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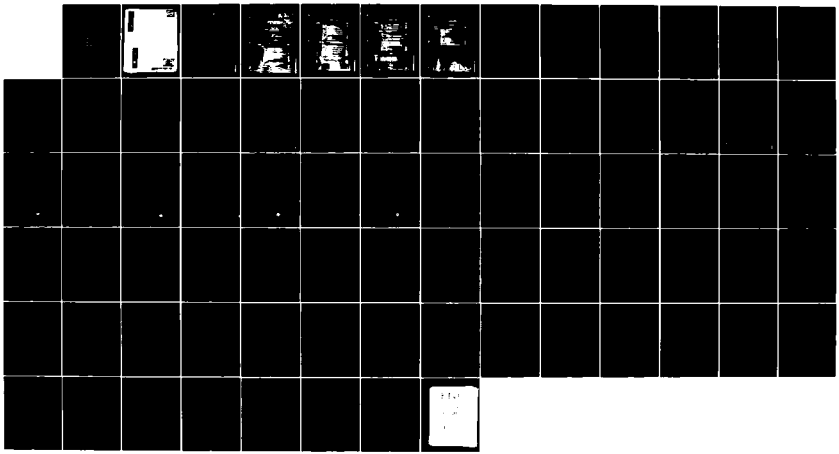

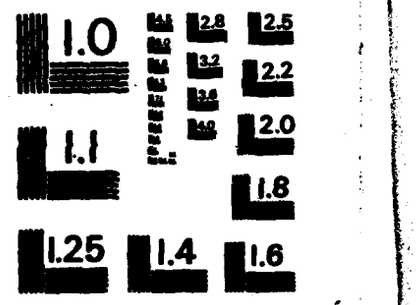

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

It is recommended that both the landward lock, the riverward lock and the dam at Lock & Dam no. 1, Minneapolis, Minnesota be completely rehabilitated. Based on studies completed to the date of this report, more detailed studies are required to firmly establish cost estimates, environmental effects, and the construction scheduling necessary to insure the work can be completed in the proposed two year construction period without delaying navigation.

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Appendix A

ALTERNATIVE PLANS OF REHABILITATION

General

Four plans for the rehabilitation of the locks and dam have been studied.

1. Plan 1, Rehabilitation of Landward Lock Without Interruption of Navigation. In this plan, most of the repair work will be carried out during the five-month winter season of November through March with navigation closed. During the remaining months, with navigation open, only work which does not interfere with boat traffic will be carried out.

2. Plan 2, Rehabilitation of Landward Lock with Temporary Use of Riverward Lock for Navigation. According to this plan, during the five-month winter season, work will be carried out within the cofferdam area. Only necessary repairs will be made in the riverward lock. This will permit the riverward lock to be used for navigation while the landward lock is being repaired for permanent use.

3. Plan 3, Rehabilitation of Landward Lock with Navigation Closed During Construction. In this plan all boat traffic is shut off during navigation season when the landward lock is being rehabilitated.

4. Plan 4, Rehabilitation of Both Locks without Interruption of Navigation. Most of the repair work in both locks will be carried out during the winter season. Work that does not interfere with navigation will be done during the remaining months.

5. Ordering of Equipment. A period of about 18 months is assumed for ordering, manufacturing and delivery of equipment, which must be ordered by the Corps of Engineers to make it available to the contractor by the fall of 1979. If a contract for the construction is awarded early in that year, construction can start in accordance with the schedules shown for all plans.

6. Elements and Length of Construction. All plans of rehabilitation include the same major construction elements such as mobilization, erection of cofferdams, unwatering, construction of hydraulic modifications, stabilization of lock and dam monoliths, repair of concrete surfaces, construction of new control house, mechanical and electrical replacements, removal of cofferdams and clean-up of construction site. Actual construction time for each plan is estimated to be approximately 2 years.

7. Peak Manpower Demand. Studies were made of the detailed construction activities to determine the number and location of personnel required and potential for interruption. The most critical period for Plans 1 and 4 occurs during the close of navigation when the majority of the work must be completed in a 5-month period.

For Plan 1 this requires, at the peak of construction, approximately 125 workers working two 10-hour shifts.

Plan 2 reduces the amount of construction required during the winter with approximately 55 workers needed. Work in the summer will require a maximum of approximately 65 workers.

Plan 3 reduces the winter construction further, requiring only approximately 50 workers, with 70 required during the summer peak season.

For Plan 4, 205 workers are required on two 10-hour shifts during the peak of construction.

8. Parking. Parking facilities for the workers' cars and bus service, if necessary, from parking areas to the site will be required.

9. Shelter. A heated shelter will be required over the locks to provide comfortable working conditions during the winter.

PLAN NO. 1 - REHABILITATION OF THE LANDWARD LOCK

WITHOUT INTERRUPTION OF NAVIGATION

10. General. Perform most of the repair work in the five-month winter season of November through March. Perform only that work which will not impair the the passage of boats during the navigation season of April through October. The schedule of rehabilitation work for Plan No. 1 is shown on Plate A-1.

11. Work Items. The work items or activities are shown in boxes with the length of the box indicating the estimated time required for completion of the activity. The activities are shown in the sequence required for construction.

12. Construction of Cofferdams. Since the major part of work for the project under this plan is to be undertaken in the winter season during the close of navigation, it is necessary to start making preparations during the summer for diversion and care of water, which involves placing of upstream and downstream cofferdam cells.

Mobilization is scheduled for July with the occupations of the initial staging areas. Work then proceeds with the construction of barge loading points in the East Bank and unloading ramps on Center Island.

Pile driving can then be started for the upstream and downstream cofferdam cells, which must be driven from a barge.

A construction road is then installed to elevation 690 from the unloading ramp on Center Island to the downstream end of the old riverwall, with a ramp up for the fist cofferdam cell.

Driving of steel sheet piling can then be started on the cofferdam cells on land.

The construction road would be continued on each side of the cofferdam cells.

Pile driving would continue for approximately 2 months.

The cofferdam cells on land would be filled with selected gravel or sand fill brought to the Island by barges. The cofferdam cells in water would be filled directly from barges.

Openings in the rows of cofferdam cells would permit traffic to enter and leave the locks until the close of navigation at the end of October. Closure cells would then be installed in both upstream and downstream cofferdams to close these openings, and permit unwatering of construction areas.

Deliveries would be expedited to have all necessary materials and equipment on site.

13. Work During Preparatory Period. During the preparatory period several non-critical work items will be carried out, including:

a. Dismantling buildings on the land wall.
b. Excavating the area behind the land wall to El. 723.
c. Excavating and driving sheet piling behind lower guide wall monoliths and stabilizing with tie back anchors.
d. Construction of an access ramp behind the lower guide wall.

Also during this period, dismantling and reconstruction of B cribwall sections with lowered footings will be implemented.

14. Work in Locks During Close of Navigation. Critical Activities. On November 1, with navigation closed, work can start on the locks. The upstream and downstream conduit bulkheads are installed and the locks unwatered.

Several critical activities can now be started.

A winter shelter will be installed, covering the locks, and heat provided to permit comfortable working conditions for concreting and other activities.

Work to be carried out includes:

a. Inspection of floor sections for remedial work.
b. Construction grouting will be carried out under the in[illegible] wall.

c. Remedial work and replacing of floor sections will be carried out if required.
d. New discharge openings will be cut in the lock walls.
e. Upper parts of the conduits will be prepared for concreting, vent and grout pipes installed and concrete pumped in.
f. New orifices formed and poured and old orifices plugged.
g. Stoney gates will be removed.
h. Removal of old lock and valve bulkheads, concrete cut-out for lowered conduits and filling valves and bulkhead slots (cofferdam area unwatered).
i. Forms placed and concrete poured along new conduits and gate slots. Abandoned conduits and gate slots plugged.
j. Install and regulate filling valves and bulkhead gates.

15. Work in Locks During Close of Navigation. Non-Critical Activities. A number of non-critical activities will also be carried out during this period, with the cofferdam area unwatered, including:

a. Cut out, form and pour new emptying valves and bulkhead slots.
b. Cut new lock bulkhead slots and install lock bulkheads.
c. Remove existing miter gate operators and install new ones.
d. Repair miter gates.
e. Install de-icing and fire protection systems.
f. Remove and replace concrete on the vertical faces of the lock chamber.
g. Construct new venting systems.

16. Work Outside the Locks Within the Cofferdam Area. Critical Activities. With the close of navigation, the closure cells in the upstream and downstream cofferdams will be driven and filled.

The critical activities in these areas can then be started. They include:

a. Remove lower guide wall Monoliths Nos. 1 and 2, and downstream apron.
b. Form, pour and backfill concrete cut-off wall.
c. Excavate slurry trench and replace slurry with concrete.

d. Prepare foundations, form and pour discharge manifolds.
e. Finalize vertical walls.
f. Clean up and remove access ramps.

17. Work Outside the Locks Within the Cofferdam Area. Non-Critical Activities. Non-critical items include:

a. Remove upper guide wall Monoliths Nos. 1 and 2.
b. Cut upstream intermediate wall monolith to new conduit elevation.
c. Place, form and pour new intake manifolds.
d. Complete upper portions of monoliths.
e. Pour concrete slab.
f. Place wall armor.
g. Stabilize downstream intermediate wall miter gate monolith with shear keys.
h. Cathodic protection of miter gates.

18. Work on Dam. Work on the dam will be carried out at this time, consisting of:

a. Prepare access to dam and install pipeline to pump sand.
b. Pump in sand (and water) for stabilization of dam.
c. Remove pipeline and clean up.

19. Electrical Activities. Starting one month prior to close of navigation, the following electrical activities will be carried out through the construction period:

a. Temporary installation of enclosure for electrical equipment.
b. Temporary installation of permanent electrical equipment, control equipment, motor control center and panel boards.

20. Opening of Navigation. All of the proceeding work will be completed and the locks made ready for navigation during the first days of April. At this time the upstream and downstream closure cofferdam cells will be removed to permit the river traffic to flow, and the winter enclosure will be removed from the lock.

21. Removal of Cofferdams. After the flood stage has subsided, about May 1, the remaining cofferdam cells requiring barges will be removed, followed by removal of the land-based cofferdam

cells. Finally, the unloading ramp and the construction access road is removed, the left bank is cleaned up, final backfill is placed behind the lower guide wall, and land wall.

22. Work to Complete the Project. Also starting May 1, the following activities are completed over the next 13 months:

a. Construct bridge for control cables, form new cable trenches and construct new control house.
b. Change over mechanical and electrical equipment.
c. Resurface concrete on decks and pave access roads and parking areas.
d. Install new floating mooring bitts and tow haulage.
e. Install lighting standards, traffic and navigation lights and pull permanent wires.
f. Disconnect temporary wiring, remove and reinstall electrical equipment, motor control center, panel board, etc. in permanent structures including permanent connections for complete installations.
g. Remove temporary wiring and enclosures.
h. Install floats to prevent pleasure craft from being swept toward the dam.

Project is now complete. Total estimated project duration is 23 months.

PLAN NO. 2 - REHABILITATION OF LANDWARD LOCK WITH TEMPORARY USE OF RIVERWARD LOCK FOR NAVIGATION

23. General. Repairs would be made to the Riverward Lock only to the extent that the lock can be used for passage of boats of 7-foot draft during the rehabilitation of the landward lock. Plate A-2 shows the construction schedule for this plan.

24. Cofferdam and Preliminary Works. In this plan the same advance preparations would be required as outlined for Plan 1, for installing cofferdam cells and other preliminary works starting with mobilization in July and finishing prior to the close of navigation on November 1.

25. Work within Downstream Cofferdam Area During Close of Navigation. At this point the upstream and downstream cofferdam closure cells would be installed and the construction area dewatered.

The work to be carried out within the area enclosed by the downstream cofferdam during the winter period of November through March will include:

a. Remove lower guidewall Monoliths Nos. 1 and 2 and downstream apron.
b. Excavate, form, pour and backfill concrete cut-off wall.
c. Excavate slurry trench and replace slurry with concrete.
d. Prepare foundations, form and pour concrete in discharge manifolds.
e. Finalize vertical walls.
f. Stabilize downstream river wall miter gate monolith by backfill and shear keys.
g. Stabilize downstream intermediate wall miter gate monolith with shear keys.
h. Place wall armor.
i. Clean up and remove access ramp.

26. Work within Upstream Cofferdam Area During Close of Navigation. Work within the area enclosed by upstream cofferdam during the winter period will include:

a. Remove upper guide wall monoliths Nos. 1 and 2.
b. Cut upstream intermediate wall monolith to new conduit elevation.
c. Place, form and pour concrete for intake monoliths.
d. Complete upper portion of monoliths.
e. Pour concrete slab.
f. Place wall armor.
g. Clean up and remove access ramp.

27. Work in Locks During Close of Navigation.

a. Inspect floor sections for remedial work.
b. Carry out compaction grouting under intermediate and river walls.
c. Carry out any remedial work required and replace floor sections.
d. Remove old lock and outside filling valve bulkheads, cut new lock bulkhead slots in landward lock.
e. Place lock bulkhead embedded parts and pour concrete.
f. Install lock and outside filling valve bulkheads.
g. Repairs on lock machinery of the riverward lock.
h. Reconditioning of electrical features of the riverward lock.
i. Work on intermediate wall monolith joints.

28. Opening of Navigation. By April 1 the winter season work is completed and the upstream and downstream cofferdam closure cells will be removed to permit start of river traffic. After the flood stage is over, about May 1, the upstream and downstream conduit bulkheads are installed on the landward lock and the lock will be unwatered.

29. Work in Landward Lock During Navigation. The following work can be completed during the summer and early fall with the traffic passing through the riverward lock:

a. Remove stoney gates.
b. Cut out concrete for lowered conduits and for filling valve and interior bulkhead gate slots.
c. Place forms and pour concrete for lowered conduits.
d. Place embedded parts and forms and pour concrete for filling valves and bulkhead gates.
e. Install and regulate filling valves and bulkhead gates.

f. Cut out concrete for new emptying valves and bulkheads.
g. Place embedded parts and pour concrete for emptying valves and bulkheads.
h. Install and regulate emptying valves and bulkheads.
i. Cut out openings for discharge orifices in lock walls.
j. Prepare upper parts of conduits for concreting.
k. Install vent and grout pipes, place forms and pump concrete.
l. Form and pour new orifices.
m. Carry out any remedial work required and replace floor sections.
n. Install de-icing and fire protection systems.
o. Remove concrete on vertical faces of lock chamber and place shotcrete.
p. Provide cathodic protection of miter gates.
q. Remove existing miter gate operators.
r. Remove and replace concrete for new operators.
s. Install new miter gate operators.
t. Connect and test new miter gate operators.
u. Repair upper and lower miter gates.
v. Construct new venting systems.
w. Temporary installation of enclosure for electrical equipment.
x. Temporary installation of permanent electrical equipment, control equipment, motor control center and panel boards.

30. Work on Dam. This work is sequenced as follows:

a. Prepare access to dam and install pipeline to place sand.
b. Pump in sand (and water) for stabilizing dam.
c. Remove pipeline and clean up.

31. Removal of Cofferdams. After May 1 remaining portions of the cofferdam will be removed. When this work is completed, ramps, unloading areas and construction roads will be removed and final backfill established behind lower guide wall. The above summer season work is scheduled to be complete about November 1.

32. Work Remaining to Complete Project.

a. Construct bridge for control cables.
b. Form new cable trenches.
c. Construct new control house.
d. Electrical rehabilitation of landward lock.
e. Change over mechanical equipment.
f. Resurface concrete on decks. Pave roads and parking areas.
g. Install new floating mooring bitts and tow haulage.
h. Install floats to prevent pleasure craft from being swept towards the dam.

These activities are scheduled to be finished about June 1. The total estimated duration for Plan 2 is 23 months.

PLAN NO. 3 - REHABILITATION OF LANDWARD LOCK

WITH NAVIGATION CLOSED DURING CONSTRUCTION

33. General. Plate A-3 shows the construction schedule for this plan of rehabilitation. The same preliminary preparations are made for this plan as described for Plan No. 1. However, in this plan mobilization starts in August and the cofferdam is made ready for close of navigation starting December 1. Navigation will then remain closed through the following summer and fall.

34. Work in the Landward Lock. After closing the upstream and downstream conduit bulkheads and unwatering the landward lock, preliminary work would start during the winter in preparation for concreting to start in April, with the civil work to be completed by the end of September.

Work items for the landward lock include:

a. Inspect floor sections for remedial work.
b. Carry out compaction grouting under intermediate wall.
c. Carry out remedial work if required and replace floor sections.
d. Cut out openings for discharge orifices in lock walls.
e. Prepare upper parts of conduits for concrete.
f. Install vent and grout pipes below conduit crowns, place forms and pump concrete.
g. Form and pour new orifices.
h. Remove Stoney Gates.
i. Remove old lock and valve bulkheads, cut out concrete for lowered conduits and filling valves and bulkhead gates. (Cofferdam area unwatered).
j. Place forms and pour concrete for lowered conduits.
k. Place embedded parts and forms and pour concrete for filling valves and bulkheads.
l. Install and regulate filling valves and bulkheads.
m. Cut out concrete for new emptying valves and bulkhead gates.
n. Place embedded parts and pour concrete for emptying valves and bulkhead gates.
o. Install and regulate emptying valves and bulkhead gates.

p. Cut out concrete for new lock bulkheads.
q. Place lock bulkhead embedded parts and pour concrete.
r. Install lock bulkheads.
s. Remove existing miter gate operators.
t. Remove and replace concrete for new operators.
u. Install new miter gate operators.
v. Connect and test new miter gate operators.
w. Carry out upper and lower miter gate repair and rehabilitation.
x. Provide cathodic protection of miter gates.
y. Install de-icing and fire protection systems.
z. Remove concrete from vertical faces of lock chambers and place shotcrete.
aa. Construct new venting systems.

35. Work in the Upstream Cofferdam Area. Starting December 1 at the close of navigation, the upstream and downstream cofferdam closure cells are installed and the following will be carried out in the area enclosed by the upstream cofferdam:

a. Remove upper guide wall Monoliths Nos. 1 and 2.
b. Cut all upstream wall monoliths to new conduit elevations.
c. Place and anchor forms and pour concrete for new intake manifolds.
d. Complete upper part of monoliths.
e. Place wall armor.
f. Clean up and remove access ramps.

36. Work in the Downstream Cofferdam Area. In the area enclosed by the downstream cofferdam:

a. Stabilize lower miter gate monolith of the intermediate wall with shear keys.
b. Remove lower landward guide wall Monoliths Nos. 1 and 2 and downstream apron.
c. Excavate, form, pour, and backfill concrete cut off wall.
d. Excavate slurry trench and replace slurry with concrete.
e. Prepare foundations, form and pour concrete for discharge manifolds.
f. Finalize vertical walls.
g. Place wall armor.
h. Clean up and remove downstream access ramps.

37. Work on Dam. The following work will be undertaken on the dam:

a. Prepare access to dam and install pipeline to place sand.
b. Pump in sand (and water) for stabilization of dam.
c. Remove pipeline and clean up.

38. Other Civil, Electrical and Mechanical Work During Close of Navigation. The civil, mechanical and electrical activities are scheduled to start about June and be completed by the end of March to be ready for the opening of navigation during the first days of April. These work items include:

a. Construct bridge for control cables, form new cable trenches, construct new control house.
b. Change over mechanical equipment.
c. Electrical rehabilitation of landward lock.

39. Removal of Cofferdams. Starting about October 1, the cofferdam closure cells, and as much of the balance of the cofferdam as weather permit, could be dismantled before the winter season starts. Any remaining portions of the cofferdam would be removed in the spring, before the construction access road has been removed.

40. Work Remaining to Complete Project. In the spring, starting around April 1, the following activities could be carried out:

a. Remove construction access road and establish final backfill behind lower guide wall and landward lock wall.
b. Remove unloading ramp.
c. Clean up left bank.
d. Resurface concrete on decks, pave access roads and parking areas.
e. Install new floating mooring bitts and tow haulage.
f. Install floats to prevent pleasure craft from being swept towards the dam.

This completes Plan No. 3 with a total estimated duration of 22 months.

PLAN NO. 4 - REHABILITATION OF BOTH LOCKS

WITHOUT INTERRUPTION OF NAVIGATION

41. General. Plate A-4 shows the construction schedule for this plan. This schedule is planned to rehabilitate both the land lock and the river lock, completing major work requiring cofferdams during one winter season of November thru March. Work shall be scheduled to concentrate efforts so one lock is complete within the period that navigation is closed.

42. Preliminary Work. As in Plan No. 1, the cofferdam will be installed in advance starting with mobilization in July and finishing at the close of navigation at the end of October. The work items for each lock are listed in Plan No. 1.

43. Work in the Landward and Riverward Locks During Close of Navigation. Critical Activities. With the close of navigation on November 1, the following activities will be carried out.

In the landward and riverward locks the critical activities are:

a. Close the upstream and downstream conduit bulkheads and unwater locks.
b. Construct a winter shelter over the locks.
c. Inspect floor sections for remedial work.
d. Provide compaction grouting under the intermediate and river walls.
e. Carry our remedial work, if required, and replace removed floor sections.
f. Cut out openings for discharge orifices in lock walls.
g. Prepare upper parts of conduits for concrete.
h. Install vent and grout pipes in conduit crowns, place forms and pump in concrete.
i. Form and pour new orifices.
j. Remove Stoney Gates.
k. Remove old lock and valve bulkheads, cut out concrete for lowered conduits and filling valves and bulkheads. (Cofferdam area unwatered).
l. Place forms and embedded parts for lowered conduits and filling valves and bulkheads.

m. Pour concrete for lowered conduits and new filling valves and bulkheads.
n. Install and regulate filling valves and bulkheads.
o. Cut out concrete for new emptying valves and bulkhead gates.

44. Work in the Landward and Riverward Locks During Close of Navigation. Non-Critical Activities. Non-critical work items in the locks include:

a. Place embedded parts and pour concrete for emptying valves and bulkhead gates.
b. Install and regulate emptying valves and bulkhead gates.
c. Cut new lock bulkhead slots.
d. Place lock bulkhead embedded parts and pour concrete.
e. Install lock bulkheads.
f. Remove existing miter gate operators.
g. Remove and replace concrete for new operators.
h. Install new miter gate operators.
i. Connect and test new miter gate operators.
j. Repair upper and lower miter gates.
k. Install de-icing and fire protection systems.
l. Remove concrete on vertical faces of lock chambers and place shotcrete.
m. Construct new venting systems.
n. Remove winter shelter.

45. Work During Close of Navigation in the Cofferdam Areas. Critical Activities In the area enclosed by the cofferdams, the critical items are:

a. Install upstream and downstream cofferdam closure cells.
b. Unwater the construction areas.
c. Remove the lower landward guide wall Monoliths Nos. 1 and 2 and downstream apron.
d. Excavate, form, pour, and backfill concrete cut-off wall.
e. Excavate slurry trench and replace slurry with concrete.
f. Prepare foundations, form and pour concrete for discharge manifolds.

g. Finalize vertical walls.
h. Clean up and remove downstream access ramps.

46. Work During Close of Navigation in the Cofferdam Areas. Non-Critical Activities. The non-critical work items include:

a. Remove slab at river wall and rip-rap from rock dike.
b. Excavate, place forms for foundation slab and pour concrete.
c. Place forms and pour conduits and stilling basin.
d. Place backfill against river wall.
e. Place rip-rap and tie into rock dike.
f. Remove upper guide wall Monoliths Nos. 1 and 2.
g. Cut upstream intermediate and river wall monoliths to new conduit elevations.
h. Place and anchor forms for new intake manifolds.
i. Pour concrete for intake manifolds.
j. Complete upper portion of monoliths.
k. Stabilize downstream intermediate wall miter gate monolith with shear keys.
l. Stabilize downstream river wall miter gate monolith with shear keys.
m. Provide cathodic protection of miter gates.
n. Install temporary wiring and connections including lock lighting and traffic lights.
o. Place wall armor.
p. Clean up and remove access ramps.

