

Attachment H
Mitigation Plan

Block 23 – Mitigation Description

On April 13, 2022, a NWP 14 (SWG-2006-00484) was issued by the U.S. Army Corps of Engineers (USACE) Galveston District authorizing TxDOT to construct the proposed SH 146 from Fairmont Parkway to Red Bluff Road project. After SWG-2006-00484 was authorized TxDOT determined that additional unavoidable impacts to Ditch 2, Ditch 3, Ditch 4, Wetland 6, Wetland 7, Wetland 9, Wetland 10, and Wetland 18 were required. These additional unavoidable impacts were due to fill required to accommodate the appropriate grade on banks along the main lane and frontage road locations as well as a concrete batch plant that is required to construct the project. The construction of sidewalks along the corridor are included in this project as TxDOT often adds them to connect future state, city or county projects. Including the construction of sidewalks in the construction of this project would minimize overall costs, minimize community disruptions, and minimize future impacts to wetlands in the area. No work has occurred in any wetlands thus far and no work shall occur within these wetlands until this Standard Permit (SP) is authorized. TxDOT purchased 1.8 wetland credits for unavoidable impacts to Crossing 3 (0.476 acre) and Crossing 12 (0.24 acre). The previously permitted and mitigated portions of Crossing 3 and Crossing 12 would be deducted from the impact totals and compensatory mitigation under this permit application.

A total of 14.96 acres of jurisdictional waters including twenty freshwater wetlands (9.18 acres), five estuarine wetlands (2.80 acres), and one tidal perennial stream (2.98) were identified during the field reconnaissance for this project and 3.3413 acres of unavoidable permanent impacts to jurisdictional waters is anticipated as a result of the proposed project; however, a total of 0.7423 acre were previously permitted and mitigated for under SWG-2006-00484. No additional impacts to jurisdictional waters are anticipated to occur from the changes after SWG-2006-00484 was issued within the following nine crossings: Crossing 1, Crossing 2, Crossing 4, Crossing 5, Crossing 10, Crossing 11, Crossing 13, Crossing 14, and Crossing 15. Therefore, any proposed construction within those jurisdictional waters is authorized and permitted to begin under the SWG-2006-00484 which was issued on April 13, 2022. A total of 2.599 acres of additional impacts to jurisdictional waters are proposed in Crossing 3, Crossing 6, Crossing 7, Crossing 8, Crossing 9, and Crossing 12; therefore, will be permitted under this SP. All six crossings are anticipated to require mitigation measures and total 2.599 acres

The Gulf Coastal Plains Mitigation Bank has a service area that overlaps the proposed project area. The project area occurs within the secondary service area for this bank, so a 1.5 multiplier is required. The bank also only releases credits in a credit suite, meaning an equal amount in each Functional Capacity Unit (FCU) category determined by the highest value must be purchased. The Atlantic and Gulf Coastal Plains utilizes HGM interim (HGMI) assessments to mandate credits of wetlands or other water of the U.S. that are adversely impacted. This bank recognizes the HGMI assessment method and for credit purchases combines Palustrine Emergent (PEM) wetlands and Palustrine Scrub-Shrub (PSS) wetlands into one credit. A Wetland Functional Assessment Report (see **Attachment G**) was completed detailing the calculations for determining the functional loss of Temporary Storage & Detention of Storage Water (TSDSW), Maintain Plant and Animal Communities (MPAC), and

Block 23 – Mitigation Description

Removal & Sequestration of Elements & Compounds (RSEC) anticipated from unavoidable impacts to wetlands as a result of the proposed project. HGMi functional assessments that were completed for the four crossings which would require mitigation measures are depicted in **Table 1**.

Table 1: Mitigation Impacts

Feature Name	Wetlands	Wetland Acres/Permanent Impacted Acres	Formula Name	Pre-FCI/ Pre-FCU Scores	Post-FCI/ Post-FCU Scores	Net FCU Loss
Ditch 2 (Crossing 3)	Palustrine Emergent	2.23/2.23	TSDSW	0.506/1.129	0.000/0.000	1.129
			MPAC	0.667/1.487	0.100/0.223	1.264
			RSEC	0.580/1.293	0.060/0.134	1.160
Wetland 3 (Crossing 3)	Palustrine Emergent	0.21/0.02	TSDSW	0.548/0.115	0.548/0.104	0.011
			MPAC	0.750/0.158	0.750/0.143	0.015
			RSEC	0.707/0.148	0.707/0.134	0.014
Ditch 3 (Crossing 3)	Palustrine Scrub-Shrub	0.02/0.004	TSDSW	0.506/0.010	0.506/0.008	0.002
			MPAC	0.667/0.013	0.667/0.011	0.003
			RSEC	0.680/0.014	0.680/0.011	0.003
Ditch 4 (Crossing 3)	Palustrine Scrub-Shrub	0.17/0.03	TSDSW	0.376/0.064	0.376/0.053	0.011
			MPAC	0.450/0.077	0.450/0.063	0.014
			RSEC	0.587/0.100	0.537/0.075	0.025
Wetland 8 (Crossing 3)	Palustrine Scrub-Shrub	0.94/0.003	TSDSW	0.506/0.476	0.506/0.474	0.002
			MPAC	0.750/0.705	0.750/0.703	0.002
			RSEC	0.580/0.545	0.580/0.543	0.002
Wetland 11 (Crossing 3)	Palustrine Scrub-Shrub	2.80/0.00	TSDSW	N/A	N/A	N/A
			MPAC	N/A	N/A	N/A
			RSEC	N/A	N/A	N/A
Crossing 3 PSS/PEM Totals		6.37/2.287	TSDSW	N/A	N/A	1.155
			MPAC	N/A	N/A	1.298
			RSEC	N/A	N/A	1.202
Wetland 6 (Crossing 6)	Palustrine Emergent	0.01/0.01	TSDSW	0.479/0.005	0.000/0.000	0.005
			MPAC	0.617/0.006	0.100/0.001	0.005
			RSEC	0.540/0.005	0.060/0.001	0.005
Wetland 7 (Crossing 7)	Palustrine Scrub-Shrub	0.16/0.16	TSDSW	0.376/0.060	0.000/0.000	0.060
			MPAC	0.450/0.072	0.100/0.016	0.056
			RSEC	0.587/0.094	0.060/0.010	0.084
Wetland 9 (Crossing 8)	Palustrine Scrub-Shrub	0.10/0.10	TSDSW	0.506/0.051	0.000/0.000	0.051
			MPAC	0.750/0.075	0.100/0.010	0.065
			RSEC	0.580/0.058	0.060/0.006	0.052
Wetland 10 (Crossing 9)	Palustrine Emergent	0.06/0.06	TSDSW	0.403/0.024	0.000/0.000	0.024
			MPAC	0.617/0.037	0.100/0.006	0.031
			RSEC	0.490/0.029	0.060/0.003	0.026
Wetland 18 (Crossing 12)	Palustrine Emergent	0.70/0.70	TSDSW	0.479/0.336	0.000/0.000	0.336
			MPAC	0.617/0.432	0.100/0.070	0.362
			RSEC	0.540/0.378	0.060/0.042	0.336
All Crossings PSS/PEM Totals			TSDSW	N/A	N/A	1.631
			MPAC	N/A	N/A	1.817
			RSEC	N/A	N/A	1.705

Attachment B – HGMi Functional Assessment
Calculations

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant TxDOT, Houston District **WAA ID:** Ditch 2 - Crossing 3 **Acreage** 2.23

Vdur: The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway.		
Decision: In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days		
	Subindex	1
Comments: Ditch 2 is mapped within the 100-year floodplain.		

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.		
Decision: Floods or ponds 2 out of 5 years (100- year floodplain)		
	Subindex	0.5
Comments:		

Vtopo: The roughness associated with the WAA.		
Decision: Smooth, flat, or very gentle undulating with little or no topographic features		
	Subindex	0.1
Comments: Ditch 2 had a flat terrain. No significant topographic features were observed.		

Vwood: Percentage of the WAA that is covered by woody vegetation.		
Decision: 11 to 33% of the WAA is covered with woody vegetation		
	Subindex	0.25
Comments: No woody vegetation was observed within Ditch 2.		

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.		
Decision: Midstory coverage of the WAA is between 1-25%		
	Subindex	0.25
Comments: Limited midstory was observed within Ditch 2.		

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant	TxDOT, Houston District	WAA ID:	Ditch 2 - Crossing 3	Acreage	2.23
Vherb: The average/mean coverage of the WAA by the herbaceous layer.					
Decision:					
Herbaceous cover in the WAA averages greater than 75%					
				Subindex	1
Comments:					
Herbaceous vegetation was observed throughout almost the entire wetland area.					

