

**SOUTHWEST COASTAL LOUISIANA  
FEASIBILITY STUDY**

**December 2015**

Version: October 27, 2015

**COST ENGINEERING ANNEX**

---

**Table of Contents**

Cost Estimate ..... 3

Section 1. Cost Estimate development..... 3

Section 2. Estimate Structure:..... 3

Section 3. Quantity Development ..... 5

Section 4. Bid competition:..... 6

Section 5. Contract Acquisition Strategy:..... 6

Section 6. Labor Shortages: ..... 6

Section 7. Labor Rates: ..... 6

Section 8. Materials: ..... 6

Section 9. Equipment: ..... 6

Section 10. Crews: ..... 7

Section 11. Relocation Cost: ..... 7

Section 12. Mobilization: ..... 7

Section 13. Field Office Overhead:..... 7

Section 14. Home Office Overhead: ..... 8

Section 15. Taxes:..... 8

Section 16. E&D and S&A: ..... 8

Section 17. Contingencies:..... 9

Section 18. Escalation: ..... 9

Section 19. HTRW:..... 9

Total Project Cost Summary (TPCS)..... 10

MII Cost Estimates ..... 14

Project Construction Schedule ..... 35

Cost and Schedule Risk Analysis (CSRA) ..... 37

Section 1. NER: ..... 38

Section 2. NED: ..... 40

## Cost Estimate

### Section 1. Cost Estimate development

- a) The project cost consists of a National Ecosystem Restoration NER (dredging/marsh creation, rock, and planting) feature and a National Economic Development NED (non-structural – structure raising and floodproofing) feature. The project cost estimates for the NER and NED features were developed in CEDEP and MCACES 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. The project partner is the local sponsor (LS), State of Louisiana CPRA. Some of the cost estimates were prepared by the LS and/or its A/E, ARCADIS U.S. Inc. due to work in-kind arrangements and due to limited USACE funds and time following 3x3x3x3 study guidance. Some costs were developed or supplemented with estimating information from other sources such as quotes, bid data, and A-E estimates. The dredging costs developed by CPRA used their in-house, proprietary dredge estimating program and correlation with their annual coastal restoration/marsh creation/shoreline protection program contracts. Based on previous MVN experience with results, CPRA outputs are consistent with USACE MVN in-house production and overall costs. The costs provided by the LS are directly applicable to the features of work either by direct estimate or reference to recent bid work for adjacent similar features. The intent was to provide or convey “fair and reasonable” estimates that depict the local market conditions. The estimates assume a typical application of 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:

- a) The NER estimate is structured to reflect the projects performed and has been subdivided by USACE feature codes.
- b) The NED estimate is structured to develop the unit costs in Mii representing the standard type non-structural work being performed. The Mii unit cost for the average structure of each type were then applied to the voluminous quantities of structures to be raised or floodproofed in an Excel summary spreadsheet that is transferred to the TPCS.

All work activities and corresponding levels of effort are based upon conversations with Davies Shoring, LLC and Orleans Shoring on 23 June 2015 and 24 June 2015, respectively.

Residential Elevation Projects were group according to the following categories:

Mobile Home, Low Lift - This includes manufactured homes raised a minimum of 2'-6" and a maximum of 6'-0" above the lowest adjacent grade. For the purpose of this estimate these are assumed to be 576 sq.ft. single-wide sectional trailers.

Mobile Home, High Lift - This includes manufactured homes raised a minimum of 6'-6" and a maximum of 13'-0" above the lowest adjacent grade. For the purpose of this estimate these are assumed to be 576 sq.ft. single-wide sectional trailers.

Pier-supported Frame House, Low Lift - This includes wood frame houses built on a pier and beam foundation raised a minimum of 2'-6" and a maximum of 6'-0" above the lowest adjacent grade. For the purpose of this estimate single story are assumed to be 1,479 sq.ft. and two-story homes are assumed to be 1,327.5 sq.ft.; footprint square footage.

Pier-supported Frame House, High Lift - This includes wood frame houses built on a pier and beam foundation raised a minimum of 6'-6" and a maximum of 13'-0" above the lowest adjacent grade. For the purpose of this estimate single story are assumed to be 1,479 sq.ft. and two-story homes are assumed to be 1,327.5 sq.ft.; footprint square footage.

Slab-supported Frame House, Low Lift - This includes wood frame houses built on a concrete slab raised a minimum of 2'-6" and a maximum of 6'-0" above the lowest adjacent grade. For the purpose of this estimate single story are assumed to be 2,031 sq.ft. and two-story homes are assumed to be 1,787.5 sq.ft.; footprint square footage.

Slab-supported Frame House, High Lift - This includes wood frame houses built on a concrete slab raised a minimum of 6'-6" and a maximum of 13'-0" above the lowest adjacent grade. For the purpose of this estimate single story are assumed to be 2,031 sq.ft. and two-story homes are assumed to be 1,787.5 sq.ft.; footprint square footage.

The work process for Mobile Homes and Pier-supported frame houses is as follows:

1. Complete program application.
2. Government prepares Guide Plans and Specifications, and Estimate.
3. Home owner selects contractor and enters into direct agreement.
3. Contractor obtains all necessary permits and Mobilize to site.
4. Residents temporarily relocate.
5. Disconnect utilities.
6. Place Jacks and Cribbing.
7. Insert Steels.
8. Elevate Structure.
9. Install Piers.
10. Set Structure on Piers.
11. Anchor Structure.
12. For High Lifts, pour grade beams between piers and slab-on-grade.
13. Reconnect Utilities.

14. For Low Lifts, install Perimeter Enclosure.
15. Install elevated landings and stairs.
16. Demobilization and Closeout.

The work process for Slab-supported houses is as follows:

1. Complete program application.
2. Government prepares Guide Plans and Specifications, and Estimate.
3. Home owner selects contractor and enters into direct agreement.
3. Contractor obtains all necessary permits and Mobilize to site.
4. Residents temporarily relocate.
5. Disconnect utilities.
6. Excavate at perimeter and tunnels under slab on 8' centers.
7. Place Jacks and Cribbing.
8. Push segmented piles to refusal.
8. Elevate Structure.
9. Install Piers.
11. Anchor Structure.
12. For lower lifts, demo existing driveway and install new driveway adjusted to garage floor elevation.
13. For High Lifts, pour grade beams between piers and slab-on-grade.
14. Reconnect Utilities.
15. For Low Lifts, install Perimeter Enclosure.
16. Install elevated landings and stairs.
17. Demobilization and Closeout.

### Section 3. Quantity Development

- a) NER - Designs are based on similar work in the area and incorporate lessons learned and include allowances for settlement and losses. Marsh creation site designs and quantities are conservatively based on similar projects in each area. Rock structures are continuations of existing structures and quantities are based on the existing designs.
- b) NED - Field teams visually inspected each structure that was identified on a map based on x,y coordinates assigned to structures appearing on aerial photos. The team estimated the number of square feet for the total structure, along with other characteristics, such as one or two-story, slab or pier foundations, etc. An “average structure” was calculated for each type (one or two-story, slab or pier foundations, mobile homes) and this “average structure” was used to develop the structure elevation costs for each type in Mii. Similar averages were used for non-residential structures for floodproofing and warehouses for berms.

Section 4. Bid competition:

- a) NER and NED: It is assumed that there will not be an economically saturated market and that bidding competition will be present.

Section 5. Contract Acquisition Strategy:

- a) NER: It is assumed that the contract acquisition strategy will be similar to past projects of this type which are predominately large, unrestricted design/bid/build contracts. There is no declared contract acquisition plan/types at this time.
- b) NED: There is no declared contract acquisition plan/type at this time and it is anticipated that the Federal Government will not issue individual contracts directly. Any contracts would be directly between property owners and contractors. The base estimate assumes open and competitive bidding which is the traditionally employed contract procurement method for this type activity.

Section 6. Labor Shortages:

- a) It is assumed there will be a normal labor market.

Section 7. Labor Rates:

- a) 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 8. Materials:

- a) Cost quotes are used on major construction items when available, although quantities per site are small relatively speaking. Recent quotes may include concrete, steel and concrete piling, rock, gravel and sand. Assumptions include:
  - i) Materials will be purchased as part of the construction contract. The estimate does not anticipate government furnished materials. Prices include delivery of materials.
  - ii) Concrete - will be purchased from commercial batch plants.
  - iii) Borrow Material and Haul - Specific borrow sources have not been identified so a conservative estimated haul distance was used where required. All borrow material is assumed contractor furnished due to the small quantities.

Section 9. Equipment:

- a) Equipment rates used are primarily based from the latest USACE EP-1110-1-8, Region III.
- b) For specialty equipment required, industry practice was assumed and followed in the cost estimates. Examples: NER - rental quotes were used for marsh excavators in Mii. NED - structure jacking system quotes from Jahns Structure Jacking Systems Inc. were entered in USACE CheckRate spreadsheet to develop an hourly equipment rate for use in Mii.

Section 10. Crews:

- a) NER: Major crew and productivity rates were developed and studied by senior USACE estimators or specialists familiar with the type of work. Dredging and rock 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. Most crew work hours are assumed to be 10 hrs 6 days/wk which is typical to the area. Marine based bucket excavation and dredging operations are assumed to work 2-12 hours shifts 7 days / week.
- b) NED: Major crew and productivity rates were developed and studied by ARCADIS engineers in conjunction with local professionals familiar with the type of work. All of the work is typical to the Louisiana area. The crews and productivities were checked by local MVN senior cost engineers, discussions with contractors, and comparisons with historical cost data. Crew work hours are assumed to be 8 hrs 5 days/wk which is typical to the area and type of work.

Section 11. Relocation Cost:

- a) Not applicable.

Section 12. Mobilization:

- a) Contractor mobilization and demobilization are based on the assumption that most of the contractors will be coming from within the Gulf Coast/Southern region. Typical equipment is required for the NER dredging and rock work. Minimal equipment is required for the NED non-structural work.

Section 13. Field Office Overhead:

- a) NER: Included in Mii / CEDEP cost estimates.
- b) NED: Included in Mii cost estimates.

