

## Section 1. The Study and Report

### 1. Study Authority

The Bayou Sorrel Lock, Louisiana feasibility study is being conducted in accordance with the following resolutions and previously authorized projects:

- a. A resolution adopted by the Committee on Public Works of the United States Senate on September 29, 1972, at the request of Senators Long and Edwards of Louisiana, which states that the:

*“ . . . Board of Engineers for Rivers and Harbors, be, and is hereby, requested to review the reports on the Gulf Intracoastal Waterway (Louisiana-Texas Section, including the Morgan City-Port Allen Route) submitted in House Document 556, 87<sup>th</sup> Congress, Second Session, and subsequent reports, with a view to determining the advisability of modifying the existing project in any way at this time, particularly with regard to widening and deepening the existing and/or authorized channel.”*

- b. A resolution adopted by the Committee on Public Works of the United States House of Representatives on October 12, 1972, at the request of Congressman Jack Brooks of Texas, which states that the:

*“ . . . Board of Engineers for Rivers and Harbors, be, and is hereby, requested to review the reports on the Gulf Intracoastal Waterway (Louisiana-Texas Section, including the Morgan City-Port Allen Route) submitted in House Document 556, 87<sup>th</sup> Congress, Second Session, and subsequent reports, with a view to determining the advisability of modifying the existing project in any way at this time, particularly with regard to widening and deepening the existing and/or authorized channel.”*

- c. The Flood Control Act of 1928 (Public Law 70-391), as amended, authorized the Flood Control, Mississippi River and Tributaries Project, including the Atchafalaya Basin, Louisiana project feature. Bayou Sorrel Lock is a feature of the Atchafalaya Basin, Louisiana project.

### 2. Purpose and Scope

The purpose of this study is to develop a plan for modifying Bayou Sorrel Lock to safely pass the project flood in the Atchafalaya Basin Floodway and to determine the feasibility of increasing the capacity of the lock to reduce delays to barge tows on the Gulf Intracoastal Waterway system.

The scope of this feasibility study is limited to the development of measures to pass the project flood in the Atchafalaya Basin Floodway at Bayou Sorrel Lock and to the feasibility of

capacity increases only at Bayou Sorrel Lock. Bayou Sorrel Lock is deficient in grade and must be modified to pass the project flood. There are other structures in the Atchafalaya Basin, Louisiana Project that are also deficient in grade relative to the project flood flowline; however, the deficiencies of the other structures are being addressed under the authority for project construction.

A reconnaissance study, Intracoastal Waterway Locks, Louisiana, completed in May 1992, concluded that there was an immediate need for a capacity increase at Bayou Sorrel Lock. The modification of Bayou Sorrel Lock to pass the project flood is being addressed in this feasibility study, instead of solely under the authority for the construction of the Atchafalaya Basin, Louisiana project, as the modification will accomplish a multipurpose plan addressing flood control and navigation improvements. The development of a multipurpose plan for the flood control and navigation associated with Bayou Sorrel Lock provides an opportunity for savings in the implementation costs when compared to those for separate flood control and navigation plans.

### 3. Prior Studies, Reports, and Existing Projects

- a. **Flood Control, Mississippi River and Tributaries Project.** The Flood Control, Mississippi River and Tributaries (MR&T) Project is a comprehensive project for the control of floods in the alluvial valley of the Mississippi River between Cape Girardeau, Missouri and Head of Passes, Louisiana. The MR&T project includes a combination of features such as: levees along the main stem of the Mississippi River and its tributaries in the alluvial plain to confine floodflows; reservoirs on the tributaries to store excess floodflows; floodways; and improvements to increase channel capacity, such as revetting, diking, and dredging. Other features include, without limitation, control structures, cutoffs, pumping plants, locks, floodwalls, and floodgates. The project is designed to convey a project flood safely to the Gulf of Mexico. Features of the MR&T project pertinent to this study are:
  - (1) **The Morganza Floodway.** The Morganza Floodway is the east side artificial intake for the Lower Atchafalaya Basin Floodway extending from the Mississippi River to the latitude of Krotz Springs. It is bounded on the east by the Morganza Floodway lower guide levee and on the north and west by the Morganza Floodway upper guide levee and the east Atchafalaya River Levee. The Morganza Floodway comprises an area of 68,000 acres. Across the head of the floodway is a gated control structure almost  $\frac{3}{4}$  mile long. The floodway is used only to pass flood flows and has been operated only once, in 1973. The design capacity of the Morganza control structure and floodway is 600,000 cubic feet per second.
  - (2) **The Atchafalaya Basin Floodway.** The Lower Atchafalaya Basin Floodway covers an area about 14 miles wide by 65 miles long, extending from about the latitude of Krotz Springs to the approximate latitude of Morgan City. The floodway is bounded on the east by the East Atchafalaya Basin Protection

