

INDIANA HARBOR AND CANAL MAINTENANCE DREDGING AND DISPOSAL ACTIVITIES – DESIGN DOCUMENTATION REPORT

COST ENGINEERING

APPENDIX H

U.S. Army Corps of Engineers, Chicago District
Cost Engineering Branch

March 2000

COST ENGINEERING APPENDIX

APPENDIX H

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**INDIANA HARBOR AND CANAL
MAINTENANCE DREDGING AND
DISPOSAL ACTIVITIES**

APPENDIX H

COST ENGINEERING

BASIS OF ESTIMATE

1. The basis of this cost estimate is the Comprehensive Management Plan (CMP) of January 1999, modified where necessary to reflect changes to the CMP Plan. The cost estimates include allowances for contingencies, escalation, engineering and design, and construction management.

UNIT COSTS

2. The unit costs derived for this project are considered fair and reasonable to a well-equipped contractor and include contractor's mobilization and demobilization, overhead, profit and bonds. The unit costs were developed by personnel in the Design and Cost Engineering Branches of the Engineering Division, Chicago District.

CONTINGENCIES

3. Since uncertainty exists in all estimates, contingencies are used to forecast the risk of time growth associated with individual cost elements. The normal contingency for this size project is found in the Engineering Instruction, Construction Cost Estimates, EI01D010 paragraph 13.5. Factors considered include the status of design, site conditions, bidding climate and state of economy.
4. The design contingencies used in this report were normal because of design elements involved. In general a factor of 15 percent was used to assume a high probability that the estimated project cost will not exceed the actual cost. A contingency of 20 percent was used for the railroad relocation and cut off wall because of site conditions.

PLANNING, ENGINEERING AND DESIGN

5. The costs for planning, engineering, and design include all engineering and design activities that are required both before and during construction. This is 12% of the total construction cost.

CONSTRUCTION MANAGEMENT

6. The cost of construction management is 7.5% of the total construction cost. The cost includes supervision, administration, inspection, and overhead for for the duration of construction.

OPERATION, MAINTENANCE, REPLACEMENT

7. The operation and maintenance (O&M) costs are shown summarized in Tables H-2 and H-3 of the project costs. The O & M costs are escalation of the previous report dated September 1998.

COST SUMMARIES

8. The project costs are summarized in Table 1.

Table 1 – Project Cost Summary

INDIANA HARBOR AND CANAL CONFINED DISPOSAL FACILITY Sequence of Construction and Dredging

Activity	Amount*
A. Railroad Relocation	\$ 1,242,300
B. Cut Off Wall	\$ 3,445,000
C. Seal Stage I Dike	\$ 1,804,700
D. Stage I Dike	\$ 7,283,700
E. Seal Perimeter Areas Parcels 1, 2a & 2b	\$ 1,698,300
F. Stage II Dikes	\$ 14,544,700
G. Hydraulic Gradient	\$ 1,283,200
H. Treatment Plant	\$ 9,260,200
I. CDF Cap	\$ 18,884,100
Dredging Year 1	\$ 2,150,200
Dredging Year 2	\$ 4,943,800
Dredging Year 3	\$ 2,201,000
TSCA Dredging	\$ 5,884,000
Dredging (Yearly 2007 – 2013)	\$ 24,421,000
Dredging (2014 – 2022)	\$ 18,285,200
Dredging (2023 – 2033)	\$ 18,454,500
TOTAL PROJECT COST	135, 786, 000

* Note: Based on October 1998 price levels.

Table 2 - O & M Cost Summary

Cooperative Dredging Program - Estimated O & M

Activity	Amount*
<u>RCRA Features</u>	
Pre-Closure	\$568,110
Post Closure	\$157,780
Subtotal	\$725,890
<u>CDF & Dredging</u>	
Pre-Closure	\$1,827,500
Post Closure	\$83,121
Subtotal	\$1,910,621
TOTAL PROJECT COST	\$2,636,511

* Note: Based on October 1998 price levels.

