Nueces (Region 13) FMEs			
	FME Type	**General Description**	**Scope & Assumptions**
1	Watershed Planning – Drainage Master Plans	Supports the development and analysis of hydrologic and hydraulic models to evaluate flood risk within a given jurisdiction, evaluate potential alternatives to mitigate flood risk, and develop capital improvement plans.	Assuming Open Channel DMPs **County DMP:** Chose to assign a uniform cost of $500,000 for each county to cover the following **Basic Services**: 1. Project Management 2. Coordination and Collaboration Work Sessions 3. Data Collection 4. Screening Assessment 5. Targeted H&H Modeling and Alternatives Analysis 6. Technical Report 7. Public Outreach **City DMP:** Assign fee based on population (2020 Census) 1. Small (< 25,000) - $250,000 2. Medium (25,000 to 100,000) - $500,000 3. Large (100,000+) - $1,000,000
2	Watershed Planning – Flood Mapping Updates	Promotes the development and/or refinement of detailed flood risk maps to address data gaps and inadequate mapping. Create FEMA mapping in previously unmapped areas and update existing FEMA maps as needed.	Key GIS Factors: • HUC 8 Intersections with County • Stream Miles* (Zone A & Zone X) o 25% of total streams (unmapped and mapped) • FEMA FIRM Panels Basic Services Include: 1. Project Management 2. Topo Data Capture 3. Survey Data 4. Alluvial Fan Data Capture 5. Hydrologic Data Capture 6. Hydraulics Data Capture 7. Coastal Data Capture 8. Floodplain Mapping 9. Technical Report ***Important to Note:* *1) Revisions might be made for counties that are in more than one region.* *2) These costs reflect "develop FEMA mapping" from scratch; therefore, an adjustment will need to be made to for FEMA mapping products that need to be updated.*
3	Watershed Planning – Flood Mapping for Dam Failure	Conduct studies to develop dam failure inundation maps and models. Hydrologic studies to determine threat, risk, and potential impacts of flooding from dam failure.	Dam Failure Scope: [$$/Dam] 1. Project Management 2. Discovery Data Capture 3. Screening Assessment 4. Detailed Dam Breach Analysis
4	Engineering Project Planning	Evaluation of a proposed project to determine whether implementation would be feasible OR Initial engineering assessment including conceptual design, alternative analysis, and up to 30 percent engineering design.	Where the (assumed) construction cost is available: • Assume FME cost is equivalent to 15% of construction costs. • Where no cost is available, assume study cost range from $100,000 to $250,000 based on scope of project as follows: • Localized - $100,000 • Community - $150,000 • Citywide - $200,000 • In excess of Citywide - $250,000 • When cost estimates were available, project costs were fragmented into "FMP Cost" (Construction) and "FME Cost" (Study) based on the project description and available information. • Where available costing information fragmented the project cost between Construction and Study, "FMP Cost" and "FME Cost" were assigned accordingly. • Where available costing information was not fragmented between Construction and Study costs, project description and supporting documentation was used to determine an appropriate split, explained below: • Where the description/documentation leaned towards Construction (no mention of Study), Study Cost was assumed as 15% of the project cost, and the existing project cost was assumed to be the Construction Cost. • Where the description/documentation leaned towards Study (no mention of Construction), the existing project cost was assumed to be the Study Cost, and the Construction Cost was assumed to be $0. • Where the description/documentation mentioned both a study and Construction Portion, the existing project cost was split such that 15% was assumed to be for Study, and 85% was assumed to be for Construction.
Notes:			
• Use project cost estimates when available.			
• Where cost estimates are not available, use the above table.			
• In all instances where a cost predating September 2020 is used, costs must be escalated to September 2020. Costs that fall within or after September 2020 may be used without being escalated.			
• Where cost estimates are available, but the year/month of their development is not available, compare the available cost with the assumed cost outlined in the above table, and use the highest of the two.			
• Reference the "Factors" sheet for additional information on accelerating project costs.			
• Reference Appendix 5-2 for for calculators associated and additional information associated with cost determination for "Watershed Planning – Flood Mapping Updates" "Watershed Planning – Flood Mapping for Dam Failure".			

