DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, VICKSBURG DISTRICT
4155 CLAY STREET
VICKSBURG, MS 39183-3435

SUBJECT: Continuing Authorities Program (CAP) 107 Port Of Rosedale Expansion, Rosedale Harbor, Bolivar County, Mississippi EA #111

PUBLIC NOTICE

To Whom It May Concern:

A draft Finding of No Significant Impact (FONSI), along with the draft Feasibility Report and integrated Environmental Assessment (EA) for the Continuing Authorities Program Section 107, Port of Rosedale Expansion, Bolivar County, Mississippi project is enclosed for your review and comment. This project involves realigning and widening the authorized channel limits at the existing barge facility, widening the channel for the entire length to facilitate two-way traffic and larger barge configurations, and enlarging the turning basin to support increased mobility with larger barge configurations. Please provide comments by 14 July 2024, to the above address, ATTN: CEMVN-PDN-UDP.

If you have any questions or comments concerning the draft FONSI or EA, please contact Mr. Taylor Piefke of this office by telephone 601-631-5087 or email Taylor.Piefke@usace.army.mil.

Sincerely,

SMITH.MARK.R.1219443621
Digitally signed by SMITH.MARK.R.1219443621
Date: 2024.06.14 13:59:30 -05'00'

Mark Smith
Chief, Environmental Compliance Branch
Regional Planning and Environment Division South

Enclosure

DRAFT FINDING OF NO SIGNIFICANT IMPACT

CONTINUING AUTHORITIES PROGRAM (CAP) 107
PORT OF ROSEDALE EXPANSION
ROSEDALE HARBOR
ROSEDALE, BOLIVAR COUNTY, MISSISSIPPI
EA #111

The U.S. Army Corps of Engineers, Vicksburg District (Corps) has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The final Integrated Feasibility Report and Environmental Assessment (IFR/EA) dated 11 September 2023, for the Port of Rosedale Expansion Project addresses the possible impacts of improving channel navigation by expanding the Port of Rosedale, opportunities, and feasibility in Bolivar County, Mississippi. The final recommendation is contained in the report of the Chief of Engineers, dated TBD.

The Draft EA, incorporated herein by reference, evaluated various alternatives that would improve channel navigation and safety in the study area. The recommended plan is the **National Economic Development (NED) Plan** and includes:

- Realigning and widening the authorized channel limits at the existing barge facility.
- Widening the channel for the entire length to facilitate two-way traffic and larger barge configurations.
- Enlarging the turning basin to support increased mobility with larger barge configurations.

- Implementation of any required environmental compensatory mitigation and associated monitoring and mitigation area adaptive management plan will be completed, when applicable and appropriate. In order to meet mitigation requirements for the project, 7.3 bottomland hardwood mitigation credits will be purchased and 7 acres of farmland will be acquired and reforested. More information on mitigation is found within Section 7 of the EA.

In addition to a “no action” plan, 6 alternatives were evaluated. The alternatives included:

- *Alternative 1 - No Action - FWOP*
- *Alternative 2 - Widen Channel at JANTRAN*
- *Alternative 3 - Widen Entire Channel*
- *Alternative 4 - Widen Turning Basin*
- *Alternative 5 - Lengthen Channel, Relocate and Widen Turning Basin*
- *Alternative 6 - Shift Channel Bend*
- *Alternative 7 - TSP - Widen Entire Channel, Extend Channel, and Expand Turning Basin*

For all alternatives, the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the recommended plan are listed in Table 1:

Table 1: Summary of Potential Effects of the Recommended Plan

	Insignificant effects	Insignificant effects as a result of mitigation*	Resource unaffected by action
Recreation and Aesthetics	☒	☐	☐
Air quality	☒	☐	☐
Aquatic resources/wetlands	☐	☒	☐
Invasive species	☒	☐	☐
Fish and wildlife habitat	☒	☐	☐
Threatened/Endangered species/critical habitat	☒	☐	☐
Historic properties	☐	☐	☒
Other cultural resources	☐	☐	☒
Floodplains	☒	☐	☐
Hazardous, toxic & radioactive waste	☒	☐	☐
Hydrology	☒	☐	☐
Land use	☒	☐	☐
Navigation	☒	☐	☐
Noise levels	☒	☐	☐
Public infrastructure	☒	☐	☐
Environmental justice	☒	☐	☐
Soils	☐	☐	☒
Tribal trust resources	☐	☐	☒
Water quality	☒	☐	☐
Climate change	☒	☐	☐

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the recommended plan. Best management practices (BMPs) as detailed in the EA will be implemented, if appropriate, to minimize impacts. No project specific mitigation opportunities were identified by USACE or the local sponsor, so a decision was made to purchase mitigation bank credits.

The recommended plan will result in unavoidable adverse impacts to 0.22 Average Annual Functional Capacity Units (AAFCU) (0.72 acres) of BLH wetland habitat and 7 acres of non-wetland forest. Impacts to forested wetlands within the project area were assessed by USFWS using the USACE certified 2013 Mississippi Alluvial Valley Hydrogeomorphic (HGM) Approach to Assessing Functions of Forested Wetlands Model (see ERDC/EL TR-13-14). All forested wetland impacts would occur within the central portion or “middle reach” of the Rosedale project. Enlargement of the turning basin at the north end of the project area was determined to have no BLH impacts. . To mitigate for these unavoidable adverse impacts, the U.S. Army Corps of

Engineers will purchase 7.3 mitigation credits from an appropriate compensatory mitigation bank and acquire 7 acres of farmland that will be reforested. More mitigation details can be found in Section 7 of the EA. All mitigation will be accomplished either prior to or concurrently with construction.

Public review of the draft EA and FONSI was completed on TBD. All comments submitted during the public review period will be responded to in the Final EA and FONSI.

Pursuant to section 7 of the Endangered Species Act of 1973, as amended, the U.S. Army Corps of Engineers utilized the Information for Planning and Consultation (IPaC) tool, developed by the U.S. Fish and Wildlife Service (USFWS) which identified 12 federally threatened or endangered species that are either known to or may possibly occur in proposed project areas: Northern Long-eared Bat (*Myotis septentrionalis*), Tricolored Bat (*Perimyotis septentrionalsis*), Eastern Black Rail (*Laterallus jamaicensis ssp.),* Ivory-billed Woodpecker (*Campephilus principalis*), Piping Plover (*Charadrius melodus*), Red Knot (*Calidris canutus rufa*), Pondberry (*Lindera melissifolia*), Alligator Snapping Turtle (*Macrochelys temminckii*), Pallid Sturgeon (*Scaphirhynchus albus*), Fat Pocketbook (*Potamilus capax*), Pink Mucket (*Lampsilis abrupta),* Monarch Butterfly (*Danaus plexippus*). It was determined that the recommended plan may affect but is not likely to adversely affect the following federally listed species or their designated critical habitat: Northern Long-eared bat and the Tricolored bat. It was determined that the recommended plan would have no effect on the other federally listed species. The U.S. Fish and Wildlife Service (FWS) concurred with the Corps' determination on 28 June 2023

Pursuant to section 106 of the National Historic Preservation Act of 1966, as amended, the U.S. Army Corps of Engineers determined that historic properties would not be adversely affected by the recommended plan. Concurrence was received from the AR SHPO on 21 September 2023 and from the MS SHPO on 22 September 2023. A response was also received from the Mississippi Band of Choctaw Indians on 5 September 2023 and the Quapaw Nation on 11 September 2023.

Pursuant to the Clean Water Act of 1972, as amended, the discharge of dredged or fill material associated with the recommended plan has been found to be compliant with section 404(b)(1) Guidelines (40 CFR 230). The Clean Water Act Section 404(b)(1) Guidelines evaluation is found in Section 5.13 of the EA.

A water quality certification pursuant to section 401 of the Clean Water Act will be obtained from the Mississippi Department of Environmental Quality (MDEQ) prior to construction. MDEQ stated that the recommended plan appears to meet the requirements of the water quality certification, pending confirmation based on information to be developed during the pre-construction engineering and design phase. All conditions of the water quality certification will be implemented in order to minimize adverse impacts to water quality.

Currently the Rosedale Harbor undergoes annual maintenance dredge activities within the defined limits that include a 150-ft wide channel and a turning basin at the upper most reach. An additional water quality certification would be required for dredge activities associated with the proposed project which extends beyond the limits of the current defined channel for Rosedale

Harbor. Once design of the tentatively selected plan is complete, the Vicksburg District will work in conjunction with MDEQ to prepare a Quality Assurance Project Plan (QAPP). The QAPP will direct additional testing protocols needed to provide the basis for the expanded water quality certification. The QAPP and testing results will be included in the water quality certification request. The MVK will ensure the water quality certification is issued prior to initiation of expanded dredge activities. For more information regarding the status of the water quality certification issuance, please contact the MVK River Engineering Section.

Technical, environmental, and economic criteria used in the formulation of alternative plans were those specified in the Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on this report, the reviews by other Federal, State, and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the recommended plan would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

_____ _____

Date

Jeremiah A. Gipson
Colonel, Corps of Engineers
District Commander

Mississippi Valley Division,
Regional Planning and Environment Division South

Port of Rosedale Expansion

Draft Feasibility Report and EA -- CAP Section 107 – Navigation Improvements

June 2024

Executive Summary

Introduction

The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division (MVD), Vicksburg District (MVK), Regional Planning and Environment Division South (RPEDS), prepared this Draft Feasibility Report and Environmental Assessment (EA) for the Port of Rosedale Expansion, under Section 107 of the Continuing Authorities Program (CAP). The proposed project is located in Bolivar County, 2 miles south of Rosedale, Mississippi. The Main Report and EA include input from the Non-federal Sponsor (NFS), other Federal and non-Federal agencies, and the public.

Purpose and Need

The underlying purpose and need (Title 40 CFR 1502.13) for this study is to improve navigation and safety in the Port of Rosedale.

Due to its unique location at the confluence of the Arkansas River and the lower Mississippi River, the Port of Rosedale is a critical location for towboat changes for all barge traffic moving from the McClellan-Kerr Arkansas River Navigation System (MKARNS) to the Mississippi River. Smaller towboats must switch to a larger towboat in the Port's channel before proceeding to the Mississippi River (and vice versa proceeding to the MKARNS with a smaller towboat).

The Rosedale-Bolivar County Port Commission identified navigation challenges and safety risks within the Port of Rosedale during annual low water times of year. In addition to the annual problem of sedimentation near the mouth of the channel, areas of the channel are extremely narrow and dangerous to navigate, especially during the low water times of the year. This risk to navigation is more prevalent during the low water period for the river, which also happens to be the "busy season" for the port due to the timing of seasonal harvest and increased business of commodities trading there. The combination of these factors creates extended barge traffic delays and navigation safety issues as the barges move through the port.

Once the Mississippi River reaches a low water stage of 10 feet on the Arkansas City gauge, port tenants are forced to move their entire fleet of barges from the Port channel out to shorelines on the Mississippi River. This incurs additional time and financial costs of fleeting vessels along the Mississippi River instead of in the channel. The channel at the JANTRAN location becomes just wide enough to hold the drydock and floating work barges with enough room for only one harbor boat and one barge to pass by en route to/from other tenants in the Port. Unfortunately, this low water season coincides with the commercial "peak season" that occurs during harvest time (August – November), incurring the additional cost of fleeting vessels along the Mississippi River instead of in the channel.

A Federal Interest Determination conducted in July 2020 determined the Port of Rosedale expansion efforts met Federal interest criteria.

Plan Formulation

The Project Design Team (PDT) implemented the risk-informed SMART (Specific, Measurable, Attainable, Risk-Informed, and Timely) planning process according to current USACE policy and guidance.

The Study planning objectives over the 50-year period of analysis, for the Port of Rosedale included:

- Improve channel navigation safety by providing safe vessel passing distances in the channel
- Reduce transportation time and costs caused by channel width restrictions during low water conditions
- Reduce transportation time and costs caused by turning basin restrictions
- Provide sufficient fleeting area to movement of barges to and from docks

The Study planning constraints included:

- Avoid and minimize adverse impacts to environmental resources
- Minimize disruption to port services
- Avoid and minimize levee instability
- Avoid and minimize wharf instability at the Port
- Avoid and minimize cultural resource impacts
- Minimize disruption to existing recreational boating traffic

Management measures considered included structural measures, such as enlarging the channel mouth, deepening the channel at the JANTRAN location, widening the channel at the JANTRAN location, lengthening the channel, relocating the JANTRAN floating dock and supporting infrastructure, expanding the turning basin, creating new turning basins, relocating the recreational boat launch, and beneficially using dredged material. Nonstructural measures considered included redirecting recreational boat traffic and posting warning signs for recreational users.

All proposed measures were carried forward to the Initial Array of Alternatives except the following based on the P&G criteria, ROM cost estimates, and best professional judgement:

- Enlarge the navigation channel mouth
- Deepen the channel at the JANTRAN location
- Beneficial use of dredged material

The remaining measures were combined in various arrangements to formulate an Initial Array of 10 alternatives, including the No Action alternative. The Initial Array of alternatives included various options to widen the channel beyond its current 150-foot width, extend the channel beyond its current 2.7 miles in length, widen the turning basin beyond its current 400-foot width, and relocate the turning basin. In addition, nonstructural safety actions were also considered.

The Initial Array of Alternatives included:

- Alternative 1 – No Action
- Alternative 2 – Widen Channel Bend
- Alternative 3 – Widen Entire Channel
- Alternative 4 – Widen Turning Basin
- Alternative 5 – Lengthen Channel, Relocate and Widen Turning Basin
- Alternative 6 – Shift Channel Bend
- Alternative 7 – Widen and Lengthen the Entire Channel, Relocate and Widen Turning Basin (combination of Alternatives 3 and 5)
- Alternative 8 – Recreational Boat Launch Permanent Closure or Relocation
- Alternative 9 – Redirect Recreational Boat Traffic and Signage
- Alternative 10 – Relocate the Floating Dock

The following screening criteria were applied to the Initial Array of alternatives to select the Final Array of Alternatives:

- Meets project objectives
- Avoids project constraints
- Meets Planning Policy and Guidance (P&G) Criteria of Completeness, Effectiveness, Efficiency, and Acceptability
- Best professional judgement
- Cultural resources impacted
- Environmental resources impacted
- Time to implement the project
- Rough order of magnitude cost (ROM) estimates

The Final Array of action alternatives met Study objectives with minimal impact and cost. The Final Array of Alternatives are shown in the Table 1 below.

Table 1. Final Array of Alternatives

Alternative	Description
1	No Action
2	Widen Channel Bend
3	Widen Entire Channel
4	Widen Turning Basin
5	Lengthen Channel, Relocate and Widen Turning Basin
6	Shift Channel Bend
7 - TSP	Widen and Lengthen Entire Channel, Relocate and Widen Turning Basin (Alternatives 3 & 5 combined)

The measures and alternatives evaluated in this study do not encroach on the existing original CAP Section 107 project, nor would they take the place of any current OMRR&R

responsibilities of the Sponsor. Conditions have changed over the last 47 years since the original Section 107 project was constructed. Therefore, measures and alternatives considered in this study are not considered components of the original Section 107 project.

In addition to the screening criteria described for the Initial Array of alternatives above, the following screening criteria were applied to the Final Array of alternatives for the purpose of selecting the TSP:

- Benefit to Cost Ratio (BCR)
- Excess benefits
- Comparison of the Four Accounts (National Economic Development (NED), Regional Economic Development (RED), Environmental Quality (EQ), and Other Social Effects (OSE)
- Excess benefits
- Benefit to Cost Ratio (BCR)

Table 2 shows the Average Annual Costs and Benefits for all action alternatives in the Final Array.

Table 2. Final Array Average Annual Costs and Benefits

Alternative	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
First Cost	$ 2,987,000	$ 5,274,000	$ 2,684,000	$ 4,092,000	$ 3,019,000	$ 8,243,000
Interest During Construction	$ 41,000	$ 72,000	$ 37,000	$ 56,000	$ 41,000	$ 113,000
Total Investment Cost	$ 3,028,000	$ 5,346,000	$ 2,720,000	$ 4,147,000	$ 3,060,000	$ 8,355,000
Average Annual First Cost	$ 112,000	$ 198,000	$ 101,000	$ 154,000	$ 113,000	$ 309,000
Average Annual Increm. OMRR&R	$ 69,000	$ 206,000	$ 86,000	$ 275,000	$ 121,000	$ 480,000
Total Average Annual Cost	$ 182,000	$ 404,000	$ 187,000	$ 428,000	$ 234,000	$ 790,000
Total Average Annual Benefits	$ 1,556,000	$ 2,106,000	$ 519,000	$ 1,038,000	$ -	$ 3,143,000
Net Annual Benefits	$ 1,374,000	$ 1,702,000	$ 332,000	$ 610,000	$ (234,000)	$ 2,353,000
BCR	8.5	5.2	2.8	2.4	0.0	4.0

*Values at FY 2024 price levels amortized at the 2024 Federal discount rate of 2.75 percent.
*All Project First Costs occur in the year 2026. Benefits begin in the year 2027.

Recommended Plan

Based on the evaluation of the Four Accounts, Excess Benefits, and Benefit-Cost Ratio (BCR), Alternative 7 (Widen and Lengthen Entire Channel, Relocate and Widen Turning Basin) is the Tentatively Selected Plan (TSP). Alternative 7 is also the Sponsor-supported plan. After selection of Alternative 7 as the recommended plan, costs were further refined. With the

refined costs, the recommended plan has average annual net benefits of $2,353,000 and a BCR of 4.0 to 1 (Table 3).

Table 3. Average Annual Costs and Benefits of TSP (Alt. 7)

Investment Cost	
First Cost	$ 8,243,000
Interest During Construction	$ 113,000
Total Investment Cost	$ 8,355,000
Average Annual Cost	
Average Annual First Cost	$ 309,000
Average Annual Incremental OMRR&R	$ 480,000
Total Average Annual Cost	$ 790,000
Benefits	
Average Annual Benefits	$ 3,143,000
Net Annual Benefits	$ 2,353,000
BCR (computed at 2.75%)	**4.0**

*Values at FY24 price levels and are amortized at the 2024 Federal discount rate of 2.75 percent.
*All Project First Costs occur in the year 2026. Benefits begin in the year 2027.

The TSP proposes three primary modifications to the existing port footprint:

1. Realign and widen the authorized channel limits at the existing barge facility
2. Widen the channel for the entire length to facilitate two-way traffic and larger barge configurations, and
3. Enlarge the turning basin to support increased mobility with larger barge configurations.

Dredged material would be cast out to the Mississippi River near the mouth of the Port. All woody material encountered during dredging/construction will be relocated on to dry ground and burned in a burn pile within the project area or relocated under water outside of the project area.

All the proposed changes and dimensions were determined based on input from the local sponsor and existing port customers. The currently authorized navigation depth equivalent to 93 feet MSL would be maintained for all the modifications and limits described herein. The channel would not be deepened below the authorized Mississippi River channel depth.

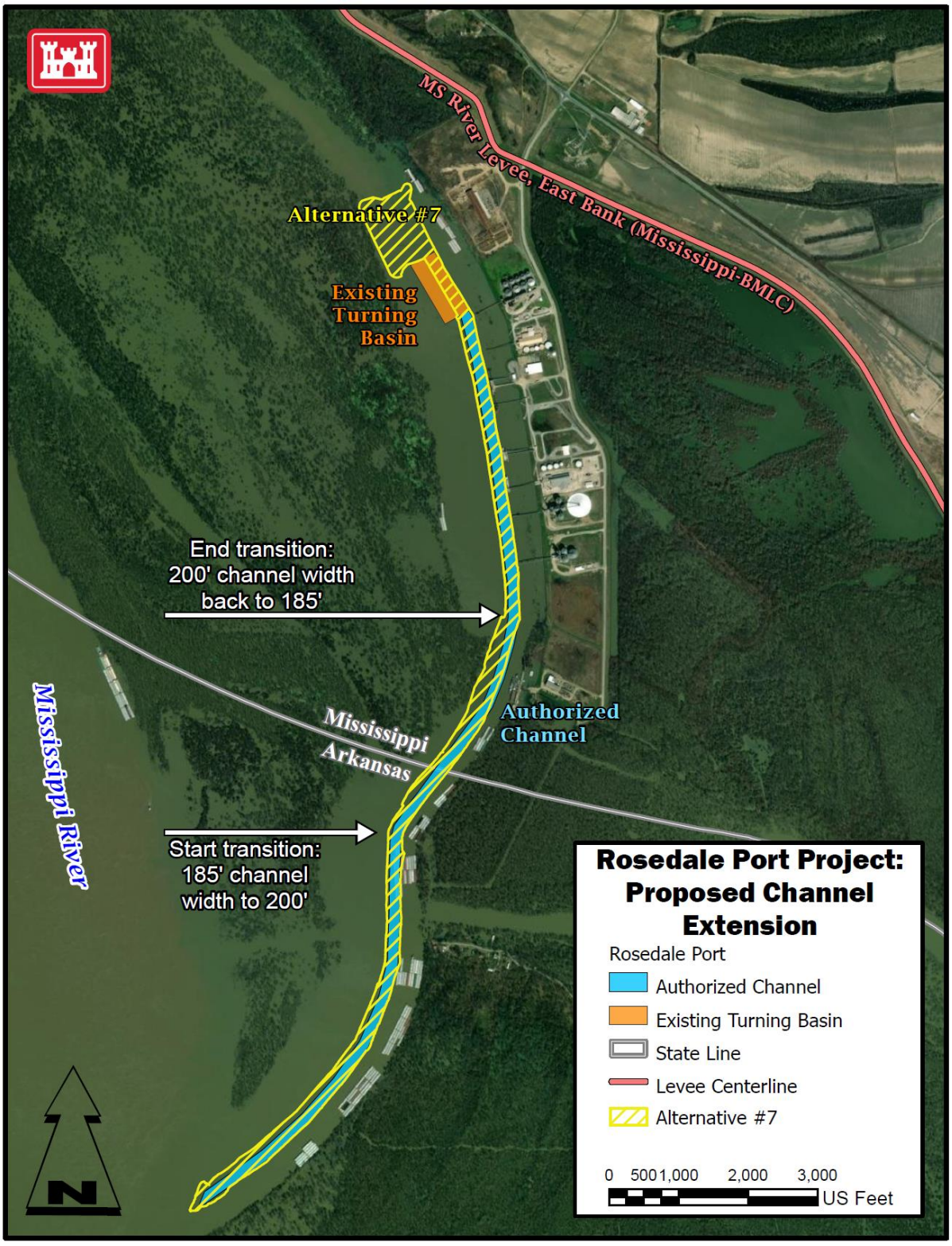

Figure 1. Alternative 7 – Widen Entire Channel, Lengthen Channel, Relocate and Widen Turning Basin

Just as the previous Section 107 authorization specified, annual operations, maintenance, repair, replacement and rehabilitation (OMRR&R) of the port channel is a Federal cost. OMRR&R of the "port area", which includes the turning basin and doc areas) is a non-Federal cost and is thus a Sponsor responsibility.

Following the successful submission of this Feasibility Report and its acceptance, the PDT estimates the following timeline:

- 1 year for Preconstruction Engineering and Design (PED)
- 1.5 years for water quality analysis and certification, which can begin near the end of PED, but must be completed prior to construction
- 1 year for construction

TSP Significant Resources/Environmental Considerations

To implement the TSP, some adverse impacts to 0.72 acres of wetland bottomland hardwood (BLH) and to 7 acres of non-wetland upland BLH forest would result from the construction of the Project and would require mitigation actions. The TSP would result in both short- and long-term impacts.

The 0.72 acres of wetland BLH would require 7.3 mitigation credits estimated at $3,400 each, for a total BLH wetland mitigation bank credit of $24,820.

The 7 acres of upland BLH would require the acquisition and reforestation of 7 acres of upland farmland. The total mitigation costs of the BLH upland habitat are $102,320, including needed LEERDs, monitoring and reporting. Total combined BLH wetland and upland mitigation costs are $127,140 as summarized in Table 4 below.

Table 4. TSP Mitigation Methods and Cost

Habitat Type	Acres Impacted	Mitigation Method	Mitigation Cost*
Wetland BLH	0.72	Bank Credits	$24,820
Upland BLH	7	Acquisition and Reforestation of 7 Acres of Farmland, Monitoring and Reporting	$102,320
Total TSP Mitigation Costs			**$127,140**

*Includes LERRDs and Contingency Estimates

The Preconstruction Engineering and Design (PED) timeline estimates 1.5 years minimum for water quality certification and U.S. Army Engineering Research and Development Center (ERDC) testing for toxicity screening of dredged material at the proposed construction site. These actions are typically lengthy processes and will likely involve two state agencies in two separate EPA regions.

Views of the Public, Agencies, Stakeholders, and Tribes

In a letter dated January 23, 2018, the Rosedale-Bolivar County Commission requested assistance from the USACE under the Section 107 authority to undertake an investigation involving the risk to navigation with the Port of Rosedale channel. The Rosedale Bolivar County Port Commission indicated its understanding of the provisions of the Section 107 authority and its willingness to cost share the project. On February 27, 2020 the Port of Rosedale sent and updated Letter of Intent.

There is no known landowner or public opposition to the project. Implementation of the TSP would be beneficial to all adjacent landowners, tenants, and Port partners.

Reviews

A District Quality Control (DQC) review, Agency Technical Review (ATR), and Policy and Legal Review have been completed for this report and its appendices at this time.

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Section 1
Introduction

The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division (MVD), Vicksburg District (MVK) and Regional Planning and Environment Division, South (RPEDS), prepared this Draft Feasibility Study and Environmental Assessment (EA) for the Port of Rosedale Expansion. This study is authorized under Section 107 of the Continuing Authorities Program (CAP). The proposed project is located in Bolivar County, 2 miles south of Rosedale, Mississippi. This Main Report is a presentation of the study results, which includes an overview of the plan formulation processes, summaries of the EA and economic analysis, and a recommendation of a Tentatively Selected Plan (TSP). The technical appendices include the EA, Engineering Appendix, Cost Engineering Appendix, Economic Appendix, and Real Estate Plan which contain technical data in support of National Environmental Policy Act (NEPA) of 1969 regulations (40 CFR Parts 1500-1508), Engineering Regulation (ER) 200-2-2 *Procedures for Implementing NEPA*, Engineering Pamphlet (EP) 1105-2-58 *Continuing Authorities Program*, and ER 1105-2-100 *Planning Guidance Notebook*. The Main Report and EA include input from the Non-federal Sponsor (NFS), other Federal and non-Federal agencies, and the public.

1.1 STUDY SCOPE

The scope of this feasibility study includes evaluation of alternatives, including the no-action alternative, to provide navigation improvements in the Port of Rosedale that maximize net benefits while minimizing environmental impacts. The alternatives evaluated limited dredging depths to 9 feet below the Low Water Reference Plane (LWRP) (Elevation 93 feet MSL) to remain consistent with current dredging maintenance operations.

1.2 USACE PLANNING PROCESS

USACE incorporates SMART (Specific, Measurable, Attainable, Risk-Informed, and Timely) elements into feasibility studies to ensure an efficient feasibility study process and to install accountability across all functional working groups.

Throughout the feasibility study, the Project Design Team (PDT) followed USACE's six step planning process in accordance with USACE Engineering Regulation (ER) 1105-2-100. This process is a structured, systematic, and repeatable planning approach for quantitatively and qualitatively assessing water resource-related problems and opportunities and resulting in recommendations to address those problems and opportunities. The planning steps occurred iteratively and concurrently. This iterative planning process, conceptualized in Figure 1-1, allowed the PDT to formulate and evaluate an efficient, effective, and reasonable array of alternative plans. The plan formulation for this study is further described in Section 3, *Plan Formulation and Evaluation*.

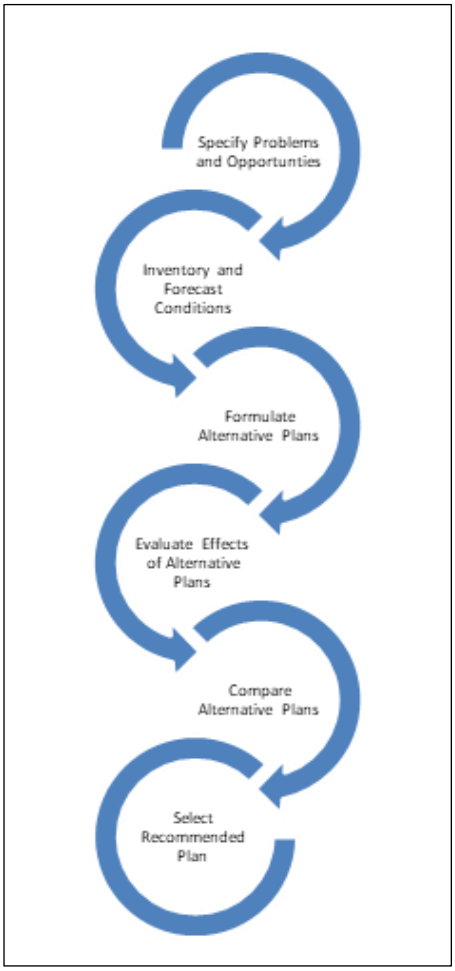

Figure 1-1. USACE Planning Process.

1.3 STUDY AUTHORITY

The authority for the project is the Small Navigation Project under Continuing Authorities of the Chief of Engineers, Section 107 of the Rivers and Harbors Act of 1960, as amended. Under the Continuing Authorities Program (CAP), the U.S. Army Corps of Engineers (USACE) is authorized to plan, design, and construct water resource and ecosystem restoration projects of limited scope and complexity without additional and specific Congressional authorization. Section 107 provides authority for the Corps of Engineers to develop and construct small navigation projects. The USACE adopts a project for construction after detailed investigation clearly shows the engineering feasibility and economic justification of the improvement.