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.					
Decision:					
Wetland plus two or more habitat type (other than forested) OR three or more habitat types					
				Subindex	0.75
Comments:					
The following habitats were located within 600 feet of Ditch 2: urban, maintained ROW (grass), and forested.					

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).					
Decision:					
Greater than 85% of the area possesses an O or A horizon					
				Subindex	1
Comments:					
O or A horizon was observed in Ditch 2.					

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.					
Decision:					
Redox features less than 20%					
				Subindex	0.1
Comments:					
Redox features were observed within Ditch 2; however, was less than 20 percent.					

Vsorp: The absorptive properties of the soils in the WAA.					
Decision:					
The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic (2					
				Subindex	1
Comments:					
The area was dominated by clay soils.					

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Ditch 2 - Crossing 3 **Acreage** 2.23

Vdur: The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway.		
Decision: The area is NOT subject to flooding		
	Subindex	0
Comments:		

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.		
Decision: The area is not subject to flooding or ponding (500 yr floodplain)		
	Subindex	0
Floods or pond annually 5 out of 5 years (floodway)		

Vtopo: The roughness associated with the WAA.		
Decision: Smooth, flat, or very gentle undulating with little or no topographic features		
	Subindex	0.1
Comments:		

Vwood: Percentage of the WAA that is covered by woody vegetation.		
Decision: 0-10% if the WAA is covered with woody vegetation		
	Subindex	0.1
Comments:		

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.		
Decision: Midstory coverage of the WAA is equal to or less than 1%		
	Subindex	0.1
Comments:		

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Ditch 2 - Crossing 3 **Acreage** 2.23

Vherb: The average/mean coverage of the WAA by the herbaceous layer.		
Decision: Herbaceous cover in the WAA is equal to or less than 1% (barren soil or all shrub)		
	Subindex	0.1
Comments:		

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.		
Decision: Surround by urban (homes, lawn, concrete, etc.)		
	Subindex	0.1
Comments:		

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).		
Decision: Site is plowed		
	Subindex	0.1
Comments:		

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.		
Decision: 0.1		
	Subindex	0.1
Comments:		

Vsorp: The absorptive properties of the soils in the WAA.		
Decision: 0.1		
	Subindex	0.1
Comments:		

Ditch 2 - Crossing 3

Total Acres	2.23
Impacted Acres	2.23

Wetland A (Pre Conditions)	
Variable	Subindex
Vdur	1
Vfreq	0.5
Vtopo	0.1
Vwood	0.25
Vmid	0.25
Vherb	1
Vdetritus	1
Vredox	0.1
Vsorpt	1
Vconnect	0.75

Wetland A (Post Conditions)	
Variable	Subindex
Vdur	0
Vfreq	0
Vtopo	0.1
Vwood	0.1
Vmid	0.1
Vherb	0.1
Vdetritus	0.1
Vredox	0.1
Vsorpt	0.1
Vconnect	0.1

Temporary Storage & Detention of Storage Water	
Square Root $\{ \{ \text{Square Root } \{Vdur \times Vfreq\} \times \{Vtopo + \{Vherb + Vmid\}/2\} / 2 \}$	
Pre Conditions = Square Root $\{ \{1.0 \times 0.75\} \times \{0.1 + \{1.0 + 0.1\}/2\} / 2 \}$	
Post Conditions = Square Root $\{ \{1.0 \times 0.75\} \times \{0.1 + \{1.0 + 0.1\}/2\} / 2 \}$	
Pre-FCI	0.506
Post-FCI	0.000

Maintain Plant and Animal Community	
$\{Vmid + Vherb + Vconnect\}/3$	
Pre Conditions = $\{0.1 + 1.0 + 1.0\}/3$	
Post Conditions = $\{0.1 + 1.0 + 1.0\}/3$	
Pre-FCI	0.667
Post-FCI	0.100

Removal & Sequestration of Elements & Compounds	
$\{ \{ [Vwood + Vfreq + Vdur + \{ \{Vtopo + Vherb + Vmid\}/3 \} + \{ \{Vdetritus + Vredox + Vsorpt\}/3 \}] / 5 \}$	
Pre Conditions = $\{ \{ [0.1 + 0.75 + 1.0 + \{ \{0.1 + 1.0 + 0.1\}/3 \} + \{ \{0.3 + 0.1 + 0.1\}/3 \}] / 5 \}$	
Post Conditions = $\{ \{ [0.1 + 0.75 + 1.0 + \{ \{0.1 + 1.0 + 0.1\}/3 \} + \{ \{0.3 + 0.1 + 0.1\}/3 \}] / 5 \}$	
Pre-FCI	0.580
Post-FCI	0.060

Function	Size (acre)		Pre FCI	Pre FCU	Post FCI	Post FCU	Net Loss
	Pre-Impact	Post-Impact					
Wetland A Temporary	2.230	2.230	0.506	1.129	0.000	0.000	1.129
Wetland A Maintain	2.230	2.230	0.667	1.487	0.100	0.223	1.264
Wetland A Removal	2.230	2.230	0.580	1.293	0.060	0.134	1.160

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 6 - Crossing 6 **Acreage** 0.01

Vdur: The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway.		
Decision: In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days		
	Subindex	1
Comments: Wetland 8 is mapped within the 100-year floodplain.		

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.		
Decision: Floods or ponds 2 out of 5 years (100- year floodplain)		
	Subindex	0.5
Comments: Wetland 8 floods or ponds 2 out of 5 years and is within the 100- year floodplain.		

Vtopo: The roughness associated with the WAA.		
Decision: Smooth, flat, or very gentle undulating with little or no topographic features		
	Subindex	0.1
Comments: Wetland 8 had a flat terrain. No significant topographic features were observed.		

Vwood: Percentage of the WAA that is covered by woody vegetation.		
Decision: 0-10% if the WAA is covered with woody vegetation		
	Subindex	0.1
Comments: Small amounts of woody vegetation was observed within Wetland 8.		

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.		
Decision: Midstory coverage of the WAA is equal to or less than1%		
	Subindex	0.1
Comments: No midstory was observed within Wetland 8.		

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant	TxDOT, Houston District	WAA ID:	Wet 3 - Crossing 3	Acreage	0.21
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Vdur: The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway.

Decision:
In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days

	Subindex	1
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Comments:
Wetland 3 is mapped within the 100-year floodplain.

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.

Decision:
Floods or ponds 2 out of 5 years (100- year floodplain)

	Subindex	0.5
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Comments:

Vtopo: The roughness associated with the WAA.

Decision:
Smooth, flat, or very gentle undulating with little or no topographic features

	Subindex	0.1
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Comments:
Wetland 3 had a flat terrain. No significant topographic features were observed.

Vwood: Percentage of the WAA that is covered by woody vegetation.

Decision:
34 to 66% of the WAA is covered with woody vegetation

	Subindex	0.5
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Comments:
Woody vegetation was observed within Wetland 3.

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.

Decision:
Midstory coverage of the WAA is between 25-50%

	Subindex	0.5
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Comments:
A midstory was observed within Wetland 3.

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 3 - Crossing 3 **Acreage** 0.21

Vherb: The average/mean coverage of the WAA by the herbaceous layer.		
Decision:		
Herbaceous cover in the WAA averages greater than 75%		
	Subindex	1
Comments:		
Herbaceous vegetation was observed throughout almost the entire wetland area.		

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.		
Decision:		
Wetland plus two or more habitat type (other than forested) OR three or more habitat types		
	Subindex	0.75
Comments:		
The following habitats were located within 600 feet of Wetland 3: urban, maintained ROW (grass), and forested.		

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).		
Decision:		
Greater than 85% of the area possesses an O or A horizon		
	Subindex	1
Comments:		
O or A horizon was observed in Wetland 3.		

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.		
Decision:		
Redox concentrations represent at least 20% of the pedon within the top 4 inches of the soil surface, or feature m		
	Subindex	1
Comments:		
Redox features were observed within Wetland 3 and were approximately 20 percent.		

Vsorp: The absorptive properties of the soils in the WAA.		
Decision:		
The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic		
	Subindex	1
Comments:		
The area was dominated by clay soils.		

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 3 - Crossing 3 **Acreage** 0.21

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

Decision:

In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days

	Subindex	1
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Comments:

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.

Decision:

Floods or ponds 2 out of 5 years (100- year floodplain)

	Subindex	0.5
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Floods or pond annually 5 out of 5 years (floodway)

Vtopo: The roughness associated with the WAA.

Decision:

Smooth, flat, or very gentle undulating with little or no topographic features

	Subindex	0.1
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Comments:

Vwood: Percentage of the WAA that is covered by woody vegetation.

