

# **OPERATION AND MAINTENANCE MANUAL**

---

## **SPRING LAKE HABITAT REHABILITATION AND ENHANCEMENT PROJECT**

**UPPER MISSISSIPPI RIVER  
ENVIRONMENTAL MANAGEMENT PROGRAM**

**POOL 13  
RIVER MILES 532-536  
CARROLL COUNTY, ILLINOIS**

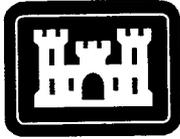
**JULY 2003**

---



**US Army Corps  
of Engineers**

Rock Island District



**US Army Corps  
of Engineers**  
Rock Island District

---

# **OPERATION AND MAINTENANCE MANUAL**

## **SPRING LAKE**

**HABITAT REHABILITATION AND  
ENHANCEMENT PROJECT**

**UPPER MISSISSIPPI RIVER  
ENVIRONMENTAL MANAGEMENT PROGRAM**

**POOL 13  
RIVER MILES 532 - 536  
CARROLL COUNTY, ILLINOIS**

---

**NOVEMBER 2002**

**OPERATION AND MAINTENANCE MANUAL  
SPRING LAKE HABITAT REHABILITATION AND ENHANCEMENT  
UPPER MISSISSIPPI RIVER  
ENVIRONMENTAL MANAGEMENT PROGRAM  
POOL 13, RIVER MILES 532 THROUGH 536  
CARROLL COUNTY, ILLINOIS**

**Contents**

1. INTRODUCTION.....	1
a. Purpose and Scope.....	1
b. Use of Manual.....	1
2. PROJECT BACKGROUND.....	2
a. Location.....	2
b. Authorization.....	2
c. Planning, Design, and Construction Activities.....	2
d. Actual Project Costs.....	6
e. Project References.....	9
3. DESCRIPTION OF PROJECT FEATURES.....	10
a. Project Data.....	10
b. General Description.....	12
c. Perimeter Levee.....	12
d. Cross Dike.....	12
e. Pump Station.....	12
f. Interior Levees.....	13
g. Stoplog Structures.....	13
h. Gated Inlet Structure.....	13
i. Gatewell Structure.....	13
j. Hemi-Marsh.....	13
k. Well.....	14
4. INSPECTIONS.....	14
a. General.....	14
b. Project Inspection by Site Manager.....	14
c. Joint Inspection by Site Manager and U.S. Army Corps of Engineers.....	15
5. OPERATION AND MAINTENANCE OF PROJECT FEATURES.....	15
a. Perimeter Levee, Interior Levee, and Cross Dike.....	16
b. Stoplong Structures.....	18
c. Pump Station.....	19
d. Gated Inlet Structure and Gatewell Structure.....	21
e. Well.....	21
6. PROJECT REHABILITATION OR ABANDONMENT.....	22
a. General.....	22
b. Post Construction.....	22
7. PERFORMANCE MONITORING AND ASSESSMENT.....	23

## Tables

2-1. Implementation Schedule.....	3
2-2. Project Goals, Objectives, and Enhancement Potential .....	4
2-3. Estimated Project Costs .....	6
2-4. Project References.....	9
3-1. Project Data Summary .....	10
7-1. Monitoring and Performance Evaluation Plan.....	24
7-2. Resource Monitoring and Data Collection Summary .....	25
7-3. Post-Construction Evaluation Plan .....	27

## Appendices

- A - Memorandum of Agreement
- B - Site Manager's Project Inspection and Monitoring Results
- C - Distribution List

## Plates

- 1 - Site Plan
- 2 - Public Entrance Area Site Plan
- 3 - Perimeter Levee Plan and Profile, Sta. 0+00 to Sta. 73+00
- 4 - Perimeter Levee Plan and Profile, Sta. 73+00 to Sta. 146+00
- 5 - Perimeter Levee Plan and Profile, Sta. 146+00 to Sta. 219+00
- 6 - Perimeter Levee Plan and Profile, Sta. 219+00 to Sta. 292+00
- 7 - Perimeter Levee Plan and Profile, Sta. 292+00 to Sta. 375+99.65
- 8 - Setback Levee Plan
- 9 - Setback Levee Section and Profile
- 10 - Upper Lake Interior Levees and Cross Dike Plan
- 11 - Traverse "A" Field Tiles
- 12 - Upper Lake Interior Levees and Cross Dike Levees Profile
- 13 - Hemi Marsh Levee Plan and Profile
- 14 - North Hemi Marsh Access Road Plan and Profile
- 15 - South Hemi Marsh Access Road Plan and Profile
- 16 - Channel Excavation Plans and Profiles
- 17 - Typical Sections I
- 18 - Typical Sections II
- 19 - Typical Sections III
- 20 - Miscellaneous Sections and Details
- 21 - Pump Station General Layout
- 22 - Pump Station Elevations
- 23 - Pump Station Miscellaneous Steel I
- 24 - Pump Station Miscellaneous Steel II

- 25 - Pump Station Miscellaneous Steel III
- 26 - Pump Station Security Fence Layout
- 27 - Gated Inlet Structure Site Plan & Elevation
- 28 - Gated Inlet Structure Sections & Elevations
- 29 - Gated Inlet Structure Steel Sections & Details
- 30 - Stoplog Structures, Stoplog Structure A
- 31 - Stoplog Structures, Stoplog Structures B, C, & HM
- 32 - Precast Gatewell Plan & Section
- 33 - Precast Gatewell Structure Details
- 34 - Pump Station Mechanical
- 35 - Electrical One-Line Diagram, Pump Station
- 36 - Power and Float Plans
- 37 - Pump Station Lighting and Receptacle Plan
- 38 - Pump Station Control Plan
- 39 - Site Plan
- 40 - Well Plan and Boring Data
- 41 - Well Details and Miscellaneous Details
- 42 - Revetment Plan
- 43 - Typical Section
- 44 - Electrical Site Plan
- 45 - Electrical One-Line Diagram and Scope of Work
- 46 - Electrical Details

**OPERATION AND MAINTENANCE MANUAL  
SPRING LAKE HABITAT REHABILITATION AND ENHANCEMENT  
UPPER MISSISSIPPI RIVER  
ENVIRONMENTAL MANAGEMENT PROGRAM  
POOL 13, RIVER MILES 532 THROUGH 536  
CARROLL COUNTY, ILLINOIS**

**1. INTRODUCTION.**

**a. Purpose and Scope.**

(1) This manual serves as a guide for the operation and maintenance of Spring Lake Habitat Rehabilitation and Enhancement project. It provides operation and maintenance instructions for the major features of this environmental management project. The instructions are consistent with the general procedures presented in the May 1993 Definite Project Report (DPR). This document is written for project and management personnel who are familiar with the project and does not contain detailed information which is common to site personnel or which is presented in other existing manuals or regulations.

(2) The intent of the operating instructions is to provide information that allows orderly and efficient use of the constructed features to meet project goals and objectives. The intent of the maintenance instructions is to present preventative maintenance information consisting of systematic inspections and subsequent corrective actions, which should ensure long-term utilization of equipment and features. A timely preventative maintenance program reduces and virtually eliminates breakdown of essential equipment and prevents major damage to constructed features by early corrective action.

(3) This manual provides the general standards of maintenance and establishes an initial frequency of maintenance inspections that should ensure satisfactory project performance.

**b. Use of Manual.**

(1) This manual is divided into the following sections: Section 1: Introduction; Section 2: Project Background; Section 3: Description of Project Features; Section 4: Inspections; Section 5: Operation and Maintenance of Project Features; Section 6: Project Rehabilitation or Abandonment; and Section 7: Performance Monitoring and Assessment.

(2) Sections 2 and 3 present project history and descriptions of actual features constructed for this project. Section 4 includes project inspection procedures, and Section 5 presents operation and maintenance instructions for each project feature.

Section 6 provided rehabilitation and abandonment instructions in case of project damage. Section 7 summarizes monitoring activities conducted through construction as well as an overview of continued monitoring actions. Performance monitoring is considered necessary to properly evaluate effects of the constructed project features.

(3) The attached drawings have been included to provide general project “as-built” plans and typical sections.

## **2. PROJECT BACKGROUND.**

**a. Location.** The Spring Lake complex encompasses approximately 3,300 acres of aquatic, wetland, and terrestrial habitat. It is located in Pool 13 on the Illinois side of the Upper Mississippi River navigation channel between river miles 532 and 536 in Carroll County, Illinois, approximately 2 miles south of the city of Savanna, Illinois.

**b. Authorization.** This project is authorized by the 1985 Supplemental Appropriations Act (Public Law 99-88) and Section 1103 of the Water Resources Development Act (WRDA) of 1986 (Public Law 99-662). The project was funded and constructed under this authorization by the U.S. Army Corps of Engineers, Rock Island District, in cooperation with the U.S. Fish and Wildlife Service (USFWS) and the Illinois Department of Natural Resources (ILDNR) formerly the Department of Conservation (DOC).

### **c. Planning, Design, and Construction Activities.**

(1) Summary. Table 2-1 provides a summary of planning, design, and construction activities.

**Table 2-1. Implementation Schedule**

<b>Project Phase</b>	<b>Purpose</b>	<b>Project Milestone</b>	<b>Date Completed</b>
<b>Pre-Project</b>	Identify and define problems and establish need of project	Fact Sheet Submitted	March 1990
		Fact Sheet Approved	September 1990
		SHPO Concurrence	March 1992
<b>Engineering and Design</b>	Quantify project objectives, perform preliminary design, satisfy NEPA and permit requirements, develop performance evaluation plan, obtain project approval for construction	Draft DPR	May 1992
		Refuge Compatibility	July 1992
		NEPA Public Review	January 1993
		Section 401 Permit	April 1993
		Final DPR	May 1993
		FONSI for EA	May 1993
		Section 404 Permit	May 1993
		DPR Approval	June 1994
		Plans and Specifications	September 1994
Memorandum of Agreement with USFWS	October 1994		
<b>Construction</b>	Finalize plans and specifications, obtain operation and maintenance agreement, advertise and award construction contracts, construct project	Main Contract Award	January 1995
		Main Contract Complete	July 1999
		Stage II Award	May 1999
		Stage II Complete	May 2000
		Stage III Award	September 2000
		Stage III Complete	June 2002

(2) Goals and Objectives. Goals and objectives were formulated during the design phase. Table 2-2 provides a summary of project goals and objectives.

<b>Table 2-2.</b>				
<b>Project Goals, Objectives, and Enhancement Potential</b>				
<b>Goal</b>	<b>Objective</b>	<b>Unit of Measure</b>	<b>Enhancement Potential</b>	
			<b>Without Alternative</b>	<b>Year 50 Target</b>
Enhance Aquatic Habitat	Improve water quality for fish	DO (mg/l)	<5.0 during critical periods	>5.0 at all times
	Maintain backwater lake	Linear feet of eroded levee	44,800	0
Enhance Wetland Habitat	Provide reliable food source in Upper Lake for migratory birds	Acres of vegetation	0	500
	Provide reliable food source in Lower Lake for migratory birds	Acres of vegetation	0	108

(3) Project Design. The project was designed by the U.S. Army Corps of Engineers, Rock Island District. The Corps funded 100% of the project. The project sponsors are the USFWS and the ILDNR. Design considerations and investigations are presented in the Definite Project Report dated May 1993.

(4) Construction Contracts.

(a) Main Contract. The construction contract, number DACW25-95-C-0020, was awarded to Illinois Constructors Corp., St. Charles, Illinois, on 25 January 1995 in the amount of \$3,316,363.00. This bid was approximately 74% of the Government Estimate. After modifications, the total Main Contract cost was \$4,152,982.74. The U.S. Army Corps of Engineers, Rock Island District, supervised the construction contract.

(b) Stage II – Hemi Marsh Well. The construction contract, number DACW25-99-C-0021, was awarded to Langman Construction, Inc., Rock Island, Illinois, on May 21, 1999 in the amount of \$162,615.00. After modifications, the total Stage II Contract cost was \$270,025.88.

(c) Stage III – Structural Modifications. The construction contract, number DACA25-00-D-0001, was awarded to Del-Jen, Inc., Rolling Hills Estates, California, on September 13, 2000 in the amount of \$43,791.41. After contract modifications, the total Stage III Contract cost was \$45,291.41.

(5) Construction Problems.

(a) Due to a higher percentage of sand than anticipated in the borrow, the perimeter levee cross-section was modified from 1V:4H to 1V:5H in some areas. The locations of these modified cross-sections are shown on the as-built drawings.

(b) The increased size of the scour hole at the setback levee necessitated the realignment of the setback levee to minimize fill requirements. Vehicular access across the setback levee alignment was needed to allow passage to the lower perimeter levee. To achieve this, a rock base was placed on the new setback levee alignment to an elevation just above the water surface and choked with coarse aggregate. The base was left in place, forming a rock core for the new setback levee.

(c) Flooding in spring of 1997 caused damage to some in-place embankment materials. Approximately 500 lineal feet of the cell B levee was washed out and the material displaced. Wave-wash also eroded the unprotected hemi-marsh levee causing considerable sloughing of the lake-side levee slope.

(d) The original stoplogs were found to be inadequate as they did not seal well, allowing water to flow between them and around them. The stoplogs were modified by eliminating the wooden end seals and bottom seals and replacing them with rubber, providing a more leak-resistant sealing surface.

(e) The contractor encountered areas of the upper perimeter levee approximately between stations 25+00 and 35+00 where borrow material had a sand content above the acceptable limit. Because of soft sediments in an old borrow ditch between the levee toe and the borrow area, the contractor also experienced great difficulty setting his equipment in this reach. For these reasons, the contractor was allowed to haul clay borrow material to this reach of the levee from a borrow source within the upper lake.

d. **Actual Project Costs.** The actual project costs are presented in Table 2-3.

Table 2-3. Actual Project Costs					
Item	Description	Quantity	U/M	U/P	Amount
<b>Stage I, Contract Number DACW25-95-C-0020</b>					
0001	Performance Bond	1	LS		\$34,000.00
0002	Temporary Field Office	1	LS		27,700.00
0003	Telephone Bills for Temporary Field Office				
0003AA	First \$1,100.00	1,100	DL	1.15	1265.00
0003AB	Over \$1,100.00	225.33	DL	1.15	259.13
0004	Mobilization and Demobilization	1	LS		300,000.00
0005	Clearing and Grubbing	1	LS		435,000.00
0006	Extend Existing Gatewell	1	LS		6,500.00
0007	Gated Inlet Structure	1	LS		226,000.00
0008	24-Inch Gatewell Structure	1	LS		66,000.00
0009	Stoplog Structures				
0009AA	Stoplog Structure A	1	LS		24,000.00
0009AB	Stoplog Structure B	1	LS		40,000.00
0009AC	Stoplog Structure C	1	LS		40,000.00
0009AD	Stoplog Structure HM	1	LS		57,000.00
0010	Pump Station	1	LS		435,000.00
0011	Levee Restoration, Embankment				
0011AA	First 100,000 Cubic Yards	100,000	CY	2.60	260,000.00
0011AB	Over 100,000 Cubic Yards	94,225	CY	2.40	226,140.00
0012	New Levee, Embankment				
0012AA	First 125,000 Cubic Yards	104,642	CY	3.45	361,014.90
0012AB	Over 125,000 Cubic Yards	0	CY	3.05	0.00
0013	Access Road, Embankment	500	CY	6.90	3450.00
0014	Channel Excavation	6,167	CY	3.00	18,501.00
0015	Stabilization Fabric	23,174	SY	1.53	35,456.22
0016	Granular Surfacing	8,228	TN	9.80	80,634.40
0017	Deleted				
0018	Stone Protection, Riprap*				

\* Riprap source: Savanna Quarry, Savanna, IL

**Table 2-3. Actual Project Costs**

<b>Item</b>	<b>Description</b>	<b>Quantity</b>	<b>U/M</b>	<b>U/P</b>	<b>Amount</b>
0018AA	First 3,500 Tons	3,500	TN	21.85	76,475.00
0018AB	Over 3,500 Tons	6,059.82	TN	21.85	132,407.07
0019	Seeding	81.85	AC	2780.00	227,543.00
0020	Willow Stakes	1	LS		19,000.00
0021	Security Gates	4	EA	1500.00	6,000.00
0022	Temporary Haul Road	1	LS		15,000.00
0023	Excavation for Inspection of Intake Pipes, Existing Pump Station	1	LS		78,000
0024	Grading and Shaping	11,893	SY	0.54	6,422.22
0025	Existing Pump Station Repairs	1	LS		15,687.40
0026	Gatewell Extensions	1	LS		1,839.42
0027	North Hemimarsh Access Road Realignment	1	LS		666.53
0028	Crossdike Realignment	1	LS		1,340.48
0029	Temporary Access Road	1	LS		3,086.62
0030	Widen/Maintain Access Road	1	LS		12,491.58
0031	Class E Revetment Stone				
0031AA	First 3000 Tons	3000	TN	22.44	67,320.00
0031AB	Over 3000 Tons	3,855.78	TN	22.44	86,523.70
0032	Granular Surfacing	1,176.85	TN	10.90	12,827.67
0033	Load, Haul, and Dump Borrow Material to Perimeter Dike	13,967	CY	5.20	72,628.40
0034	Bedding/48 Inch/Pump Station	1	LS		4,651.99
0035	Crossdike Breach	1	LS		11,324.50
0036	Setback Levee	48,358	CY	9.84	475,842.72
0037	Stoplog Structure Revisions	1	LS		27,636.85
	<b>Total</b>				<b>\$4,152,982.74</b>
<b>Stage II, Contract Number DACW25-99-C-0021</b>					
0001	Performance Bond	1	LS	10,000.00	\$10,000.00

**Table 2-3. Actual Project Costs**

Item	Description	Quantity	U/M	U/P	Amount
0002	Work Performed by Interstate Power at Contractor's Expense	1	LS	20,115.00	20,115.00
0003	Bedding Stone**				
0003AA	First 145 Tons	145	TN	25.00	3,625.00
0003AB	Over 145 Tons	15	TN	25.00	375.00
0004	Riprap**				
0004AA	First 350 Tons	350	TN	25.00	8,750.00
0004AB	Over 350 Tons	60	TN	25.00	1,500.00
0005	All Other Work - Well	1	LS	115,000.00	115,000.00
0006	Offshore Riprap	3190	TN	32.37	103,260.30
0007	Grading & Seeding	2	AC	1,500.00	3,000.00
0008	Extra Well Depth	1	LS	4,400.58	4,400.58
	<b>Total</b>				<b>\$270,025.88</b>
<b>Stage III, Contract Number DACA25-00-D-0001</b>					
0001	Dredge Inlet	1	LS	15,261.25	\$15,261.25
0002	Sandbag/Weld Lift Gate	1	LS	17,178.10	17,178.10
0003	Modify Stem Covers	1	LS	3,951.67	3,951.67
0004	Install Grating/Rails	1	LS	3,993.20	3,993.20
0005	Install Locking Covers	1	LS	1,443.60	1,443.60
0006	Install Staff Gages	1	LS	2,267.48	2,267.48
0007	Extend Stoplog	1	LS	1,196.11	1,196.11
	<b>Total</b>				<b>\$45,291.41</b>
<b>Summary of Project Costs</b>					
	<b>Description</b>				<b>Amount</b>
	Real Estate				\$1,564.16
	Definite Project Report				674,480.25
	Plans and Specifications				317,522.72
	Engineering and Design				313,631.23
	Stage I Construction Contract				4,152,982.74
	Stage II Construction Contract				270,025.88
	Stage III Construction Contract				45,291.41
	Construction Management				870,276.78
	<b>Total Project Costs</b>				<b>\$6,645,775.17</b>

\*\* Riprap source: Wendling Quarries, Mt. Carroll Quarry.

e. **Project References.** Table 2-4 summarizes related project references.

<b>Table 2-4. Project References</b>		
<b>Title</b>	<b>Purpose</b>	<b>Date</b>
Upper Mississippi River System Environmental Management Program, Definite Project Report (R-12F) with Integrated Environmental Assessment, Spring Lake Rehabilitation and Enhancement, U.S. Army Corps of Engineers, Rock Island District	Provides planning, engineering and sufficient construction details of the selected plan for project approval purposes	May 1993
Construction As-Builts, Stage I	Provides as-built construction drawings	August 1996
Construction As-Builts, Stage II	Provides as-built construction drawings	March 2001
Construction As-Builts, Stage III	Provides as-built construction drawings	August 2002
Manufacturer's Data (Shop Drawings)	Provides detailed operation and maintenance instructions for specific pieces of equipment as recommended by the manufacturer	October 1999
Year 5 Performance Evaluation Report	Provides summary of project performance based on project post-construction monitoring	November 2002

### 3. DESCRIPTION OF PROJECT FEATURES.

a. **Project Data.** Table 3-1 presents a summary of project data.

Table 3-1. Project Data Summary		
Item	Quantity	U/M
Upper Lake Perimeter Levee		
Length	2.6	miles
Crown Width	12	feet
Sideslopes	4:1	horizontal:vertical
Elevation	595 - 594.5	feet MSL
Embankment Volume	41,000	cubic yards
Upper Lake Interior Levees		
Length	7,700	feet
Crown Width	10-12	feet
Sideslopes	4:1	horizontal:vertical
Elevation	587	feet MSL
Embankment Volume	7,600	cubic yards
Cross Dike		
Length	1.4	miles
Crown Width	12	feet
Sideslopes	4:1	horizontal:vertical
Elevation	590	feet MSL
Embankment Volume	6,000	cubic yards
Cross Dike Overflow Sections		
Length (total)	400	feet
Crown Width	12	feet
Sideslopes	4:1	horizontal:vertical
Elevation	588.75	feet MSL
Riprap (IL RR5)	1,000	tons
Lower Lake Perimeter Levee		
Length	4.5	miles
Crown Width	12	feet
Sideslopes	4:1	horizontal:vertical
Elevation	594.5 - 593	feet MSL
Embankment Volume	105,500	cubic yards
Riprap (IL RR5)	3,000	tons
Pump Station		
Submersible Pumps (2)	5,200	nominal gpm
Station Invert	575	feet MSL
Trash Racks	2	Upper & lower end
Sluice Gate (1)	3 by 3	feet
Discharge Pipe	48	Inches
Power		
Electric Transformer	3	Phase
Buried Primary Feeder Length	37.5 (3-phase)	kVA
Riprap (IL RR5)	3,000	Feet
Controller Platform	280	Tons
Platform Elevation	1	Each
Platform Elevation	599	feet MSL
Stoplog Structures		
Weir Length Per Structure	5	Feet
Concrete Sill Elevation		

**Table 3-1. Project Data Summary**

Item	Quantity	U/M
Cell A	582	feet MSL
Cell B	579	feet MSL
Cell C	579	feet MSL
Hemi-Marsh	581	feet MSL
Water Control Structure		
Slide Gates (2)	5 by 5	feet
Invert Elevation	578	feet MSL
Trash Racks	1	Each
Riprap (IL RR5)	300	Tons
Gatewell Structure		
Slide Gate (1)	2 by 2	Feet
Invert Elevation	580	feet MSL
Riprap (IL RR5)	225	Tons
Hemi-Marsh Levee		
Length	7,600	Feet
Crown Width	10	Feet
Sideslopes	4:1	Horizontal:Vertical
Level of Protection	2	Year event
Elevation	586	feet MSL
Embankment Volume	10,000	Cubic yards
Crushed Stone	1,800	Tons
Riprap (IL RR5)	3,200	Tons
Well Station		
Well Depth	133	Feet
Casing Diameter	12	Inches
Well Screen		
Length	20	Feet
Diameter	12	Inches
Submersible Pump		
Capacity	1,170	Gpm
Depth	125	Feet
Discharge Pipe		
Diameter	8	Inches
Length	120	Feet
Riprap-Lined Discharge Channel		
Length	220	Feet
Width	20	Feet
Riprap Thickness (IL RR4)	16	Inches
Bedding thickness (IL RR1)	6	Inches
Power		
Electric (3-phase)	480	Volts
Transformer	22.5 (3-phase)	kVA
Overhead primary feeder length	2,000	Feet
Platform	1	Each
Service road		
Length	2,000	Feet
Width w/shoulder	12	Feet
Crushed stone (IL CA-6)	480	Tons

**b. General Description.** The Spring Lake project consists of aquatic habitat enhancement by levee restoration and water control structures. Wetland habitat is enhanced by creating a 3-cell, managed moist soil unit in the Upper Lake and a hemi-marsh in the Lower Lake. Water for the Upper Lake is provided by pumping from the Lower Lake. Water for the hemi-marsh is provided by a well located near the low-level hemi-marsh levee. Water level control for the hemi-marsh and the three cells in the Upper Lake is provided by containment dikes and stoplog structures.

**c. Perimeter Levee.** The existing perimeter levee was raised and strengthened by excavating adjacent soil for levee embankments. The levee top was restored to the 50-year design elevation with a 12-foot top width to ensure adequate levee stability. The perimeter levee provides no level of protection from floodwaters, as the levee is open to the river at the lower end.

**d. Cross Dike.** The existing cross dike was raised and strengthened by excavating adjacent soil for levee embankments. The levee top was raised to the 10-year flood elevation of 590.0 to increase protection against floodwater damage in the Upper Lake. The 590.0 elevation was chosen based on the depth of water to be impounded in the Upper Lake plus freeboard and the availability of adjacent borrow material. Two overflow sections depressed to elevation 588.75 will minimize overtopping damage to the cross dike. Granular surfacing is provided the entire length of the cross-dike to allow vehicular access to the pump station and the perimeter levee.

**e. Pump Station.** A new pump station is installed in the cross dike to fill and evacuate the Upper Lake. The pumps, manufactured by Flygt<sup>®</sup> Corp., are sized to fill the Upper Lake in approximately 30 days and evacuate it in 25 days. The pump station has two identical pumps that pump in opposite directions. This provides the capability to dewater the Upper Lake during drawdown times and to pump water from the Lower Lake into the Upper Lake during desired inundation periods. An electrical lock-out prevents the pumps from being operated simultaneously. The rated capacity of these pumps is 5200 gallons per minute at 8.5 feet of total dynamic head (TDH). The pump station is turned on manually and will operate automatically until turned off. An underground electric cable in the cross dike supplies 480-volt, three-phase power. The pump station is furnished with a trash rack on both the Upper Lake side and the Lower Lake side due to the dual pumping capacity. A mechanically excavated inlet channel on the Lower Lake side reduces sediment flow into the pump station forebay. In addition, a radius directly in front of the pump station inlet is over-excavated to inhibit vegetative growth in this area. The pump station includes a 3-foot by 3-foot sluice gate to allow for gravity flows. An electric motor operates the gate. The gate may be used any time the desired flow will occur by gravity, saving wear on the pumps and reducing operating costs. Both pumps and the gate are located within a durable concrete building. A 7-foot chain-link perimeter fence with barbed-wire crown surrounds the building to discourage vandalism.

**f. Interior Levees.** The three cells of the Upper Lake are separated by low-level interior levees, approximately 5 feet high. The levees separating Cells B and C are also used to provide a water feeder channel to Cell A. The Cell A and Cell B levees have a 10-foot top width, as no vehicle access is required. The Cell C levee has a 12-foot top width and a 10-foot wide granular roadway to allow vehicle access to the Cell A stoplog structure.

**g. Stoplog Structures.** Four reinforced concrete stoplog structures are utilized throughout the project to control water levels. All structures are the same type, consisting of a concrete sill, concrete abutments, and cast iron stoplog channels. The structures are used to control water levels in Cells A, B, and C, and the hemi-marsh. Heavy duty, removable AASHTO H-20 grating is provided to allow vehicular access across the structures.

**h. Gated Inlet Structure.** A reinforced concrete gated inlet structure allows river water to enter the Lower Lake to increase dissolved oxygen concentrations during periods of low flow. The structure consists of two 5-foot by 5-foot gated box culverts capable of passing 175 cubic feet per second, at typical low-flow river elevations. A 7-foot chain-link perimeter fence with barbed-wire crown surrounds the entire structure to discourage vandalism and unauthorized operation.

The 60-inch by 60-inch vertical sluice gates are raised and lowered by pedestal lifts located on top of the structure. Each lift is equipped with an indicator to show the position of the gates. These lifts may be operated by a hand crank or a portable engine operator. The portable engine operator is a hand-held gasoline engine-driven device for operating the pedestal lift. Each gatewell is furnished with an integral ladder and covered with removable grating to allow access to the gates and gate stems. The grating is equipped with a locking mechanism to prevent unauthorized entry to the gatewells.

**i. Gatewell Structure.** A 24-inch reinforced concrete gatewell structure provides extra management capability to provide oxygenated water to the southwest region of the Lower Lake. The structure was sized to be small enough to operate easily and large enough to not pose a habitual maintenance problem. The structure has a single 24-inch diameter vertical sluice gate operated by a pedestal lift located on top of the structure. This lift may be operated by a hand crank or a portable engine operator, and incorporates an indicator to show gate position. Access to the gate and gate stem is provided through a manhole on top of the structure. A lockable manhole cover prevents unauthorized entry.

**j. Hemi-Marsh.** This feature consists of an approximate 130-acre hemi-marsh located on the southeastern fringe of the Lower Lake. A low-level perimeter levee separates the hemi-marsh from the rest of the Lower Lake. The levee top elevation of 586.0 was chosen based on the need to pond 2 feet of water in the hemi-marsh. Water levels are controlled with a concrete stoplog structure at the southern end of the hemi-marsh and

an 1170-gallon-per-minute well. An offshore rock mound protects the hemi-marsh levee from erosion due to wind-induced waves in the Lower Lake.

**k. Well.** A well was installed in the northeast corner of the hemi-marsh. The well has a 10-inch, 15-horsepower, 460-volt pump delivering 1170 gallons per minute at 23 feet TDH. The well is approximately 130 feet deep and allows water levels within the marsh to be raised as needed. A vented well cover encloses the top of the well casing. A painted steel protective pipe with a lockable cap serves as a vandal-resistant cover over all exposed portions of the well. A riprap-lined ditch (IL gradation RR4, bedding stone IL gradation RR1) directs the well water into the hemi-marsh while preventing erosion of the surrounding ground.

#### **4. INSPECTIONS.**

##### **a. General.**

(1) An active maintenance program is based on inspections and subsequent servicing, adjustment, or repair. The two main objectives of inspections are to: (a) ensure project serviceability by timely and thorough inspections, thereby avoiding or reducing maintenance costs, and (b) document the condition of the project as a baseline for consideration of rehabilitation for project damage resulting from a major storm or flood event.

(2) The two types of inspections for the project are: (a) project inspection by the site manager, and (b) joint inspection by the site manager and personnel from the U.S. Army Corps of Engineers, Rock Island District.

##### **b. Project Inspection by Site Manager.**

(1) The project inspection should be performed by the site manager or appropriate representative for the purpose of noting routine deficiencies and initiating corrective actions. This inspection will be performed at periods not exceeding 12 months and will follow inspection guidance presented in subsequent sections of this manual. It is suggested that the inspection be conducted every May, which is representative of the conditions after spring flooding. Other project inspections should occur as necessary, after high water events or as scheduled by the site manager.

(2) A project inspection checklist has been developed as presented in Appendix B. The site manager shall furnish a copy of the completed checklist to the U.S. Army Corps of Engineers, Rock Island District, ATTN: EMP Project Manager, CEMVR-PM-M, Clock Tower Building, P.O. Box 2004, Rock Island, Illinois 61204-2004, immediately following each project inspection.

**c. Joint Inspection by Site Manager and U.S. Army Corps of Engineers.**

(1) Routine. A joint inspection by the site manager and the Corps of Engineers shall be performed annually. The purpose of this inspection is to assure that adequate maintenance is being performed as presented in the Definite Project Report and this manual. The District Engineer or Authorized Representative should have access to all portions of the constructed project upon coordination with the site manager for this purpose.

(2) Catastrophic. A joint inspection by the site manager and the Corps of Engineers should be formally requested by the site manager immediately following a specific storm or flood event which causes damage exceeding the annual operation and maintenance as specified in this manual and the Definite Project Report. The project inspections by the site manager and joint inspections results will be the basis for determining maintenance responsibility and potential rehabilitation by the Corps of Engineers.

**5. OPERATION AND MAINTENANCE OF PROJECT FEATURES.**

This section presents operation and maintenance instructions for the major project features. Steps will be taken by the site manager to correct conditions disclosed by project inspections or joint inspections. Regular maintenance repair measures will be accomplished during the appropriate season as scheduled by the site manager to ensure structure serviceability. Appropriate advance measures will be taken to ensure the availability of adequate labor and materials to meet contingencies.

Project features should be continuously maintained and operated to obtain maximum benefits. No encroachment or trespass, which will adversely affect the efficient operation or maintenance of the project, should be permitted upon the constructed features. No improvement should be passed over, under, or through the constructed features, nor should any excavation or construction be permitted within these features without prior approval by the Corps of Engineers, Rock Island District. Such improvements or alterations that are desirable and permissible should be constructed in accordance with standard engineering practice. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods of construction acceptable under standard engineering practice should be obtained from the District Engineer or, if otherwise obtained, should be submitted for approval. Drawings or prints showing improvements or alterations as finally constructed should be furnished to the District Engineer after completion of such work.

The capability of the USFWS to carry out the maintenance responsibilities described below will be contingent upon the passage of sufficient appropriations for that purpose by Congress.

**a. Perimeter Levee, Interior Levees, and Cross Dike.**

(1) Operation.

(a) During operational inundation period, the levees should be inspected to be certain that:

(i) There are no indications of slides or sloughs developing;

(ii) Wave wash or scouring action is not occurring;

(iii) No low reaches of levee below design grade exist which may be overtopped; and

(iv) No other conditions exist which might endanger the levee.

(b) Appropriate advance measures should be taken to ensure availability of adequate labor and materials to meet contingencies. Steps should be taken to control any condition that endangers the levee and to repair the damaged section.

(c) **Emergency Fill Procedure.** During a high-water event, measures may need to be taken to minimize damage to the cross dike from overtopping. The cross dike is provided with armored overflow sections that were designed to allow the Upper Lake to fill before the cross dike is overtopped. However, a quick-rising flood may still overtop the cross dike before the Upper Lake has time to equalize with the Lower Lake. Hydraulic analysis shows that opening the pump station gate and the gatewell in Cell A at the onset of a high-water event will greatly reduce the risk of damage to the cross dike. Assuming a floodwater rise of 1 foot per day, with both gates open, the head differential (difference in water levels between Upper and Lower Lakes) when the cross dike overtops will be 0.8 to 2.0 feet, depending on the initial water level in the Upper Lake. This analysis assumes that the gates are opened when the Lower Lake reaches elevation 587.0, and that all stoplogs are removed. Therefore, when the water elevation in the Lower Lake reaches 587.0, and is expected to continue rising, stoplogs should be removed from structures A, B, and C and the pump station gate and gatewell structure should be opened fully.

**NOTE:** This paragraph is based on project as designed, and does not take into account any of the changes made to the Cross Dike in 2002 by Refuge personnel.

(2) Maintenance.

(a) The site manager should provide at all times such maintenance as may be necessary to ensure the serviceability of the levee in time of inundation. Measures should be taken to promote the growth of sod, control burrowing animals, remove wild growth and drift deposits, and repair damage caused by erosion or other forces. Routine burning or mowing shall be performed at least once per year on the levee extending 5 feet horizontally from the toe of the levee.

(b) Project inspections should be made by the site manager to ensure that the above maintenance measures are being effectively carried out and to be certain that:

(i) no unusual settlement, sloughing or material loss of grade or levee cross section has taken place;

(ii) no caving has occurred on either the landside or the riverside of the levee which might affect the stability of the levee section;

(iii) no seepage, saturated areas, or sand boils are occurring;

(iv) no action is being taken, such as burning grass and weeds during inappropriate seasons, which will retard or destroy the growth of sods;

(v) the crown of the levee is shaped to drain readily;

(vi) there is no unauthorized grazing or vehicular traffic on the levee; and

(vii) encroachments are not being made on the levee which might endanger the structure or hinder its proper and efficient functioning during times of inundation.

(c) Such inspections should be made prior to the beginning of an inundation period, immediately following major high water periods, and otherwise at intervals necessary to insure the best care of the levee or one time per year as stated in section 6. Steps should be taken to correct conditions disclosed by such inspections. Regular maintenance repair measures should be accomplished during the appropriate season as scheduled by the site manager.

**b. Stoplog Structures.**

(1) Operation.

(a) A stoplog lifting hook is furnished with the project for the installation and removal of the stoplogs. This tool should be stored in a secure place to allow ready use when needed.

(b) Add or remove stoplogs as required to maintain desired water levels in impoundment areas (i.e., Cells A, B, & C, and hemi-marsh). Prior to high water events, stoplogs should be removed to allow water levels in all impoundment areas to equalize with the river stage. This will reduce the risk of levee damage in the event of overtopping.

(2) Maintenance.

(a) The water control structures should be inspected immediately following draining and after a high water event to determine whether seepage is taking place along the lines of its contact with the embankment. Corrective action should be taken upon discovery of any adverse conditions at the structure.

(b) Project inspections of the control structures should be made by the Site Manager to be certain that:

(i) stoplogs, headwalls, staff gages, stoplog keepers, steel rails posts, grating, and riprap are in good operating condition;

(ii) inlet and outlet channels are open;

(iii) sediment buildup is not occurring;

(iv) care is being exercised to prevent the accumulation of trash and debris near the structure; and

(v) erosion is not occurring adjacent to the structure which might endanger its function.

(c) Steps should be taken to repair damage, replace missing or broken parts, or remedy adverse conditions disclosed by such inspections.

**c. Pump Station.**

(1) Operation.

(a) To fill or drain the Upper Lake, the respective pump must be activated manually using the appropriate 'MAN-OFF-AUTO' switch, located on the control panel. If river levels are such that the desired action (filling or draining) will occur by gravity flow, the pump station gate should be opened and the pumps switched to the 'OFF' position. The pumps should not be on when the gate is open, as this will impede the desired action.

(b) During desired drawdown periods, the gate should be closed and pump #2 switched to the 'AUTO' position. The pump station will start evacuating the Upper Lake and will continue pumping until the water level drops to elevation 579.0, at which time the pump will automatically stop. With the #2 pump control remaining in the 'AUTO' position, the pump station will automatically turn on at water elevation 579.5 and turn off at water elevation 579.0.

(c) When it is desired to pump water into the Upper Lake, the gate should be closed and pump #1 switched to the 'AUTO' position. The pump station will start filling the Upper Lake and will continue pumping until the water level reaches elevation 585.0, at which time the pump will automatically stop. With the #1 pump control remaining in the 'AUTO' position, the pump station will automatically turn on at water elevation 584.5 and turn off at water elevation 585.0.

(d) When water levels in the Lower Lake reach elevation 587.0 and are expected to continue rising, the pump station gate should be opened to allow water levels in the Upper and Lower Lake to equalize. This will greatly reduce the risk of damage to the cross dike in the event of overtopping.

(e) The pumps are equipped with a 30-second lock-out feature. If a pump is stopped for any reason, there will be a delay timer, which disables the pump from being restarted for 30 seconds.

(2) Maintenance.

(a) The pump station should be inspected immediately following a high-water event to determine whether any damage occurred to the structure or the surrounding embankment. Corrective action should be taken upon discovery of any adverse conditions.

(b) Project inspections of the pump station should be made by the Site Manager. Inspections should include the following:

(i) Building. Visually inspect all surfaces to discover cracks, spalling of concrete, faulty joints, or leaks. Check for damage to railings, safety chains, ladders, doors, vents, latches and all other hardware.

(ii) Gate. When conditions permit, operate the gate through its operational range of travel to determine whether it functions as required. Examine exposed parts of the gate - including rivets, bolts and welds - for corrosion, cracking, and deterioration of coating, or other damage.

(iii) Pumps.

(a) Pumps should be observed for indications of improper operation or damage. Avoid operation of pumps during sump cavitation or ice conditions. The pumps will automatically shut down through the pump control unit located in the electrical panel on high stator winding temperature, stator casing leakage, high bearing temperature, phase loss, phase reversal, phase imbalance, undervoltage, or ground fault. Warning lights for system shutdown should be checked before restarting the respective pump. Periodically check the sump for proper water depth, especially prior to extended operation. Mud in the sump may be a cause for cavitation during operation.

(b) The Site Manager should have a Flygt<sup>®</sup> authorized representative conduct pump inspections and maintenance and repair work in accordance with the manufacturer's specifications, and operations and maintenance manuals (such as that for the electric pump). Ancillary equipment such as cables, level sensors, starter and monitoring equipment should also be periodically inspected. Damaged components should be repaired or replaced by a qualified mechanic or electrician.

(iv) Control Panel. Examine closely for overall condition. Tighten, repair, and clean as needed. Discourage rodents, birds, hornets, etc. from building nests in and around the control panel. Check tightness of electrical connections.

(v) Trash Racks. Check for trash accumulation at racks and remove as necessary. Should operating conditions or observations indicate trouble is developing and operating conditions will permit, inspect racks to indicate general condition. Underwater inspection may be more practical than removal of racks. The racks should be repaired as necessary to maintain a satisfactory condition.

(c) Steps should be taken to repair damage, replace missing or broken parts, or remedy adverse conditions disclosed by such inspections.

#### **d. Gated Inlet Structure and Gatewell Structure**

(1) Operation. To allow river water to enter the Lower Lake, the sluice gates must be opened manually. Each inlet is provided with a hand crank and a gate-position indicator. Additionally, the Gated Inlet Structure is provided with a portable engine operator. As river flows increase, the gates should be closed to prevent sediment-laden water from entering the Lower Lake.

(2) Maintenance.

(a) The structures should be inspected immediately following a high-water event to determine whether seepage is taking place along the lines of its contact with the embankment. Corrective action should be taken upon discovery of any adverse conditions at the structure.

(b) Project inspections of the structures should be made by the Site Manager to be certain that:

(i) hand cranks, headwalls, trash racks, staff gages, stoplog keepers, handrails, posts, grating, and riprap bank protection are in good operating condition;

(ii) inlet and outlet channels are open;

(iii) sediment buildup is not occurring;

(iv) care is being exercised to prevent the accumulation of trash and debris near the structure; and

(v) erosion is not occurring adjacent to the structure which might endanger its function.

(c) Steps should be taken to repair damage, replace missing or broken parts, or remedy adverse conditions disclosed by such inspections.

#### **e. Well.**

(1) Operation. To inundate the hemi-marsh, the pump must be activated manually. The pump also must be deactivated manually once the desired interior water elevation is achieved. Pumping to maintain interior elevations during hemi-marsh operation also will be by manual activation/deactivation. Water levels should be monitored periodically to assure adequate water levels are maintained.

The manual activation/deactivation of the pump is accomplished using the disconnect switch located on pole P4, adjacent to the electric meter. If the pump

fails to engage with the disconnect switch in the "ON" position, it is possible that a fault has caused the Motor Minder control to disengage the motor circuit. In this case, the Motor Minder, located on the control box on pole P5, must be reset in order for the pump to operate.

(2) Maintenance. Well inspections shall be performed by the site manager. Steps should be taken to correct conditions disclosed by such inspections. In general, the well inspection should include the following:

(a) Well. Visually inspect the protective casing, bollards, and the discharge apron to discover any adverse conditions. Conditions that may affect the operation of the hemi-marsh should be corrected as soon as practicable.

(b) Controls. All electrical controls and associated wiring should be examined closely and their overall condition assessed. Watertight connections should be inspected for integrity. Any corroded, loose, or broken contacts should be cleaned, tightened, and repaired as needed.

(c) Pump.

(i) The pump should periodically be observed for indications of improper operation or damage. The pump will automatically shut down through the control and status unit located in the electrical panel on high stator winding temperature, stator casing leakage, or high lower bearing temperature.

(ii) The site manager should have an authorized representative conduct pump inspections and maintenance and repair work in accordance with Pump Manufacturers Installation, Care, and Maintenance Manual. Ancillary equipment such as cables, level sensors, starter and monitoring equipment should also be periodically inspected. Damaged components should be repaired or replaced by a qualified technician.

## 6. PROJECT REHABILITATION OR ABANDONMENT.

**a. General.** As stated in the Operation, Maintenance, and Rehabilitation Agreement between the USFWS and the Corps, the Corps will be responsible for any mutually agreed upon repair and rehabilitation that exceeds the annual operation and maintenance requirements identified in the Definite Project Report and that is needed as a result of a specific storm or flood. The project will be inspected as previously described, following flood events or specific storms.

**b. Post-Construction.** Should inspection of the project area following a major flood or natural disaster disclose substantial damage to any of the major components of the project that appears to exceed the annual operation and maintenance as specified in this manual and the Definite Project Report, the Corps and the USFWS should meet and

discuss the appropriate course of action in light of the original project design. The inspections by the site manager (as summarized in the submitted checklist) and the joint inspections with the Corps will be the basis for determining maintenance responsibility by the U.S. Fish and Wildlife Service versus potential rehabilitation by the Corps. Repair of damage attributable to lack of maintenance is a U.S. Fish and Wildlife Service Responsibility. The options of rehabilitation or abandonment of the project may be considered at this time. Any decision would be carried forth only upon written mutual agreement of the USFWS and the Corps. Included within such agreement would be a description of the agreed upon course of action and funding responsibilities, if any.