Section 14. Home Office Overhead:

- a) NER: Included in Mii cost estimates.
- b) NED: Included in Mii cost estimates.

Section 15. Taxes:

- a) 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 16. E&D and S&A:

- a) USACE costs to manage design (PED) and construction (S&A) are based on New Orleans District Programmatic Cost Estimate guidance:
  - i) NER:
    - (1) Planning, Engineering & Design (PED): The PED cost includes such costs as project management, engineering, planning, designs, investigations, studies, reviews, value engineering, contracting, and engineering during construction (EDC). Historically New Orleans District has used a 12% rate for the E&D portion plus small amounts for other tasks, applied against the estimated construction costs.
    - (2) 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. A 10% rate was used for the S&A portion.
  - ii) NED:
    - (1) Planning, Engineering & Design (PED): Itemized line item costs are included in the direct costs for specific implementation/administrative steps (Gov't and contractor) of each of the projects (non-Real Estate portion – Real Estate related costs covered under Acct 01). Additional PED costs have been included in the 30 Acct PED for more overall programmatic efforts such as Project Management, Planning & Environmental Compliance, Contracting, Planning during Construction, and Project Operations.
    - (2) Supervision & Administration (S&A): Itemized line item costs are included in the direct costs for specific implementation/administrative steps for the Government administration of each of the projects (non-Real Estate portion – Real Estate related costs covered under Acct 01). Additional more general S&A costs have been included in the 31 Acct S&A for more overall programmatic

Construction Management efforts. It is anticipated that construction actions will be directly between building owner and the contractor they select.

Section 17. Contingencies:

- a) 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. A separate CSRA was developed for the NED and NER plans. See summaries in Cost Schedule Risk Analysis (CSRA) section.

Section 18. Escalation:

- a) Escalation used in the Mii and TPCS is based upon the latest US Army Corps of Engineers Engineering Manual (EM) 1110-2-1304 Civil Works Construction Cost Index System (CWCCIS).

Section 19. HTRW:

- a) The estimates include no costs for any potential Hazardous, Toxic, and Radioactive Waste (HTRW). HTRW issues are not expected and project features could be revised to avoid. HTRW will be avoided at all costs.

## Total Project Cost Summary (TPCS)

---

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

PROJECT: Southwest Coastal (SWC) Feasibility Study - NER + NED  
PROJECT NO: P2 135700  
LOCATION: Southwest Louisiana

DISTRICT: New Orleans District  
POC: CHIEF, COST ENGINEERING, Thomas D. Murphy, P.E.  
PREPARED: 10/23/2015

This Estimate reflects the scope and schedule in report; Southwest Coastal (SWC) Feasibility Study - NER + NED

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	ESC (%) G	COST (\$K) H	CNTG (\$K) I	TOTAL (\$K) J	Program Year (Budget EC): Effective Price Level Date: 2016 1 OCT 15		TOTAL FIRST COST (\$K) K	INFLATED (%) L	COST (\$K) M	CNTG (\$K) N	FULL (\$K) O
										Spent Thru: 10/1/2015 (\$K)						
06	FISH & WILDLIFE FACILITIES	\$62,807	\$23,239	37.0%	\$86,046	0.0%	\$62,807	\$23,239	\$86,046	\$0	\$86,046	\$86,046	76.0%	\$110,556	\$40,906	\$151,461
09	CHANNELS & CANALS	\$26,637	\$9,856	37.0%	\$36,493	0.0%	\$26,637	\$9,856	\$36,493	\$0	\$36,493	\$36,493	76.0%	\$46,887	\$17,348	\$64,235
11	LEVEES & FLOODWALLS	\$586,543	\$202,357	34.5%	\$788,900	0.0%	\$586,543	\$202,357	\$788,900	\$0	\$788,900	\$788,900	37.4%	\$806,003	\$278,071	\$1,084,074
15	FLOODWAY CONTROL & DIVERSION STRU	\$630,422	\$233,256	37.0%	\$863,678	0.0%	\$630,422	\$233,256	\$863,678	\$0	\$863,678	\$863,678	76.0%	\$1,109,696	\$410,587	\$1,520,283
16	BANK STABILIZATION	\$560,182	\$207,267	37.0%	\$767,449	0.0%	\$560,182	\$207,267	\$767,449	\$0	\$767,449	\$767,449	76.0%	\$986,057	\$364,841	\$1,350,898
19	BUILDINGS, GROUNDS & UTILITIES	\$0	\$0	-	\$0	-	\$0	\$0	\$0	\$0	\$0	\$0	-	\$0	\$0	\$0
<b>CONSTRUCTION ESTIMATE TOTALS:</b>		\$1,866,591	\$675,975		\$2,542,566	0.0%	\$1,866,591	\$675,975	\$2,542,566	\$0	\$2,542,566	\$2,542,566	64.0%	\$3,059,198	\$1,111,753	\$4,170,951
01	LANDS AND DAMAGES	\$58,321	\$14,581	25.0%	\$72,902	0.0%	\$58,321	\$14,581	\$72,902	\$0	\$72,902	\$72,902	43.2%	\$83,518	\$20,881	\$104,399
30	PLANNING, ENGINEERING & DESIGN	\$336,535	\$123,785	36.8%	\$460,320	0.0%	\$336,535	\$123,785	\$460,320	\$0	\$460,320	\$460,320	252.6%	\$1,185,791	\$437,295	\$1,623,086
31	CONSTRUCTION MANAGEMENT	\$184,537	\$67,985	36.8%	\$252,522	0.0%	\$184,537	\$67,985	\$252,522	\$0	\$252,522	\$252,522	256.5%	\$657,601	\$242,733	\$900,334
<b>PROJECT COST TOTALS:</b>		\$2,445,984	\$882,326	36.1%	\$3,328,310		\$2,445,984	\$882,326	\$3,328,310	\$0	\$3,328,310	\$3,328,310	104.3%	\$4,986,108	\$1,812,662	\$6,798,770

CHIEF, COST ENGINEERING, Thomas D. Murphy, P.E.

PROJECT MANAGER, Darrel Broussard

CHIEF, REAL ESTATE, Linda Labure

CHIEF, PLANNING, Troy Constance

Acting CHIEF, ENGINEERING, John Bivona, P.E.

CHIEF, OPERATIONS, Mike Park

CHIEF, CONSTRUCTION, Stuart Waits, P.E.

CHIEF, CONTRACTING, Tim Black

CHIEF, PM-PB, xxxx

CHIEF, DPM, Mark Wingate

ESTIMATED FEDERAL COST: 65% \$4,419,200  
ESTIMATED NON-FEDERAL COST: 35% \$2,379,569

ESTIMATED TOTAL PROJECT COST: \$6,798,770

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

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

PROJECT: Southwest Coastal (SWC) Feasibility Study - NER + NED  
 LOCATION: Southwest Louisiana  
 This Estimate reflects the scope and schedule in report; Southwest Coastal (SWC) Feasibility Study - NER + NED

DISTRICT: New Orleans District  
 POC: CHIEF, COST ENGINEERING, Thomas D. Murphy, P.E.  
 PREPARED: 10/23/2015

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: Effective Price Level:		28-Sep-15 1-Oct-15		Program Year (Budget EC): Effective Price Level Date:		2016 1 OCT 15						
		RISK BASED												
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST (\$K)	CNTG (\$K)	CNTG (%)	TOTAL (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	TOTAL (\$K)	Mid-Point Date	INFLATED (%)	COST (\$K)	CNTG (\$K)	FULL (\$K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
<b>NER plan</b>														
06	FISH & WILDLIFE FACILITIES	\$62,807	\$23,239	37.0%	\$86,046	0.0%	\$62,807	\$23,239	\$86,046	2044Q4	76.0%	\$110,556	\$40,906	\$151,461
09	CHANNELS & CANALS	\$26,637	\$9,856	37.0%	\$36,493	0.0%	\$26,637	\$9,856	\$36,493	2044Q4	76.0%	\$46,887	\$17,348	\$64,235
11	LEVEES & FLOODWALLS		\$0		\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
15	FLOODWAY CONTROL & DIVERSION STRU	\$630,422	\$233,256	37.0%	\$863,678	0.0%	\$630,422	\$233,256	\$863,678	2044Q4	76.0%	\$1,109,696	\$410,587	\$1,520,283
16	BANK STABILIZATION	\$560,182	\$207,267	37.0%	\$767,449	0.0%	\$560,182	\$207,267	\$767,449	2044Q4	76.0%	\$986,057	\$364,841	\$1,350,898
19	BUILDINGS, GROUNDS & UTILITIES		\$0		\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
<b>CONSTRUCTION ESTIMATE TOTALS:</b>		\$1,280,048	\$473,618	37.0%	\$1,753,666		\$1,280,048	\$473,618	\$1,753,666			\$2,253,195	\$833,682	\$3,086,877
01	LANDS AND DAMAGES	\$8,745	\$2,187	25.0%	\$10,932	0.0%	\$8,745	\$2,187	\$10,932	2044Q4	76.0%	\$15,393	\$3,850	\$19,243
<b>30 PLANNING, ENGINEERING &amp; DESIGN</b>														
2.0%	Project Management	\$25,601	\$9,472	37.0%	\$35,073	0.0%	\$25,601	\$9,472	\$35,073	2044Q4	267.1%	\$93,991	\$34,777	\$128,768
2.0%	Planning & Environmental Compliance	\$25,601	\$9,472	37.0%	\$35,073	0.0%	\$25,601	\$9,472	\$35,073	2044Q4	267.1%	\$93,991	\$34,777	\$128,768
12.0%	Engineering & Design	\$153,606	\$56,834	37.0%	\$210,440	0.0%	\$153,606	\$56,834	\$210,440	2044Q4	267.1%	\$563,946	\$208,660	\$772,606
1.0%	Reviews, ATRs, IEPs, VE	\$12,800	\$4,736	37.0%	\$17,536	0.0%	\$12,800	\$4,736	\$17,536	2044Q4	267.1%	\$46,994	\$17,388	\$64,381
1.0%	Life Cycle Updates (cost, schedule, risks)	\$12,800	\$4,736	37.0%	\$17,536	0.0%	\$12,800	\$4,736	\$17,536	2044Q4	267.1%	\$46,994	\$17,388	\$64,381
1.0%	Contracting & Reprographics	\$12,800	\$4,736	37.0%	\$17,536	0.0%	\$12,800	\$4,736	\$17,536	2044Q4	267.1%	\$46,994	\$17,388	\$64,381
2.0%	Engineering During Construction	\$25,601	\$9,472	37.0%	\$35,073	0.0%	\$25,601	\$9,472	\$35,073	2044Q4	267.1%	\$93,991	\$34,777	\$128,768
2.0%	Planning During Construction	\$25,601	\$9,472	37.0%	\$35,073	0.0%	\$25,601	\$9,472	\$35,073	2044Q4	267.1%	\$93,991	\$34,777	\$128,768
1.0%	Project Operations	\$12,800	\$4,736	37.0%	\$17,536	0.0%	\$12,800	\$4,736	\$17,536	2044Q4	267.1%	\$46,994	\$17,388	\$64,381
<b>31 CONSTRUCTION MANAGEMENT</b>														
10.0%	Construction Management	\$128,005	\$47,362	37.0%	\$175,367	0.0%	\$128,005	\$47,362	\$175,367	2044Q4	267.1%	\$469,955	\$173,883	\$643,838
1.0%	Project Operation:	\$12,800	\$4,736	37.0%	\$17,536	0.0%	\$12,800	\$4,736	\$17,536	2044Q4	267.1%	\$46,994	\$17,388	\$64,381
2.5%	Project Management	\$32,001	\$11,840	37.0%	\$43,841	0.0%	\$32,001	\$11,840	\$43,841	2044Q4	267.1%	\$117,488	\$43,470	\$160,958
<b>CONTRACT COST TOTALS:</b>		\$1,768,809	\$653,411		\$2,422,220		\$1,768,809	\$653,411	\$2,422,220			\$4,030,909	\$1,489,590	\$5,520,499