Decision:

34 to 66% of the WAA is covered with woody vegetation

	Subindex	0.5
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Comments:

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.

Decision:

Midstory coverage of the WAA is between 25-50%

	Subindex	0.5
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Comments:

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 3 - Crossing 3 **Acreage** 0.21

Vherb: The average/mean coverage of the WAA by the herbaceous layer.		
Decision: Herbaceous cover in the WAA averages greater than 75%		
	Subindex	1
Comments:		

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.		
Decision: Wetland plus two or more habitat type (other than forested) OR three or more habitat types		
	Subindex	0.75
Comments:		

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).		
Decision: Greater than 85% of the area possesses an O or A horizon		
	Subindex	1
Comments:		

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.		
Decision: 1		
	Subindex	1
Comments:		

Vsorpt: The absorptive properties of the soils in the WAA.		
Decision: 1		
	Subindex	1
Comments:		

Wet 3 - Crossing 3

Total Acres	0.21
Impacted Acres	0.02

Wetland A (Pre Conditions)	
Variable	Subindex
Vdur	1
Vfreq	0.5
Vtopo	0.1
Vwood	0.5
Vmid	0.5
Vherb	1
Vdetritus	1
Vredox	1
Vsorpt	1
Vconnect	0.75

Wetland A (Post Conditions)	
Variable	Subindex
Vdur	1
Vfreq	0.5
Vtopo	0.1
Vwood	0.5
Vmid	0.5
Vherb	1
Vdetritus	1
Vredox	1
Vsorpt	1
Vconnect	0.75

Temporary Storage & Detention of Storage Water	
Square Root $[\{\text{Square Root } \{Vdur \times Vfreq\} \times \{Vtopo + \{Vherb + Vmid\}/2\}]/2$	
Pre Conditions = Square Root $[\{1.0 \times 0.75\} \times \{0.1 + \{1.0 + 0.1\}/2\}]/2$	
Post Conditions = Square Root $[\{1.0 \times 0.75\} \times \{0.1 + \{1.0 + 0.1\}/2\}]/2$	
Pre-FCI	0.548
Post-FCI	0.548

Maintain Plant and Animal Community	
$\{Vmid + Vherb + Vconnect\}/3$	
Pre Conditions = $\{0.1 + 1.0 + 1.0\}/3$	
Post Conditions = $\{0.1 + 1.0 + 1.0\}/3$	
Pre-FCI	0.750
Post-FCI	0.750

Removal & Sequestration of Elements & Compounds	
$[(Vwood + Vfreq + Vdur + \{Vtopo + Vherb + Vmid\}/3) + \{Vdetritus + Vredox + Vsorpt\}/3]/5$	
Pre Conditions = $[(0.1 + 0.75 + 1.0 + \{0.1 + 1.0 + 0.1\}/3) + \{0.3 + 0.1 + 0.1\}/3]/5$	
Post Conditions = $[(0.1 + 0.75 + 1.0 + \{0.1 + 1.0 + 0.1\}/3) + \{0.3 + 0.1 + 0.1\}/3]/5$	
Pre-FCI	0.707
Post-FCI	0.707

Function	Size (acre)		Pre FCI	Pre FCU	Post FCI	Post FCU	Net Loss
	Pre-Impact	Post-Impact					
Wetland A Temporary	0.210	0.190	0.548	0.115	0.548	0.104	0.011
Wetland A Maintain	0.210	0.190	0.750	0.158	0.750	0.143	0.015
Wetland A Removal	0.210	0.190	0.707	0.148	0.707	0.134	0.014

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant	TxDOT, Houston District	WAA ID:	Ditch 3 - Crossing 3	Acreage	0.02
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Vdur: The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway.

Decision:
In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days

	Subindex	1
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Comments:
Ditch 3 is mapped within the 100-year floodplain.

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.

Decision:
Floods or ponds 2 out of 5 years (100- year floodplain)

	Subindex	0.5
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Comments:

Vtopo: The roughness associated with the WAA.

Decision:
Smooth, flat, or very gentle undulating with little or no topographic features

	Subindex	0.1
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Comments:
Ditch 3 had a flat terrain. No significant topographic features were observed.

Vwood: Percentage of the WAA that is covered by woody vegetation.

Decision:
67 to 90 % of the WAA is covered with woody vegetation

	Subindex	0.75
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Comments:
Woody vegetation was observed within Ditch 3.

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.

Decision:
Midstory coverage of the WAA is between 1-25%

	Subindex	0.25
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Comments:
Limited midstory was observed within Ditch 3.

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant TxDOT, Houston District **WAA ID:** Ditch 3 - Crossing 3 **Acreage** **0.02**

Vherb: The average/mean coverage of the WAA by the herbaceous layer.		
Decision:		
Herbaceous cover in the WAA averages greater than 75%		
	Subindex	1
Comments:		
Herbaceous vegetation was observed throughout almost the entire wetland area.		

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.		
Decision:		
Wetland plus two or more habitat type (other than forested) OR three or more habitat types		
	Subindex	0.75
Comments:		
The following habitats were located within 600 feet of Ditch 3: urban, maintained ROW (grass), and forested.		

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).		
Decision:		
Greater than 85% of the area possesses an O or A horizon		
	Subindex	1
Comments:		
O or A horizon was observed in Ditch 3.		

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.		
Decision:		
Redox features less than 20%		
	Subindex	0.1
Comments:		
Redox features were observed within Ditch 3; however, was less than 20 percent.		

Vsorpt: The absorptive properties of the soils in the WAA.		
Decision:		
The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic		
	Subindex	1
Comments:		
The area was dominated by clay soils.		

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Ditch 3 - Crossing 3 **Acreage** 0.02

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

Decision:

In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days

	Subindex	1
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Comments:

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.

Decision:

Floods or ponds 2 out of 5 years (100- year floodplain)

	Subindex	0.5
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Floods or pond annually 5 out of 5 years (floodway)

Vtopo: The roughness associated with the WAA.

Decision:

Smooth, flat, or very gentle undulating with little or no topographic features

	Subindex	0.1
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Comments:

Vwood: Percentage of the WAA that is covered by woody vegetation.

Decision:

67 to 90 % of the WAA is covered with woody vegetation

	Subindex	0.75
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Comments:

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.

Decision:

Midstory coverage of the WAA is between 1-25%

	Subindex	0.25
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Comments:

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Ditch 3 - Crossing 3 **Acreage** 0.02

Vherb: The average/mean coverage of the WAA by the herbaceous layer.		
Decision:		
Herbaceous cover in the WAA averages greater than 75%		
	Subindex	1
Comments:		

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.		
Decision:		
Wetland plus two or more habitat type (other than forested) OR three or more habitat types		
	Subindex	0.75
Comments:		

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).		
Decision:		
Greater than 85% of the area possesses an O or A horizon		
	Subindex	1
Comments:		

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.		
Decision:		
0.1		
	Subindex	0.1
Comments:		

Vsorpt: The absorptive properties of the soils in the WAA.		
Decision:		
1		
	Subindex	1
Comments:		

Ditch 3 - Crossing 3

Total Acres	0.02
Impacted Acres	0.004

Wetland A (Pre Conditions)	
Variable	Subindex
Vdur	1
Vfreq	0.5
Vtopo	0.1
Vwood	0.75
Vmid	0.25
Vherb	1
Vdetritus	1
Vredox	0.1
Vsorpt	1
Vconnect	0.75

Wetland A (Post Conditions)	
Variable	Subindex
Vdur	1
Vfreq	0.5
Vtopo	0.1
Vwood	0.75
Vmid	0.25
Vherb	1
Vdetritus	1
Vredox	0.1
Vsorpt	1
Vconnect	0.75

Temporary Storage & Detention of Storage Water	
Square Root [$\{\text{Square Root}\{Vdur \times Vfreq\}\} \times \{Vtopo + \{Vherb + Vmid\}/2/2\}$]	
Pre Conditions = Square Root [$\{1.0 \times 0.75\} \times \{0.1 + \{1.0 + 0.1\}/2/2\}$]	
Post Conditions = Square Root [$\{1.0 \times 0.75\} \times \{0.1 + \{1.0 + 0.1\}/2/2\}$]	
Pre-FCI	0.506
Post-FCI	0.506

Maintain Plant and Animal Community	
$\{Vmid + Vherb + Vconnect\}/3$	
Pre Conditions = $\{0.1 + 1.0 + 1.0\}/3$	
Post Conditions = $\{0.1 + 1.0 + 1.0\}/3$	
Pre-FCI	0.667
Post-FCI	0.667

Removal & Sequestration of Elements & Compounds	
$[[Vwood + Vfreq + Vdur + [\{Vtopo + Vherb + Vmid\}/3] + [\{Vdetritus + Vredox + Vsorpt\}/3]]/5$	
Pre Conditions = $[[0.1 + 0.75 + 1.0 + [\{0.1 + 1.0 + 0.1\}/3] + [\{0.3 + 0.1 + 0.1\}/3]]/5$	
Post Conditions = $[[0.1 + 0.75 + 1.0 + [\{0.1 + 1.0 + 0.1\}/3] + [\{0.3 + 0.1 + 0.1\}/3]]/5$	
Pre-FCI	0.680
Post-FCI	0.680

Function	Size (acre)		Pre FCI	Pre FCU	Post FCI	Post FCU	Net Loss
	Pre-Impact	Post-Impact					
Wetland A Temporary	0.020	0.016	0.506	0.010	0.506	0.008	0.002
Wetland A Maintain	0.020	0.016	0.667	0.013	0.667	0.011	0.003
Wetland A Removal	0.020	0.016	0.680	0.014	0.680	0.011	0.003

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant	TxDOT, Houston District	WAA ID:	Ditch 4 - Crossing 3	Acreage	0.17
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Vdur: The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway.