## **7. PERFORMANCE MONITORING AND ASSESSMENT.**

The purpose of this section is to summarize monitoring and data collection aspects of the project. Table 7-1 presents the principal types, purposes, and responsibility of monitoring and data collection. Table 7-2 summarizes inspection, monitoring, and data parameters grouped by project phase, responsible agency, and data collection intervals. Changes to the monitoring plan should be coordinated with the USFWS, the ILDNR, and the U.S. Army Corps of Engineers. Table 7-3 presents the post-construction quantitative measurements to be performed by the Corps of Engineers. The monitoring parameters were developed to measure the effectiveness of the stated goals. The Site Manager should follow Table 7-2, as shown, to make annual field observations. These observations are summarized in checklist form in Appendix B. The annual field observations and the quantitative monitoring parameters will form the basis of project evaluation.

**Table 7-1.  
Monitoring and Performance Evaluation Plan**

<b>Type of Activity</b>	<b>Purpose</b>	<b>Responsibility</b>
Sedimentation Problem Analysis	Definition of system-wide problem definition and evaluation of planning assumptions	USFWS
Pre-Project Monitoring	Establishment of need for proposed project features	USFWS
Baseline Monitoring	Establishment of baseline for performance evaluation	Corps of Engineers
Data Collection for Design	Include quantification of project objectives, design of project, and development of performance evaluation plan	Corps of Engineers
Construction Monitoring	Assessment of construction impacts and assurance that permit conditions are met	Corps of Engineers
Performance Evaluation Monitoring	Continuing monitoring and determination of project success relative to goals and objectives	Corps of Engineers (quantitative) USFWS (field observations)
Biological Response Monitoring	Evaluation of predictions and assumptions made during WHAG analysis and incorporation of studies beyond scope of performance evaluation	Corps of Engineers

**Table 7-2. Resource Monitoring and Data Collection Summary**

Type of Measurement	Water Quality Data						Engineering Data			Natural Resource Data			Sampling Agency	
	Pre-Project Phase		Design Phase		Post-Const. Phase		Pre-Project Phase	Design Phase	Post-Const. Phase	Pre-Project Phase	Design Phase	Post-Const. Phase		
	APR-SEPT	OCT-MAR	APR-SEPT	OCT-MAR	APR-SEPT	OCT-MAR								
POINT MEASUREMENTS														
<i>Water Quality Stations</i>														USACE
Turbidity	--	--	2W	M	2W	M								
Secchi Disk Transparency	2W	--	2W	--	2W	M								
Suspended Solids	2W	--	2W	M	2W	M								
Dissolved Oxygen	2W	--	2W	M	2W	M								
Specific Conductance	2W	--	2W	M	2W	M								
Water Temperature	2W	--	2W	M	2W	M								
Ph	2W	--	2W	M	2W	M								
Total Alkalinity	--	--	2W	M	2W	M								
Chlorophyll	2W	--	2W	M	2W	M								
Velocity	--	--	2W	M	2W	M								
Water Depth	2W	--	2W	M	2W	M								
Water Elevation	2W	--	2W	M	2W	M								
Percent Ice Cover	--	--	--	M	--	M								
Ice Depth	--	--	--	M	--	M								
Percent Snow Cover	--	--	--	M	--	M								
Snow Depth	--	--	--	M	--	M								
Wind Direction	--	--	2W	M	2W	M								
Wind Velocity	--	--	2W	M	2W	M								
Wave Height	--	--	2W	M	2W	M								
Air Temperature	2W	--	2W	M	2W	M								
Percent Cloud Cover	--	--	2W	M	2W	M								USACE
<i>Elutriate Test Stations</i>			1											USACE
<i>Column Settling Stations</i>										1				
Column Settling Analysis														
<i>Boring Stations</i>										1				
Geotechnical Borings														

**Table 7-2. Resource Monitoring and Data Collection Summary (continued)**

Type of Measurement	Water Quality Data						Engineering Data				Natural Resource Data			Sampling Agency
	Pre-Project Phase		Design Phase		Post-Const. Phase		Pre-Project Phase	Design Phase	Post-Const. Phase	Pre-Project Phase	Design Phase	Post-Const. Phase		
	APR-SEPT	OCT-MAR	APR-SEPT	OCT-MAR	APR-SEPT	OCT-MAR								
<i>Fish Stations</i>										1	1	1	ILDNR	
Electrofishing														
TRANSECT MEASUREMENTS														
<i>Sedimentation Transects</i>														
Hydrographic Soundings							1		5Y				USACE	
Vegetation Monitoring												5Y	USACE	
Vegetation Survey														
Levee System							1		5Y					
Cross-sections at even 500-foot intervals and profile of cross dike and perimeter levee														
AREA MEASUREMENTS														
Mapping														
Land Cover / Land Use Map										1		5Y	USACE	
<b>Legend</b>	W = weekly M = monthly Y = yearly nY = n-year interval nW = n-week interval 1, 2, 3, ... = number of times data is collected within designated project phase													
<b>Note:</b> Construction completed July 1999 and is the start date for performance monitoring.														

**Table 7-3.  
Post-Construction Evaluation Plan**

Goal	Objective	Unit of Measure	Enhancement Feature	Field Observation	Monitoring Plan	Monitoring Intervals
Enhance Aquatic Habitat	Improve water quality for fish	DO (mg/l)	Inlet structure/excavated channel	Description of fishing conditions	Water quality testing	April-September: every 2 weeks, October-March: every month
	Maintain backwater lake	Linear feet of eroded levee	Perimeter levee and cross dike	Description of erosion effects	Levee system transects and profiles	every 5 years
Enhance Wetland Habitat	Provide reliable food source in Upper Lake for migratory birds	Acres of vegetation	Upper Lake water control	Estimation of acres of emerged and submerged vegetation	Vegetation transects	every 5 years
	Provide reliable food source in Lower Lake for migratory birds	Acres of vegetation	Hemi-marsh	Estimation of acres of emerged and submerged vegetation	Vegetation transects	every 5 years

**Appendix A**

**Memorandum of Agreement**

**MEMORANDUM OF AGREEMENT  
BETWEEN  
THE DEPARTMENT OF THE ARMY  
AND  
THE UNITED STATES FISH AND WILDLIFE SERVICE  
FOR  
ENHANCING FISH AND WILDLIFE RESOURCES  
OF THE  
UPPER MISSISSIPPI RIVER SYSTEM  
AT SPRING LAKE**

**I. PURPOSE**

The purpose of this Memorandum of Agreement (MOA) is to establish the relationships, arrangements, and general procedures under which the U.S. Fish and Wildlife Service (USFWS) and the Department of the Army (DA) will operate in constructing, operating, maintaining, and rehabilitating the Spring Lake, Illinois, separable element of the Upper Mississippi River System - Environmental Management Program (UMRS-EMP).

**II. BACKGROUND**

Section 1103 of the Water Resources Development Act of 1986, Public Law 99-662, authorizes construction of measures for the purpose of enhancing fish and wildlife resources in the Upper Mississippi River System. The project area is managed by the USFWS and is on lands managed as a national wildlife refuge. Under conditions of Section 906(e) of the Water Resources Development Act of 1986, Public Law 99-662, 100 percent of the construction costs of those fish and wildlife features at Spring Lake, Illinois, are the responsibility of (DA), and pursuant to Section 107(b) of the Water Resources Development Act of 1992, Public Law 102-580, 100 percent of operation and maintenance for Spring Lake, Illinois, project area are the responsibility of USFWS.

**III. GENERAL SCOPE**

The project to be accomplished pursuant to this MOA shall consist of providing 3 independent water-controlled cells in the Upper Lake; constructing a gated inlet water control structure and a gatewell structure in the Lower Lake; establishing 108 acres of hemi-marsh in the Lower Lake; and restoring 7.1 miles of the existing perimeter levee and 1.4 miles of the cross dike.

#### IV. RESPONSIBILITIES

##### A. The DA is responsible for:

1. **Construction:** Rehabilitation of the existing perimeter levee and cross dike; construction of interior levees, four (4) stoplog structures, one (1) pump station, one (1) water control structure, one (1) gatewell structure and one (1) well station.

2. **Major Rehabilitation:** The Federal share of any mutually agreed upon rehabilitation of the project that exceeds the annual operation and maintenance requirements identified in the Definite Project Report and that is needed as a result of specific storm or flood events.

3. **Construction Management:** Subject to and using funds appropriated by the Congress of the United States, and in accordance with Section 906(e) of the Water Resources Development Act of 1986, Public Law 99-662, the DA will construct the Spring Lake, Illinois, Fish and Wildlife Enhancement project as described in the Definite Project Report with Integrated Environmental Assessment, Spring Lake Rehabilitation and Enhancement, dated May 1993, applying those procedures usually followed or applied in Federal projects, pursuant to Federal laws, regulations, and policies. The USFWS will be afforded the opportunity to review and comment on all modifications and change orders prior to the issuance to the contractor of the Notice to Proceed. If the DA encounters potential delays related to construction of the project the DA will promptly notify the USFWS of such delays.

4. **Maintenance of Records:** The DA will keep books, records, documents, and other evidence pertaining to costs and expenses incurred in connection with construction of the project to the extent and in such detail as will properly reflect total costs. The DA shall maintain such books, records, documents, and other evidence for a minimum of 3 years after completion of construction of the project and resolution of all relevant claims arising therefrom, and shall make available at its evidence for inspection and audit by authorized representatives of the USFWS.

**B: The USFWS is responsible for Operation, Maintenance, and Repair:** Upon completion of construction as determined by the District Engineer, Rock Island, the USFWS shall accept the project and shall operate, maintain, and repair the project as defined in the Definite Project Report with Integrated Environmental Assessment, Spring Lake Rehabilitation and Enhancement, dated May 1993, in accordance with Section 107(b) of the Water Resources Development Act of 1992, Public Law 102-580.

**V. MODIFICATION AND TERMINATION**

This MOA may be modified or terminated at any time by mutual agreement of the parties. Any such modification or termination must be in writing. Unless otherwise modified or terminated, this MOA shall remain in effect for a period of no more than 50 years after initiation of construction of the project.

**VI. REPRESENTATIVES**

The following individuals or their designated representatives shall have authority to act under this MOA for their respective parties:

**USFWS:** Regional Director  
U.S. Fish and Wildlife Service  
Federal Building, Fort Snelling  
Twin Cities, Minnesota 55111

**DA:** District Engineer  
U.S. Army Engineer District, Rock Island  
Clock Tower Building  
P.O. Box 2004  
Rock Island, Illinois 61204-2004

**EFFECTIVE DATE OF MOA**

This MOA shall become effective when signed by the appropriate representatives of both parties.

**THE DEPARTMENT OF ARMY**

**THE U.S. FISH AND WILDLIFE SERVICE**

BY: Charles S. Cox  
CHARLES S. COX  
Colonel, U.S. Army  
District Engineer

BY: Sam Marler  
SAM MARLER  
Regional Director  
U.S. Fish and Wildlife  
Service

DATE: 7 Oct 94

DATE: 29 Sept 1994

**Appendix B**  
**Site Manager's**  
**Project Inspection and Monitoring Results**

**OPERATION AND MAINTENANCE MANUAL**  
**SPRING LAKE HABITAT REHABILITATION AND ENHANCEMENT**  
**UPPER MISSISSIPPI RIVER**  
**ENVIRONMENTAL MANAGEMENT PROGRAM**  
**POOL 13, RIVER MILES 522.5 THROUGH 526**  
**CARROLL AND WHITESIDE COUNTIES, ILLINOIS**

**SITE MANAGER'S PROJECT INSPECTION OBSERVATIONS**

Inspected By \_\_\_\_\_ Date \_\_\_\_\_

Type of Inspection:            ( ) annual            ( ) emergency-disaster            ( ) other

1. PROJECT INSPECTION.

<u>Item</u>	<u>Condition</u>
<b>a. <u>Upper Perimeter Levee</u></b>	
( ) Settlement, sloughs or loss of section	_____
( ) Wavewash, scouring	_____
( ) Vegetative cover (mowing)	_____
( ) Burrowing animals	_____
( ) Unauthorized grazing or traffic	_____
( ) Encroachments	_____
( ) Unfavorable tree/shrub growth	_____
( ) Other	_____
<b>b. <u>Lower Perimeter Levee</u></b>	
( ) Settlement, sloughs or loss of section	_____
( ) Wavewash, scouring	_____
( ) Vegetative cover (mowing)	_____
( ) Burrowing animals	_____
( ) Unauthorized grazing or traffic	_____
( ) Encroachments	_____
( ) Unfavorable tree/shrub growth	_____
( ) Other	_____

c. Interior Levees

- Settlement, sloughs or loss of section
- Wavewash, scouring
- Overtopping erosion
- Vegetative cover (mowing)
- Burrowing animals
- Unauthorized grazing or traffic
- Encroachments
- Unfavorable tree/shrub growth
- Other

---

---

---

---

---

---

---

---

---

---

d. Cross Dike

- Settlement, sloughs or loss of section
- Wavewash, scouring
- Overtopping erosion
- Vegetative cover (mowing)
- Burrowing animals
- Unauthorized grazing or traffic
- Encroachments
- Unfavorable tree/shrub growth
- Other

---

---

---

---

---

---

---

---

---

---

e. Hemimarsh Levee

- Settlement, sloughs or loss of section
- Wavewash, scouring
- Overtopping erosion
- Vegetative cover (mowing)
- Burrowing animals
- Unauthorized grazing or traffic
- Encroachments
- Unfavorable tree/shrub growth
- Other

---

---

---

---

---

---

---

---

---

---

f. Stoplog Structure A

- Stoplogs, stoplog keepers, stoplog slots
- Concrete
- Steel rails, grating, fasteners
- Displaced/missing riprap
- Erosion adjacent to structure
- Sedimentation
- Other

---

---

---

---

---

---

---

---

---

---

g. Stoplog Structure B

- Stoplogs, stoplog keepers, stoplog slots \_\_\_\_\_
- Concrete \_\_\_\_\_
- Steel rails, grating, fasteners \_\_\_\_\_
- Displaced/missing riprap \_\_\_\_\_
- Erosion adjacent to structure \_\_\_\_\_
- Sedimentation \_\_\_\_\_
- Other \_\_\_\_\_

h. Stoplog Structure C

- Stoplogs, stoplog keepers, stoplog slots \_\_\_\_\_
- Concrete \_\_\_\_\_
- Steel rails, grating, fasteners \_\_\_\_\_
- Displaced/missing riprap \_\_\_\_\_
- Erosion adjacent to structure \_\_\_\_\_
- Sedimentation \_\_\_\_\_
- Other \_\_\_\_\_

i. Stoplog Structure HM

- Stoplogs, stoplog keepers, stoplog slots \_\_\_\_\_
- Concrete \_\_\_\_\_
- Steel rails, grating, fasteners \_\_\_\_\_
- Displaced/missing riprap \_\_\_\_\_
- Erosion adjacent to structure \_\_\_\_\_
- Sedimentation \_\_\_\_\_
- Other \_\_\_\_\_

j. Pump Station

- Building/hardware \_\_\_\_\_
- Control panel \_\_\_\_\_
- Pumps \_\_\_\_\_
- Gate \_\_\_\_\_
- Sump (sediment, debris) \_\_\_\_\_
- Trash racks \_\_\_\_\_
- Inlet & outlet channels \_\_\_\_\_
- Displaced/missing riprap \_\_\_\_\_
- Erosion or seepage adjacent to structure \_\_\_\_\_
- other \_\_\_\_\_

k. Gated Inlet Structure

- Concrete
- Gates and operating mechanism
- Displaced/missing riprap
- Inlet & outlet channels
- Erosion or seepage adjacent to structure
- other

---

---

---

---

---

---

l. 24-in. Gatewell

- Concrete
- Gate and operating mechanism
- Inlet & outlet channels
- Erosion or seepage adjacent to structure
- other

---

---

---

---

---

---

m. Well

- Protective casing
- Bollards
- Outlet apron (riprap)
- Electrical controls
- Pump
- Other

---

---

---

---

---

---

n. Access Roads (on levee)

- Excessive rutting
- Erosion / loss of crown width
- Displaced granular surfacing

---

---

---

o. Overflow Spillway

- Displaced or missing riprap
- Debris accumulation
- Erosion

---

---

---

2. COMMENTS.

---

Site Manager

**Appendix C**  
**Distribution List**

**Distribution List**

Mr. Ed Britton  
U.S. Fish and Wildlife Service  
7071 Riverview Road  
Thomson, Illinois 61285 (4 copies)

Mr. Robert Delaney  
Environmental Management Technical Center  
575 Lester Avenue  
Lake Onalaska, Wisconsin 54650

Mr. Jon Duyvejonck  
Upper Mississippi River Conservation Committee (UMRCC) Coordinator  
US Fish and Wildlife Service  
4469 48th Ave Ct  
Rock Island, IL 61201

Mr. Rick Nelson  
U.S. Fish and Wildlife Service  
4469 48th Avenue Court  
Rock Island, Illinois 61201

Mr. Mike Steuck  
Team Leader  
Long-Term Resource Monitoring Bellevue Field Station  
206 Rose Street  
Bellevue, Iowa 52031

Mr. Holly Stoerker  
Upper Mississippi River Basin Association  
415 Hamm Building  
408 St. Peter Street  
St. Paul, Minnesota 55102

**Distribution List (continued)**

Mr. Scott Stuewe  
EMP Coordinator  
Illinois Department of Natural Resources  
One Natural Resources Way  
Springfield, IL 62702-1271

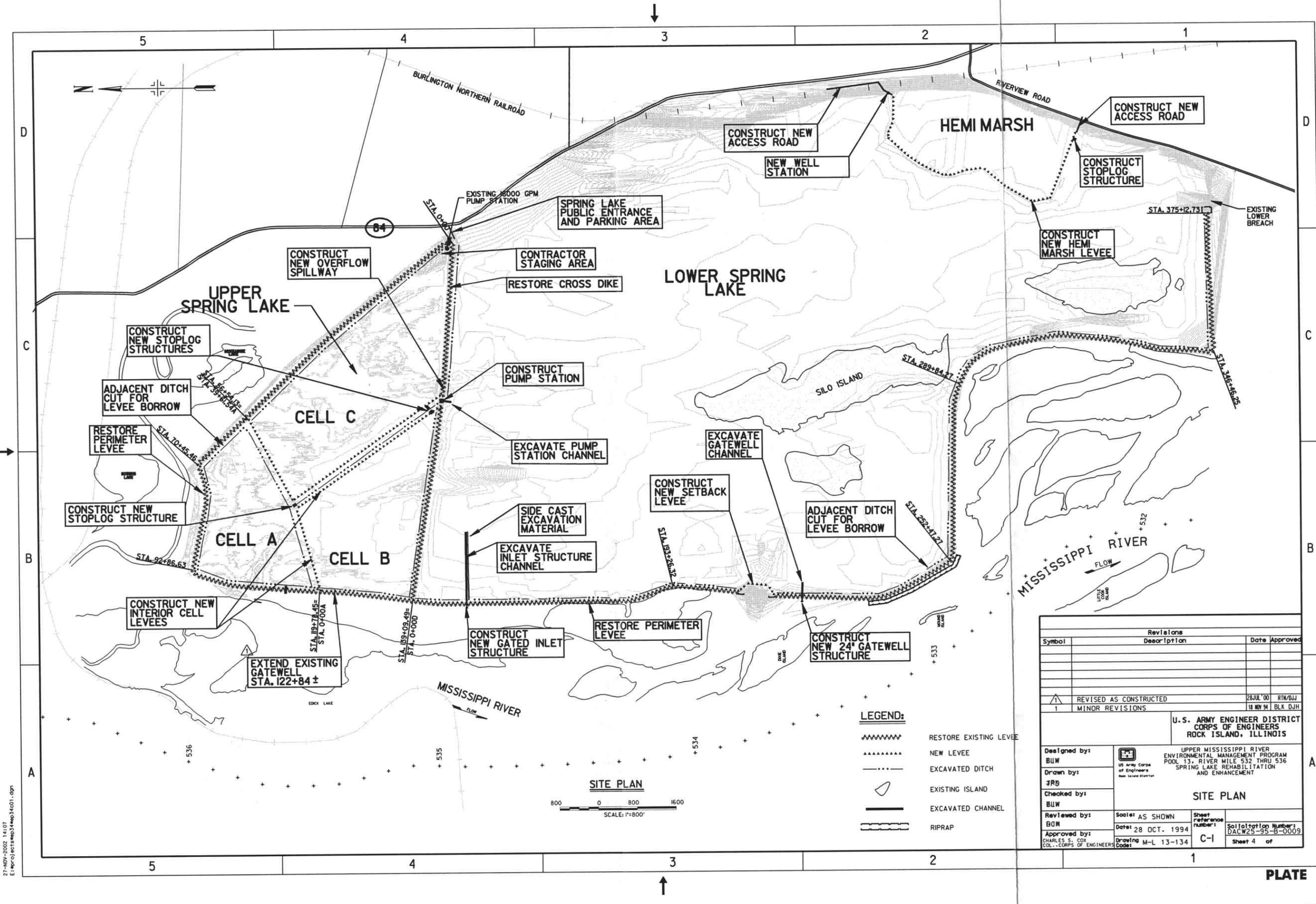
EMP Coordinator  
U.S. Fish and Wildlife Service  
51 E. 4th Street, Room 101  
Winona, Minnesota 55987

US Army Corps of Engineers, Mississippi Valley Division  
PO Box 80  
Vicksburg, MS 39181-0080  
Attn: CEMVD-MD-PR (Tom Pullen)

US Army Corps of Engineers, Mississippi Valley Division  
PO Box 80  
Vicksburg, MS 39181-0080  
Attn: CEMVD-MD-PM (Greg Ruff)

US Army Corps of Engineers, Rock Island District  
Clock Tower Building  
PO Box 2004  
Rock Island, Illinois 61204-0004  
ATTN:  
CEMVR-ED-DN (2 hard copies)  
CEMVR-OD-MN (hard copy)  
CEMVR-OD-T (hard copy)  
CEMVR-PM-A (hard copy)  
CEMVR-PM-M (2 hard copies)  
CEMVR-CD (digital copy)  
CEMVR-ED (digital copy)  
CEMVR-ED-D (digital copy)  
CEMVR-ED-DG (digital copy)  
CEMVR-ED-DM (digital copy)  
CEMVR-ED-DS (digital copy)  
CEMVR-ED-G (digital copy)  
CEMVR-ED-H (digital copy)  
CEMVR-ED-HH (digital copy)  
CEMVR-ED-HQ (digital copy)  
CEMVR-ED-S (digital copy)

**Plates**



Revisions		
Symbol	Description	Date Approved
△	REVISED AS CONSTRUCTED	28 JUL 00 RTM/DJJ
1	MINOR REVISIONS	18 NOV 94 BLK/DJJ

**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

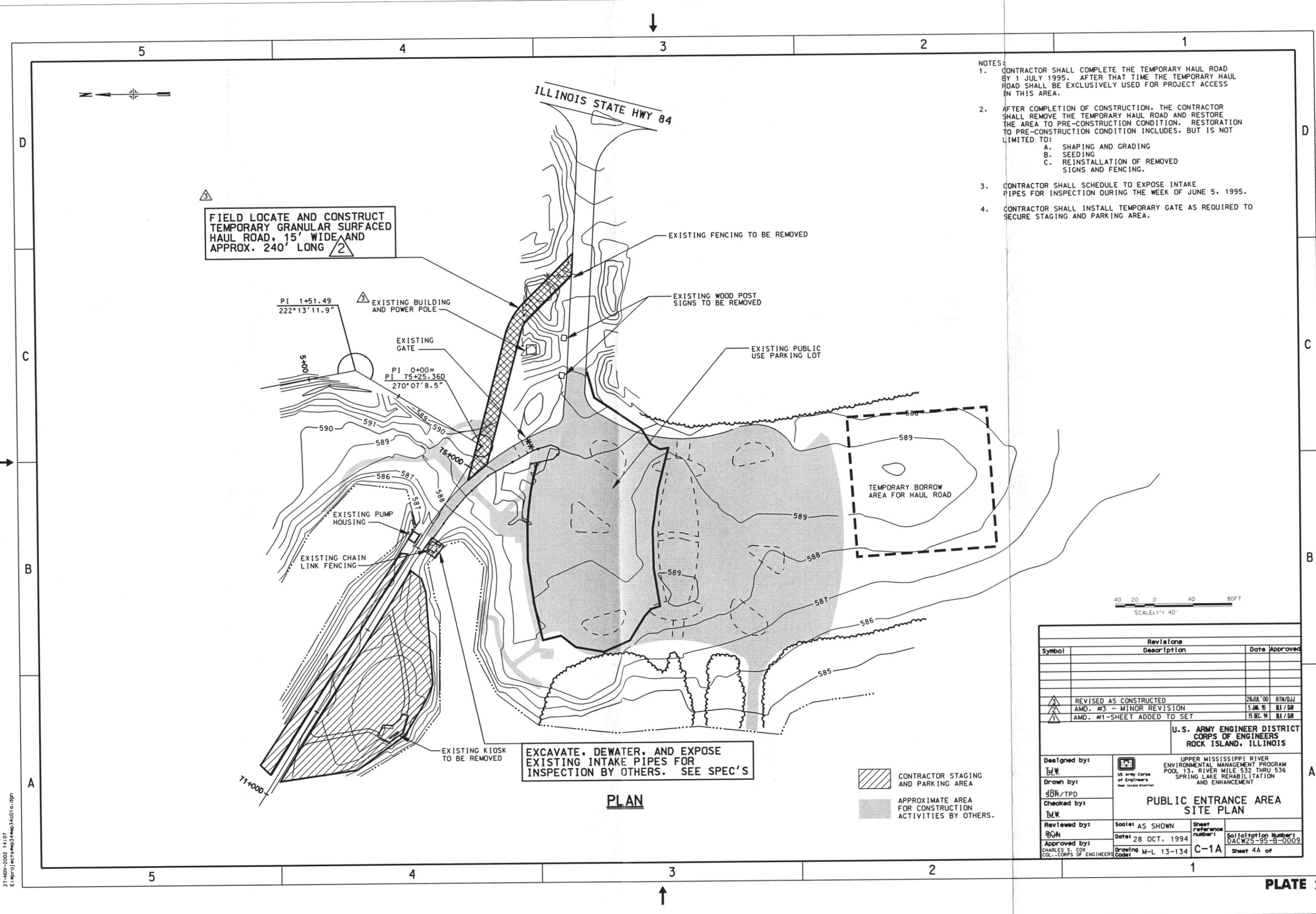
**Designed by:** BUW  
**Drawn by:** JRB  
**Checked by:** BUW  
**Reviewed by:** BOM  
**Approved by:** CHARLES S. COX  
COL., CORPS OF ENGINEERS

**Scale:** AS SHOWN  
**Date:** 28 OCT. 1994  
**Drawing Code:** M-L 13-134

**SITE PLAN**

**Sheet Reference Number:** C-1  
**Solicitation Number:** DACW25-95-B-0009  
**Sheet 4 of**

27-MAY-2002 14:07  
E:\proj\fact\map3\map3\4001.dgn



FIELD LOCATE AND CONSTRUCT TEMPORARY GRANULAR SURFACED HAUL ROAD, 15' WIDE AND APPROX. 240' LONG

EXCAVATE, DEWATER, AND EXPOSE EXISTING INTAKE PIPES FOR INSPECTION BY OTHERS. SEE SPEC'S

- NOTES:
- CONTRACTOR SHALL COMPLETE THE TEMPORARY HAUL ROAD BY 1 JULY 1995. AFTER THAT TIME THE TEMPORARY HAUL ROAD SHALL BE EXCLUSIVELY USED FOR PROJECT ACCESS IN THIS AREA.
  - AFTER COMPLETION OF CONSTRUCTION, THE CONTRACTOR SHALL REMOVE THE TEMPORARY HAUL ROAD AND RESTORE THE AREA TO PRE-CONSTRUCTION CONDITION. RESTORATION TO PRE-CONSTRUCTION CONDITION INCLUDES, BUT IS NOT LIMITED TO:
    - SHAPING AND GRADING
    - SEEDING
    - REINSTALLATION OF REMOVED SIGNS AND FENCING.
  - CONTRACTOR SHALL SCHEDULE TO EXPOSE INTAKE PIPES FOR INSPECTION DURING THE WEEK OF JUNE 5, 1995.
  - CONTRACTOR SHALL INSTALL TEMPORARY GATE AS REQUIRED TO SECURE STAGING AND PARKING AREA.



Revisions		
Symbol	Description	Date Approved
△	REVISED AS CONSTRUCTED	28 JUL '00 RTM/DJJ
△	AMD. #3 - MINOR REVISION	5 JUN '95 BLK/DAM
△	AMD. #1 - SHEET ADDED TO SET	15 DEC '94 BLK/DAM

U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS

Designed by: **BLK**  
 Drawn by: **dBK/TPD**  
 Checked by: **BLK**  
 Reviewed by: **RCM**  
 Approved by: **CHARLES S. COX**  
 COL., CORPS OF ENGINEERS

UPPER MISSISSIPPI RIVER ENVIRONMENTAL MANAGEMENT PROGRAM  
 POOL 13, RIVER MILE 532 THRU 536  
 SPRING LAKE REHABILITATION AND ENHANCEMENT

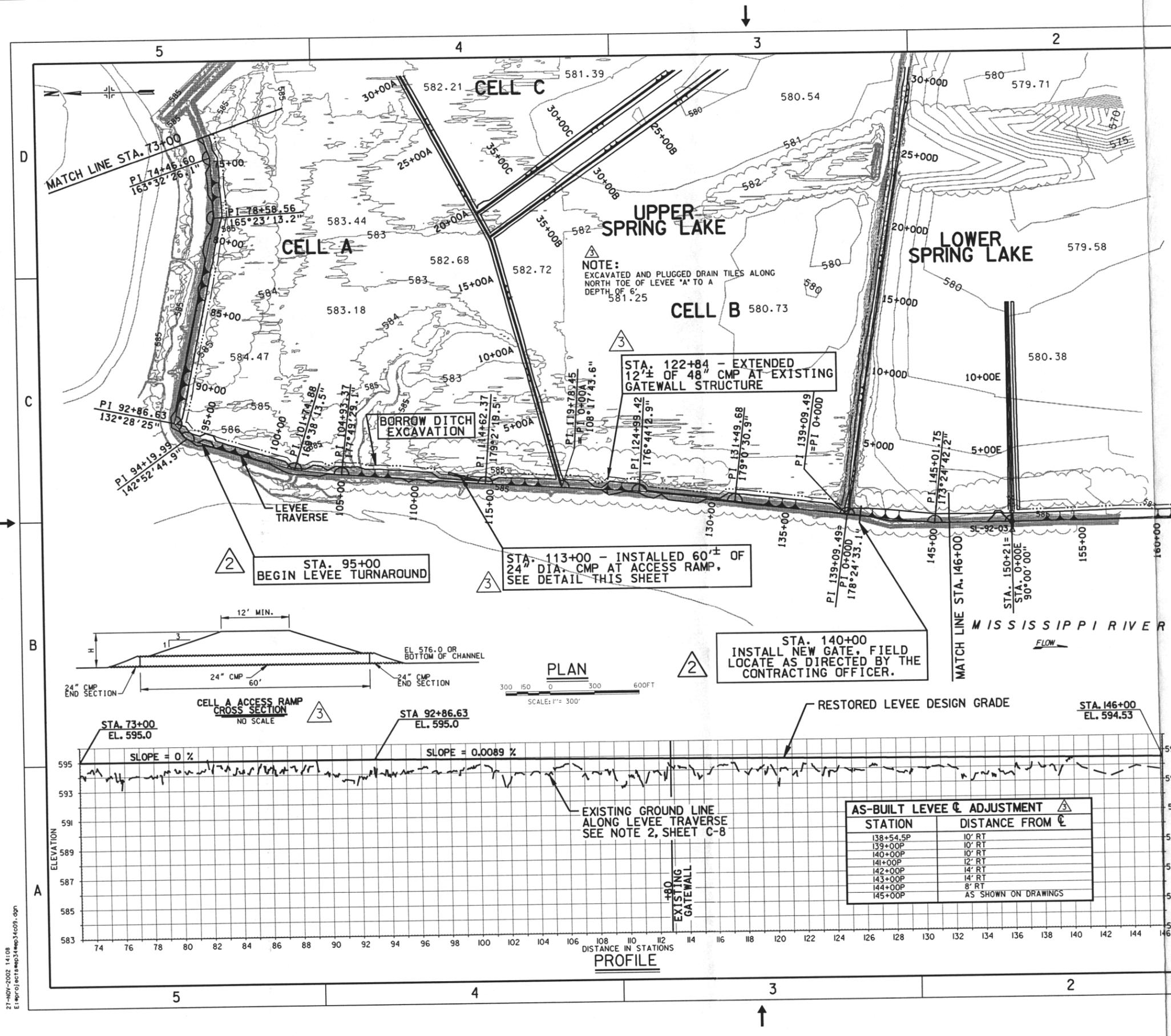
**PUBLIC ENTRANCE AREA SITE PLAN**

Scale: AS SHOWN  
 Date: 28 OCT. 1994  
 Drawing Code: M-L 13-134

Sheet Reference Number: **C-1A**  
 Solicitation Number: DACW25-95-B-0009  
 Sheet 4A of

27-MAY-2002 14:07  
 E:\projects\step3\step3\1010.dgn





**NOTE:**  
EXCAVATED AND PLUGGED DRAIN TILES ALONG  
NORTH TOE OF LEVEE 'A' TO A  
DEPTH OF 6.25

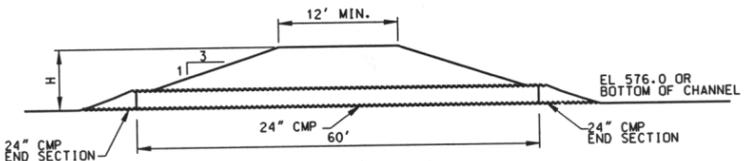
STA. 122+84 - EXTENDED  
12'± OF 48" CMP AT EXISTING  
GATEWALL STRUCTURE

BORROW DITCH  
EXCAVATION

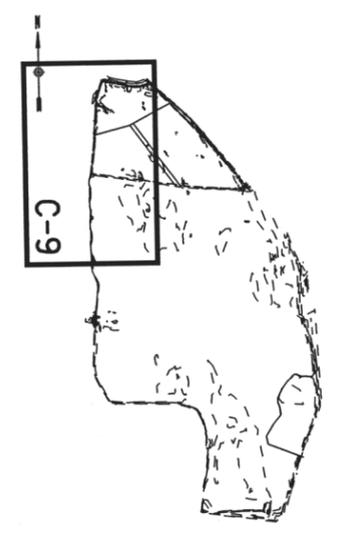
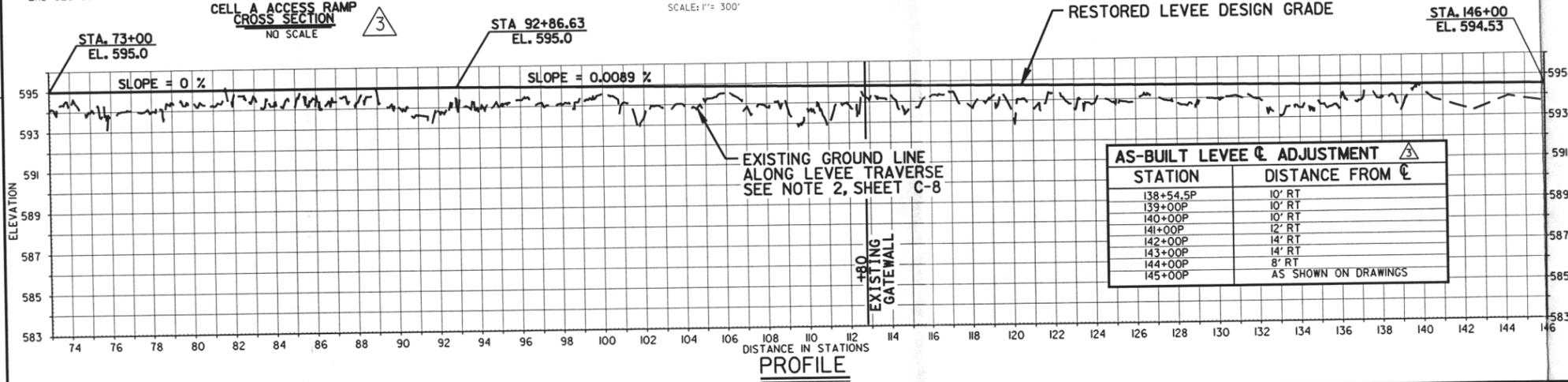
STA. 95+00  
BEGIN LEVEE TURNAROUND

STA. 113+00 - INSTALLED 60"± OF  
24" DIA. CMP AT ACCESS RAMP.  
SEE DETAIL THIS SHEET

STA. 140+00  
INSTALL NEW GATE, FIELD  
LOCATE AS DIRECTED BY THE  
CONTRACTING OFFICER.



**PLAN**  
SCALE: 1" = 300'



**KEY PLAN**

**LEGEND:**

- BORROW DITCH EXCAVATION
- ~~~ APPROXIMATE TREE LINE

**NOTES:**

FOR NOTES SEE SHEET C-8.

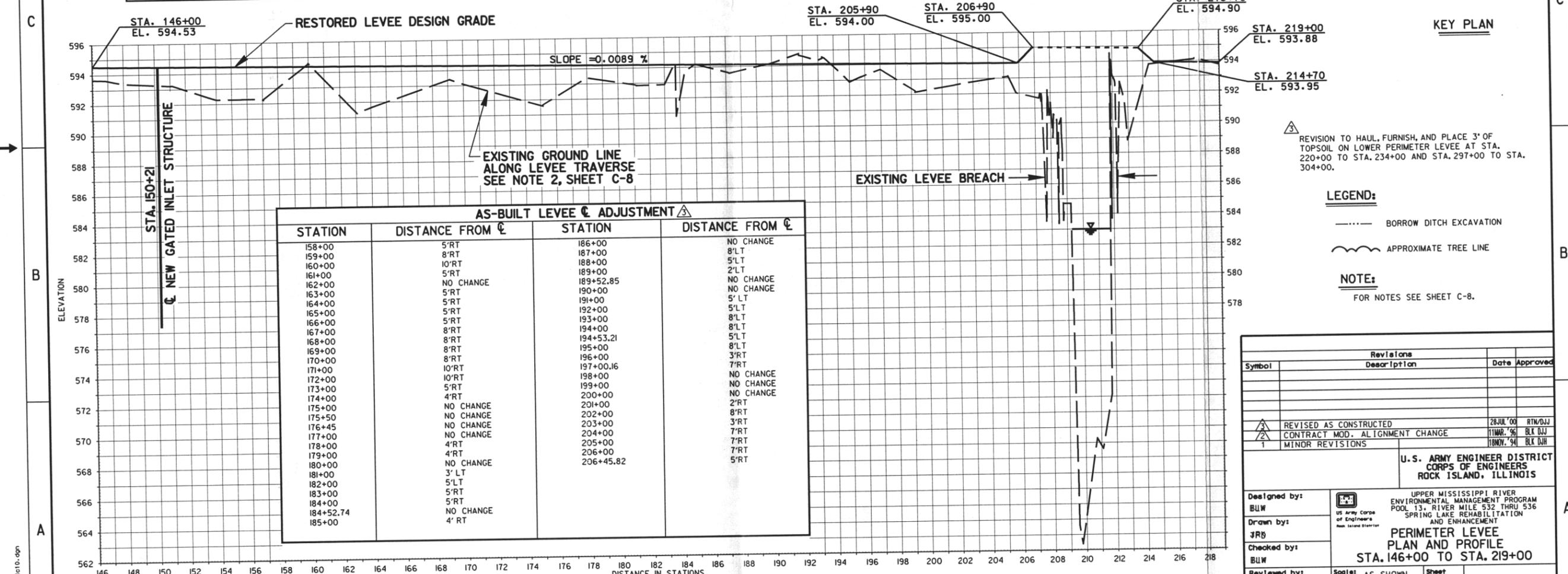
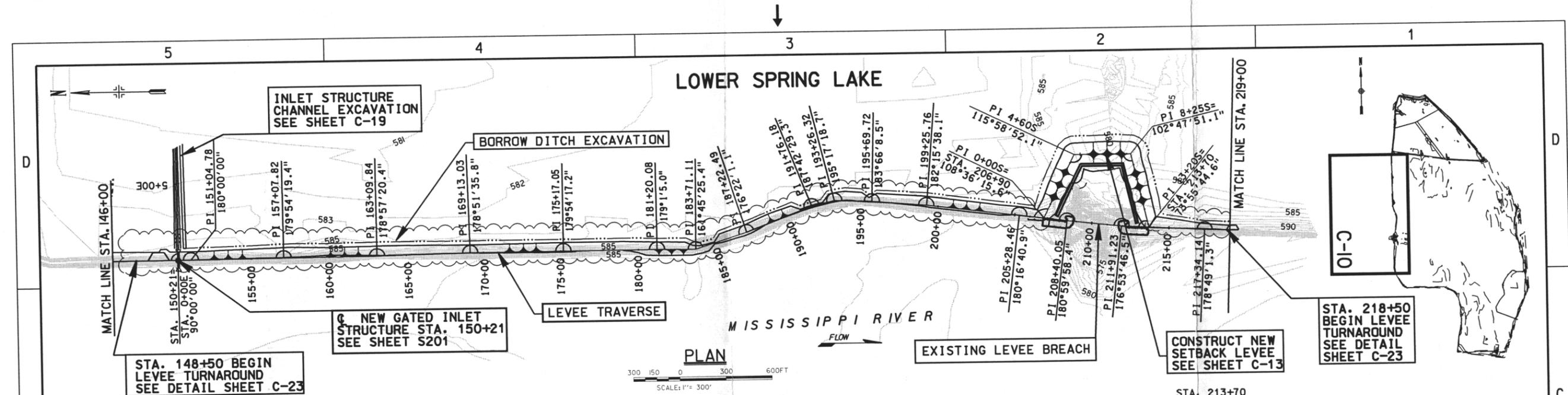
**NOTE:**  
ADDITIONAL 160 CUBIC YARDS OF EMBANKMENT PLACED  
ON INTERIOR DIKE 'B' TO RAISE GRADE

Revisions		
Symbol	Description	Date Approved
△	REVISED AS CONSTRUCTED	28 JUL 00 RTM/DJJ
△	AMD. #1 MINOR REVISIONS	15 DEC 94 BLK DJH
1	MINOR REVISIONS	18 NOV 94 BLK DJH

**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

Designed by: BLW	UPPER MISSISSIPPI RIVER ENVIRONMENTAL MANAGEMENT PROGRAM POOL 13, RIVER MILE 532 THRU 536 SPRING LAKE REHABILITATION AND ENHANCEMENT  <b>PERIMETER LEVEE PLAN AND PROFILE STA. 73+00 TO STA. 146+00</b>
Drawn by: JRB	
Checked by: BLW	
Reviewed by: BOM	
Approved by: CHARLES S. COX COL., CORPS OF ENGINEERS	
Scale: AS SHOWN	Sheet Reference Number: C-9
Date: 28 OCT. 1994	Solicitation Number: DACW25-95-B-0009
Drawing M-L 13-134	Sheet 12 of

27-NOV-2002 14:50  
E:\projects\emp3\emp3\c09.dgn



**Revisions**

Symbol	Description	Date	Approved
△	REVISED AS CONSTRUCTED	28 JUL '00	RIN/DJJ
△	CONTRACT MOD. ALIGNMENT CHANGE	11 MAR '96	BLK/DJJ
1	MINOR REVISIONS	18 NOV '94	BLK/DJJ

**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

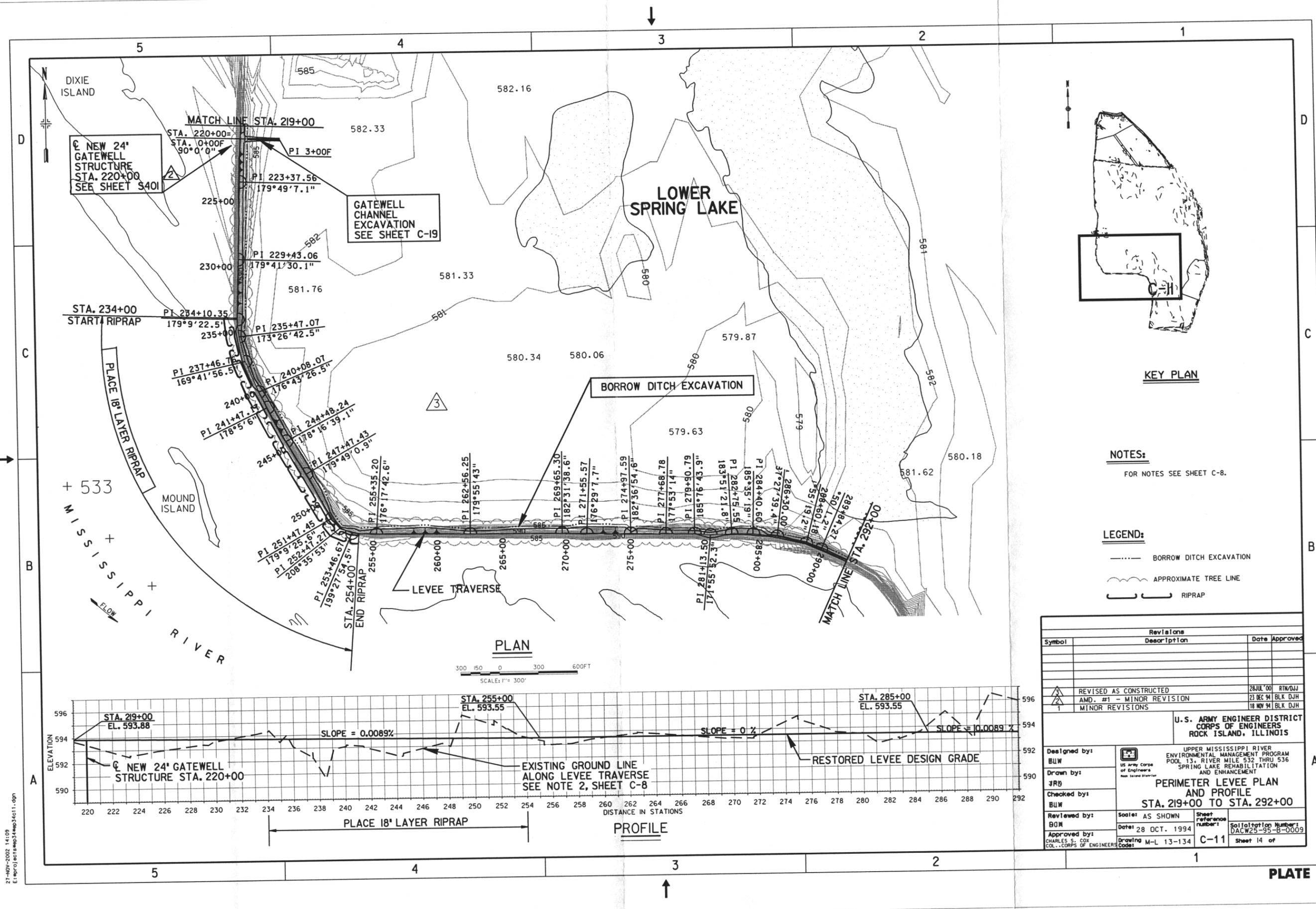
Designed by: BLW  
 Drawn by: JRB  
 Checked by: BLW  
 Reviewed by: BOM  
 Approved by: CHARLES S. COX  
 COL., CORPS OF ENGINEERS

UPPER MISSISSIPPI RIVER  
 ENVIRONMENTAL MANAGEMENT PROGRAM  
 POOL 13, RIVER MILE 532 THRU 536  
 SPRING LAKE REHABILITATION  
 AND ENHANCEMENT

**PERIMETER LEVEE  
 PLAN AND PROFILE  
 STA. 146+00 TO STA. 219+00**

Scale: AS SHOWN  
 Date: 28 OCT. 1994  
 Drawing Code: M-L 13-134  
 Sheet reference number: C-10  
 Solicitation Number: DACW25-95-B-0009  
 Sheet 13 of

27-NOV-2002 14:08  
 E:\projects\amp34\amp34c10.dgn



NEW 24' GATEWELL STRUCTURE STA. 220+00 SEE SHEET S401

GATEWELL CHANNEL EXCAVATION SEE SHEET C-19

BORROW DITCH EXCAVATION

PLACE 18" LAYER RIPRAP

LEVEE TRAVERSE



KEY PLAN

**NOTES:**

FOR NOTES SEE SHEET C-8.

**LEGEND:**

- BORROW DITCH EXCAVATION
- ~~~ APPROXIMATE TREE LINE
- RIPRAP