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

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

PROJECT: Southwest Coastal (SWC) Feasibility Study - NER + NED  
 LOCATION: Southwest Louisiana  
 This Estimate reflects the scope and schedule in report; Southwest Coastal (SWC) Feasibility Study - NER + NED

DISTRICT: New Orleans District  
 POC: CHIEF, COST ENGINEERING, Thomas D. Murphy, P.E.  
 PREPARED: 10/23/2015

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: Effective Price Level:		28-Sep-15 1-Oct-15		Program Year (Budget EC): Effective Price Level Date:		2016 1 OCT 15						
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST (\$K)	CNTG (\$K)	CNTG (%)	TOTAL (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	TOTAL (\$K)	Mid-Point Date	INFLATED (%)	COST (\$K)	CNTG (\$K)	FULL (\$K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
<b>NED Plan</b>														
05	LOCKS	\$0	\$0	0.0%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
06	FISH & WILDLIFE FACILITIES	\$0	\$0	0.0%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
11	LEVEES & FLOODWALLS	\$586,543	\$202,357	34.5%	\$788,900	0.0%	\$586,543	\$202,357	\$788,900	2032Q2	37.4%	\$806,003	\$278,071	\$1,084,074
08	ROADS, RAILROADS & BRIDGES	\$0	\$0	0.0%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
09	CHANNELS & CANALS	\$0	\$0	0.0%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
10	BREAKWATER & SEAWALLS	\$0	\$0	0.0%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
<b>CONSTRUCTION ESTIMATE TOTALS:</b>		\$586,543	\$202,357	34.5%	\$788,900		\$586,543	\$202,357	\$788,900			\$806,003	\$278,071	\$1,084,074
01	LANDS AND DAMAGES	\$49,576	\$12,394	25.0%	\$61,970	0.0%	\$49,576	\$12,394	\$61,970	2032Q2	37.4%	\$68,125	\$17,031	\$85,156
30	PLANNING, ENGINEERING & DESIGN													
1.0%	Project Management	\$5,865	\$2,023	34.5%	\$7,888	0.0%	\$5,865	\$2,023	\$7,888	2032Q2	97.5%	\$11,581	\$3,996	\$15,577
1.0%	Planning & Environmental Compliance	\$5,865	\$2,023	34.5%	\$7,888	0.0%	\$5,865	\$2,023	\$7,888	2032Q2	97.5%	\$11,581	\$3,996	\$15,577
	Engineering & Design	\$0	\$0	34.5%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
	Reviews, ATRs, IEPRs, VE	\$0	\$0	34.5%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
	Life Cycle Updates (cost, schedule, risks)	\$0	\$0	34.5%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
1.0%	Contracting & Reprographics	\$5,865	\$2,023	34.5%	\$7,888	0.0%	\$5,865	\$2,023	\$7,888	2032Q2	97.5%	\$11,581	\$3,996	\$15,577
	Engineering During Construction	\$0	\$0	34.5%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
1.0%	Planning During Construction	\$5,865	\$2,023	34.5%	\$7,888	0.0%	\$5,865	\$2,023	\$7,888	2032Q2	97.5%	\$11,581	\$3,996	\$15,577
1.0%	Project Operations	\$5,865	\$2,023	34.5%	\$7,888	0.0%	\$5,865	\$2,023	\$7,888	2032Q2	97.5%	\$11,581	\$3,996	\$15,577
31	CONSTRUCTION MANAGEMENT													
2.0%	Construction Management	\$11,731	\$4,047	34.5%	\$15,778	0.0%	\$11,731	\$4,047	\$15,778	2032Q2	97.5%	\$23,165	\$7,992	\$31,156
	Project Operation:	\$0	\$0	34.5%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
	Project Management	\$0	\$0	34.5%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
<b>CONTRACT COST TOTALS:</b>		\$677,175	\$228,916		\$906,091		\$677,175	\$228,916	\$906,091			\$955,199	\$323,072	\$1,278,271

# MII Cost Estimates

---

Southwest Coastal Feasibility Study NER rev Sept 2015

Estimated by MVN New Orleans District and LA CPRA  
Designed by USACE, MVN and La CPRA  
Prepared by John Petitbon

Preparation Date 9/28/2015  
Effective Date of Pricing 6/19/2015  
Estimated Construction Time Days

This report is not copyrighted, but the information contained herein is For Official Use Only.

Date	Author	Note
6/29/2015	JP	<p>Southwest Coastal (SWC) Feasibility StudyThe people, economy, environment, and cultural heritage of coastal areas in Southwest Louisiana are at risk from damages caused by hurricane and storm surge flooding. Southwest coastal Louisiana's topography, and low elevation, proximity to the Gulf of Mexico, subsiding lands, and rising seas, are all contributing factors which cause coastal flooding, shoreline erosion, saltwater intrusion, and loss of wetland and Chenier habitats which are conditions that are expected to continue to worsen.Through separate authorizations, Congress authorized the investigation of alternatives to: (1) provide hurricane protection and storm damage reduction, and (2) significantly restore environmental conditions. Planning measures for ecosystem restoration (the NER component) concentrated exclusively on locations within the coastal zone.The SWC study area encompasses over 4,700 square miles of varying terrain in the Calcasieu, Cameron, and Vermilion Parishes. The major physiographic divisions are the Gulf Coast Prairies and the Gulf Coast Marsh. The major hydrologic basins in the Study Area are the Mermentau River, the Calcasieu-Sabine Lakes, and the Teche/Vermilion Basin.The NER TSP is "Small Integrated Restoration" based on the NER Plan CM-4 and consists of the following ecosystem restoration features: 9 marsh restoration features; 35 chenier reforestation features; 5 shoreline protection features. The NER TSP is a comprehensive ecosystem restoration plan that addresses land loss and ecosystem degradation with the goal of minimizing land loss. The NER TSP contains features to restore wetlands; restore and protect designated critical habitat (for threatened piping plover and red knot); enhance plant productivity; and reinforce and protect critical landscape features. The Calcasieu Ship Channel Salinity Barrier Navigation Study is recommended as an additional long-range study and not included in the cost estimate.Estimate Philosophy: The estimate development 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. The project partner is the LS, State of Louisiana CPRA. Some of the cost estimates were prepared by the LS due to work in-kind arrangements and due to limited USACE funds and time following 3x3x3x3 study guidance. Some costs were developed or supplemented with estimating information from other sources such as quotes, bid data, and A-E estimates. The dredging costs developed by CPRA used their in-house, proprietary dredge estimating program and correlation with their vast annual coastal restoration/marsh creation/shoreline protection program contracts. Based on previous MVN experience with results, CPRA outputs are consistent with MVN in-house production and overall costs. The costs provided by the LS are directly applicable to the features of work either by direct estimate or reference to recent bid work for adjacent similar features. 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.Estimate Structure: The estimate is structured to reflect the projects performed. The estimates are subdivided by USACE feature codes and by local "reach" name.Bid competition: It is assumed that there will not be an economically saturated market and bidding competition will be present.Contract Acquisition Strategy: It is assumed that the contract acquisition strategy will be similar to past projects of this type which are predominately large, unrestricted design/bid/build contracts. There is no declared contract acquisition plan/types at this time.Labor Shortages: It is assumed there will be a normal labor market.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.Materials: Cost quotes are used on major construction items when available. Recent quotes may include rock and other aggregates. Assumptions include:a. materials will be purchased as part of the construction contract. The estimate does not anticipate government furnished materials. Prices include delivery of materials.b. Rock and stone - The New Orleans delta area has no rock sources. Historically, rock is barged from northern sources on the Mississippi River. This decision is based upon local knowledge, experience and supported with cost quotes.Equipment: Rates used are based from the latest USACE EP-1110-1-8, Region III. Adjustments are made for current fuel, local factors, and facility capital cost of money (FCCM). Use of owned verses 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.Fuel: Fuels (gasoline, on and off-road diesel) were based on local market averages for on-road and off-road for the Gulf Coast area. The Team found that fuels fluctuate irrationally; thus, conservatively used an above average rate.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 hydraulic dredging, bucket dredging, dike construction, marine rock placement, and planting.Most crew work hours are assumed to be 10 hrs 6 days/wk which is typical to the area. Marine based bucket excavation and dredging operations are assumed to work 2-12 hours shifts 7 days / week.Unit Prices: The unit prices found within various project estimates are based on historical data from recent bid tabulations for similar work.Relocation Cost: Relocation costs are defined as the relocation of public roads, bridges, railroads, and utilities required for project purposes. In cases where potential significant impacts were known, costs were included within the cost estimate. There are no relocations on this project.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.Field Office Overhead: detailed in Mii / CEDEP.Home Office Overhead: Estimate percentages range based upon consideration of 8(a), small business and unrestricted prime contractors and the type of work they perform. The rates are based upon estimating and negotiating experience, and consultation with local construction representatives.Taxes: Local taxes will be applied, using an average between the parishes that contain the work. Reference the LA parish tax rate website: <a href="http://www.laota.com/pta.htm">http://www.laota.com/pta.htm</a>Bond: Bond is assumed in the 1%-2% range applied against the prime contractor, assuming large contracts. No differentiation was made between large and small businesses.E&amp;D</p>