1.4 NON-FEDERAL SPONSOR

The Rosedale-Bolivar County Port Commission is the Non-Federal Sponsor (NFS) for this study. The Non-Federal Sponsor (NFS) is the Rosedale-Bolivar County Commission (RBCC). In a Letter of Intent (LOI) dated January 23, 2018, the RBCC requested assistance from the USACE under the Section 107 authority to undertake an investigation involving the risk to navigation with the Port of Rosedale channel. The RBCC indicated its understanding of the provisions of the Section 107 authority and its willingness to cost share the project. On February 27, 2020, the Port of Rosedale sent an updated Letter of Intent. The Feasibility Cost Sharing Agreement (FCSA) was executed on April 13, 2021.

1.5 STUDY AREA (PLANNING AREA)

The study area is located on the Mississippi River, approximately 2 miles south of Rosedale, Mississippi, on the left descending MS Riverbank at River Mile 585 and just north of where the Arkansas River flows into the lower Mississippi river. The Port spans the boundary between the State of Mississippi and the State of Arkansas. The Study Area is within Mississippi Congressional District 2 and Arkansas Congressional District 1.

The Port of Rosedale (Port) is also located 10 miles from Memphis and is within a 500-mile radius of major markets including Houston, Texas, Birmingham, Alabama, and Atlanta, Georgia, making this Port an important amenity to the nation’s economy. The Study Area within the Port is illustrated in Figure 1-2 below.

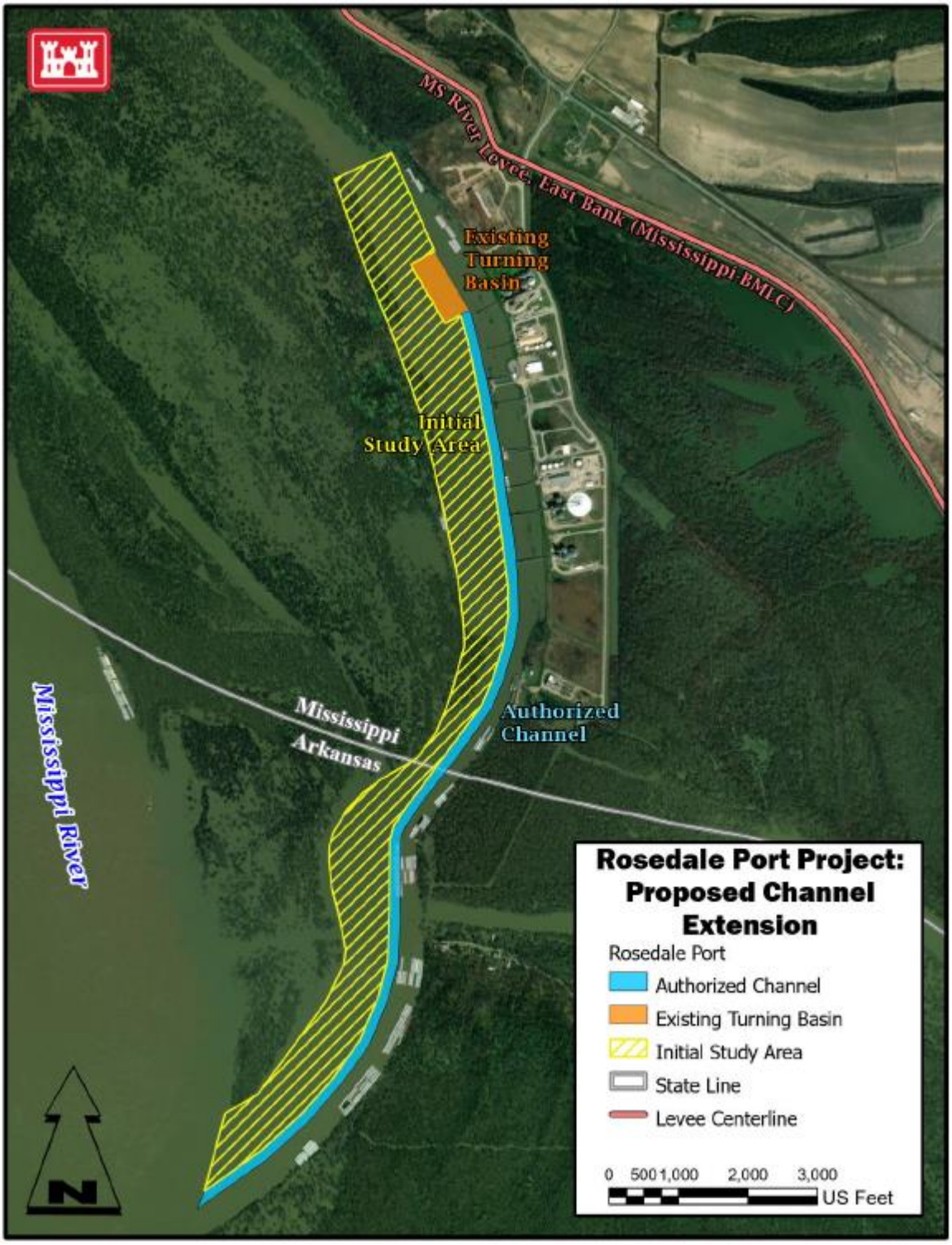

Figure 1-2. Port of Rosedale Expansion Study Area.

1.6 BACKGROUND AND HISTORY

The USACE 1977 report titled *Rosedale Harbor Mississippi Detailed Project Report Feasibility Report and Environmental Assessment* initiated the construction of the current Port of Rosedale and channel (the Port). The Port was constructed between the years of 1977 and 1978. The original report was also authorized under Section 107 of the River and Harbor Act of 1960, as amended (PL86-645).

The original Port channel was constructed as 150 ft wide and 2.7 miles long with a turning basin 1000 ft long and 400 ft wide. The original Port construction created a 20-acre dredge-material fill area (1250 ft long and 700 ft wide), raising the elevation of this fill area to a net elevation of 162.9, mean sea level (MSL). For the initial Port construction, an access road was also constructed from Mississippi Highway 1 to the Port site.

The Port of Rosedale now has 168 acres of hydraulic fill for marine related industries, a general cargo dock, and dry-bulk unloading and loading docks. Two private docks are also located at the Port, as well as a major towing company on the Arkansas Navigation System.

The Port has been maintained annually at a minimum dredge depth of 9 feet below the lowest water of record (102.5 ft MSL). The current dredging maintenance schedule costs $1,689,000 annually. At the location of the Port, the Mississippi River is authorized for a dredge depth of 12 feet below the LWRP (elevation 90) but is maintained at a 9-foot depth at this location.

Due to the Port's unique location at the confluence of the Arkansas River with the lower Mississippi River, all barge traffic moving from the moving from the McClellan-Kerr Arkansas River Navigation System (MKARNS) to the Mississippi River switches to a larger towboat in the Port's channel before proceeding to the Mississippi River (and vice versa proceeding to the MKARNS with a smaller towboat). The tow change occurs within the Port for safety reasons—it is much safer to switch in the slack water Port, whereas the stronger Mississippi River currents pose operational safety risks.

Despite annual dredging maintenance operations, sedimentation in the Port combined with low water conditions have substantially increased navigation costs and time and increase safety risks. These problems worsen during droughts when water levels are especially low, such as during the historic Mississippi low water event in the year 2022. The highest demand on the Port occurs during the lowest water levels due to the food stuffs and fertilizer commodities trading which typically increases during harvest times of year (August through November) which is typically also the driest times of year.

Once the lower Mississippi River reaches a low water stage of 10 feet on the Arkansas City gauge, port tenants are forced to move their entire fleet of barges from the Port channel out to shorelines on the Mississippi River, incurring the additional cost of fleeting vessels along the Mississippi River instead of in the channel (Figure 1-3).

Figure 1-3. Barges stranded at the Port of Rosedale during Historically Low Mississippi River Water Levels (October 2022).

JANTRAN's location within the Port is shown in Figure 1-4 below. The channel at the JANTRAN location becomes just wide enough to hold the drydock and floating work barges with enough room for only one harbor boat and one barge to pass by en route to/from other tenants in the Port.

Figure 1-4. JANTRAN Location. Source: Google Earth

In a Letter of Intent (LOI) dated January 23, 2018, the Rosedale-Bolivar County Commission requested assistance from the USACE under the Section 107 authority to undertake an investigation involving the risk to navigation with the Port of Rosedale channel. The Rosedale Bolivar County Port Commission indicated its understanding of the provisions of the Section 107 authority and its willingness to cost share the project.

On February 27, 2020 the Port of Rosedale sent and updated LOI which once more initiated a navigation improvement effort under the authority of CAP Section 107. See Appendix A for LOI enclosures.

The most relevant studies, reports, and projects in the study area are listed in Table 1-1.

Table 1-1. Relevant Studies in Area

Project Year	Study/Report/Environmental Document Title	Document Type
1977	*Rosedale Harbor Mississippi Detailed Project Report Feasibility Report and Environmental Assessment*, Rosedale, Mississippi. United States Army Corps of Engineers (USACE), 31 January 1977	USACE Feasibility Study
2012	*A Phase I Cultural Resources Survey of a Proposed New Boating Access Facility on the Mississippi River in S21, T23N, R8W, Bolivar County, Mississippi, MDAH Project Log #04-108-12*. Cobb Institute of Archaeology, Mississippi State University	Cultural Resources Survey
2013	*A Cultural Resources Survey of 141 Acres for Improvements to the Port of Rosedale, Desha County, Arkansas, and Bolivar County, Mississippi*. Brockington and Associates, Inc. Submitted to Pickering Firm, Inc.	Cultural Resources Survey
2017	*A Phase I Cultural Resources Survey in Association with the Proposed Rosedale Industrial Park Development, Bolivar County, Mississippi*. Cobb Institute of Archaeology, Mississippi State University	Cultural Resources Survey
2018	*Mississippi River and Tributaries Flowline Assessment Hydraulics Report.* USACE MRG&P Report No. 24; Volume 3, December 2018	Mississippi River Geomorphology & Potamology Program (MRG&P)
2020	*Mississippi River Mainline Levee (MRL) Supplemental Environmental Impact Statement (SEIS II)* USACE, November 2020	Supplemental EIS

1.7 PURPOSE AND NEED

The underlying purpose and need (Title 40 CFR 1502.13) for this study is to improve navigation and safety in the Port of Rosedale, which are especially vulnerable during low water conditions.

Due to its location at the confluence of the Arkansas River and the lower Mississippi River, the Port serves as a critical location for towboat changes for all barge traffic moving between the McClellan-Kerr Arkansas River Navigation System (MKARNS) and the Mississippi River.

The Rosedale-Bolivar County Port Commission identified navigation challenges and safety risks within the Port of Rosedale during annual low water times of year. In addition to the annual problem of sedimentation near the mouth of the channel, areas of the channel are extremely narrow and dangerous to navigate during the low water times of the year. This risk to navigation is more prevalent during the low water period for the river, which also happens

to be the "busy season" for the port due to the timing of seasonal harvest and increasing business of commodities trading there. This creates extended barge traffic delays and navigation safety issues as the barges move through the port.

In addition, the Port of Rosedale (Port) is reaching full-capacity use of developed property and intends to expand the Port further. All these factors create an environment where barge traffic through the Port will also continue to increase. In addition to the channel improvement in the narrow throat of the Port, the north end of the Port and turning basin should also be evaluated. To adequately serve all the tenants at the port, it is imperative that there is sufficient fleeting area and area for movement of barges to and from docks.

1.8 FEDERAL INTEREST

Preceding this Feasibility Study, a Federal Interest Determination (FID) was conducted in July 2020 to determine whether navigational improvements studied within the project area provide sufficient benefits to demonstrate a Federal Interest. The Federal interest was determined by comparing the overall cost of applying navigational improvement measures within the project area as compared to the overall public benefits.

Several alternative plans for improvement of the Port of Rosedale had been preliminarily developed by the Rosedale-Bolivar County Port Commission. For the purpose of determining a potential Federal Interest in this project the No Action plan and a plan identified as being most likely to meet the necessary criteria were preliminarily considered:

- **FID Alternative 1 - No Action** – Under this alternative, no action would be taken to increase the inlet channel and turning basin areas. This alternative would have no cost and would provide no benefits.
- **FID Alternative 2 – 19.27 Acre Plan** – This project would involve enlarging the channel by excavating 8.03 acres within the entry channel another 11.24 acres for the turning basin.

The Project Cost of FID Alternative 2 at the time of the FID's release was $12,231,000 (FY20 dollars). The annual benefit for this plan is $960,000.

Annualized costs at the time were $453,000 per year at a Federal Discount rate of 2.75 percent for the 50-year project life. The annual operation and maintenance (O&M) costs for FID Alternative 2 were estimated to be approximately $100,000 per year. The Total Annual Cost summed to $553,000 while total annual benefits totaled $960,000. This resulted in $407,000 in excess benefits and a be of 1.74:1 with the FID Alternative 2 project in place.

Because the 19.27 acre-plan had a Benefit-Cost Ratio (BCR) above unity and FID Alternative 2 showed positive Net Excess Benefits, the FID Alternative 2 demonstrated a Federal interest. The USACE recommended continued evaluation of the project at the feasibility level.

1.9 PROBLEMS AND OPPORTUNITIES

1.9.1 Problems

The Rosedale-Bolivar County Port Commission identified risks to navigation and substantially increased costs of navigation within the Port of Rosedale, especially during low water times of the year.

Several problems identified within the Port include:

- The narrow channel is dangerous to navigate during low water conditions, creating safety risks.
- Peak Port use occurs during peak danger periods while navigation demand continues to increase.
- Impassability of the channel during low water conditions results in and time and cost increases to navigation.
- Annual sedimentation at the entrance channel exacerbates the navigation safety risks, and the increases fleeting time and costs.

In addition to the annual problem of sedimentation near the port mouth at the Mississippi River, there is an area that is extremely narrow and dangerous to navigate during the low water times of the year. This area has been a concern for several years, but due to increasing business at the Port and the resulting increase in barge traffic, this concern has become more urgent.

The risks to navigation are heightened during the low water period for the river, which is simultaneously the "busy season" for the Port due to the increasing business of commodities trading during harvest season, which is also typically the driest time of year.

When river levels are low, navigation at the port suffers significant time losses and increased cost. Once the lower Mississippi River reaches 10 feet on the Arkansas City gauge, port tenants are forced to move their entire fleet of barges from the Port channel out to shorelines on the Mississippi River. The Port channel becomes just wide enough to hold the drydock and floating work barges. The Port channel only allows room for one harbor boat and one barge to pass by en route to/from other tenants in the port. When the low water season forces the river fleet to be located at LMR miles 585 to 587, in the Without Project Condition (WOPC) it takes about 3.5 hours for a tug to go to the river fleet to retrieve a barge and bring it to its intended dock.

1.9.2 Opportunities

To address these problems, several opportunities were identified for the Port:

- Improve channel navigation safety
- Provide sufficient fleeting area to movement of barges to and from docks
- Enhance economic opportunities at the Port
- Improve recreational traffic safety in the Port

- Lengthen the channel to increase capacities of the Port
- Widen the channel to increase fleeting opportunities for barges
- Expand the turning basin to support increased mobility with larger barge configurations
- Use dredged materials from the channel and turning basin beneficially within the Port

1.10 OBJECTIVES AND CONSTRAINTS

1.10.1 Objectives

The primary goal is to improve the economic benefits to the Port of Rosedale and the nation. The Study planning objectives over the 50-year period of analysis, for the Port of Rosedale included:

- Reduce transportation time and costs caused by channel width restrictions during low water conditions
- Reduce transportation time and costs caused by turning basin restrictions
- Provide sufficient fleeting area to movement of barges to and from docks
- Increase ancillary benefits to navigation safety within the channel by widening the channel to increase vessel passing distances.

1.10.2 Constraints

The Study planning constraints included:

- CAP Project maximum cost cap is $10 Million Federal expenditure (institutional cost constraint)
- Avoid and minimize adverse impacts to environmental resources including the four endangered species identified in the Study area: the interior least tern (*Sterna antillarum*), the fat pocketbook muscle (*Potamilus capax*), the pallid sturgeon (*Scaphirhynchis albus*), and the wood stork (*Mycteria americana*)
- Minimize disruption to port services
- Avoid and minimize levee instability
- Avoid and minimize wharf instability at the Port
- Avoid and minimize cultural resource impacts
- Minimize disruption to existing recreational boating traffic

Section 2
Existing and Future Without Project Conditions

Social and environmental conditions are presented in Appendix A, Environmental Assessment.

2.1 PERIOD OF ANALYSIS

This study investigated alternatives to address navigation problems in the Port of Rosedale over a 50-year period of analysis. Economic analysis assumed that construction was completed in 1 year in 2026 with benefits beginning in the year 2027.

2.2 GENERAL SETTING

The project area is the Port of Rosedale, located on the east bank of the Mississippi River (river mile 585) in Bolivar County, Mississippi. Portions of the Port channel extend into Desha County, Arkansas. The Port of Rosedale provides southern port access to the Gulf of Mexico at New Orleans, and western access on the Arkansas River, all the way to Muskogee and through the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System.

2.3 NAVIGATION

The Mississippi River is an essential component of the nation’s land-based transportation network, serving as a vital link in the nation’s multi-modal transportation system and relieving congestion on roads and rail. Commercial navigation is made possible by a series of locks and dams on the Mississippi River, mostly built in the 1930s, which, along with active channel maintenance, provide a reliable navigation system.

The Port channel in the Study Area poses certain navigational challenges when in operation. There is an area at the JANTRAN location in the bend of the channel, which creates challenges for pilots, particularly when barges that are being loaded encroach into the navigation channel. This area is extremely narrow and dangerous to navigate. Due to increasing business at the Port and the resulting increasing barge traffic, it has become more urgent to address this concern. In addition, annual sedimentation at the entrance to the channel exacerbates the navigation risks.

The risks to navigation are heightened during the low water period for the river, which is simultaneously the "busy season" for the port due to the increasing business of commodities trading there. When river levels are low, navigation suffers significant time losses and cost to perform its services. Once the lower Mississippi River reaches 10 feet on the Arkansas City gauge, port tenants are forced to move their entire fleet of barges from the Port channel out to shorelines on the Mississippi River. The channel in the Port of Rosedale becomes just wide

enough to hold the drydock and floating work barges and enough room for one harbor boat and one barge to pass by enroute to/from other tenants in the port.

In addition, the Port of Rosedale is reaching full-capacity use of developed property and considering alternative solutions to hopefully satisfy the continuing demand of businesses to locate at the port. All these factors create an environment where barge traffic through the port will also continue to increase and lead to more delays and navigational safety risks. The channel is currently authorized for a width of 150 feet and at an elevation of 93 feet MSL, which is 9 feet below the LWRP of 102 feet.

2.4 FACILITIES AND INFRASTRUCTURE

The Port is a 2.7-mile-long slack water port with a minimum of 9 feet draft and a 400-feet x 1000-feet turning basin. There is a general cargo dock, two dry-bulk unloading and loading docks, 168 acres of hydraulic fill for marine related industries, and a 270-acre industrial park constructed on the landside of the Mississippi River levee system.

2.4.1 Docks

- General Cargo Dock: Handles a range of materials such as coil rod, coil steel, cottonseed and cottonseed hulls; lightering and shifting of cargoes is also available.
- Dry-Bulk, Truck-to-Barge Loading Dock: Handles movement of all types of grain and other dry-bulk free-flowing commodities, including soybeans, rice, winter wheat, and corn.
- Dry-Bulk, Barge-to-Truck Unloading Dock: Handles movement of aggregates (limestone and sandstone), fertilizer, and other dry-bulk materials.

2.4.2 Industrial Park

Available acreage is located on or near the slack-water Poer offering stevedoring services and access to the Mississippi River and the Arkansas River. This includes 70 acres of hydraulic fill (100-year flood-free) and 200 acres of natural elevation land adjacent to the channel.

2.4.3 Warehouse

On site is a 20,000 square-foot humidity-controlled warehouse with cargo docks on both the north and south sides.

2.4.4 Equipment

Equipment includes:

200 TPH Drag System
400 TPH Conveyor Belt
600 TPH Conveyor Belt

1,300 TPH Conveyor Belt
150-Ton Crawler crane
Three 30K Pound Forklifts
Two 10K Pound Forklifts
Department of Agriculture and Commerce certified truck scales

2.5 CLIMATE

The climate in Mississippi has always been variable and sometimes extreme—and climate change may intensify this historical pattern. Average state temperatures have varied substantially over the past century, with a warming trend since the late 1960s. Average rainfall has changed only a little, with summers becoming slightly drier and winters slightly wetter, and extreme rainfall events have become more frequent.

Bolivar County is in the northwestern portion of Mississippi, alongside the Mississippi River, in an area referred to as the Delta Region. The Delta Region covers 35,000 square miles from southern Illinois to the Gulf of Mexico, encompassing 219 counties in seven states and approximately 8.3 million people. The climate in the area is characterized by humid subtropical conditions with temperate winters and long, hot summers. Normal precipitation values range from 50 to 65 inches, annually, with the wettest months being March and April and the driest months being August and September. High temperatures range from 50 degrees Fahrenheit in January to 92 degrees Fahrenheit in July and low temperatures range from 33 degrees Fahrenheit in January to 73 degrees Fahrenheit in July. The study area is subject to periods of both drought and flood, and the climate rarely seems to truly exhibit “average” conditions.

Tropical storms and hurricanes are unlikely to affect the area as Bolivar County, MS is in a very low risk hurricane zone. Twenty-six hurricanes have been recorded in Bolivar County, MS since 1930. The largest hurricane was Betsy in 1965. The most recent Bolivar County, MS hurricane was Humberto in 2007.

(https://www.homefacts.com/hurricanes/Mississippi/Bolivar-County.html)

A climate change analysis was conducted. Results are presented in Appendix B *Engineering*. The available literature and USACE Climate Assessment tools do not reach a clear consensus on observed and projected streamflow, temperature, and precipitation throughout the Lower Mississippi River Basin due to long-term persistent climate trends or anthropogenic climate change. Due to this lack of consensus, any potential risks to the project were determined to be unlikely.

2.6 GEOLOGY

The project area is located regionally in the Gulf Coastal Plain in the SE United States and locally in the Alluvial Plain physiographic province of Mississippi. It lies within the Mississippi Embayment and geomorphically, it is comprised of Holocene Meander Belts and Pleistocene Valley Trains. The Port of Rosedale is in Boliver, County Mississippi located near the town of Rosedale, MS. The project site is underlain by point bar meander scrolls and abandoned channels of the ancestral Mississippi River and neighboring streams and tributaries. These Quaternary alluvial sediments generally exhibit clays and silts which can produce vertisols (soils with >30% clay with shrinking/swelling potentials) underlain by sand and gravels at depth. Typically, these environments showcase what is known as a “fining upward sequence” in sequence stratigraphy. A fining upward sequence indicates that grain sizes decrease at shallower depths and increase at greater depths. To deposit heavier grains hydraulic energy must be higher so this sequence highlights distinct facies change due to depositional environment down section. The Mississippi Embayment was filled by large river and delta system during the Cenozoic depositing sediments up to 45,000 ft thick beneath the Gulf Coastal Plain. The Quaternary alluvium, sands, gravels, and loess deposited in the last 2.5 million years (myr) are considered shallow deposits and are the primary materials considered for construction and analysis.

The Port of Rosedale project site rests locally on point bar and abandoned channels on the left descending bank of the Mississippi River near Rosedale, MS. Lithologically, abandoned channels typically host fine grained material (ml, ch, cl) and point bars host coarser grained materials (sp, sm, sw). Foundation conditions analyzed through previous drilling programs corroborates the presence of these soils. These different soil types pinch out and are laterally discontinuous in some areas whereas in others they swell and are continuous. This architecture and geospatial distribution is typical of meandering fluvial environments. Supporting figures and further detail for this geologic write up are included in appendix b engineering.

2.7 WATERSHED

The Mississippi River is the main stem of the world’s most highly developed waterway system, and it measures approximately 2,340 miles in length. It has the third largest drainage basin in the world, exceeded in size only by the watersheds of the Amazon and Congo Rivers, and it discharges the headwater flows from about 41 percent of the contiguous 48 states. The basin covers more than 1,245,000 square miles, includes all or parts of 31 states and two Canadian provinces, and roughly resembles a funnel which has its spout at the Gulf of Mexico. Waters from as far east as New York and as far west as Montana contribute to flows in the lower river.

The lower alluvial valley of the Mississippi River is a relatively flat plain of about 35,000 square miles bordering on the river which would be overflowed during time of high water if it were not for man-made protective works. This valley begins just below Cape Girardeau, Missouri, is roughly 600 miles in length, varies in width from 25 to 125 miles, and includes parts of seven states—Missouri, Illinois, Tennessee, Kentucky, Arkansas, Mississippi, and Louisiana.

Deep-draft navigation is a major component of waterborne traffic on the Mississippi River, and it is the key waterway for moving grain by barge from farm states to domestic export markets. Low water levels impact commerce by reducing the navigable portions of the river with sufficient depth for barges.

2.8 HYDROLOGY AND HYDRAULICS

In the vicinity of Rosedale the Mississippi River has an average top bank width of approximately 3500 feet and a thalweg depth of approximately 100 feet at bankfull stage. Slopes vary from an average of about 0.5 foot per mile for low water to about 0.4 foot per mile for high water. Maximum and minimum discharges at Rosedale are approximately 2,200,000 and 85,000 cubic feet per second, respectively. Since 1941, the average annual stage fluctuation at Rosedale was 33.5 feet, and the maximum fluctuation in any one year was 48.6 feet in 2011. The Mississippi River is authorized for a 12-foot-deep navigation channel but currently continues to maintain a navigation channel of 9-foot minimum depth and 300-foot minimum width at the lowest river stages.

A hydraulic analysis was performed to determine the months of the year the stage at the Arkansas City gage could reach 10 ft or below, triggering the removal of barges from the Port to be stored on the Mississippi River. The analysis shows stages falling below 10 ft occurring almost every year any time during the months from June to February. The most recent low water occurred in 2023 between the months of June to January, as shown on the Hydrograph below in Figure 2-1.

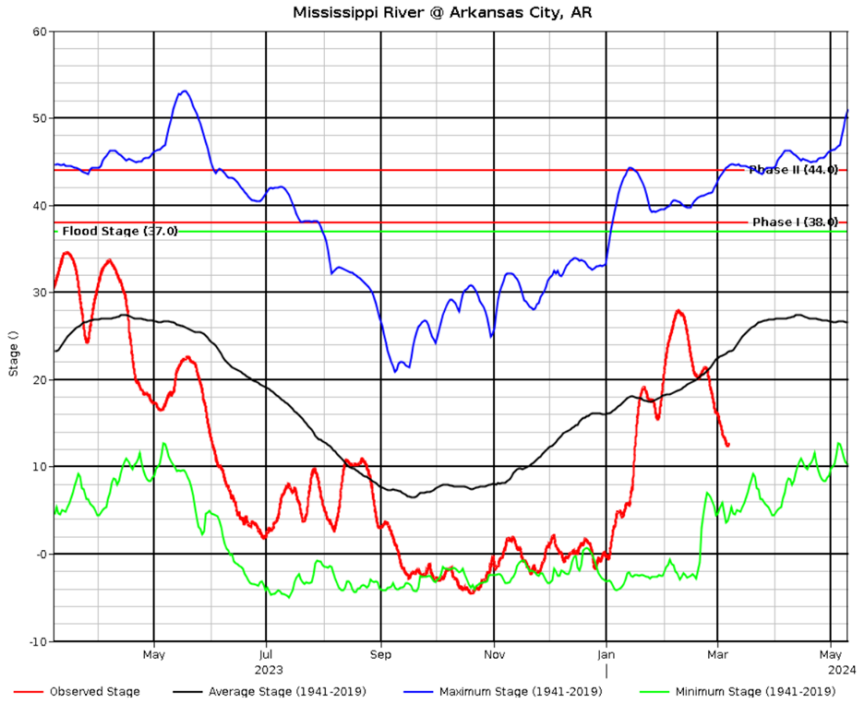

Figure 2-1. Mississippi River at Arkansas City, AR, 2023-2024

With the chance of low water reaching 10 ft or less as long as approximately 6 months per year impacting port operations, the TSP would greatly improve the economic benefits to the Port of Rosedale and the Nation. Table 6.1 in Section 6 shows the Average Annual Costs and Benefits of the TSP.

The Port is a slack water Port with no significant inflow from creeks or streams. The mouth of the channel experiences ongoing sedimentation.

As this is a slack water port with no significant inflow from creeks or streams, this work will have little to no impact on the hydraulics of the main Mississippi River Channel. Sedimentation of the port is fairly well characterized based on current operations, and no alternatives considered altering the bottom grade of the constructed channel. As a result, neither the flow nor the sedimentation rate would substantially be altered by any of the alternatives considered herein. Therefore, no substantive hydraulic analysis was performed.

The Port has been maintained annually at a minimum dredge depth of 9 feet below the lowest water of record (102.5 ft MSL). The current dredging maintenance schedule costs $1,689,000 annually.

For maintenance dredging, the Operations Dredging unit runs their discharge pipe through the woods and discharges in the outside of the river bendway adjacent to the port. While this method shortens the length of dredge pipe, it has caused operational issues for the port as the discharged material tends to deposit downstream at the mouth of the port, thus requiring additional dredging.

