UPPER MISSISSIPPI RIVER ILLINOIS WATERWAY SYSTEM NAVIGATION STUDY
ENGINEERING COORDINATING COMMITTEE
MEETING NUMBER ONE
MAY 25, 1994

On 25 May 1994 the first Engineering Coordinating Committee was held in St. Louis at the Airport Marriott Hotel. The purpose of the meeting was to present the UMR-IWS Navigation Study to representatives of the towing industry, construction and the five states within the study bounds. A list of participants is provided in these minutes.

Mr. Hughey opened the meeting with introductions. Mr. Hughey gave a broad overview of the Navigation Study. A summarized description of Mr. Hughey's presentation follows:

Meeting Purpose

- Status of Engineering effort on Navigation Study.
- To present alternative designs and construction methods being considered.
- Solicit ideas on what is/could be considered.
- Develop a consensus regarding the goals and expectations for the design portion of the Navigation Study.

Charter

A handout of the draft Charter was handed out and is included in these minutes. The Charter is currently under development and is in need of comment from the meeting participants.

Study Purpose

To determine the need and costs for navigation expansion measures to meet increasing traffic on the river system.

Study Historical Background

Two earlier reconnaissance studies found expansion measures feasible. In October 1991, the Assistant Secretary of the Army directed the studies be combined and documented in an Initial Project Management Plan (IPMP). In September 1992, the IPMP was submitted to higher authority for review and a $22.7 million study ($26 million fully funded) was recommended. In December 1992, a reconnaissance review conference was held. In March 1993, study funding increased by $10.9 million. In February 1994, the Public Involvement portion of the study was enhanced by $1.1 million. The final study cost including inflation is approximately $39 million. The study will span six years and involves the Rock Island, St. Paul and St. Louis Districts and the North Central and Lower Mississippi Valley Divisions.

IPMP

The IPMP is a living document which outlines the goals and purpose of the study. It has evolved and will continue to evolve to accurately depict where the study has been and where it is going.

Study Work Groups

Environmental (includes Historic Properties) - Includes preparation of system-wide EIS and preliminary investigations of specific sites recommended for navigation improvements. Includes studies to evaluate system-wide physical and biological impacts. Develops data management methodologies and mathematical models for impact assessment (extrapolation to the system). The Environmental effort is funded at $15.5 million. Historic properties is funded at $1.4 million.

Economics - Primary objective is to measure beneficial contributions to National Economic Development. The building blocks of the effort are to establish the existing condition, assess the future with and without projects, and formulate and assess alternatives. Funded at $4.1 million.

Engineering - The Engineering effort is divided into objectives each of which determines cost. Objective 1 determines the baseline and future projections of operation and maintenance expenditures on the current navigation system. A draft report is currently under internal review. Objective 2 determines the condition of the existing system and is a building block used to determine a schedule of expenditures for future rehabilitation needs. It also establishes the need for future replacement of projects. Investigates investment schedules required for enhanced maintenance. Objective 3 identifies small scale capacity improvements. Many similar studies have been done in the past and will be reviewed for this study. Lock operator and towing industry input will be solicited. Close coordination with the Economics group is required. Objective 4 determines large scale capacity improvements on representative sites and adapts them to other sites in the system. At each site, five alternative locations are considered. Three locks of different design life will be considered. Objective 5 performs detailed engineering studies that will lend feasibility to system enhancements and provide a transition into Site Specific Studies. Includes physical and numerical models. Site Specific designs and cost estimates will be developed for the recommended plan starting in FY 97. Funded at $13.6 million.

Public Involvement - Purpose is to hold public meetings/workshops, summarize public opinion and publish Newsletters. Funded at $2.3 million.

Study Management - Coordinates the study team effort, manages budget fund control and plan formulation. Briefs higher authority. Prepares final report and Project Management Plan. Funded at $4.9 million.

Detailed presentations of Objective 4a - 1200 ft. lock capacity.

During this portion of the meeting, presentations on the details of constructing a 1200 ft. locks at five potential locations was provided. Both pile and rock founded lock concepts are investigated in the study.

Pile founded lock concepts are based on the site specific parameters of Lock 25, Lock 22 for rock founded. Concept locks will be adaptable to other sites in the study. Mr. Stamper, Mr. Sully and Mr. Lundberg presented detailed lock concepts of Objective 4a. Slide shows accompanied their presentations.

Mr. Stamper provided a brief description of the five potential lock locations, 1. landward of the existing lock, 2. extending the existing lock, 3. extending the existing auxiliary miter gate bay, 4. in the dam, 5. in the overflow/nonoverflow section were presented. Also presented for the lock concepts were three levels of investment; 1. lowest first cost, 2. traditional construction (similar to Mel Price Lock), 3. innovative design (intermediate first cost with low life-cycle cost). The three levels of investment for locks will be compared to determine which has the lowest life-cycle cost to help determine a selected plan. Details of innovative lock concepts and construction sequencing at locations 1, 3, 4 and 5 along with the lowest first cost lock at location 4 sand/pile founded were presented. Location 3 construction activities may interfere with river traffic which will be investigated. Innovations highlighted were single sheet pile wall cofferdams, slurry walls, removable precast concrete rubbing panels, bottom filling and emptying (F&E) culverts, in-the-wet construction, extensive use of tremie-placed concrete, slide valves for F&E, modular/repetitive construction, and sheet pile cellular walls filled with crushed stone and armored as a lowest first cost chamber wall. Other concepts and innovations are under development.

Mr. Sully presented the pile founded alternative for the location 2 lock extension. Most of the construction is to be done while the lock is still in service. Some construction activities will be scheduled during the winter when the lock can be shut down. It was noted that the construction must be coordinated with river traffic to minimize delays. Innovations highlighted were precast concrete float-in lockwalls, gate sills and lock floor units. Construction staging and on-site precast concrete yards, along with temporary fleeting areas away from the lock were proposed. Cost estimates will include delay costs to the industry created by the lock extension construction activities. Tow width restrictions during some construction activities are being considered. A rock founded lock concept at location 2 is being developed.

Mr. Lundberg presented rock founded concepts for all three levels of investment at location 4. Many of the general concepts were similar to those for pile founded locks at location 4. Innovations highlighted were reduced cofferdams, single sheet pile wall cofferdams, cellular sheet pile walls filled with concrete, and bottom F&E culvert. Concepts at other locations are under development.

After the detailed presentations, open discussion was held. It was hosted by Mr. Hughey. Responses to questions are from the Corps of Engineers unless otherwise noted. Individual responders are noted where recorded.

1. Will study delay interim navigation improvements?

   No. It is anticipated that once small scale improvements are identified and all environmental analysis complete, funding will be sought for implementation of those that are justifiable. This could possibly occur sooner than for large scale improvements.

   Norb Whitlock: Industry self help will do more than any measures such as mooring cells or traveling kevels, guidewall, etc.

2. Jim Hall: What items require authorization?

   This is a grey area that will require coordination with Corps Headquarters. The Study team plans to generate a list of all possible small scale improvements for analysis by a multi-discipline team. Justifiable improvements will be submitted to headquarters to determine if authorization is required.

3. Norb Whitlock: Where does increase in traffic come from?

   National system increase is about one percent per year. What is Upper Mississippi traffic increase per year?

   Nelson Cordoba: The study is using an average annual rate of traffic increase of 2%.

4. Where are industry self help, computer traffic management, tow standardization, etc, identified in the Navigation Study?

   Objectives 2c and 3 will address these.

5. How is industry self help initiated?

   Norb Whitlock: When the need occurs, industry responds on their own initiative.

