. 23 of Brown's Fruit Ridge Subdivision, situated in the Northwest corner of Section No. 77 of the Texas & New Orleans Railroad Company, Abstract No. 249, and being the same land conveyed by E. L. Brown to Courtenay Marshall by warranty deed dated November 24, 1919, recorded in Volume 13 on page 130 of the Deed Records of Chambers County, Texas, and being further described in correction deed dated June 5, 1925, from Thomas Brown and wife Emma Brown to Courtnay Marshall, recorded in Volume 25 on page 136 of the said deed records; said land is also described in that certain quitclaim deed dated October 4, 1930, from E.L. Brown to Courtenay Marshall, recorded in Volume 32 on Page 507 of the Deed Records of Chambers County, Texas.

6 - SECOND TRACT: Containing 30.59 acres of land, more or less, being all of Lot No. 22, containing 30.39 acres, more or less, of Brown's Fruit Ridge Subdivision of said T&NO RR Co. Section No. 77, and a small tract containing 1/5 or 2/10 of an acre, more or less adjoining said Lot No. 22 on the North, being the same two tracts of land conveyed by Thomas Brown to James C. Carr by deeds dated April 24, 1908, and December 18, 1916, and being the same land conveyed by James C. Carr and wife Mary Carr to Courtenay Marshall, by warranty deed dated November 6, 1919, recorded in Volume 13 on page 129 of the Deed records of Chambers County, Texas.

8 - THIRD TRACT: Containing 18.73 acres of land, more or less, being all of Lots numbered 24, 25, 26 and 27 of Brown's Fruit Ridge Subdivision of said Section No. 77 of the Texas & New Orleans Railroad Company, Abstract No. 249, and being the same 18.73 acre tract of land conveyed by William C. Bailey and wife Theodocia Bailey to Courtenay Marshall by Warranty deed dated October 28, 1911, recorded in Volume 8, on page 172 of the Deed Records of Chambers County, Texas.

7 - FOURTH TRACT: Containing 5.25 acres of land, more or less, being the East 5.25 acres of Lot No. 20 of said Brown's Fruit Ridge Subdivision of Section No. 77 of the Texas & New Orleans Railroad Company Block, Abstract No. 249, and being the same tract of land conveyed by Thomas Brown and wife Emma Brown to Courtenay Marshall by deed dated November 17, 1916, recorded in Volume 8 on page 179 of the Deed Records of Chambers County, Texas.

9 - FIFTH TRACT: Containing 15.0 acres of land, more or less, being all of Lot No. 21 of said Brown's Fruit Ridge Subdivision of said Section No. 77, Texas & New Orleans Railroad Company Survey, Abstract No. 249, and being the same tract of land conveyed to Cromiel A. Carr by Thomas Brown by deed dated April 24, 1908, recorded in Volume W on page 59 of the Deed Records of Chambers County, Texas, and by Cromiell A. Carr to Courtenay Marshall, by warranty deed dated February 4, 1911, recorded in Volume 8 on page 168 of the Deed Records, of Chambers County, Texas.

1 - SIXTH TRACT: Containing 15.50 acres of land, more or less, being the West 15.5 acres of Lot No. 20 of Brown's Fruit Ridge Subdivision of Section No. 77, T. & N. O. RR. Co. Survey, Abstract No. 249, being the same tract of land conveyed by Thomas Brown to Courtenay Marshall, by Warranty deed dated February 3, 1909, recorded in Volume 8 on page 162 of the Deed Records of Chambers County, Texas.

12 - SEVENTH TRACT: Containing 30.45 acres of land, more or less, being all of Lots numbered 18 and 19 of Brown's Fruit Ridge Subdivision of said Section No. 77 of the Texas & New Orleans Railroad Company Survey, Abstract No. 249, and being the same tract of land conveyed by Thomas Brown to John H. Cooke, by deed dated November 11, 1908, recorded in Volume V on page 401 of the Deed Records of Chambers County, Texas, and conveyed by John H. Cooke to Courtenay Marshall by deed dated November 14, 1922, recorded in Volume 13 on page 239 of the deed records of said County and State.

5- EIGHTH TRACT: Containing 30.0 acres of land, more or less, being all of Lot No. 3 of said Brown's Fruit Ridge Subdivision of said Section No. 77, Texas & New Orleans Railroad Company Survey, Abstract No. 249, being the same tract of land conveyed by Thomas Brown to L.E. and H.S. Ezell by deed dated April 24, 1908, recorded in Volume U on page 611 of the deed records of said County and State, and by L.E. and H.S. Ezell to Courtenay Marshall by deed dated March 23, 1911, recorded in Volume 8 on page 169 of the Deed Records of Chambers County, Texas.

1- NINTH TRACT: Containing 15.0 acres of land, more or less, being all of Lot No. 4 of Brown's Fruit Ridge Subdivision of said Section No. 77, T. & N O R R Co. Survey, Abstract No. 249, being the same land conveyed by J. O. Griffin and wife Mrs. J. O. Griffin to Courtenay Marshall by warranty deed dated January 6, 1912, recorded in Volume 2 on page 210 of the Deed Records of Chambers County, Texas.

10- TENTH TRACT: Containing 15.0 acres of land, more or less, being all of Lot No. 5 of Brown's Fruit Ridge Subdivision of said Section No. 77, T&NO RR Co. Survey, Abstract No. 249, being the same land conveyed by Thomas Brown and wife Emma Brown to Courtenay Marshall by warranty deed dated January 27, 1916, recorded in Volume 8 on page 178 of the Deed Records of Chambers County, Texas.

13- ELEVENTH TRACT: Containing 46.96 acres of land, more or less, being all of Lots Numbered 15, 16, and 17 of Brown's Fruit Ridge Subdivision of said Section No. 77, T & N O RR Co Abstract No. 249, and a strip of land 25 feet in width along the East sides of Lots 15, 16, 17, 18, and 19 of said subdivision, being a portion of the same land conveyed by Thomas Brown to Courtenay Marshall by warranty deed dated October 30, 1909, recorded in Volume 8 on page 163 of the DeedRecords of Chambers County, Texas.

12- TWELFTH: Containing 15.21 acres of land, more or less, being all of Lot No. 14 of said Brown's Fruit Ridge Subdivision of said Section No. 77, Texas & New Orleans Railroad Company Survey, Abstract No. 249, and being the same tract of land conveyed by Thomas Brown to Courtenay Marshall by warranty deed dated March 29, 1912, recorded in Volume 8 on page 174 of the Deed Records of Chambers County, Texas.

23- THIRTEENTH: Containing 11.38 acres of land, more or less, being the same 11.38 acre tract situated in Section No. 80 of the T. & N O RR Co. Block known as the D.L. Broussard Survey, Abstract No. 423, as conveyed by that certain deed, dated August 6, 1925, from Home Building and Loan Company to Courtenay Marshall, recorded in Volume 20 on page 433 of the Deed Records of Chambers County, Texas.

28- FOURTEENTH: Containing 9.18 acres of land, more or less, being a part of said Section No. 80 of the T & N O RR Co. Block, Abstract No. 423, D.L. Broussard Survey, being the identical 9.18 acre tract described in that certain deed dated August 6, 1925, from Home Building and Loan Company to Courtenay Marshall.

14- FIFTEENTH: Containing 86/100 of an acre of land, more or less, lying just West of the Fourteenth tract described above, being the identical tract of land conveyed and described as 86/100 of an acre in deed dated November 26, 1919, from Home Building and Loan Company to Courtenay Marshall, recorded in Volume 16 on page 554 of the Deed Records of Chambers County, Texas, same being situated in Section No. 80, T & N O RR Co. Block, D. L. Broussard Survey, Abstract No. 423.

7- SIXTEENTH TRACT: Containing 37/100 of an acre of land, more or less, situated in Section No. 80, T&NO RR Co. Block, D.L. Broussard Survey, Abstract No. 423, lying at the Northwest corner of the Fifteenth tract described above, and known as the "Hotel Property," being the same land conveyed by E.L. Brown to Courtenay Marshall by deed dated August 30, 1917, recorded in Volume 13 on page 266 of the Deed Records of Chambers County, Texas.

SEVENTEENTH TRACT: Containing 17/100 of an acre (said to contain 1/5 of an acre), more or less, situated in Section No. 80, T & N O RR Co. Block, D. L. Broussard Survey, Abstract No. 423, being a tract of land 50 feet by 150 feet adjoining the Hotel Property on the South, and being the same land conveyed by Thomas Brown to Courtenay Marshall by deed dated August 30, 1917, recorded in Volume 8 on page 564 of the Deed Records of Chambers County, Texas.

EIGHTEENTH TRACT: Containing 4.30 acres of land more or less, being parts of Lots Numbered 86 and 87 of Brown's Fruit Ridge Subdivision of Section No. 80, T & N O RR Co. Block, D. L. Broussard Survey, Abstract No. 423, and being the same 4.30 acre tract conveyed by Thomas Brown and wife Emma Brown to Courtenay Marshall, by deed dated May 24, 1918, recorded in Volume 13 on page 267 of the Deed Records of Chambers County, Texas.

30- NINETEENTH TRACT: Containing 15 acres of land, more or less, situated in Section No. 80, T&NO RR Co. Block, D.L. Broussard Survey, Abstract No. 423, and being all of Lot No. 92 of Brown's Fruit Ridge Subdivision and a 5 acre tract lying to the West of said Lot No. 93, being the same 15 acre tract described in deed from Thomas Brown and wife to Courtenay Marshall dated June 21, 1926, recorded in Volume 25 on page 139 of the Deed Records of Chambers County, Texas.

26- TWENTIETH TRACT: Containing 15 acres of land, more or less, situated in Section No. 80, T & N O RR Co. Block, D. L. Broussard Survey, Abstract No. 423, being all of Lot No. 92 of Brown's Fruit Ridge Subdivision and a 5 acre tract adjoining said Lot No. 92 of the West, being a portion of the same land conveyed by Home Building and Loan Company to Courtenay Marshall by deed dated August 6, 1925, recorded in Volume 20 on page 433 of the Deed Records of Chambers County, Texas.

27- TWENTY-FIRST TRACT: Containing 10 acres of land, more or less, situated in Section No. 80, T & N R RR Co. Block, D. L. Broussard Survey, Abstract No. 423, being all of Lot No. 91 of Brown's Fruit Ridge Subdivision of said Section, being the same land conveyed by J. C. Eby and wife to Courtenay Marshall, by deed dated February 16, 1925, recorded in Volume 32 on page 502 of the Deed Records of Chambers County, Texas.

TWENTY-SECOND TRACT: Containing 5 acres of land, more or less situated in Section No. 80, T. & NO RR Co. Block, D. L. Broussard Survey, Abstract No. 423, being that certain 5 acre tract lying West of Lot No. 91 of Brown's Fruit Ridge Subdivision and adjacent thereto, as conveyed by H. H. Guy and wife to Courtenay Marshall by deed dated August 10, 1925, recorded in Volume 22 on page 8 of the Deed Records of Chambers County, Texas.

24- TWENTY-THIRD TRACT: Containing 10 acres of land, more or less, situated in Section No. 80, T & N O RR Co. Block, D. L. Broussard Survey, Abstract No. 423, being all of Lot No. 90 of said Brown's Fruit Ridge Subdivision, as described in deed from Thomas Brown to Courtenay Marshall dated August 30, 1917, recorded in Volume 8 on page 564 of the Deed Records of Chambers County, Texas.

23- TWENTY-FOURTH TRACT: Containing 10 acres of land, more or less, situated in Section No. 80, T. & NO RR Co. Block, D. L. Broussard Survey, Abstract No. 423, being all of Lot No. 89 of Brown's Fruit Ridge Subdivision of said Section as described in deed from G. H. Shepherd et al to Courtenay Marshall dated September 28, 1931, recorded in Volume 34 on page 35 of the Deed Records of Chambers County, Texas.

21- TWENTY-FIFTH TRACT: Containing 10 acres, all of Lot No. 88 of Brown's Fruit Ridge Subdivision in Section No. 80, T. & N. O. RR Co. Block, D. L. Broussard Survey, Abstract No. 423, and being described in deed from J.S. Gordon to Courtenay Marshall, dated September 24, 1931, recorded in Volume 33 on page 419 of the Deed Records of Chambers County, Texas.

20- TWENTY-SIXTH TRACT: Out of the Western portion of Lots 5 and 6 of Stratford's Subdivision of Section No. 80, T & N O RR Co. Block, D. L. Broussard Survey, Abstract No. 423, being all of that certain 99.907 acre tract conveyed by J. S. Gordon to Courtenay Marshall by deed dated September 24, 1931, recorded in Volume 33 on page 419 of the Deed Records of Chambers County, Texas.

18-24- TWENTY-SEVENTH TRACT: Containing 315 acres of land more or less, situated in Section No. 80, T & N O CO Block, D. L. Broussard Survey, Abstract No. 423, and Section No. 98, HT&B RR Co. Block, G. J. Mayes Survey, Abstract No. 438, being all of Lots Numbered 7, 8, 13 and a strip of land 29.8 feet in width off the North end of Lot No. 14 of Stratford's Subdivision of said Sections, according to the official map or plat thereof, recorded in Volume J on page 294 of the Deed Records of Chambers County, Texas, an undivided 1/2 interest in said 315 acre tract was acquired by Courtenay Marshall on August 5, 1925, by deed from P. F. Campbell, recorded in Volume 20 on page 185 of the Deed Records of Chambers County, Texas, and the other undivided 1/2 interest in said 315 acre tract was acquired by Courtenay Marshall on August 18, 1925, from Jessie Myers Harp and husband R.W. Harp;

Kate M. Stith and husband, R. W. Stith, Allan O. Myers, W. D. Myers, Jr., and H. H. Myers by deed recorded in Volume 20 on page 187 of the Deed Records of Chambers County, Texas.

40 - TWENTY-EIGHTH TRACT: Containing 42.39 acres of land, more or less, (called 42.46 acres, more or less), situated in Section No. 179, Texas & New Orleans Railroad Company Survey, Abstract No. 628, being all of Lots numbered 10, 11, 12 and 13 of Brown's Fruit Ridge Subdivision of said Section, and described in deed from Thomas Brown to Courtenay Marshall dated December 5, 1910, recorded in Volume 8 on page 167 of the Deed Records of Chambers County, Texas.

41 - TWENTY-NINTH TRACT: Containing 20.73 acres of land more or less situated in Section No. 179, T & N O RR Co. Survey, Abstract No. 628, being all of Lots numbered 34 and 35 of Brown's Fruit Ridge Subdivision of said Section, and being the same land conveyed by Thomas Brown to Courtenay Marshall by deed dated February 15, 1909, recorded in Volume 8 on page 164 of the Deed Records of Chambers County, Texas.

42 - THIRTIETH TRACT: Containing 30 acres of land, more or less, situated in Section No. 179, T & N O RR Co. Survey, Abstract No. 628, being all of Lots numbered 36, 37, and 38 of Brown's Fruit Ridge Subdivision of said section, being the same land conveyed by W.W. Kendrick and wife to Courtenay Marshall by deed dated May 14, 1910, recorded in Volume 8 on page 166 of the Deed Records of Chambers County, Texas.

44 - THIRTY-FIRST TRACT: Containing 79 acres of land, more or less, situated in Section No. 179, T & N O RR Co. Survey, Abstract No. 628, being all of Lot No. 39 of Brown's Fruit Ridge Subdivision of said section, being the same 79 acre tract of land conveyed by Thomas Brown to Courtenay Marshall by deed dated October 30, 1909, recorded in Volume 8 on page 163 of the Deed Records of Chambers County, Texas.

45 - THIRTY-SECOND TRACT: Containing 1.11 acres of land, more or less, situated in Section No. 179, T & N O RR Co Survey, Abstract No. 628, being a strip of land 25 feet in width by 1943 feet in length adjacent to the East line of said Lot No. 39 of Brown's Fruit Ridge Subdivision in Chambers County, Texas, and being the same land conveyed by Thomas Brown to Courtenay Marshall by deed dated August 31, 1917, recorded in Volume 8 on page 565 of the Deed Records of Chambers County, Texas.

43 - THIRTY-THIRD TRACT: Containing 78 acres of land, more or less, situated entirely in Jefferson County, Texas, being a part of Section No. 179, T & N O RR Co. Survey, Abstract No. 628, being all of Lots Numbered 40, 41, 42, 43, 49, and 50 of Brown's Fruit Ridge Subdivision of said Section, being the same 78 acre tract conveyed by Charles Brown to Courtenay Marshall by deed dated May 26, 1925, recorded in Volume 260 on page 498 of the Deed Records of Jefferson County, Texas.