Date	Author	Note
6/29/2015	JP	and S&A: USACE Costs to manage design (PED) and construction (S&A) are based on New Orleans District Programmatic and generally accepted cost estimate guidance:a. Planning, Engineering & Design (PED): The PED cost includes such costs as project management, engineering, planning, designs, investigations, studies, reviews, value engineering, contracting, and engineering during construction (EDC). Historically New Orleans District has used a 12% rate for the E&D portion plus small amounts for other tasks, 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%.b. 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. A 10% rate was used for the S&A portion. 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.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.Escalation: Escalation used in the TPCS is based upon the latest US Army Corps of Engineers Engineering Manual (EM) 1110-2-1304 Civil Works Construction Cost Index System (CWCCIS).HTRW: The estimate includes no costs for any potential Hazardous, Toxic, and Radioactive Waste (HTRW) concerns. Phase 1 HTRW investigations were not completed due to funding and time constraints. HTRW issues are not expected and project features could be revised to avoid.
6/29/2015	JP	06-29-2015Revised to base on \$50M/year funding stream for SWC (NER and NED) - assume approx. \$25M/year for NER. Revise number of Mob/Demobs.
7/1/2015	JP	Cameron Parish sales tax - 4%Calcasieu Parish sales tax - 9.25%Vermilion Parish sales tax - 7.75%
7/7/2015	JP	Added Adaptive Management for Record keeping to Acct 06
10/1/2015	JP	Added additional notes documenting costs per ATR comments.slight revision to qtys for 124c and 3c1 per CPRA area adjustments for overlapping existing mitigation sites.updated 06 Acct -new cost provided by Environmental Br.

Description	Quantity	UOM	ContractCost	Contingency	Escalation	ProjectCost
bid schedule summary			1,280,047,097.52	0.00	0.00	1,280,047,097.52
			62,807,000.00			62,807,000.00
06 Fish and Wildlife Facilities	1.0000	EA	62,807,000.00	0.00	0.00	62,807,000.00
			62,807,000.00			62,807,000.00
00 Fish and Wildlife Facilities	1.0000	EA	62,807,000.00	0.00	0.00	62,807,000.00
01 Adaptive Management	1.0000	LS	62,807,000.00	0.00	0.00	62,807,000.00
			26,636,899.00			26,636,899.00
09 Channels and Canals	1.0000	EA	26,636,899.00	0.00	0.00	26,636,899.00
			26,636,899.00			26,636,899.00
09 01 CHANNELS	1.0000	EA	26,636,899.00	0.00	0.00	26,636,899.00
			5,597,496.00			5,597,496.00
09 01 01 16bW Fortify Spoil Banks of GIWW and Freshwater Bayou	1.0000	EA	5,597,496.00	0.00	0.00	5,597,496.00
			5,841,827.00			5,841,827.00
09 01 02 16bNE Fortify Spoil Banks of GIWW and Freshwater Bayou	1.0000	EA	5,841,827.00	0.00	0.00	5,841,827.00
			15,197,576.00			15,197,576.00
09 01 03 16bSE Fortify Spoil Banks of GIWW and Freshwater Bayou	1.0000	EA	15,197,576.00	0.00	0.00	15,197,576.00
			630,421,649.52			630,421,649.52
15 Ecosystem Restoration	1.0000	EA	630,421,649.52	0.00	0.00	630,421,649.52
			628,670,323.00			628,670,323.00
15 00 Marsh Creation / Restoration	1.0000	EA	628,670,323.00	0.00	0.00	628,670,323.00
			17,396,127.80			17,396,127.80
15 00 01 124d Dedicated Dredging - Calcasieu Ship Channel	1.0000	EA	17,396,127.80	0.00	0.00	17,396,127.80
			58,664,050.14			58,664,050.14
15 00 01 124c Marsh Creation at Mud Lake	1.0000	EA	58,664,050.14	0.00	0.00	58,664,050.14
			91,995,556.45			91,995,556.45
15 00 01 47a1 Marsh Restoration South of Hwy 82	1.0000	EA	91,995,556.45	0.00	0.00	91,995,556.45
			84,505,519.69			84,505,519.69
15 00 01 47a2 Marsh Restoration South of Hwy 82	1.0000	EA	84,505,519.69	0.00	0.00	84,505,519.69
			83,516,901.25			83,516,901.25
15 00 01 47c1 Marsh Restoration South of Hwy 82	1.0000	EA	83,516,901.25	0.00	0.00	83,516,901.25
			45,257,472.54			45,257,472.54
15 00 01 127c3 Marsh Restoration at Pecan Island	1.0000	EA	45,257,472.54	0.00	0.00	45,257,472.54
			63,808,602.17			63,808,602.17
15 00 01 306a1 Rainey Marsh Restoration - Southwest Portion	1.0000	EA	63,808,602.17	0.00	0.00	63,808,602.17
			43,768,469.91			43,768,469.91
15 00 01 3a1 Beneficial Use of Dredge Material from Calcasieu Ship Channel	1.0000	EA	43,768,469.91	0.00	0.00	43,768,469.91

Description	Quantity	UOM	ContractCost	Contingency	Escalation	ProjectCost
15 00 01 3c1 Beneficial Use of Dredge Material from Calcasieu Ship Channel	1.0000	EA	139,757,623.05	0.00	0.00	139,757,623.05
15 01 Chenier Reforestation	1.0000	EA	1,751,326.53	0.00	0.00	1,751,326.53
15 01 01 01 fencing	150,000.0000	LF	10.00	0.00	0.00	10.00
15 01 01 510a Blue Buck Ridge Restoration	524.4000	ACR	177.75	0.00	0.00	177.75
15 01 02 510b Hackberry Ridge Restoration	148.5000	ACR	93,212.10	0.00	0.00	93,212.10
15 01 03 510d Front Ridge Restoration	458.7000	ACR	177.75	0.00	0.00	177.75
15 01 04 509c Bill Ridge Restoration	21.4000	ACR	26,395.88	0.00	0.00	26,395.88
15 01 05 509d Cheniere Au Tigre Ridge Restoration	8.2000	ACR	177.75	0.00	0.00	177.75
15 01 06 416 Grand Chenier Ridge Restoration	251.9000	ACR	182.75	0.00	0.00	182.75
16 Bank Stabilization	1.0000	EA	3,910.85	0.00	0.00	3,910.85
16 00 Bank Stabilization	1.0000	EA	1,498.55	0.00	0.00	1,498.55
16 00 01 6b1 Gulf Shoreline Restoration - Calcasieu River to FWB	1.0000	EA	177.75	0.00	0.00	177.75
16 00 01 6b2 Gulf Shoreline Restoration - Calcasieu River to FWB	1.0000	EA	560,181,549.00	0.00	0.00	560,181,549.00
16 00 01 6b3 Gulf Shoreline Restoration - Calcasieu River to FWB	1.0000	EA	203,414,240.00	0.00	0.00	203,414,240.00
16 00 01 5a Holly Beach Shoreline Stabilization	1.0000	EA	149,488,714.00	0.00	0.00	149,488,714.00
			118,359,774.00	0.00	0.00	118,359,774.00
			88,918,821.00	0.00	0.00	88,918,821.00

<b>Description</b>	<b>Page</b>
<b>Project Notes</b> .....	<b>ii</b>
<b>bid schedule summary</b> .....	<b>1</b>
06 Fish and Wildlife Facilities .....	1
00 Fish and Wildlife Facilities .....	1
01 Adaptive Management .....	1
09 Channels and Canals .....	1
09 01 CHANNELS .....	1
09 01 01 16bW Fortify Spoil Banks of GIWW and Freshwater Bayou .....	1
09 01 02 16bNE Fortify Spoil Banks of GIWW and Freshwater Bayou .....	1
09 01 03 16bSE Fortify Spoil Banks of GIWW and Freshwater Bayou .....	1
15 Ecosystem Restoration .....	1
15 00 Marsh Creation / Restoration .....	1
15 00 01 124d Dedicated Dredging - Calcasieu Ship Channel .....	1
15 00 01 124c Marsh Creation at Mud Lake .....	1
15 00 01 47a1 Marsh Restoration South of Hwy 82 .....	1
15 00 01 47a2 Marsh Restoration South of Hwy 82 .....	1
15 00 01 47c1 Marsh Restoration South of Hwy 82 .....	1
15 00 01 127c3 Marsh Restoration at Pecan Island .....	1
15 00 01 306a1 Rainey Marsh Restoration - Southwest Portion .....	1
15 00 01 3a1 Beneficial Use of Dredge Material from Calcasieu Ship Channel .....	1
15 00 01 3c1 Beneficial Use of Dredge Material from Calcasieu Ship Channel .....	2
15 01 Chenier Reforestation .....	2
15 01 01 01 fencing .....	2
15 01 01 510a Blue Buck Ridge Restoration .....	2
15 01 02 510b Hackberry Ridge Restoration .....	2
15 01 03 510d Front Ridge Restoration .....	2
15 01 04 509c Bill Ridge Restoration .....	2
15 01 05 509d Cheniere Au Tigre Ridge Restoration .....	2
15 01 06 416 Grand Chenier Ridge Restoration .....	2
16 Bank Stabilization .....	2
16 00 Bank Stabilization .....	2
16 00 01 6b1 Gulf Shoreline Restoration - Calcasieu River to FWB .....	2
16 00 01 6b2 Gulf Shoreline Restoration - Calcasieu River to FWB .....	2
16 00 01 6b3 Gulf Shoreline Restoration - Calcasieu River to FWB .....	2
16 00 01 5a Holly Beach Shoreline Stabilization .....	2