Symbol	Revisions Description	Date	Approved
3	REVISED AS CONSTRUCTED	28 JUL 00	RTW/DJJ
2	AMD. #1 - MINOR REVISION	23 DEC 94	BLK/DJH
1	MINOR REVISIONS	18 NOV 94	BLK/DJH

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS

Designed by: BLW  
 Drawn by: JRB  
 Checked by: BLW  
 Reviewed by: BOH  
 Approved by: CHARLES S. COX  
 COL., CORPS OF ENGINEERS

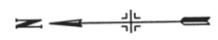
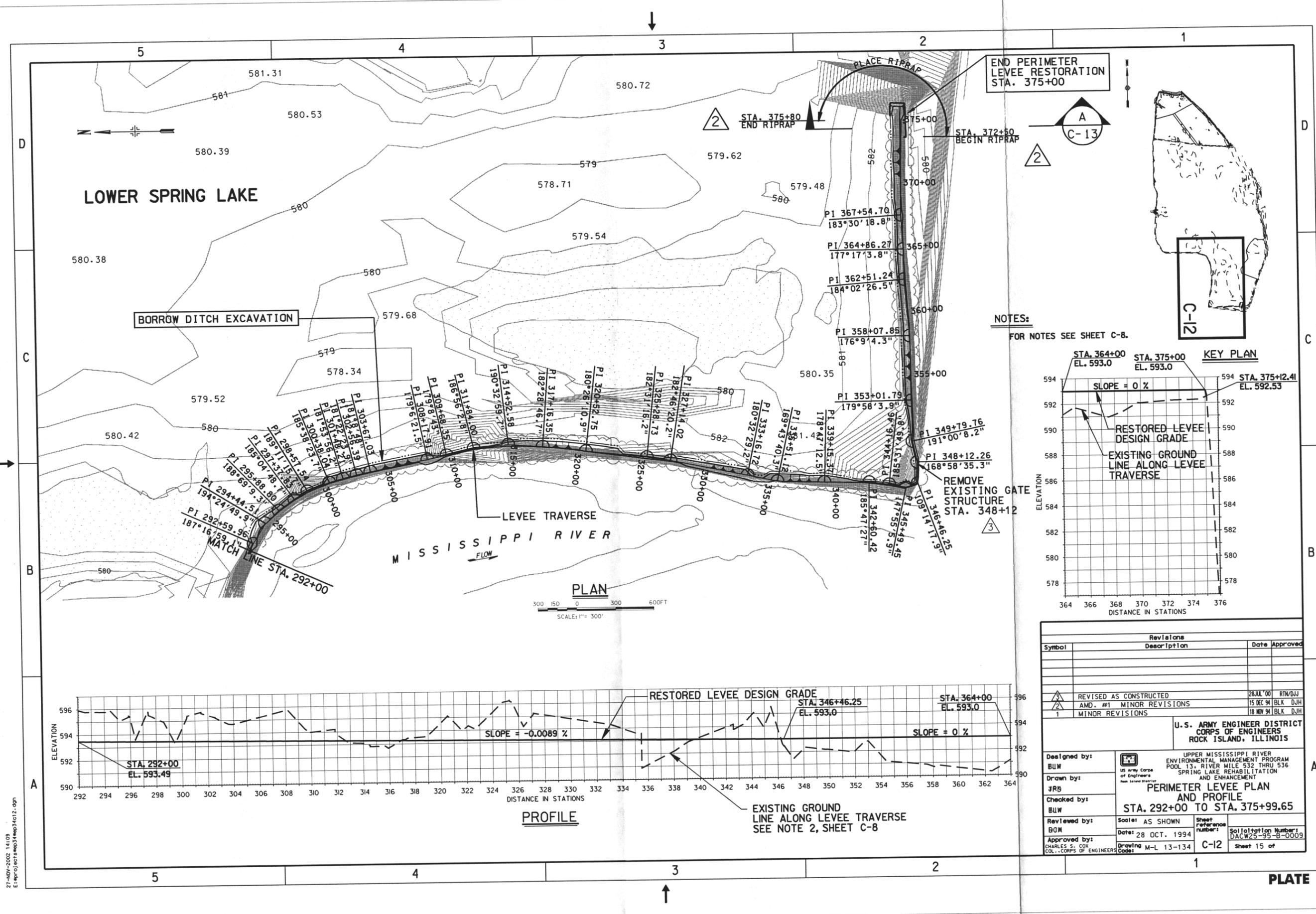
UPPER MISSISSIPPI RIVER ENVIRONMENTAL MANAGEMENT PROGRAM POOL 13, RIVER MILE 532 THRU 536 SPRING LAKE REHABILITATION AND ENHANCEMENT

**PERIMETER LEVEE PLAN AND PROFILE**  
 STA. 219+00 TO STA. 292+00

Scale: AS SHOWN  
 Date: 28 OCT. 1994  
 Drawing Code: M-L 13-134

Sheet reference number: C-11  
 Solicitation Number: DACW29-95-B-0009  
 Sheet 14 of

27-NOV-2002 14:09  
 E:\proj\ectr\map34\map34c11.dgn

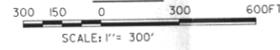


LOWER SPRING LAKE

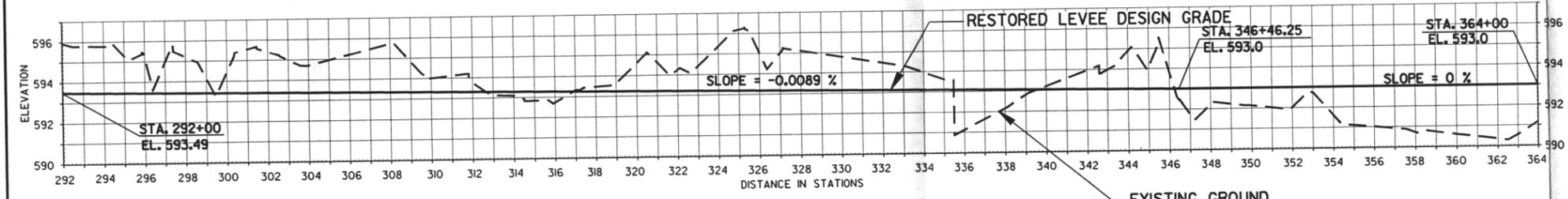
BORROW DITCH EXCAVATION

MISSISSIPPI RIVER

PLAN



PROFILE



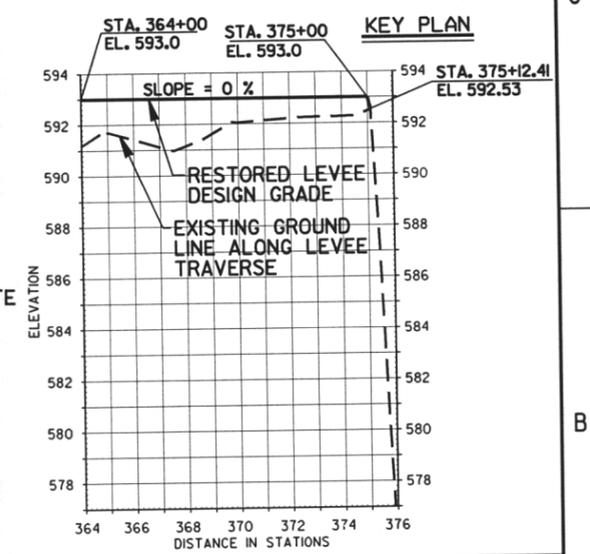
END PERIMETER  
LEVEE RESTORATION  
STA. 375+00

2 STA. 375+80  
END RIPRAP

3 STA. 372+50  
BEGIN RIPRAP

NOTES:

FOR NOTES SEE SHEET C-8.



Revisions		
Symbol	Description	Date Approved
3	REVISED AS CONSTRUCTED	28 JUN 00 RIN/DJ
2	AMD. #1 MINOR REVISIONS	15 DEC 94 BLK DJH
1	MINOR REVISIONS	18 NOV 94 BLK DJH

U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS

Designed by: BUW  
Drawn by: JRB  
Checked by: BUW  
Reviewed by: BOB  
Approved by: CHARLES S. COX  
COL., CORPS OF ENGINEERS

UPPER MISSISSIPPI RIVER  
ENVIRONMENTAL MANAGEMENT PROGRAM  
POOL 13, RIVER MILE 532 THRU 536  
SPRING LAKE REHABILITATION  
AND ENHANCEMENT

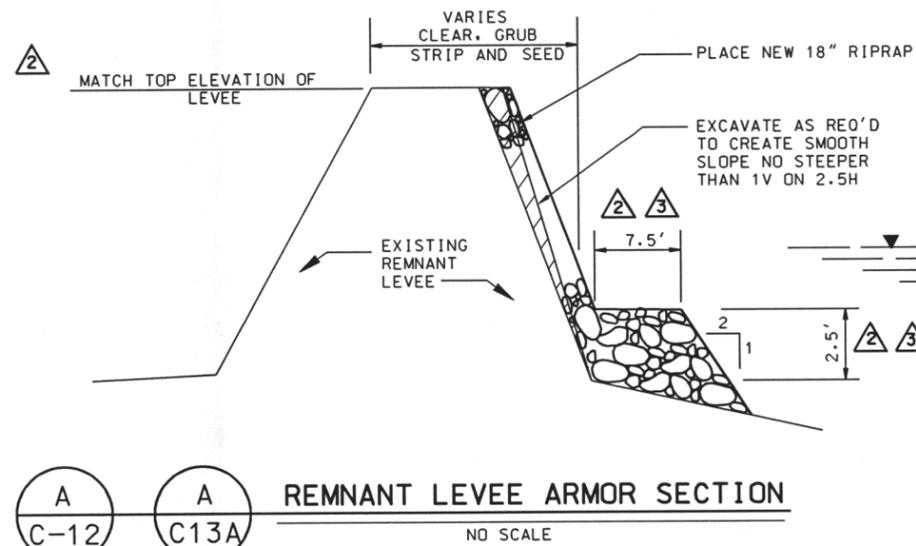
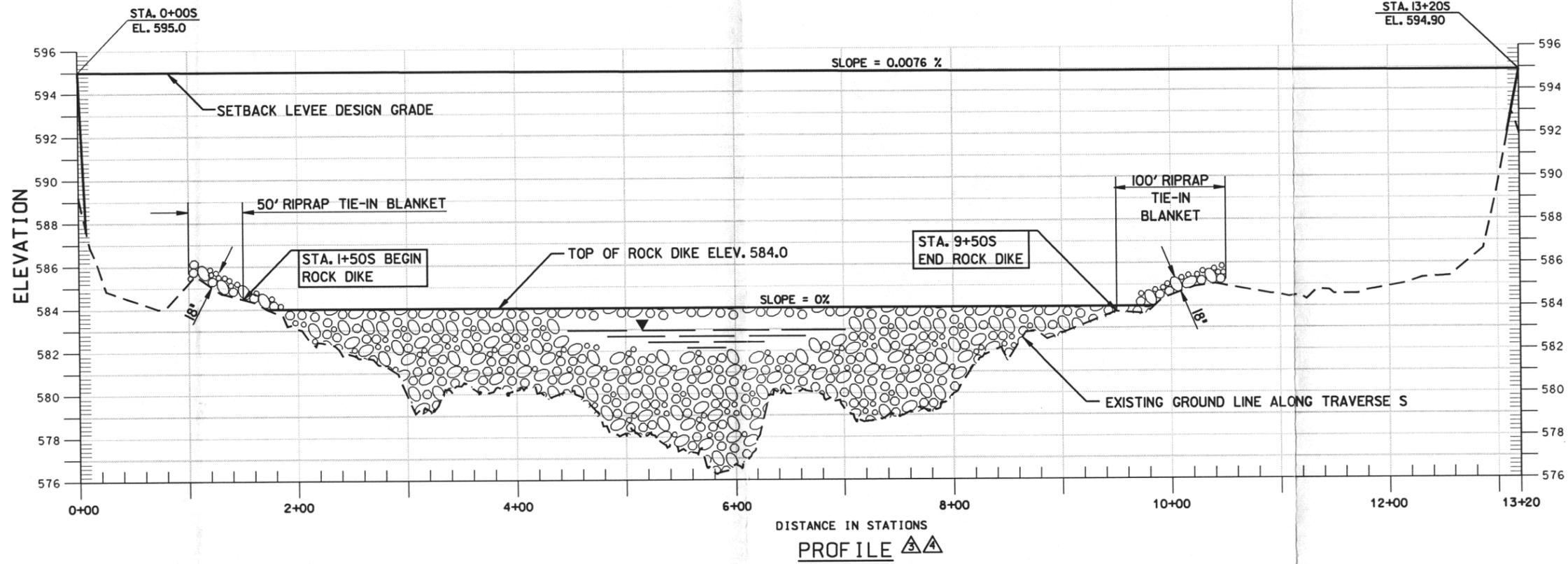
**PERIMETER LEVEE PLAN  
AND PROFILE**  
STA. 292+00 TO STA. 375+99.65

Scale: AS SHOWN  
Date: 28 OCT. 1994  
Drawing: M-L 13-134  
Code: C-12

Sheet reference number: C-12  
Sollittation Number: DACW25-95-B-0009  
Sheet 15 of

27-NOV-2002 14:09  
E:\proj\ect\map34\map34c12.dgn





**NOTE:**

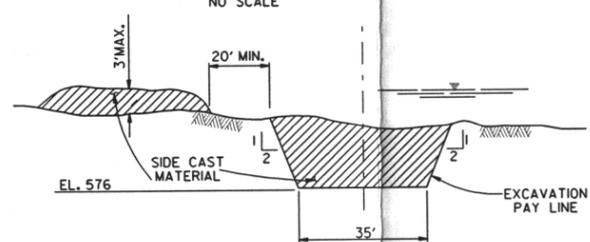
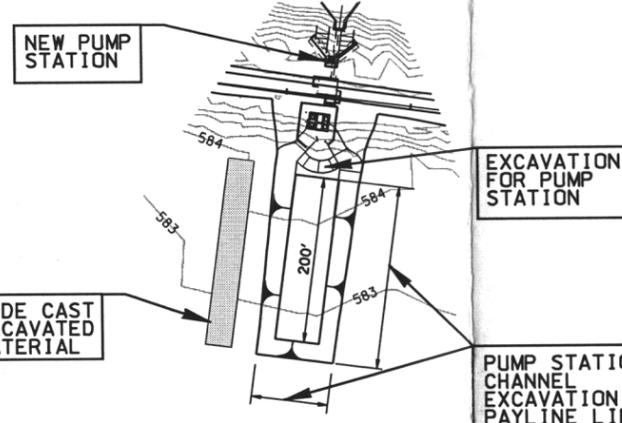
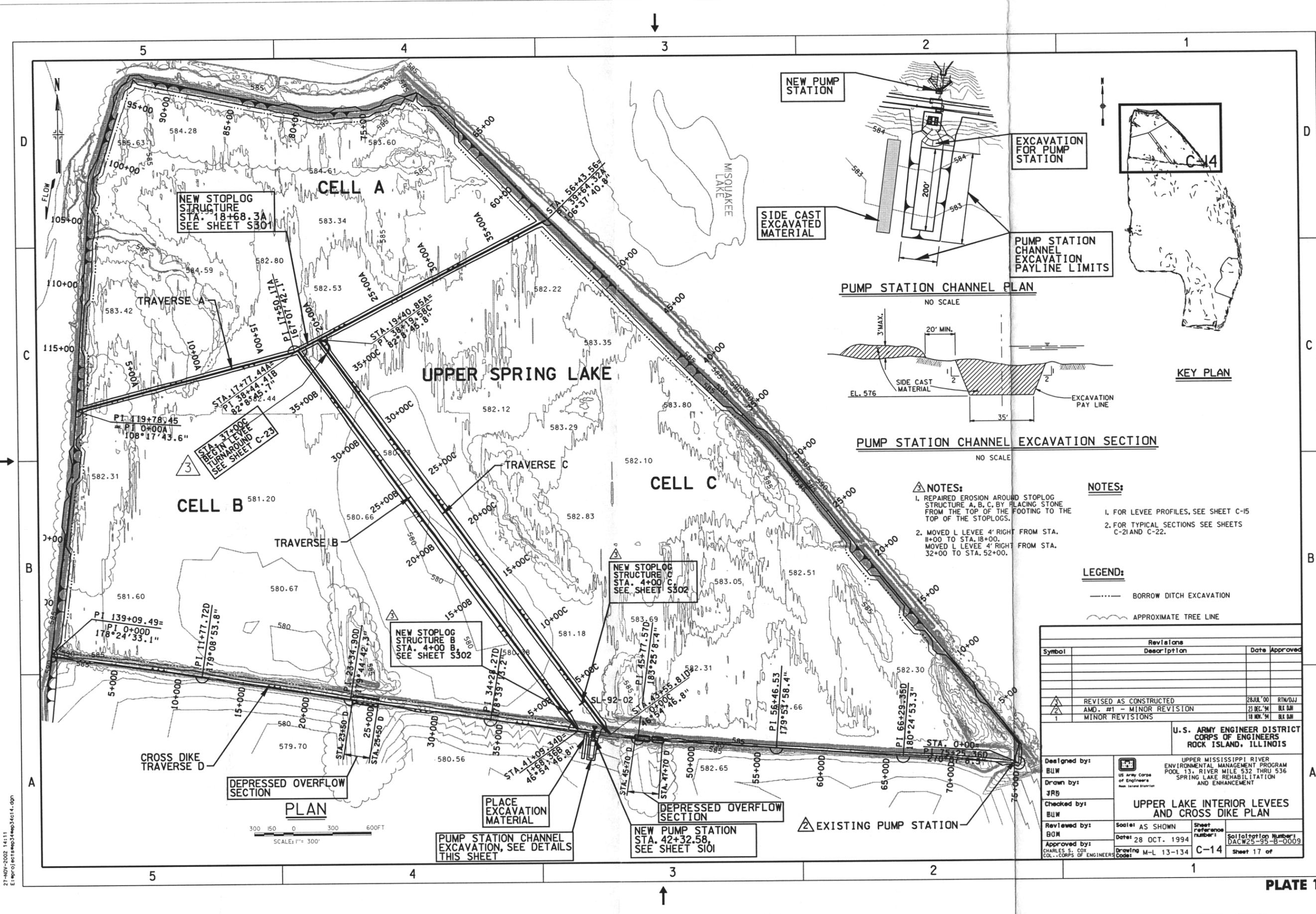
FOR NOTES SEE SHEET C-8.

Revisions			
Symbol	Description	Date	Approved
$\triangle$	AS CONSTRUCTED	28 JUL 00	RTM/DJJ
$\triangle$	CONTRACT MOD.	12 AUG 96	BLK/DJJ
$\triangle$	CONTRACT MOD. ALIGNMENT CHANGE	11 MAR 96	BLK/DJJ
$\triangle$	AMD. #1 - MINOR REVISION	23 DEC 94	BLK/DJJ
$\triangle$	MINOR REVISIONS	18 NOV 94	BLK/DJJ

**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

Designed by: BLW	UPPER MISSISSIPPI RIVER ENVIRONMENTAL MANAGEMENT PROGRAM POOL 13, RIVER MILE 532 THRU 536 SPRING LAKE REHABILITATION AND ENHANCEMENT	<b>SETBACK LEVEE SECTION AND PROFILE</b>	
Drawn by: JRB		Scale: AS SHOWN	Sheet reference number: C13A
Checked by: BLW	Date: 28 OCT. 1994	Drawing Code: M-L 13-134	Sheet 16A of
Reviewed by: BLW	Approved by: CHARLES S. COX COL., CORPS OF ENGINEERS		

27-NOV-2002 14:10  
E:\proj\facts\ep3\ep3a13a.dgn



- NOTES:**
- REPAIRED EROSION AROUND STOPLOG STRUCTURE A, B, C, BY PLACING STONE FROM THE TOP OF THE FOOTING TO THE TOP OF THE STOPLOGS.
  - MOVED L. LEVEE 4' RIGHT FROM STA. 14+00 TO STA. 18+00. MOVED L. LEVEE 4' RIGHT FROM STA. 32+00 TO STA. 52+00.

- NOTES:**
- FOR LEVEE PROFILES, SEE SHEET C-15
  - FOR TYPICAL SECTIONS SEE SHEETS C-21 AND C-22.

- LEGEND:**
- BORROW DITCH EXCAVATION
  - ~~~ APPROXIMATE TREE LINE

Revisions			
Symbol	Description	Date	Approved
3	REVISED AS CONSTRUCTED	28 JUL '00	RTM/DJJ
2	AMD. #1 - MINOR REVISION	23 DEC '94	BLK/DH
1	MINOR REVISIONS	18 MAR '94	BLK/DH

**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

UPPER MISSISSIPPI RIVER ENVIRONMENTAL MANAGEMENT PROGRAM  
POOL 13, RIVER MILE 532 THRU 536  
SPRING LAKE REHABILITATION AND ENHANCEMENT

**UPPER LAKE INTERIOR LEVEES AND CROSS DIKE PLAN**

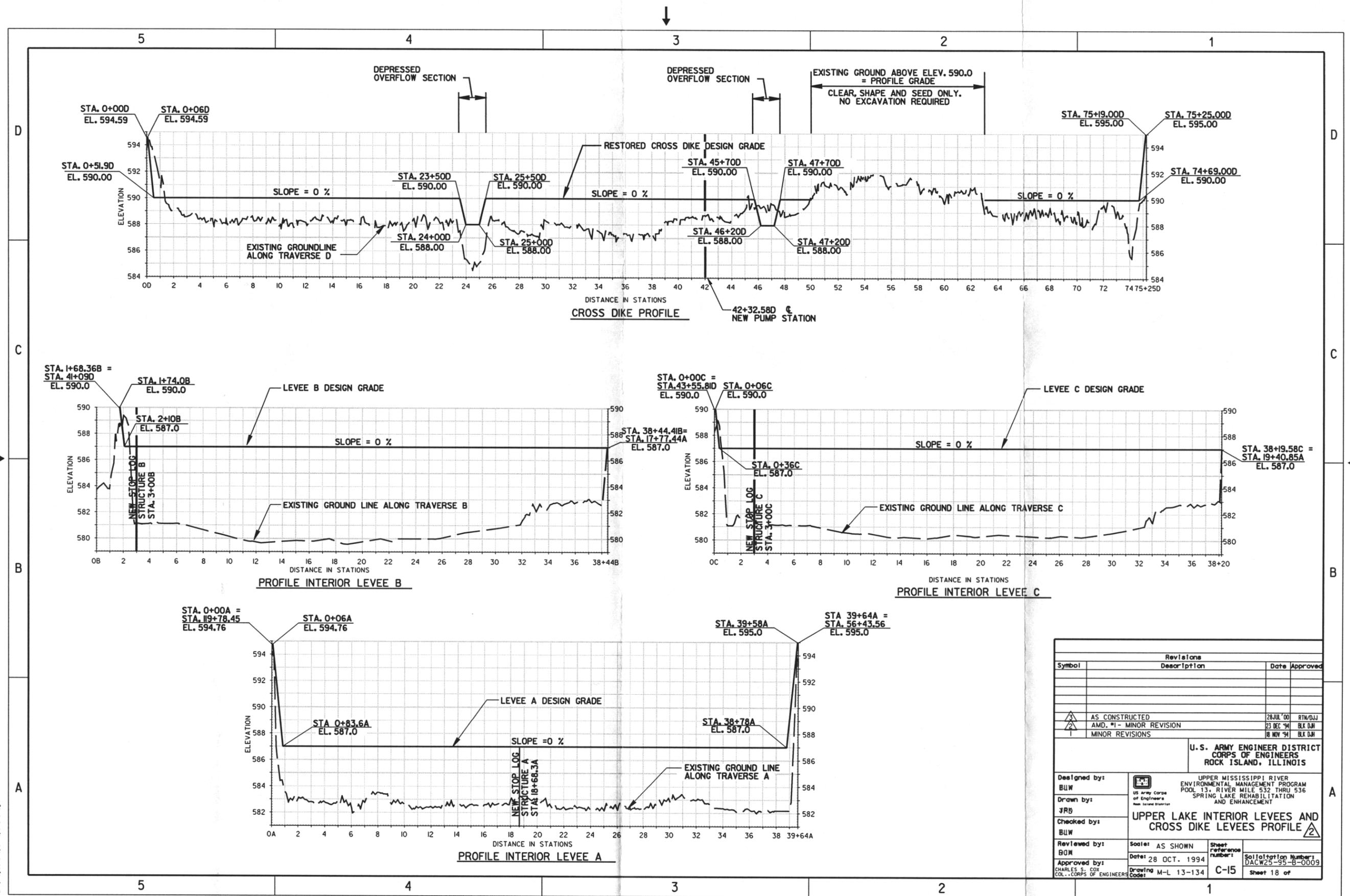
Designed by: BUW  
Drawn by: JRB  
Checked by: BUW  
Reviewed by: BOM  
Approved by: CHARLES S. COX, COL., CORPS OF ENGINEERS

Scale: AS SHOWN  
Date: 28 OCT. 1994  
Drawing Code: M-L 13-134

Sheet reference number: C-14  
Sollatation Number: DACW25-95-B-0009  
Sheet 17 of

27-MAY-2002 14:11  
E:\proj\act\leap3\leap3\c14.dgn



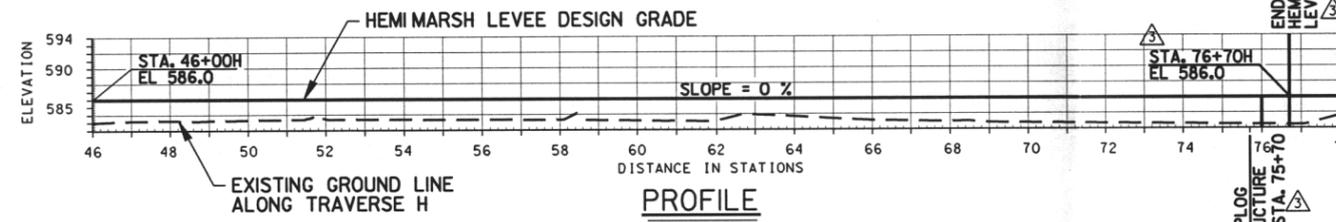
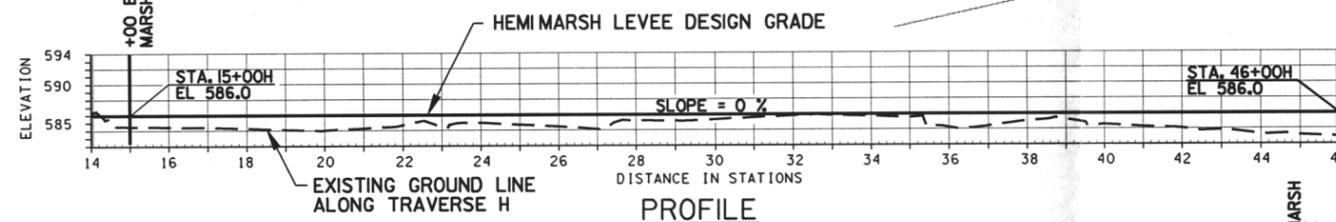
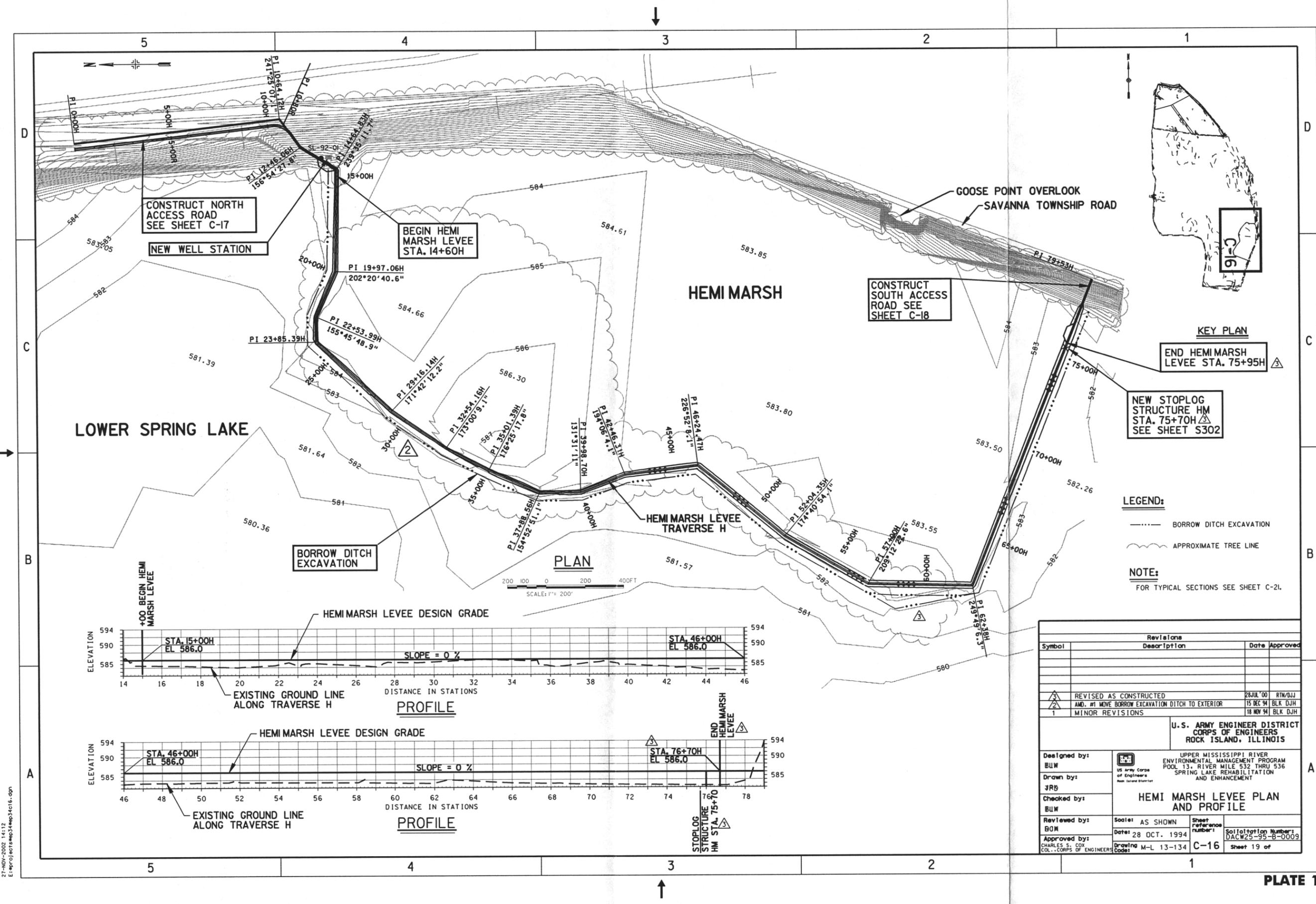


Revisions		
Symbol	Description	Date Approved
△	AS CONSTRUCTED	28 JUL '00 RTM/DJJ
△	AMD. #1 - MINOR REVISION	23 DEC '94 BLK DJR
△	MINOR REVISIONS	18 NOV '94 BLK DJR

**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

Designed by: BLW	UPPER MISSISSIPPI RIVER ENVIRONMENTAL MANAGEMENT PROGRAM POOL 13, RIVER MILE 532 THRU 536 SPRING LAKE REHABILITATION AND ENHANCEMENT
Drawn by: JRB	
Checked by: BLW	<b>UPPER LAKE INTERIOR LEVEES AND CROSS DIKE LEVEES PROFILE</b>
Reviewed by: BGR	
Approved by: CHARLES S. COX COL., CORPS OF ENGINEERS	Scale: AS SHOWN Date: 28 OCT. 1994 Drawing Code: M-L 13-134
	Sheet Reference Number: C-15 Sollittation Number: DACW25-95-B-0009 Sheet 18 of

27-NOV-2002 14:12  
E:\proj\lcr\wp3\leap3\c15.dgn



**LEGEND:**  
 - - - - - BORROW DITCH EXCAVATION  
 ~~~~~~ APPROXIMATE TREE LINE

**NOTE:**  
 FOR TYPICAL SECTIONS SEE SHEET C-21.

| Symbol | Revisions Description                            | Date       | Approved |
|--------|--------------------------------------------------|------------|----------|
| △      | REVISED AS CONSTRUCTED                           | 28 JUL '00 | RTW/DJJ  |
| △      | AMD. #1 MOVE BORROW EXCAVATION DITCH TO EXTERIOR | 15 DEC 94  | BLK DJH  |
| 1      | MINOR REVISIONS                                  | 18 NOV 94  | BLK DJH  |

**U. S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

Designed by: BLW  
 Drawn by: JRB  
 Checked by: BLW  
 Reviewed by: BDM  
 Approved by: CHARLES S. COX  
 COL., CORPS OF ENGINEERS

**HEMI MARSH LEVEE PLAN  
AND PROFILE**

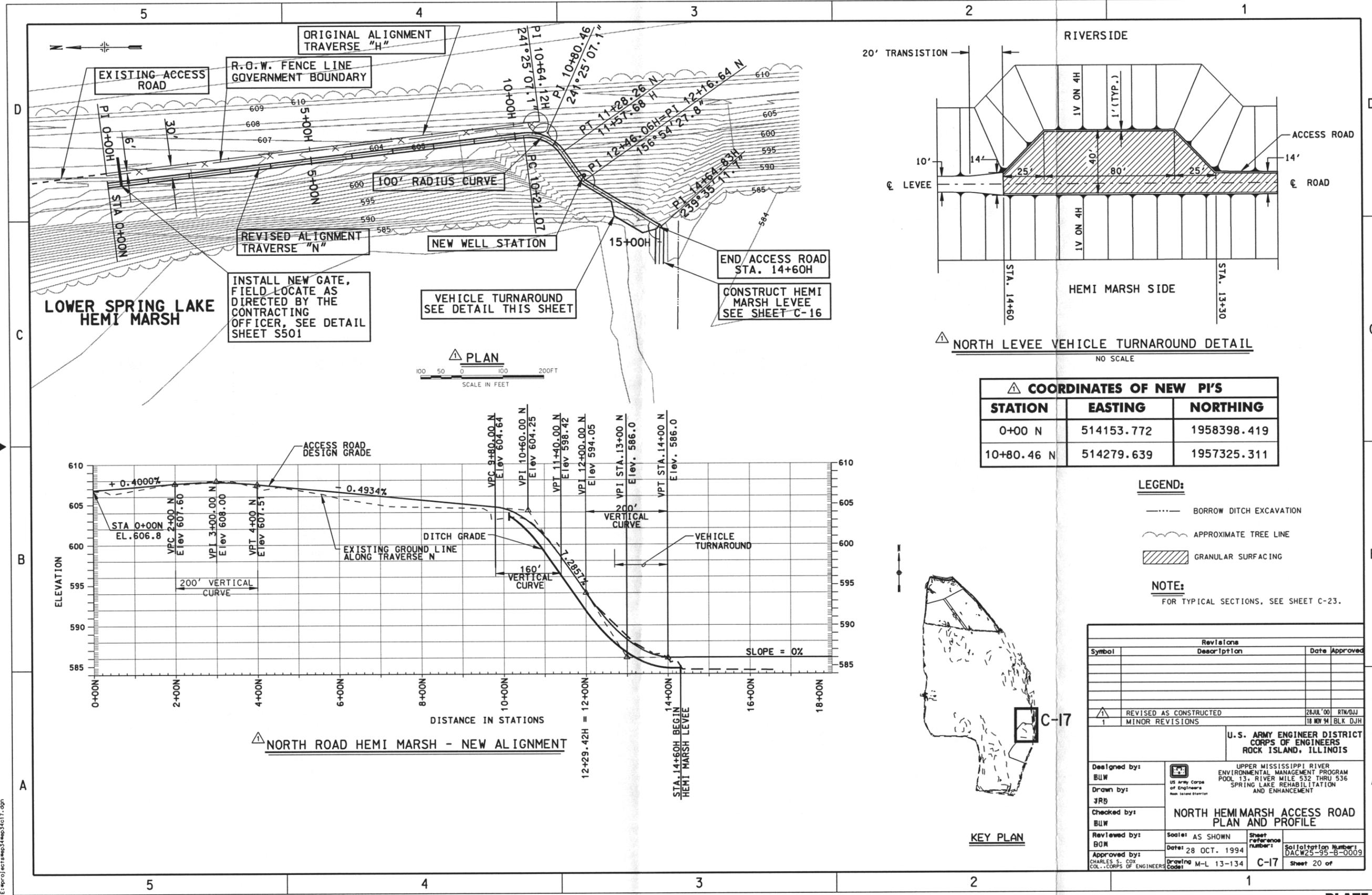
UPPER MISSISSIPPI RIVER  
 ENVIRONMENTAL MANAGEMENT PROGRAM  
 POOL 13, RIVER MILE 532 THRU 536  
 SPRING LAKE REHABILITATION  
 AND ENHANCEMENT

Scale: AS SHOWN  
 Date: 28 OCT. 1994  
 Drawing Code: M-L 13-134

Sheet Reference Number: C-16  
 Solicitation Number: DACW25-95-B-0009  
 Sheet 19 of

27-NOV-2002 14:12  
 E:\mrc\ecf\mep34\ep34c16.dgn

27-NOV-2002 14:13  
E:\projects\sep3\sep3\c17.dgn



INSTALL NEW GATE, FIELD LOCATE AS DIRECTED BY THE CONTRACTING OFFICER, SEE DETAIL SHEET S501

VEHICLE TURNAROUND SEE DETAIL THIS SHEET

CONSTRUCT HEMI MARSH LEVEL SEE SHEET C-16

**△ NORTH LEVEL VEHICLE TURNAROUND DETAIL**  
NO SCALE

| △ COORDINATES OF NEW PI'S |            |             |
|---------------------------|------------|-------------|
| STATION                   | EASTING    | NORTHING    |
| 0+00 N                    | 514153.772 | 1958398.419 |
| 10+80.46 N                | 514279.639 | 1957325.311 |

**LEGEND:**

- BORROW DITCH EXCAVATION
- ~~~ APPROXIMATE TREE LINE
- ▨ GRANULAR SURFACING

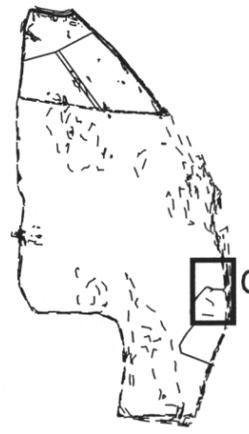
**NOTE:**

FOR TYPICAL SECTIONS, SEE SHEET C-23.

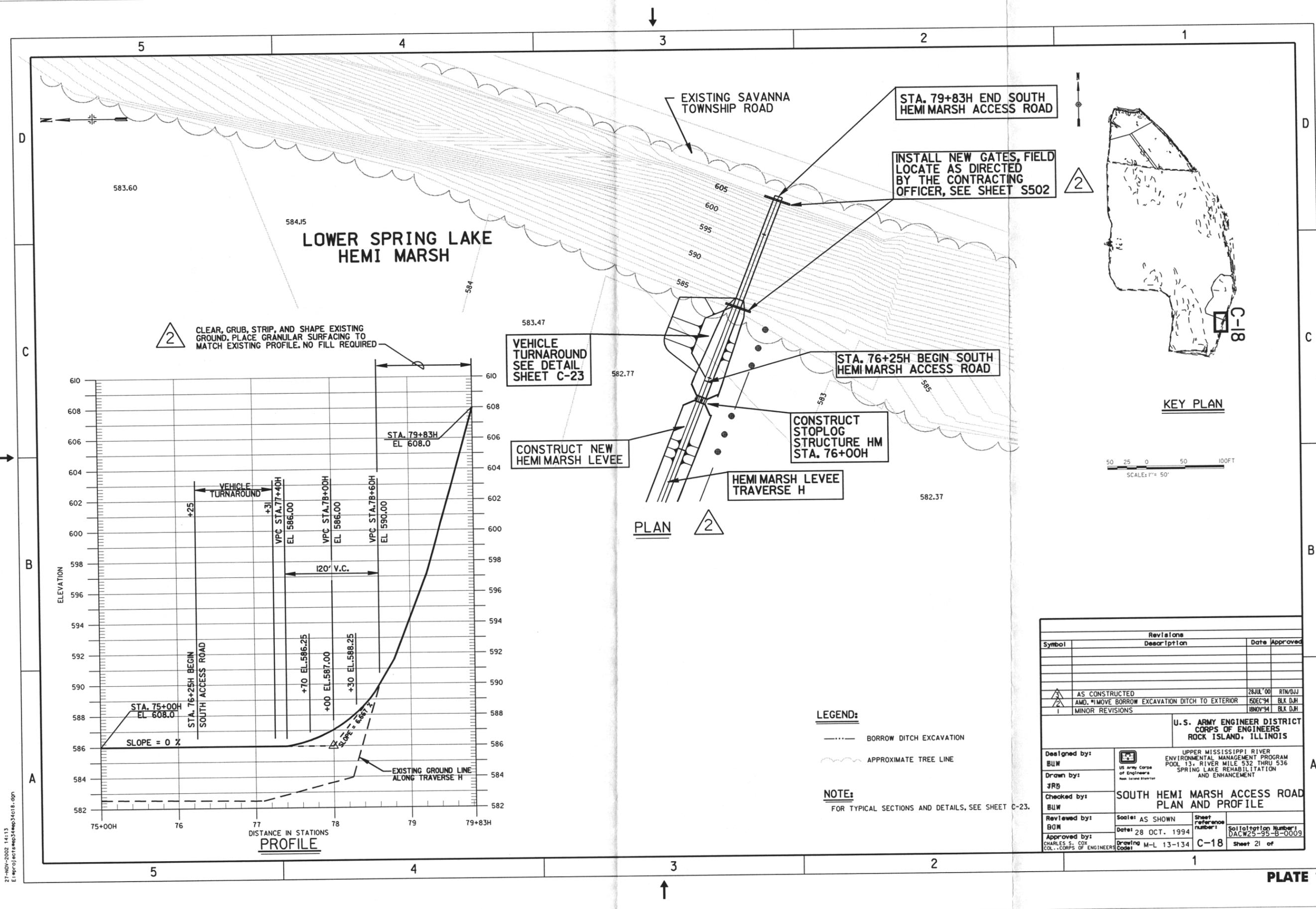
| Revisions |                        |            |          |
|-----------|------------------------|------------|----------|
| Symbol    | Description            | Date       | Approved |
| △         | REVISED AS CONSTRUCTED | 28 JUL '00 | RTN/DJJ  |
| 1         | MINOR REVISIONS        | 18 NOV '94 | BLK DJH  |

**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

|                                                            |                                                                                                                                            |                                                                                                   |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Designed by:<br>BLW                                        | UPPER MISSISSIPPI RIVER ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 13, RIVER MILE 532 THRU 536<br>SPRING LAKE REHABILITATION AND ENHANCEMENT |                                                                                                   |
| Drawn by:<br>JRB                                           |                                                                                                                                            |                                                                                                   |
| Checked by:<br>BLW                                         | <b>NORTH HEMI MARSH ACCESS ROAD<br/>PLAN AND PROFILE</b>                                                                                   |                                                                                                   |
| Reviewed by:<br>BOM                                        |                                                                                                                                            |                                                                                                   |
| Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS | Scale: AS SHOWN<br>Date: 28 OCT. 1994<br>Drawing Code: M-L 13-134                                                                          | Sheet Reference Number:<br><b>C-17</b><br>Solicitation Number:<br>DACW25-95-B-0009<br>Sheet 20 of |



**KEY PLAN**



2

CLEAR, GRUB, STRIP, AND SHAPE EXISTING GROUND. PLACE GRANULAR SURFACING TO MATCH EXISTING PROFILE. NO FILL REQUIRED

VEHICLE TURNAROUND SEE DETAIL SHEET C-23

STA. 79+83H END SOUTH HEMI MARSH ACCESS ROAD

INSTALL NEW GATES, FIELD LOCATE AS DIRECTED BY THE CONTRACTING OFFICER, SEE SHEET S502

STA. 76+25H BEGIN SOUTH HEMI MARSH ACCESS ROAD

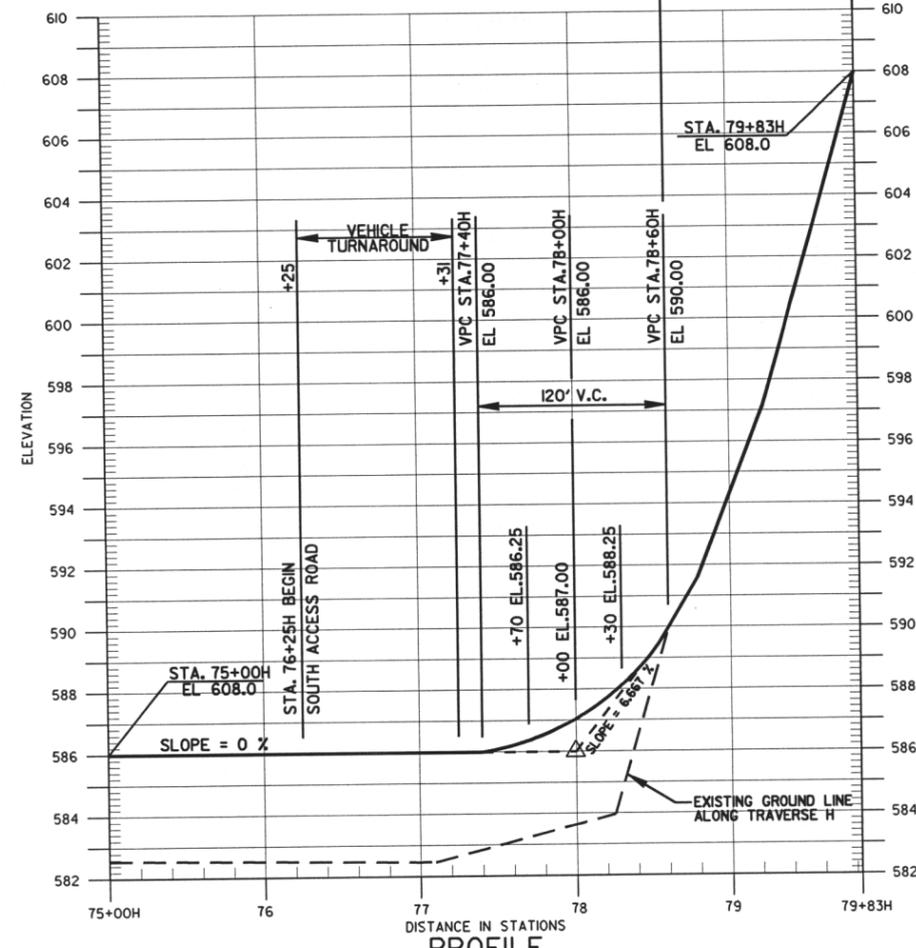
CONSTRUCT STOPLOG STRUCTURE HM STA. 76+00H

CONSTRUCT NEW HEMI MARSH LEVEE

HEMI MARSH LEVEE TRAVERSE H

PLAN

2



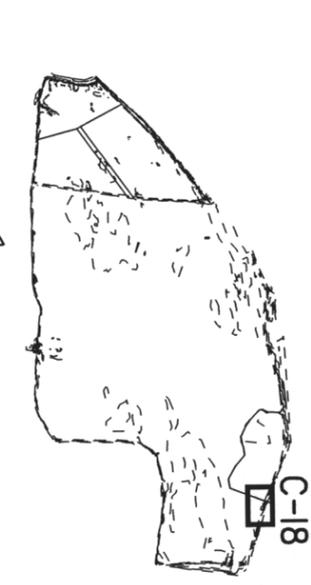
PROFILE

LEGEND:

- BORROW DITCH EXCAVATION
- ~~~ APPROXIMATE TREE LINE

NOTE:

FOR TYPICAL SECTIONS AND DETAILS, SEE SHEET C-23.