47. Electrical and Mechanical Work During Close of Navigation. Starting around October 1, arrangements will be made to provide for the electrical requirements; these activities include:

a. Temporary installation of enclosure for electrical equipment.
b. Temporary installation of permanent electrical equipment, control equipment, motor control center and panel boards.

All of the above activities carried out during the winter season are scheduled for completion by the end of March with the locks in operating condition.

48. Work on Dam. The following work will be undertaken on the dam.

a. Prepare access to dam and install pipeline to place sand.
b. Pump in sand (and water) for stabilizing dam.
c. Remove pipeline and clean up.

49. Removal of Cofferdams. On April 1, the upstream and downstream cofferdam closure cells are removed to permit the river traffic to enter and exit. During the summer season from May through October, the following activities are scheduled:

a. Remove remaining cofferdam cells in water.
b. Remove cofferdam land based cells.
c. Remove unloading ramps.
d. Clean up left bank.
e. Remove construction access road and establish final backfill behind lower guide wall and landward lock wall.

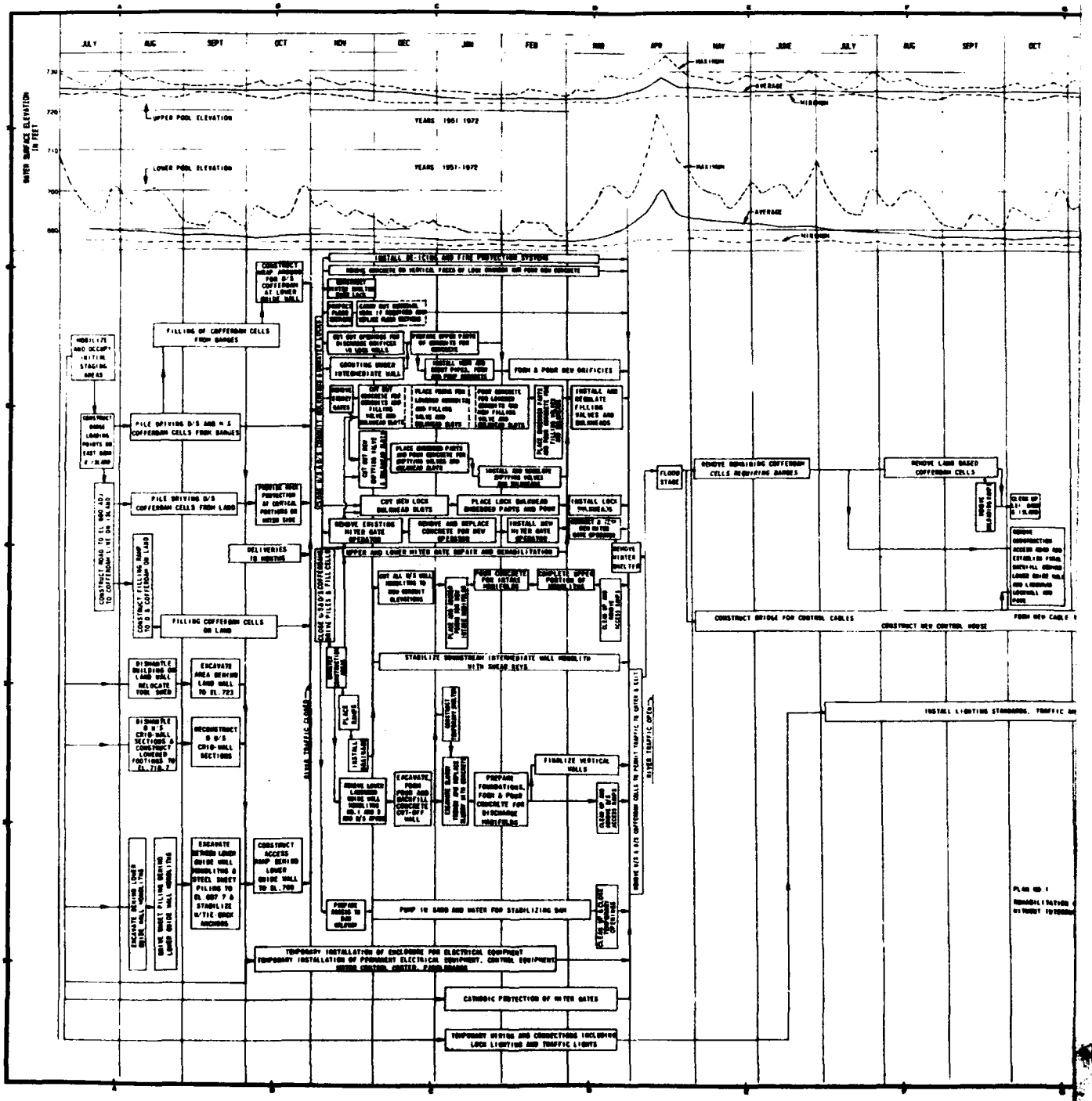
50. Work to Complete Project. The following activities are scheduled to start May 1, but will continue through the following May.

a. Construct bridge for control cables, form new cable trenches and construct new control house.
b. Change over mechanical and electrical equipment.
c. Install lighting standards, traffic and navigation lights, and pull permanent wires.
d. Disconnect temporary wiring, remove and reinstall electrical control equipment, motor control center, panel board, etc. in permanent structure, including permanent connection for complete installation.
e. Remove temporary wiring and enclosure.
f. Resurface concrete on decks, pave access roads and parking areas.
g. Install new floating mooring bitts and tow haulage.
h. Install floats to prevent pleasure craft from being swept towards the dam.

Project is now complete. Total estimated project duration is 23 months.

COST ESTIMATES

51. Costs have been estimated on the basis of the most up-to-date information available at the time the estimate was prepared. Accordingly all estimates are based upon price levels prevailing in January 1975. None of the unit prices or lump sum amounts in the body of the estimate contain any provision for price escalation. The total first costs of the various plans of rehabilitation are also given in October 1975 price levels.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730
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710
700
690
MAXIMUM
AVERAGE
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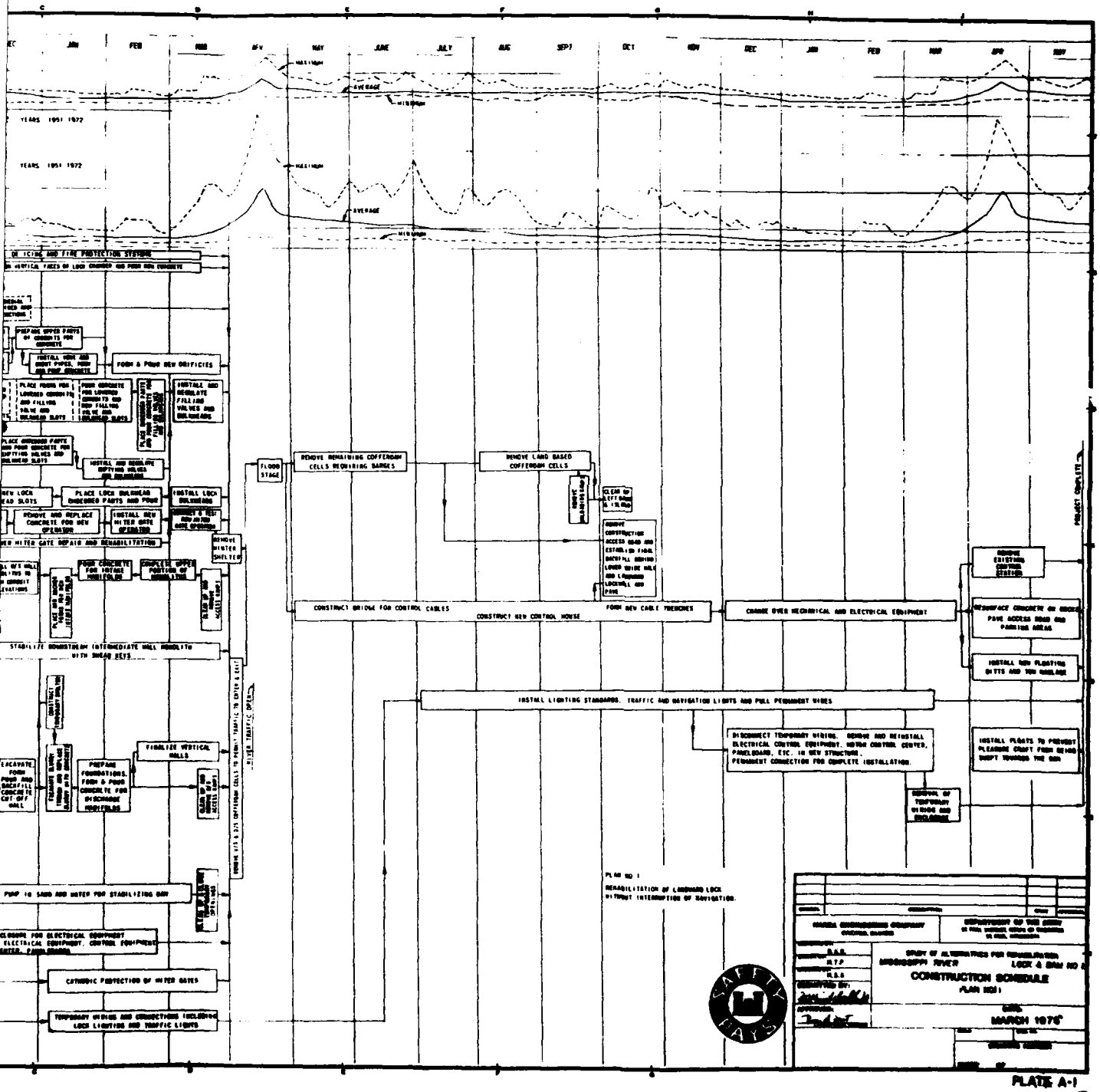
UPPER POOL ELEVATION
YEARS 1951 1972
LOWER POOL ELEVATION
YEARS 1951-1972
INSTALL ICE AND TIDE PROTECTION SYSTEM
REMOVE CONCRETE ON VERTICAL FACES OF LOCK CHAMBER AND FORM NEW CONCRETE
FILLING OF COFFERDAM CELLS FROM BARGES
PILE DRIVING D/S AND N.S COFFERDAM CELLS FROM BARGES
PILE DRIVING D/S COFFERDAM CELLS FROM LAND
FILLING COFFERDAM CELLS ON LAND
GROUTING UNDER INTERMEDIATE WALL
FORM & POUR NEW ORIFICES
CUT NEW LOCK BULKHEAD SLOTS
PLACE LOCK BULKHEAD EMBEDDED PARTS AND POUR
INSTALL LOCK BULKHEADS
REMOVE EXISTING WATER GATE OPERATOR
REMOVE AND REPLACE CONCRETE FOR NEW OPERATOR
INSTALL NEW WATER GATE OPERATOR
UPPER AND LOWER WATER GATE REPAIR AND REHABILITATION
REMOVE WINTER SHELTER
STABILIZE DOWNSTREAM INTERMEDIATE WALL MONOLITH WITH SHEAR KEYS
FINALIZE VERTICAL WALLS
PUMP 10 SAND AND WATER FOR STABILIZING DAM
TEMPORARY INSTALLATION OF ENCLOSURE FOR ELECTRICAL EQUIPMENT
CATHODIC PROTECTION OF WATER GATES
TEMPORARY WIRING AND CONNECTIONS INCLUDING LOCK LIGHTING AND TRAFFIC LIGHTS
FLOOD STAGE
REMOVE REMAINING COFFERDAM CELLS REQUIRING BARGES
REMOVE LAND BASED COFFERDAM CELLS
CONSTRUCT BRIDGE FOR CONTROL CABLES
CONSTRUCT NEW CONTROL HOUSE
INSTALL LIGHTING STANDARDS, TRAFFIC



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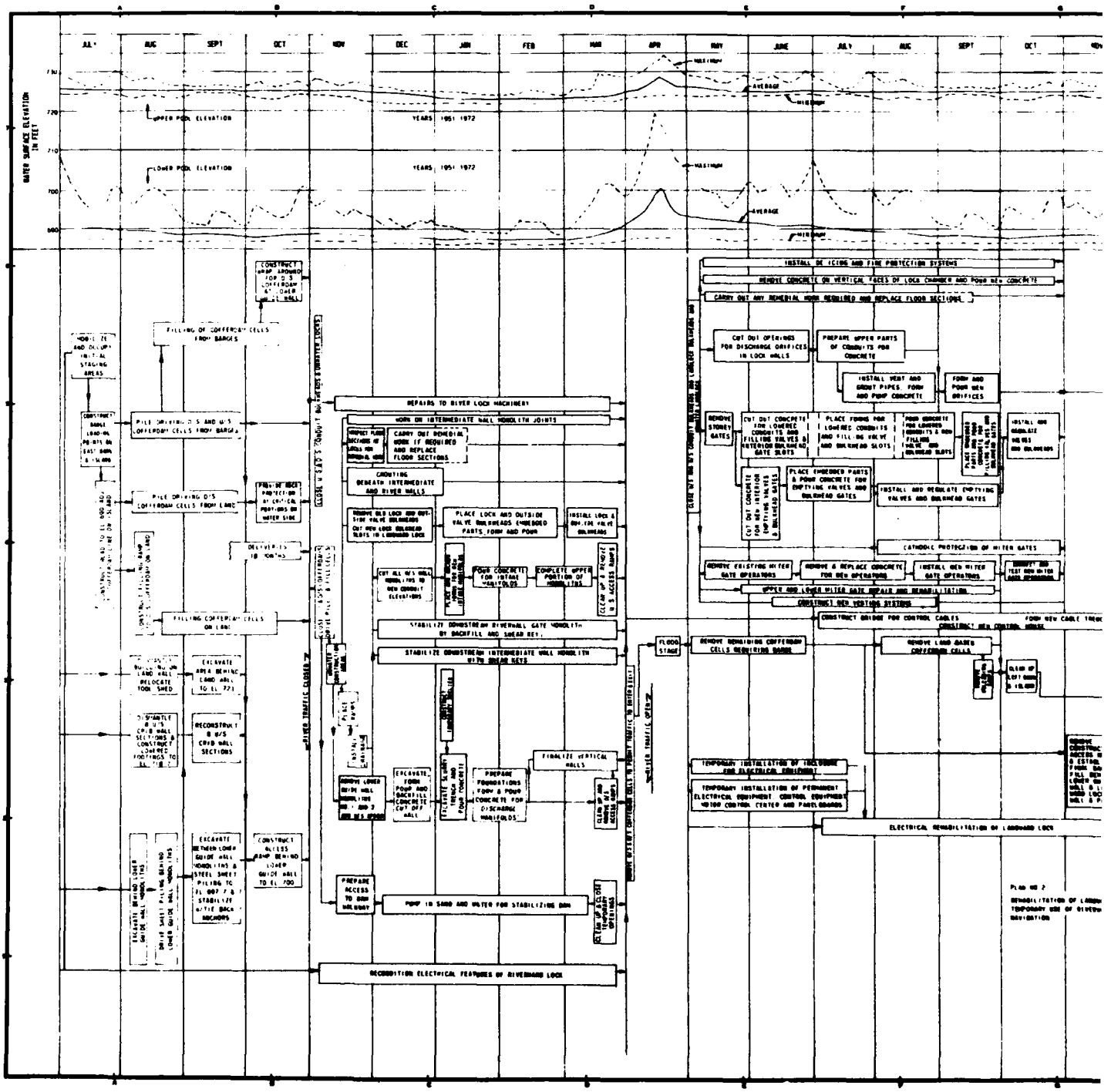
FORM & POUR NEW ORIFICIES
INSTALL AND REGULATE FILLING VALVES AND BULKHEADS
INSTALL AND REGULATE EMPTYING VALVES AND BULKHEADS
PLACE LOCK BULKHEAD ENDEBBED PARTS AND POUR
INSTALL LOCK BULKHEADS
REMOVE AND REPLACE CONCRETE FOR NEW OPERATOR
INSTALL NEW MITER GATE OPERATOR
REMOVE MITER GATE REPAIR AND REHABILITATION
REMOVE MINTER SHELTER
POUR CONCRETE FOR INTAKE MANIFOLDS
COMPLETE UPPER PORTION OF MONOLITHS
STABILIZE DOWNSTREAM INTERMEDIATE WALL MONOLITH WITH SHEAR KEYS
FINALIZE VERTICAL WALLS
PREPARE FOUNDATIONS, FORM & POUR CONCRETE FOR DISCHARGE MANIFOLDS
PUMP IN SAND AND WATER FOR STABILIZING DAM
CATHODIC PROTECTION OF MITER GATES
TEMPORARY WIRING AND CONNECTIONS INCLUDING LOCK LIGHTING AND TRAFFIC LIGHTS
FLOOD STAGE
REMOVE REMAINING COFFERDAM CELLS REQUIRING BARGES
REMOVE LAND BASED COFFERDAM CELLS
CONSTRUCT BRIDGE FOR CONTROL CABLES
CONSTRUCT NEW CONTROL HOUSE
FORM NEW CABLE TRENCHES
CHANGE OVER MECHANICAL AND ELECTRICAL EQUIPMENT
REMOVE EXISTING CONTROL STATION
RESURFACE CONCRETE ON DOCKS PAVE ACCESS ROAD AND PARKING AREAS
INSTALL NEW FLOATING DITTS AND TOW HAULAGE
INSTALL LIGHTING STANDARDS, TRAFFIC AND NAVIGATION LIGHTS AND PULL PERMANENT WIRES
DISCONNECT TEMPORARY WIRING, REMOVE AND REINSTALL ELECTRICAL CONTROL EQUIPMENT, MOTOR CONTROL CENTER, PANELBOARD, ETC. IN NEW STRUCTURE. PERMANENT CONNECTION FOR COMPLETE INSTALLATION.
INSTALL FLOATS TO PREVENT PLEASURE CRAFT FROM BEING SWEPT TOWARDS THE DAM
REMOVAL OF TEMPORARY WIRING AND ENCLOSURE
PROJECT COMPLETE
PLAN NO 1
REHABILITATION OF LANDWARD LOCK WITHOUT INTERRUPTION OF NAVIGATION.
MARCA ENGINEERING COMPANY
DEPARTMENT OF THE ARMY
STUDY OF ALTERNATIVES FOR REHABILITATION
MISSISSIPPI RIVER
LOCK & DAM NO 1
CONSTRUCTION SCHEDULE
PLAN NO 1
MARCH 1975
SAFETY PAYS

