



St. Tammany Parish, Louisiana Feasibility Study



Appendix D – Annex 10 - Nonstructural

April 2023

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Cost Estimate

Section 1. Cost estimate development

The project cost estimate was developed in the TRACES MII cost estimating software and used the standard approaches for a feasibility estimate structure regarding labor, equipment, materials, crews, unit prices, quotes, sub- and prime contractor markups. This philosophy was taken wherever practical within the time constraints. It was supplemented with estimating information from other sources where necessary such as quotes, bid data, and A-E estimates. The intent was to provide or convey a “fair and reasonable” estimate that which depicts the local market conditions. The estimates assume a typical application of tiering subcontractors. Given the long time over which this project/program is to be constructed and the unknown economic status during that time, demands from non-governmental civil works projects were not considered to dampen the competition and increase prices.

Section 2. Estimate Structure:

The estimates are structured to reflect the projects performed. The estimates have been subdivided by USACE feature codes.

Section 3. Bid competition:

It is assumed that there will not be an economically saturated market and that bidding competition will be present.

Section 4. Contract Acquisition Strategy:

There is no declared contract acquisition plan/types at this time. Although it has not been declared, it is anticipated to be Hubzone or 8a small business.

Section 5. Labor Shortages:

It is assumed there will be a normal labor market.

Section 6. Labor Rates:

Local labor market wages are above the local Davis-Bacon Wage Determination and actual rates have been used. This is based upon local information and payroll data received from the New Orleans District Construction Representatives and estimators with experiences in past years.

Section 7. Materials:

Cost quotes are used on major construction items. Material prices quotes were also taken from previous job or historical data.

Section 8. Equipment:

Rates used are based from the latest USACE EP-1110-1-8, Region III. Adjustments are made for fuel and facility capital cost of money (FCCM). Judicious use of owned versus rental rates was considered based on typical contractor usage and local equipment availability. Only a few select pieces of marine \ marsh equipment are considered rental. Full FCCM/Cost of Money rate is latest available; Mii program takes EP recommended discount, no other adjustments have been made to the FCCM.

Section 9. Fuel:

Fuels (gasoline, on and off-road diesel) were based on local market prices for on-road and off-road for the Gulf Coast area. The Team found that fuels fluctuate irrationally; thus, used the current price and placed a risk on the risk register.

Section 10. Crews:

Major crew and productivity rates were developed and studied by senior USACE estimators familiar with the type of work. All of the work is typical to the New Orleans District. The crews and productivities were checked by local MVN estimators, discussions with contractors and comparisons with historical cost data. Major crews include haul, earthwork, clearing and snagging, piling and concrete.

Most crew work hours are assumed to be 8 hrs 5 days/wk which is typical to the area.

Section 11. Unit Prices:

The unit prices found within the various project estimates will fluctuate within a range between similar construction units such as Residential Structures and Commercial Structures. Variances are a result of low lift, high lift, type of commercial structure, small or large business markups, subcontracted items, designs and estimates by others.

Section 12. Relocation Cost:

N/A

Section 13. Mobilization:

Contractor mobilization and demobilization are based on the assumption that most of the contractors will be coming from within the Gulf Coast/Southern region. Mob/demob costs are based on historical studies of detailed Government estimate mob/demobs which averaged 5% of the construction costs. With undefined acquisition strategies and assumed individual project limits for the large number of potential contracts in this program, the estimate utilizes a more comprehensive approx. 5% value applied at each contract rather than risking minimizing mob/demob costs by detailing costs based on an assumed number of contracts. The 5% value also matches well with the 5% value previously prescribed by Walla Walla District, which has studied historical rates.

Section 14. Field Office Overhead:

The estimate used a field office overhead rate based on the average of relevant jobs. The reason this was done is because similar work is being done and the job office overhead should also be similar.