O & M COST ESTIMATE		27-Aug-99 Sheet 1 of 2
PROJECT: INDIANA HARBOR AND CANAL COOPERATIVE DREDGING PROGRAM - ESTIMATED RCRA FEATURES O & M		
ITEM NO.	DESCRIPTION	ESTIMATED AMOUNT
	PRE CLOSURE O & M COSTS	
	A. Water Treatment	\$389,490
	B. Gradient Control System	
	1. Pumping	\$2
	2. Analytical Testing	
	3. Sample Collection	
	C. Ground Water Monitoring	
	1. Analytical Testing	\$82,500
	2. Sample Collection	\$6,300
	D. CDF Surface Water Collection	
	1. Pumping	\$1,452
	2. Analytical Testing	
	3. Sample Collection	
	E. Erosion Control Repair, Mowing	
	Subtotal	
	Escalation OCT 93 to OCT 98	13%
	TOTAL	\$568,110
	POST CLOSURE O & M COSTS	
	A. Water Treatment	\$76,000
	B. Gradient Control System	
	1. Pumping	\$456
	2. Treatment Surcharge	
	3. Analytical Testing	
	4. Sample Collection	
	C. Ground Water Monitoring	
	1. Analytical Testing	\$41,250
	2. Sample Collection	\$3,150
	D. Erosion Control Repair, Mowing	
	Subtotal	\$139,628
	Escalation OCT 93 to OCT 98	13%
	TOTAL	\$157,780

O & M COST ESTIMATE		27-Aug-99 Sheet 1 of 2
PROJECT: INDIANA HARBOR AND CANAL COOPERATIVE DREDGING PROGRAM - ESTIMATED CDF & DREDGING O & M		
ITEM NO.	DESCRIPTION	ESTIMATED AMOUNT
	PRE CLOSURE O & M COSTS	
	A. Water Treatment	\$1,233,370
	B. Gradient Control System	
	1. Pumping	\$912
	2. Analytical Testing	\$27,360
	3. Sample Collection	\$3,192
	C. Ground Water Monitoring	
	1. Analytical Testing	\$82,500
	2. Sample Collection	
	D. CDF Surface Water Collection	
	1. Pumping	\$4,600
	2. Analytical Testing	\$36,000
	3. Sample Collection	\$4,200
	E. Erosion Control Repair, Mowing	\$3,420
	F. Dredged Material Management	\$185,400
	G. Air Monitoring Plan Implementation	\$30,000
	Subtotal	\$1,617,254
	Escalation OCT 93 to OCT 98 13%	\$210,243
	TOTAL	\$1,827,497
	POST CLOSURE O & M COSTS	
	A. Water Treatment	\$24,000
	B. Gradient Control System	
	1. Pumping	\$144
	2. Analytical Testing	
	3. Sample Collection	
	C. Ground Water Monitoring	
	1. Analytical Testing	\$41,250
	2. Sample Collection	\$3,150
	D. Erosion Control Repair, Mowing	\$190
	Subtotal	\$73,558
	Escalation OCT 93 to OCT 98 13%	\$9,563
	TOTAL	\$83,121

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INDIANA HARBOR AND CANAL MAINTENANCE DREDGING AND DISPOSAL ACTIVITIES

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PROJECT:
**INDIANA HARBOR AND CANAL
MAINTENANCE DREDGING AND DISPOSAL ACTIVITIES**