Levee (EABPL) and on the west by the West Atchafalaya Basin Protection Levee (WABPL). The WABPL originates near Hamburg, Louisiana, at a junction with the Bayou des Glaives fuseplug levee and proceeds in a southerly direction, terminating south of Berwick, Louisiana. The EABPL emanates from its intersection with the Morganza Floodway lower guide levee near Lottie, Louisiana, and continues generally southward through Morgan City and along the Lower Atchafalaya River to Avoca Island Cutoff. The design capacity of the floodway is 1,500,000 cubic feet per second.

- (3) **The East Atchafalaya Basin Protection Levee (EABPL).** The EABPL begins at the lower end of the Morganza Floodway lower guide levee and extends southward through Morgan City to Avoca Island Cutoff and includes Bayou Sorrel and Bayou Boeuf Locks. The length of this levee is 87.2 miles, including about 17.2 miles of floodwall in the vicinity of Morgan City.
- (4) **Bayou Sorrel Lock.** Bayou Sorrel Lock passes vessel traffic moving on the GIWW, Port Allen-to-Morgan City Alternate Route through the EABPL. Bayou Sorrel Lock was completed in 1951. The existing structure has a clear width of 56 - feet and a chamber length of 790-feet. The sill of the lock is at elevation -14.8 NGVD; the top of the concrete walls is at elevation +24.0 NGVD. In each concrete gate bay are two 60 degree steel sector gate leaves that are electrically operated.

- b. **General Design Memorandum, Flood Control, Mississippi River and Tributaries, Atchafalaya Basin Floodway System, Louisiana, July 1963.** This general design memorandum address problems related to safely passing the Atchafalaya Basin design flood of 1,500,000 cubic feet per second. Changed conditions resulting from sediment deposition indicated a need for reexamination of the project flood flow lines. This in turn required the height of east and west protection levees along with several structures to be increased. Bayou Sorrel Lock is one of the structures identified in the GDM as needing modifications. At that time the project design flow line was 25 m.s.l. The GDM was approved by the Mississippi River Commission and the Chief, Engineering Division, Civil Works "as a basis for further engineering analysis, for development of pertinent construction proposals, and for cost estimating required for planning and programming purposes. Modification required: "Install permanent concrete parapet. Install steel plate closure on gate to elevation 27 m.s.l...."
- c. **Flood Control, Mississippi River and Tributaries, Atchafalaya Basin, Louisiana – Lower Atchafalaya Basin Reevaluation Feasibility Study.** The purpose of this study is to reevaluate the flood control features authorized by the Chief of Engineers in his February 1983 endorsement of the report, Atchafalaya Basin Floodway System, Louisiana, Floodway System, dated January 1982. Recommendations in the draft reevaluation report that could affect the project flood flowline for the Atchafalaya Basin, Louisiana project

are that the following features authorized in 1983 not be implemented: (1) the widening of the Wax Lake Outlet overbank area for conveyance of flood flows, (2) channel training works below Morgan City, (3) control of the distribution of flows between the Lower Atchafalaya River and the Wax Lake Outlet, and (4) the extension of the Avoca Island Levee along the east bank of the Lower Atchafalaya River south of Morgan City. The net effect of this recommendation is that there will be no further modifications of the Atchafalaya Basin, Louisiana project that will have any effects on the project flood flowline in the vicinity of Bayou Sorrel Lock.