PLATE A-1

2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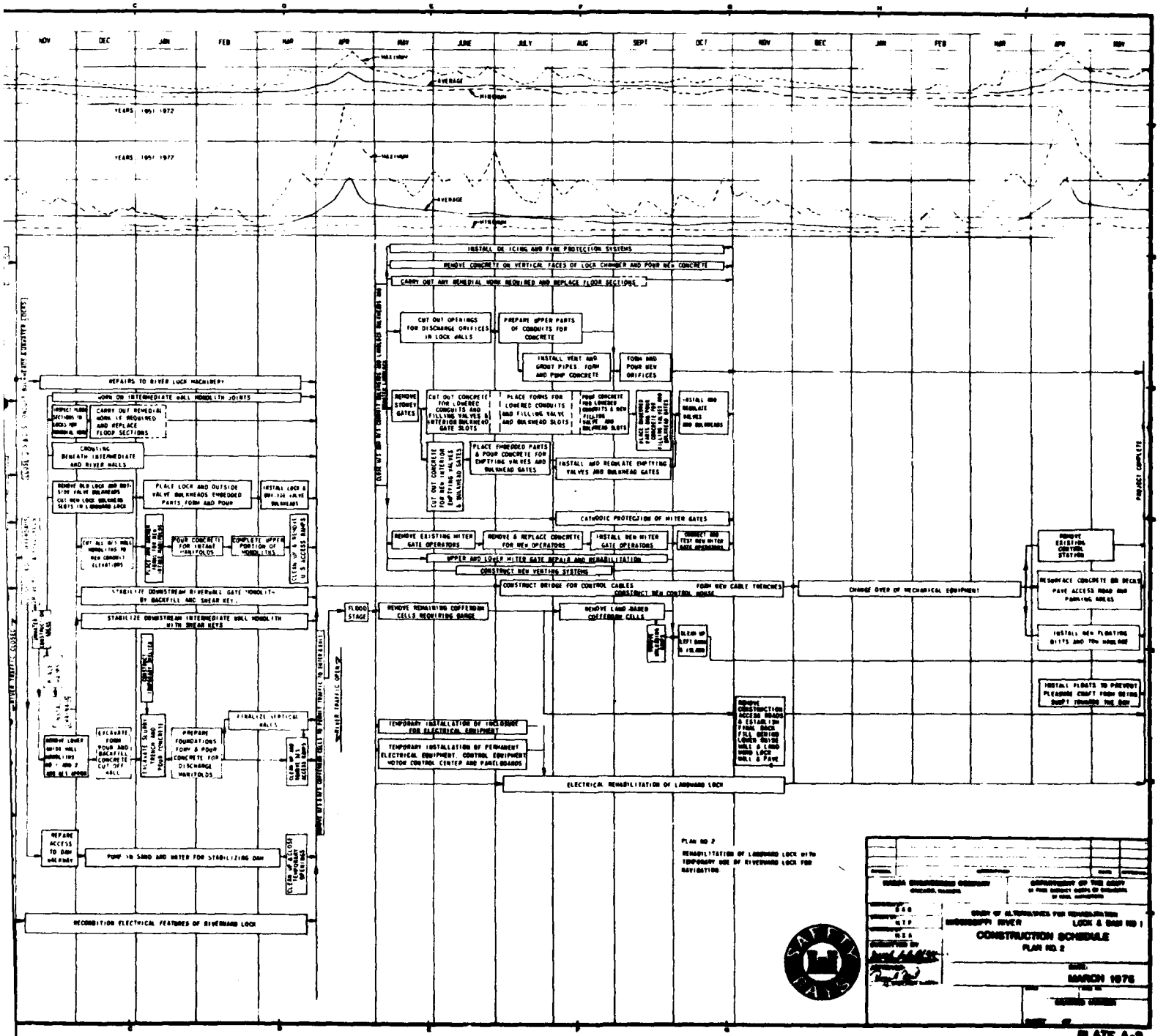
CONSTRUCT DRAW AROUND FOR D/S COFFERDAM ALONGSIDE WALL
FILLING OF COFFERDAM CELLS FROM BARGES
MOBILIZE AND DEVELOP INITIAL STAGING AREAS
CONSTRUCT BARGE LOADING POINTS ON EAST BANK & ISLAND
PILE DRIVING D/S AND U/S COFFERDAM CELLS FROM BARGE
PILE DRIVING D/S COFFERDAM CELLS FROM LAND
FINISH OF WOOD PROTECTION ON CRITICAL PORTIONS ON WATER SIDE
DELIVERIES IN WINTER
FILLING COFFERDAM CELLS ON LAND
EXCAVATE AREA BEHIND LAND WALL TO EL 721
RELOCATE TOOL SHED
DISMANTLE D/S CRIB WALL SECTIONS & CONSTRUCT LOWERED FOOTINGS TO EL 718
RECONSTRUCT D/S CRIB WALL SECTIONS
EXCAVATE BETWEEN LOWER GUIDE WALL MONOLITHS & STEEL SHEET PILING TO EL 697 & STABILIZE WITH BACK ANCHORS
CONSTRUCT GUIDES AND BEHIND LOWER GUIDE WALL TO EL 700
EXCAVATE BEHIND LOWER GUIDE WALL MONOLITHS
DRIVE SHEET PILING BEHIND LOWER GUIDE WALL MONOLITHS
RIVER TRAFFIC CLOSED
REPAIRS TO RIVER LOCK MACHINERY
WORK ON INTERMEDIATE WALL MONOLITH JOINTS
INSPECT FLOOR SECTIONS OF WALLS FOR REMEDIAL WORK
CARRY OUT REMEDIAL WORK IF REQUIRED AND REPLACE FLOOR SECTIONS
GROUTING BENEATH INTERMEDIATE AND RIVER WALLS
REMOVE OLD LOCK AND OUTSIDE VALVE BULKHEADS CUT NEW LOCK BULKHEAD SLOTS IN LANDWARD LOCK
PLACE LOCK AND OUTSIDE VALVE BULKHEADS EMBEDDED PARTS, FORM AND POUR
INSTALL LOCK & OUTSIDE VALVE BULKHEADS
CUT ALL U/S WALL MONOLITHS TO NEW CONDUIT ELEVATIONS
POUR CONCRETE FOR INTAKE MANIFOLDS
COMPLETE UPPER PORTION OF MONOLITHS
CLEAN UP & REMOVE U/S ACCESS RAMPS
STABILIZE DOWNSTREAM RIVERWALL GATE MONOLITH BY BACKFILL AND SHEAR KEYS
STABILIZE DOWNSTREAM INTERMEDIATE WALL MONOLITH WITH SHEAR KEYS
REMOVE LOWER GUIDE WALL MONOLITHS 1 AND 2 AND U/S GUIDES
EXCAVATE FORM POUR AND BACKFILL CONCRETE CUT OFF WALL
EXCAVATE SLURRY TRENCH AND POUR CONCRETE
PREPARE FOUNDATIONS FORM & POUR CONCRETE FOR DISCHARGE MANIFOLDS
FINALIZE VERTICAL WALLS
CLEAN UP AND REMOVE U/S ACCESS RAMPS
PREPARE ACCESS TO DAM HALLWAY
PUMP IN SAND AND WATER FOR STABILIZING DAM
RETURN UP & CLOSE TEMPORARY OPENINGS
RECONDITION ELECTRICAL FEATURES OF RIVERWARD LOCK
RIVER TRAFFIC OPEN
FLOOD STAGE
INSTALL DE ICING AND FIRE PROTECTION SYSTEMS
REMOVE CONCRETE ON VERTICAL FACES OF LOCK CHAMBER AND POUR NEW CONCRETE
CARRY OUT ANY REMEDIAL WORK REQUIRED AND REPLACE FLOOR SECTIONS
CUT OUT OPENINGS FOR DISCHARGE ORIFICES IN LOCK WALLS
PREPARE UPPER PARTS OF CONDUITS FOR CONCRETE
INSTALL VENT AND GROUT PIPES, FORM AND PUMP CONCRETE
FORM AND POUR NEW ORIFICES
REMOVE STONEY GATES
CUT OUT CONCRETE FOR LOWERED CONDUITS AND FILLING VALVES & INTERIOR BULKHEAD GATE SLOTS
PLACE FORMS FOR LOWERED CONDUITS AND FILLING VALVE AND BULKHEAD SLOTS
POUR CONCRETE FOR LOWERED CONDUITS & NEW FILLING VALVE AND BULKHEAD SLOTS
INSTALL AND REGULATE FILLING VALVES AND BULKHEAD GATES
CUT OUT CONCRETE FOR NEW INTERIOR EMPTYING VALVES & BULKHEAD GATES
PLACE EMBEDDED PARTS & POUR CONCRETE FOR EMPTYING VALVES AND BULKHEAD GATES
INSTALL AND REGULATE EMPTYING VALVES AND BULKHEAD GATES
CATHODIC PROTECTION OF WATER GATES
REMOVE EXISTING WATER GATE OPERATORS
REMOVE & REPLACE CONCRETE FOR NEW OPERATORS
INSTALL NEW WATER GATE OPERATORS
UPPER AND LOWER WATER GATE REPAIR AND REHABILITATION
CONSTRUCT NEW VENTING SYSTEMS
CONSTRUCT BRIDGE FOR CONTROL CABLES
FORM NEW CABLE TRENCHES
CONSTRUCT NEW CONTROL HOUSE
REMOVE REMAINING COFFERDAM CELLS REQUIRING DAMS
REMOVE LAND BARGE COFFERDAM CELLS
TEMPORARY INSTALLATION OF INCLOSURE AND ELECTRICAL EQUIPMENT
TEMPORARY INSTALLATION OF PERMANENT ELECTRICAL EQUIPMENT CONTROL EQUIPMENT MOTOR CONTROL CENTER AND PANEL BOARDS
ELECTRICAL REHABILITATION OF LANDWARD LOCK
REMOVE CONSTRUCTION ACCESS W & ESTABL FROM DAM FILL DEN LOWER GU WALL & L GUIDE LOC WALL & P
PLAN NO 2
REHABILITATION OF LANDWA TEMPORARY USE OF RIVERW NAVIGATION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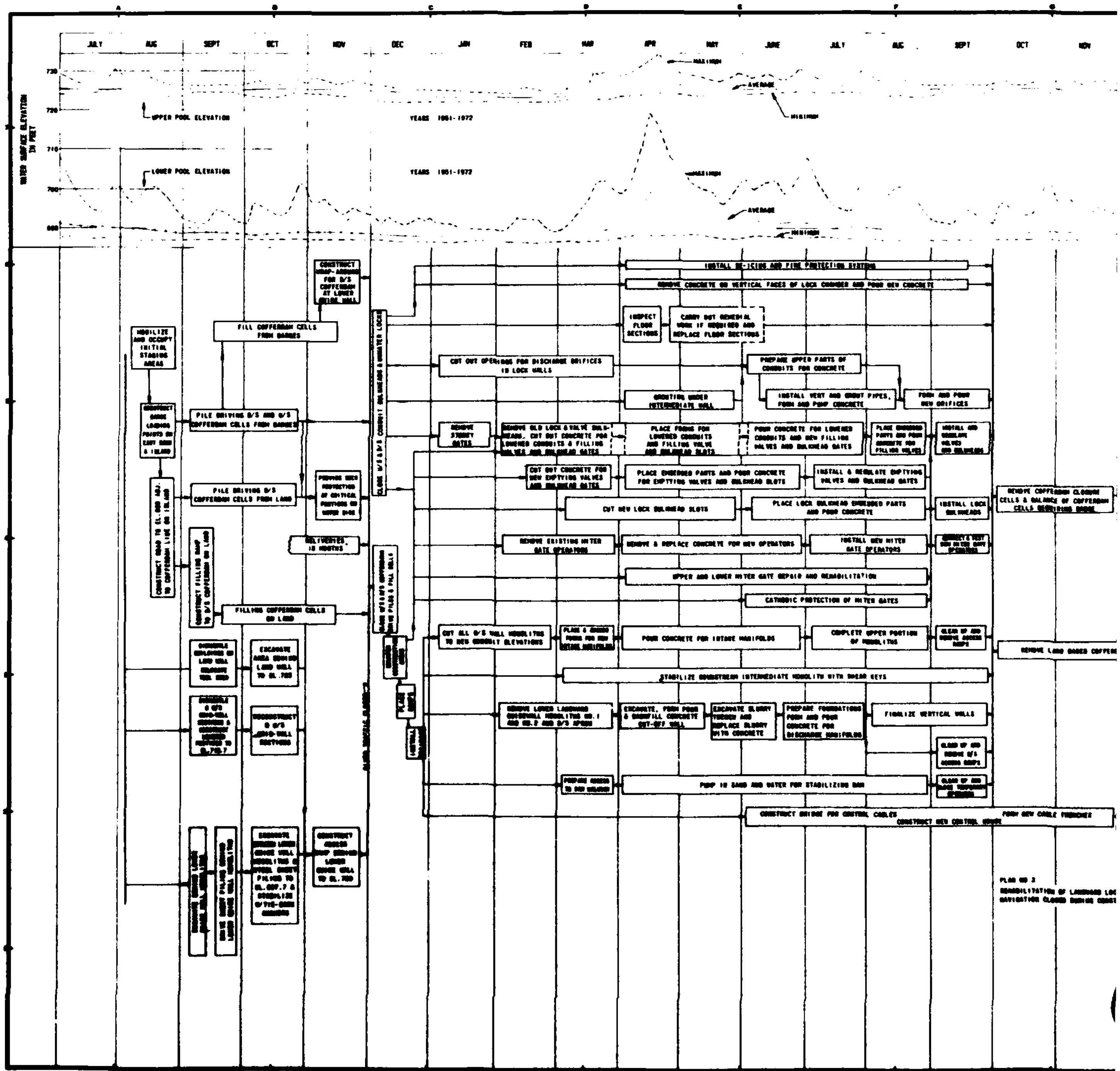
INSTALL DE ICING AND FIRE PROTECTION SYSTEMS
REMOVE CONCRETE ON VERTICAL FACES OF LOCK CHAMBER AND POUR NEW CONCRETE
CARRY OUT ANY REMEDIAL WORK REQUIRED AND REPLACE FLOOR SECTIONS
CUT OUT OPENINGS FOR DISCHARGE ORIFICES IN LOCK WALLS
PREPARE UPPER PARTS OF CONDUITS FOR CONCRETE
INSTALL VENT AND GROUT PIPES FORM AND PUMP CONCRETE
FORM AND POUR NEW ORIFICES
REPAIRS TO RIVER LOCK MACHINERY
WORK ON INTERMEDIATE WALL MONOLITH JOINTS
INSPECT FLOOR SECTIONS TO ASCERTAIN REMEDIAL WORK
CARRY OUT REMEDIAL WORK IF REQUIRED AND REPLACE FLOOR SECTIONS
CROWNING BENEATH INTERMEDIATE AND RIVER WALLS
REMOVE OLD LOCK AND BOTTOM VALVE BULKHEADS CUT NEW LOCK BULKHEAD SLOTS IN LANDWARD LOCK
PLACE LOCK AND OUTSIDE VALVE BULKHEADS EMBEDDED PARTS FORM AND POUR
INSTALL LOCK & BOTTOM VALVE BULKHEADS
CUT ALL RIVER WALL MONOLITHS TO NEW CONDUIT ELEVATIONS
POUR CONCRETE FOR INTAKE MANIFOLDS
COMPLETE UPPER PORTION OF MONOLITHS
CLEAN UP & REMOVE 10 % ACCESS RAMPS
STABILIZE DOWNSTREAM RIVERWALL GATE MONOLITH BY BACKFILL AND SHEAR KEY.
STABILIZE DOWNSTREAM INTERMEDIATE WALL MONOLITH WITH SHEAR KEYS
REMOVE LOWER RIVER WALL MONOLITHS NO. 1 AND 2 UPS WALL OPENING
EXCAVATE FORM POUR AND BACKFILL CONCRETE CUT OFF WALL
EXCAVATE SLURRY TRENCH AND POUR CONCRETE
PREPARE FOUNDATIONS FORM & POUR CONCRETE FOR DISCHARGE MANIFOLDS
FINALIZE VERTICAL WALLS
CLEAN UP AND REMOVE 10 % ACCESS RAMPS
REPAIR ACCESS TO DAM BULKHEAD
PUMP IN SAND AND WATER FOR STABILIZING DAM
CLEAN UP & CLOSE TEMPORARY OPENINGS
RECONDITION ELECTRICAL FEATURES OF RIVERWARD LOCK
RIVER TRAFFIC CLOSED
RIVER TRAFFIC OPEN
FLOOD STAGE
REMOVE REMAINING COFFERDAM CELLS REQUIRING BARGE
REMOVE LAND BASED COFFERDAM CELLS
CLEAN UP LEFT BANK & FILLING
REMOVE EXISTING WATER GATES
CUT OUT CONCRETE FOR LOWERED CONDUITS AND FILLING VALVES & INTERIOR BULKHEAD GATE SLOTS
PLACE FORMS FOR LOWERED CONDUITS AND FILLING VALVE AND BULKHEAD SLOTS
POUR CONCRETE AND LOWERED CONDUITS & NEW FILLING VALVE AND BULKHEAD SLOTS
PLACE EMBEDDED PARTS AND POUR CONCRETE FOR NEW FILLING VALVES AND BULKHEAD GATES
INSTALL AND REGULATE VALVES AND BULKHEADS
CUT OUT CONCRETE FOR NEW INTERIOR EMPTYING VALVES & BULKHEAD GATES
PLACE EMBEDDED PARTS & POUR CONCRETE FOR EMPTYING VALVES AND BULKHEAD GATES
INSTALL AND REGULATE EMPTYING VALVES AND BULKHEAD GATES
CATHODIC PROTECTION OF WATER GATES
REMOVE EXISTING WATER GATE OPERATORS
REMOVE & REPLACE CONCRETE FOR NEW OPERATORS
INSTALL NEW WATER GATE OPERATORS
CONNECT AND TEST NEW WATER GATE OPERATORS
UPPER AND LOWER WATER GATE REPAIR AND REHABILITATION
CONSTRUCT NEW VENTING SYSTEMS
CONSTRUCT BRIDGE FOR CONTROL CABLES
FORM NEW CABLE TRENCHES
CONSTRUCT NEW CONTROL HOUSE
CHANGE OVER OF MECHANICAL EQUIPMENT
REMOVE EXISTING CONTROL STATION
RESURFACE CONCRETE OR DECKS PAVE ACCESS ROAD AND PARKING AREAS
INSTALL NEW FLOATING BITTS AND TOW HOLDER
INSTALL FLOATS TO PREVENT PLEASURE CRAFT FROM GETTING SUCKED TOWARDS THE DAM
PROJECT COMPLETE
TEMPORARY INSTALLATION OF TRANSFORMER FOR ELECTRICAL EQUIPMENT
TEMPORARY INSTALLATION OF PERMANENT ELECTRICAL EQUIPMENT CONTROL EQUIPMENT MOTOR CONTROL CENTER AND PANELBOARDS
REMOVE CONSTRUCTION ACCESS ROADS & ESTABLISH FINAL DECK FILL BEHIND LOWER GATE HOUSE WALL & LAND WARD LOCK WALL & PAVE
ELECTRICAL REHABILITATION OF LANDWARD LOCK
PLAN NO 2
REHABILITATION OF LANDWARD LOCK WITH TEMPORARY USE OF RIVERWARD LOCK FOR NAVIGATION
SAFETY FIRST
STUDY OF ALTERNATIVES FOR REHABILITATION
MISSISSIPPI RIVER
LOCK & DAM NO 1
CONSTRUCTION SCHEDULE
PLAN NO 2
MARCH 1976

PLATE A-2



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UPPER POOL ELEVATION
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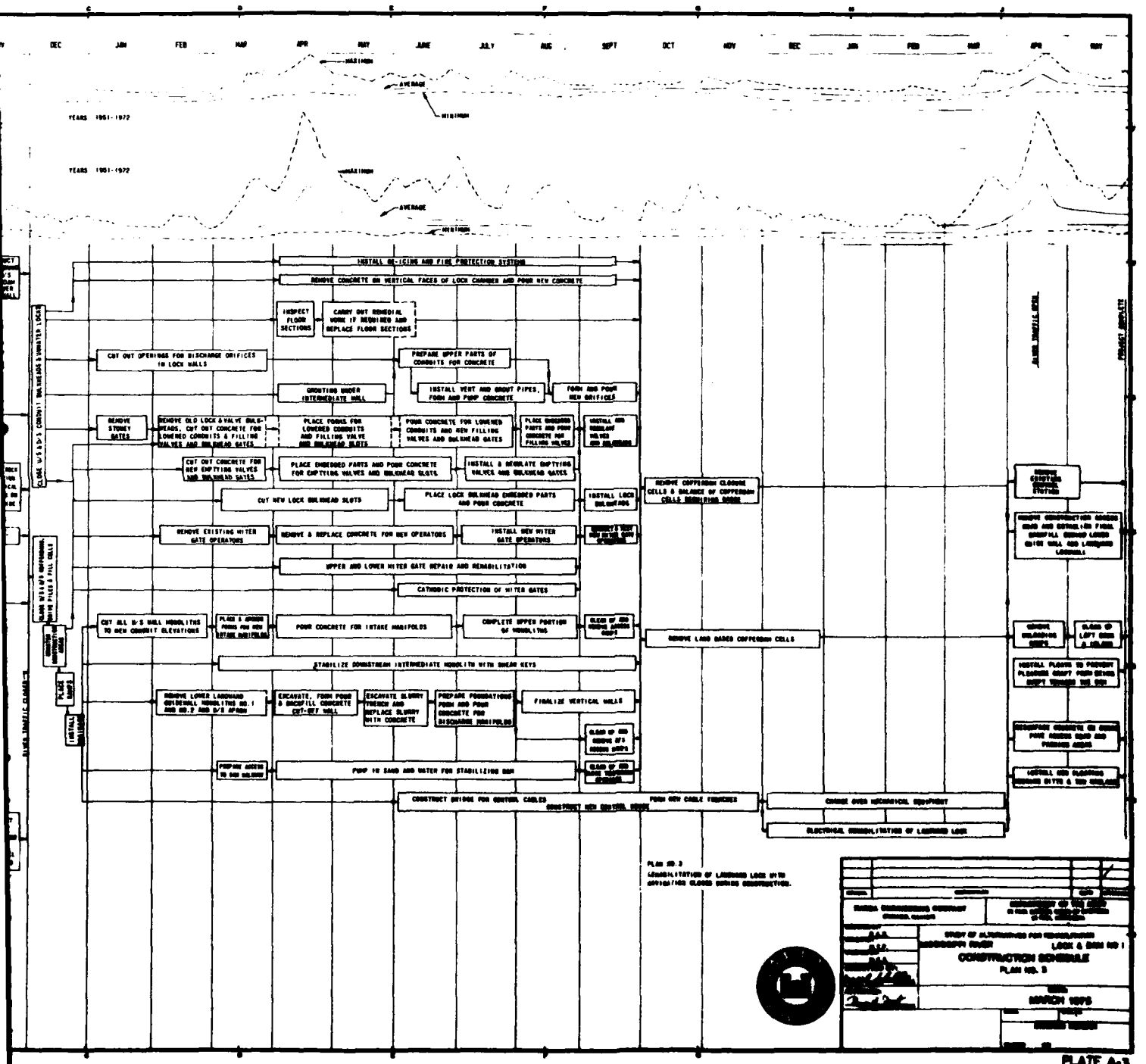
INSTALL DE-ICING AND FIRE PROTECTION SYSTEMS
REMOVE CONCRETE ON VERTICAL FACES OF LOCK CHAMBER AND POUR NEW CONCRETE
INSPECT FLOOR SECTIONS
CARRY OUT REMEDIAL WORK IF REQUIRED AND REPLACE FLOOR SECTIONS
MOBILIZE AND OCCUPY INITIAL STAGING AREAS
FILL COFFERDAM CELLS FROM BARGES
CUT OUT OPENINGS FOR DISCHARGE ORIFICES IN LOCK WALLS
PREPARE UPPER PARTS OF CONDUITS FOR CONCRETE
GROUTING UNDER INTERMEDIATE WALL
INSTALL VENT AND GROUT PIPES, FORM AND POUR CONCRETE
FORM AND POUR NEW ORIFICES
PILE DRIVING U/S AND D/S COFFERDAM CELLS FROM BARGES
REMOVE STONEY GATES
PLACE FORMS FOR LOWERED CONDUITS AND FILLING VALVE AND BULKHEAD SLOTS
POUR CONCRETE FOR LOWERED CONDUITS AND NEW FILLING VALVES AND BULKHEAD GATES
PILE DRIVING D/S COFFERDAM CELLS FROM LAND
PLACE EMBEDDED PARTS AND POUR CONCRETE FOR EMPTYING VALVES AND BULKHEAD SLOTS
INSTALL & REGULATE EMPTYING VALVES AND BULKHEAD GATES
CUT NEW LOCK BULKHEAD SLOTS
PLACE LOCK BULKHEAD EMBEDDED PARTS AND POUR CONCRETE
INSTALL LOCK BULKHEADS
DELIVERIES, 18 MONTHS
REMOVE EXISTING MITER GATE OPERATORS
REMOVE & REPLACE CONCRETE FOR NEW OPERATORS
INSTALL NEW MITER GATE OPERATORS
UPPER AND LOWER MITER GATE REPAIR AND REHABILITATION
CATHODIC PROTECTION OF MITER GATES
FILLING COFFERDAM CELLS ON LAND
CUT ALL D/S WALL MONOLITHS TO NEW CONDUIT ELEVATIONS
POUR CONCRETE FOR INTAKE MANIFOLDS
COMPLETE UPPER PORTION OF MONOLITHS
STABILIZE DOWNSTREAM INTERMEDIATE MONOLITH WITH SHEAR KEYS
FINALIZE VERTICAL WALLS
PUMP IN SAND AND WATER FOR STABILIZING BAR
CONSTRUCT BRIDGE FOR CONTROL CABLES
CONSTRUCT NEW CONTROL HOUSE
FORM NEW CABLE TRENCHES
CLOSE U/S & D/S CONDUIT BULKHEADS & DEWATER LOCKS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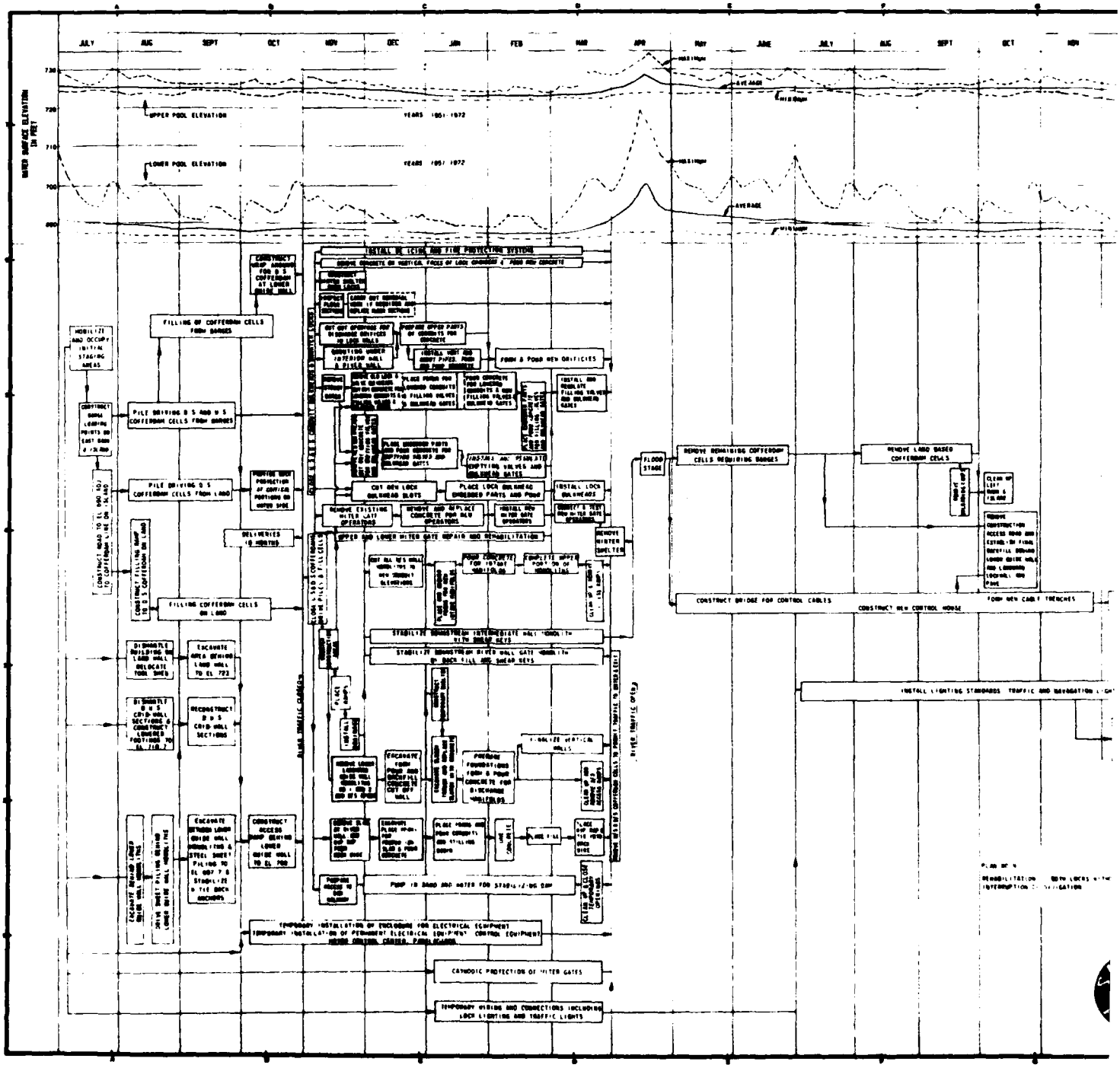
INSTALL DE-ICING AND FIRE PROTECTION SYSTEMS
REMOVE CONCRETE ON VERTICAL FACES OF LOCK CHAMBER AND POUR NEW CONCRETE
INSPECT FLOOR SECTIONS
CARRY OUT REMEDIAL WORK IF REQUIRED AND REPLACE FLOOR SECTIONS
CUT OUT OPENINGS FOR DISCHARGE ORIFICES IN LOCK WALLS
PREPARE UPPER PARTS OF CONDUITS FOR CONCRETE
GROUTING UNDER INTERMEDIATE WALL
INSTALL VENT AND GROUT PIPES, FORM AND PUMP CONCRETE
FORM AND POUR NEW ORIFICES
REMOVE STONEY GATES
REMOVE OLD LOCK & VALVE BULKHEADS, CUT OUT CONCRETE FOR LOWERED CONDUITS & FILLING VALVES AND BULKHEAD GATES
PLACE FORMS FOR LOWERED CONDUITS AND FILLING VALVE AND BULKHEAD SLOTS
POUR CONCRETE FOR LOWERED CONDUITS AND NEW FILLING VALVES AND BULKHEAD GATES
PLACE EMBEDDED PARTS AND POUR CONCRETE FOR FILLING VALVES
INSTALL AND REGULATE FILLING VALVES AND BULKHEADS
CUT OUT CONCRETE FOR NEW EMPTYING VALVES AND BULKHEAD GATES
PLACE EMBEDDED PARTS AND POUR CONCRETE FOR EMPTYING VALVES AND BULKHEAD SLOTS
INSTALL & REGULATE EMPTYING VALVES AND BULKHEAD GATES
CUT NEW LOCK BULKHEAD SLOTS
PLACE LOCK BULKHEAD EMBEDDED PARTS AND POUR CONCRETE
INSTALL LOCK BULKHEADS
REMOVE CONCRETE CLOSURE CELLS & BALANCE OF COFFERDAM CELLS
REMOVE EXISTING WITER GATE OPERATORS
REMOVE & REPLACE CONCRETE FOR NEW OPERATORS
INSTALL NEW WITER GATE OPERATORS
UPPER AND LOWER WITER GATE REPAIR AND REHABILITATION
CATHODIC PROTECTION OF WITER GATES
CUT ALL D/S WALL MONOLITHS TO NEW CONDUIT ELEVATIONS
PLACE & GROUT FORMS FOR NEW INTAKE MANIFOLDS
POUR CONCRETE FOR INTAKE MANIFOLDS
COMPLETE UPPER PORTION OF MONOLITHS
REMOVE LAND BASED COFFERDAM CELLS
STABILIZE DOWNSTREAM INTERMEDIATE MONOLITH WITH SHEAR KEYS
REMOVE LOWER LANDWARD COFFERWALL MONOLITHS NO. 1 AND NO. 2 AND D/S APRON
EXCAVATE, FORM POUR & BACKFILL CONCRETE CUT-OFF WALL
EXCAVATE SLURRY TRENCH AND REPLACE SLURRY WITH CONCRETE
PREPARE FOUNDATIONS FORM AND POUR CONCRETE FOR DISCHARGE MANIFOLDS
FINALIZE VERTICAL WALLS
PREPARE ACCESS TO DAM BULKHEAD
PUMP IN SAND AND WATER FOR STABILIZING DAM
CONSTRUCT BRIDGE FOR CONTROL CABLES
FORM NEW CABLE TRENCHES
CHANGE OVER MECHANICAL EQUIPMENT
ELECTRICAL REHABILITATION OF LANDWARD LOCK
PLAN NO. 3
REHABILITATION OF LANDWARD LOCK WITH OPERATIONS CLOSED DURING CONSTRUCTION.
STUDY OF ALTERNATIVES FOR REHABILITATION
MISSISSIPPI RIVER
LOCK & DAM NO. 1
CONSTRUCTION SCHEDULE
PLAN NO. 3
MARCH 1975