6. Does the study consider system wide and site specific environmental impacts?

   Yes. System impacts will be analyzed as part of the study. Preliminary site specific impacts for the 16 sites identified as needing possible expansion in the next 50 years will also be analyzed. Site Specific studies for the recommended plan will be included as part of the site specific feasibility study which will begin in FY 97.

7. Did reconnaissance level report address engineering concerns only?

   No. It too was comprehensive, but environmental results did not consider a systemic approach to solutions.

8. **Lowell Greimann** or Jim Hall. Has there been an effort to cut costs in the service gate monoliths?

Minimal effort to date. Greater cost savings are achieved by concentrating on the chamber monoliths.

9. Bruce Barker. On Location 3 you have the culvert in the wall which is different than other locations, is there flexibility in culvert placement?

This proposal is conceptual at this point; however, since we will utilize the existing auxiliary gate bay we have many givens with which to work. The culvert placement in the wall is one of them.

A floor culvert at location 3 requires excavation that will undermine the existing intermediate lock wall.

10. But the culvert in the auxiliary gate bay is small.

It is the same size as that in the 600 foot lock.

11. Is lock construction at location 3 possible at all Mississippi locks? Do they all have the extra gate bay?

Many are of similar layout. The study will show location 3 not applicable at some locations such as Peoria and LaGrange on the Illinois Waterway.

Monte Hines. In Rock Island we prefer to call the extra gate bay an emergency gate.

12. Jim Hall. Location 5 requires a lot of dredging to move the channel over to it.

The study is comprehensive. We will address a lock at location 5 and note the Hydraulic and Environmental concerns and costs. It is possible that the original lock should have been located at location 5 to ease approach conditions.

13. Jim Hall. You have been showing us very large scale system improvements. Given the status of the Inland Waterways Trust Fund, annual revenue of $70 million, how do you justify such a study effort? Studies show that major improvements such as presented can not come on line on the Upper Mississippi until the year 2019. In the interim, funding is targeted for Ohio River improvements.

The study is comprehensive. Its purpose is to determine the feasibility and cost of large and small scale capacity improvements. The Waterways User Board is currently providing recommendations on only those projects which have studies submitted for review. It is important for the Upper Mississippi Study to be completed to allow it to enter the arena for possible consideration.

14. **The presentation has shown only 1200 foot lock construction. Will the study consider construction of 600 foot locks?**

Yes.

15. Comment. Norb Whitlock.

Monangahela Locks 2, 3, and 4 total initial construction costs was $750 million. Through a joint working relationship with the Pittsburgh District and the towing industry, costs have been reduced to as low as $350 million. With such drastic cost reductions, all the projects in the queue for construction can be accomplished and Upper Mississippi projects may get into the queue by the year 2005.

The 52 and 53 lock concepts (sheetpile locks) should be given attention due to their low costs and long life for the level of capital investment.

16. Lowell Greimann. Is there or will there be an effort to look at first costs and life-cycle costs?

Yes. To date we have quantified some of the lock concepts and completed rough initial cost estimates. Engineering will soon identify life expectancy of components in an effort to obtain life-cycle costs.

17. Comment. Participant: When looking at the life-cycle costs, include information from the Chicago Harbor lock.

Noted.

18. At location 3, the lock walls were constructed first, followed by the gate monoliths. At location 4 the gate monoliths were constructed first with the walls next. Is there a reason why this was done?

Yes. In part, the location specific parameters at location 3 dictate a certain construction sequence. Those parameters are in part concerned with minimizing the impact to navigation and increasing the safety of the working crew. Location 4 is more flexible due to its remote location. In general flexibility among the sites and concepts is an issue being addressed.

19. Will there be an effort to replace lost dam capacity when tainter gates are removed?

Yes. Initially, no pool raise will be allowed which will assume a gate-for-gate replacement. Site specific feasibility studies will address the issue further. At some sites, lost gates may not require replacement.

20. For location 2, where is the sheetpile wall cut off?

It is cut off underwater. It has been looked at and should be out of the path of tow boats and barges.

21. Is the float-in monolith concept economical when compared to other options?

Float-in is economical when interference with navigation and the associated cost is a driving issue. With float-in (preassembled) construction, on site labor and construction activities, and therefore potential disruption to traffic, is minimized.

22. Jim Hall. Will the study address capacity expansion measures by accommodating recreational craft in a different manner? Are small lock additions an option?

Yes. Objective 3 will address these issues.

23. Comment. Norb Whitlock: The extension of the 600 foot lock makes sense on the Ohio River when you have a 1200 and a 600 foot lock and want two-1200 foot locks. On the Mississippi where we have only the 600 foot lock to extend under traffic conditions, a great conflict with navigation will be created. Construction staging, deliveries and mobilization areas, if upstream of the lock, will create the need for more lockages which will further tie-up the lock. If a structure is hit, the towing company, contractor, and Corps will all be in conflict. This will cause a ripple effect extending to claims and construction delays. There is a lot of risk with location 2 lock extension.

24. Have precast float-in construction techniques been used and has it been used for the application?

Yes. Float-in construction has been used in other applications in this country. Modular precast building blocks and floating segments (caissons) have been used in Europe for dry dock construction and other applications.

25. It was noted that location 2 has minimal environmental impact and therefore little mitigation costs, an advantage over other potential locations.

26. For location 2, it could be possible to put some cells (barriers) in the approach so tows don't hit placed precast components. This would restrict tow width to two barges wide.

Noted.

27. For location 2, channel and approach modifications are minimized. Also, of all the plans it will have the least impact on the environment.

Noted.

28. **Comment. Participant: Much discussion was targeted at identifying the problems of locating a lock at each of the sites. Concerns dealt with approach conditions, site specific parameters and environmental costs.**

> Mr. Hughey addressed the concerns with a blanket statement of the effort to date. Objective 4a's purpose is to develop generic locks that can be constructed at any lock and dam site. Another effort, Objective 4b, will adapt the lock concepts to the various lock project sites. The towing industry will play a role in this effort.

29. Mr. Hughey stated that a goal of the study team is to have rough construction cost estimates for the lock additions by the next Engineering Coordinating Committee Meeting.

30. It was noted that the construction costs to date have concentrated on the areas that show the potential for savings. Those items are cofferdam and dewatering and chamber monolith construction. Other smaller items are being addressed too. The cost reduction effort will continue beyond the objective 4a window. A future area of cost reduction is the guidewalls. Their cost at Mel Price lock is approximately $60 million.

31. In summary, the study team is looking at many ways to reduce initial construction and long-term maintenance costs of lock structures.

32. Bruce Barker. Location 1 is a canal site. The lock could be constructed with end gate monoliths and a ditch with a fender system to align the tows.

> This concept is being studied.

33. The cost of an efficient, expedient filling and emptying system was addressed by the Corps. Doubling of these times is expected for a 1200 foot lock. The cost savings results from a slimmer structure.

34. Chris Brescia. Realizing that it would be a different thought process, what lock structure would the industry get for $100 million?

> In part, many of the tows could get into the lock with little or no guidewalls which would significantly reduce costs. A low performance lock would result. Corps criteria and therefore safety may be more of an issue. A risk and cost must be associated with options of lock construction. For example, what is the risk and cost reduction associated with shorter guidewalls? Other items such as the inability to unwater the lock, stone floor, stone-filled cellular walls, and miter gates (in lieu of lift gates which ease winter time navigation) will reduce cost and affect performance.

35. It was noted by a participant that the carriers were lightly represented at the meeting. They are important and do require more representation at future meetings.

36. Norb Whitlock. Proposed at future meetings that more of his colleagues will be encouraged to attend.

37. There will be many trade-offs of performance versus cost as the designs progress. Industry concerns need to be addressed.