Section 15. Overhead assumptions may include:

Superintendent, office manager, pickups, periodic travel, costs, communications, temporary offices (contractor and government), office furniture, office supplies, computers and software, as-built drawings and minor designs, tool trailers, staging setup, camp and kitchen maintenance and utilities, utility service, toilets, safety equipment, security and fencing, small hand and power tools, project signs, traffic control, surveys, temp fuel tank station, generators, compressors, lighting, and minor miscellaneous.

Section 16. Home Office Overhead:

Estimate percentages range based upon consideration of 8(a), small business and unrestricted prime contractors. The rates are based upon estimating and negotiating experience, and consultation with local construction representatives. Different percents are used when considering the contract acquisition strategy regarding small business 8(a), competitive small business and large business, high to low respectively. This project will assume an acquisition strategy of small business and assume a Home Office Overhead of 7%.

Section 17. Taxes:

Local taxes will be applied, using an average between the parishes that contain the work.

Reference the LA parish tax rate website: <http://www.laota.com/pta.htm>

Section 18. Bond:

Bond is assumed .83% applied against the prime contractor, assuming large contracts. No differentiation was made between large and small businesses.

Section 19. E&D and S&A:

USACE Costs to manage design (PED) and construction (S&A) are based on New Orleans District Programmatic Cost Estimate guidance:

- i) The PED cost includes such costs as project management, engineering, planning, designs, investigations, studies, reviews, value engineering and engineering during construction (EDC). Historically a rate of approximately 12% for E&D plus small percentages for other support features is applied against the estimated construction costs. Other USACE civil works districts such as St. Paul, Memphis, and St. Louis have reported values ranging from 10-15% for E&D. Additional support features might include project management, engineering, planning, designs, investigations, studies, reviews, and value engineering. Non-Structural will not have as much PED as typical civil works projects. The PED will probably much less. The estimate uses 2% PED.
- ii) Supervision & Administration (S&A): Historically, New Orleans District used a range from 5% to 15% depending on project size and type applied against the estimated construction costs. Other USACE civil works districts such as St. Paul, Memphis and St. Louis report values ranging from 7.5-10%. Consideration includes that a portion of the S&A effort could be performed by contractors. Based on discussions with MVN Construction Division, an S&A cost based on contract durations was developed. Non-Structural will not have as much S&A as typical civil works projects. The S&A will probably much less. The estimate uses 5% PED.

iii)

Section 20. Contingencies:

Contingencies were developed using the USACE Cost and Schedule Risk Analysis (CSRA) process and the Crystal Ball software that evaluates schedule and cost related risks. The contingency for is 32%. For more information see risk report. See summary in Risk Report.

Section 21. Escalation:

Escalation used in the TPCS is based upon the US Army Corps of Engineers Engineering Manual (EM) 1110-2-1304 Civil Works Construction Cost Index System (CWCCIS) revised 30 Sept 2022.

Section 22. HTRW:

The estimate includes no costs for any potential Hazardous, Toxic, and Radioactive Waste (HTRW) concerns.

Schedule

The project schedule was developed based on the construction of the individual features of work to include all residential and commercial building chosen by PDT.

Total Project Cost Summary (TPCS)

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: St. Tammany Parish Feasibility Study
PROJECT NO: P2 xxxxxx
LOCATION: Slidell, Louisiana