**Floodproofing Measures**

Category	Number of Structures	Extended Direct Costs	Temporary Housing (3)	Implementation Admin (4)	Total
Mobile Homes	204	\$16,803,597	\$0	\$2,965,140	\$19,768,737
1 STY Pier	907	\$92,008,055	\$0	\$13,183,245	\$105,191,300
2 STY Pier	45	\$4,602,799	\$0	\$654,075	\$5,256,874
1 STY Slab	1966	\$270,518,656	\$0	\$28,575,810	\$299,094,466
2 STY Slab	317	\$39,161,442	\$0	\$4,607,595	\$43,769,037
Commercial	336	\$17,789,563		\$5,965,680	\$23,755,243
Warehouses	157	\$86,920,157		\$2,787,535	\$89,707,692
Subtotal	3,932	\$527,804,269.00	\$0.00	\$58,739,080.00	<b>\$586,543,349.00</b>

DO NOT Include in Construction Cost

**Acquisition Measures (2)**

Category	Number of Structures	Structure & URA	Admin	Total
Mobile Homes	6			\$0.00
1 STY Pier	7			\$0.00
2 STY Pier	0			\$0.00
1 STY Slab	5			\$0.00
2 STY Slab	5			\$0.00
Commercial	6			\$0.00
Warehouses	0			\$0.00
Subtotal	29	\$0.00	\$0.00	\$0.00

**TOTAL**

1) Costs DO NOT include contingency

2) Acquisition Measures NOT included in construction costs - a RE cost

3) Temporary Housing NOT Authorized for Floodproofing measures.

4) Implementation Admin for Floodproofing - Non-RE portion only

Southwest Coastal Louisiana NED Non-Structural Flood Risk Management - rev1

This cost estimate develops the program unit costs for different Floodproofing measures. Unit costs transferred to an Excel summary sheet for TOTAL cost to include on TPCS.

Estimated by ARCADIS U.S., Inc.  
Designed by  
Prepared by David Fulks, PE

Preparation Date 9/22/2015  
Effective Date of Pricing 7/15/2015  
Estimated Construction Time 45 Days

This report is not copyrighted, but the information contained herein is For Official Use Only.

Date	Author	Note
7/17/2015	D. Fulks	All work activities and corresponding levels of effort are based upon conversations with Davies Shoring, LLC and Orleans Shoring on 23 June 2015 and 24 June 2015, respectively.
7/17/2015	D. Fulks	Residential Elevation Projects were group according to the following categories: Mobile Home, Low Lift - This includes manufactured homes raised a minimum of 2'-6" and a maximum of 6'-0" above the lowest adjacent grade. For the purpose of this estimate these are assumed to be 576 sq.ft. single-wide sectional trailers. Mobile Home, High Lift - This includes manufactured homes raised a minimum of 6'-6" and a maximum of 13'-0" above the lowest adjacent grade. For the purpose of this estimate these are assumed to be 576 sq.ft. single-wide sectional trailers. Pier-supported Frame House, Low Lift - This includes wood frame houses built on a pier and beam foundation raised a minimum of 2'-6" and a maximum of 6'-0" above the lowest adjacent grade. For the purpose of this estimate single story are assumed to be 1,479 sq.ft. and two-story homes are assumed to be 1,327.5 sq.ft.; footprint square footage. Pier-supported Frame House, High Lift - This includes wood frame houses built on a pier and beam foundation raised a minimum of 6'-6" and a maximum of 13'-0" above the lowest adjacent grade. For the purpose of this estimate single story are assumed to be 1,479 sq.ft. and two-story homes are assumed to be 1,327.5 sq.ft.; footprint square footage. Slab-supported Frame House, Low Lift - This includes wood frame houses built on a concrete slab raised a minimum of 2'-6" and a maximum of 6'-0" above the lowest adjacent grade. For the purpose of this estimate single story are assumed to be 2,031 sq.ft. and two-story homes are assumed to be 1,787.5 sq.ft.; footprint square footage. Slab-supported Frame House, High Lift - This includes wood frame houses built on a concrete slab raised a minimum of 6'-6" and a maximum of 13'-0" above the lowest adjacent grade. For the purpose of this estimate single story are assumed to be 2,031 sq.ft. and two-story homes are assumed to be 1,787.5 sq.ft.; footprint square footage.
7/17/2015	D. Fulks	The work process for Mobile Homes and Pier-supported frame houses is as follows: 1. Complete program application. 2. Government prepares Guide Plans and Specifications, and Estimate. 3. Home owner selects contractor and enters into direct agreement. 3. Contractor obtains all necessary permits and Mobilize to site. 4. Residents temporarily relocate. 5. Disconnect utilities. 6. Place Jacks and Cribbing. 7. Insert Steels. 8. Elevate Structure. 9. Install Piers. 10. Set Structure on Piers. 11. Anchor Structure. 12. For High Lifts, pour grade beams between piers and slab-on-grade. 13. Reconnect Utilities. 14. For Low Lifts, install Perimeter Enclosure. 15. Install elevated landings and stairs. 16. Demobilization and Closeout.
7/17/2015	D. Fulks	The work process for Slab-supported houses is as follows: 1. Complete program application. 2. Government prepares Guide Plans and Specifications, and Estimate. 3. Home owner selects contractor and enters into direct agreement. 3. Contractor obtains all necessary permits and Mobilize to site. 4. Residents temporarily relocate. 5. Disconnect utilities. 6. Excavate at perimeter and tunnels under slab on 8' centers. 7. Place Jacks and Cribbing. 8. Push segmented piles to refusal. 8. Elevate Structure. 9. Install Piers. 11. Anchor Structure. 12. For lower lifts, demo existing driveway and install new driveway adjusted to garage floor elevation. 13. For High Lifts, pour grade beams between piers and slab-on-grade. 14. Reconnect Utilities. 15. For Low Lifts, install Perimeter Enclosure. 16. Install elevated landings and stairs. 17. Demobilization and Closeout.
7/17/2015	D. Fulks	The following process generally describes how the Huntington District implemented its floodproofing program. The process is team based and streamlined to reduce cost. No attempt is made here to describe every facet of the process but rather to provide an overview from which to develop administrative cost for a typical structure. The team consisted of a planner who was generally the team leader (similar to a project manager) and was involved with most every aspect of the process, an architect/engineer who was responsible for the preparation of the floodproofing design, a cost engineer who developed the government estimate, a real estate attorney who verified ownership and prepared floodproofing agreements and conducted closings and a construction inspection. Others who had a minimal part in the process were real estate staff and inspectors for HTRW analysis of the structure. Applications for participation are received from the homeowner (HO) and ownership is verified. The team leaders schedules a site visit with the HO to gather info to develop the design and cost estimate as well as explain the process, responsibilities of all parties, the criteria and policies. The team leader, designer and cost engineer usually participated in the site visits. Based on field visit, the designer prepared the Guide Plans & Specifications (GP&S) which consisted of a general Scope of Work (usually one or two pages, a set of standard specifications, and specific details applicable to the specific structures. The details are pulled from a standard full set of previously developed. Details included would be those needed to guide the contractor in the specific criteria for that particular structure. While this is being done the structure would have been inspected to determine if there was the presence of any HTRW. Any corrective action for HTRW would be included in the scope of work. The GP&S would be delivered to the HO and the HO would be instructed to obtain a minimum of one construction proposal based on the GP&S. In the meantime the cost engineer would be developing the government estimate. An offer would eventually be made to the HO and a request for a floodproofing agreement would be made. Once the HO and Government executed the floodproofing agreement, the HO would be given notice to proceed. Although the HO is responsible for their contractor's performance, the construction inspector would inspect certain critical aspects of the construction. Following completion of construction and approval of the HO and construction inspector, a closing would be conducted and the floodproofing agreement and restrictions on the property would be recorded in the local court house. Again this is a very brief description of the process. The hours needed by discipline, for an average structure is shown below. Note that the hours shown are based on an average structure and that multiple structures would be inspected during a site visit and the construction inspector would be inspecting multiple structures on any given day of inspection. Team leader (planner/PM) - 40 hours Designer (architect/engineer) - 36 hours (res) / 64 hours (com) Estimator (Cost engineer) - 26 hours Construction inspector - 24 hours RE attorney - 24 hours (in

<u>Date</u>	<u>Author</u>	<u>Note</u>
7/17/2015	D. Fulks	RE cost)RE support staff - 24 hours (in RE cost)Other support staff - 24 hours
10/8/2015	JP	09/22/15 Revised fuel and CMR to be consistent with NER estimate.