KEY PLAN

| Revisions |                                                  |          |          |
|-----------|--------------------------------------------------|----------|----------|
| Symbol    | Description                                      | Date     | Approved |
| △         | AS CONSTRUCTED                                   | 28JUL'00 | RIN/DJJ  |
| △         | AMD. #1 MOVE BORROW EXCAVATION DITCH TO EXTERIOR | 15DEC'94 | BLK D.H. |
| △         | MINOR REVISIONS                                  | 18NOV'94 | BLK D.H. |

U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS

Designed by: BUW  
Drawn by: JRB  
Checked by: BUW  
Reviewed by: BGR  
Approved by: CHARLES S. COX  
COL., CORPS OF ENGINEERS

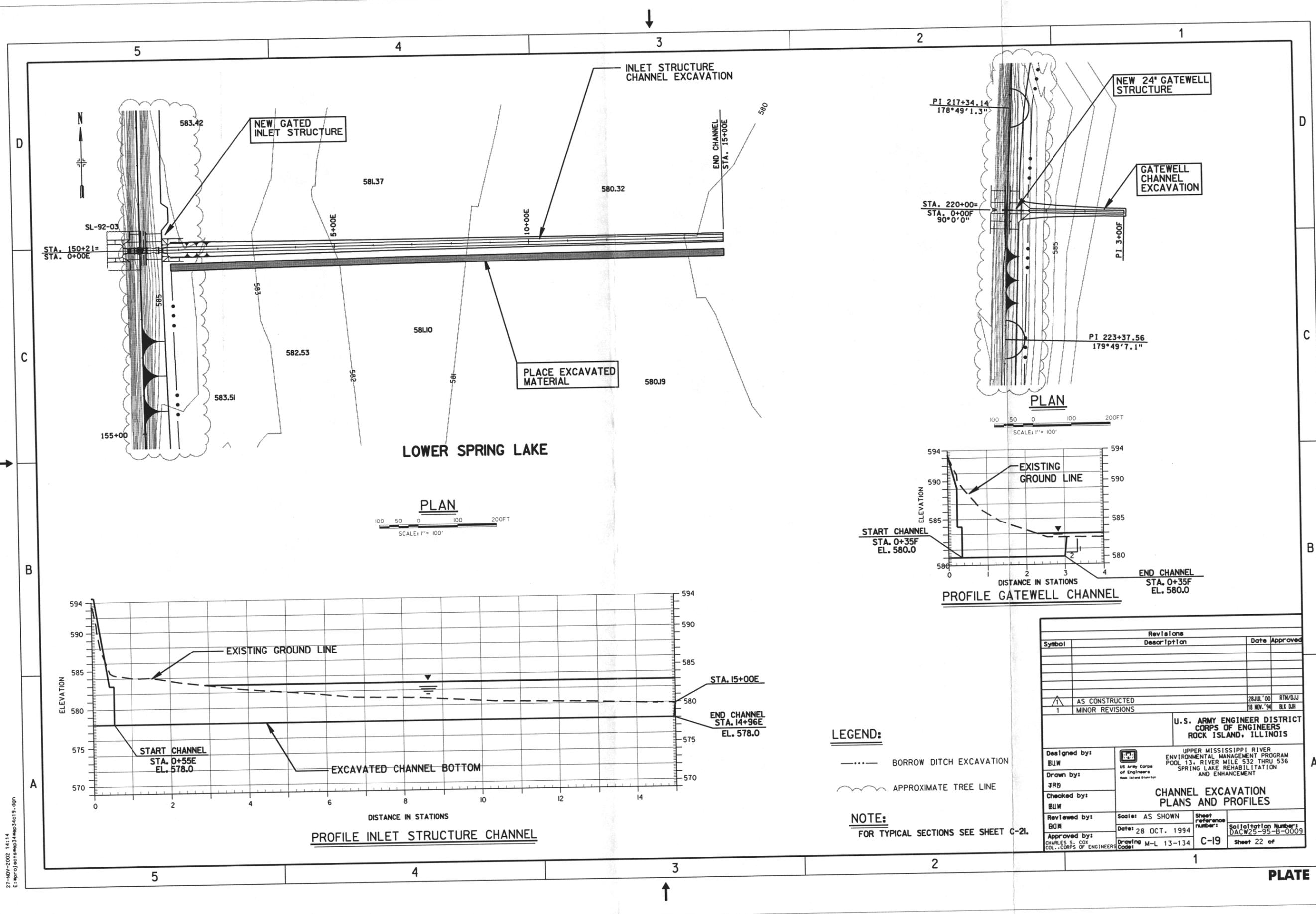
UPPER MISSISSIPPI RIVER  
ENVIRONMENTAL MANAGEMENT PROGRAM  
POOL 13, RIVER MILE 532 THRU 536  
SPRING LAKE REHABILITATION  
AND ENHANCEMENT

**SOUTH HEMI MARSH ACCESS ROAD  
PLAN AND PROFILE**

Scale: AS SHOWN  
Date: 28 OCT. 1994  
Drawing Code: M-L 13-134

Sheet reference number: C-18  
Solicitation Number: DACW25-95-B-0009  
Sheet 21 of

27-MAY-2002 14:13  
E:\proj\springlake\map\c18.dgn



27-NOV-2002 14:14  
E:\proj\ect\rep3\rep3\c19.dgn

| Revisions |                 |            |          |
|-----------|-----------------|------------|----------|
| Symbol    | Description     | Date       | Approved |
| 1         | AS CONSTRUCTED  | 28 JUL '00 | RTM/DJJ  |
| 1         | MINOR REVISIONS | 18 NOV '94 | BLK BJK  |

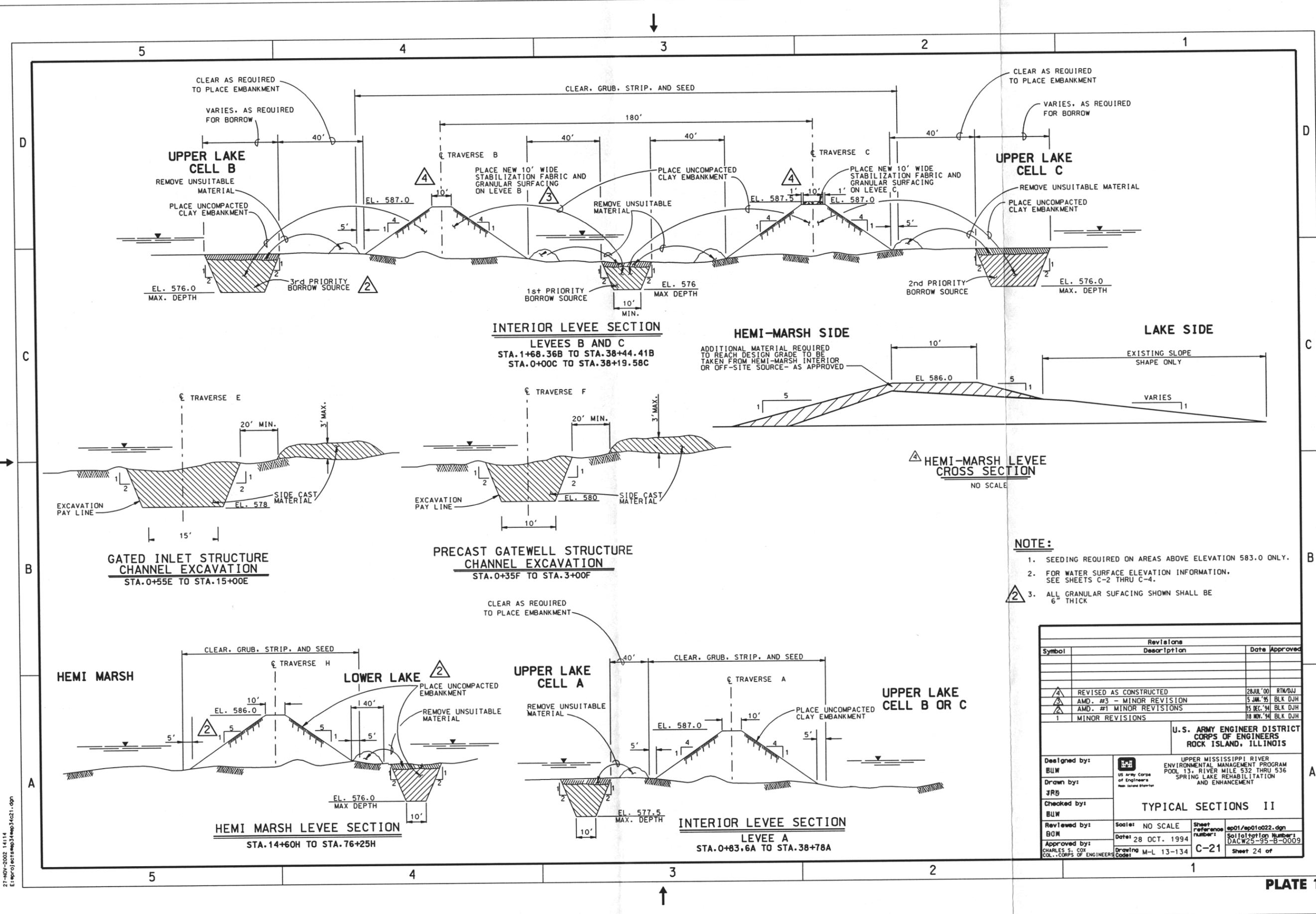
**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

|                                                            |                                                                                                                                                  |                                         |             |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-------------|
| Designed by:<br>BLW                                        | UPPER MISSISSIPPI RIVER<br>ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 13, RIVER MILE 532 THRU 536<br>SPRING LAKE REHABILITATION<br>AND ENHANCEMENT |                                         |             |
| Drawn by:<br>JRB                                           |                                                                                                                                                  |                                         |             |
| Checked by:<br>BLW                                         | <b>CHANNEL EXCAVATION<br/>PLANS AND PROFILES</b>                                                                                                 |                                         |             |
| Reviewed by:<br>BGM                                        |                                                                                                                                                  |                                         |             |
| Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS |                                                                                                                                                  |                                         |             |
| Scale: AS SHOWN                                            | Sheet reference number:<br>C-19                                                                                                                  | Sollitation Number:<br>DACW25-95-B-0009 | Sheet 22 of |
| Date: 28 OCT. 1994                                         | Drawing Code: M-L 13-134                                                                                                                         |                                         |             |