39 - THIRTY-FOURTH TRACT: Containing 6.56 acres of land, more or less, situated entirely in Jefferson County, Texas, being out of the Southwest corner of Lot #48 of Brown's Fruit Ridge Subdivision of Section No. 179, T & N O RR Co. Survey, Chambers County, Abstract No. 628, and being the same 6.56 acre tract conveyed by W. L. Pondrom, Independent Executor and Trustee of the Estate of John H. Jackson, Deceased to Courtenay Marshall dated August 21, 1935, recorded in Volume 46 on page 534 of the Deed Records of Chambers County, Texas.

47 - THIRTY-FIFTH TRACT: Containing 87.12 acres of land, more or less, situated in Chambers and Jefferson Counties, Texas, being a portion of Section No. 180, Texas & New Orleans Railroad Company Block, James A. Dunshie Survey, Chambers County Abstract No. 609, there being 41.12 acres in Chambers County, Texas, and 46 acres in Jefferson County, Texas, being the same 87.12 acre tract conveyed by W. L. Pondrom, Independent Executor and Trustee of the Estate of John H. Jackson, deceased, to Courtenay Marshall by deed dated August 21, 1935, recorded in Volume 46 on page 534, Deed Records of Chambers County, Texas.

THIRTY-SIXTH TRACT: Deed from W. L. Pondrom, Independent Executor and Trustee under the will of John H. Jackson, deceased, to Courtenay Marshall, dated September 28, 1942, and recorded in Volume 76, page 35, of the Deed Records of Chambers County, Texas, conveying the following tracts of land.

FIRST TRACT: 52.47 acres situated in Chambers County, Texas on the waters of Spindle Top Creek, being out of and a part of H. T. & B. Railroad Section Number 98, Abstract Number 438, and T. & N. O. Railroad Section Number 80, Abstract Number 423, and more particularly described as that part of Lots 4 and 9 of Stratford's Subdivision which lies north and east from the center line of Spindle Top Creek. Save and Except 5 acres out of the Northwest corner of Lot #4 conveyed by Henry W. Lubben to Anna W. Reading, et al by Deed dated July 5, 1901, and recorded in Volume "M" page 369 of the Deed Records of Chambers County, Texas.

36 - SECOND TRACT: 36.5 acres of land out of T. & N. O. Railroad Section Number 80, Abstract Number 423, being all of Lot Number 3 of Stratford's Subdivision. Save and except 15 acres off the West side thereof, as conveyed by C. C. Roberts to Houston Oil Company of Texas, by Deed dated April 19, 1923, of record in Volume 17 page 209 of the Deed Records of Chambers County, Texas.

7 - THIRD TRACT: 12 acres of land out of said T & N O Railroad Section Number 80 and lying adjacent to and immediately north of Tract Number Two above described, this 12 acres being further described by metes and bounds as follows:

Beginning at the northeast corner of the second tract above described, same being the northeast corner of Lot Number 3 of Stratford's Subdivision;

Thence north along the east line of Lot Number 2 of Stratford's Subdivision, a distance of 686.7 feet to corner; thence west 774.6 feet to corner; thence south 686.7 feet more or less to north line of Lot Number 3; thence east 749.6 feet following the north line of Lot Number 3 to place of beginning.

38 - FOURTH TRACT: 155.60 acres in Chambers County, Texas being out of and a part of H. T. & B. Railroad Section Number 99, Abstract Number 141 and being that portion of said section which lies north of the center line of Spindle Top Creek.

15 - FIFTH TRACT: 114 acres more or less out of T. & N. O. Railroad Section Number 77 in Chambers County, Texas, being lots 7,8,9,10,11,12, & 13 of the Brown's Fruit Ridge Subdivision. Save & except 3.99 acres out of the Northeast corner of Lot. #13.

7 - THIRTY-SEVENTH TRACT: Deed from W. L. Pondrom, Independent Executor and Trustee under the will of John H. Jackson, to Courtenay Marshall, dated November 18, 1942, recorded in Volume 79, page 408, of the Deed Records of Chambers County, Texas, conveying a tract of 41.86 acres out of T & N O Railroad Company Survey No. 80, being all of Lots 4 and 9 of the Stratford Subdivision lying South of the center line of Spindletop Creek.

4 - THIRTY-EIGHTH TRACT: Deed from W. L. Pondrom, Independent Executor and Trustee under the will of John H. Jackson, deceased, to Courtenay Marshall, dated August 21, 1935, and recorded in Volume 46, page 534, Deed Records of Chambers County, Texas, conveying the East 3.99 acres of Lot 13 of Brown's Fruit Ridge Subdivision of T & N O RR Co. Survey No. 77.

EXHIBIT "B"

216
Right of Way from Chas. M. Lowe, to G. & I. Ry. Company, dated January 11, 1899, of record in Volume "J" page 634 of the Deed Records of Chambers County, Texas, over and across H. & B. RR Company Section #98 and T. & N. O. RR Company Section No. 80.

Right of Way Deed, dated July 14, 1920, of record in Volume 14 page 132 of the Deed Records of Chambers County, Texas, from Thomas Brown to Chambers County.

Right of Way Deed, dated July 14, 1923, of record in Volume 14 page 132 of the Deed Records of Chambers County, Texas, from Thomas Brown to Chambers County.

Right of Way Deed, dated September 30, 1930, of record in Volume 32 page 485 of the Deed Records of Chambers County, Texas, from Courtenay Marshall to Chambers County.

Right of Way Deed, dated October 14, 1930, of record in Volume 32 page 486 of the Deed Records of Chambers County, Texas, from A. E. Shepherd, et al to Chambers County.

Right of Way Deed, dated January 6, 1931, of record in Volume 32, page 491 of the Deed Records of Chambers County, Texas, from J. S. Gordon to Chambers County.

217
Easement, dated July 10, 1931, of record in Volume 33 page 568 of the Deed Records of Chambers County, Texas, from G. H. Shepherd, et al to Gulf States Utilities Co.

218
Easement, dated November 23, 1937, of record in Volume 61 page 73 of the Deed Records of Chambers County, Texas, from W. L. Pondrom, Independent Executor of the Estate of John H. Jackson, Deceased, to Sun Oil Company.

219
Right of Way, dated December 1, 1939, of record in Volume 66 page 422 of the Deed Records of Chambers County, Texas, from W. L. Pondrom, Independent Executor of the Estate of John H. Jackson, Deceased, to State of Texas. 551

220
Easement, dated June 3, 1946, of record in Volume 99 page 488 of the Deed Records of Chambers County, Texas, from Mrs. Courtenay Marshall to Gulf States Utilities Co.

221
Easement, dated June 3, 1953, of record in Volume 151 page 57 of the Deed Records of Chambers County, Texas, from Edith A. Marshall to Trinity Bay Conservation District.

222
Easement, dated December 18, 1967, of record in Volume 292 page 565 of the Deed Records of Chambers County, Texas, from Chilton O'Brien, Independent Executor and Trustee to Gulf States Utilities Company.

223
Easement, dated September 15, 1972, of record in Volume 349 page 406 of the Deed Records of Chambers County, Texas, from Chilton O'Brien, Independent Executor and Trustee to Trinity Bay Conservation District.

Subject to the rights of third parties, if any, in and to the use of any roads shown on the Subdivision Plats of record, and any roadways, whether private or public, which cross or traverse any of the tracts covered hereby whether recorded or un-recorded. BROWN'S FRUIT RIDGE SUBDIV.

Subject to the rights of third parties, if any, for use, as drainage purpose, of Spindletop Bayou.

Subject to the terms and conditions of the Water Permits issued by the State of Texas as follows: (1) To O. H. Acom, dated January 22, 1923, of record in Volume 16 page 384, of the Deed Records of Chambers County, Texas, and (2) to Mrs. Courtenay Marshall, dated October 30, 1969, of record in Volume 310 page 467 of the Deed Records of Chambers County, Texas.

1/16th Royalty Interest in and to Tract No. 24 described herein, being Lot No. 89, of Thos. Brown's Fruit Ridge Subdivision of T. & N. O. RR Co. Section No. 80, as reserved by A. E. Shepherd, G. H. Shepherd and W. A. Myrick, Jr. in their deed to Courtenay Marshall, dated September, 1931, of record in Volume 34 page 35 of the Deed Records of Chambers County, Texas.

1/16th Royalty Interest in and to Tract No. 25 described herein, being Lot No. 88, of the Brown's Fruit Ridge Subdivision of T. & N. O. RR Co. Section No. 80, as reserved in deed from J. S. Gordon to Courtenay Marshall, dated September 24, 1931, of record in Volume 33 page 419 of the Deed Records of Chambers County, Texas.

1/16th Royalty Interest in and to Tract No. 26 described herein, being 99.907 Acres out of Lots 5 & 6 of the Stratford Subdivision of T. & N. O. RR Co., Section No. 80, as reserved by J. S. Gordon in his deed to Courtenay Marshall, dated Sept. 24, 1931, of record in Volume 33 page 419 of the Deed Records of Chambers County, Texas.

1/16th Royalty Interest in and to Tract No. 35 described herein, being 87.12 acres out of T. & N. O. RR Company Section No. 180, as reserved by W. L. Pondrom, as Independent Executor and Trustee of the Estate of John H. Jackson, Deceased, to Courtenay Marshall, in his deed dated August 21, 1935, of record in Volume 46 page 534 of the Deed Records of Chambers County, Texas.

All of the Oil, Gas and other Minerals for a period of 10 years with provisions for extension thereof in event of successful mineral development, also a 1/16th perpetual Royalty interest as reserved by W. L. Pondrom, Independent Executor & Trustee under the Will of John H. Jackson, in his deed to Courtenay Marshall, dated September 28, 1942, of record in Volume 76 page 35 of the Deed Records of Chambers County, Texas, in and to the Five Tracts described as Tract 36 herein.

All of the Oil, Gas and other Minerals for a period of 10 years with provisions for extension thereof in event of successful mineral development, also a 1/16th perpetual Royalty interest as reserved by W. L. Pondrom, Independent Executor and Trustee under the Will of John H. Jackson, in his deed to Courtenay Marshall dated November 18, 1942, of record in Volume 79 page 408 of the Deed Records of Chambers County, Texas in and to the 37th Tract described herein.

1/16th Royalty interest as reserved in Deed from W. L. Pondrom, Independent Executor and Trustee under the Will of John H. Jackson, Deceased, to Courtenay Marshall, dated August 21, 1935, of record in Volume 46 page 534 of the Deed Records of Chambers County, Texas, in and to the East 3.99 acres of Lot 13 of the Brown's Fruit Ridge Subdivision as described therein.

1/2 of the Oil, Gas & Other Minerals as reserved by Courtenay D. Marshall in his deed to Mrs. Edith Marshall, dated May 28, 1945, of record in Volume 96 page 180 of the Deed Records of Chambers County, as to 34 tracts described therein.

1/4 of the Oil, Gas & Other Minerals, as reserved by Courtenay D. Marshall in his deed to Mrs. Edith Marshall, dated May 28, 1945, of record in Volume 96 page 190, of the Deed Records of Chambers County, Texas, as to the five tracts described under Thirty-Six and the one tract described as Thirty-Seventh tract herein.

Undivided 1/2 of all the Oil, Gas and other Minerals as reserved in deed from Courtenay D. Marshall to Mrs. Edith Marshall, as recorded in Volume 596 page 354 of the Deed Records of Jefferson County, Texas.

Subject to Oil, Gas & Mineral Lease, dated April 1, 1978, recorded in Volume 415 page 372 of the Deed Records of Chambers County, Texas, and in Volume 2070 page 21 of the Deed Records of Jefferson County, Texas, from Chilton O'Brien, Independent Executor and Trustee under the Will of Mrs. Edith Axline Marshall, Deceased, Courtenay D. Marshall and Diane Fertitta to T. L. Healey, for a Primary Term of 3 years.

APPENDIX J – HYDROLOGIC DESIGN MEMORANDUM

Sea Breeze Wetland Mitigation Bank Hydrologic Design Memorandum



Prepared for:

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2/16/2017

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Executive Summary

This report summarizes the hydraulic and hydrologic basis of design (BOD) analyses performed by HydroGeo Designs LLC. (HGD), in support of a proposed wetland mitigation bank (Sea Breeze) approximately 4.5 miles south of Winnie, TX on the south side of Spindletop Bayou near the crossing of Highway 124. The wetland areas, approximately 231 acres on the west side of the highway and 40 acres on the east side, will be restored with hydrologic function by increasing floodplain connectivity from Spindletop Bayou with a series of two (2) levee window breach zones on the west side of the highway and full levee removal/lowering on the east side of the highway. Topographic grading and revegetation elements will also provide ecological lift to the restored wetland areas. An outer berm area, also known as a setback levee, will be constructed around the project site to ensure that flood protection that is equivalent to or better than the existing conditions will be present after project implementation.

The results of this hydrologic analysis indicate that the wetland areas will be flooded by Spindletop Bayou a minimum of 2.84 out of 5 years (1.76 year recurrence interval) and the areas will flood on average a duration of 2.62 days per year. The outer berm of the project area will be elevated to a minimum elevation of 16.5 FT NAVD 88, this is 0.3 FT higher than the highest flood stage recorded at the gage in the 14 years of record dating back to 2002. This berm will raise the existing ground around the perimeter from 0.5 to 2 FT depending on existing ground elevations.

1.0 Introduction

1.1 Project Name and Purpose

This report summarizes the hydrologic basis of design (BOD) analyses performed by HydroGeo Designs LLC. (HGD), in support of the Sea Breeze Wetland Mitigation Bank located on Spindletop Bayou approximately 4.5 miles south of Winnie, TX in Chambers county (**Figure 1**). The purpose of the project is to restore wetland function to areas south of Spindletop Bayou with improvement in floodplain connectivity (levee breaches), topographic grading and revegetation.

1.2 Project Limits/Site Location

The project limits are shown in **Figure 1** the project will begin on the south bank of Spindletop Bayou and extend along the property boundaries to the east, west and south. Highway 124 will divide the project into east and west side areas. The site latitude is 29°; 45': 13.20" and longitude is 94°; 22': 35.69".

1.3 Project Objectives

The objectives of the project are:

- Provide improved floodplain connectivity from Spindletop Bayou to the wetland areas to the south via levee breaches.
- Maintain or improve the existing level of flood protection at the site with a flood retention berm built around the wetland areas.

- Provide macrotopography to wetland areas to improve ecologic function and habitat value.
- Incorporate re-vegetation measures that will provide herbaceous wetland plant communities to the site.
- Minimize erosion risk with riprap protection at the levee breach sites and gentle slope grading on all project features.
- Allow continued access for the Trinity Bay Conservation District to maintain their existing easements.

1.4 Project Constraints

The project is divided into east and west areas by highway 124. The area on the east side of highway 124 is heavily wooded which will make it difficult to access some locations with equipment.

1.5 Prior Studies

There have been no prior studies off this site.

2.0 Existing Site Conditions

2.1 Topography

The project site is located in the coastal plain areas draining to the marsh areas on the coast of the Gulf of Mexico. The current topography is relatively flat with the only notable elevation changes occurring along the spoil pile levees on the banks of Spindletop Bayou. The bayou has a low gradient at the site of 0.022% with subtle meanders. FEMA Lidar data from 2006 was utilized to generate cross sections of the project area. This data set is in NAVD 88 vertical datum and has been shown to be accurate in the project area (personal communication with Jefferson County drainage district 6).

2.1.2 Soils

The soils on the property are composed of two major units identified from the SSURGO GIS database (USDA 1976).

1. **Beaumont Clay:** These soils are located along the channel margins for approximately a 300 foot width buffer, they also comprised most of the area of interest on the east side of Highway 124. These are Vertisol soils of the Aquerts sub-order. They have a high hydric rating and are typically poorly drained. They have a low erosion potential.
2. **Morely Silt Loam:** These soils are located on the central eastern portion of the area of interest on the west side of Highway 124. These soils are Mollisols of the Udolls sub-order. They have a high hydric rating and are classified as somewhat poorly drained. They have a potentially high erodibility rating, however they will not be subject to hydraulic stress since the water will be ponded in that location.