PLATE A-3
2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YEARS 1951-1972
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YEARS 1951-1972
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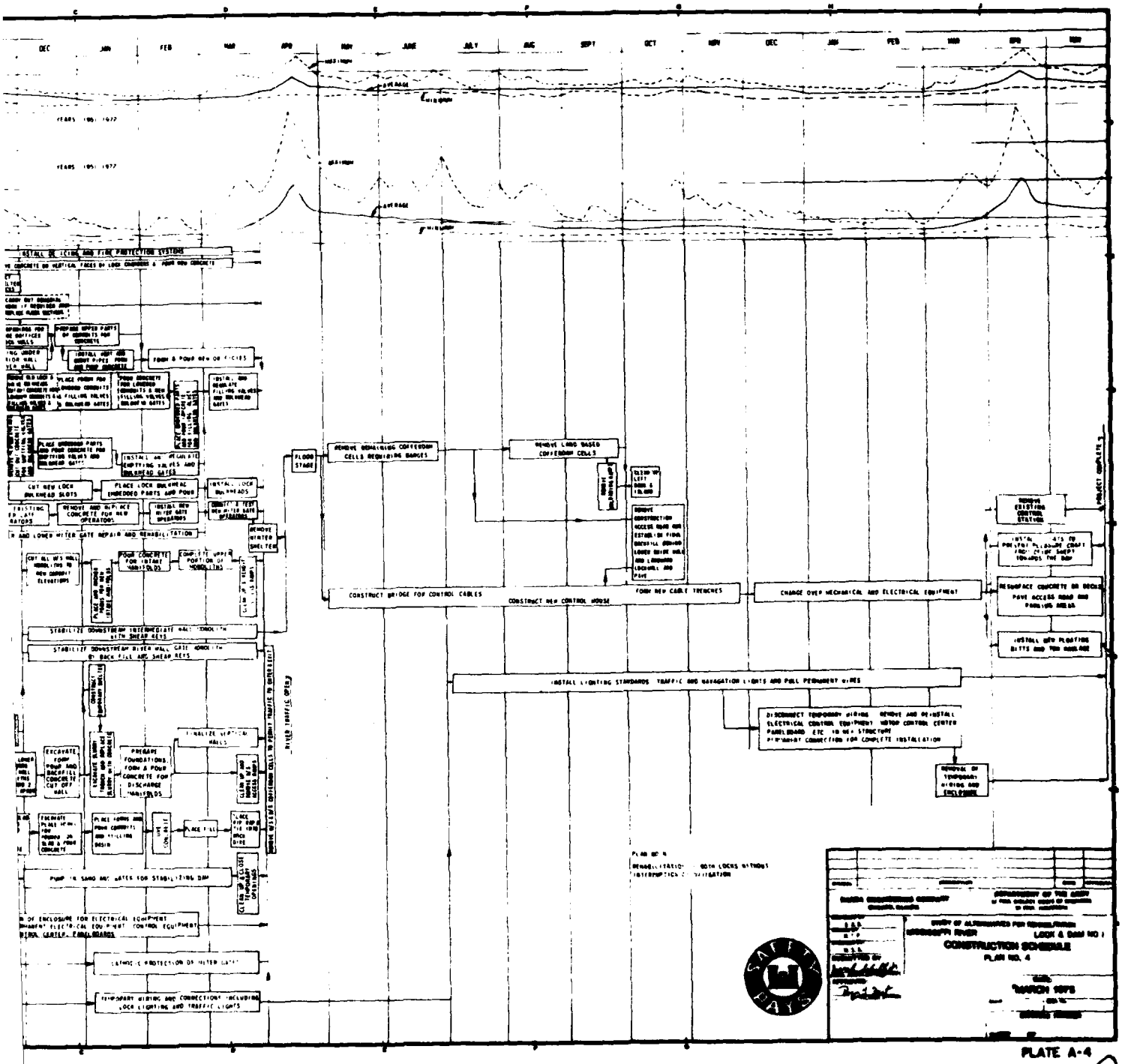
INSTALL DE-ICING AND FIRE PROTECTION SYSTEMS
REMOVE CONCRETE ON VERTICAL FACES OF LOCK CHAMBER & POUR NEW CONCRETE
CONSTRUCT WHARF AHEADS FOR D S COFFERDAM AT LOWER GUIDE WALL
FILLING OF COFFERDAM CELLS FROM BARGES
MOBILIZE AND OCCUPY INITIAL STAGING AREAS
CONSTRUCT RAMP LEADING POINTS ON EAST BANK & ISLAND
PILE DRIVING D S AND U S COFFERDAM CELLS FROM BARGES
PILE DRIVING D S COFFERDAM CELLS FROM LAND
CONSTRUCT ROAD TO EL 690 (U) TO COFFERDAM & ON ISLAND
CONSTRUCT FILLING RAMP TO U S COFFERDAM ON LAND
FILLING COFFERDAM CELLS ON LAND
DELIVERIES IS HOURLY
PROVIDE WICK PROTECTION OF CONTROL POSITIONS ON OUTER SIDE
CUT OFF OPENINGS FOR DISCHARGE ORIFICES IN LOCK WALLS
PREPARE UPPER PARTS OF CONCRETE FOR CONCRETE
CONCRETING UNDER FOUNDATION WALL & FILLER WALL
INSTALL VENT AND ABOVE PIPES, PUMP AND POUR CONCRETE
FORM & POUR NEW ORIFICES
INSTALL AND REGULATE FILLING VALVES AND BULKHEAD GATES
PLACE FORM AND REINFORCED CONCRETE
POUR CONCRETE FOR LANDING CONCRETE & NEW FILLING VALVES & BULKHEAD GATES
PLACE EMBEDDED PARTS AND CONCRETE FOR EMPTYING VALVES AND BULKHEAD GATES
INSTALL AND REGULATE EMPTYING VALVES AND BULKHEAD GATES
CUT NEW LOCK BULKHEAD SLOTS
PLACE LOCK BULKHEAD EMBEDDED PARTS AND POUR
INSTALL LOCK BULKHEADS
REMOVE EXISTING MITER GATE OPERATORS
REMOVE AND REPLACE CONCRETE FOR NEW OPERATORS
INSTALL NEW OPERATORS
UPPER AND LOWER MITER GATE REPAIR AND REHABILITATION
REMOVE MITER SHELTER
POUR CONCRETE FOR ISTORY MONITORING
COMPLETE UPPER PORT TO OF MONITORING
CLEAN UP & REMOVE EQUIPMENT
STABILIZE DOWNSTREAM INTERMEDIATE WALL MONOLITH WITH SHEAR KEYS
STABILIZE DOWNSTREAM DIVER WALL GATE MONOLITH BY ROCK FILL AND SHEAR KEYS
PLACE LOCKS
INSTALL BULKHEADS
CONSTRUCT ACCESS BRIDGE
FLOOD STAGE
REMOVE REMAINING COFFERDAM CELLS REQUIRING BARGES
REMOVE LAND BASED COFFERDAM CELLS
REMOVE BULKHEADS
CLEAN UP LEAVE RAMP & ISLAND
REMOVE CONSTRUCTION ACCESS ROAD AND ESTABLISH FINAL BACKFILL BEHIND LOWER GUIDE WALL AND LOWERING LOCKWALL AND PIPE
CONSTRUCT BRIDGE FOR CONTROL CABLES
CONSTRUCT NEW CONTROL HOUSE
FORM NEW CABLE TRENCHES
INSTALL LIGHTING STANDARDS TRAFFIC AND NAVIGATION LIGHTS
DISMANTLE BUILDING ON LAND WALL
RELOCATE TOOL SHED
EXCAVATE AREA BEHIND LAND WALL TO EL 723
DISMANTLE D S CRIB WALL SECTIONS & CONSTRUCT LOWER FOUNDATIONS TO EL 718.7
RECONSTRUCT D S CRIB WALL SECTIONS
REMOVE LOWER LANDING GUIDE WALL MONOLITHS
EXCAVATE FOR FOUNDATIONS AND CUT OFF WALL
PREPARE FOUNDATIONS FORM & POUR CONCRETE FOR DISCHARGE MONOLITHS
FINALIZE VERTICAL WALLS
CLEAN UP AND REMOVE EQUIPMENT
EXCAVATE BEHIND LOWER GUIDE WALL MONOLITHS
DRIVE SHEET PILING BEHIND LOWER GUIDE WALL MONOLITHS
EXCAVATE BEHIND LOWER GUIDE WALL MONOLITHS & STEEL SHEET PILING TO EL 697.7 & STABILIZE WITH ROCK ANCHORS
CONSTRUCT ACCESS RAMP BEHIND LOWER GUIDE WALL TO EL 700
REMOVE BLOCK OF INTAKE WALL AND CUT OFF WALL FROM GUIDE
EXCAVATE PLACE FORM AND POUR CONCRETE
PLACE FORM AND POUR CONCRETE AND STILLING BASIN
LINE CONCRETE
PLACE FILL
CLEAN UP AND REMOVE EQUIPMENT
REMOVE DIVER'S COFFERDAM CELLS TO PERMIT TRAFFIC TO DIVER'S GATE
PREPARE ACCESS TO ROCK BELOW
PUMP IN SAND AND WATER FOR STABILIZING DAM
CLEAN UP & CLOSE OPERATIONS
TEMPORARY INSTALLATION OF ENCLOSURE FOR ELECTRICAL EQUIPMENT
TEMPORARY INSTALLATION OF PERMANENT ELECTRICAL EQUIPMENT CONTROL EQUIPMENT
CATHODIC PROTECTION OF MITER GATES
TEMPORARY WIRING AND CONNECTIONS INCLUDING LOCK LIGHTING AND TRAFFIC LIGHTS
RIVER TRAFFIC OPEN
RIVER TRAFFIC CLOSED
COFFERDAM
REHABILITATION
INTERRUPTION


DEC
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AVERAGE
YEARS 1951 1977
INSTALL OIL LIGHTING AND FIRE PROTECTION SYSTEMS
FORM & POUR NEW OIL FILLERS
PLACE EMBEDDED PARTS AND POUR CONCRETE FOR EMPTYING VALVES AND BULKHEAD GATES
CUT NEW LOCK BULKHEAD SLOTS
PLACE LOCK BULKHEAD EMBEDDED PARTS AND POUR
INSTALL LOCK BULKHEADS
REMOVE AND REPLACE CONCRETE FOR NEW OPERATORS
INSTALL NEW MITER GATE OPERATORS
REMOVE MITER GATE SHELTER
MITER AND LOWER MITER GATE REPAIR AND REHABILITATION
POUR CONCRETE FOR INTAKE MANIFOLDS
COMPLETE UPPER PORTION OF MONOLITHS
STABILIZE DOWNSTREAM INTERMEDIATE WALL MONOLITH WITH SHEAR KEYS
STABILIZE DOWNSTREAM RIVER WALL GATE MONOLITH BY BACK FILL AND SHEAR KEYS
CONSTRUCT TEMPORARY SHELTER
FINALIZE VERTICAL WALLS
EXCAVATE FOR PRIME AND BACKFILL CONCRETE CUT OFF WALL
PREPARE FOUNDATIONS, FORM & POUR CONCRETE FOR DISCHARGE MANIFOLDS
PLACE FORMS AND POUR CONCRETE AND FILLING BASIN
PLACE FILL
PUMP IN SAND AND GRAVEL FOR STABILIZING DAM
CLEAN UP AND REMOVE TEMPORARY OPERATIONS
INSTALL ELECTRICAL PROTECTION OF MITER GATE
TEMPORARY WIRING AND CONNECTIONS INCLUDING LOCK LIGHTING AND TRAFFIC LIGHTS
FLOOD STAGE
REMOVE REMAINING COFFERDAM CELLS REQUIRING BARGES
REMOVE LAND BASED COFFERDAM CELLS
REMOVE CONSTRUCTION ACCESS ROAD FOR ESTABLISH FINAL GRADING AND LOWER DRIVE HOLE AND LANDING LOCKWALL AND PAVE
CONSTRUCT BRIDGE FOR CONTROL CABLES
CONSTRUCT NEW CONTROL HOUSE
FORM NEW CABLE TRENCHES
CHANGE OVER MECHANICAL AND ELECTRICAL EQUIPMENT
REMOVE EXISTING CONTROL STATIONS
INSTALL 4'x3' TO PREVENT PLEASURE CRAFT FROM PASSING THE DAM
RESURFACE CONCRETE ON DECKS
PAVE ACCESS ROAD AND PARKING AREA
INSTALL BUOY FLOATING BITTS AND TOW HOOKS
INSTALL LIGHTING STANDARDS TRAFFIC AND NAVIGATION LIGHTS AND PULL PERMANENT WIRES
DISCONNECT TEMPORARY WIRING REMOVE AND REINSTALL ELECTRICAL CONTROL EQUIPMENT MOTOR CONTROL CENTER PANELBOARD ETC IN NEW STRUCTURE PERMANENT CONNECTION FOR COMPLETE INSTALLATION
REMOVAL OF TEMPORARY WIRING AND EQUIPMENT
PROJECT COMPLETE
RIVER TRAFFIC OPEN
SAFETY BAYS
STUDY OF ALTERNATIVES FOR REHABILITATION
MISSISSIPPI RIVER
LOCK & DAM NO 1
CONSTRUCTION SCHEDULE
PLAN NO. 4
MARCH 1975

PLATE A-4

2

REHABILITATION OF LOCK AND DAM NO. 1

SUMMARY OF COST ESTIMATES

ITEM	PLAN NO. 1	PLAN NO. 2	PLAN NO. 3	PLAN NO. 4A 1/	PLAN NO. 4B 2/	PLAN
1. Temporary Construction						
Diversion and Care of Water						
Downstream Cofferdam and Pumping	$ 1,295,000	$ 1,439,000	$ 1,295,000	$ 1,478,000	$ 1,478,000	$ 1,
Upstream Cofferdam and Pumping	491,000	491,000	491,000	491,000	491,000	
Other Facilities	529,000	50,000	48,000	934,000	934,000	
2. Intake Manifolds	536,000	507,000	497,000	817,000	817,000	
3. Discharge Structures	1,023,000	970,000	938,000	1,323,000	1,399,000	1,
4. Upper Guide Wall	43,000	43,000	43,000	43,000	43,000	
5. Land Wall	725,000	717,000	714,000	739,000	739,000	
6. Intermediate Wall	630,000	624,000	620,000	1,059,000	1,059,000	1,
7. River Wall	8,000	168,000	8,000	630,000	630,000	
8. Dam	10,000	10,000	10,000	10,000	10,000	
9. Bridge and Elevator	157,000	153,000	153,000	169,000	169,000	
10. Control House	279,000	270,000	270,000	146,000	146,000	
11. Observation Platform	—	—	—	24,000	24,000	
12. Repair of Concrete Surfaces	1,121,000	1,121,000	1,121,000	1,515,000	1,515,000	1,
13. Mechanical Equipment	1,430,000	1,524,000	1,430,000	2,296,000	2,296,000	2,
14. Electrical Equipment	555,000	586,000	555,000	1,100,000	1,100,000	1,
15. Protection of Pleasure Craft	2,000	2,000	2,000	2,000	2,000	
16. Miscellaneous Facilities and Improvements	92,000	92,000	92,000	118,000	118,000	
Subtotal Direct Cost	8,926,000	8,767,000	8,287,000	12,894,000	12,970,000	13,
Contingencies (20% ±)	1,824,000	1,783,000	1,663,000	2,606,000	2,630,000	2,
Total Direct Construction Cost	10,750,000	10,550,000	9,950,000	15,500,000	15,600,000	16,
Engineering and Design (7% ±)	780,000	730,000	730,000	1,080,000	1,080,000	1,
Supervision and Inspection (5% ±)	550,000	520,000	520,000	770,000	770,000	
Overhead on Engineering & Design (25% ±)	190,000	180,000	180,000	270,000	270,000	
Overhead on Supervision and Inspection (24% ±)	130,000	120,000	120,000	180,000	180,000	
Total First Cost (January 1975 price levels)	$12,400,000	$12,100,000	$11,500,000	$17,800,000	$17,900,000	$18,
Total First Cost (October 1975 price Levels)	$13,500,000	$13,200,000	$12,500,000	$19,400,000	$19,500,000	$20,

1/ Discharge from the River Wall across the River.
2/ Discharge from the River Wall into a natural channel between the Center Island and Rockfill Dike.
3/ Discharge from the River Wall through the laterals downstream of River Lock.

4/ Cost of rehabilitation of River Lock at a later date (at January 1975 price levels) subsequent to rehabilitation of Land Lock, assuming that hydraulic discharge structures from the River Wall will be constructed as in Plan No.4B.

NOTE: Plans Nos. 1, 2 and 3 include cost of abandoning the River Lock (see paragraph 69 for description of work).

TABLE A-1

REHABILITATION OF LOCK AND DAM NO. 1

SUMMARY OF COST ESTIMATES

	PLAN NO. 1	PLAN NO. 2	PLAN NO. 3	PLAN NO. 4A 1/	PLAN NO. 4B 1/	PLAN NO. 4C 1/	RIVER LOCK 2/
)	$ 1,295,000	$ 1,439,000	$ 1,295,000	$ 1,478,000	$ 1,478,000	$ 1,439,000	$ 1,394,000
	491,000	491,000	491,000	491,000	491,000	491,000	491,000
	529,000	50,000	48,000	934,000	934,000	934,000	529,000
	536,000	507,000	497,000	817,000	817,000	817,000	485,000
	1,023,000	970,000	938,000	1,323,000	1,399,000	1,880,000	335,000
	43,000	43,000	43,000	43,000	43,000	43,000	–
	725,000	717,000	714,000	739,000	739,000	739,000	–
	630,000	624,000	620,000	1,059,000	1,059,000	1,059,000	425,000
	8,000	168,000	8,000	630,000	630,000	630,000	620,000
	10,000	10,000	10,000	10,000	10,000	10,000	–
	157,000	153,000	153,000	169,000	169,000	169,000	–
	279,000	270,000	270,000	146,000	146,000	146,000	–
	–	–	–	24,000	24,000	24,000	–
	1,121,000	1,121,000	1,121,000	1,515,000	1,515,000	1,515,000	394,000
	1,430,000	1,524,000	1,430,000	2,296,000	2,296,000	2,296,000	943,000
	555,000	586,000	555,000	1,100,000	1,100,000	1,100,000	545,000
	2,000	2,000	2,000	2,000	2,000	2,000	–
ments	92,000	92,000	92,000	118,000	118,000	118,000	16,000
	8,926,000	8,767,000	8,287,000	12,894,000	12,970,000	13,412,000	6,177,000
	1,824,000	1,783,000	1,663,000	2,606,000	2,630,000	2,688,000	1,223,000
	10,750,000	10,550,000	9,950,000	15,500,000	15,600,000	16,100,000	7,400,000
	780,000	730,000	730,000	1,080,000	1,080,000	1,180,000	510,000
	550,000	520,000	520,000	770,000	770,000	830,000	370,000
25% ±)	190,000	180,000	180,000	270,000	270,000	290,000	130,000
	130,000	120,000	120,000	180,000	180,000	200,000	90,000
els)	$12,400,000	$12,100,000	$11,500,000	$17,800,000	$17,900,000	$18,600,000	$ 8,500,000
els)	$13,500,000	$13,200,000	$12,500,000	$19,400,000	$19,500,000	$20,300,000	$ 9,300,000

he River.
ateral channel
Dike.
the laterals

2/ Cost of rehabilitation of River Lock at a later date (at January 1975 price levels) subsequent to rehabilitation of Land Lock, assuming that hydraulic discharge structures from the River Wall will be constructed as in Plan No.4B.