38. The next meeting was tentatively scheduled for the last week in September in St. Louis. Final date is pending. For the meeting, a package will be distributed two weeks in advance. It will contain items to be discussed during the meeting. It will also address towing/performance related items.

39. Minutes from this meeting will be distributed by June 10.

40. The point was made that the Corps should not spend resources on evaluating lock concepts for locations that are not feasible.

Noted.

41. Location 4 design creates a pocket that would trap ice, making winter operation difficult. A lift gate seems necessary.

Noted.

42. Bruce Barker. Oversize the filling and emptying valves.

Noted.

43. Mr. Hughey invited comments on the Charter for the Engineering Coordination Committee.

44. Mr. Hughey stated that he will be the POC for questions between now and the next meeting.

45. Jerry Vineyard: Promoted the idea of an energy conservation effort within the study to include containerized shipping to reduce the truck traffic on the roads.

The economic model does consider alternate modes of transportation.

46. A comment was made concerning the comprehensiveness of the presentation. Since the engineering portion of the study seems to be input to the economic model, maybe a presentation from the Economics Work Group should be part of the ENCC meetings.

Noted. This will be incorporated at the next meeting.

ATTENDANCE SHEET
UPPER MISSISSIPPI RIVER - ILLINOIS WATERWAY SYSTEM NAVIGATION STUDY
ENGINEERING COORDINATING COMMITTEE
MEETING NUMBER ONE
MAY 25, 1994

NAME	ORGANIZATION	PHONE
Jeff Stamper	Corps - St. Louis	314/331-8226
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Billy Arthur	Corps - St. Louis	314/331-8333
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Teresa Kincaid	Corps - Rock Island	309/794-5279
Nelson J. Cordoba	Corps - Rock Island	309/794-5399
Monte Hines	Corps - Rock Island	309/794-5551
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Jerry D. Vineyard	Missouri Dept. of Natural Resources	314/368-2148
Paul Schnoebelen	Massman Const. Co.	314/821-0042
Dave Wehrley	Corps - Rock Island	309/794-5245
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Bruce Barker	IL/DOT - DWR	217/782-3488
Denny Lundberg	Corps - Rock Island	309/794-5632
Chris Brescia	MARC 2000	314/436-7303
Bob Hughey	Corps - St. Louis	314/331-8300

ENgineering Coordinating Committee (ENCC)

FIRST MEETING

MAY 25, 1994

ST. LOUIS, MISSOURI

Agenda

- 9:00 Opening Remarks — Hughey
  - Introductions
  - Purpose
  - Charter
- 9:30 Navigation Study Overview — Kincaid
- 9:45 Engineering Study Overview — Hughey
- 10:00 Objective 3 - Small Scale Improvements — Hughey
- 10:15 Objective 4 - Large Scale Improvements
  - Presentation of Alternatives being considered

  Stamper/Lundberg/Sully
- 11:30 Lunch
- 12:30 Discussion — State Representatives & Official Observers
- 2:30 Open Discussion and Public Comment
- 3:00 Adjourn

Meeting Purpose

- Provide Status of Engineering effort on System Feasibility Study.
- Present alternative designs and construction methods being considered.
- Solicit your ideas and suggestions on what is being or could be considered.
- Develop a concensus regarding the goals and expectations for the engineering and design portion of the Navigation Study.

Charter Development

Upper Mississippi River & Illinois
WW System Navigation Study

- Background
- Content of Initial Project Management Plan - Feasibility Study
- Current Status of the Feasibility Study

Background

- Purpose - To determine the need for navigation capacity expansion measures on the river system

History

- Two separate reconnaissance studies initially
- Both studies found expansion measures feasible
- Oct 91 - ASA (CW) directed the studies be combined and an Initial Project Management Plan (IPMP) for a system study be prepared
- Sep 92 - IPMP submitted to higher authority, recommending a $22.7 million study ($26 million fully funded)
- Dec 92 - Reconnaissance Review Conference held
- 1 Mar 93 - Received guidance to add $10.9 million to study
- Feb 94 - Enhanced Public Involvement Plan - Increase of $1.1 million, Total Study cost of $36.8 million, and with anticipated price level and inflation - $39 million

Upper Mississippi River & Illinois
WW System Navigation Study

- Purpose - Determine the feasibility of navigation capacity improvements
- Length - Six-year time frame (Completion in 1999)
- Conducted by Rock Island, St. Paul, and St. Louis Districts

Initial Project Management Plan - Five Work Groups

- **Environmental, Including Historic Properties**
- **Economics**
- **Engineering**
- **Public Involvement**
- **Study/Project Management**

Upper Mississippi River & Illinois WW System Navigation Study

- Environmental
  - **Includes preparation of system-wide EIS and preliminary investigations of specific sites recommended for navigation improvements**
  - **Scientific studies to evaluate system-wide physical and biological impacts**
  - **Development of Data Management methodologies and mathematical models for impact assessment (extrapolation to the system)**
- Environmental Effort - Approx. $15.5 (fully funded)
- Historic Properties Effort - Approx. $1.4 million

- Primary Objective - Measure beneficial contributions to National Economic Development

Economics

- Existing Conditions
- Future Without Project Conditions
- Formulate and Assess Alternatives
- Support for other Work Groups
- Total Economic Effort - $4.1 million (fully funded)

Engineering

- Future Without Project - Costs
  - **Objective 1 - Baseline, Regular O&M**
  - **Objective 2 - Enhanced O&M**
- Future With Project - Costs
  - **Objective 3 - Small Scale Improvements**
  - **Objective 4 - Large Scale Improvements**
  - **Objective 5 - Engineering Studies**
- Site Specific
  - **Site Specific Design and Cost**
- Total Engineering Effort - $15.1 million

Public Involvement

- Public Meetings/Workshops
- Newsletters
- Summarize Public Opinion and Input
- Total Public Involvement Effort - $2.3 (fully funded)

Study/Project Management

- Coordination of Study Team Effort
- Financial Management & Funds Control
- Facilitate resolution of project issues
- Plan Formulation
- Briefings
- Involvement in Corps Budget Process
- Preparation of final report and Project Management Plan
- Total Study/Project Management Effort - $4.9 million (fully funded)

Upper Mississippi River & Illinois
WW System Navigation Study

- Six-Year Study
- Total Cost - $39 million (With estimated inflation through study period)

Upper Mississippi River & Illinois WW System Navigation Study

- Status
  - **Env - Physical Model constructed and study scopes underway**
  - **Eng - Work underway on all five objectives, with Obj 1 nearly complete**
  - **Econ - Work Underway on Models, existing conditions, and support for other work groups**
  - **Public Inv. - Informational meetings held in Fall '93, several newsletters distributed**
  - **Study/Project Management**

Upper Mississippi River and Illinois Waterway Navigation Study

Overview of the Engineering Plan

Engineering Plan

- Objective 1 - Baseline Cost (O&M)
- Objective 2 - Future w/o Project Costs
- Objective 3 - Future w/ Small Scale Improvements
- Objective 4 - Future w/ Large Scale Improvements
- Objective 5 - General Navigation Modeling
- Site Specific Feasibility for Recommended Plan

Objective 1
Baseline w/o Project

- Establishes past policies and practices for O&M
- Provides a future projection for O&M investments