The selected method for material disposal in the TSP will be to place the discharge pipe in the Mississippi River outside of the existing main navigation channel. For this effort, the contract will require that the discharge be located approximately at the location shown below.

Sea level change (SLC) in Future-without project is believed to be insignificant given the interior latitude of the proposed work area.

2.9 BATTURE

The Batture refers to the seasonally flooded area of low water river land, inland to the levees. It is a combination of different aquatic and terrestrial habitats and includes bare soil and vegetated surfaces, varying from emergent marsh to cypress swamps to seasonally or even infrequently flooded hardwood forests. Some portions of it are seasonally farmed or used as range for grazing livestock and the forests have been harvested for timber. But for the most part, Batture lands have been left untouched as compared to the lands outside of the levee system.

The ecological value of the Batture is reflected by the high biodiversity of aquatic and terrestrial species. Biologically, the Batture has proven to be a refuge for wetland vegetation and a

migration corridor for birds and terrestrial animals. The Batture lands provide significant habitat for migrating neotropical songbirds as well as wintering waterfowl.

The flow of the Mississippi River maintains a natural hydrograph, periodically connecting oxbow lakes, sloughs, forested lands, and other aquatic habitats in the Batture. Fish move from the channel into the Batture for spawning, rearing, and feeding following the flow paths that form as the river rises (Junk et al. 1989). Resident fish living in Batture waterbodies receive food and nutrients from the river water contributing to increased somatic growth and survival. The ebb and flow of floodwater in the Batture benefits many other groups of animals contributing to its high biodiversity.

2.10 WETLAND RESOURCES

Wetlands are defined as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas” (33 C.F.R. § 328.3[b]) (Regulatory Programs of the Corps of Engineers 1986).

Wetlands are dynamic systems that are subject to both human and natural alterations that may affect their abundance as well as their quality. Natural events, including subsidence, rise in sea level, and sedimentation can impact the number and type of wetlands found in any given region of the country. Human activities have mainly led to a reduction in the number of acres of wetlands due to drainage for agriculture, channelization of waterways, dredging, and placement of fill for urban or industrial development.

Inland wetlands are referred to as palustrine habitats or wetlands associated with riverine or lake systems. The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, emergent mosses or lichens, forest vegetation and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt. It also includes wetlands lacking such vegetation, but with all the following four characteristics: (1) area less than 8 ha (20 acres); (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 2.5 m (8.2 ft) at low water; and (4) salinity due to ocean-derived salts less than 0.5 ppt. (USFWS National Inventory - https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/)

Much of the project area once consisted largely of bottomland hardwood (BLH) deciduous forest, mixed hardwood forest, and cottonwood-sycamore-willow community. Construction of the Port significantly modified the vegetative communities within and around the project area. Today, the existing habitat in the project area consists of forest and low elevation frequently flooded herbaceous/shrub zone. The forested areas are frequently flooded bottomland hardwood vegetated primarily with black willow (*Salix nigra*). These wetland forests provide habitat for white-tailed deer, raccoon, swamp rabbit, and a variety of migratory songbirds and other birds. Such forests also provide floodwater storage and water quality improvement functions.

2.10.1 Wetland Value Assessment

Scrub-shrub wetlands are covered by woody vegetation generally less than 20 feet tall that grows in saturated soil conditions. These wetland features provide storm and flood mitigation, cleaner water, economic gains, and cultural traditions as ecosystem service benefits.

Scrub-shrub habitat is utilized by most species of marsh mammals including nutria (*Myocaster coypus*), raccoon (*Procyon lotor*), muskrat (*Ondatra zibethicus*), swamp rabbit (*Sylviagus aquaticus*), and white-tailed deer (*Odocoileus virginianus*). Scrub-shrub habitats provide essential refuge for wintering waterfowl, nesting mottled ducks, wading birds, marsh birds, and shorebirds. Shrub-dominated ridges and willow-covered areas provide important stopover habitat for many Neotropical migrants. Birds such as egrets (*Ardea alba*; *Egretta thula*), herons (*Ardea herodias*; *Egretta* spp.; *Nycticorax* spp.), rails, gallinules, and mottled ducks (*Anas fulvigula*) use scrub-shrub vegetation for nesting because nests would not be affected by occasional high water. Scrub-shrub habitat provides essential refuge for marsh animals during high water events.

2.11 AQUATIC RESOURCES/FISHERIES

The most significant fishery resources within the proposed expansion area are the backwater habitats along the Mississippi River. Spawning and early life history dynamics of fishes found in this backwater floodplain system are directly associated with the height and duration of the flooding. During springtime flooding, the shallow water throughout the batture lands provides essential spawning and foraging habitat for a variety of fish species. After the eggs hatch, the floodplain also provides the slack-water, structure filled habitat needed by the young fish. Permanent habitats, such as oxbow lakes and abandoned channels (Lake Beulah, Lake Vermillon, and Lake Whittington), provide the pond-like conditions preferred by important sport fishes such as crappie, bream, and largemouth bass.

Of the 109 species of freshwater fish in the Lower Mississippi River, more than half depend on the backwater habitats provided by the floodplain. The floodplain also provides a rich food supply for not only the young fish, but for all fish in the river.

2.12 TERRESTRIAL RESOURCES & WILDLIFE

Some of the terrestrial habitat is forested, but other areas consist of a low elevation frequently flooded herbaceous/shrub zone. The forest habitat in the project area consists of mostly black willow (*Salix nigra*) but may also include other species of oaks, cottonwood, sycamores, elms, maples, and ashes common to the area including cottonwood (*Populus deltoides*), river birch (*Betula nigra*), green ash (*Fraxinus pennsylvanica),* and American elm (*Ulmus americana*).

Wildlife in vicinity of the proposed actions are those recreational and esthetic species typical for the southern United States and include the usual compliment of wildlife species pursued by the public such as white-tailed deer (Odocoileus virginianus), squirrels (Sciuridae spp.), rabbits (Sylvilagus spp.), as well as other terrestrial mammals such as raccoons (Procyon

lotor). Various species of birds including the Northern bobwhite (*Colinus virginianus*), Painted Bunting (*Passerina ciris*), and Short-eared Owls (*Asio flammeus*) may also occur in the project area. No individual species of significant commercial value occur within the project area.

2.13 THREATENED, ENDANGERED & PROTECTED SPECIES

According to results obtained from the USFWS Information, Planning, and Conservation (IPaC) tool on 5 March 2024 there are a total of 11 threatened, endangered, or candidate species listed in Mississippi and Arkansas that could inhabit the immediate project area (Attachment 1). The federally listed species that could occur in the project area are as follows:

Northern Long-eared Bat (*Myotis septentrionalis*)	Endangered
Tricolored Bat (*Perimyotis septentrionalsis*)	Proposed Endangered
Eastern Black Rail (*Laterallus jamaicensis ssp.)*	Threatened
Ivory-billed Woodpecker (*Campephilus principalis*)	Endangered
Piping Plover (*Charadrius melodus*)	Threatened
Red Knot (*Calidris canutus rufa*)	Threatened
Pondberry (*Lindera melissifolia*)	Endangered
Alligator Snapping Turtle (*Macrochelys temminckii*)	Proposed Threatened
Pallid Sturgeon (*Scaphirhynchus albus*)	Endangered
Fat Pocketbook (*Potamilus capax*)	Endangered
Pink Mucket (*Lampsilis abrupta)*	Endangered
Monarch Butterfly (*Danaus plexippus*)	Candidate

The NLEB is an endangered mammal species found throughout the continental US. During summer, NLEBs roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. The NLEB seems opportunistic in selecting roosts, using tree species based on suitability to retain bark or provide cavities or crevices. NLEBs have also been found, albeit rarely, roosting in structures like barns and sheds. In winter, NLEBs hibernate in caves and mines.

The tricolored bat is a small insectivorous bat that is distinguished by its unique tricolored fur and often appears yellowish to nearly orange. The once common species is wide ranging across the eastern and central United States and portions of southern Canada, Mexico, and Central America. During the winter, tricolored bats are often found in caves and abandoned mines, although in the southern United States, where caves are sparse, tricolored bats are often found roosting in road-associated culverts where they exhibit shorter torpor bouts and forage during warm nights. During the spring, summer, and fall, tricolored bats are found in forested habitats where they roost in trees, primarily among leaves of live or recently dead deciduous hardwood trees, but may also be found in Spanish moss, pine trees, and occasionally human structures. Tricolored bats face extinction due primarily to the range wide impacts of white-nose syndrome, a deadly disease affecting cave-dwelling bats across the continent.

The Ivory-billed Woodpecker is noted for its striking black-and-white plumage; robust white, chisel-tipped bill; lemon-yellow eye; and pointed crest. Males are red from the nape to the top of their crest with black outlining the front of the crest. Females have a solid black crest which is somewhat more pointed and slightly recurved to point forward. The bases of the male's red crest feathers are white and may allow a spot of white to be displayed on the side of the crest when the feathers are fully erect. Morphological data from live birds are lacking. The last universally accepted sighting of an American ivory-billed woodpecker occurred in Louisiana in 1944.

The piping plover is a small sand-colored, sparrow-sized shorebird that nests and feeds along coastal sand and gravel beaches in North America. The adult has yellow-orange-red legs, a black band across the forehead from eye to eye, and a black stripe running along the breast line. This chest band is usually thicker in males during the breeding season, and it is the only reliable way to tell the sexes apart. There are two subspecies of piping plovers: the eastern population is known as *Charadrius m. melodus* and the mid-west population is known as *C. m. circumcinctus.* The bird's name is derived from its plaintive bell-like whistles which are often heard before the bird is visible.

Red Knots are plump, neatly proportioned sandpipers that in summer sport brilliant terracotta-orange underparts and intricate gold, buff, rufous, and black upperparts. This cosmopolitan species occurs on all continents except Antarctica and migrates exceptionally long distances, from High Arctic nesting areas to wintering spots in southern South America, Africa, and Australia. Red Knots from eastern North America have declined sharply in recent decades owing in part to unsustainable harvest of horseshoe crab eggs, and they have become a flagship species for shorebird conservation in the twenty-first century.

Pondberry is a deciduous shrub, growing from less than 1 ft. (30 cm) to, infrequently, more than 6 ft. (2 m) in height. Leaves are aromatic, alternate, elliptical, somewhat thin, and membranaceous, with entire margins. Shrubs usually are sparsely branched, with fewer branches on smaller plants. Plants are rhizomatous, frequently propagating by vegetative sprouts and forming clonal colonies. Plants are dioecious (each plant is either a male or a female) and produce clusters of small, yellow flowers in early spring prior to leaf development from buds on branches produced from the growth during the preceding year. Fruits are drupes that green when immature and ripen to red by fall.

The alligator snapping turtle is proposed to be listed as endangered and is one of the largest freshwater turtles in the world, with adults sometimes exceeding two feet in shell length and a weight that can reach nearly 250 pounds. Its size and appearance give this creature a prehistoric likeness. The back of the shell is distinctly jagged, and the top of the shell (carapace) has three rows of "spikes" or knobs running lengthwise along entire length of the shell. Alligator snapping turtles spend almost their entire lives in water, normally venturing onto land only to lay eggs. While beneath the water's surface, these turtles are able to use their unique worm-like appendage located on the bottom of their mouth to lure in potential prey.

The pallid sturgeon is an endangered species of ray-finned fish, endemic to the waters of the Missouri and lower Mississippi river basins of the United States. It may have even reached the St. Croix River before colonization. Named for its pale coloration, it is closely related to the relatively common shovelnose sturgeon (*Scaphirhynchus platorynchus*), but is much larger, averaging between 30 and 60 inches (76 and 152 cm) in length and 85 pounds (39 kg) in weight at maturity.[3][4] This species takes 15 years to mature and spawns infrequently, but can live up to a century.

The fat pocketbook mussel is a freshwater mussel that grows to about 4 to 5 inches (10 to 13 centimeters) long. It has a smooth and shiny yellow, tan, or brown outer shell that is round and inflated. In young mussels, the shell is thin, but in adults it is thick. The inside of the shell is pink at the center and bluish white toward the shell edges. The fat pocketbook lives at the bottoms of large rivers in places where the water is less than eight feet deep. It buries itself in the sand or mud at the bottom of the river with only its feeding siphons (tubular organs used to draw in fluids) exposed to the water. It then feeds by pumping water through its siphon, gathering nutrition from the tiny plant and animal life in the water.

The pink mucket is a rounded, slightly elongated mussel with a thick, inflated, and smooth shell, which is usually yellow brown in color. It can be found on the bottoms of various bodies of water, among gravel and cobble. It can be found in water one inch to five feet in depth. The mussel can live up to fifty years. The pink mucket has been a federally endangered species since the year 1976. The building of dams and reservoirs caused the flooding of the habitat, affecting both the mussel and the host fish. Deteriorating water quality and siltation also affects mussel populations. The pink mucket reproduces in a similar manner to most other freshwater mussels. It requires a stable and undisturbed habitat.

The monarch butterfly is a candidate insect species, thus there are no section 7 requirements for this species, but conservation is strongly encouraged by the USFWS and others of conservation interest. Adult monarch butterflies are large and conspicuous, with bright orange wings surrounded by a black border and covered with black veins. During the breeding season, monarchs lay their eggs on their obligate milkweed host plant and larvae emerge after two to five days. Individual monarchs in temperate climates, such as eastern and western North America, undergo long-distance migration, and live for an extended period of time. In the fall, in both eastern and western North America, monarchs begin migrating to their respective overwintering sites.

2.14 WATER QUALITY

Section 303(d) of the Clean Water Act requires states to identify water bodies that are considered impaired due to not meeting one or more applicable water quality standards. Within the same watershed as the project area there are two impaired bodies of water. The Arkansas river, which flows into the Mississippi River slightly south of the project area, and the nearby Lake Beulah are both considered impaired due to degraded aquatic life and low rates of dissolved oxygen. However, neither falls within the project area. The are no scenic and wild rivers within the project area.

2.15 AIR QUALITY

The air quality of the proposed project location is considered “good”. Except for odor, the ambient air quality standards for Mississippi are the Primary and Secondary Air Quality Standards promulgated by the Environmental Protection Agency (EPA). The EPA has set air quality standards for six principal pollutants: nitrogen (NO2), ozone (O3), sulfur dioxide (SO2), particulate matter, carbon dioxide (CO2), and lead (PB). Currently, Mississippi meets all air quality standards. Bolivar County, specifically, has an air quality index value of 46.

2.16 RECREATION AND AESTHETICS

There is a boat ramp in the project area that is used heavily by recreational boaters during the Port’s peak Fall and Spring commerce seasons. Recreational boaters are subject to navigational safety concerns caused by barges inability to safely navigate the narrow channel during low water events. There is no indication that recreational use of the ramp causes delays with current barge loading or unloading operations.

2.17 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW)

The proposed work involves both the dredging and the expansion of the of the currently authorized channel at the Port of Rosedale. To develop this HTRW report, records review, site reconnaissance, and sample testing were conducted of the project area (Appendix A, Annex 1). The following conclusions are based on, or are reasonably ascertainable from, published information, and field observations.

The results of the record search identified three facilities within a 1-mile radius of the project area, none of which appear to pose a significant HTRW risk to the project. Site reconnaissance did not reveal any findings that would appear to pose a significant HTRW risk to the project. Sample collection and analysis was conducted of the proposed soil to be removed as part of the preferred alternatives within the project area for organics, inorganics, and pesticides, and no findings from the sample appear to pose a significant HTRW risk to the project. Follow-up supplemental water quality analysis will be conducted at the request and to the satisfaction of the governing environmental agencies of the project area. At this time, there is little reason to believe there exists a significant HTRW risk to the intended use of this proposed area.

2.18 CULTURAL RESOURCES

The undertaking is in Bolivar County, Mississippi, and Desha County, Arkansas. In addition to the Area of Potential Effect (APE) USACE MVK revised a 1-mile buffer around proposed undertaking. Historic properties in the project vicinity were identified based on a review of the National Register of Historic Places (NRHP) database, the Automated Management of Archaeological Site Data in Arkansas (AMASDA), Mississippi Department of Archives and History’s Historical Site Management Tool (HSMT), historic aerial photography, historic map research, and a review of cultural resources survey reports. Review of current cultural resources maps revealed no historic properties within the APE and relatively few known cultural resources adjacent to the APE. According to the Automated Management of Archaeological Site Data in Arkansas (AMASDA), in Desha County, AR, there is one

previously recorded archaeological site, consisting of the purported location (listed but not field-verified) of the 19th-century community of Napoleon (Table 2-1 at end of this section), three cultural features (McCloud Landing, Napoleon Landing, and O'Neal Landing), which are the historic locations of 20th-century landscape features (e.g., cemeteries, dams, military encampments/structures, oilfields, towers, trails, and wells), and two 20th-century rural structures, transposed from the Arkansas Highway and Transportation Department (AHTD) county maps. Additionally, one cultural resources survey was previously executed within a 1-mile radius of the APE (Table 2-2). There are no National Register of Historic Properties (NRHP) sites within or adjacent to the Arkansas APE.

According to data from the Mississippi Department of Archives and History's (MDAH) Historical Site Management Tool (HSMT) for the Bolivar County, Mississippi, APE, there are 12 previously recorded archaeological sites in the vicinity, which includes resources with little-to-no provided, a prehistoric mound, and post-Civil War tenant sites (see Table 2-1). Although none have been listed to the NRHP, one of these archaeological sites (a multi-component site is considered eligible for listing to the National Register. The remainder are ineligible for listing (n=8) or have not been assessed/evaluated (undetermined [n=3]) for listing to the National Register. Additionally, 14 historic structures have been inventoried with this same search radius, consisting mostly of early twentieth-century residences (see Table 2-1). Furthermore, there have been five cultural resources surveys conducted in or adjacent to the APE in Bolivar County; one of these efforts overlaps with where the turning basin enlargement at the northern project terminus and channel realignment and widening in the center, respectively (MDAH Report No. 13-0717) (see Table 2-2 at the end of this section). There are no NRHP sites within or adjacent to the Mississippi APE.

Three cultural resources surveys have been conducted on behalf of the Port of Rosedale over the last 11 years in association with a proposed new boating access facility, industrial park development, and other anticipated facilities improvements (MDAH Report Nos. 12-0307, 13-0717, & 17-0108). According to recent cultural resources surveys, fill from the 1970s dredging was also piled up on the north and east banks of Log Loader Chute to create an artificial landscape for Port facilities (Alvey and Baca 2012; Baca and Alvey 2017; Futch and Rabbysmith 2013). Additional subsurface investigation of the area north of the existing turning basin as well as across the peninsula that separates the port channel and the Mississippi River, exhibited evidence of fill from dredging activities down to a depth of 1.31-1.64 ft. (40-50 cm). Several deep auger tests were randomly excavated to a depth of up to 4.75 ft. (145 cm) to the north of the turning basin and across the alluvial peninsula west of the existing channel to investigate the possibility that deeply buried cultural deposits could be present. However, each auger test only demonstrated the continued presence of subsoil, usually composed of brownish orange sandy clay. No deeply buried cultural horizons or cultural material were identified (Futch and Rabbysmith 2013:31, 35). Table 2-1 below itemizes previously recorded cultural resources surveys within an approximately 1-mile (1.6 km) radius of the APE.

Table 2-1. Previously Recorded Cultural Resources Surveys within 1.6 km radius of the APE.

Report No.	Title	Author/Principal Investigator	Date
1313 (AR)	Cultural Resources and Geomorphological Reconnaissance of the McClellan-Kerr, Arkansas River Navigation System Pools 1 through 9 of the McClellan-Kerr Arkansas River Navigation System between Dardanelle, Arkansas, and the Mississippi River	W. J. Bennett, Jr., Phyllis L. Breland, and Lawson M. Smith – Archeological Assessment, Inc.	1/1989
84-036 (MS)	A Cultural Resources Survey Near Rosedale, Bolivar County, Mississippi	Sam Brookes - Private	3/1984
04-106 (MS)	Cultural Resources Survey of the Proposed Route of Interstate 69 Between Robinsonville and Benoit-Bolivar, Coahoma, Tunica and Sunflower Counties, Mississippi	Joanne Ryan, Douglas C. Wells, Richard A. Weinstein, David B. Kelley, and Sara A. Hahn – Coastal Environments, Inc.	4/2004
12-0307 (MS)	A Phase I Cultural Resources Survey of a Proposed New Boating Access Facility on the Mississippi River in S21, T23, R8W, Bolivar County, MDAH Project Log #04-108-12	Jeffrey Alvey – Cobb Institute of Archaeology (Mississippi State University)	6/2012
13-0717 (MS)	A Cultural Resources Survey of 141 Acres for Improvements to the Port of Rosedale Bolivar County, Mississippi, and Desha County, Arkansas	Jana J. Futch – Brockington Cultural Resources Consulting	11/2013
17-0108 (MS)	A Phase I Cultural Resources Survey in Association with the Proposed Rosedale Industrial Park Development, Bolivar County, Mississippi	Keith Baca and Jeffrey Alvey – Cobb Institute of Archaeology (Mississippi State University)	4/2017

Table 2-2 below documents previously recorded cultural resources located approximately within a 1-mile (1.6 km) radius of the APE.

Table 2-2.. Previously Recorded Cultural Resources Located within 1.6 km Radius of the APE

Resource Designation	Period(s)	Date Recorded	NRHP Status
3DE0128 (AR)	19th Century	1988	Undetermined
22Bo0114 (MS)	Early 20th Century (MS River Levee)	2013	Ineligible
22Bo630 (MS)	Middle Woodland; Mississippian; Late 19th through early 20th Centuries	1984	Ineligible
22Bo668 (MS)	Undetermined prehistoric period; Late 19th through early 20th Centuries	1994	Ineligible
22Bo669 (MS)	Woodland; Mississippian; Late 19th through mid - 20th Centuries	1994	Eligible
22Bo771 (MS)	Mounds Site – Undetermined age	2000	Undetermined
22Bo804 (MS)	Late 19th through early 20th Centuries	2002	Undetermined
22Bo805 (MS)	Late Woodland; Late 19th through early 20th Centuries	2002	Ineligible
22Bo806 (MS)	Mississippian	2002	Undetermined
22Bo975 (MS)	Woodland; Mid-to-late 19th through 20th Centuries	2017	Ineligible
22Bo976 (MS)	Mid-to-late 19th through Mid-20th Centuries	2017	Ineligible
22Bo977 (MS)	Undetermined prehistoric period; Mid-to-late 19th through Mid-20th Centuries	2017	Ineligible
22Bo978 (MS)	Mid-to-late 19th through Mid-20th Centuries	2017	Ineligible
011-ROS-0191 (MS)	Circa 1890 Aaron Tabernacle Missionary Baptist Church	Not listed	Undetermined
011-ROS-0192 (MS)	Circa 1930 vernacular house	Not listed	Undetermined
011-ROS-0193 (MS)	Circa 1935 vernacular house	Not listed	Undetermined
011-ROS-0194 (MS)	Circa 1935 vernacular house	Not listed	Undetermined
011-ROS-0195 (MS)	Circa 1935 vernacular house	Not listed	Undetermined
011-ROS-0196 (MS)	Circa 1920 vernacular house	Not listed	Undetermined
011-ROS-0197 (MS)	Circa 1920 Shotgun-style house	Not listed	Undetermined
011-ROS-0198 (MS)	Circa 1920 vernacular house	Not listed	Undetermined
011-ROS-0199 (MS)	Circa 1920 vernacular house	Not listed	Undetermined
011-ROS-0281 (MS)	Circa 1935 vernacular house	Not listed	Undetermined
011-ROS-0282 (MS)	Circa 1935 vernacular house	Not listed	Undetermined
011-ROS-0285.1-X (MS)	Circa 1940 Rosedale School complex – Classroom Building I	Not listed	Undetermined
011-ROS-0285.2-X (MS)	Circa 1948 Rosedale School complex – Classroom Building II	Not listed	Undetermined
011-ROS-0285.3-X (MS)	Circa 1952 Rosedale School complex – Classroom Building III	Not listed	Undetermined

2.19 ENVIRONMENTAL JUSTICE

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations, and policies. The Department of Defense's Strategy on Environmental Justice, specifically Executive Orders No. 12898, 59 Fed. Reg. 7629 (11 Feb. 1994), No. 13990 (20 Jan. 2021), and No. 14008, 86 Fed. Reg. 7619 (20 July 2021), directs federal agencies to identify and address any adverse human health or environmental effects, as well as climate crisis issues, caused by federal actions that have a disproportionately high effect on communities of color and/or people/households with incomes below the federal poverty line.

The EPA's EJ Screen tool and the CEQ's Climate and Economic Justice Tool (CEJST) tool were used to locate people/households with income below the federal poverty line and racial and ethnic groups in the project area. According to the EPA's CEJST tool the area in which the project would be located has been identified as disadvantaged. There are no residents located directly within the project area, so a 5-mile buffer was added to the EJ Screen analysis. Within a 5-mile radius of the proposed actions approximately 74% of residents have incomes below the federal poverty line and approximately 88% are classified as people of color. Further detail is provided in *Appendix A, Environmental Assessment*.

2.20 SOCIOECONOMIC

The study area includes four counties in Mississippi and one county in Arkansas that may be directly impacted by the project. The parameters used to describe the demographic and socioeconomic environment include recent trends in population, employment, and wage earnings by sectors. Other social characteristics such as race, age distribution, and poverty are also examined.

2.20.1 Population

Mississippi and Arkansas rank as the 34th and 33rd largest states in the Union, respectively, in terms of resident population as of the 2020 United States census.

Between the years of 1990 and 2020, Mississippi's population increased by 16 percent from 2.6 million to 3.0 million persons, or about half of the national average of 31 percent. Across the four Mississippi counties during that same time period, a 27 percent reduction in growth was observed indicating significant decreases in population.

The state of Arkansas saw its population grow from 2.4 million to 3.0 million persons in the years 1990 to 2020, an increase of 28 percent that is much closer to the 31 percent national average. Desha County, however, experienced a very large dip (-31%) as its population dropped from 16,798 in 1990 to 11,538 persons in 2020 (Table 2-3).

Table 2-3. Population Trends for Selected Mississippi and Arkansas Counties – 1990 to 2020

County/City	Population				Percentage Change			
	1990	2000	2010	2020	1990 to 2000	2000 to 2010	2010 to 2020	1990 to 2020
United States	**248,709,873**	**281,421,906**	**308,745,538**	**326,569,308**	**13%**	**10%**	**6%**	**31%**
Mississippi	**2,573,216**	**2,844,658**	**2,967,297**	**2,981,835**	**11%**	**4%**	**0%**	**16%**
Bolivar County	41,875	40,633	34,145	31,253	-3%	-16%	-8%	-25%
Rosedale	2,595	2,414	1,873	1,855	-7%	-22%	-1%	-29%
Cleveland	15,384	13,841	12,334	11,363	-10%	-11%	-8%	-26%
Coahoma County	31,665	30,622	26,151	22,685	-3%	-15%	-13%	-28%
Clarksdale	19,717	20,645	17,962	15,342	5%	-13%	-15%	-22%
Sunflower County	32,867	34,369	29,450	25,759	5%	-14%	-13%	-22%
Indianola	11,809	12,066	10,683	9,258	2%	-11%	-13%	-22%
Washington County	67,935	62,977	51,137	45,072	-7%	-19%	-12%	-34%
Greenville	45,226	41,633	34,400	29,854	-8%	-17%	-13%	-34%
Arkansas	**2,350,725**	**2,673,400**	**2,915,918**	**3,011,873**	**14%**	**9%**	**3%**	**28%**
Desha County	16,798	15,341	13,008	11,538	-9%	-15%	-11%	-31%
Dumas	5,520	5,238	4,706	3,850	-5%	-10%	-18%	-30%

Source: American Community Survey, Demographic Characteristics, 2020 5-Year Estimates

2.20.2 Employment

The State of Mississippi employment in 2020 totaled about 1.2 million. Of the major industry sectors within the state, the educational services and health care and social assistance sector employs the most persons at 316,000. This industry is followed by manufacturing (164,000) and retail trade (140,000).

The State of Arkansas employment in 2020 totaled about 1.3 million. Similar to the State of Mississippi, the greatest number of workers are found in the educational services and health care and social assistance sector and total 322,000. The next largest sectors are manufacturing and retail at 175,000 and 171,000 workers, respectively.

The proportions of workers per sector in the counties in the study area fairly parallel what is observed at the state level (Table 2-4).

Table 2-4. Employment by Industry – 2020

Industry	United States	Mississippi	Bolivar County	Coahoma County	Sunflower County	Washington County	Arkansas	Desha County
Agriculture, forestry, fishing and hunting, and mining	2,658,413	28,694	694	405	532	420	35,004	485
Construction	10,416,196	83,156	548	312	324	923	90,504	179
Manufacturing	15,617,461	163,939	1,059	759	724	1,482	175,414	550
Wholesale trade	3,971,773	29,983	238	103	291	410	32,037	183
Retail trade	17,195,083	140,140	1,443	864	881	3,028	170,961	512
Transportation and warehousing, and utilities	8,576,862	81,316	419	286	453	1,158	77,392	147
Information	3,066,743	14,477	96	34	91	363	18,007	40
Finance and insurance, and real estate and rental and leasing	10,319,201	56,316	307	242	357	584	64,276	184
Professional, scientific, and management, and administrative and waste management services	18,312,454	86,231	903	235	250	1,018	100,720	249
Educational services, and health care and social assistance	36,315,080	316,357	3,470	2,380	2,526	4,309	321,734	1,085
Arts, entertainment, and recreation, and accommodation and food services	14,651,909	117,848	757	1,272	903	1,798	103,098	178
Other services, except public administration	7,516,616	58,887	391	309	398	751	63,059	177
Public administration	7,271,189	65,751	623	539	701	934	57,542	408
TOTAL	**155,888,980**	**1,243,095**	**10,948**	**7,740**	**8,431**	**17,178**	**1,309,748**	**4,377**

Source: American Community Survey, Economic Characteristics, 2020 5-Year Estimates

2.20.3 Median Household Income for Selected Counties

Median household incomes for the five counties in 2020 are shown in Table 2-5. The average median household income across the four State of Mississippi counties is $31,675, which is much lower than the state median of $46,511 and the national median of $64,994. Likewise, the median household income of Desha County in Arkansas at $31,855 is below the state median of $49,475 as well as that of the nation.