Decision:
In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days

	Subindex	1
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Comments:
Ditch 4 is mapped within the 100-year floodplain.

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.

Decision:
Floods or ponds 2 out of 5 years (100- year floodplain)

	Subindex	0.5
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Comments:

Vtopo: The roughness associated with the WAA.

Decision:
Smooth, flat, or very gentle undulating with little or no topographic features

	Subindex	0.1
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Comments:
Ditch 4 had a flat terrain. No significant topographic features were observed.

Vwood: Percentage of the WAA that is covered by woody vegetation.

Decision:
34 to 66% of the WAA is covered with woody vegetation

	Subindex	0.5
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Comments:
Woody vegetation was observed within Ditch 4..

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.

Decision:
Midstory coverage of the WAA is between 1-25%

	Subindex	0.1
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Comments:
No midstory was observed within Ditch 4.

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant	TxDOT, Houston District	WAA ID:	Ditch 4 - Crossing 3	Acreage	0.17
Vherb: The average/mean coverage of the WAA by the herbaceous layer.					
Decision:					
Herbaceous cover in the WAA averages between 25-50%					
				Subindex	0.5
Comments:					
Herbaceous vegetation was observed throughout 25 to 50 percent of the wetland area.					

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.					
Decision:					
Wetland plus two or more habitat type (other than forested) OR three or more habitat types					
				Subindex	0.75
Comments:					
The following habitats were located within 600 feet of Ditch 2: urban, maintained ROW (grass), and forested.					

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).					
Decision:					
Greater than 85% of the area possesses an O or A horizon					
				Subindex	1
Comments:					
O or A horizon was observed in Ditch 4.					

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.					
Decision:					
Redox features less than 20%					
				Subindex	0.1
Comments:					
Redox features were observed within Ditch 4; however, was less than 20 percent.					

Vsorpt: The absorptive properties of the soils in the WAA.					
Decision:					
The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic					
				Subindex	1
Comments:					
The area was dominated by clay soils.					

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Ditch 4 - Crossing 3 **Acreage** 0.17

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

Decision:

In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days

	Subindex	1
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Comments:

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.

Decision:

Floods or ponds 2 out of 5 years (100- year floodplain)

	Subindex	0.5
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Floods or pond annually 5 out of 5 years (floodway)

Vtopo: The roughness associated with the WAA.

Decision:

Smooth, flat, or very gentle undulating with little or no topographic features

	Subindex	0.1
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Comments:

Vwood: Percentage of the WAA that is covered by woody vegetation.

Decision:

11 to 33% of the WAA is covered with woody vegetation

	Subindex	0.25
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Comments:

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.

Decision:

Midstory coverage of the WAA is equal to or less than 1%

	Subindex	0.1
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Comments:

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Ditch 4 - Crossing 3 **Acreage** 0.17

Vherb: The average/mean coverage of the WAA by the herbaceous layer.		
Decision:		
Herbaceous cover in the WAA is equal to or less than 1% (barren soil or all shrub)		
	Subindex	0.5
Comments:		

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.		
Decision:		
Wetland plus two or more habitat type (other than forested) OR three or more habitat types		
	Subindex	0.75
Comments:		

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).		
Decision:		
Greater than 85% of the area possesses an O or A horizon		
	Subindex	1
Comments:		

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.		
Decision:		
0.1		
	Subindex	0.1
Comments:		

Vsorp: The absorptive properties of the soils in the WAA.		
Decision:		
1		
	Subindex	1
Comments:		

Ditch 4 - Crossing 3

Total Acres	0.17
Impacted Acres	0.03

Wetland A (Pre Conditions)	
Variable	Subindex
Vdur	1
Vfreq	0.5
Vtopo	0.1
Vwood	0.5
Vmid	0.1
Vherb	0.5
Vdetritus	1
Vredox	0.1
Vsorpt	1
Vconnect	0.75

Wetland A (Post Conditions)	
Variable	Subindex
Vdur	1
Vfreq	0.5
Vtopo	0.1
Vwood	0.25
Vmid	0.1
Vherb	0.5
Vdetritus	1
Vredox	0.1
Vsorpt	1
Vconnect	0.75

Temporary Storage & Detention of Storage Water	
Square Root [$\{\text{Square Root}\{Vdur \times Vfreq\}\} \times \{Vtopo + \{Vherb + Vmid\}/2\}/2]$	
Pre Conditions = Square Root [$\{1.0 \times 0.75\} \times \{0.1 + \{1.0 + 0.1\}/2\}/2]$	
Post Conditions = Square Root [$\{1.0 \times 0.75\} \times \{0.1 + \{1.0 + 0.1\}/2\}/2]$	
Pre-FCI	0.376
Post-FCI	0.376

Maintain Plant and Animal Community	
$\{Vmid + Vherb + Vconnect\}/3$	
Pre Conditions = $\{0.1 + 1.0 + 1.0\}/3$	
Post Conditions = $\{0.1 + 1.0 + 1.0\}/3$	
Pre-FCI	0.450
Post-FCI	0.450

Removal & Sequestration of Elements & Compounds	
$[(Vwood + Vfreq + Vdur + \{Vtopo + Vherb + Vmid\}/3) + \{Vdetritus + Vredox + Vsorpt\}/3]/5$	
Pre Conditions = $[(0.1 + 0.75 + 1.0 + \{0.1 + 1.0 + 0.1\}/3) + \{0.3 + 0.1 + 0.1\}/3]/5$	
Post Conditions = $[(0.1 + 0.75 + 1.0 + \{0.1 + 1.0 + 0.1\}/3) + \{0.3 + 0.1 + 0.1\}/3]/5$	
Pre-FCI	0.587
Post-FCI	0.537

Function	Size (acre)		Pre FCI	Pre FCU	Post FCI	Post FCU	Net Loss
	Pre-Impact	Post-Impact					
Wetland A Temporary	0.170	0.140	0.376	0.064	0.376	0.053	0.011
Wetland A Maintain	0.170	0.140	0.450	0.077	0.450	0.063	0.014
Wetland A Removal	0.170	0.140	0.587	0.100	0.537	0.075	0.025

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant	TxDOT, Houston District	WAA ID:	Wet 8 - Crossing 3	Acreage	0.94
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Vdur: The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway.

Decision:
In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days

	Subindex	1
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Comments:
Wetland 8 is mapped within the 100-year floodplain.

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.

Decision:
Floods or ponds 2 out of 5 years (100- year floodplain)

	Subindex	0.5
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Comments:

Vtopo: The roughness associated with the WAA.

Decision:
Smooth, flat, or very gentle undulating with little or no topographic features

	Subindex	0.1
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Comments:
Wetland 8 had a flat terrain. No significant topographic features were observed.

Vwood: Percentage of the WAA that is covered by woody vegetation.

Decision:
11 to 33% of the WAA is covered with woody vegetation

	Subindex	0.25
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Comments:
Limited woody vegetation was observed within Wetland 8.

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.

Decision:
Midstory coverage of the WAA is between 1-25%

	Subindex	0.25
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Comments:
Limited midstory was observed within Wetland 8.

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 8 - Crossing 3 **Acreage** 0.94

Vherb: The average/mean coverage of the WAA by the herbaceous layer.		
Decision: Herbaceous cover in the WAA averages greater than 75%		
	Subindex	1
Comments: Herbaceous vegetation was observed throughout almost the entire wetland area.		

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.		
Decision: Wetland plus four habitats and/or surrounded by forested		
	Subindex	1
Comments: The following habitats were located within 600 feet of Wetland 8: urban, open water, maintained ROW (grass), and forested.		

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).		
Decision: Greater than 85% of the area possesses an O or A horizon		
	Subindex	1
Comments: O or A horizon was observed in Wetland 8.		

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.		
Decision: Redox features less than 20%		
	Subindex	0.1
Comments: Redox features were observed within Wetland 8; however, was less than 20 percent.		

Vsorp: The absorptive properties of the soils in the WAA.		
Decision: The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic		
	Subindex	1
Comments: The area was dominated by clay soils.		

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 8 - Crossing 3 **Acreage** 0.94

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

Decision:

In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days

	Subindex	1
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Comments:

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.

Decision:

Floods or ponds 2 out of 5 years (100- year floodplain)

	Subindex	0.5
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Floods or pond annually 5 out of 5 years (floodway)

Vtopo: The roughness associated with the WAA.

Decision:

Smooth, flat, or very gentle undulating with little or no topographic features

	Subindex	0.1
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Comments:

Vwood: Percentage of the WAA that is covered by woody vegetation.

Decision:

11 to 33% of the WAA is covered with woody vegetation

	Subindex	0.25
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Comments:

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.

Decision:

Midstory coverage of the WAA is between 1-25%

	Subindex	0.25
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Comments:

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 8 - Crossing 3 **Acreage** 0.94

Vherb: The average/mean coverage of the WAA by the herbaceous layer.		
Decision:		
Herbaceous cover in the WAA averages greater than 75%		
	Subindex	1
Comments:		

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.		
Decision:		
Wetland plus four habitats and/or surrounded by forested		
	Subindex	1
Comments:		

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).		
Decision:		
Greater than 85% of the area possesses an O or A horizon		
	Subindex	1
Comments:		

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.		
Decision:		
0.1		
	Subindex	0.1
Comments:		

Vsorp: The absorptive properties of the soils in the WAA.		
Decision:		
1		
	Subindex	1
Comments:		

Wet 8 - Crossing 3

Total Acres	0.94
Impacted Acres	0.003

Wetland A (Pre Conditions)	
Variable	Subindex
Vdur	1
Vfreq	0.5
Vtopo	0.1
Vwood	0.25
Vmid	0.25
Vherb	1
Vdetritus	1
Vredox	0.1
Vsorpt	1
Vconnect	1

Wetland A (Post Conditions)	
Variable	Subindex
Vdur	1
Vfreq	0.5
Vtopo	0.1
Vwood	0.25
Vmid	0.25
Vherb	1
Vdetritus	1
Vredox	0.1
Vsorpt	1
Vconnect	1

Temporary Storage & Detention of Storage Water	
Square Root $[\{\text{Square Root } \{Vdur \times Vfreq\} \times \{Vtopo + \{Vherb + Vmid\}/2\}/2]$	
Pre Conditions = Square Root $[\{1.0 \times 0.75\} \times \{0.1 + \{1.0 + 0.1\}/2\}/2]$	
Post Conditions = Square Root $[\{1.0 \times 0.75\} \times \{0.1 + \{1.0 + 0.1\}/2\}/2]$	
Pre-FCI	0.506
Post-FCI	0.506

Maintain Plant and Animal Community	
$\{Vmid + Vherb + Vconnect\}/3$	
Pre Conditions = $\{0.1 + 1.0 + 1.0\}/3$	
Post Conditions = $\{0.1 + 1.0 + 1.0\}/3$	
Pre-FCI	0.750
Post-FCI	0.750

Removal & Sequestration of Elements & Compounds	
$[(Vwood + Vfreq + Vdur + \{Vtopo + Vherb + Vmid\}/3) + \{Vdetritus + Vredox + Vsorpt\}/3]/5$	
Pre Conditions = $[(0.1 + 0.75 + 1.0 + \{0.1 + 1.0 + 0.1\}/3) + \{0.3 + 0.1 + 0.1\}/3]/5$	
Post Conditions = $[(0.1 + 0.75 + 1.0 + \{0.1 + 1.0 + 0.1\}/3) + \{0.3 + 0.1 + 0.1\}/3]/5$	
Pre-FCI	0.580
Post-FCI	0.580

Function	Size (acre)		Pre FCI	Pre FCU	Post FCI	Post FCU	Net Loss
	Pre-Impact	Post-Impact					
Wetland A Temporary	0.940	0.937	0.506	0.476	0.506	0.474	0.002
Wetland A Maintain	0.940	0.937	0.750	0.705	0.750	0.703	0.002
Wetland A Removal	0.940	0.937	0.580	0.545	0.580	0.543	0.002

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 6 - Crossing 6 **Acreage** 0.01

Vherb: The average/mean coverage of the WAA by the herbaceous layer.		
Decision: Herbaceous cover in the WAA averages greater than 75%		
	Subindex	1
Comments: Herbaceous vegetation was observed throughout almost the entire wetland area.		

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.		
Decision: Wetland plus two or more habitat type (other than forested) OR three or more habitat types		
	Subindex	0.75
Comments: The following habitats were located within 600 feet of Wetland 8: urban, maintained ROW (grass), and forested.		

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).		
Decision: Greater than 85% of the area possesses an O or A horizon		
	Subindex	1
Comments: O or A horizon was observed in Wetland 8.		

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.		
Decision: Redox features less than 20%		
	Subindex	0.1
Comments: Redox features were observed within Wetland 8; however, was less than 20 percent.		

Vsorpt: The absorptive properties of the soils in the WAA.		
Decision: The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic		
	Subindex	1
Comments: The area was dominated by clay soils.		

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 6 - Crossing 6 **Acreage** 0.01

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

Decision:

The area is NOT subject to flooding

Subindex

0

Comments:

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.

Decision:

The area is not subject to flooding or ponding (500 yr floodplain)

Subindex

0

Floods or pond annually 5 out of 5 years (floodway)

Vtopo: The roughness associated with the WAA.

Decision:

Smooth, flat, or very gentle undulating with little or no topographic features

Subindex

0.1

Comments:

Vwood: Percentage of the WAA that is covered by woody vegetation.

Decision:

0-10% if the WAA is covered with woody vegetation

Subindex

0.1

Comments:

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.

Decision:

Midstory coverage of the WAA is equal to or less than 1%

Subindex

0.1

Comments:

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 6 - Crossing 6 **Acreage** 0.01

Vherb: The average/mean coverage of the WAA by the herbaceous layer.		
Decision: Herbaceous cover in the WAA is equal to or less than 1% (barren soil or all shrub)		
	Subindex	0.1
Comments:		

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.		
Decision: Surround by urban (homes, lawn, concrete, etc.)		
	Subindex	0.1
Comments:		

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).		
Decision: Site is plowed		
	Subindex	0.1
Comments:		

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.		
Decision: 0.1		
	Subindex	0.1
Comments:		

Vsorpt: The absorptive properties of the soils in the WAA.		
Decision: 0.1		
	Subindex	0.1
Comments:		

Wet 6 - Crossing 6

Total Acres	0.01
Impacted Acres	0.010

Wetland A (Pre Conditions)	
Variable	Subindex
Vdur	1
Vfreq	0.5
Vtopo	0.1
Vwood	0.1
Vmid	0.1
Vherb	1
Vdetritus	1
Vredox	0.1
Vsorpt	1
Vconnect	0.75

Wetland A (Post Conditions)	
Variable	Subindex
Vdur	0
Vfreq	0
Vtopo	0.1
Vwood	0.1
Vmid	0.1
Vherb	0.1
Vdetritus	0.1
Vredox	0.1
Vsorpt	0.1
Vconnect	0.1

Temporary Storage & Detention of Storage Water	
Square Root $[\{\text{Square Root } \{Vdur \times Vfreq\}} \times \{Vtopo + \{Vherb + Vmid\}/2\}/2]$	
Pre Conditions = Square Root $[\{1.0 \times 0.75\} \times \{0.1 + \{1.0 + 0.1\}/2\}/2]$	
Post Conditions = Square Root $[\{1.0 \times 0.75\} \times \{0.1 + \{1.0 + 0.1\}/2\}/2]$	
Pre-FCI	0.479
Post-FCI	0.000

Maintain Plant and Animal Community	
$\{Vmid + Vherb + Vconnect\}/3$	
Pre Conditions = $\{0.1 + 1.0 + 1.0\}/3$	
Post Conditions = $\{0.1 + 1.0 + 1.0\}/3$	
Pre-FCI	0.617
Post-FCI	0.100