DISTRICT: MVN
POC: CHIEF, COST ENGINEERING, xxx

PREPARED: 2/3/2023

This Estimate reflects the scope and schedule in report; xxx

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)					TOTAL PROJECT COST (FULLY FUNDED)			
WBS NUMBER A	Civil Works Feature & Sub-Feature Description B	COST (\$K) C	CNTG (\$K) D	CNTG (%) E	TOTAL (\$K) F	Program Year (Budget EC): Effective Price Level Date:					INFLATED (%) L	COST (\$K) M	CNTG (\$K) N	FULL (\$K) O
						ESC (%) G	COST (\$K) H	CNTG (\$K) I	TOTAL (\$K) J	TOTAL FIRST COST (\$K) K				
19	BUILDINGS, GROUNDS & UTILITIES	\$945,475	\$302,552	32.0%	\$1,248,027	0.0%	\$945,475	\$302,552	\$1,248,027	\$1,248,027	18.5%	\$1,120,189	\$358,460	\$1,478,649
18	CULTURAL RESOURCE PRESERVATION	\$14,056	\$4,498	32.0%	\$18,554	0.0%	\$14,056	\$4,498	\$18,554	\$18,554	9.0%	\$15,320	\$4,902	\$20,222
05	LOCKS	\$0	\$0 -		\$0	-	\$0	\$0	\$0	\$0	-	\$0	\$0	\$0
06	FISH & WILDLIFE FACILITIES	\$0	\$0 -		\$0	-	\$0	\$0	\$0	\$0	-	\$0	\$0	\$0
07	POWER PLANT	\$0	\$0 -		\$0	-	\$0	\$0	\$0	\$0	-	\$0	\$0	\$0
08	ROADS, RAILROADS & BRIDGES	\$0	\$0 -		\$0	-	\$0	\$0	\$0	\$0	-	\$0	\$0	\$0
09	CHANNELS & CANALS	\$0	\$0 -		\$0	-	\$0	\$0	\$0	\$0	-	\$0	\$0	\$0
10	BREAKWATER & SEAWALLS	\$0	\$0 -		\$0	-	\$0	\$0	\$0	\$0	-	\$0	\$0	\$0
CONSTRUCTION ESTIMATE TOTALS:		\$959,532	\$307,050		\$1,266,582	0.0%	\$959,532	\$307,050	\$1,266,582	\$1,266,582	18.3%	\$1,135,508	\$363,363	\$1,498,871
01	LANDS AND DAMAGES	\$178,594	\$44,649	25.0%	\$223,243	0.0%	\$178,594	\$44,649	\$223,243	\$223,243	9.0%	\$194,646	\$48,661	\$243,307
30	PLANNING, ENGINEERING & DESIGN	\$47,977	\$15,353	32.0%	\$63,329	0.0%	\$47,977	\$15,353	\$63,329	\$63,329	9.6%	\$52,566	\$16,821	\$69,387
31	CONSTRUCTION MANAGEMENT	\$19,191	\$6,141	32.0%	\$25,332	0.0%	\$19,191	\$6,141	\$25,332	\$25,332	15.9%	\$22,242	\$7,118	\$29,360
PROJECT COST TOTALS:		\$1,205,293	\$373,192	31.0%	\$1,578,486		\$1,205,293	\$373,192	\$1,578,486	\$1,578,486	16.6%	\$1,404,962	\$435,963	\$1,840,925

CHIEF, COST ENGINEERING, xxx

ESTIMATED TOTAL PROJECT COST: \$1,840,925

PROJECT MANAGER, xxx

CHIEF, REAL ESTATE, xxx

CHIEF, PLANNING, xxx

CHIEF, ENGINEERING, xxx

CHIEF, OPERATIONS, xxx

CHIEF, CONSTRUCTION, xxx

CHIEF, CONTRACTING, xxx

CHIEF, PM-PB, xxx

CHIEF, DPM, xxx

Mii Cost Estimate

Floodproofing Measures					
Category	Number of Structures	Extended Direct Costs	Temporary Housing	Implementation Admin	Total
Mobile Homes - Raised	406	\$42,202,899	\$0	\$8,833,748	\$51,036,647
1 STY Pier - Raised	2918	\$364,178,469	\$0	\$63,489,844	\$427,668,313
2 STY Pier - Raised	2476	\$288,968,274	\$0	\$53,872,808	\$342,841,082
Commercial - Dry FP	844	\$105,565,489		\$18,363,752	\$123,929,241
Subtotal	6,644	\$800,915,131.00	\$0.00	\$144,560,152.00	\$945,475,283.00

Cost and Schedule Risk Analysis (CSRA)

The CSRA process for this project includes an analysis on the Buildings, Grounds, and Utilities feature. The results of the analyses are determined by qualifying and quantifying all potential cost risks and running a Monte Carlo simulation to produce the frequency spectrum and probability range for the applied risk costs. The cost contingency is obtained from the 80-percent contingency as determined by this analysis.