PROJECT:
**INDIANA HARBOR AND CANAL
MAINTENANCE DREDGING AND DISPOSAL ACTIVITIES**

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PROJECT: INDIANA HARBOR AND CANAL MAINTENANCE DREDGING AND DISPOSAL ACTIVITIES					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	D. STAGE I DIKE				
1	Clearing & Grubbing within boundary of Slurry Wall	166	AC	\$2,000.00	\$332,000
2	Topsoil Stripping top 6 inches of ditch and dike footprint	33,373	CY	\$3.75	\$125,149
3	Additional Stripping of ditch and dike footprint to 587.5	86,824	CY	\$3.75	\$325,590
4	Perimeter Ditch				
	a. Excavation for ditch and clay liner below 587.5	67,604	CY	\$5.00	\$338,020
	b. Topsoil for perimeter ditch	5,923	CY	\$5.20	\$30,800
	c. Seeding for perimeter ditch	7	AC	\$3,240.00	\$22,680
	d. Geotextile	28,430	SY	\$1.50	\$42,645
	e. 42" RCP	263	LF	\$100.00	\$26,300
	1. Excavation	1,054	CY	\$3.00	\$3,162
	2. Bedding	33	CY	\$30.00	\$990
	3. Backfill	980	CY	\$6.80	\$6,664
	4. Riprap	24	TON	\$45.00	\$1,080
5	Stone for Access Road	1,190	TON	\$25.00	\$29,750
6	Geotextile for Access Road	6,300	SY	\$1.50	\$9,450
7	Perimeter Dike, Stage I - Sta. 0+00-8+75 & 71+10-86+72				

PROJECT COST ESTIMATE					27-Aug-99 Sheet 5 of 19
PROJECT: INDIANA HARBOR AND CANAL MAINTENANCE DREDGING AND DISPOSAL ACTIVITIES					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	D. STAGE I DIKE <i>continue</i>				
	a. Dike Material (clean fill)	85,385	CY	\$10.35	\$883,735
	b. Topsoil	3,882	CY	\$5.20	\$20,186
	c. Seeding	5	AC	\$3,240.00	\$16,200
	d. Stone for Access Road	3,529	TON	\$25.00	\$88,225
	e. Geotextile for Access Road	14,351	SY	\$1.50	\$21,527
8	Dike between North & South Areas, first 10 ft. lift				
	a. Dike Material (Stripped material)	7,290	CY	\$8.27	\$60,288
	b. Stone for Access Road	600	TON	\$25.00	\$15,000
	c. Geotextile for Access Road	2,430	SY	\$1.50	\$3,645
9	Dike between East & West Areas, first 10 ft. lift				
	a. Dike Material (Stripped material)	14,967	CY	\$8.27	\$123,777
	b. Stone for Access Road	1,205	TON	\$25.00	\$30,125
	c. Geotextile for Access Road	4,749	SY	\$1.50	\$7,124
10	Perimeter Dike, Stage I - Sta. 8+75 to 71+10				
	a. Dike Material (clean fill)	218,456	CY	\$10.35	\$2,261,020
	b. Topsoil	9,930	CY	\$5.20	\$51,636

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PROJECT: INDIANA HARBOR AND CANAL MAINTENANCE DREDGING AND DISPOSAL ACTIVITIES					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	F. STAGE II DIKES				
1	Perimeter Dike, Stage II Sta. 0+00 to 86+72				
	a. Remove Topsoil from Stage I Dike	13,811	CY	\$3.75	\$51,791
	b. Remove & Replace Access Road Stone	10,621	CY	\$9.00	\$95,589
	c. Dike Material (clean fill)	514,761	CY	\$10.35	\$5,327,776
	d. Clay Liner	23,768	CY	\$15.64	\$371,732
	e. Topsoil	9,373	CY	\$5.20	\$48,740
	f. Seeding	29	AC	\$3,240.00	\$93,960
	g. Remove & Replace Geotextile	41,423	SY	\$1.00	\$41,423
2	Subcell Dikes - final height = 30 feet				
	a. Dike Material (dried dredged material)	806,402	CY	\$4.25	\$3,427,209
3	Four additional lifts of 5 feet each for interior dikes				
	a. Remove & Replace Stone Access Road	9,812	TON	\$9.00	\$88,308
	b. Add lift of dike material (dried dredged material)	234,820	CY	\$4.25	\$997,985
	c. Remove & Replace Geotextile for Access Road	39,216	SY	\$1.00	\$39,216

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PROJECT COST ESTIMATE

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