Table 2-5. Median Household Income – 2020

Geography	Median Household Income	% of State Median Household Income	% of National Median Household Income
United States	**$ 64,994**	**-**	**-**
Mississippi	**$ 46,511**	**-**	**72%**
Bolivar County	$ 32,412	70%	50%
Coahoma County	$ 30,761	66%	47%
Sunflower County	$ 31,515	68%	48%
Washington County	$ 32,011	69%	49%
Arkansas	**$ 49,475**	**-**	**76%**
Desha County	$ 31,855	64%	49%

Source: American Community Survey, Economic Characteristics, 2020 5-Year Estimates

As shown in Table 2-6, the unemployment rates range from 5.0 percent (Desha County) to 12.0 percent (Coahoma County). The average rate of 10.1 percent across the four Mississippi counties is higher than the rate of 7.1 percent for the state and nearly double that of the national rate of 5.4 percent. Desha County's unemployment rate, however, is below both that of Arkansas (5.2%) and the nation.

Table 2-6. Unemployment Rate – 2020

Geography	Unemployment Rate
United States	5.4%
Mississippi	7.1%
Bolivar County	7.4%
Coahoma County	12.0%
Sunflower County	11.0%
Washington County	10.1%
Arkansas	5.2%
Desha County	5.0%

Source: American Community Survey, Economic Characteristics, 2020 5-Year Estimates

2.20.4 Race

In 2020 the majority populations of both Mississippi and Arkansas are characterized as "White," though Arkansas's is much higher at 75 percent and is closer to the national average of 70 percent compared to Mississippi's 58 percent.

The next largest population for both states is the "Black or African American" population. Mississippi's "Black or African American" population percentage at 38 percent is nearly three times that of the national average (13%); Arkansas's "Black or African American" population at 15 percent is much closer to the national average. All four of the Mississippi counties' "Black or African American" population percentages are very high (64% – 77%) compared to that of the nation, and Desha County's 47 percent is a little less than four times the national percentage.

"Asian" population percentages across both states and counties are less than the national average of 6 percent. Additionally, the "Hispanic or Latino" population percentages for both states and counties are well below the national average of 18 percent with Desha County being the closest at 6 percent (Table 2-7 and Table 2-8).

Table 2-7. Racial Composition (Number) – 2020

Race	United States	Mississippi	Bolivar County	Coahoma County	Sunflower County	Washington County	Arkansas	Desha County
White	229,960,813	1,729,353	10,101	4,711	6,297	11,326	2,269,959	5,631
Black or African American	41,227,384	1,123,545	20,068	17,465	19,069	32,445	457,840	5,471
American Indian & Alaska Native	2,688,614	13,951	46	75	60	21	19,146	40
Asian	18,421,637	29,742	235	109	7	306	46,130	46
Native Hawaiian & Other Pacific Islander	611,404	1,215	-	-	-	-	10,455	-
Some other race	16,783,914	33,999	496	124	99	468	88,363	176
Two or more races	16,875,542	50,030	307	201	227	506	119,980	174
Hispanic or Latino[1]	59,361,020	94,342	689	357	483	756	229,629	734
TOTAL	**326,569,308**	**2,981,835**	**31,253**	**22,685**	**25,759**	**45,072**	**3,011,873**	**11,538**

Source: American Community Survey, Demographic Characteristics, 2020 5-Year Estimates

[1] Hispanic or Latino numbers not included in TOTAL

Table 2-8. Racial Composition (Percentage) – 2020

Race	United States	Mississippi	Bolivar County	Coahoma County	Sunflower County	Washington County	Arkansas	Desha County
White	70%	58%	32%	21%	24%	25%	75%	49%
Black or African American	13%	38%	64%	77%	74%	72%	15%	47%
American Indian & Alaska Native	0.8%	0.5%	0.1%	0.3%	0.2%	0.05%	1%	0.3%
Asian	6%	1%	1%	0.5%	0.0%	1%	2%	0.4%
Native Hawaiian & Other Pacific Islander	0.2%	0.04%	-	-	-	-	0.3%	-
Some other race	5%	1%	2%	0.5%	0.4%	1%	3%	2%
Two or more races	5%	2%	1.0%	1%	0.9%	1%	4%	2%
Hispanic or Latino[2]	18%	3%	2%	1.6%	2%	2%	8%	6%
TOTAL	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: American Community Survey, Demographic Characteristics, 2020 5-Year Estimates

[2] Hispanic or Latino numbers not included in TOTAL

2.20.5 Age Distribution

The age characteristics of the counties are shown in Table 2-9 and Table 2-10. The average median age across all four Mississippi counties is 36.2 years and is a year and a half less than the state median of 37.7 years. The Arkansas county of Desha has a median age of 40.8 years and is two and a half years greater than the state median of 38.3 years. The median age of the United States is 38.2 years.

Table 2-9. Age Characteristics (Number) – 2020

Age	United States	Mississippi	Bolivar County	Coahoma County	Sunflower County	Washington County	Arkansas	Desha County
Under 18 years	73,296,738	707,221	7,733	6,112	5,683	11,601	702,832	2,962
18 - 65 years	200,909,753	1,800,344	18,644	13,137	16,601	26,095	1,798,924	6,412
65 years and older	52,362,817	474,270	4,876	3,436	3,475	7,376	510,117	2,164
Median age	38.2	37.7	36.0	35.4	36.3	37.1	38.3	40.8
Total population	**326,569,308**	**2,981,835**	**31,253**	**22,685**	**25,759**	**45,072**	**3,011,873**	**11,538**

Source: American Community Survey, Demographic Characteristics, 2020 5-Year Estimates

Table 2-10. Age Characteristics (Percent) – 2020

Age	United States	Mississippi	Bolivar County	Coahoma County	Sunflower County	Washington County	Arkansas	Desha County
Under 18 years	22%	24%	25%	27%	22%	26%	23%	26%
18 - 65 years	62%	60%	60%	58%	64%	58%	60%	56%
65 years and older	16%	16%	16%	15%	13%	16%	17%	19%
Total population	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: American Community Survey, Demographic Characteristics, 2020 5-Year Estimates

2.20.6 Income and Poverty

Income and poverty data for the counties are summarized in Table 2-11 for the year 2020. Although Mississippi and Arkansas have median household income levels and per capita income less than the national average, all counties in the study area show a substantial gap when compared to that of the nation. These five counties' medium household income levels are all less than half the national average of $64,994 and their per capita income is more than $10,000 less than the national average of $35,384. Additionally, all five counties have a greater percentage of persons below the poverty level compared to the national average of

12.8 percent. Coahoma County in Mississippi has the highest percentage at 36.5 percent, while Desha County in Arkansas has the lowest percentage at 25.5 percent.

Table 2-11. Income and Poverty Data – 2020

Income and Poverty	United States	Mississippi	Bolivar County	Coahoma County	Sunflower County	Washington County	Arkansas	Desha County
Persons per Household	2.67	2.67	2.58	2.63	3.09	2.52	2.57	2.28
Median Household Income	$64,994	$46,511	$32,412	$30,761	$31,515	$32,011	$49,475	$31,855
Per Capita Income	$35,384	$25,444	$21,420	$19,649	$16,437	$22,181	$27,724	$19,090
Persons Below Poverty Level	12.8%	19.6%	31.1%	36.5%	30.6%	30.9%	16.1%	25.5%

Source: American Community Survey, Economic Characteristics, 2020 5-Year Estimates

2.20.7 Education

The educational attainment levels for the counties in 2020 are presented in Table 2-12 and Table 2-13. On average across the counties in the study area, 79.6 percent of persons aged 25 years and older had completed high school, while 18.8 percent had a bachelor's degree or higher. These values are lower than both Mississippi's and Arkansas's high school graduate rates of 85.3 percent and 87.2 percent, respectively, as well as their bachelor's degree or higher rates of 22.8 percent and 23.8 percent, respectively. Only Bolivar County in Mississippi at 25.4 percent had a bachelor's degree or higher rate that exceeded its state rate. The national statistics for both high school and college graduates are greater than those at the state and county level at 88.5 percent and 32.9 percent, respectively.

Table 2-12. Educational Attainment for Persons 25 Years or Older (Number) – 2020

Education	United States	Mississippi	Bolivar County	Coahoma County	Sunflower County	Washington County	Arkansas	Desha County
High School Graduate or Higher	197,274,154	1,692,077	16,416	11,548	13,020	24,087	1,766,362	6,185
Bachelor's Degree or Higher	73,356,319	451,199	5,164	2,534	2,864	6,039	482,695	1,082

Source: American Community Survey, Social Characteristics, 2020 5-Year Estimates

Table 2-13. Educational Attainment for Persons 25 Years or Older (Percent) – 2020

Education	United States	Mississippi	Bolivar County	Coahoma County	Sunflower County	Washington County	Arkansas	Desha County
High School Graduate or Higher	88.5%	85.3%	80.7%	80.8%	74.9%	81.6%	87.2%	80.1%
Bachelor's Degree or Higher	32.9%	22.8%	25.4%	17.7%	16.5%	20.5%	23.8%	14.0%

Source: American Community Survey, Social Characteristics, 2020 5-Year Estimates

Section 3
Plan Formulation and Evaluation

3.1 PLANNING FRAMEWORK

Plan formulation supports the USACE water resources development mission. A systematic and repeatable planning approach was used to ensure that sound decisions were made. Engineering Regulation (ER) 1105-2-100 describes the planning process for Federal water resource projects. This publication requires formulating Alternative plans that support Federal objectives. Each Alternative plan is composed of one or more management measures. A management measure is a feature or activity that can be implemented at a specific geographic site to address one or more planning objectives.

3.2 ASSUMPTIONS

The following assumptions were applied throughout the planning process including alternative evaluation.

- Extreme unforeseen events that may impact cost estimates, such as a pandemic, were not included in cost estimates.
- Construction Procurement – Project will require one contract action in order to complete the project.
- Design and Administration of Construction – The design and construction oversight will primarily be performed by the U.S. Army Corps of Engineers (USACE) Vicksburg District.
- Plans and Specifications (P&S) will be fully developed by USACE personnel.
- For estimating purposes, a single subcontractor was utilized. In the field it is possible that multiple subcontractors and vendors will be used; however, it is assumed that they will have a similar markup scheme.

3.3 MANAGEMENT MEASURES

In an initial planning charrette, the PDT initially developed a set of structural and nonstructural measures to address the planning objectives:

Structural measures considered included:

- Enlarge the navigation channel mouth
- Deepen the channel at the JANTRAN location
- Widen the channel at the JANTRAN location
- Lengthen the channel
- Expand the turning basin
- Create new turning basins
- Relocate the JANTRAN floating dock and supporting infrastructure
- Relocate the recreational boat launch

- Beneficial use of dredged material

Nonstructural (NS) measures considered included:
- Redirect recreational boat traffic
- Post warning signs for recreational users

3.3.1 Measure Screening

At the initial planning charrette, the PDT established the decision criteria to screen measures out in order to formulate viable alternatives and to screen alternatives. The following screening criteria were applied to measures and the initial array of alternatives:

- Meets project objectives
- Avoids project constraints
- Best professional judgement
- Cultural resources impacted
- Environmental resources impacted
- Time to implement the project
- Rough order of magnitude cost (ROM) estimates

All proposed measures were carried forward and combined into to the alternatives in the Initial Array, except the following measures:

- Enlarge the navigation channel mouth
- Deepen the channel at the JANTRAN location
- Beneficial use of dredged material

The justification for screening these measures is described in the subsections below.

3.3.1.1 Enlarge the Navigation Channel Mouth

The PDT applied engineering judgement to determine that enlarging the channel mouth would not significantly resolve the Port's navigation and safety concerns compared to other proposed measures. According to best professional judgement, this measure would therefore not provide an efficient solution.

3.3.1.2 Deepen the Channel

Though the channel is authorized in the original 1977 Rosedale Harbor Mississippi Report to be dredged to a depth of 12 feet below the Low Water Reference Plane (LWRP) (elevation 90 feet, NAVD 88), the channel is currently maintained only at 9 feet below the LWRP (elevation 93 feet MSL).

Deepening the channel below 9 feet below LWRP (elevation 93 feet MSL) would not have long-term realistic outcomes. This measure would therefore not be effective according to best professional judgement.

3.3.1.3 Beneficial Use of Dredged Material

The Initial Array of Alternatives initially included beneficial placement of dredged material. Figure 3-1 below shows the proposed original location of the placement of the proposed hydraulic fill, located at the northwest side of the study area.

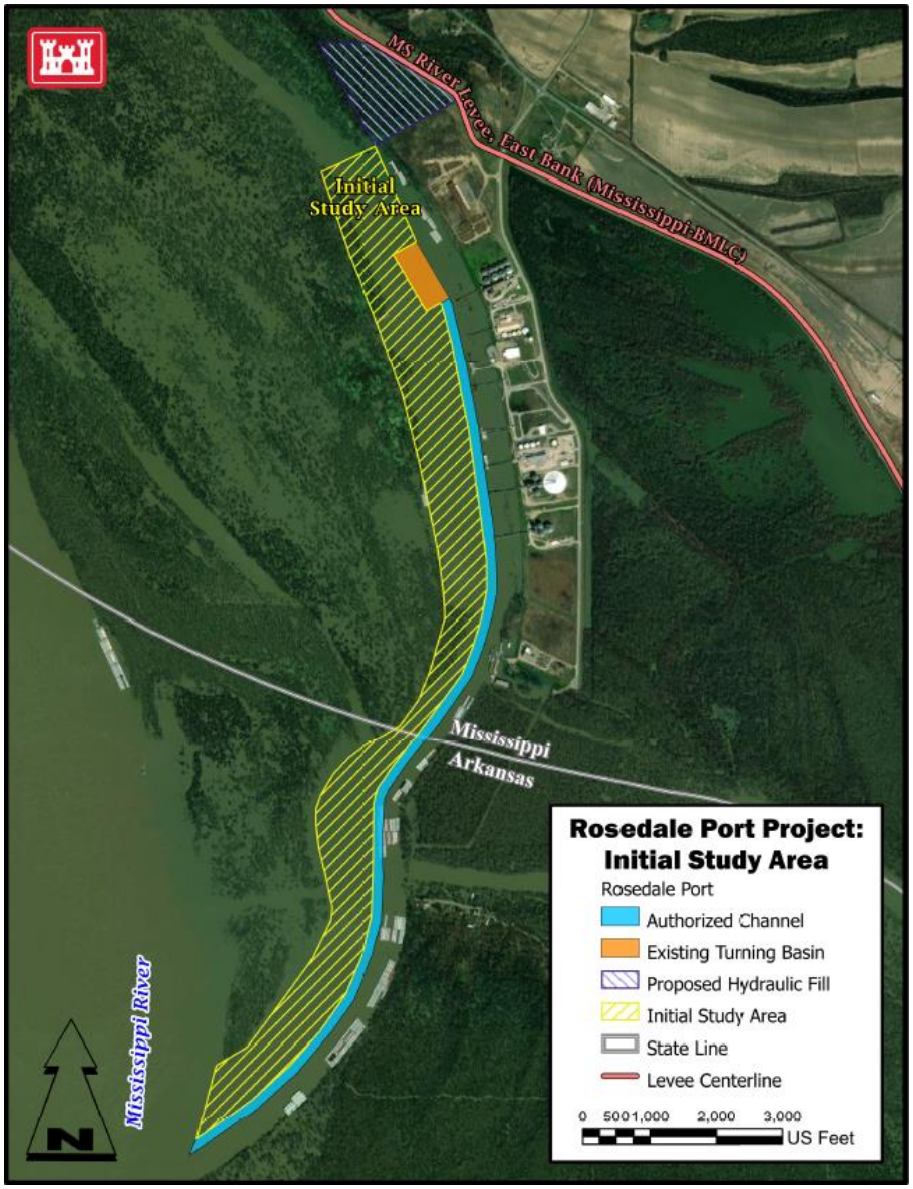

Figure 3-1. Study Area and Location of Initially-Proposed Hydraulic Fill

The PDT investigated dredge material quantity, placement location, environmental impacts, mitigation costs, and other factors. The PDT determined that there would be insufficient volume of dredge material produced to significantly benefit the proposed fill location. Early ROM Cost Engineering estimates showed the construction, operations, and maintenance cost

would exceed CAP limits. In addition, the cost to determine the environmental impacts and the cost of environmental mitigation for placing dredged material in this location would exceed the Federal funding constraints of this CAP study. Due to ROM cost estimates, beneficial use of dredged material was therefore screened from all alternatives.

Instead, for all alternatives involving dredging, dredged material would be cast to the Mississippi River. For all alternatives, dredging would only occur in the project footprint (yellow polygon in Figure 3-1 above). The channel would only be dredged to the current maintenance depth of 9 feet below the low water reference plane (LWRP), to elevation 93 feet MSL.

All woody material encountered during dredging/construction will be relocated on to dry ground and burned in a burn pile within the project area or relocated under water outside of the project area.

3.3.2 Combining Measures

After screening, the remaining measures included:

Structural measures:
- Widen the channel at the JANTRAN location
- Lengthen the channel
- Expand the turning basin
- Create new turning basins
- Relocate the JANTRAN floating dock and supporting infrastructure
- Relocate the recreational boat launch

Nonstructural (NS) measures:
- Redirect recreational boat traffic
- Post warning signs for recreational users

These measures were combined in various arrangements to form an Initial Array of complete alternatives, using the minimum number of measures necessary in each alternative to meet project objectives. Completeness refers to the extent that an alternative plan provides all necessary investments or actions to assure realization of the planned effect.

3.4 ARRAYS OF ALTERNATIVES

3.4.1 Initial Array of Alternatives

From the measures considered, an Initial Array of 10 alternatives, including the No Action alternative, were formulated. The Initial Array of alternatives included various options to widen the channel beyond its current 150-foot width, extend the channel beyond its current 2.7 miles in length, widen the turning basin beyond its current 400-foot width, and relocate the turning basin. In addition, nonstructural safety actions were also considered, described in the sections below.

3.4.1.1 Alternative 1 – No Action

The No Action alternative is synonymous with no Federal Action. National Environmental Policy Act (NEPA) regulations (title 40 CFR 1502.14(c)) require that the No-Action alternative is carried forth to the Final Array. Under this alternative, the future without project conditions would likely occur; the Port would continue to experience increasing navigation challenges as port traffic increases, especially during low water periods. Navigation risks would remain high and would continue to increase. Cost and lost time would continue to increase, resulting in negative impacts to the Port of Rosedale economy.

3.4.1.2 Alternative 2 – Widen Channel Bend

Under this alternative, a 0.97-mile length of the channel bend at JANTRAN would be widened to 200 feet wide by widening the Western channel limit by 50 feet to the West. The Eastern channel limit would remain the same (Figure 3-2). This widening results in 3.25 acres of terrestrial habitat that would be cleared and snagged. Dredge depth would be only to the currently maintained depth of 9 feet below the LWRP. Only the additional channel area would be dredged (not the existing channel). Dredged material would be cast to the Mississippi River; snagged material would be burned onsite.

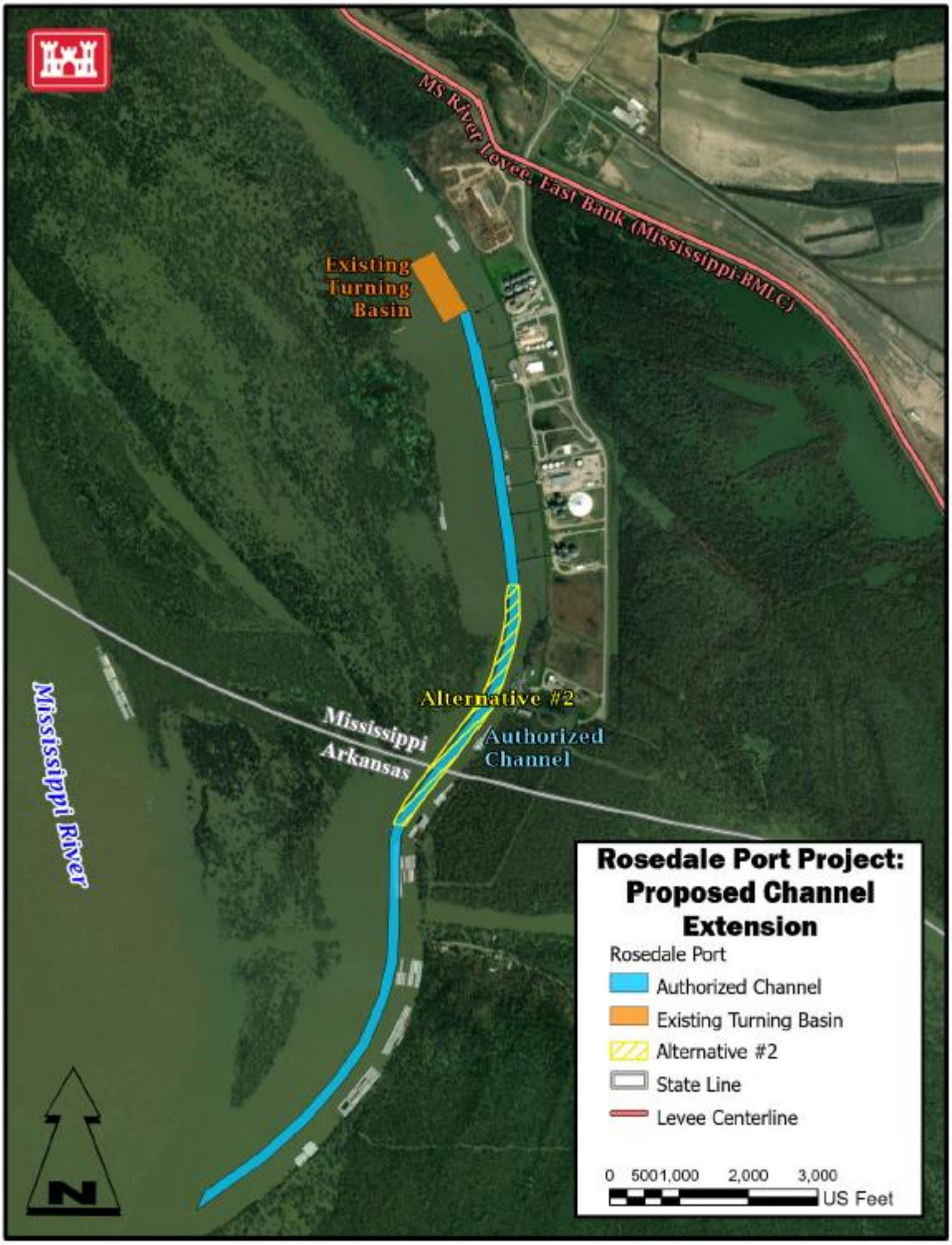

Figure 3-2. Alternative 2 – Widen Channel Bend

3.4.1.3 Alternative 3 – Widen Entire Channel

Under this alternative, a 0.68-mile length of channel near JANTRAN would be widened to the West to total 200 feet wide. The remainder of the channel, from the mouth of the channel to the existing turning basin, would be widened to the West to total 185 feet wide. The Eastern channel limit would remain in the same location. Channel width transitions are shown in Figure 3-3 below. Under this alternative, 4 acres of terrestrial habitat would be cleared and snagged. Dredge depth would be only to the currently maintained depth of 9 feet below the LWRP. Only the additional channel area would be dredged (not the existing channel). Dredged material would be cast to the Mississippi River; snagged material would be burned onsite.

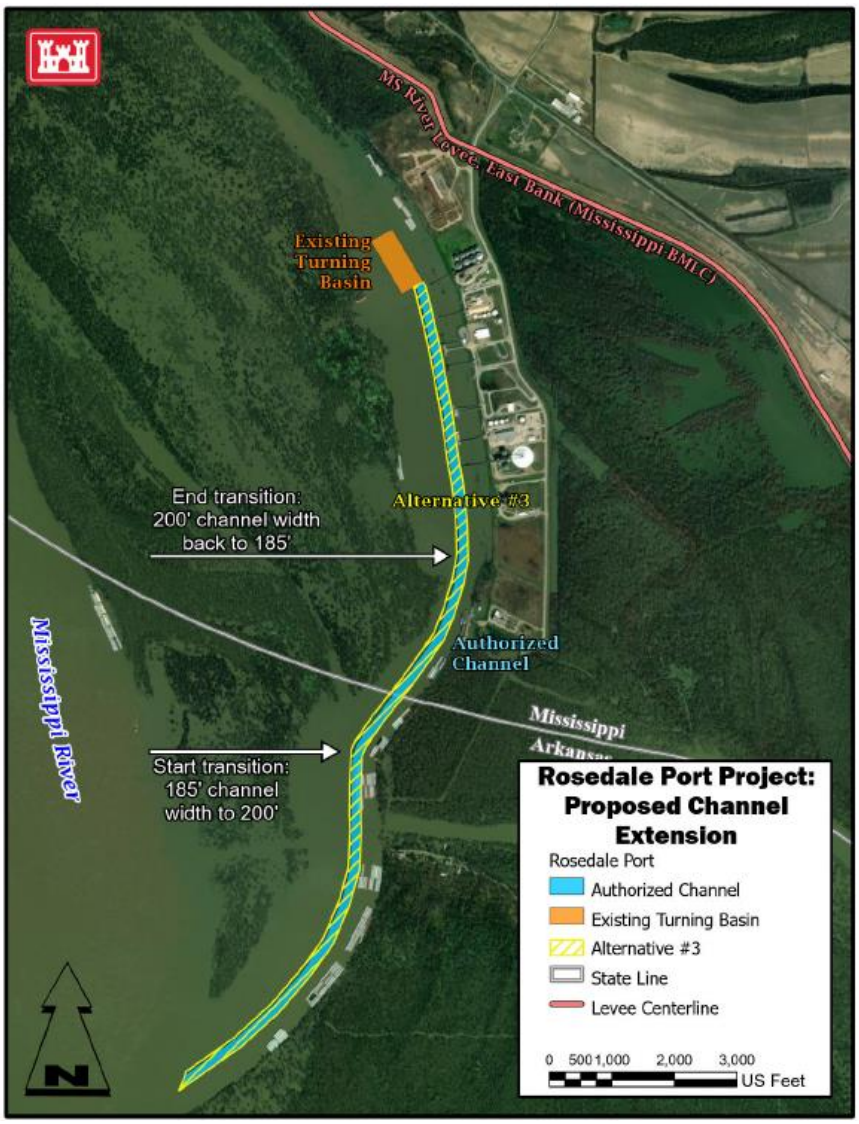

Figure 3-3. Alternative 3 -- Widen Entire Channel

3.4.1.4 Alternative 4 – Widen Turning Basin

The existing turning basin area is 400,000 square feet (400 feet wide x 1000 feet long). Under this alternative, the width of the existing turning basin would be widened by 200 feet to the West, thus adding 200,000 square feet to the existing turning basin. The eastern perimeter of the turning basin and the turning basin length would remain the same. The new turning basin area would be 600,000 square feet (600 feet wide x 1000 feet long). The additional turning basin width would allow barges to more quickly and easily turn 180 degrees, even during low water conditions.

Under this alternative, 1.2 acres of terrestrial habitat would need to be cleared and snagged. Dredge depth would be only to the currently maintained depth of 9 feet below the LWRP. Only the additional channel area would be dredged (not the existing channel). Dredged material would be cast to the Mississippi River; snagged material would be burned onsite. Alternative 4 is depicted in Figure 3-4 below.