NOTE: Plans Nos. 1, 2 and 3 include cost of abandoning the River Lock (see paragraph 69 for description of work).

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HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Project: REHABILITATION OF LOCK AND DAM No. 1 Date: March 1975 Page 1 of 20 Pages

Structure: Temporary Construction Estimated by: JAT Checked by: GJK

Item No.	ITEM	Plan No. 1 Quantity	Plan No. 1 Unit Price	Plan No. 1 Amount	Plan No. 2 Quantity	Plan No. 2 Unit Price	Plan No. 2 Amount	Quantity
1.	Temporary Construction							
	Diversion and Care of Water							
	Downstream Cofferdam and Pumping							
	Steel Sheet Piling	1,100 tons	600.00	660 000	1,300 tons	600.00	780 000	1,100 t
	Cell Fill	16,500 c.y.	13.50	222 750	18,000 c.y.	13.50	243 000	16,500 c.
	Access Ramp for Filling Land Cells	700 c.y.	6.00	4 200	700 c.y.	6.00	4 200	700 c.
	Wrap-Around at Cofferdam Ends							
	Excavation River Alluvium	700 c.y.	3.00	2 100	700 c.y.	3.00	2 100	700 c.
	Impervious Core	2,500 c.y.	12.00	30 000	2 500 c.y.	12.00	30 000	2,500 c.
	Gravel Filter	600 c.y.	13.50	8 100	600 c.y.	13.50	8 100	600 c.
	Random Fill	300 c.y.	1.50	450	300 c.y.	1.50	450	300 c.
	Dumped Rock	900 c.y.	20.50	18 450	900 c.y.	20.50	18 450	900 c.
	Hand Placed Rock	700 c.y.	30.00	21 000	700 c.y.	30.00	21 000	700 c.
	Access Ramp Random Fill	9,000 c.y.	5.50	49 500	9,000 c.y.	5.50	49 500	9,000 c.
	Rock Protection, Flow Side	3,600 c.y.	20.50	73 800	3,800 c.y.	20.50	77 900	3 600 c.
	Pumping		L.S.	100 000		L.S.	100 000	
	Temporary Access Behind Guide Wall							
	Steel Sheet Piling (left in place)	100 tons	700.00	70 000	100 tons	700.00	70 000	100 t
	Tie Back Anchors							
	Drilling Holes	600 lin.ft.	10.00	6 000	600 lin.ft.	10.00	6 000	600 l.
	Steel Anchor Rods	1,500 lbs.	0.50	750	1,500 lbs.	0.50	750	1,500 l
	Grouting	150 cu.ft.	6.00	900	150 cu.ft.	6.00	900	150 c
	Excavation and Backfill	1,500 c.y.	6.00	9 000	1,500 c.y.	6.00	9 000	1,500 c
	Fill (and removal)	1,700 c.y.	6.00	10 200	1,700 c.y.	6.00	10 200	1,700 c
	Cut Steel Sheet Piling Tops	140 lin.ft.	20.00	2 800	140 lin.ft.	20.00	2 800	140 l
	Unwater Construction Area		L.S.	5 000		L.S.	5 000	
	Subtotal Downstream Cofferdam and Pumping			1 295 000			1 339 350	
		Use		1 295 000			1 339 000	
1	The costs given here are for Plan No. 4C. For Plans Nos. 4A and 4B, which have one more cofferdam cell, the subtotal cost of Downstream Cofferdam							

A ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Date March 1975 Page 1 of 20 Pages

Estimated by JAT Checked by GJK

Amount	Plan No. 2 Quantity	Plan No. 2 Unit Price	Plan No. 2 Amount	Plan No. 3 Quantity	Plan No. 3 Unit Price	Plan No. 3 Amount	Plan No. 4 Quantity	Plan No. 4 Unit Price	Plan No. 4 Amount
560 000	1,300 tons	600.00	780 000	1,100 tons	600.00	660 000	1,300 tons	600.00	780 000
222 750	18,000 c.y.	13.50	243 000	16,500 c.y.	13.50	222 750	18.000 c.y.	13.50	243 000
4 200	700 c.y.	6.00	4 200	700 c.y.	6.00	4 200	700 c.y.	6.00	4 200
2 100	700 c.y.	3.00	2 100	700 c.y.	3.00	2 100	700 c.y.	3.00	2 100
30 000	2 500 c.y.	12.00	30 000	2,500 c.y.	12.00	30 000	2,500 c.y.	12.00	30 000
8 100	600 c.y.	13.50	8 100	600 c.y.	13.50	8 100	600 c.y.	13.50	8 100
450	300 c.y.	1.50	450	300 c.y.	1.50	450	300 c.y.	1.50	450
18 450	900 c.y.	20.50	18 450	900 c.y.	20.50	18 450	900 c.y.	20.50	18 450
21 000	700 c.y.	30.00	21 000	700 c.y.	30.00	21 000	700 c.y.	30.00	21 000
49 500	9,000 c.y.	5.50	49 500	9,000 c.y.	5.50	49 500	9,000 c.y.	5.50	49 500
73 800	3,800 c.y.	20.50	77 900	3 600 c.y.	20.50	73 800	3 800 c.y.	20.50	77 900
100 000		L.S.	100 000		L.S.	100 000		L.S.	100 000
70 000	100 tons	700.00	70 000	100 tons	700.00	70 000	100 tons	700.00	70 000
6 000	600 lin.ft.	10.00	6 000	600 lin.ft	10.00	6 000	600 lin.ft.	10.00	6 000
750	1,500 lbs.	0.50	750	1,500 lbs.	0.50	750	1,500 lbs.	0.50	750
900	150 cu.ft.	6.00	900	150 cu.ft.	6.00	900	150 cu.ft.	6.00	900
9 000	1,500 c.y.	6.00	9 000	1,500 c.y.	6.00	9 000	1,500 c.y.	6.00	9 000
10 200	1 700 c.y.	6.00	10 200	1,700 c.y.	6.00	10 200	1,700 c.y.	6.00	10 200
2 800	140 lin.ft.	20.00	2 800	140 lin.ft.	20.00	2 800	140 lin.ft.	20.00	2 800
5 000		L.S.	5 000		L.S.	5 000		L.S.	5 000
1 295 000			1439 950			1295 000			1439 350
1 295 000			1439 000			1295 000			1439 080

ave one more cofferdam cell, the subtotal cost of Downstream Cofferdam and Pumping is $ 1,479,000 instead of $ 1,439,000.

2

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

REHABILITATION OF

Project LOCK AND DAM No. 1 Date MARCH 1975 Page 2 of 20 Pages

Structure TEMPORARY CONSTRUCTION Estimated by JAT Checked by GJK

Item No.	ITEM	PLAN No. 1 Quantity	Unit Price	Amount	PLAN No. 2 Quantity	Unit Price	Amount	PLAN Quantity
1	Temporary Construction , Cont'd							
	Upstream Cofferdam and Pumping							
	Steel Sheet Piling	470 tons	600.00	282000	470 tons	600.00	282000	470
	Cell Fill	5,500 c.y.	13.50	74250	5,500 c.y.	13.50	74250	5,500
	Access Ramp Random Fill	3,000 c.y.	5 50	16500	3,000 c.y.	5.50	16500	3,000
	Rock Protection, Flow Side	3,200 c.y.	20.50	65600	3,200 c.y.	20.50	65600	3,200
	Dewater Construction Area		L.S.	3000		L.S.	3000	
	Pumping		L.S.	50000		L.S.	50000	
	Subtotal Upstream Cofferdam and Pumping			491850			491850	
		Use		491000			491000	
	Other Facilities							
	Barge Landings							
	East Bank							
	Steel Sheet Piling	20 tons	600.00	12000	20 tons	600.00	12000	20
	Tie Back Anchors	1,000 lbs	1.50	1500	1,000 lbs	1.50	1500	1,000
	Concrete Dead Men	10 c.y.	100.00	1000	10 c.y.	100.00	1000	10
	Walas, Lumber	1,000 bd.ft.	0.50	500	1,000 bd.ft.	0.50	500	1,000
	Backfill	200 c.y.	6.00	1200	200 c.y.	6.00	1200	200
	Excavation, Wet	150 c.y.	9.00	1350	150 c.y.	9 00	1350	150
	Center Island							
	Steel Sheet Piling	20 tons	600.00	12000	20 tons	600.00	12000	20
	Tie Back Anchors	1,000 lbs	1.50	1500	1.000 lbs	1.50	1500	1,000
	Concrete Dead Men	10 c.y.	100.00	1000	10 c.y.	100.00	1000	10
	Walas, Lumber	1,000 bd.ft.	0.50	500	1,000 bd.ft.	0.50	500	1,000
	Backfill	300 c.y.	6.00	1800	300 c.y.	6.00	1800	300
	Excavation, Wet	200 c.y.	9.00	1800	200 c.y.	9.00	1800	200
	Construct Dry Work Area for Pile Driving							
	Fill	4,000 c.y.	3.00	12000	4,500 c.y.	3.00	13500	4,000
	Construct Shelter for Winter Work and Remove							
	Structural Steel	180 tons	820.00	147600	-			-

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Date MARCH 1975 Page 2 of 20 Pages

ON Estimated by JAT Checked by GJK

Price	Amount	PLAN No. 2 Quantity	Unit Price	Amount	PLAN No. 3 Quantity	Unit Price	Amount	PLAN No. 4 Quantity	Unit Price	Amount
.00	282000	470 tons	600.00	282000	470 tons	600.00	282000	470 tons	600.00	282000
.50	74250	5,500 c.y.	13.50	74250	5,500 c.y.	13.50	74250	5,500 c.y.	13.50	74250
50	16500	3,000 c.y.	5.50	16500	3,000 c.y.	5.50	16500	3,000 c.y.	5.50	16500
.50	65500	3,200 c.y.	20.50	65600	3,200 c.y.	20.50	65500	3,200 c.y.	20.50	65500
L.S.	3000		L.S.	3000		L.S.	3000		L.S.	3000
L.S.	50000		L.S.	50000		L.S.	50000		L.S.	50000
	491350			491350			491350			491350
	491000			491000			491000			491000
.00	12000	20 tons	600.00	12000	20 tons	600.00	12000	20 tons	600.00	12000
.50	1500	1,000 lbs	1.50	1500	1,000 lbs	1.50	1500	1,000 lbs	1.50	1500
.00	1000	10 c.y.	100.00	1000	10 c.y.	100.00	1000	10 c.y.	100.00	1000
.50	500	1,000 bd.ft.	0.50	500	1,000 bd.ft.	0.50	500	1,000 bd.ft.	0.50	500
.00	1200	200 c.y.	6.00	1200	200 c.y.	6.00	1200	200 c.y.	6.00	1200
.00	1350	150 c.y.	9 00	1350	150 c.y.	9.00	1350	150 c.y.	9.00	1350
.00	12000	20 tons	600.00	12000	20 tons	600.00	12000	20 tons	600.00	12000
.50	1500	1,000 lbs	1.50	1500	1,000 lbs	1.50	1500	1,000 lbs	1.50	1500
.00	1000	10 c.y.	100.00	1000	10 c.y.	100.00	1000	10 c.y.	100.00	1000
.50	500	1,000 bd.ft.	0.50	500	1,000 bd.ft.	0.50	500	1,000 bd.ft.	0.50	500
.00	1800	300 c.y.	6.00	1800	300 c.y.	6.00	1800	300 c.y.	6.00	1800
.00	1800	200 c.y.	9.00	1800	200 c.y.	9.00	1800	200 c.y.	9.00	1800
.00	12000	4,500 c.y.	3.00	13500	4,000 c.y.	3.00	12000	4,500 c.y.	3.00	13500
.00	147500	-			-			300 tons	820.00	246000

2

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Project: REHABILITATION OF LOCK AND DAM No. 1 Date: MARCH 1975 Page 3 of 20 Pages

Structure: TEMPORARY CONSTR.; INTAKE MANIFOLDS Estimated by: JAT Checked by: GJK

Item No.	ITEM	PLAN No. 1			PLAN No. 2			
		Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity
1.	Temporary Construction, Cont'd							
	Other Facilities, Cont'd							
	Lumber for Roof	85,000 bd.ft.	0.55	46750	-			-
	Tar Paper for Roof	56,000 sq.ft.	0.30	16800	-			-
	Canvas (or similar) Sides	20,000 sq.ft.	0.40	8000	-			-
	Heating and Ventilating		L.S.	250000	-			-
	Lighting		L.S.	7000	-			-
	Pumping		L.S.	5000	-			-
	Subtotal Other Facilities			529000			49650	
		Use		529000			50000	
	Subtotal Temporary Construction			2315000			1980000	
2.	Intake Manifolds							
	Upper Guide Wall							
	Excavate Existing Backfill	1,000 c.y.	6.00	6000	1,000 c.y.	6.00	6000	1,000 c.
	Excavate Sandstone	200 c.y.	15.00	3000	200 c.y.	15.00	3000	200 c.
	Remove Existing Concrete, Mass	550 c.y.	65.00	35750	550 c.y.	65.00	35750	550 c.
	Steel Soldier Beams	21 tons	700.00	14700	21 tons	700.00	14700	21 to
	Timber Lagging	20,000 bd.ft.	0.40	8000	20,000 bd.ft.	0.40	8000	20,000 bd
	Tie Back Anchors							
	Drill Holes	300 lin.ft.	10.00	3000	300 lin.ft.	10.00	3000	300 li
	Tie Rods 1" dia.	1,000 lbs	0.50	500	1,000 lbs	0.50	500	1,000 lb
	Steel Channel Wales	2,000 lbs	0.50	1000	2,000 lbs	0.50	1000	2,000 lb
	Grouting	150 cu.ft.	6.00	900	150 cu.ft.	6.00	900	150 cu
	Concrete	850 c.y.	90.00	76500	850 c.y.	80.00	68000	850 c
	Forms Straight	4,500 sq.ft.	3.00	13500	4,500 sq.ft.	3.00	13500	4,500 sq
	Forms Curved	450 sq.ft.	6.00	2700	450 sq.ft.	6.00	2700	450 sq
	Backfill	700 c.y.	6.00	4200	700 c.y.	6.00	4200	700 c
	Treshracks	1,600 lbs	0.75	1200	1,600 lbs	0.75	1200	1,600 lb
	Subtotal Upper Guide Wall			170950			162450	

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Date MARCH 1975 Page 3 of 20 Pages

; INTAKE MANIFOLDS Estimated by JAT Checked by GJK

. 1		PLAN No. 2			PLAN No. 3			PLAN No. 4		
Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
0.55	46750	-			-			143,000 bd.ft.	0.55	78650
0.30	16000	-			-			95,000 sq.ft.	0.30	28500
0.40	8000	-			-			27,000 sq.ft.	0.40	10000
L.S.	250000	-			-				L.S.	500000
L.S.	7000	-			-				L.S.	10000
L.S.	5000	-			-				L.S.	10000
	529100			49650			48150			933600
	529000			50000			48000			934000
	2315000			1980000			1834000			2864000
6.00	6000	1,000 c.y.	6.00	6000	1,000 c.y.	6.00	6000	6,000 c.y.	6.00	6000
15.00	3000	200 c.y.	15.00	3000	200 c.y.	15.00	3000	200 c.y.	15.00	3000
65.00	35750	550 c.y.	65.00	35750	550 c.y.	65.00	35750	550 c.y.	65.00	35750
700.00	14700	21 tons	700.00	14700	21 tons	700.00	14700	21 tons	700.00	14700
0.40	8000	20,000 bd.ft.	0.40	8000	20,000 bd.ft.	0.40	8000	20,000 bd.ft.	0.40	8000
10.00	3000	300 lin.ft.	10.00	3000	300 lin.ft.	10.00	3000	300 lin.ft.	10.00	3000
0.50	500	1,000 lbs	0.50	500	1,000 lbs	0.50	500	1,000 lbs	0.50	500
0.50	1000	2,000 lbs	0.50	1000	2,000 lbs	0.50	1000	2,000 lbs	0.50	1000
6.00	900	150 cu.ft.	6.00	900	150 cu.ft.	6.00	900	150 cu.ft.	6.00	900
90.00	76500	850 c.y.	80.00	68000	850 c.y.	75.00	63750	850 c.y.	95.00	80750
3.00	13500	4,500 sq.ft.	3.00	13500	4,500 sq.ft.	3.00	13500	4,500 sq.ft.	3.00	13500
6.00	2700	450 sq.ft.	6.00	2700	450 sq.ft.	6.00	2700	450 sq.ft.	6.00	2700
6.00	4200	700 c.y.	6.00	4200	700 c.y.	6.00	4200	700 c.y.	6.00	4200
0.75	1200	1,600 lbs	0.75	1200	1,600 lbs	0.75	1200	1,600 lbs	0.75	1200
	170950			162450			158200			175200

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HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Project: REHABILITATION OF LOCK AND DAM No. 1 — Date: MARCH 1975 — Page 4 of 20 Pages

Structure: INTAKE MANIFOLDS — Estimated by: JAT — Checked by: GJK

Item No.	ITEM	PLAN No. 1 Quantity	PLAN No. 1 Unit Price	PLAN No. 1 Amount	PLAN No. 2 Quantity	PLAN No. 2 Unit Price	PLAN No. 2 Amount	
2.	Intake Manifolds, Cont'd							
	Land Wall							
	Remove Existing Concrete for Conduit in Monolith No. 1	110 c.y.	270.00	29700	110 c.y.	270.00	29700	11
	Concrete	50 c.y.	125.00	6250	50 c.y.	120.00	6000	5
	Forms, Straight	900 sq.ft.	3.00	2700	900 sq.ft.	3.00	2700	90
	Subtotal Land Wall			38650			38400	
	Intermediate Wall							
	Remove Existing Concrete, Mass	1,200 c.y.	65.00	78000	1,200 c.y.	65.00	78000	1,20
	Remove Existing Concrete for Conduit in Monolith No.	110 c.y.	270.00	29700	110 c.y.	270.00	29700	11
	Concrete	1,100 c.y.	90.00	99000	1,100 c.y.	80.00	88000	1,10
	Forms, Straight	3,500 sq.ft.	3.00	10500	3,500 sq.ft.	3.00	10500	3,50
	Forms, Curved	2,400 sq.ft.	6.00	14400	2,400 sq.ft.	6.00	14400	2,40
	Trashracks	1,600 lbs	0.75	1200	1,600 lbs	0.75	1200	1,60
	Subtotal Intermediate Wall			232900			221900	
	River Wall							
	Excavate Existing Backfill	-			-			
	Remove Existing Concrete, Mass	-			-			
	Remove Existing Concrete for Conduits in Monoliths Nos. 3 and	-			-			
	Concrete	-			-			
	Forms, Straight	-			-			
	Forms, Curved	-			-			
	Backfill	-			-			
	Trashracks							
	Subtotal River Wall							

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

1 Date MARCH 1975 Page 4 of 20 Pages

Estimated by JAT Checked by GJK

No. 1 Unit Price	No. 1 Amount	PLAN No. 2 Quantity	PLAN No. 2 Unit Price	PLAN No. 2 Amount	PLAN No. 3 Quantity	PLAN No. 3 Unit Price	PLAN No. 3 Amount	PLAN No. 4 Quantity	PLAN No. 4 Unit Price	PLAN No. 4 Amount
270.00	29700	110 c.y.	270.00	29700	110 c.y.	270.00	29700	110 c.y.	270.00	29700
125.00	6250	50 c.y.	120.00	6000	50 c.y.	115.00	5750	50 c.y.	130.00	6500
3.00	2700	900 sq.ft.	3.00	2700	900 sq.ft.	3.00	2700	900 sq.ft.	3.00	2700
	38650			38400			38150			38900
65.00	78000	1,200 c.y.	65.00	78000	1,200 c.y.	65.00	78000	1,200 c.y.	65.00	78000
270.00	29700	110 c.y.	270.00	29700	110 c.y.	270.00	29700	110 c.y.	270.00	29700
90.00	99000	1,100 c.y.	80.00	88000	1,100 c.y.	75.00	82500	1,300 c.y.	95.00	123500
3.00	10500	3,500 sq.ft.	3.00	10500	3,500 c.y.	3.00	10500	5,800 sq.ft.	3.00	17400
6.00	14400	2,400 sq.ft.	6.00	14400	2,400 sq.ft.	6.00	14400	3,600 sq.ft.	6.00	21600
0.75	1200	1,600 lbs	0.75	1200	1,600 lbs	0.75	1200	3,200 lbs	0.75	2400
	232800			221900			216300			272500
		-			-			1,000 c.y.	6.00	6000
		-			-			900 c.y.	65.00	58500
		-			-			110 c.y.	270.00	29700
		-			-			1,200 c.y.	95.00	114000
		-			-			7,300 sq.ft.	3.00	21900
		-			-			450 sq.ft.	6.00	2700
		-			-			450 c.y.	6.00	2700
		-			-			1,600 lbs	0.75	1200
										236700

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HAIZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Project: REHABILITATION OF LOCK AND DAM NO. 1 Date: MARCH 1975 Page 5 of 20 Pages

Structure: INTAKE MANIFOLDS; DISCHARGE MANIFOLDS Estimated by: JAT Checked by: GJK

Item No.	ITEM	PLAN NO. 1 Quantity	Unit Price	Amount		PLAN NO. 2 Quantity	Unit Price	Amount	
2	Intake Manifolds Cont'd.								
	Upstream Apron								
	Excavation, Sand and Alluvium	1,700 c.y.	3,00	5	100	1,700 c.y.	3,00	5	100
	Gravel Bedding (6" thick)	250 c.y.	10,50	2	625	250 c.y.	10,50	2	625
	Concrete Slab (2' thick)	900 c.y.	95,00	85	500	900 c.y.	85,00	76	500
	Subtotal, Upstream Apron			93	225			84	225
	Subtotal Intake Manifolds								
		Use		536	000			507	000
3	Discharge Manifolds								
	Removal of Slab and Apron								
	Remove Mud from Apron and Slab	300 c.y.	3.00		900	300 c.y.	3.00		900
	Remove Existing Concrete Apron and Slab	1,100 c.y.	65,00	71	500	1,100 c.y.	65,00	71	500
	Subtotal Removal of Slab and Apron			72	400			72	400
	Lower Guide Wall								
	Excavate Existing Backfill	200 c.y.	6,00	1	200	200 c.y.		1	200
	Remove Existing Concrete, Mass	1,100 c.y.	65,00	71	500	1,100 c.y.	65,00	71	500
	Remove Timber Cribs under Monolith No.3								
	Excavate for New Manifold Monoliths	350 c.y.	15,00	5	250	350 c.y.	15,00	5	250
	Concrete	1,500 c.y.	90,00	135	000	1,500 c.y.	80,00	120	000
	Forms, Straight	7,200 sq.ft.	3,00	21	600	7,200 sq.ft.	3,00	21	600
	Forms, Curved	1,000 sq.ft.	6,00	6	000	1,000 sq.ft.	6,00	6	000
	Backfill	200 c.y.	6,00	1	200	200 c.y.	6,00	1	200
	Subtotal Lower Guide Wall			241	750			226	750

2) The costs of Discharge Manifolds in Lower Guide Wall, as given here, are for Plan No. 4C. For Plans Nos. 4A and 4B the subtotal cost of L

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

: OF
O. 1 Date MARCH 1975 Page 5 of 20 Pages

DS; DISCHARGE MANIFOLDS Estimated by JAT Checked by GJK

N NO. 1				PLAN NO. 2				PLAN NO. 3				PLAN NO. 4				(2
Unit Price	Amount			Quantity	Unit Price	Amount		Quantity	Unit Price	Amount		Quantity	Unit Price	Amount		
3,00	5	100		1,700 c.y.	3,00	5	100	1,700 c.y.	3,00	5	100	1,700 c.y.	3,00	5	100	
10,50	2	625		250 c.y.	10,50	2	625	250 c.y.	10.50	2	625	250 c.y.	10,50	2	625	
95,00	85	500		900 c.y.	85,00	76	500	900 c.y.	85,00	76	500	900 c.y.	95,00	85	500	
	93	225				84	225			84	225			93	225	
	536	000				507	000			497	000			817	000	
3 00		900		300 c.y.	3,00		900	300 c.y.	3,00		900	300 c.y.	3,00		900	
65,00	71	500		1,100 c.y.	65,00	71	500	1,100 c.y.	65,00	71	500	1,100 c.y.	65,00	71	500	
	72	400				72	400			72	400			72	400	
6,00	1	200		200 c.y.		1	200	200 c.y.	6,00	1	200	300 c.y.	6,00	1	800	
65,00	71	500		1,100 c.y.	65,00	71	500	1,100 c.y.	65,00	71	500	1,400 c.y.	65,00	91	000	
												220 c.y.	9,00	1	900	
15,00	5	250		350 c.y.	15,00	5	250	350 c.y.	15,00	5	250	550 c.y.	15,00	8	250	
90,00	135	000		1,500 c.y.	80,00	120	000	1,500 c.y.	75,00	112	500	2,100 c.y.	95,00	199	500	
3,00	21	600		7,200 sq.ft.	3,00	21	600	7,200 sq.ft.	3,00	21	600	10,000 sq.ft.	3,00	30	000	
6,00	6	000		1,000 sq.ft.	6,00	6	000	1,000 sq.ft.	6,00	6	000	1,000 sq.ft.	6,00	6	000	
6,00	1	200		200 c.y.	6,00	1	200	200 c.y.	6,00	1	200	300 c.y.	6,00	1	800	
	241	750				226	750			219	250			340	330	

here, as for Plan No. 4C. For Plans Nos. 4A and 4B the subtotal cost of Lower Guide Wall is $ 209,000 instead of $340,330.