2.2 Land Use

The upstream land use on Spindletop Bayou is primarily agricultural and rural. Drainage from the west side of Winnie and the town of Stowell also contribute to the flow. The upstream tributaries are ditched

in many locations. There are some isolated oil well pad sites in the upstream watershed. These upstream watershed conditions may lead to increases flows in this area of Spindletop Bayou compared to historic conditions. This can be primarily attributed to the increased hydraulic efficiency of the ditched system.

2.3 Right of Way

The project is located on Spindletop Bayou. The Trinity Bay Conservation District (TBCD) has a drainage easement along the bayou and also has drainage easements abutting the west and south boundaries of the site. TBCD has indicated their willingness to allow the modification of the spoil material along the bayou provided such modifications do not preclude the ability to travel along the bayou for monitoring and maintenance of their easement.

A highline right of way abuts the east boundary of the project site along State Highway 124.

2.4 Pipelines and Utilities

All pipelines and utilities will be located surveyed and flagged prior to project construction.

3.0 Proposed Project Plans

3.1 Description

The proposed wetland restoration design consists of the following elements:

- 2 levee breach locations that are approximately 125 feet across in width
- Degrading the levee on the east tract
- Shallow depressions for macro-topography
- Herbaceous plantings for re-vegetation and habitat
- Flood retention berm on the outer perimeter to prevent flooding from the newly restored floodplain wetland areas
- Riprap protection at the transition sill areas for the levee breaches

The proposed design drawings are available in **Appendix C** of this submittal.

4.0 Hydrology and Hydraulics Methods and Results

4.1 Analysis Objectives

The goals of the hydrology and hydraulics analysis (H and H) are to determine as follows:

- Determine the optimal elevation for the levee breaches at the site.
- Determine the frequency and duration of floodwater connectivity to the re-established wetland areas.
- Demonstrate flood protection no rise conditions post project for flood flow events

4.2 Hydrology Methods and Results

Detailed stream gaging data was available from the Jefferson County Drainage District #6. A rainfall and stream gage is located at the Highway 124 crossing of Spindletop Bayou (sensor ID 4600). The gaging data was available from 2002-2016, fifteen years of record. The rainfall data was recorded on a daily schedule and the stream gaging data was recorded at three hour intervals. The stream gaging data is on the NGVD29 vertical datum. This datum was rectified to the NAVD 88 datum that the FEMA Lidar Data is on using the VERTCON program provided by the National Geodetic Survey (NGS). The vertical shift was extremely small at this location +0.003 FT.

The rainfall and stream gage data time series were analyzed to determine the frequency and duration of rainfall patterns and corresponding flow elevations. The rainfall data is summarized in **Table 1** and **Figure 2**. The average annual rainfall at the site is 49.94 inches. The maximum annual rainfall of 78.39 inches occurred in 2016 and the minimum of 27.05 inches occurred in 2011.

A Weibull method annual maximum time series analysis was conducted for the stream gaging data to determine the annual recurrence interval of flood events and the corresponding stage. The results of this analysis are presented in **Table 2** and **Figure 3**. The target goal for floodplain connectivity at the site was to have the upstream levee breach and downstream wetlands inundated every three out of five years to meet IHGM criteria. This would correspond to an annual recurrence interval of 1.67 years. *The upstream levee breach will be set to an elevation of 13.8 FT NAVD 88. The design flow elevation at the upstream levee breach is 14.2 FT NAVD 88, this elevation was utilized to provide 0.4 feet of flow depth over the weir crest to simulate a full wetland inundation scenario.* Utilizing the hydraulic gradient of 0.022% for reach average conditions on Spindletop Bayou and the distance upstream of 4250 FT from the Highway 124 gage location the corresponding gage height at the bridge is $(14.2 \text{ FT} - (0.00022 \text{ FT/FT} \times 4250 \text{ FT})) = 13.26 \text{ FT}$. This corresponds to a Weibull annual maximum series recurrence interval of 1.76 YR (full wetland flow inundation 2.84 out of 5 years). **Event based analysis indicates that the this flow stage was reached in 9 out of the 15 years of gage data record or every 3 out of 5 years (Table 3).** The levee breach elevation is 0.4 feet below the design flow elevation, therefore the upstream levee breach will begin to receive flow from Spindletop Bayou at a gage elevation of 12.86 FT. This is equivalent to a 1.73 year annual max series recurrence interval event (2.89 out of 5 years). This is the best achievable outcome given the topographic constraints at the upstream levee site and restrictions on raising current flood levels in Spindletop Bayou. The levee breach elevation at the upstream extent of the site will be set to 13.80 FT NAVD 88 as shown in the project plans (**Appendix C**) to accomplish this level of floodplain connectivity at the site. A 13.80 FT upstream levee breach would correspond to an annual recurrence interval of approximately 1.76 years. The downstream levee breach will be set to an elevation of 14.1 FT to retain water in the wetland site. This will ensure that a water volume of 151 acre-ft will be retained on the restoration site.

We also performed a flow duration analysis of the stream gaging data to determine the number of days per year each flow elevation will be exceeded. The flow elevations in Spindletop Bayou ranged from 1.14 – 16.21 FT NAVD 88 over the gaging period of record from 11 November 2002 to 31 December 2016. A flow bin size of 0.5 FT was selected and a histogram analysis of the data was performed to determine the number of occurrences for each flow bin elevation. The results are presented in **Figure 4**

and **Table 4**. Results indicate that the wetland areas with a levee breach elevation of 13.8 FT NAVD88 with a water elevation of 14.2 FT NAVD88 will be inundated for a duration of 2.62 days per year at the gage station when accounting for the hydraulic grade line through the reach. This data was utilized to calculate the necessary levee breach width required to generate a storage volume 72.41 acre-ft detailed in Section 4.3.2.

4.3 Hydraulics Methods and Results

4.3.1 Channel Hydraulics

Cross section data extracted from the FEMA lidar data couple with RiverMorph software and fundamental hydraulic design equations to investigate the channel and levee breach area hydraulics for the proposed project. A typical channel cross section on Spindletop Bayou at Section B (**Figure 1**) was extracted from the Lidar elevation data. This section was modeled in RiverMorph software using velocity area methods to determine the typical channel hydraulics that will result in flood flow through the levee breaches at an elevation of 13.8 FT. The longitudinal slope of 0.00022 ft/ft, (0.022%) was also determined from the Lidar data. Summary results of this analysis are presented in **Table 5**. The results indicate that the channel will flood into the wetland areas at a discharge of 2251 (ft³/s) and the main channel velocity will be 1.76 ft/s. This is a relatively low velocity and will not result in erosion or channel avulsion issues at the site.

4.3.2 Levee Breach Hydraulics and Erosion Rock Sizing

A. Levee Breach Sizing and Hydraulics

Hypothetical flood flow situations for the levee breach areas were examined using basic hydraulic principles. The two scenarios examined were:

1. **High Flow Scenario:** Flood flow stage of 16.2 FT NAVD 88 with 0.4 FT of head differential across the weir crest apron.
2. **Moderate Flow Scenario:** Flood flow stage of 14.2 FT NAVD 88 with 0.2 FT of head differential across the weir crest apron.

The discharge through the levee breach area was computed using the standard broad crested weir equation given below.

$$\text{Equation 1: } Q = C_d \times W \times H^{3/2}$$

Where:

Q= Water discharge across the weir (ft³/s)

W= Width of the weir perpendicular to levee breach flow (ft)

H= Water surface head differential across the weir in the direction of the weir flow (ft)

A levee breach width of two hundred and eighty (280) Linear Feet bottom width will generate approximately 151 acre-ft of storage in the wetland area. This satisfies the project goal of 75 acre-ft with a safety factor of two to account for uncertainties in the analysis. The results of the hydraulic computations are presented in **Table 6**. The anticipated water discharge and velocities through the levee breach for the modeled scenarios will be:

High Flow: Discharge = 184.2 ft³/s and Velocity = 0.27 ft/s

Moderate Flow: Discharge = 65.1 ft³/s and Velocity = 0.58 ft/s

The moderate flow scenario generates flow into the wetland areas for a duration of 2.62 days per year with a predicted flow storage volume of 151 acre-ft. This corresponds to an annual recurrence interval of 1.76 yrs. The 151 acre-ft of storage volume allows for a safety factor of 2.0 compared to the target storage volume goal of 72.14 acre-ft in the calculation assumptions. This means that it is likely that more than 72.14 acre-ft will be stored in the off-channel wetlands. The end result of this analysis is that a two hundred and eighty (280) foot width levee breach will be sufficient to maintain wetland hydrology to the off channel wetland areas.

Future design refinements will include an unsteady flow HEC-RAS off channel storage model of the site to better understanding the hydraulic loading and routing characteristics into the wetland basin through the levee breaches.

B. Levee Erosion Rock Sizing.

Riprap rock was sized according to Shield's relationship for incipient motion of sediment (1936). Shields developed a relationship for the initial motion of bed material through flume studies relating the grain Reynolds number to the critical Shield's stress value (**Figure 5**). Additional research has added to Shield's initial study of incipient motion, suggesting values of critical Shield's stress ranging from 0.03 to 0.06 (Buffington and Montgomery 1997, Rosgen 2008). Based on measured river sediment transport data Rosgen 2008 suggests a value of 0.03 for flood flow conditions. This lower value was selected for the analysis and will result in larger more conservative rock sizing.

The critical rock size during large flow events capable of mobilizing the stream bed material can be calculated by rearranging the critical Shield's stress equation 2 as:

$$D_{rock} = F.S \left(\frac{R S}{1.65 \tau_c^*} \right)$$

Where: D_{rock} = critical diameter of rock (ft)

FS = factor of safety

R = hydraulic radius of channel (ft)

S = energy slope (ft/ft)

$$\tau^*_c = \text{critical Shield's stress}$$

Hydraulic computations indicate that the high flow scenario will be the governing condition for rock stability. The computation results are presented in **Table 7**. The computations were run with a factor of safety (FS) equal to two (2) and the stable rock size will be 14.9 inches. Harris County Flood Control Riprap Gradation 2 specification (HCFCD 2010) will meet the criteria for stability.

5.0 References

Buffington JM and Montgomery DR. (1997). A systematic analysis of eight decades of incipient motion studies, with special reference to gravel-bedded rivers. *Water Resources Research*. Vol. 33(8): 1993–2029.

Cao Z., Pender G., Meng J. (2006). Explicit formulation of the shields diagram for incipient motion of sediment. *Journal of Hydraulic Engineering* 132(10).

Harris County Flood Control District (HCFCD) (2010). Policy Criteria and Procedure Manual. 3: 3-6.

Shields, A. (1936), Application of similarity principles and turbulence research to bed-load movement (in German), Mitt. Preuss. Versuchsanst. Wasserbau Schiffbau, 26, 5 – 2

United States Department of Agriculture (USDA) Soil Conservation Service (1976) Soil Survey of Harris County, Texas.

Appendix A – Figures

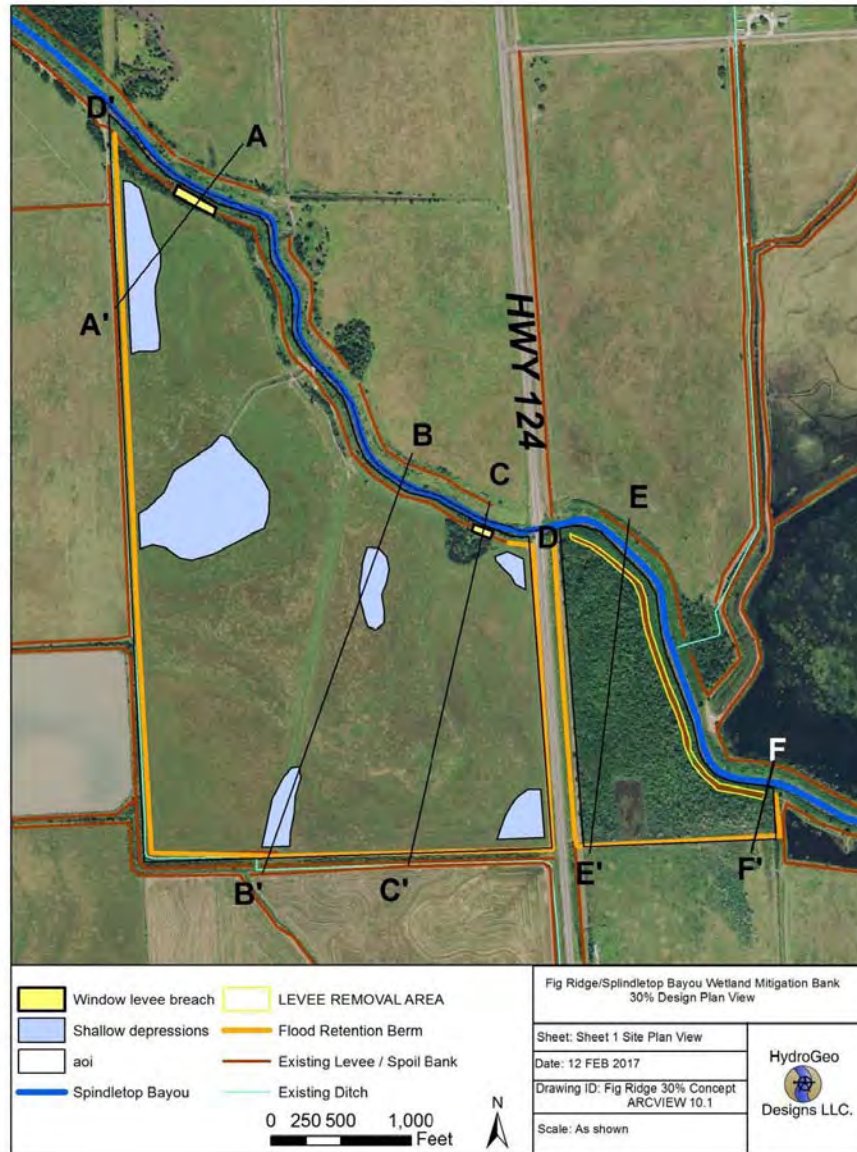


Figure 1 Project Overview/Location Map.