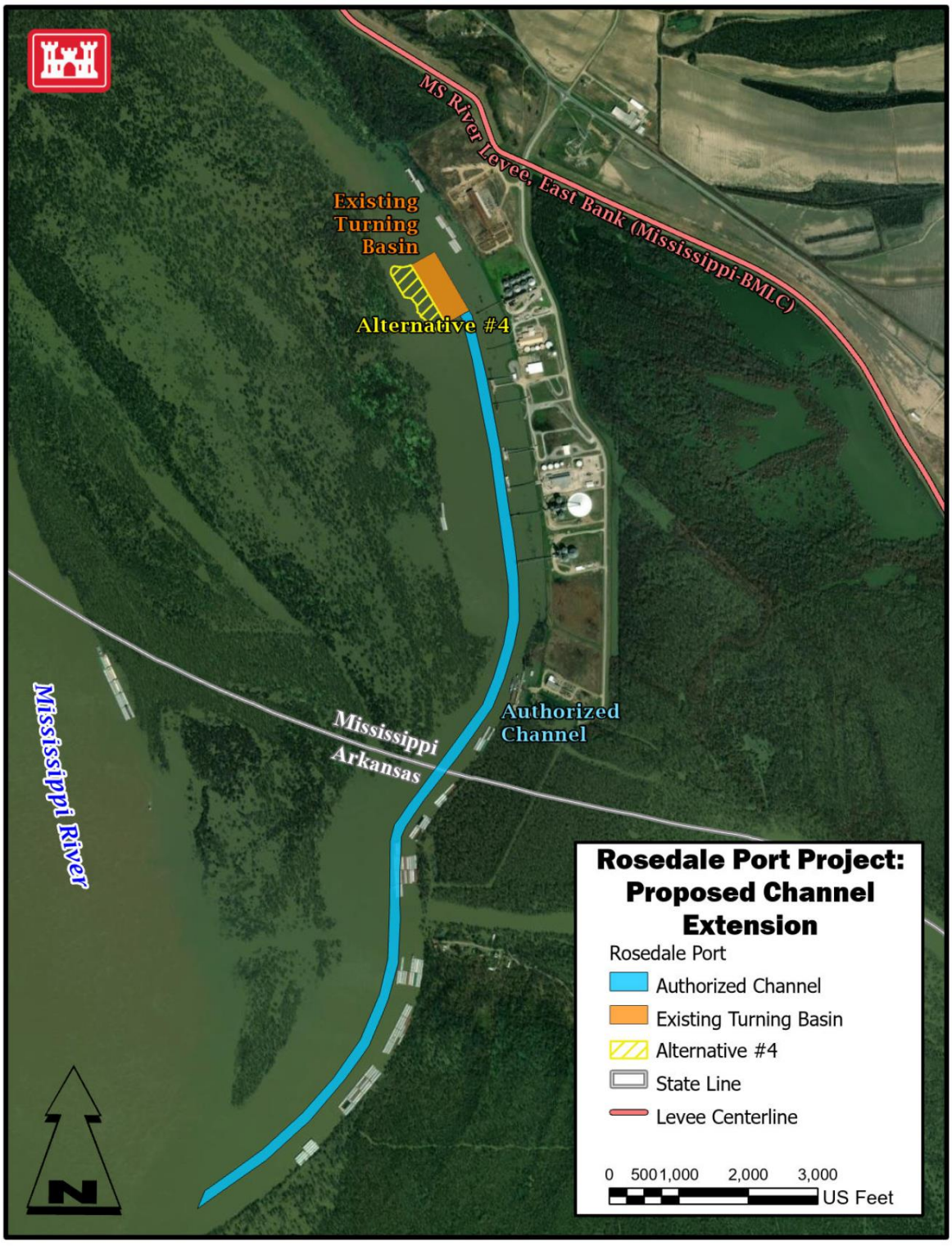

Figure 3-4. Alternative 4 -- Widen Turning Basin

3.4.1.5 Alternative 5 – Lengthen Channel, Relocate and Widen Turning Basin

Under this alternative, the shipping channel would be extended 1000 feet in length; the channel width for the extended portion of the channel would be 150-feet.

The turning basin would be relocated farther to the north of the Port and would be widened. The existing turning basin area is 400,000 square feet (400 feet wide x 1000 feet long).

Under this alternative, the new turning basin area would be 600,000 square feet (600 feet wide x 1000 feet long).

The additional channel length would facilitate access for additional port developments. The additional turning basin width would allow a greater number of barges to turn 180 degrees more easily, even during low water conditions.

Under this alternative, 3 acres of terrestrial habitat would be cleared and snagged. Dredge depth would be only to the currently maintained depth of 9 feet below the LWRP. Only the additional channel area would be dredged (not the existing channel). Dredged material would be cast to the Mississippi River; snagged material would be burned onsite.

Alternative 5 is depicted in Figure 3-5 below.

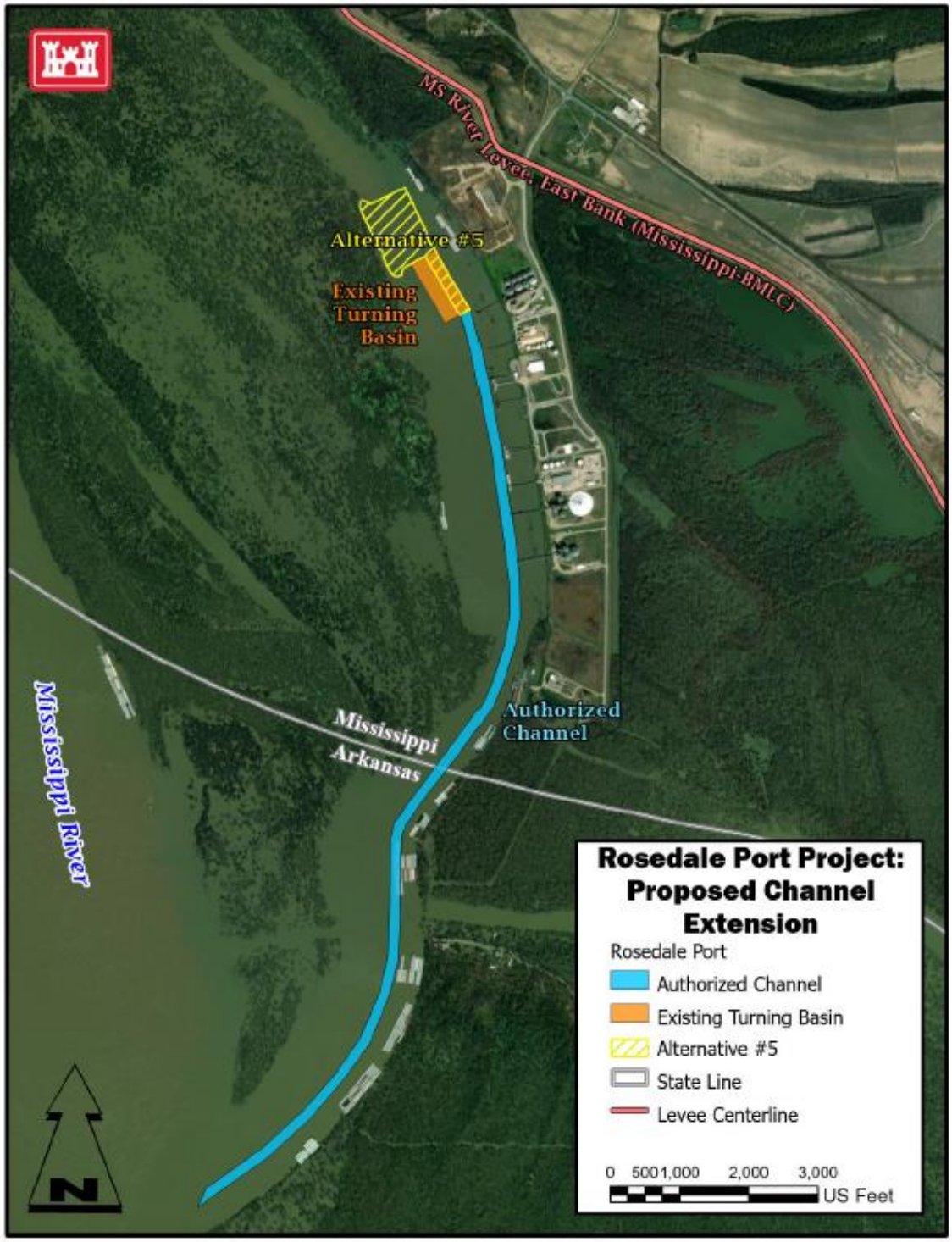

Figure 3-5. Alternative 5 – Lengthen Channel, Relocate and Widen Turning Basin

3.4.1.6 Alternative 6 – Shift Channel Bend

Under this alternative, a 0.63-mile length of channel bend near JANTRAN would be shifted to the West. Unlike in Alternative 2, the channel width would remain the same (150 feet wide). This length of altered channel is also slightly shorter than in Alternative 2.

For the new shifted channel, the Eastern channel limits are past the Western limits of the existing channel.

Under this alternative, 3.5 acres of terrestrial habitat would need to be cleared and snagged. Dredge depth would be only to the currently maintained depth of 9 feet below the LWRP. Only the additional channel area would be dredged (not the existing channel). Dredged material would be cast to the Mississippi River; snagged material would be burned onsite.

Alternative 6 is depicted in Figure 3-6 below.

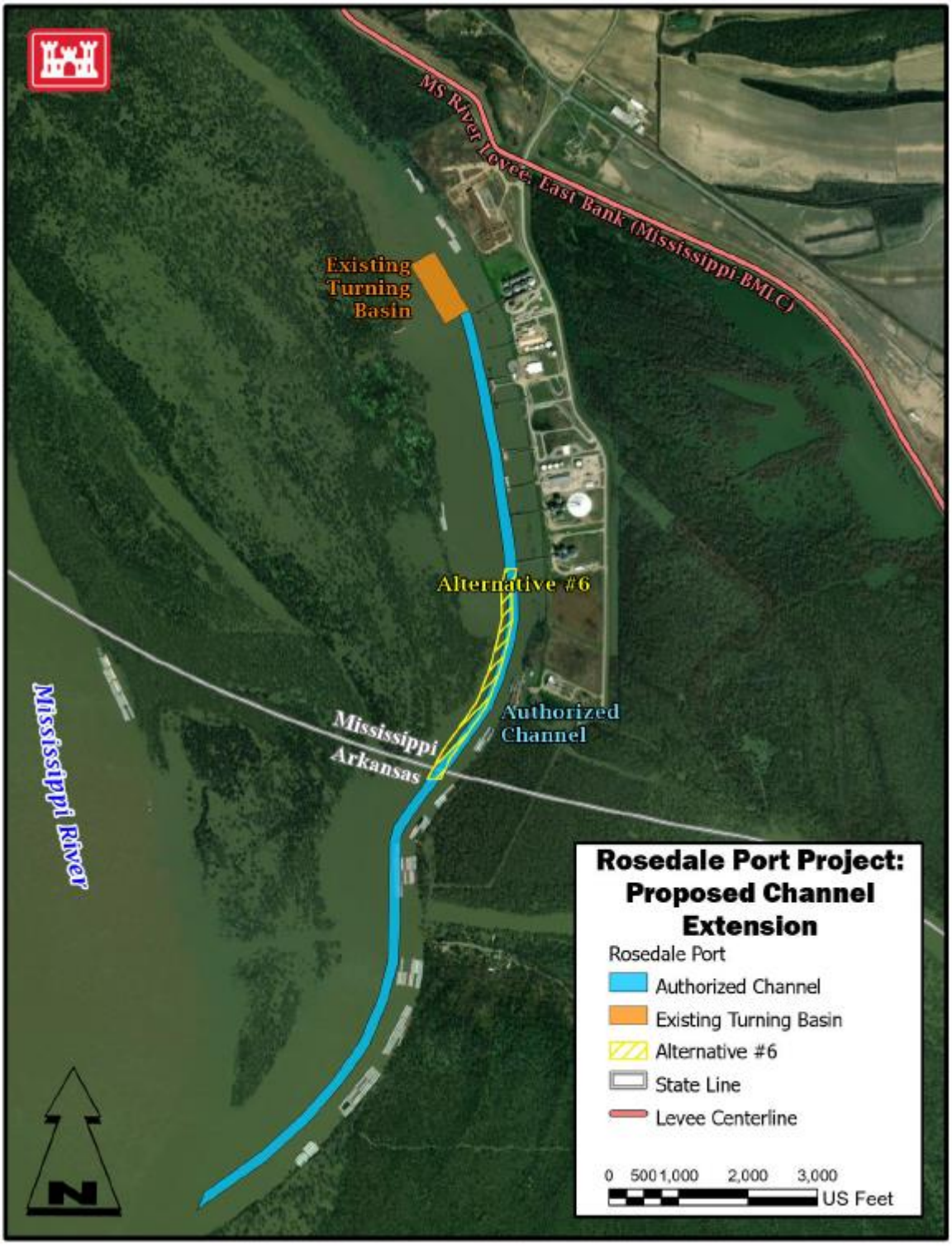

Figure 3-6. Alternative 6 – Shift Channel Bend

3.4.1.7 Alternative 7 – Widen and Lengthen Entire Channel, Relocate and Widen Turning Basin

This alternative is a combination of Alternatives 3 and 5.

Under this alternative, a 0.68-mile length of channel near JANTRAN would be widened to the West to total 200 feet wide. The remainder of the channel, from the mouth of the channel to the existing turning basin, would be widened to the West to total 185 feet wide. The Eastern channel limit would remain in the same location. Channel width transitions are shown in Figure 3.7 below. The additional channel length would facilitate access for additional port developments.

The shipping channel would be extended 1000 feet in length; the channel width would also be 185-feet. The turning basin would be relocated farther to the north of the Port and would be widened. The existing turning basin area is 400,000 square feet (400 feet wide x 1000 feet long). Under this alternative, the new turning basin area would be 600,000 square feet (600 feet wide x 1000 feet long).

The additional turning basin width would allow a greater number of barges to turn 180 degrees more easily, even during low water conditions.

Under this alternative, 7 acres of terrestrial habitat would be cleared and snagged. Dredge depth would be only to the currently maintained depth of 9 feet below the LWRP. Only the additional channel area would be dredged (not the existing channel). Dredged material would be cast to the Mississippi River; snagged material would be burned onsite.

Alternative 7 is depicted in Figure 3-7 below.

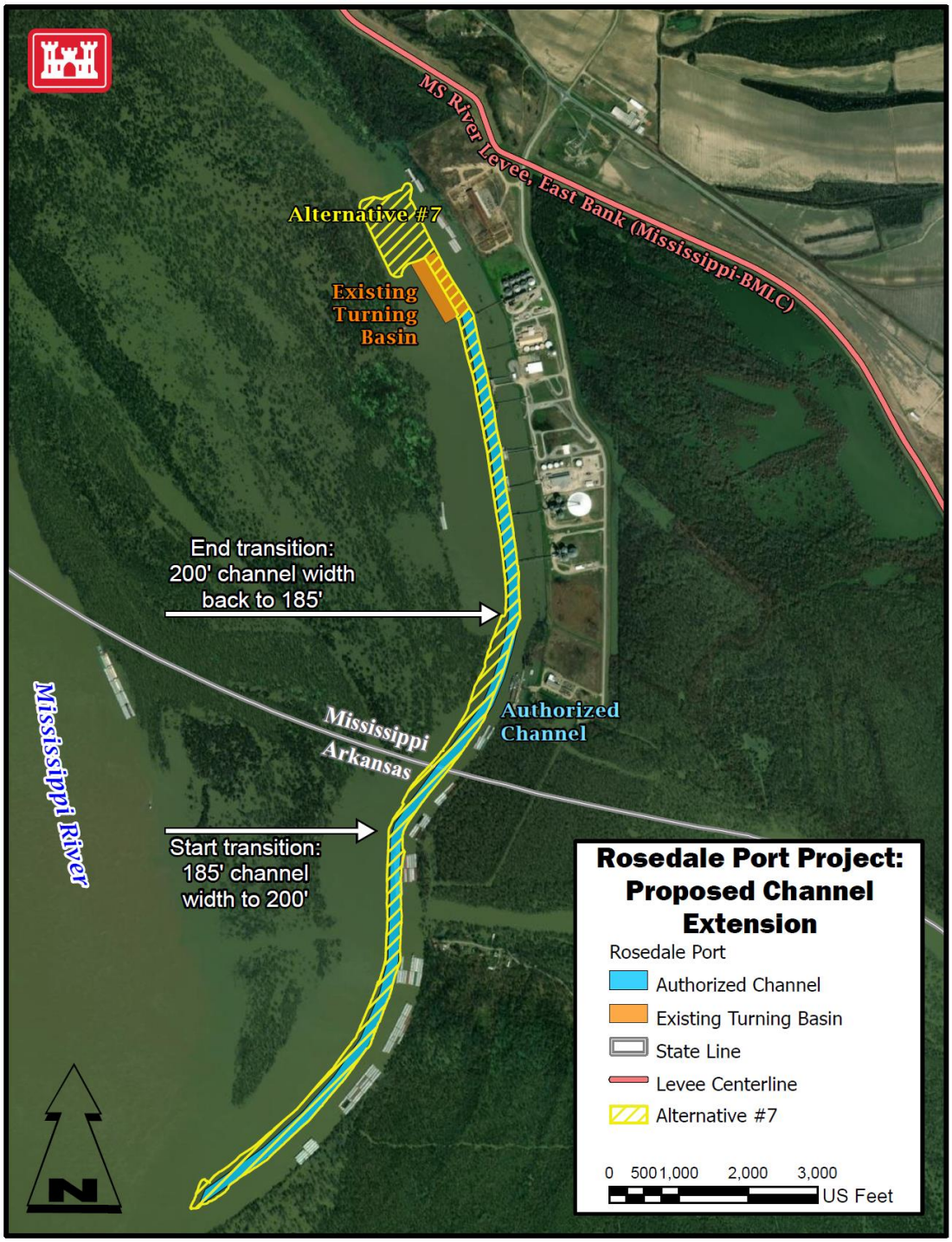

Figure 3-7. Alternative 7 – Widen Entire Channel, Lengthen Channel, Relocate and Widen Turning Basin

3.4.1.8 Alternative 8 – Recreational Boat Launch Permanent Closure or Relocation

The Port is used heavily by recreational boaters during the Port's peak Fall and Spring commerce seasons. This alternative would relocate the ramp to the northern side of the port or close the public boat launch in the Port to reduce the risk of collisions.

3.4.1.9 Alternative 9 – Redirect Recreational Boat Traffic and Signage

This alternative would redirect all recreational boat launch access during peak Fall and Spring commerce seasons to reduce the risk of collisions. Additionally, signage for both recreational and commercial boaters would be installed to help direct port traffic and manage timing of port use.

3.4.1.10 Alternative 10 – Relocate the Floating Dock

In this alternative, the floating docks and associated buildings at JANTRAN would be relocated from the bend in the channel to deeper within the port. JANTRAN's current floating dock location impedes the navigability of the channel bend.

3.4.2 Screening the Initial Array of Alternatives

The Planning and Guidance evaluation criteria were applied in order to screen the Initial Array of Alternatives to the Final Array of Alternatives.

In accordance with planning guidance, alternatives must be compared to the following Policy and Guidance (P&G) Section VI.1.6.2(c) criteria: completeness, effectiveness, efficiency, and acceptability (ER 1105-2-100). Completeness refers to the extent that an alternative plan provides all necessary investments or actions to assure realization of the planned effect. Effectiveness refers to an alternative's ability to alleviate the specified problems and achieve the opportunities. Efficiency refers to the extent of an alternative plan's cost effectiveness in alleviating the problems and achieving the opportunities. Acceptability refers to the workability and viability of an alternative with respect to acceptance of Federal, state, and local entities and general public and compatibility of existing laws, regulations, and public policies.

Table 3-1 below summarizes the results of the P&G Criteria evaluation for the full Initial Array of Alternatives. Alternatives 1-7, highlighted in blue in the table, were carried forward to the Final Array of Alternatives.

Table 3-1. Alternatives Evaluated Against P&G Criteria

*Alternatives highlighted in blue indicate that the alternative was carried forward to the final array.

		P&G Criteria			
Alternative		**Complete**	**Effective**	**Efficient**	**Acceptable**
1	No Action	Yes – No action would result in same navigation conditions.	No — No action would not achieve planning objectives.	No -- Benefits would not be realized without an investment in the Port; navigation costs in the Port continue to rise due to lost time to shunt barges.	No – No action is not acceptable to government entities, or the public. No action is feasible from a technical, environmental, financial, legal, institutional, and social perspective.
2	Widen Channel Bend	Yes – All necessary investments would be available for the desired effect.	Yes – Achieves planning objectives except turning basin restrictions.	Yes – Benefit to cost ratio (BCR) exceeds unity.	Yes – Plan is feasible from technical, environmental, economic, financial, political, legal, institutional and social perspective. Satisfies government entities and the public.
3	Widen Entire Channel	Yes – All necessary investments would be available for the desired effect.	Yes – Achieves planning objectives except turning basin restrictions.	Yes – BCR exceeds unity.	Yes – Plan is feasible from technical, environmental, economic, financial, political, legal, institutional and social perspective. Satisfies government entities and the public.
4	Widen Turning Basin	Yes – All necessary investments would be available for the desired effect.	No – Does not achieve certain planning objectives. Does not reduce costs due to channel width restrictions. Does not provide sufficient fleeting area to movement	Yes – BCR exceeds unity.	No – Does not satisfy government entities.

			of barges to and from docks. Does not increase navigation and safety for commercial and recreational users.		
5	Lengthen Channel, Relocate and Widen Turning Basin	Yes – All necessary investments would be available for the desired effect.	No – Does not achieve certain planning objectives. Does not reduce costs due to channel width restrictions. Does not provide sufficient fleeting area to movement of barges to and from docks. Does not increase navigation and safety for commercial and recreational users.	Yes – BCR exceeds unity.	No – Does not satisfy government entities.
6	Shift Channel Bend	Yes – All necessary investments would be available for the desired effect.	No – Does not achieve certain planning objectives. Does not reduce costs due to channel width restrictions. Does not provide sufficient fleeting area to movement of barges to and from docks. Does not increase navigation and safety for commercial and recreational users.	No —Because the channel would only be shifted, no benefits were generated from this alternative. Therefore the BCR was not justified.	No – Does not satisfy government entities.
7 - TSP	Widen and Lengthen Entire Channel, Relocate and Widen Turning Basin (Alternatives 3 & 5 combined)	Yes – All necessary investments would be available for the desired effect.	Yes – Would achieve planning objectives.	Yes – BCR exceeds unity.	Yes – Is the Sponsor-supported plan. Plan is feasible from a technical, environmental, economic, financial, political, legal, institutional, and social perspective.

8	Recreational Boat Launch Permanent Closure or Relocation	Yes, all necessary investments would be available for the desired effect.	No —Does not achieve planning objectives.	No – Benefits could not be generated without data to quantify recreational use or safety hazards.	No —Is not acceptable as a sole solution to satisfy government entities.
9	Redirect Recreational Boat Traffic and Signage	Yes, all necessary investments would be available for the desired effect.	No —Does not achieve planning objectives.	No – Benefits could not be generated without data to quantify recreational use or safety hazards.	No —Is not acceptable as a sole solution to satisfy government entities.
10	Relocate Floating Dock	Yes, all necessary investments would be available for the desired effect.	No —Does not achieve planning objectives.	No – Enormous preliminary costs of relocating dock and supporting facilities would not have yielded a BCR greater than unity.	No —Plan would not have been financially feasible within CAP limits.

Alternative 8 (Recreational Boat Lunch Permanent Closure) and Alternative 9 (Redirect Recreational Boat Traffic) were screened due to a lack of existing data, which indicated these alternatives would not be effective. According to the Sponsor, existing data could not be provided on repetitive or recorded recreational usage. The Sponsor also did not have any documentation of serious recreational accidents or any indication that recreational use caused delays with current barge loading or unloading operations. The absence of this data made it difficult to calculate benefits for these alternatives. Knowing that a potential USACE project might expand the channel width, expand the channel length, and increase barge traffic, the Sponsor opted to evaluate recreational use after the potential implementation of a USACE project.

Preliminary rough order of magnitude (ROM) costs for Alternative 10 (Relocating Floating Dock and Buildings at JANTRAN) would have far exceeded CAP cost limits, and therefore was not financially feasible. Alternative 10 was therefore screened.

The seven alternatives carried forward to the Final Array included Alternative 1, the No Action Alternative, and action Alternatives 2-7. Evaluation and screening of the Final Array of Alternatives is described in Section 5, *Plan Comparison and Selection*, of this Report. Section 5 also discusses the justification and selection of the Tentatively Selected Plan (TSP), which was Alternative 7.

Section 4
Environmental Effects and Consequences

4.1 AFFECTED ENVIRONMENT (40 CFR 1502.15) AND ENVIRONMENTAL CONSEQUENCES (40 CFR 1502.16)

This section discusses the environmental effects and consequences for the future-without project scenario (Alternative 1 - No Action) and for each action Alternative in the Final Array (Alternatives 2-7). While Section 4 references the Tentatively Selected Plan (TSP), the methodology and justification for selecting the TSP are described in Section 5, *Plan Comparison and Selection*, of this Report. In Section 5, Alternative 7 was selected as the TSP.

4.1.1 Navigation

Future Conditions with No-Action

Under Alternative 1, the No-Action alternative, the Port would remain at the existing authorized navigation footprint of a 150 feet wide navigation channel which extends from the confluence of the Port and the Mississippi River Channel up to the existing 400’ by 1,000’ turning basin. The port will remain busy and dangerous to navigate, especially during yearly low water events. Siltation will also continue to build up at the mouth of the channel. As business at the Port grows and barge traffic increases, these problems will continue to worsen. Future port expansion will also be limited without improvements to navigation and safety leading to economic loss in the area.

Future Conditions with the Proposed Actions

Alternative 2

This alternative would widen the existing channel 200’ through the bendway, with tapered transitions in the upper and lower channel crossovers. This would partially improve navigation during low water events by allowing wider barge configurations to pass the JANTRAN. However, this alternative does not address navigational issues with the current turning basin or allow for future economic growth.

Alternative 3

This alternative would involve widening the entire channel between its confluence with the Mississippi River and the current turning basin. Expanding the channel width to 185 feet would allow one way traffic for two-by-two barge configurations. This would improve navigation within the channel during low water events but would not correct navigational issues related to the small turning basin or allow for future expansion of the Port.

Alternative 4

Under this alternative, the width of the existing turning basin would be widened by 200 feet to the West, thus adding 200,000 square feet to the existing turning basin. This increased area would allow two-by-two barge configurations to utilize the turning basin. However, this

alternative does not address the navigational dangers caused in the channel during low water events.

Alternative 5

Under this alternative, the shipping channel would be extended 1000 feet in length and have a channel width of 150-feet. The turning basin would also be relocated farther to the north of the Port and would be expanded. The additional channel length would facilitate access for additional port developments in the future and the additional turning basin width would allow a greater number of barges to turn 180 degrees more easily, even during low water conditions. However, navigation in the rest of the channel would still be dangerous, especially during low water events.

Alternative 6

Under this alternative, a 0.63-mile length of the channel bend near JANTRAN would be relocated. Relocating the channel would only slightly improve navigation during low water events. Only smaller barges would be able to utilize the navigation channel and turning basin.

Alternative 7 (TSP)

Under this alternative, the proposed actions include widening and extending the navigation channel and moving and expanding the current turning basin. The entire channel would be widened to 185 feet except for a 0.67-mile stretch near the JANTRAN facility, where it would be widened to 200 feet. The proposed expansion of the channel would allow two-way traffic and larger barge configurations to navigate the channel easily and safely, even during times of low water.

In addition, extending the channel 1000 feet in length and relocating and enlarging the turning basin to 600 feet by 1,000 feet (600,000 square feet) allows larger barge configurations to utilize the turning basin, and its new location would provide better access to the water with more frontage for the port. This water access will help with the Ports economic growth as business and barge traffic increases.

4.1.2 Wetlands

Future Conditions with No-Action

Under Alternative 1, the No-Action alternative, there would be no direct impacts to wetlands in the project area.

Future Conditions with the Proposed Action

Project construction impacts to forested wetlands within the project area were assessed by USFWS in the Coordination Act Report (Attachment 3) using the USACE certified 2013 Mississippi Alluvial Valley Hydrogeomorphic (HGM) Approach to Assessing Functions of Forested Wetlands Model (see ERDC/EL TR-13-14). All forested wetland impacts would occur within the central portion or “middle reach” of the Rosedale project. Enlargement of the turning basin at the north end of the project area was determined to have no BLH impacts.

Alternative 2, 3, & 7 (TSP)

The HGM results (Table 4-1) determined the construction activities associated with the project TSP will adversely impact approximately 0.72 acres of BLH wetland with average annual functional capacity units (FCU) of 0.22 for the duration of the project. The impacts to the bottomland hardwood forest would be caused by clearing and dredging the area to increase the width of the channel and improve navigation (Figure 4-1). The compensatory mitigation requirement for the impacts to wetlands would require purchasing mitigation credits. Mitigation efforts for the proposed project are detailed in Section 7, *Environmental Compliance*, in this report.

Alternative 4-5

There would be no direct impact to wetlands in the project area.

Alternative 6

The HGM results (Table 4-1) determined the construction activities associated with the project TSP will adversely impact approximately 0.57 acres of BLH wetland with average annual functional capacity units (FCU) of 0.18 for the duration of the project.

Table 4-11. Mississippi Alluvial Valley Hydrogeomorphic Wetland Results for Port of Rosedale

Summary of Rosedale Port Expansion HGM Results

Alt	BLH Impact (acres)	BLH Impact (ha)	Current HGM Impact (FCUs)	**Average Annual FCUs**
2	0.72	0.29	0.22	**0.22**
3	0.72	0.29	0.22	**0.22**
4	0	0	0	**0**
5	0	0	0	**0**
6	0.57	0.23	0.18	**0.18**
7	0.72	0.29	0.22	**0.22**

HGM Results for Alt 7

	FCI	FCU
Detain Floodwater	0.9	0.26
Detain Precipitation	0.48	0.14
Cycle Nutrients	0.9	0.26
Export Organic Carbon	0.85	0.25
Maintain Plant Communities	0.69	0.2
Provide F&W Habitat	0.77	0.22
average FCU =		**0.22**

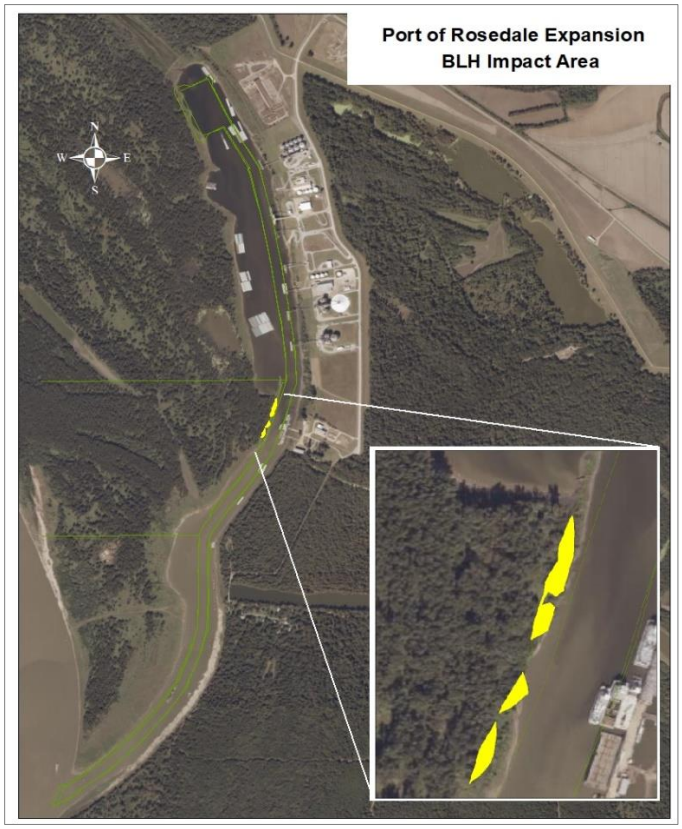

Figure 4-1. Port of Rosedale Project Area and BLH Wetland Impact Areas Map for the TSP

4.1.3 Aquatic Resources/Fisheries

Future Conditions with No-Action

Alternative 1, the No-Action alternative would not have a direct impact on aquatic resources and fisheries in the short-term since the existing conditions would be maintained.