Objective 1 - Status

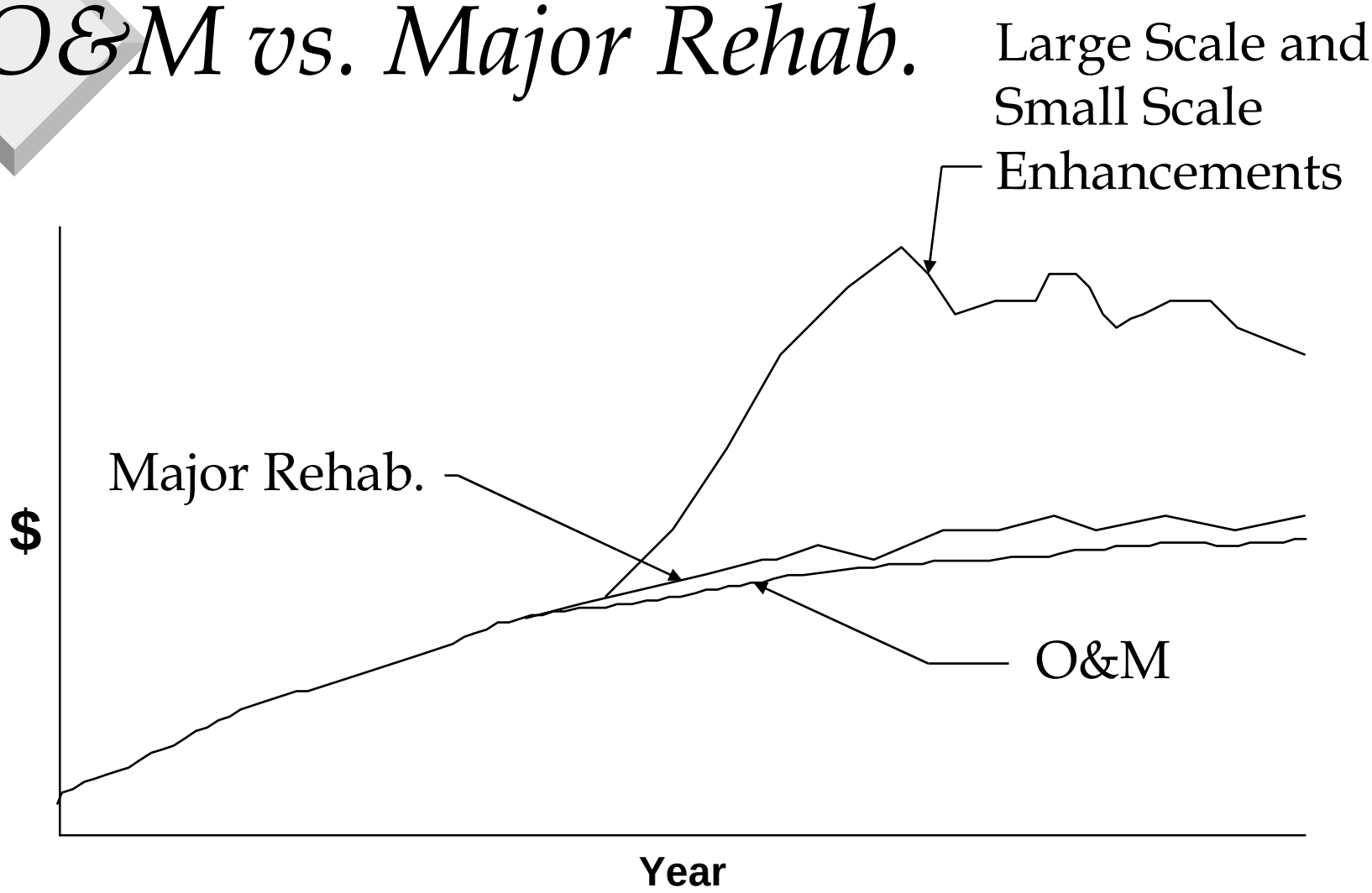
- Draft report complete and undergoing internal review

Objective 2
Future Needs w/o Project

- 2a - Future Rehabilitation Costs (Reliability)
- 2b - Future Replacement
- 2c - Small Scale Improvements
- 2d - Enhanced Maintenance

- Existing Congressional Authorization

O&M vs. Major Rehab.



Objective 2 - Status

Objective 2a:

- Reliability Models under development for major components
- Application of models to begin May 1994

Objective 2b:

- Future replacement needs scheduled for FY 95

Objective 2c:

- Combined with Objective 3, underway

Objective 2d:

- Concurrent development with Objective 2a

Objective 3 - Future with Project Small Scale Enhancements

- Determines the Engineering Feasibility and Costs for Small Scale Enhancements.
  - Guidewall Extensions

- Needs New Congressional Authorization

Objective 2c & 3 - Status

- Previous studies reviewed
- Initial list of potential measures identified
- Economic, operational, engineering, environmental, and Industry assessment to begin this summer.

Objective 4 - Future with Large Scale Enhancements

- 4a - Feasibility of Placing a New Lock Into an Existing Lock and Dam
- 4b - Best Location of a New Lock at 16 sites
- 4c - Hydraulic Impacts of New Locks
- 4d - Cost Estimates for Large Scale Enhancements

- New Congressional Authorization

Objective 4 - Status

- Objective 4a
  - Concepts under development
  - Preliminary designs initiated
- Objective 4b
  - Initial screening of site selections complete
  - Site adaptation of 4a results to begin in FY 95
- Objective 4c
  - Hydraulic impacts of new designs under review
- Objective 4d
  - Final cost estimating to begin in FY 95

Objective 5 - General Navigation Modeling

- Physical Modeling of L/D 22 and 25
- Filling/Emptying Systems
- Numerical Modeling

Objective 5 - Status

- Physical model construction initiated
- Testing to begin in FY 95

Site Specific Feasibility for Recommended Plan

- Site Specific Engineering and Design
- Cost Estimates for Appropriation

Site-Specific Feasibility - Status

- Scheduled for FY 97

Objectives 2c & 3 - Small Scale Improvements

Cooperative effort with Economics, Operations, and Industry

- Review previous studies.
- Identify potential measures.
- Assess costs and impact to capacity.
- Economics will assess scenarios and site specific impacts.
- Engineering will site adapt viable measures.

Objective 4a - Feasibility of Placing a New Lock into an Existing Lock and Dam

- Details developed for 2 representative sites:
  - L/D 22 - Rock foundation
  - L/D 25 - Pile foundation
- Each site will contain 5 alternative locations
- Three alternative types of lock construction will be studied at each location:
  - Least first-cost lock
  - Intermediate cost lock
  - Traditional lock
- Study will compare cost vs. performance

Location 1 - Pile Founded Innovative Lock

- Located landward of the existing lock
- Constructed within a tied-back excavation. Slurry trench method being proposed.
- Upstream and Downstream lock gate monoliths are constructed.
- Chamber wall monoliths and lock floor are constructed.
- Complete project with Upstream and Downstream guidewalls. Navigation channel modifications are required.
- View through lock chamber showing final geometry.

Location 3 - Pile Founded Innovative Lock

- Extend the existing auxiliary miter gate monolith
- Extend the existing guidewall to assist in downstream approach conditions
- Extend the riverward wall and install a protection cell
- Extend the existing I-wall
- Complete the downstream miter gate sill in a dewatered cofferdam
- Complete the project with upstream and downstream guidewalls
- View through the existing lock chamber showing the final geometry and construction activities done under water.

Location 4 - Pile Founded Innovative Lock

- Locate the new lock anywhere in the existing dam. Final location is dependent on approach conditions and environmental concerns.
- Construct upstream and downstream lock gate monoliths in a dewatered cofferdam
- Construct chamber floor and walls without the use of a cofferdam
- Construct a special structure at the intersection of the new lock with the existing dam. Modify channel and lock approach conditions.
- Complete the project with upstream and downstream guidewalls
- View through the lock chamber showing final geometry and construction activities done underwater.

