

Final Appendix E

Cost Engineering

Rahway River Basin, New Jersey

Flood Risk Management Findings Report

September 2025

Final



**New Jersey Department of
Environmental Protection**



**U.S. Army Corps of Engineers
New York District**

Appendix E: Cost Appendix

Introduction

This memorandum documents development of the Micro-Computer Aided Cost Estimating System (MCACES) 2nd Generation (MII) cost estimate for the Rahway River Basin, New Jersey Feasibility Study.

Estimating Guidance

The estimate was prepared in accordance with the following USACE guidance documents:

- ER 1110-2-1302, Civil Works Cost Engineering.
- ER 1110-2-1150, Engineering Design for Civil Works Projects
- ER 1110-1-1300, Cost Engineering Policy and General Requirements

General Approach

A task-based cost estimate was prepared for each alternative reflecting the full scope of work necessary to complete the work. Task-based estimating assumes a construction method, equipment types, labor classifications, and material pricing appropriate for the scope of work, site properties, and level of design detail. The cost estimate includes costs which a prudent, well-equipped, and experienced contractor would reasonably prepare for a competitive bid with multiple contractors. Costs included in the estimate were determined as accurately as possible, in as much detail as can be assumed, and based on the best information available in the feasibility designs. Unknowns due to the level of design were estimated under reasonable assumptions and documented within the estimate narrative: lump sum allowances were not used to address such unknowns.

Estimate Classification

The estimate is considered a class 4 estimate per USACE ER 1110-2-1302.

Effective Pricing Level

The estimate is considered a 2025 price level. Escalation to the midpoint of construction will eventually be included in the TPCS.

Software

The construction cost estimate was prepared in Micro-Computer Aided Cost Estimating System (MCACES) 2nd Generation (MII) version 4.4.4

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Cost Book

The cost estimate utilizes the 2024 MII Cost Book with adjustments to localize and escalate costs to the effective price level. It is understood that the cost book represents generic, national average costs and is not appropriate as the entire basis for a cost estimate. Some perspectives on cost book use:

- Cost book CSI Tasks were modified when appropriate, including crews, production rates, or material costs. These modifications are noted at the CSI Task and Project Item level.
- The cost book is often a helpful source for crews or production rates during development of user-generated (USR) CSI Tasks. Use of cost book data will be noted at the CSI Task and Project Item level.
- Significant portions of site civil construction (earthwork, concrete, foundation stabilization) is estimated via USR CSI Tasks and other work estimated via modified cost book items. This is the general anticipated approach; details are documented in the MII notes and later in this memo.

Direct Cost Basis

Labor Rates

Sources of labor rates are as follows:

1. Davis-Bacon Act (DBA) Rates obtained 14 July 2025 via sam.gov, wage determination number NJ20250052, dated 6 June 2025 for heavy construction. It is noted that DBA Rates for individual classifications may not be up-to-date even in a recently released wage determination. This was assessed; nearly all labor classifications have been updated within the year preceding publication of this estimate and the wage determination was considered a suitable source. Those labor rates not recently updated were escalated to 2025 per EM 1110-2-1304. The labor codes for each rate are described in the MII labor tab.
2. SCA Rates obtained 14 July 2025 via sam.gov, 2015-4211 Revision 30 dated 22 April 2025. Taxable fringe benefits for SCA rates are assumed equal to 30% of the base wage if fringe rates.

Labor rates are burdened with appropriate payroll, tax, and insurance rates for the State of New Jersey and the type of work performed. Per diem and travel are not anticipated to be required.

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Equipment Rates

The estimate utilizes the 2024 MII Region 1 equipment library. Fuel rates were updated for the central Atlantic area per the US Energy Information Administration (EIA, <https://www.eia.gov/petroleum/gasdiesel>) at the time of estimate preparation (Gas \$3.178/gal, Off-Road Diesel \$3.552/gal, and On-Road Diesel \$3.936/gal). Off-road diesel rates were modified based on the New Jersey gas tax of \$0.384/gallon. Cost-of-money (COM) is the current Federal funds rate published at <https://www.fiscal.treasury.gov/prompt-payment/rates.html>.