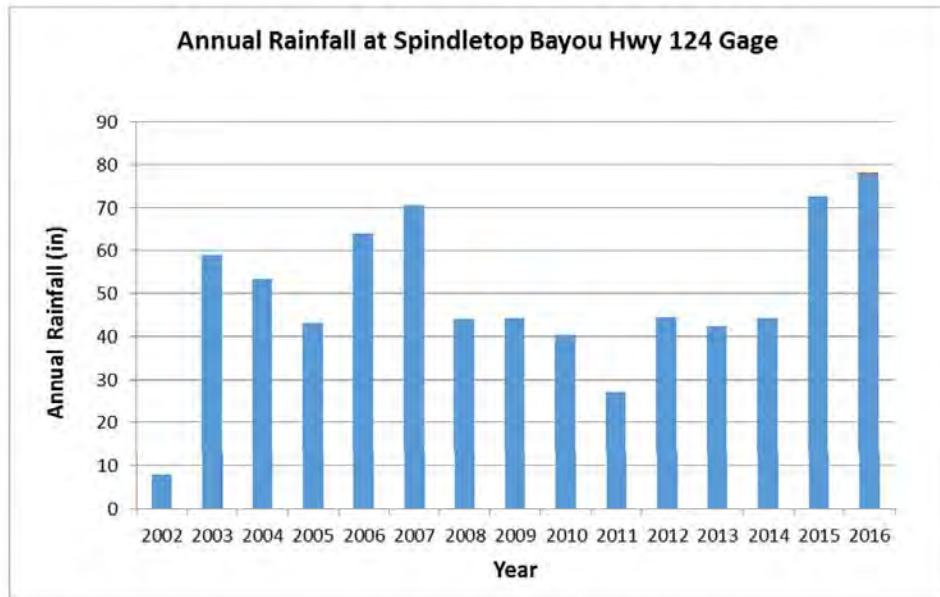


Figure 2 Rain gaging summary data from Spindletop Bayou Highway 124 location

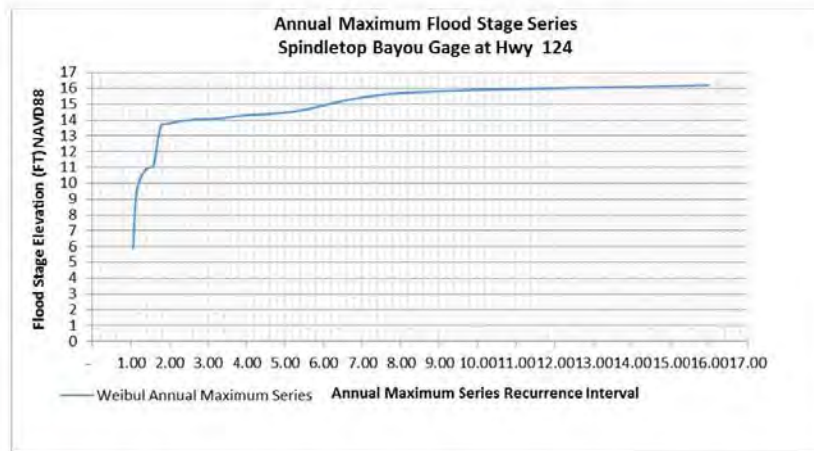


Figure 3 Results of the Weibull series annual maximum flood frequency analysis for the stream gage located at Highway 124 on Spindletop Bayou

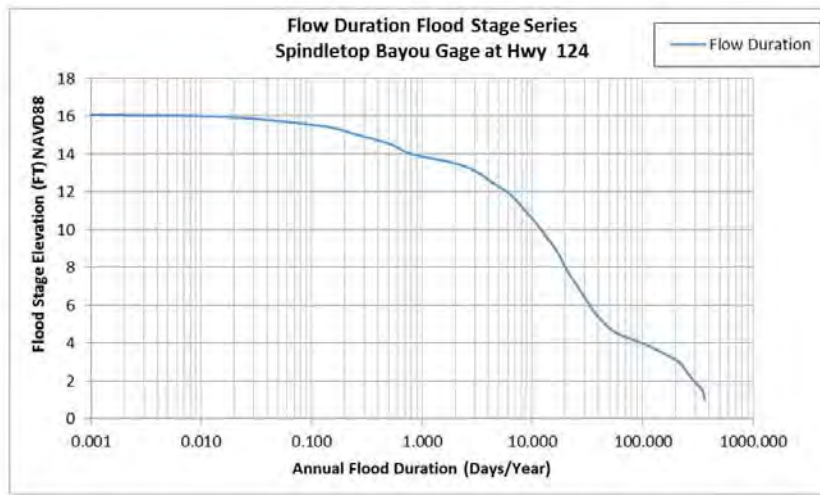


Figure 4 Flow duration analysis for Spindletop Bayou Highway 124 stream gage data

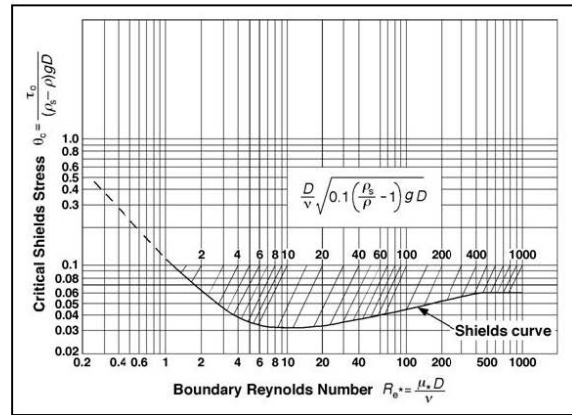


Figure 5 Shield's Curve for Incipient Motion of Bed Material (Cao, 2006)

Appendix B – Tables

Table 1 Rain gaging summary data from Spindletop Bayou Highway 124 location.

Year	Annual Precipitation (in)
2003	59.02
2004	53.27
2005	43.11
2006	64.17
2007	70.55
2008	43.94
2009	44.13
2010	40.35
2011	27.05
2012	44.52
2013	42.32
2014	44.22
2015	72.57
2016	78.39
Average 2003 - 2015	51.97

Source: Jefferson County Drainage District #6

Table 2 Weibull Annual Maximum frequency analysis summary stream gaging data from Spindletop Bayou Highway 124 location.

Year	Stage (ft)	Rank	Probability	Recurrence Interval (years)
2008	16.21	1	6.3%	16.00
2006	15.7	2	12.5%	8.00
2002	14.57	3	18.8%	5.33
2007	14.3	4	25.0%	4.00
2009	14.08	5	31.3%	3.20
2016	14.03	6	37.5%	2.67
2004	13.93	7	43.8%	2.29
2015	13.78	8	50.0%	2.00
2003	13.57	9	56.3%	1.78
2013	11.14	10	62.5%	1.60
2012	10.97	11	68.8%	1.45
2014	10.69	12	75.0%	1.33
2010	10.14	13	81.3%	1.23
2005	9.23	14	87.5%	1.14
2011	5.9	15	93.8%	1.07

Source: Jefferson County Drainage District #6

Table 3 Event based frequency analysis of flood stage

Assuming flood is at stage of 13.26 feet navd 88

Flood Date	Days Flooded	Max Stage
12/4/2002	1.00	14.57
2/21/03	0.13	13.57
9/1/03	0.13	13.33
5/14/04	0.13	13.33
6/25/04	1.63	13.93
5/29/06	5.50	15.70
6/19/06	1.00	14.10
7/6/06	0.38	13.59
7/26/06	0.50	13.60
10/16/06	1.88	14.80
10/26/06	1.25	14.90
12/30/06	0.13	13.40
7/4/07	0.88	13.60
7/6/07	1.25	14.30
9/13/08	1.88	16.21
4/19/09	0.75	14.08
4/28/09	0.13	13.33
4/18/15	0.63	13.78
12/3/16	3.02	14.03
Average	1.17	

Table 4 Flow duration analysis for Spindletop Bayou Highway 124 stream gage data.

Source: Jefferson County Drainage District #6

<i>Bin</i>	<i>Frequency</i>	<i>probability</i>	% of time water surface exceeds elevation	<i>Days/year</i>
1	0	0.00%	100.00%	365.000
1.5	1862	4.48%	95.52%	348.631
2	6662	16.05%	79.47%	290.066
2.5	4673	11.25%	68.22%	248.986
3	4121	9.93%	58.29%	212.758
3.5	7126	17.16%	41.13%	150.114
4	5896	14.20%	26.93%	98.283
4.5	4468	10.76%	16.17%	59.005
5	1531	3.69%	12.48%	45.546
5.5	850	2.05%	10.43%	38.074
6	570	1.37%	9.06%	33.063
6.5	443	1.07%	7.99%	29.168
7	405	0.98%	7.02%	25.608
7.5	358	0.86%	6.15%	22.461
8	296	0.71%	5.44%	19.859
8.5	198	0.48%	4.96%	18.118
9	230	0.55%	4.41%	16.096
9.5	250	0.60%	3.81%	13.898
10	219	0.53%	3.28%	11.973
10.5	188	0.45%	2.83%	10.321
11	196	0.47%	2.36%	8.598
11.5	150	0.36%	1.99%	7.279
12	158	0.38%	1.61%	5.890
12.5	181	0.44%	1.18%	4.299
13	120	0.29%	0.89%	3.244
13.5	142	0.34%	0.55%	1.996
14	137	0.33%	0.22%	0.791
14.5	30	0.07%	0.14%	0.527
15	30	0.07%	0.07%	0.264
15.5	17	0.04%	0.03%	0.114
16	12	0.03%	0.00%	0.009
16.5	1	0.00%	0.00%	0.000

Table 5 Channel Hydraulic Modeling Summary.

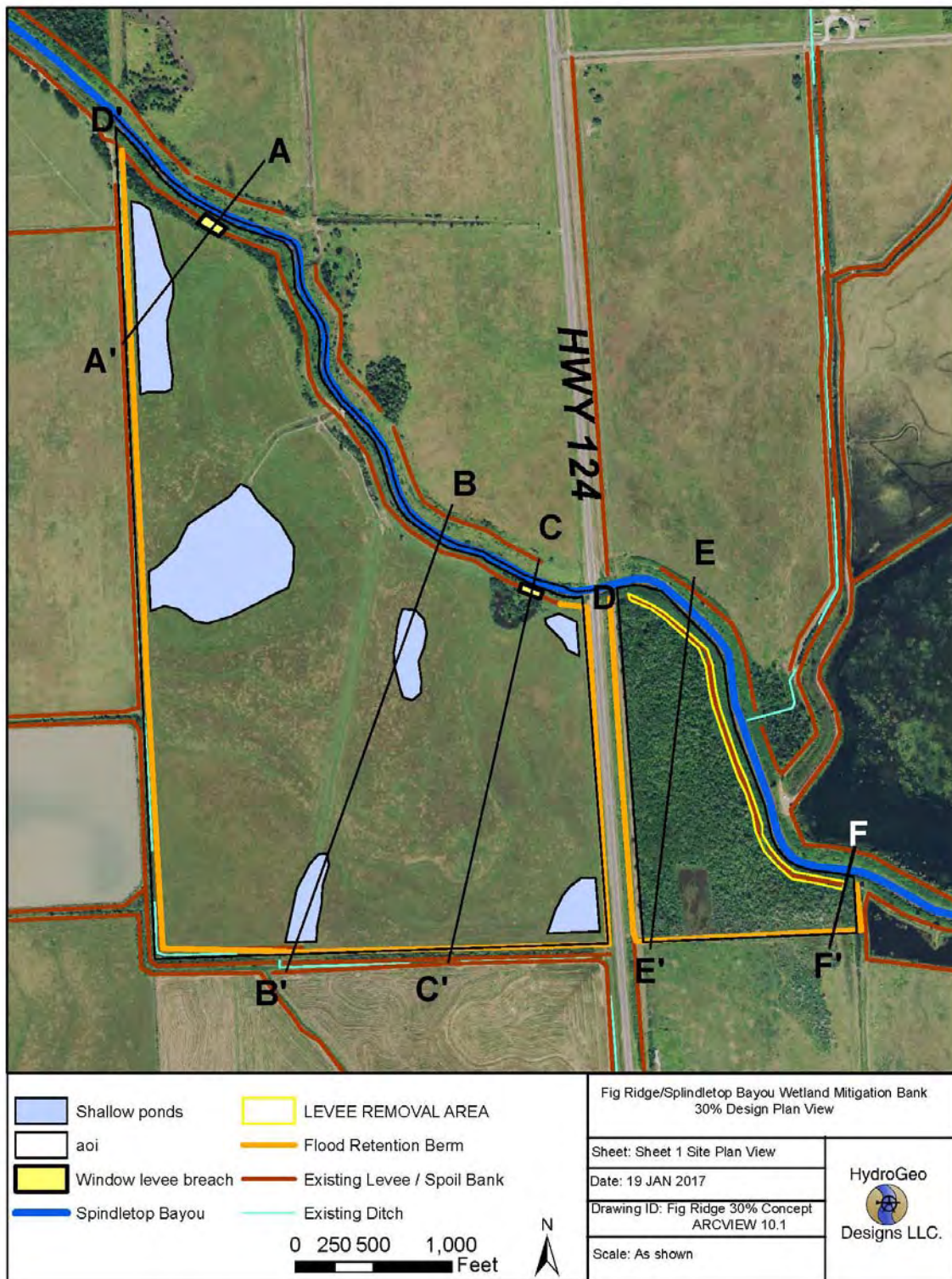
Hydraulic Parameter	Value (Units)
Manning n roughness (channel)	0.04
Channel cross section area	1283 (ft ²)
Maximum depth	13.03 (ft)
Mean depth	6.22 (ft)
Top width	206.15 (ft)
Width/depth ratio	33.14
Entrenchment ratio	4.99
Rosgen stream type	C5-6
Hydraulic grade line slope	0.00022 (ft/ft)
Discharge	2251 (ft ³ /s)
Velocity	1.76 (ft/s)
Bed shear stress	0.08 (lb/ft ²)

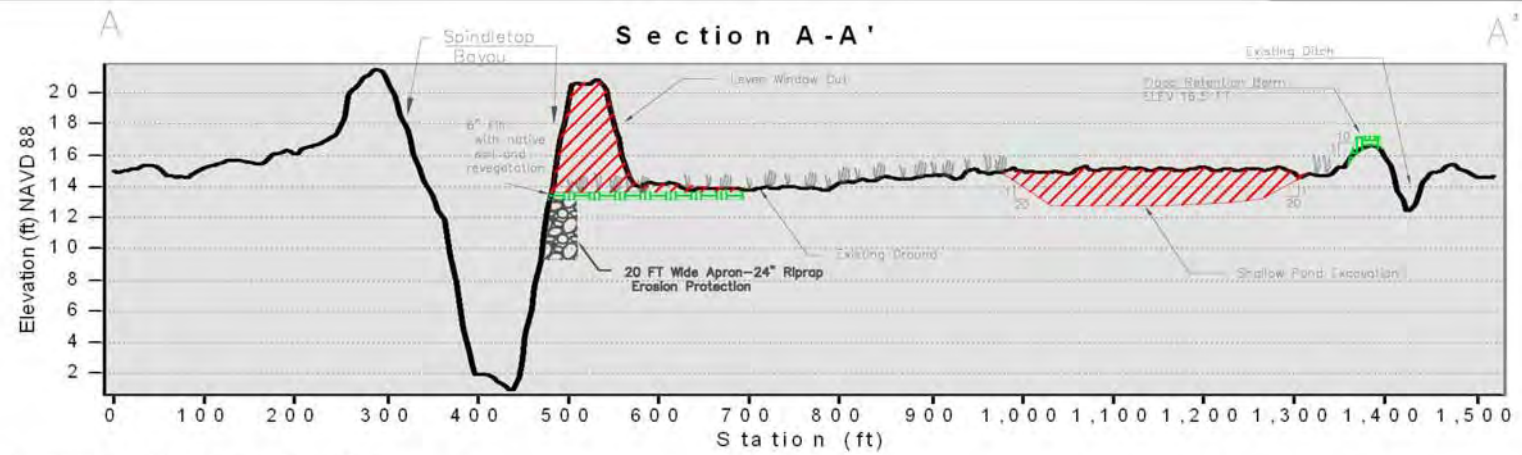
Table 6 Levee Breach Weir Flow Calculations.

	High Flow Scenario	Moderate Flow Scenario
Weir length-ft	280	280
Weir invert elevation-ft	13.8	13.8
Flood stage-ft	16.2	14.2
Tailwater stage-ft	15.8	14
Head-ft	0.4	0.2
Weir Coefficient (Cd)	2.6	2.6
apron length-ft	30	30
hydraulic slope-ft/ft	0.013	0.0067
Weir Discharge (ft ³ /s)	184.17	65.11
Duration (days/event)	0.19	1.17
Duration (s/event)	16329.60	101088.00
ft ³ /event	3007439.59	6582274.31
Acre-ft	69.02	151.06
Flow depth-ft	2.4	0.4
Area (ft ²)	672	112
Velocity (ft/s)	0.27	0.58
Wetted perimeter-ft	284.8	280.8
Hydraulic radius-ft	2.36	0.40
Bed shear (lb/ft ²)	1.96	0.17
dimensionless critical shear	0.03	0.03
Safety factor	2	2
stable rock size-ft	1.3	0.1
stable rock size-in	15.3	1.3

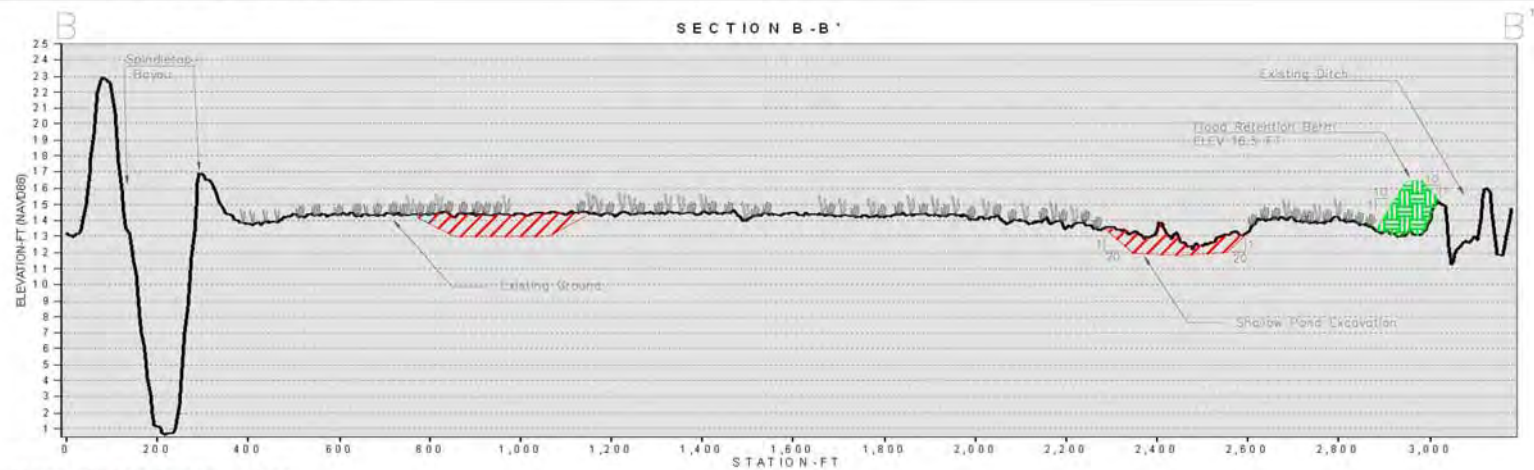
Table 7 Summary of Input Variables and Results for Rock Stability Calculations.