Location 5 - Pile Founded Innovative Lock

- Locates the new lock toward the opposite bank from the existing lock. Final location is dependent on approach conditions and environmental concerns.
- Construct upstream and downstream lock gate monoliths in a dewatered cofferdam
- Construct chamber floor and walls without the use of a cofferdam
- Construct a special structure at the intersection of the new lock with the existing dam. Modify channel and lock approach conditions.
- Complete the project with upstream and downstream guidewalls.
- View through the lock chamber showing final geometry and construction activities done underwater.

Location 4 - Pile Founded Least First-Cost Lock

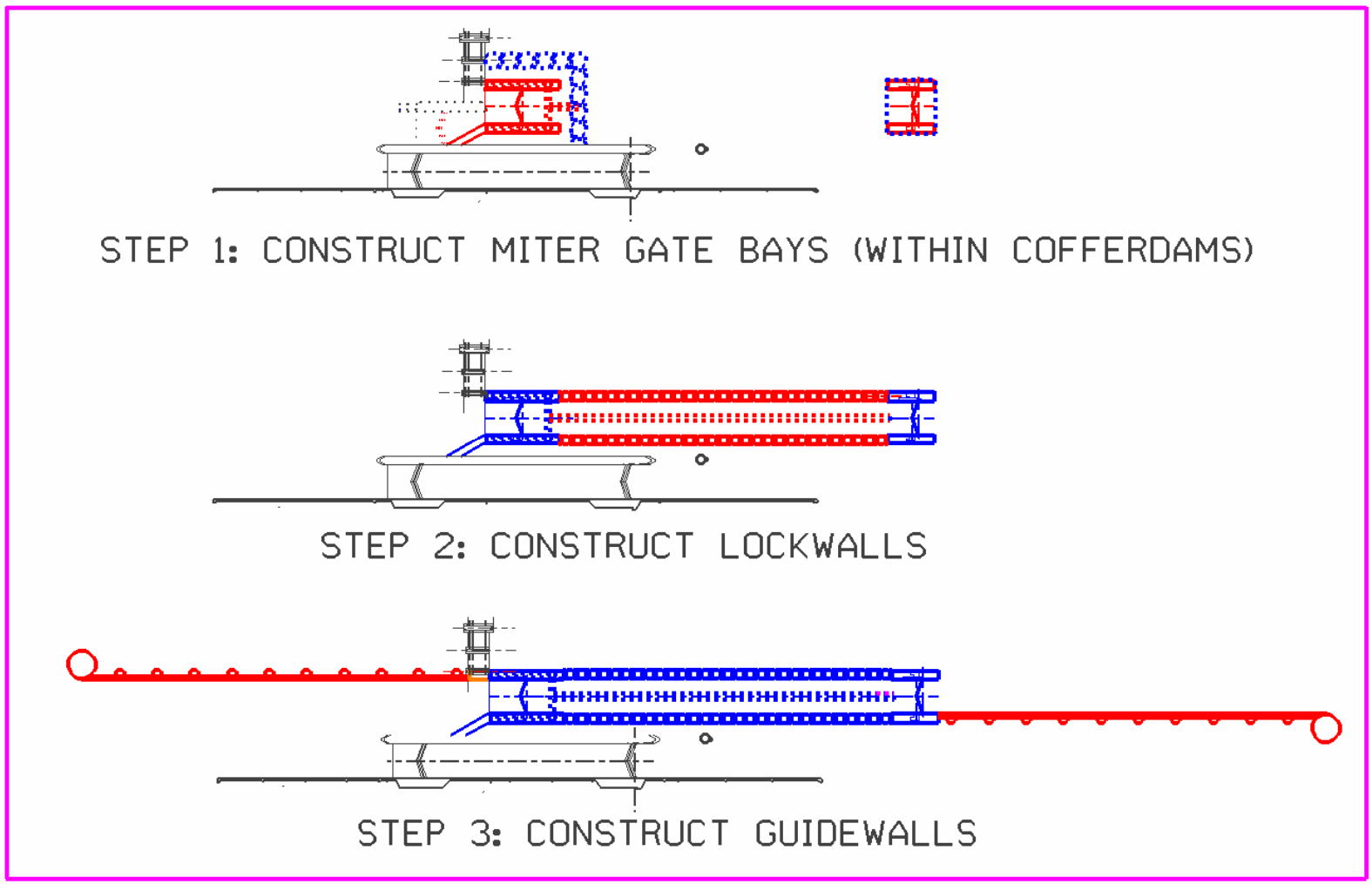
- Locate the new lock very near the existing lock to minimize channel realignment
- Construct upstream and downstream lock gate monoliths in a dewatered cofferdam
- Construct sheet pile cellular lock walls filled with stone
- Construct a special structure at the intersection of the new lock with the existing dam.
- Complete the project with upstream and downstream guidewalls.
- View through the lock chamber showing the final geometry and construction activities done under water.

Location 2 - Pile Founded Innovative Lock

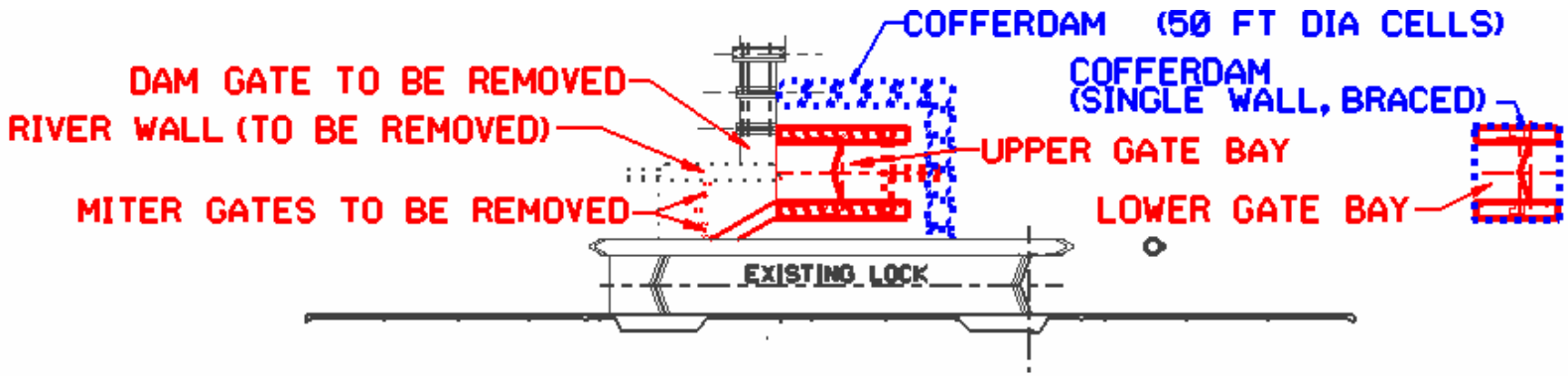
- Placement of Gate Block Monolith
- Construct Downstream Guidewall
- Construct Riverward Lockwall
- Construct Landward Lockwall
- Raise Lockwalls to finished elevation
- Detail Section through chamber