Description	Quantity	UOM	ContractCost	Contingency	Escalation	ProjectCost
<b>bid schedule summary</b>			<b>7,612,863.28</b>	<b>0.00</b>	<b>0.00</b>	<b>7,612,863.28</b>
			<i>6,678,218.85</i>			<i>6,678,218.85</i>
<b>1 Residential Structures</b>	<b>1.0000</b>	<b>EA</b>	<b>6,678,218.85</b>	<b>0.00</b>	<b>0.00</b>	<b>6,678,218.85</b>
			<i>18,583.76</i>			<i>18,583.76</i>
<b>11 Implementation Costs</b>	<b>1.0000</b>	<b>EA</b>	<b>18,583.76</b>	<b>0.00</b>	<b>0.00</b>	<b>18,583.76</b>
<b>Government Administration - Implementation (Non-RE activities)</b>	<b>1.0000</b>	<b>LS</b>	<b>14,533.76</b>	<b>0.00</b>	<b>0.00</b>	<b>14,533.76</b>
<b>Homeowner Subsistence</b>	<b>1.0000</b>	<b>LS</b>	<b>4,050.00</b>	<b>0.00</b>	<b>0.00</b>	<b>4,050.00</b>
			<i>75,201.98</i>			<i>75,201.98</i>
<b>12 Mobile Homes</b>	<b>12.0000</b>	<b>EA</b>	<b>902,423.71</b>	<b>0.00</b>	<b>0.00</b>	<b>902,423.71</b>
			<i>52,557.50</i>			<i>52,557.50</i>
<b>Low Lift (1.50'-2.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>52,557.50</b>	<b>0.00</b>	<b>0.00</b>	<b>52,557.50</b>
			<i>91.25</i>			<i>91.25</i>
<b>Single-Wide</b>	<b>576.0000</b>	<b>SF</b>	<b>52,557.50</b>	<b>0.00</b>	<b>0.00</b>	<b>52,557.50</b>
			<i>55,290.84</i>			<i>55,290.84</i>
<b>Low Lift (2.50'-3.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>55,290.84</b>	<b>0.00</b>	<b>0.00</b>	<b>55,290.84</b>
			<i>95.99</i>			<i>95.99</i>
<b>Single-Wide</b>	<b>576.0000</b>	<b>SF</b>	<b>55,290.84</b>	<b>0.00</b>	<b>0.00</b>	<b>55,290.84</b>
			<i>58,664.57</i>			<i>58,664.57</i>
<b>Low Lift (3.50'-4.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>58,664.57</b>	<b>0.00</b>	<b>0.00</b>	<b>58,664.57</b>
			<i>101.85</i>			<i>101.85</i>
<b>Single-Wide</b>	<b>576.0000</b>	<b>SF</b>	<b>58,664.57</b>	<b>0.00</b>	<b>0.00</b>	<b>58,664.57</b>
			<i>61,397.91</i>			<i>61,397.91</i>
<b>Low Lift (4.50'-5.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>61,397.91</b>	<b>0.00</b>	<b>0.00</b>	<b>61,397.91</b>
			<i>106.59</i>			<i>106.59</i>
<b>Single-Wide</b>	<b>576.0000</b>	<b>SF</b>	<b>61,397.91</b>	<b>0.00</b>	<b>0.00</b>	<b>61,397.91</b>
			<i>64,340.37</i>			<i>64,340.37</i>
<b>Low Lift (5.50'-6.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>64,340.37</b>	<b>0.00</b>	<b>0.00</b>	<b>64,340.37</b>
			<i>111.70</i>			<i>111.70</i>
<b>Single-Wide</b>	<b>576.0000</b>	<b>SF</b>	<b>64,340.37</b>	<b>0.00</b>	<b>0.00</b>	<b>64,340.37</b>
			<i>73,660.15</i>			<i>73,660.15</i>
<b>High Lift (6.50'-7.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>73,660.15</b>	<b>0.00</b>	<b>0.00</b>	<b>73,660.15</b>
			<i>127.88</i>			<i>127.88</i>
<b>Single-Wide</b>	<b>576.0000</b>	<b>SF</b>	<b>73,660.15</b>	<b>0.00</b>	<b>0.00</b>	<b>73,660.15</b>
			<i>79,387.22</i>			<i>79,387.22</i>
<b>High Lift (7.50'-8.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>79,387.22</b>	<b>0.00</b>	<b>0.00</b>	<b>79,387.22</b>

Description	Quantity	UOM	ContractCost	Contingency	Escalation	ProjectCost
Single-Wide	576.0000	SF	79,387.22	0.00	0.00	79,387.22
High Lift (8.50'-9.49')	1.0000	EA	83,024.76	0.00	0.00	83,024.76
Single-Wide	576.0000	SF	83,024.76	0.00	0.00	83,024.76
High Lift (9.50'-10.49')	1.0000	EA	87,599.96	0.00	0.00	87,599.96
Single-Wide	576.0000	SF	87,599.96	0.00	0.00	87,599.96
High Lift (10.50'-11.49')	1.0000	EA	91,237.50	0.00	0.00	91,237.50
Single-Wide	576.0000	SF	91,237.50	0.00	0.00	91,237.50
High Lift (11.50'-12.49')	1.0000	EA	95,812.70	0.00	0.00	95,812.70
Single-Wide	576.0000	SF	95,812.70	0.00	0.00	95,812.70
High Lift (12.50'-13.49')	1.0000	EA	99,450.24	0.00	0.00	99,450.24
Single-Wide	576.0000	SF	99,450.24	0.00	0.00	99,450.24
13 Pier-supported Frame Houses	1.0000	EA	2,312,567.47	0.00	0.00	2,312,567.47
Low Lift (1.50'-2.49')	1.0000	EA	120,976.41	0.00	0.00	120,976.41
Single-Story	1,479.0000	SF	60,724.76	0.00	0.00	60,724.76
Two-Story	1,327.5000	SF	60,251.64	0.00	0.00	60,251.64
Low Lift (2.50'-3.49')	1.0000	EA	128,373.11	0.00	0.00	128,373.11
Single-Story	1,479.0000	SF	64,387.18	0.00	0.00	64,387.18
Two-Story	1,327.5000	SF	63,985.94	0.00	0.00	63,985.94

Description	Quantity	UOM	ContractCost	Contingency	Escalation	ProjectCost
<b>Low Lift (3.50'-4.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>138,475.15</b>	<b>0.00</b>	<b>0.00</b>	<b>138,475.15</b>
			<i>138,475.15</i>			<i>138,475.15</i>
<b>Single-Story</b>	<b>1,479.0000</b>	<b>SF</b>	<b>69,330.38</b>	<b>0.00</b>	<b>0.00</b>	<b>69,330.38</b>
			<i>46.88</i>			<i>46.88</i>
<b>Two-Story</b>	<b>1,327.5000</b>	<b>SF</b>	<b>69,144.77</b>	<b>0.00</b>	<b>0.00</b>	<b>69,144.77</b>
			<i>52.09</i>			<i>52.09</i>
<b>Low Lift (4.50'-5.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>145,871.86</b>	<b>0.00</b>	<b>0.00</b>	<b>145,871.86</b>
			<i>145,871.86</i>			<i>145,871.86</i>
<b>Single-Story</b>	<b>1,479.0000</b>	<b>SF</b>	<b>72,992.79</b>	<b>0.00</b>	<b>0.00</b>	<b>72,992.79</b>
			<i>49.35</i>			<i>49.35</i>
<b>Two-Story</b>	<b>1,327.5000</b>	<b>SF</b>	<b>72,879.06</b>	<b>0.00</b>	<b>0.00</b>	<b>72,879.06</b>
			<i>54.90</i>			<i>54.90</i>
<b>Low Lift (5.50'-6.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>154,033.18</b>	<b>0.00</b>	<b>0.00</b>	<b>154,033.18</b>
			<i>154,033.18</i>			<i>154,033.18</i>
<b>Single-Story</b>	<b>1,479.0000</b>	<b>SF</b>	<b>77,073.45</b>	<b>0.00</b>	<b>0.00</b>	<b>77,073.45</b>
			<i>52.11</i>			<i>52.11</i>
<b>Two-Story</b>	<b>1,327.5000</b>	<b>SF</b>	<b>76,959.72</b>	<b>0.00</b>	<b>0.00</b>	<b>76,959.72</b>
			<i>57.97</i>			<i>57.97</i>
<b>High Lift (6.50'-7.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>195,565.96</b>	<b>0.00</b>	<b>0.00</b>	<b>195,565.96</b>
			<i>195,565.96</i>			<i>195,565.96</i>
<b>Single-Story</b>	<b>1,479.0000</b>	<b>SF</b>	<b>98,156.71</b>	<b>0.00</b>	<b>0.00</b>	<b>98,156.71</b>
			<i>66.37</i>			<i>66.37</i>
<b>Two-Story</b>	<b>1,327.5000</b>	<b>SF</b>	<b>97,409.25</b>	<b>0.00</b>	<b>0.00</b>	<b>97,409.25</b>
			<i>73.38</i>			<i>73.38</i>
<b>High Lift (7.50'-8.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>209,478.97</b>	<b>0.00</b>	<b>0.00</b>	<b>209,478.97</b>
			<i>209,478.97</i>			<i>209,478.97</i>
<b>Single-Story</b>	<b>1,479.0000</b>	<b>SF</b>	<b>104,901.43</b>	<b>0.00</b>	<b>0.00</b>	<b>104,901.43</b>
			<i>70.93</i>			<i>70.93</i>
<b>Two-Story</b>	<b>1,327.5000</b>	<b>SF</b>	<b>104,577.54</b>	<b>0.00</b>	<b>0.00</b>	<b>104,577.54</b>
			<i>78.78</i>			<i>78.78</i>
<b>High Lift (8.50'-9.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>219,358.96</b>	<b>0.00</b>	<b>0.00</b>	<b>219,358.96</b>
			<i>219,358.96</i>			<i>219,358.96</i>
<b>Single-Story</b>	<b>1,479.0000</b>	<b>SF</b>	<b>109,770.83</b>	<b>0.00</b>	<b>0.00</b>	<b>109,770.83</b>
			<i>74.22</i>			<i>74.22</i>
<b>Two-Story</b>	<b>1,327.5000</b>	<b>SF</b>	<b>109,588.13</b>	<b>0.00</b>	<b>0.00</b>	<b>109,588.13</b>
			<i>82.55</i>			<i>82.55</i>