<i>Input</i>	High Flow (82.2 cfs)	Moderate Flow (42.7 cfs)
Hydraulic Radius (ft)	2.31	0.98
Energy Slope (ft/ft)	0.013	0.0067
Critical Shield's Stress	0.03	0.03
Safety Factor	2	2
<i>Output</i>		
Stable Rock Size (in)	14.9	1.3





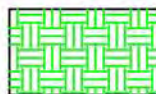
Source 2006 FEMA LIDAR



Source 2006 FEMA LIDAR NAVD88



Proposed Excavation



Proposed Earthen Fill



Existing Ground

Fig Ridge Spindletop Bayou Mitigation Bank
Existing Condition and
Proposed Condition

Chambers County, TX

Sheet: Sht 2 Sections A-A' and B-B'

Scale: NTS

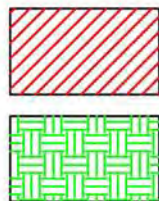
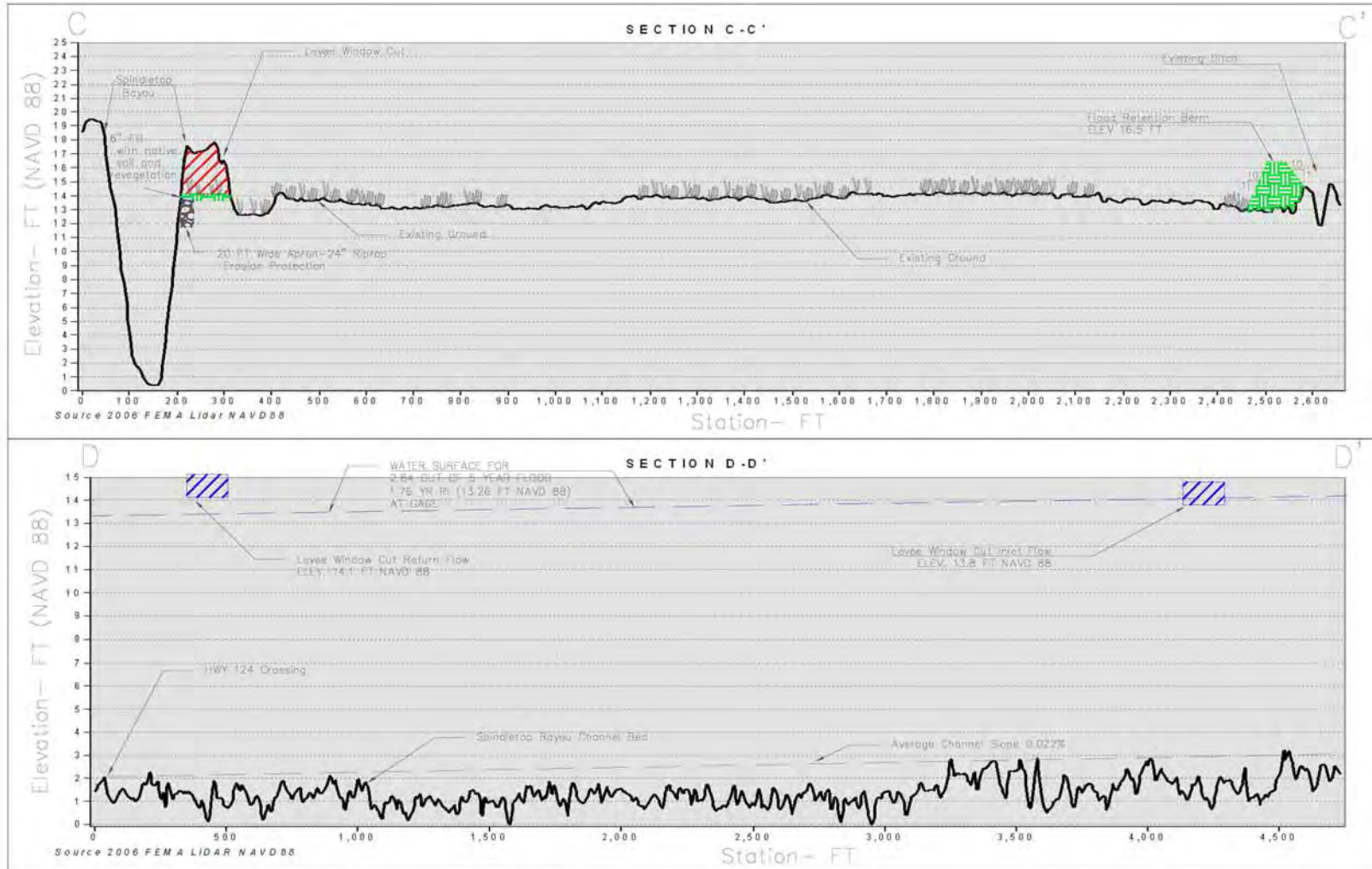
Date: 19 JAN 2017

Drawing No.: FigRidge_30%.dwg

HydroGeo



Designs



Proposed Excavation

Proposed Earthen Fill



Existing Ground

Fig Ridge Spindletop Bayou Mitigation Bank
Existing Condition and
Proposed Condition
Chambers County, TX

Sheet: Sht 3 Sections C-C' and D-D'

Scale: NTS

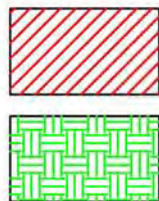
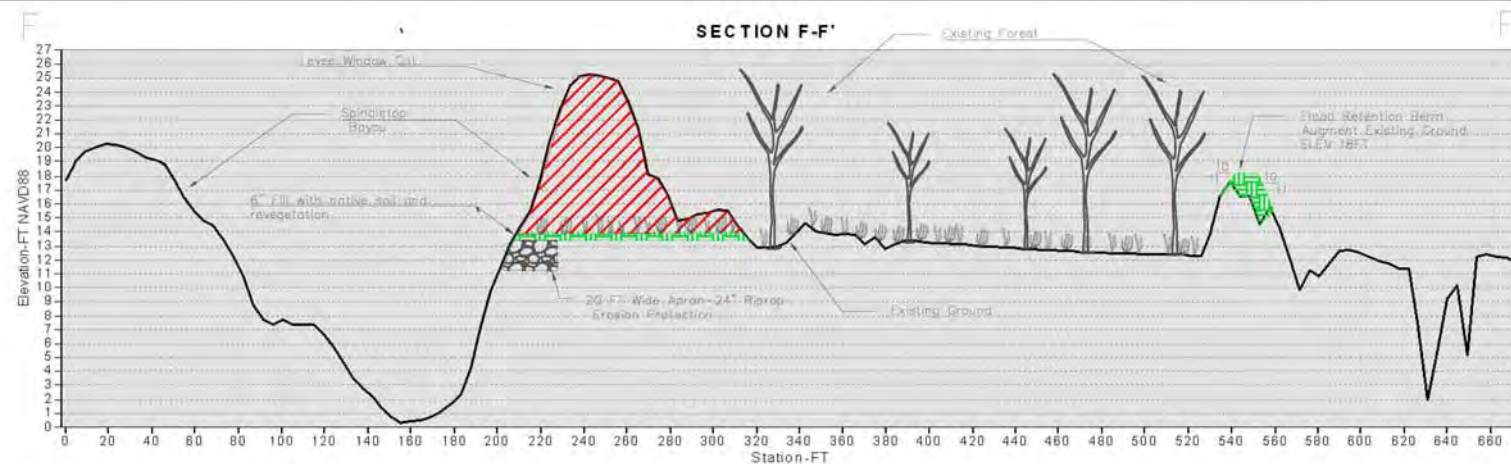
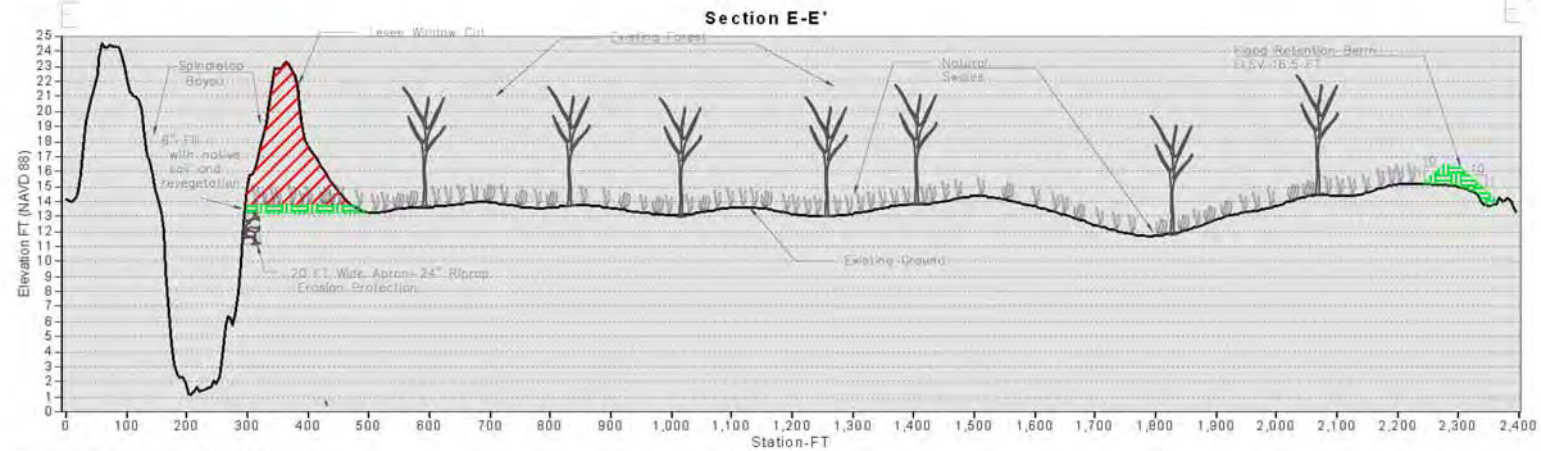
Date: 19 JAN 2017

Drawing No.: FigRidge 30%.dwg

HydroGeo



Designs



Proposed Excavation

Proposed Earthen Fill



Existing Ground

Fig Ridge Spindletop Bayou Mitigation Bank
Existing Condition and
Proposed Condition

Chambers County, TX

Sheet: Sht 4 Sections E-E' and F-F'

Scale: NTS

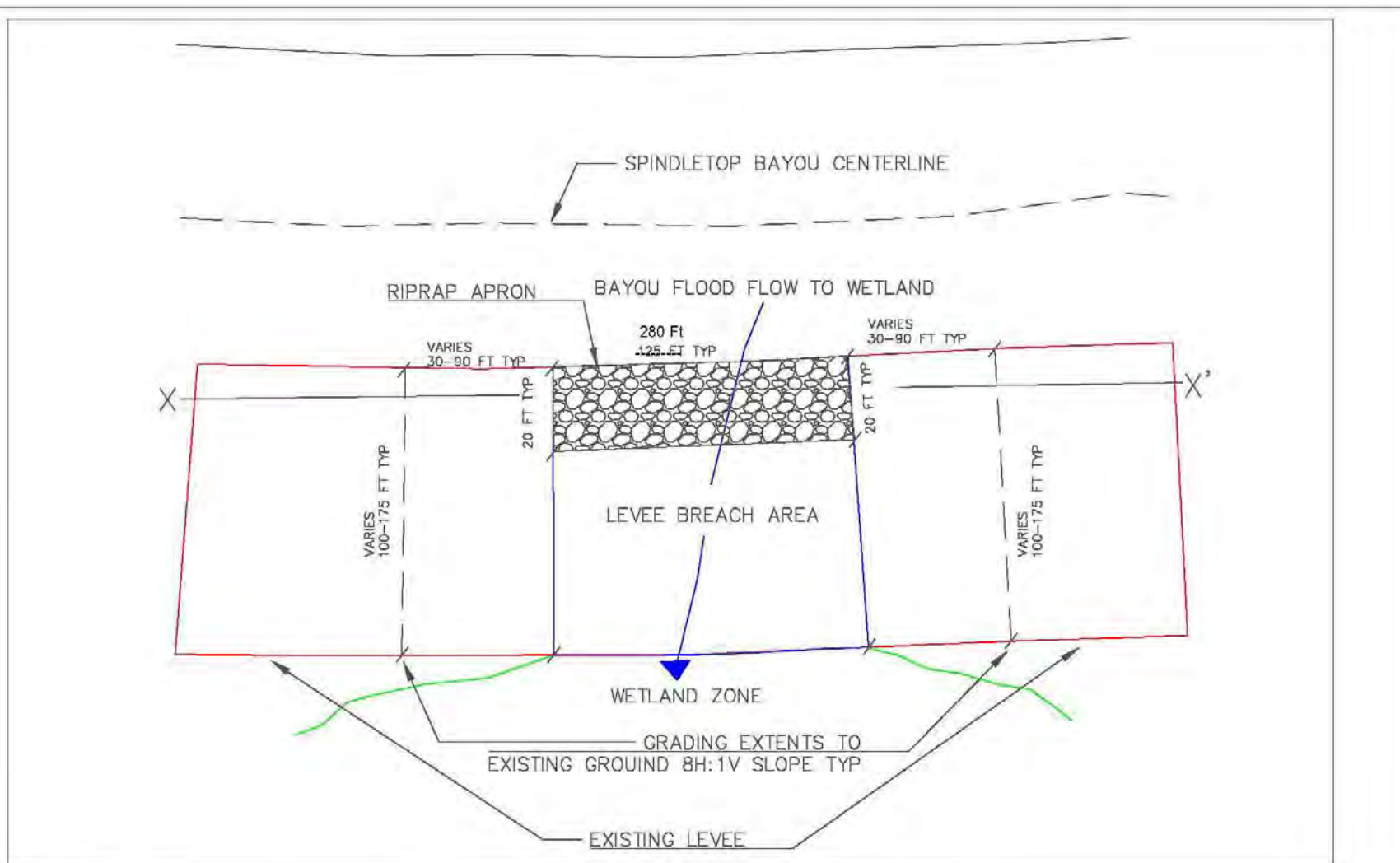
Date: 19 JAN 2017

Drawing No.: FigRidge 30%.dwg

HydroGeo



Designs



Grade 1 Riprap



Levee Breach Area



Existing Levee

Fig Ridge Spindletop Bayou Mitigation Bank
Existing Condition and
Proposed Condition