Removal & Sequestration of Elements & Compounds	
$[(Vwood + Vfreq + Vdur + \{Vtopo + Vherb + Vmid\}/3) + \{Vdetritus + Vredox + Vsorpt\}/3]/5$	
Pre Conditions = $[(0.1 + 0.75 + 1.0 + \{0.1 + 1.0 + 0.1\}/3) + \{0.3 + 0.1 + 0.1\}/3]/5$	
Post Conditions = $[(0.1 + 0.75 + 1.0 + \{0.1 + 1.0 + 0.1\}/3) + \{0.3 + 0.1 + 0.1\}/3]/5$	
Pre-FCI	0.540
Post-FCI	0.060

Function	Size (acre)		Pre FCI	Pre FCU	Post FCI	Post FCU	Net Loss
	Pre-Impact	Post-Impact					
Wetland A Temporary	0.010	0.010	0.479	0.005	0.000	0.000	0.005
Wetland A Maintain	0.010	0.010	0.617	0.006	0.100	0.001	0.005
Wetland A Removal	0.010	0.010	0.540	0.005	0.060	0.001	0.005

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant	TxDOT, Houston District	WAA ID:	Wet 7 - Crossing 7	Acreage	0.16
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Vdur: The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway.		
Decision:		
In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days		
	Subindex	1
Comments:		
Wetland 7 is mapped within the 100-year floodplain.		

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.		
Decision:		
Floods or ponds 2 out of 5 years (100- year floodplain)		
	Subindex	0.5
Comments:		

Vtopo: The roughness associated with the WAA.		
Decision:		
Smooth, flat, or very gentle undulating with little or no topographic features		
	Subindex	0.1
Comments:		
Wetland 7 had a flat terrain. No significant topographic features were observed.		

Vwood: Percentage of the WAA that is covered by woody vegetation.		
Decision:		
34 to 66% of the WAA is covered with woody vegetation		
	Subindex	0.5
Comments:		
Woody vegetation was observed within Wetland 7.		

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.		
Decision:		
Midstory coverage of the WAA is equal to or less than 1%		
	Subindex	0.1
Comments:		
No midstory was observed within Wetland 7.		

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant	TxDOT, Houston District	WAA ID:	Wet 7 - Crossing 7	Acreage	0.16
Vherb: The average/mean coverage of the WAA by the herbaceous layer.					
Decision:					
Herbaceous cover in the WAA averages between 25-50%					
				Subindex	0.5
Comments:					
Herbaceous vegetation was observed throughout 25 to 50 percent of the wetland area.					

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.					
Decision:					
Wetland plus four habitats and/or surrounded by forested					
				Subindex	0.75
Comments:					
The following habitats were located within 600 feet of Wetland 7: urban, maintained ROW (grass), and forested.					

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).					
Decision:					
Greater than 85% of the area possesses an O or A horizon					
				Subindex	1
Comments:					
O or A horizon was observed in Wetland 7.					

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.					
Decision:					
Redox features less than 20%					
				Subindex	0.1
Comments:					
Redox features were observed within Wetland 7; however, was less than 20 percent.					

Vsorp: The absorptive properties of the soils in the WAA.					
Decision:					
The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic (2					
				Subindex	1
Comments:					
The area was dominated by clay soils.					

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 7 - Crossing 7 **Acreage** 0.16

Vdur: The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway.		
Decision: The area is NOT subject to flooding		
	Subindex	0
Comments:		

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.		
Decision: The area is not subject to flooding or ponding (500 yr floodplain)		
	Subindex	0
Floods or pond annually 5 out of 5 years (floodway)		

Vtopo: The roughness associated with the WAA.		
Decision: Smooth, flat, or very gentle undulating with little or no topographic features		
	Subindex	0.1
Comments:		

Vwood: Percentage of the WAA that is covered by woody vegetation.		
Decision: 0-10% if the WAA is covered with woody vegetation		
	Subindex	0.1
Comments:		

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.		
Decision: Midstory coverage of the WAA is equal to or less than 1%		
	Subindex	0.1
Comments:		

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 7 - Crossing 7 **Acreage** 0.16

Vherb: The average/mean coverage of the WAA by the herbaceous layer.		
Decision: Herbaceous cover in the WAA is equal to or less than 1% (barren soil or all shrub)		
	Subindex	0.1
Comments:		

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.		
Decision: Surround by urban (homes, lawn, concrete, etc.)		
	Subindex	0.1
Comments:		

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).		
Decision: Site is plowed		
	Subindex	0.1
Comments:		

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.		
Decision: 0.1		
	Subindex	0.1
Comments:		

Vsorp: The absorptive properties of the soils in the WAA.		
Decision: 0.1		
	Subindex	0.1
Comments:		

Wet 7 - Crossing 7

Total Acres	0.16
Impacted Acres	0.16

Wetland A (Pre Conditions)	
Variable	Subindex
Vdur	1
Vfreq	0.5
Vtopo	0.1
Vwood	0.5
Vmid	0.1
Vherb	0.5
Vdetritus	1
Vredox	0.1
Vsorpt	1
Vconnect	0.75

Wetland A (Post Conditions)	
Variable	Subindex
Vdur	0
Vfreq	0
Vtopo	0.1
Vwood	0.1
Vmid	0.1
Vherb	0.1
Vdetritus	0.1
Vredox	0.1
Vsorpt	0.1
Vconnect	0.1

Temporary Storage & Detention of Storage Water	
Square Root [{{Square Root {Vdur x Vfreq}} X {Vtopo + {Vherb + Vmid}/2}/2]	
Pre Conditions = Square Root [{1.0 x 0.75} X {0.1 + {1.0 + 0.1}/2}/2]	
Post Conditions = Square Root[{1.0 x 0.75} X {0.1 + {1.0 + 0.1}/2}/2]	
Pre-FCI	0.376
Post-FCI	0.000

Maintain Plant and Animal Community	
{Vmid + Vherb + Vconnect}/3	
Pre Conditions = {0.1 + 1.0 + 1.0}/3	
Post Conditions = {0.1 + 1.0 + 1.0}/3	
Pre-FCI	0.450
Post-FCI	0.100

Removal & Sequestration of Elements & Compounds	
[[Vwood + Vfreq + Vdur + {{Vtopo + Vherb + Vmid}/3} + {{Vdetritus + Vredox + Vsorpt}/3}]/5	
Pre Conditions = [[0.1 + 0.75 + 1.0 + {{0.1 + 1.0 + 0.1}/3} + {{0.3 + 0.1 + 0.1}/3}]/5	
Post Conditions = [[0.1 + 0.75 + 1.0 + {{0.1 + 1.0 + 0.1}/3} + {{0.3 + 0.1 + 0.1}/3}]/5	
Pre-FCI	0.587
Post-FCI	0.060

Function	Size (acre)		Pre FCI	Pre FCU	Post FCI	Post FCU	Net Loss
	Pre-Impact	Post-Impact					
Wetland A Temporary	0.160	0.160	0.376	0.060	0.000	0.000	0.060
Wetland A Maintain	0.160	0.160	0.450	0.072	0.100	0.016	0.056
Wetland A Removal	0.160	0.160	0.587	0.094	0.060	0.010	0.084

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant	TxDOT, Houston District	WAA ID:	Wet 9 - Crossing 8	Acreage	0.10
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Vdur: The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway.		
Decision:		
In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days		
	Subindex	1
Comments:		
Wetland 9 is mapped within the 100-year floodplain.		

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.		
Decision:		
Floods or ponds 2 out of 5 years (100- year floodplain)		
	Subindex	0.5
Comments:		

Vtopo: The roughness associated with the WAA.		
Decision:		
Smooth, flat, or very gentle undulating with little or no topographic features		
	Subindex	0.1
Comments:		
Wetland 9 had a flat terrain. No significant topographic features were observed.		

Vwood: Percentage of the WAA that is covered by woody vegetation.		
Decision:		
11 to 33% of the WAA is covered with woody vegetation		
	Subindex	0.25
Comments:		
Limited woody vegetation was observed within Wetland 9.		

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.		
Decision:		
Midstory coverage of the WAA is between 1-25%		
	Subindex	0.25
Comments:		
Limited midstory was observed within Wetland 9.		

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 9 - Crossing 8 **Acreage** **0.10**

Vherb: The average/mean coverage of the WAA by the herbaceous layer.		
Decision: Herbaceous cover in the WAA averages greater than 75%		
	Subindex	1
Comments: Herbaceous vegetation was observed throughout almost the entire wetland area.		

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.		
Decision: Wetland plus four habitats and/or surrounded by forested		
	Subindex	1
Comments: The following habitats were located within 600 feet of Wetland 9: urban, open water, maintained ROW (grass), and forested.		