FME Costing Table

Nueces (Region 13) FMSs			
	FMS Type	FMS Description/FMS Scope	Assumptions
1	Education and Outreach	1. 'Turn Around Don't Drown" campaign and LWC 2. NFIP program and flood insurance public awareness 3. Public education on flooding	1. Assume a $50,000 minimum for this group based on similar educational programs. 2. Assume a $50,000 minimum for this group based on similar educational programs. 3. Assume as follows based on extents of education program: Region Wide - $100,000 County Wide - $50,000 City Wide - $25,000
2	Flood Measurement and Warning	1. Early flood warning system/local warning system 2. Install stream and rain gauges and weather stations 3. LWC flood warning devices, signs, and gates	Assume a minimum of $250,000 for this group based on https://texaswaternewsroom.org/pressreleases/2016-08-25_flood.html
3	Infrastructure Projects	1. HROM Program 2. Lift station flood-proofing	1. Assume $35,000,000. 2. Assume $100,000.
4	Other	1. Debris clearing maintenance program 2. Channel maintenance and erosion control 3. Dam inspection program 4. Levee inspection 5. Establish city parks in low lying areas 6. Implement green infrastructure	1. Assume $100,000. 2. Assume $250,000. 3. Assume $100,000 per dam. (High Level Estimate) 4. Assume $50,000 a year. (High Level Estimate) 5. Assume $1,000,000. 6. Assume $500,000.
5	Property Acquisition and Structural Elevation	1. Acquire high risk and repetitive loss properties 2. Acquire and preserve open space adjacent to floodplain areas	Assume $5,000,000 minimum to acquire several structures based on http://nrcsolutions.org/rush-creek-property-acquisition-project-arlington-tx/
6	Regulatory and Guidance	1. City floodplain ordinance creation/updates 2. Zoning regulations and Land Use Programs 3. Create a Storm water Management Plan 4. Levy a stormwater fee for developers 5. Floodplain Manager Position / Enforcement of Code and Flood Damage Prevention Ordinances 6. NFIP/CRS participation 7. Region-wide stormwater management manual	1. Assume a $100,000 minimum for policy/regulations to cover engineering consultant fees. 2. Assume $100,000 to cover engineering consultant fees. 3. Assume $300,000 for engineering consultant fees. 4. Assume $200,000. 5. Assume $75,000 for a first-year salary based on the top 25% annual salary for a floodplain manager; https://www.floods.org/career-center/careers-in-floodplain-management/salary-information/ 6. Assume $100,000 to cover engineering consultant fees and implement projects to increase rating. 7. Assume $500,000 to cover engineering consultant fees and support communities in their implementation process.

Notes:

- Use project cost estimates when available.
- Where cost estimates are not available, use the above table.
- In all instances where a cost predating September 2020 is used, costs must be accelerated to September 2020. Costs that fall within or after September 2020 may be used without being accelerated.
- Where cost estimates are available, but the year/month of their development is not available, compare the available cost with the assumed cost outlined in the above table, and use the highest of the two.
- Reference the "Factors" sheet for additional information on accelerating project costs.