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HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Project: REHABILITATION OF LOCK AND DAM NO. 1 — Date: MARCH 1975 — Page 6 of 20 Pages

Structure: DISCHARGE MANIFOLDS — Estimated by: JAT — Checked by: GJK

Item No.	ITEM	PLAN NO. 1 Quantity	PLAN NO. 1 Unit Price	PLAN NO. 1 Amount	PLAN NO. 2 Quantity	PLAN NO. 2 Unit Price	PLAN NO. 2 Amount	Quantity
3	Discharge Manifolds, Cont'd.							
	Laterals Downstream of Landward Lock							
	Excavation, Sandstone	1,400 c.y.	15,00	21 000	1,400 c.y.	15,00	21 000	1,400 c
	Pea Gravel	350 c.y.	10,50	3 675	350 c.y.	10,50	3 675	350 c
	Gravel Filter	100 c.y.	10.50	1 050	100 c y.	10,50	1 050	100 c
	Drains 24" Dia., Perf. Clay Pipe	70 lin.ft.	15,00	1 050	70 lin.ft.	15,00	1 050	70 l
	Drains, 12" Dia., Perf. Clay Pipe	70 lin.ft.	8,00	560	70 lin.ft.	8,00	560	70 l
	Concrete	1,200 c.y.	125,00	150 000	1,200 c.y.		144 000	1,200 c
	Forms, Straight	6,000 sq.ft.	3,00	18 000	6,000 sq.ft.	3,00	18 000	6,000 s
	Dumped Rock, Quarry Run	350 c.y.	16,00	5 600	350 c.y.	16,00	5 600	350 c
	Subtotal Laterals Downstream of Landward Lock			200 935			194 935	
	Intermediate Wall Extension							
	Excavation, Sandstone	700 c.y.	15,00	10 500	700 c.y.	15,00	10 500	700 c
	Pea Gravel	150 c.y.	10,50	1 575	150 c.y.	10,50	1 575	150 c
	Gravel Filter	50 c.y.	10,50	525	50 c.y.	10,50	525	50 c
	Drains, 24" Dia., Perf. Clay Pipe	40 lin.ft.	15,00	600	40 lin.ft.	15,00	600	40 l
	Concrete	2,600 c.y.	90,00	234 000	2,600 c.y.	80,00	208 000	2,600 c
	Forms, Straight	13,100 sq.f.t	3,00	39 300	13,100 sq.ft.	3,00	39 300	13,100 s
	Forms, Curved	1,500 sq.ft.	6,00	9 000	1,500 sq.ft.	6,00	9 000	1,500 s
	Backfill	400 c.y.	6,00	2 400	400 c.y.	6,00	2 400	400 c
	Subtotal Intermediate Wall Extension			297 900			271 900	

3) The costs of Laterals Downstream of Landward Lock are for Plan No. 4C. For Plans Nos. 4A and 4B the subtotal cost of Laterals Downstream of Land

4) The costs of Intermediate Wall Extension are for Plan No. 4C. For Plans Nos. 4A and 4B the subtotal cost of Intermediate Wall Extension is $ 31

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

OF 1 Date MARCH 1975 Page 6 of 20 Pages

LDS Estimated by JAT Checked by GJK

PLAN NO. 1			PLAN NO. 2			PLAN NO. 3			PLAN NO. 4 (3 & (4		
	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
	15,00	21 000	1,400 c.y.	15,00	21 000	1,400 c.y.	15,00	21 000	1,900 c.y.	15,00	28 500
	10,50	3 675	350 c.y.	10,50	3 675	350 c.y.	10,50	3 675	450 c.y.	10,50	4 725
	10.50	1 050	100 c y.	10,50	1 050	100 c.y.	10,50	1 050	100 c.y.	10,50	1 050
	15,00	1 050	70 lin.ft.	15,00	1 050	70 lin.ft.	15,00	1 050	60 lin.ft.	15,00	900
	8,00	560	70 lin.ft.	8,00	560	70 lin.ft.	8,00	560	60 lin.ft.	8,00	480
	125,00	150 000	1,200 c.y.		144 000	1,200 c.y.	115,00	138 000	1,500 c.y.	130,00	195 000
	3,00	18 000	6,000 sq.ft.	3,00	18 000	6,000 sq.ft.	3,00	18 000	8,300 sq.ft.	3,00	24 900
	16,00	5 600	350 c.y.	16,00	5 600	350 c.y.	16,00	5 600	350 c.y.	16,00	5 600
		200 935			194 935			188 935			261 155
	15,00	10 500	700 c.y.	15,00	10 500	700 c.y.	15,00	10 500	1,100 c.y.	15,00	16 500
	10,50	1 575	150 c.y.	10,50	1 575	150 c.y.	10,50	1 575	250 c.y.	10,50	2 625
	10,50	525	50 c.y.	10,50	525	50 c.y.	10,50	525	50 c.y.	10,50	525
	15,00	600	40 lin.ft.	15,00	600	40 linft.	15 00	600	35 lin.ft.	15,00	525
	90,00	234 000	2,600 c.y.	80,00	208 000	2,600 c.y.	75,00	195 000	4,300 c.y.	95,00	408 500
	3,00	39 300	13,100 sq.ft.	3,00	39 300	13,100 sq.ft.	3,00	39 300	22,000 sq.ft.	3,00	66 000
	6,00	9 000	1,500 sq.ft.	6,00	9 000	1,500 sq.ft.	6,00	9 000	3,000 sq.ft.	6,00	18 000
	6,00	2 400	400 c.y.	6,00	2 400	400 c.y.	6,00	2 400	1,000 c.y.	6,00	6 000
		297 900			271 900			258 900			518 675

n No. 4C. For Plans Nos. 4A and 4B the subtotal cost of Laterals Downstream of Landward Lock is $ 207,000 instead of $ 261,155.

For Plans Nos. 4A and 4B the subtotal cost of Intermediate Wall Extension is $ 311,000 instead of $ 518,675.

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HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Project: REHABILITATION OF LOCK AND DAM NO. 1 — Date: MARCH 1975 — Page 7 of 20 Pages

Structure: DISCHARGE MANIFOLDS — Estimated by: JAT — Checked by: GJK

Item No.	ITEM	PLAN NO. 1 Quantity	Unit Price	Amount	PLAN NO. 2 Quantity	Unit Price	Amount	Quan
3	Discharge Manifolds, Cont'd.							
	Laterals Downstream of Riverward Lock							
	Excavation, River Alluvium	1,600 c.y.	3,00	4 800	1,600 c.y.	3,00	4 800	1,60
	Excavation, Sandstone	50 c.y.	15,00	750	50 c.y.	15,00	750	5
	Pea Gravel	450 c.y.	10,50	4 725	450 c.y.	10,50	4 725	45
	Gravel Filter	150 c.y.	10,50	1 575	150 c.y.	10,50	1 575	15
	Drains, 24" Dia., Perf. Clay Pipe	130 lin.ft.	15,00	1 950	130 lin.ft.	15,00	1 950	13
	Drains, 12" Dia., Perf. Clay Pipe	15 lin.ft.	8,00	120	15 lin.ft.	8,00	120	1
	Slurry Trench and Concrete (20' depth)	180 c.y.	130,00	23 400	180 c.y.	130,00	23 400	18
	Shelter for Slurry Trench During Construction		L.S.	10 000		L.S.	10 000	
	Concrete	1,100 c.y.	125,00	137 500	1,100 c.y.	120,00	132 000	1,10
	Forms, Straight	5,600 sq.ft.	3,00	16 800	5,600 sq.ft.	3,00	16 800	5,60
	Dumped Rock, Quarry Run	500 c.y.	16,00	8 000	500 c.y.	16,00	8 000	50
	Subtotal Laterals Downstream of Riverward Lock			209 620			204 120	

5) The costs of laterals Downstream of Riverward Lock are for Plan No. 4. For Plans Nos. 4A and 4B the subtotal cost of Laterals Downstream of

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

1 Date MARCH 1975 Page 7 of 20 Pages

LDS Estimated by JAT Checked by GJK

PLAN NO. 1			PLAN NO. 2			PLAN NO. 3			PLAN NO. 4 (5		
Unit Price	Amount		Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
3,00	4	800	1,600 c.y.	3,00	4 800	1,600 c.y.	3,00	4 800	1,900 c.y.	3,00	5 700
15,00		750	50 c.y.	15,00	750	50 c.y.	15,00	750	50 c.y.	15,00	750
10,50	4	725	450 c.y.	10,50	4 725	450 c.y.	10,50	4 725	600 c.y.	10,50	6 300
10,50	1	575	150 c.y.	10,50	1 575	150 c.y.	10,50	1 575	150 c.y.	10,50	1 575
15,00	1	950	130 lin.ft.	15,00	1 950	130 lin.ft.	15,00	1 950	175 lin.ft.	15,00	2 625
8,00		120	15 lin.ft.	8,00	120	15 lin.ft.	8,00	120	15 lin.ft.	8,00	120
130,00	23	400	180 c.y.	130,00	23 400	180 c.y.	130,00	23 400	260 c.y.	135,00	35 100
L.S.	10	000		L.S.	10 000		L.S.	10 000		L.S.	12 000
125,00	137	500	1,100 c.y.	120,00	132 000	1,100 c.y.	115,00	126 500	1,700 c.y.	130,00	221 000
3,00	16	800	5,600 sq.ft.	3,00	16 800	5,600 sq.ft.	3,00	16 800	10,500 sq.ft.	3,00	31 500
16,00	8	000	500 c.y.	16,00	8 000	500 c.y.	16,00	8 000	500 c.y.	16,00	8 000
	209	620			204 120			198 620			324 670

No. 4c For Alt Nos. 4A and 4b the subtotal cost of Laterals Downstream of Riverward Lock is $216,000 instead of $ 324,670.

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HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Project: REHABILITATION OF LOCK AND DAM NO. 1 Date: MARCH 1975 Page 8 of 20 Pages

Structure: DISCHARGE MANIFOLDS Estimated by: JAT Checked by: GJK

Item No.	ITEM	PLAN NO. 1 Quantity	PLAN NO. 1 Unit Price	PLAN NO. 1 Amount	PLAN NO. 2 Quantity	PLAN NO. 2 Unit Price	PLAN NO. 2 Amount	PLAN Quantity
3	Discharge Manifolds Cont'd							
	Extension of River Wall							
	Remove Rockfill Dike	-			-			-
	Remove Existing Mass Concrete from River Guide Wall Monoliths	-			-			-
	Remove Timber Cribs	-			-			-
	Excavate Alluvium	-			-			-
	Place Timber Piles	-			-			-
	Trim Timber Piles	-			-			-
	Concrete	-			-			-
	Forms, Straight	-			-			-
	Forms, Curved	-			-			-
	Reconstruct Rockfill Dike	-			-			-
	Reconstruct Rockfill Timber Crib							
	Protection	-			-			-
	Subtotal Extension of River Wall							
	Subtotal Discharge Manifolds			1 022605			970105	
		Use		1 023000			970000	

6) The costs of Extension of River Wall are for Plan No. 4C. For Plans Nos. 4A and 4B the Subtotal cost of Extension of River Wall is $ 135,000 ins

For Plan No. 4A the Subtotal cost of Hydraulic Jump Stilling Basin including discharge channel located East of River Wall, is $133,000. (Support

For Plan No. 4B the Subtotal cost of Bent Discharge Structure including discharge channel, located East of River Wall, is $ 205,000. (Supporting

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CHICAGO, ILLINOIS

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DS Estimated by JAT Checked by GJK

			PLAN NO. 2			PLAN NO. 3			PLAN NO. 4			(6
Unit Price	Amount		Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	
			-			-			3,700 c.y.	4.50	16	650
			-			-			400 c.y.	65.00	26	000
			-			-			850 c.y.	9.00	7	650
			-			-			650 c.y.	3.00	1	950
			-			-			2,000 lin. ft.	6.00	12	000
			-			-			94 ea.	3.00		282
			-			-			2,400 c.y.	95.00	228	000
			-			-			14,500 sq. ft.	3.00	43	500
			-			-			1,000 sq. ft.	6.00	6	000
			-			-			3,000 c.y.	5.00	15	000
			-			-			350 c.y.	15.00	5	250
											362	282
		1 022605			970105			938 105			1 879	512
		1 023000			970000			938 000			1 880	000

Plans Nos. 4A and 4B the Subtotal cost of Extension of River Wall is $ 135,000 instead of $ 362,282. (Supporting Data, p.44 of 65)

basin including discharge channel located East of River Wall, is $133,000. (Supporting Data, p.42 of 65)

including discharge channel, located East of River Wall, is $ 209,000. (Supporting Data, p.43 of 65)

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HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Project: REHABILITATION OF LOCK AND DAM NO. 1 — Date: MARCH 1975 — Page 9 of 20 Pages

Structure: UPPER GUIDE WALL; LAND WALL — Estimated by: JAT — Checked by: GJK

Item No.	ITEM	PLAN NO. 1 Quantity	PLAN NO. 1 Unit Price	PLAN NO. 1 Amount	PLAN NO. 2 Quantity	PLAN NO. 2 Unit Price	PLAN NO. 2 Amount	P Quantity
4	Upper Guide Wall							
	Remedial Pressure Grouting							
	Set-Ups	100 ea.	50.00	5000	100 ea.	50.00	5 000	100 ea.
	Drilling	2,500 lin. ft.	10.00	25000	2,500 lin. ft.	10.00	25 000	2,500 lin
	Grouting	80 c.y.	160.00	12800	80 c.y.	160.00	12 800	80 c.y.
	Subtotal Upper Guide Wall			42800			42 800	
		Use		43000			43 000	
5	Land Wall							
	Remove Existing Buildings & Structures		L.S.	10000		L.S.	10 000	
	Dismantle Bluff Protection Crib Wall	(2,200 sq. ft.)	L.S.	9000	(2,200 sq. ft.)	L.S.	9 000	(2,200 sq.
	Remove Concrete Footing	14 c.y.	65.00	910	14 c.y.	65.00	910	14 c.y
	Concrete Footing	14 c.y.	95.00	1330	14 c.y.	85.00	1 190	14 c.y.
	Concrete Cribbing	16 c.y.	215.00	3440	16 c.y.	210.00	3 360	16 c.y.
	Reconstruct Crib Wall		L.S	15000		L.S.	15 000	
	Excavate Fill	9,000 c.y.	3.00	27000	9,000 c.y.	3.00	27 000	9,000 c
	Remove Concrete							
	Lowered Filling Conduit	320 c.y.	270.00	86400	320 c.y.	270.00	86 400	320 c.y
	New Filling Valve Slot	120 c.y.	150.00	18000	120 c.y.	150.00	18 000	120 c.y
	New Bulkhead Gate Slot	30 c.y.	150.00	4500	30 c.y.	150.00	4 500	30 c.y.
	Lowered Conduit Crown	80 c.y.	270.00	21600	80 c.y.	270.00	21 600	80 c.y.
	New Ports	100 c.y.	270.00	27000	100 c.y.	270.00	27 000	100 c.y
	Concrete							
	Lowered Filling Conduit	110 c.y.	125.00	13750	110 c.y.	120.00	13 200	110 c.y
	New Filling Valve Slot	70 c.y.	185.00	12950	70 c.y.	180.00	12 600	70 c.y
	New Bulkhead Gate Slot	40 c.y.	185.00	7400	40 c.y.	180.00	7 200	40 c.y
	Fill Existing Upper Conduit	210 c.y.	80.00	16800	210 c.y.	75.00	15 750	210 c.y
	Lowered Conduit Crown	460 c.y.	125.00	57500	460 c.y.	120.00	55 200	460 c.y

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

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NO. 1 Date MARCH 1975 Page 9 of 20 Pages

ALL: LAND WALL Estimated by JAT Checked by GJK

NO. 1			PLAN NO. 2			PLAN NO. 3			PLAN NO. 4		
	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
	50,00	5000	100 ea.	50,00	5 000	100 ea.	50,00	5 000	100 ea.	50,00	5 000
.	10,00	25000	2,500 lin. ft.	10,00	25 000	2,500 lin. ft.	10,00	25 000	2,500 lin. ft.	10,00	25 000
	160,00	12800	80 c.y.	160,00	12 800	80 c.y.	160,00	12 800	80 c.y.	160,00	12 800
		42800			42 800			42 800			42 800
		43000			43 000			43 000			43 000
	L.S.	10000		L.S.	10 000		L.S.	10 000		L.S.	10 000
	L.S.	9000	(2,200 sq. ft.)	L.S.	9 000	(2,200 sq. ft.)	L.S.	9 000	(2,200 sq. ft.)	L.S.	9 000
	65,00	910	14 c.y.	65,00	910	14 c.y.	65,00	910	14 c.y.	65,00	910
	95,00	1330	14 c.y.	85,00	1 190	14 c.y.	85,00	1 190	14 c.y.	95,00	1 330
	215,00	3440	16 c.y.	210,00	3 360	16 c.y.	210,00	3 360	16 c.y.	250,00	4 000
	L.S	15000		L.S.	15 000		L.S.	15 000		L.S.	15 000
	3,00	27000	9,000 c.y.	3,00	27 000	9,000 c.y.	3,00	27 000	9,000 c.y.	3,00	27 000
	270,00	86400	320 c.y.	270,00	86 400	320 c.y.	270,00	86 400	320 c.y.	270,00	86 400
	150,00	18000	120 c.y.	150,00	18 000	120 c.y.	150,00	18 000	120 c.y.	150,00	18 000
	150,00	4500	30 c.y.	150,00	4 500	30 c.y.	150,00	4 500	30 c.y.	150,00	4 500
	270,00	21600	80 c.y.	270,00	21 600	80 c.y.	270,00	21 600	80 c.y.	270,00	21 600
	270,00	27000	100 c.y.	270,00	27 000	100 c.y.	270,00	27 000	100 c.y.	270,00	27 000
	125,00	13750	110 c.y.	120,00	13 200	110 c.y.	115,00	12 650	110 c.y.	130,00	14 300
	185,00	12950	70 c.y.	180,00	12 600	70 c.y.	180,00	12 600	70 c.y.	200,00	14 000
	185,00	7400	40 c.y.	180,00	7 200	40 c.y.	180,00	7 200	40 c.y.	200,00	8 000
	80,00	16800	210 c.y.	75,00	15 750	210 c.y.	75,00	15 750	210 c.y.	85,00	17 850
	125,00	57500	460 c.y.	120,00	55 200	460 c.y.	115,00	52 900	460 c.y.	130,00	59 800

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HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Project: REHABILITATION OF LOCK AND DAM NO. 1 Date: MARCH 1975 Page 10 of 20 Pages

Structure: LAND WALL Estimated by: JAT Checked by: GJK

Item No.	ITEM	PLAN NO. 1 Quantity	Unit Price	Amount	PLAN NO. 2 Quantity	Unit Price	Amount	Quantity
5	Land Wall, Continued							
	Concrete, Continued							
	Fill Existing Valve and Gate Slots	60 c.y.	80,00	4 800	60 c.y.	75,00	4 500	60
	New Ports	70 c.y.	215,00	15 050	70 c.y.	210,00	14 700	70
	Plug Existing Ports	40 c.y.	80,00	3 200	40 c.y.	75,00	3 000	40
	Mass Concrete in Monoliths 4 & 5	450 c.y.	80,00	36 000	450 c.y.	75,00	33 750	450
	Forms, Straight	10,000 sq. ft.	3,00	30 000	10,000 sq.ft.	3,00	30 000	10,000 sq
	Forms, Curved	2,000 sq. ft.	6,00	12 000	2,000 sq.ft.	6,00	12 000	2,000 sq
	For Placing Mass Concrete in Monoliths 4 & 5							
	Steel Sheet Piling	45 tons	700,00	31 500	45 tons	700,00	31 500	45
	Drilling Holes	450 lin. ft.	10,00	4 500	450 lin. ft.	10,00	4 500	450
	Steel Anchor Rods	1200 lbs.	0,50	600	1200 lbs.	0,50	600	1200
	Grouting	150 cu. ft.	6,00	900	150 cu. ft.	6,00	900	150
	Excavation	700 c.y.	5,00	3 500	700 c.y.	5,00	3 500	700
	Backfill	250 c.y.	5,00	1 250	250 c.y.	5,00	1 250	250
	Air Vents							
	Excavation and Backfill	1700 c.y.	10,00	17 000	1700 c.y.	10,00	17 000	1700
	Drilling in Concrete (3ft. Dia. Holes)							
	Set-Ups	5 ea.	250,00	1 250	5 ea.	250,00	1 250	5
	Drilling	110 lin. ft.	165,00	18 150	110 lin. ft.	165,00	18 150	110
	Vent Pipes	55,000 lbs.	0,75	41 250	55,000 lbs.	0,75	41 250	55,000
	Miscellaneous Connections, etc.		L.S.	4 125		L.S.	4 125	
	Cable Trenches							
	Remove Existing Concrete	75 c.y.	150,00	11 250	75 c.y.	150,00	11 250	75
	Concrete	75 c.y.	125,00	9 375	75 c.y.	120,00	9 000	75
	Forms Straight	2,400 sq. ft.	3,00	7 200	2,400 sq. ft.	3,00	7 200	2,400
	Gratings	11,000 lbs.	1,25	13 750	11,000 lbs.	1,25	13 750	11,000
	Valve Structures		L.S.	2 500		L.S.	2 500	