Future Conditions with the Proposed Action (Alternatives 2-7 (TSP))

Construction activity is anticipated to result in some short-term negative impacts to aquatic resources in the immediate project area. Due to noise disturbances caused by dredging, fish and other mobile aquatic species are likely to avoid the project area during the proposed actions but are expected to return shortly after the project is complete. Since the project area is currently an active port that is dredged on a regular basis, benthic species are already frequently disturbed and would not experience any additional long-term adverse effects due to the proposed actions. This project would not contribute toward long-term impairments of fish and invertebrates.

4.1.4 Terrestrial Resources/Wildlife

Future Conditions with No-Action

Alternative 1, the No-Action alternative, would not have a direct impact on wildlife in the short-term since the existing conditions would be maintained.

Future Conditions with the Proposed Action

With implementation of Alternatives 2-7 (TSP), wildlife movement and activity patterns around the project area would be temporarily influenced by general traffic and the noise generated from operating construction equipment. However, this temporary impact is not significant, as many species would be expected to become tolerant or return to the area upon completion of the construction.

Some alternatives would impact terrestrial habitats adjacent to the turning basin and at the constricted portion of the channel, midway between the turning basin and the Mississippi River. For all alternatives that require clearing it is recommended that clearing and construction activities take place in the fall and winter to minimize impacts to nesting migratory songbirds and colonies containing nesting wading birds such as herons, egrets, anhingas, and cormorants. Mitigation for non-wetland terrestrial forest habitat that is cleared would require acquiring and reforesting upland farmland equal to the acres of forest cleared.

Alternative 2

With implementation of the proposed actions, approximately 3.25 acres of wildlife habitat and 0.72 acres of wetlands would be cleared to widen the channel at the bendway.

Alternative 3

With implementation of the proposed actions, approximately 4 acres of wildlife habitat and 0.72 acres of wetlands would be cleared to widen the entire channel.

Alternative 4

With implementation of the proposed actions, approximately 1.2 acres of wildlife habitat would be cleared and snagged to widen the turning basin.

Alternative 5

With implementation of the proposed actions, approximately 3 acres of wildlife habitat would be cleared and snagged to extend the channel and widen the turning basin.

Alternative 6

With implementation of the proposed actions, approximately 3.5 acres of wildlife habitat and 0.57 acres of wetlands would be cleared and snagged to shift the channel at the bendway.

Alternative 7 (TSP)

With implementation of the proposed actions, approximately 7 acres of wildlife habitat and 0.72 acres of wetlands would be cleared and snagged to widen and extend the channel, expand the turning basin, and improve navigation.

4.1.5 Threatened and Endangered Species

Future Conditions with No-Action

Alternative 1, the No-Action alternative would not have a direct impact on threatened and endangered species since the existing conditions would be maintained.

Future Conditions with the Proposed Action (Alternatives 2-7 (TSP))

USACE completed Section 7 consultation on 6 July 2023 through emails with USFWS (Attachment 4) and USFWS's IPaC website (Attachment 1). USACE made the following determinations related to project effects on threatened and endangered species that could possibly occur in the project area:

Northern Long-eared Bat (Myotis septentrionalis)	May affect but unlikely to adversely affect
Tricolored Bat (Perimyotis septentrionalsis)	May affect but unlikely to adversely affect
Eastern Black Rail (Laterallus jamaicensis ssp.)	No Effect
Ivory-billed Woodpecker (Campephilus principalis)	No Effect
Piping Plover (Charadrius melodus)	No Effect
Red Knot (Calidris canutus rufa)	No Effect
Pondberry (Lindera melissifolia)	No Effect
Alligator Snapping Turtle (Macrochelys temminckii)	No Effect
Pallid Sturgeon (Scaphirhynchus albus)	No Effect
Fat Pocketbook (Potamilus capax)	May affect but unlikely to adversely affect
Pink Mucket (*Lampsilis abrupta*)	May affect but unlikely to adversely affect

As part of the IPaC process a NLEB range wide determination key was completed (Attachment 5) and concurred with the USFWS email that the proposed actions of this project may affect but are not likely to adversely affect the NLEB. Due to having a similar natural history and roosting behavior as the NLEB, it was determined that the proposed actions may affect but are unlikely to adversely affect the Tricolored bat. A determination of no effect was given for the Eastern Black Rail, Piping Plover, Red Knot, and pondberry due to poor habitat conditions. The project area is a very active port with frequent barges entering and exiting channel, causing disturbances to the surrounding area. In addition to these disturbances, the area is not coastal and there are few sandy shores for the birds to utilize.

The alligator snapping turtle, pallid sturgeon, pink mucket, and fat pocket mussel are also unlikely to be present in the project area due to regular disturbances to the aquatic environment caused by barges. Annual dredging has also removed firm sand and gravel bed substrates from the area that are necessary for many aquatic species lifecycles including the pallid sturgeon, pink mucket, and fat pocketbook mussel. Dredge material would be disposed of in the same manner as regular maintenance dredging and is unlikely to affect downstream species (See Section 6.2.2). If required a biological assessment would be completed to further determine potential impacts to aquatic species in the project area including the fat pocket mussel and pink mucket. The biological assessment would be submitted to USFWS before

any construction is initiated.

Best management practices such as having clearing and construction activities take place in the fall and winter to minimize possible impacts to nesting migratory songbirds, colonies containing nesting wading birds, and bats would be properly implemented in order to minimize any negative impacts. Therefore, based on the current species review and the habitat in the project area, it is USACE's determination that the proposed actions would likely have no adverse effects on any federal-listed species.

4.1.6 Water Quality

Future Conditions with No-Action

Without the proposed action (Alternative 1 – No Action), there would be no direct impacts to water quality in the area.

Future Conditions with the Proposed Action (Alternatives 2-7 (TSP))

Two impaired bodies of water occur within the same watershed as the project area. The Arkansas river, which flows into the Mississippi River slightly south of the project area, and the nearby Lake Beulah are both considered impaired due to degraded aquatic life and low rates of dissolved oxygen. However, since neither body of water falls within the direct project area and all dredge material will be properly disposed of (see Section 2.2), these impaired bodies of water will not be affected by the proposed actions. The are no scenic and wild rivers within the project area.

The project would have only minor impacts on water quality in the project area. Turbidity and suspended solids would be increased to minor degrees as a result of runoff from cleared areas and dredging the port. Since the dredge material disposal method being utilized is the same as the yearly maintenance dredging there would only be minor increases in turbidity in downstream habitats. However, these impacts are expected to be temporary as the Mississippi River continues to carry and disperse the sediment and dredge material downstream. Turbidity is expected to return to normal shortly after construction. A water quality certification (WQC) from MDEQ would be required for the disposal of the dredged material and placement of woody debris within the waters of the Mississippi River (See Section 4.1.12).

4.1.7 Air Quality

Future Conditions with No-Action

Without implementation of the proposed action (Alternative 1 – No Action), no direct or indirect impacts to ambient air quality would occur.

Future Conditions with the Proposed Action (Alternatives 2-7 (TSP))

Air quality would be slightly impacted for a short time during construction due to the use of internal combustion engines, heavy machinery, and dust-related sources. Air quality would also be minorly affected due the burning of woody material encountered during dredging/construction being burned in a burn pile within the project area. However, these short-term impacts would not be expected to violate any state or federal standards or cause the region to be classified as being in nonattainment. Furthermore, the climatic conditions of the region favor rapid dispersal of the pollutants and thus would not allow concentrations to accumulate.

4.1.7.1 Greenhouse Gas Emissions

Carbon dioxide (CO2) is the primary greenhouse gas emitted from human activities, chiefly through combustion of fossil fuels. Additionally, carbon levels in soil used for agricultural purposes tend to decrease over time as carbon is oxidized and released into the atmosphere. Increasing quantities of atmospheric greenhouse gases have resulted in measurable changes to the Earth's surface and ecosystems. CO2 equivalent is a unit that represents the warming effect of any given greenhouse gas on the global climate and is calculated by multiplying the mass of the gas by its warming potential, which describes the relative potency and residence time of the gas in the atmosphere. Thus, using a CO2 equivalent provides a common scale for measuring effects of different gases. The estimated existing and with-project CO2 equivalent conditions consist of the anticipated emissions produced by project area vehicular and construction emissions as well as anticipated carbon release from agricultural land soils.

In accordance with EO 13990 Sec. 5, the social cost of greenhouse gas emissions (SC-GHG) was considered in this EA. SC-GHG is an estimate of the monetized damages associated with incremental increases in greenhouse gas emissions and is intended to include changes in net agricultural productivity, human health, property damage from increased flood risk, and the value of ecosystem services. The SC-GHG is intended to be used for alternative comparison purposes and is determined as: SC-GHG = CO2 equivalent (metric tons) X social cost in dollars per metric ton of carbon dioxide or $51/metric ton.

Future Conditions with No Action

Under Alternative 1 – No Action, the amount of CO2 equivalent that would be emitted for the No Action alternative is currently being calculated. The SC-GHG produced by the No Action alternative will be included in this EA before final FONSI signature is received.

Future Conditions with Alternative 7 (TSP)

The amount of CO2 equivalent that would be emitted via dredging and construction equipment is currently being calculated. The SC-GHG produced by the proposed actions will be included in this EA before final FONSI signature is received.

4.1.8 Recreation and Aesthetics

Future Conditions with No-Action

Without implementation of the proposed action, no direct or indirect impacts to recreation and aesthetics would occur.

Future Conditions with the Proposed Action

Dredging and clearing may temporarily affect access to and recreational use of the boat ramp. However, after completion of the project the recreational ramp use would return to normal. These impacts are considered minimal.

Alternatives 2, 3, & 7

Widening the entire channel or bend would improve navigation (See Section 5.1) and safety for barges and recreational boaters using the channel and boat ramp.

Alternatives 4-6

Under these alternatives recreational navigation and safety would remain the same as current conditions.

4.1.9 Cultural Resources

Future Conditions with No-Action

Without implementation of the proposed action, the conditions would continue as they have in the past and would be dictated by the natural land use patterns and processes that have dominated the area in the past.

Future Conditions with the Proposed Action (Alternatives 2-7)

Given the absence of identified historic properties, existing survey coverage, previous construction, development, and maintenance activities, and the low probability of the presence of unidentified resources, USACE has determined that the existing surveys constitute a reasonable and good faith effort at identification and evaluation of historic properties and that it is unlikely that any unidentified historic properties are present in the currently proposed APE; therefore, no further cultural resources investigation is recommended.

Given the absence of cultural material within the proposed project area, USACE has proposed **No Historic Properties Affected** for this undertaking/project. Consultation with this determination is ongoing, with 22 Tribes and the AR SHPO and MS SHPO offices which were contacted by USACE on August 25, 2023. Concurrence was received from the AR SHPO on 21 September 2023 and from the MS SHPO on 22 September 2023. A response was also received from the Mississippi Band of Choctaw Indians on 5 September 2023 and the Quapaw Nation on 11 September 2023. Additionally, if an inadvertent discovery is made during the project's implementation, the resource will be evaluated, assessed for effects, avoided if

possible, and mitigated in accordance with Federal statutes and regulations (36 CFR, Part 800) and corresponding state guidelines and statutes (Mississippi State Antiquities Law (39-7-31) (16 Miss. Code R. § 3-11.4).

4.1.10 Environmental Justice

Future Conditions with No-Action

Without implementation of the proposed action, no direct or indirect environmental justice impacts would occur.

Future Conditions with the Proposed Action (Alternatives 2-7)

Executive Orders No. 13990, and No. 12898 were considered while the project was analyzed in this EA. The EPA's EJ Screen and the CEQ's CEJST tools were utilized to locate people/households with incomes below the federal poverty line and racial and ethnic groups that live within the project area (Appendix A, *Environmental Assessment*, Attachment 2). The CEQ's CEJST tool identified the project area as being disadvantaged.

However, it was determined that the construction of this project would not have any disproportionate effects on communities of color or people experiencing poverty in the surrounding area due to its relatively small footprint and lack of residents in the project area.

4.1.11 Hazardous, Toxic and Radioactive Waste

To evaluate if potential HTRW concerns are present within the project area, a review of EPA's environmental databases of known facilities permitted to handle, treat, store, or dispose of hazardous waste was performed. In addition, a review of reported spills, remediation projects and accidental releases of hazardous materials was also performed. The review was restricted to an area within the minimum search distances reported in the American Society for Testing and Materials, E1527-13, "Environmental Site Assessments: Phase I Environmental Site Assessment Process." The database review was conducted utilizing EPA's EnviroMapper online query system for regulated facilities.

The results of the record search identified three facilities within a 1-mile radius of the project area (Axel Americas, Cives Steel Company, and JANTRAN Inc), none of which appear to pose a significant HTRW risk to the project. A site reconnaissance performed on October 26, 2022 did not reveal any findings that would appear to pose a significant HTRW risk to the project. Sample collection and analysis was conducted on the proposed soil to be removed as part of the preferred alternatives within the project area for organics, inorganics, and pesticides, and no findings from the sample appear to pose a significant HTRW risk to the project. Follow-up supplemental water quality analysis will be conducted at the request and to the satisfaction of the governing environmental agencies of the project area. At this time, there is little reason to believe there exists a significant HTRW risk to the intended use of this proposed area.

4.1.12 Section 404(b)(1) Considerations

According to Section 401 of the Clean Water Act, an additional water quality certification from the Mississippi Department of Environmental Quality (MDEQ) and Arkansas Department of Environmental Quality (ADEQ) will be required for the proposed port expansion project. Currently the Port of Rosedale undergoes annual maintenance dredge activities within the defined limits that include a 150-ft wide channel and a turning basin at the upper most reach. An additional water quality certification would be required for dredge activities associated with the proposed project which extends beyond the limits of the current defined channel for The Port of Rosedale.

Once the project completes the Feasibility phase and enters the PED phase, the Vicksburg District (MVK) will work in conjunction with both MDEQ and ADEQ to prepare a QAPP. The QAPP will direct additional testing protocols needed to provide the basis for the expanded water quality certification, which is currently permitted through General Permit Number 16 for the Vicksburg District (REGULATED ACTIVITIES ASSOCIATED WITH MAINTENANCE DREDGING OF ACCESS CHANNELS, PORT BASINS, AND TERMINAL AREAS OF COMMERCIAL AND MUNICIPAL PORTS ALONG THE MISSISSIPPI RIVER WITHIN THE VICKSBURG DISTRICT). The QAPP and testing results will be included and will form the basis of the water quality certification request. The MVK will ensure the water quality certification is issued prior to initiation of expanded dredge activities. For more information regarding the status of the water quality certification issuance, please contact the MVK River Engineering Section.

4.1.13 Cumulative Impacts Analysis

The Council on Environmental Quality (CEQ) Regulations define cumulative impacts (CI) as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. CI can result from individually minor but collectively significant actions taking place over a period of time.”

Beneficially, implementation of the proposed plan would increase navigational safety at the port and within the channel. Completing the project would allow larger barges to access the Port and would create increased economic opportunity at the Port. Barges Time required for barges to access the port would be reduced leading to increased efficiency and reduced greenhouse gas emissions produced by idle barges.

Negative effects associated with implementation of the proposed project would relate to the cumulative contribution of the proposed actions to the effects of other projects, past and present. Overall, this project is unlikely to have many incremental impacts on the larger watershed over the 50-year life of the project. Wetlands in the project area will be significantly impacted and cleared. With wetlands becoming rarer in the watershed since the late 1800’s, this project could incrementally contribute to total loss of future wetlands depending on the amount of wetlands cleared in future projects. However, wetland mitigation will be completed for this project to account for the impacts and would not lead to a net loss of overall wetlands.

The temporary construction-related increases in traffic, noise and vibration, and vehicle and equipment emissions would be temporally and locally unique and unlikely, combined with other similar disturbances, to significantly affect the citizens or natural environment in the city.

There would be minor temporary impacts to fish and wildlife resources and no impacts to cultural resources or the flood plain. Because the project proposes needed navigational improvements to increase safety, mitigation for wetlands, and the overall outcome of the project would be beneficial to the community, the cumulative negative impacts are considered minimal.

4.2 MITIGATION

On January 4, 2007, the 110th Congress of the United States of America finalized the Water Resources Development Act (WRDA) of 2007 (H.R. 1495, Public Law 110-114). Under Section 2036(c), Mitigation for Fish and Wildlife and Wetlands Losses – Wetlands Mitigation, it specifically directs the USACE to consider the use of commercial mitigation banks to fulfill the mitigation responsibilities of Civil Works projects, stating:

> *In carrying out a water resources project that involved wetlands mitigation and that has impacts that occur within the service area of a mitigation bank, the Secretary, where appropriate, shall first consider the use of the mitigation bank if the bank contains sufficient available credits to offset the impact and the bank is approved in accordance with the Federal Guidance for the Establishment Use and Operation of Mitigation Banks (60 Fed. Reg. 58605) or other applicable Federal law (including regulations).*

The TSP (Alternative 7) includes the maximum acreage of BLH wetland and BLH upland habitat impact. Even this maximum area is considered small. The following section details the mitigation required for the TSP (Alternative 7) only. All other alternatives would require significantly less mitigation.

Therefore, the following mitigation plan proposes to acquire appropriate BLH compensatory mitigation bank credits for unavoidable impacts to 0.22 Average Annual Functional Capacity Units (AAFCU) (0.72 acres) of BLH forested wetlands resulting from the proposed project. Additionally, this mitigation plan proposes to acquire and reforest 7 acres of upland farmland in order to compensate for the unavoidable clearing of 7 acres of BLH non-wetland upland forest. No additional significant impacts were assessed as a result of the project. No project specific mitigation opportunities were identified by USACE or the local sponsor, so a decision was made to purchase mitigation bank credits.

In Federal Register Vol. 73, No. 70, April 10, 2008, specifically Part 332, § 332.4 (c)(1) Compensatory Mitigation for Losses of Aquatic Resources, Planning and documentation, Mitigation Plan, Preparation and Approval, guidance was set forth requiring the preparation of a draft and final mitigation plan that would address the following 12 items: 1) preparation and approval; 2) objectives; 3) site selection; 4) site protection instrument; 5) baseline information; 6) determination of credits; 7) mitigation work plan; 8) maintenance plan; 9) performance standards; 10) monitoring requirements; 11) long-term management plan; 12) adaptive

management plan; financial assurances; and other information. However, since the proposed mitigation plan proposes to utilize a compensatory mitigation bank, the following language included in Part 332 § 332.4 (c)(1)(i)(ii) would apply, "For permittees who intend to fulfill their compensatory mitigation obligations by securing credits from approved mitigation banks…their mitigation plan need include only the items described in paragraphs (c)(5) and (c)(6) ...". Therefore, only items 5 and 6, baseline information and determination of credits, would be addressed further.

Item 5 – Baseline Information. For a complete description of "Baseline Information", please refer to the following Sections within this document: 1.5 General Study Area; 2.5 Climate; 2.6 Geology; 2.7 Watershed; 2.10 Wetland Resources; 4.1.2.; or in EA #111: 3.1 Description of the Watershed; 3.2 Description of the Project Area; 3.3 Climate; 3.4 Geology; and 4.2 Wetlands.

Item 6 – Determination of Credits. The Mississippi Alluvial Valley Hydrogeomorphic Model (HGM) was used to quantify project impacts by the U.S. Fish and Wildlife Service and the results were included in the U.S. Fish and Wildlife Coordination Act Report (Attachment 3). The proposed project resulted in 0.72 acres of bottomland hardwood forest (BLH) impacts. According to the HGM model, 0.22 Average Annual Functional Capacity Units (AAFCUs) were determined to be affecting BLH wetland functions. The cumulative 50-year impacts in AAFCUs (0.22) were divided by the area of impacted BLH (0.72 acres) to determine the required acreage for mitigation. Therefore, 0.22 / 0.72 = 0.31 acres of mitigation would be required for the project.

Mitigation bank credits were determined based on the original 0.72 acres of BLH impacts with the consideration that the 0.72 acre of BLH would be permanently impacted. The impacted acreage (0.72 acres) was converted using the MVK Regulatory Branch utilized Charleston method to calculate mitigation credits based on the impact acreage. It was determined that 7.3 mitigation credits would be required to compensate for the 0.72 acres of permanent BLH impacts. This approach was coordinated with the U.S. Fish and Wildlife Service and received their concurrence. As recommended by USFWS (Appendix A- Attachment3), if available mitigation credits would be purchased from a mitigation bank that includes stream restoration and/or stream/aquatic benefits.

The proposed mitigation bank plan is designed to comply with the requirements set forth under USACE guidance "Implementation Guidance for Section 2036(a) of the Water Resources Development Act of 2007 – Mitigation for Fish and Wildlife and Wetland Losses" dated August 31, 2009, which further highlights the need for Civil Works mitigation plans to be consistent with the regulations and policies governing the USACE Regulatory Program. To comply with these multiple laws and directives and to be consistent with the USACE Regulatory Program, the Vicksburg District investigated the use of mitigation banks within an appropriate, applicable service area, the Mississippi River watershed basin. However, in the event that the total amount of credits that would be required to fully compensate for unavoidable wetlands impacts would not be achievable, the proposed mitigation bank plan is meant to afford the CEMVK the opportunity to explore reasonable and available mitigation opportunities both within the

impacted service area as well as adjacent service areas in order to compensate for unavoidable wetlands impacts.

In summary, mitigation for the TSP would require 7.3 credits to fully compensate for unavoidable wetland impacts and the acquisition and reforestation of 7 acres of upland farmland to compensate for unavoidable impacts to non-wetland forest habitat. All mitigation will be accomplished prior to construction.

The BLH mitigation credits for the TSP would be purchased from an appropriate compensatory mitigation bank. The 0.72 acres of wetland BLH would require 7.3 mitigation credits estimated at $3,400 each, for a total BLH wetland mitigation bank credit of $24,820.

The 7 acres of upland BLH would require the acquisition and reforestation of 7 acres of upland farmland. The total mitigation costs of the BLH upland habitat are $102,320, including needed LEERDs, monitoring and reporting. Total TSP mitigation costs are $127,140 as summarized in Table 4-2 below.

Table 4-22. Environmental Mitigation Costs

Habitat Type	Acres Impacted	Mitigation Method	Mitigation Cost*
Wetland BLH	0.72	Bank Credits	$24,820
Upland BLH	7	Acquisition and Reforestation of 7 Acres of Farmland, Monitoring and Reporting	$102,320
Total TSP Mitigation Costs			**$127,140**

*Includes LERRDs and Contingency Estimates

Section 5
Plan Comparison and Selection

5.1 PLAN COMPARISON

Alternatives 1-7 (including the No Action alternative) comprised the Final Array of alternatives which merited further analysis (Table 5-1). The Final Array of action alternatives met Study objectives with minimal impact and cost. To perform this economic analysis, environmental mitigation needs were first assessed, and mitigation costs were generated as described in Section 4.2 *Mitigation*.

Table 5-1. Final Array of Alternatives

Alternative	Description
1	No Action
2	Widen Channel Bend
3	Widen Entire Channel
4	Widen Turning Basin
5	Lengthen Channel, Relocate and Widen Turning Basin
6	Shift Channel Bend
7 - TSP	Widen and Lengthen Entire Channel, Relocate and Widen Turning Basin (Alternatives 3 & 5 combined)

The Final Array of Alternatives were evaluated and compared using benefit and cost economic analysis, development of conceptual designs, rough order of magnitude (ROM) quantities, and parametric cost estimates. Cost estimates include environmental mitigation credit costs, determined by the methods described in Section 4.2 *Mitigation*.

5.1.1 System of Accounts

To facilitate the evaluation and display of effects of the alternative plans, ER 1105-2-100 calls for an evaluation of the “four accounts” established in the P&G. The four accounts include:

a) The National Economic Development (NED) Account, which displays changes in the economic value of the national output of goods and services.

b) The Regional Economic Development (RED) Account, which displays changes in the distribution of regional economic activity, such as income and employment.

c) The Environmental Quality (EQ) Account displays non-monetary effects on ecological, cultural, and aesthetic resources including the positive and adverse effects of ecosystem restoration plans.

d) The Other Social Effects (OSE) Account displays plan effects on social aspects such as community impacts, health and safety, displacement, energy conservation, etc.

The following sections describe the evaluation of the Four Accounts in further detail.

5.2 NATIONAL ECONOMIC DEVELOPMENT (NED) EVALUATION

5.2.1 NED Costs

Financial costs of the proposed project consist of the construction and mitigation costs accrued during construction of the project and over its lifecycle. A detailed description of the cost engineering methods is included in Appendix D, *Cost Engineering*; the economic analysis is further detailed in Appendix E, *Economics*.

USACE cost engineers prepared the cost estimates for each of the proposed final array alternatives for use in the economic analysis. Cost estimates were developed at a Class 3 level of effort utilizing largely parametric unit prices from sources such as historical Government and Commercial bid data, Architect-Engineer (A-E) cost estimates available from design reports, RS Means Cost Data Books and other available historical cost data sources.

The sum of these costs is used to determine Interest During Construction (IDC), which represents the economic cost of building a project.

Another financial cost is the annual cost accrued over the life of a project due to Operation, Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) activities that represent an increase over the current OMRR&R costs to maintain the entrance channel. OMRR&R was excluded from the list of financial costs above because it is not included in the calculation of IDC. IDC considers only those costs incurred during construction.

IDC represents an economic cost of building a project that is considered in the selection of the recommended plan but does not factor in as a paid cost. IDC is the cost of the foregone opportunity to invest the money required to construct a project for another use. The hypothetical return on another investment, measured as IDC, is counted as an NED cost. As an economic cost rather than a financial cost, IDC is not considered in the determination of cost-sharing responsibilities.

IDC reflects that project construction costs are not incurred in one lump sum, but as a flow over the construction period. This analysis assumes that construction expenditures are incurred at a constant rate over the period of construction, an assumption which is supported by the *NED Manual for Deep Draft Navigation*. The IDC calculation methods are further described in *Appendix E, Economics*.

Table 5-2 shows the NED first costs for all alternatives; Table 5-3 shows total investment, IDC, average annual first costs, average annual incremental OMRR&R, and total average annual costs for all alternatives. Values are at FY24 price levels and amortized at the 2024 Federal discount rate of 2.75 percent.

Table 5-2. Project First Costs

Alternative	Item	Cost	Contingency	Project First Cost
2	Construction	$ 1,703,940	$ 527,113	$ 2,231,053
	Preconstruction Engineering, and Design	$ 410,000	$ 101,557	$ 511,557
	Supervision and Administration	$ 148,000	$ 42,429	$ 190,429
	Mitigation	$ 38,250	$ 15,813	$ 54,063
	TOTAL	**$ 2,261,940**	**$ 671,099**	**$ 2,987,000**
3	Construction	$ 3,034,825	$ 1,340,448	$ 4,375,273
	Preconstruction Engineering, and Design	$ 410,000	$ 101,557	$ 511,557
	Supervision and Administration	$ 255,000	$ 73,104	$ 328,104
	Mitigation	$ 42,000	$ 16,750	$ 58,750
	TOTAL	**$ 3,699,825**	**$ 1,515,108**	**$ 5,274,000**
4	Construction	$ 1,360,470	$ 447,977	$ 1,808,447
	Preconstruction Engineering, and Design	$ 540,000	$ 133,758	$ 673,758
	Supervision and Administration	$ 121,000	$ 39,284	$ 160,284
	Mitigation	$ 28,000	$ 13,250	$ 41,250
	TOTAL	**$ 2,021,470**	**$ 621,019**	**$ 2,684,000**
5	Construction	$ 2,180,085	$ 938,886	$ 3,118,971
	Preconstruction Engineering, and Design	$ 540,000	$ 133,758	$ 673,758
	Supervision and Administration	$ 186,000	$ 60,387	$ 246,387
	Mitigation	$ 37,000	$ 15,500	$ 52,500
	TOTAL	**$ 2,906,085**	**$ 1,133,031**	**$ 4,092,000**
6	Construction	$ 1,723,350	$ 535,540	$ 2,258,890
	Preconstruction Engineering, and Design	$ 410,000	$ 101,557	$ 511,557
	Supervision and Administration	$ 150,000	$ 43,002	$ 193,002
	Mitigation	$ 39,500	$ 16,125	$ 55,625
	TOTAL	**$ 2,283,350**	**$ 680,099**	**$ 3,019,000**
7 - TSP	Construction	$ 4,547,940	$ 2,358,337	$ 6,906,277
	Preconstruction Engineering, and Design	$ 590,000	$ 146,143	$ 736,143
	Supervision and Administration	$ 376,000	$ 122,073	$ 498,073
	Mitigation	$ 81,820	$ 20,500	$ 102,320
	TOTAL	**$ 5,513,940**	**$ 2,626,552**	**$ 8,243,000**

*Values at FY24 price levels and are amortized at the 2024 Federal discount rate of 2.75 percent.
*"Construction" line item for each alternative includes BLH wetlands mitigation credit costs.
*"Mitigation" line item includes BLH uplands mitigation costs including LERRDs acquisition, monitoring and reporting.
*All Project First Costs occur in the year 2026.