**LEGEND:**  
 - - - - - BORROW DITCH EXCAVATION  
 ~~~~~~ APPROXIMATE TREE LINE

**NOTE:**  
 FOR TYPICAL SECTIONS SEE SHEET C-2.





- NOTE:**
1. SEEDING REQUIRED ON AREAS ABOVE ELEVATION 583.0 ONLY.
  2. FOR WATER SURFACE ELEVATION INFORMATION, SEE SHEETS C-2 THRU C-4.
  3. ALL GRANULAR SUFCING SHOWN SHALL BE 6" THICK

| Symbol | Revisions Description    | Date       | Approved |
|--------|--------------------------|------------|----------|
| △      | REVISED AS CONSTRUCTED   | 28 JUL '00 | RTM/DJH  |
| △      | AMD. #3 - MINOR REVISION | 5 JUN '95  | BLK/DJH  |
| △      | AMD. #1 MINOR REVISIONS  | 15 DEC '94 | BLK/DJH  |
| △      | MINOR REVISIONS          | 18 NOV '94 | BLK/DJH  |

**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

Designed by: BLW  
 Drawn by: JRB  
 Checked by: BLW  
 Reviewed by: BOR  
 Approved by: CHARLES S. COX  
COL., CORPS OF ENGINEERS

**TYPICAL SECTIONS II**

Scale: NO SCALE  
 Date: 28 OCT. 1994  
 Drawing Code: M-L 13-134

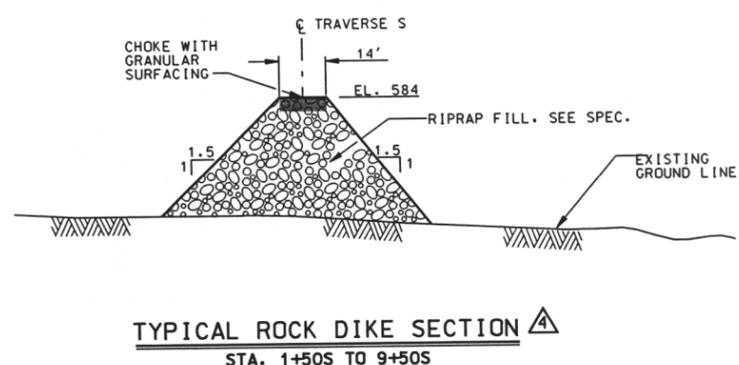
UPPER MISSISSIPPI RIVER ENVIRONMENTAL MANAGEMENT PROGRAM  
 POOL 13, RIVER MILE 532 THRU 536  
 SPRING LAKE REHABILITATION AND ENHANCEMENT

Sheet Reference Number: ap01/ep01a022.dgn  
 Solution Number: DACW25-95-B-0009  
 Sheet 24 of C-21

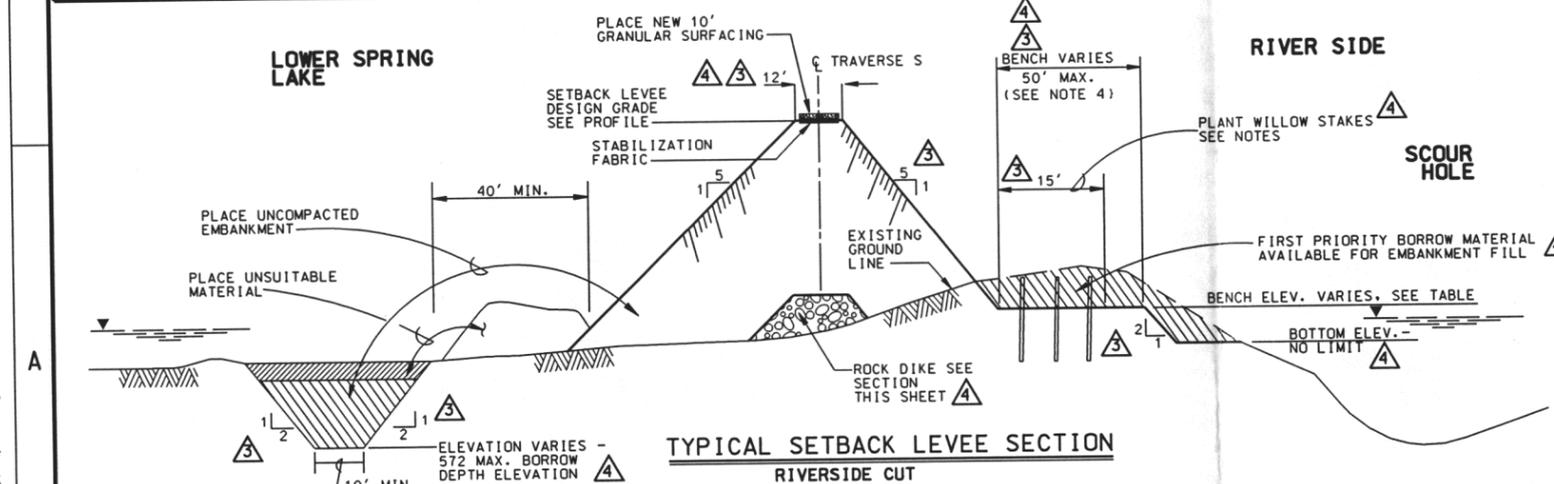
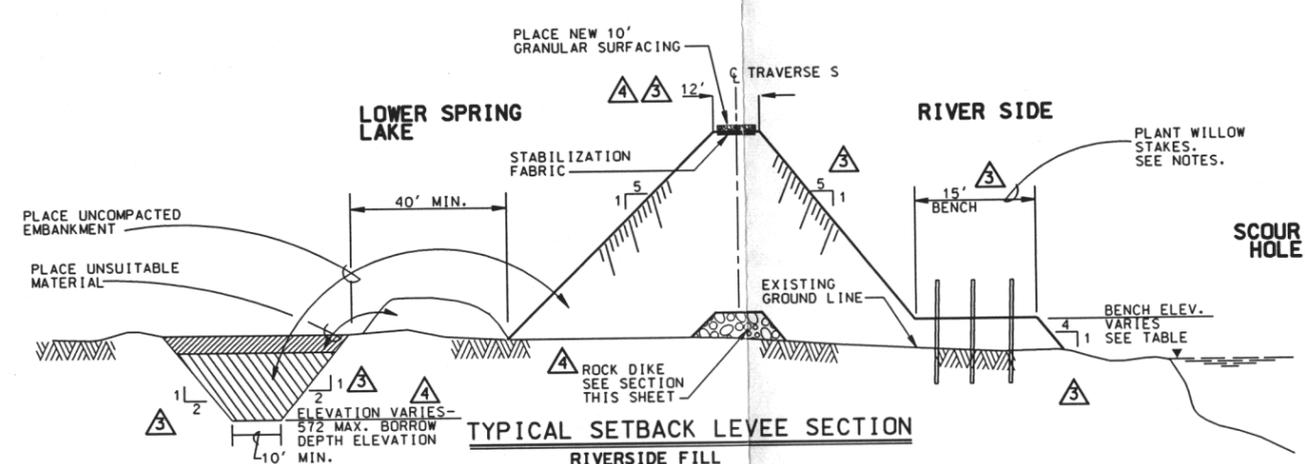
27-MAY-2002 14:14  
E:\proj\ecst\ep3\ep31a021.dgn

### OFFSET DISTANCE FROM LEVEE TRAVERSE TO C OF IMPROVED LEVEE

| STATION | DISTANCE IN FEET | STATION    | DISTANCE IN FEET | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0+00    | 0                | 117+50  | 10 L             | 235+00  | 4 L              | 348+00  | 7 R              | CROSS DIKE |                  |
| 2+50    | 0                | 120+00  | 10 L             | 237+50  | 2 L              | 349+00  | 2 R              | 0+00       | 3 L              |
| 5+00    | 4 L              | 122+50  | 10 L             | 240+00  | 5 L              | 350+00  | 6 R              | 2+00       | 3 L              |
| 7+50    | 6 L              | 125+00  | 5 L              | 242+50  | 6 L              | 351+00  | 4 L              | 4+00       | 5 L              |
| 10+00   | 4 L              | 127+50  | 0.5 L            | 245+00  | 7 L              | 352+00  | 3 L              | 6+00       | 7 L              |
| 12+50   | 10 L             | 130+00  | 6 L              | 247+50  | 10 L             | 353+00  | 0                | 8+00       | 8 L              |
| 15+00   | 13 L             | 132+50  | 2 L              | 250+00  | 7 L              | 354+00  | 3 R              | 10+00      | 8 L              |
| 17+50   | 12 L             | 135+00  | 6 L              | 252+50  | 1 L              | 355+00  | 0                | 12+00      | 5 L              |
| 20+00   | 10 L             | 137+50  | 10 L             | 255+00  | 10 L             | 356+00  | 0                | 14+00      | 5 L              |
| 22+50   | 9 L              | 140+00  | 13 L             | 257+50  | 10 L             | 357+00  | 5 R              | 16+00      | 6 L              |
| 25+00   | 6 L              | 142+50  | 11 L             | 260+00  | 8 L              | 358+00  | 8 R              | 18+00      | 8 L              |
| 27+50   | 4 L              | 145+00  | 10 L             | 262+50  | 7 L              | 359+00  | 8 R              | 20+00      | 9 L              |
| 30+00   | 2 L              | 147+50  | 10 L             | 265+00  | 6 L              | 360+00  | 6 R              | 22+00      | 8 L              |
| 32+50   | 19 L             | 150+00  | 10 L             | 267+50  | 7 L              | 361+00  | 6 R              | 24+00      | 6 L              |
| 35+00   | 5 L              | 152+50  | 12 L             | 270+00  | 8 L              | 362+00  | 6 R              | 26+00      | 7 L              |
| 37+50   | 9 L              | 155+00  | 15 L             | 272+50  | 10 L             | 363+00  | 4 R              | 28+00      | 11 L             |
| 40+00   | 12 L             | 157+50  | 17 L             | 275+00  | 4 L              | 364+00  | 0                | 30+00      | 15 L             |
| 42+50   | 15 L             | 160+00  | 18 L             | 277+50  | 8 L              | 365+00  | 6 R              | 32+00      | 17 L             |
| 45+00   | 17 L             | 162+50  | 19 L             | 280+00  | 5 L              | 366+00  | 2 R              | 34+00      | 19 L             |
| 47+50   | 16 L             | 165+00  | 16 L             | 282+50  | 0                | 367+00  | 6 L              | 36+00      | 15 L             |
| 50+00   | 15 L             | 167+50  | 10 L             | 285+00  | 0                | 368+00  | 0                | 38+00      | 10 L             |
| 52+50   | 16 L             | 170+00  | 7 L              | 287+50  | 0                | 369+00  | 0                | 40+00      | 6 L              |
| 55+00   | 17 L             | 172+50  | 6 L              | 290+00  | 5 R              | 370+00  | 0                | 42+00      | 4 L              |
| 57+50   | 16 L             | 175+00  | 6 L              | 292+50  | 9 L              | 371+00  | 0                | 44+00      | 2 L              |
| 60+00   | 14 L             | 177+50  | 7 L              | 295+00  | 9 L              | 372+00  | 2 R              | 46+00      | 0                |
| 62+50   | 12 L             | 180+00  | 4 L              | 297+50  | 0                | 372+50  | 2 R              | 48+00      | 2 L              |
| 65+00   | 9 L              | 182+50  | 0                | 300+00  | 0                | 373+00  | 0                | 50+00      | 2 L              |
| 67+50   | 15 L             | 185+00  | 0                | 302+50  | 1 L              |         |                  | 52+00      | 3 L              |
| 70+00   | 0                | 187+50  | 2 L              | 305+00  | 4 L              |         |                  | 54+00      | 4 L              |
| 72+50   | 11 L             | 190+00  | 6 L              | 307+50  | 9 L              |         |                  | 56+00      | 5 L              |
| 75+00   | 5 L              | 192+50  | 0                | 310+00  | 0                |         |                  | 58+00      | 7 L              |
| 77+50   | 5 L              | 195+00  | 8 L              | 312+50  | 0                |         |                  | 60+00      | 8 L              |
| 80+00   | 2 L              | 197+50  | 7 L              | 315+00  | 0                |         |                  | 62+00      | 11 L             |
| 82+50   | 2 L              | 200+00  | 7 L              | 317+50  | 5 L              |         |                  | 64+00      | 14 L             |
| 85+00   | 3 L              | 202+50  | 6 L              | 320+00  | 1 L              |         |                  | 66+00      | 19 L             |
| 87+50   | 1 L              | 205+00  | 9 L              | 322+50  | 4 L              |         |                  | 68+00      | 24 L             |
| 90+00   | 1 L              | 207+50  | 16 L             | 325+00  | 5 R              |         |                  | 70+00      | 26 L             |
| 92+50   | 1 L              | 214+00  | 14 L             | 327+50  | 0                |         |                  | 72+00      | 16 L             |
| 95+00   | 4 L              | 215+00  | 13 L             | 330+00  | 0                |         |                  | 74+00      | 6 L              |
| 97+50   | 2 L              | 217+50  | 11 L             | 332+50  | 1 R              |         |                  |            |                  |
| 100+00  | 1 L              | 220+00  | 7 L              | 335+00  | 3 L              |         |                  |            |                  |
| 102+50  | 2 L              | 222+50  | 7 L              | 337+50  | 11 L             |         |                  |            |                  |
| 105+00  | 9 L              | 225+00  | 8 L              | 340+00  | 6 L              |         |                  |            |                  |
| 110+00  | 10 L             | 227+50  | 9 L              | 342+50  | 0                |         |                  |            |                  |
| 112+50  | 10 L             | 230+00  | 10 L             | 345+00  | 0                |         |                  |            |                  |
| 115+00  | 9 L              | 232+50  | 9 L              | 347+50  | 0                |         |                  |            |                  |



| STATION | ELEVATION | STATION | ELEVATION |
|---------|-----------|---------|-----------|
| 0+00    | NO BENCH  | 10+25   | 584       |
| 0+50    | 586       | 10+50   | 586       |
| 2+75    | 586       | 12+75   | NO BENCH  |
| 3+00    | 584       |         |           |



- NOTE:**
- CUTTINGS FOR WILLOW STAKES SHALL BE HARVESTED FROM WITHIN THE SPRING LAKE REFUGE AS DIRECTED BY THE CONTRACTING OFFICER.
  - WILLOW STAKES SHALL BE PLANTED IN 3 ROWS SPACED 4' APART. STAKES SHALL BE SPACED 3' APART WITHIN ROWS. ROWS SHALL BE STAGGERED TO CREATE AN ASYMMETRICAL STAKE PATTERN. PLANTING DEPTH SHALL BE 5' TO 6'.
  - ALL GRANULAR SURFACING SHALL BE 6" THICK.
  - CONTRACTOR MAY BORROW BEYOND 50' BENCH. A SIDE SLOPE NO STEEPER THAN 1V ON 2H MUST BE MAINTAINED ON ALL BORROW EXCAVATION.

| Symbol | Revisions Description     | Date          | Approved |
|--------|---------------------------|---------------|----------|
| 5      | REVISED AS CONSTRUCTED    | 28 JUL '00    | RTM/DJW  |
| 4      | CONTRACT MOD.             | 12 AUGUST '99 | BLK/DJW  |
| 3      | CONTRACT MOD.             | 11 MARCH '99  | BLK/DJW  |
| 2      | AMD. #1 - MINOR REVISIONS | 23 DEC. 1998  | BLK/DJW  |
| 1      | MINOR REVISIONS           | 18 NOV. 1998  | BLK/DJW  |

**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

Designed by: BLW  
 Drawn by: JRB  
 Checked by: BLW  
 Reviewed by: BOR  
 Approved by: CHARLES S. COX  
 COL., CORPS OF ENGINEERS

UPPER MISSISSIPPI RIVER  
 ENVIRONMENTAL MANAGEMENT PROGRAM  
 POOL 13, RIVER MILE 532 THRU 536  
 SPRING LAKE REHABILITATION  
 AND ENHANCEMENT

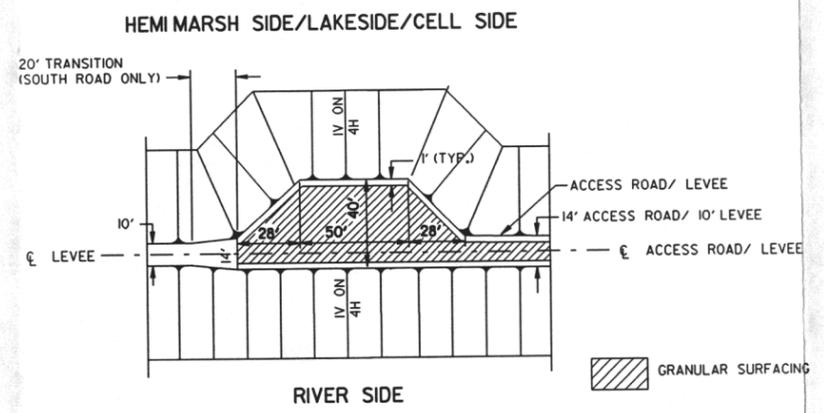
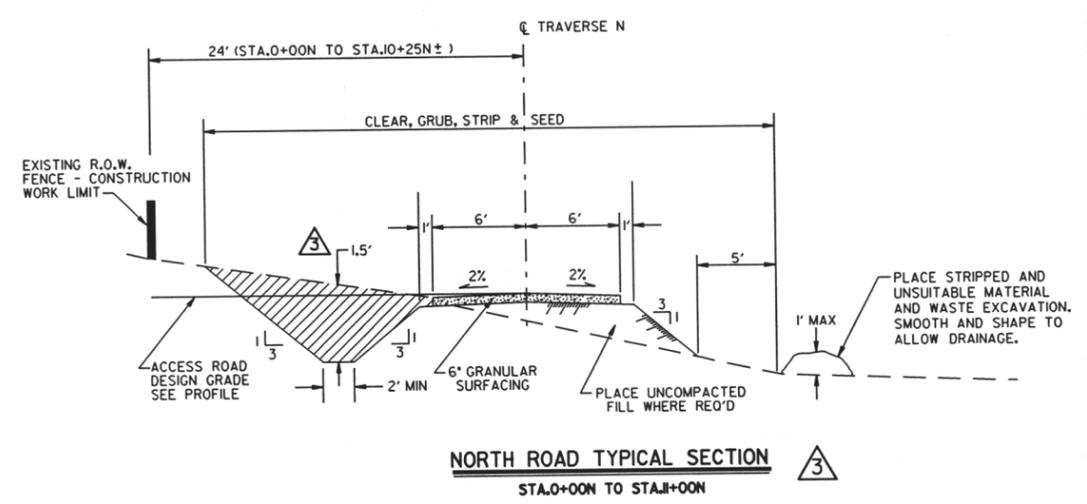
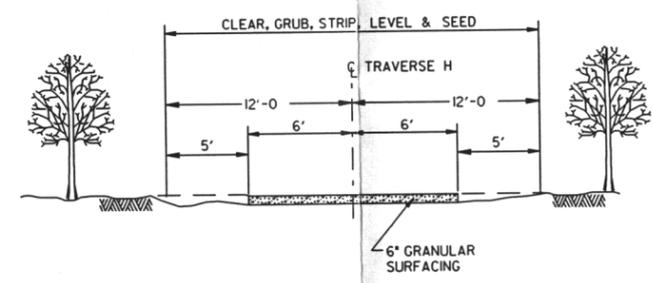
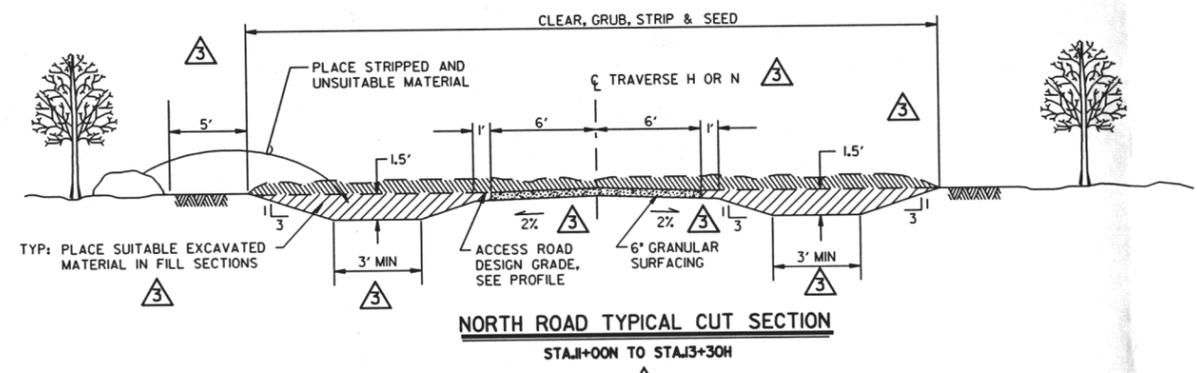
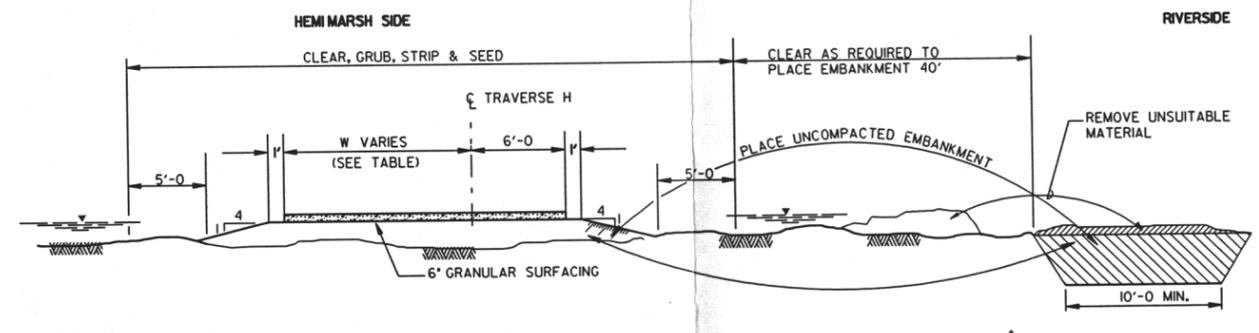
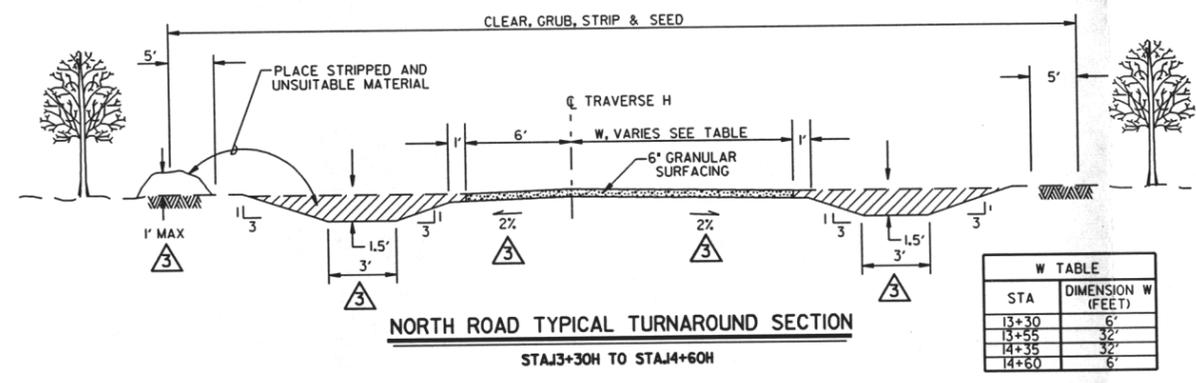
**TYPICAL SECTIONS III**

Scale: NO SCALE  
 Date: 28 OCT. 1994  
 Drawing Code: M-L 13-134

Sheet reference number: C-22  
 Solicitation Number: DACW25-95-B-0009  
 Sheet 25 of

27-MAY-2002 14:15  
 E:\proj\factmap\step\14c22.dgn

27-MAY-2002 14:15  
 E:\proj\201\201\201\201\201\201.dgn



| Revisions |                         |           |          |
|-----------|-------------------------|-----------|----------|
| Symbol    | Description             | Date      | Approved |
| 4         | REVISED AS CONSTRUCTED  | 28 JUL 00 | RTH/DJ   |
| 3         | CONTRACT MODIFICATION   | 8 DEC 95  | BLK/DJ   |
| 2         | AMD. #1 MINOR REVISIONS | 15 DEC 94 | BLK/DJ   |
| 1         | MINOR REVISIONS         | 18 NOV 94 | BLK/DJ   |

**U.S. ARMY ENGINEER DISTRICT  
 CORPS OF ENGINEERS  
 ROCK ISLAND, ILLINOIS**

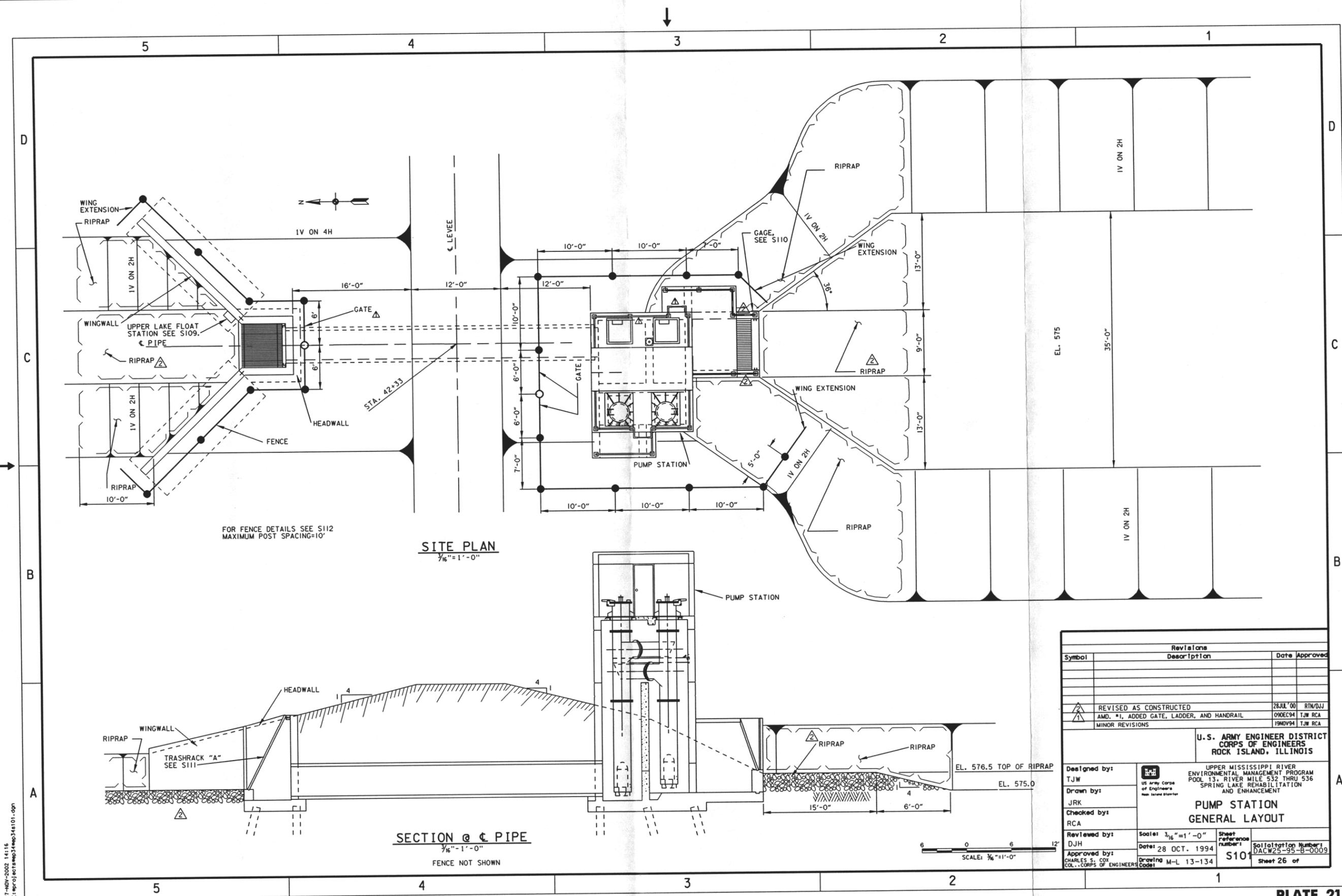
Designed by: BUW  
 Drawn by: JRB  
 Checked by: BUW  
 Reviewed by: BDR  
 Approved by: CHARLES S. COX  
 COL., CORPS OF ENGINEERS

**MISCELLANEOUS  
 SECTIONS AND DETAILS**

Scale: NO SCALE  
 Date: 28 OCT. 1994  
 Drawing Code: M-L 13-134

Upper Mississippi River  
 Environmental Management Program  
 Pool 13, River Mile 532 thru 536  
 Spring Lake Rehabilitation  
 and Enhancement

Sheet Reference Number: C-23  
 Solicitation Number: DACW25-95-B-0009  
 Sheet 25A of



FOR FENCE DETAILS SEE S112  
MAXIMUM POST SPACING=10'

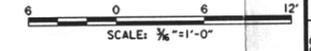
**SITE PLAN**  
1/16" = 1'-0"

**SECTION @ C PIPE**  
1/16" = 1'-0"  
FENCE NOT SHOWN

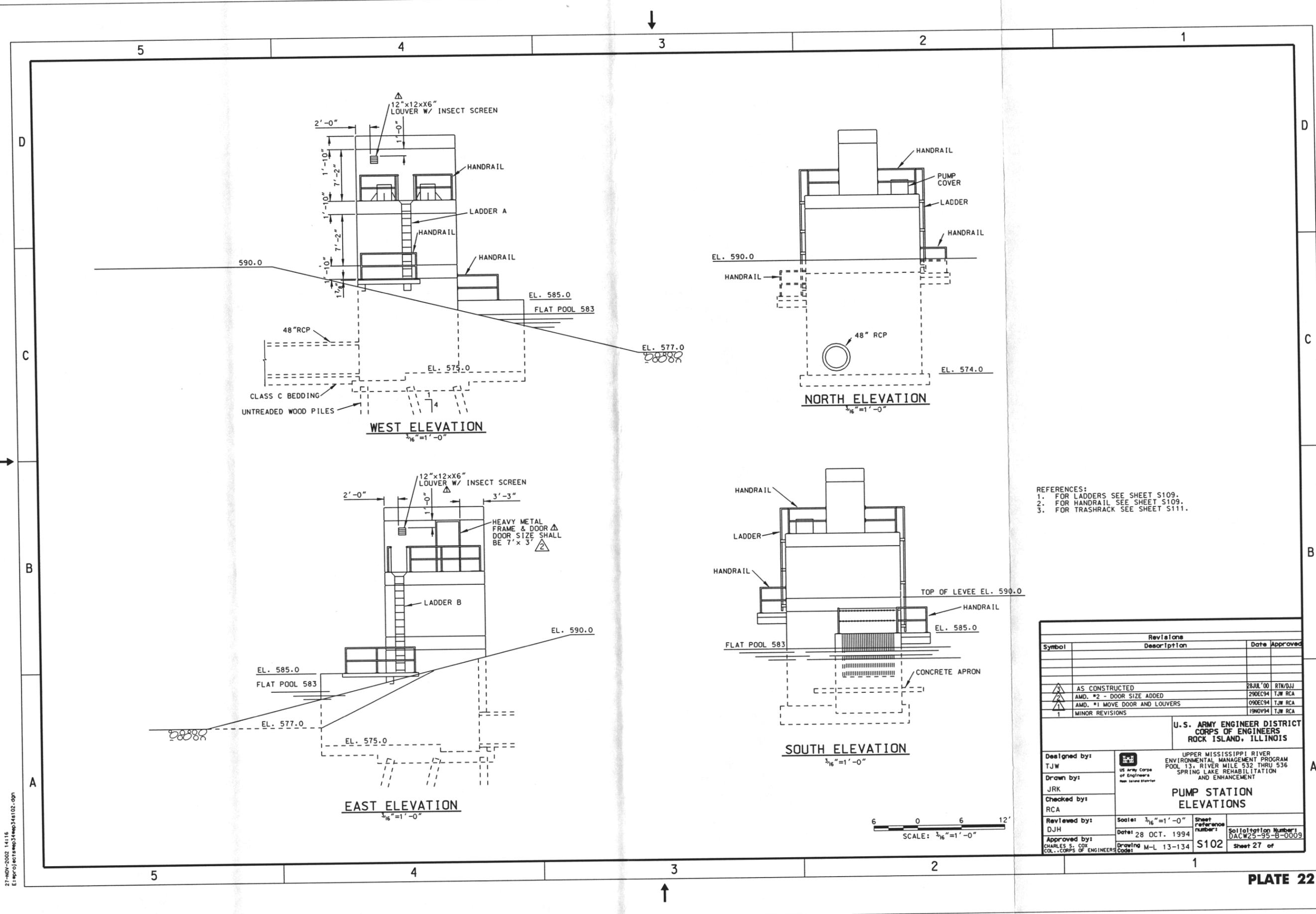
| Revisions |   |                    |
|-----------|---|--------------------|
| Symbol    | Description                               | Date Approved      |
|           |   |                    |
|           |   |                    |
| ▲         | REVISED AS CONSTRUCTED                    | 28 JUL '00 RIN/DJJ |
| ▲         | AMD. #1, ADDED GATE, LADDER, AND HANDRAIL | 09 DEC 94 TJW/RCA  |
| ▲         | MINOR REVISIONS                           | 19 NOV 94 TJW/RCA  |

**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

|  |  |  |   |
|--|--|--|---|
| Designed by:<br>TJW  | UPPER MISSISSIPPI RIVER<br>ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 13, RIVER MILE 532 THRU 536<br>SPRING LAKE REHABILITATION<br>AND ENHANCEMENT | Sheet<br>reference<br>number:<br><b>S101</b> | Solicitation Number:<br>DACW25-95-B-0009<br>Sheet 26 of |
| Drawn by:<br>JRK   |  |  |   |
| Checked by:<br>RCA   | <b>PUMP STATION<br/>GENERAL LAYOUT</b>   |  |   |
| Reviewed by:<br>DJH  | Scale: 3/16" = 1'-0"   | Date: 28 OCT. 1994                           | Drawing Code: M-L 13-134                                |
| Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS |  |  |   |



27-MOV-2002 14116  
E:\proj\trch\p3\p3\101.dgn



- REFERENCES:  
 1. FOR LADDERS SEE SHEET S109.  
 2. FOR HANDRAIL SEE SHEET S109.  
 3. FOR TRASHRACK SEE SHEET S111.

| Revisions |                               |                  |
|-----------|-------------------------------|------------------|
| Symbol    | Description                   | Date Approved    |
| ▲         | AS CONSTRUCTED                | 28JUL'00 RTN/DJJ |
| ▲         | AMD. #2 - DOOR SIZE ADDED     | 29DEC94 TJW RCA  |
| ▲         | AMD. #1 MOVE DOOR AND LOUVERS | 09DEC94 TJW RCA  |
| 1         | MINOR REVISIONS               | 19NOV94 TJW RCA  |

**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

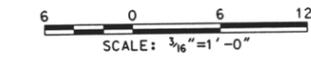
UPPER MISSISSIPPI RIVER  
 ENVIRONMENTAL MANAGEMENT PROGRAM  
 POOL 13, RIVER MILE 532 THRU 536  
 SPRING LAKE REHABILITATION  
 AND ENHANCEMENT

**PUMP STATION  
ELEVATIONS**

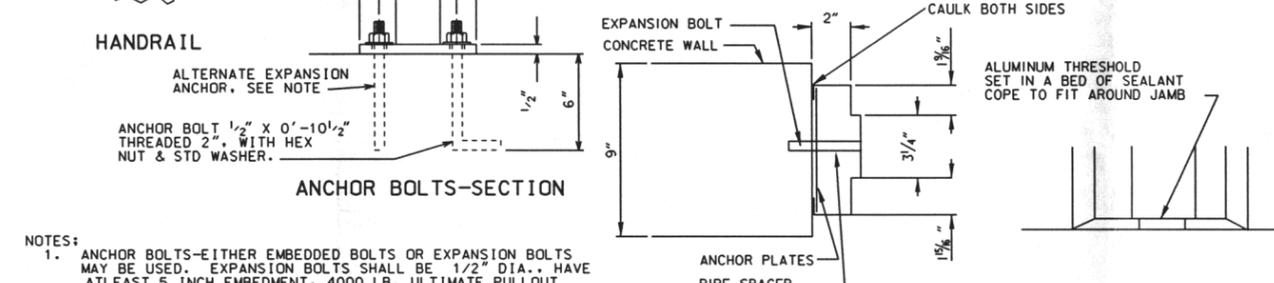
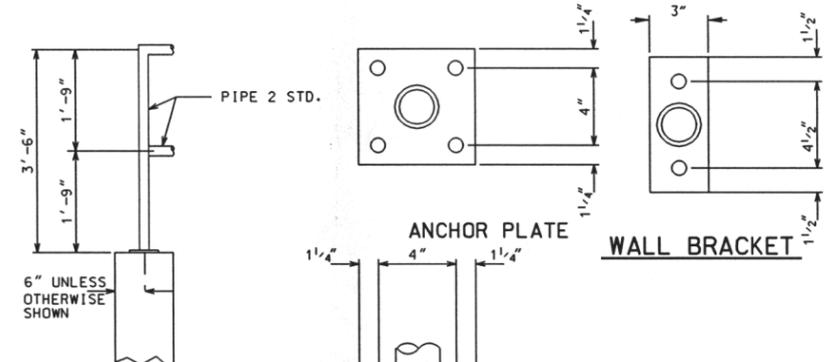
Designed by: TJW  
 Drawn by: JRK  
 Checked by: RCA  
 Reviewed by: DJH  
 Approved by: CHARLES S. COFF, COL., CORPS OF ENGINEERS

Scale: 3/16" = 1' - 0"  
 Date: 28 OCT. 1994  
 Drawing: M-L 13-134

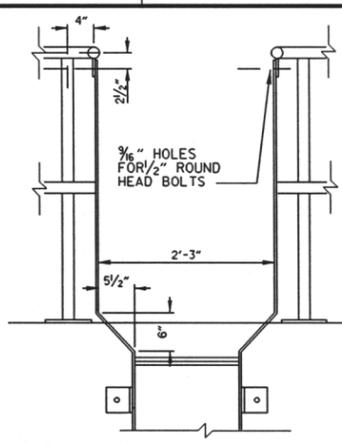
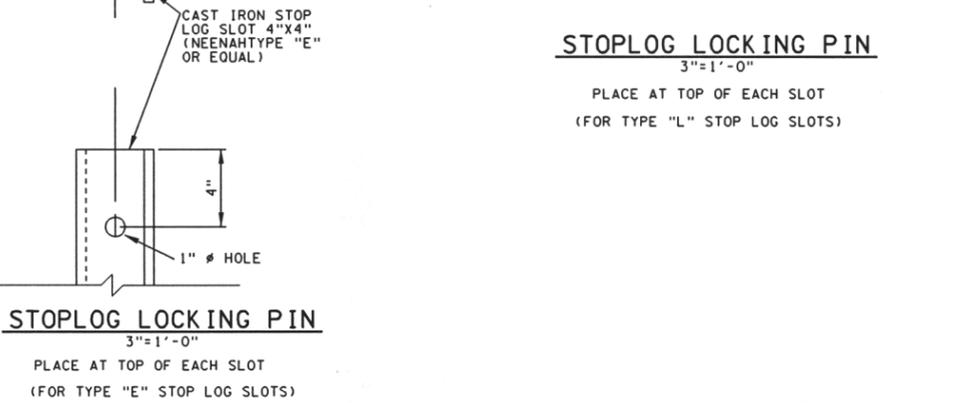
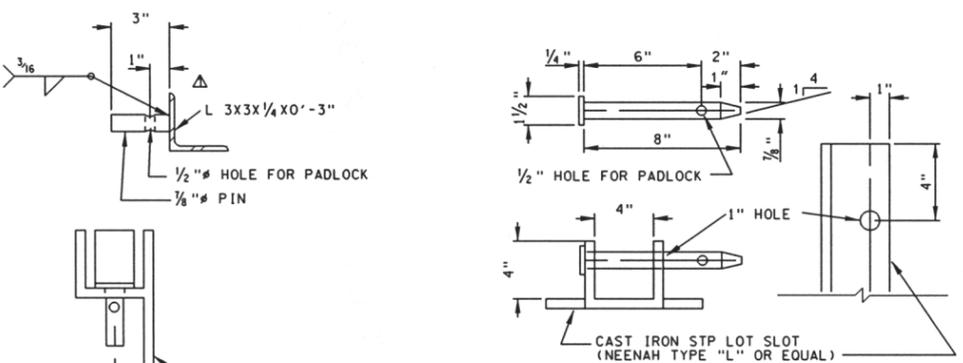
Sheet reference number: S102  
 Solicitation Number: DACW29-95-B-0009  
 Sheet 27 of



27-MAY-2002 14:16  
 E:\proj\act\pump\pump346102.dgn



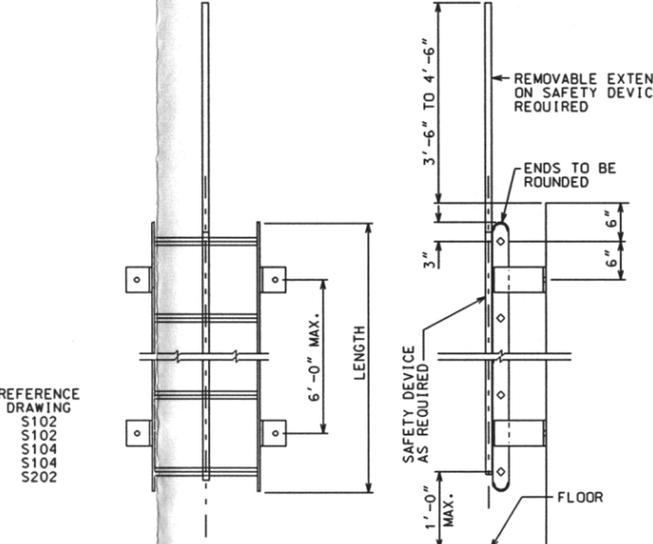
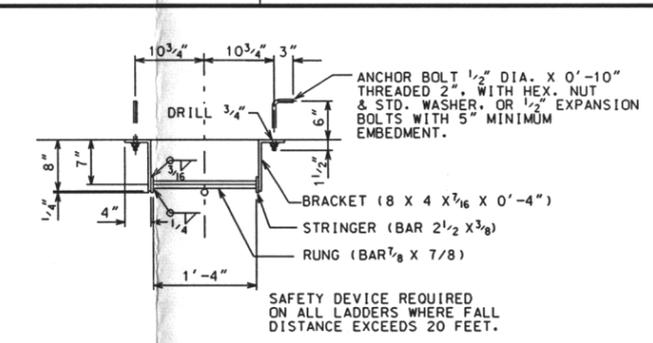
- NOTES:
- ANCHOR BOLTS—EITHER EMBEDDED BOLTS OR EXPANSION BOLTS MAY BE USED. EXPANSION BOLTS SHALL BE 1/2" DIA., HAVE AT LEAST 5 INCH EMBEDMENT, 4000 LB. ULTIMATE PULLOUT AND 6000 LB. ULTIMATE SHEAR. ALL ANCHOR BOLTS AND FASTENERS TO BE GALVANIZED.
  - WELD ALL PIPE JOINTS WITH CONTINUOUS BEAD, SIZE EQUAL TO PIPE WALL THICKNESS, AND DRESS SMOOTH.
  - HANDRAIL TO BE GALVANIZED AFTER FABRICATION.
  - MAXIMUM POST SPACING 6'-0"



STEP THRU AT DECK  
1" = 1'-0"

LADDER TABLE

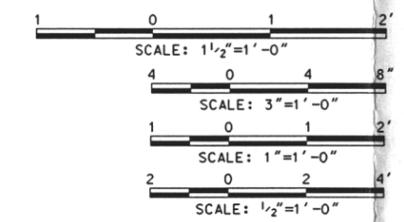
| LADDER | QUANTITY | WALKTHRU | LENGTH | GATE | SAFETY DEVICE | REFERENCE DRAWING |
|--------|----------|----------|--------|------|---------------|-------------------|
| A      | 1        | YES      | 10.5   | YES  | NO            | S102              |
| B      | 1        | YES      | 13.5   | YES  | NO            | S102              |
| C      | 1        | NO       | 24.5   | NO   | YES           | S104              |