FMS Costing Table

Year	January	February	March	April	May	June	July	August	September	October	November	December	Avg
2022	0.92	0.91	0.90	0.89									
2021	0.99	0.98	0.98	0.97	0.96	0.95	0.94	0.92	0.92	0.92	0.92	0.92	0.95
2020	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.00	1.00	1.00	0.99	0.99	1.00
2019	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.01	1.01	1.02
2018	1.06	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.03	1.03	1.03	1.04
2017	1.09	1.09	1.08	1.08	1.08	1.07	1.07	1.06	1.06	1.06	1.06	1.06	1.07
2016	1.13	1.13	1.12	1.12	1.11	1.11	1.11	1.11	1.11	1.10	1.10	1.09	1.11
2015	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.14	1.14	1.14	1.13	1.15
2014	1.19	1.19	1.19	1.18	1.17	1.17	1.17	1.17	1.17	1.16	1.16	1.16	1.17
2013	1.22	1.22	1.22	1.21	1.21	1.21	1.20	1.20	1.20	1.19	1.19	1.19	1.20
2012	1.25	1.25	1.24	1.24	1.24	1.24	1.23	1.23	1.23	1.23	1.22	1.22	1.24
2011	1.29	1.28	1.28	1.27	1.27	1.27	1.27	1.27	1.26	1.26	1.25	1.25	1.27
2010	1.33	1.33	1.33	1.33	1.31	1.31	1.30	1.30	1.30	1.29	1.28	1.28	1.31
2009	1.35	1.35	1.35	1.35	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.33	1.34
2008	1.42	1.42	1.42	1.42	1.41	1.40	1.39	1.38	1.34	1.33	1.34	1.34	1.38
2007	1.46	1.46	1.46	1.46	1.45	1.45	1.44	1.44	1.43	1.43	1.42	1.42	1.44
2006	1.50	1.50	1.49	1.49	1.50	1.49	1.49	1.49	1.48	1.46	1.45	1.46	1.48
2005	1.58	1.58	1.57	1.56	1.55	1.55	1.55	1.54	1.53	1.52	1.51	1.50	1.54
2004	1.68	1.68	1.65	1.64	1.63	1.62	1.61	1.60	1.58	1.57	1.57	1.57	1.62
2003	1.75	1.73	1.74	1.73	1.73	1.72	1.72	1.71	1.71	1.70	1.69	1.70	1.72
2002	1.78	1.78	1.77	1.77	1.77	1.76	1.74	1.74	1.75	1.75	1.75	1.75	1.76
2001	1.83	1.83	1.83	1.83	1.83	1.82	1.80	1.80	1.80	1.80	1.79	1.80	1.81
2000	1.88	1.87	1.85	1.85	1.84	1.84	1.85	1.84	1.85	1.84	1.84	1.83	1.85
1999	1.92	1.92	1.92	1.91	1.91	1.90	1.89	1.89	1.88	1.87	1.88	1.88	1.90
1998	1.96	1.96	1.96	1.95	1.96	1.95	1.94	1.94	1.93	1.92	1.92	1.92	1.94
1997	1.99	1.99	2.00	1.98	1.97	1.96	1.96	1.96	1.97	1.97	1.97	1.96	1.97
1996	2.08	2.08	2.08	2.07	2.06	2.05	2.05	2.03	2.02	2.01	2.00	2.00	2.05
1995	2.11	2.11	2.12	2.12	2.12	2.12	2.10	2.09	2.09	2.09	2.08	2.08	2.10
1994	2.15	2.14	2.14	2.13	2.13	2.13	2.13	2.12	2.11	2.11	2.11	2.11	2.13
1993	2.27	2.27	2.25	2.23	2.19	2.19	2.19	2.20	2.19	2.18	2.18	2.17	2.21
1992	2.35	2.35	2.33	2.32	2.32	2.31	2.30	2.29	2.28	2.28	2.27	2.27	2.31
1991	2.41	2.41	2.41	2.41	2.40	2.39	2.37	2.35	2.35	2.35	2.35	2.35	2.38
1990	2.46	2.45	2.45	2.45	2.44	2.43	2.43	2.42	2.41	2.41	2.40	2.41	2.43

1. Multipy project cost by factor that represents the month and year the cost estimate was developed to convert to September 2020 dollars.

Project Cost Escalation Factors

OPINION OF PROBABLE CONSTRUCTION COST - DEVELOP FEMA FIS

PROJECT NAME	Regional Flood Plans	DATE	
CLIENT	Regional Flood Planning Group (RFPG)	GROUP	
FME ID		PM	