Description	Quantity	UOM	ContractCost	Contingency	Escalation	ProjectCost
<b>High Lift (9.50'-10.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>233,271.97</b>	<b>0.00</b>	<b>0.00</b>	<b>233,271.97</b>
			<i>78.78</i>			<i>78.78</i>
<b>Single-Story</b>	<b>1,479.0000</b>	<b>SF</b>	<b>116,515.55</b>	<b>0.00</b>	<b>0.00</b>	<b>116,515.55</b>
			<i>87.95</i>			<i>87.95</i>
<b>Two-Story</b>	<b>1,327.5000</b>	<b>SF</b>	<b>116,756.43</b>	<b>0.00</b>	<b>0.00</b>	<b>116,756.43</b>
			<i>243,151.96</i>			<i>243,151.96</i>
<b>High Lift (10.50'-11.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>243,151.96</b>	<b>0.00</b>	<b>0.00</b>	<b>243,151.96</b>
			<i>82.07</i>			<i>82.07</i>
<b>Single-Story</b>	<b>1,479.0000</b>	<b>SF</b>	<b>121,384.95</b>	<b>0.00</b>	<b>0.00</b>	<b>121,384.95</b>
			<i>91.73</i>			<i>91.73</i>
<b>Two-Story</b>	<b>1,327.5000</b>	<b>SF</b>	<b>121,767.02</b>	<b>0.00</b>	<b>0.00</b>	<b>121,767.02</b>
			<i>257,064.98</i>			<i>257,064.98</i>
<b>High Lift (11.50'-12.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>257,064.98</b>	<b>0.00</b>	<b>0.00</b>	<b>257,064.98</b>
			<i>86.63</i>			<i>86.63</i>
<b>Single-Story</b>	<b>1,479.0000</b>	<b>SF</b>	<b>128,129.66</b>	<b>0.00</b>	<b>0.00</b>	<b>128,129.66</b>
			<i>97.13</i>			<i>97.13</i>
<b>Two-Story</b>	<b>1,327.5000</b>	<b>SF</b>	<b>128,935.31</b>	<b>0.00</b>	<b>0.00</b>	<b>128,935.31</b>
			<i>266,944.97</i>			<i>266,944.97</i>
<b>High Lift (12.50'-13.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>266,944.97</b>	<b>0.00</b>	<b>0.00</b>	<b>266,944.97</b>
			<i>89.92</i>			<i>89.92</i>
<b>Single-Story</b>	<b>1,479.0000</b>	<b>SF</b>	<b>132,999.07</b>	<b>0.00</b>	<b>0.00</b>	<b>132,999.07</b>
			<i>100.90</i>			<i>100.90</i>
<b>Two-Story</b>	<b>1,327.5000</b>	<b>SF</b>	<b>133,945.90</b>	<b>0.00</b>	<b>0.00</b>	<b>133,945.90</b>
			<i>3,444,643.91</i>			<i>3,444,643.91</i>
<b>14 Slab-supported Frame Houses</b>	<b>1.0000</b>	<b>EA</b>	<b>3,444,643.91</b>	<b>0.00</b>	<b>0.00</b>	<b>3,444,643.91</b>
			<i>207,225.63</i>			<i>207,225.63</i>
<b>Low Lift (1.50'-2.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>207,225.63</b>	<b>0.00</b>	<b>0.00</b>	<b>207,225.63</b>
			<i>53.54</i>			<i>53.54</i>
<b>Single-Story</b>	<b>2,031.0000</b>	<b>SF</b>	<b>108,739.55</b>	<b>0.00</b>	<b>0.00</b>	<b>108,739.55</b>
			<i>55.10</i>			<i>55.10</i>
<b>Two-Story</b>	<b>1,787.5000</b>	<b>SF</b>	<b>98,486.07</b>	<b>0.00</b>	<b>0.00</b>	<b>98,486.07</b>
			<i>217,113.78</i>			<i>217,113.78</i>
<b>Low Lift (2.50'-3.49')</b>	<b>1.0000</b>	<b>EA</b>	<b>217,113.78</b>	<b>0.00</b>	<b>0.00</b>	<b>217,113.78</b>
			<i>56.07</i>			<i>56.07</i>
<b>Single-Story</b>	<b>2,031.0000</b>	<b>SF</b>	<b>113,872.11</b>	<b>0.00</b>	<b>0.00</b>	<b>113,872.11</b>

Description	Quantity	UOM	ContractCost	Contingency	Escalation	ProjectCost
			57.76			57.76
Two-Story	1,787.5000	SF	103,241.67	0.00	0.00	103,241.67
			229,250.54			229,250.54
Low Lift (3.50'-4.49')	1.0000	EA	229,250.54	0.00	0.00	229,250.54
			59.17			59.17
Single-Story	2,031.0000	SF	120,173.11	0.00	0.00	120,173.11
			61.02			61.02
Two-Story	1,787.5000	SF	109,077.43	0.00	0.00	109,077.43
			239,138.70			239,138.70
Low Lift (4.50'-5.49')	1.0000	EA	239,138.70	0.00	0.00	239,138.70
			61.70			61.70
Single-Story	2,031.0000	SF	125,305.67	0.00	0.00	125,305.67
			63.68			63.68
Two-Story	1,787.5000	SF	113,833.03	0.00	0.00	113,833.03
			251,275.46			251,275.46
Low Lift (5.50'-6.49')	1.0000	EA	251,275.46	0.00	0.00	251,275.46
			64.80			64.80
Single-Story	2,031.0000	SF	131,606.67	0.00	0.00	131,606.67
			66.95			66.95
Two-Story	1,787.5000	SF	119,668.79	0.00	0.00	119,668.79
			286,656.39			286,656.39
High Lift (6.50'-7.49')	1.0000	EA	286,656.39	0.00	0.00	286,656.39
			74.40			74.40
Single-Story	2,031.0000	SF	151,109.67	0.00	0.00	151,109.67
			75.83			75.83
Two-Story	1,787.5000	SF	135,546.72	0.00	0.00	135,546.72
			301,377.69			301,377.69
High Lift (7.50'-8.49')	1.0000	EA	301,377.69	0.00	0.00	301,377.69
			78.19			78.19
Single-Story	2,031.0000	SF	158,803.87	0.00	0.00	158,803.87
			79.76			79.76
Two-Story	1,787.5000	SF	142,573.82	0.00	0.00	142,573.82
			314,420.97			314,420.97
High Lift (8.50'-9.49')	1.0000	EA	314,420.97	0.00	0.00	314,420.97
			81.52			81.52
Single-Story	2,031.0000	SF	165,565.83	0.00	0.00	165,565.83

Description	Quantity	UOM	ContractCost	Contingency	Escalation	ProjectCost
			83.28			83.28
Two-Story	1,787.5000	SF	148,855.14	0.00	0.00	148,855.14
			329,142.26			329,142.26
High Lift (9.50'-10.49')	1.0000	EA	329,142.26	0.00	0.00	329,142.26
			85.31			85.31
Single-Story	2,031.0000	SF	173,260.02	0.00	0.00	173,260.02
			87.21			87.21
Two-Story	1,787.5000	SF	155,882.24	0.00	0.00	155,882.24
			342,185.54			342,185.54
High Lift (10.50'-11.49')	1.0000	EA	342,185.54	0.00	0.00	342,185.54
			88.64			88.64
Single-Story	2,031.0000	SF	180,021.99	0.00	0.00	180,021.99
			90.72			90.72
Two-Story	1,787.5000	SF	162,163.55	0.00	0.00	162,163.55
			356,906.83			356,906.83
High Lift (11.50'-12.49')	1.0000	EA	356,906.83	0.00	0.00	356,906.83
			92.43			92.43
Single-Story	2,031.0000	SF	187,716.18	0.00	0.00	187,716.18
			94.65			94.65
Two-Story	1,787.5000	SF	169,190.65	0.00	0.00	169,190.65
			369,950.11			369,950.11
High Lift (12.50'-13.49')	1.0000	EA	369,950.11	0.00	0.00	369,950.11
			95.75			95.75
Single-Story	2,031.0000	SF	194,478.14	0.00	0.00	194,478.14
			98.17			98.17
Two-Story	1,787.5000	SF	175,471.97	0.00	0.00	175,471.97
			381,012.86			381,012.86
2 Commercial Structures	1.0000	EA	381,012.86	0.00	0.00	381,012.86
			17,754.88			17,754.88
21 Implementation Costs	1.0000	EA	17,754.88	0.00	0.00	17,754.88
Government Administration - Implementation (Non-RE activities)	1.0000	LS	17,754.88	0.00	0.00	17,754.88
			7.40			7.40
EAT Eatery	5,972.0000	EA	44,208.69	0.00	0.00	44,208.69
			7.04			7.04
GROC Grocery	6,362.0000	SF	44,814.95	0.00	0.00	44,814.95

<b>Description</b>	<b>Quantity</b>	<b>UOM</b>	<b>ContractCost</b>	<b>Contingency</b>	<b>Escalation</b>	<b>ProjectCost</b>
<b>MULT Multi-occupany</b>	<b>38,321.0000</b>	<b>EA</b>	<b>83,791.35</b>	<b>0.00</b>	<b>0.00</b>	<b>83,791.35</b>
			<i>2.19</i>			<i>2.19</i>
<b>PROF Professional</b>	<b>6,190.0000</b>	<b>SF</b>	<b>44,547.57</b>	<b>0.00</b>	<b>0.00</b>	<b>44,547.57</b>
			<i>7.20</i>			<i>7.20</i>
<b>PUBL Public</b>	<b>7,970.0000</b>	<b>EA</b>	<b>47,314.61</b>	<b>0.00</b>	<b>0.00</b>	<b>47,314.61</b>
			<i>5.94</i>			<i>5.94</i>
<b>REPA Repair</b>	<b>5,772.0000</b>	<b>SF</b>	<b>43,897.78</b>	<b>0.00</b>	<b>0.00</b>	<b>43,897.78</b>
			<i>7.61</i>			<i>7.61</i>
<b>RETA Retail</b>	<b>11,407.5000</b>	<b>EA</b>	<b>54,683.02</b>	<b>0.00</b>	<b>0.00</b>	<b>54,683.02</b>
			<i>4.79</i>			<i>4.79</i>
<b>3 Warehouses</b>	<b>1.0000</b>	<b>EA</b>	<b>553,631.57</b>	<b>0.00</b>	<b>0.00</b>	<b>553,631.57</b>
			<i>553,631.57</i>			<i>553,631.57</i>
<b>BERM Berms</b>	<b>1.0000</b>	<b>EA</b>	<b>376,525.10</b>	<b>0.00</b>	<b>0.00</b>	<b>376,525.10</b>
			<i>376,525.10</i>			<i>376,525.10</i>
<b>GATE Flood Gates</b>	<b>1.0000</b>	<b>EA</b>	<b>177,106.47</b>	<b>0.00</b>	<b>0.00</b>	<b>177,106.47</b>
			<i>177,106.47</i>			<i>177,106.47</i>