Initial Risk Register considered over 13 risk items. A total of 9 potential risk items for the Buildings, Grounds, and Utilities features were developed by the CSRA PDT team and applied to a risk registry for analysis. Assumptions were made for each risk item before running the Monte Carlo simulation. The result of the simulation gave a 32% percent (rounded) contingency respectively at the 80-percent confidence level.

The contingency cost for this project was utilized for a Micro Computer Aided Cost Estimating System (MCACES) estimation of the costs associated with the Mile Branch project. The potential cost risks developed during this analysis also serve as an indicator of how to avoid unforeseen escalation of project costs throughout project implementation and therefore, may be used as a valuable tool in all future aspect of the project study, design, and construction planning and estimation.

The major contributors to the resulting total project cost contingency for the Buildings, Grounds, and Utilities Features were:

- Owner Participation Rate
- Scope Maturity
- Availability of Floodproof Contractors

The major contributor to the resulting total project contingency for the Schedule feature was:

- Intermittent Funding
- Contract Acquisition
- PED and S&A Cost

The corresponding Total Cost including contingency (cost & schedule) for the Buildings, Grounds, and Utilities is presented on table 1.

Table 1. Structures and Levee/All other Features Contingency Analysis Table

**INITIAL CONSTRUCTION
Contingency Analysis**

Base Estimate ->	\$1,025,714,948	
Confidence Level	Contingency Value	Contingency
0%	-205,142,990	-20%
10%	51,285,747	5%
20%	102,571,495	10%
30%	143,600,093	14%
40%	174,371,541	17%
50%	215,400,139	21%
60%	246,171,588	24%
70%	287,200,186	28%
80%	328,228,783	32%
90%	389,771,680	38%
100%	666,714,716	65%

The rounded contingency percentage for **Buildings, Grounds, and Utilities Feature (32.0%)** were transferred to the TPCS for final calculation of total contingency and cost. Lands and Damages cost and contingency are not included in the above. (NOTE: The rounding of the contingencies causes the totals on the TPCS to be slightly higher than and not add up to exactly the costs above.)