ESTIMATED BY	QC CHECKED BY	FNI PROJECT NUMBER
Jane Doe	XXXX	ABC12345

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PROJECT MANAGEMENT					
1	Project Management and Meetings	1	LS	$ 7,029.86	$ 7,030
DISCOVERY DATA CAPTURE					
2	Data Collection	1	HUC 8	$ 15,000.00	$ 15,000.00
3	Data Collection QA/QC	1	LS	$ 1,500.00	$ 1,500.00
4	Event Data Capture	1	LS	$ 750.00	$ 750.00
ALLUVIAL FAN DATA CAPTURE					
9	High Alluvial Fan Analysis (low)	1	SQ MI	$ 3,000.00	$ 3,000.00
10	High Alluvial Fan Analysis (medium)	1	SQ MI	$ 6,250.00	$ 6,250.00
11	High Alluvial Fan Analysis (high)	1	SQ MI	$ 9,500.00	$ 9,500.00
12	High Alluvial Fan Analysis QA/QC	1	LS	$ 1,875.00	$ 1,875.00
HYDROLOGIC DATA CAPTURE					
13	Regression Analyses (low)	1	SQ MI	$ 450.00	$ 450.00
14	Regression Analyses (med)	1	SQ MI	$ 700.00	$ 700.00
15	Regression Analyses (high)	1	SQ MI	$ 950.00	$ 950.00
16	Rainfall-Runoff Analyses (low)	1	SQ MI	$ 550.00	$ 550.00
17	Rainfall-Runoff Analyses (medium)	1	SQ MI	$ 2,300.00	$ 2,300.00
18	Rainfall-Runoff Analyses (high)	1	SQ MI	$ 6,600.00	$ 6,600.00
19	Rainfall-Runoff Analyses QA/QC	1	LS	$ 189.00	$ 189.00
HYDRAULICS DATA CAPTURE					
20	Approximate Study (low)	1	RV MI	$ 50.00	$ 50.00
21	Approximate Study (medium)	1	RV MI	$ 125.00	$ 125.00
22	Approximate Study (high)	1	RV MI	$ 175.00	$ 175.00
23	Detailed Study (low)	1	RV MI	$ 2,500.00	$ 2,500.00
24	Detailed Study (medium)	1	RV MI	$ 3,500.00	$ 3,500.00
25	Detailed Study (high)	1	RV MI	$ 4,750.00	$ 4,750.00
26	Floodplain Mapping	6	RV MI	$ 105.00	$ 630.00
27	Riverine Workmaps	20	PANEL	$ 200.00	$ 4,000.00
28	QA/QC	1	LS	$ 314.60	$ 314.60
COASTAL DATA CAPTURE					
29	Floodplain Mapping of Coastal	1	CO MI	$ 3,000.00	$ 3,000.00
30	QA/QC	1	LS	$ 300.00	$ 300.00
FLOODPLAIN MAPPING DATA CAPTURE					
31	Redelineation (low)	1	RV MI	$ 200.00	$ 200.00
32	Redelineation (medium)	1	RV MI	$ 350.00	$ 350.00
33	Redelineation (high)	1	RV MI	$ 550.00	$ 550.00
34	Redelineation QA/QC	3	RV MI	$ 80.00	$ 240.00
FINAL DELIVERABLES					
35	Technical Report	1	LS	$ 7,029.86	$ 7,029.86
36	Technical Report QC	1	LS	$ 3,514.93	$ 3,514.93

SUBTOTAL			$ 87,873
CONTINGENCY	30%	$	27,000
SUBTOTAL		$	115,000
SURVEY DATA CAPTURE	5%	$	6,000

PROJECT TOTAL (2021 COSTS) **$ 121,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

NOTES:

1. FNI OPCC classified as an AACE Class 4 Estimate with accuracy range or -20 to + 30.

IMPORTANT NOTES / ASSUMPTIONS:

The highlighted units (ie: HUC 8, SQ MI, RIV MI) are all values pulled from the GIS effort.

FORM SETUP / QC REVIEW

FORM SETUP / QC REVIEW COMMENTS

INSTRUCTIONS

Enter **Pricing** and **Quantities** using the sections to the right. **Expand/collapse** each section by clicking on the + or - button at the top.

ENTER COMMENTS / QC REVIEW COMMENTS

Note base year of costs in OPCC

Determine and Input Cost Esclation Factor Used
Note year costs escalated to in parenthesis

PRICING

PRICING SECTION

INSTRUCTIONS

1. **Unit Prices** - enter the Detailed Unit Price Breakdown for each line item OR overwrite formula to enter specific Unit Price to use.
2. **Contingency** - if desired apply a contingency factor to increase the Unit Prices either at an Individual line item level or for all unit prices.
3. **Location Factor** - select state to adjust unit prices based on location.

1.00	LOCATION MULTIPLIER	Texas	SELECT STATE
1.00	HIDDEN CONTINGENCY (applied to all unit prices)		

UNIT PRICES	OR	DETAILED UNIT PRICE BREAKDOWN LABOR	MATERIALS	EQUIPMENT	OTHER	INDIVIDUAL CONTINGENCY	REFERENCE/ASSUMPTION
							Assuming 10% of total/overall project cost
$ 15,000.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 1,500.00							Assumming 10% of Discovery Data Capture cost
$ 750.00							Assumming 5% of Discovery Data Capture cost
$ 3,000.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 6,250.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 9,500.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 1,875.00							Assuming 10% of total Alluvial Cost
$ 450.00							
$ 700.00							
$ 950.00							
$ 550.00							RFP Fee Spreadsheet
$ 2,300.00							RFP Fee Spreadsheet
$ 6,600.00							RFP Fee Spreadsheet
$ 189.00							Assumming 2% of total Hydrology Cost
$ 50.00							
$ 125.00							
$ 175.00							
$ 2,500.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 3,500.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 4,750.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 105.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 200.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 314.60							Assumming 2% of total Hydraulics Cost
$ 3,000.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 300.00							Assumming 10% of total Coastal Data Cost
$ 200.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 350.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 550.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 80.00							FEMA Bluebook/LWI Region 2 Spreadsheet
							Assumming 10% of Total Project Cost?
							Assumming 5% of Technical Report Line