| D      | 1        | NO       | 23.5   | NO   | YES           | S104              |
| E      | 2        | NO       | 16.5   | NO   | NO            | S202              |



LADDER DETAIL

SCALE: 1" = 1'-0"  
1" = 6" = 0"

SAFETY DEVICE REQUIRED ON ALL LADDERS WHERE FALL DISTANCE EXCEEDS 20 FEET.

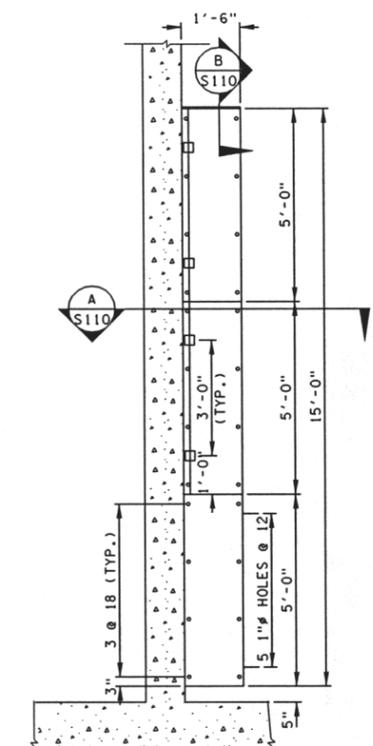


| Revisions |   |          |          |
|-----------|---|----------|----------|
| Symbol    | Description                                     | Date     | Approved |
| 2         | REVISED AS CONSTRUCTED                          | 28JUL'00 | RJM/DJJ  |
| 1         | AMD #1, LADDER GATE ADDED, ANCHOR PLATE REMOVED | 09OCT94  | TJM/RCA  |
| 1         | MINOR REVISIONS                                 | 19NOV94  | TJM/RCA  |

**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

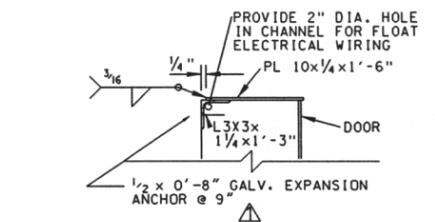
|  |  |
|--|--|
| Designed by:<br>TJW  | UPPER MISSISSIPPI RIVER<br>ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 13, RIVER MILE 532 THRU 536<br>SPRING LAKE REHABILITATION<br>AND ENHANCEMENT |
| Drawn by:<br>JRK   |  |
| Checked by:<br>RCA   | <b>PUMP STATION<br/>MISCELLANEOUS STEEL I</b>  |
| Reviewed by:<br>DJH  | Scale: AS SHOWN  |
| Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS | Date: 28 OCT. 1994   |
|  | Sheet reference number:<br>S109  |
|  | Solicitation Number:<br>DACW25-95-B-0009   |
|  | Drawing Code:<br>M-L 13-134  |
|  | Sheet 34 of  |

27-MDY-2002 14:17  
E:\proj\elect\epo34\epo34s109.dgn

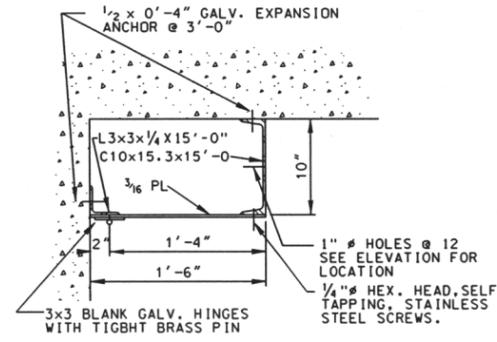


**FLOAT STATION COVER  
INSIDE PUMP STATION**  
1/2" = 1'-0"

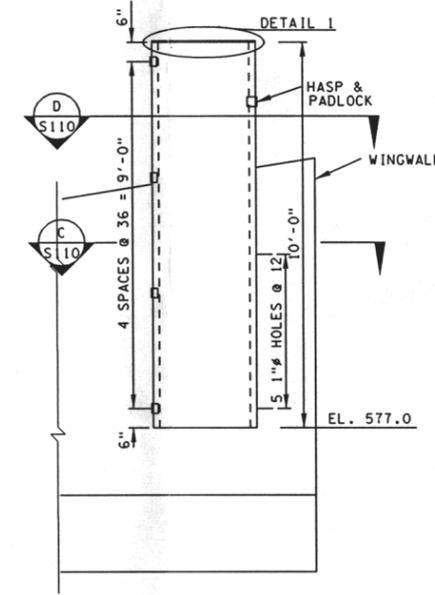
MAKE 1 AS SHOWN AND 1 OPPOSITE HAND



**SECTION B**  
1/2" = 1'-0" S110

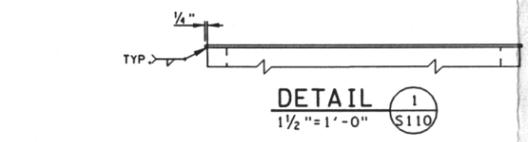


**SECTION A**  
1/2" = 1'-0" S110

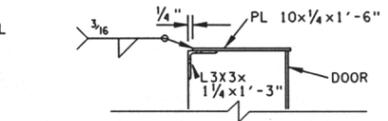


**FLOAT STATION COVER  
ON WINGWALL**  
1/2" = 1'-0"

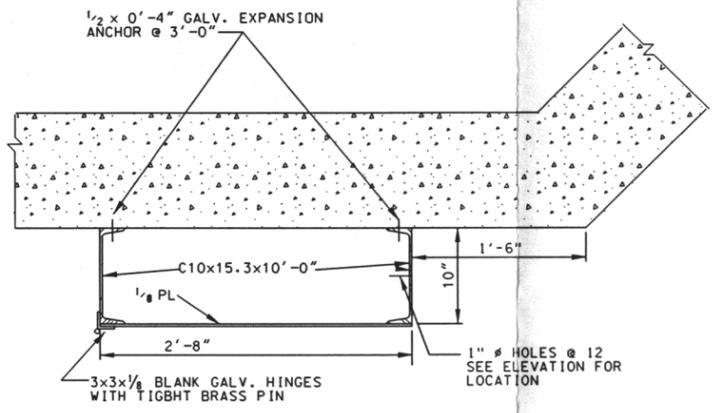
MAKE 1 AS SHOWN AND 1 OPPOSITE HAND



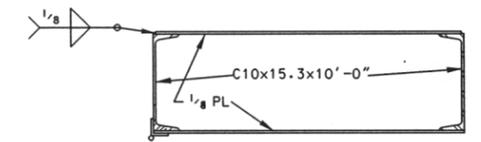
**DETAIL 1**  
1/2" = 1'-0" S110



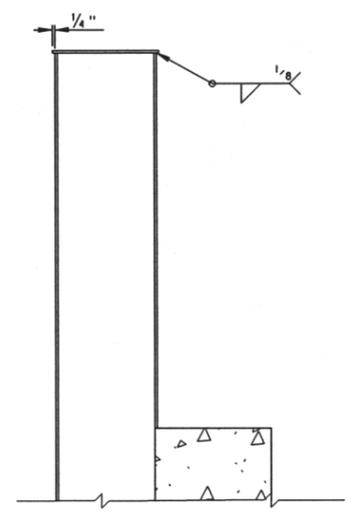
**SECTION E**  
1/2" = 1'-0" S110



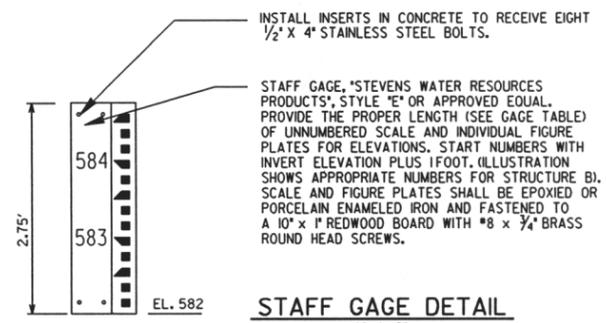
**SECTION C**  
1/2" = 1'-0" S110



**SECTION D**  
1/2" = 1'-0" S110



**SECTION E**  
1/2" = 1'-0" S110



**STAFF GAGE DETAIL**  
1" = 1'-0"

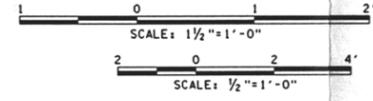
INSTALL INSERTS IN CONCRETE TO RECEIVE EIGHT 1/2" X 4" STAINLESS STEEL BOLTS.

STAFF GAGE, "STEVENS WATER RESOURCES PRODUCTS", STYLE "E" OR APPROVED EQUAL. PROVIDE THE PROPER LENGTH (SEE GAGE TABLE) OF UNNUMBERED SCALE AND INDIVIDUAL FIGURE PLATES FOR ELEVATIONS. START NUMBERS WITH INVERT ELEVATION PLUS 1 FOOT. (ILLUSTRATION SHOWS APPROPRIATE NUMBERS FOR STRUCTURE B). SCALE AND FIGURE PLATES SHALL BE EPOXIED OR PORCELAIN ENAMELED IRON AND FASTENED TO A 10" X 1" REDWOOD BOARD WITH #8 X 3/4" BRASS ROUND HEAD SCREWS.

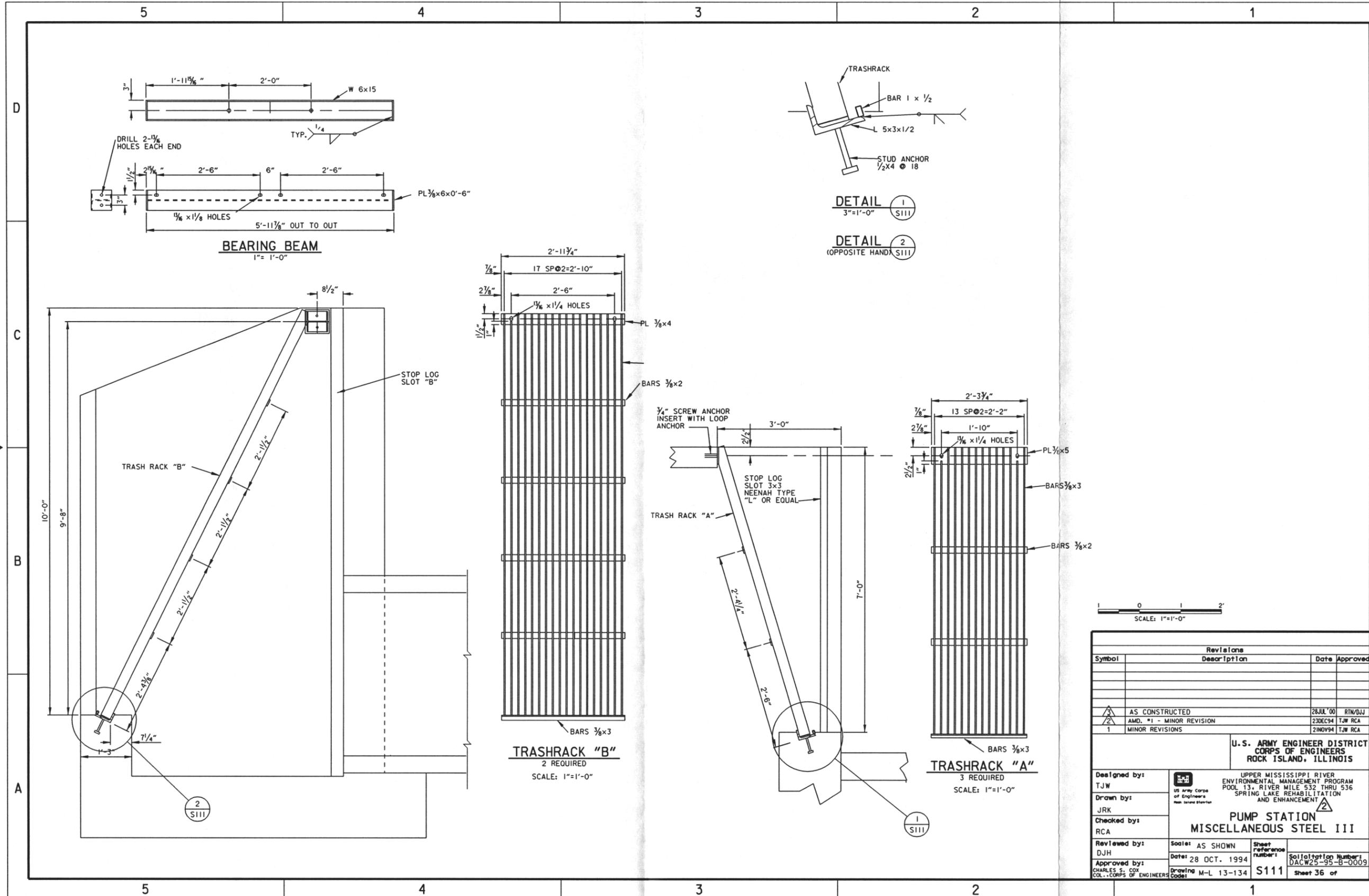
| Revisions |                                  |          |          |
|-----------|----------------------------------|----------|----------|
| Symbol    | Description                      | Date     | Approved |
|           |                                  |          |          |
|           |                                  |          |          |
|           |                                  |          |          |
| AS        | AS CONSTRUCTED                   | 28JUL'00 | RJM/OJJ  |
| AMD.      | #1 ADDED GAGE, FLOATWELL ANCHORS | 09DEC94  | TJW RCA  |
| 1         | MINOR REVISIONS                  | 21NOV94  | TJW RCA  |

**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

|   |                                 |  |                         |
|---|---------------------------------|--|-------------------------|
| <b>Designed by:</b><br>TJW  |                                 | UPPER MISSISSIPPI RIVER<br>ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 13, RIVER MILE 532 THRU 536<br>SPRING LAKE REHABILITATION<br>AND ENHANCEMENT |                         |
| <b>Drawn by:</b><br>JRK   |                                 | <b>PUMP STATION<br/>MISCELLANEOUS STEEL II</b>   |                         |
| <b>Checked by:</b><br>TJW   | <b>Scale:</b>                   | <b>Sheet Reference Number:</b>   | <b>Revision Number:</b> |
| <b>Reviewed by:</b><br>RCA  | <b>Date:</b> 28 OCT. 1994       | <b>S110</b>  | <b>Sheet 35 of</b>      |
| <b>Approved by:</b><br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS | <b>Drawing Code:</b> M-L 13-134 |  |                         |



27-NOV-2002 14:17  
E:\proj\act\amp\34\p34s110.dgn



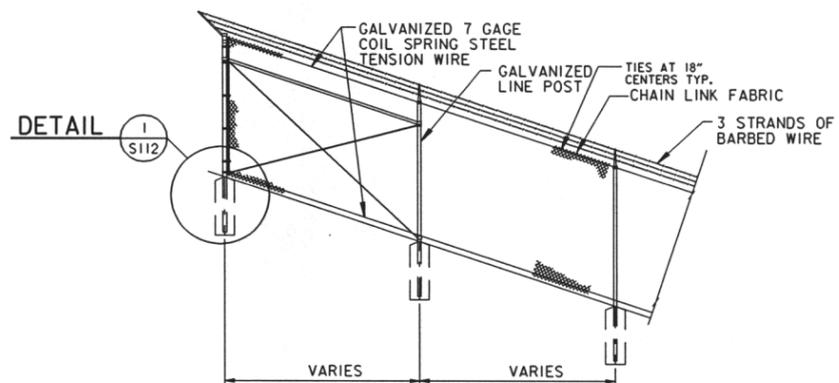
27-NOV-2002 14:17  
 E:\proj\act\amp\34\amp\34s111.dgn

1 0 1 2'  
 SCALE: 1"=1'-0"

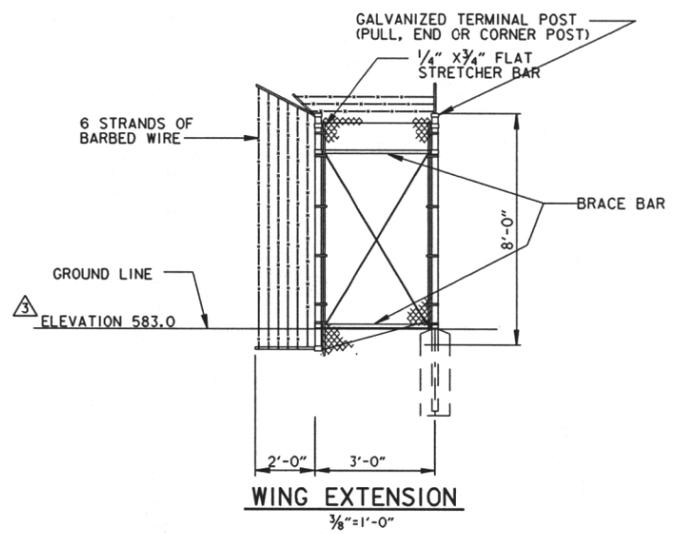
| Revisions |                 |         |          |
|-----------|-----------------|---------|----------|
| Symbol    | Description     | Date    | Approved |
| AS        | AS CONSTRUCTED  | 28JUL00 | RTM/DJJ  |
| AMD. #1   | MINOR REVISION  | 23DEC94 | TJW/RCA  |
| 1         | MINOR REVISIONS | 21NOV94 | TJW/RCA  |

**U.S. ARMY ENGINEER DISTRICT  
 CORPS OF ENGINEERS  
 ROCK ISLAND, ILLINOIS**

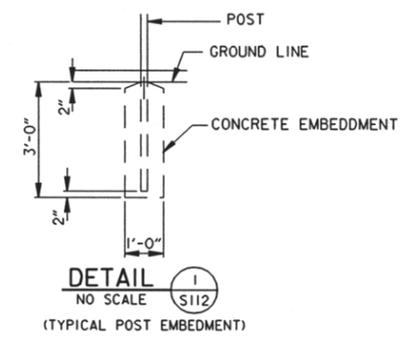
|  |   |   |
|--|---|---|
| Designed by:<br>TJW<br>Drawn by:<br>JRK<br>Checked by:<br>RCA<br>Reviewed by:<br>DJH<br>Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS | Scale: AS SHOWN<br>Date: 28 OCT. 1994<br>Drawing Code: M-L 13-134 | Sheet Reference Number:<br><b>S111</b><br>Solicitation Number:<br>DACW25-95-B-0009<br>Sheet 36 of |
|--|---|---|



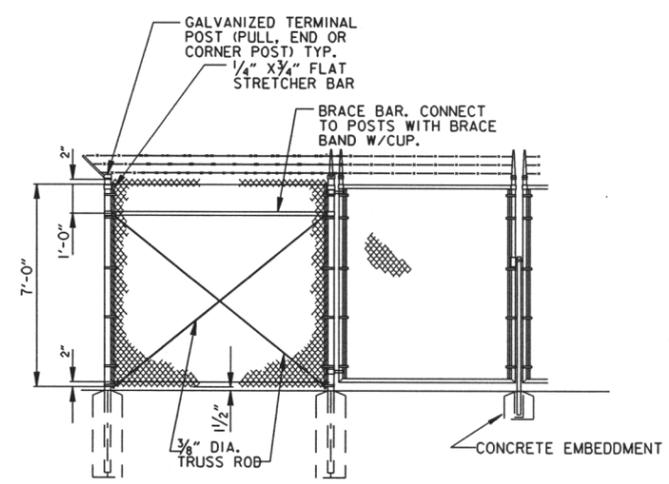
**TYPICAL FENCE POST SPACING**  
 $\frac{3}{8}'' = 1'-0''$



**WING EXTENSION**  
 $\frac{3}{8}'' = 1'-0''$



**DETAIL 1 S112**  
 NO SCALE  
 (TYPICAL POST EMBEDMENT)



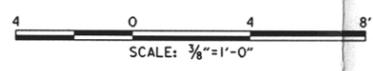
**SWING GATE ELEVATION**  
 $\frac{3}{8}'' = 1'-0''$

NOTE:  
 MAXIMUM POST SPACING=10'.

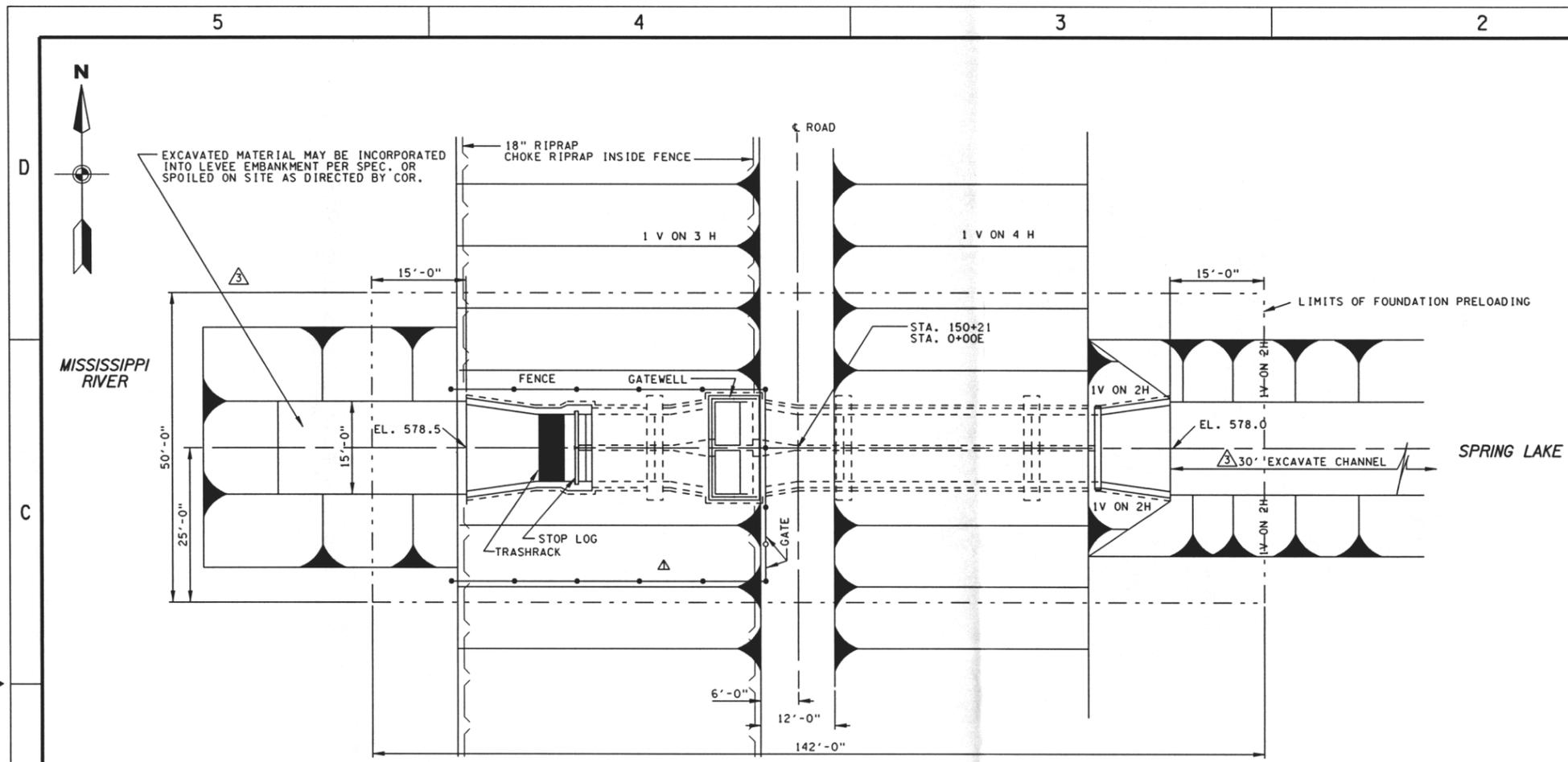
| Revisions |                          |          |          |
|-----------|--------------------------|----------|----------|
| Symbol    | Description              | Date     | Approved |
|           |                          |          |          |
|           |                          |          |          |
| ⚠         | REVISED AS CONSTRUCTED   | 28JUL'00 | RIN/DJJ  |
| ⚠         | AMD. #1 - MINOR REVISION | 23DEC94  | TJW/RCA  |
| 1         | MINOR REVISIONS          | 19NOV94  | TJW/RCA  |

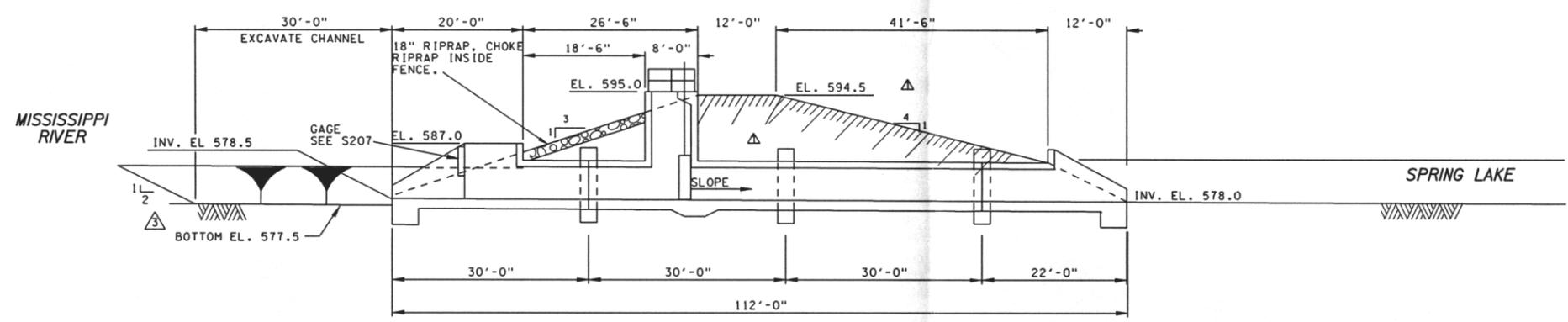
|  |  |
|--|--|
| U.S. ARMY ENGINEER DISTRICT<br>CORPS OF ENGINEERS<br>ROCK ISLAND, ILLINOIS |  |
| Designed by:<br>TJW  | UPPER MISSISSIPPI RIVER<br>ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 13, RIVER MILE 532 THRU 536<br>SPRING LAKE REHABILITATION<br>AND ENHANCEMENT |
| Drawn by:<br>JRK   |  |
| Checked by:<br>RCA   | PUMP STATION<br>SECURITY FENCE LAYOUT  |
| Reviewed by:<br>DJH  |  |
| Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS                 | Scale:<br>Date: 28 OCT. 1994<br>Drawing Code: M-L 13-134   |
|  | Sheet reference number:<br>S112  |
|  | Solicitation Number:<br>DACW25-95-B-0009<br>Sheet 37 of  |



27-NOV-2002 14:18  
 E:\proj\act\temp\temp34s112.dgn



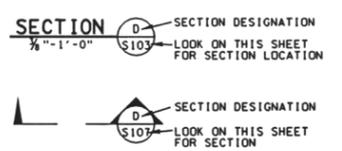
**SITE PLAN**  
1"=10'-0"



**ELEVATION**  
1"=10'-0"



**LEGEND:**



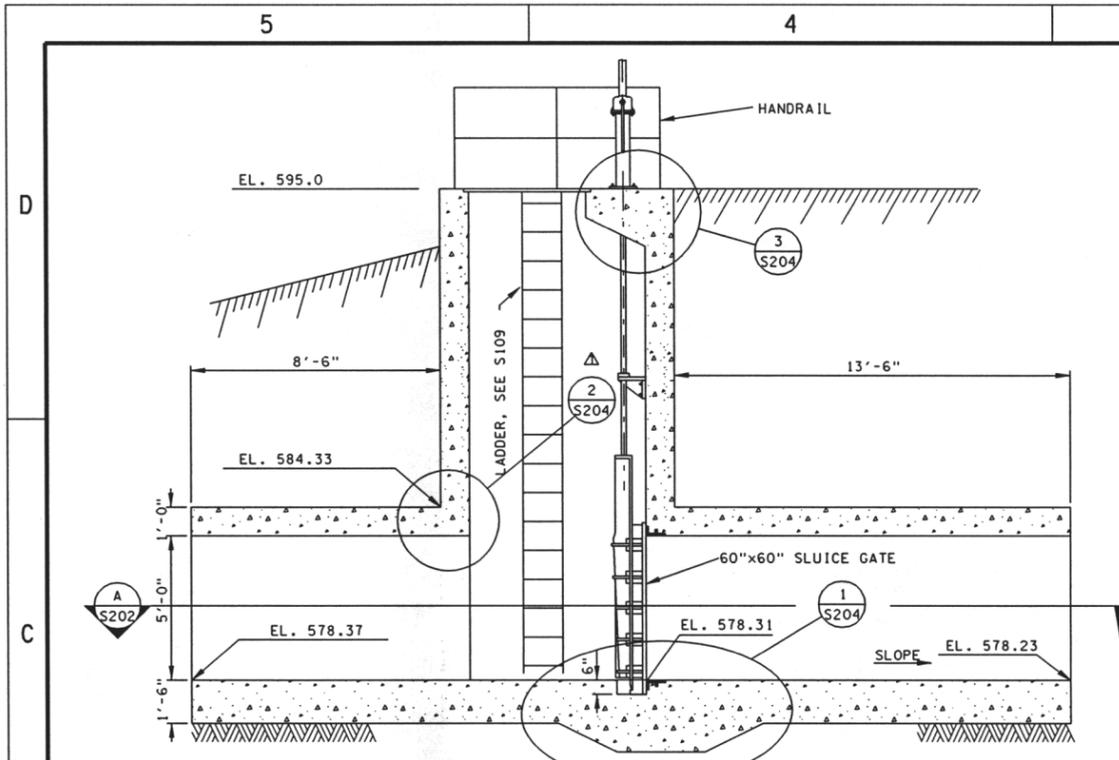
- NOTES:**
- FOR FOUNDATION & CONCRETE NOTES, SEE DRAWING S202.
  - FOR STEEL AND ALUMINUM NOTES, SEE DRAWING S206.
- RELATED DRAWINGS:**
- |                                  |      |
|----------------------------------|------|
| PUMPSTATION REINFORCING SECTIONS | S107 |
| MISCELLANEOUS STEEL I            | S109 |
| SITE PLAN & ELEVATION            | S201 |
| SECTIONS & ELEVATIONS            | S202 |
| STEEL SECTIONS & DETAILS         | S207 |
| FENCE DETAILS                    | S112 |
- ENTIRE FOUNDATION SHALL BE PRELOADED TO AN ELEVATION 5 FEET ABOVE THE NEW LEVEE HEIGHT.
  - A SETTLEMENT PLATE SHALL BE INSTALLED PRIOR TO PRELOADING. IT WILL BE LOCATED AT THE INTERSECTION OF THE LEVEE CENTERLINE AND THE STRUCTURE CENTERLINE.

| Revisions |  |          |          |
|-----------|--|----------|----------|
| Symbol    | Description                            | Date     | Approved |
| △         | REVISED AS CONSTRUCTED                 | 28JUL'00 | RIN/DJJ  |
| △         | AMD. #2 - NOTES 3 & 4 ADDED            | 29DEC94  | YSY RCA  |
| △         | AMD. #1, FENCE ADDED, HYD FILL REMOVED | 09DEC94  | YSY RCA  |
| △         | MINOR REVISIONS, RAISED INVERT 3'      | 19NOV94  | YSY RCA  |

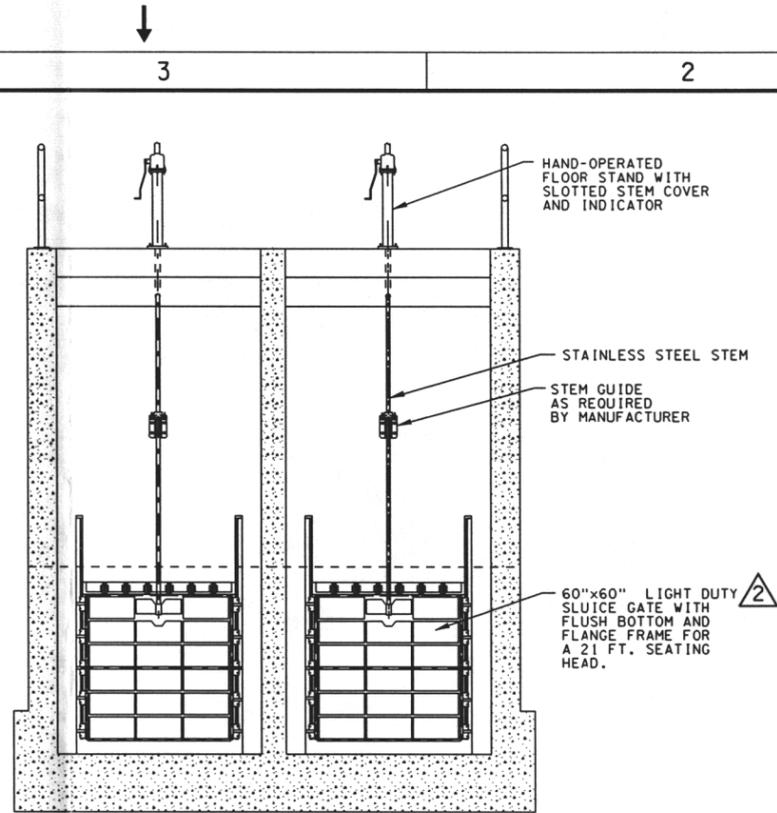
**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

|  |  |   |
|--|--|---|
| Designed by:<br>YSY  | UPPER MISSISSIPPI RIVER<br>ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 13, RIVER MILE 532 THRU 536<br>SPRING LAKE REHABILITATION<br>AND ENHANCEMENT |   |
| Drawn by:<br>JRK   |  |   |
| Checked by:<br>RCA   |  |   |
| Reviewed by:<br>DJH  |  |   |
| Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS | Date: 28 OCT. 1994<br>Drawing Code: M-L 13-134   | Sheet Reference Number:<br><b>S201</b><br>Soli/Intgrtn Number:<br>DACW25-95-B-0009<br>Sheet 38 of |

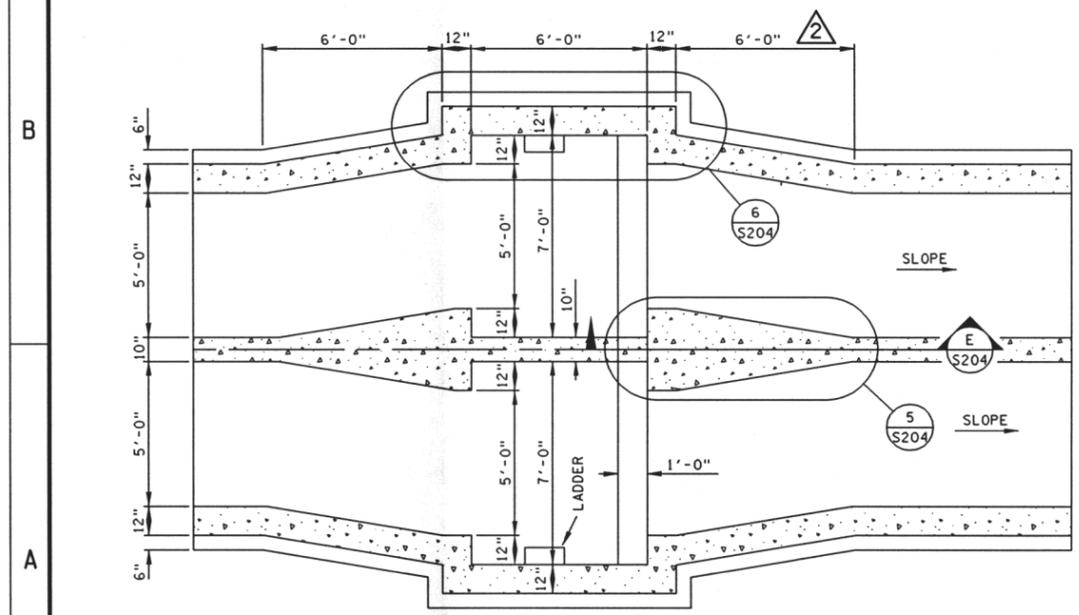
27-NOV-2002 14:18  
 E:\proj\act\emp\34\mp\34e201.dgn



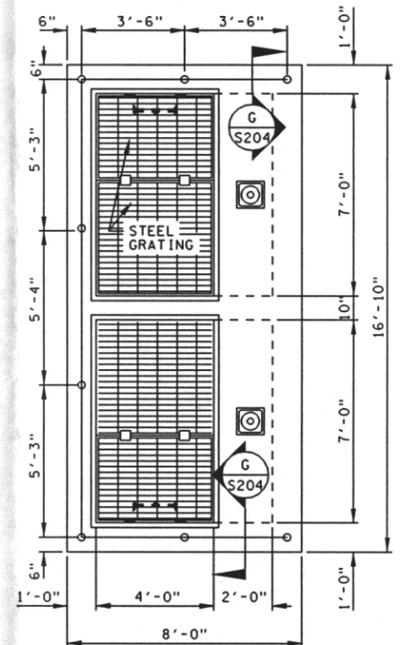
**GATEWELL ELEVATION**  
SCALE: 3/8" = 1'-0"



**GATE ELEVATION**  
3/8" = 1'-0"



**SECTION A-A**  
SCALE: 3/8" = 1'-0"



**TOP OF GATEWELL**  
SCALE: 3/8" = 1'-0"

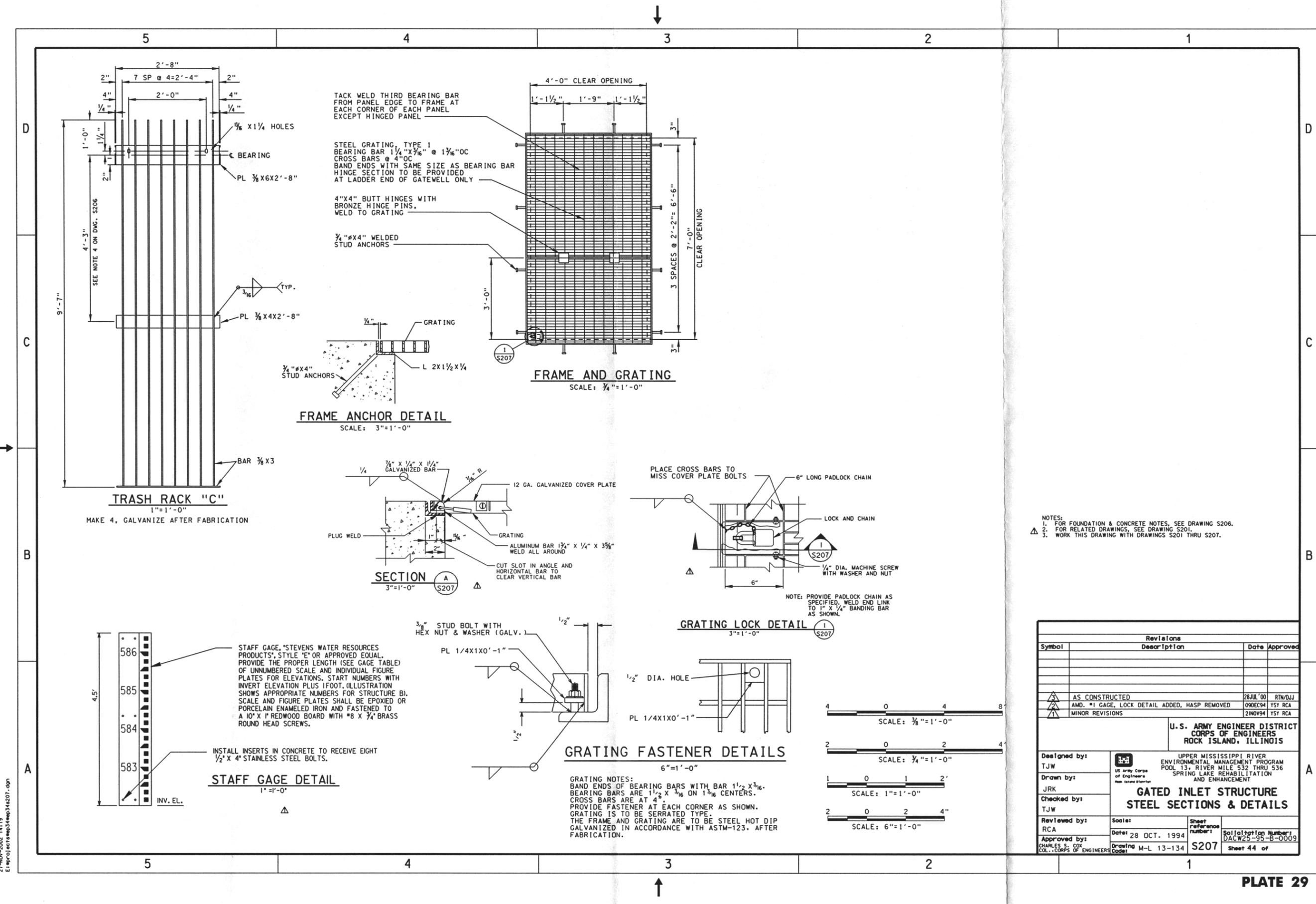
- NOTES:**
- ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318)", "ACI MANUAL OF STANDARD PRACTICES", AND SPECIFICATIONS OF ARMY CORPS OF ENGINEERS.
  - MINIMUM COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 4000 PSI AT 28 DAYS.
  - ALL REINFORCING STEEL SHALL BE NEW BILLET CONFORMING TO ASTM A615 GR60.
  - DETAILING, FABRICATION AND TAGGING OF REINFORCEMENT SHALL BE IN ACCORDANCE WITH ACI MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES (ACI 315).
  - A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE.
  - MINIMUM CONCRETE COVER
    - CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 4 in.
    - EXPOSED TO EARTH OR WEATHER
      - 6 THROUGH #18 BARS 2 in.
      - #5 BARS AND SMALLER 1.5 in.
  - ALL ANCHOR BOLTS AND EMBEDDED STEEL SHALL BE ACCURATELY LOCATED AND SECURELY HELD SO AS NOT TO MOVE DURING CONCRETE PLACEMENT. NO ACCUMULATION OF ERROR SHALL BE PERMITTED.
  - IF SOIL FOUNDATION GRADE IS DEEMED UNACCEPTABLE FURTHER EXCAVATION SHALL BE PERFORMED AS DIRECTED BY THE GEOTECHNICAL ENGINEER. ALL BACKFILL UNDER FOUNDATIONS SHALL BE COMPACTED TO 95% OF MAX. DENSITY AT OPTIMUM MOISTURE DETERMINED BY ASTM SPECIFICATIONS E698.
  - ALL ANCHOR BOLTS FOR GATES AND ACCESSORIES SHALL BE SUPPLIED BY THE GATE MANUFACTURER AND INSTALLED BY THE CONTRACTOR.
  - LOCATE AND INSTALL ANCHOR BOLTS FOR STEM FROM DIMENSIONS FURNISHED BY THE GATE MANUFACTURER.
  - BEFORE PLACING ANY CONCRETE, ALL MECHANICAL, ELECTRICAL & ARCHITECTURAL DRAWINGS SHALL BE CHECKED TO ASCERTAIN THAT ALL EMBEDDED ITEMS, UNDERGROUND PIPES, CONDUITS ETC., WHETHER INDICATED ON STRUCTURAL DRAWINGS OR NOT, ARE FURNISHED AND PROPERLY INSTALLED.
  - FOR TYPICAL GATEWELL SECTION, SEE DRAWING S204.
  - FOR TYPICAL CULVERT SECTION, SEE DRAWING S204.
  - FOR TYPICAL JOINT BETWEEN CONDUITS, SEE DRAWING S205.
  - WORK THIS DRAWING WITH DRAWINGS S201 & S203 THRU S207.
  - FOR SITE PLAN AND ELEVATION, SEE DRAWING S201.
  - FOR STEEL & ALUMINUM NOTES, SEE DRAWING S206.

| Revisions |                                   |            |          |
|-----------|-----------------------------------|------------|----------|
| Symbol    | Description                       | Date       | Approved |
| △         | AS CONSTRUCTED                    | 28 JUL '00 | RTN/DJW  |
| △         | AMD. #1 MINOR REVISIONS           | 23 DEC 04  | YSY RCA  |
| △         | REVISED NOTES                     | 09 DEC 04  | YSY RCA  |
| △         | MINOR REVISIONS, RAISED INVERT 3' | 19 NOV 94  | YSY RCA  |

**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

|  |  |  |
|--|--|--|
| Designed by:<br>YSY  | UPPER MISSISSIPPI RIVER<br>ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 13, RIVER MILE 532 THRU 536<br>SPRING LAKE REHABILITATION<br>AND ENHANCEMENT | <b>GATED INLET STRUCTURE<br/>SECTIONS AND ELEVATIONS</b> |
| Drawn by:<br>RDG JRK                                       |  |  |
| Checked by:<br>RCA   |  |  |
| Reviewed by:<br>DJH  |  |  |
| Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS |  |  |
| Scale: 3/8" = 1'-0"  | Sheet reference number: S202   | Calculation Number: DACW25-95-B-0009                     |
| Date: 28 OCT. 1994   | Drawing Code: M-L 13-134   | Sheet 39 of  |

27-NOV-2002 14:19  
E:\proj\act\emp\344202.dgn



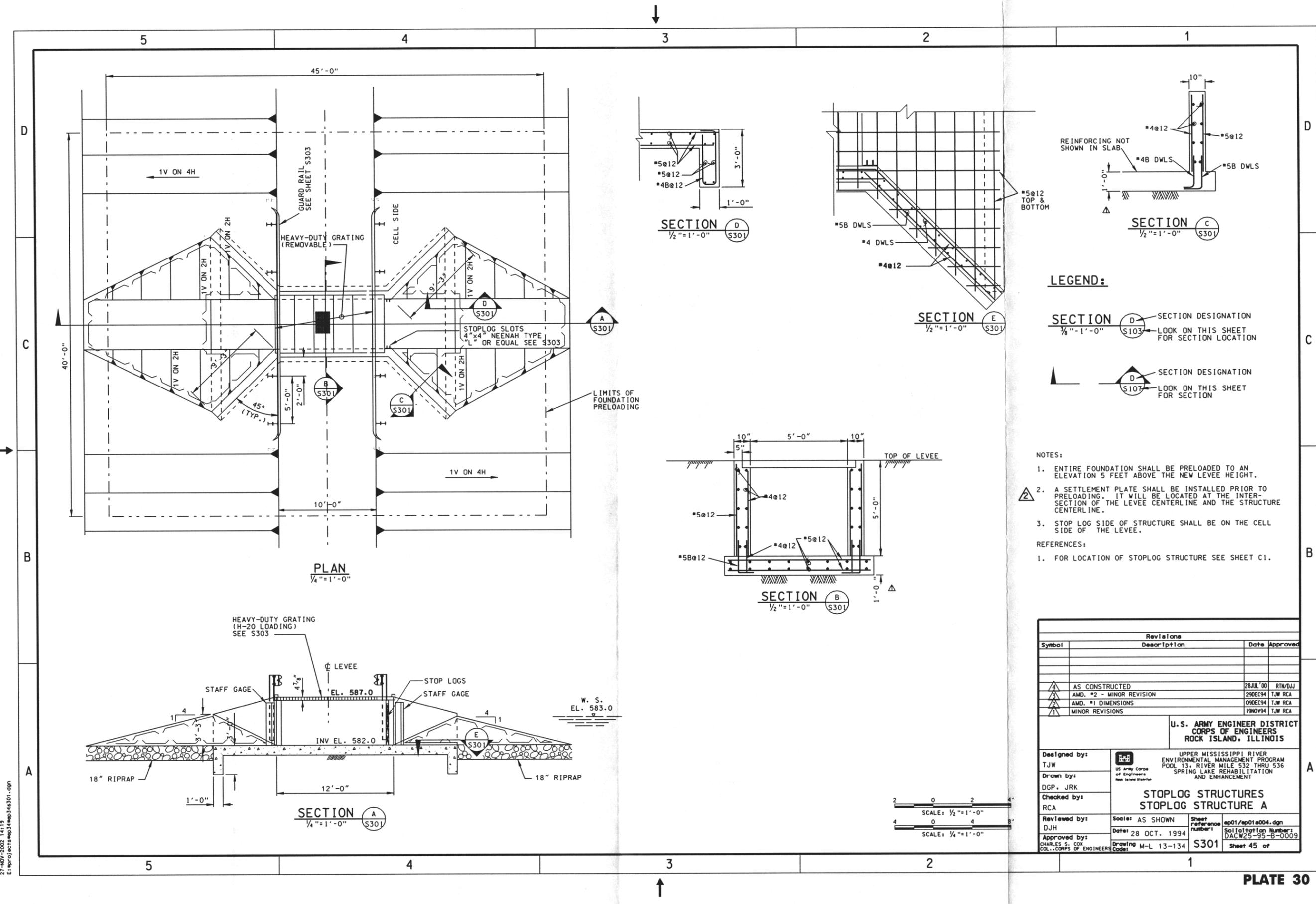
- NOTES:  
 1. FOR FOUNDATION & CONCRETE NOTES, SEE DRAWING S206.  
 2. FOR RELATED DRAWINGS, SEE DRAWING S201.  
 3. WORK THIS DRAWING WITH DRAWINGS S201 THRU S207.

| Revisions |   |          |          |
|-----------|---|----------|----------|
| Symbol    | Description                                   | Date     | Approved |
|           | AS CONSTRUCTED                                | 28JUL'00 | RTM/DJJ  |
|           | AMD. #1 GAGE, LOCK DETAIL ADDED, HASP REMOVED | 09DEC94  | YSY RCA  |
|           | MINOR REVISIONS                               | 21NOV94  | YSY RCA  |

**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

|  |  |
|--|--|
| Designed by:<br>TJW  | UPPER MISSISSIPPI RIVER<br>ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 13, RIVER MILE 532 THRU 536<br>SPRING LAKE REHABILITATION<br>AND ENHANCEMENT |
| Drawn by:<br>JRK   |  |
| Checked by:<br>TJW   | <b>GATED INLET STRUCTURE<br/>STEEL SECTIONS &amp; DETAILS</b>  |
| Reviewed by:<br>RCA  | Soil:<br>Date: 28 OCT. 1994  |
| Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS | Sheet reference number:<br>Drawing M-L 13-134<br>Code:   |

S207  
Sheet 44 of  
Solicitation Number:  
DACW25-95-B-0009



**LEGEND:**

SECTION D (1/2"=1'-0") S301 - SECTION DESIGNATION  
 LOOK ON THIS SHEET FOR SECTION LOCATION

SECTION D (1/2"=1'-0") S107 - SECTION DESIGNATION  
 LOOK ON THIS SHEET FOR SECTION

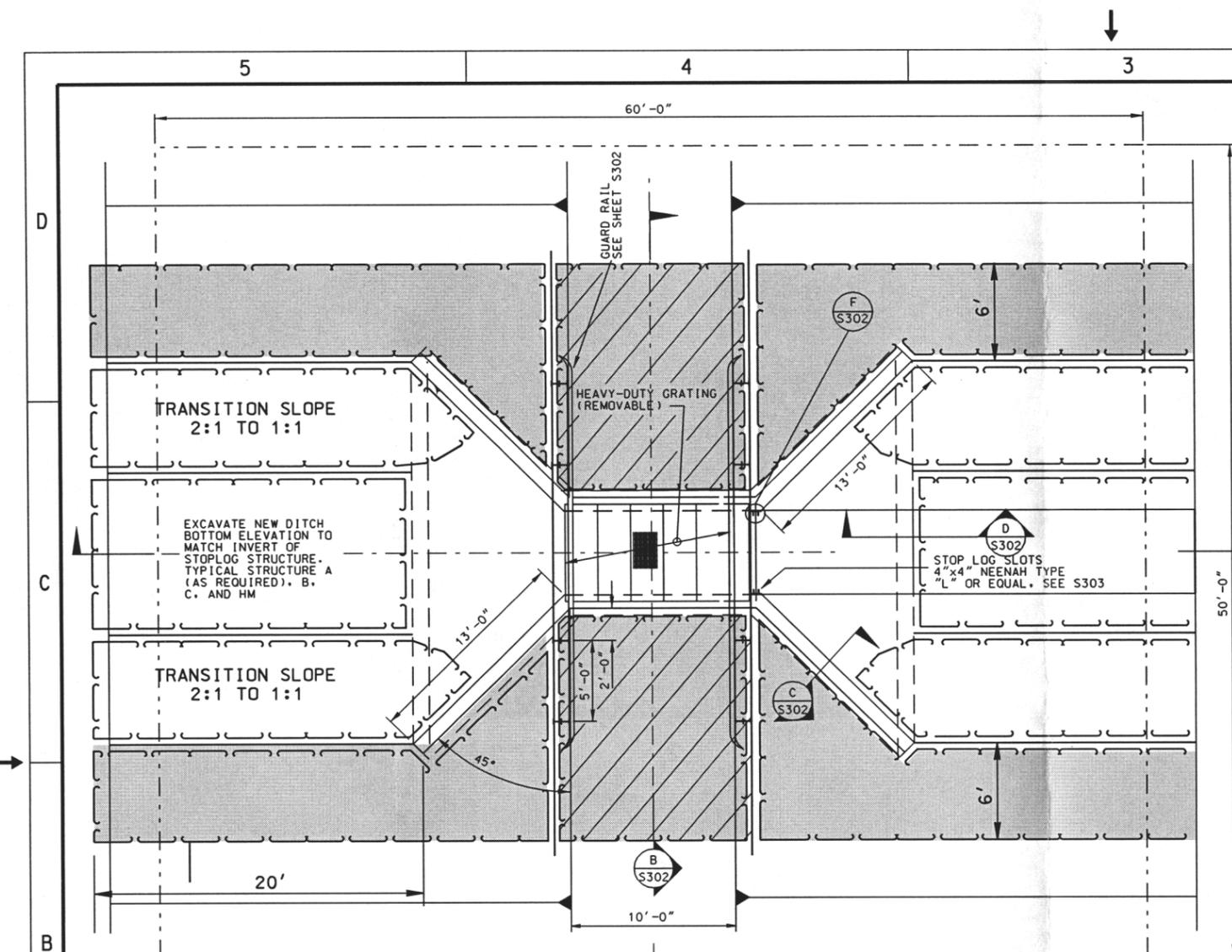
- NOTES:**
- ENTIRE FOUNDATION SHALL BE PRELOADED TO AN ELEVATION 5 FEET ABOVE THE NEW LEVEE HEIGHT.
  - A SETTLEMENT PLATE SHALL BE INSTALLED PRIOR TO PRELOADING. IT WILL BE LOCATED AT THE INTERSECTION OF THE LEVEE CENTERLINE AND THE STRUCTURE CENTERLINE.
  - STOP LOG SIDE OF STRUCTURE SHALL BE ON THE CELL SIDE OF THE LEVEE.
- REFERENCES:**
- FOR LOCATION OF STOPLOG STRUCTURE SEE SHEET C1.

| Revisions |                          |          |          |
|-----------|--------------------------|----------|----------|
| Symbol    | Description              | Date     | Approved |
| △         | AS CONSTRUCTED           | 28JUL'00 | RTU/DJJ  |
| △         | AMD. #2 - MINOR REVISION | 29DEC94  | TJW/RCA  |
| △         | AMD. #1 DIMENSIONS       | 09DEC94  | TJW/RCA  |
| △         | MINOR REVISIONS          | 19NOV94  | TJW/RCA  |

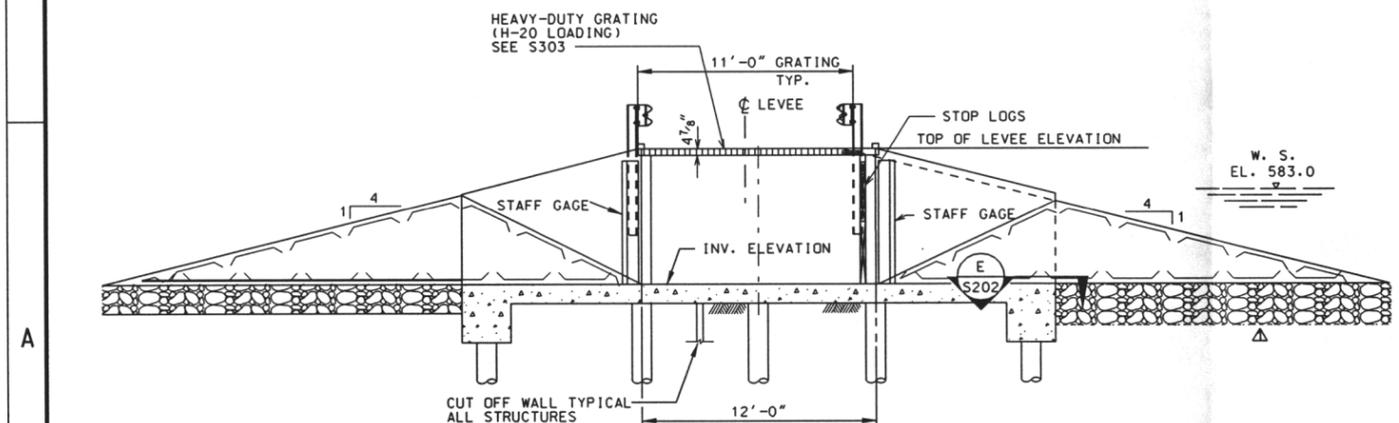
**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

|  |  |   |
|--|--|---|
| Designed by:<br>TJW  | UPPER MISSISSIPPI RIVER<br>ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 13, RIVER MILE 532 THRU 536<br>SPRING LAKE REHABILITATION<br>AND ENHANCEMENT |   |
| Drawn by:<br>DGP, JRK                                      |  |   |
| Checked by:<br>RCA   | <b>STOPLOG STRUCTURES<br/>STOPLOG STRUCTURE A</b>  |   |
