# **Appendix J – Cost Engineering**

Lower Guadalupe Feasibility Study (Guadalupe and Blanco Rivers), TX Integrated Draft Feasibility Report and Environmental Impact Assessment

December 2019



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# Appendix J

# **Detailed Cost Estimate and Cost Analysis**

# **Project Goals and Objectives**

The purpose of the study was to determine how to effectively address the flood risk in the Lower Guadalupe Blanco River Basin. The study used previous studies completed by Halff and Associates at the request of the Guadalupe-Blanco River Authority (GBRA), the non-Federal Sponsor (NFS). Those Halff studies identified 11 damage centers, and potential solutions to the 4 damage centers with the greatest flood risk.

The study specific objectives for the study from the year 2028 to 2078 for the focused damage centers of Lower Guadalupe River Basin are:

- 1. Reduce flood risks to human health and safety
- 2. Reduce flood damages to buildings, property

The study specific constraints are:

- 1. Minimize impacts to the recharge of the Edwards Aquifer and coordinate any impacts with the Texas Commission on Environmental Quality (TCEQ)
- 2. Avoid reduction in flows from the aquifer, alter cave systems, or decrease surface water quality at the Edwards Aquifer-fed Comal and San Marcos Springs
- Minimize impacts to Nesting Habitat for the endangered Golden Cheeked Warbler

Minimize negative impacts to cultural resources

# Methodology

To arrive at the current costs for each of the alternative, the MII V 4.4 software and 2016 cost books (latest available versions) were used for plan formulation and then the final numbers for the Tentatively Selected Plan (TSP) were updated to the newer MII V 4.4.2 and 2016 cost books, and escalated to current pricing. This is the most current version of the MCACES software. The remaining measures in the estimate are broken out based on the Civil Works Work Breakdown Structure (CWWBS). The project had multiple flood risk management and mitigation options. After going through all of them the final options for the Tentatively Selected Plan were developed. There were three measures and broken out into options with different environmental alternatives. The costs for each were developed and the most cost effective for this project was deemed

to be the TSP. The estimate currently includes construction, relocations, plantings, PED and Construction Management costs, and contingency (based on the Abbreviated Risk Analysis).

# **Assumptions and Constraints**

The assumption for this project is that all work will be done within the existing right of way and some Real Estates will have to be acquired. There are two bridges within the construction limits and they will impact in Option 1 & 2. Option 1 will include the demolition of Cummings Dam and Option 2 will include the demolition of Textile Mill Dam. Based on the TSP that was chosen, a planning level recreation plan was determined to stay within the allotted 10% of the federal costs.

# Alternatives

Original alternatives included Blanco River Bypass Channel, Bear Creek Detention, and Blanco River Detention at various heights. The alternatives were reviewed by the team and the most cost effective for the benefits available was chosen. The first costs for the alternatives are:

Blanco River Detention (60' height) - \$53,443,000 Blanco River Detention (65' height) - \$60,638,000 Blanco River Detention (73' height) - \$73,014,000 Blanco River Bypass Channel - \$52,503,000 Bear Creek Detention - \$21,774,000

# Risks

After having the Project Development Team complete the abbreviated risk analysis for this project it was determined that contingencies for this project range from 10% for mitigation to 43% for relocations. The higher risks come from the Special Construction or Fabrication, Project Scope Growth, and Acquisition Strategy.

The information received from Civil Design section for Option 3 to install Instream Riffle/Boulder Structure for a total of 8 units was considered. However, it has been determined that this method was not the best option based on not cost effective when compared it to other options.

## **Recommended Plan**

After analyzing the costs and the risks associated with the various alternative, the recommended plan is Bear Creek Detention with Mitigation Option 1. The plan is the

most cost effective when compared to Option 2 & 3. The first cost for the TSP is \$39,042,000.00. After input from geotech it was determined the type of structure would have to be changed and would increase the Roller Compacted Concrete more than 3 times the original qtys, after updating all the corresponding information the revised project first cost was shown to be \$70,293,000.00

### Lower Guadalupe - TSP

### The Markups for the Prime Contractor are as follows:

For work completed by the Prime: JOOH - Calculated HOOH - 8% Profit - 10.8% Bond - Bond Table

Work Completed by the Subcontractor: JOOH - 10% HOOH - 8% Profit - 10.8%

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6/20/2019
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Labor ID: NLS2016 EQ ID: EP16R06

Project Cost Summary Report Page 1

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectCost	SubCMU	PrimeCMU	Escalation	ProjectCost
Project Cost Summary Report			2,371,825	550,694	19,477,568	9,470,577	38,589,237	5,519,554	8,580,025	0	52,688,816
1 Tentatively Selected Plan	1.00	EA	2,371,824.71 <b>2,371,825</b>	550,693.56 <b>550,694</b>	19,477,568.34 <b>19,477,568</b>	9,470,577.36 <b>9,470,57</b> 7	38,589,236.96 <b>38,589,237</b>	5,519,554	8,580,025	0	52,688,816.06 <b>52,688,816</b>
1.1 Real Estate - LERRDs	1.00	EA	0.00 <b>0</b>	0.00 0	0.00 <b>0</b>	0.00 <b>0</b>	5,745,000.00 <b>5,745,000</b>	0	0	0	5,745,000.00 <b>5,745,000</b>
1.2 Demolition	1.00	EA	747,362.16 <b>747,362</b>	47,319.41 <b>47,319</b>	0.00 0	0.00 <b>0</b>	794,681.57 <b>794,682</b>	200,292	303,607	0	1,298,580.40 <b>1,298,580</b>
1.3 Lower Guadalupe Rentention Structure Cost	1.00	EA	1,361,766.81 <b>1,361,767</b>	490,755.08 <b>490,755</b>	19,395,522.09 <b>19,395,522</b>	0.00 0	21,446,616.98 <b>21,446,617</b>	5,319,262	8,167,372	0	34,933,251.68 <b>34,933,252</b>
1.4 Mitigation	1.00	EA	262,695.74 <b>262,696</b>	12,619.06 <b>12,619</b>	82,046.25 <b>82,046</b>	0.00 <b>0</b>	357,361.05 <b>357,361</b>	0	109,046	0	466,406.63 <b>466,407</b>
1.5 Planning, Engineering and Design	1.00	LS	0	0	0	5,066,789	5,841,789	0	0	0	5,841,789
1.6 Construction Management	1.00	LS	0	0	0	4,403,789	4,403,789	0	0	0	4,403,789

### U.S. Army Corps of Engineers (Fort Worth District) Project : Lower Guadalupe - TSP

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Project Direct Costs Report Page 2

Description	Quantity	UOM	Contractor	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectCost	SubCMU	PrimeCMU	Escalation	ProjectCost
Project Direct Costs Report				2,371,825	550,694	19,477,568	9,470,577	38,589,237	5,519,554	8,580,025	0	52,688,816
1 Tentatively Selected Plan	1.00	EA	1 Prime Contractor	2,371,824.71 <b>2,371,825</b>	550,693.56 <b>550,694</b>	19,477,568.34 <b>19,477,568</b>	9,470,577.36 <b>9,470,577</b>	38,589,236.96 <b>38,589,237</b>	5,519,554	8,580,025	0	52,688,816.06 <b>52,688,816</b>
1.1 Real Estate - LERRDs	1.00	EA	2 Prime No Markups	0.00 0	0.00 <b>0</b>	0.00 <b>0</b>	0.00 <b>0</b>	5,745,000.00 <b>5,745,000</b>	0	0	0	5,745,000.00 <b>5,745,000</b>
1.1.1 Cummings Dam	1.00	EA	2 Prime No Markups	0.00 0	0.00 0	<i>0.00</i> 0	0.00 0	105,000.00 105,000	0	0	0.00% 0	<i>105,000.00</i> 105,000
1.1.1 Bear Creek Area Mitigation - Real Estate	1.00	EA	2 Prime No Markups	0.00 0	0.00 0	0.00 <b>0</b>	0.00 0	5,640,000.00 <b>5,640,000</b>	0	0	0	5,640,000.00 <b>5,640,000</b>
Costs				0.00	0.00	0.00	0.00	2 0 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			0.000/	2 0 6 0 0 0 0 0 0
1.1.1.1 Warbler	1.00	EA	2 Prime No Markups	0.00	0.00	0.00	0.00	2,060,000.00	0	0	0.00%	2,060,000.00
1.1.1.2 Riparian	1.00	EA	2 Prime No Markups	0.00 0	0.00 0	0.00 0	0.00 0	<i>1,800,000.00</i> 1,800,000	0	0	0.00% 0	<i>1,800,000.00</i> 1,800,000
1.1.1.3 Work Area (acres)	1.00	EA	2 Prime No Markups	0.00 0	0.00 0	0.00 0	0.00 0	<i>14,000.00</i> 14,000	0	0	0.00% 0	<i>14,000.00</i> 14,000
1.1.1.4 Damages 5%	1.00	EA	2 Prime No Markups	0.00 0	0.00 0	0.00 0	0.00 0	<i>103,000.00</i> 103,000	0	0	0.00% 0	<i>103,000.00</i> 103,000
1.1.1.5 Residential (homes)	1.00	EA	2 Prime No Markups	0.00 0	0.00 0	0.00 0	<i>0.00</i> 0	<i>1,050,000.00</i> 1,050,000	0	0	0.00% 0	<i>1,050,000.00</i> 1,050,000
1.1.1.6 Relo (homes)	1.00	EA	2 Prime No Markups	0.00 0	0.00 0	0.00 0	0.00 0	238,000.00 238,000	0	0	0.00% 0	238,000.00 238,000
1.1.1.7 Utility Relo	1.00	EA	2 Prime No Markups	0.00 0	0.00 0	0.00 0	0.00 0	250,000.00 250,000	0	0	0.00% 0	250,000.00 250,000
1.1.1.8 Borrow (acres)	1.00	EA	2 Prime No Markups	0.00 0	0.00 0	0.00 0	0.00 0	<i>25,000.00</i> 25,000	0	0	0.00% 0	<i>25,000.00</i> 25,000

Labor ID: NLS2016 EQ ID: EP16R06

### U.S. Army Corps of Engineers (Fort Worth District) Project : Lower Guadalupe - TSP

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Project Direct Costs Report Page 3

Description	Quantity	UOM	Contractor	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectCost	SubCMU	PrimeCMU	Escalation	ProjectCost
1.1.1.9 Condemnation	1.00	EA	2 Prime No Markups	0.00 0	0.00 0	<i>0.00</i> 0	0.00 0	<i>100,000.00</i> 100,000	0	0	0.00% 0	<i>100,000.00</i> 100,000
1.2 Demolition	1.00	EA	1.1 Sub Contractor	747,362.16 <b>747,362</b>	47,319.41 <b>47,319</b>	0.00 <b>0</b>	0.00 <b>0</b>	794,681.57 <b>794,682</b>	200,292	303,607	0	1,298,580.40 <b>1,298,580</b>
1.2.1 Cummings Dam	1.00	EA	1.1 Sub Contractor	747,362.16 <b>747,362</b>	47,319.41 <b>47,319</b>	0.00 <b>0</b>	0.00 0	794,681.57 <b>794,682</b>	200,292	303,607	0	1,298,580.40 <b>1,298,580</b>
1.2.1.1 Selective demolition, cutout, concrete, walls, bar reinforced, under 6 C.F., excludes loading and disposal	14,904.00	CF	1.1 Sub Contractor	48.28 719,521	2.89 43,006	0.00 0	0.00 0	51.16 762,527	192,187	291,323	0.00% 0	83.60 1,246,037
1.2.1.2 Rubbish handling, loading & trucking, ramp loaded, includes 2 mile haul, cost to be added to demolition cost.	552.00	СҮ	1.1 Sub Contractor	<i>50.44</i> 27,842	7.81 4,313	0.00 0	0.00 0	58.25 32,155	8,104	12,285	0.00% 0	95.19 52,543
1.3 Lower Guadalupe Rentention Structure Cost	1.00	EA	1.1 Sub Contractor	1,361,766.81 <b>1,361,767</b>	490,755.08 <b>490,755</b>	19,395,522.09 <b>19,395,522</b>	0.00 0	21,446,616.98 21,446,617	5,319,262	8,167,372	0	34,933,251.68 <b>34,933,252</b>
1.3.2 Roller Compacted Concrete	115,089.81	СҮ	1.1 Sub Contractor	7.21 <b>829,474</b>	0.61 7 <b>0,578</b>	162.00 <b>18,644,549</b>	0.00 0	169.82 19,544,601	4,926,021	7,466,995	0	277.50 <b>31,937,617</b>
1.3.2.1 Roller compacted concrete, mass placement, formed vertical face, 6" lift, includes spread and compact, excludes material	115,089.81	СҮ	1.1 Sub Contractor	7.21 829,474	<i>0.61</i> 70,578	<i>162.00</i> 18,644,549	<i>0.00</i> 0	<i>169.82</i> 19,544,601	4,926,021	7,466,995	0.00% 0	277.50 31,937,617

### U.S. Army Corps of Engineers (Fort Worth District) Project : Lower Guadalupe - TSP

Project Direct Costs Report Page 4

Description	Quantity	UOM	Contractor	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectCost	SubCMU	PrimeCMU	Escalation	ProjectCost
1.3.3 Batch Plant	1.00	EA	1 Prime Contractor	0.00 <b>0</b>	341,782.91 <b>341,783</b>	0.00 0	0.00 0	341,782.91 <b>341,783</b>	0	104,292	0	446,074.96 <b>446,075</b>
1.3.3.1 BATCH PLANT, CONCRETE AGGREGATE DRY, 200 CY/HR, W/TWO AGGREGATE BINS, 81 TON, 60 CY/ 36"X20' CONVEYOR/ 3 BIN 12 CY AGGREGATE BATCHER/ 30"X33.5' LOADING CONVEYOR/ & 475 BARREL, 88 TON CEMENT SILO, TRAILER MTD (ADD 110 KW GENERATOR)	4,160.00	HR	1 Prime Contractor	0.00 0	<i>82.16</i> 341,783	0.00 0	0.00 0	82.16 341,783	0	104,292	0.00% 0	107.23 446,075
1.3.4 Stilling Basin	2,069.00	CY	1.1 Sub Contractor	110.49 <b>228,613</b>	0.55 1,140	205.20 <b>424,559</b>	0.00 <b>0</b>	316.25 <b>654,311</b>	164,913	249,979	0	516.77 <b>1,069,203</b>
1.3.4.1 Structural concrete, in place, spread footing (3000 psi), over 5 C.Y., includes forms(4 uses), Grade 60 rebar, concrete (Portland cement Type I), placing and finishing	2,069.00	СҮ	1.1 Sub Contractor	<i>110.49</i> 228,613	0.55 1,140	205.20 424,559	0.00 0	<i>316.25</i> 654,311	164,913	249,979	0.00% 0	<i>516.77</i> 1,069,203
1.3.5 Culvert 10' 12'	1.00	LF	1.1 Sub Contractor	0.00 0	0.00 0	0.00 <b>0</b>	0.00 <b>0</b>	198,573.00 <b>198,573</b>	50,048	75,865	0	324,485.95 <b>324,486</b>
1.3.5.1 Culvert 10' x 12'	1.00	EA	1.1 Sub Contractor	0.00 0	0.00 0	<i>0.00</i> 0	<i>0.00</i> 0	<i>198,573.00</i> 198,573	50,048	75,865	0.00% 0	<i>324,485.95</i> 324,486

# U.S. Army Corps of Engineers (Fort Worth District) Project : Lower Guadalupe - TSP

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Project Direct Costs Report Page 5

Description	Quantity	UOM	Contractor	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectCost	SubCMU	PrimeCMU	Escalation	ProjectCost
1.3.6 Excavation with Haul off	27,992.41	СҮ	1.1 Sub Contractor	2.99 <b>83,671</b>	1.93 <b>53,888</b>	0.00 <b>0</b>	0.00 0	4.91 <b>137,559</b>	34,670	52,554	0	8. <i>03</i> <b>224,784</b>
1.3.6.1 Excavating, trench, heavy soil, 20' to 25' deep, 4 C.Y. bucket, hydraulic excavator, excludes sheeting or dewatering	27,992.41	BCY	1.1 Sub Contractor	<i>0.47</i> 13,114	<i>0.46</i> 12,842	0.00 0	<i>0.00</i> 0	0.93 25,955	6,542	9,916	0.00% 0	<i>1.52</i> 42,413
1.3.6.2 Hauling, excavated or borrow material, loose cubic yards, 6 mile round trip @ 40 MPH (2.1 cycles/hour), 16.5 C.Y. dump trailer, highway haulers, excludes loading	34,990.51	LCY	1.1 Sub Contractor	2.02 70,557	<i>1.17</i> 41,046	0.00 0	0.00 0	<i>3.19</i> 111,604	28,129	42,638	0.00% 0	5.21 182,370
137 Comencia	1 257 41	CV	116	49.73	15.78 10 844	<i>162.00</i>	0.00	227.51	72 102	100 204	0	371.77
Cut-off wall	1,257.41	CY	Contractor	02,529	19,044	203,700	U	280,075	/2,102	109,294	U	407,409
1.3.7.1 Structural concrete, placing, walls, with crane and bucket, 15" thick, includes leveling (strike off) & consolidation, material	1,257.41	СҮ	1.1 Sub Contractor	<i>49.73</i> 62,529	<i>15.78</i> 19,844	<i>162.00</i> 203,700	0.00 0	227.51 286,073	72,102	109,294	0.00% 0	<i>371.77</i> 467,469
1.3.8 Dental	1.00	EA	1.1 Sub	157,480.95 <b>157,481</b>	3,522.16 <b>3.522</b>	122,713.65 <b>122.714</b>	0.00	283,716.76 <b>283,717</b>	71.508	108.394	0	463,618.42 <b>463,618</b>
Grout	1.00		Contractor	107,101	5,522	,, 17	0	_00,11	. 1,000	200,074	0	,
1.3.8.1 Dental grout	26,735.00	SY	1.1 Sub Contractor	5.89 157,481	0.13 3,522	<i>4.59</i> 122,714	0.00 0	<i>10.61</i> 283,717	71,508	108,394	0.00% 0	<i>17.34</i> 463,618
1.4 Mitigation	1.00	EA	1 Prime Contractor	262,695.74 <b>262,696</b>	12,619.06 <b>12,619</b>	82,046.25 <b>82,046</b>	0.00 0	357,361.05 <b>357,361</b>	0	109,046	0	466,406.63 <b>466,407</b>
Labor ID: NLS2016	EQ ID: EP	16R06			Cur	rency in US dolla	rs				TRACI	ES MII Version 4.4

TRACES MII Version 4.4

### U.S. Army Corps of Engineers (Fort Worth District) Project : Lower Guadalupe - TSP

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Project Direct Costs Report Page 6

Description	Quantity	UOM	Contractor	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectCost	SubCMU	PrimeCMU	Escalation	ProjectCost
1.4.1 Riparian Habitat Mitigation - Planting done by LAERF	25.00	ACR	1 Prime Contractor	10,507.83 <b>262,696</b>	504.76 <b>12,619</b>	3,281.85 <b>82,046</b>	0.00 <b>0</b>	14,294.44 <b>357,361</b>	0	109,046	0	18,656.27 <b>466,407</b>
1.4.1.1 Trees 715 per acre	25.00	ACR	1 Prime Contractor	10,507.83 <b>262,696</b>	504.76 <b>12,619</b>	3,281.85 <b>82,046</b>	0.00 <b>0</b>	14,294.44 <b>357,361</b>	0	109,046	0	18,656.27 <b>466,407</b>
1.4.1.1.1 Planting, trees, shrubs, and ground cover, heavy or stony soil, bare root seedlings, 3" to 5", includes planting only	17,875.00	EA	1 Prime Contractor	<i>0.73</i> 13,051	0.00 0	0.00 0	0.00 0	0.73 13,051	0	3,982	0.00% 0	<i>0.95</i> 17,033
1.4.1.1.2 Bare root tree	17,875.00	EA	1 Prime Contractor	0.00 0	0.00 0	<i>4.59</i> 82,046	0.00 0	<i>4.59</i> 82,046	0	25,036	0.00% 0	5.99 107,082
1.4.1.1.3 Topsoil stripping and stockpiling, topsoil, sandy loam, adverse conditions, 200 H.P. dozer	20,167.00	СҮ	1 Prime Contractor	0.63 12,670	0.63 12,619	0.00 0	0.00 0	1.25 25,289	0	7,717	0.00% 0	1.64 33,006
1.4.1.1.4 Watering, soaker hoses, 50' hose, 1" of water	1,300.00	ACR	1 Prime Contractor	<i>182.29</i> 236,975	0.00 0	<i>0.00</i> 0	<i>0.00</i> 0	<i>182.29</i> 236,975	0	72,311	0.00% 0	<i>237.91</i> 309,286
1.5 Planning, Engineering and Design	1.00	LS	2 Prime No Markups	0	0	0	5,066,789	5,841,789	0	0	0	5,841,789
1.5.1 PED	1.00	LS	2 Prime No Markups	0	0	0	4,403,789	5,178,789	0	0	0	5,178,789
1.5.1.1 PED	0.12	LS	2 Prime No Markups	0	0	0	4,403,789	4,403,789	0	0	0	4,403,789
			-	0.00	0.00	0.00	0.00	775,000.00				775,000.00

Labor ID: NLS2016 EQ ID: EP16R06

### U.S. Army Corps of Engineers (Fort Worth District) Project : Lower Guadalupe - TSP

Project Direct Costs Report Page 7

Description	Quantity	UOM	Contractor	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectCost	SubCMU	PrimeCMU	Escalation	ProjectCost
1.5.1.1 Cultural Resources Cost Estimate	1.00	EA	2 Prime No Markups	0	0	0	0	775,000	0	0	0	775,000
1.5.1.1.1 Phase I Archaeological Survey	1.00	EA	2 Prime No Markups	0.00 0	0.00 0	0.00 0	<i>0.00</i> 0	<i>290,000.00</i> 290,000	0	0	0.00% 0	290,000.00 290,000
1.5.1.1.2 Contracting Labor	1.00	EA	2 Prime No Markups	0.00 0	0.00 0	0.00 0	0.00 0	<i>25,000.00</i> 25,000	0	0	0.00% 0	<i>25,000.00</i> 25,000
1.5.1.1.3 Monitor Field Work	1.00	EA	2 Prime No Markups	0.00 0	0.00 0	0.00 0	<i>0.00</i> 0	<i>50,000.00</i> 50,000	0	0	0.00% 0	<i>50,000.00</i> 50,000
1.5.1.1.4 Determin of NRHP and HABS/HAER for Cummings Dam	1.00	EA	2 Prime No Markups	0.00 0	0.00 0	<i>0.00</i> 0	<i>0.00</i> 0	<i>50,000.00</i> 50,000	0	0	0.00% 0	<i>50,000.00</i> 50,000
1.5.1.1.5 Contingency Phase II Survey	1.00	EA	2 Prime No Markups	0.00 0	0.00 0	0.00 0	0.00 0	230,000.00 230,000	0	0	0.00% 0	230,000.00 230,000
1.5.1.1.6 Phase III Mitigation	1.00	EA	2 Prime No Markups	0.00 0	0.00 0	0.00 0	0.00 0	<i>130,000.00</i> 130,000	0	0	0.00% 0	<i>130,000.00</i> 130,000
1.5.2 Adaptive Management	1.00	LS	2 Prime No Markups	0	0	0	663,000	663,000	0	0	0	663,000
1.5.2.1 Adaptive Management	1.00	LS	2 Prime No Markups	0	0	0	663,000	663,000	0	0	0	663,000
1.6 Construction Management	1.00	LS	2 Prime No Markups	0	0	0	4,403,789	4,403,789	0	0	0	4,403,789
1.6.1 CM	1.00	LS	2 Prime No Markups	0	0	0	4,403,789	4,403,789	0	0	0	4,403,789
1.6.1.1 CM	0.12	LS	2 Prime No Markups	0	0	0	4,403,789	4,403,789	0	0	0	4,403,789

		Abbreviated Risk Analysis									
	Project (less than \$40M): Lower Guadalupe River Basin Alternative: TSP										
	Risk Categ	ory: Low Risk: Typical Construction, Si	imple		Meeting Da	te:	6/14/2019				
		Total Estimated Construction Contract	Cost = \$	36,699,047							
	CWWBS	Feature of Work	<u>Estir</u>	mated Cost	<u>% Contingenc</u>	<u>y \$</u>	Contingency	<u>Total</u>			
	01 LANDS AND DAMAGES	Real Estate	\$	5,745,000	25%	\$	1,436,250 \$	7,181,250			
1	02 03 CEMETERIES, UTILITIES, AND STRUCTURES, Construction Activities	Removal of Cummings Dam	\$	1,299,175	43%	\$	564,194 \$	1,863,369			
2	06 FISH AND WILDLIFE FACILITIES	Mitigtion - planting habitat	\$	466,620	10%	\$	46,662 \$	513,282			
3	04 DAMS	Roller Compacted Concrete Dam	\$	34,933,252	26%	\$	8,986,291 \$	43,919,543			
4	04 DAMS				0%	\$	- \$	-			
5	04 DAMS				0%	\$	- \$	-			
6	04 DAMS				0%	\$	- \$	-			
7	11 01 LEVEES				0%	\$	- \$	-			
8			\$		0%	\$	- \$	-			
9			\$		0%	\$	- \$	-			
10			\$		0%	\$	- \$	-			
11			\$		0%	\$	- \$	-			
12	All Other	Remaining Construction Items	\$	-	0.0% 0%	\$	- \$	-			
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$	5,841,789	20%	\$	1,143,443 \$	6,985,232			
14	31 CONSTRUCTION MANAGEMENT	Construction Management	\$	4,403,789	13%	\$	586,340 \$	4,990,129			
xx	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL,	MUST INCLUDE JUSTIFICATION SEE BELOW)				\$	-				

	Totals					
	Real Estate \$	5,745,000	25%	\$	1,436,250 \$	7,181,250.00
	Total Construction Estimate \$	36,699,047	26%	\$	9,597,147 \$	46,296,194
	Total Planning, Engineering & Design \$	5,841,789	20%	\$	1,143,443 \$	6,985,232
	Total Construction Management \$	4,403,789	13%	\$	586,340 \$	4,990,129
	Total Excluding Real Estate \$	46,944,625	24%	\$	11,326,931 \$	58,271,556
			Ba	se	50%	80%
	Confidence Level R	ange Estimate (\$000's)	\$46,94	15k	\$53,741k	\$58,272k
				* 50%	based on base is at 5% CL.	
Fixed Dollar Risk Add: (Allows for additional risk to						
be added to the risk analsyis. Must include						
justification. Does not allocate to Real Estate.						

PROJECT:Lower Guadalupe River BasinPROJECT NO:P2 xxxxxxLOCATION:TX

PREPARED: 6/21/2019

POC: CHIEF, COST ENGINEERING, Ninfa Taggart

DISTRICT: SWF

This Estimate reflects the scope and schedule in report; Feasibility Report

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Civil	Works Work Breakdown Structure	Iown Structure ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)					TOTAL PROJECT COST (FULLY FUNDED)				
WBS <u>NUMBER</u> A	Civil Works Feature & Sub-Feature Description <b>B</b>	COST _(\$K) 	CNTG (\$K) <i>D</i>	CNTG _(%)_ <i>E</i>	TOTAL (\$K) <i>F</i>	ESC (%) <b>G</b>	Pro Ef COST <u>(\$K)</u> H	gram Year ( fective Price CNTG _(\$K)_ <i>I</i>	Budget EC): Level Date: TOTAL _(\$K)_ J	2019 1 OCT 18 Spent Thru: <b>1-Oct-16</b> <u>(\$K)</u>	TOTAL FIRST COST K	INFLATED (%)	COST _(\$K)	CNTG (\$K) <i>N</i>	FULL _ <u>(\$K)</u> O
02 04 06	RELOCATIONS DAMS FISH & WILDLIFE FACILITIES CONSTRUCTION ESTIMATE TOTALS:	\$1,299 \$34,933 \$466 	\$558 \$9,083 \$47 \$9,688	43.0% 26.0% 10.0% –	\$1,857 \$44,016 \$513  \$46,386	5.0% 4.6% 5.0% 4.6%	\$1,363 \$36,528 \$490 	\$586 \$9,497 \$49 	\$1,949 \$46,025 \$539 \$48,513	\$0 \$0 \$0	\$1,949 \$46,025 \$539 \$48,513	2.5% 2.5% 2.5% 2.5%	\$1,397 \$37,446 \$502 \$39,345	\$601 \$9,736 \$50 \$10,387	\$1,998 \$47,182 \$552 
01 30	LANDS AND DAMAGES PLANNING, ENGINEERING & DESIGN	\$5,745 \$6,943	\$1,436 \$1,389	25.0% 20.0%	\$7,181 \$8,332	4.9% 7.1%	\$6,024 \$7,435	\$1,506 \$1,487	\$7,530 \$8,921	\$0 \$0	\$7,530 \$8,921	-2.0% -1.2%	\$5,903 \$7,342	\$1,476 \$1,468	\$7,379 \$8,810
31	CONSTRUCTION MANAGEMENT PROJECT COST TOTALS:	\$4,404 \$53,790	\$572 \$13,085	13.0%	\$4,976	7.1%	\$4,715 \$56,555	\$613 \$13,738	\$5,328 <b>\$70,293</b>	\$0	\$5,328 <b>\$70,293</b>	5.2%	\$4,962 \$57,553	\$645 \$13,976	\$5,607 \$71,529

 CHIEF, COST ENGINEERING, Ninfa Taggart
 PROJECT MANAGER, Andrew Johnston
 CHIEF, REAL ESTATE, Rocky Lee
 CHIEF, PLANNING, xxx
 CHIEF, ENGINEERING, Mark Black
 CHIEF, OPERATIONS, xxx
 CHIEF, CONSTRUCTION, Sharon Garay-Rodriguez
 CHIEF, CONTRACTING, Michael Orr
 CHIEF, PM-PB, xxxx
 CHIEF, DPM, xxx

### ESTIMATED TOTAL PROJECT COST:

\$71,529

### \*\*\*\* TOTAL PROJECT COST SUMMARY \*\*\*\*

#### \*\*\*\* CONTRACT COST SUMMARY \*\*\*\*

Lower Guadalupe River Basin PROJECT: LOCATION: ΤХ This Estimate reflects the scope and schedule in report;

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Feasibility Report

DISTRICT: SWF

PREPARED: 6/21/2019 POC: CHIEF, COST ENGINEERING, Ninfa Taggart

Civi	ESTIMATED COST					PROJECT (Constant	FIRST COS Dollar Basis	s)	TOTAL PROJECT COST (FULLY FUNDED)					
	Estir Effec	nate Prepare tive Price Lev	d: rel:	<b>19-Jun-19</b> 1-Oct-16	Prograi Effectiv	m Year (Bud ve Price Lev	lget EC): vel Date:	2019 1 OCT 18						
WBS <u>NUMBER</u> <b>A</b>	Civil Works <u>Feature &amp; Sub-Feature Description</u> <i>B</i> Demo Cummings Dam	COST _(\$K) 	CNTG <u>(\$K)</u> <b>D</b>	RISK BASED CNTG <u>(%)</u> <b>E</b>	TOTAL (\$K) <i>F</i>	ESC (%) <b>G</b>	COST _(\$K)	CNTG _(\$K)/ _/	TOTAL (\$K)	Mid-Point <u>Date</u> <b>P</b>	INFLATED (%) L	COST <u>(\$K)</u> <i>M</i>	CNTG _(\$K)	FULL (\$K) <i>O</i>
02	RELOCATIONS	\$1,299	\$558	43.0%	\$1,857	5.0%	\$1,363	\$586	\$1,949	2020Q2	2.5%	\$1,397	\$601	\$1,998
	CONSTRUCTION ESTIMATE TOTALS:	\$1,299	\$558	43.0%	\$1,857	-	\$1,363	\$586	\$1,949			\$1,397	\$601	\$1,998
01	LANDS AND DAMAGES	\$105	\$26	25.0%	\$131	4.9%	\$110	\$28	\$138	2018Q1	-2.0%	\$108	\$27	\$135
30	PLANNING, ENGINEERING & DESIGN													
2.0	0% Project Management	\$26	\$5	20.0%	\$31	7.1%	\$28	\$6	\$33	2018Q2	-3.0%	\$27	\$5	\$32
1.0	0% Planning & Environmental Compliance	\$13	\$3	20.0%	\$16	7.1%	\$14	\$3	\$17	2018Q2	-3.0%	\$13	\$3	\$16
7.9	9% Engineering & Design	\$103	\$21	20.0%	\$123	7.1%	\$110	\$22	\$132	2018Q2	-3.0%	\$107	\$21	\$128
1.0	0% Reviews, ATRs, IEPRs, VE	\$13	\$3	20.0%	\$16	7.1%	\$14	\$3	\$17	2018Q2	-3.0%	\$13	\$3	\$16
1.0	D% Life Cycle Updates (cost, schedule, risks)	\$13	\$3	20.0%	\$16	7.1%	\$14	\$3	\$17	2018Q2	-3.0%	\$13	\$3	\$16
1.0	0% Contracting & Reprographics	\$13	\$3	20.0%	\$16	7.1%	\$14	\$3	\$17	2018Q2	-3.0%	\$13	\$3	\$16
2.0	2% Engineering During Construction	\$26	\$5	20.0%	\$31	7.1%	\$28	\$6	\$33	2020Q2	5.2%	\$29	\$6	\$35
2.0	0% Planning During Construction	\$26	\$5	20.0%	\$31	7.1%	\$28	\$6	\$33	2020Q2	5.2%	\$29	\$6	\$35
0.0	0% Adaptive Management & Monitoring	\$0	\$0	20.0%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
1.0	0% Project Operations	\$13	\$3	20.0%	\$16	7.1%	\$14	\$3	\$17	2018Q2	-3.0%	\$13	\$3	\$16
31	CONSTRUCTION MANAGEMENT													
8.0	0% Construction Management	\$104	\$14	13.0%	\$117	7.1%	\$111	\$14	\$126	2020Q2	5.2%	\$117	\$15	\$132
2.0	0% Project Operation:	\$26	\$3	13.0%	\$29	7.1%	\$28	\$4	\$31	2020Q2	5.2%	\$29	\$4	\$33
2.0	0% Project Management	\$26	\$3	13.0%	\$29	7.1%	\$28	\$4	\$31	2020Q2	5.2%	\$29	\$4	\$33
	CONTRACT COST TOTALS:	\$1,805	\$654		\$2,459		\$1,903	\$688	\$2,591			\$1,941	\$703	\$2,643