Table 3. Risk Register – Modeled Items

PPM-1	1 - Project & Program Management (PM)	PED and S&A Costs	Project assumes the Fed Gov't will perform high level administration. The PDT's concern is that the Fed Gov't may have to implement a more robust administration/ inspection/approval process for the program.	It is still unclear exactly how this program will be implemented / administered; but it was assumed that the Federal Gov't will administer at a high level. If the Gov't has to implement a full administration plan to the low end levels, it would add considerable administrative costs - PED and S&A.	High	Medium
PPM-2	1 - Project & Program Management (PM)	Inventory of Eligible Structures	The PDT's concern is that the structure inventory could vary significantly from the current inventory. However, implementation of other similar projects has proven that the inventory generally reduces as a project moves from feasibility to implementation.	This risk item considers the accuracy of the inventory of structures eligible for the nonstructural program. The inventory, which is the basis for the nonstructural cost estimate, was developed in 2020 and considered conservative. Basis for the inventory is the National Structure Inventory. The foundation heights of the structures were developed through a stratified random sample of a visual inspection. It is assumed structures constructed after this survey would not be eligible nor have a need for this project because they would have been built to the new code. Assume that risk of inventory increasing is unlikely.	Low	Low
PPM-3	1 - Project & Program Management (PM)	Scope Maturity	Concern that unanticipated items of work could be added as part of the program as it is developed. Total number structures being raised and dry floodproofing within a year may extended schedule. May not be able to raise enough homes/year to maintain an appropriate schedule.	This item is to address the concern that due to the early program development stage, extended period of completion, number of structures and political pressure of dealing directly with the public, there could be un-anticipated items of work that could be added/required and extend to schedule.	High	Low
CA-1	5 - Contract Acquisition Risks (CA)	Contract Acquisition	limited competition during contract procurement could increase bid prices.	The base estimate assumes open and competitive bidding which is the traditionally employed contract procurement method. However, often competition will be limited due to certain small business objectives, using small groups of pre-approved contractors, or with the intent of improving overall quality of construction (best-value procurements). The house elevating costs are based on the limited pool available in the LA area, so some limited competition could be considered to already be built into the costs. There is a risk not knowing the exact implementation plan could cause increased levels of tiered subcontracting and/or limit the pool of contractors.	High	Medium
CO-1	13 - Construction (CO)	Availability of Floodproof Contractors	The concern is that the contracting pool could not be sufficient to support this project thereby reducing production, quality, and competitive market.	The base estimate assumes that there is no issue in obtaining capable contractors to perform the construction associated with the nonstructural floodproofing efforts. There is the risk that if you were to flood the market with a robust budget in a given time period and had a limited pool of contractors you could greatly increase contractor prices.	High	Medium
CO-2	13 - Construction (CO)	Unknown Cultural Resources	cultural resources might be encountered.	Work is on existing property/structures.	Low	Low
CO-3	13 - Construction (CO)	Construction Contract Modifications	concern that construction contract modifications/claims could impact cost and schedule.	Dealing with the public, occupied structures, and unknown site conditions could result in increased risk of contract modifications/claims. Will impact costs, but little overall impact to larger project timeline.	Medium	Low
ES-1	14 - Estimate and Schedule Risks (ES)	Required Raise Height	The concern is that assumed ground elevations may not be accurate and could result in a higher "required" raise amount.	The existing ground elevation was taken from 2017 LIDAR which is considered to be reasonably accurate for this level of detail. The calculated "raise" height was rounded LP based on efficiencies in the cost estimate. The Std deviation is less than 1 ft based on the check surveys of LIDAR data. A one foot difference in elevation costs the same in many cases. Raise height calculations considered conservative.	Low	Low
ES-2	14 - Estimate and Schedule Risks (ES)	Temporary Relocation of Residents	temporary relocation assistance during residential house elevating is NOT currently allowed for homeowners.	Due to public outrage Gov't may be forced to provide relocation assistance during construction on residential structures. Based on available information, avg outage is approximately 45 days. Add 15 days due the robust amount of contractor that may be needed to complete home raise.	Medium	Low
ES-3	14 - Estimate and Schedule Risks (ES)	Assumed Average Structure Size	concern that the "average" structure size by occupancy type used in the calculations may not truly represent the total of the actual sizes affected and therefore under-represent the project cost.	Due to large volume there is no way to estimate using individual dimensions, so they were averaged into an "average" structure for the various types. Accuracy of the size data method could result in variations from the actual sizes and cause the total cost to increase. Sizes were determined from aerial photographs but a field recon was also performed.	Medium	Low
EX-1	4 - External Risks (EX)	Owner Participation Rate	This item is perceived by the PDT to potentially be a significant opportunity. Historical participation rates in other programs have varied widely from project to project (ex. LRFs nonstructural program ranging from a low of about 5% to a high of about 80 with an average of about 56%).	The nonstructural program involves voluntary participation on the part of individuals at risk due to flooding. A 100% participation rate has been conservatively assumed in the cost estimate. Therefore, no chance of cost increases, only cost decrease. This risk element is negative so it is likely to have a cost reduction effect.	High	Low
EX-2	4 - External Risks (EX)	Intermittent Funding	Receiving inadequate Federal or State funds will result in inefficient effort and contract procurements. The overall implementation of the project could be affected, exposing the project to greater risk of inflation.	This is one of the most difficult risk to quantify and yet has the potential to negatively affect the project's final cost and schedule. The PDT has little or no influence over this risk item. The project is fully supported by the State. Intermittent funding could result in increased construction schedule resulting in construction cost escalation.	Low	High
TR-1	7 - General Technical Risk (TR)	Technical / Design Changes	possible design changes/ technical requirements for implementation	This item is to address the concern that due to the extended period of completion, there could be future design / technical changes to design criteria or hydraulic analysis that would result in increased requirements and cost.	High	Low