QUANTITY TAKEOFF SECTION

INSTRUCTIONS

1. **Sheet Reference** - input the primary sheet where this line item is details within the plans.
2. **Total Quantity** - the quantity can be calculated by sheet using the "Quantity by Sheet" section and it is automatically summed or the quantity can be manually inputted below to overwrite the formula.
3. **Units of Measure** - determine the appropriate unit of measure based on how item is priced to calculate quantity
4. **Quantity Details Described** - input description of what is being quantified for this line item, especially for Lump Sum quantities provide details on what is included within that lump sum.
5. **Assumptions/Comments** - input any specific assumptions made when quantifying this line item.

SHEET REFERENCE	**TOTAL QUANTITY**	**UNITS OF MEASURE**	QUANTITY DETAILS DESCRIBED	ASSUMPTIONS/COMMENTS
	1	LS		Assuming 10% of total project cost
	1	HUC 8		
	1	LS		
	1	LS		
				Use when applicable to county
	1	SQ MI		
	1	SQ MI		
	1	SQ MI		
	1	LS		
				Total Drainage Area (Sq. Mi.)
	1	SQ MI	0.8	Assumming 80% of hydrology
	1	SQ MI		
	1	SQ MI		
	1	SQ MI	0.2	Assumming will need to do a model to cover larger lakes/ponds
	1	SQ MI	0	
	1	SQ MI	0	
	1	LS		
				Total River Miles
	1	RV MI	0.7	Assuming 70% of total stream miles with this LOD
	1	RV MI	0.2	Assuming 20% of total stream miles with this LOD
	1	RV MI		
	1	RV MI		
	1	RV MI		
	1	RV MI	0.1	Assuming 10% of total stream miles with this LOD
	6	RV MI		Assumming 100% of total stream miles (ie: the sum)
	20	PANEL		The total number of FIRM panels (see GIS)
	1	LS		
				Use when applicable to county
	1	CO MI		
	1	LS		
	1	RV MI		
	1	RV MI		
	1	RV MI		
	3	RV MI		
	1	LS		
	1	LS		

DETAILED QUANTITY TAKEOFF - TOTALS BY SHEET

QUANTITY BY SHEETS

SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT

OPINION OF PROBABLE CONSTRUCTION COST - DAM FAILURE

PROJECT NAME	Regional Flood Plans	DATE	7/5/2022
CLIENT	Regional Flood Planning Group (RFPG)	GROUP	
FME ID		PM	

ESTIMATED BY	QC CHECKED BY	FNI PROJECT NUMBER
Jane Doe	XXXX	ABC12345

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PROJECT MANAGEMENT					
1	Project Management	1	LS	$ 49,600.00	$ 49,600
DISCOVERY DATA CAPTURE					
2	Dam Data Collection + QC	1	LS	$ 10,000.00	$ 10,000.00
SCREENING ASSESSMENT					
3	Dam Prioritization & Need	116	EA	$ 2,000.00	$ 232,000.00
DETAILED DAM BREACH ANALYSIS					
4	Full Hydrologic Analysis + PMF Regulations + Technical Report	25	EA	$ 30,000.00	$ 750,000.00
		SUBTOTAL			$ 1,041,600
		CONTINGENCY		30%	$ 313,000
PROJECT TOTAL (2021 COSTS)					**$ 1,355,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

NOTES:

1. FNI OPCC classified as an AACE Class 4 Estimate with accuracy range or -20 to + 30.

IMPORTANT NOTES / ASSUMPTIONS / SCOPE ITEMS:

Task 1 - Project Management

- Perform internal project setup and coordination, including project kickoff meetings and maintaining project schedule. Provide monthly status reports and invoices with backup documentation for the duration of the project.
- Participate in up to ## project coordination meetings with CLIENT staff, via teleconference, as specified in the following tasks. One (1) site visit will be performed to kick-off the project, review project requirements, and tour the downstream breach inundation zone