Material Costs

Material costs have several sources:

- Quotes from suppliers are used for concrete, forms, and sheet piling. These quotes were obtained in 2024 for other flood control projects of similar scope and size. They are considered suitable for the feasibility study estimate.
- The Cost Book was used for most other material costs. These prices were adjusted to New Jersey per the area cost factor of 1.23 indicated in EM 1110-2-1304. This factor is applied via direct cost adjustment markup in MII.
- Historical material prices were used very little except for concrete rebar which was assumed to be \$1.70/lb per recent industry experience.

All material price sources are noted in the MII notes. User pricing is entered at the CSI Task level and cost overrides are not used.

Acquisition Strategy

The cost estimate assumes Design-Bid-Build procurement with at least four competent bidders. The prime contractor is assumed to be a large earthwork/general contractor with subcontractors for other disciplines, for example:

- Concrete subcontractor for spillway construction
- Pile driving subcontractor for sheet pile cofferdam installation and jet grout column installation
- Steel construction subcontractor for the steel truss bridge
- Landscaping subcontractor for clearing and grubbing and planting

Markups

The following sections describe the estimate markups.

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Direct Cost Markups

- Overtime: The overtime markup assumes five 10-hour days per week (+16.67% labor percentage and -33.33 equipment FCCM adjustment).
- Productivity: A productivity markup of 83% is applied to all items in the estimate which represents an approximate 50-minutes of productivity for every hour. This markup is considered construction convention and not indicative of weather, mechanical, or other delays.
- Sales Tax: Sales tax of 6.63% per Essex County, New Jersey.
- Escalation: There were some historical material costs which required a direct cost adjustment to bring costs to the effective price level. This was calculated per EM 1110-2- 1304 and documented in the notes.

Prime Contractor Markups

- Jobsite Office Overhead (JOOH): JOOH is an itemized calculation under the Prime Contractor in the Contractor tab. Cost is based on the anticipated General Requirements of the project, including, for example, project management and site office staff, office operations, vehicles, security, and some staging activities. The estimate assumes the Contractor will establish project offices onsite for both the Contractor and government supervision. Cost for both offices, including installation, removal, rental costs, and utilities will be included in the JOOH calculation.
- Small Tools: Small Tools will be calculated as 2.5% of prime labor costs.
- Home Office Overhead (HOOH): HOOH is 8% to cover costs of operating the Prime Contractors home office facilities, staff, and ongoing operations.
- Profit: Profit is 9.1% and was calculated per the profit-weighted guidelines (PWG) tool in MII.
- Bond: Bond is 2%.

Subcontractor Markups

- JOOH: Subcontractor JOOH is assumed included in the Prime calculated JOOH except for the small tools markup of 2.5%.
- HOOH: Subcontractor HOOH is 8%.
- Profit: Subcontractor profit will be a running percentage similar to that calculated to the prime.

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Project Markups

Escalation and contingency are not included in the cost estimate. These will eventually be included in the Total Project Cost Summary (TPCS) developed for the Tentatively Selected Plan (TSP).

- Escalation: Escalation from the effective price level to the midpoint of construction will be included in TPCS.
- Contingency: Contingency was calculated by Abbreviated Risk Analysis (ARA) and will be included in the TPCS.

Quantities

Quantities were calculated in CAD, by spreadsheet, or with on-screen software. All takeoffs are provided in the cost estimate package. Quantities were part of the quality control (QC) review.

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Table E1: Alternative 2: Upstream Detention MII High Level Overview