Description	Page
<b>Project Notes</b>	<b>vii</b>
<b>bid schedule summary</b>	<b>1</b>
1 Residential Structures	1
11 Implementation Costs	1
Government Administration - Implementation (Non-RE activities)	1
Homeowner Subsistence	1
12 Mobile Homes	1
Low Lift (1.50'-2.49')	1
Single-Wide	1
Low Lift (2.50'-3.49')	1
Single-Wide	1
Low Lift (3.50'-4.49')	1
Single-Wide	1
Low Lift (4.50'-5.49')	1
Single-Wide	1
Low Lift (5.50'-6.49')	1
Single-Wide	1
High Lift (6.50'-7.49')	1
Single-Wide	1
High Lift (7.50'-8.49')	1
Single-Wide	2
High Lift (8.50'-9.49')	2
Single-Wide	2
High Lift (9.50'-10.49')	2
Single-Wide	2
High Lift (10.50'-11.49')	2
Single-Wide	2
High Lift (11.50'-12.49')	2
Single-Wide	2
High Lift (12.50'-13.49')	2
Single-Wide	2
13 Pier-supported Frame Houses	2
Low Lift (1.50'-2.49')	2
Single-Story	2
Two-Story	2
Low Lift (2.50'-3.49')	2
Single-Story	2
Two-Story	2
Low Lift (3.50'-4.49')	3
Single-Story	3
Two-Story	3
Low Lift (4.50'-5.49')	3
Single-Story	3
Two-Story	3

Description	Page
Low Lift (5.50'-6.49') .....	3
Single-Story .....	3
Two-Story .....	3
High Lift (6.50'-7.49') .....	3
Single-Story .....	3
Two-Story .....	3
High Lift (7.50'-8.49') .....	3
Single-Story .....	3
Two-Story .....	3
High Lift (8.50'-9.49') .....	3
Single-Story .....	3
Two-Story .....	3
High Lift (9.50'-10.49') .....	4
Single-Story .....	4
Two-Story .....	4
High Lift (10.50'-11.49') .....	4
Single-Story .....	4
Two-Story .....	4
High Lift (11.50'-12.49') .....	4
Single-Story .....	4
Two-Story .....	4
High Lift (12.50'-13.49') .....	4
Single-Story .....	4
Two-Story .....	4
14 Slab-supported Frame Houses .....	4
Low Lift (1.50'-2.49') .....	4
Single-Story .....	4
Two-Story .....	4
Low Lift (2.50'-3.49') .....	4
Single-Story .....	4
Two-Story .....	5
Low Lift (3.50'-4.49') .....	5
Single-Story .....	5
Two-Story .....	5
Low Lift (4.50'-5.49') .....	5
Single-Story .....	5
Two-Story .....	5
Low Lift (5.50'-6.49') .....	5
Single-Story .....	5
Two-Story .....	5
High Lift (6.50'-7.49') .....	5
Single-Story .....	5
Two-Story .....	5
High Lift (7.50'-8.49') .....	5

Description	Page
Single-Story .....	5
Two-Story .....	5
High Lift (8.50'-9.49') .....	5
Single-Story .....	5
Two-Story .....	6
High Lift (9.50'-10.49') .....	6
Single-Story .....	6
Two-Story .....	6
High Lift (10.50'-11.49') .....	6
Single-Story .....	6
Two-Story .....	6
High Lift (11.50'-12.49') .....	6
Single-Story .....	6
Two-Story .....	6
High Lift (12.50'-13.49') .....	6
Single-Story .....	6
Two-Story .....	6
2 Commercial Structures .....	6
21 Implementation Costs .....	6
Government Administration - Implementation (Non-RE activities) .....	6
EAT Eatery .....	6
GROC Grocery .....	6
MULT Multi-occupany .....	7
PROF Professional .....	7
PUBL Public .....	7
REPA Repair .....	7
RETA Retail .....	7
3 Warehouses .....	7
BERM Berms .....	7
GATE Flood Gates .....	7

# Project Construction Schedule

---

**NER plan:**

Individual feature schedules were not fully developed because due to the funding constraints assumed, all schedules (program and individual projects) are totally funding driven.

PM is assuming approximately \$50M/year for both features (NER and NED) of the Southwest Coastal Louisiana Study (SWC).

Budget justification sheets have the feasibility study completion and a Chief's report in 2016, gap period 2017, PED initiate 2018, construction start in mid to late 2019.

Based on an October 1, 2019 construction start and approximate \$25-\$50M annual funding for the NER features, we will use a **50 year NER program schedule** based on the base construction cost of \$1,218 million (Mii total excluding Acct 06 AM&M \$62,807,000). After completion of the NED plan, more funds could be directed to the NER and shorten the program duration.

**NED plan:**

Individual feature schedules were not fully developed because due to the funding constraints assumed, all schedules (program and individual projects) are totally funding driven.

PM is assuming approximately \$50M/year for both features (NER and NED) of the Southwest Coastal Louisiana Study (SWC).

Budget justification sheets have the feasibility study completion and a Chief's report in 2016, gap period 2017, PED initiate 2018, construction start in mid to late 2019.

Based on an October 1, 2019 construction start and approximate \$25-\$50M annual funding for the NED features, we will use a **25 year NED program schedule** based on the base construction cost of \$587 million. This schedule allows for almost 100% participation which is not probable.

# Cost and Schedule Risk Analysis (CSRA)

---

In an effort to identify the applicable cost and schedule risks inherent with execution of the Recommended Alternative, a Cost and Schedule Risk Analysis was prepared for both the NER and NED features as per ER 1110-2-1302. These were implemented in an effort to determine a contingency cost required for cost estimating and based on the risk items associated with the project. The results of these 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.

#### Section 1. NER:

The initial Risk Register considered 34 risk items. A total of 11 potential moderate and high risk items were chosen for modeling purposes for the Cost Risk Analysis and 1 risk items for the Schedule Risk Analysis. Assumptions were made for each risk item before running the Monte Carlo simulation. The result of the simulation for the Cost and Schedule Risk Analysis gave a 37% (rounded) contingency 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 Southwest Coastal Ecosystem Restoration Plan. 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.

The major contributors to the resulting total project cost contingency for the Cost Estimate were:

- (TL-1) Design Development – risk of designs not being fully developed due to lack of site specific data and designs
- (CA-1) Acquisition Strategy – risk of cost increases due to lack of or changes in the acquisition strategy.
- (PR-4) Fuel Cost – risk that fuel costs could escalate.

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

- (PR-1) Funding Availability – risk of delays in schedule due to a lack of funding during the project.

The corresponding Total Cost including contingency (cost & schedule) for the Cost Risk Analysis is presented on Table 1.

**Table 1. Cost Contingency Analysis Table**

Confidence Level	Value	Contingency
Most Likely Cost Estimate	\$ 1,760,065,000	0.00%
5%	\$ 2,182,480,600	24.00%
50%	\$ 2,323,285,800	32.00%
<b>80%</b>	<b>\$ 2,411,289,050</b>	<b>37.00%</b>
95%	\$ 2,481,691,650	41.00%

The corresponding Total Schedule including contingency for the Project Schedule is presented on Table 2.

**Table 2. Schedule Contingency Analysis Table**

Confidence Level	Value	Contingency
Most Likely Cost Estimate	600.0 Months	0.00%
5%	612.0 Months	2.00%
50%	690.0 Months	15.00%
<b>80%</b>	<b>768.0 Months</b>	<b>28.00%</b>
95%	834.0 Months	39.00%

The rounded contingency percentage for **Project Cost and Schedule (37.0%)** 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.)

Section 2. NED:

The initial Risk Register considered 13 risk items. From the initial risk items, a total of 9 potential moderate and high risk items were chosen for modeling purposes for the Cost Risk Analysis and 3 risk items for the Schedule Risk Analysis. Assumptions were made for each risk item before running the Monte Carlo simulation. The result of the simulation for the Cost and Schedule Risk Analysis gave a 34.5% (rounded) contingency 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 Southwest Coastal NED Non-Structural Plan. 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.

The major contributors to the resulting total project cost contingency for the Cost Estimate were:

- (PR-2) Participation Rate 10yr to 25yr – risk (positive) of having only a 65% participation rate instead of the 100% assumed in cost.
- (CON-1) Availability of Floodproofing Contractors – risk of inflated prices due to large budgets and limited pool of contractors.
- (CA-1) Contract Acquisition – risk that contract acquisition methods chosen could cause increased levels of subcontracting and/or limit pool of contractors.

The major contributors to the resulting total project schedule contingency for the project schedule were:

- (PR-3) Intermittent Funding – risk of delays in schedule due to a lack of funding during the project.
- (CA-1) Contract Acquisition – risk of limited competition due to contract type delaying the schedule.
- (PPM-1) PED and S&A - risk of Federal Gov't having to set up a full system to engineer, design, and administer program to the lowest levels.

The corresponding Total Cost including contingency (cost & schedule) for the Cost Risk Analysis is presented on table 3.

**Table 3. Cost Contingency Analysis Table**

Confidence Level	Value	Contingency
Most Likely Cost Estimate	\$627,602,000	0.00%
5%	\$633,627,818	0.96%
50%	\$765,261,114	21.93%
<b>80%</b>	<b>\$843,781,100</b>	<b>34.45%</b>
95%	\$918,422,524	46.34%

The corresponding Total Schedule including contingency for the Project Schedule is presented on Table 4.

**Table 4. Schedule Contingency Analysis Table**

Confidence Level	Value	Contingency
Most Likely Cost Estimate	300.0 Months	0.00%
5%	317.2 Months	5.74%
50%	360.1 Months	20.02%
<b>80%</b>	<b>399.2 Months</b>	<b>33.08%</b>
95%	433.3 Months	44.43%

The rounded contingency percentage for **Project Cost and Schedule (34.5%)** 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.)

For more detailed information on the CSRA, see the complete CSRA Risk Report.