Location 4 - Rock Founded Case

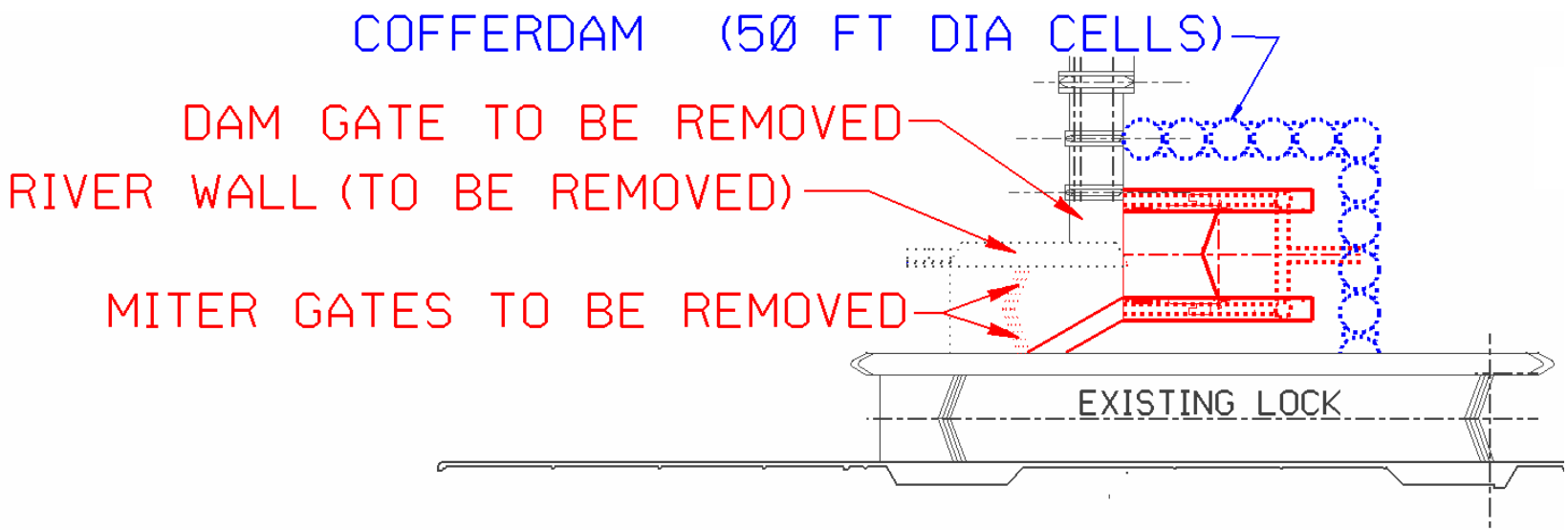
Location 4 - Construction Sequence Least 1st & Intermediate Cost Locks



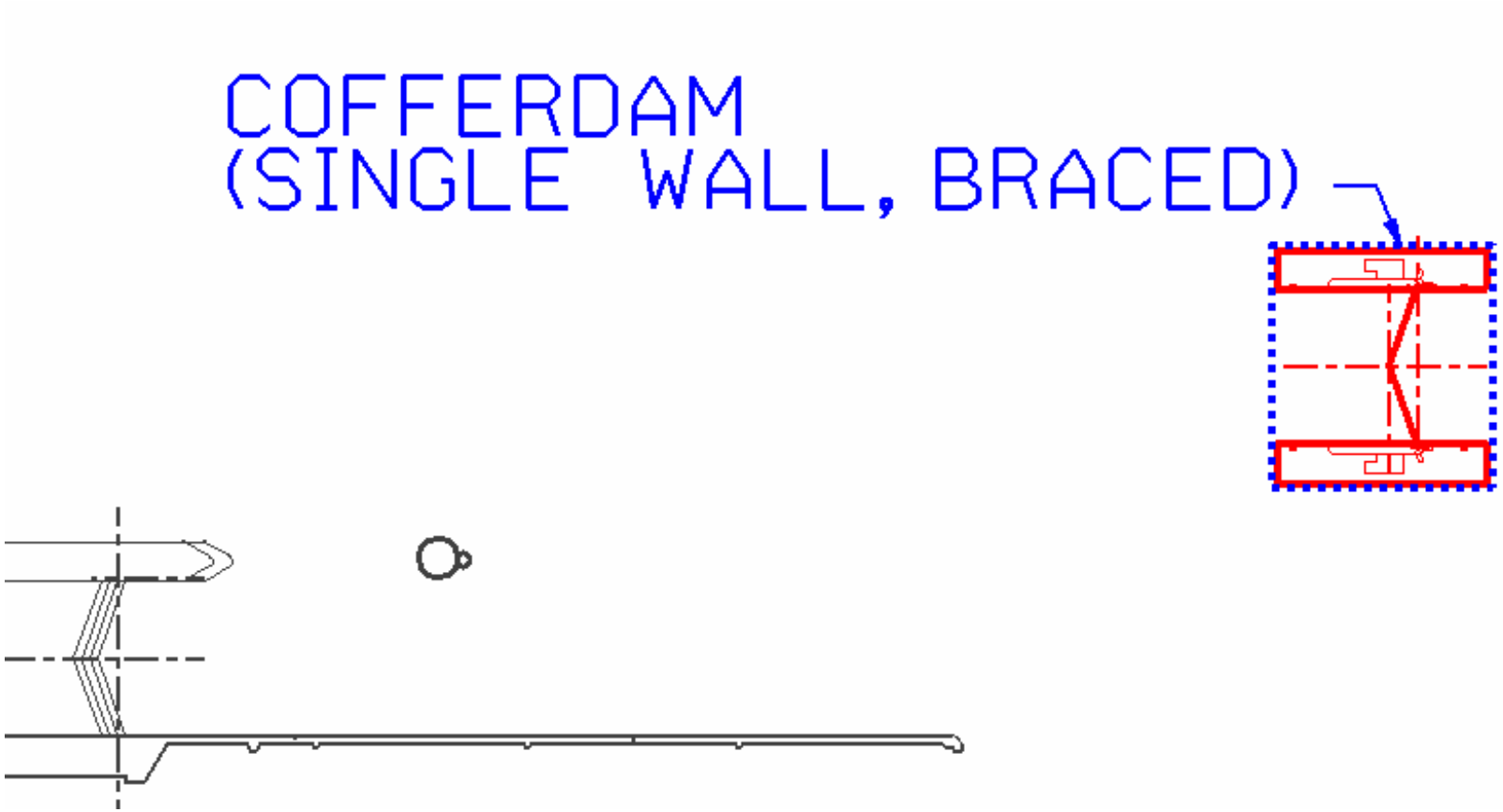
Location 4 - Step 1, Construct Gate Bays Least 1st & Intermediate Cost Locks