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).		
Decision: Greater than 85% of the area possesses an O or A horizon		
	Subindex	1
Comments: O or A horizon was observed in Wetland 9.		

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.		
Decision: Redox features less than 20%		
	Subindex	0.1
Comments: Redox features were observed within Wetland 9; however, was less than 20 percent.		

Vsorp: The absorptive properties of the soils in the WAA.		
Decision: The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic (2		
	Subindex	1
Comments: The area was dominated by clay soils.		

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 9 - Crossing 8 **Acreage** 0.10

Vdur: The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway.		
Decision: The area is NOT subject to flooding		
	Subindex	0
Comments:		

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.		
Decision: The area is not subject to flooding or ponding (500 yr floodplain)		
	Subindex	0
Floods or pond annually 5 out of 5 years (floodway)		

Vtopo: The roughness associated with the WAA.		
Decision: Smooth, flat, or very gentle undulating with little or no topographic features		
	Subindex	0.1
Comments:		

Vwood: Percentage of the WAA that is covered by woody vegetation.		
Decision: 0-10% if the WAA is covered with woody vegetation		
	Subindex	0.1
Comments:		

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.		
Decision: Midstory coverage of the WAA is equal to or less than 1%		
	Subindex	0.1
Comments:		

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 9 - Crossing 8 **Acreage** 0.10

Vherb: The average/mean coverage of the WAA by the herbaceous layer.		
Decision: Herbaceous cover in the WAA is equal to or less than 1% (barren soil or all shrub)		
	Subindex	0.1
Comments:		

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.		
Decision: Surround by urban (homes, lawn, concrete, etc.)		
	Subindex	0.1
Comments:		

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).		
Decision: Site is plowed		
	Subindex	0.1
Comments:		

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.		
Decision: 0.1		
	Subindex	0.1
Comments:		

Vsorp: The absorptive properties of the soils in the WAA.		
Decision: 0.1		
	Subindex	0.1
Comments:		

Wet 9 - Crossing 8

Total Acres	0.10
Impacted Acres	0.10

Wetland A (Pre Conditions)	
Variable	Subindex
Vdur	1
Vfreq	0.5
Vtopo	0.1
Vwood	0.25
Vmid	0.25
Vherb	1
Vdetritus	1
Vredox	0.1
Vsorpt	1
Vconnect	1

Wetland A (Post Conditions)	
Variable	Subindex
Vdur	0
Vfreq	0
Vtopo	0.1
Vwood	0.1
Vmid	0.1
Vherb	0.1
Vdetritus	0.1
Vredox	0.1
Vsorpt	0.1
Vconnect	0.1

Temporary Storage & Detention of Storage Water	
Square Root [{{Square Root {Vdur x Vfreq}} X {Vtopo + {Vherb + Vmid}/2/2}]	
Pre Conditions = Square Root [{{1.0 x 0.75}} X {0.1 + {1.0 + 0.1}/2/2}]	
Post Conditions = Square Root[{{1.0 x 0.75}} X {0.1 + {1.0 + 0.1}/2/2}]	
Pre-FCI	0.506
Post-FCI	0.000

Maintain Plant and Animal Community	
{Vmid + Vherb + Vconnect}/3	
Pre Conditions = {0.1 + 1.0 + 1.0}/3	
Post Conditions = {0.1 + 1.0 + 1.0}/3	
Pre-FCI	0.750
Post-FCI	0.100

Removal & Sequestration of Elements & Compounds	
[[Vwood + Vfreq + Vdur + {{Vtopo + Vherb + Vmid}/3}] + {{Vdetritus + Vredox + Vsorpt}/3}]/5	
Pre Conditions = [[0.1 + 0.75 + 1.0 + {{0.1 + 1.0 + 0.1}/3}] + {{0.3 + 0.1 + 0.1}/3}]/5	
Post Conditions = [[0.1 + 0.75 + 1.0 + {{0.1 + 1.0 + 0.1}/3}] + {{0.3 + 0.1 + 0.1}/3}]/5	
Pre-FCI	0.580
Post-FCI	0.060

Function	Size (acre)		Pre FCI	Pre FCU	Post FCI	Post FCU	Net Loss
	Pre-Impact	Post-Impact					
Wetland A Temporary	0.100	0.100	0.506	0.051	0.000	0.000	0.051
Wetland A Maintain	0.100	0.100	0.750	0.075	0.100	0.010	0.065
Wetland A Removal	0.100	0.100	0.580	0.058	0.060	0.006	0.052

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 10 - Crossing 9 **Acreage** 0.06

Vdur: The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway.		
Decision: In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days		
	Subindex	1
Comments: Wetland 10 is mapped within the 100-year floodplain.		

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.		
Decision: Floods or ponds 2 out of 5 years (100- year floodplain)		
	Subindex	0.25
Comments: Wetland 10 floods or ponds 2 out of 5 years and is within the 100- year floodplain but there are no notable elevation changes within this wetland.		

Vtopo: The roughness associated with the WAA.		
Decision: Smooth, flat, or very gentle undulating with little or no topographic features		
	Subindex	0.1
Comments: Wetland 10 had a flat terrain. No significant topographic features were observed.		

Vwood: Percentage of the WAA that is covered by woody vegetation.		
Decision: 0-10% if the WAA is covered with woody vegetation		
	Subindex	0.1
Comments: No woody vegetation was observed within Wetland 10.		

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.		
Decision: Midstory coverage of the WAA is equal to or less than 1%		
	Subindex	0.1
Comments: No midstory was observed within Wetland 10.		

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 10 - Crossing 9 **Acreage** 0.06

Vherb: The average/mean coverage of the WAA by the herbaceous layer.		
Decision: Herbaceous cover in the WAA averages greater than 75%		
	Subindex	1
Comments: Herbaceous vegetation was observed throughout almost the entire wetland area.		

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.		
Decision: Wetland plus two or more habitat type (other than forested) OR three or more habitat types		
	Subindex	0.75
Comments: The following habitats were located within 600 feet of Wetland 10: urban, maintained ROW (grass), and forested.		

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).		
Decision: Greater than 85% of the area possesses an O or A horizon		
	Subindex	1
Comments: O or A horizon was observed in Wetland 10.		

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.		
Decision: Redox features less than 20%		
	Subindex	0.1
Comments: Redox features were observed within Wetland 10; however, was less than 20 percent.		

Vsorpt: The absorptive properties of the soils in the WAA.		
Decision: The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic		
	Subindex	1
Comments: The area was dominated by clay soils.		

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 10 - Crossing 9 **Acreage** 0.06

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

Decision:

The area is NOT subject to flooding

Subindex

0

Comments:

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.

Decision:

The area is not subject to flooding or ponding (500 yr floodplain)

Subindex

0

Floods or pond annually 5 out of 5 years (floodway)

Vtopo: The roughness associated with the WAA.

Decision:

Smooth, flat, or very gentle undulating with little or no topographic features

Subindex

0.1

Comments:

Vwood: Percentage of the WAA that is covered by woody vegetation.

Decision:

0-10% if the WAA is covered with woody vegetation

Subindex

0.1

Comments:

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.

Decision:

Midstory coverage of the WAA is equal to or less than 1%

Subindex

0.1

Comments:

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 10 - Crossing 9 **Acreage** 0.06

Vherb: The average/mean coverage of the WAA by the herbaceous layer.		
Decision: Herbaceous cover in the WAA is equal to or less than 1% (barren soil or all shrub)		
	Subindex	0.1
Comments:		

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.		
Decision: Surround by urban (homes, lawn, concrete, etc.)		
	Subindex	0.1
Comments:		

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).		
Decision: Site is plowed		
	Subindex	0.1
Comments:		

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.		
Decision: 0.1		
	Subindex	0.1
Comments:		

Vsorpt: The absorptive properties of the soils in the WAA.		
Decision: 0.1		
	Subindex	0.1
Comments:		

Wet 10 - Crossing 9

Total Acres	0.06
Impacted Acres	0.06

Wetland A (Pre Conditions)	
Variable	Subindex
Vdur	1
Vfreq	0.25
Vtopo	0.1
Vwood	0.1
Vmid	0.1
Vherb	1
Vdetritus	1
Vredox	0.1
Vsorpt	1
Vconnect	0.75

Wetland A (Post Conditions)	
Variable	Subindex
Vdur	0
Vfreq	0
Vtopo	0.1
Vwood	0.1
Vmid	0.1
Vherb	0.1
Vdetritus	0.1
Vredox	0.1
Vsorpt	0.1
Vconnect	0.1

