Mississippi Valley Division,
Regional Planning and Environment Division South

J. Bennett Johnston Waterway 12-FT Channel

Appendix B – Cost Engineering

June 2025

CONTENTS

SECTION 1
Basis of Estimate

1.1 CLASSIFICATION OF ESTIMATE

The project cost estimate was developed in the MII (MCACES Second Generation) cost estimating software and used the standard approaches for a feasibility estimate structure regarding labor, equipment, materials, crews, unit prices, quotes, subcontractor markups and prime contractor markups. This philosophy was taken wherever practical within the time constraints. It was supplemented with estimating information from other sources where necessary such as from quotes, bid data, and Architect-Engineer estimates.

Cost estimates for the proposed Alternatives were developed at a Class 4 level utilizing largely parametric unit prices from sources such as historical Government and commercial bid data, Architect-Engineer cost estimates available from design reports, RS Means Cost Data Books and other available historical cost data sources.

1.2 PROJECT DESCRIPTION

The authorized J. Bennett Johnston (JBJ) Waterway project consists of a 9-FT deep by 200-FT wide navigation channel extending 283 miles (1967 mileage) from the Mississippi River through Old River and up the Red River to the I-220 bridge in the vicinity of Shreveport. Five locks with dimensions of 84 feet by 705 feet by 14 feet and adjacent dams provide the required lift of 141 feet. The project also provides for realigning the banks of the Red River from the Old River to Shreveport by means of dredging, cutoffs, and training works and for stabilizing its banks by means of revetments, dikes, and other methods. Since the waterway was opened in December 1994, a navigable channel has been maintained as far upstream as the Caddo-Bossier Port near river mile (RM) 212. The U.S. Army Corps of Engineers spent the last three decades of the 20th century developing the lower 280 miles of the Red River channel in Louisiana for commercial navigation. The development included an extensive channel improvement program that included channel realignments, bank stabilization works, and channel contraction.

The scope for this study is investigating how to increase the authorized draft from 9-FT to 12-FT in order achieve transportation cost efficiencies for the JBJ Waterway, maximizing net benefits while minimizing environmental impacts. The measures to achieve a 12-FT draft that were evaluated in this study include draft restrictions, a waiver for the draft required to navigate through the lock and dam, dredging to achieve O&M efficiencies and remove obstructions, and construction of dikes and modification of dikes to achieve O&M efficiencies and remove obstructions.

1.3 DIRECT COSTS

Direct costs are based on anticipated labor, equipment, and material necessary to construct this project. Direct costs were calculated independent of the contractor assigned to perform the task.

1.3.1 Quantities

Quantities were provided by the Vicksburg District River Stabilization Section for the dredged material volumes and rock dike tonnages. Quantities were reviewed and checked by Vicksburg District Cost Engineering Section.

1.3.2 Labor

Labor rates were developed comparing Region 3 labor market wages with the local Davis-Bacon Wage Determination: the greater rate was used. Regional wage information was formulated from data gathered from USACE Vicksburg District construction projects in the region and is assumed to be a fair representation of wage rates for the project area.

1.3.3 Equipment

Rates used were based on the latest USACE Engineer Pamphlet (EP) 1110-1-8, Region III. Adjustments were made for fuel and facility capital cost of money (FCCM). The latest available full FCCM/cost of money rate was adopted. The MII program takes the EP-recommended discount, but no other adjustments were made to the FCCM. Equipment was chosen based on historical knowledge of similar projects.

1.3.4 Crews

The work is typical to the Vicksburg District Area of Responsibility and is well understood by the cost engineers. The crews and productivity rates were checked by estimators, and comparisons with historical cost data were referenced. Crews and productivity rates were adjusted as necessary based on those findings to reflect reasonable crew sizes and production rates.

1.3.5 Work Schedule

Most crew work hours were assumed to be 10 hours/day, 6 days/week, which is typical for the area and type of proposed work.

1.3.6 Productivity

Productivity was assigned to each crew reflective of the expected output per unit of measure for the specific task listed in the cost estimate. Notes in the estimate identify specific alterations to productivity due to workspace access.

1.3.7 Sales Tax

The Alexandria, Louisiana, sales tax of 10.5 percent (5.0 percent Louisiana State sales tax plus 5.5 percent Rapides Parish sales tax) was applied to supplies and materials needed for construction.

1.4 INDIRECT COSTS

Indirect costs were based on the prime contractors' markups—which include job office overhead (JOOH), home office overhead (HOOH), profit, and bonds—and project (owner) costs, which include escalation and contingency. The same was applied for the subcontractor markups. Overhead assumptions may include costs for the superintendent, the office manager, pickup trucks, periodic travel costs, communications, temporary offices (contractor and Government), office furniture, office supplies, computers and software, as-built drawings and minor designs, tool trailers, staging setup, camp/facility/kitchen maintenance and utilities, utility service, toilets, safety equipment, security and fencing, small hand and power tools, project signs, traffic control, surveys, temporary fuel tank station, generators, compressors, lighting, and minor miscellaneous items.