### \*\*\*\* TOTAL PROJECT COST SUMMARY \*\*\*\*

6/21/2019

#### \*\*\*\* CONTRACT COST SUMMARY \*\*\*\*

 PROJECT:
 Lower Guadalupe River Basin

 LOCATION:
 TX

 This Estimate reflects the scope and schedule in report;
 The scope and schedule in report;

Feasibility Report

DISTRICT: SWF POC: CHIE

SWF PREPARED: CHIEF, COST ENGINEERING, Ninfa Taggart

Civil Works Work Breakdown Structure		ESTIMATED COST					PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estir Effect	nate Prepare ive Price Lev	d: el:	<b>19-Jun-19</b> 1-Oct-16	Prograi Effecti <sup>,</sup>	m Year (Bud ve Price Lev	lget EC): rel Date:	2019 1 OCT 18						
WBS <u>NUMBER</u> <b>A</b>	Civil Works Feature & Sub-Feature Description <i>B</i> Mitigation	COST (\$K) <b>C</b>	CNTG (\$K) <b>D</b>	CNTG _(%) <i>E</i>	TOTAL (\$K) <i>F</i>	ESC (%) <b>G</b>	COST _(\$K)	CNTG _(\$K)/ _/	TOTAL _(\$K) 	Mid-Point <u>Date</u> <b>P</b>	INFLATED (%) L	COST _(\$K)	CNTG (\$K) <b>N</b>	FULL (\$K) <b>O</b>	
06	FISH & WILDLIFE FACILITIES	\$466	\$47	10.0%	\$513	5.0%	\$490	\$49	\$539	2020Q2	2.5%	\$502	\$50	\$552	
	CONSTRUCTION ESTIMATE TOTALS:	\$466	\$47	10.0%	\$513	-	\$490	\$49	\$539			\$502	\$50	\$552	
01	LANDS AND DAMAGES	\$0	\$0	25.0%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0	
30	PLANNING, ENGINEERING & DESIGN														
2.0%	Project Management	\$9	\$2	20.0%	\$11	7.1%	\$10	\$2	\$12	2018Q2	-3.0%	\$10	\$2	\$12	
1.0%	Planning & Environmental Compliance	\$5	\$1	20.0%	\$6	7.1%	\$5	\$1	\$6	2018Q2	-3.0%	\$5	\$1	\$6	
7.9%		\$37	\$7	20.0%	\$44	7.1%	\$40	\$8	\$47	2018Q2	-3.0%	\$38	\$8	\$46	
1.0%	Reviews, ATRs, IEPRs, VE	\$5	\$1 ¢1	20.0%	\$6 ¢6	7.1%	\$5 ¢5	\$1 ¢1	\$6 ¢6	2018Q2	-3.0%	\$5 ©5	\$1 ¢1	\$6 ¢6	
1.0%	Contracting & Reprographics	φ0 ¢5	φι ¢1	20.0%	φ0 ¢6	7.170	φ0 ¢5	φι ¢1	φ0 ¢e	2018Q2	-3.0%	φ0 ¢5	⇒⊥ ¢1	φ0 ¢6	
2.0%	Engineering During Construction	\$0 \$0	φ I ¢ 2	20.0%	ቃ0 ©11	7.1%	φυ ¢10	ر ف ر م	φU ¢12	2018Q2	-3.0%	დე დ11	⊅⊥ ¢⊃	φυ ¢13	
2.0%	Planning During Construction	\$9 \$9	ψ2 \$2	20.0%	\$11 \$11	7.1%	\$10	φ2 \$2	\$12	202002	5.2%	\$11 \$11		φ1J \$13	
0.0%	Adaptive Management & Monitoring	\$0	\$0	20.0%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	¢19 \$0	
1.0%	6 Project Operations	\$5	\$1	20.0%	\$6	7.1%	\$5	\$1	\$6	2018Q2	-3.0%	\$5	\$1	\$6	
31	CONSTRUCTION MANAGEMENT														
8.0%	6 Construction Management	\$37	\$5	13.0%	\$42	7.1%	\$40	\$5	\$45	2020Q2	5.2%	\$42	\$5	\$48	
2.0%	6 Project Operation:	\$9	\$1	13.0%	\$11	7.1%	\$10	\$1	\$11	2020Q2	5.2%	\$11	\$1	\$12	
2.0%	6 Project Management	\$9	\$1	13.0%	\$11	7.1%	\$10	\$1	\$11	2020Q2	5.2%	\$11	\$1	\$12	
	CONTRACT COST TOTALS:	\$611	\$72		\$682		\$644	\$76	\$720			\$659	\$77	\$736	