| Reviewed by:<br>DJH  | Scale: AS SHOWN  | Sheet reference number:<br>sp01/ep01a004.dgn  |
| Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS | Date: 28 OCT. 1994   | Soil/lot/revision Number:<br>DACW25-95-B-0009 |
|  | Drawing M-L 13-134   | S301  |
|  |  | Sheet 45 of                                   |

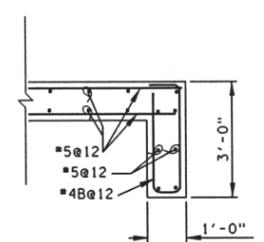
27-NOV-2002 14:19  
E:\proj\act\sep34s301.dgn



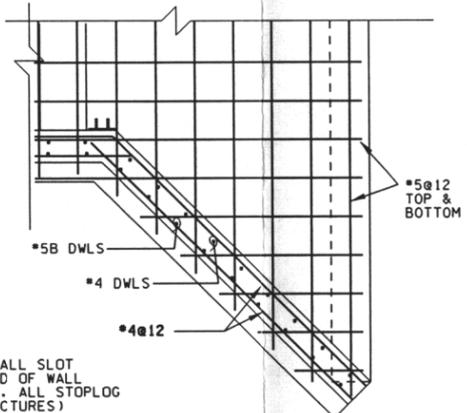
PLAN (TYP. FOR ALL STRUCTURES)



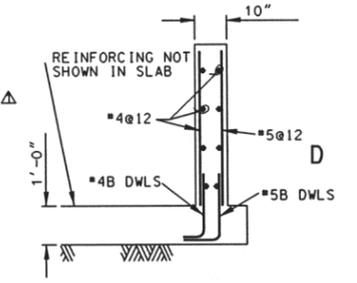
SECTION A  
1/4" = 1'-0" S302



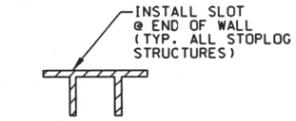
SECTION D  
1/2" = 1'-0" S302



SECTION E  
1/2" = 1'-0" S302



SECTION C  
1/2" = 1'-0" S302



DETAIL F  
NOT TO SCALE S302

LEGEND:

- RIPRAP ALL STRUCTURES A, B, C AND HM
- RIPRAP AT HM ONLY
- CHOKE WITH GRANULAR SURFACING (STRUCTURE HM ONLY)

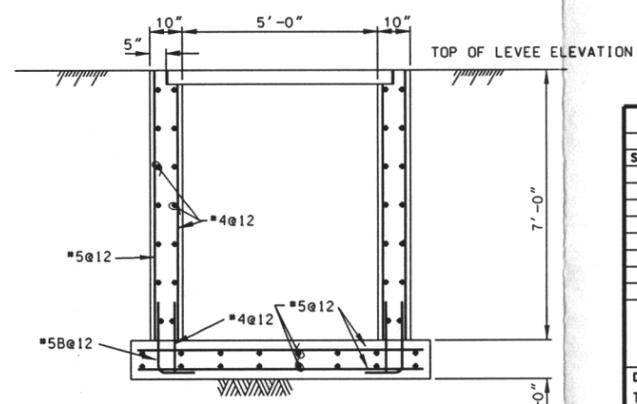
| STOP LOG STRUCTURE | TOP OF LEVEE ELEVATION | INVERT ELEVATION |
|--------------------|------------------------|------------------|
| B                  | △ 587.0                | 579.0            |
| C                  | △ 587.0                | 579.0            |
| HM                 | △ 586.0                | 581.0            |

NOTES:

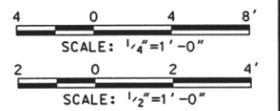
1. ENTIRE FOUNDATION SHALL BE PRELOADED TO AN ELEVATION 5 FEET ABOVE THE NEW LEVEE HEIGHT.
2. A SETTLEMENT PLATE SHALL BE INSTALLED PRIOR TO PRELOADING. IT WILL BE LOCATED AT THE INTERSECTION OF THE LEVEE CENTERLINE AND THE STRUCTURE CENTERLINE.
3. STOP LOG SIDE OF STRUCTURE SHALL BE ON THE CELL SIDE OF THE LEVEE.

REFERENCES:

1. FOR LOCATION OF STOPLOG STRUCTURE SEE SHEET C1.



SECTION B  
1/2" = 1'-0" S302



| Revisions |                                 | Date       | Approved |
|-----------|---------------------------------|------------|----------|
| Symbol    | Description                     |            |          |
| △         | REVISED AS CONSTRUCTED          | 28 JUL '00 | RTM/DJW  |
| △         | AMD. #2 REV. NOTE 1, DIMENSIONS | 09 DEC 94  | TJW/RCA  |
| △         | MINOR REVISIONS                 | 19 NOV 94  | TJW/RCA  |

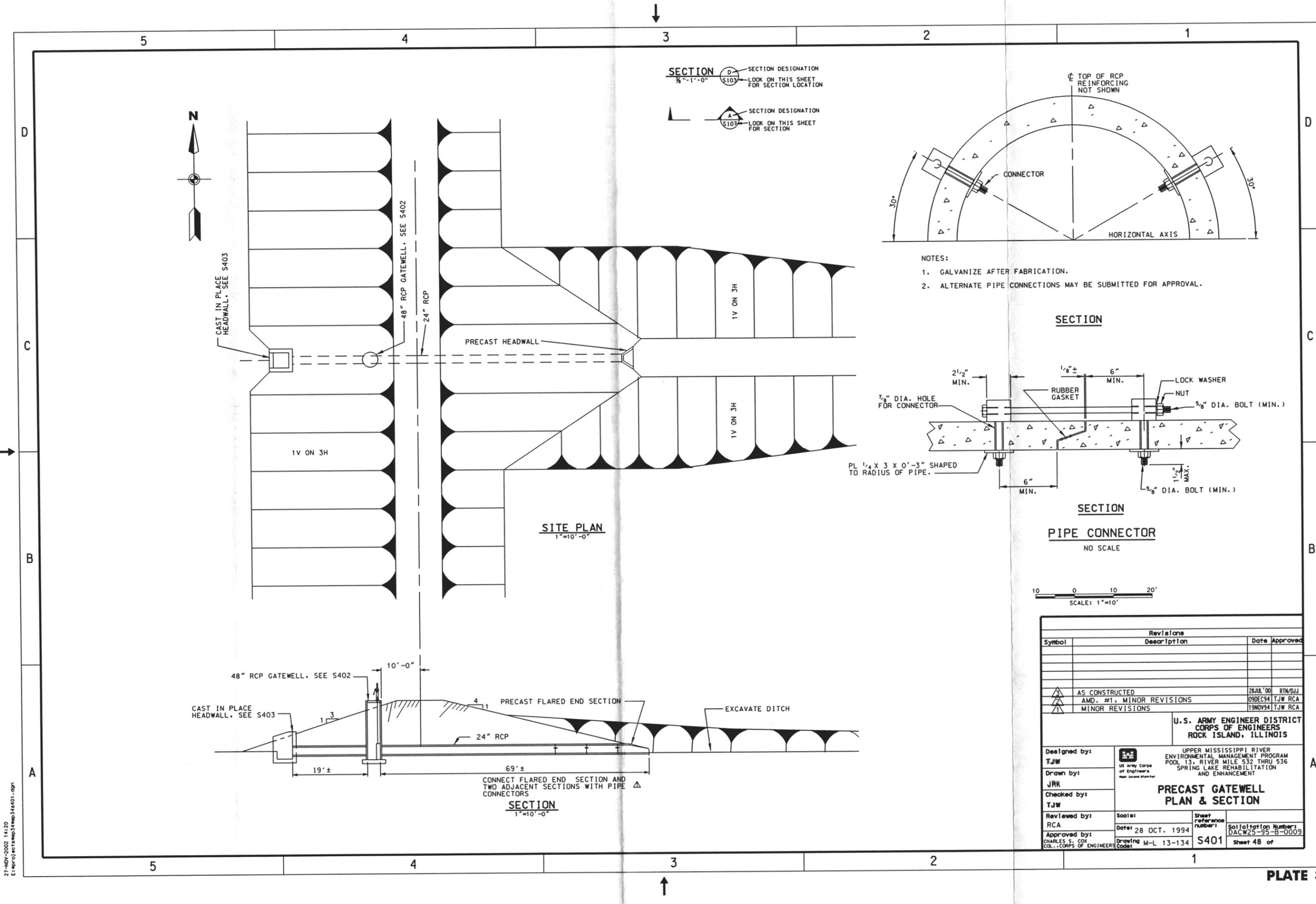
**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

|  |  |
|--|--|
| Designed by:<br>TJW  | UPPER MISSISSIPPI RIVER<br>ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 13, RIVER MILE 532 THRU 536<br>SPRING LAKE REHABILITATION<br>AND ENHANCEMENT |
| Drawn by:<br>DGP   |  |
| Checked by:<br>RCA   | <b>STOPLOG STRUCTURES<br/>STOPLOG STRUCTURES B, C, &amp; HM</b>  |
| Reviewed by:<br>DJH  |  |
| Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS | Scale: AS SHOWN<br>Date: 28 OCT. 1994<br>Drawing Code: M-L 13-134  |

Sheet Reference Number: sp01/sp01a004.dgn  
 Solitation Number: DACW25-95-B-0009  
 Sheet 46 of

27-NOV-2002 14:20  
E:\proj\act\wp34\wp34s302.dgn

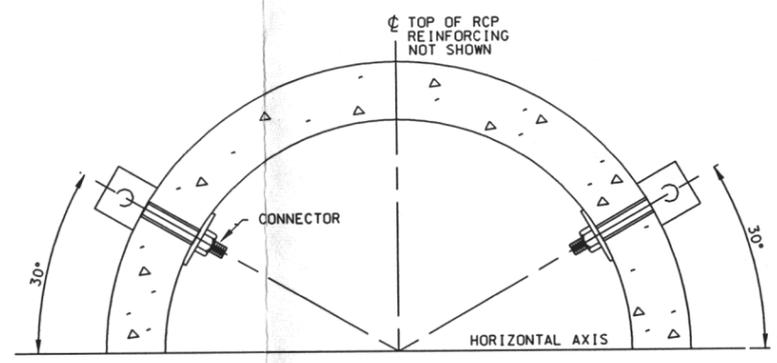
27-MAY-2002 14:20  
E:\proj\trains\step3\4e01.dgn



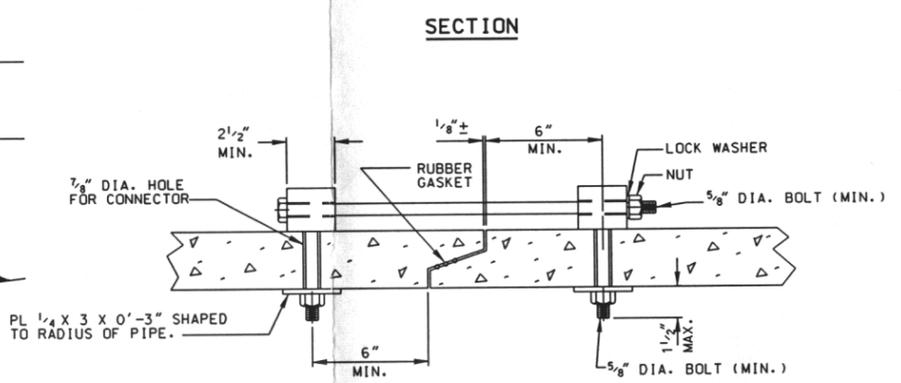
**SECTION**  $\frac{1}{4}''-1'-0''$

SECTION DESIGNATION  
S103  
LOOK ON THIS SHEET FOR SECTION LOCATION

SECTION DESIGNATION  
S107  
LOOK ON THIS SHEET FOR SECTION



NOTES:  
1. GALVANIZE AFTER FABRICATION.  
2. ALTERNATE PIPE CONNECTIONS MAY BE SUBMITTED FOR APPROVAL.



**SECTION**  
**PIPE CONNECTOR**  
NO SCALE

SCALE: 1"=10'

**SITE PLAN**  
1"=10'-0"

**SECTION**  
1"=10'-0"

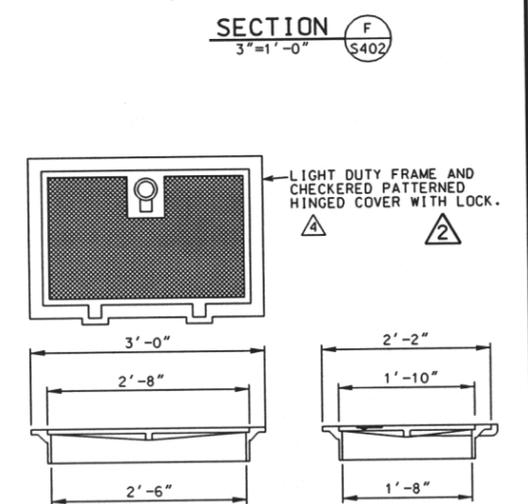
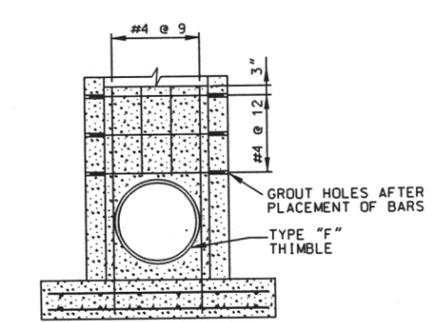
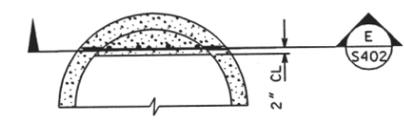
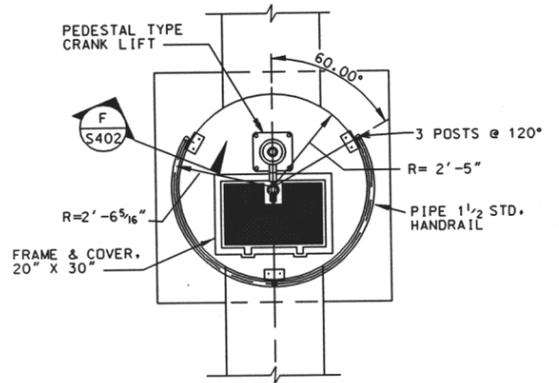
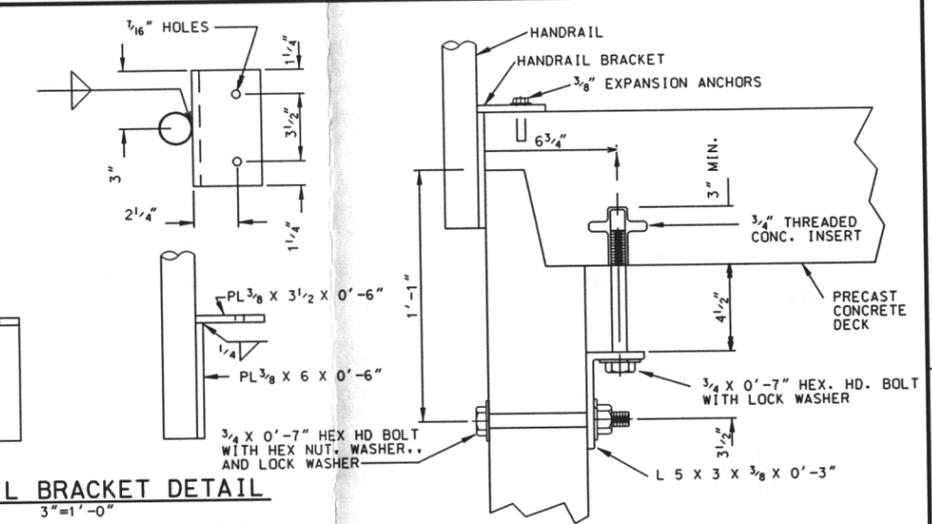
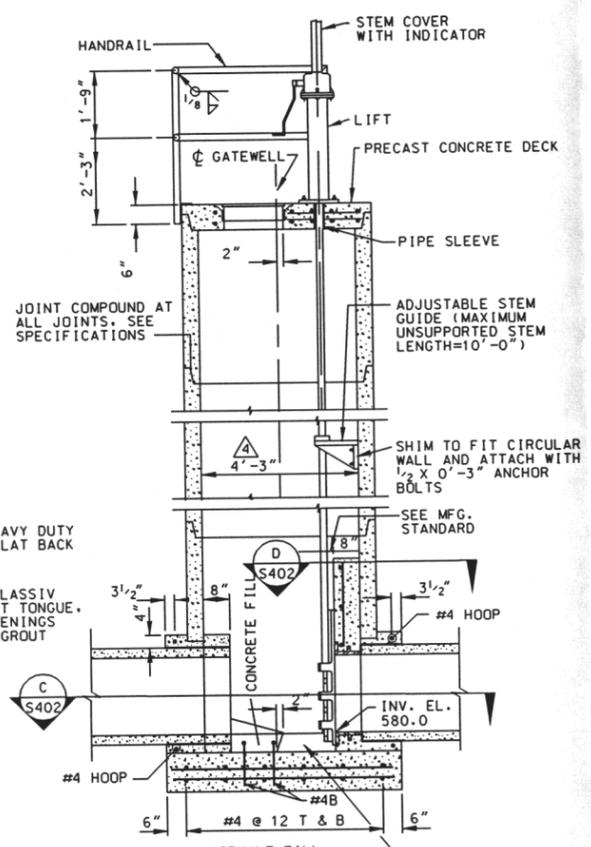
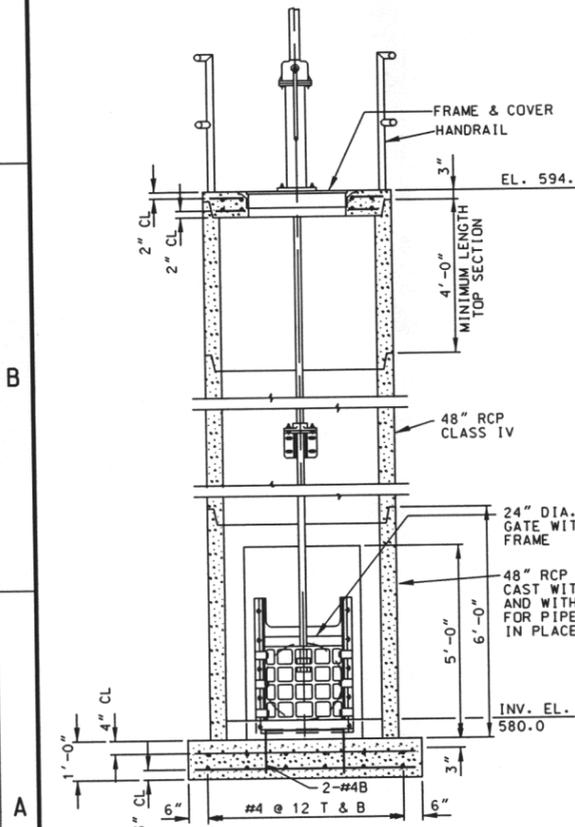
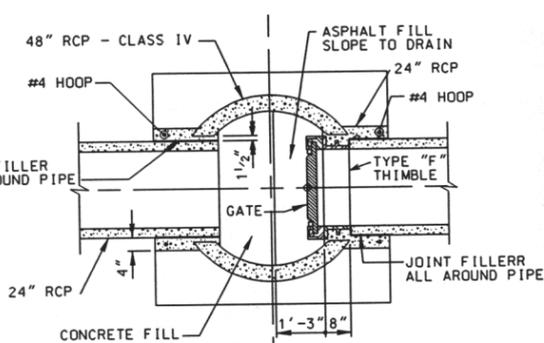
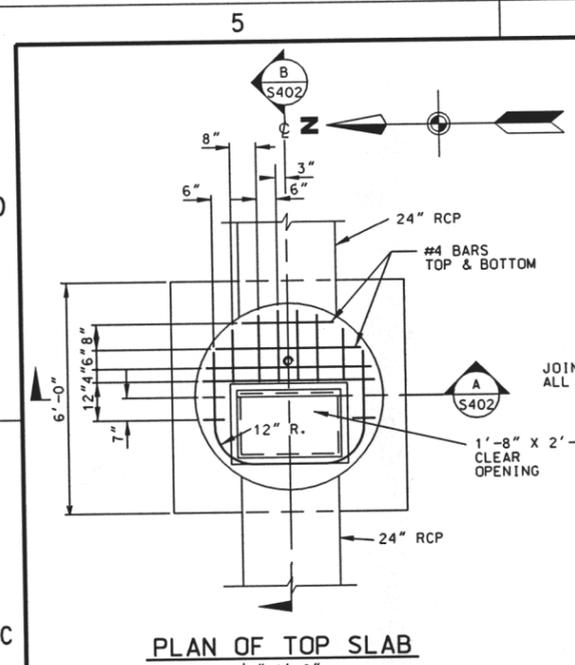
| Revisions |                          |                 |
|-----------|--------------------------|-----------------|
| Symbol    | Description              | Date Approved   |
| AS        | AS CONSTRUCTED           | 28JUL00 RTW/DJJ |
| 2         | AMD. #1, MINOR REVISIONS | 09DEC94 TJW/RCA |
| 1         | MINOR REVISIONS          | 19NOV94 TJW/RCA |

U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS

Designed by: TJW  
Drawn by: JRK  
Checked by: TJW  
Reviewed by: RCA

Scale: M-L 13-134  
Date: 28 OCT. 1994  
Drawing Code:

Sheet reference number: S401  
Solicitation Number: DACW25-95-B-0009  
Sheet 48 of

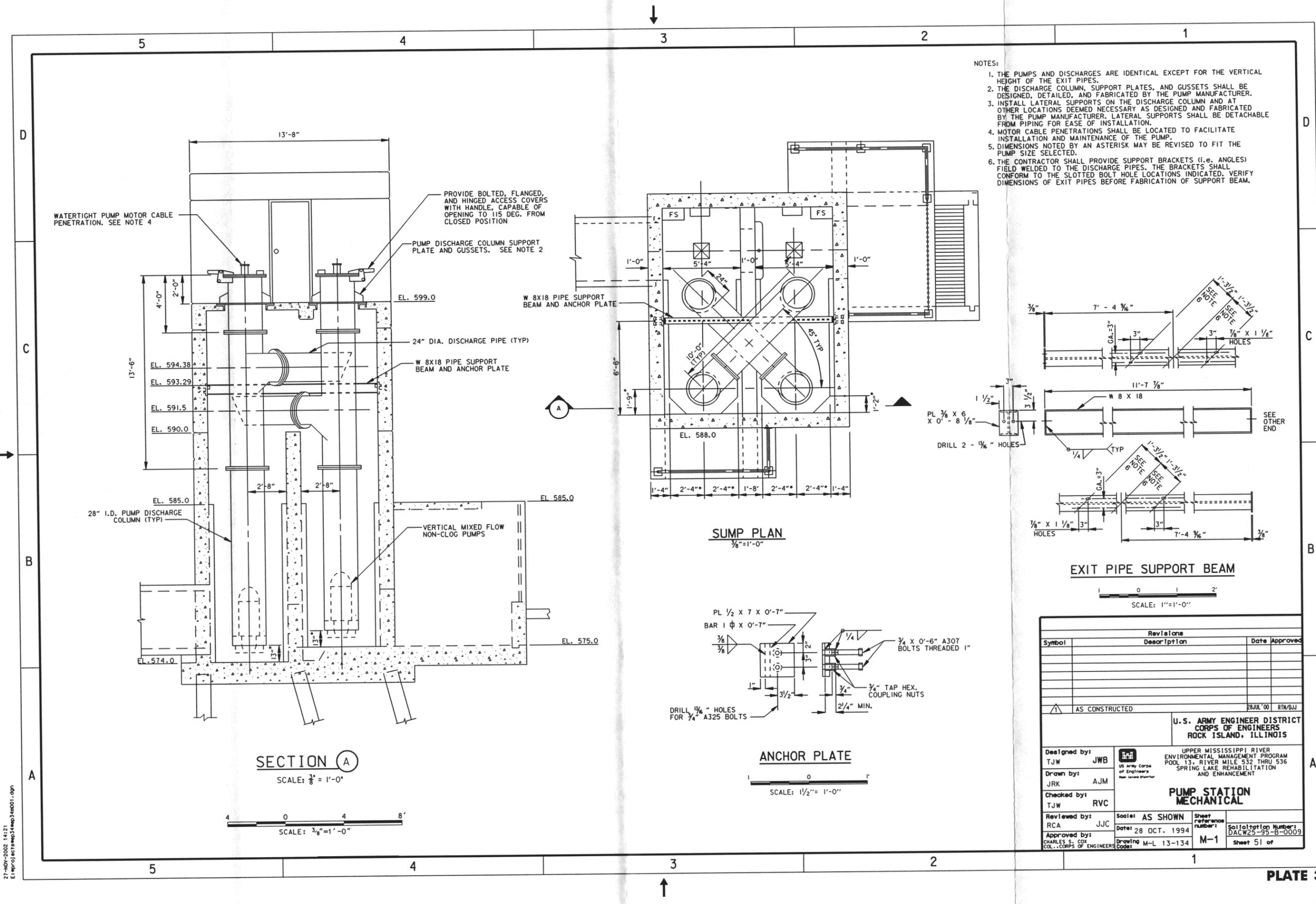


| Revisions |                           |                 |
|-----------|---------------------------|-----------------|
| Symbol    | Description               | Date Approved   |
| △         | REVISED AS CONSTRUCTED    | 28JUL'00 RIN/DJ |
| △         | AMD. #1 - MINOR REVISIONS | 23DEC94 TJW/RCA |
| △         | REVISED NOTE              | 09DEC94 TJW/RCA |
| △         | MINOR REVISIONS           | 19NOV94 TJW/RCA |

**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

|  |  |
|--|--|
| Designed by:<br>TJW  | UPPER MISSISSIPPI RIVER<br>ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 13, RIVER MILE 532 THRU 536<br>SPRING LAKE REHABILITATION<br>AND ENHANCEMENT |
| Drawn by:<br>JRK   |  |
| Checked by:<br>TJW   | <b>PRECAST GATEWELL<br/>STRUCTURAL DETAILS</b>   |
| Reviewed by:<br>RCA  |  |
| Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS | Sheet number:<br>S402  |
|  | Date: 28 OCT. 1994   |
|  | Drawing M-L 13-134   |
|  | Sheet 49 of  |

27-MDV-2002 14121  
E:\proj\ect\temp\34ep346402.dgn



- NOTES:
1. THE PUMPS AND DISCHARGES ARE IDENTICAL EXCEPT FOR THE VERTICAL HEIGHT OF THE EXIT PIPES.
  2. THE DISCHARGE COLUMN, SUPPORT PLATES, AND GUSSETS SHALL BE DESIGNED, DETAILED, AND FABRICATED BY THE PUMP MANUFACTURER.
  3. INSTALL LATERAL SUPPORTS ON THE DISCHARGE COLUMN AND AT OTHER LOCATIONS DEEMED NECESSARY AS DESIGNED AND FABRICATED BY THE PUMP MANUFACTURER. LATERAL SUPPORTS SHALL BE DETACHABLE FROM PIPING FOR EASE OF INSTALLATION.
  4. MOTOR CABLE PENETRATIONS SHALL BE LOCATED TO FACILITATE INSTALLATION AND MAINTENANCE OF THE PUMP.
  5. DIMENSIONS NOTED BY AN ASTERISK MAY BE REVISED TO FIT THE PUMP SIZE SELECTED.
  6. THE CONTRACTOR SHALL PROVIDE SUPPORT BRACKETS (I.E. ANGLES) FIELD WELDED TO THE DISCHARGE PIPES. THE BRACKETS SHALL CONFORM TO THE SLOTTED BOLT HOLE LOCATIONS INDICATED. VERIFY DIMENSIONS OF EXIT PIPES BEFORE FABRICATION OF SUPPORT BEAM.

| Revisions |                | Date    | Approved |
|-----------|----------------|---------|----------|
| Symbol    | Description    |         |          |
|           | AS CONSTRUCTED | 28JUL00 | RTM/BJJ  |

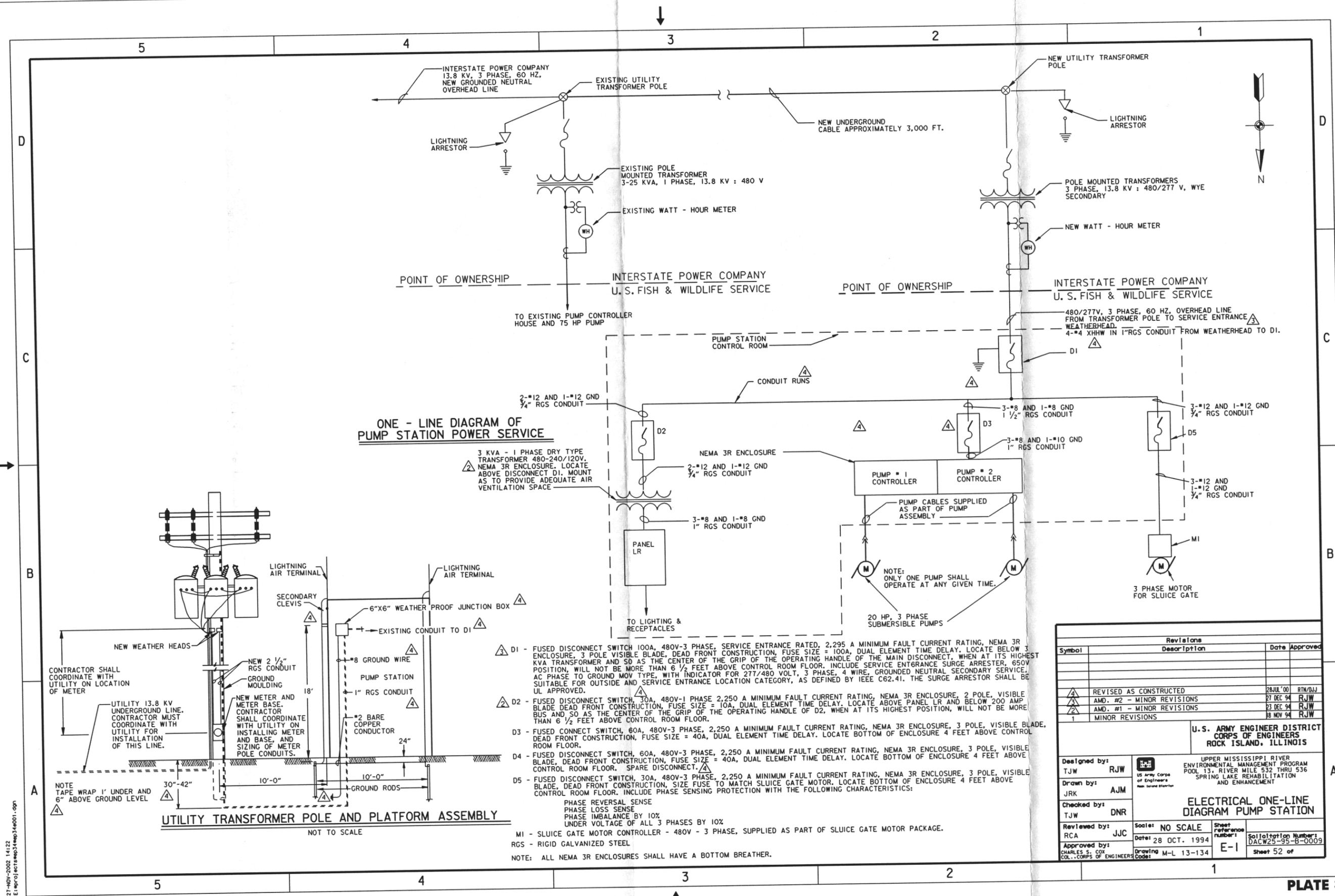
U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS

UPPER MISSISSIPPI RIVER  
ENVIRONMENTAL MANAGEMENT PROGRAM  
POOL 13, RIVER MILE 532 THRU 536  
SPRING LAKE REHABILITATION  
AND ENHANCEMENT

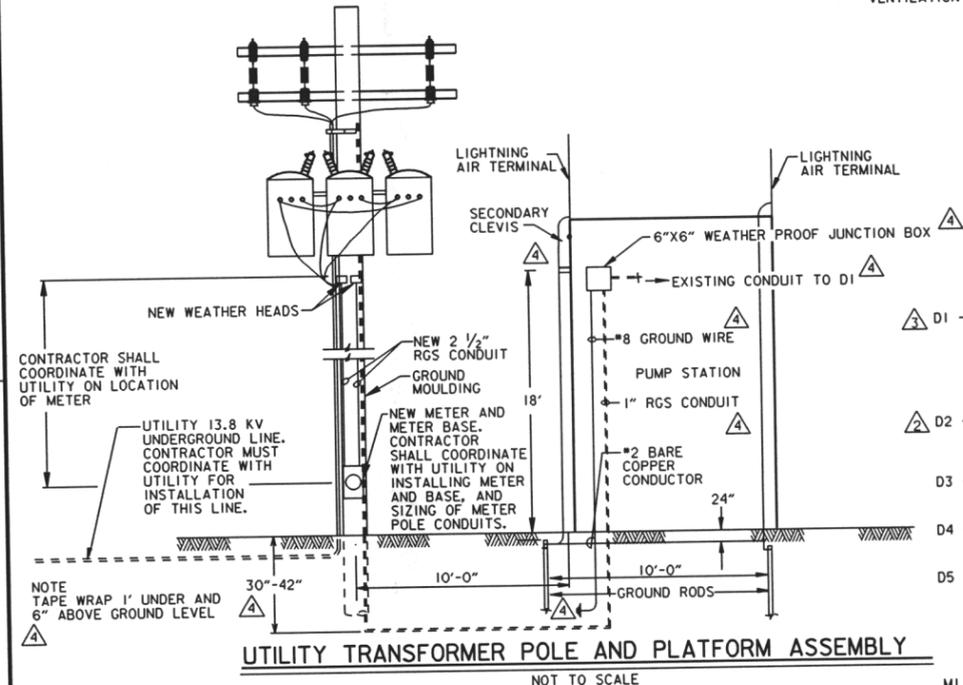
**PUMP STATION  
MECHANICAL**

|  |     |                    |                                |  |
|--|-----|--------------------|--------------------------------|--|
| Designed by:<br>TJW  | JWB | Scale: AS SHOWN    | Sheet reference number:<br>M-1 | Solicitation Number:<br>DACW25-95-B-0009 |
| Drawn by:<br>JRK   | AJM |                    |                                |  |
| Checked by:<br>TJW   | RVC | Date: 28 OCT. 1994 |                                |  |
| Reviewed by:<br>RCA  | JJC | Code: M-L 13-134   |                                |  |
| Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS |     | Sheet 51 of        |                                |  |

27-100-0002 14121  
E:\p\01\ect\mp31\mp31.mcd01.dgn



**ONE - LINE DIAGRAM OF PUMP STATION POWER SERVICE**



- ⚠ D1 - FUSED DISCONNECT SWITCH 100A, 480V-3 PHASE, SERVICE ENTRANCE RATED, 2,295 A MINIMUM FAULT CURRENT RATING, NEMA 3R ENCLOSURE, 3 POLE VISIBLE BLADE, DEAD FRONT CONSTRUCTION, FUSE SIZE = 100A, DUAL ELEMENT TIME DELAY. LOCATE BELOW 3 KVA TRANSFORMER AND SO AS THE CENTER OF THE GRIP OF THE OPERATING HANDLE OF THE MAIN DISCONNECT, WHEN AT ITS HIGHEST POSITION, WILL NOT BE MORE THAN 6 1/2 FEET ABOVE CONTROL ROOM FLOOR. INCLUDE SERVICE ENTRANCE SURGE ARRESTOR, 650V AC PHASE TO GROUND MOV TYPE, WITH INDICATOR FOR 277/480 VOLT, 3 PHASE, 4 WIRE, GROUNDED NEUTRAL SECONDARY SERVICE, SUITABLE FOR OUTSIDE AND SERVICE ENTRANCE LOCATION CATEGORY, AS DEFINED BY IEEE C62.41. THE SURGE ARRESTOR SHALL BE UL APPROVED.
  - ⚠ D2 - FUSED DISCONNECT SWITCH, 30A, 480V-1 PHASE 2,250 A MINIMUM FAULT CURRENT RATING, NEMA 3R ENCLOSURE, 2 POLE, VISIBLE BLADE DEAD FRONT CONSTRUCTION, FUSE SIZE = 10A, DUAL ELEMENT TIME DELAY. LOCATE ABOVE PANEL LR AND BELOW 200 AMP BUS AND SO AS THE CENTER OF THE GRIP OF THE OPERATING HANDLE OF D2, WHEN AT ITS HIGHEST POSITION, WILL NOT BE MORE THAN 6 1/2 FEET ABOVE CONTROL ROOM FLOOR.
  - ⚠ D3 - FUSED CONNECT SWITCH, 60A, 480V-3 PHASE, 2,250 A MINIMUM FAULT CURRENT RATING, NEMA 3R ENCLOSURE, 3 POLE, VISIBLE BLADE, DEAD FRONT CONSTRUCTION, FUSE SIZE = 40A, DUAL ELEMENT TIME DELAY. LOCATE BOTTOM OF ENCLOSURE 4 FEET ABOVE CONTROL ROOM FLOOR.
  - ⚠ D4 - FUSED DISCONNECT SWITCH, 60A, 480V-3 PHASE, 2,250 A MINIMUM FAULT CURRENT RATING, NEMA 3R ENCLOSURE, 3 POLE, VISIBLE BLADE, DEAD FRONT CONSTRUCTION, FUSE SIZE = 40A, DUAL ELEMENT TIME DELAY. LOCATE BOTTOM OF ENCLOSURE 4 FEET ABOVE CONTROL ROOM FLOOR. SPARE DISCONNECT.
  - ⚠ D5 - FUSED DISCONNECT SWITCH, 30A, 480V-3 PHASE, 2,250 A MINIMUM FAULT CURRENT RATING, NEMA 3R ENCLOSURE, 3 POLE, VISIBLE BLADE, DEAD FRONT CONSTRUCTION, SIZE FUSE TO MATCH SLUICE GATE MOTOR. LOCATE BOTTOM OF ENCLOSURE 4 FEET ABOVE CONTROL ROOM FLOOR. INCLUDE PHASE SENSING PROTECTION WITH THE FOLLOWING CHARACTERISTICS:  
 PHASE REVERSAL SENSE  
 PHASE LOSS SENSE  
 PHASE IMBALANCE BY 10%  
 UNDER VOLTAGE OF ALL 3 PHASES BY 10%
- M1 - SLUICE GATE MOTOR CONTROLLER - 480V - 3 PHASE, SUPPLIED AS PART OF SLUICE GATE MOTOR PACKAGE.  
 RGS - RIGID GALVANIZED STEEL  
 NOTE: ALL NEMA 3R ENCLOSURES SHALL HAVE A BOTTOM BREATHER.

| Revisions |                           |           |          |
|-----------|---------------------------|-----------|----------|
| Symbol    | Description               | Date      | Approved |
| ⚠         | REVISED AS CONSTRUCTED    | 28 JUL 00 | RJW/DJJ  |
| ⚠         | AMD. #2 - MINOR REVISIONS | 27 DEC 94 | RJW      |
| ⚠         | AMD. #1 - MINOR REVISIONS | 23 DEC 94 | RJW      |
| 1         | MINOR REVISIONS           | 18 NOV 94 | RJW      |

**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

DESIGNED BY: TJW RJW  
 DRAWN BY: JRK AJM  
 CHECKED BY: TJW DNR  
 REVIEWED BY: RCA JJC  
 APPROVED BY: CHARLES S. COX COL., CORPS OF ENGINEERS

**ELECTRICAL ONE-LINE  
DIAGRAM PUMP STATION**

Scale: NO SCALE  
 Date: 28 OCT. 1994  
 Drawing Code: M-L 13-134

**E-1**

Sheet reference number: E-1  
 Solicitation Number: DACW25-95-B-0009  
 Sheet 52 of

27-NDV-2002 14122  
E:\proj\ectr\p3\step3\ed01.dgn

**GENERAL NOTES:**

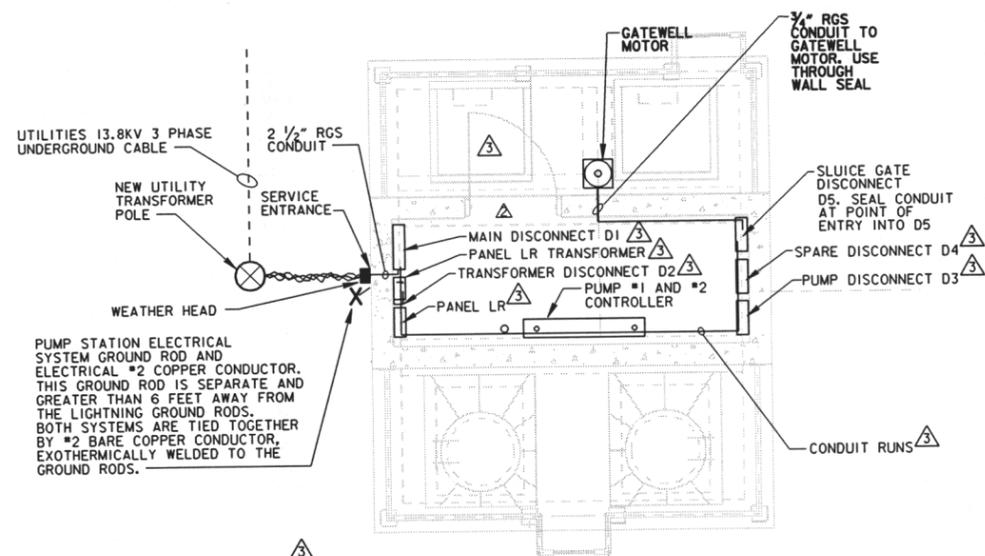
1. ALL WIRING IS XHHW COPPER SIZE #12 UNLESS OTHERWISE SPECIFIED.
2. ALL CONDUIT IS 3/4" MINIMUM RIGID GALVANIZED STEEL. SURFACE MOUNTED. IDENTIFIED FOR WET LOCATIONS, CONDUIT NEED NOT BE USED IN SUMP AREA TO HOUSE PUMP AND FLOAT CABLES. CONDUIT MUST BE USED TO HOUSE F2 LIGHT WIRING.
3. DIMENSIONS ON THIS DRAWING ARE APPROXIMATE. CONTRACTOR MUST FIELD VERIFY ACTUAL DIMENSIONS OF EQUIPMENT BEFORE INSTALLATION.
4. THESE DRAWINGS SHOW APPROXIMATE PLACEMENT OF ALL ELECTRICAL HARDWARE. CONTRACTOR SHALL USE DISCRETION DURING INSTALLATION TO GET BEST FIT AND MEET NFPA 70.
5. ALL ELECTRICAL HARDWARE AND CABLING SHALL BE SURFACE MOUNTED UNLESS SPECIFIED.
6. USE THROUGH WALL AND FLOOR SEALS WHERE CONDUIT PASSES THROUGH WALL OR FLOOR. EACH SEAL SHALL BE OF AN IRON OR STEEL BODY, PRESSURE RING, NEOPRENE GROMMET CONSTRUCTION.

**NOTES:**

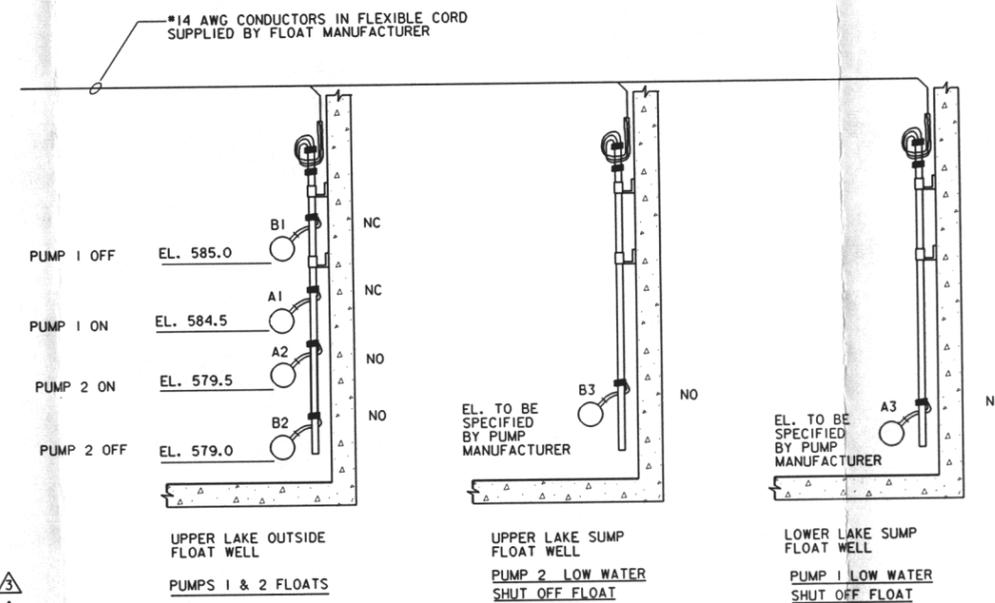
1. CONTRACTOR SHALL COORDINATE WITH UTILITY FOR PLACEMENT OF TRANSFORMERS, TRANSFORMER POLE, METER, AND UTILITY GROUNDING SYSTEM.
2. CONTRACTOR SHALL COORDINATE WITH UTILITY FOR CONNECTION OF AND PAYMENT FOR SERVICE TO PUMP STATION.
3. CONTRACTOR SHALL COORDINATE WITH AND PAY UTILITY FOR INSTALLATION OF APPROXIMATELY 3000 FEET OF 13.8KV 3 PHASE BURIED CABLE. THE UTILITY POINT OF CONTACT IS AS FOLLOWS:  
INTERSTATE POWER  
201-NORTH 2ND STREET  
P.O. BOX 818  
CLINTON, IA. 52733-0818  
PHONE: 319-243-2611  
POC: RON SEYMOUR.
4. LIGHTNING PROTECTION SYSTEM FOR THE STRUCTURE SHALL BE A CLASS 1 INSTALLATION PER NFPA 780.

**FLOAT NOTES:**

1. THE FLOATS SHALL BE 316 SS, #20 GAUGE.
2. THE FLOATS SHALL HOUSE MERCURY TILT TYPE SWITCHES RATED TO HANDLE CONTROL CIRCUIT VOLTAGE AND CURRENT.
3. FLOAT ASSEMBLIES SHALL BE SECURELY FASTENED TO 1" DIAMETER GALVANIZED STEEL NPT PIPE (FLOAT POLE) BY GALVANIZED STEEL CLAMP AND BRACKET ASSEMBLIES AND ADJUSTED AS PER INSTRUCTIONS BY FLOAT MANUFACTURER.
4. THE 1" DIAMETER FLOAT POLE SHALL BE MOUNTED VERTICALLY IN ITS FLOAT WELL, SECURELY CLAMPED TO THE FLOAT WELL WALL (SHEETS E-5 AND E-6). ADJUST FLOAT POLE DISTANCE TO WALL AS PER INSTRUCTIONS FROM FLOAT MANUFACTURER. USE 2 GALVANIZED STEEL WALL MOUNTING CLAMPS, BOTH OF WHICH SHALL BE AS HIGH AS PRACTICAL ON THE FLOAT POLE.
5. FLOAT HARDWARE TO BE SUPPLIED BY FLOAT MANUFACTURER.



**FLOOR PLAN**  
3/8"=1'-0"  
**PUMP STATION POWER PLANS**



NC = NORMALLY CLOSED CONTACTS WHEN IN LOW WATER STATE.  
NO = NORMALLY OPEN CONTACTS WHEN IN LOW WATER STATE.

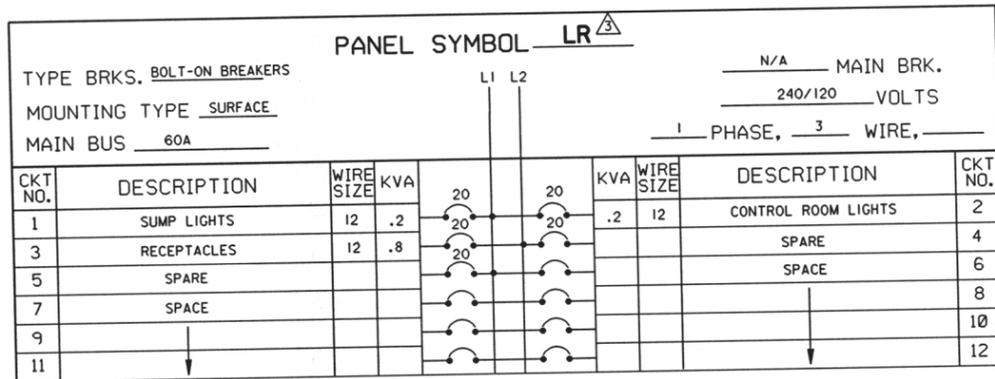
**FLOATS**

| Revisions |                                |            |          |
|-----------|--------------------------------|------------|----------|
| Symbol    | Description                    | Date       | Approved |
| △         | REVISED AS CONSTRUCTED         | 28 JUL '00 | RTM/DJJ  |
| △         | AMENDMENT #1 - MINOR REVISIONS | 5 DEC 94   | RJW      |
| △         | MINOR REVISIONS                | 18 NOV 94  | RJW      |

**U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

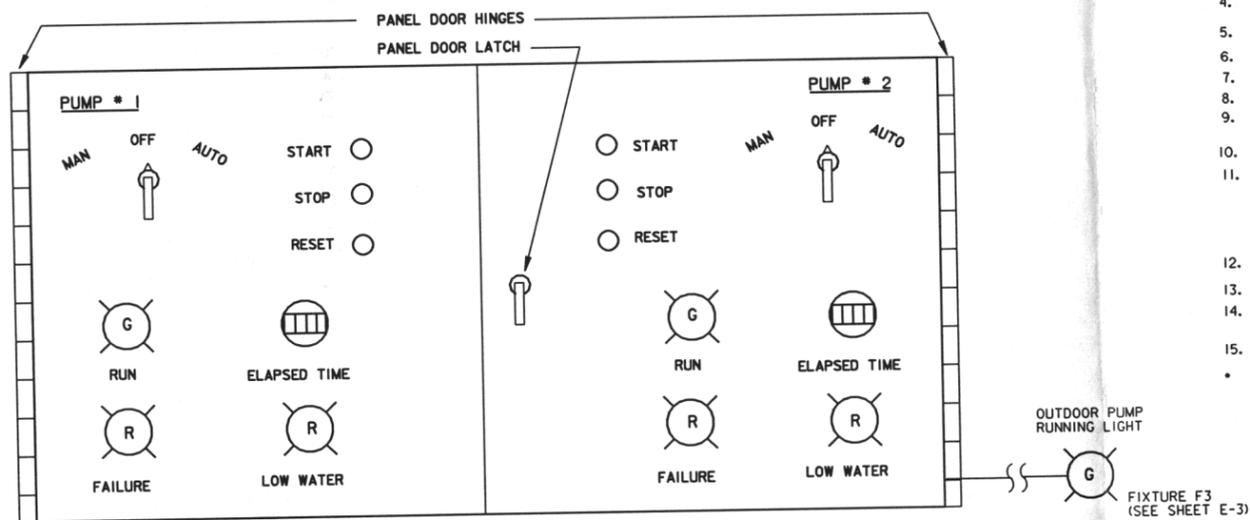
|  |  |  |
|--|--|--|
| Designed by:<br>BLW  | RJW  | <br>UPPER MISSISSIPPI RIVER ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 13, RIVER MILE 532 THRU 536<br>SPRING LAKE REHABILITATION AND ENHANCEMENT |
| Drawn by:<br>JRB   | AJM  |  |
| Checked by:<br>BLW   | DNR  |  |
| Reviewed by:<br>BOM  | JJC  |  |
| Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS | Date: 28 OCT. 1994<br>Drawing Code: M-L 13-134 | Sheet reference number:<br><b>E-2</b><br>Solicitation Number:<br>DACW25-95-B-0009<br>Sheet 53 of   |





PANEL SCHEDULE

- NOTES:
- 60A SERVICE, 10,000 AMP AIC, 240/120V-1 PHASE, NEMA 3R ENCLOSURE WITH BOTTOM BREATHER, BOLT-ON CIRCUIT BREAKERS, 20 INCH WIDE PANEL.
  - PROVIDE DEDICATED GROUND BAR IN PANEL. GROUND TO SYSTEM INDICATED ON SHEET E-2.
  - LOCATE PANEL JUST BELOW DISCONNECT D2 AS SHOWN ON SHEET E-2.
  - ONLY ONE CIRCUIT BREAKER SHALL BE USED FOR EACH SPACE. TANDEM CIRCUIT BREAKERS SHALL NOT BE USED.



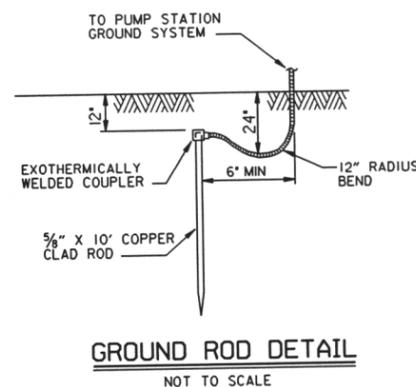
SUBMERSIBLE PUMP CONTROLS (FRONT PANEL)

2 SUBMERSIBLE PUMP OPERATION

- THE PUMPS ARE INTERLOCKED SO ONLY 1 PUMP CAN RUN AT A TIME.
- EACH PUMP CAN BE RUN IN EITHER MANUAL OR AUTO MODE. IN MANUAL MODE, FLOATS A1, B1, A2, AND B2 ARE OUT OF THE CIRCUIT. ONLY FLOATS A3 AND B3 ARE ACTIVE. IN AUTO MODE, ALL FLOATS ARE IN THE CIRCUIT.
- WHEN PUMP 1, (PUMPS FROM LOWER LAKE TO UPPER LAKE, TO MAINTAIN UPPER LAKE WATER LEVEL), IS IN MANUAL OPERATING MODE, START BUTTON MUST BE PUSHED TO START. PUMP 1 WILL RUN UNTIL ITS STOP BUTTON IS PUSHED, ITS LOW WATER EMERGENCY FLOAT A3 OPENS, (LOCATED IN THE LOWER LAKE SUMP), OR A PUMP 1 FAILURE OCCURS.