1.4.1 Job Office Overhead

The estimated percentages for field office overhead were based on estimating and negotiation experience, and consultation with local construction representatives. The estimates used a field office overhead rate based on the average of relevant jobs with a similar scope and magnitude.

Different percentages were used when considering the scope of work for each feature. However, when reviewing historical cost pricing data, a range of 10–20 percent was typically used. The JOOH rate of 10 percent was used for the prime contractors, which was based on similar historical projects.

1.4.2 Home Office Overhead

The estimated percentages vary based on consideration of 8(a), small businesses and unrestricted prime contractors. The rates were based on estimating and negotiating experience, and consultation with local construction representatives. Different percentages were used when considering the contract acquisition strategy regarding small businesses 8(a), competitive small businesses and large businesses, from high to low. For HOOH, a percentage of 15 percent was assumed for the prime contractors.

1.4.3 Bonds

The bond interest rate was assumed to be 1.5 percent, applied against the prime contractor.

1.4.4 Contingency

Contingencies for the alternatives were developed using the USACE Abbreviated Risk Analysis (ARA) program. An ARA is a qualitative approach used by the Project Delivery

Team to address key risk concerns for major features of work and their impact to cost and schedule drivers such as project scope growth, acquisition strategy, construction elements, quantities, specialty fabrication or equipment, cost estimate assumptions and external project risks. The development of the ARA resulted in a total composite risk contingency of 23.3 percent for the Tentatively Selected Plan, Alternative 3a, considering all factors of the project. Real estate, preconstruction engineering and design, and supervision and administration costs were not included in formulating the composite risk contingency.

1.5 PROJECT FEATURE CODES

1.5.1 Channels and Canals (Code 09)

This feature code includes all the necessary direct costs (material, labor, and equipment) and indirect costs (JOOH, HOOH, profit, bonds, contingency, and escalation) for the dredging within the JBJ Waterway. It also includes all necessary direct and indirect costs for stone placement associated for revetments and dikes constructed as channel improvement works for navigation.

1.5.2 Planning, Engineering, and Design (Code 30)

This feature includes all engineering, design, surveys, preparation of detailed plans and specifications, and related work required for the construction of the project, including relocations. A design cost of $200,000 per individual dike, revetment, and dredging location was assumed.

1.5.3 Construction Management (Code 31)

This feature includes such functions as inspection, supervision, project office administration, and distributive costs of area office and general overhead charged to the project and was assumed to be approximately 12 percent of the calculated construction costs.

1.6 MAJOR ASSUMPTIONS

- Dredging unit costs were developed using statistics from the 2024 Red River dredging season, updated with 2025 Red River leased dredge contract's unit rates. A total of 1,119,999 cubic yards were dredged, with an estimated total contract cost of $9,301,000 for fiscal year 2025, or approximately $8.30/cubic yard. Therefore, $9/cubic yard was used as a direct cost in MII for dredging.
- A material and transport cost quote for "B" stone was obtained from Luhr Brothers. Transport quote was given for locations at RM 0, RM 89, and RM 222.5 on the Red River. Transport costs to each work site were interpolated from the provided quote. Labor and equipment costs for stone placement were estimated using MII.
- Mobilization/demobilization costs were assumed to be $500,000 for stone placement items and $1,000,000 for dredging items, based on historical bid data.
- Plans and specifications will be fully developed by USACE personnel.

- For estimating purposes, a single prime contractor was utilized. In the field, it is possible that multiple subcontractors and vendors will be used; however, it is assumed these parties will have a similar markup scheme.
- The design and construction oversight will primarily be performed by USACE Vicksburg District personnel.

1.7 REFERENCES

U.S. Army Corps of Engineers, 1993, Engineering and Design Cost Engineering Policy and General Requirements, Engineering Regulation 1110-1-1300, Department of the Army, Washington D.C., 26 March 1993.

U.S. Army Corps of Engineers, 1999, Engineering and Design for Civil Works Projects,

Engineering Regulation 1110-2-1150, Department of the Army, Washington D.C., 31 August 1999.

U.S. Army Corps of Engineers, 2016, Civil Works Cost Engineering, Engineering Regulation 1110-2-1302, Department of the Army, Washington D.C., 30 June 2016.

U.S. Army Corps of Engineers, 2020, Construction Equipment Ownership and Operating Expense Schedule, Region III, Engineering Pamphlet 1110-1-8, Department of the Army, Washington D.C., 12 August 2021.

U.S. Army Corps of Engineers, 2016, Civil Works Construction Cost Index System (CWCCIS), Engineering Manual 1110-2-1304, Department of the Army, Washington D.C., 30 September 2019.

U.S. Army Corps of Engineers, 2000, Planning Guidance Notebook, Engineering Regulation 1105-2-100, Department of the Army, Washington D.C., 22 April 2000.

1.8 ATTACHMENTS

Abbreviated Risk Analysis (ARA) for selected alternatives