Chambers County, TX

Sheet: Sht 5 Levee Breach Plan View

Scale: NTS

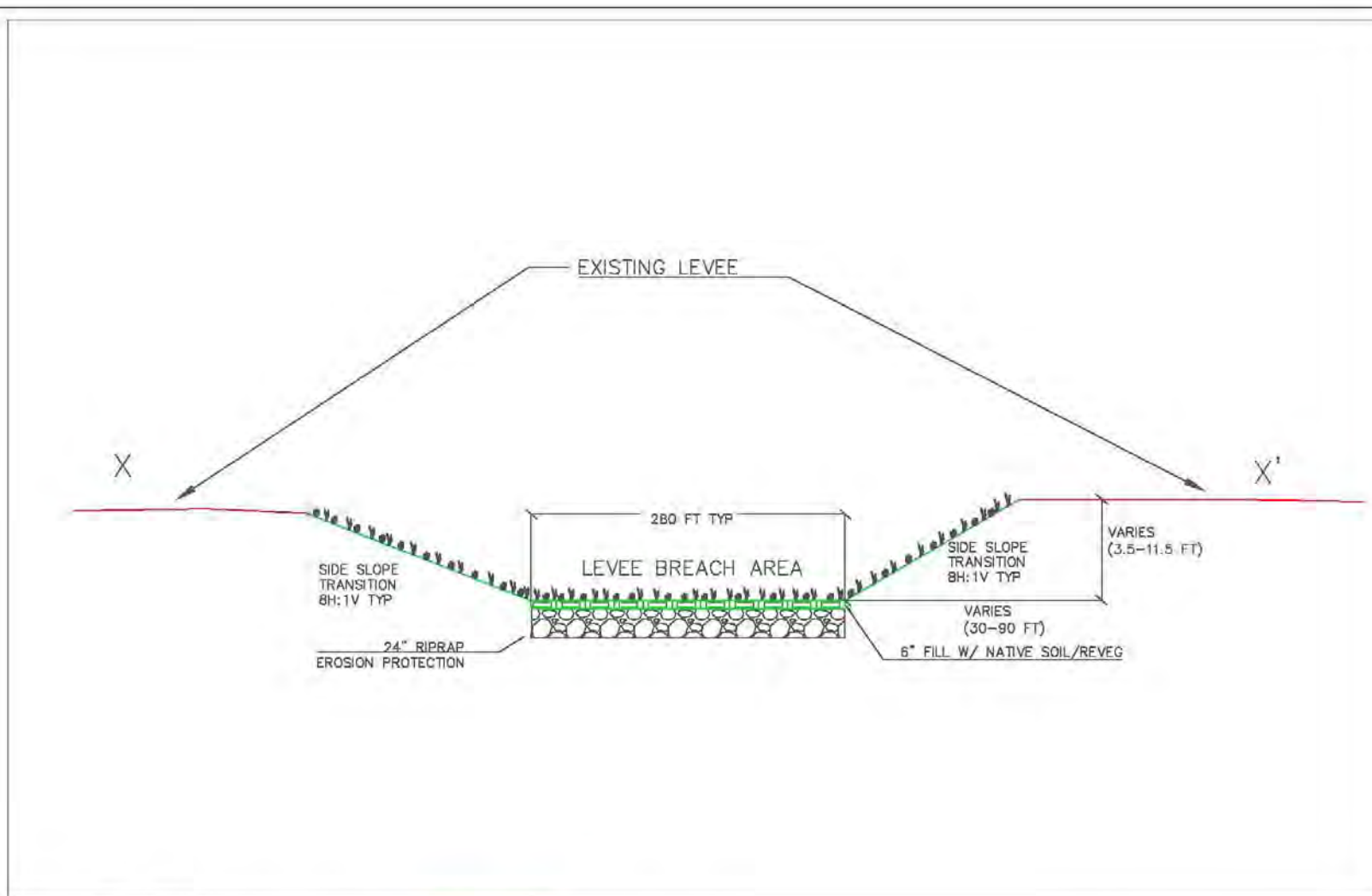
Date: 19 JAN 2017

Drawing No.: FigRidge_30%.dwg

HydroGeo



Designs



Grade 1 Riprap



Native Soil Fill and
Revegetation

Existing Levee

Fig Ridge Spindletop Bayou Mitigation Bank
Existing Condition and
Proposed Condition

Chambers County, TX

Sheet: Sht 6 Levee Breach Section X-X'

Scale: NTS

Date: 19 JAN 2017

Drawing No.: FigRidge 30%.dwg

HydroGeo
Designs

APPENDIX K – TCEQ WATER USE PERMIT CORRESPONDANCE

2/23/2017

Inbox [1/9187] - Cliff Sunda <cliff@wildwoodcredits.com>

Fwd: Sea Breeze

From: "Michael Harrison" <michael@wildwoodcredits.com>
To: "Sunda Cliff" <cliff@wildwoodcredits.com>

02/23/17 15:50

Michael Harrison, RPL
214.536.1694

Begin forwarded message:

From: Alisa Patterson <Alisa.Patterson@Tceq.Texas.Gov>
Date: February 23, 2017 at 2:48:50 PM CST
To: Michael <michael@wildwoodcredits.com>
Cc: Christine Peters <Christine.Peters@tceq.texas.gov>
Subject: RE: Sea Breeze

Mr. Harrison,

Based on the additional information provided for the Sea Breeze Mitigation Bank in the February 1, 2017 and February 22, 2017 emails and our phone call on February 22, 2017, we could agree at this time that the area identified will not require a water rights permit from TCEQ. For any future project modifications, you may contact us with permitting questions.

Thank you,

Alisa Patterson, P.E.
Hydrologist
Surface Water Availability Team
(512) 239-4613

From: Michael [<mailto:michael@wildwoodcredits.com>]
Sent: Wednesday, February 22, 2017 1:56 PM
To: Alisa Patterson <Alisa.Patterson@Tceq.Texas.Gov>
Subject: Sea Breeze

Alisa,

To address any concerns per our last conversation. The design for the proposed Sea Breeze Mitigation Bank site will breach the existing levee at or slightly above flood plain grade, not below. The purpose of the project is to reestablish natural historic flood plain connectivity and macrotopography that resembles natural historic conditions. There will be no directing of flow to any impoundments/depressions within the site. I look forward to hearing from you and appreciate your help with this.

Thank you,

<http://mail.wildwoodcredits.com:32000/webmail/>

1/2

2/23/2017

Inbox [1/9/187] - Cliff Sunda <cliff@wildwoodcredits.com>

Michael

Michael C. Harrison
Environmental Scientist
Wildwood Environmental Credit Company, LLC
PO Box 6602
Tyler, Texas 75711
214-536-1694 (m)
903-579-9384 (o)
michael@wildwoodcredits.com

VIA EMAIL

January 31, 2017

Iliana Delgado
Water Rights Permits
Water Rights Permitting & Availability Section
Texas Commission on Environmental Quality
(512) 239-3678
Iliana.Delgado@tceq.texas.gov



RE: Sea Breeze Wetland Mitigation Bank SWG-2016-00086 Water Use Permit

Dear Mrs. Delgado,

The purpose of this letter is to coordinate with you regarding our proposed mitigation bank's design and to determine whether modifications to our proposed design would require a Water Use Permit. This is a follow-up to previous letters dated June 16, 2016 and November 2, 2016, both of which resulted in your office's determination that a water use permit was required.

Our current proposed design is based on "Option B" from our previous correspondence; however, we have been able to modify the design using LiDAR elevation data to determine that a breach placed at grade would permit flooding of the site on a 1.76-year recurrence interval versus the 2.5 we had previously calculated and reported to you in November. Therefore, we decided to update our SPAW (Soil-Plant-Air-Water) computer model of the site and report the updated values to you for consideration.

Under the revised plan approximately 10 acre-feet would be stored onsite following the 1.76-year flood event, less than the originally calculated 16 acre-feet per flood event. This would occur more frequently though, and would result in an average of 12 acre-feet being stored per year versus the originally calculated 10 acre-feet per year. No additional floodwaters would be stored during less frequent flood events. The constructed site would have a volume of approximately 72 acre-feet and therefore the potential to store that amount of floodwater, but our model considers the daily precipitation and flood stage patterns that have occurred at the site over the past fifteen years and has determined that on average, 62 acre-feet of the site would be filled by precipitation, not floodwater, prior to the overbank flood occurring. The tract is currently and will be taxed as open land.

Our question is: Would the project as designed require the project to obtain a Water Use Permit?

Enclosed with this letter is a map of the conceptual restoration plan. In conclusion, our modeling indicates that flood elevations more frequent than the 1.76-year event would not enter the site. During higher, less frequent floods approximately 10 acre-feet of floodwater would be stored for an average of 12 acre-feet of water stored per year based on the 1.76-year return interval. Please contact me by phone or email listed below or Cliff Sunda should you have any questions.

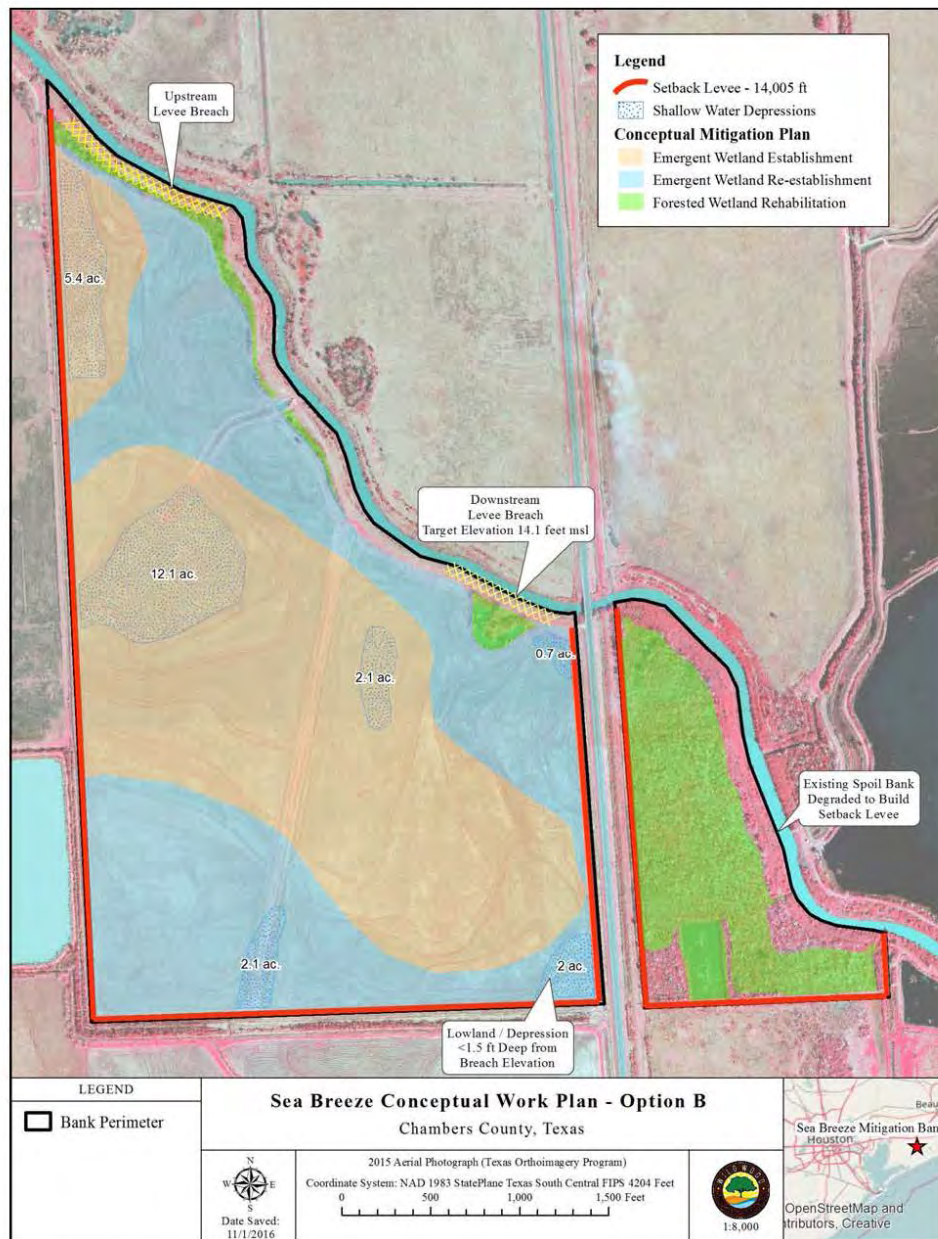
Best regards,

Michael C. Harrison

Michael C. Harrison, RPL
Wildwood Environmental Credit Company, LLC
P.O. Box 6602
Tyler, Texas 75711
(214) 536-1694
michael@wildwoodcredits.com

Enclosures: 1 – Conceptual Restoration Plan
Enclosure 1 – Conceptual Restoration Plan – Option B

Wildwood Environmental Credit Company, LLC 2



2/1/2017

Inbox [1/42] - Cliff Sunda <cliff@wildwoodcredits.com>

Fwd: Sea Breeze Wetland Mitigation Bank - Water Use Permit Inquiry

From: "Michael Harrison" <michael@wildwoodcredits.com>
To: "Sunda Cliff" <cliff@wildwoodcredits.com>

01/06/17 18:03

See response below.

Michael Harrison, RPL
214.536.1694

Begin forwarded message:

From: Alisa Patterson <Alisa.Patterson@Tceq.Texas.Gov>
Date: January 6, 2017 at 3:17:30 PM CST
To: "michael@wildwoodcredits.com" <michael@wildwoodcredits.com>
Cc: Iliana Delgado <iliana.delgado@tceq.texas.gov>, Christine Peters <Christine.Peters@tceq.texas.gov>, Chris Kozlowski <chris.kozlowski@tceq.texas.gov>
Subject: RE: Sea Breeze Wetland Mitigation Bank - Water Use Permit Inquiry

Mr. Harrison,

Based on the information provided for the Sea Breeze Mitigation Bank on November 2, 2016 and during our phone call on January 6, 2017, we could agree at this time that the area identified will not require a water rights permit from TCEQ. For any future project modifications, you may contact us with permitting questions.

Thank you,

Alisa Patterson, P.E.
Hydrologist
Surface Water Availability Team
(512) 239-4613

From: Michael [mailto:michael@wildwoodcredits.com]
Sent: Wednesday, November 02, 2016 5:33 PM
To: Iliana Delgado <iliana.delgado@tceq.texas.gov>
Cc: Cliff@wildwoodcredits.com
Subject: Sea Breeze Wetland Mitigation Bank - Water Use Permit Inquiry

Mrs. Delgado,

Per an email response from Alisa Patterson to myself on June 29, 2016. Ms. Patterson requested we follow up with any new information regarding alternative design. Please, review the attached document herein regarding if a Water Use Permit is necessary for our original proposal herein called "Option A" and a potential alternative option herein called "Option B". I appreciate you taking the time to review this matter and look forward hearing from you. If you should have any questions, please feel free to contact me anytime.

Thank you,

<http://mail.wildwoodcredits.com:32000/webmail/>

1/2

2/1/2017

Inbox [1/42] - Cliff Sunda <cliff@wildwoodcredits.com>

Michael Harrison, RPL
Wildwood Environmental Credit Company
(214) 536-1694

<http://mail.wildwoodcredits.com:32000/webmail/>

2/2

VIA EMAIL

November 2, 2016

Iliana Delgado
Water Rights Permits
Water Rights Permitting & Availability Section
Texas Commission on Environmental Quality
(512) 239-3678
Iliana.Delgado@tceq.texas.gov



RE: Sea Breeze Wetland Mitigation Bank SWG-2016-00086 Water Use Permit

Dear Mrs. Delgado,

This is a follow-up on my letter dated June 16, 2016 and Alisa Patterson's email response to Michael Harrison on June 29, 2016. Per Ms. Patterson's request we are following up with new information regarding our project and a proposed alternative design. We are requesting a review from your office regarding the need for a Water Use Permit for our original proposal herein called "Option A" and a potential alternative option herein called "Option B".

The proposed wetland mitigation bank is located in Chambers County, Texas south of the town of Winnie. The project consists of wetland and floodplain restoration adjacent to Spindletop Bayou. Under both options, a spoil bank adjacent to Spindletop Bayou would be breached to allow floodwaters from Spindletop Bayou to flow into the site during the 2.5 year flood event. In "Option A" breaches would be located evenly along the Bayou frontage. "Option A" is an updated version of what your office had originally reviewed which has now removed spreader dams and reconfigured the shallow depressions. In "Option B" a single large breach would be located at the upstream end and a breach of higher elevation would be located at the downstream end.

Detailed modeling of the daily water budget has indicated that, as currently designed, overbank floodwater from Spindletop Bayou may be stored at the site post-construction. *Under "Option A, the model indicates that approximately 5-acre feet of floodwater would be stored on site following the 2.5 year flood event. Under "Option B" approximately 16 acre-feet would be stored onsite following the 2.5 year flood event. No additional floodwaters would be stored by either option during less frequent flood events. In most years (average of three out of five years) no floodwater would enter the site under either option. The tract is currently and will be taxed as open land.*

Our question is: Would either "Option A" or "Option B" require the project to obtain a Water Use Permit?