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

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Estimated by JAT Checked by GJK

1		PLAN NO. 2			PLAN NO. 3			PLAN NO. 4		
Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
80,00	4 500	60 c.y.	75,00	4 500	60 c.y.	75,00	4 500	60 c.y.	85,00	5 100
215,00	15 050	70 c.y.	210,00	14 700	70 c.y.	210,00	14 700	70 c.y.	250,00	17 500
80,00	3 200	40 c.y.	75,00	3 000	40 c.y.	75,00	3 000	40 c.y.	85,00	3 400
80,00	36 000	450 c.y.	75,00	33 750	450 c.y.	75,00	33 750	450 c.y.	85, 0	38 250
3,00	30 000	10,000 sq.ft.	3,00	30 000	10,000 sq. ft.	3,00	30 000	10,000 sq. ft.	3,00	30 000
6,00	12 000	2,000 sq.ft.	6,00	12 000	2,000 sq. ft.	6,00	12 000	2,000 sq. ft.	6,00	12 000
700,00	31 500	45 tons	700,00	31 500	45 tons	700,00	31 500	45 tons	700,00	31 500
10,00	4 500	450 lin. ft.	10,00	4 500	450 lin. ft.	10,00	4 500	450 lin. ft.	10,00	4 500
0,50	600	1200 lbs.	0,50	600	1200 lbs.	0,50	600	1200 lbs.	0,50	600
6,00	900	150 cu. ft.	6,00	900	150 cu. ft.	6,00	900	150 cu. ft.	6,00	900
5,00	3 500	700 c.y.	5,00	3 500	700 c.y.	5,00	3 500	700 c.y.	5,00	3 500
5,00	1 250	250 c.y.	5,00	1 250	250 c.y.	5,00	1 250	250 c.y.	5,00	1 250
10,00	17 000	1700 c.y.	10,00	17 000	1700 c.y.	10,00	17 000	1700 c.y.	10,00	17 000
250,00	1 250	5 ea.	250,00	1 250	5 ea.	250,00	1 250	5 ea.	250,00	1 250
165,00	18 150	110 lin. ft.	165,00	18 150	110 lin. ft.	165,00	18 150	110 lin. ft.	165,00	18 150
0,75	41 250	55,000 lbs.	0,75	41 250	55,000 lbs.	0,75	41 250	55,000 lbs.	0,75	41 250
L.S.	4 125		L.S.	4 125		L.S.	4 125		L.S.	4 125
150,00	11 250	75 c.y.	150,00	11 250	75 c.y.	150,00	11 250	75 c.y.	150,00	11 250
125,00	9 375	75 c.y.	120,00	9 000	75 c.y.	115,00	8 625	75 c.y.	130,00	9 750
3,00	7 200	2,400 sq. ft.	3,00	7 200	2,400 sq. ft.	3,00	7 200	2,400 sq. ft.	3,00	7 200
1,25	13 750	11,000 lbs.	1,25	13 750	11,000 lbs.	1,25	13 750	11,000 lbs.	1,25	13 750
L.S.	2 500		L.S.	2 500		L.S.	2 500		L.S.	2 500

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HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Project: REHABILITATION OF LOCK AND DAM NO. 1 Date: MARCH 1975 Page 11 of 20 Pages

Structure: LAND WALL; INTERMEDIATE WALL Estimated by: JAT Checked by: GJK

Item No.	ITEM	Plan No. 1 Quantity	Plan No. 1 Unit Price	Plan No. 1 Amount	Plan No. 2 Quantity	Plan No. 2 Unit Price	Plan No. 2 Amount	Quantity
5	Land Wall, Cont'd.							
	Mooring Bitts							
	Remove Existing Concrete	200 c.y.	150.00	30 000	200 c.y.	150.00	30 000	200 c.
	Mooring Bitts (See 14, Mechanical Equipment)							
	Concrete	100 c.y.	185.00	18 500	100 c.y.	180.00	18 000	100 c.
	Forms, Curved	2,200 sq.ft.	6.00	13 200	2,200 sq.ft.	6.00	13 200	2,200
	Surfacing Access Road and Parking Area	5,000 s.y.	10.00	50 000	5,000 s.y.	10.00	50 000	5,000
	Landscaping		L.S.	12 000		L.S.	12 000	
	Subtotal Land Wall			725 430			716 785	
		Use		725 000			717 000	
6	Intermediate Wall							
	Remove Existing Valve Operating Structures		L.S.	2 000		L.S.	2 000	
	Remove Existing Control House		L.S.	10 000		L.S.	10 000	
	Remove Concrete							
	Lowered Filling Conduit(s)	300 c.y.	270.00	81 000	300 c.y.	270.00	81 000	300 c
	New Filling Valve Slot(s)	120 c.y.	150.00	18 000	120 c.y.	150.00	18 000	120 c
	New Bulkhead Gate Slot(s)	30 c.y.	150.00	4 500	30 c.y.	150.00	4 500	30 c.
	Lowered Conduit Crown(s)	80 c.y.	270.00	21 600	80 c.y.	270.00	21 600	80 c.
	Lowered Ports	100 c.y.	270.00	27 000	100 c.y.	270.00	27 000	100 c
	Concrete							
	Lowered Filling Conduit(s)	100 c.y.	125.00	12 500	100 c.y.	120.00	12 000	100 c
	New Filling Valve Slot(s)	70 c.y.	185.00	12 950	70 c.y.	180.00	12 600	70 c
	New Bulkhead Gate Slot(s)	40 c.y.	185.00	7 400	40 c.y.	180.00	7 200	40 c

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

OF
). 1 Date MARCH 1975 Page 11 of 20 Pages
TERMEDIATE WALL Estimated by JAT Checked by GJK

No. 1			Plan No. 2			Plan No. 3			Plan 4		
	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
	150.00	30 000	200 c.y.	150.00	30 000	200 c.y.	150.00	30 000	200 c.y.	150.00	30 000
	185.00	18 500	100 c.y.	180.00	18 000	100 c.y.	180.00	18 000	100 c.y.	200.00	20 000
	6.00	13 200	2,200 sq.ft.	6.00	13 200	2,200 sq.ft.	6.00	13 200	2,200 sq.ft	6.00	13 200
	10.00	50 000	5,000 s.y.	10.00	50 000	5,000 s.y.	10.00	50 000	5,000 s.y.	10.00	50 000
	L.S.	12 000		L.S.	12 000		L.S.	12 000		L.S.	12 000
		725 430			716 785			713 560			738 615
		725 000			717 000			714 000			739 000
	L.S.	2 000		L.S.	2 000		L.S.	2 000		L.S	2 000
	L.S.	10 000		L.S.	10 000		L.S.	10 000		L.S.	10 000
	270.00	81 000	300 c.y.	270.00	81 000	300 c.y.	270.00	81 000	600 c.y.	270.00	162 000
	150.00	18 000	120 c.y.	150.00	18 000	120 c.y.	150.00	18 000	240 c.y.	150.00	36 000
	150.00	4 500	30 c.y.	150.00	4 500	30 c.y.	150.00	4 500	60 c.y.	150.00	9 000
	270.00	21 600	80 c.y.	270.00	21 600	80 c.y.	270.00	21 600	160 c.y.	270.00	43 200
	270.00	27 000	100 c.y.	270.00	27 000	100 c.y.	270.00	27 000	200 c.y.	270.00	54 000
	125.00	12 500	100 c.y.	120.00	12 000	100 c.y.	115.00	11 500	200 c.y.	130.00	36 000
	185.00	12 950	70 c.y.	180.00	12 600	70 c.y.	180.00	12 600	140 c.y.	200.00	28 000
	185.00	7 400	40 c.y.	180.00	7 200	40 c.y.	180.00	7 200	80 c.y.	200.00	16 000

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HARZA ENGINEERING COMPANY
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ESTIMATE

Project REHABILITATION OF LOCK AND DAM NO. 1 Date MARCH 1975 Page 12 of 20 Pages

Structure INTERMEDIATE WALL Estimated by JAT Checked by GJK

Item No.	ITEM	Plan No. 1 Quantity	Plan No. 1 Unit Price	Plan No. 1 Amount	Plan No. 2 Quantity	Plan No. 2 Unit Price	Plan No. 2 Amount
6	Intermediate Wall, Cont'd.						
	Concrete Cont'd						
	Fill Existing Upper Conduit(s)	210 c.y.	80.00	16 800	210 c.y.	75.00	15 750
	Lowered Conduit Crown(s)	460 c.y.	125.00	57 500	460 c.y.	120.00	55 200
	Fill Existing Valve and Gate Slots	60 c.y.	80.00	4 800	60 c.y.	75.00	4 500
	Rebuilt Ports	120 c.y.	215.00	25 800	120 c.y.	210.00	25 200
	Forms, Straight	7,900 sq. ft.	3.00	23 700	7,900 sq. ft.	3.00	23 700
	Forms, Curved	2,100 sq. ft.	6.00	12 600	2,100 sq. ft.	6.00	12 600
	Grouting Beneath the Wall						
	Set-ups	330 ea.	50.00	16 500	330 ea.	50.00	16 500
	Drilling	5,000 lin. ft.	10.00	50 000	5,000 lin. ft.	10.00	50 000
	Grout	100 c.y.	160.00	16 000	100 c.y.	160.00	16 000
	Air Vents						
	Excavation and Backfill	2,700 c.y.	10.00	27 000	2,700 c.y.	10.00	27 000
	Drilling in Concrete (3 ft. diam. Holes)						
	Set-ups	5 ea.	250.00	1 250	5 ea.	250.00	1 250
	Drilling	135 lin. ft.	165.00	22 275	135 lin. ft.	165.00	22 275
	Vent Pipes	55,000 lbs.	0.75	41 250	55,000 lbs	0.75	41 250
	Miscellaneous Connections, etc.		L.S.	4 125		L.S.	4 125
	Cable Trenches						
	Remove Existing Concrete	70 c.y.	150.00	10 500	70 c.y.	150.00	10 500
	Concrete	135 c.y.	125.00	16 875	135 c.y.	120.00	16 200
	Forms, Straight	7,000 sq. ft.	3.00	21 000	7,000 sq. ft.	3.00	21 000
	Gratings	16,000 lbs.	1.25	20 000	16,000 lbs.	1.25	20 000
	Vertical Shear Keys Between						
	Monoliths 17, 18 and 19						
	Set-ups	4 ea.	250.00	1 000	4 ea.	250.00	1 000
	Drilling in Concrete (2 ft. diam. Holes)	160 lin. ft.	140.00	22 400	160 lin. ft.	140.00	22 400
	Concrete Fill, Reinforced	19 c.y.	115.00	2 185	19 c.y.	110.00	2 090

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

1 Date MARCH 1975 Page 12 of 20 Pages

Estimated by JAT Checked by GJK

No. 1		Plan No. 2			Plan No. 3			Plan No.4		
Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
80.00	16 800	210 c.y.	75.00	15 750	210 c.y.	75.00	15 750	420 c.y.	85.00	35 700
125.00	57 500	460 c.y.	120.00	55 200	460 c.y.	115.00	52 900	920 c.y.	130.00	119 600
80.00	4 800	60 c.y.	75.00	4 500	60 c.y.	75.00	4 500	120 c.y.	85.00	10 200
215.00	25 800	120 c.y.	210.00	25 200	120 c.y.	210.00	25 200	240 c.y.	250.00	60 000
3.00	23 700	7,900 sq. ft.	3.00	23 700	7,900 sq. ft.	3.00	23 700	16,800 sq. ft.	3.00	50 400
6.00	12 600	2,100 sq. ft.	6.00	12 600	2,100 sq. ft.	6.00	12 600	4,200 sq. ft.	6.00	25 200
50.00	16 500	330 ea.	50.00	16 500	330 ea.	50.00	16 500	330 ea.	50.00	16 500
10.00	50 000	5,000 lin. ft.	10.00	50 000	5,000 lin. ft.	10.00	50 000	5,000 lin. ft.	10.00	50 000
160.00	16 000	100 c.y.	160.00	16 000	100 c.y.	160.00	16 000	100 c.y.	160.00	16 000
10.00	27 000	2,700 c.y.	10.00	27 000	2,700 c.y.	10.00	27 000	3,200 c.y.	10.00	32 000
250.00	1 250	5 ea.	250.00	1 250	5 ea.	250.00	1 250	10 ea.	250.00	2 500
165.00	22 275	135 lin. ft.	165.00	22 275	135 lin. ft.	165.00	22 275	270 lin. ft.	165.00	44 550
0.75	41 250	55,000 lbs	0.75	41 250	55,000 lbs.	0.75	41 250	110,000 lbs.	0.75	82 500
L.S.	4 125		L.S.	4 125		L.S.	4 125		L.S.	8 250
150.00	10 500	70 c.y.	150.00	10 500	70 c.y.	150.00	10 500	75 c.y.	150.00	11 250
125.00	16 875	135 c.y.	120.00	16 200	135 c.y.	115.00	15 525	140 c.y.	130.00	18 200
3.00	21 000	7,000 sq. ft.	3.00	21 000	7,000 sq. ft.	3.00	21 000	7,100 sq. ft.	3.00	21 300
1.25	20 000	16,000 lbs.	1.25	20 000	16,000 lbs.	1.25	20 000	17,000 lbs.	1.25	21 250
250.00	1 000	4 ea.	250.00	1 000	4 ea.	250.00	1 000	4 ea.	250.00	1 000
140.00	22 400	160 lin. ft.	140.00	22 400	160 lin. ft.	140.00	22 400	160 lin. ft.	140.00	22 400
115.00	2 185	19 c.y.	110.00	2 090	19 c.y.	105.00	1 995	19 c.y.	120.00	2 280

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HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Project: REHABILITATION OF LOCK AND DAM NO. 1 Date: MARCH 1975 Page 13 of 20 Pages

Structure: INTERMEDIATE WALL; RIVER WALL Estimated by: JAT Checked by: GJK

Item No.	ITEM	Plan No. 1 Quantity	Plan No. 1 Unit Price	Plan No. 1 Amount	Plan No. 2 Quantity	Plan No. 2 Unit Price	Plan No. 2 Amount
6	Intermediate Wall, Cont'd.						
	Horizontal Shear Keys Between						
	Monoliths 17, 18 and 19						
	Set-ups and Drilling	8 ea.	1200,00	9 600	8 ea.	1200,00	9 600
	Concrete Fill, Reinforced	6 c.y.	115,00	690	6 c.y.	110,00	660
	Valve Operating Structures		L.S.	2 500		L.S.	2 500
	Paving	630 s.y.	10,00	6 300	630 s.y.	10,00	6 300
	Subtotal Intermediate Wall			629 600			623 500
		Use		630 000			624 000
7	River Wall						
	Install Half of Demolished Tool Shed from Land Wall		L.S.	2 000		L.S.	2 000
	Remove Existing Valve Operating Structures		L.S.	1 000		L.S.	1 000
	Remove Concrete						
	Lowered Filling Conduit						
	New Filling Valve Slot						
	New Bulkhead Gate Slot						
	Lowered Conduit Crown						
	New Ports						
	Concrete						
	Lowered Filling Conduit						
	New Filling Valve Slot						
	New Bulkhead Gate Slot						
	Fill Existing Upper Conduit						
	Lowered Conduit Crown						
	Fill Existing Valve and Gate Slots						
	New Ports						
	Plug Existing Ports						

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

OF
1 Date MARCH 1975 Page 13 of 20 Pages

LL: RIVER WALL Estimated by JAT Checked by GJK

o. 1			Plan No. 2			Plan No. 3			Plan No. 4		
Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
	1200,00	9 600	8 ea.	1200,00	9 600	8 ea.	1200,00	9 600	8 ea.	1200,00	9 600
	115,00	690	6 c.y.	110,00	660	6 c.y.	105,00	630	6 c.y.	120,00	720
	L.S.	2 500		L.S.	2 500		L.S.	2 500		L.S.	5 000
	10,00	6 300	630 s.y.	10,00	6 300	630 s.y.	10,00	6 300	630 s.y.	10,00	6 300
		629 600			623 500			619 900			1058 900
		630 000			624 000			620 000			1059 000
	L.S.	2 000		L.S.	2 000		L.S.	2 000		L.S.	2 000
	L.S.	1 000		L.S.	1 000		L.S.	1 000		L.S.	1 000
									300 c.y.	270.00	81 000
									120 c.y.	150.00	18 000
									30 c.y.	150.00	4 500
									80 c.y.	270.00	21 600
									100 c.y.	270.00	27 000
									100 c.y.	130.00	13 000
									70 c.y.	200.00	14 000
									40 c.y.	200.00	8 000
									210 c.y.	85.00	17 850
									460 c.y.	130.00	59 800
									60 c.y.	85.00	5 100
									70 c.y.	250.00	17 500
									40 c.y.	85.00	3 400

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HASSA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Project: Rehabilitation of Lock and Dam No. 1 Date: March 1975 Page 14 of 20 Pages

Structure: River Wall Estimated by: JAT Checked by: GJK

Item No.	ITEM	PLAN NO. 1 Quantity	PLAN NO. 1 Unit Price	PLAN NO. 1 Amount	PLAN NO. 2 Quantity	PLAN NO. 2 Unit Price	PLAN NO. 2 Amount	Quant
7	River Wall							
	Forms, Straight	---			---			
	Forms, Curved	---			---			
	Grouting Beneath the Wall							
	Set-Ups	---			75 ea.	50.00	3 750	
	Drilling	---			2,250 lin.ft.	10.00	22 500	
	Grout	---			50 c.y.	160.00	8 000	
	Air Vents							
	Excavation and Backfill	---			---			
	Drilling in Concrete (3 ft. diam. Holes)							
	Set-Ups	---			---			
	Drilling	---			---			
	Vent Pipes	---			---			
	Miscellaneous Connections, etc.	---			---			
	Cable Trenches							
	Remove Existing Concrete	---			---			
	Concrete	---			---			
	Forms, Straight	---			---			
	Gratings	---			---			
	Vertical Shear Keys Between							
	Monoliths 19, 20 and 21							
	Set-Ups	---			4 ea.	250.00	1 000	
	Drilling in Concrete (2 ft. diam. Holes)	---			160 lin. ft.	140.00	22 400	
	Concrete Fill, Reinforced	---			19 c.y.	110.00	2 090	
	Horizontal Shear Keys Between							
	Monoliths 19, 20 and 21							
	Set-Ups and Drilling	---			8 ea.	1200.00	9 600	
	Concrete Fill, Reinforced	---			6 c.y.	110.00	660	

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

tation of
Dam No. 1 Date March 1975 Page 14 of 20 Pages

Wall Estimated by JAT Checked by GJK

PLAN NO. 1			PLAN NO. 2			PLAN NO. 3			PLAN NO. 4		
	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
			---			---			7,900 sq.ft.	3.00	23 700
			---			---			2,000 sq.ft.	6.00	12 000
			75 ea.	50.00	3 750	---			75 ea.	50.00	3 750
			2,250 lin.ft.	10.00	22 500	---			2,250 lin.ft.	10.00	22 500
			50 c.y.	160.00	8 000	---			50 c.y.	160.00	8 000
			---			---			3,000 c.y.	10.00	30 000
			---			---			5 ea.	250.00	1 250
			---			---			110 lin.ft.	165.00	18 150
			---			---			50,000 lbs.	0.75	37 500
			---			---				L.S.	3 750
			---			---			25 c.y.	150.00	3 750
			---			---			85 c.y.	140.00	11 900
			---			---			4,800 sq.ft.	3.00	14 400
			---			---			10,000 lbs.	1.25	12 500
			4 ea.	250.00	1 000	---			4 ea.	250.00	1 000
			160 lin. ft.	140.00	22 400	---			160 lin. ft.	140.00	22 400
			19 c.y.	110.00	2 090	---			19 c.y.	110.00	2 090
			8 ea.	1200.00	9 600	---			8 ea.	1200.00	9 600
			6 c.y.	110.00	660	---			6 c.y.	120.00	720

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HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Project: Rehabilitation of Lock and Dam No. 1 Date: March 1975 Page 15 of 20 Pages

Structure: River Wall; Dam; Estimated by: JAT Checked by: GJK

Item No.	ITEM	PLAN NO. 1 Quantity	Unit Price	Amount	PLAN NO. 2 Quantity	Unit Price	Amount	Quan
7	River Wall, Con'd							
	Fill Behind Monoliths 17 through 21							
	Excavation	---			1,500 c.y.	3.00	4 500	

	Random Fill	---			3,000 c.y.	6.00	18 000	
	Gravel Filter	---			1,800 c.y.	10.50	18 900	
	Random Rock Fill	---			1,000 c.y.	16.00	16 000	
	Selected Rock Protection	---			1,300 c.y.	25.00	32 500	
	Valve Operating Structures	---			---			
	Paving	470 sq.yd.	10.00	4 700	470 sq.yd.	10.00	4 700	470
	Subtotal River Wall			7 700			167 600	
		Use		8 000			168 000	
8	Dam							
	Sand Fill, Placed by Pumping	200 c.y.	l.s.	10 000	200 c.y.	l.s.	10 000	20
		Use		10 000			10 000	

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

litation of
d Dam No. 1 Date March 1975 Page 15 of 20 Pages

all: Dam: Estimated by JAT Checked by GJK

LAN NO. 1			PLAN NO. 2			PLAN NO. 3			PLAN NO. 4		
	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
			1,500 c.y.	3.00	4 500	---			1,500 c.y.	3.00	4 500
			3,000 c.y.	6.00	18 000	---			3,000 c.y.	6.00	18 000
			1,800 c.y.	10.50	18 900	---			1,800 c.y.	10.50	18 900
			1,000 c.y.	16.00	16 000	---			1,000 c.y.	16.00	16 000
			1,300 c.y.	25.00	32 500	---			1,300 c.y.	25.00	32 500
			---			---				L.S.	2 500
.	10.00	4 700	470 sq.yd.	10.00	4 700	470 sq.yd.	10.00	4700	470 sq.yd.	10.00	4 700
		7 700			167 600			7700			625 810
		8 000			168 000			8000			630 000
	1.s.	10 000	200 c.y.	1.s.	10 000	200 c.y.	1.s.	10 000	200 c.y.	1.s.	10 000
		10 000			10 000			10 000			10 000

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HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Project: Rehabilitation of Lock and Dam No. 1 Bridge & Elevator; Date: March 1975 Page 16 of 20 Pages