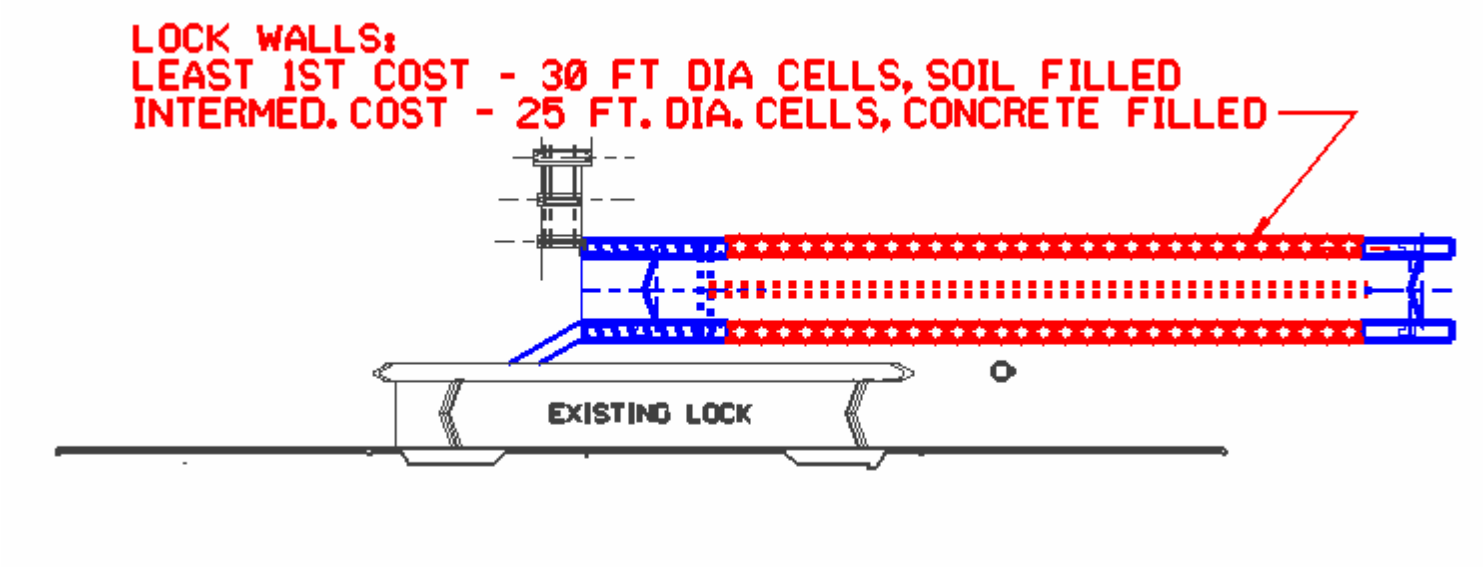
Location 4 - Step 1a, Construct Upper Gate Bay Least 1st & Intermediate Cost Locks



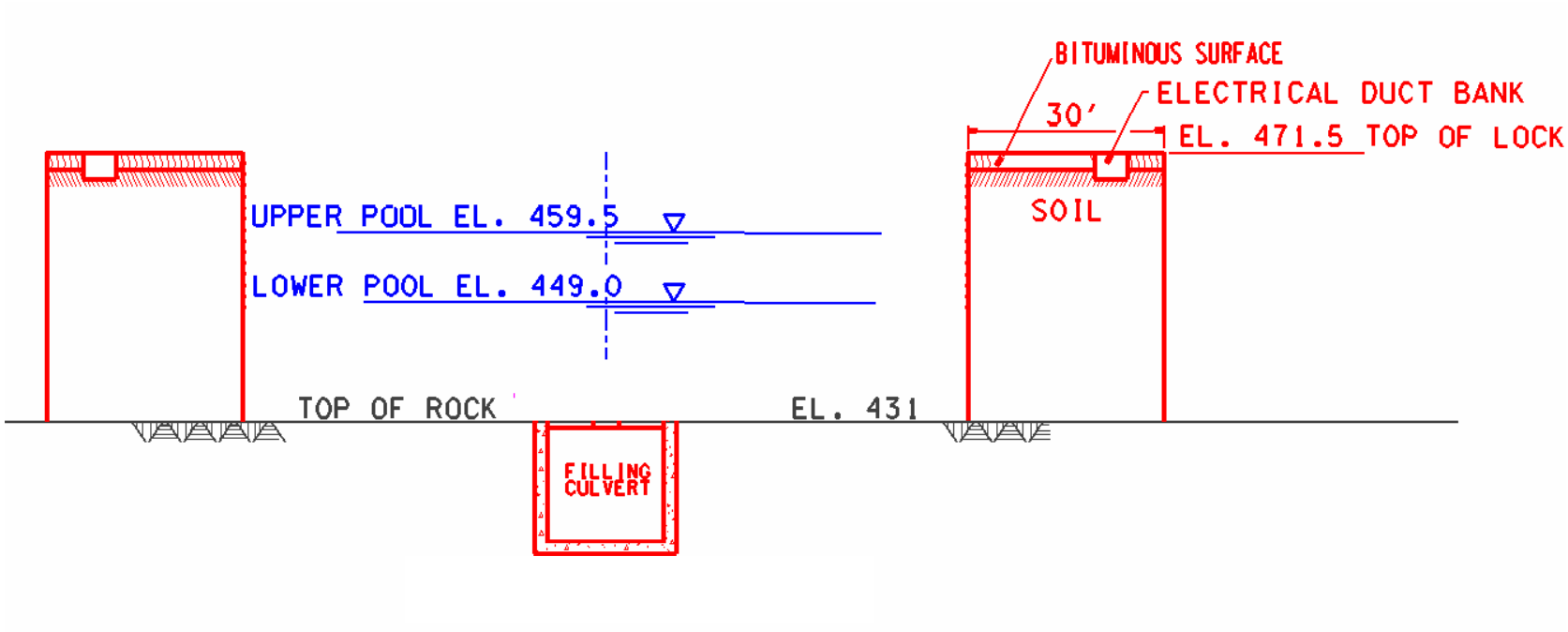
Location 4 - Step 1b, Construct Lower Gate Bay Least 1st & Intermediate Cost Locks



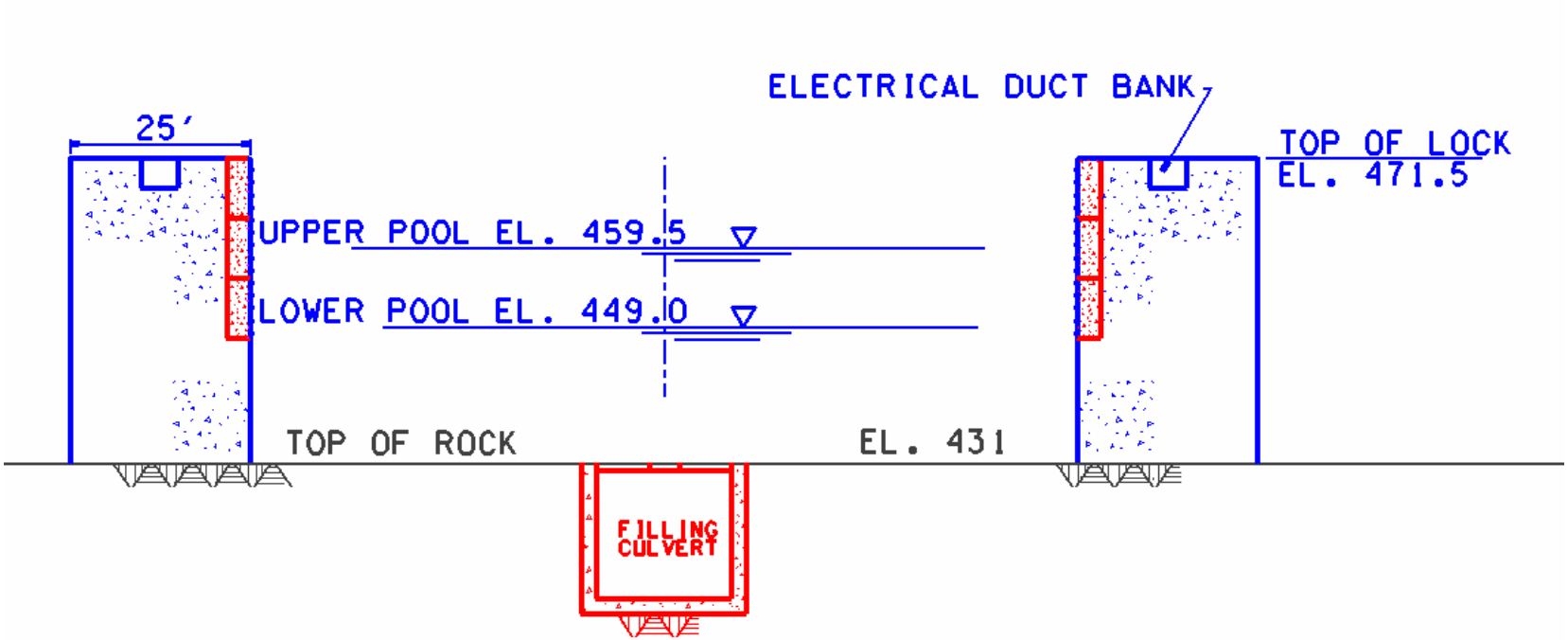
Location 4 - Step 2, Construct Lockwalls
Least 1st & Intermediate Cost Locks