Daily water budgets were constructed using the SPAW (Soil-Plant-Air-Water) computer model and soil and evaporation data for the site. Overbank flooding and precipitation data from a gage located at the site from 2002 to present were used to construct a daily water budget. This allowed us to determine how much of the site would be filled with precipitation when an overbank flood event occurred. Daily simulations were based on actual past flood and corresponding precipitation events.

Enclosed with this letter are six maps and a table to assist you with your determination. In conclusion, our modeling indicates that flood elevations more frequent than the 2.5 year event would not enter the site. During higher, less frequent floods approximately 5 or 16 acre-feet of floodwater would be stored by the project depending on which option is employed. Thank you for your time with this matter. Please contact me by phone or email listed below or Michael Harrison should you have any questions.

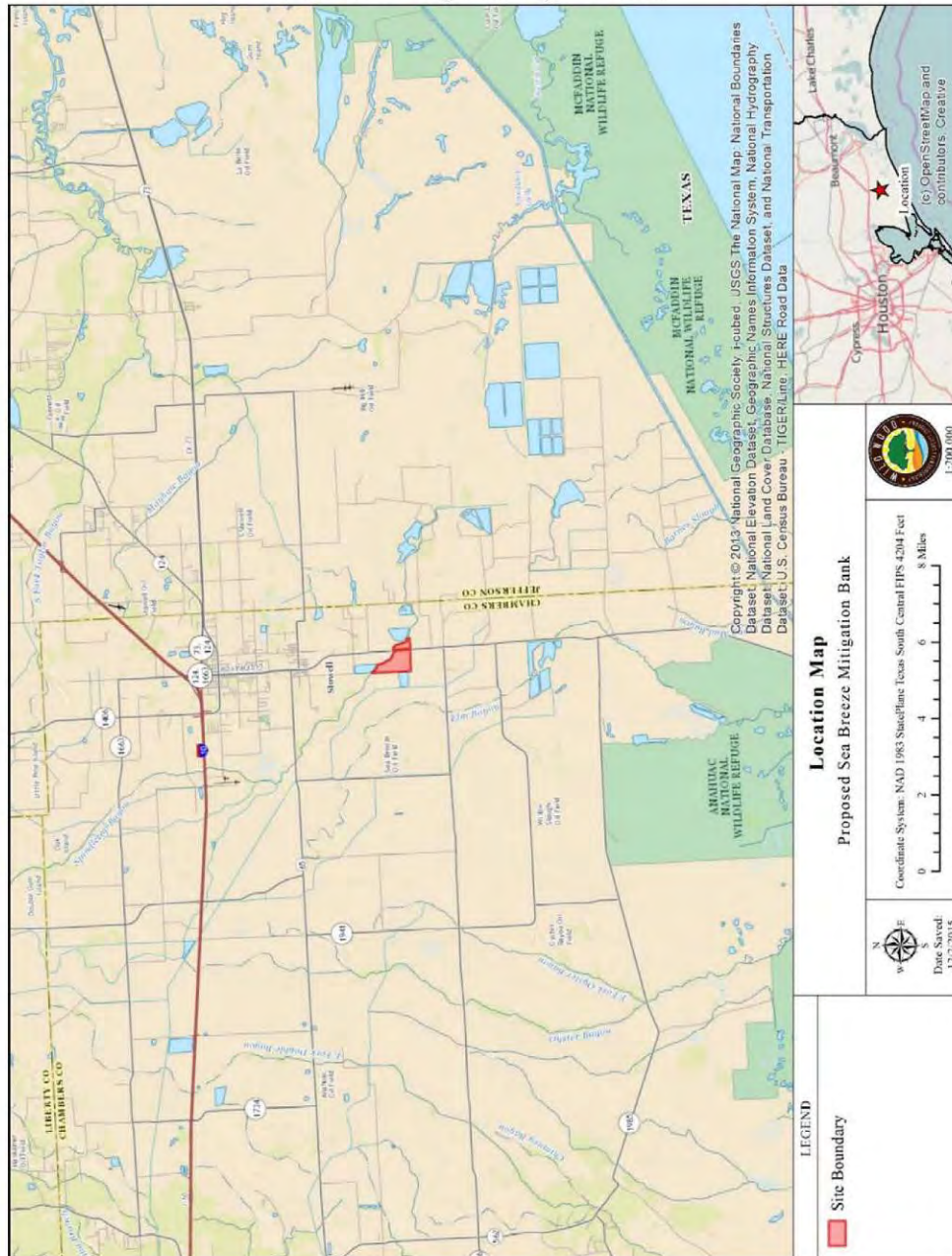
Best regards,



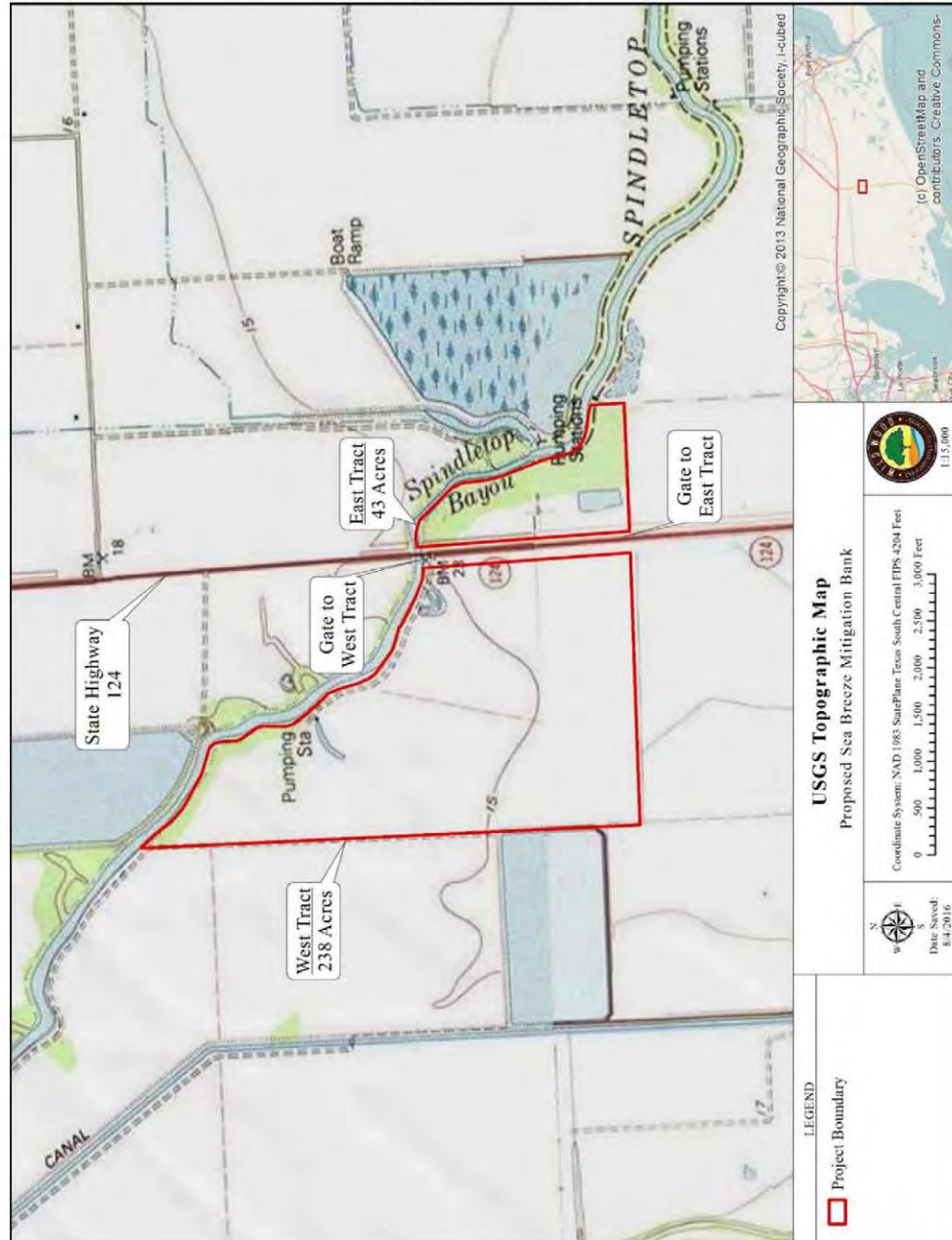
Cliff J. Sunda, ACF, CF
Vice President, Operations
Wildwood Environmental Credit Company, LLC
P.O. Box 6602
Tyler, Texas 75711
(936) 371-1305
cliff@wildwoodcredits.com

Enclosures: 1 - Map of the Project Location
 2 - Topographic Map of the Project
 3 - 1938 Aerial Photograph of the Project
 4 - 2015 TOP Aerial Photo Map of the Project Location
 5 - Conceptual Restoration Plan – Option A
 6 - Conceptual Restoration Plan – Option B
 7 - Historic Precipitation and Gage Height on Spindletop Bayou at SH 124

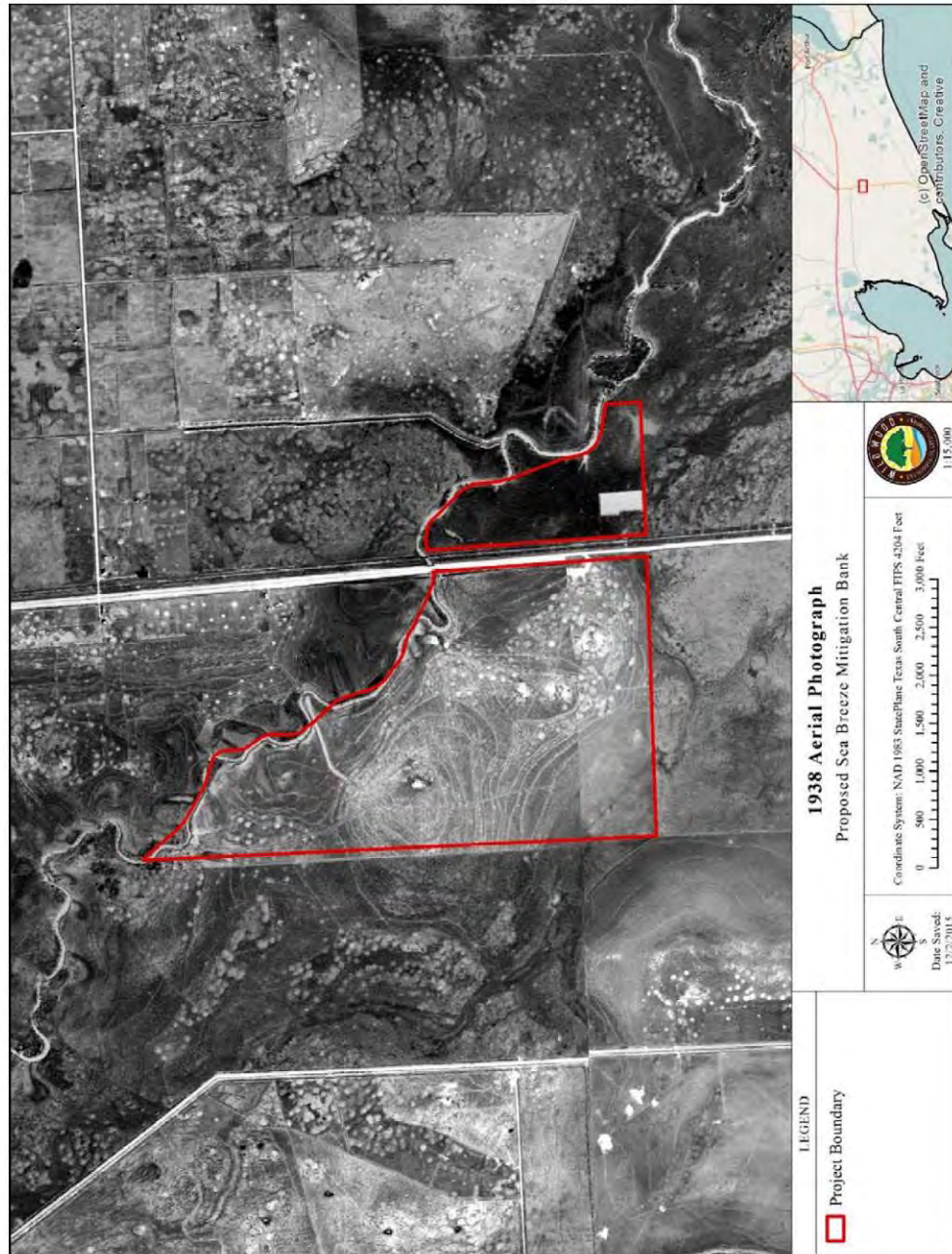
Enclosure 1 – Map of the Project Location.



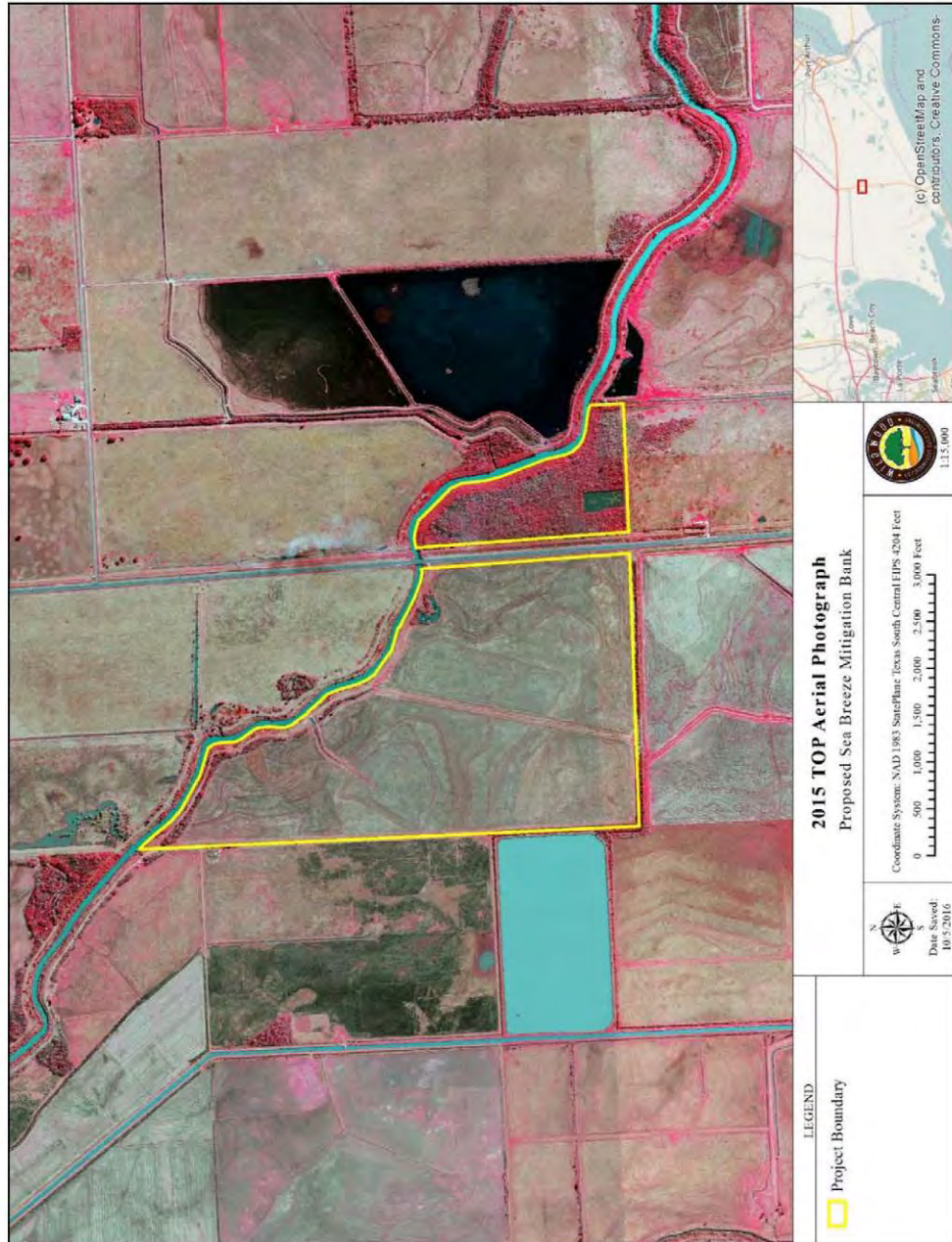
Enclosure 2 – Topographic Map of the Project.