In the Projects First Cost Table 5-2 above, all BLH wetlands mitigation credit costs are included in the "Construction" line item for each alternative. All BLH uplands mitigation costs, including necessary LERRDs, monitoring reporting, are included in the "Mitigation" line item of the table.

Table 5-3. Total Costs

Alternative	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
First Cost	$ 2,987,000	$ 5,274,000	$ 2,684,000	$ 4,092,000	$ 3,019,000	$ 8,243,000
Interest During Construction	$ 41,000	$ 72,000	$ 37,000	$ 56,000	$ 41,000	$ 113,000
Total Investment Cost	$ 3,028,000	$ 5,346,000	$ 2,720,000	$ 4,147,000	$ 3,060,000	$ 8,355,000
Average Annual First Cost	$ 112,000	$ 198,000	$ 101,000	$ 154,000	$ 113,000	$ 309,000
Average Annual Increm. OMRR&R	$ 69,000	$ 206,000	$ 86,000	$ 275,000	$ 121,000	$ 480,000
Total Average Annual Cost	$ 182,000	$ 404,000	$ 187,000	$ 428,000	$ 234,000	$ 790,000

*Values at FY24 price levels and are amortized at the 2024 Federal discount rate of 2.75 percent.
*LERRDs only acquired for BLH upland environmental mitigation.
*All Project First Costs occur in the year 2026.

5.2.2 NED Benefits

For the purposes of Navigation Economic Analysis per ER 1105-2-100, a NED benefit may include:

"Cost reduction benefits for commodities for the same origin and destination and the same mode of transit thus increasing the efficiency of current users. This reduction represents a NED gain because resources will be released for productive use elsewhere in the economy. Examples for inland navigation are reductions in costs incurred from trip delays (e.g., reduction in lock congestions), reduction in costs associated with the use of larger or longer tows, and reduction in costs due to more efficient use of barges."

Barge time savings, vessel operating costs, and fee reductions were provided by Port officials and JANTRAN vessel operators. Calculated benefits for each alternative are itemized in Section 4, *Transportation Cost Savings Benefit Analysis* in Appendix E, *Economics.*

5.2.3 NED Benefits Benefit/Cost Analysis

Having identified the costs and benefits associated with all final array alternatives, identification of the tentatively selected plan (TSP) requires a comparison of the average annual net benefits resulting from each alternative. Table 5-4 contains the NED annual costs and benefits as well as the resulting Net Excess Benefits and Benefit-Cost Ratios (BCR) at FY 2024 price levels and amortized at the 2024 Federal discount rate of 2.75 percent.

Using preliminary cost estimates, Alternative 7 has the greatest average annual net benefits at $2,353,000 and a BCR of 4.0 to 1.

Table 5-4. Preliminary Average Annual Costs and Benefits

Alternative	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
First Cost	$ 2,987,000	$ 5,274,000	$ 2,684,000	$ 4,092,000	$ 3,019,000	$ 8,243,000
Interest During Construction	$ 41,000	$ 72,000	$ 37,000	$ 56,000	$ 41,000	$ 113,000
Total Investment Cost	$ 3,028,000	$ 5,346,000	$ 2,720,000	$ 4,147,000	$ 3,060,000	$ 8,355,000
Average Annual First Cost	$ 112,000	$ 198,000	$ 101,000	$ 154,000	$ 113,000	$ 309,000
Average Annual Increm. OMRR&R	$ 69,000	$ 206,000	$ 86,000	$ 275,000	$ 121,000	$ 480,000
Total Average Annual Cost	$ 182,000	$ 404,000	$ 187,000	$ 428,000	$ 234,000	$ 790,000
Total Average Annual Benefits	$ 1,556,000	$ 2,106,000	$ 519,000	$ 1,038,000	$ -	$ 3,143,000
Net Annual Benefits	$ 1,374,000	$ 1,702,000	$ 332,000	$ 610,000	$ (234,000)	$ 2,353,000
BCR	8.5	5.2	2.8	2.4	0.0	4.0

*Values at FY 2024 price levels amortized at the 2024 Federal discount rate of 2.75 percent.
*All Project First Costs occur in the year 2026. Benefits begin in the year 2027.

5.3 REGIONAL ECONOMIC DEVELOPMENT (RED)

The U.S. Army Corps of Engineers (USACE) Institute for Water Resources, Louis Berger, and Michigan State University have developed a regional economic impact modeling tool, RECONS (Regional ECONomic System), that provides estimates of jobs and other economic measures such as labor income, value added, and sales that are supported by USACE programs, projects, and activities. This modeling tool automates calculations and generates estimates of jobs, labor income, value added, and sales through the use of IMPLAN®'s multipliers and ratios, customized impact areas for USACE project locations, and customized spending profiles for USACE projects, business lines, and work activities. RECONS allows the USACE to evaluate the regional economic impact and contribution associated with USACE expenditures, activities, and infrastructure.

"Value Added" calculations include the sum of Local Capture, Output, Jobs presented in full-time equivalency (FTE), labor income. "Total Impact" includes the sum of direct and indirect impacts.

As shown in Table 5-5 below, Alternative 7 demonstrates the highest Total Impact (direct and secondary impact) in Local, State, and U.S. areas of impact of all the action alternatives.

Appendix E, Economics further details the local, state, and national impacts of each alternative in the final array.

Table 5-5. Regional Economic Development: Summary of Local, State, and National Impacts

Alternative	Area of Impact	Total Impact Value Added
2	Local	$1,321,224
	State	$2,223,274
	US	$4,450,571
3	Local	$2,332,821
	State	$3,925,526
	US	$7,858,157
4	Local	$1,187,200
	State	$1,997,746
	US	$3,999,107
5	Local	$1,809,993
	State	$3,045,743
	US	$6,097,000
6	Local	$1,335,379
	State	$2,247,092
	US	$4,498,251
7 - TSP	Local	$3,646,083
	State	$6,135,401
	US	$12,281,909

*Jobs are presented in full-time equivalence (FTE)
*Values at FY 2024 price levels amortized at the 2024 Federal discount rate of 2.75 percent.
*Construction occurs in the year 2026. Benefits begin in the year 2027.

5.4 ENVIRONMENTAL QUALITY (EQ) EVALUATION

Overall project related impacts would be temporary in nature with the exception of clearing wetland and upland BLH habitat. All alternatives with habitat impacts include a plan for environmental mitigation. All alternatives involve clearing less than one acre of BLH wetland scrub/shrub habitat except for Alternatives 4 and 5 which do not require any wetland clearing. BLH wetland acres would be mitigated for using BLH wetland mitigation bank credits.

All alternatives involve clearing less than 7 acres of BLH upland habitat, which would be mitigated for via the acquisition and reforestation of upland farmland in the local area. Annual monitoring and reporting by foresters for the first five years would help ensure the establishment of the new BLH upland forest.

For all other effects to the environment, all alternatives would have similar minimal impacts, which are described in the EA (*Appendix A* in this report).

5.5 OTHER SOCIAL EFFECTS (OSE) EVALUATION

The EPA's EJ Screen tool and the CEQ's Climate and Economic Justice Tool (CEJST) were used to analyze environmental justice (EJ) impacts. There are no communities of people directly in the project area, but all communities in the surrounding area would be affected equally by the proposed alternatives. For all alternatives it was determined that there would be no negative impacts to EJ.

5.6 FOUR ACCOUNTS COMPARISON

The Final Array evaluation and comparison under the Four Accounts is summarized in Table 5-6 below.

Table 5-6. Final Array Evaluation of the Four Accounts

Four Accounts	Metrics	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
NED	Net Excess Benefits	$ 1,374,000	$ 1,702,000	$ 332,000	$ 610,000	$ (234,000)	$ 2,353,000
	BCR	8.5	5.2	2.8	2.4	0.0	4.0
	Rank (Net Excess Benefits)	3rd	2nd	5th	4th	6th	1st
RED	Local Total Impact Value Added	$1,321,224	$2,332,821	$1,187,200	$1,809,993	$1,335,379	$3,646,083
	State Total Impact Value Added	$2,223,274	$3,925,526	$1,997,746	$3,045,743	$2,247,092	$6,135,401
	U.S. Total Impact Value Added	$4,450,571	$7,858,157	$3,999,107	$6,097,000	$4,498,251	$12,281,909
	Rank	5th	2nd	6th	3rd	4th	1st

Four Accounts	Metrics	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
EQ	Wetland BLH Impacted	0.72 acres	0.72 acres	0 acres	0 acres	0.57 acres	0.72 acres
	Upland Terrestrial BLH Impacted	3.25 acres	4 acres	1.2 acres	3 acres	3.5 acres	7 acres
	Assess-ment	Overall project related impacts would be similar and temporary in nature for all alternatives with the exception of clearing BLH wetland and BLH upland terrestrial habitats (listed above). All alternatives involving clearing of wetlands include a plan for mitigation. For all other effects to the environment, all alternatives would have similar minimal impacts. They are described in the attached EA for this study.					
	Rank	3rd	5th	1st	2nd	4th	6th
OSE	Assess-ment	The EPA's EJ Screen tool and the CEQ's Climate and Economic Justice Tool (CEJST) were used to analyze environmental justice (EJ) impacts. There are no communities of people directly in the project area, but all communities in the surrounding area would be affected equally by the proposed alternatives. For all alternatives it was determined that there would be no negative impacts to EJ.					
	Rank	N/A					

*Ranking of 1st indicates optimal ranking.
*Values at FY 2024 price levels and are amortized at the 2024 Federal discount rate of 2.75 percent.
*All Project First Costs occur in the year 2026. Benefits begin in the year 2027.

5.7 SCREENING THE FINAL ARRAY OF ALTERNATIVES

Screening criteria applied to the Final Array of Alternatives to select the Tentatively Selected Plan (TSP) was based on:

- Comparison of the Four Accounts (National Economic Development (NED), Regional Economic Development (RED), Environmental Quality (EQ), and Other Social Effects (OSE).
- NED Excess Benefits
- NED Benefit to Cost Ratio (BCR)

Based on the evaluation of the Four Accounts above, Alternative 7 (Widen and Lengthen Entire Channel, Relocate and Widen Turning Basin) is the TSP.

Alternative 7 is ranked 1st for both NED and RED benefits. In fact, the RED benefits paralleled the NED benefits for each Alternative. Alternative 7 is also the sponsor supported plan (SSP). There was no difference among the Alternatives in the OSE Account.

Because Alternative 7 is a combination of most other alternatives, Alternative 7 would impact the greatest area of wetlands and terrestrial habitats. Though Alternative 7 ranks last in the EQ Account evaluation, it should be noted that Alternative 7 only impacts 0.72 acres of BLH wetlands which is only 0.72 acres more than the 1st ranking EQ alternative. Alternative 7 impacts 7 acres of BLH upland terrestrial habitat, which is only 4 acres more than the 1st ranking EQ alternative. Alternative 7 showed no EQ difference from the other action alternatives for other project-related impacts, which would be temporary in nature.

Section 6
Tentatively Selected Plan

6.1 PLAN ACCOMPLISHMENTS

Alternative 7 (Widen and Lengthen Entire Channel, Relocate and Widen Turning Basin), is the Tentatively Selected Plan (TSP). Alternative 7 is also the sponsor supported plan (SSP). After selection of Alternative 7 as the recommended plan, costs were further refined. The TSP has average annual net excess benefits of $2,353,000 and a BCR of 4.0 to 1 (Table 6-1).

Table 6-1. Average Annual Costs and Benefits of TSP (Alt. 7)

Investment Cost	
First Cost	$ 8,243,000
Interest During Construction	$ 113,000
Total Investment Cost	$ 8,355,000
Average Annual Cost	
Average Annual First Cost	$ 309,000
Average Annual Incremental OMRR&R	$ 480,000
Total Average Annual Cost	$ 790,000
Benefits	
Average Annual Benefits	$ 3,143,000
Net Excess Benefits	$ 2,353,000
BCR (computed at 2.75%)	**4.0**

*Values at FY24 price levels and are amortized at the 2024 Federal discount rate of 2.75 percent.
*All Project First Costs occur in the year 2026. Benefits begin in the year 2027.

The TSP would achieve the Study's primary goal of improving economic benefits to the Port of Rosedale and the nation. The TSP meets all of the Study's planning objectives:

- Reduce transportation time and costs caused by channel width restrictions during low water conditions
- Reduce transportation time and costs caused by turning basin restrictions
- Provide sufficient fleeting area to movement of barges to and from docks
- Increase ancillary benefits to navigation safety within the channel by widening the channel to increase vessel passing distances.

6.2 TSP PLAN COMPONENTS

6.2.1 Primary Port Modifications

The TSP proposes three primary modifications to the existing port footprint:

1. Realign and widen the authorized channel limits at the existing barge facility;
2. Widen the channel for the entire length to facilitate two-way traffic and larger barge configurations; and
3. Enlarge the turning basin to support increased mobility with larger barge configurations.

The existing barge loading facility is located approximately halfway up the 2.7 mile (14,256 feet) long by 150-foot-wide navigation channel, which runs between the port and the Mississippi River. (Figure 6-1) The current authorized depth of the channel is 93 feet MSL, which is 9 feet below the Low Water of Reference (LWRP) of 102 feet.

The route to the turning basin poses certain navigational challenges when in operation. The position of the JANTRAN floating dock in the bend in the channel, creates challenges for pilots, particularly when barges that are being loaded encroach into the navigation channel. As part of the proposed alternative, the existing bend in the channel would be expanded from the currently authorized width of 150 feet to 200 feet to alleviate some of the difficulties of traversing the channel bend during busier time frames. This expansion would also permit larger barge configurations to navigate the bend more easily. The channel would also be realigned in the vicinity of the JANTRAN facility to avoid encroachments from barges that are moored at the facility for loading and unloading. The realignment would involve shifting 3,600 feet (0.68 miles) of the navigational channel 100 feet to the west.

The remaining portion of the navigation channel between the Mississippi River and the turning basin at the upper end of the port would be expanded from 150 feet to 185 feet (except for the portion mentioned above). This additional width would allow improved facilitation of two-way traffic and provide navigational support for larger barge configurations.

The final main feature of this alternative is the reconfiguration and enlargement of the existing 400 foot by 1000 foot turning basin. The new proposed configuration would lengthen the navigational channel to extend through the existing turning basin and shifts the footprint of the turning basin further upstream past its current location. The newly enlarged and relocated turning basin would measure 600 feet by 1000 feet. This increase in size allows larger barge configurations to utilize the turning basin, and its new location would provide better access to the water with more frontage for the port.

All the proposed changes and dimensions were determined based on input from the local sponsor and existing port customers. The currently authorized navigation channel elevation of 93 feet MSL would be maintained for all the modifications and limits described herein. The channel would not be deepened below the authorized Mississippi River channel depth.

The TSP does not encroach on the existing original CAP Section 107 project, nor does it take the place of any current OMRR&R responsibilities of the Sponsor. Because conditions have changed since the original Section 107 project was constructed in 1977, the TSP is not considered components of the original project.

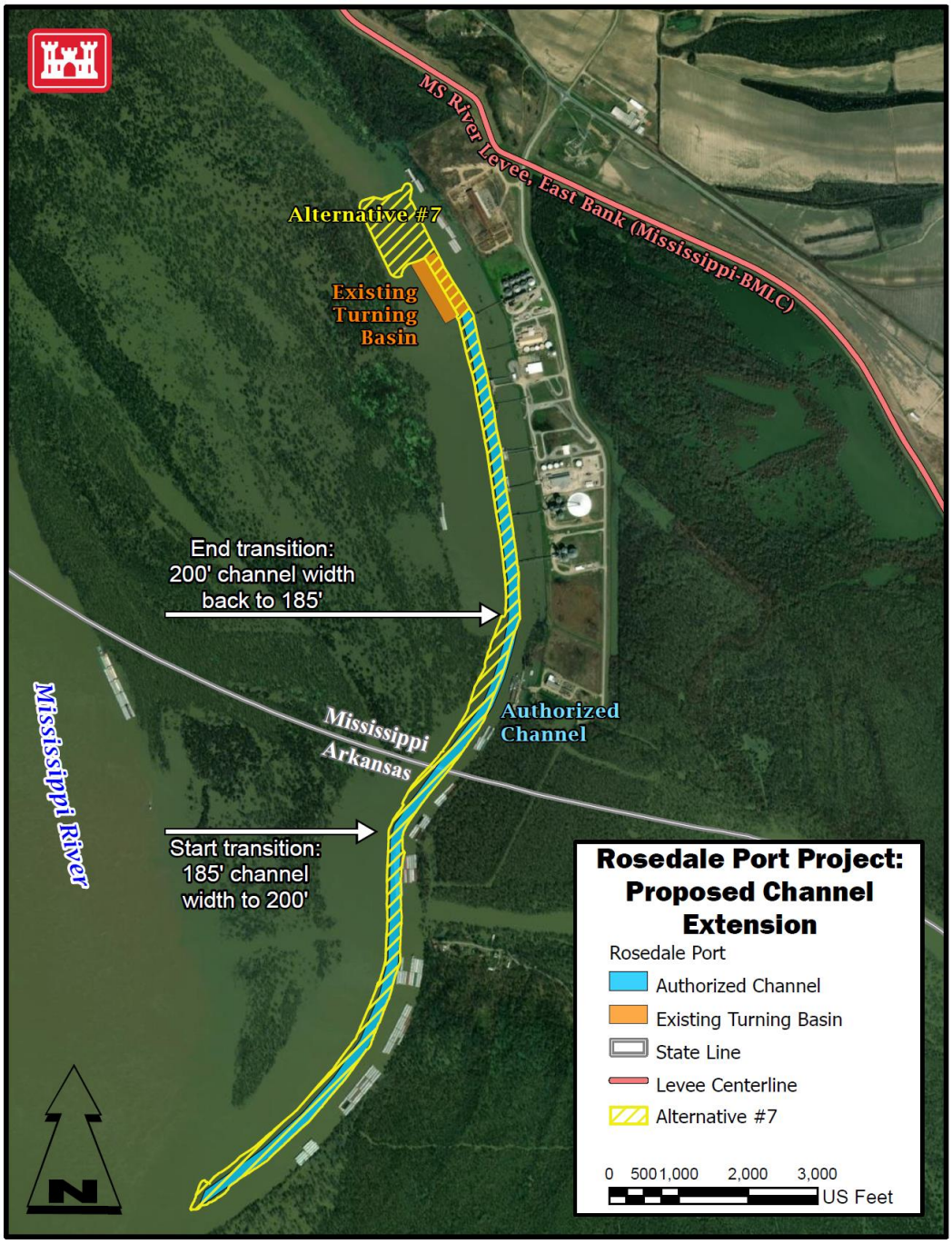

Figure 6-1. Alternative 7 – Widen Entire Channel, Lengthen Channel, Relocate and Widen Turning Basin

6.2.2 Dredged Material Disposal

A cutter head dredge would be utilized to excavate material from the navigational channel and the turning basin. All dredged material would be pumped from the cutter head and carried via a dredge pipe and cast out to the Mississippi River near the mouth of the Port Navigation Channel (Figure 6-4). The currents of the river will carry and disperse the dredge material as it travels downstream of the project area. This method of dredge material disposal is currently utilized annually for maintenance dredging of the port. The dredge pipe would be placed along the eastern side of the navigation channel as to not interfere with any ingress or egress navigation at the port. During work hours, a boat on the discharge pipe would be utilized and move the line for passing tows as needed. Because of the distance needed to pump material to the river, a booster pump would be required. The distance into the river needed to discharge all dredge material would be determined based on a hydrographic survey, and the pipe would not impact navigation on the Mississippi River.

All woody material encountered during dredging/construction will be relocated on to dry ground and burned in a burn pile within the project area or relocated under water outside of the project area.

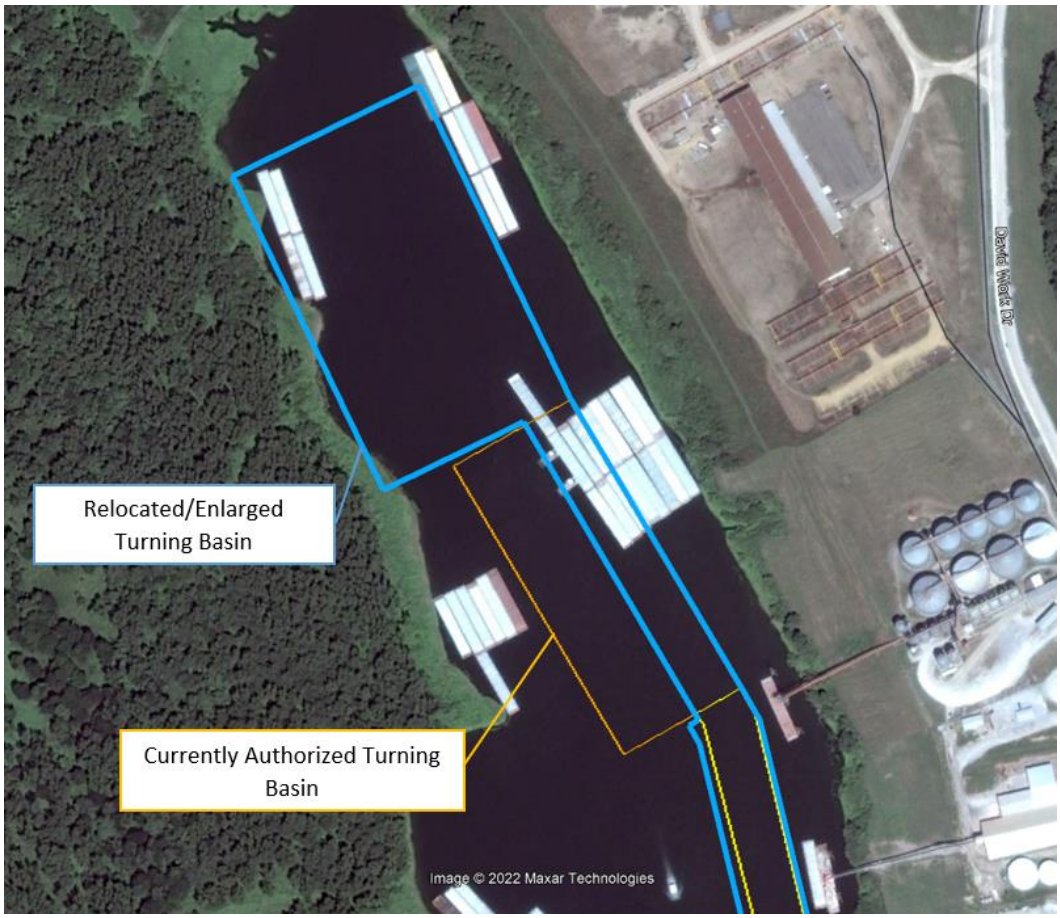

Figure 6-2. Proposed TSP Turning Basin Modifications.

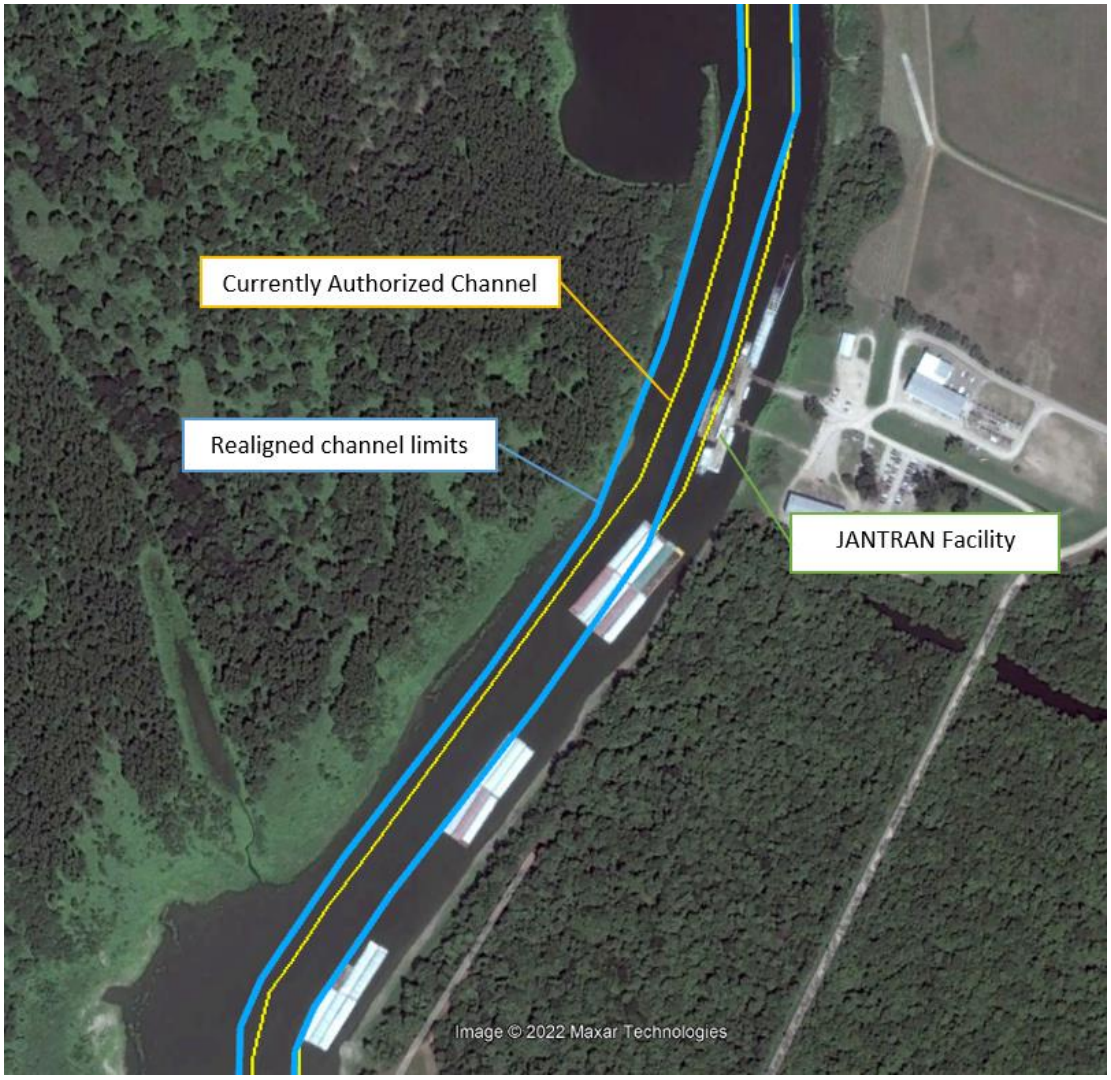

Figure 6-3. Proposed TSP Channel Modifications.

Figure 6-4. Dredge Pipe Alignment and Extent of Disposal.

6.3 COST ESTIMATE

Cost estimates for the Tentatively Selected Plan were developed at a Class 3 level of effort utilizing largely parametric unit prices from sources such as historical Government and Commercial bid data, A-E cost estimates available from design reports, RS Means Cost Data Books and other available historical cost data sources. Cost estimation methods are further described in Appendix D, *Cost Engineering*. Table 6-2 below summarizes the TSP Project First Costs. LERRDs, itemized separately here, are required only for BLH upland environmental mitigation efforts. Environmental mitigation costs for BLH wetlands and uplands are included in the "Construction" costs line item of Table 6-2 below.

Table 6-2. TSP Project First Cost

Item	Cost	Contingency	Project First Cost
Construction	$4,340,000	$2,246,818	$6,586,818
PED	$589,000	$145,895	$734,895
Supervision & Administration (Construction Mgmt.)	$359,000	$116,567	$475,567
LERRDs	$63,000	$15,750	$78,750
Total	**$5,351,000**	**$2,525,030**	**$7,876,030**

*Values at FY24 price levels and are amortized at the 2024 Federal discount rate of 2.75 percent.
*All Project First Costs occur in the year 2026. Benefits begin in the year 2027.
*Environmental mitigation costs included in the "Construction" costs line item.
*LEERD costs only apply to BLH upland environmental mitigation.

6.4 LANDS, EASEMENTS, RIGHTS-OF-WAY, RELOCATIONS, AND DISPOSAL

The estimated TSP LERRD costs only apply to BLH upland terrestrial environmental mitigation efforts.

The estimated LERRD required for the construction, operation, and maintenance of the project's TSP totals 105+/- acres. This acreage consists of 98+/- acres of lands that fall under Navigational Servitude and/or previously provided NFS right-of-way and 7+/- acres of land for upland terrestrial mitigation efforts. The entirety of the project LERRD area is held in a fee title by the Rosedale-Bolivar Port Commission and Bolivar County; therefore, no LERRD acquisition is required for the construction, operation, or maintenance of the project's TSP.