Print Date Wed 29 October 2025 Eff. Date 7/17/2025		CUI U.S. Army Corps of Engineers Project FS: Rahway River Basin, New Jersey Feasibility Study, Alt 2 Dry Dam Rahway Fluvial Alternative 2: Upstream Detention		Time 09:28:54 Overview Page 1		
Description	UOM	Quantity	DirectLabor	DirectEQ	DirectMatl	ProjectCost
Overview			30,562,931.08	12,743,426.75	23,087,689.03	100,891,451.83
Dam Embankment and Spillway	LS	1.00	25,232,102.85	10,070,600.91	18,068,372.04	82,378,262.88
Dam Embankment, Foundation Improvements, Culvert	LS	1.00	20,264,604.83	8,712,360.64	2,973,311.83	49,829,565.49
Dam Spillway and Access Bridge	LS	1.00	4,967,498.02	1,358,240.27	15,095,060.21	32,548,697.39
Brookside Dr Relocation	LS	1.00	5,330,828.23	2,672,825.84	5,019,316.99	18,513,188.95
Clearing and Grubbing (Brookside Dr)	ACR	6.90	10,252,8926 70,744.96	2,903,1582 20,031.79	0.0000 0.00	20,385,9610 140,663.13
Roadway Excavation (Brookside Dr)	BCY	112,700.00	2,897,350.23	1,886,221.06	0.00	6,167,337.36
Roadway Fill (Brookside Dr)	BCY	9,600.00	51,6268 495,617.30	36,5373 350,758.18	0.0000 0.00	114,2315 1,096,622.83
Soil Nails (Brookside Dr)	EA	1,800.00	543,9660 979,138.73	127,0224 228,640.36	955,3662 1,719,659.13	2,470,6384 4,447,149.20
Shotcrete (Brookside Dr)	CY	800.00	114,9762 91,980.99	36,1774 28,941.96	227,4041 181,923.25	575,0771 460,061.70
Reinforcement for Shotcrete (Brookside Dr)	SY	5,000.00	33,4499 167,249.28	0.0000 0.00	10,7781 53,890.73	67,1879 335,939.66
Roadway Bridge (Brookside Dr)	SF	8,000.00	65,9928 527,942.56	13,6745 109,395.94	348,4707 2,787,765.25	650,3958 5,203,166.12
Aggregate Base (Brookside Dr)	CY	2,070.00	23,3969 48,431.55	13,4403 27,821.48	27,5845 57,099.95	99,5664 206,102.53
Hot Mix Asphalt (Brookside Dr)	CY	970.00	48,6296 47,170.73	20,0542 19,452.61	203,1835 197,088.01	425,3771 412,615.76
Striping	LF	11,200.00	0.4019 4,501.71	0.1395 1,562.48	1.9107 21,400.20	3,7252 41,721.89
Signage	EA	9.00	77,8001 700.20	0.0000 0.00	54,4962 490.47	200,9749 1,808.77

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Table E2: Alternative 3: Combination Plan MII High Level Overview

Print Date Wed 29 October 2025 Eff. Date 7/17/2025		U.S. Army Corps of Engineers Project FS: Rahway River Basin, New Jersey Feasibility Study, Alt 3 Combination Plan Rahway Fluvial Alternative 3: Combination Plan					Time 09:39:10 Overview Page 1	
Description	UOM	Quantity	DirectLabor	DirectEQ	DirectMatl	ProjectCost		
Overview			51,744,045.39	21,654,847.38	39,418,352.76	157,983,766.71		
Channels	LS	1.00	8,426,797.64	2,265,980.24	5,311,035.17	23,128,142.97		
Raise Essex St. Bridge Low Chord	LS	1.00	1,642,639.70	281,364.18	1,192,067.22	4,411,708.94		
Improve Channel, Millburn Clark East Branch, RM 102262	LS	1.00	1,313,369.52	385,554.60	689,819.47	4,023,637.49		
Raise Oakland Rd. Bridge Low Chord	LS	1.00	702,326.64	159,936.77	1,177,330.81	2,979,898.90		
Improve Channel, Millburn Clark East Branch, RM 5843-397	LS	1.00	2,426,796.56	950,994.88	611,036.45	5,410,659.34		
Remove Sperry Dam	LS	1.00	618,507.83	123,981.61	295,452.51	1,444,608.71		
Modify Drolescher's Dam	LS	1.00	846,169.62	177,557.91	656,218.48	2,370,370.13		
Modify Jackson Pond Dam	LS	1.00	876,987.78	186,590.29	689,110.23	2,487,259.47		
Levees and Floodwalls	EA	1.00	40,772,583.8169	17,889,708.7615	33,962,323.1420	129,524,517.2370		
West Levee	EA	1.00	40,772,583.82	17,889,708.76	33,962,323.14	129,524,517.24		
East Levee	EA	1.00	24,019,624.2156	10,599,517.5048	17,116,056.4774	72,156,448.7516		
Floodway Control and Diversion Structures	EA	1.00	24,019,624.22	10,599,517.50	17,116,056.48	72,156,448.75		
Offline Storage Basin	EA	1.00	16,752,959.6014	7,290,191.2568	16,846,266.6646	57,368,068.4855		
	EA	1.00	16,752,959.60	7,290,191.26	16,846,266.66	57,368,068.49		
	EA	1.00	2,544,663.9341	1,499,158.3764	144,994.4403	5,331,106.5011		
	EA	1.00	2,544,663.93	1,499,158.38	144,994.44	5,331,106.50		
	LS	1.00	2,544,663.93	1,499,158.38	144,994.44	5,331,106.50		