Temporary Storage & Detention of Storage Water	
Square Root $[\{\text{Square Root } \{Vdur \times Vfreq\} \times \{Vtopo + \{Vherb + Vmid\}/2\}/2]$	
Pre Conditions = Square Root $[\{1.0 \times 0.75\} \times \{0.1 + \{1.0 + 0.1\}/2\}/2]$	
Post Conditions = Square Root $[\{1.0 \times 0.75\} \times \{0.1 + \{1.0 + 0.1\}/2\}/2]$	
Pre-FCI	0.403
Post-FCI	0.000

Maintain Plant and Animal Community	
$\{Vmid + Vherb + Vconnect\}/3$	
Pre Conditions = $\{0.1 + 1.0 + 1.0\}/3$	
Post Conditions = $\{0.1 + 1.0 + 1.0\}/3$	
Pre-FCI	0.617
Post-FCI	0.100

Removal & Sequestration of Elements & Compounds	
$[(Vwood + Vfreq + Vdur + \{Vtopo + Vherb + Vmid\}/3) + \{Vdetritus + Vredox + Vsorpt\}/3]/5$	
Pre Conditions = $[(0.1 + 0.75 + 1.0 + \{0.1 + 1.0 + 0.1\}/3) + \{0.3 + 0.1 + 0.1\}/3]/5$	
Post Conditions = $[(0.1 + 0.75 + 1.0 + \{0.1 + 1.0 + 0.1\}/3) + \{0.3 + 0.1 + 0.1\}/3]/5$	
Pre-FCI	0.490
Post-FCI	0.060

Function	Size (acre)		Pre FCI	Pre FCU	Post FCI	Post FCU	Net Loss
	Pre-Impact	Post-Impact					
Wetland A Temporary	0.060	0.058	0.403	0.024	0.000	0.000	0.024
Wetland A Maintain	0.060	0.058	0.617	0.037	0.100	0.006	0.031
Wetland A Removal	0.060	0.058	0.490	0.029	0.060	0.003	0.026

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant	TxDOT, Houston District	WAA ID:	Wet 18 - Crossing 12	Acreage	0.70
Vdur: The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway.					
Decision:					
In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days					
				Subindex	1
Comments:					
Wetland 18 is mapped within the 100-year floodplain.					

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.					
Decision:					
Floods or ponds 2 out of 5 years (100- year floodplain)					
				Subindex	0.5
Comments:					

Vtopo: The roughness associated with the WAA.					
Decision:					
Smooth, flat, or very gentle undulating with little or no topographic features					
				Subindex	0.1
Comments:					
Wetland 18 had a flat terrain. No significant topographic features were observed.					

Vwood: Percentage of the WAA that is covered by woody vegetation.					
Decision:					
0-10% if the WAA is covered with woody vegetation					
				Subindex	0.1
Comments:					
No woody vegetation was observed within Wetland 18.					

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.					
Decision:					
Midstory coverage of the WAA is equal to or less than1%					
				Subindex	0.1
Comments:					
No midstory was observed within Wetland 18.					

Riverine Herbaceous/Shrub HGM (Interim) Assessment Pre-Impacts

Applicant	TxDOT, Houston District	WAA ID:	Wet 18 - Crossing 12	Acreage	0.70
Vherb: The average/mean coverage of the WAA by the herbaceous layer.					
Decision:					
Herbaceous cover in the WAA averages greater than 75%					
				Subindex	1
Comments:					
Herbaceous vegetation was observed throughout almost the entire wetland area.					

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.					
Decision:					
Wetland plus two or more habitat type (other than forested) OR three or more habitat types					
				Subindex	0.75
Comments:					
The following habitats were located within 600 feet of Wetland 18: urban, maintained ROW (grass), and forested.					

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).					
Decision:					
Greater than 85% of the area possesses an O or A horizon					
				Subindex	1
Comments:					
O or A horizon was observed in Wetland 18.					

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.					
Decision:					
Redox features less than 20%					
				Subindex	0.1
Comments:					
Redox features were observed within Wetland 8; however, was less than 20 percent.					

Vsorp: The absorptive properties of the soils in the WAA.					
Decision:					
The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic (2					
				Subindex	1
Comments:					
The area was dominated by clay soils.					

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 18 - Crossing 12 **Acreage** 0.70

Vdur: The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway.		
Decision: The area is NOT subject to flooding		
	Subindex	0
Comments:		

Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway.		
Decision: The area is not subject to flooding or ponding (500 yr floodplain)		
	Subindex	0
Floods or pond annually 5 out of 5 years (floodway)		

Vtopo: The roughness associated with the WAA.		
Decision: Smooth, flat, or very gentle undulating with little or no topographic features		
	Subindex	0.1
Comments:		

Vwood: Percentage of the WAA that is covered by woody vegetation.		
Decision: 0-10% if the WAA is covered with woody vegetation		
	Subindex	0.1
Comments:		

Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.		
Decision: Midstory coverage of the WAA is equal to or less than 1%		
	Subindex	0.1
Comments:		

Riverine Herbaceous/Shrub HGM (Interim) Assessment Post-Impacts

Applicant TxDOT, Houston District **WAA ID:** Wet 18 - Crossing 12 **Acreage** 0.70

Vherb: The average/mean coverage of the WAA by the herbaceous layer.		
Decision: Herbaceous cover in the WAA is equal to or less than 1% (barren soil or all shrub)		
	Subindex	0.1
Comments:		

Vconnect: The number of habitat types within a 600' of the parameter of the WAA.		
Decision: Surround by urban (homes, lawn, concrete, etc.)		
	Subindex	0.1
Comments:		

Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less).		
Decision: Site is plowed		
	Subindex	0.1
Comments:		

Vredox: The amount of the WAA that exhibits redox features an indication of the chemical exchange.		
Decision: 0.1		
	Subindex	0.1
Comments:		

Vsorp: The absorptive properties of the soils in the WAA.		
Decision: 0.1		
	Subindex	0.1
Comments:		

Wet 18 - Crossing 12

Total Acres	0.70
Impacted Acres	0.70

Wetland A (Pre Conditions)	
Variable	Subindex
Vdur	1
Vfreq	0.5
Vtopo	0.1
Vwood	0.1
Vmid	0.1
Vherb	1
Vdetritus	1
Vredox	0.1
Vsorpt	1
Vconnect	0.75

Wetland A (Post Conditions)	
Variable	Subindex
Vdur	0
Vfreq	0
Vtopo	0.1
Vwood	0.1
Vmid	0.1
Vherb	0.1
Vdetritus	0.1
Vredox	0.1
Vsorpt	0.1
Vconnect	0.1

Temporary Storage & Detention of Storage Water	
Square Root $\{ \{ \text{Square Root } \{Vdur \times Vfreq\} \} \times \{Vtopo + \{Vherb + Vmid\}/2\} / 2$	
Pre Conditions = Square Root $\{ \{ 1.0 \times 0.75 \} \times \{ 0.1 + \{ 1.0 + 0.1 \} / 2 \} / 2$	
Post Conditions = Square Root $\{ \{ 1.0 \times 0.75 \} \times \{ 0.1 + \{ 1.0 + 0.1 \} / 2 \} / 2$	
Pre-FCI	0.479
Post-FCI	0.000

Maintain Plant and Animal Community	
$\{Vmid + Vherb + Vconnect\} / 3$	
Pre Conditions = $\{ 0.1 + 1.0 + 1.0 \} / 3$	
Post Conditions = $\{ 0.1 + 1.0 + 1.0 \} / 3$	
Pre-FCI	0.617
Post-FCI	0.100

Removal & Sequestration of Elements & Compounds	
$\{ [Vwood + Vfreq + Vdur + \{Vtopo + Vherb + Vmid\} / 3] + \{Vdetritus + Vredox + Vsorpt\} / 3 \} / 5$	
Pre Conditions = $\{ [0.1 + 0.75 + 1.0 + \{0.1 + 1.0 + 0.1\} / 3] + \{0.3 + 0.1 + 0.1\} / 3 \} / 5$	
Post Conditions = $\{ [0.1 + 0.75 + 1.0 + \{0.1 + 1.0 + 0.1\} / 3] + \{0.3 + 0.1 + 0.1\} / 3 \} / 5$	
Pre-FCI	0.540
Post-FCI	0.060

Function	Size (acre)		Pre FCI	Pre FCU	Post FCI	Post FCU	Net Loss
	Pre-Impact	Post-Impact					
Wetland A Temporary	0.700	0.700	0.479	0.336	0.000	0.000	0.336
Wetland A Maintain	0.700	0.700	0.617	0.432	0.100	0.070	0.362
Wetland A Removal	0.700	0.700	0.540	0.378	0.060	0.042	0.336