### \*\*\*\* TOTAL PROJECT COST SUMMARY \*\*\*\*

#### \*\*\*\* CONTRACT COST SUMMARY \*\*\*\*

Lower Guadalupe River Basin PROJECT: LOCATION: ΤХ This Estimate reflects the scope and schedule in report;

Feasibility Report

DISTRICT: SWF

PREPARED: 6/21/2019 POC: CHIEF, COST ENGINEERING, Ninfa Taggart

Civil W	ESTIMATED COST					PROJECT (Constant I	FIRST COS Dollar Basis	T 5)	TOTAL PROJECT COST (FULLY FUNDED)					
	Estin Effect	nate Prepare ive Price Lev	d: vel:	<b>19-Jun-19</b> 1-Oct-16	Prograi Effectiv	m Year (Bud ve Price Lev	get EC): el Date:	2019 1 OCT 18						
WBS <u>NUMBER</u> <b>A</b>	Civil Works <u>Feature &amp; Sub-Feature Description</u> B Dom et Boos Crock	COST (\$K) <b>C</b>	CNTG (\$K) <b>D</b>	CNTG (%) <i>E</i>	TOTAL (\$K) <i>F</i>	ESC (%) <b>G</b>	COST _(\$K)	CNTG _(\$K)/ _/	TOTAL (\$K)	Mid-Point <u>Date</u> <b>P</b>	INFLATED (%) L	COST <u>(\$K)</u> <i>M</i>	CNTG (\$K) <b>N</b>	FULL (\$K) <b>O</b>
04	DAMS	\$34,933	\$9,083	26.0%	\$44,016	4.6%	\$36,528	\$9,497	\$46,025	2020Q2	2.5%	\$37,446	\$9,736	\$47,182
	CONSTRUCTION ESTIMATE TOTALS:	\$34,933	\$9,083	26.0%	\$44,016	-	\$36,528	\$9,497	\$46,025			\$37,446	\$9,736	\$47,182
01	LANDS AND DAMAGES	\$5,640	\$1,410	25.0%	\$7,050	4.9%	\$5,914	\$1,479	\$7,393	2018Q1	-2.0%	\$5,795	\$1,449	\$7,244
30	PLANNING, ENGINEERING & DESIGN	<b>*</b> 200	\$140	00.0%	¢000	7.40/	¢740	¢150	¢000	004000	2.0%	¢700	¢145	4071
2.0%	Project Management	\$699	\$140	20.0%	\$838	7.1%	\$748	\$150	\$898	2018Q2	-3.0%	\$726	\$145	\$8/1
1.0%	Figure & Environmental Compliance	\$349 \$0.767	\$/U ¢550	20.0%	\$419	7.1%	\$374 \$3.060	\$/5 ¢500	\$449	2018Q2	-3.0%	\$303 ¢0.074	\$73 #F7F	\$435 \$2,440
1.9%		\$2,707 \$349	دەدە 70\$	20.0%	\$3,320 \$419	7.1%	\$2,90Z \$371	\$092 \$75	\$3,555 011\$	2018Q2	-3.0%	¢2,074 \$363	\$3/3 ¢73	۵,449 ¢435
1.0%	Life Cycle Undates (cost schedule risks)	\$349	\$70	20.0%	\$419	7.1%	\$374	\$75	\$449	201802	-3.0%	\$363	\$73 \$73	\$435 \$435
1.0%	Contracting & Reprographics	\$349	\$70	20.0%	\$419	7.1%	\$374	\$75	\$449	2018Q2	-3.0%	\$363	\$73	\$435
2.0%	Engineering During Construction	\$699	\$140	20.0%	\$838	7.1%	\$748	\$150	\$898	2020Q2	5.2%	\$787	\$157	\$945
2.0%	Planning During Construction	\$699	\$140	20.0%	\$838	7.1%	\$748	\$150	\$898	2020Q2	5.2%	\$787	\$157	\$945
0.0%	Adaptive Management & Monitoring	\$0	\$0	20.0%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
1.0%	Project Operations	\$349	\$70	20.0%	\$419	7.1%	\$374	\$75	\$449	2018Q2	-3.0%	\$363	\$73	\$435
31	CONSTRUCTION MANAGEMENT													
8.0%	6 Construction Management	\$2,795	\$363	13.0%	\$3,158	7.1%	\$2,992	\$389	\$3,381	2020Q2	5.2%	\$3,149	\$409	\$3,558
2.0%	Project Operation:	\$699	\$91	13.0%	\$789	7.1%	\$748	\$97	\$845	2020Q2	5.2%	\$787	\$102	\$890
2.0%	Project Management	\$699	\$91	13.0%	\$789	7.1%	\$748	\$97	\$845	2020Q2	5.2%	\$787	\$102	\$890
	CONTRACT COST TOTALS:	\$51,375	\$12,359		\$63,734		\$54,008	\$12,975	\$66,982			\$54,954	\$13,197	\$68,150