Any dredge/excavated material will be deposited in the Mississippi River channel and taken downstream, negating the need for a disposal area. To compensate for environmental impacts resulting from the construction or operation and maintenance of the project, 7 +/- acres of Port property (location to be determined) will be taken out of agricultural production and allowed to reforest naturally. The acreage will mitigate for construction efforts on upland terrestrial lands. Environmental impacts to bottomland hardwoods are considered minimal (0.72 acres worth of credits) and will be offset through the purchase of mitigation bank credits.

The total Federal and NFS real estate cost for the implementation of the TSP has been estimated to be $78,750. Federal costs are estimated at $10,000 and NFS at $68,750. The cost includes land payments and all other administrative cost affiliated with providing the necessary real estate interest to support construction, operation, and maintenance of the project (i.e., surveys, mapping, title, appraisal, NFS review/oversite, LERRD crediting, etc.).

Authorized under Section 107 of the River and Harbor Act of 1960 as amended the original Rosedale Harbor Mississippi Study published January 31,1977 called for 377 required acres for the project. Approximately 298 acres were provided to USACE as ROW for construction. Since the original acquisition the Rosedale-Bolivar Port Commission has acquired additional acreage. Today the Port maintains over 1400 acres in and along the channel.

The entirety of the project LERRDS used for construction (98+/- acres) of the proposed solution falls under the United States doctrine of Navigational Servitude and is therefore non-creditable to the NFS. Navigational Servitude will be further detailed below in this report.

There is no LERRD acquisition required for the construction, operation or maintenance of this project, as all project LERRDs either fall within Navigational Servitude or have been previously acquired by the NFS. There are no known Federally owned lands or lesser interest that lie fully or partially within the proposed project area. There would be no induced flooding as a result of implementing of the project. No homes, businesses, or farms would be displaced as a result of the proposed work, therefore no relocation assistance payments would be required. There are no known mineral recovery activities currently ongoing or anticipated, or oil/gas wells present on the project LERRD and the immediate vicinity that would impact the

construction, operation, or maintenance of the project. No acquisition of any mineral interest from the surface owner or rights outstanding in third parties will be required.

Navigation servitude is the dominant right of the Government under the Commerce Clause of the U.S. Constitution (U.S. CONST.art.I, §8,cl.3) to use, control and regulate the navigable waters of the United States and the submerged lands thereunder for various commerce-related purposes including navigation, flood control, and hydro-electric power. In tidal areas, the servitude extends to all lands below the mean high water mark or the ordinary high water line (OHWL). In non-tidal areas, the servitude extends to all lands within the bed and banks of a navigable stream that lie below the OHWL.

In order to apply Navigational Servitude, the following two criteria must be met:

1) The project must serve as an aid to commerce, such being recognized as navigation, flood control, and hydro-electric power

2) The land required for project purposes must be located below the mean or high ordinary water mark of the navigable waterway.

The project is clearly capable and currently used for interstate commerce. The LEERD area of the project falls under the ordinary high-water mark. The Port of Rosedale channel is therefore considered “Navigable Waters.” The 98+/- acres of the project’s construction LEERD is subject to Navigation Servitude and considered non-creditable.

6.5 OPERATIONS, MAINTENANCE, REPAIR, REPLACEMENT, AND REHABILITATION (OMRR&R)

Just as the previous Section 107 authorization specified, annual operations, maintenance, repair, replacement and rehabilitation (OMRR&R) of the port channel is a Federal cost. OMRR&R of the “port area”, which includes the turning basin and doc areas) is a non-Federal cost, and thus a Sponsor responsibility.

The Port has been maintained annually, and would continue to be maintained annually, at a minimum dredge depth of 9 feet below the lowest water of record (102.5 ft MSL). The TSP would increase dredging costs by 28% ($480,000 Average Annual Incremental cost, Table 5-4), resulting in a total annual dredging cost of $2,161,920.

The BLH upland terrestrial habitat impacted will require the acquisition and reforestation of 7 acres of local upland farmland. The estimated mitigation costs for this land include monitoring and reporting efforts of 2 foresters visiting annually for the first five years to help ensure the natural establishment of the new local BLH upland habitat.

6.6 COST SHARING

The Rosedale-Bolivar Port Commission is serving as the NFS for the project. As the NFS, the Port would be required to execute formal assurances in the form of a Project Partnership Agreement (PPA) with the Federal government. The PPA would define the roles and responsibilities of both agencies in the cost sharing and execution of work.

Cost sharing of Navigation projects is dependent on the depth and maintenance of intended channels and navigable waterways. Cost sharing provisions for the Preconstruction Engineering and Design (PED) phase has been determined to be 90% federal and 10% non-federal. Cost sharing for the Construction Management and Construction phase has been determined to be 80% federal and 20% non-federal.

Generally, the NFS would be required to contribute 20% of the total project implementation cost as 5% cash, work-in-kind, relocations, and/or LERRD. If the value of these contributions fails to equal or exceed 20% of the total project cost, the Port must pay additional cash in the amount necessary to attain the 20% cost sharing requirement. The Port Commission would also be responsible for the performance and cost of all relocations, alterations, or modifications to any public utilities or facilities required.

Table 6-3. Non-Federal Sponsor Cost Sharing

Item	Federal Cost	Non-Federal Cost	Total Cost
Feasibility	$100,000	$0	$100,000
FCSA (50/50)	$287,260	$287,260	$574,520
Preconstruction Engineering and Design (PED) (90/10)	$698,969	$77,663	$776,632
Construction Management and Construction (80/20)	$6,088,626	$1,522,156	$7,610,782
LERRD	$10,000	$68,750	$78,750
Total	**$7,184,854**	**$1,955,830**	**$9,140,684**

6.7 DESIGN AND CONSTRUCTION

The estimated design and construction schedule for the TSP (Alternative 7) selected for the Port of Rosedale is described below, including a water quality certification timing constraint.

Following the successful submission of this Feasibility Report and its acceptance, the PDT estimates the following timeline:

- 1.5 years for Preconstruction Engineering and Design (PED). PED would include 1.5 years required for water quality analysis and certification, which must be completed prior to construction.
- 1 year for construction.

Water quality certification and U.S. Army Engineering Research and Development Center (ERDC) testing at the proposed construction site, is typically a lengthy process, in this case estimated at 1.5 years minimum in anticipation of the involvement of two state agencies in two separate EPA regions.

The Mississippi River forms the political boundary between the State of Mississippi (MS) and the State of Arkansas (AK). Material dredged during Port construction will be discharged into the swift moving waters of the Mississippi River main channel. In doing so, the discharge could cross the AK state line, which will likely trigger additional water quality analysis. Crossing the state line from MS to AK also implies crossing from EPA Region 4 to EPA Region 6. Coordinating water quality certification efforts among different EPA regions and different states could add schedule delays before construction.

The water quality certification would initiate with a funding agreement for water quality certification with the NFS for the recommended plan. A Quality Assurance Project Plan (QAPP) would be developed with the Mississippi Department of Environmental Quality (MDEQ) and the Arkansas Department of Environmental Quality (ADEQ). Then a contract would be secured with ERDC to administer the QAPP testing protocols related to the recommended plan.

The field work and laboratory testing results form the basis of the water quality certification applications that would be submitted to the two state agencies (MDEQ, ADEQ). The field work and lab analysis alone typically takes 6 months.

The existing Water Quality Certification for current dredging maintenance practices in the Port will also need to be expanded, as the footprint of the dredging operations will change. This will also add time to the schedule before construction.

Water quality certification cannot begin until near the end of PED because this certification requires a fairly completed design and intent.

6.8 ENVIRONMENTAL COMMITMENTS

The USFWS DCAR is Attachment 3 in Appendix A, *Environmental Engineering*.

6.9 ENVIRONMENTAL OPERATING PRINCIPLES

The U.S. Army Corps of Engineers (USACE) Environmental Operating Principles (EOPs) were developed to ensure that USACE missions include totally integrated sustainable environmental practices. The EOPs, introduced in 2022, provided corporate direction to

ensure the workforce recognizes USACE's role in, and responsibility for, sustainable use, stewardship, and restoration of natural resources across the nation.

The re-energized Environmental Operating Principles include:

- Foster sustainability as a way of life throughout the organization.
- Proactively consider environmental consequences of all USACE activities and act accordingly.
- Create mutually supporting economic and environmentally sustainable solutions.
- Continue to meet our corporate responsibility and accountability under the law for activities undertaken by USACE, which may impact human and natural environments.
- Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.
- Leverage scientific, economic and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner.
- Employ an open, transparent process that respects views of individuals and groups interested in USACE activities.

The concepts embedded in the original EOPs remain vital to the success of USACE and its missions.

In this Study, the PDT considered the USACE EOPs throughout the planning process. For example, beneficial use of dredged material was seriously considered as a measure in an effort to enhance environmental sustainability. The PDT ensured NEPA compliance and collaborated with SHPO, USFWS, and other environmental and cultural resources partners. The PDT investigated potential HTRW concerns. The PDT considered environmental risks when conducting risk assessments such as the Abbreviated Risk Analysis.

The PDT made every effort to ensure the proposed project is economically sustainable. For example, the PDT opted not to dredge deeper than 9 feet below the LWRP to ensure that future dredging maintenance operations could maintain the project as implemented.

The PDT leveraged scientific, economic and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner.

6.10 VIEWS OF THE NON-FEDERAL SPONSOR

In a letter dated January 23, 2018, the Rosedale-Bolivar County Commission requested assistance from the USACE under the Section 107 authority to undertake an investigation involving the risk to navigation with the Port of Rosedale channel. The Rosedale Bolivar County Port Commission indicated its understanding of the provisions of the Section 107 authority and its willingness to cost share the project. On February 27, 2020 the Port of Rosedale sent and updated Letter of Intent.

There is no known landowner or public opposition to the project. Implementation of the TSP would be beneficial to all adjacent landowners, tenants, and Port partners.

6.11 RISK AND UNCERTAINTY

Risk and uncertainty are intrinsic in water resources planning and design. This section describes various risks that could later impact construction schedule or costs. These risks were accounted for in cost and schedule contingency estimates and have therefore been factored into the total cost of the TSP. None of the risks identified below are considered to be serious risks.

PED and Construction Schedule and Cost Risks

- Medium Risk
  - Water quality sampling, laboratory work, and certifications needed in both the States of Mississippi and Arkansas (also in two separate EPA regions) risk schedule delays between PED and construction. See Section 6.7 in this Report for further detail.
  - If heavy metals are found in dredged material, then limitations on disposal could be imposed, potentially adding time and cost to construction. There is a marine fabrication facility nearby (northern end) that could cause heavy metals to be found in dredged material.
  - A high-water event could cause additional mobilization/demobilization costs.
  - If the amount of dredge material increases, then costs could increase. Lidar and hydrographic surveys were taken. The PDT is fairly confident in the Lidar data, however some time has passed since these surveys were taken.
  - Fuel rates, inflation, and access to material and labor are issues that could increase cost and extend schedule.

- Low Risk
  - Turbidity monitoring could be needed and could affect productivity.
  - Cultural findings could cause additional time and costs for PED or construction.
  - Dredging restrictions for sturgeon spawning are known and would be included in the contract, so it is unlikely to affect cost.
  - The lack of geologic and geotechnical site characterization during feasibility results in significant some uncertainty and the risk of materially differing site condition Request for Equitable Adjustments (REAs) and Claims during construction.

Section 7
Environmental Compliance

7.1 ENVIRONMENTAL COMPLIANCE TABLE

Environmental compliance for the proposed action would be achieved based upon coordination of this EA and FONSI with all appropriate agencies, organizations, and individuals for their review and comments. The FONSI would not be signed until the proposed action achieves environmental compliance with applicable laws and regulations.

This section contains a description of relevant resources that could be impacted by the project. The important resources described are those recognized by laws, executive orders, regulations, and other standards of national, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the public. Table 7-1 provides summary information of the institutional, technical, and public importance of these resources.

The following relevant resources are discussed in this report: navigation, wetlands, scrub-shrub, wildlife, aquatic resources/fisheries, threatened and endangered species, water quality, air quality, cultural resources, and environmental justice concerns.

Table 7-1. Relevant Resources and Their Institutional, Technical, and Public Importance

Resource	Institutionally Important	Technically Important	Publicly Important
Navigation	Rivers and Harbors Act of 1899 and River and Harbor Flood Control Act of 1970 (PL 91-611).	N/A	Navigation concerns affect area economy and are of significant interest to community.
Wetlands	Clean Water Act of 1977, as amended; Executive Order 11990 of 1977, Protection of Wetlands; Coastal Zone Management Act of 1972, as amended; and the Estuary Protection Act of 1968., EO 11988, and Fish and Wildlife Coordination Act.	Wetlands provide necessary habitat for various species of plants, fish, and wildlife; they serve as ground water recharge areas; they provide storage areas for storm and flood waters; they serve as natural water filtration areas; they provide protection from wave action, erosion, and storm damage; and they provide various consumptive and non-consumptive recreational opportunities.	The high value the public places on the functions and values that wetlands provide. Environmental organizations and the public support the preservation of marshes.
Aquatic Resources/ Fisheries	Fish and Wildlife Coordination Act of 1958, as amended; Clean Water Act of 1977, as amended; Coastal Zone Management Act of 1972, as amended; and the Estuary Protection Act of 1968.	Aquatic resources/Fisheries are a critical element of many valuable freshwater and marine habitats; they are an indicator of the health of the various freshwater and marine habitats; and many species are important commercial resources.	The high priority that the public places on their esthetic, recreational, and commercial value.

Resource	Institutionally Important	Technically Important	Publicly Important
Wildlife	Fish and Wildlife Coordination Act of 1958, as amended and the Migratory Bird Treaty Act of 1918	Wildlife is a critical element of many valuable aquatic and terrestrial habitats; they are an indicator of the health of various aquatic and terrestrial habitats; and many species are important commercial resources.	The high priority that the public places on the esthetic, recreational, and commercial value of wildlife.
Threatened and Endangered Species	The Endangered Species Act of 1973, as amended; the Marine Mammal Protection Act of 1972; and the Bald Eagle Protection Act of 1940.	USACE, USFWS, NMFS, NRCS, EPA, LDWF, and LDNR cooperate to protect these species. The status of such species provides an indication of the overall health of an ecosystem.	The public supports the preservation of rare or declining species and their habitats.
Cultural Resources	National Historic Preservation Act of 1966, as amended; the Native American Graves Protection and Repatriation Act of 1990; and the Archeological Resources Protection Act of 1979	State and Federal agencies document and protect sites. Their association or linkage to past events, to historically important persons, and to design and construction values; and for their ability to yield important information about prehistory and history.	Preservation groups and private individuals support protection and enhancement of historical resources.
Greenhouse Gas Emissions	Executive Order 13990.	Need to use science to reduce greenhouse gas emissions and bolster resilience to the impacts of climate change.	Virtually all citizens express a desire for clean air.
Water Quality	Clean Water Act of 1977, Fish and Wildlife Coordination Act, Coastal Zone Mgt Act of 1972, and Louisiana State & Local Coastal Resources Act of 1978.	USACE, USFWS, NMFS, NRCS, EPA, and State DNR and wildlife/fishery offices recognize value of fisheries and good water quality and the national and state standards established to assess water quality.	Environmental organizations and the public support the preservation of water quality and fishery resources and the desire for clean drinking water.
Environmental Justice	Executive Orders 12898, 13990, & 14008, Federal Actions to Address Environmental Justice in Communities of Color and People Experiencing Poverty, and the Department of Defense's Strategy on Environmental Justice of 1995, & Tackling the climate crisis at home and abroad 2021.	The social and economic welfare of communities of color and people experiencing poverty may be positively or disproportionately impacted by the preferred plan.	Public concerns about the fair and equitable treatment (fair treatment and meaningful involvement) of all people with respects to environmental and human health consequences of federal laws, regulations, policies, and actions.

The following resources have also been considered and found to not be affected by any alternative under consideration: coastal zone, essential fish habitat, beaches, floodplain management, prime or unique farmland, Gulf water bottoms, public use of lands, unique or rare wildlife habitat, Indian trust resources, and soundscapes/noise.

7.2 PUBLIC INVOLVEMENT

7.2.1 Scoping

All the proposed changes and dimensions incorporated into the alternatives were determined based on input from the NFS and existing Port customers. The Sponsor was included in the initial charrette.

7.2.2 Agency Coordination

Preparation of this draft EA and a draft FONSI have been coordinated with appropriate Congressional, Federal, Tribal, state, and local interests, as well as environmental groups and other interested parties. The following agencies, as well as other interested parties, have received copies of the draft EA and draft FONSI:

U.S. Fish and Wildlife Service
U.S. National Park Service
EPA, Region IV
Natural Resources Conservation Service
Advisory Council on Historic Preservation
Mississippi Department of Wildlife and Fisheries
Mississippi Department of Environmental Quality
Mississippi State Historic Preservation Officer (MSSHPO)
Arkansas State Historic Preservation Officer (ARSHPO)

7.2.3 Tribal Consultation

The USACE, as a federal agency, is required, pursuant to Executive Order 13175, NEPA, as amended (42 U.S.C. Sections 4321 et seq), Section 106 of the NHPA, as amended, (54 U.S.C. Section 306108) and its implementing regulations, (38 CFR Part 800) and Section 110 of the NHPA, to assume responsibility for the preservation of historic properties or resources that fall under USACE jurisdiction and that such properties are maintained and managed in a way that considers the preservation of the historic, archeological, architectural, and cultural values.

The NHPA Section 106 process, implemented by regulations of the Advisory Council on Historic Preservation, 36 CFR § 800, requires agencies to define a project's APE, identify historic properties in that area that may be directly or indirectly affected by the project, assess the potential for adverse effects, resolve those adverse effects, and provide the Advisory Council on Historic Preservation a reasonable opportunity to comment on the undertaking.

The consideration of impacts to historic and cultural resources is mandated under § 101(b)(4) of NEPA as implemented by 40 C.F.R. Parts 1501-1508. NEPA calls for the consideration of a broad range of historic and cultural resources, including sites of religious and cultural importance to federally recognized Tribal governments. Cultural resources include historic properties, archeological resources, and Native American resources including sacred sites and traditional cultural properties. Common cultural resource sites include prehistoric Native American archeological sites, historic archeological sites, shipwrecks, and structures such as bridges and buildings. Historic properties have a narrower meaning and are defined in § 101(a)(1)(A) of the NHPA; they include districts, sites (archaeological and religious/cultural), buildings, structures, and objects that are listed in or determined eligible for listing in the NRHP. Historic properties are identified by qualified agency representatives in consultation with SHPO, Tribes, and other consulting parties.

In compliance with NHPA Section 106, CEMVK initiated Section 106 consultation for a No Historic Properties Affected determination for the Proposed Action (Proposed Undertaking) as described in the CEVMK correspondence dated August 25, 2023, to the AR SHPO, MS SHPO, and the following Tribes:

Absentee-Shawnee Tribe of Indians of Oklahoma
Alabama Coushatta Tribe of Texas
Alabama-Quassarte Tribal Town
Apache Tribe of Oklahoma
Caddo Nation
Chickasaw Nation
Choctaw Nation of Oklahoma
Coushatta Tribe of Louisiana
Eastern Band of Cherokee Indians
Eastern Shawnee Tribe of Oklahoma
Jena Band of Choctaw Indians
Kialegee Tribal Town
Kickapoo Tribe of Oklahoma
Mississippi Band of Choctaw Indians
Muscogee (Creek) Nation
Osage Nation
Ponca Tribe of Indians of Oklahoma
Quapaw Nation
Seminole Nation of Oklahoma
Thlopthlocco Tribal Town
Tunica-Biloxi Tribe of Louisiana
United Keetoowah Band of Cherokee

Concurrence responses to USACE's determination of No Historic Properties Affected have been received from the following consulting parties: the Mississippi Band of Choctaw Indians on September 5, 2023; the Quapaw Nation on September 11, 2023; the AR SHPO on September 21, 2023; the MS SHPO on September 22, 2023; and the Choctaw Nation of Oklahoma on October 3, 2023 (see Attachment 6, Appendix A). Upon receipt of these responses, USACE considers the Section 106 consultation process complete.

7.2.4 Public Comments Received and Responses

At this time, the Report has not been released for public review.

Section 8
Summary and Conclusions

A Continuing Authorities Program (CAP) Section 107 Feasibility Study and Environmental Assessment (EA) was conducted to evaluate potential alternatives to reduce excess fleeting costs and time incurred in the Port of Rosedale (the Port) during low water conditions and reduce potential navigation safety risks. The Port is located in Bolivar County, 2 miles south of Rosedale, Mississippi at the confluence of the Arkansas River and the lower Mississippi River. The Port serves as a critical location for towboat changes for all barge traffic moving between the McClellan-Kerr Arkansas River Navigation System (MKARNS) and the Mississippi River.

At present, when the lower Mississippi River reaches 10 feet on the Arkansas City gauge, the entire fleet of barges must be moved from the Port out to the shorelines on the Mississippi River. The Port channel becomes just wide enough to allow only one harbor boat and one barge to pass through the channel at a time, causing excess cost and time for fleeting vessels and increasing safety risks.

After evaluating ten alternatives in the Initial Array, the Project Design Team (PDT) selected the proposed Tentatively Selected Plan (TSP). The TSP involves the widening and lengthening the Port of Rosedale (Port) channel and shifting and widening the turning basin. Dredged material would be cast to the Mississippi River at downstream side of the Port channel mouth.

The TSP addresses the current navigation challenges and safety risks in the Port of Rosedale, especially during low water conditions. The TSP is also the Sponsor-supported plan. The TSP does not encroach on the existing original CAP Section 107 project, nor does it take the place of any current OMRR&R responsibilities of the Sponsor. Because conditions have changed since the original Section 107 project was constructed in 1977, the TSP is not considered components of the original project.

The TSP has Net Excess Benefits of $2,353,000 and a Benefit-Cost Ratio (BCR) of 4.0. The PDT assumed values at a FY 2024 levels and amortized at the 2024 Federal Discount Rate of 2.75 percent. The PDT assumed that construction occurs in the year 2026 with benefits beginning in the year 2027.

The Main Report and EA include input from the Non-Federal Sponsor (NFS), other Federal and non-Federal Agencies, and the public.

An environmental analysis has been conducted by the Vicksburg District for the with-project alternatives to address the impacts associated with the Port expansion. The potential impacts of the TSP were considered, and it was determined that the TSP would not results in significant impacts to air quality, water quality, aquatic resources, waterfowl resources, threatened and

endangered species, recreation, or aesthetics. There were no significant concerns with HTRW, cultural resources, or environmental justice issues.

However, some adverse impacts to 0.72 acres of bottomland hardwood (BLH) wetlands and 7 acres of BLH terrestrial upland forest would result from the construction of the Project and would require mitigation actions. The TSP would result in both short- and long-term impacts. Therefore 7.3 mitigation credits would be required for BLH wetland mitigation, estimated at $3,400 each for a total mitigation cost of $24,820. The 7 acres of upland BLH would require the acquisition and reforestation of 7 acres of upland farmland. The total mitigation costs of the BLH upland habitat are $102,320, including needed LEERDs, monitoring and reporting. Total combined BLH wetland and upland mitigation costs are $127,140.

Section 9
List of Preparers

This Draft Section 533(D) Report and Environmental Assessment, were prepared by the U.S. Army Corps of Engineers Lead Planner (New Orleans District; Regional Planning and Environment Division South, MVN-PD; 7400 Leake Avenue, New Orleans, Louisiana 70118) and Environmental Manager (Vicksburg District, 4155 Clay St, Vicksburg, MS 39183), respectively.

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Environmental Manager, Vegetation Resources, Aquatic Resources and Fisheries, Wildlife, Threatened, Endangered, and Protected Species, Geology, Water Quality, Appendices	Taylor Piefke
Plan Formulation	Demetria Christo
Economics	Matt Napolitano
Socioeconomics	Matt Napolitano
Geographic Information System	Bill Sisneros
Threatened and Endangered Species Coordination	Taylor Piefke
Water Quality, 404 (b)(1)	Sara Thames
Cultural Resources, Tribal Consultation	John Underwood
Aesthetics	Taylor Piefke
Recreation & Environmental Justice	Taylor Piefke
Air Quality, HTRW	Brian Johnson
Cumulative Impacts	Taylor Piefke
District Quality Control	Brandon Davis
Project Manager	Barry Moore
Engineering	Colby Yarbrough
Hydrology & Hydraulics	Brian Johnson

Section 10
References and Resources

Project References:

Alvey, Jeffrey S., and Keith A. Baca., 2012, *A Phase I Cultural Resources Survey of a Proposed New Boating Access Facility on the Mississippi River in S21, T23N, R8W, Bolivar County, Mississippi, MDAH Project Log #04-108-12*. Cobb Institute of Archaeology, Mississippi State University. Submitted to Mississippi Department of Wildlife, Fisheries, and Parks, Jackson, Mississippi. Report on file at the MDAH, Jackson, Mississippi (MDAH Report No.12-0307).

Baca, Keith A., and Jeffrey S. Alvey., 2017, *A Phase I Cultural Resources Survey in Association with the Proposed Rosedale Industrial Park Development, Bolivar County, Mississippi*. Cobb Institute of Archaeology, Mississippi State University. Submitted to Eley-Barkley Engineering and Architecture, Cleveland, Mississippi. Report on file at the MDAH, Jackson, Mississippi (MDAH Report No. 17-0108).

Brockington and Associates, Inc. Submitted to Pickering Firm, Inc., 2013, *A Cultural Resources Survey of 141 Acres for Improvements to the Port of Rosedale, Desha County, Arkansas, and Bolivar County, Mississippi*. Brockington and Associates, Inc. Submitted to Pickering Firm, Inc.

Cobb Institute of Archaeology, Mississippi State University, 2012, *A Phase I Cultural Resources Survey of a Proposed New Boating Access Facility on the Mississippi River in S21, T23N, R8W, Bolivar County, Mississippi, MDAH Project Log #04-108-12*. Cobb Institute of Archaeology, Mississippi State University.

Cobb Institute of Archaeology, Mississippi State University, 2017, *A Phase I Cultural Resources Survey in Association with the Proposed Rosedale Industrial Park Development, Bolivar County, Mississippi*. Cobb Institute of Archaeology, Mississippi State University.

Futch, Jana J., and Steven Rabbysmith., 2013. *A Cultural Resources Survey of 141 Acres for Improvements to the Port of Rosedale, Desha County, Arkansas, and Bolivar County, Mississippi*. Brockington and Associates, Inc. Submitted to Pickering Firm, Inc. Report on file at the MDAH, Jackson, Mississippi (MDAH Report No. 13-0717).

Junk, Wolfgang & Bayley, Peter & Sparks, Richard., 1989. The Flood Pulse Concept in River-Floodplain Systems. (1989). The Flood Pulse Concept in River-Floodplain Systems. Can. Spec. Public Fish. Aquat. Sci. 106.

U.S. Army Corps of Engineers, 1977, *Rosedale Harbor Mississippi Detailed Project Report Feasibility Report and Environmental Assessment*, Rosedale, Mississippi. United States Army Corps of Engineers (USACE), 31 January 1977.

U.S. Army Corps of Engineers, 1980, *Layout and Design of Shallow Draft Waterways*, Engineering Manual 1110-2-1611, Department of the Army, Washington D.C., 22 April 2000.

U.S. Water Resources Council, 1983, *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies, 10 March 1983.*

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

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, 2018 *Mississippi River and Tributaries Flowline Assessment Hydraulics Report,* MRG&P Report No. 24; Volume 3, December 2018.

U.S. Army Corps of Engineers, 2019, *Continuing Authorities Program*, Engineering Pamphlet 1105-2-58, Department of the Army, Washington D.C., 01 March 2019.

U.S. Army Corps of Engineers, 2019, *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, 2022, *Construction Equipment Ownership and Operating Expense Schedule, Region III*, Engineering Pamphlet 1110-1-8, Department of the Army, Washington D.C., January 2022.

U.S. Army Corps of Engineers, 2020, *Mississippi River Mainline Levee (MRL) Supplemental Environmental Impact Statement (SEIS II)*, November 2020.

Section 11
List of Acronyms and Abbreviations

ADEQ	Arkansas Department of Environmental Quality
AK	State of Arkansas
APE	Area of Potential Effect
BCR	Benefit-Cost Ratio
CAP	Continuing Authorities Program
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act of 1972
CZMA	Coastal Zone Management Act of 1972
DCAR	Draft Coordination Act Report
EO	Executive Orders
EP	Engineering Pamphlet
EPA	Environmental Protection Agency
ER	Engineering Regulation
ERDC	U.S. Army Engineer Research and Development Center
ESA	Environmental Site Assessment
FWCA	Fish and Wildlife Coordination Act
HTRW	Hazardous, Toxic, and Radioactive Waste
HUC	Hydrologic Unit Code
LERRD	Lands, Easements, Rights-of-Way, Relocations, and Dredged or Excavated Material Disposal Areas
LOI	Letter of Intent
LWRP	Low Water Reference Plane

MDAH	Mississippi Department of Archives and History
MDEQ	Mississippi Department of Environmental Quality
MDWFP	Mississippi Department of Wildlife, Fish and Parks
MDNR	Mississippi Department of Natural Resources
MKARNS	McClellan-Kerr Arkansas River Navigation System
MS	State of Mississippi
MSL	Mean Sea Level
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NFS	Non-federal Sponsor
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
OMRR&R	Operations, Maintenance, Repair, Replacement and Rehabilitation
P&G	Planning and Guidance
PED	Preconstruction Engineering and Design
RBCC	Rosedale-Bolivar County Commission
RECs	Recognized Environmental Conditions
SHPO	State Historic Preservation Office
SSP	Sponsor Supported Plan
TSP	Tentatively Selected Plan
USACE	United States Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WRDA	Water Resources Development Act