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Table E3: Alternative 4: Nonstructural 10 Year Plan MII High Level Overview

Print Date	Wed 29 October 2025	U.S. Army Corps of Engineers					Time	09:57:24
Eff. Date	7/17/2025	Project FS-10YR: Rahway River Basin, New Jersey Feasibility Study, Alt 4 Nonstructural Plan, 10YR					Overview Page 1	
		Rahway Fluvial Alternative 4: Nonstructural 10 Year Plan						
Description			UOM	Quantity	DirectLabor	DirectEQ	DirectMatl	ProjectCost
Overview					40,741,287.93	5,729,455.63	24,854,253.47	108,091,927.06
Cranford					30,003,522.0965	3,858,386.9707	17,653,874.8094	77,681,273.9290
Relocations			JOB	1.00	30,003,522.10	3,858,386.97	17,653,874.81	77,681,273.93
Levees and Floodwalls			LS	1.00	16,012,914.63	640,179.70	8,525,387.82	36,381,912.33
Levees and Floodwalls			LS	1.00	13,990,607.46	3,218,207.27	9,128,486.98	41,299,361.60
East Branch					4,768,362.0476	619,454.1005	2,857,376.0721	12,458,006.5628
Relocations			JOB	1.00	4,768,362.05	619,454.10	2,857,376.07	12,458,006.56
Levees and Floodwalls			LS	1.00	2,563,873.05	116,550.91	1,362,630.28	5,887,327.40
Levees and Floodwalls			LS	1.00	2,204,489.00	502,903.19	1,494,745.79	6,570,679.17
Robinsons Compound					5,969,403.7884	1,251,614.5546	4,343,002.5905	17,952,646.5678
Relocations			JOB	1.00	5,969,403.79	1,251,614.55	4,343,002.59	17,952,646.57
Levees and Floodwalls			LS	1.00	940,427.73	47,485.58	513,617.22	2,191,024.08
Levees and Floodwalls			LS	1.00	5,028,976.06	1,204,128.98	3,829,385.37	15,761,622.49

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Table E4: Alternative 4: Nonstructural 100 Year Plan MII High Level Overview

Print Date	Wed 29 October 2025	U.S. Army Corps of Engineers	Time	10:01:24
Eff. Date	7/17/2025	Project FS-100YR: Rahway River Basin, New Jersey Feasibility Study, Alt 4 Nonstructural Plan, 100YR	Overview Page 1	
		Rahway Fluvial Alternative 4: Nonstructural 100 Year Plan		
Description	UOM	Quantity	DirectLabor	DirectEQ
Overview			69,452,354.38	10,570,241.42
Cranford	JOB	1.00	47,101,839.8554	6,715,701.7971
Relocations	LS	1.00	21,237,603.42	855,236.35
Levees and Floodwalls	LS	1.00	25,864,236.44	5,860,465.45
East Branch	JOB	1.00	13,482,378.5034	2,229,869.9098
Relocations	LS	1.00	4,512,133.25	220,723.33
Levees and Floodwalls	LS	1.00	8,970,245.25	2,009,146.58
Robinsons Compound	JOB	1.00	8,868,136.0261	1,624,669.7135
Relocations	LS	1.00	2,423,675.95	107,226.76
Levees and Floodwalls	LS	1.00	6,444,460.07	1,517,442.95