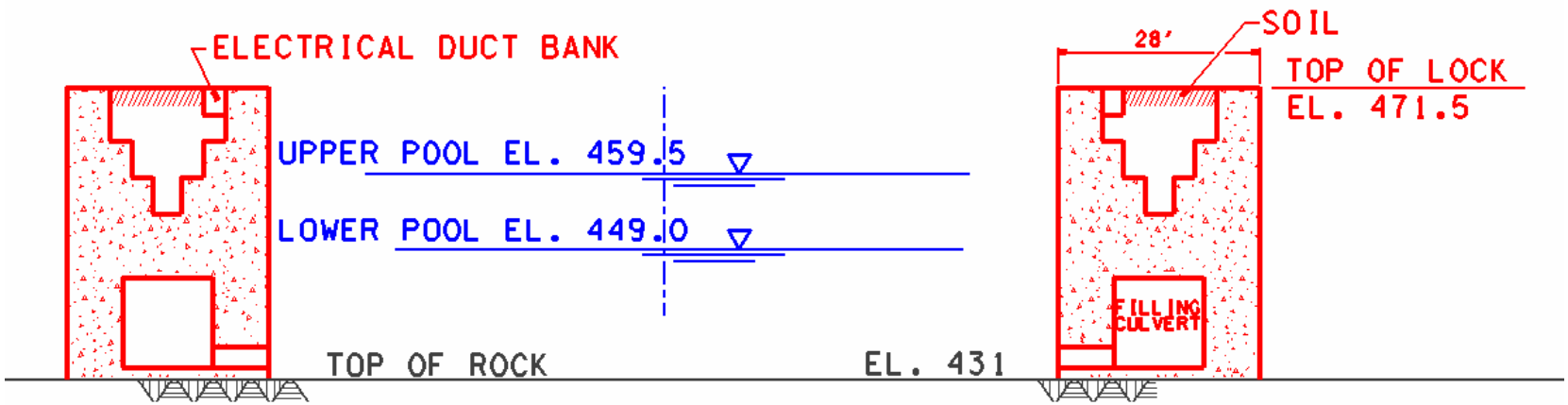
Location 4 - Rock Founded, Least 1st Cost Lock, X-Section



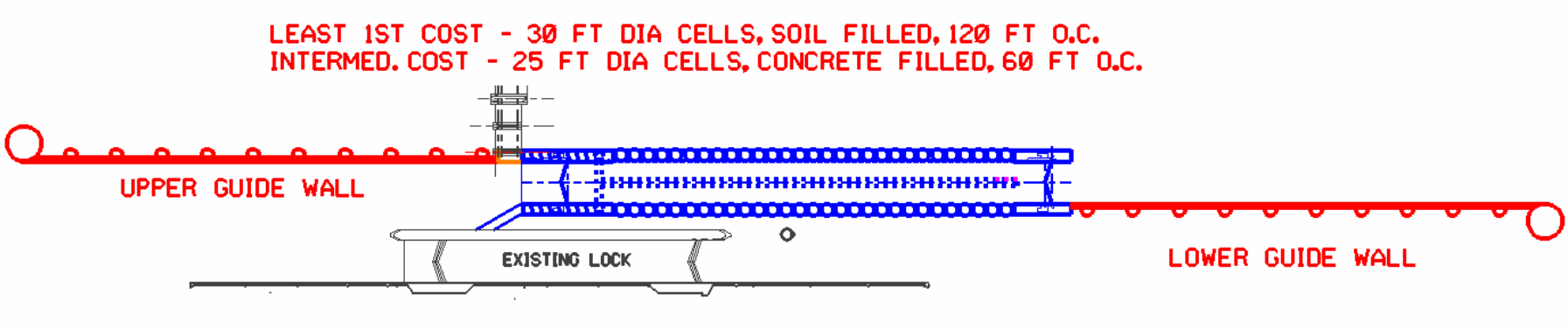
Location 4 - Rock Founded, Intermediate Cost Lock, X-Section



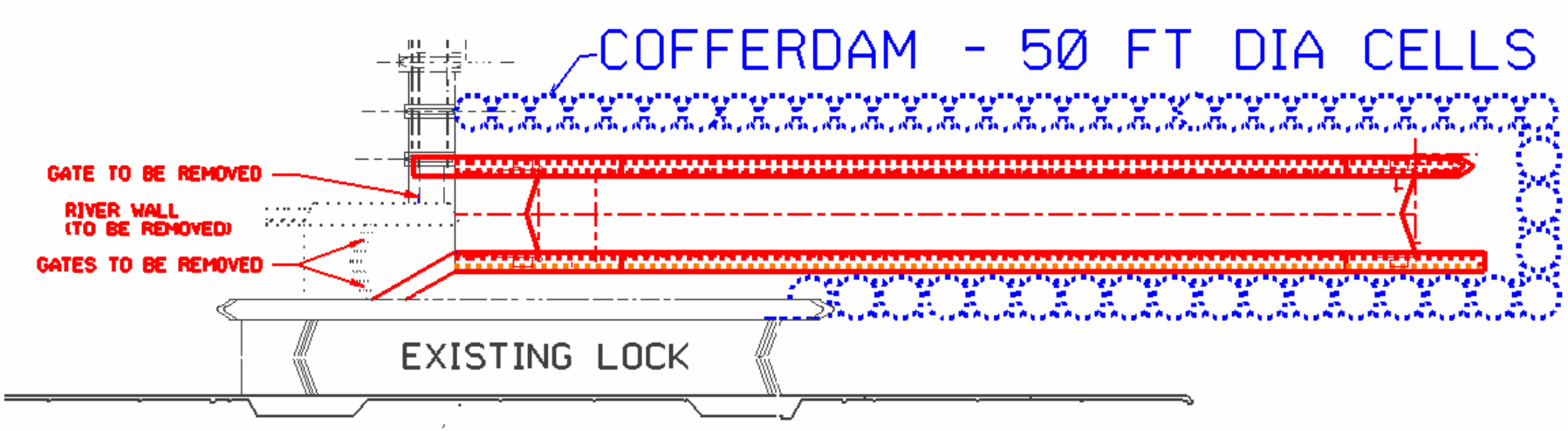
Location 4 - Rock Founded, Traditional Lock, X-Section



Location 4 - Step 3, Construct Guidewalls Least 1st & Intermediate Cost Locks



Location 4 - Traditional Lock Construction with Cofferdam



DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

REPLY TO
ATTENTION OF:

CELMS-ED-DA

22 June 1994

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Engineering Coordinating Committee Meeting Minutes

1. I want to thank you for attending and participating in the first Engineering Coordinating Committee meeting. Your contribution is appreciated and essential to the development of a quality feasibility report.

2. Please find enclosed minutes from the first Engineering Coordinating Committee Meeting. The minutes are considered final, but due to recording difficulties comments are invited. Authors and responders to questions are noted in the minutes where discernable during the recording. Comments can be faxed to the undersigned at (314) 331-8244.

3. Looking forward to continuing our working relationship on this important study.

FOR THE COMMANDER:

BOBBY R. HUGHEY, P.E.
Chief, Design Branch

Encl

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