- d. **MR&T Atchafalaya Basin, Louisiana Project Flood Flow Line Design Memorandum No. 1, Hydraulic Design.** The Design Memorandum (DM), completed in January 1987, presented the results of a reanalysis of the then-authorized project flood flow line, based on projections of channel development and sedimentation in the Atchafalaya Basin Floodway system. The design memorandum recommended a revised project flood flowline and presented the effects of the revised flowline on the features of the Atchafalaya Basin, Louisiana project. The revised project flood flowline approved in this design memorandum is the current design project flowline for the Atchafalaya Basin, Louisiana project. It has an elevation of 28.7 NGVD in the vicinity of Bayou Sorrel Lock. The elevation of the top of the lock walls is 24 feet, NGVD.
- e. **Gulf Intracoastal Waterway.** The Gulf Intracoastal Waterway (GIWW) traces the U.S. coast along the Gulf of Mexico from Apalachee Bay near St. Marks, Florida to the Mexican border at Brownsville, Texas. Mile 0.0 of the GIWW intersects the Mississippi River at mile 98.2 Above Head of Passes (AHP), the location of Harvey Lock, and extends eastward for approximately 376 miles and westward for approximately 690 miles. In addition to the mainstem, the GIWW includes a major alternate channel, 64 miles long, which connects Morgan City, Louisiana, to Port Allen, Louisiana, at Mississippi River mile 227.6 AHP. Bayou Sorrel Lock passes inland waterway traffic on this alternate route through the East Atchafalaya Basin Protection Levee. The GIWW also includes a parallel mainstem channel, 9.0 miles long, which joins the Mississippi River at mile 88.0 AHP, the location of Algiers Lock, to the mainstem at GIWW West mile 6.2 (6.2 miles west of the Mississippi River). Project dimensions for the mainstem channel and the alternate route are 12 feet deep and 125 feet wide, except for the reach between the Mississippi River and Mobile Bay, which is 150 feet wide. Numerous side channels and tributaries intersect both the eastern and western mainstem channel providing access to inland areas, coastal harbors, and the Gulf of Mexico.
- f. **Intracoastal Waterway Locks, Louisiana Reconnaissance Study.** The reconnaissance study, which was completed in May 1992, focused on determining the need for increasing the capacity of locks located on the GIWW

system west of the Mississippi River. The report included a recommendation to proceed with feasibility studies based on an immediate need for increases in the capacities of Bayou Sorrel Lock and Calcasieu Lock to pass inland navigation traffic. The Bayou Sorrel Lock, Louisiana feasibility study is being conducted in response to the recommendations in the reconnaissance report.

- g. **Mississippi River – Gulf Outlet, New Lock and Connecting Channels, Louisiana, March 1997.** This lock is a feature of the Mississippi River-Gulf Outlet, Louisiana project, which was authorized by Public Law 84-455. It provides for the replacement of the existing Inner Harbor Navigation Canal Lock in New Orleans, Louisiana, with a new lock, 110 feet wide by 1,200 feet long with a sill elevation of 36 feet, NGVD. The existing Inner Harbor Navigation Canal Lock, which is 75 feet wide by 640 feet long with a sill elevation of 31.5 feet, Mean Sea Level, connects the Mississippi River and the Gulf Intracoastal Waterway east of the Mississippi River, the Mississippi River-Gulf Outlet, the Industrial Canal (also known as the Inner Harbor Navigation Canal), and Lake Pontchartrain. The Port of New Orleans completed the existing lock in 1921. Increases in inland waterway traffic over the years have made the Inner Harbor Navigation Canal Lock increased congestion at the lock, which has average delays of 10 hours for each barge tow.
  
- h. **Atchafalaya Basin Floodway System Louisiana Project, State Master Plan, August 2000.** The Atchafalaya Basin Advisory Committee with the Louisiana Department of Natural Resources designated as the lead agency prepared the Master Plan. The objective of the Master Plan is to conserve, restore, and enhance, where possible, the natural habitat of the Atchafalaya Basin and enhance the opportunity for all to enjoy the Atchafalaya Experience. It is also to develop alternative solutions to water flow and sedimentation and to select critical ecological/scenic areas to be protected.

#### 4. Report Contents

The Bayou Sorrel Lock, Louisiana Feasibility Report documents the results of feasibility-level studies on improvements at Bayou Sorrel Lock. The report presents a full range of potential structural and non-structural alternatives for addressing the navigation and flood control problems and needs at Bayou Sorrel. The net contribution of each alternative to National Economic Development (NED) has been estimated as a basis for selecting the best overall plan with consideration given to environmental, social and economic effects, engineering feasibility, and public acceptability.

The report is organized in seven volumes:

- Volume 1. Main Report and Environmental Impact Statement (EIS).
- Volume 2. Appendix A, Economics
- Volume 3. Appendix B, Environmental Design and Real Estate

- Volume 4. Appendix C, Engineering Design
- Volume 5. MCASES Cost Estimate
- Volume 6. Value Engineering Team Study Report
- Volume 7. Quality Control Plan, Technical Review, Public Meeting, Comments, and Responses

The Main Report is an overall presentation of study results and findings and contains the District Engineer's recommendation and the EIS. The three technical appendices augment the Main Report with supporting detailed data and analysis. The Value Engineering Study Report took a critical look at the functional elements of the project and developed alternative ways to increase the value of the project. The Value Engineering team proposed 15 cost-saving design recommendations. Their resolutions are listed in the beginning of the report in Volume 6. Volume 7 documents the independent technical review of assumptions, methods, procedures, and the appropriateness of data used as well as whether the product meets the customer's need consistent with law and existing Corps policy. Comments from the public review period are listed at the end of this Volume.