Structure: Central Control Station Estimated by: JAT Checked by: GJK

Item No.	ITEM	PLAN NO. 1 Quantity	Unit Price	Amount	PLAN NO. 2 Quantity	Unit Price	Amount	Quantity
9	Bridge and Elevator							
	Excavation	750 c.y.	9.00	6 750	750 c.y.	9.00	6 750	750 c
	Concrete	280 c.y.	155.00	43 400	280 c.y.	140.00	39 200	280 c
	Forms Straight	15,400 sq.ft.	3.00	46 200	15,400 sq.ft.	3.00	46 200	15,400 s
	Backfill	120 c.y.	6.00	720	120 c.y.	6.00	720	120 c
	Roofing	56 sq.ft.	4.00	224	56 sq.ft.	4.00	224	56 s
	Flagpole (30 ft.)	1 ea.	L.S.	700	1 ea.	L.S.	700	1 e
	Elevator (60 ft. travel, 3 stops)	1 ea.	L.S.	40 000	1 ea.	L.S.	40 000	1 e
	Miscellaneous Steel	2 tons	L.S.	4 000	2 tons	L.S.	4 000	2 t
	Bridge Dome	1,080 sq.ft.	14.00	15 120	1,080 sq.ft.	14.00	15 120	1,080 s
	Subtotal Bridge and Elevator			157 114			152 914	
		Use		157 000			153 000	
10	Central Control Station							
	Excavation	1,430 c.y.	3.00	4 290	1,430 c.y.	3.00	4 290	1,430 c
	Concrete	600 c.y.	155.00	93 000	600 c.y.	140.00	84 000	600 c
	Forms, Straight	28,000 sq.ft.	3.00	84 000	28,000 sq.ft.	3.00	84 000	28,000 s
	Backfill	1,300 c.y.	6.00	7 800	1,300 c.y.	6.00	7 800	1,300 c
	Windows, Aluminum and 1/4" Glass	670 sq.ft.	6.00	4 020	670 sq.ft.	6.00	4 020	670 s
	Storefront, Aluminum and 1/4" Glass	500 sq.ft.	7.00	3 500	500 sq.ft.	7.00	3 500	500 s
	Doors, Aluminum and Glass (3' x 7')	1 ea.	750.00	750	1 ea.	750.00	750	1 e
	Doors, Aluminum or Stainless Steel	10 ea.	400.00	4 000	10 ea.	400.00	4 000	10 e
	Doors, Steel Rollup (7' x 9')	1 ea.	650.00	650	1 ea.	650.00	650	1 e
	Concrete Block Wall (6")	1,200 sq.ft.	5.00	6 000	1,200 sq.ft.	5.00	6 000	1,200 s
	Toilet Partitions	85 sq.ft.	10.00	850	85 sq.ft.	10.00	850	85 s
	Stair Nosings, Steel	340 lin.ft.	15.00	5 100	340 lin.ft.	15.00	5 100	340 l
	Handrail, Aluminum, Floor Mounted	100 lin.ft.	12.00	1 200	100 lin.ft.	12.00	1 200	100 l
	Handrail, Aluminum, Wall Mounted	90 lin.ft.	8.00	720	90 lin.ft.	8.00	720	90 l
	Roofing, Hypalon with Paving	1,200 sq.ft.	8.00	9 600	1,200 sq.ft.	8.00	9 600	1,200 s
	Insulation, Rigid (1 1/2")	3,600 sq.ft.	0.60	2 160	3,600 sq.ft.	0.60	2 160	3,600 s
	Dry Wall on Furring (1/2")	2,400 sq.ft.	0.30	720	2,400 sq.ft.	0.30	720	2,400 s

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

tation of
Dam No. 1 Date March 1975 Page 16 of 20 Pages
dge & Elevator;
l Control Station Estimated by JAT Checked by GJK

N NO. 1				PLAN NO. 2				PLAN NO. 3				PLAN NO. 4			
	Unit Price	Amount		Quantity	Unit Price	Amount		Quantity	Unit Price	Amount		Quantity	Unit Price	Amount	
	9.00	6	750	750 c.y.	9.00	6	750	750 c.y.	9.00	6	750	750 c.y.	9.00	6	750
	155.00	43	400	280 c.y.	140.00	39	200	280 c.y.	140.00	39	200	280 c.y.	160.00	44	800
.	3.00	46	200	15,400 sq.ft.	3.00	46	200	15,400 sq.ft.	3.00	46	200	15,400 sq.ft.	3.00	46	200
	6.00		720	120 c.y.	6.00		720	120 c.y.	6.00		720	120 c.y.	6.00		720
.	4.00		224	56 sq.ft.	4.00		224	56 sq.ft.	4.00		224	56 sq.ft.	4.00		224
	L.S.		700	1 ea.	L.S.		700	1 ea.	L.S.		700	1 ea.	L.S.		700
	L.S.	40	000	1 ea.	L.S.	40	000	1 ea.	L.S.	40	000	1 ea.	L.S.	40	000
)	L.S.	4	000	2 tons	L.S.	4	000	2 tons	L.S.	4	000	2 tons	L.S.	4	000
.	14.00	15	120	1,080 sq.ft.	14.00	15	120	1,080 sq.ft.	14.00	15	120	1,800 sq.ft.	14.00	25	200
		157	114			152	914			152	914			168	594
		157	000			153	000			153	000			169	000
	3.00	4	290	1,430 c.y.	3.00	4	290	1,430 c.y.	3.00	4	290	---			
	155.00	93	000	600 c.y.	140.00	84	000	600 c.y.	140.00	84	000	270 c.y.	160.00	43	200
.	3.00	84	000	28,000 sq.ft.	3.00	84	000	28,000 sq.ft.	3.00	84	000	15,400 sq.ft.	3.00	46	200
	6.00	7	800	1,300 c.y.	6.00	7	800	1,300 c.y.	6.00	7	800	---			
.	6.00	4	020	670 sq.ft.	6.00	4	020	670 sq.ft.	6.00	4	020	680 sq.ft.	6.00	4	080
.	7.00	3	500	500 sq.ft.	7.00	3	500	500 sq.ft.	7.00	3	500	---			
	750.00		750	1 ea.	750.00		750	1 ea.	750.00		750	1 ea.	750.00		750
	400.00	4	000	10 ea.	400.00	4	000	10 ea.	400.00	4	000	7 ea.	400.00	2	800
	650.00		650	1 ea.	650.00		650	1 ea.	650.00		650	---			
.	5.00	6	000	1,200 sq.ft.	5.00	6	000	1,200 sq.ft.	5.00	6	000	400 sq.ft.	5.00	2	000
.	10.00		850	85 sq.ft.	10.00		850	85 sq.ft.	10.00		850	---			
t.	15.00	5	100	340 lin.ft.	15.00	5	100	340 lin.ft.	15.00	5	100	170 lin.ft.	15.00	2	550
t.	12.00	1	200	100 lin.ft.	12.00	1	200	100 lin.ft.	12.00	1	200	40 lin.ft.	12.00		480
t.	8.00		720	90 lin.ft.	8.00		720	90 lin.ft.	8.00		720	40 lin.ft.	8.00		320
.	8.00	9	600	1,200 sq.ft.	8.00	9	600	1,200 sq.ft.	8.00	9	600	---			
.	0.60	2	160	3,600 sq.ft.	0.60	2	160	3,600 sq.ft.	0.60	2	160	4,000 sq.ft.	0.60	2	400
.	0.30		720	2,400 sq.ft.	0.30		720	2,400 sq.ft.	0.30		720	1,800 sq.ft.	0.30		540

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HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Project: Rehabilitation of Lock and Dam No. 1 — Date: March 1975 — Page 17 of 20 Pages

Structure: Central Control Station; Observation Platform; Repair of Concrete Surfaces — Estimated by: JAT — Checked by: GJK

Item No.	ITEM	PLAN NO. 1 Quantity	PLAN NO. 1 Unit Price	PLAN NO. 1 Amount	PLAN NO. 2 Quantity	PLAN NO. 2 Unit Price	PLAN NO. 2 Amount	
10	Central Control Station, Cont'd							
	Terrazo Floor	1,200 sq.ft.	4.00	4 800	1,200 sq.ft.	4.00	4 800	1,
	Roofing Hypalon	2,100 sq.ft.	4.00	8 400	2,100 sq.ft.	4.00	8 400	2,
	Acoustical Ceiling	1,050 sq.ft.	1.50	1 575	1,050 sq.ft.	1.50	1 575	1,
	Painting	11,600 sq.ft.	0.50	5 800	11,600 sq.ft.	0.50	5 800	11,
	Mirrors (2' x 2')	2 ea.	65.00	130	2 ea.	65.00	130	
	Lockers, Single Tier (12" x 18")	4 ea.	20.00	80	4 ea.	20.00	80	
	Elevator (32' travel, 4 stops)	1 ea.	L.S.	30 000	1 ea.	L.S.	30 000	
	Elevator (32' travel, 3 stops)	---			---			
	Subtotal Central Control Station			279 145			270 145	
		Use		279 000			270 000	
11	Observation Platform							
	Excavation and Backfill	---			---			
	Concrete	---			---			
	Forms, Straight	---			---			
	Handrail, Steel Pipe, Floor Mounted	---			---			
	Subtotal Observation Platform							
		Use						
12	Repair of Concrete Surfaces							
	(with wall armor)							
	Concrete Removal	2,200 c.y.	65.00	143 000	2,200 c.y.	65.00	143 000	2,
	Shotcrete	960 c.y.	175.00	168 000	960 c.y.	175.00	168 000	
	Concrete (w/o steel reinforcement)	1,170 c.y.	80.00	93 600	1,170 c.y.	80.00	93 600	1,
	Precast Panels	220 c.y.	200.00	44 000	220 c.y.	200.00	44 000	
	Formwork	19,000 sq.ft.	3.00	57 000	19,000 sq.ft.	3.00	57 000	19,
	Bedding, Pea Gravel	150 c.y.	10.50	1 575	150 c.y.	10.50	1 575	
	Repair Cracks and Joints	250 lin.ft.	4.00	1 000	250 lin.ft.	4.00	1 000	

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

tion of
m No. 1 Date March 1975 Page 17 of 20 Pages
ontrol Station;
tion Platform; Estimated by JAT Checked by GJK
Concrete Surfaces

NO. 1		PLAN NO. 2			PLAN NO. 3			PLAN NO. 4		
Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
4.00	4 800	1,200 sq.ft.	4.00	4 800	1,200 sq.ft.	4.00	4 800	1,200 sq.ft.	4.00	4 800
4.00	8 400	2,100 sq.ft.	4.00	8 400	2,100 sq.ft.	4.00	8 400	1,600 sq.ft.	4.00	6 400
1.50	1 575	1,050 sq.ft.	1.50	1 575	1,050 sq.ft.	1.50	1 575	970 sq.ft.	1.50	1 455
0.50	5 800	11,600 sq.ft.	0.50	5 800	11,600 sq.ft.	0.50	5 800	6,500 sq.ft.	0.50	3 250
65.00	130	2 ea.	65.00	130	2 ea.	65.00	130	2 ea.	65.00	130
20.00	80	4 ea.	20.00	80	4 ea.	20.00	80	6 ea.	20.00	120
L.S.	30 000	1 ea.	L.S.	30 000	1 ea.	L.S.	30 000	---		
		---			---			1 ea.	L.S.	25 000
	279 145			270 145			270 145			146 475
	279 000			270 000			270 145			146 000
		---			---			25 c.y.	12.00	300
		---			---			55 c.y.	160.00	8 800
		---			---			4,200 c.y.	3.00	12 600
		---			---			190 lin.ft.	12.00	2 280
										23 980
										24 000
65.00	143 000	2,200 c.y.	65.00	143 000	2,200 c.y.	65.00	143 000	2,900 c.y.	65.00	188 500
175.00	168 000	960 c.y.	175.00	168 000	960 c.y.	175.00	168 000	1,660 c.y.	175.00	290 500
80.00	93 600	1,170 c.y.	80.00	93 600	1,170 c.y.	80.00	93 600	1,260 c.y.	85.00	107 100
200.00	44 000	220 c.y.	200.00	44 000	220 c.y.	200.00	44 000	220 c.y.	200.00	44 000
3.00	57 000	19,000 sq.ft.	3.00	57 000	19,000 sq.ft.	3.00	57 000	22,000 sq.ft.	3.00	66 000
10.50	1 575	150 c.y.	10.50	1 575	150 c.y.	10.50	1 575	150 c.y.	10.50	1 575
4.00	1 000	250 lin.ft.	4.00	1 000	250 lin.ft.	4.00	1 000	1,100 lin.ft.	4.00	4 400

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MARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Project: Rehabilitation of Lock and Dam No. 1 — Date: March 1975 — Page 18 of 20 Pages

Structure: Repair of Concrete Surfaces; Mechanical Equipment — Estimated by: JAT — Checked by: GJK

Item No.	ITEM	PLAN NO. 1 Quantity	Unit Price	Amount	PLAN NO. 2 Quantity	Unit Price	Amount	Q
12	Repair of Concrete Surfaces, Cont'd							
	Epoxy Grout	30 gal.	25.00	750	30 gal.	25.00	750	3
	Rock Bolts for Mesh	2,500 lin.ft.	6.00	15 000	2,500 lin.ft.	6.00	15 000	2,50
	Steel Reinforcement (bars and mesh)	68,000 lbs.	0.40	27 200	68,000 lbs.	0.40	27 200	68,00
	Upper Protection Steel Angles	126,000 lbs.	1.00	126 000	126,000 lbs.	1.00	126 000	126,00
	Wall Armor, Steel	379,000 lbs.	1.00	379 000	379,000 lbs.	1.00	379 000	379,00
	Anchor Bars, 4 ft.	8,600 lbs.	1.75	15 050	8,600 lbs.	1.75	15 050	8,60
	Anchors 3/4" diameter x 1 ft.	8,200 lbs.	2.00	16 400	8,200 lbs.	2.00	16 400	8,20
	Joint Sealer	11,000 lin.ft.	3.00	33 000	11,000 lin.ft.	3.00	33 000	11,00
	Subtotal Repair of Concrete Surfaces			1 120 575			1 120 575	
		Use		1 121 000			1 121 000	
13	Mechanical Equipment							
	Miter Gate Repairs	1 set*	L.S.	408 000	1 set	L.S.	408 000	
	Miter Gate Operators	1 set	L.S.	86 000	1 set	L.S.	86 000	
	Slide Gate Filling Valves	1 set	L.S.	91 000	1 set	L.S.	91 000	
	Slide Gate Emptying Valves	1 set	L.S.	103 000	1 set	L.S.	103 000	
	Slide Gate Valve Bulkheads	1 set	L.S.	18 000	1 set	L.S.	18 000	
	Valve Bulkhead Embedded Parts	1 set	L.S.	42 500	1 set	L.S.	42 500	
	Lock Dewatering Bulkheads	1 set	L.S.	178 500	1 set	L.S.	178 500	
	Lock Bulkhead Slot Embedded Parts	1 set	L.S.	40 000	1 set	L.S.	40 000	
	Mooring Provisions and Mis. Items	1 set	L.S.	208 000	1 set	L.S.	208 000	
	Deicing System	1 set	L.S.	44 000	1 set	L.S.	44 000	
	Station Services		L.S.	134 000		L.S.	134 000	
	Repairs to River Lock Machinery	---				L.S.	94 000	
	Bulkhead above River Lock							
	Upper Miter Gate		L.S.	60 000		L.S.	60 000	
	Remove River Lock Machinery (excl. valves)		L.S.	9 000		L.S.	9 000	
	Remove River Lock Filling and Emptying							
	Valves		L.S.	5 000		L.S.	5 000	

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

ion of
No. 1 Date March 1975 Page 18 of 20 Pages
ncrete Surfaces;
al Equipment Estimated by JAT Checked by GJK

NO. 1				PLAN NO. 2						PLAN NO. 3						PLAN NO. 4					
Unit Price	Amount			Quantity	Unit Price	Amount				Quantity	Unit Price	Amount				Quantity	Unit Price	Amount			
25.00			750	30 gal.	25.00			750		30 gal.	25.00			750		135 gal.	25.00			3	375
6.00		15	000	2,500 lin.ft.	6.00		15	000		2,500 lin.ft.	6.00		15	000		3,550 lin.ft.	6.00			21	300
0.40		27	200	68,000 lbs.	0.40		27	200		68,000 lbs.	0.40		27	200		96,000 lbs.	0.40			38	400
1.00		126	000	126,000 lbs.	1.00		126	000		126,000 lbs.	1.00		126	000		126,000 lbs.	1.00			126	000
1.00		379	000	379,000 lbs.	1.00		379	000		379,000 lbs.	1.00		379	000		553,000 lbs.	1.00			553	000
1.75		15	050	8,600 lbs.	1.75		15	050		8,600 lbs.	1.75		15	050		9,500 lbs.	1.75			16	625
2.00		16	400	8,200 lbs.	2.00		16	400		8,200 lbs.	2.00		16	400		10,800 lbs.	2.00			21	600
3.00		33	000	11,000 lin.ft.	3.00		33	000		11,000 lin.ft.	3.00		33	000		11,000 lin.ft.	3.00			33	000
	1	120	575			1	120	575				1	120	575				1	515	375	
	1	121	000			1	121	000				1	121	000				1	515	000	
L.S.		408	000	1 set	L.S.		408	000		1 set	L.S.		408	000		2 sets	L.S.		816	000	
L.S.		86	000	1 set	L.S.		86	000		1 set	L.S.		86	000		2 sets	L.S.		172	000	
L.S.		91	000	1 set	L.S.		91	000		1 set	L.S.		91	000		2 sets	L.S.		182	000	
L.S.		103	000	1 set	L.S.		103	000		1 set	L.S.		103	000		2 sets	L.S.		206	000	
L.S.		18	000	1 set	L.S.		18	000		1 set	L.S.		18	000		2 sets	L.S.		36	000	
L.S.		42	500	1 set	L.S.		42	500		1 set	L.S.		42	500		2 sets	L.S.		85	000	
L.S.		178	500	1 set	L.S.		178	500		1 set	L.S.		178	500		1 set	L.S.		178	500	
L.S.		40	000	1 set	L.S.		40	000		1 set	L.S.		40	000		2 sets	L.S.		80	000	
L.S.		208	000	1 set	L.S.		208	000		1 set	L.S.		208	000		1 set & 1 partial set	L.S.		297	000	
L.S.		44	000	1 set	L.S.		44	000		1 set	L.S.		44	000		1 set & extras	L.S.		74	000	
L.S.		134	000		L.S.		134	000			L.S.		134	000			L.S.		169	000	
					L.S.		94	000		---						---					
L.S.		60	000		L.S.		60	000			L.S.		60	000							
L.S.		9	000		L.S.		9	000			L.S.		9	000							
L.S.		5	000		L.S.		5	000			L.S.		5	000							

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HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Project: Rehabilitation of Lock and Dam No. 1 — Date: March, 1975 — Page 19 of 20 Pages

Structure: Mechanical Equipment; Electrical Equipment; Protection of Pleasure Craft — Estimated by: JAT — Checked by: GJK

Item No.	ITEM	PLAN NO. 1 Quantity	Unit Price	Amount	PLAN NO. 2 Quantity	Unit Price	Amount	Quan
13	Mechanical Equipment Cont'd							
	Tie-Back River Lock Miter Gates		L.S.	1 500		L.S.	1 500	
	Widen Walkway on River Lock Upper Miter Gates		L.S.	2 000		L.S.	2 000	
	Subtotal Mechanical Equipment			1 430 500			1 524 500	
		Use		1 430 000			1 524 000	
	* One set is the total required for one lock. Details in Mechanical Design Appendix.							
14	Electrical Equipment							
	Rehabilitation with Bridge and Central Control Station at Center of Land Wall		L.S.	555 000		L.S.	586 000	
	Rehabilitation with Bridge and Central Control Station on Downstream End of Intermediate Wall	---			---			
	Subtotal Electrical Equipment			555 000*			586 000*	*
	* See Electrical Appendix for Details							
15	Protection of Pleasure Craft							
	Oil Drums (55 Gallons)	12 ea.	10.00	120	12 ea.	10.00	120	12 e
	Anchors (150 lbs. Each)	6 ea.	75.00	450	6 ea.	75.00	450	6 e
	Steel Cable, (3/8 inch diameter)	180 lin.ft.	1.00	180	180 lin.ft.	1.00	180	180 l
	Rope (1 inch diameter, with Floats)	500 lin.ft.	0.30	150	500 lin.ft.	0.30	150	500 l
	Structural Steel	400 lbs.	1.00	400	400 lbs.	1.00	400	400 l
	Warning Sign, 4 ft. x 3 ft.	1	L.S.	25	1	L.S.	25	1
	Subtotal Protection of Pleasure Craft			1 325			1 325	
		Use		2 000			2 000	

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

ation of
m No. 1 Date March, 1975 Page 19 of 20 Pages
ical Equipment;
tical Equipment; Estimated by JAT Checked by GJK
of Pleasure Craft

AN NO. 1			PLAN NO. 2			PLAN NO. 3			PLAN NO. 4		
	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
	L.S.	1 500		L.S.	1 500		L.S.	1 500			
	L.S.	2 000		L.S.	2 000		L.S.	2 000			
		1 430 500			1 524 500			1 430 500			2 295 500
		1 430 000			1 524 000			1 439 000			2 296 000
anical Design Appendix.											
	L.S.	555 000		L.S.	586 000		L.S.	555 000	---		
			---			---				L.S.	1 100 000
		555 000*			586 000*			555 000*			1 100 000*
	10.00	120	12 ea.	10.00	120	12 ea.	10.00	120	12 ea.	10.00	120
	75.00	450	6 ea.	75.00	450	6 ea.	75.00	450	6 ea.	75.00	450
t.	1.00	180	180 lin.ft.	1.00	180	180 lin.ft.	1.00	180	180 lin.ft.	1.00	180
t.	0.30	150	500 lin.ft.	0.30	150	500 lin.ft.	0.30	150	500 lin.ft.	0.30	150
	1.00	400	400 lbs.	1.00	400	400 lbs.	1.00	400	400 lbs.	1.00	400
	L.S.	25	1	L.S.	25	1	L.S.	25	1	L.S.	25
		1 325			1 325			1 325			1 325
		2 000			2 000			2 000			2 000

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NARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

Project: Rehabilitation of Lock and Dam No. 1 — Date: March 1975 — Page 20 of 20 Pages

Structure: Miscellaneous Facilities and Improvements — Estimated by: JAT — Checked by: GJK

Item No.	ITEM	PLAN NO. 1 Quantity	PLAN NO. 1 Unit Price	PLAN NO. 1 Amount	PLAN NO. 2 Quantity	PLAN NO. 2 Unit Price	PLAN NO. 2 Amount	Qu
16	Miscellaneous Facilities and Improvements							
	Shop and Storage Building							
	Separate Building for Plan No. 4 only							
	(for Plans No. 1 thru 3 included in							
	Central Control Station)							
	Pool Elevation Recorders		L.S.	20 000		L.S.	20 000	
	Replacing Concrete Slabs around							
	Pipe Trenches after Sealing Mono-							
	lith Joints in I-Wall and River							
	Wall		L.S.	1 500		L.S.	1 500	
	Remove and replace Fence along							
	Upper Guide Wall		L.S.	6 000		L.S.	6 000	
	Fabriform Mattresses and Gabion							
	Baskets for Shore Protection							
	Upstream of Upper Guide Wall		L.S.	50 000		L.S.	50 000	
	Remove and replace Railing around							
	River Lock and Wall		L.S.	15 000		L.S.	15 000	
	Subtotal Miscellaneous Items			92 500			92 500	
		Use		92 000			92 000	

HARZA ENGINEERING COMPANY
CHICAGO, ILLINOIS

ESTIMATE

ion of
No. 1 Date March 1975 Page 20 of 20 Pages
cellaneous
and Improvements Estimated by JAT Checked by GJK

NO. 1			PLAN NO. 2			PLAN NO. 3			PLAN NO. 4		
Unit Price	Amount		Quantity	Unit Price	Amount	Quantity	Unit Price	Amount	Quantity	Unit Price	Amount
									960 sq.ft.	25.00	24 000
L.S.	20	000		L.S.	20 000		L.S.	20 000		L.S.	20 000
L.S.	1	500		L.S.	1 500		L.S.	1 500		L.S.	2 500
L.S.	6	000		L.S.	6 000		L.S.	6 000		L.S.	6 000
L.S.	50	000		L.S.	50 000		L.S.	50 000		L.S.	50 000
L.S.	15	000		L.S.	15 000		L.S.	15 000		L.S.	15 000
	92	500			92 500			92 500			117 500
	92	000			92 000			92 000			118 000

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END

DATE

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