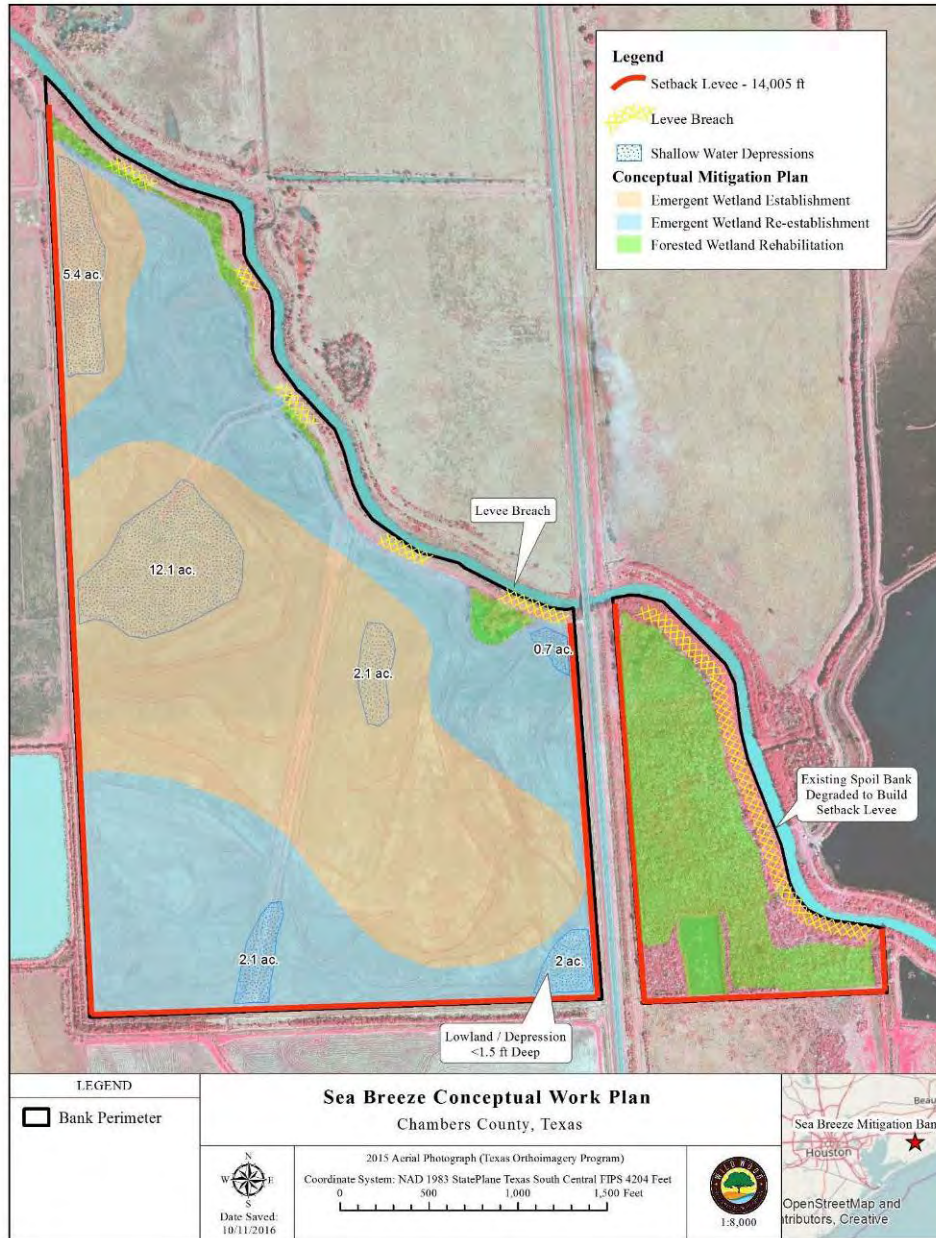
Enclosure 3 – 1938 Aerial Photograph of the Project.



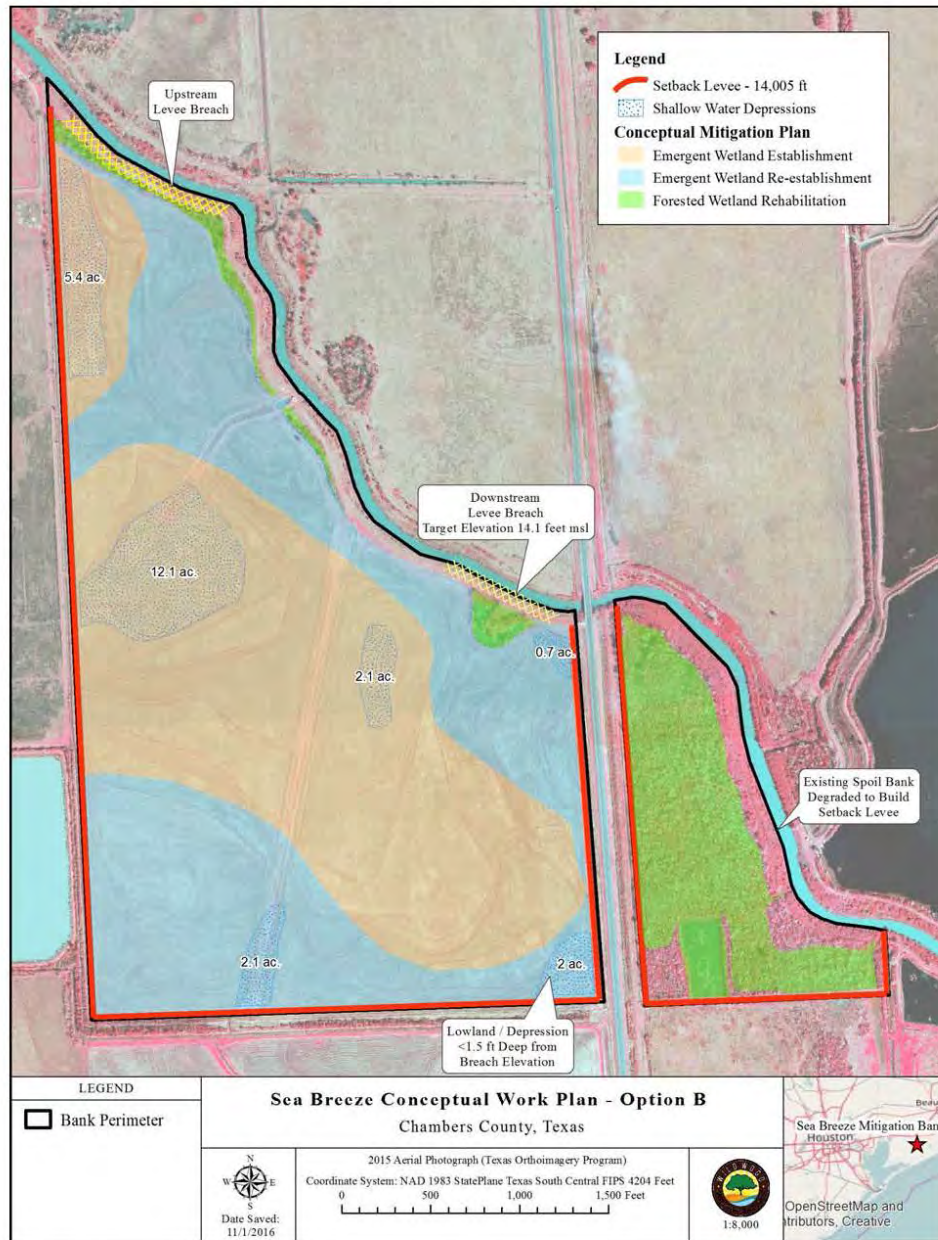
Enclosure 4 – 2015 TOP Aerial Photo Map of the Project Location.



Enclosure 5 – Conceptual Restoration Plan – Option A



Enclosure 6 – Conceptual Restoration Plan – Option B



Enclosure 7 – Historic Precipitation and Gage Height at Jefferson County Drainage District 6 Site 4600 at Spindletop Bayou and SH 124 (at the project site).

A rain and flood gauge operated by Jefferson County Drainage District #6 has been in continuous operation on the SH 124 bridge over Spindletop Bayou since November 2002.

Table 1. Historic precipitation and water levels at Spindletop Bayou and SH 124.

Year	Annual Precipitation (in)	Maximum Water Stage (ft)	Return Interval (yr)
2002	7.76 (incomplete)	14.6	5.0
2003	59.02	13.6	1.9
2004	53.27	13.9	2.5
2005	43.11	9.2	1.2
2006	64.17	15.7	7.5
2007	70.55	14.3	3.8
2008	43.94	16.2	15.0
2009	44.13	14.1	3.0
2010	40.35	10.1	1.3
2011	27.05	5.9	1.1
2012	44.52	11.0	1.5
2013	42.32	11.1	1.7
2014	44.22	10.7	1.4
2015	67.25	13.8	2.1
Average 2003 - 2015	48.05		

APPENDIX L – QUALIFICATION SUMMARY



Cliff J. Sunda, PWS, CF
Vice President/Senior Project Manager

Education

M.S. Forest Economics / Spatial Science, Stephen F. Austin, 2013
B.S. Forestry, Stephen F. Austin State University, 2007

Areas of Relevant Expertise

Forestry
Economics
Spatial Science
Wetlands / Streams
Compensatory Mitigation

Certifications – Qualifications – Training

Certified Professional Wetland Scientist (PWS) No. 2765
Certified Forester (CF) No. 3866
Rosen Natural Channel Design Levels I-IV
Certified GIS Professional (GISP) No. 91743
Association of Consulting Foresters (ACF)
Soil and Water Assessment Tool (SWAT) Training
Agricultural Policy/Environmental eXtender Model Training
Forest Vegetation Simulator Training
Upland Hardwood Silviculture

**Relevant Experience
Summary**

- Mitigation Banking
- Compensatory Mitigation
- Silviculture
- USACE HGM Analysis
- USACE TXRAM Analysis
- Reforestation
- Habitat Restoration
- Expert Testimony
- Prescribed Burning
- Wildland Firefighting
- Timber Management
- Vegetation Growth & Yield Modeling
- Carbon Accounting
- Water Quality Modeling

Years of Experience

With This Firm: 2
With Other Firms: 7

Peer-Reviewed Publications

Camarillo, S. A., J. P. Stovall, and C. J. Sunda. 2015. *The impact of Chinese tallow (Triadica sebifera) on stand dynamics in bottomland hardwood forests*. Forest Ecology and Management. 344: 10-19.

Experience Summary

Mr. Sunda is a managing member of Wildwood Environmental Credit Company, LLC. His responsibilities include overseeing the permitting, management, and monitoring of Wildwood's compensatory mitigation sites. Prior to Wildwood, Mr. Sunda was the resident forester at Working Lands Investment Partners, LLC where he worked throughout the U.S. on active and potential compensatory mitigation sites. Prior to Working Lands Mr. Sunda was an independent forestry consultant responsible for managing over ten thousand acres of private commercial timberland in East Texas. Mr. Sunda's specialties include compensatory mitigation, economics, forestry, ecosystem services, and spatial science.



C. Lee Sherrod, PWS
Vice President/Senior Project Manager

Education

M.A., Botany/Wetland Ecology, University of Texas at Austin, 1980
B.S., Forestry/Wildlife Science, Stephen F. Austin University, 1975

Areas of Relevant Expertise

Wetlands
Threatened/Endangered Species
Terrestrial Ecology
Habitat Restoration/Creation
Regulatory Compliance: Section 404; Endangered Species Act,
NEPA

Certifications – Qualifications – Training

Certified Training in Habitat Evaluation Procedure (HEP)
Certified Professional Wetland Scientist (PWS) No. 000155
US Army Corps of Engineers Qualified Wetland Delineation Training

Years of Experience

With This Firm: 27
With Other Firms: 11

Relevant Experience Summary

- Habitat Restoration
- Jurisdictional Wetland Delineation
- Section 404/10 Permitting
- Threatened/Endangered Species
- Section 7/10(a) Permitting (ESA)
- Terrestrial Ecology
- Mitigation
- Land Use
- NEPA EA/EIS
- Expert Testimony
- USFWS HEP Procedure
- USACE HGM Analysis

Experience Summary

Mr. Sherrod is a co-founder of Horizon™ and specializes in terrestrial and wetland ecology, endangered species, regulatory permitting, and NEPA compliance. He has over 37 years of experience in the technical applications of these fields and the regulatory aspects of project-compliance procedures. He is a recognized expert in wetlands issues and is certified as a "Professional Wetland Scientist" (No. 000155) by the Society of Wetland Scientists Certification Program, Inc. He has directed hundreds of wetland assessment and permitting projects throughout the southern US that have included jurisdictional wetland delineation; aerial photographic interpretation and mapping; habitat creation, enhancement, and reclamation; shoreline stabilization; and mitigation planning. Mr. Sherrod has been qualified as an expert witness in federal court regarding wetlands and endangered species issues and has been regularly invited to give presentations and lectures on these issues at conferences and universities. He has successfully represented public and private applicants in numerous Section 10(a)(1)(B) permits (Endangered Species Act incidental take of endangered species) issued in the Albuquerque Region of the US Fish and Wildlife Service as well as Section 7 consultations. He has certified training in HEP (US Fish and Wildlife Service Habitat Evaluation Procedure) and has participated in numerous HEP analyses, performing the computer analysis for many of these studies. He has also conducted numerous Hydrogeomorphic Model (HGM) analyses for wetland impacts and mitigation. He brings an enormous amount of practical experience and expertise to any project to facilitate regulatory permitting, particularly as related to wetlands and endangered species. His capabilities are based upon many baseline and impact assessments requiring statistically supportable quantitative data collected for vegetation and wildlife over large acreage project sites.



Brett A. Jordan PhD, PE CPESC
Hydraulic Engineer/Fluvial Geomorphologist

Education

- Ph.D** **Colorado State University, Fort Collins, CO, 2009**
Civil Engineering- Hydraulics/River Mechanics
- M.S.** **Colorado State University, Fort Collins, CO, 2004**
Civil Engineering- Hydraulics/River Mechanics
- B.S.** **Bryant University, Smithfield, RI, 1993**
Business Administration-cum laude

Registrations

Professional Engineer (Colorado, Texas)
Certified Professional Erosion and Sediment Control (CPESC)

Brett Jordan **PhD, PE** has 15 years of experience in hydrology, fluvial geomorphology, open channel hydraulics, storm water management, erosion control, sediment transport and stream restoration design in the academic and private consulting sectors. He has worked on over 60 different river systems ranging from steep mountain headwater streams to low gradient sand bed streams and coastal marshlands in the Inter-Mountain West, Pacific Northwest, Southeast and Gulf Coast regions. These projects have ranged from watershed scale analysis of sediment and nutrient transport, reach scale stream and coastal marshland restoration designs and site specific analysis of hydraulic structures. He has designed and built over 20 miles of stream rehabilitation projects and performed geomorphic assessment on over a hundred miles of stream. For each stream restoration project a comprehensive conceptual design alternative analysis is performed.

Dr. Jordan has also has taught graduate level courses in the Civil Engineering Department at Colorado State University and short courses to government agencies focusing on field data collection and geomorphic assessment and analysis of river systems. The Cache La Poudre River has been the field setting for many of these courses. These courses emphasize quantitative measurement of river attributes necessary for understanding natural channel geomorphic processes and designing stream restoration projects. In addition to teaching the field data analysis techniques, he has **implemented** identical techniques on successful stream and river projects in the Inter-Mountain West, Gulf the Pacific Northwest, and California.

Computer Proficiency

- HEC (HMS, HEC-RAS, SIAM, HEC-6)
- XPSTORM 2D FLOW MODELING
- GIS (ARC-GIS 9.2, ARC-INFO)
- GSTARS 1-D (Bureau of Reclamation sediment transport modeling software)
- AUTO-CAD Civil 3D
- RIVERMORPH
- STATISTICA (statistics software)

Publications (peer reviewed)

- Jordan BA, Annable WK, Watson CC, Sen D. (2009) Contrasting stream stability characteristics in adjacent urban watersheds: Santa Clara Valley, California. *Journal of River Research and Applications*. 25: 1-17.
- Jordan BA, Annable WK, Watson CC. (*Accepted in revision*) Urban watershed response to rapid valley subsidence, Santa Clara Valley, California. *Earth Surface Processes and Landforms*.

END OF PROSPECTUS