- WHEN PUMP 1 IS IN AUTO OPERATING MODE, START BUTTON MUST BE PUSHED TO START PUMP. PUMP 1 WILL START IF ITS UPPER LAKE "ON" FLOAT (FLOAT A1) IS CLOSED. THE PUMP WILL RUN UNTIL ITS UPPER LAKE "OFF" FLOAT, (FLOAT B1), OPENS, WHICH WILL STOP PUMP 1. PUMP 1 WILL RESTART WHEN THE UPPER LAKE WATER LEVEL IS LOW ENOUGH TO CAUSE FLOAT A1 TO CLOSE. THE PUMP WILL CONTINUE THRU THIS FLOAT CONTROLLED "ON-OFF" SEQUENCE UNTIL THE OPERATOR PRESSES THE STOP BUTTON, SWITCHES OUT OF AUTO MODE, THE LOW WATER FLOAT (A3) OPENS, OR A FAILURE OF PUMP 1 OCCURS.
- PUMP 1 LOW WATER FLOAT (A3) IS LOCATED IN THE LOWER LAKE FLOAT SUMP. THIS SHUT OFF WATER LEVEL IS SPECIFIED BY PUMP MANUFACTURER. IF PUMP 1 IS SHUT OFF BY A3 OPENING, IT SHALL NOT AUTOMATICALLY RESTART. PUMP 1 WILL BE RESET WHEN A3 CLOSSES BUT WILL NOT START UNTIL THE OPERATOR PUSHES START BUTTON.
- IF PUMP 1 IS STOPPED FOR ANY REASON THERE WILL BE A DELAY TIMER WHICH DISABLES PUMP 1 FROM BEING RESTARTED FOR 30 SECONDS.
- PUMP 1 GREEN RUN LIGHT SHALL BE LIT WHEN PUMP 1 IS RUNNING.
- PUMP 1 ELAPSED TIME INDICATOR SHALL BE RUNNING WHEN PUMP 1 IS RUNNING AND SHALL INDICATE PUMP RUN TIME IN HOURS AND TENTHS OF HOURS.
- PUMP 1 RED LOW WATER LIGHT SHALL LIGHT WHEN PUMP 1 IS SHUT OFF BY THE LOW WATER FLOAT (FLOAT A3).
- PUMP 1 RED FAILURE LIGHT SHALL LIGHT WHEN PUMP 1 IS SHUT OFF FOR MOTOR THERMAL OVERLOAD, PUMP BEARING OVER TEMP\*, PUMP SEAL LEAKAGE\*, PHASE LOSS, PHASE IMBALANCE, ALL PHASES LOW VOLTAGE, OR PHASE REVERSAL. AN INDICATOR MODULE INSIDE THE PUMP CONTROLLER SHALL INDICATE EXACT SENSOR WHICH INITIATED FAILURE. AFTER FAILURE IS FIXED, RESET BUTTON WILL CLEAR FAILURE ALARM.
- THERE SHALL BE A GREEN, 100W, OUTDOOR LAMP WHICH SHALL BE LIT WHENEVER EITHER PUMP IS RUNNING. IF EITHER PUMP STOPS FOR ANY REASON, THIS LIGHT WILL TURN OFF.
- PUMP 2 PUMPS FROM THE UPPER LAKE TO THE LOWER LAKE TO MAINTAIN UPPER LAKE WATER LEVEL. PUMP 2 OPERATION WILL BE THE SAME AS THAT OF PUMP 1 EXCEPT PUMP 2 IS CONTROLLED BY DIFFERENT FLOATS (SHEET E-2). THE LOW WATER EMERGENCY SHUT OFF FLOAT, (FLOAT B3), IS LOCATED IN THE UPPER LAKE FLOAT WELL. FLOATS A2 AND B2 (LOCATED IN THE UPPER LAKE OUTSIDE FLOAT WELL ADJACENT TO PUMP 1 FLOATS) TURN PUMP 2 ON AND OFF RESPECTIVELY.

PUMP CONTROLLER NOTES:

- CONTROL CIRCUIT SHALL BE 120VAC.
- PUMP EMERGENCY LOGIC CIRCUIT MAY BE EITHER 24VAC OR 120VAC.
- CONTROL CIRCUIT AND EMERGENCY LOGIC CIRCUIT TRANSFORMER SHALL BE PROTECTED BY FUSES OR CIRCUIT BREAKERS SIZED FOR THAT CIRCUIT LOAD.
- NOMINAL PANEL SIZE IS 80" WIDE, 42" TALL, AND 12" DEEP. CONTRACTOR SHALL MAKE ALLOWANCES FOR BEST FIT IN CONTROL ROOM (SHEET E-2). SIZE AND LAYOUT MAY VARY DEPENDING ON MANUFACTURER.
- INTERNAL PANEL WIRING SHALL BE SIS WITH A MINIMUM INSTALLATION TEMPERATURE OF -10 F.
- ALL INTERNAL WIRING SHALL BE COLOR CODED OR NUMBERED AND ANOTATED ON A SCHEMATIC SUPPLIED TO CORPS OF ENGINEERS BY CONTRACTOR.
- ALL INTERNAL WIRING SHALL TERMINATE ON TERMINAL BOARDS OR ELECTRICAL DEVICES.
- WIRE SHALL BE SIZED TO HANDLE ITS LOAD IN ACORDANCE WITH NEC TABLE 310-16.
- WIRE BUNDLES WHICH RUN BETWEEN PANEL BODY AND PANEL DOOR SHALL HAVE A BEND LOOP SUCH THAT THE PANEL DOORS MAY BE FULLY OPENED WITHOUT PUTTING STRAIN ON THE WIRES.
- PUMP CONTROLLER SHALL BE MOUNTED SO THE MIDDLE OF CONTROLLER IS APPROXIMATELY 4 FEET ABOVE CONTROL ROOM FLOOR.
- FAILURE INDICATOR REPRESENTS A SUMMATION INDICATION OF MOTOR THERMAL OVERLOAD, PUMP BEARING OVER TEMP\*, SEAL LEAKAGE\*, PHASE LOSS, PHASE REVERSAL, PHASE IMBALANCE, UNDERVOLTAGE OR GROUND FAULT. WHEN A FAILURE OCCURS, (PANEL LIGHT LIT), THE OPERATOR SHALL OPEN THE FRONT PANEL DOOR AND SCAN A FAILURE MONITOR TO TELL WHICH OF THE ABOVE MENTIONED FAILURES HAS TRIGGERED THE FAILURE INDICATOR. THE OUTDOOR ALARM INDICATOR LIGHT (F3) WILL BE LIT IF EITHER PUMP IS RUNNING AND WILL GO OFF IF THAT PUMP STOPS. THE OPERATOR CAN DETECT THIS LIGHT FROM A DISTANCE WITHOUT HAVING TO GO INSIDE THE PUMP STATION.
- RESET BUTTON IS USED TO RESET FAILURE SEQUENCE ONCE FAILURE HAS BEEN ELIMINATED.
- PUMP CONTROLLER SHALL BE SUPPLIED BY PUMP MANUFACTURER.
- CONTROLLER MANUFACTURER SHALL SUPPLY INTERNAL HEATER AND THERMOSTAT TO MAINTAIN INTERNAL PUMP CONTROLLER TEMPERATURE JUST ABOVE FREEZING WHEN AMBIENT TEMPERATURE IS AT 0°F.
- CONTROLLER SHALL BE NEMA 3R ENCLOSURE WITH BOTTOM BREATHER.
- THESE FAILURE SENSORS AND INDICATORS MAY NOT BE AVAILABLE FOR ALL PUMP MODELS.



GROUND ROD DETAIL  
NOT TO SCALE

| Revisions |                          |           |          |
|-----------|--------------------------|-----------|----------|
| Symbol    | Description              | Date      | Approved |
| △         | REVISED AS CONSTRUCTED   | 28 JUL 00 | RJM/DJ   |
| △         | AMD. #1 - MINOR REVISION | 23 DEC 94 | RJW      |
| △         | MINOR REVISIONS          | 18 NOV 94 | RJW      |

U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS

Designed by: TJW RJW  
Drawn by: JRK AJM  
Checked by: TJW DNR  
Reviewed by: RCA JJC  
Approved by: CHARLES S. COX COL., CORPS OF ENGINEERS

UPPER MISSISSIPPI RIVER ENVIRONMENTAL MANAGEMENT PROGRAM  
POOL 13, RIVER MILE 532 THRU 536  
SPRING LAKE REHABILITATION AND ENHANCEMENT

**PUMP STATION CONTROL PLAN**

Scale: NO SCALE  
Date: 28 OCT. 1994  
Drawing: M-L 13-134

Sheet reference number: E-4  
Colligation Number: DACW25-95-B-0009  
Sheet 55 of

27-NDV-2002 14123  
E:\proj\elect\pump3\pump04.dgn



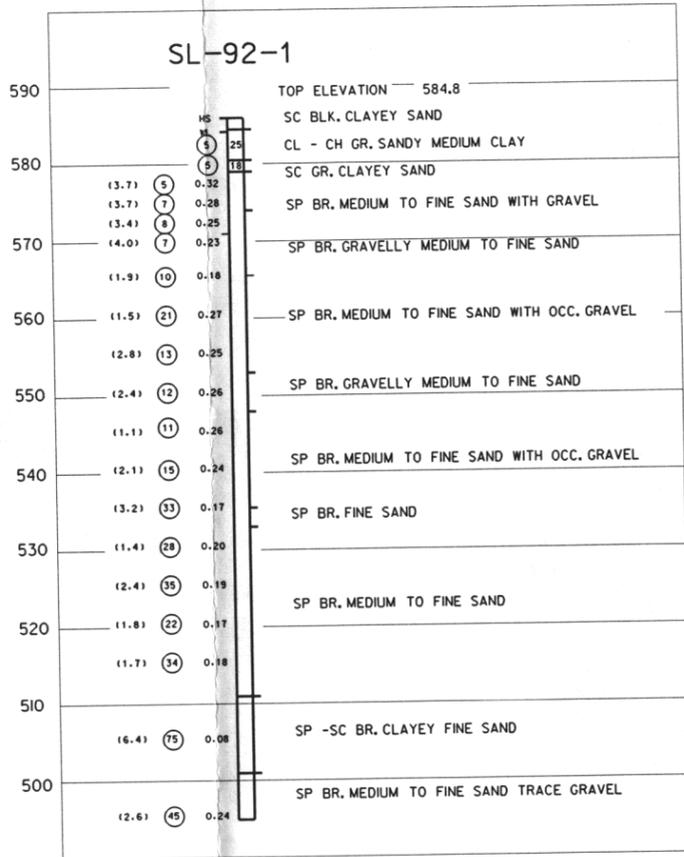
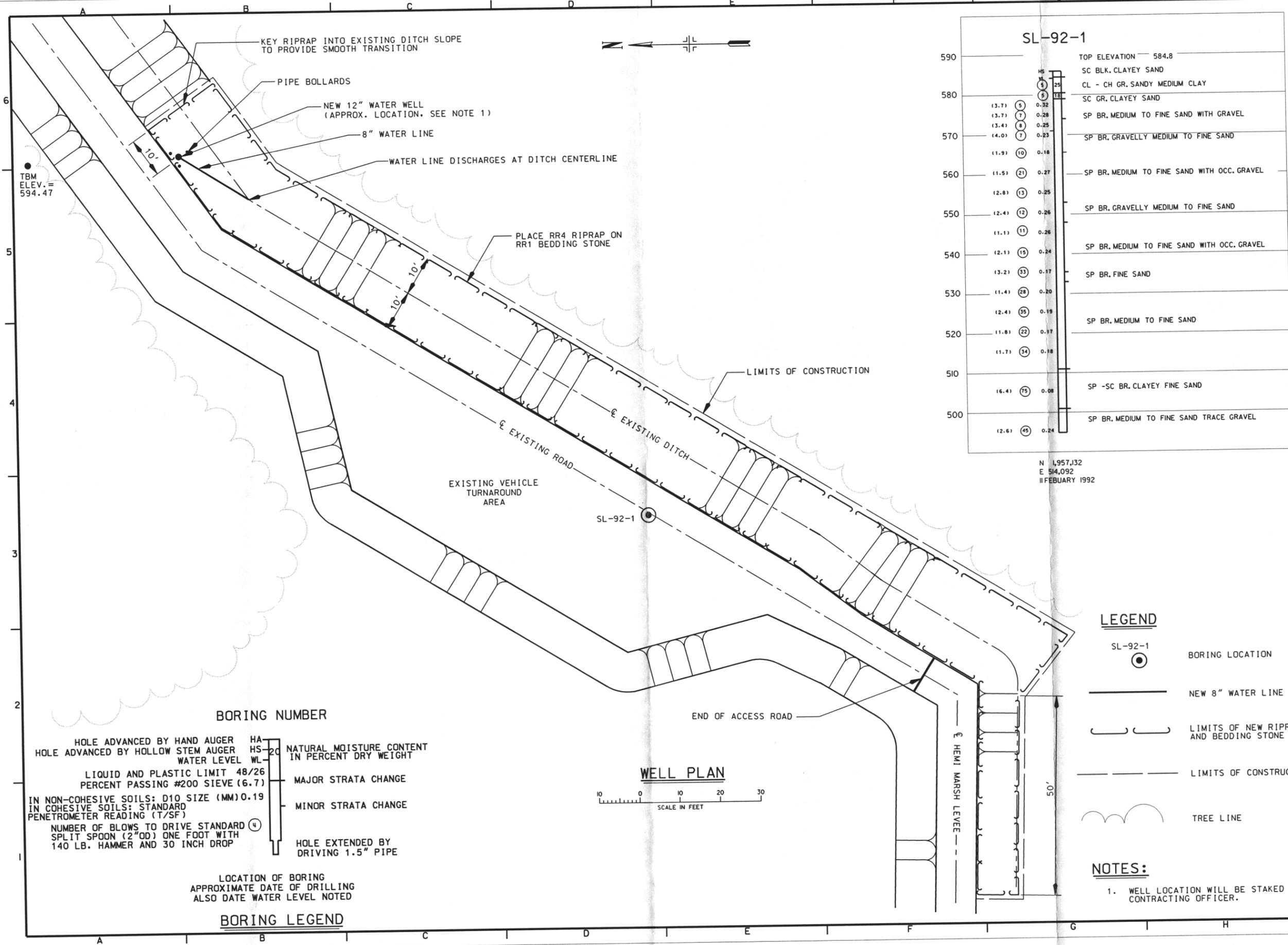
| Symbol | Description    | Revisions |
|--------|----------------|-----------|
| AS     | AS CONSTRUCTED |           |

|              |     |                       |                 |
|--------------|-----|-----------------------|-----------------|
| Designed By: | RTN | Date:                 | 21 AUG. 1998    |
| Drawn By:    | TPD | Scale:                | AS SHOWN        |
| Checked By:  | BLK | Drawing Code:         | M-L13-137       |
| Reviewed By: | KGB | Specification Number: | DAC25-98-9-0014 |

UPPER MISSISSIPPI RIVER PROGRAM  
ENVIRONMENTAL RESTORATION  
FOURTH RIVER REHABILITATION  
AND STAGE-11

**WELL PLAN AND BORING DATA**

**PLATE 40**



N 1957,132  
E 514,092  
11 FEBRUARY 1992

**BORING NUMBER**

HA HOLE ADVANCED BY HAND AUGER  
HS HOLE ADVANCED BY HOLLOW STEM AUGER  
WL WATER LEVEL

LIQUID AND PLASTIC LIMIT 48/26  
PERCENT PASSING #200 SIEVE (6.7)

IN NON-COHESIVE SOILS: D10 SIZE (MM) 0.19  
IN COHESIVE SOILS: STANDARD  
PENETROMETER READING (T/SF)

NUMBER OF BLOWS TO DRIVE STANDARD  
SPLIT SPOON (2" OD) ONE FOOT WITH  
140 LB. HAMMER AND 30 INCH DROP

NATURAL MOISTURE CONTENT  
IN PERCENT DRY WEIGHT

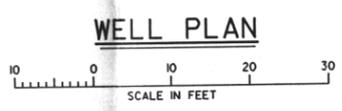
MAJOR STRATA CHANGE

MINOR STRATA CHANGE

HOLE EXTENDED BY  
DRIVING 1.5" PIPE

LOCATION OF BORING  
APPROXIMATE DATE OF DRILLING  
ALSO DATE WATER LEVEL NOTED

**BORING LEGEND**



**LEGEND**

SL-92-1 BORING LOCATION

NEW 8" WATER LINE

LIMITS OF NEW RIPRAP AND BEDDING STONE

LIMITS OF CONSTRUCTION

TREE LINE

**NOTES:**

1. WELL LOCATION WILL BE STAKED BY CONTRACTING OFFICER.

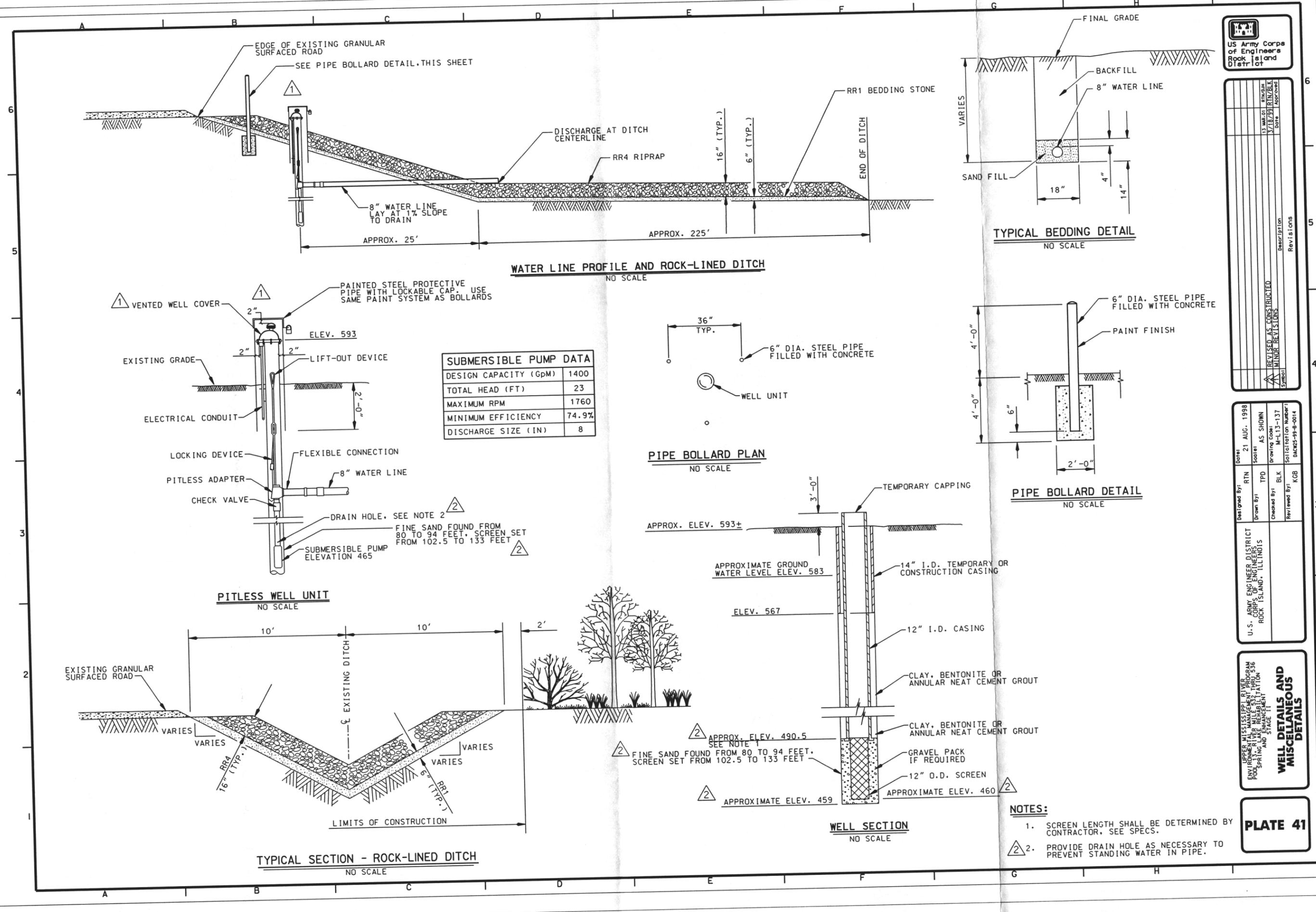
| NO. | DATE    | DESCRIPTION                              | BY      | APPROVED |
|-----|---------|--|---------|----------|
| 1   | 3/18/98 | REVISED AS CONSTRUCTED THROUGH REVISIONS | ENR/BLK | ENR/BLK  |
| 2   | 3/18/98 |  |         |          |
| 3   | 3/18/98 |  |         |          |
| 4   | 3/18/98 |  |         |          |
| 5   | 3/18/98 |  |         |          |
| 6   | 3/18/98 |  |         |          |

|              |     |                       |               |
|--------------|-----|-----------------------|---------------|
| Designed By: | RTN | Date:                 | 21 AUG. 1998  |
| Drawn By:    | TPD | Scale:                | AS SHOWN      |
| Checked By:  | BLK | Drawing Code:         | M-L13-137     |
| Reviewed By: | KGB | Specification Number: | DAC25-98-0014 |

UPPER MISSISSIPPI RIVER  
ENVIRONMENTAL MANAGEMENT PROGRAM  
POLYMER FLOCCULANT REHABILITATION  
AND ENHANCEMENT  
STAGE II

**WELL DETAILS AND  
MISCELLANEOUS  
DETAILS**

**PLATE 41**





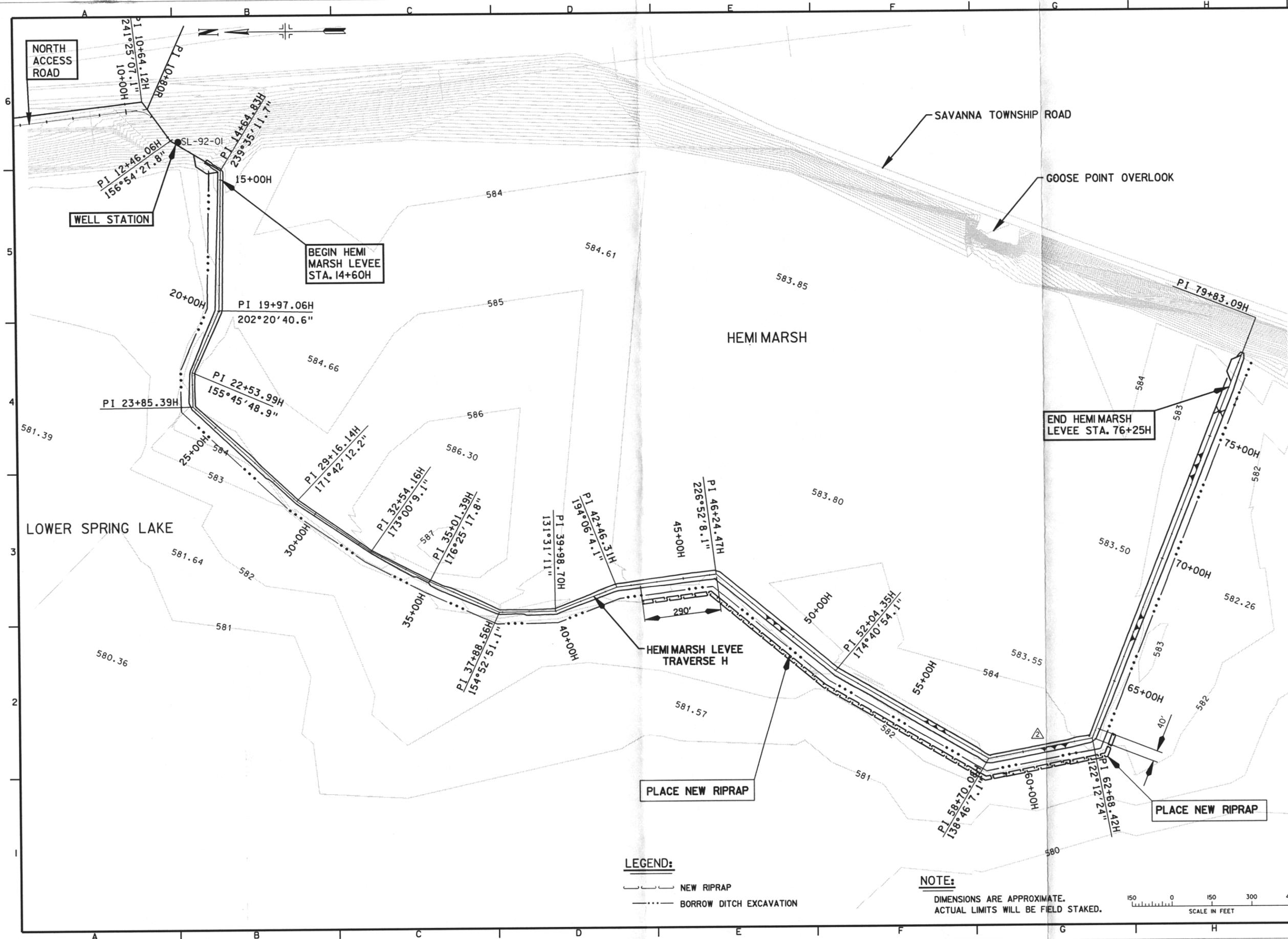
| Symbol | Description                                     | Date | Revised By |
|--------|---|------|------------|
| ▲      | REVISED AS CONSTRUCTED                          |      |            |
| ▲      | CONTRACT MODIFICATION 0003 - SHEET ADDED TO SET |      |            |

|              |     |                      |               |
|--------------|-----|----------------------|---------------|
| Designed By: | BJM | Date:                | 21 AUG. 1998  |
| Drawn By:    | TPD | Scale:               | AS SHOWN      |
| Checked By:  | BBR | Drawing Code:        | M-L 13-137    |
| Reviewed By: | BBR | Solicitation Number: | DUC25-98-0014 |

UPPER MISSISSIPPI RIVER ENVIRONMENTAL MANAGEMENT PROGRAM PROJECT RIVER MILE 532 THROUGH 536 ROCK ISLAND DISTRICT SPRING AND ENHANCEMENT AND STAGE I

**REVISION PLAN**

**PLATE 42**

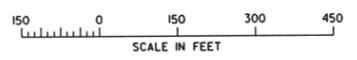


**LEGEND:**

- NEW RIPRAP
- BORROW DITCH EXCAVATION

**NOTE:**

DIMENSIONS ARE APPROXIMATE. ACTUAL LIMITS WILL BE FIELD STAKED.







| Revisions | Date      | By                     | Approved |
|-----------|-----------|------------------------|----------|
| 1         | 13 MAR 01 | REVISED AS CONSTRUCTED |          |

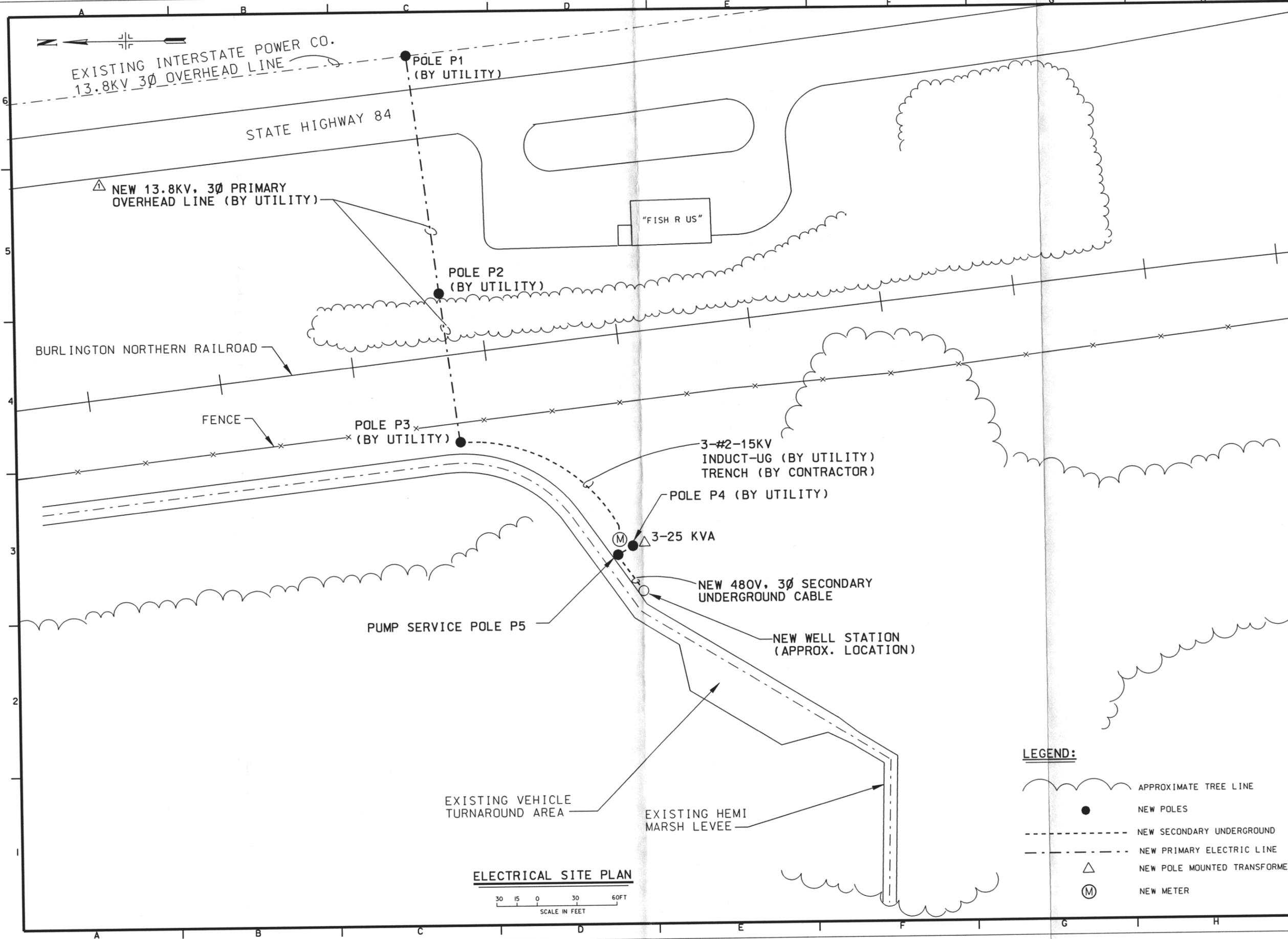
|              |     |                       |                 |
|--------------|-----|-----------------------|-----------------|
| Designed By: | CJA | Date:                 | 21 AUG. 1998    |
| Drawn By:    | TPD | Scale:                | AS SHOWN        |
| Checked By:  | BCR | Drawing Code:         | ML-13-137       |
| Reviewed By: | BLK | Specification Number: | DUCTS-98-8-0014 |

DESIGNED BY: CJA  
 DRAWN BY: TPD  
 CHECKED BY: BCR  
 REVIEWED BY: BLK

DATE: 21 AUG. 1998  
 SCALE: AS SHOWN  
 DRAWING CODE: ML-13-137  
 SPECIFICATION NUMBER: DUCTS-98-8-0014

**ELECTRICAL SITE PLAN**

**PLATE 44**



- LEGEND:**
- APPROXIMATE TREE LINE
  - NEW POLES
  - NEW SECONDARY UNDERGROUND
  - NEW PRIMARY ELECTRIC LINE
  - NEW POLE MOUNTED TRANSFORMER
  - NEW METER

**ELECTRICAL SITE PLAN**



21-AUG-2002 14:25 E:\proj\elec\mp3\elec3\plate44.dgn

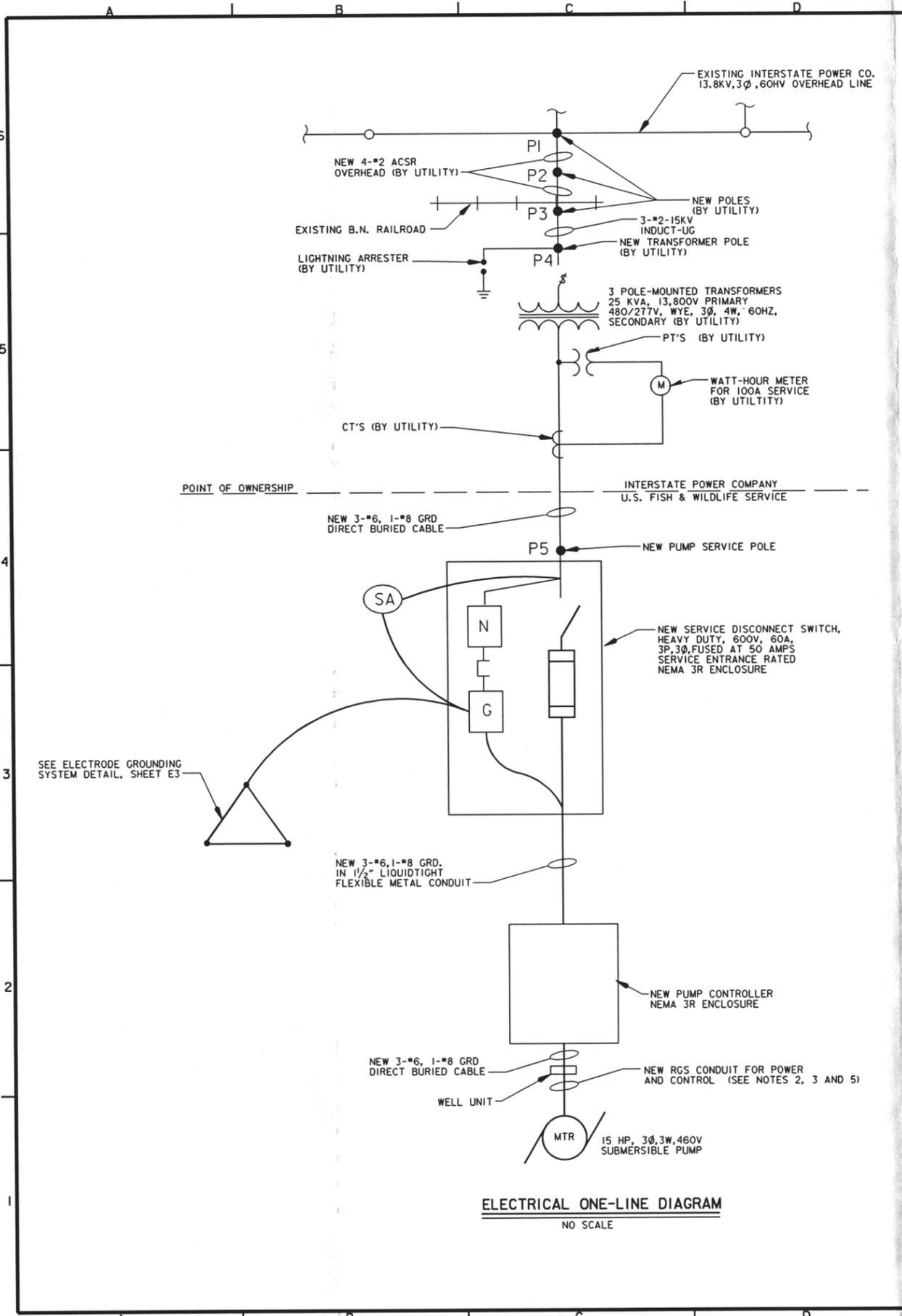
| Date      | Description | Revised As Constructed | Revisions |
|-----------|-------------|------------------------|-----------|
| 13 MAR 01 |             |                        |           |
|           |             |                        |           |
|           |             |                        |           |
|           |             |                        |           |
|           |             |                        |           |
|           |             |                        |           |
|           |             |                        |           |
|           |             |                        |           |
|           |             |                        |           |
|           |             |                        |           |

|                  |                                    |
|------------------|------------------------------------|
| Designed By: CJA | Date: 21 AUG. 1998                 |
| Drawn By: TPD    | Scale: AS SHOWN                    |
| Checked By: BGR  | Drawing Code: R-13-137             |
| Reviewed By: BLK | Soil Station Number: DUC25-93-0014 |

UPPER MISSISSIPPI RIVER ENVIRONMENTAL MANAGEMENT PROGRAM FLOODING AND REHABILITATION AND ENHANCEMENT AND STAGE 11

**ELECTRICAL ONE-LINE DIAGRAM AND SCOPE OF WORK**

27-MAY-2002 14:56  
E:\p\3121\map\3121p45.dwg



**SCOPE OF ELECTRICAL WORK:**

- A. CONTRACTOR WORK INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:
1. FURNISH AND INSTALL CONDUITS, CONDUCTORS, AND APPURTENANCES BETWEEN THE UTILITY TRANSFORMER POLE #4, AND THE SUBMERSIBLE WELL PUMP.
  2. PROVIDE TRENCH AND BACKFILL BETWEEN UTILITY POLES #4, PUMP SERVICE POLE (P5) AND NEW WELL.
  3. FURNISH AND INSTALL GROUNDING SYSTEM.
  4. FURNISH AND INSTALL SECONDARY DISCONNECT SWITCH.
  5. FURNISH AND INSTALL POLE (P5).
  6. INSTALL METER BASE, FURNISHED BY UTILITY.
  7. FURNISH AND INSTALL SECONDARY SURGE ARRESTER.
  8. INSTALL PUMP CONTROLLER AND PUMP CABLE.
  9. FURNISH AND INSTALL 1 1/2" RGS CONDUIT RISER WITH WEATHERHEAD ON TRANSFORMER POLE P4.
  10. PROVIDE TRENCH AND BACKFILL FOR PRIMARY CABLE. PRIMARY CABLE IS FURNISHED AND INSTALLED BY UTILITY.
- B. UTILITY WORK INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:
1. FURNISH AND INSTALL FOUR(4) POLES AND APPURTENANCES.
  2. FURNISH AND INSTALL PRIMARY CABLES AND APPURTENANCES (OVERHEAD AND UNDERGROUND).
  3. FURNISH AND INSTALL THREE (3) POLE MOUNTED TRANSFORMERS.
  4. FURNISH AND INSTALL METER, CT'S, PT'S, CUTOUPS, ARRESTERS, GROUNDING, AND PRIMARY TERMINATION ON POLE P4.
  5. PROVIDE SECONDARY CONNECTIONS TO TRANSFORMERS.
- C. THE ABOVE ELECTRICAL WORK IN PART B TO BE PROVIDED AT THE CONTRACTOR'S EXPENSE. COORDINATE ALL INTERSTATE POWER CO. WORK WITH THE CONTRACTOR.
- D. INTERSTATE POWER CO. POINT OF CONTACT:  
MR. BRUCE BIELEMA  
201 NORTH SECOND STREET  
CLINTON, IOWA 52732  
TELEPHONE NO. (319) 243-2611 EXT.145

**GENERAL NOTES:**

1. PUMP MANUFACTURER SHALL FURNISH PUMP CONTROLLER.
2. PUMP MANUFACTURER SHALL SIZE AND FURNISH CABLE BETWEEN PUMP CONTROLLER AND SUBMERSIBLE WELL PUMP.
3. VERIFY CONDUIT SIZE WITH MANUFACTURER CABLE SIZE.
4. FOR WELL DETAILS, SEE SHEET C3.
5. NO SPLICES SHALL BE MADE TO PUMP MANUFACTURER SUPPLIED CABLE.
6. BOND GROUNDING ELECTRODES TOGETHER BELOW GRADE.
7. FOR GROUNDING DETAILS, SEE SHEET E3.
8. LEAVE ABOUT 3-4 FT. ADDITIONAL CABLE AT WEATHERHEAD ON POLE P4 FOR TRANSFORMER CONNECTIONS.
9. INSTALL SECONDARY SURGE ARRESTER IN NEMA 3R ENCLOSURE. ATTACH TO SIDE OF 60A SERVICE DISCONNECT SWITCH.
10. ALL NEMA 3R ENCLOSURES SHALL HAVE A BOTTOM BREATHER.
11. DISCONNECT AND CONTROLLER SHALL BE PADLOCKABLE.
12. BOND GROUNDING WELL CASING TO POWER SUPPLY GROUND.

**ELECTRICAL LEGEND:**

- NEW POLE (BY UTILITY)
- RGS RIGID GALVANIZED STEEL
- GRD DENOTES GROUND
- SA SURGE ARRESTER
- CT CURRENT TRANSFORMER
- PT POTENTIAL TRANSFORMER
- UG UNDERGROUND
- |— FUSIBLE DISCONNECT SWITCH
- ⏏ GROUNDING ELECTRODE
- ⊗ MTR MOTOR
- ⊞ FUSE
- N DENOTES NEUTRAL BUS
- G DENOTES GROUND BUS
- PI DENOTES POLE NUMBER
- EXISTING UTILITY POLE

| Symbol | Description | Date      | Revised As Constructed |
|--------|-------------|-----------|------------------------|
| △      | REVISAS     | 11 MAR 01 | Approved               |

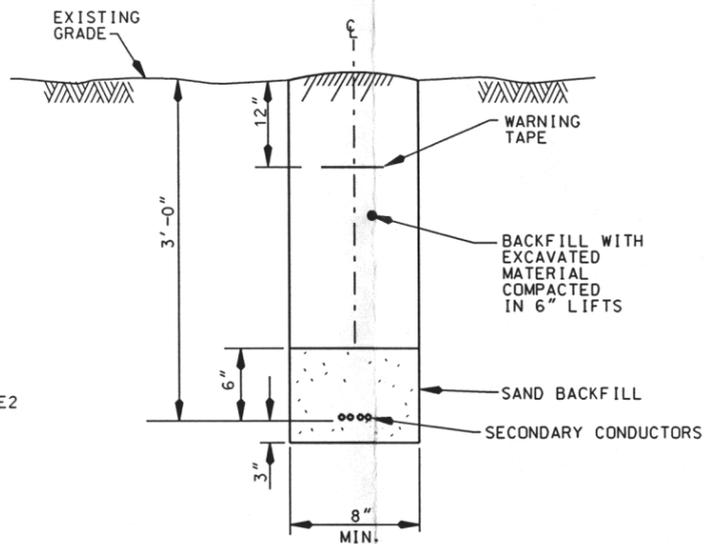
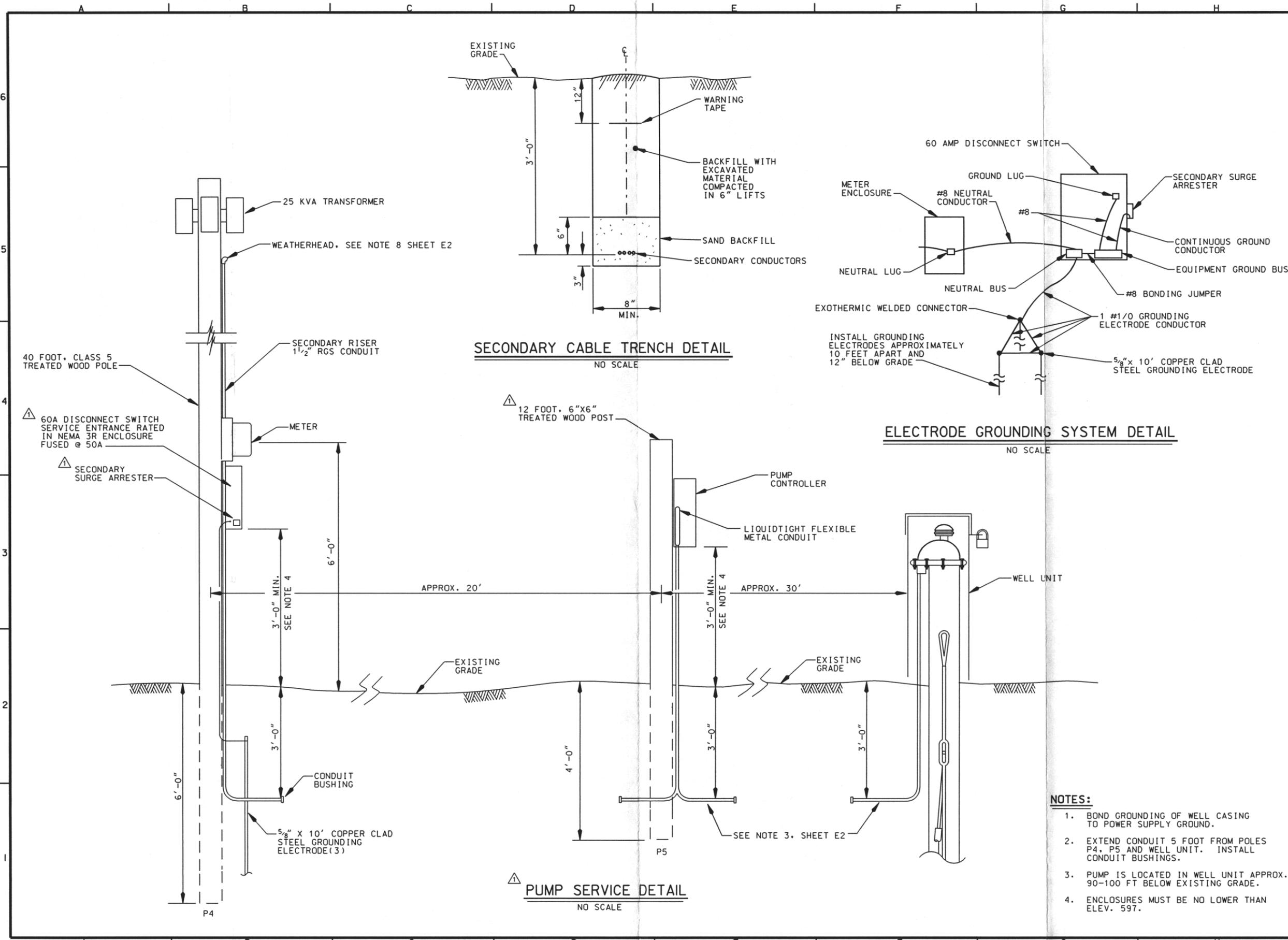
|  |  |  |
|--|--|--|
| U.S. ARMY ENGINEER DISTRICT<br>CORPS OF ENGINEERS<br>ROCK ISLAND, ILLINOIS | Designed By: CJA<br>Drawn By: TPD<br>Checked By: BCR<br>Reviewed By: BLK | Date: 21 AUG. 1998<br>Scale: AS SHOWN<br>Drawing Code: RL-13-137<br>Specification Number: DACR25-98-0014 |
|--|--|--|

UPPER MISSISSIPPI RIVER  
ENVIRONMENTAL MANAGEMENT PROGRAM  
FOOSPRING LAKE REHABILITATION  
AND ENHANCEMENT  
STAGE II

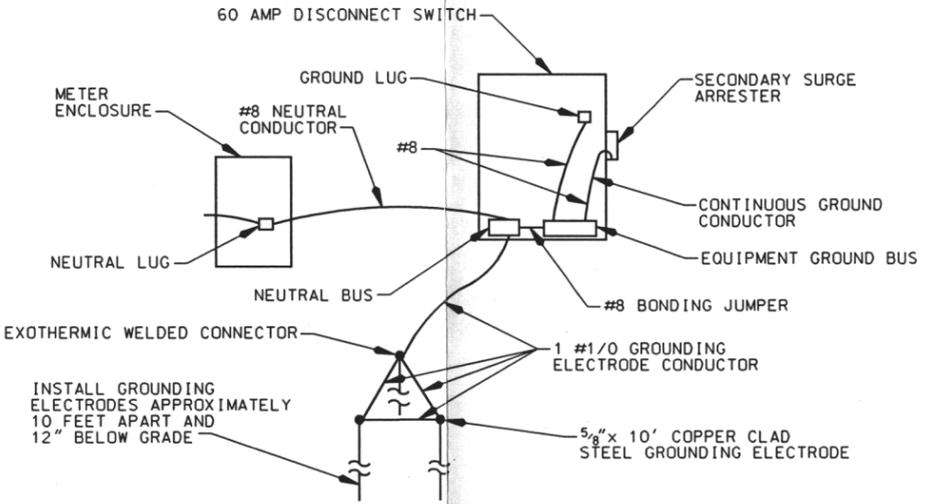
**ELECTRICAL DETAILS**

**PLATE 46**

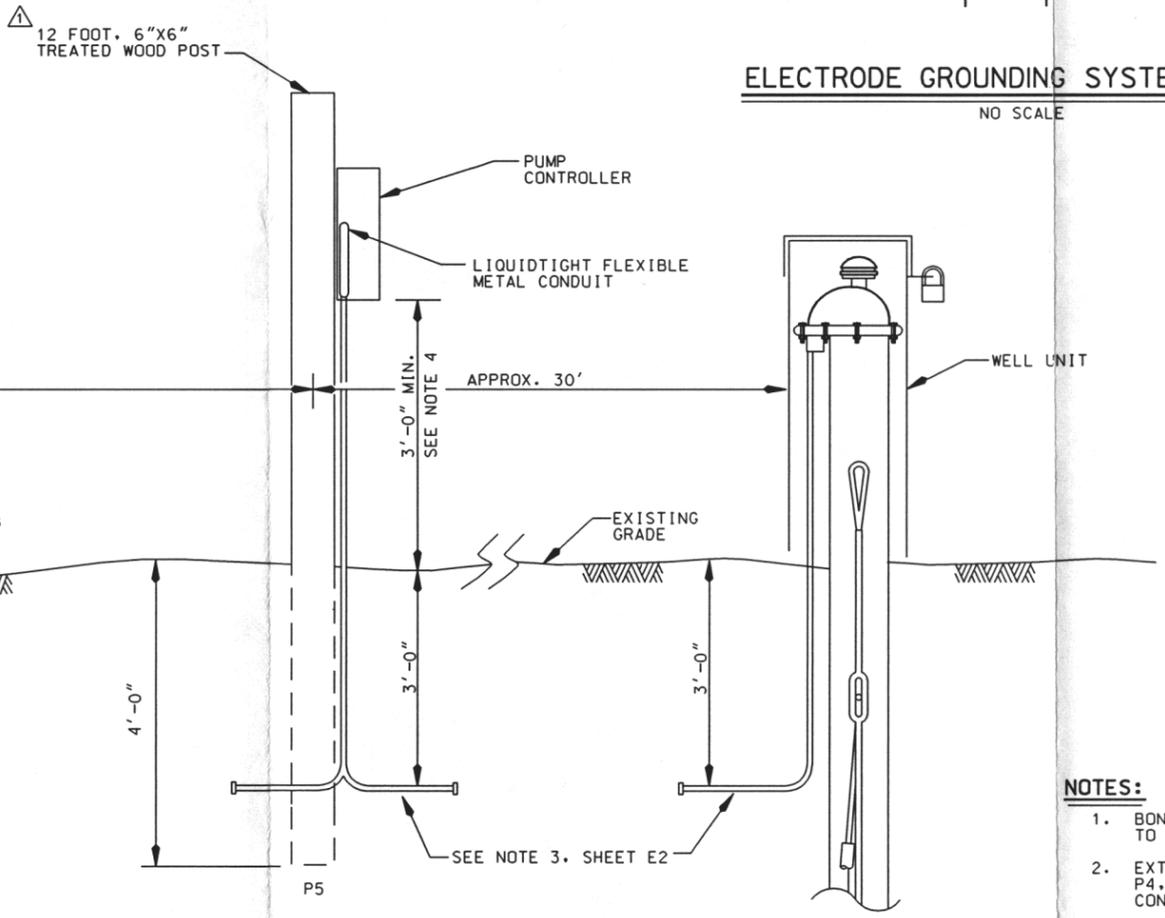
22-4897-0000 1415X  
E:\proj\2014\ep3\46p3\46p46.dgn



**SECONDARY CABLE TRENCH DETAIL**  
NO SCALE



**ELECTRODE GROUNDING SYSTEM DETAIL**  
NO SCALE



**PUMP SERVICE DETAIL**  
NO SCALE

- NOTES:**
- BOND GROUNDING OF WELL CASING TO POWER SUPPLY GROUND.
  - EXTEND CONDUIT 5 FOOT FROM POLES P4, P5 AND WELL UNIT. INSTALL CONDUIT BUSHINGS.
  - PUMP IS LOCATED IN WELL UNIT APPROX. 90-100 FT BELOW EXISTING GRADE.
  - ENCLOSURES MUST BE NO LOWER THAN ELEV. 597.