Task 2 - Hydrologic Assessment

Hydrologic models are used to analyze dam performance during a rainfall event. Per TCEQ regulations, dams are required to be evaluated for hydrologic capacity for minimum design flood based on the Probable Maximum Flood (PMF) event. The design flood for a given dam is based on both the size and hazard classification of the dam and is expressed as a percentage of the PMF. In addition to evaluating the design flood capacity, the hydrologic models are used to establish peak water surface elevations and reservoir inflow hydrographs, which are in turn utilized for performing the breach analysis and generating breach inundation mapping

- Research and gather historical information about the dams
- Generate PMP depths based on recently updated TCEQ PMP guidelines
- Develop hydrologic models for routing the PMF utilizing HEC-HMS
- Compute spillway discharge rating curves based on dimensions of the structure provided in available construction drawings
- Evaluate the dams' existing capacity, expressed as a percentage of the PMF, to determine whether the dam complies with TCEQ criteria for hydrologic adequacy
- Results of the hydrologic analysis for each dam will be presented in a technical report combined with the dam breach analysis. This report is described under the Dam Breach Analysis task.

Task 3 - Dam Breach Analysis

Hydraulic models are used to analyze downstream conditions from flows through a dam; either designed flows through a spillway or hypothetical flows resulting from an uncontrolled breach, or failure, of the dam. Specific to this project, hydraulic models are used to map inundation extents from a hypothetical breach of the dam

- Gather necessary data for hydraulic model inputs, including any relevant previous studies and topography data from available LiDAR or other sources.
- Develop dam breach models in HEC-RAS to evaluate the required breach scenarios – normal pool breach, barely overtopping breach (if necessary), and design flood (PMF) breach (TAC)
- Evaluate the downstream hazard classification according to TCEQ criteria
- Prepare breach inundation maps of the final breach scenarios for inclusion in an Emergency Action Plan (EAP)
- Prepare a combined draft technical report documenting the processes, assumptions, and findings of both the Hydrologic Assessment (Task 2) and the Dam Breach Analysis (Task 3).
- Meet with CLIENT to discuss findings of the Hydrologic Assessment and Breach Analysis for each dam.

FORM SETUP / QC REVIEW COMMENTS

INSTRUCTIONS

Enter **Pricing** and **Quantities** using the sections to the right. **Expand/collapse** each section by clicking on the + or - button at the top.

ENTER COMMENTS / QC REVIEW COMMENTS

To add row, copy entire row and paste.

Note base year of costs in OPCC

FORM SETUP / QC REVIE

PRICING

PRICING SECTION

INSTRUCTIONS

1. **Unit Prices** - enter the Detailed Unit Price Breakdown for each line item OR overwrite formula to enter specific Unit Price to use.
2. **Contingency** - if desired apply a contingency factor to increase the Unit Prices either at an Individual line item level or for all unit prices.
3. **Location Factor** - select state to adjust unit prices based on location.

1.00	LOCATION MULTIPLIER	Texas	SELECT STATE
1.00	HIDDEN CONTINGENCY (applied to all unit prices)		

		DETAILED UNIT PRICE BREAKDOWN					
UNIT PRICES	OR	LABOR	MATERIALS	EQUIPMENT	OTHER	INDIVIDUAL CONTINGENCY	REFERENCE/ASSUMPTION
							Assumming 5% of total project cost
$ 10,000.00							Ranges between $10,000 - $20,000
$ 2,000.00							
$ 30,000.00							Ranges between $10,000-$50,000

QUANTITY TAKEOFF

QUANTITY TAKEOFF SECTION

INSTRUCTIONS

1. **Sheet Reference** - input the primary sheet where this line item is details within the plans.
2. **Total Quantity** - the quantity can be calculated by sheet using the "Quantity by Sheet" section and it is automatically summed or the quantity can be manually inputted below to overwrite the formula.
3. **Units of Measure** - determine the appropriate unit of measure based on how item is priced to calculate quantity
4. **Quantity Details Described** - input description of what is being quantified for this line item, especially for Lump Sum quantities provide details on what is included within that lump sum.
5. **Assumptions/Comments** - input any specific assumptions made when quantifying this line item.

SHEET REFERENCE	**TOTAL QUANTITY**	**UNITS OF MEASURE**	QUANTITY DETAILS DESCRIBED	ASSUMPTIONS/COMMENTS
	1	LS		Lump sum, assumming 5% of total project cost
	1	LS		Identifying what's available
	116	EA		Use all dams accounted for in County
	25	EA		Assumming 10 is the maximum number of dams that will be analyzed at this LOD. If there aren't

QUANTITY BY SHEET

DETAILED QUANTITY TAKEOFF - TOTALS BY SHEET

SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT