



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

OPERATION AND MAINTENANCE MANUAL

PRINCETON REFUGE HABITAT REHABILITATION AND ENHANCEMENT

UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM

**POOL 14, MISSISSIPPI RIVER MILES 504.0 – 506.4R
SCOTT COUNTY, IOWA**

AUGUST 2005



DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

CEMVR-PM-F

**OPERATION AND MAINTENANCE MANUAL
FOR
PRINCETON REFUGE HABITAT
REHABILITATION AND ENHANCEMENT**

**UPPER MISSISSIPPI RIVER SYSTEM
ENVIRONMENTAL MANAGEMENT PROGRAM**

**POOL 14, MISSISSIPPI RIVER MILES 504.0-506.4R
SCOTT COUNTY, IOWA**

AUGUST 2005

ACKNOWLEDGMENT

Many individuals of the Rock Island District, U.S. Army Corps of Engineers; the U.S. Fish and Wildlife Service; and the Iowa Department of Natural Resources contributed to the development of this Operations and Maintenance Manual for the Princeton Refuge Habitat Rehabilitation and Enhancement Project. Additional information about the Princeton HREP project is available at the following web site - www.mvr.usace.army.mil. These individuals are listed below:

U.S. ARMY CORPS OF ENGINEERS ROCK ISLAND DISTRICT

PROGRAM MANAGER:	Roger Perk
TECHNICAL COORDINATOR:	Darron Niles
PROJECT ENGINEER:	Rachel Fellman
BIOLOGIST:	Charlene Carmack
FORESTER:	Gary Swenson
GEOTECHNICAL ENGINEER:	Tom Mack
HYDRAULIC ENGINEER:	Tom Kirkeeng
LEVEE INSPECTOR:	Mark Clark
MECHANICAL ENGINEER:	John Behrens
REPORT PREPARER:	Nancy Holling

U.S. FISH AND WILDLIFE SERVICE UPPER MISSISSIPPI RIVER NATIONAL WILDLIFE & FISH REFUGE

EMP COORDINATOR:	Keith Beseke
SAVANNA DISTRICT MANAGER:	Ed Britton

IOWA DEPARTMENT OF NATURAL RESOURCES MAQUOKETA WILDLIFE UNIT

AREA WILDLIFE BIOLOGIST:	Bob Sheets
WILDLIFE TECHNICIAN/SITE MANAGER:	Randy Robinson
MISSISSIPPI RIVER FISHERIES BIOLOGIST:	Tom Boland
MISSISSIPPI RIVER WILDLIFE BIOLOGIST:	Mike Griffin



**US Army Corps
of Engineers®**



**OPERATION AND MAINTENANCE MANUAL
FOR
PRINCETON REFUGE HABITAT
REHABILITATION AND ENHANCEMENT**

**UPPER MISSISSIPPI RIVER SYSTEM
ENVIRONMENTAL MANAGEMENT PROGRAM**

**POOL 14, MISSISSIPPI RIVER MILES 504.0–506.4R
SCOTT COUNTY, IOWA**

CONTENTS

1. INTRODUCTION.....	1
a. Background	1
b. Purpose and Scope	1
c. Use of Manual	2
2. HISTORICAL SUMMARY	3
a. Authorization and Location.....	3
b. Planning and Construction Activities	3
c. Actual Project Costs	6
d. Project References	12
3. DESCRIPTION OF PROJECT FEATURES	13
a. Project Data.....	13
b. General Description	14
c. Water Control Plan.....	15
d. Water Source.....	16
e. Levee System	17
f. Pump Station.....	17
g. Water Control Structures	18
h. Gatewell Structure	18
i. Mast Tree Plantings	18
j. Site Access.....	18
k. Borrow Areas/Potholes	19
l. Utilities.....	19
4. INSPECTIONS	20
a. Purpose.....	20
b. Project Inspections.....	20
c. Joint Inspections.....	20
5. OPERATION AND MAINTENANCE.....	21
a. General	21
b. Perimeter Levee, Overflow Roadway, and Cross Dike	22
c. Pump Station	23

d. Water Control Structures	25
e. Gatewell Structures	26
f. Mast Tree Plantings	27
g. Borrow Areas/Potholes	27
6. PERFORMANCE MONITORING AND ASSESSMENT	28
a. General	28
b. Post-Construction.....	29

Tables

2-1	Implementation Schedule.....	3
2-2	Project Goals and Objectives	5
2-3	Summary of Project Costs	6
2-4	Stage I Construction Costs.....	7
2-5	Stage II Construction Costs	8
2-6	Stage III Construction Costs	10
2-7	Stage IV Construction Costs.....	11
2-8	Project References	12
3-1	Summary of Project Data.....	13
3-2	Wetland Management Unit Water Control Plan.....	15
3-3	Elevation Frequency Relationships.....	16
5-1	Estimated Annual Operation and Maintenance Costs	21
5-2	Annual Management Plan.....	24
6-1	Estimated Annual Post-Construction Monitoring Costs.....	28
6-2	Monitoring and Performance Evaluation Matrix	30
6-3	Monitoring and Data Collection Summary	31
6-4	Transect Evaluation Summary	33
6-5	Post-Construction Evaluation Plan	34

Figures

3-1	Stage-Duration Curve	16
-----	----------------------------	----

Appendices

A	Acronyms
B	Operation, Maintenance, and Rehabilitation Agreement
C	Site Manager’s Project Inspection and Monitoring Results
D	Cooperating Agency Correspondence
E	Pump Station Inspection Report
F	Mechanical Equipment Data
G	Levee Inspection Report
H	List of Rock Island District Approved Pesticides
I	Photographs of Project Features

Appendices (Continued)

- J Project Team Members
- K Distribution List
- L Plates

Plates

Stage I

- 1 Location Plan, Vicinity Map, and General Notes
- 2 Site Plan
- 3 Boring Locations
- 4 Boring Logs I
- 5 Boring Logs II
- 6 Boring Logs III
- 7 Perimeter Levee Plan and Profile Station 0+00 to Station 45+00
- 8 Perimeter Levee Plan and Profile Station 45+00 to Station 90+00
- 9 Perimeter Levee Plan and Profile Station 90+00 to Station 135+00
- 10 Perimeter Levee Plan and Profile Station 135+00 to Station 163+73
- 11 Overflow Roadway/Spillway Plan and Profile Station 0+00B to Station 24+51B
- 12 Cross Dike Plan and Profile Station 0+00C to Station 52+68.51C
- 13 Typical Levee Sections I
- 14 Typical Levee Sections II
- 15 Offset Tables
- 16 Miscellaneous Details
- 17 Pump Station Site Plan
- 18 Pump Station and Intake Section
- 19 Gate Details
- 20 Gatewell Plan and Elevation
- 21 Gatewell Reinforcing
- 22 Gatewell Grating and Handrail Details
- 23 Stoplog Structure Plan & Section
- 24 Stoplog Structure Reinforcing
- 25 Stoplog Structure and Staff Gage Details
- 26 Stoplog Structure Guardrail Details
- 27 Stoplog Structure Miscellaneous Details
- 28 Pump Engine Building Plan, Elevations and Section
- 29 Pump Engine Building Foundation Reinforcing I
- 30 Pump Engine Building Foundation Reinforcing II
- 31 Pump Engine Building Framing Details
- 32 Pump Engine Building Door Details
- 33 Pump Engine Building Doors
- 34 Pump Engine Building Hinge and Locking Details
- 35 Pump Engine Building Walk in Door
- 36 Intake Structure Plan and Elevation
- 37 Intake Structure Foundation Plans

Plates (Continued)

Stage I (Continued)

- 38 Intake Structure Reinforcing
- 39 Intake Structure Grating & Trashrack
- 40 Pump Station Site Plan
- 41 Pump Station and Pump Discharge Section
- 42 Stoplog Structure Plan and Section
- 43 Intake Structure Plan and Elevation
- 44 Ventilation and Exhaust Plans
- 45 Engine Ventilation and Exhaust Details
- 46 Electrical Details

Stage II

- 47 Location Plan, Vicinity Map, and Index
- 48 Site Plan
- 49 Water Control Structure Plan and Section
- 50 Water Control Structure Details I
- 51 Water Control Structure Details II

Stage III

- 52 Scour Repair Station 0+00 to Station 40+00
- 53 Breach Repair Setback Levee
- 54 As-Builts Station 4+00 Mainline Levee
- 55 As-Builts Station 13+00 Mainline Levee
- 56 As-Builts Station 16+00 Mainline Levee
- 57 As-Builts Station 1+00 Setback Levee
- 58 As-Builts Station 4+00 Setback Levee
- 59 As-Builts Station 7+50 Setback Levee

General

- 60 Monitoring Plan

Stage IV

- 61 Location Maps, General Index, Notes
- 62 Site Plan
- 63 Lower Overflow Roadway/ Spillway

**OPERATION AND MAINTENANCE MANUAL
FOR
PRINCETON REFUGE HABITAT
REHABILITATION AND ENHANCEMENT**

**UPPER MISSISSIPPI RIVER SYSTEM
ENVIRONMENTAL MANAGEMENT PROGRAM**

**POOL 14, MISSISSIPPI RIVER MILES 504.0–506.4R
SCOTT COUNTY, IOWA**

1. INTRODUCTION.

a. Background. The Princeton Refuge Habitat Rehabilitation and Enhancement Project (HREP), hereafter referred to as “the Princeton HREP project,” is a part of the Upper Mississippi River System (UMRS) Environmental Management Program (EMP). The Princeton HREP project is operated and maintained by the Iowa Department of Natural Resources (IADNR) under the terms of a Cooperative Agreement with the U.S. Fish and Wildlife Service (USFWS).

The levee surrounding Princeton was originally constructed in the late 1920’s and early 1930’s. A small capacity pump and outlet structure, installed in 1957, allowed some manipulation of water levels, but management was often compromised by limited pumping capability and levee overtopping during high water events. Levee improvements in 1982, in combination with the installation of a higher capacity pump in 1983, helped to overcome some of these difficulties. However, improved water level control was necessary to maximize and sustain wetland habitat quality and quantity for migratory birds.

As stated in the Definite Project Report (DPR), the Princeton HREP project was initiated due to the inability to maintain desirable water levels as the result of a deteriorated levee system and limited water level control. The purpose of the DPR was to evaluate alternatives for potential features and identify those that would maintain the project goals and objectives over a design life of 50 years. This report also presented a detailed proposal for the rehabilitation and enhancement of the Princeton HREP project and provided planning, engineering, and sufficient construction details of the selected plan to allow final design and construction to proceed following approval.

b. Purpose and Scope. The Operation and Maintenance (O&M) Manual serves as a guide for the management of the Princeton HREP project. O&M instructions are provided for the major project features. These instructions are consistent with the general procedures presented in the approved DPR. This document is written for management personnel who are familiar with the project and does not contain detailed information that is common knowledge to such personnel or which is presented in other regulations or references (see Table 2-7).

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 to ensure long-term utilization of project features. A timely preventative maintenance program reduces and prevents damage to constructed features by early corrective action.

c. Use of Manual. The O&M Manual provides the general standards of operation and maintenance and establishes an initial frequency of management responsibilities to ensure satisfactory project performance. This document is divided into the following sections: Section 1 - Introduction, Section 2 - Historical Summary, Section 3 - Description of Project Features, Section 4 - Inspections, Section 5 - Operation and Maintenance, and Section 6 - Performance Monitoring and Assessment. Sections 2 and 3 present historical summaries and descriptions of the major features as constructed for this project. Sections 4 and 5 include inspection procedures and O&M instructions for the major project features. Section 6 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. The attached drawings in Appendix L have been included to provide as-built conditions and typical sections of project features.

2. HISTORICAL SUMMARY.

a. Authorization and Location. The authority for this project is provided by the Supplemental Appropriations Act (Public Law 99-88) and Section 1103 of the Water Resources Development Act of 1986 (Public Law 99-662). The Princeton HREP project was funded and constructed under this authorization by the U.S. Army Corps of Engineers (USACE), Rock Island District, in cooperation with the U.S. Fish and Wildlife Service (USFWS) and the Iowa Department of Natural Resources (IADNR).

The Princeton HREP project is located in Pool 14 along the right descending bank of the Upper Mississippi River navigation channel between River Miles (RM) 504.0 and 506.4, or approximately 1 mile north of the City of Princeton, Iowa. The entire refuge encompasses approximately 1,129 acres, with 418 acres being State lands and the remaining 711 acres being Federal lands. Plate 1 in Appendix L contains the location plan, vicinity map, and general notes for the Princeton HREP project.

b. Planning and Construction Activities.

(1) Summary. Table 2-1 summarizes the planning, engineering, design, and construction activities associated with the Princeton HREP project. These activities are further discussed in the following sections.

TABLE 2-1 Implementation Schedule			
Project Phase	Purpose	Project Milestone	Date Completed
Planning	Identify and define problems and establish need of project	Submit Fact Sheet	May 1988
		Approve Fact Sheet	June 1989
		SHPO Concurrence	April 1992
		O&M Agreement	June 1992
Engineering & Design	Quantify project objectives, perform preliminary design, satisfy NEPA and permit requirements, develop performance evaluation plan, obtain project approval for construction	Draft DPR	August 1993
		DPR Public Review	October 1994
		NEPA Public Review	November 1994
		Refuge Compatibility	December 1994
		Final DPR & EA Obtain Section 401/404 Permits	February 1995

**TABLE 2-1 (Continued)
Implementation Schedule**

Project Phase	Purpose	Project Milestone	Date Completed
		Final Plans & Specifications Project Cooperative Agreement	September 1995
		Approve Plans & Specifications Memorandum of Agreement	October 1995
Construction	Finalize plans and specifications, obtain operation and maintenance agreement, advertise and award construction contracts, construct project	Request for Proposal	November 1995
		Bid Opening	December 1995
		Award Contract	September 1996
		Notice to Proceed	October 1996
		Complete Stage I Construction	October 1999
		Complete Stage II Construction	July 2000
		Complete Stage II As-Builts	November 2000
		Complete Stage I As-Builts	May 2001
		Complete Stage III Construction	December 2001
		Complete Stage III As-Builts	January 2002
		Complete Stage IV Construction	September 2002
		Complete Stage IV As-Builts	October 2002

(2) Goals and Objectives. Project goals and objectives, formulated and quantified during the design phase, are summarized in Table 2-2.

TABLE 2-2 Project Goals and Objectives		
Goals	Objectives	Project Features
Enhance Wetland Habitat	Provide reliable food source for migratory birds	Levee restoration
		Water control improvements
	Increase overall vegetation diversity and availability of preferred wildlife foods	Mast tree planting

(3) Project Design. The project was designed by USACE, Rock Island District, in cooperation with the USFWS and IADNR. Design considerations and investigations are presented in the DPR dated February 1995.

(4) Construction Contracts.

(a) Stage I Contract. The Stage I contract was designated as an 8a set aside. The bid opening was conducted on December 18, 1995. Due to insufficient funds, negotiations for the project were delayed until March 1996. The Stage I construction contract was awarded to Malco Steel, Incorporated of Kansas City, Missouri, on September 13, 1996, in the amount of \$2,463,900.42. This contract was negotiated, awarded, and performed through cooperation with the Small Business Administration and was supervised by USACE, Rock Island District, Construction Division, Central Area Office.

The Stage I contract (DACW25-96-C-0019) included construction of the major project features. The existing access road was modified to function as a spillway. During high river levels, the overflow roadway (spillway) provides controlled filling, minimizing damage to the perimeter levee. The perimeter levee was reinforced and raised. The pump station was moved from the lower end to the middle of the wetland management unit (WMU). This relocation, along with the cross dike, provides independent water level control to the two WMUs. A spring flood in 1997 on the Mississippi River resulted in modifications to the construction schedule. Major damage occurred inside the refuge. The high river levels were enough to overtop the perimeter levee and scour the loose embankment material. The borrow areas were completely filled with water. With no means of dewatering the entire project, construction was delayed several weeks. Construction was essentially complete in November 1998, except for the mast tree plantings, which were conducted in the spring of 1999. A dedication ceremony was held in November 1999.

(b) Stage II Contract. The Stage II contract (DACW25-00-P-0003) was awarded to Kemp & Son Incorporated of Letts, Iowa, in the amount of \$72,379.20. This contract consisted of supplying a portable pump and construction of two CMP stoplog structures. Cross dike ditch excavation was also completed to provide improved drainage. The portable pump is an 8-inch Godwin CD225M driven by a John Deere 4045T diesel engine, mounted on a GP3052 highway trailer. Construction was complete in July 2000.

(c) Stage III Contract. The Stage III contract (DACW25-02-C-0011) was awarded to Phoenix Corporation of the Quad Cities from Port Byron, Illinois, in the amount of \$60,456.00. This contract consisted of repairs to the north perimeter levee as a result of the 2001 spring flood. Construction was complete in December 2001. Stage III drawings are illustrated in Appendix L, plates 33 through 40.

(d) Stage IV Contract. The Stage IV contract (DACW25-02-M-0333) was awarded to MPS Engineers, P.C. from West Des Moines, Iowa, in the amount of \$38,126.00. This contract consisted of repairs to the overflow roadway as a result of the 2001 spring flood. Construction was complete in September 2002. Stage IV drawings are illustrated in Appendix L, plates 61 through 63.

c. Actual Project Costs. A summary of overall project costs is presented in Table 2-3, with construction costs in Tables 2-4, 2-5, and 2-6. The original bid schedule for Stage I included Items 0001 through 0016, with Items 0017 through 0033 added as a result of modifications.

TABLE 2-3 Summary of Project Costs (as of October 2002)	
Description	Amount
Real Estate	12,587.90
Definite Project Report (DPR)	474,510.29
Planning, Engineering, and Design	391,408.88
Stage I Construction Contract	2,627,062.41
Stage II Construction Contract	144,425.87
Stage III Construction Contract	55,224.50
Stage IV Construction Contract	38,105.84
Construction Management	278,200.74
TOTAL	\$4,021,526.21

**TABLE 2-4
Stage I Construction Costs**

Item	Description	Quantity	U/M	U/P	Amount
0001	Performance Bond	1	LS	30,899.12	\$30,899.12
0002	Temporary Field Office	1	LS	18,872.00	18,872.00
0003	Telephone Bills				
0003AA	First \$720	720	DL	1.43	1,029.60
0003AB	Over \$720	720	DL	1.43	129.60
0004	Mobilization & Demobilization	1	LS	63,818.00	63,818.00
0005	Clearing & Grubbing	1	LS	164,449.00	164,449.00
0006	Pump Station	1	LS	543,396.00	543,396.00
0007	Stoplog Structure	1	LS	89,806.00	89,806.00
0008	Gatewell	1	LS	89,997.00	89,997.00
0009	Perimeter Levee Embankment Station 0+75 to 37+00 & Station 10+88B to 19+55B				
0009AA	First 4,700 Cubic Yards	4,700	CY	8.94	42,018.00
0009AB	Over 4,700 Cubic Yards	9,555	CY	8.94	85,421.70
0010	Perimeter Levee Embankment Station 37+00 to 10+88B & Station 19+55B to 23+32.7B				
0010AA	First 68,250 Cubic Yards	68,250	CY	8.94	610,155.00
0010AB	Over 68,250 Cubic Yards	45,716	CY	8.94	408,701.04
0011	Cross Dike Levee Embankment Station 0+00C to 52+68.5C				
0011AA	First 13,200 Cubic Yards	13,200	CY	8.94	118,008.00
0011AB	Over 13,200 Cubic Yards	4,419	CY	8.94	39,505.86
0012	Ditch Excavation Station 0+00C to 53+41C	734	CY	8.94	6,561.96
0013	Granular Surfacing	4,835.93	TN	18.41	89,029.47
0014	Stone Protection, Riprap				
0014AA	First 2,100 Tons	288.5	TN	34.58	9,976.33
0014AB	Over 2,100 Tons	0	TN	34.58	0
0015	Seeding	33.2	AC	2,055.00	68,226.00
0016	Security Gates	2	EA	6,196.00	12,392.00
0017	Granular Surfacing	1600	TN	29.77	47,632.00
0018	Filter Fabric	4450	SY	1.77	7,876.50
0019	Cross Dike-Clear/Grub	1	LS	8,190.69	8,190.69
0020	Water Access at Cross Dike	1	LS	2,169.22	2,169.22

TABLE 2-4 (Continued). Stage I Construction Costs					
Item	Description	Quantity	U/M	U/P	Amount
0021	Regrade Borrow Areas	1	LS	3,481.55	3,481.55
0022	Access at Inlet Structure	1	LS	486.42	486.42
0023	Repair Scour Hole	1	LS	12,326.76	12,326.76
0024	Additional Survey	1	LS	1,429.71	1,429.71
0025	Pump Revisions	1	LS	7,146.51	7,146.51
0026	Remobilization	1	LS	6,773.11	6,773.11
0027	Flood Damage	1	LS	10,581.45	10,581.45
0028	Hydraulic Hose	1	LS	7,127.67	7,127.67
0029	Bedding Stone	1	LS	3,485.36	3,485.36
0030	Stripped Material	1	LS	5,002.54	5,002.54
0031	Flatten Slopes	1	LS	2,031.00	2,031.00
0032	Seed Specifications	1	LS	54.18	54.18
0033	Geotextile Fabric	1	LS	8,876.06	8,876.06
TOTAL					\$2,627,062.41

The original bid schedule for Stage II included Items 0001 through 0006, with Items 0007 through 0010 added as a result of modifications. Stage III was an equipment rental contract with Items 0002 through 0008 complete with operation personnel and supplies.

TABLE 2-5. Stage II Construction Costs					
Item	Description	Quantity	U/M	U/P	Amount
0001	New Cross Dike Excavation	1	LS	30,899.12	30,899.12
0001AA	First 3,200 Cubic Yards	3,200	CY	6.88	22,016.00
0001AB	Over 3,200 Cubic Yards	6,321.67	CY	6.88	43,493.09
0002	Existing Cross Dike Ditch Excavation				
0002AA	First 490 Cubic Yards	490	CY	6.88	3,371.20
0002AB	Over 490 Cubic Yards	957.74	CY	6.88	6,589.25
0003	Water Control Structure	2	EA	10,265.60	20,531.20
0004	Seeding, Cross Dike	1	LS	2,000.00	2,000.00

**TABLE 2-5 (Continued).
Stage II Construction Costs**

0005	Seeding, Perimeter Levee					
0005AA	First 1,600 Square Yards	1,600	SY	3.13	5,008.00	
0005AB	Over 1,600 Square Yards	800	SY	3.13	2,504.00	
0006	Relocation of Existing Brush Piles	1	LS	10,000.00	10,000.00	
0007	Additional Survey	1	LS	3,780.00	3,780.00	
0008	Additional Final Survey	1	LS	2,220.00	2,220.00	
0009	Additional Seeding, Cross Dike	1	LS	6,764.10	6,764.10	
0010	Additional Ditch Excavation	1	LS	16,149.03	16,149.03	
TOTAL					\$144,425.87	

**TABLE 2-6
Stage III Construction Costs**

Item	Description	Quantity	U/M	U/P	Amount
0001	Mobilization	1	LS	XXX	\$5,000.00
0002	Tractor; crawler type, minimum engine horsepower of 150, equipped w/hydraulically operated bulldozer blade of minimum 108 inch width, and tower tamping roller				
0002AA	First 48 Hours	48	HR	\$140.00	\$6,720.00
0002AB	Over 48 Hours	8	HR	\$140.00	\$1,120.00
0003	Tractor; crawler type, minimum engine horsepower of 150, equipped w/hydraulically operated bulldozer blade of minimum 108 inch width				
0003AA	First 24 Hours	24	HR	\$125.00	\$3,000.00
0003AB	Over 24 Hours	8	HR	\$125.00	\$1,000.00
0004	Tractor; crawler type, minimum engine horsepower of 90, maximum ground pressure of 7.0 psi, equipped w/hydraulically operated bulldozer blade of minimum 96 inch width				
0004AA	First 72 Hours	72	HR	\$96.00	\$6,912.00
0004AB	Over 72 Hours	5.75	HR	\$96.00	\$552.00
0005	Dump Truck; off-highway type, end dump, 13 to 16 cubic yard capacity				
0005AA	First 48 Hours	37.5	HR	\$118.00	\$4,425.00
0005AB	Over 48 Hours	0	HR	\$118.00	\$0.00
0006	Dump Truck; off-highway type, end dump, 13 to 16 cubic yard capacity				
0006AA	First 48 Hours	44.25	HR	\$118.00	\$5,221.50
0006AB	Over 48 Hours	0	HR	\$118.00	\$0.00
0007	Dump Truck; off-highway type, end dump, 13 to 16 cubic yard capacity				
0007AA	First 48 Hours	48	HR	\$118.00	\$5,664.00
0007AB	Over 48 Hours	0	HR	\$118.00	\$0.00
0008	Hydraulic Excavator; crawler type, minimum 3 cubic yard capacity				
0008AA	First 48 Hours	48	HR	\$162.00	\$7,776.00
0008AB	Over 48 Hours	7	HR	\$162.00	\$1,134.00
0009	Demobilization	1	LS	XXX	\$5,000.00
0010	Survey Support				
0010AA	First 3 Days	2	DY	\$680.00	\$1,360.00
0010AB	Over 2 Days	0.5	DY	\$680.00	\$340.00
TOTAL					\$55,224.50

**TABLE 2-7
Stage IV Construction Costs**

Item	Description	Quantity	U/M	U/P	Amount
0001	Roadway Excavation	1	LS	26,526.00	26,526.00
0002	Granular Surfacing (3")	800	TN	12.00	9,600.00
0003	Seeding	1	LS	2,000.00	2,000.00
0004	Variation in Quantity	1	LS	-20.16	-20.16
TOTAL					\$38,105.84

d. Project References. Several reports and documents related to this project were reviewed and incorporated into the O&M Manual. Table 2-8 below summarizes these related project references.

TABLE 2-8 Project References		
Title	Purpose	Date
<i>Definite Project Report (R-10F) with Integrated Environmental Assessment, Princeton Wildlife Management Area, Upper Mississippi River System Environmental Management Program, Pool 14, Mississippi River Miles 504.0 – 506.5, Scott County, Iowa</i>	To provide guidance on planning, designing, constructing, operating, and managing the recommended plan for project approval purposes	February 1995
<i>Shop Drawings</i>	To provide detailed operation and maintenance instructions for specific pieces of equipment as recommended by the manufacturer	October 1999
<i>As-Built Drawings, Upper Mississippi River System, Environmental Management Program, Pool 14, River Miles 504.0 thru 506.4, Princeton Wildlife Management Area, Stage II</i>	To provide sufficient detail for construction of the cross dike ditch and water control structures	November 2000
<i>Draft Operation and Maintenance Manual, Princeton Wildlife Management Area, Upper Mississippi River Environmental Management Program, Pool 14, River Miles 504.0 - 506.4, Scott County, Iowa</i>	To serve as a guide for the operation and maintenance of the Princeton HREP project and to provide operation & maintenance instructions for major features	March 2001
<i>As-Built Drawings, Upper Mississippi River System, Environmental Management Program, Pool 14, River Miles 504.0 thru 506.4, Princeton Wildlife Management Area</i>	To provide sufficient detail for construction of the wetland management unit, which consisted of levee restoration, water control improvements, mast tree plantings	May 2001
<i>Post-Construction Performance Evaluation Report – Year 3 (2001) and Flood Damage Assessment (2001), Upper Mississippi River System, Pool 14, Mississippi River Miles 504.0-506.4R, Scott County, Iowa</i>	To provide a summary of the monitoring data, field observations, and operation & maintenance, as well as an assessment of the spring 2001 flood damages	November 2001
<i>As-Built Drawings, Upper Mississippi River System, Environmental Management Program, Pool 14, River Miles 504.0 - 506.4, Scott County, Iowa, Princeton Wildlife Management Area, Stage III, Emergency Levee Repairs, Lease of Equipment</i>	To provide sufficient detail for construction of setback levee and repair of scour areas along north perimeter levee from flood of 2001	January 2002
<i>As-Built Drawings, Upper Mississippi River System, Environmental Management Program, Pool 14, River Miles 504.0 - 506.4, Scott County, Iowa, Princeton Wildlife Management Area, Stage IV, Repair Overflow Roadway</i>	To provide sufficient detail for construction of setback levee and repair of scour areas along the overflow roadway from the flood of 2001	October 2002

3. DESCRIPTION OF PROJECT FEATURES.

a. Project Data. The Princeton HREP project consists of a 2-cell wetland management unit (WMU) to enhance wetland habitat. Plate 2 in Appendix L contains the site plan for the Princeton HREP project. Project data have been collected for the perimeter levee, cross dike, overflow roadway (spillway), intake structure, pump engine building, reinforced stoplog structure, CMP stoplog structures (2), and the gatewell structure. Table 3-1 presents a quantitative summary of the project data.

TABLE 3-1 Summary of Project Data		
Project Feature	Measurement or Quantity	Units of Measure
<i>Perimeter Levee</i>		
Length	16,400	Feet
Crown Width	10 - 12	Feet
Side Slopes	4:1	Horizontal:Vertical
Level of Protection	15	Year Event
Design Top Elevation	581.3 – 582.3	Feet NGVD 1912
Embankment Volume	100,000	Cubic Yards
<i>Overflow Roadway</i>		
Length	2,300	Feet
Crown Width	24	Feet
Side Slopes	4:1	Horizontal:Vertical
Level of Protection	10	Year Event
Design Top Elevation	580.3	Feet NGVD 1912
Embankment Volume	5,000	Cubic Yards
<i>Cross Dike</i>		
Length	5,158	Feet
Crown Width	10	Feet
Side Slopes	4:1	Horizontal:Vertical
Level of Protection	< 5	Year Event
Design Top Elevation	578	Feet NGVD 1912
Embankment Volume	18,500	Cubic Yards
<i>Pump Station Intake Structure</i>		
Concrete Top Elevation	578	Feet NGVD 1912
Concrete Sill Elevation	568	Feet NGVD 1912
<i>Intake Pipe</i>		
Diameter	24	Inches
Length (to centerline traverse)	27	Feet
Invert Elevation	570	Feet NGVD 1912
Riprap	182	Tons

**TABLE 3-1 (Continued)
Summary of Project Data**

Project Feature	Measurement or Quantity	Units of Measure
<i>Pump Station Engine Building</i>		
Length	28	Feet
Width	22	Feet
Concrete Floor Elevation	583.5 – 583.78	Feet NGVD 1912
<i>Concrete Stoplog Structure</i>		
Concrete Top Elevation	578.5	Feet NGVD 1912
Concrete Sill Elevation	574	Feet NGVD 1912
Length	16	Feet
Width	5	Feet
<i>Discharge Pipe</i>		
Diameter	24	Inches
Length (to centerline traverse)	90.5	Feet
Invert Elevation	575	Feet NGVD 1912
Riprap	20	Tons
<i>CMP Stoplog Structures (2)</i>		
Diameter	24	Inches
Invert Elevation West Structure	571.50	Feet NGVD 1912
Invert Elevation Middle Structure	572.10	Feet NGVD 1912
<i>Gateway Structure</i>		
Concrete Top Elevation	582	Feet NGVD 1912
Concrete Floor Elevation	573	Feet NGVD 1912
Slide Gate	1	Each
<i>RCP</i>		
Diameter	36	Inches
Length	64	Feet
Landside Invert Elevation	573.25	Feet NGVD 1912
Riverside Invert Elevation	572.75	Feet NGVD 1912
Riprap	22	Tons

b. General Description. The Princeton HREP project consists of wetland habitat enhancement through levee restoration, water control improvements, and mast tree plantings. Water level control is provided by construction of low levees, which are used to impound water during seasonal waterfowl migrations. River water is provided to the project through use of a portable pump or by gravity flow. The two wetland cells can be managed independently through operation of stoplog structures located along the cross dike. Mast tree plantings provide vegetation diversity and availability of preferred wildlife foods. The project features discussed in more detail below include the water control plan, water source, perimeter levee, overflow roadway (spillway), cross dike, pump station, water control structures, gateway structure, mast tree plantings, site access, and borrow

areas. These features and additional project components are shown in Appendix L. Photographs of project features can be viewed in Appendix I.

c. Water Control Plan. Over 700 acres of the Princeton HREP project area can be impounded by the constructed earthen levees and associated water control structures to create a 357-acre forested north WMU and a 344-acre non-forested south WMU as shown on plate 2 in Appendix L. The basic operating plan for the Princeton HREP project is to maintain a lower water elevation in the spring and summer and a higher water elevation in the fall and winter, as illustrated in Table 2-2. To manage for specific vegetation needs, it is best to be able to control water levels independently within two WMUs, hereafter referred to as the North Wetland Management Unit (NWMU) and South Wetland Management Unit (SWMU).

To accomplish independent filling of the WMUs, the pump station directly discharges into a reinforced concrete structure (located at the east end of the cross dike) where flow direction can then be controlled by placement or removal of stoplogs. To facilitate independent drainage of the WMUs, a new gatewell structure was constructed to gravity drain the NWMU. The existing gatewell structure at the downstream end of the project area is used to gravity drain the SWMU. Two CMP stoplog structures were added to the cross dike to increase capacity and facilitate drainage to a lower elevation. A portable pump may also be used to increase or decrease water elevations within the WMUs.

TABLE 3-2 Wetland Management Unit Water Control Plan				
Water Elevation (Feet)	Area < 1' Deep (Acres)	Acres 1'-2' Deep (Acres)	Acres > 2' Deep (Acres)	Total Area Flooded (Acres)
<i>SWMU</i>				
574	167.1	9.8	0.0	177.0
575	167.0	167.1	9.9	344.0
576	98.0	167.0	177.0	442.0
577	33.0	98.0	344.0	475.0
<i>NWMU</i>				
574	36.0	0.0	0.0	36.0
575	181.0	36.0	0.0	217.0
576	140.0	181.0	36.0	357.0
577	97.0	140.0	217.0	454.0

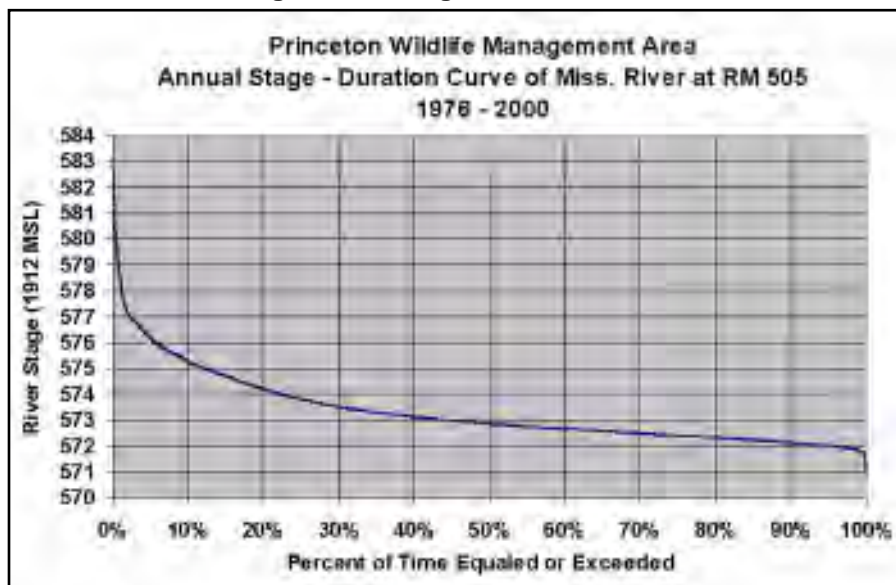
Table 3-2 shows the surface areas of incremental water depths for various flooding heights for each WMU. The optimum water surface elevations are 576 feet NGVD in the NWMU and 575 feet NGVD in the SWMU. These elevations represent those that maximize the

water surface area with water 1 to 2 feet deep. Migratory waterfowl, in particular dabbling ducks, require water depths of 12 to 18 inches for access to food plants. The optimum water surface elevations represent maximum levels for design purposes; actual operating levels may be lower if desired.

d. Water Source. The pump station intake is located in Grant Slough, which is a backwater of the Mississippi River. Water surface elevations in the slough fluctuate with those of the river, but overall a flat pool elevation of 572 feet NGVD is maintained for navigation. Therefore, the slough is considered to be a reliable water source and will accommodate the annual management plan.

TABLE 3-3 Elevation Frequency Relationships			
Storm Frequency	RM 504.0 South End	RM 505.0 Cross Dike	RM 506.5 North End
5-Year	578.7	579.1	579.7
10-Year	580.3	580.7	581.3
25-Year	582.0	582.5	583.1
50-Year	583.3	583.8	584.4
100-Year	584.4	584.8	585.5
200-Year	585.6	586.0	586.7
500-Year	587.0	587.4	588.0

Figure 3-1. Stage-Duration Curve



Mississippi River discharge frequency relationships and corresponding water surface elevations were developed by USACE, Rock Island District, in cooperation with the St. Paul and St. Louis Districts for the Upper Mississippi River Basin Commission. Table 3-3 illustrates the elevation frequency relationships, while Figure 3-1 presents the stage/duration curve for selected river miles adjacent to the Princeton HREP project.

e. Levee System.

(1) Perimeter Levee. The existing perimeter levee is approximately 3.1 miles in length. The maximum top elevation for the WMU perimeter levee is 582.3 feet NGVD (Station 0+00 to Station 56+00). To minimize damage potential, the perimeter levee profile parallel to the Mississippi River (Station 56+00 to Station 164+00) is sloped from elevation 582.3 feet NGVD at the upstream end to elevation 581.3 feet NGVD at the downstream end. This design provides for gradual overtopping during a 15-year flood event or greater. The levee top width is 12 feet in reaches having an access road and 10 feet in reaches without an access road. The levee side slopes are shaped to a minimum of 4 horizontal on 1 vertical. The plan, profile, and section drawings for the perimeter levee are located in Appendix L, plates 8 through 12.

(2) Overflow Roadway. To provide controlled overtopping of the levee system, a 2,300-foot overflow roadway (spillway) was constructed at elevation 580.3 feet NGVD or approximately 2 feet lower than the north end of the perimeter levee. This elevation provides for gradual overtopping during a 10-year flood event or greater. The top width is 24 feet with minimum side slopes of 4 horizontal on 1 vertical. The overflow roadway allows rapid filling of the WMU interior water surfaces prior to overtopping of the perimeter levee. An overtopping analysis is contained in Appendix H of the DPR. The plan, profile, and section drawings for the overflow roadway are presented on plates 13 and 15 in Appendix L.

To ensure proper function during flood events, it is critical that the overflow roadway maintain an elevation at or below the design grade of 580.3 feet NGVD. This elevation can be field verified on occasion through use of a benchmark located at the east end of the overflow roadway. The benchmark is a chiseled “X” on the northeast wingwall of the gatewell structure at elevation 577.28 feet NGVD.

(3) Cross Dike. To provide enhanced management capabilities, a 5,158-foot cross dike was constructed at elevation 578 feet NGVD. This elevation provides for gradual overtopping during a 5-year flood event or greater. The top width is 10 feet with minimum side slopes of 4 horizontal on 1 vertical. The plan, profile, and section drawings for the cross dike are presented on plates 14 and 15 in Appendix L.

f. Pump Station. A pump station was constructed at the intersection of the perimeter levee and cross dike. The pump station is designed to fill the NWMU to elevation 576 feet NGVD in 7 days and the SWMU to elevation 575 feet NGVD in 5 days. Actual fill times are longer than the design intent. The pump station consists of an intake structure and engine building. Equipment data for the pump station are contained in

Appendix F. Additional details for the pump station are presented on plates 16 through 23 in Appendix L.

(1) Intake Structure. The intake structure is located on the riverside slope of the levee and was constructed of reinforced concrete. The intake structure has a top elevation of 578 feet NGVD and a sill elevation of 568 feet NGVD. The intake pipe from this structure to the engine building is 24 inches in diameter and approximately 27 feet in length with an invert elevation of 570 feet NGVD. The base of the intake structure is protected with riprap.

(2) Engine Building. The engine building was constructed of reinforced concrete with a floor elevation of 583.5 feet NGVD. The size of the engine building is 28 feet long by 22 feet wide. This building provides weather-tight housing for the pump engine, trailer, an additional fuel tank, diesel engine generator, and miscellaneous supplies. A 16,000-gallon per minute hydraulic pump provides the necessary flow to fill the WMUs.

g. Water Control Structures.

(1) Concrete Stoplog Structure. The stoplog structure is located at the east end of the cross dike in conjunction with the pump station discharge pipe. This pipe is 24 inches in diameter and approximately 90 feet long with an invert elevation of 575 feet NGVD. The stoplog structure was constructed of reinforced concrete with a top elevation of 578.5 feet NGVD and a sill elevation of 574 feet NGVD. The base of this structure is 16 feet long by 5 feet wide. The placement of aluminum stoplogs at either end of this structure directs the pumped water into the NWMU or SWMU as needed. Heavy-duty metal grating was provided across the top for vehicular access. Additional details are provided in Appendix L, plates 24 and 25.

(2) CMP Stoplog Structures. In addition, two stoplog structures with 24-inch-diameter CMPs are located near the middle and west end of the cross dike. These structures provide water level control between the WMUs at lower elevations by gravity flow. The invert elevations for the middle and west structures are 572.1 and 571.5 feet NGVD, respectively. Further details are shown in Appendix L, plates 27 through 32.

h. Gatewell Structure. A gatewell structure with a 36-inch-diameter reinforced concrete pipe is located immediately upstream of the intake structure along the perimeter levee. Operation of this structure allows for filling or dewatering of the WMUs, whenever river levels will allow. Additional details are illustrated in Appendix L, plate 26.

i. Mast Tree Plantings. In the NWMU, approximately 21 acres of mast trees were planted. Two sites were selected for plantings, one near the mid-point of the north perimeter levee and one in the eastern half just south of the power line. The species selected consist of swamp white oak, pin oak, bur oak, pecan, hickory, and cedar.

j. Site Access. Access to the project is by county road from U.S. Highway 67. There are three access areas to the Princeton HREP project: south, middle, and north.

Each area has a parking lot and security gate to control access. The IADNR operates these gates as necessary to prevent public vehicular access and minimize consequent disturbance. A crushed stone surface road, 10 feet in width, runs along the top of the perimeter levee from the south parking lot to the pump station. This road facilitates delivery of materials for the pump station. Plate 2 in Appendix L illustrates the site access areas, parking lots, and access road to the pump station.

k. Borrow Areas/Potholes. Material for perimeter levee restoration came from the riverside slope and borrow areas located within the project boundaries. Material for cross dike construction came from the adjacent ditch excavation and was supplemented with the borrow areas. The excavated ditch along the south side of the cross dike serves as boat access from the west parking lot to the SWMU.

During construction, the contractor removed the material from the borrow areas in strips, rather than excavating one big hole. Therefore, if seepage of ground water occurred, it would be contained and not saturate the entire area. The strips are approximately 10 feet apart. Now these strips function as potholes, creating additional habitat benefits. The borrow areas and soil borings are identified on plates 2 and 4 in Appendix L. The soil boring logs are presented in Appendix L, plates 5 through 7.

l. Utilities. A transmission line running east-west crosses the north portion of the NWMU. The size of this line is approximately 345,000 Volts. The transmission line eventually crosses the Mississippi River. At all times, measures shall be taken to ensure electrical safety and to preserve the integrity of the transmission line foundations.

4. INSPECTIONS.

a. Purpose. An active preventative maintenance program reduces damage to constructed features by taking early corrective action. Additional costs, associated with repair and rehabilitation, are also avoided. An effective preventative maintenance program requires regular, thorough inspections. These inspections will aid the IADNR Site Manager in discovering deficiencies within the project. In addition, they will provide the IADNR Site Manager with baseline condition data. These data are necessary for considering repair options of major damage.

The two types of inspections for the Princeton HREP project are project inspections, conducted by the IADNR Site Manager, and joint inspections, conducted by the IADNR Site Manager together with personnel from USACE and USFWS.

b. Project Inspections. Annual project inspections shall be performed by the IADNR Site Manager or appropriate representative for the purpose of noting routine deficiencies and initiating corrective actions. This inspection shall be conducted at periods not exceeding 12 months and shall follow inspection guidance presented in subsequent sections of this manual. It is suggested that the inspection be conducted every May, which is representative of site conditions following high river levels. Additional project inspections shall occur as necessary after flood events or as scheduled by the IADNR Site Manager.

A project inspection checklist has been developed as presented in Appendix C. It is required that the IADNR Site Manager furnish a signed copy of the completed checklist to the U.S. Army Corps of Engineers; Rock Island District; ATTN: CEMVR-ED; Clock Tower Building; Post Office Box 2004; Rock Island, Illinois 61204-2004; immediately following each project inspection.

c. Joint Inspections. Joint inspections by the IADNR Site Manager, USFWS, and USACE shall be completed in accordance with ER 1110-2-100, the Project Cooperation Agreement, and the Memorandum of Agreement, as illustrated in Appendix B. These inspections shall be initiated by USACE. The purpose of joint inspections is to assure that adequate maintenance is being performed as presented in this manual. The Rock Island District Engineer or Authorized Representative shall have access to all portions of the constructed project upon coordination with the IADNR Site Manager.

Additional joint inspections shall be formally requested by the IADNR Site Manager immediately following a specific storm or flood event that causes damage in excess of the annual operation and maintenance costs specified in this manual. A comparison of project inspections before and after such events together with the joint inspections shall be the basis for determining maintenance responsibility and potential rehabilitation by USACE as stated in the Memorandum of Agreement.

5. OPERATION AND MAINTENANCE.

a. General. This section presents management instructions for the major project features that were designed and constructed to minimize O&M requirements. The estimated annual O&M costs are presented in Table 5-1.

TABLE 5-1 Estimated Annual Operation and Maintenance Costs (as of June 2002)				
Description	Quantity	Unit	Unit Price	Amount
<i>Operation</i>				
Pump Fuel	1	LS	\$11,000.00	\$11,000.00
Pump Station Operation	35	HR	\$10.00	\$350.00
Gate Operation	16	HR	\$40.00	\$640.00
Stoplog Operation	16	HR	\$40.00	\$640.00
<i>Subtotal Operation</i>				<u>\$12,630.00</u>
<i>Maintenance</i>				
Levee Inspection	40	HR	\$40.00	\$1,600.00
Levee Mowing	55	AC	\$45.00	\$2,475.00
Pump Maintenance	40	HR	\$50.00	\$2,000.00
Crushed Stone	50	TN	\$20.00	\$1,000.00
Stoplog Replacement	4	EA	\$10.00	\$40.00
Riprap	30	TN	\$30.00	\$900.00
Levee Erosion Control	20	HR	\$100.00	\$2,000.00
Planting Maintenance	15	AC	\$40.00	\$600.00
<i>Subtotal Maintenance</i>				<u>\$10,615.00</u>
<i>Rehabilitation</i>				
Pump Replacement	1	LS	\$5,000.00	\$5,000.00
<i>Subtotal O&M</i>				\$28,245.00
Contingencies				\$2,000.00
TOTAL ESTIMATED ANNUAL O&M COSTS				\$30,245.00

^{1/} Rehabilitation cannot be accurately estimated. Rehabilitation is reconstructive work that significantly exceeds the annual operation and maintenance requirements identified above and which is needed as a result of major storms or flood events.

The IADNR Site Manager shall take the appropriate steps to correct conditions disclosed by project inspections or joint inspections. Regular maintenance repair measures shall be

accomplished during the appropriate season as scheduled by the IADNR Site Manager to ensure feature serviceability. Appropriate advance measures shall be taken to ensure the availability of adequate labor and materials to meet contingencies.

Project features shall be continuously maintained and operated to obtain maximum benefits. No encroachment or trespass that will adversely affect the efficient operation or maintenance of the project shall be permitted upon the constructed features. No improvement shall be passed over, under, or through the constructed features, nor shall any excavation or construction be permitted within these features without prior approval by the USACE, Rock Island District. Such improvements or alterations, which are desirable and permissible, shall 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 shall be obtained from the Rock Island District Engineer or, if otherwise obtained, shall be submitted for approval. As-built drawings or prints showing improvements or alterations as finally constructed shall be furnished to the Rock Island District Engineer or Authorized Representative after completion of such work.

b. Perimeter Levee, Overflow Roadway, and Cross Dike.

(1) Operation. Specific operation requirements will be performed as determined by the IADNR Site Manager. During operational inundation periods, the levee system shall be inspected to verify the following:

- No indications of slides or sloughs are developing;
- No wave wash or scouring action is occurring;
- No high reaches of overflow roadway above design grade exist to delay filling of the WMU interior;
- No low reaches of perimeter levee below design grade exist that may be overtopped prematurely; and
- No other conditions exist which might endanger the levee system.

Steps shall be taken to control any condition that endangers the levee system and to repair the damaged section.

(2) Maintenance. The IADNR Site Manager shall provide at all times such maintenance as may be necessary to ensure the serviceability of the levee system in time of inundation. Measures shall be taken such as mowing, burning, and herbicide application to promote the growth of sod, control burrowing animals, provide routine mowing to extend 10 feet horizontally from the toe of the levee where applicable, remove wild growth and drift deposits, and repair damage caused by erosion or other forces. Any major repairs shall be coordinated with USACE, Rock Island District.

Project inspections shall be made by the IADNR Site Manager to ensure that the above maintenance measures are being effectively carried out and to verify the following:

- No unusual settlement, sloughing, or material loss of grade or levee cross section has taken place;
- No caving has occurred on either the landside or the riverside of the levee that may affect the stability of the levee section;
- No seepage, saturated areas, or sand boils are occurring;
- No action is being taken, such as burning grass and weeds during inappropriate seasons, which will retard or destroy the growth of sods;
- The crown of the levee is shaped to drain readily;
- No unauthorized grazing or vehicular traffic on the levee; and
- No encroachments are occurring that may endanger the levee system or hinder its proper and efficient functioning during times of inundation.

Such inspections shall 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 system or once per year. Steps shall be taken to correct conditions disclosed by such inspections. Regular maintenance repair measures shall be accomplished during the appropriate season as scheduled by the IADNR Site Manager. All routine maintenance and corrective actions completed shall be documented in the levee inspection report provided in Appendix G.

c. Pump Station.

(1) Operation. Specific operation requirements will be performed as determined by the IADNR Site Manager. To inundate the WMUs, the pump must be activated manually. The pump also must be deactivated manually once the desired interior water elevations are achieved. Pumping to maintain interior elevations during WMU operation also will be by manual activation/deactivation. To recover a 6-inch drop in the interior water level, approximately 4 days of pumping will be required. Once initial flooding is completed, the overall decrease in water elevation during the impoundment period (November through February) due to seepage, infiltration, and evaporation is not expected to exceed 6 inches. The pump station and reinforced concrete stoplog structure are equipped with staff gages to easily determine water levels in the WMUs.

As with more recently developed EMP projects, a formal Annual Management Plan has been developed for the Princeton HREP project. This plan was developed by the USACE, in coordination with the IADNR, as shown in Table 5-2.

TABLE 5-2 Annual Management Plan		
Month	Action	Purpose
April to July	Dewater area by gravity flow or portable pump	Expose and maintain mudflats to allow revegetation
August to November	Gradually increase water levels to correspond with growth of marsh plant community	Provide access to food plants for migratory waterfowl
December to April	Maintain water levels to maximum extent possible and then release water late during early spring	Maintain winter furbearer habitat and then prepare for aquatic plant germination through gradual water release

(2) Maintenance. The Rock Island District shall monitor the management of the pump station through annual inspections. In addition, the IADNR Site Manager shall perform inspections of the pump station as necessary, but as a minimum, no less than once per year. Steps shall be taken to correct conditions disclosed by such inspections. A pump station inspection guide is provided in Appendix E to assist the IADNR Site Manager in performing the necessary maintenance.

Project inspections shall be made by the IADNR Site Manager to ensure that the above maintenance measures are being effectively carried out and to check the following:

(a) Structure. Visually inspect all structural surfaces to discover any adverse conditions such as cracks or excessive corrosion. Conditions that may affect the integrity of the structure shall be corrected as soon as practicable.

(b) Lighting/Generator. All electrical lighting and associated wiring shall be examined closely and their overall condition assessed. The standby generator shall be periodically operated to ensure reliability in accordance with the manufacturer's operation and maintenance manual. Any corroded, loose, or broken contacts shall be cleaned, tightened, and repaired as needed.

(c) Pump. The pump shall be observed for indications of improper operation or damage. Avoid operation of pump during sump cavitation or ice conditions. 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 and will require periodic

cleaning. Inspect the hydraulic piping and hoses for evidence of leaking or deterioration. During operation, the engine gauges shall be monitored for proper engine oil pressure and temperature, revolutions per minute and hydraulic oil pressure, and temperature. Perform pump, engine, and hydraulic maintenance as required by the pump manufacturer's operation and maintenance manual.

Stoplogs shall be installed in the slots, prior to major seasonal flooding, to avoid sediment inflow into the project. Flow tests have shown that larger pumping capacities are achieved with a 3-inch siphon break gate valve open. Pump operation shall occur with this valve in the open position.

(d) Trash Racks. The IADNR Site Manager shall check for trash accumulation at racks and clear as necessary. If operating conditions or observations indicate trouble is developing and as operating conditions will permit, inspections shall be performed to investigate general condition.

(e) Sump. The IADNR Site Manager shall check for sedimentation in the sump. Accumulated sediments in the sump may interfere with the proper operation of the pump and shall be cleaned out prior to use of the pump.

d. Water Control Structures.

(1) Operation. Specific operation requirements will be performed as determined by the IADNR Site Manager. When the WMUs are in use, the stoplogs shall be in place. Stoplogs can be placed at either end of the reinforced concrete structure to direct the flow of water to the desired cell during pumping. To prevent overtopping damage to the cross dike, all stoplogs shall be removed and stored when the water levels of the Mississippi River rise, and overtopping of the perimeter levee is predicted. Overtopping occurs at the overflow roadway at an elevation of 580.3 feet NGVD at RM 504. This elevation correlates to a river stage of 7.5 feet at the Princeton Gage, located at RM 502.1R on the concrete retaining wall. The stoplogs shall remain out until the water levels recede and the unit goes back into operation. The stoplogs can also be removed to direct the flow of water from one cell to the other to facilitate drainage.

(2) Maintenance. The water control structures shall 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 shall be taken upon discovery of any adverse conditions at the structures.

Project inspections of the water control structures shall be made by the IADNR Site Manager to verify the following:

- Stoplog channels are clear of debris and the stoplogs are present;
- Inlet and outlet channels are open;

- Care is being exercised to prevent the accumulation of trash and debris; and
- Erosion is not occurring adjacent to the structure that may endanger its function.

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

e. Gatewell Structures.

(1) Operation. Specific operation requirements will be performed as determined by the IADNR Site Manager. When the WMUs are in use, or water levels of the Mississippi River rise with heavy sediment loads, the gatewell structures in the perimeter levee and overflow roadway shall be closed to prevent sediment from entering the project. The gatewell structures shall remain closed until the following occurs:

- Heavy sediment floodwaters recede;
- The WMUs are not in use; or
- Overtopping of the perimeter levee is predicted.

Overtopping occurs at the overflow roadway at an elevation of 580.3 feet NGVD at RM 504. This elevation correlates to a river stage of 7.5 feet at the Princeton Gage, located at RM 502.1R on concrete retaining wall.

(2) Maintenance. The gatewell structures shall 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 shall be taken upon discovery of any adverse conditions at the structures.

Project inspections of the gatewell structures shall be made by the IADNR Site Manager to verify the following:

- Slide gate is in good operating condition;
- Inlet and outlet channels are open;
- Care is being exercised to prevent the accumulation of trash and debris; and
- Erosion is not occurring adjacent to the structure that may endanger its function.

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

f. Mast Tree Plantings.

(1) Operation. Specific operational requirements shall be performed as determined by the IADNR Site Manager. The Rock Island District shall monitor the survival and growth of mast trees through annual inspections of the planting sites. The IADNR Site Manager shall perform remedial action as necessary to ensure survival and growth. In addition, the IADNR Site Manager shall keep records of any herbicide applications and inspections, as well as any corrective actions taken to ensure survival.

(2) Maintenance. The mast tree plantings shall be inspected immediately following a high water event to determine any negative impacts. Corrective action shall be taken upon discovery of any adverse conditions at the planting sites.

Project inspections of the mast trees shall be made by the IADNR Site Manager to verify the following:

- Survival and growth of the seedlings; and
- Unwanted vegetation is kept to a minimum.

Steps shall be taken to repair damage or remedy adverse conditions disclosed by such inspections.

g. Borrow Areas/Potholes.

(1) Operation. Specific operational requirements shall be performed as determined by the IADNR Site Manager.

(2) Maintenance. The borrow areas/potholes shall be inspected immediately following a high water event to determine any negative impacts. Corrective action shall be taken upon discovery of any adverse conditions at the potholes.

Project inspections of the mast trees shall be made by the IADNR Site Manager to verify the following:

- Presence or absence of debris, sedimentation, or vegetation; and
- Wildlife use, vegetation types and density, presence or absence of invertebrates.

Steps shall be taken to repair damage or remedy adverse conditions disclosed by such inspections.

6. PERFORMANCE MONITORING AND ASSESSMENT.

a. General. The purpose of this section is to summarize monitoring and data collection aspects of the project. Table 6-1 outlines the estimated annual post-construction monitoring costs. Engineering data are the levee system transects to be conducted by the USACE every 5 years. Natural resources data are the vegetation transects and aerial photography to be completed by the IADNR Site Manager every 5 years. The estimated cost for collecting these data every 5 years was interpolated into an annual cost as shown below in Table 6-1.

TABLE 6-1 Estimated Annual Post-Construction Monitoring Costs (June 1993 Price Level)	
Description	Amount
Engineering Data	\$3,000.00
Natural Resources Data	\$2,000.00
<i>Subtotal Monitoring Data</i>	<i>\$5,000.00</i>
Contingencies	\$1,000.00
<i>Total Monitoring Data</i>	<i>\$6,000.00</i>
Planning, Engineering, and Design	\$1,500.00
TOTAL MONITORING COSTS	\$7,500.00

Table 6-2 presents the Monitoring and Performance Evaluation Matrix, which highlights the main project phases, the types of activities involved for each phase, and their purposes. For each activity, it is defined who is the responsible agency, who is the implementing agency, what is the funding source, and any implementation instructions, if applicable.

Table 6-3 illustrates the Monitoring and Data Collection Summary, which outlines what is monitored, how it will be accomplished, who will collect the data, and at what intervals. For purposes of this manual, USACE and the IADNR Site Manager are responsible for the engineering and natural resources data in the post-construction phase column.

Table 6-4 contains the Transect Evaluation Summary, which defines the locations for vegetation and levee system transects and the objectives associated with these transects. These locations can be seen on the monitoring plan in Appendix L, plate 60. Changes to the monitoring plan shall be coordinated with the IADNR, USFWS, and USACE.

b. Post-Construction. Table 6-5 presents the Post-Construction Evaluation Plan. The seventh column in this table shall be completed for the year the enhancement features are monitored, while the last column outlines the annual field observations to be performed by the IADNR Site Manager. These observations shall be completed in conjunction and documented on the checklist form provided in Appendix C.

The monitoring parameters were developed to measure the effectiveness of the stated goals. The feature measurements, together with the annual field observations, as illustrated in Table 6-5, will form the basis for project evaluation. The proposed feature measurements focus primarily on the physical response to the project, while the annual field observations deal more with the biological response. The physical and biological response shall be monitored as follows:

(1) General. The Princeton HREP project shall be monitored through aerial photography performed every 5 years by the IADNR Site Manager. With this mapping, an overall evaluation as to the performance of the enhancement features will be possible. In addition, the borrow areas/potholes shall be monitored every year by the IADNR Site Manager. Annual field observations shall describe the presence or absence of debris, sedimentation, or vegetation and evaluate wildlife use and vegetation types and density.

(2) Provide Reliable Food Source for Migratory Birds through Levee Restoration. This objective shall be monitored through levee system transects and profiles performed every 5 years by USACE. The goal is to maintain zero lineal feet of eroded levee at Year 50 (2048). The total length of the levee system is 16,400 feet. Annual field observations by the IADNR Site Manager shall describe any erosion and/or seepage.

(3) Provide Reliable Food Source for Migratory Birds through Water Control Improvements. This objective shall be monitored through vegetation transects performed every 5 years by the IADNR Site Manager. The goal is to attain 300 acres of aquatic vegetation at Year 50 (2048). This acreage includes areas of cropland or non-forested wetland conversion. The area of aquatic vegetation prior to construction was 213 acres. Annual field observations by the IADNR Site Manager shall estimate the effective acreage of aquatic vegetation and wildlife use. These field observations of wildlife use shall include annual waterfowl census data.

(4) Increase Overall Vegetation Diversity and Availability of Preferred Wildlife Foods through Mast Tree Planting. This objective shall be monitored through vegetation transects performed every 5 years by the IADNR Site Manager. The goal is to attain 40 acres of mast trees at Year 50 (2048). The area of mast trees prior to construction was approximate 7 to 10 acres. Annual field observations by the IADNR shall estimate the effective acreage of established and/or regenerated mast trees.

TABLE 6-2 Monitoring and Performance Evaluation Matrix						
Project Phase	Type of Activity	Purpose	Responsible Agency	Implementing Agency	Funding Source	Implementation Instructions
Pre-Project	Sedimentation Problem Analysis	System-wide problem definition; Evaluate planning assumptions	USGS	USGS (UMESC)	LTRMP	--
	Pre-Project Monitoring	Identify and define problems at HREP site; Establish need of proposed project features	Sponsor	Sponsor	Sponsor	--
	Baseline Monitoring	Establish baselines for performance evaluation	USACE	USACE/ Sponsor	HREP	See Table 6-3
Design	Data Collection for Design	Include quantification of project objectives; Design of project; and Development of performance evaluation plan	USACE	USACE	HREP	See Table 6-3
Construction	Construction Monitoring	Assess construction impacts; Assure permit conditions are met	USACE	USACE	HREP	See State Section 401 Stipulations
Post-Construction	Performance Evaluation Monitoring	Determine success of project, as related to objectives	USACE/ Sponsor	USACE/ Sponsor	HREP	See Table 6-3

TABLE 6-3
Monitoring and Data Collection Summary ^{1/}

Type Measurement	Engineering Data			Natural Resource Data			Sampling Agency	Remarks
	Pre-Project Phase	Design Phase	Post-Const Phase	Pre-Project Phase	Design Phase	Post-Const Phase		
POINT MEASUREMENTS								
<i>Select Point Locations</i>							USACE	
Soil Borings ^{2/}	1	1						
TRANSECT MEASUREMENTS								
<i>Transects</i>								
Vegetation ^{3/}						5Y	Sponsor	
Levee System ^{4/}		1	5Y				USACE	
AREA MEASUREMENTS								
<i>Mapping</i>								
Vegetation Monitoring ^{5/}					1		USACE	
Aerial Photography ^{6/}				1		5Y	Sponsor	
Land Topographic ^{7/}		1					USACE	

LEGEND

Y = Yearly

nY = n-Yearly interval

1,2,3, --- = number of times data are collected within designated project phase

**TABLE 6-3 (Continued)
Monitoring and Data Collection Summary ^{1/}**

^{1/} Monitoring and Data Collection Summary (See plate 60 in Appendix L for Monitoring Plan) – First monitoring activity to occur the first year following project completion

^{2/} Soil Borings (Pre-Project Phase)

<u>Boring Number</u>	<u>Date</u>
PWA-90-1 to PWA-90-2	05-22-90
PWA-90-3 to PWA-90-6	05-23-90
PWA-90-7 to PWA-90-8	05-24-90
PWA-90-9 to PWA-90-11	05-15-90
PWA-90-12	05-24-90
PWA-90-13 to PWA-90-17	05-29-90
PWA-90-18 to PWA-90-19	05-30-90
PWA-90-20	05-31-90
PWA-90-21	05-05-90
PWA-90-21A	05-31-90
PWA-90-22 to PWA-90-24	06-01-90

Soil Borings (Design Phase)

<u>Boring Number</u>	<u>Date</u>
PWA-92-1 to PWA-92-4	01-29-92
PWA-92-5	02-10-92

^{3/} Vegetation Transects (Post-Construction Phase) – See plate 3 in Appendix L for locations

V-M503.1B to V-M503.4J
V-M504.6A to V-M504.7K
V-M506.0A to V-M505.9J
V-M506.2A to V-M506.1J

^{4/} Levee System Transects (Design Phase) – Cross sections at even 200-foot intervals, profile cross dike and perimeter levee

Levee System Transects (Post-Construction Phase) – Cross sections at even 500-foot intervals, profile cross dike and perimeter levee

^{5/} Vegetation Monitoring (Design Phase) – September 1990 aerial photography

^{6/} Aerial Photography (Pre-Project and Post-Construction Phases) – Scale at 1:1250

^{7/} Land Topographic (Design Phase) – Contours at 1-foot intervals

**TABLE 6-4
Transect Evaluation Summary**

Transect	Project Objectives to Be Evaluated	
	Provide Reliable Food Source for Migratory Birds	Increase Overall Vegetation Diversity and Availability of Preferred Wildlife Foods
Vegetation		
<i>SWMU</i>		
V-M503.1B to V-M503.4J	X	X
V-M504.6A to V-M504.7K	X	X
<i>NWMU</i>		
V-M506.0A to V-M505.9J	X	X
V-M506.2A to V-M506.1J	X	X
Levee System		
<i>Perimeter Levee</i>		
Sta. 0+00 to Sta. 164+00	X	
<i>Overflow Roadway</i>		
Sta. 0+00B to Sta. 23+50B	X	
<i>Cross Dike</i>		
Sta. 0+00C to Sta. 53+53C	X	

TABLE 6-5 Post-Construction Evaluation Plan									
Goal	Objective	Enhancement Feature	Unit	Year 0 (1998) Without Project	Year 0 (1998) With Project	^{1/} Year X (XXXX) With Project	Target Year 50 (2048) With Project	Feature Measurement	Annual Field Observations by IADNR Site Manager ^{3/}
Enhance Wetland Habitat	Provide reliable food source for migratory birds	Levee Restoration	Lineal feet of eroded levee	16,400	0	--	0	Levee system transects and profiles	Describe any erosion and/or seepage effects
		Water Control Improvements	Acres of aquatic vegetation	213	213	--	300 ^{2/}	Vegetation transects	Estimate effective acreage and wildlife use ^{4/}
	Increase overall vegetation diversity & availability of preferred wildlife foods	Mast Tree Planting	Acres of mast trees	7-10	28-31	--	40	Vegetation transects	Estimate area of established and/or regenerated vegetation

^{1/} Completed for the year the enhancement features are monitored

^{2/} Includes areas of cropland or non-forested wetland conversion

^{3/} To be submitted with annual Site Manager's Project Inspection and Monitoring Results (refer to Appendix C)

^{4/} Includes annual waterfowl census data

APPENDIX A

ACRONYMS

ACRONYMS

CEMVR	Corps of Engineers, Mississippi Valley Division, Rock Island District
CMP	corrugated metal pipe
DPR	Definite Project Report
EMP	Environmental Management Program
ER	Engineer Regulation
HREP	Habitat Rehabilitation and Enhancement Project
LTRMP	Long-Term Resource Monitoring Program
IADNR	Iowa Department of Natural Resources
NGVD	National Geodetic Vertical Datum
NWMU	North Wetland Management Unit
O&M	Operation and Maintenance
PM-M	Planning, Programs, and Project Management Division – Project Management Branch
R	Right Descending Bank
RM	River Mile
SWMU	South Wetland Management Unit
UMESC	Upper Midwest Environmental Sciences Center
UMRS	Upper Mississippi River System
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WMU	Wetland Management Unit

APPENDIX B

OPERATION, MAINTENANCE, AND REHABILITATION AGREEMENT



MEMORANDUM OF AGREEMENT
BETWEEN
THE UNITED STATES FISH AND WILDLIFE SERVICE
AND
THE DEPARTMENT OF THE ARMY
FOR
ENHANCING FISH AND WILDLIFE RESOURCES
OF THE
UPPER MISSISSIPPI RIVER SYSTEM
AT
PRINCETON WILDLIFE MANAGEMENT AREA

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 (DOA) will operate in constructing, operating, maintaining, repairing, and rehabilitating the Princeton Wildlife Management Area (PWMA), Iowa, separable element of the Upper Mississippi River System - Environmental Management Program (UMRS-EMP).

II. BACKGROUND

a. The Federally owned project lands of the Princeton Wildlife Management Area are managed under a cooperative agreement between the Department of the Interior, USFWS, and the U.S. Army Corps of Engineers, dated 14 February 1963. Management of these project lands has been assumed by the Iowa Department of Natural Resources under a successive cooperative agreement between the USFWS and the Iowa Department of Natural Resources dated 11 October 1963.

b. 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. Approximately 65 percent of the project area is managed for the USFWS by the Iowa Department of Natural Resources (IDNR) as part of The Upper Mississippi River National Fish and Wildlife Refuge. Under conditions of Section 906(e) of the Water Resources Development Act of 1986, Public Law 99-662, all construction costs of those fish and wildlife

features located on those lands managed as a National Wildlife Refuge are 100 percent Federal and pursuant to Section 107(b) of the Water Resources Development Act of 1992, Public Law 102-580, all costs of operation and maintenance for the Princeton Wildlife Management Area, Iowa are 100 percent non-Federal.

III. GENERAL SCOPE

The project to be accomplished pursuant to this MOA shall consist of converting the PWMA to a 2-celled managed marsh by restoring 16,400 feet of perimeter levee, to include 2,400 feet of overflow roadway; constructing a cross dike and 1 stoplog and 1 gatewell structure; and relocating an existing pump station. In addition, approximately 25 acres within the project area will be planted with mast-producing tree species.

IV. RESPONSIBILITIES

A. DOA is responsible for:

1. Construction. Rehabilitation of the existing perimeter levee; construction of a cross dike, and one gatewell and one stoplog structure; relocation of the existing pump station; and planting 25 acres of mast-producing trees.

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, DOA will construct on the Federally owned lands of the Princeton Wildlife Management Area, Iowa, the Fish and Wildlife Enhancement Project as described in the "Upper Mississippi River System Environmental Management Program Definite Project Report (R-10D) with Integrated Environmental Assessment Princeton Wildlife Management Area dated February 1995", 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 a Notice to Proceed. If DOA encounters potential delays related to construction of the project, DOA will promptly notify USFWS of such delays.

4. Maintenance of Records. The DOA 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 DOA shall maintain such books, records, documents, and other evidence for a minimum of three years after completion of construction of the project and resolution of all relevant claims arising therefrom, and shall make available at its offices, at reasonable times, such books, records, documents, and other evidence for inspection and audit by authorized representatives of the USFWS.

b. FWS Responsibilities. Upon completion of construction as determined by the District Engineer, Rock Island, the USFWS shall accept the Project as part of the Upper Mississippi River National Fish and Wildlife Refuge of the Princeton, Wildlife Management Area, Iowa.

c. Non-Federal Responsibilities. In accordance with Section 107(b) of the Water Resources Development Act of 1992, Public Law 102-580, 100 percent of all costs associated with the operation, maintenance, and repair of the Princeton Wildlife Management Area, Iowa will be borne by the Iowa Department of Natural Resources.

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.

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

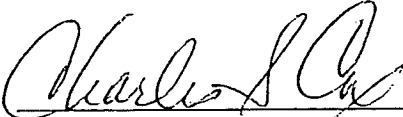
DOA: District Engineer
U.S. Army Engineer District, Rock Island
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004


VII. EFFECTIVE DATE OF MOA

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

THE DEPARTMENT OF THE ARMY

THE U.S. FISH AND WILDLIFE SERVICE

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

BY: 
For WILLIAM F. HARTWIG
Regional Director
U.S. Fish and Wildlife Service

DATE: 26 Oct 95

DATE: OCT 12 1995

**PROJECT COOPERATION AGREEMENT
BETWEEN
THE DEPARTMENT OF THE ARMY
AND
THE STATE OF IOWA
FOR CONSTRUCTION OF THE
PRINCETON WILDLIFE MANAGEMENT AREA
HABITAT REHABILITATION AND ENHANCEMENT PROJECT
IN SCOTT COUNTY, IOWA**

THIS AGREEMENT is entered into this 29 day of September, 1995, by and between THE DEPARTMENT OF THE ARMY (hereinafter the "Government"), represented by the U.S. Army Engineer for the Rock Island District (hereinafter the "District Engineer"), and THE STATE OF IOWA (hereinafter the "State"), represented by the Director, Iowa Department of Natural Resources.

WITNESSETH, THAT:

WHEREAS, construction of the Habitat Rehabilitation and Enhancement Project, at Princeton Wildlife Management Area, in Scott County, Iowa (hereinafter the "Authorized Project" as defined in Article I.A. of this Agreement), was approved under the terms of the Upper Mississippi River System Environmental Management Program, as authorized by Section 1103(e) of the Water Resources Development Act of 1986, Public Law 99-662, as amended;

WHEREAS, a portion of the Authorized Project is located on lands owned by the State of Iowa (hereinafter the "Project", as defined in Article I.B. of this Agreement);

WHEREAS, the Government and the U.S. Fish and Wildlife Service shall enter into an agreement regarding the construction, operation, and maintenance of that portion of the Authorized Project located solely on Federal lands;

WHEREAS, the Government and the State desire to enter into a Project Cooperation Agreement for construction of the Project.

WHEREAS, Section 906(e) of the Water Resources Development Act of 1986, Public Law 99-662, as amended, specifies the cost sharing requirements applicable to construction of the Project.

WHEREAS, Section 906(e) provides that the first costs for enhancement of fish and wildlife resources shall be a Federal cost when certain specified circumstances are present;

WHEREAS, Section 906(e) further provides that when such specified circumstances are not present, 25 percent of the first cost of enhancement of fish and wildlife resources shall be provided by the Non-Federal Interest;

WHEREAS, the Government and the State agree that the specified circumstances referred to in Subsection 906(e) of Public Law 99-662 are not present for the project;

WHEREAS, Section 1103(e)(7)(a) of the Water Resources Development Act of 1986, Public Law 99-662, as amended by Section 107(b) of the Water Resources Development Act of 1992, Public Law 102-580, specifies the operation and maintenance responsibilities for the Project;

WHEREAS, Section 221 of the Flood Control Act of 1970, Public Law 91-611, as amended, provides that the Secretary of the Army shall not commence construction of any water resources project, or separable element thereof, until each non-Federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element;

WHEREAS, Section 1103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, establishes the maximum amount of costs for the habitat rehabilitation and enhancement component of the Upper Mississippi River System Environmental Management Program;

WHEREAS, the Government and the State have the full authority and capability to perform as hereinafter set forth and intend to cooperate in cost-sharing and financing of the construction of the Project in accordance with the terms of this Agreement.

NOW, THEREFORE, the Government and the State agree as follows:

ARTICLE I - DEFINITIONS AND GENERAL PROVISIONS

For purposes of this Agreement:

A. The term "Authorized Project" shall mean the improvement and development of an approximate 1050 acre wetland management area which includes approximately 16,400 lineal feet of earthen levee improvements; approximately 5000 lineal feet of new earthen levee; a stop log water control structure; a gated water intake structure; relocation of an existing hydraulic pump; and approximately 2,400 lineal feet of rock-armored overflow levee, as generally described in the Definite Project Report dated February 1995 and approved by the Commander, North Central Division on March 17, 1995 (hereinafter the "DPR").

B. The term "Project" shall mean that portion of the Authorized Project located on lands owned by the State of Iowa, which shall include the improvement of approximately 3750 lineal

feet of earthen levee and development of approximately 1250 lineal feet of rock-armored overflow levee, as generally described in the DPR.

C. The term "total project costs" shall mean all costs incurred by the State and the Government in accordance with the terms of this Agreement directly related to construction of the Project. Subject to the provisions of this Agreement, the term shall include, but is not necessarily limited to: continuing planning and engineering costs incurred after October 1, 1985; advanced engineering and design costs; preconstruction engineering and design costs; engineering and design costs during construction; the costs of investigations to identify the existence and extent of hazardous substances in accordance with Article XV.A. of this Agreement; costs of historic preservation activities in accordance with Article XVIII.A. of this Agreement; actual construction costs; supervision and administration costs; costs of participation in the Project Coordination Team in accordance with Article V of this Agreement; costs of contract dispute settlements or awards; the value of lands, easements, right-of-way, relocation, and suitable borrow and dredged or excavated material disposal areas for which the Government affords credit in accordance with Article IV of this agreement and costs of audit in accordance with Article X of this Agreement. The term does not include any costs for operation or maintenance, repair, replacement, rehabilitation; any costs due to betterments; or any costs of dispute resolution under Article VII of this Agreement.

D. The term "financial obligation for construction" shall mean a financial obligation of the Government, other than an obligation pertaining to the provision of lands, easements, rights-of-way, relocations, and borrow and dredged or excavated material disposal areas, that results or would result in a cost that is or would be included in total project costs.

E. The term "non-Federal proportionate share" shall mean the ratio of the State's total cash contribution required in accordance with Articles II.D.1. and II.D.2. of this Agreement to total financial obligations for construction, as projected by the Government.

F. The term "period of construction" shall mean the time from the date the Government first notifies the State in writing, in accordance with Article VI.B. of this Agreement, of the scheduled date for issuance of the solicitation for the first construction contract to the date that the U.S. Army Engineer for the Rock Island District (hereinafter the "District Engineer") notifies the State in writing of the Government's determination that construction of the Project is complete.

G. The term "highway" shall mean any public highway, roadway, street, or way, including any bridge thereof.

H. The term "relocation" shall mean providing a functionally equivalent facility to the owner of an existing utility, cemetery, highway or other public facility, or railroad when such action is authorized in accordance with applicable legal principles of just compensation or as otherwise provided in the authorizing legislation for the Project or any report referenced therein. Providing a functionally equivalent facility may take the form of alteration, lowering, raising, or replacement and attendant removal of the affected facility or part thereof.

I. The term "fiscal year" shall mean one fiscal year of the Government. The Government fiscal year begins on October 1 and ends on September 30.

J. The term "functional portion of the Project" shall mean a portion of the Project that is suitable for tender to the State to operate and maintain in advance of completion of the entire Project. For a portion of the Project to be suitable for tender, the District Engineer must notify the State in writing of the Government's determination that the portion of the Project is complete and can function independently and for a useful purpose, although the balance of the Project is not complete.

K. The term "betterment" shall mean a change in the design and construction of an element of the Project resulting from the application of standards that the Government determines exceed those that the Government would otherwise apply for accomplishing the design and construction of that element.

ARTICLE II - OBLIGATIONS OF THE GOVERNMENT AND THE STATE

A. The Government, subject to receiving funds appropriated by the Congress of the United States (hereinafter, the "Congress") and using those funds and funds provided by the State, shall expeditiously construct the Project applying those procedures usually applied to Federal projects, pursuant to Federal laws, regulations, and policies.

1. The Government shall afford the State the opportunity to review and comment on the solicitations for all contracts, including relevant plans and specifications, prior to the government's issuance of such solicitations. The Government shall not issue the solicitation for the first construction contract until the State has confirmed in writing its willingness to proceed with the Project. To the extent possible, the Government shall afford the State the opportunity to review and

comment on all contract modifications, including change orders, prior to the issuance to the contractor of a Notice to Proceed. In any instance where providing the State with notification of a contract modification or change order is not possible prior to issuance of the Notice to Proceed, the Government shall provide such notification in writing at the earliest date possible. To the extent possible, the Government also shall afford the State the opportunity to review and comment on all contract claims prior to resolution thereof. The Government shall consider in good faith the comments of the State, but the contents of solicitations, award of contracts, execution of contract modifications, issuance of change orders, resolution of contract claims, and performance of all work on the Project (whether the work is performed under contract or by Government personnel), shall be exclusively within the control of the Government.

2. Throughout the period of construction, the District Engineer shall furnish the State with a copy of the Government's Written Notice of Acceptance of Completed Work for each contract for the Project.

B. The State may request the Government to accomplish betterments. Such requests shall be in writing and shall describe the betterments requested to be accomplished. If the Government in its sole discretion elects to accomplish the requested betterments or any portion thereof, it shall so notify the State in a writing that sets forth any applicable terms and conditions, which must be consistent with this Agreement. In the event of conflict between such a writing and this Agreement, this Agreement shall control. The State shall be solely responsible for all costs due to the requested betterments and shall pay all such costs in accordance with Article VI.C. of this Agreement.

C. When the District Engineer determines that the entire Project is complete or that a portion of the Project has become a functional portion of the Project, the District Engineer shall so notify the State in writing and furnish the State with an Operation and Maintenance Manual (hereinafter the "O&M Manual") and with copies of all of the Government's Written Notices of Acceptance of Completed Work for all contracts for the Project or the functional portion of the Project that have not been provided previously. Upon such notification, the State shall operate and maintain the entire Project or the functional portion of the Project in accordance with Article VIII of this Agreement.

D. The State shall contribute 25 percent of total project costs in accordance with the provisions of this paragraph.

1. In accordance with Article III of this Agreement, the State shall provide all lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas that the Government determines the State must provide for the

construction, operation, and maintenance of the Project and shall perform or ensure performance of all relocations that the Government determines to be necessary for the construction, operation, and maintenance of the Project.

2. If the Government projects that the value of the State's contributions under paragraph D.1. of this Article and Articles V, X, and XV.A. of this Agreement will be less than 25 percent of total project costs, the State shall provide an additional cash contribution, in accordance with Article VI.B. of this Agreement, in the amount necessary to make the Non-Federal Sponsor's total contribution equal to 25 percent of total project costs.

3. If the Government determines that the value of the Non-Federal Sponsor's contributions provided under paragraphs D.1. and D.2. of this Article and Articles V, X, and XV.A. of this Agreement has exceeded 25 percent of total project costs, the Government, subject to the availability of funds, shall reimburse the Non-Federal Sponsor for any such value in excess of 25 percent of total project costs. After such a determination, the Government, in its sole discretion, may provide any remaining Project lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas and perform any remaining Project relocations on behalf of the Non-Federal Sponsor.

E. The State may request the Government to provide lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas or perform relocations on behalf of the State. Such requests shall be in writing and shall describe the services requested to be performed. If in its sole discretion the Government elects to perform the requested services or any portion thereof, it shall so notify the State in a writing that sets forth any applicable terms and conditions, which must be consistent with this Agreement. In the event of conflict between such writing and this Agreement, this Agreement shall control. The State shall be solely responsible for all costs of the requested services and shall pay all such costs in accordance with Article VI.C. of this Agreement. Notwithstanding the provision of lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas or performance of relocations by the Government, the State shall be responsible, as between the Government and the State, for the costs of cleanup and response in accordance with Article XV.C. of this Agreement.

F. The Government shall perform a final accounting in accordance with Article VI.D. of this Agreement to determine the contributions provided by the State in accordance with paragraphs B., D., and E. of this Article and Articles V, X, and XV.A. of

this Agreement and to determine whether the State has met its obligations under paragraphs B., D., and E. of this Article.

G. The State shall not use Federal funds to meet the State's share of total project costs under this Agreement unless the Federal granting agency verifies in writing that the expenditure of such funds is expressly authorized by statute.

**ARTICLE III - LANDS, RELOCATIONS, DISPOSAL AREAS,
AND PUBLIC LAW 91-646 COMPLIANCE**

A. The Government, after consultation with the State, shall determine the lands, easements, and rights-of-way required for the construction, operation, and maintenance of the Project, including those required for relocations, borrow materials, and dredged or excavated material disposal. The Government in a timely manner shall provide the State with general written descriptions, including maps as appropriate, of the lands, easements, and rights-of-way that the Government determines the State must provide, in detail sufficient to enable the State to fulfill its obligations under this paragraph, and shall provide the State with a written notice to proceed with acquisition of such lands, easements, and rights-of-way. Prior to the end of the period of construction, the State shall acquire all lands, easements, and rights-of-way set forth in such descriptions. Furthermore, prior to issuance of the solicitation for each construction contract, the State shall provide the Government with authorization for entry to all lands, easements, and rights-of-way the Government determines the State must provide for that contract. For so long as the Project remains authorized, the State shall ensure that lands, easements, and rights-of-way that the Government determines to be required for the operation and maintenance of the Project and that were provided by the State are retained in public ownership for uses compatible with the authorized purposes of the Project.

B. The Government, after consultation with the State, shall determine the improvements required on lands, easements, and rights-of-way to enable the proper disposal of dredged or excavated material associated with the construction, operation, and maintenance of the Project. Such improvements may include, but are not necessarily limited to, retaining dikes, wasteweirs, bulkheads, embankments, monitoring features, stilling basins, and de-watering pumps and pipes. The Government in a timely manner shall provide the State with general written descriptions of such improvements in detail sufficient to enable the State to fulfill its obligations under this paragraph, and shall provide the State with a written notice to proceed with construction of such improvements. Prior to the end of the period of construction, the State shall provide all improvements set forth in such descriptions. Furthermore, prior to issuance of the solicitation

for each Government construction contract, the State shall prepare or ensure the preparation of plans and specifications for all improvements the Government determines to be required for the proper disposal of dredged or excavated material under that contract, submit such plans and specifications to the Government for approval, and provide such improvements in accordance with the approved plans and specifications.

C. The Government, after consultation with the State, shall determine the relocations necessary for the construction, operation, and maintenance of the Project, including those necessary to enable the removal of borrow materials and the proper disposal of dredged or excavated material. The Government in a timely manner shall provide the State with general written descriptions, including maps as appropriate, of such relocations in detail sufficient to enable the State to fulfill its obligations under this paragraph, and shall provide the State with a written notice to proceed with such relocations. Prior to the end of the period of construction, the State shall perform or ensure the performance of all relocations as set forth in such descriptions. Furthermore, prior to issuance of the solicitation for each Government construction contract, the State shall prepare or ensure the preparation of plans and specifications for, and perform or ensure the performance of, all relocations the Government determines to be necessary for that contract.

D. The State in a timely manner shall provide the Government with such documents as are sufficient to enable the Government to determine the value of any contribution provided pursuant to paragraphs A., B., or C. of this Article. Upon receipt of such documents the Government, in accordance with Article IV of this Agreement and in a timely manner, shall determine the value of such contribution, include such value in total project costs, and afford credit for such value toward the States' share of total project costs.

E. The State shall comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 C.F.R. Part 24, in acquiring lands, easements, and rights-of-way required for the construction, operation, and maintenance of the Project, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, and shall inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

ARTICLE IV - CREDIT FOR VALUE OF LANDS, RELOCATIONS, AND
IMPROVEMENTS OF DISPOSAL AREAS

A. The State shall receive credit toward its share of total project costs for the value of the lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas that the State must provide pursuant to Article III of this Agreement, and for the value of the relocations, that the State must perform or for which it must ensure performance pursuant to Article III of this Agreement. However, the State shall not receive credit for the value of any lands, easements, rights-of-way, relocations, or borrow and dredged or excavated material disposal areas that have been provided previously as an item of cooperation for another Federal project, or that are owned by the State and used for fish and wildlife management purposes on the effective date of this agreement. The State also shall not receive credit for the value of lands, easements, rights-of-way, relocations, or borrow and dredged or excavated material disposal areas to the extent that such items are provided using Federal funds unless the Federal granting agency verifies in writing that such credit is expressly authorized by statute.

B. For the sole purpose of affording credit in accordance with this Agreement, the value of lands, easements, and rights-of-way, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, shall be fair market value of the real property interests, plus certain incidental costs of acquiring those interests, as determined in accordance with the provisions of this paragraph.

1. Date of Valuation. The fair market value of lands, easements, or rights-of-way owned by the State on the effective date of this Agreement shall be fair market value of such real property interests as of the date the State provides the Government with authorization for entry thereto. The fair market value of lands, easements, or rights-of-way acquired by the State after the effective date of this Agreement shall be the fair market value of such real property interests at the time the interests are acquired.

2. General Valuation Procedure. Except as provided in paragraph B.3. of this Article, the fair market value of lands, easements, or rights-of-way shall be determined in accordance with paragraph B.2.a. of this Article, unless thereafter a different amount is determined to represent fair market value in accordance with paragraph B.2.b. of this Article.

a. The State shall obtain, for each real property interest, an appraisal that is prepared by a qualified appraiser who is acceptable to the State and the Government. The appraisal must be prepared in accordance with the applicable rules of just

compensation, as specified by the Government. The fair market value shall be the amount set forth in the State's appraisal, if such appraisal is approved by the Government. In the event the Government does not approve the State's appraisal, the State may obtain a second appraisal and the fair market value shall be the amount set forth in the State's second appraisal, if such appraisal is approved by the Government. In the event the Government does not approve the State's second appraisal, or the State chooses not to obtain a second appraisal, the Government shall obtain an appraisal and the fair market value shall be the amount set forth in the Government's appraisal, if such appraisal is approved by the State. In the event the State does not approve the Government's appraisal, the Government, after consultation with the State shall consider the Government's and the State's appraisals and determine an amount based thereon, which shall be deemed to be the fair market value.

b. Where the amount paid or proposed to be paid by the State for the real property interest exceeds the amount determined pursuant to paragraph B.2.a. of this Article, the Government, at the request of the State, shall consider all factors relevant to determining fair market value and, in its sole discretion, after consultation with the State, may approve in writing an amount greater than the amount determined pursuant to paragraph B.2.a. of this Article, but not to exceed the amount actually paid or proposed to be paid. If the Government approves such an amount, the market value shall be the lesser of the approved amount or the amount paid by the State, but not less than the amount determined pursuant to paragraph B.2.a. of this Article.

3. Eminent Domain Valuation Procedure. For lands, easements, or rights-of-way acquired by eminent domain proceedings instituted after the effective date of this Agreement, the State shall, prior to instituting such proceedings, submit to the Government notification in writing of its intent to institute such proceedings and an appraisal of the specific real property interests to be acquired in such proceedings. The Government shall have 60 days after receipt of such notice and appraisal within which to review the appraisal, if not previously approved by the Government in writing.

a. If the Government previously has approved the appraisal in writing, or if the Government provides written approval of, or takes no action on, the appraisal within such 60-day period, the appraisal shall be considered approved and the State shall use the amount set forth in such appraisal as the estimate of just compensation for the purpose of instituting the eminent domain proceeding.

b. If the Government provides written disapproval of the appraisal, including the reasons for the disapproval, within such 60-day period, the Government and the State shall consult in good faith to promptly resolve the issues or areas of disagreement that are identified in the Government's written disapproval. If, after such good faith consultation, the Government and the State agree as to an appropriate amount, then the State shall use that amount as the estimate of just compensation for the purpose of instituting the eminent domain proceeding. If, after such good faith consultation, the Government and the State cannot agree as to an appropriate amount, then the State may use the amount set forth in its appraisal as the estimate of just compensation for the purpose of instituting the eminent domain proceeding.

c. For lands, easements, or rights-of-way acquired by eminent domain proceedings instituted in accordance with subparagraph B.3. of this Article, fair market value shall be either the amount of the court award for the real property interests taken, to the extent the Government determined such interests are required for the construction, operation, and maintenance of the project, or the amount of any stipulated settlement or portion thereof that the Government approves in writing.

4. Incidental Costs. For lands, easements, or rights-of-way acquired by the State within a five-year period preceding the effective date of this Agreement, or at any time after the effective date of this Agreement, the value of the interest shall include the documented incidental costs of acquiring the interest, as determined by the Government, subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of costs. Such incidental costs shall include, but not necessarily be limited to, closing and title costs, appraisal costs, survey cost, attorney's fees, plat maps, and mapping costs, as well as the actual amounts expended for payment of any Public Law 91-646 relocation assistance benefits provided in accordance with Article III.E. of this Agreement.

C. After consultation with the State, the Government shall determine the value of relocations in accordance with the provisions of this paragraph.

1. For a relocation other than a highway, the value shall be only that portion of relocation costs that the Government determines is necessary to provide a functionally equivalent facility, reduced by depreciation, as applicable and by the salvage value of any removed items.

2. For a relocation of a highway, the value shall be only that portion of relocation costs that would be necessary to accomplish the relocation in accordance with the design standard

that the State of Iowa would apply under similar conditions of geography and traffic load, reduced by the salvage value of any removed items.

3. Relocation costs shall include, but not necessarily be limited to, actual costs of performing the relocation; planning, engineering and design costs; supervision and administration costs; and documented incidental costs associated with performance of the relocation, but shall not include any costs due to betterments, as determined by the Government, nor any additional cost of using new material when suitable used material is available. Relocation costs shall be subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of costs.

D. The value of the improvements made to lands, easements, and rights-of-way for the proper disposal of dredged or excavated material shall be the costs of the improvements, as determined by the Government, subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of costs. Such cost shall include, but not necessarily be limited to, actual costs of providing the improvements; planning, engineering and design costs; supervision and administration costs; and documented incidental costs associated with providing the improvements, but shall not include any costs due to betterments, as determined by the Government.

ARTICLE V - PROJECT COORDINATION TEAM

A. To provide for consistent and effective communication, the State and the Government, not later than 30 days after the effective date of this Agreement, shall appoint named senior representatives to a Project Coordination Team. Thereafter, the Project Coordination Team shall meet regularly until the end of the period of construction. The Government's Project Manager and a counterpart named by the State shall co-chair the Project Coordination Team.

B. The Government's Project Manager and the State counterpart shall keep the Project Coordination Team informed of the progress of construction and of significant pending issues and actions, and shall seek the views of the Project Coordination Team on matters that the Project Coordination Team generally oversees.

C. Until the end of the period of construction, the Project Coordination Team shall generally oversee the Project, including issues related to design; plans and specifications; scheduling; real property and relocation requirements; real property

acquisition; contract awards and modifications; contract costs; the Government's cost projections; final inspection of the entire Project or functional portions of the Project; preparation of the proposed O&M Manual; anticipated requirements and needed capabilities for performance of operation and maintenance of the Project; and other related matters. This oversight shall be consistent with a project management plan developed by the Government after consultation with the State.

D. The Project Coordination Team may make recommendations that it deems warranted to the District Engineer on matters that the Project Coordination Team generally oversees, including suggestions to avoid potential sources of dispute. The Government in good faith shall consider the recommendations of the Project Coordination Team. The Government, having the legal authority and responsibility for construction of the Project, has the discretion to accept, reject, or modify the Project Coordination Team's recommendations.

E. The costs of participation in the Project Coordination Team shall be included in total project costs and cost shared in accordance with the provisions of this Agreement.

ARTICLE VI - METHOD OF PAYMENT

A. The Government shall maintain current records of contributions provided by the parties and current projections of total project costs and costs due to betterments. At least quarterly, the Government shall provide the State with a report setting forth all contributions provided to date and the current projections of total project costs, of total costs due to betterments, of the components of total project costs, of each party's share of total project costs, of the State's total cash contributions required in accordance with Articles II.B., II.D., and II.E. of this Agreement, and of the non-Federal proportionate share. On the effective date of this Agreement, total project costs are projected to be \$92,500, and the State's cash contribution required under Article II.D. of this Agreement is projected to be \$23,125. Such amounts are estimates subject to adjustment by the Government and are not to be construed as the total financial responsibilities of the Government and the State.

B. The State shall provide the cash contribution required under Article II.D.2. of this Agreement in accordance with the following provisions: Not less than 60 calendar days prior to the scheduled date for issuance of the solicitation for the first construction contract, the Government shall notify the State in writing of such scheduled date and the funds the Government determines to be required from the State to meet its projected cash contribution under Article II.D.2. of this Agreement. Not later than such scheduled date, the State shall provide the

Government with the full amount of the required funds by delivering a check payable to "FAO, USAED, Rock Island" to the District Engineer. The Government shall draw from the funds provided by the State such sums as the Government deems necessary to cover: (a) the non-Federal proportionate share of financial obligations for construction incurred prior to the commencement of the period of construction; and (b) the non-Federal proportionate share of financial obligations for construction as they are incurred during the period of construction. In the event the Government determines that the State must provide additional funds to meet the State's cash contribution, the Government shall notify the State in writing of the additional funds required. Within 60 calendar days thereafter, the State shall provide the Government with a check for the full amount of the additional required funds.

C. In advance of the Government incurring any financial obligation associated with additional work under Article II.B. or II.E. of this Agreement, the State shall provide the Government with the full amount of the funds required to pay for such additional work by delivering a check payable to "FAO, USAED, Rock Island" to the District Engineer. The Government shall draw from the funds provided by the State such sums as the Government deems necessary to cover the Government's financial obligations for such additional work as they are incurred. In the event the Government determines that the State must provide additional funds to meet its cash contribution, the Government shall notify the State in writing of the additional funds required. Within 30 calendar days thereafter, the State shall provide the Government with a check for the full amount of the additional required funds.

D. Upon completion of the Project or termination of this Agreement, and upon resolution of all relevant claims and appeals, the Government shall conduct a final accounting and furnish the State with the results of the final accounting. The final accounting shall determine total project costs, each party's contribution provided thereto, and each party's required share thereof. The final accounting also shall determine costs due to betterments and the State's cash contribution provided pursuant to Article II.B. of this Agreement.

1. In the event the final accounting shows that the total contribution provided by the State is less than its required share of total project costs plus costs due to any betterments provided in accordance with Article II.B. of this Agreement, the State shall, no later than 90 calendar days after receipt of written notice, make a cash payment to the Government of whatever sum is required to meet the State's required share of total project costs plus costs due to any betterments provided in accordance with Article II.B. of this Agreement.

2. In the event the final accounting shows that the total contribution provided by the State exceeds its required share of total project costs plus costs due to any betterments provided in accordance with Article II.B. of this Agreement, the Government shall, subject to the availability of funds, refund the excess to the State no later than 90 calendar days after the final accounting is complete. In the event existing funds are not available to refund the excess to the State, the Government shall seek such appropriations as are necessary to make the refund.

ARTICLE VII - DISPUTE RESOLUTION

As a condition precedent to a party bringing any suit for breach of this Agreement, the party must first notify the other party in writing of the nature of the purported breach and seek in good faith to resolve the dispute through negotiation. If the parties cannot resolve the dispute through negotiation, they may agree to a mutually acceptable method of non-binding alternative dispute resolution with a qualified third party acceptable to both parties. The parties shall each pay 50 percent of any costs for the services provided by such a third party as such costs are incurred. The existence of a dispute shall not excuse the parties from performance pursuant to this Agreement.

ARTICLE VIII - OPERATION AND MAINTENANCE (O&M)

A. Upon notification in accordance with Article II.C. of this Agreement and for so long as the Authorized Project remains authorized, the State shall operate and maintain the entire Project or the functional portion of the Project, at no cost to the Government, in a manner compatible with the Project's authorized purposes and in accordance with applicable Federal and State laws as provided in Article XI of this Agreement and specific directions prescribed by the Government in the O&M Manual and any subsequent amendments thereto.

B. The State hereby gives the Government a right to enter, at reasonable times and in a reasonable manner, upon property that the State owns or controls for access to the Project for the purpose of inspection and, if necessary, for the purpose of completing, operating, and maintaining the Project. If an inspection shows that the State for any reason is failing to perform its obligations under this Agreement, the Government shall send a written notice describing the non-performance to the State. If, after 30 calendar days from receipt of notice, the State continues to fail to perform, then the Government shall have the right to enter, at reasonable times and in a reasonable manner, upon property that the State owns or controls for access to the Project for the purpose of completing, operating, and

maintaining the Project. No completion, operation, or maintenance by the Government shall operate to relieve the State of responsibility to meet the State's obligations as set forth in this Agreement, or to preclude the Government from pursuing any other remedy at law or equity to ensure faithful performance pursuant to this Agreement.

ARTICLE IX - INDEMNIFICATION

The State shall hold and save the Government free from all damages arising from the construction, operation, and maintenance of the Project and any Project-related betterments, except for damages due to the fault or negligence of the Government or its contractors.

ARTICLE X - MAINTENANCE OF RECORDS AND AUDIT

A. Not later than 60 calendar days after the effective date of this Agreement, the Government and the State shall develop procedures for keeping books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to this Agreement. These procedures shall incorporate, and apply as appropriate, the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 C.F.R. Section 33.20. The Government and the State shall maintain such books, records, documents, and other evidence in accordance with these procedures and for a minimum of three years after the period of construction and resolution of all relevant claims arising therefrom. To the extent permitted under applicable Federal laws and regulations, the Government and the State shall each allow the other to inspect such books, documents, records, and other evidence.

B. Pursuant to 32 C.F.R. Section 33.26, the State is responsible for complying with the Single Audit Act of 1984, 31 U.S.C. Sections 7501-7507, as implemented by Office of Management and Budget (OMB) Circular No. A-128 and Department of Defense Directive 7600.10. Upon request of the State and to the extent permitted under applicable Federal laws and regulations, the Government shall provide to the State and independent auditors any information necessary to enable an audit of the State's activities under this Agreement. The costs of any non-Federal audits performed in accordance with this paragraph shall be allocated in accordance with the provisions of OMB Circulars A-87 and A-128, and such costs as are allocated to the Project shall be included in total project costs and cost shared in accordance with the provisions of this Agreement.

C. In accordance with 31 U.S.C. Section 7503, the Government may conduct audits in addition to any audit that the State is required to conduct under the Single Audit Act. Any such Government audits shall be conducted in accordance with Government Auditing Standards and the cost principles in OMB Circular No. A-87 and other applicable cost principles and regulations. The costs of Government audits performed in accordance with this paragraph shall be included in total project costs and cost shared in accordance with the provisions of this Agreement.

ARTICLE XI - FEDERAL AND STATE LAWS

In the exercise of their respective rights and obligations under this Agreement, the State and the Government agree to comply with all applicable Federal and State laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army".

ARTICLE XII - RELATIONSHIP OF PARTIES

A. In the exercise of their respective rights and obligations under this Agreement, the Government and the State each act in an independent capacity, and neither is to be considered the officer, agent, or employee of the other.

B. In the exercise of its rights and obligations under this Agreement, neither party shall provide, without the consent of the other party, any contractor with a release that waives or purports to waive any rights such other party may have to seek relief or redress against such contractor either pursuant to any cause of action that such other party may have or for violation of any law.

ARTICLE XIII - OFFICIALS NOT TO BENEFIT

No member of or delegate to the Congress, nor any resident commissioner, shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom.

ARTICLE XIV - TERMINATION OR SUSPENSION

A. If at any time the State fails to fulfill its obligations under Article II.B., II.D., II.E., VI, or XVIII.C. of this Agreement, the Assistant Secretary of the Army (Civil Works) shall terminate this Agreement or suspend future performance under this Agreement unless he determines that continuation of work on the Project is in the interest of the United States or is necessary in order to satisfy agreements with any other non-Federal interests in connection with the Project.

B. If the Government fails to receive annual appropriations in amounts sufficient to meet Project expenditures for the then-current or upcoming fiscal year, the Government shall so notify the State in writing, and 60 calendar days thereafter either party may elect without penalty to terminate this Agreement or to suspend future performance under this Agreement. In the event that either party elects to suspend future performance under this Agreement pursuant to this paragraph, such suspension shall remain in effect until such time as the Government receives sufficient appropriations or until either the Government or the State elects to terminate this Agreement.

C. In the event that either party elects to terminate this Agreement pursuant to this Article or Article XV of this Agreement, both parties shall conclude their activities relating to the Project and proceed to a final accounting in accordance with Article VI.D. of this Agreement.

D. Any termination of this Agreement or suspension of future performance under this Agreement in accordance with this Article or Article XV of this Agreement shall not relieve the parties of liability for any obligation previously incurred. Any delinquent payment shall be charged interest at a rate, to be determined by the Secretary of the Treasury, equal to 150 per centum of the average bond equivalent rate of the 13-week Treasury bills auctioned immediately prior to the date on which such payment became delinquent, or auctioned immediately prior to the beginning of each additional 3-month period if the period of delinquency exceeds 3 months.

ARTICLE XV - HAZARDOUS SUBSTANCES

A. After execution of this Agreement and upon direction by the District Engineer, the State shall perform, or cause to be performed, any investigations for hazardous substances that the Government or the State determines to be necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (hereinafter "CERCLA"), 42 U.S.C. Sections 9601-9675, that may exist in, on, or under lands, easements, and

rights-of-way that the Government determines, pursuant to Article III of this Agreement, to be required for the construction, operation, and maintenance of the Project. However, for lands that the Government determines to be subject to the navigation servitude, only the Government shall perform such investigations unless the District Engineer provides the State with prior specific written direction, in which case the State shall perform such investigations in accordance with such written direction. All actual costs incurred by the State for such investigations for hazardous substances shall be included in total project costs and cost shared in accordance with the provisions of this Agreement, subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of costs.

B. In the event it is discovered through any investigation for hazardous substances or other means that hazardous substances regulated under CERCLA exist in, on, or under any lands, easements, or rights-of-way that the Government determines, pursuant to Article III of this Agreement, to be required for the construction, operation, and maintenance of the Project, the State and the Government shall provide prompt written notice to each other, and the State shall not proceed with the acquisition of the real property interests until both parties agree that the State should proceed.

C. The Government and the State shall determine whether to initiate construction of the Project, or, if already in construction, whether to continue with work on the Project, suspend future performance under this Agreement, or terminate this Agreement for the convenience of the Government, in any case where hazardous substances regulated under CERCLA are found to exist in, on, or under any lands, easements, or rights-of-way that the Government determines, pursuant to Article III of this Agreement, to be required for the construction, operation, and maintenance of the Project. Should the Government and the State determine to initiate or continue with construction after considering any liability that may arise under CERCLA, the State shall be responsible, as between the Government and the State, for the costs of clean-up and response, to include the costs of any studies and investigations necessary to determine an appropriate response to the contamination. Such costs shall not be considered a part of total project costs. In the event the State fails to provide any funds necessary to pay for clean up and response costs or to otherwise discharge the State's responsibilities under this paragraph upon direction by the Government, the Government may, in its sole discretion, either terminate this Agreement for the convenience of the Government, suspend future performance under this Agreement, or continue work on the Project.

D. The State and the Government shall consult with each other in accordance with Article V of this Agreement in an effort to ensure that responsible parties bear any necessary clean up and response costs as defined in CERCLA. Any decision made pursuant to paragraph C. of this Article shall not relieve any third party from any liability that may arise under CERCLA.

E. As between the Government and the State, the State shall be considered the operator of the Project for purposes of CERCLA liability. To the maximum extent practicable, the State shall operate and maintain the Project in a manner that will not cause liability to arise under CERCLA.

ARTICLE XVI - NOTICES

A. Any notice, request, demand, or other communication required or permitted to be given under this Agreement shall be deemed to have been duly given if in writing and either delivered personally or by telegram or mailed by first-class, registered, or certified mail, as follows:

If to the State:

Director
Iowa Department of Natural Resources
Wallace State Office Building
Des Moines, Iowa 50319-0034

If to the Government:

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

B. A party may change the address to which such communications are to be directed by giving written notice to the other party in the manner provided in this Article.

C. Any notice, request, demand, or other communication made pursuant to this Article shall be deemed to have been received by the addressee at the earlier of such time as it is actually received or seven calendar days after it is mailed.

ARTICLE XVII - CONFIDENTIALITY

To the extent permitted by the laws governing each party, the parties agree to maintain the confidentiality of exchanged information when requested to do so by the providing party.

ARTICLE XVIII - HISTORIC PRESERVATION

A. The costs of identification, survey and evaluation of historic properties shall be included in total project costs and cost shared in accordance with the provisions of this Agreement.

B. As specified in Section 7(a) of Public Law 93-291 (16 U.S.C. Section 469c(a)), the costs of mitigation and data recovery activities associated with historic preservation shall be borne entirely by the Government and shall not be included in total project costs, up to the statutory limit of one percent of the total amount the Government is authorized to expend for the Project.

C. The Government shall not incur costs for mitigation and data recovery that exceed the statutory one percent limit specified in paragraph B. of this Article unless and until the Assistant Secretary of the Army (Civil Works) has waived that limit in accordance with Section 208(3) of Public Law 96-515 (16 U.S.C. Section 469c-2(3)). Any costs of mitigation and data recovery that exceed the one percent limit shall be included in total project costs and cost shared in accordance with the provisions of this Agreement.

ARTICLE XIX - SECTION 1103 PROJECT COST LIMITS

The State has reviewed the provisions set forth in Section 1103 of Public Law 99-662, as amended, and understands that Section 1103 establishes the maximum amount of costs for the habitat rehabilitation and enhancement component of the Upper Mississippi River System Environmental Management Program.

Notwithstanding any other provisions of this Agreement, the Government shall not make a new project expenditure, or afford credit toward total project costs for the value of any contribution provided by the State, if such obligation, expenditure, or credit would result in total project costs, plus the value of any obligations already made under the habitat

rehabilitation and enhancement component of the Upper Mississippi River System Environmental Management Program, exceeding the maximum amount, unless otherwise authorized by law.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, which shall become effective upon the date it is signed by the Department of the Army.

THE DEPARTMENT OF THE ARMY

THE STATE OF IOWA,
DEPARTMENT OF NATURAL RESOURCES

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

BY: [Signature]
Director
Iowa Department of
Natural Resources

DATE: 29 Sep 95

DATE: 9/25/95

APPENDIX C

SITE MANAGER'S PROJECT INSPECTION AND MONITORING RESULTS

**PRINCETON REFUGE HABITAT
REHABILITATION AND ENHANCEMENT**

**UPPER MISSISSIPPI RIVER SYSTEM
ENVIRONMENTAL MANAGEMENT PROGRAM
POOL 14, MISSISSIPPI RIVER MILES 504.0 – 506.4R
SCOTT COUNTY, IOWA**

SITE MANAGER'S PROJECT INSPECTION AND MONITORING RESULTS

Inspected By _____ Date _____

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

River EL: _____ Forebay EL: _____

RATING SCALE: A-ACCEPTABLE M-MINIMULY ACCEPTABLE U-UNACCEPTABLE

1. PROJECT INSPECTION

<u>Item</u>	<u>Condition</u>	<u>Rating</u>
a. <u>Perimeter Levee and Overflow Spillway</u>		
() Settlement, slough or loss of section	_____	_____
() Wavewash, scouring	_____	_____
() Overtopping erosion	_____	_____
() Vegetative cover (mowing)	_____	_____
() Unauthorized grazing or traffic	_____	_____
() Encroachments	_____	_____
() Unfavorable tree/shrub growth	_____	_____
() Seepage distress	_____	_____
b. <u>Cross-Dike</u>		
() Settlement, slough or loss of section	_____	_____
() Wavewash, scouring	_____	_____
() Overtopping erosion	_____	_____
() Vegetative cover (mowing)	_____	_____
() Unauthorized grazing or traffic	_____	_____
() Encroachments	_____	_____
() Unfavorable tree/shrub growth	_____	_____
() Seepage distress	_____	_____

<u>Item</u>	<u>Condition</u>	<u>Rating</u>
c. <u>Gatewell Structure-North Perimeter Levee</u>		
() Gate operation	_____	_____
() Concrete	_____	_____
() Inlet and outlet channels	_____	_____
() Displaced/missing riprap	_____	_____
() Erosion adjacent to structure	_____	_____
() Sedimentation (culverts/approaches)	_____	_____
() Seepage distress	_____	_____
d. <u>Gatewell Structure-South Perimeter Levee</u>		
() Gate operation	_____	_____
() Concrete	_____	_____
() Steel rail/posts, grating, fasteners	_____	_____
() Inlet and outlet channels	_____	_____
() Displaced/missing riprap	_____	_____
() Erosion adjacent to structure	_____	_____
() Sedimentation (culverts/approaches)	_____	_____
() Seepage distress	_____	_____
e. <u>Concrete Water Control Structure-Cross-Dike</u>		
() Stoplogs, stoplog keepers/slots	_____	_____
() Concrete	_____	_____
() Steel rail/posts, grating, fasteners	_____	_____
() Inlet and outlet channels	_____	_____
() Displaced/missing riprap	_____	_____
() Erosion adjacent to structure	_____	_____
() Sedimentation (culverts/approaches)	_____	_____
() Seepage distress	_____	_____
f. <u>East CMP Water Control Structure-Cross-Dike</u>		
() Stoplogs, stoplog keepers/slots	_____	_____
() Inlet and outlet channels	_____	_____
() Erosion adjacent to structure	_____	_____
() Sedimentation (culverts/approaches)	_____	_____
() Seepage distress	_____	_____

<u>Item</u>	<u>Condition</u>	<u>Rating</u>
g. <u>West CMP Water Control Structure-Cross-dike</u>		
() Stoplogs, stoplog keepers/slots	_____	_____
() Inlet and outlet channels	_____	_____
() Erosion adjacent to structure	_____	_____
() Sedimentation (culverts/approaches)	_____	_____
() Seepage distress	_____	_____
h. <u>Flood/Drainage Ditches</u>		
() Debris	_____	_____
() Unauthorized structures	_____	_____
() Bank erosion	_____	_____
() Seepage distress	_____	_____
i. <u>Pump Station</u>		
() Structure-steel	_____	_____
() Structure-concrete	_____	_____
() Displaced/missing riprap	_____	_____
() Electrical lighting/standby generator	_____	_____
() Steel discharge pipe/flapgate	_____	_____
() Forebay/sump (sedimentation)	_____	_____
() Diesel engine/hydraulic pump	_____	_____
() Hydraulic reservoir/piping/hoses	_____	_____
() Hydraulic pump	_____	_____
() Fuel supply/piping/bulk tank	_____	_____
() Stoplogs/inlet/outlet-aluminum	_____	_____
() Gravity outlet sluice gate/operator	_____	_____
() Air release/siphon break	_____	_____
j. <u>Portable Pump Station</u>		
() Diesel engine	_____	_____
() Trailer	_____	_____
() pump	_____	_____
k. <u>Vegetation</u>		
() Mast trees	_____	_____
() Seeding	_____	_____

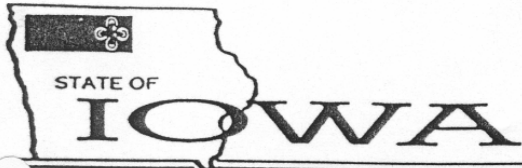
<u>Item</u>	<u>Condition</u>	<u>Rating</u>
1. <u>Access</u>		
() Road-granular surfacing, etc.	_____	_____
() Riprap	_____	_____
m. <u>Borrow Areas/Potholes</u>		
() Debris, sedimentation, or vegetation	_____	_____
() Wildlife use	_____	_____
() Vegetation types and density	_____	_____

2. COMMENTS

Site Manager

APPENDIX D

COOPERATING AGENCY CORRESPONDENCE



LARRY E. BRANSTAD, GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
LARRY J. WILSON, DIRECTOR

June 1, 1992

Colonel John R. Brown
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, IL 61204-2004

Dear Colonel Brown:

The Iowa Department of Natural Resources hereby agrees to the following cost-share conditions for the Princeton Refuge Habitat Rehabilitation and Enhancement Project under the Environmental Management Program (EMP):

1. Construction:

a. The State of Iowa is responsible for 25 percent of all construction costs assigned to project features located on non-Federal lands within the project area. In this case, the non-Federal lands are owned by the State of Iowa.

b. The Federal Government, through the U.S. Army Corps of Engineers, is responsible for the remaining 75 percent of construction costs assigned to project features located on non-Federal lands within the project area.

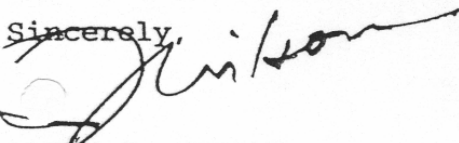
c. The Federal Government, through the U.S. Army Corps of Engineers, is responsible for 100 percent of all construction costs assigned to project features located on Federal lands within the project area that are "managed as a national wildlife refuge" in the context of Section 906(e) of the Water Resources Development Act of 1986. In this case, Federal lands are General Plan lands managed by the Iowa Department of Natural Resources through a cooperative agreement with the U.S. Fish and Wildlife Service.

2. Operation, Maintenance, and Repair:

a. The State of Iowa is responsible for 100 percent of operations, maintenance, and repair of project features located on non-Federal lands.

b. The State of Iowa will cooperate with the U.S. Fish and Wildlife Service to assure that non-Federal operation, maintenance, and repair responsibilities associated with the project features on Federal land are in conformance with Section 906(e) of the Water Resources Development Act of 1986 and existing agreements between the Service and the Director, Iowa Department of Natural Resources.

Sincerely,


LARRY J. WILSON
DIRECTOR

IOWA DEPARTMENT OF NATURAL RESOURCES

APPENDIX E

PUMP STATION INSPECTION REPORT

PUMP STATION INSPECTION REPORT

Name of Project and Program (EMP, 1135, Etc.):

Princeton Wildlife Management Area, EMP
Pool 14, River Miles 504.0-506.5, Scott County, Iowa

Date/Hour Inspection Began/Ended:

Date: _____ Time: _____

Inspectors:

Corps Representatives:
Local Sponsor Officials:

River/Forebay Elevations:

Mississippi River El.: _____ Stage El.: _____ Zero Gage El.: _____
North Management Unit El.: _____ Stage El.: _____ Zero Gage El.: _____
South Management Unit El.: _____ Stage El.: _____ Zero Gage El.: _____

Note:

Project Data:

Pumping Arrangement and Configuration: One (1) hydraulic submersible M&W pump set up for one-way pumping with diversion to either management unit.

Size of Moist Cell Unit(s) (Acres): North Management Unit = 357 Acres at water surface elevation 576.0
South Management Unit = 344 Acres at water surface elevation 575.0

Fill Time (Days):

Actual: North Management Unit = 45 days fill time to elevation 577.0. (1' above Corps design)
It takes an additional 15 days of pumping to achieve the 1' increase.
South Management Unit = Approximately 30 days simultaneous with the filling of the North Management Unit.

Design: The design was to take 7 days for the North Unit and 5 days for the South Unit.

Empty Time (Days):

Actual: Depends on the fluctuating river. IADNR tries to lower the management units as low as possible.
Design: Approximately elevation 574.0

General Comments:

PUMP STATION MAINTENANCE INSPECTION GUIDE

RATED ITEM	A	M	U	EVALUATION	REMARKS
SECTION I				<i>FOR INTERNAL USE AND EVALUATION</i>	
1. Pump Station Size				Pump station has adequate capacity (considering pumping capacity, ponding areas, Compare Fill/Empty times with Design, etc.). (A or U.)	
SECTION II				<i>FOR LOCAL SPONSOR USE</i>	
2. O&M Manual				O&M Manual is present and adequately covers all pertinent areas. (A or U.)	
3. Operating Log				Pump Station Operating Log is present and being used. (A or U.)	

PUMP STATION MAINTENANCE INSPECTION GUIDE

RATED ITEM	A	M	U	EVALUATION	REMARKS
4. Annual Inspection				Annual inspection is being performed by the local sponsor. (A or U.)	
5. Plant Building				<p>A Plant building is in good structural condition. No apparent major cracks in concrete, no subsidence, roof is not leaking, etc. Intake louvers clean, clear of debris. Exhaust fans operational and maintained. Safe working environment.</p> <p>M Spalling and cracking are present, or minimal subsidence is evident, or roof leaks, or other conditions are present that need repair but do not threaten the structural integrity or stability of the building.</p> <p>U Any condition that does not meet at least Minimum Acceptable standard.</p>	
6. Pumps				<p>A All pumps are operational. Preventive maintenance and lubrication are being performed. System is periodically subjected to performance testing. No evidence of unusual sounds, cavitation, or vibration.</p> <p>M All pumps are operational and deficiencies/minor discrepancies are such that pumps could be expected to perform through the next period of usage.</p> <p>U One or more primary pumps are not operational, or noted discrepancies have not been corrected.</p>	

PUMP STATION MAINTENANCE INSPECTION GUIDE

RATED ITEM	A	M	U	EVALUATION	REMARKS
7. Motors, Engines and Gear Reducers				<p>A All items are operational. Preventive maintenance and lubrication being performed. Systems are periodically subjected to performance testing. Instrumentation, alarms, and auto shutdowns operational.</p> <p>M All systems are operational and deficiencies/minor discrepancies are such that pumps could be expected to perform through the next expected period of usage.</p> <p>U One or more primary motors are not operational, or noted discrepancies have period of usage.</p>	
8. Sumps/Trash Racks				<p>SPECIAL INSTRUCTIONS: <i>Measure silt accumulation in sumps and trash racks. Measure water depth at inlet and outlet.</i></p> <p>A Sumps/Trash Racks are free of concrete deterioration, protected from Permanent damage by corrosion and free of floating and sunken debris. Sumps are clear of Accumulated silt. Passing debris is minimized by spacing of trash rack bars. Periodic maintenance performed on trash racks and removal of accumulated silt in sumps is performed.</p> <p>M Trash racks and sumps have some accumulated silt or debris but are not currently inhibiting the pump(s) performance. No periodic maintenance has been performed. Present condition could be expected to perform through the next expected period of usage provided removal of floating debris is accomplished.</p> <p>U Proper operation can not be ensured through the next period of usage. Possible damage could result to the pumping equipment with continued operation.</p>	

PUMP STATION MAINTENANCE INSPECTION GUIDE

RATED ITEM	A	M	U	EVALUATION
9. Other Metallic Items				<p>A All metal parts in plant/building are protected from permanent damage by corrosion. Equipment anchors and grout pads show no rust or deterioration.</p> <p>M Corrosion on metallic parts (except equipment anchors) and deterioration period of usage.</p> <p>U Any condition that does not meet at least Minimum Acceptable standards.</p>
10. Ancillary Equipment i.e. Compressed Air Siphon Breakers Fuel Supply Vacuum Priming Pump Lubrication Heating/Ventilation Engine Cooling Engine Oil Filtering				<p>A All equipment operational. Preventive and annual maintenance being performed. Equipment operation understood and followed by pump station operators.</p> <p>M Ancillary equipment is operational and deficiencies/minor discrepancies are such that equipment could be expected to perform through the next period of usage.</p> <p>U One or more of the equipment systems is inoperable. The present condition of the inoperable equipment could reduce the efficiency of the pump station or jeopardize the pump station's role in flood protection.</p>
11. Backup Ancillary Equipment				<p>A Adequate, reliable, and enough capacity to meet demands. Backup units/equipment are properly sized, operational, periodically exercised, and in an overall well maintained condition.</p> <p>M Backup ancillary equipment is operational and deficiencies/minor discrepancies are such that equipment could be expected to perform through the next period of usage.</p> <p>U Backup ancillary equipment not considered reliable to sustain operations during flooding conditions.</p>
12. Pump Control System				<p>A Operational and maintained free of damage, corrosion, or other debris.</p> <p>M Operational with minor discrepancies.</p> <p>U Not operational, or uncorrected discrepancies noted from previous inspections.</p>

PUMP STATION MAINTENANCE INSPECTION GUIDE

RATED ITEM	A	M	U	EVALUATION	REMARKS
13. Intake and Discharge Outlets				Functional. No damaging erosion evident. Opening/closing devices for vertical gates, flap gates, etc. are functional in a well-maintained condition. (A or U.)	
14. Insulation Megger Testing (For pump stations with electric pumps only)				<p>A Megger test has been performed within the last 36 months. Results of megger test show that insulation of primary conductors and electric motor meets manufacturer's or industry standard.</p> <p>M Results of megger test show that insulation resistance is lower than manufacturer's or industry's standard, but can be expected to perform satisfactorily until next testing or can be corrected.</p> <p>U Insulation resistance is low enough to cause the equipment to not be able to meet its design standard of operation.</p>	
15. Final Remarks					
<p>GENERAL INSTRUCTIONS</p> <ol style="list-style-type: none"> 1. All items on this guide must be addressed and a rating given. 2. The lowest single rating given will determine the overall rating for the pump station. 3. Additional areas for inspection will be incorporated by the inspector into this guide if the layout or physical characteristics of the pump station warrant this. Appropriate entries will be made in the REMARKS block. 4. Rating Codes: <ul style="list-style-type: none"> A - Acceptable M - Minimally Acceptable U - Unacceptable 					

APPENDIX F

MECHANICAL EQUIPMENT DATA



INVOICE

of America, Inc.
 Floodgate Road, Bridgeport, NJ 08014
 Telephone: (609) 467-3636/3638
 Fax: (609) 467-4841

CUST. NO.	IN. L	INVOICE NO.
91824	10/18/99	024527

Delivery Slip #: 42377

S O L D T O
 US ARMY ENGRG. DIST. ROCK ISLAND
 DISBURSING OFFICER
 CLOCK TOWER BLDG, P.O. BOX 2004
 ROCK ISLAND, IL 61204-2004

S H I P T O
 US ARMY ENG. DIST. RI/IDWA DEPT
 NATURAL RESOURCES/ MAQUOKETA
 WILDLIFE, 51576 GREEN ISLAND RD
 GREEN ISLAND, IA

CUSTOMER P.O. NO.	ORDERED BY	DATE ORDERED	DATE SHIPPED	GODWIN ORDER NO.	SLS. NO.	SHIPPED VIA	TERMS
DACW25-99-M0550	JAN KRAHL	9/01/99	10/12/99	M06610	63	MOTOR FRT	NET 30 DAYS
Description							

SALE

ATTN: MR. JOHN BEHRENS, ED-DG

GODWIN CD225M 8" DRI-PRIME PUMPSET DRIVEN BY A
 SPECIAL JOHN DEERE 4045T DIESEL ENGINE MOUNTED ON A
 SPECIAL GP3052 HIGHWAY TRAILER EQUIPPED W/EVERTITE
 FITTINGS ON SUCTION AND DISCHARGE (AS PER SPEC)

S/N 9917861-5 ENG# 810214
 COMP# E90434 TRL# 025935

SET OF FILTERS
 8" X 10' RUBBER SUCTION HOSE W/EVERTITE FITTINGS
 8" X 10' RUBBER DISCHARGE HOSE W/EVERTITE FITTINGS
 8" EVERTITE FEMALE X SUCTION SCREEN

GODWIN PUMPS WILL RETAIN OWNERSHIP OF THE ABOVE
 EQUIPMENT UNTIL THIS INVOICE IS PAID IN FULL.

Ord	Ship	B/D	Sell Price	Ext Sell
1	1		28,378.00	28,378.00

MERCHANDISE	LABOR	SPECIAL CHARGES	MISC. CHARGES	SUB-TOTAL
28,378.00	.00	.00	.00	28,378.00
SALES TAX				.00
SHIPPING CHARGES				.00
TOTAL INVOICE				28,378.00

ALL PAST DUE INVOICES ARE SUBJECT
 TO 1 1/2% PER MONTH SERVICE CHARGE

REMIT TO:
 P.O. BOX 191



INVOICE

of America, Inc.
 Floodgate Road, Bridgeport, NJ 08014
 Telephone: (609) 467-3636/3638
 Fax: (609) 467-4841

CUST. NO.	INVOICE DATE	INVOICE NO.
91824	10/20/99	245492

S O L D T O
 US ARMY ENGRG. DIST. ROCK ISLAND
 DISBURSING OFFICER
 CLOCK TOWER BLDG, P.O. BOX 2004
 ROCK ISLAND, IL 61204-2004

S H I P T O
 US ARMY ENGRG. DIST. ROCK ISLAND
 DISBURSING OFFICER
 CLOCK TOWER BLDG, P.O. BOX 2004
 ROCK ISLAND, IL 61204

CUSTOMER P.O. NO.	ORDERED BY	DATE ORDERED	DATE SHIPPED	GODWIN ORDER NO.	SLS. NO.	SHIPPED VIA	TERMS
DACN25-99-C-0111	JAN	10/12/99	10/12/99	011171A	063	GODWIN TRUC	CREDIT MEMO
ITEM NO	DESCRIPTION		ORD	SHIP	B/O	SELL	EXT SELL

DEERE FILTERS
 B-7125
 BF-1237
 FA-2072
 FA-2805
 CREDIT AGAINST INVOICE #244664.

4	4	4	4	4	4	4	4
POWERTECH OIL FILTER	10.83	43.320					
DEERE FUEL FILTER	17.13	68.520					
AIR FILTER	6.86	27.440					
4045T AIR FILTER	31.29	125.160					

ALL PAST DUE INVOICES ARE SUBJECT TO 1 1/2% PER MONTH SERVICE CHARGE

MERCHANDISE	LABOR	SPECIAL CHARGES	MISC. CHARGES	SUB-TOTAL
264.44				#264.440
SALES TAX				0
SHIPPING CHARGE				0

REMIT TO:



INVOICE

of America, Inc.
 Floodgate Road, Bridgeport, NJ 08014
 Telephone: (609) 467-3636/3638
 Fax: (609) 467-4841

CUST. NO.	IN L.	INVOICE NO.
91924	10/20/99	245494

S O L D T O
 US ARMY ENGRG. DIST., ROCK ISLAND
 DISBURSING OFFICER
 CLOCK TOWER BLDG, P.O. BOX 2004
 ROCK ISLAND, IL 61204-2004

S H I P T O
 US ARMY ENGRG. DIST., ROCK ISLAND
 DISBURSING OFFICER
 CLOCK TOWER BLDG, P.O. BOX 2004
 ROCK ISLAND, IL 61204

CUSTOMER P.O. NO.	ORDERED BY	DATE ORDERED	DATE SHIPPED	GODWIN ORDER NO.	SLS. NO.	SHIPPED VIA	TERMS
DACW25-99-C-0111	JAN	10/12/99	10/12/99	011171E	063	MOTOR FRT	NET 30 DAYS

ITEM NO. DESCRIPTION. -ORD- -SHIP- -B/D- -SELL- -EXT SELL

DEERE FILTER	QUANTITY	UNIT PRICE	TOTAL
B-7125 POWERTECH OIL FILTER	4	.00	.00
BF-1237 DEERE FUEL FILTER	4	.00	.00
FA-2072 AIR FILTER	4	.00	.00
FA-2805 4045T AIR FILTER	4	.00	.00

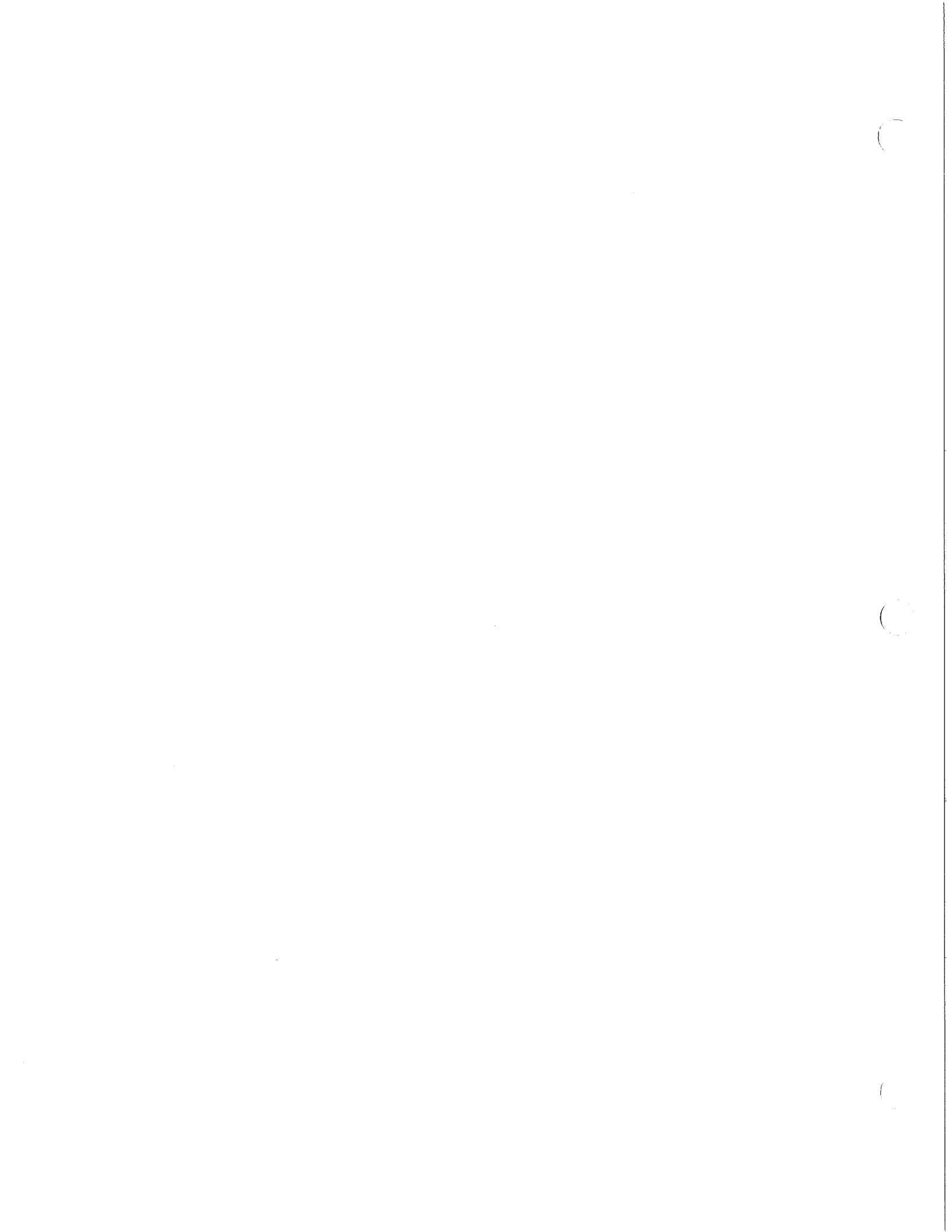
PARTS SHIPPED AT NO CHARGE.

MERCHANDISE	LABOR	SPECIAL CHARGES	MISC. CHARGES	SUB-TOTAL

ALL PAST DUE INVOICES ARE SUBJECT TO 1 1/2% PER MONTH SERVICE CHARGE

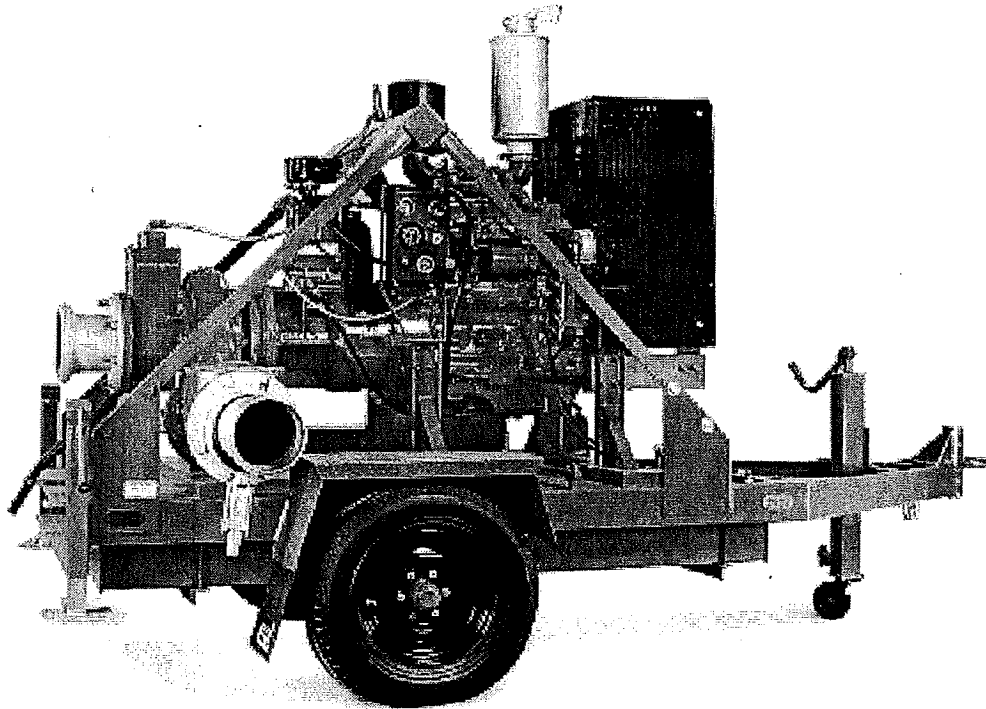
SALES TAX
 SHIPPING CHARGES
 TOTAL INVOICE \$.00

REMIT TO:
 P.O. BOX 191



CD225M Dri-Prime® Pumps

CD225M



The 8" CD225M Dri-Prime is an extremely rugged pump, capable of flow rates to 3100 gpm, total dynamic heads to 180 feet, and solids handling capabilities up to 3-1/8" in diameter. The CD225M also features the unique Godwin high pressure oil bath mechanical seal that allows for indefinite dry running, perfect for intermittent flow applications. All of these features come standard on a highly maneuverable highway trailer or compact skid for convenient use.

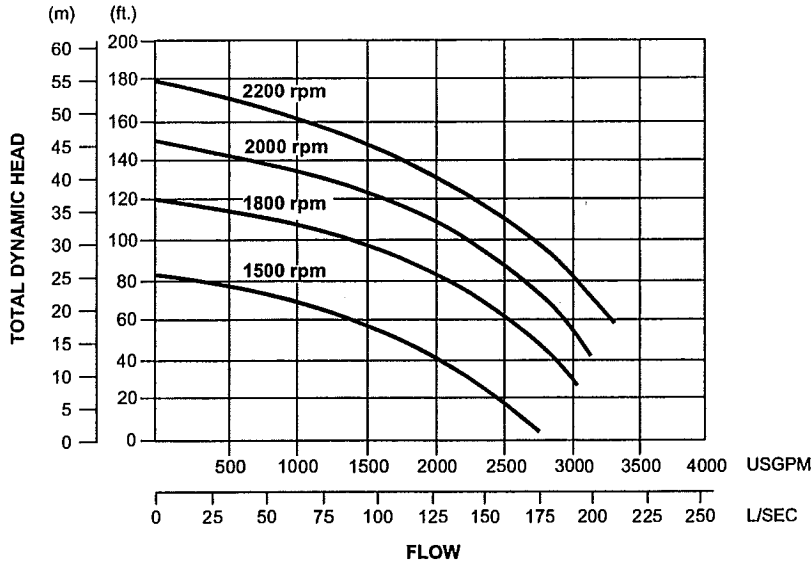
Features

- Close mounted arrangement carrying pump and vacuum priming compressor mounted to a diesel engine or electric motor.
- Pump end available in cast iron, stainless steel and other hardened materials
- Extensive application flexibility — will handle raw sewage, slurries and liquids with solids up to 3-1/8" in diameter.
- Continuously operated "Godwin" air ejector priming device requiring no form of periodic adjustment or control.
- Dry running, high pressure oil bath, mechanical seal with high abrasion resistant silicon carbide interfaces.
- Solids handling swing check Non Return Valve.
- Compact unit mounted on a skid base or two wheeled highway trailer both incorporating integral overnight running fuel tank.
- Simple maintenance — normally limited to checking engine and seal cavity oil levels.
- Standard John Deere 4045T or Caterpillar 3054TA engine. Also available with other diesel engines or electric drive motor.
- Silenced units can be supplied.
- Balanced unit with centralized lifting bracket for easy handling.

godwin
pumps



CD225M Performance Curve



Performance Table

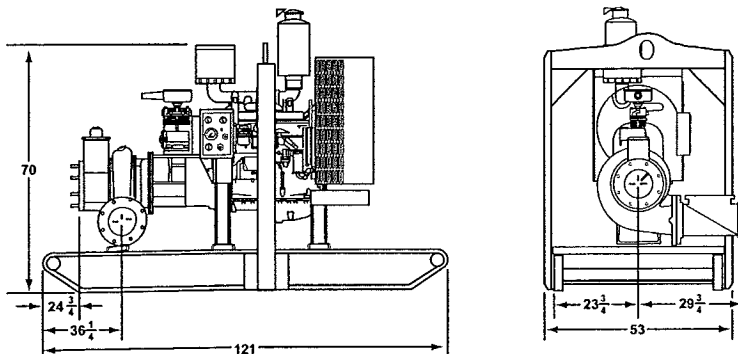
Diesel Set: John Deere 4045T, 99 hp @ 2200 rpm
Caterpillar 3054TA, 108 hp @ 2200 rpm
Impeller Diameter – 11 3/8 inches (290 mm)

Total Suction Head — Feet	Total Delivery Head — Feet			
	40	60	80	100
15	3000	2950	2640	2220
20	2700	2600	2350	2160
25	2510	2300	2110	1610

Performance data listed in table and curves based on water tests at sea level and 68° F (20° C). Larger diameter pipes may be required for maximum flows.

Dimensions

CD225M — shown with John Deere 4045T Engine, Skid Base
Weight: 4966 lbs.



All dimensions listed in inches.

Specifications

- Maximum Operating Speed:** 2200 rpm
- Maximum Operating Temperature:** +212° F (100° C)
- Maximum Working Pressure:** 78.0 psi
- Maximum Suction Pressure:** 88 psi
- Maximum Casing Pressure:** 117 psi
- Fuel Tank Capacity:** 100 gallons
- Fuel Consumption (full load & max. speed):**
John Deere: 4.9 gph @ 2200 rpm
Caterpillar 3054TA: 6.6 gph @ 2200 rpm
- Pipe Connections:** 8" ASA 150#
- Solids Handling:** 3-1/8" diameter

Materials

- Pump Casing, Suction Cover, Separation Tank and Wearplates:** Close grained cast iron
- Impeller:** Cast chromium steel hardened to minimum Brinell 341 HB
- Shaft:** 1-1/2% nickel/chromium steel
- Non Return Valve Body-Ejector Housing:** Close grained cast iron
- Non Return Valve Flapper:** High nitrile rubber
- Mechanical Seal Faces:** Solid silicon carbide

godwin
pumps

One Floodgate Road, Bridgeport, NJ 08014
Tel: (856) 467-3636 • Fax: (856) 467-4841
E-mail: sales@godwinpumps.com
www.godwinpumps.com

BRANCH LOCATIONS:

Norwich, CT • Buffalo, NY • Chicago, IL
Washington, DC • Richmond, VA • Virginia Beach, VA • Charleston, WV • N. Charleston, SC
Atlanta, GA • Houston, TX • Raleigh, NC

Dri-Prime® is a registered trademark of Godwin Pumps of America. Specifications and Illustrations are subject to revision without notice.
© Copyright 2001 Godwin Pumps of America, Inc. All rights reserved.
GPASL.018.601



77 ①

OPERATING INSTRUCTIONS AND PARTS MANUAL
PORTABLE DIESEL GENERATOR

MODELS 3ZC06A AND 4W315A

VAULT

FORM 5S3125
 03430
 1192/351/VP

READ THESE INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING TO INSTALL, OPERATE OR MAINTAIN THE PRODUCT DESCRIBED. PROTECT YOURSELF AND OTHERS BY OBSERVING ALL SAFETY INFORMATION. FAILURE TO COMPLY WITH INSTRUCTIONS COULD RESULT IN PERSONAL INJURY AND/OR PROPERTY DAMAGE! KEEP THESE INSTRUCTIONS FOR FUTURE REFERENCE.

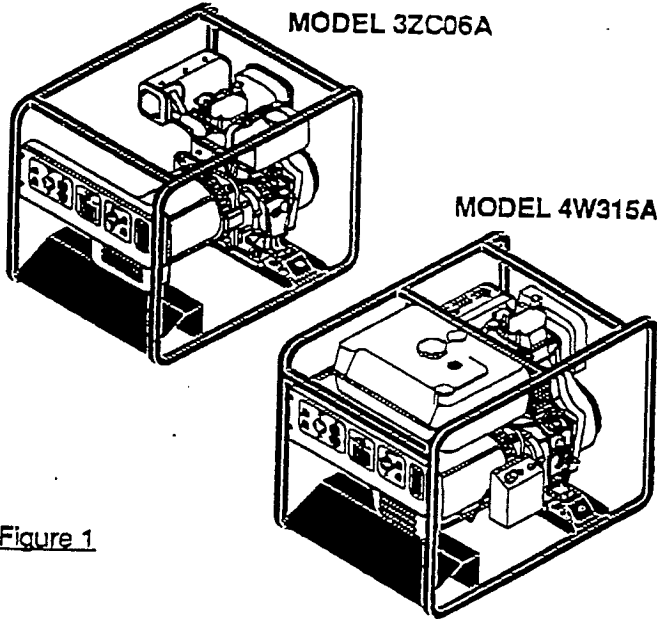


Figure 1

Description

This Dayton Professional portable generator is rugged and compact. It provides dependable, trouble-free service. The alternator is brushless with revolving fields. Yanmar diesel engine provides long life under heavy use. This engine is governed to maintain engine speed of 3600 RPM under load. 3600 RPM engine speed provides 120/240V, 60 Hz power.

This generator also includes circuit breaker protection, spark-arresting muffler, large fuel tank, oil alert system, electric starter (4W315A only), and a pressurized lubrication system.

Unpacking

1. Remove generator from carton.
2. Remove any protective packaging applied to generator for shipment.
3. Check for loose or missing parts. Check for shipping damage. If any parts are missing or damaged, promptly inform dealer where you bought generator.
4. Model 4W315A only: Battery cables are in a separate bag inside generator carton. You must install these cables to engine. See *Battery*, page 8 for installation instructions.

Table Of Contents

<u>SECTION</u>	<u>PAGE</u>
Description	1
Unpacking	1
General Safety Information	2
Warranty	4
Specifications	5
Generator Features	6
Oil Alert System	6
Battery Discharge Lamp	6
Full Power Selector Switch	6
Voltmeter	6
Electric Start	6
Receptacle Circuit Breaker	7
Spark Arrester	7
Pre-Installation	7
Engine Oil	7
Checking Oil Level and Adding Oil	7
Fuel	8
Installation	8
Battery	8
Generator Grounding	10
Ground Fault Protection	10
Extension Cords	10
Standby Installation To Home or Building	10
Operation	11
Determining Electrical Load For Generator	11
Ventilation	12
Dust, Dirt, Rain, and Snow	12
High and Low Temperature Operation	12
General Information	12
Using Receptacle	12
Power Cord and Plug Requirements	12
Prestart	13
Starting	13
High Altitude Operation	15
Adding Electrical Loads	15
Disconnecting Electrical Loads	15
Stopping Engine	15
Maintenance	16
Storage	18
Troubleshooting	19
Product Identification	21
Wiring Diagrams	22
Replacement Parts Lists	23-27

APPROVAL RECOMMENDED

A DATE 5/15/97 BY CJA

Specifications

VAULT

GENERAL SPECIFICATIONS

MODEL	YANMAR ENGINE H.P.	YANMAR MODEL	FUEL TYPE	FUEL TANK CAPACITY	OIL ALERT SYSTEM	ELECTRIC START	WEIGHT (POUNDS)
3ZC06A	6	L60	Diesel	0.9 gal.	No	No	168.5
4W315A	9 ✓	L90	Diesel ✓	4.2 gal. ✓	Yes ✓	Yes ✓	241

RECEPTACLE SPECIFICATIONS

MODEL	120V DUPLEX	120V, 30-AMP TWIST-LOCK	120/240V, 20-AMP TWIST-LOCK	120V FULL POWER SWITCH
3ZC06A	Yes	Yes	Yes	Yes
4W315A	Yes	Yes	Yes ✓	Yes ✓

ELECTRICAL SPECIFICATIONS

MODEL	RATED WATTAGE*	RATED AMPERAGE	
		120V	240V
3ZC06A	3000	25.0	12.5
4W315A	5000 ✓	41.7 ✓	20.8 ✓

* Single-phase, 1.0 power factor

ELECTRICAL COMPONENT SPECIFICATIONS

MODEL	RESISTANCE IN OHMS				CAPACITOR, MFD 450 VOLT	DIODES (2) 800 VOLT
	STATOR MAIN WINDING *	STATOR AUXILIARY WINDING Δ	ROTOR PRIMARY WINDING †	ROTOR SECONDARY WINDING †		
3ZC06A	0.71	2.17	0.54	2.07	40	70 Amp
4W315A	0.54	1.38	0.61	2.29	50	70 Amp

- (*) Connect T2 (green) and T3 (black). Measure resistance between T1 (red) and T4 (yellow).
- (Δ) Resistance between brown and white leads.
- (†) Remove diodes to check resistance.

A APPROVAL RECOMMENDED
DATE 5/15/97 BY CJA

DAYTON PORTABLE DIESEL GENERATOR MODEL 4W315

Generator Set Specs

Brand Name	Dayton Electric
Model Number	4W315
Weight (shipping)	255 lbs
Dimensions L x W x H	32" x 21.5" x 24"
Frame	1" welded steel wrap around
Vibration Isolation	yes

Engine Specs

Manufacturer	Yanmar
Rating	9 HP
Cylinder Construction	cast-iron sleeve
Low Oil Shutdown	Yes
Lubrication	pressurized
Bearing Type	ball bearings on crankshaft
Muffler	USDA Forest Service Approved spark arrest
Starting System	12 volt electric and recoil
Battery required (not included)	12V, Group U1, 31 amp minimum
Decompression Control	Yes (for easy starting)
Fuel Tank	4.2 gal
Run Time at full load	8.3 hrs
Sound Level at 23 ft & full load	85 db

Alternator Specs

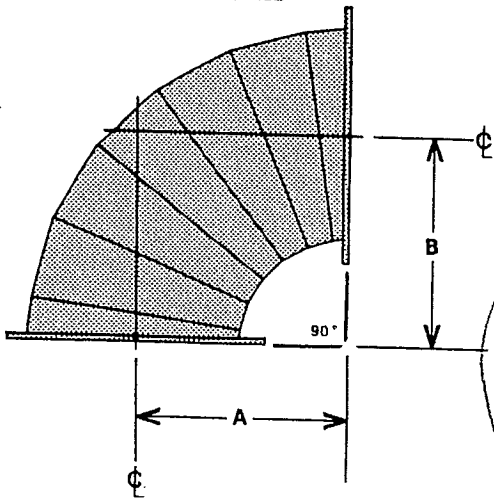
Rated Electrical Power Output	5,000 watts
Voltage Output	120/240 volts, 1 phase, 60 Hz
Field Type	brushless
Rated Current Output	41.6/20.8 amps

Control Panel

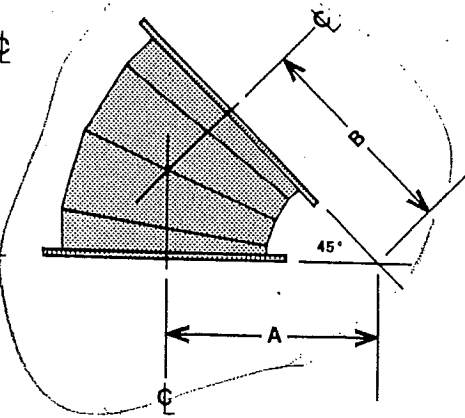
Automatic Idle Control	No
Running Time Hour Meter	Yes
Motor Starting Capability	6 HP code G capacitor start @ 240V
Output Circuit Breakers	Yes, for all receptacles
Receptacles, at 120V (qty)	(2) 15 amp GFCI NEMA 5-15R
	(2) 15 amp NEMA 5-15R
	(1) 30 amp NEMA L5-30R
Receptacles, at 240V (qty)	(1) 20 amp NEMA L1420R

M&W PUMP CORPORATION

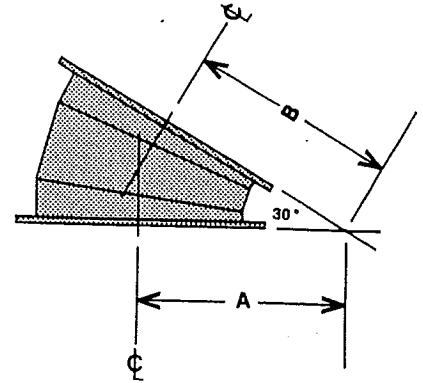
90 DEGREE



45 DEGREE



30 DEGREE

**DIMENSIONS (A=B)**

- SHORT RADIUS ELBOW — A & B DIMENSIONS = DIAMETER OF PIPE
 STANDARD RADIUS ELBOW — A & B DIMENSIONS = 1.5 x DIAMETER OF PIPE
 LONG RADIUS ELBOW — A & B DIMENSIONS = 2 x DIAMETER OF PIPE

USE NOMINAL PIPE SIZES WHEN DETERMINING PIPE DIAMETER REQUIREMENTS TO MATCH WATER PUMP DISCHARGE.

NOTES:

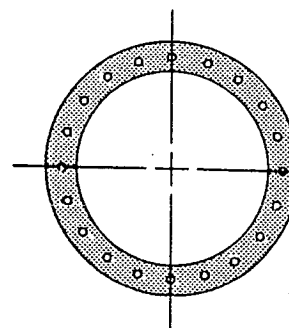
1. M&W standard drilling & diameter flanges are used on all pipe and elbows manufactured by M&W to match water pump discharge flange.
2. Wall thickness on discharge pipe depends on installation structural requirements and pressure rating considerations.
3. Smooth wall steel pipe is utilized to manufacture all mitered elbows.

OPTIONAL ELBOWS

STANDARD M&W FLANGE ARRANGEMENT

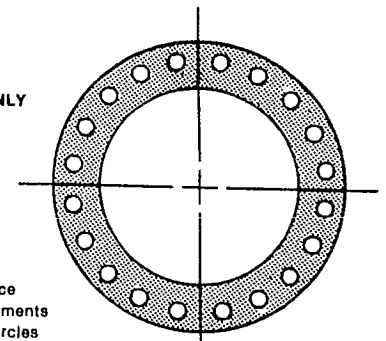
NOMINAL PIPE SIZE IN	NO. OF HOLES	DIAMETER OF HOLES	BOLT CIRCLE DIAMETER	OUTER DIAMETER
Inches		Inch	Inch	Inch
6	12	.203	8.25	9.0
8	8	.5625	10.75	12.75
12	12	.5625	14.875	16.0
16	12	.5625	19.0	20.8125
18	16	.5625	20.25	22.5
20	18	.5625	22.0	24.125
24	20	.5625	26.375	28.625
30	24	.5625	32.75	34.125
36	28	.75	40.625	43.125
42	30	.75	45.5	49.5
60	50	.81	63.0	66.13

Always position hole in direct top of flange



TYPICAL M&W STANDARD FLANGE

Positioned normally with space between two holes at top of flange



TYPICAL A.S.A. OR A.N.S.I. FLANGE

EXAMPLE ONLY

CAUTION:
 Note difference in flange arrangements (different bolt circles and hole diameters.)

OPTIONAL PIPE FLANGES

OPTIONAL:
 A.S.A. & A.N.S.I. drilling & diameter flanges are available to match customers existing pipe flange. Consult factory.

ITEM	DESCRIPTION	PART NO.	QTY.	NOTE
1	LOWER VENTURI (MAIN PUMP HOUSING)	A23615	1	
2	PROPELLER	A00515	1	
3	PROPELLER SHAFT	A09815	1	
4	PROPELLER LOCKNUT	A09715	1	
5	WEAR RING (LINER)	A03715	1	
6	BEARING SEAL PLATE WITH RESTRICTOR RING <i>6A Outer Lip Seal</i>	A07815 / E05000 JM 10635-LDS-4	1	
7	SEAL ASSEMBLY	E14400 U.S. Seal Mfg. Co. P.S. 838	1	507 WGT 152 N.York 10011
8	BEARING(S)	J03100 H007318BY6	3	
9	O-RING BEARING HOUSING MOTOR MOUNT	E01500 / / E05300	1	1
1A	BEARING HOUSING	ATTACHED TO 1B		
1B	DISTRIBUTOR BLADES	ATTACHED TO 1A		
10	MOTOR (HYD) MOUNT	A06115 BRE	1	
11	COUPLING ASSEMBLY	H07400 / H07300 / H07500	1	
12	O-RING MOTOR MOUNT HYDRAULIC MOTOR	E05300	1	1
13	HYDRAULIC MOTOR	F08040	1	
14	SPEED CONVERTER	F30020	1	3
15				
16	VENTURI EXTENSION (UPPER PUMP HOUSING)	A25115 BRE	1	
16A	GUIDE BLADES	ATTACHED TO 16		
17	PLUMBING GUARD	A44615	1	
18	VALVE (DIRECTIONAL)	G03000	1	
19	FLANGED WATER SEAL	SPECIFY (INNER DIA) SIZE		
20	INTAKE BELL	SPECIFY INTAKE ANGLE	1	2
20A	GUIDE VANES	ATTACHED TO 20 / 20B		
20B	GUIDE CONE	ATTACHED TO 20A		
20C	BAR STRAINER	ATTACHED TO 20		
21	HIGH PRESSURE (SUPPLY) QUICK COUPLER ASSEMBLY	C03810	1	
22	LOW PRESSURE (RETURN) QUICK COUPLER ASSEMBLY	C03650	1	
23	LOW PRESSURE (DRAIN) QUICK COUPLER ASSEMBLY	C00200 / C02200	1	3
24	HEAT EXCHANGER COIL (RETURN)	A600124	1	3

PART LIST NOTES

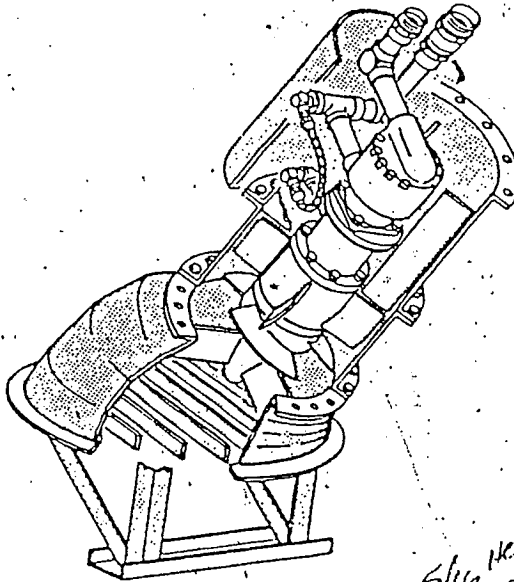
- 1 When ordering adjacent parts, examine O-ring for damage and order if required.
- 2 Intake bells are available as straight, 30°, 45° & 90° with either ring stand, U-channel stand or no stand / all come with standard bar strainer.
- 3 Due to nature of the hydraulic system used or water pump size this item may be required.
- 4 Due to the design of some hydraulic motors this accessory may be required.

GENERAL NOTES

- 1 Consult factory before replacing internal pump parts.
- 2 When requesting replacement parts from factory, provide type of pump/serial number/date built/original project name/ part number and description as above.

AXIAL FLOW PUMP DESCRIBED . . .

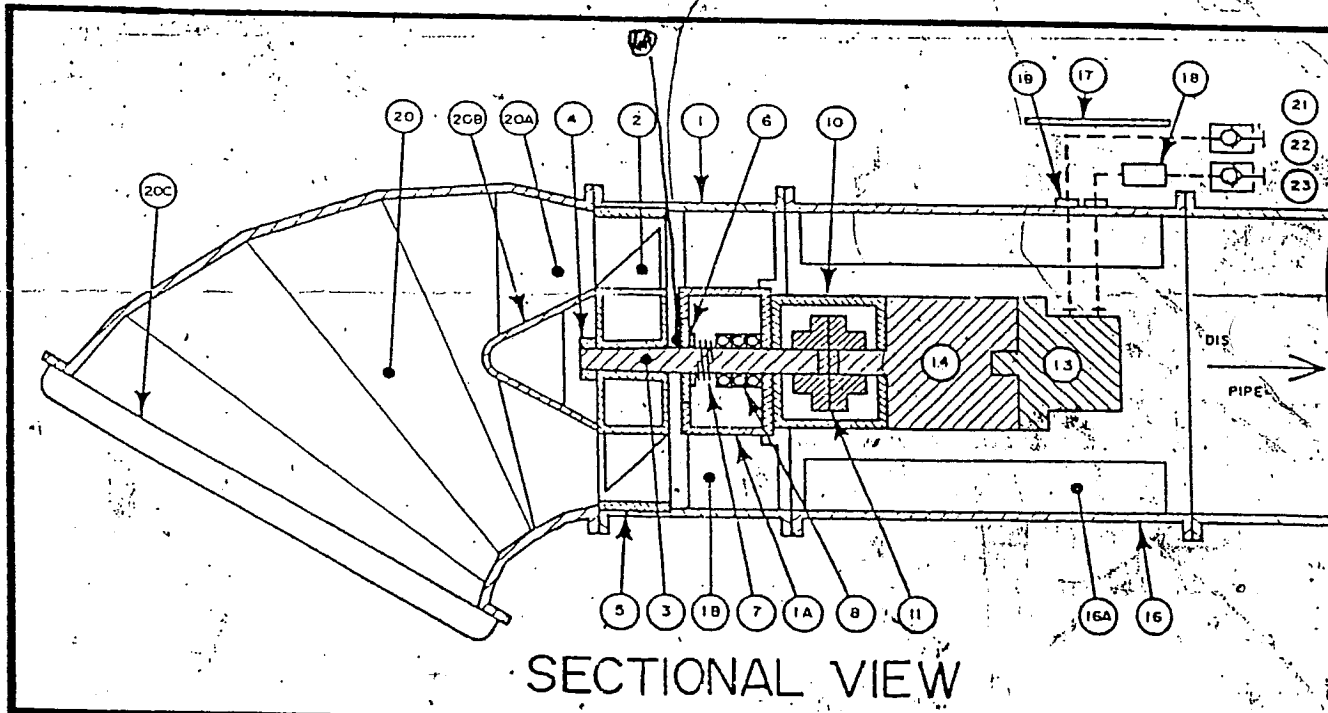
An axial flow propeller pump consists of a revolving propeller in a bowl containing stationary vanes above and below the propeller. Liquid enters the pump through the intake bell and is discharged into the distributor section and out the discharge column. The stationary vanes below and above the propeller prevent the water from whirling inside the bowl. Therefore, the flow is essentially in a straight line along the pump axis, which holds water friction to a minimum, resulting in the most efficient means yet devised for volume pumping . . . thus the name axial flow pumps.



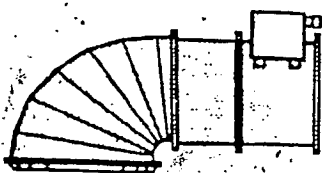
HYDRAFLO DESCRIB . . .

THE HYDRAFLO PUMP is a patented, portable, submersible axial flow propeller pump with the propeller driven through a shaft internal shaft directly connected to a hydraulic motor, all sealed with bearings operate under water. The pump has many built-in long-life features, including a corrosion/abrasion resistant propeller which runs in a replaceable stainless steel liner.

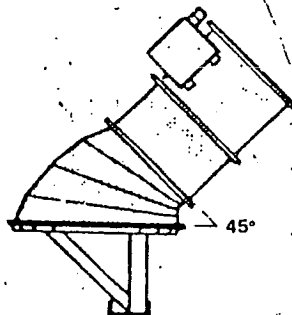
*5/16 Hex Cap screws
out put plates
TORQUE 30 FT/LBS*



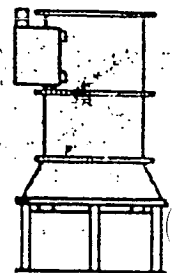
M & W Pump Corporation reserves the right to substitute any components utilized in manufacturing the basic hydraulic system due to the availability of materials or improvements (made by us). We shall, however, provide equipment equal or superior to present design, if substitutions are necessary. All hydraulic equipment utilized in the Hydraflo pump shall be considered as basic parts to the package pumping plant.



**OPTIONAL HORIZONTAL
HYDRAFLO PUMP**



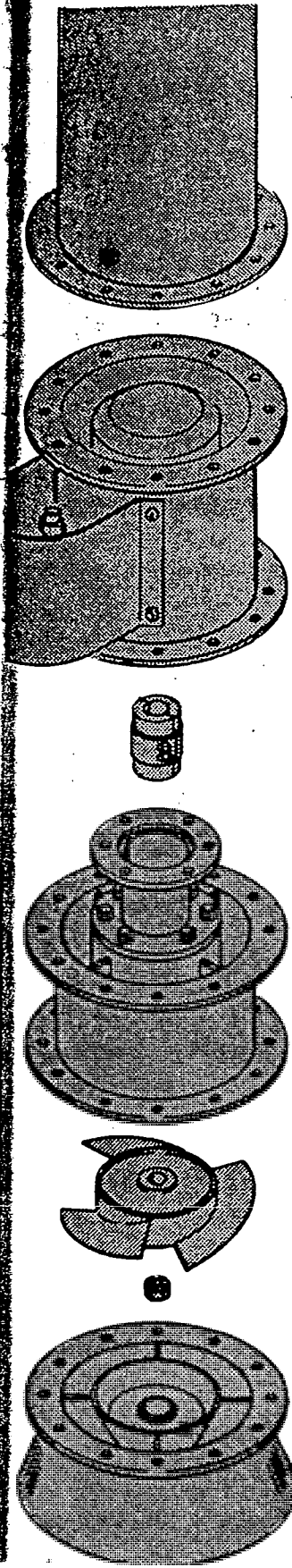
**OPTIONAL ANGLE
HYDRAFLO PUMP**



**STANDARD VERTICAL
HYDRAFLO PUMP**

PECIFICATIONS

& W PUMP CORP.



- 1. GENERAL:** Pump shall be hydraulically driven, axial flow propeller, submersible type. Pump shall be capable of delivering 14000 gpm at a maximum total dynamic head of 24 feet. Pump discharge shall be nominally 24 inches diameter and flanged. Intake diameter shall be nominally 36 inches diameter. Propeller shall be nominally 24 inches diameter. Pump shall be designed so as to provide the following features:
 - a. Versatility:** Pump shall be designed and manufactured so as to fit various pump depths within the recommended range by simply adding elbow fittings and discharge pipe. Pumps shall be capable of being "staged" for higher heads by simply bolting pumps together in series, using velocity adaptors between stages. Pump shall be suitable for operation at any angle from vertical to horizontal.
 - b. Minimum Maintenance:** Pump shall be designed so as to be self-lubricated by the hydraulic drive system. There shall be no outside lubrication required for the pumps themselves. Pump shall be variable speed and designed so that the passing water will provide cooling to hydraulic system.
- 2. PUMP SHAFT, BEARINGS, AND SEAL:** Pump shaft shall be manufactured from high tensile strength, solid stainless steel, designed in accordance with A.S.M.E. Code for transmission shafting to transmit full load torque at design speed, plus an additional safety factor for medium shock loads. The shaft shall be supported by multiple angular contact ball bearings installed so as to prevent any axial or radial movement of the shaft. All bearings shall be self-lubricated automatically by oil, and designed for 50,000 life hours of use. The bearings shall be protected by a high pressure carbon/ceramic seal, spring-loaded so that there will be no wear taking place at the point of seal contact against the shaft. The seals shall be protected by a bronze restrictor ring above the propeller to prevent sand-sized particles from reaching the seal area.
- 3. PROPELLER & LINER HOUSING:** Pump propeller blades shall be manufactured from abrasive resistant steel equivalent to AISI 316-SS. It shall be statically balanced and secured firmly to the shaft on a standard taper with key and lock nut. It shall run in a machined, replaceable, stainless steel liner. Propeller and liner shall be capable of being readily replaced in field.
- 4. HYDRAULIC MOTOR:** Pump propeller shall be driven by hydraulic motor, directly connected to pump shaft by jaw coupling. Hydraulic motor pump bearings, shaft, and coupling shall all be high pressure sealed, capable of operating completely submerged in any position from vertical to horizontal. Inlet and outlet port pipe connections shall extend from the hydraulic motor to the outside portion of pump bowl, where they will be male threaded to match female quick coupling connections from hydraulic "feeder" high pressure, and "return" low pressure flexible hoses.
- 5. HYDRAULIC HOSES:** Hydraulic hoses shall be of sufficient size to transmit required volumes of hydraulic oil at operating pressures not to exceed 2500 psi. Bursting pressure rating of hose shall be at least 5000 psi. Both "feeder" and "return" hose shall be 50 feet in length and equipped with quick coupling connections on each end.
- 6. DISCHARGE PIPE:** Smooth wall steel discharge pipe and fittings flanged on each end shall be provided. Check with M & W.

te of Test: 8/12/98

Testers: John Behrens, COE
Willie Schlotfeldt, Hutcheson Engineering

Testing Equipment: Greyline PDFill Doppler Flowmeter (Corps)
Dynasonics Doppler Acoustical Flowmeter (Hutcheson)

Benchmark Elevation (Top of Concrete of Intake Structure) = EL. 578.0
Static River Elevation in Intake Sump (Prior to Pump Test) = EL. 572.75
River Elevation in Intake Sump (During Pump Test @ 1 Hr.) = EL. 572.69
Static River Elevation in Intake Sump (After Pump Test) = EL. 572.68
Size of Discharge Pipe = 23.25", Engine Hours @ Start of Test = 1324.3
M&W Hydroflow Power Unit, Model # 2400 D.P., S/N: 5506, Date Mfr.: 9/82
Cummins Diesel, 6cyl., Model: N-855-P, 235HP @ 2100RPM, Conf. # D091327PX02, Date Mfr.: 9/81
Pump Model: HH524, S/N: 1131, Date Mfr.: 9/82

	Time (Min)									
	1	15	30	45	60	75	90	105	120	
Engine Speed (RPM)	1600	1625	1650	1650	1650	1650	1650	1650	1650	1650
Engine Oil Temp. (Deg. F)	140	170	170	170	170	170	180	180	180	180
Engine Water Temp. (Deg. F)	150	170	170	170	170	170	170	170	170	170
Engine Oil Press. (PSI)	? Gage Malfunction.	70	70	70	? Gage Malfunction.	65	? Gage Malfunction.	? Gage Malfunction.	? Gage Malfunction.	? Gage Malfunction.
Hydraulic Press. (PSI)	2150	2000	2000	2000	2000	1975	1975	1975	1975	1975
M&W Pump Flow Rate (GPM)	13,900 H 16,500 C	13,670 H 16,860 C	13,700 H 16,760 C	13,700 H 16,500 C	13,764 H 16,400 C	13,764 H 16,400 C	13,700 H 16,100 C	13,670 H 16,240 C	13,760 H 16,200 C	
H = Hutcheson Meas. C = Corps Meas.										

Notes:

1. Hydraulic Oil Temperature gauge does not work on the engine.
2. The Engine Oil Pressure gauge malfunctions periodically.
3. Engine RPM 1800, Hydraulic Pressure 2200 PSI

Flow Rates

14,200 GPM (H) with 3" Siphon Break Gate Valve Open
16,900 GPM (C) with 3" Siphon Break Gate Valve Open

11,100 GPM (H) with 3" Siphon Break Gate Valve Closed
12, 800 GPM (C) with 3" Siphon Break Gate Valve Closed

APPENDIX G

LEVEE INSPECTION REPORT

LEVEE INSPECTION REPORT

1. Name of Flood Control Works:
Princeton Refuge Habitat Rehabilitation and Enhancement Project (HREP)

2. Date/Hour Inspection Began/Ended:

3. Inspectors (Including Sponsor Representatives):
Corps Representative(s) –
Sponsor Representative(s) –

4. Inspection Procedures Followed:

5. Evaluation of Flood Control Works:

6. General Comments:

Inspector's observations and comments as follows:

RATING	ITEM	LOCATION Sta. to Sta.	REMARKS Note: R/S - Riverside L/S - Landside
--------	------	--------------------------	----------------------------------------------------

LEVEE SLOPES

Depressions

Erosion

Slope Stability

Cracking

Seepage Areas
*(Do not rate. Note areas that are
of concern during high water.)*

Animal Burrows

Unwanted Growth

Grazing

Sod

Encroachments

RATING	ITEM	LOCATION Sta. to Sta.	REMARKS Note: R/S - Riverside L/S - Landside
--------	------	--------------------------	----------------------------------------------------

LEVEE CROWN

Authorized Access Gates
(Do not rate. List gate locations.)

Three security gates located at the north, west, and south access areas

Depressions

Erosion

Cracking

Animal Burrows

Unwanted Growth

Grazing

Sod

Road Crossings
(other than those with closure structures)

Encroachments

RATING	ITEM	LOCATION Sta. to Sta.	REMARKS Note: R/S - Riverside L/S - Landside
--------	------	--------------------------	----------------------------------------------------

REVETTED AREAS

Riprap/Revetment

Unwanted Growth

Encroachments

DRAINAGE STRUCTURE(S)

Toe Drains
*(Do not rate. List stationing
and locations of drains.)*

Relief Wells

Culverts

Riprap/Revetment

Stability of Concrete Structures

Concrete Surfaces

Structural Foundations

Gates

RATING	ITEM	LOCATION Sta. to Sta.	REMARKS Note: R/S - Riverside L/S - Landside
--------	------	--------------------------	----------------------------------------------------

CHANNELS

Unwanted Growth

Stability of Concrete Structures

Concrete Surfaces

Structural Foundations

CLOSURE STRUCTURE(S)

PUMP STATION(S)
(See "Pump Station Inspection Report" in Appendix E.)

APPENDIX H

LIST OF ROCK ISLAND DISTRICT APPROVED PESTICIDES

List of Rock Island District Approved Pesticides

The below list of chemicals, by trade name, have been approved in accordance with product label restrictions on Corps properties at Coralville Lake, Lake Red Rock, Saylorville Lake, and the Mississippi River Recreation and Natural Resource Lands. It is the responsibility of each project to ensure that each pesticide is applied according to label directions and properly documented.

2,4-D 40A	Frontier	Rodeo
2,4-D LV4	Furidan 4F	Rotenone
2,4-D Amine	Fusilade	Roundup
Accent	Fusilade 4E	Roundup Pro
Accord	Fusion	Roundup Ultra
Arsenal	Garlon 3A	Saharha
Asana	Garlon 4	Salsbury Ropax Bars
Avitrol	Glyphosate	See 2,4-D
Banvel	Goal 1.6E	Select
Basagran	Harness	Sencor
Beacon	Hawk	Sevin Dust
Blazer	Hornet	Short-Stop
Boundry	Hyvar	Solicam
Broadstrike	Karmex DF	Sonar
Buctril	Kerb 50W	Spike 20P
Casaron 4G	Krenite S	Sprout-Gard-AR
ChemSurf	Lasso	Stalker
Clarity	Liberty	Stomp
Class 40A	Lorox	Sultan
Class LV4	Malathion	Surflan AS
Command	MCCP	Surpass
Counter 20CR	Millenium Ultra	Team
Crossbow	Orthene	Tempo
Cygon 400	Oust	Tree Guard
Dacthal W-75	Pathfinder	Tordon RTU
Demand CS	Pathfinder II	Touchdown
Diazanone	Pathway	Transline
Dicamba	Penduum	Treflan MTF
Diuron	Penncap M	Trimec
Dowpon	Permit	Triplet
Dual	Plateau	Tripower
Dual 25G	Poast	Triox
Dual II	Preference	Turbo
Dylox	Princep 4G	Turflon-d
Embark	Princep 80W	Vantage
Endurance	Princep Caliber 90	Vernam
Eradicane	Princep DF	Weed B-Gon
Escort	Prowl	Weedone 170
Evik	Pursuit	Weedone LV-4
Flexstar	Pyrid	Wilbur Ellis LV-4
Force	Quest	
Formula 40 2,4-D	Resource	
Fortress	Reward	

APPENDIX I

PHOTOGRAPHS OF PROJECT FEATURES

Photos 1, 2, & 3



Photos 4, 5, & 6



- Photo 1 – Southeast corner of refuge looking north at gatewell structure
- Photo 2 – Southeast corner of refuge looking north at security gate
- Photo 3 – West parking lot looking east at cross dike
- Photo 4 – South perimeter levee looking north at pump station
- Photo 5 – North perimeter levee
- Photo 6 – North perimeter levee

Photos 7, 8, & 9



Photos 10 & 11



Photo 7 – Perimeter levee looking south from pump station

Photo 8 – Cross dike looking west from pump station at concrete stoplog structure

Photo 9 – Southeast corner of refuge looking west at access road (overflow spillway)

Photo 10 – Southeast corner of refuge looking north at perimeter levee

Photo 11 – Cross dike looking west from pump station at concrete stoplog structure

Photos 12 & 13



Photos 14 & 15



Photo 16



Photo 12 – East end of cross dike looking north at gatewell structure

Photo 13 – Northwest corner of refuge looking north along railroad levee

Photo 14 – Northwest corner of refuge looking south from railroad levee

Photo 15 – East end of cross dike looking north at brush pile

Photo 16 – Southeast corner of refuge looking west from gatewell structure

Photos 17 & 18



Photos 19 & 20



Photo 20



Photos 16 to 20 – Mast tree plantings

APPENDIX J

PROJECT TEAM MEMBERS

PRINCETON HREP PROJECT TEAM MEMBERS									
POC	Position	Agency	Address	City	State	Zip Code	Telephone Number	FAX Number	Email Address
Roger Perk	Program Manager	USACE	Clock Tower Building P.O. Box 2004	Rock Island	IL	61204	309-794-5475	309-794-5710	Roger.A.Perk@usace.army.mil
Darron Niles	Technical Coordinator	USACE	Clock Tower Building P.O. Box 2004	Rock Island	IL	61204	309-794-5400	309-794-5710	Darron.L.Niles@usace.army.mil
Rachel Fellman	Project Engineer	USACE	Clock Tower Building P.O. Box 2004	Rock Island	IL	61204	309-794-5788	309-794-5698	Rachel.C.Fellman@usace.army.mil
John Behrens	Mechanical Engineer	USACE	Clock Tower Building P.O. Box 2004	Rock Island	IL	61204	309-794-5620	309-794-5698	John.T.Behrens@usace.army.mil
Charlene Carmack	Biologist	USACE	Clock Tower Building P.O. Box 2004	Rock Island	IL	61204	309-794-5570	309-794-5157	Charlene.Carmack@usace.army.mil
Ron Cover	Engineering Technician	USACE	Clock Tower Building P.O. Box 2004	Rock Island	IL	61204	309-794-5481	309-794-5698	Ronald.L.Cover@usace.army.mil
Tom Kirkeeng	Hydraulic Engineer	USACE	Clock Tower Building P.O. Box 2004	Rock Island	IL	61204	309-794-4348	309-794-5584	Thomas.A.Kirkeeng@usace.army.mil
Randy Kinney	Geotechnical Engineer	USACE	Clock Tower Building P.O. Box 2004	Rock Island	IL	61204	309-794-5483	309-794-5207	Randall.S.Kinney@usace.army.mil
Gary Swenson	Forester	USACE	Clock Tower Building P.O. Box 2004	Rock Island	IL	61204	309-794-4489	309-794-4347	Gary.V.Swenson@usace.army.mil
Nancy Holling	Report Preparer	USACE	Clock Tower Building P.O. Box 2004	Rock Island	IL	61204	309-794-5491	309-794-5710	Nancy.L.Holling@usace.army.mil
Keith Beseke	EMP Coordinator	USFWS	51 East Fourth Street Room 101	Winona	MN	55987	507-452-4232	507-452-0851	Keith_Beseke@fws.gov
Ed Britton	District Manager	USFWS	7071 Riverview Road	Thomson	IL	61285	815-273-2732	815-273-2960	Ed_Britton@fws.gov
Bob Sheets	Area Wildlife Biologist	IADNR	County Court House 201 West Platt	Maquoketa	IA	52060	563-652-3132	563-652-3909	Robert.Sheets@dnr.state.ia.us
Randy Robinson	Site Manager	IADNR	51576 Green Island Road	Miles	IA	52064	563-682-7392		Randy.Robinson@dnr.state.ia.us
Mike Griffin	Wildlife Biologist	IADNR	206 Rose Street	Bellevue	IA	52031	563-872-5700	563-872-5456	Michael.Griffin@dnr.state.ia.us
Tom Boland	Fisheries Biologist	IADNR	24143 Highway 52 R.R. 3 Box 160	Bellevue	IA	52031	563-872-4976	563-872-4945	Tom.Boland@dnr.state.ia.us

APPENDIX K

DISTRIBUTION LIST

DISTRIBUTION LIST

Mr. Robert Sheets
Maquoketa Wildlife Unit
18670 63rd St
Maquoketa, IA 52060

Mr. Randy Robinson
Site Manager
Iowa Department of Natural Resources
51576 Green Island Road
Miles, IA 52064

Mr. Mike Steuck
Natural Resources Biologist
Iowa Department of Natural Resources
24143 Highway 52
Rural Route 3 Box 160
Bellevue, IA 52031

Mr. Ed Britton
Savanna District Manager
U.S. Fish and Wildlife Service
UMR National Fish and Wildlife Refuge
7071 Riverview Road
Thomson, IL 61285

Ms. Sharonne Baylor
EMP Coordinator
U.S. Fish and Wildlife Service
UMR National Fish and Wildlife Refuge
51 East Fourth Street #101
Winona, MN 55987

Ms. Doris Bautch
Great Lakes Region Director
U.S. Department of Transportation
Maritime Administration
2860 South River Road, Suite 185
Des Plaines, IL 60018-2413

Ms. Janet Sternburg
Missouri Department of Conservation
2401 West Truman Boulevard
P.O. Box 180
Jefferson City, MO 65102-0180

Mr. Al Fenedick
U.S. Environmental Protection Agency
Environmental Analysis Section, ME-19J
77 West Jackson Boulevard
Chicago, IL 60604

Mr. George Garklavs
District Chief
U.S. Geological Survey
Water Resources Division
2280 Wooddale Drive
Mounds View, MN 55112

Ms. Linda Leake
Center Director
U.S. Geological Survey
Upper Midwest Environmental Sciences
Center
2630 Fanta Reed Road
La Crosse, WI 54601

Mr. Tim Schlagenhaft
Minnesota Department of Natural Resources
2300 Silver Creek Road NE
Rochester, MN 55906

Ms. Gretchen Benjamin
Wisconsin Department of Natural Resources
3550 Mormon Coulee Road
La Crosse, WI 54601

Ms. Holly Stoerker
Executive Director
Upper Mississippi River Basin Association
415 Hamm Building
408 Saint Peter Street
St. Paul, MN 55102

Mr. Rick Mollahan
Office of Resource Conservation
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, IL 62702-1271

Mr. Mike McGhee
Iowa Department of Natural Resources
Wallace State Office Building
Des Moines, IA 50319

Mr. Charles Wooley
Assistant Regional Director
Ecological Services
U.S. Fish and Wildlife Service
Bishop Henry Whipple Federal Building
1 Federal Drive
Fort Snelling, MN 55111

Mr. Charles Barton
U.S. Army Corps of Engineers
Mississippi Valley Division
ATTN: CEMVD-PD-SP
1400 Walnut P.O. Box 80
Vicksburg, MI 39181-0080

Mr. Owen Dutt
U.S. Army Corps of Engineers
Saint Louis District
ATTN: CEMVS-PM-N
1222 Spruce Street
St. Louis, MO 63103-2833

Mr. Donald Powell
U.S. Army Corps of Engineers
Saint Paul District
ATTN: CEMVP-PM-A
190 Fifth Street East
St. Paul, MN 55101-1638

Mr. Mike Griffin
Iowa Department of Natural Resources
206 Rose St.
Bellevue, IA 52031

Ms. Susan Smith
U.S. Army Corps of Engineers
Mississippi Valley Division
ATTN: CEMVD-PM-E
1400 Walnut P.O. Box 80
Vicksburg, MS 39181-0080

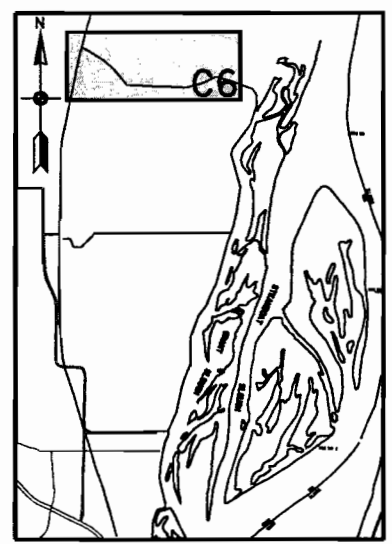
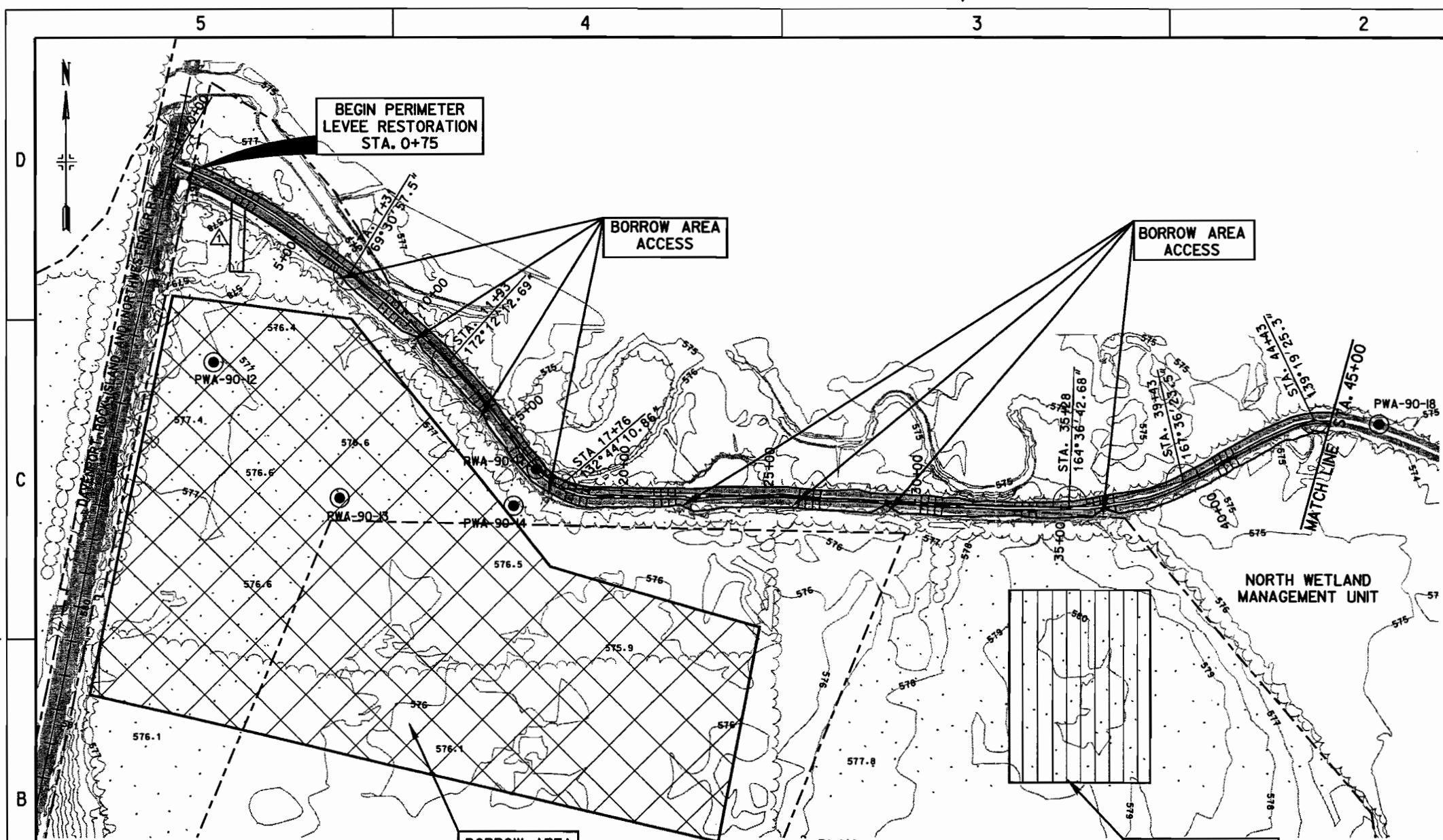
Mr. Mike Thompson
U.S. Army Corps of Engineers
Saint Louis District
ATTN: CEMVS-PM-N
1222 Spruce Street
St. Louis, MO 63103-2833

INTERNAL DISTRIBUTION:

CEMVR-PM-M (2)
CEMVR-PM-F (Niles)
CEMVR-PM-M (Perk)
CEMVR-PM-A
CEMVR-PM-A (Carmack)
CEMVR-CD
CEMVR-CD-C
CEMVR-ED
CEMVR-ED-D
CEMVR-ED-DN (2)
CEMVR-ED-DG (Fellman)
CEMVR-ED-H
CEMVR-ED-HQ
CEMVR-ED-HQ (Bierl)
CEMVR-ED-G
CEMVR-OD-M
CEMVR-OD-MN
CEMVR-OD-MN (Swenson)
CEMVR-IM-CL (2)

APPENDIX L

PLATES



KEY PLAN

LEGEND:

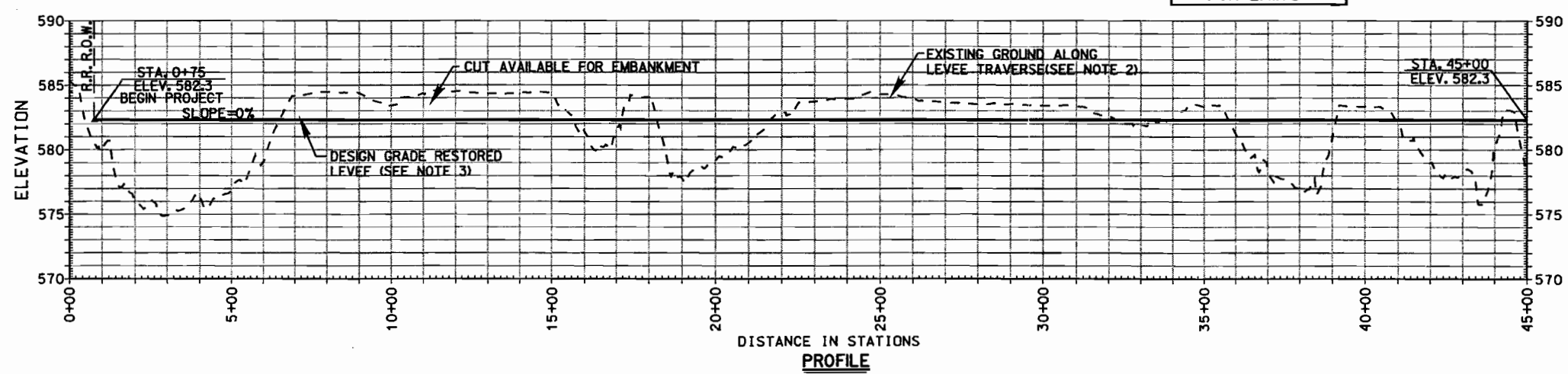
- STATE BOUNDARY
- [Cross-hatched box] BORROW AREA
- [Dotted box] STATE - OWNED LAND
- [Hatched box] CONSTRUCTION AVOIDANCE ZONE
- [Circle with dot] BORING LOCATION
PWA-90-20
- [Wavy line] TREE LINE

NOTES:

1. SEE SHEETS C12 AND C13 FOR TYPICAL LEVEE SECTIONS.
2. DUE TO MEANDERING OF THE EXISTING TRAVERSE ALIGNMENT, THE LEVEE TRAVERSE ALIGNMENT DOES NOT NECESSARILY COINCIDE WITH THE TOP OF THE LEVEE IN SOME LOCATIONS.
3. DESIGN GRADE OF RESTORED LEVEE DOES NOT INCLUDE 6-INCH OVERBUILD (SEE SPECIFICATIONS).

PLAN
200 100 0 200 400FT

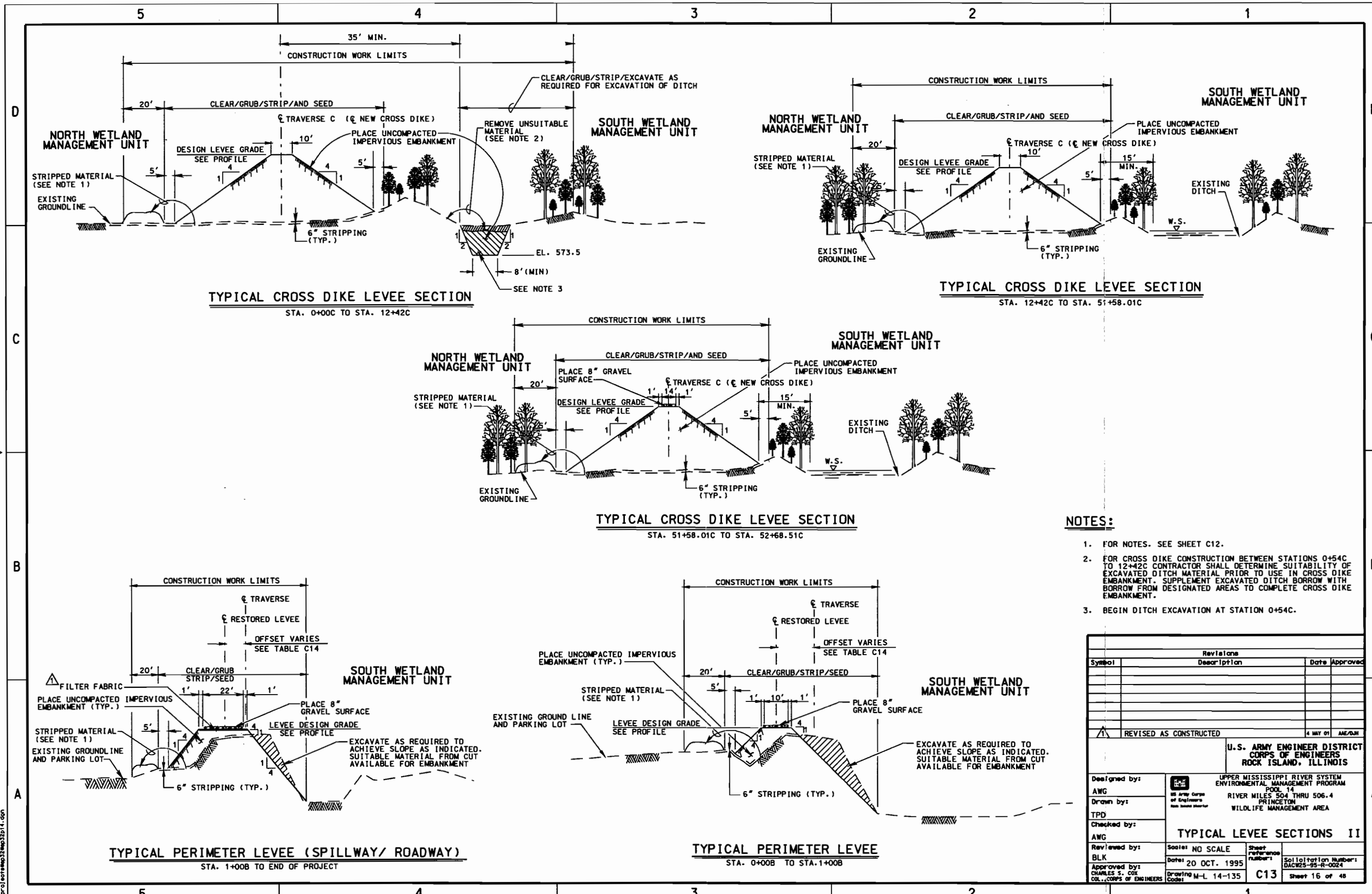
CONSTRUCTION AVOIDANCE ZONE
SEE SPECIFICATIONS FOR LIMITS



PROFILE

Revisions		
Symbol	Description	Date Approved
AS CONSTRUCTED		
4 MAY 01 AME/DAN		
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS		
Designed by: AWG	UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM POOL 14 RIVER MILES 504 THRU 506.4 PRINCETON WILDLIFE MANAGEMENT AREA PERIMETER LEVEE PLAN AND PROFILE STA. 0+00 TO STA. 45+00	
Drawn by: TPD	Scales: AS SHOWN	
Checked by: AWG	Sheet Reference Number: C6	
Reviewed by: BLK	Dates: 20 OCT. 1995	
Approved by: CHARLES S. COX COL., CORPS OF ENGINEERS	Solicitation Number: DACW25-95-R-0024	
	Drawing M-L 14-135	
	Sheet 9 of 48	

21-JUN-2002 10:05
d:\wp\of\ec1\map32\map32p07.dgn



NOTES:

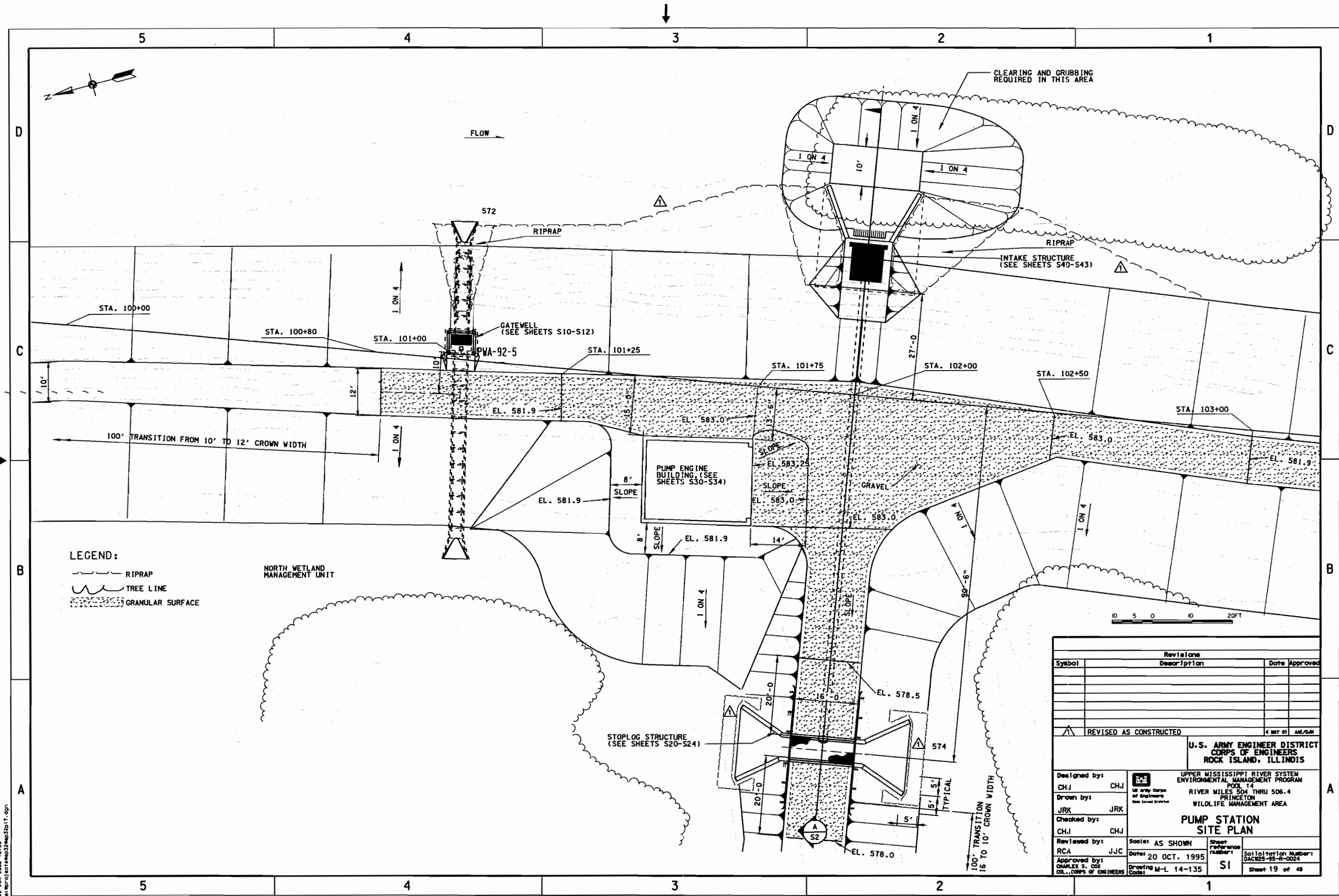
- FOR NOTES. SEE SHEET C12.
- FOR CROSS DIKE CONSTRUCTION BETWEEN STATIONS 0+54C TO 12+42C CONTRACTOR SHALL DETERMINE SUITABILITY OF EXCAVATED DITCH MATERIAL PRIOR TO USE IN CROSS DIKE EMBANKMENT. SUPPLEMENT EXCAVATED DITCH BORROW WITH BORROW FROM DESIGNATED AREAS TO COMPLETE CROSS DIKE EMBANKMENT.
- BEGIN DITCH EXCAVATION AT STATION 0+54C.

Revisions		
Symbol	Description	Date Approved
1	REVISED AS CONSTRUCTED	4 MAY 01 AEG/DM

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

Designed by: AWG	UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM POOL 14	
Drawn by: TPD	RIVER MILES 504 THRU 506.4 PRINCETON WILDLIFE MANAGEMENT AREA	
Checked by: AWG	TYPICAL LEVEE SECTIONS II	
Reviewed by: BLK	Scale: NO SCALE	Sheet reference number: C13
Approved by: CHARLES S. COX COL., CORPS OF ENGINEERS	Date: 20 OCT. 1995	Solicitation Number: DACW25-95-R-0024
	Drawing M-L 14-135	Sheet 16 of 48

21-JUN-2002 10:32
c:\pcc\soft\map32\map32p14.dgn



LEGEND:
 --- RIPRAP
 ~~~~~ TREE LINE  
 ▨ GRANULAR SURFACE

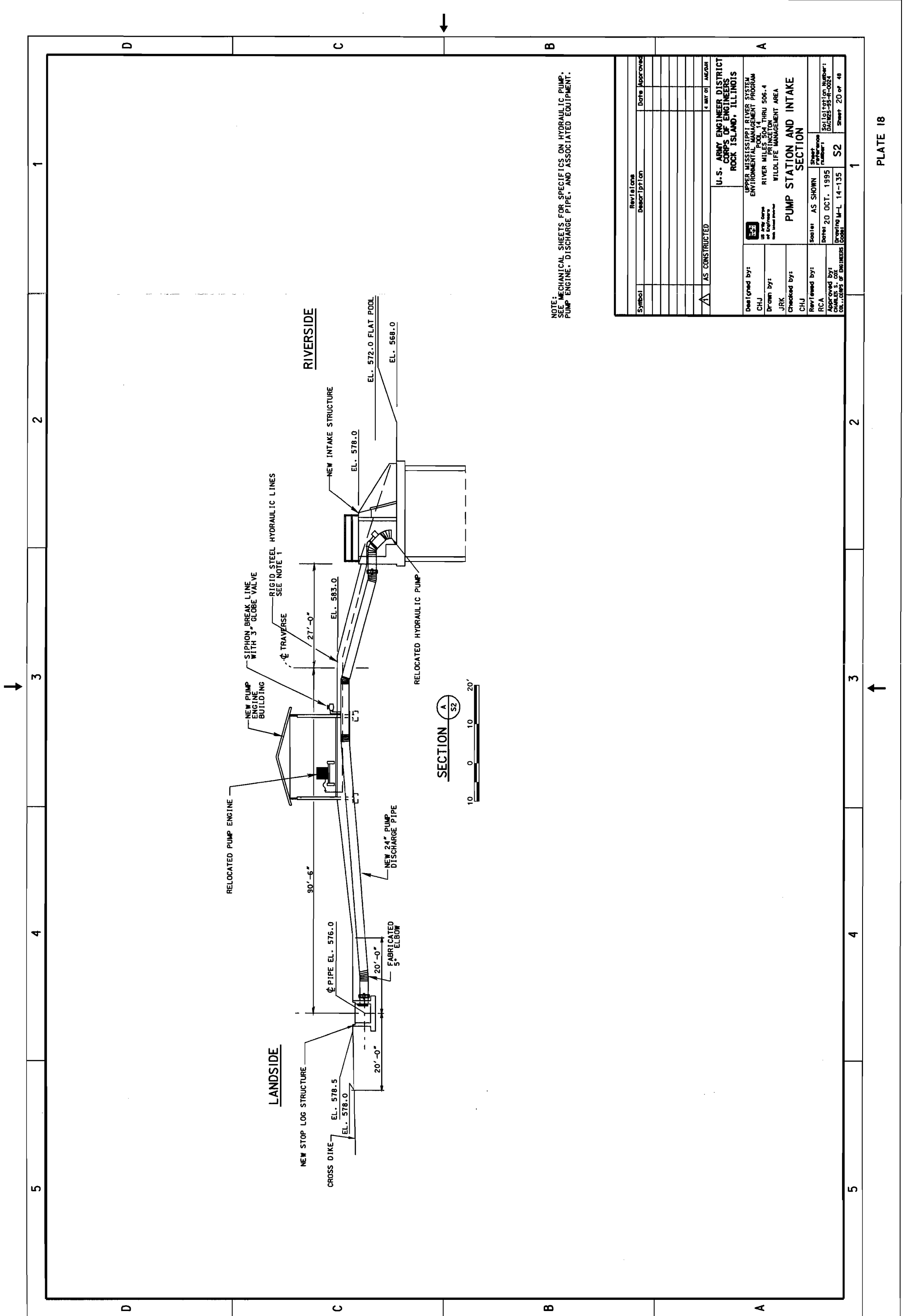
NORTH WETLAND  
 MANAGEMENT UNIT

| Revisions |                        |                  |
|-----------|------------------------|------------------|
| Symbol    | Description            | Date Approved    |
| ▲         | REVISED AS CONSTRUCTED | 4 MAY 01 ABE/DAI |

|                                                                                                                                                                    |                                                                                                                                                                                                    |                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>U.S. ARMY ENGINEER DISTRICT<br/>         CORPS OF ENGINEERS<br/>         ROCK ISLAND, ILLINOIS</b>                                                              |                                                                                                                                                                                                    |                                                                                                                                                                   |
| Designed by:<br>CHJ CHJ<br>Drawn by:<br>JRK JRK<br>Checked by:<br>CHJ CHJ<br>Reviewed by:<br>RCA JJC<br>Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS | UPPER MISSISSIPPI RIVER SYSTEM<br>ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 14<br>RIVER MILES 504 THRU 506.4<br>PRINCETON<br>WILDLIFE MANAGEMENT AREA<br><b>PUMP STATION<br/>         SITE PLAN</b> | Scale: AS SHOWN<br>Date: 20 OCT. 1995<br>Drawing M-L 14-135<br>Sheet reference number:<br><b>SI</b><br>Solicitation Number:<br>DACW25-95-R-0024<br>Sheet 19 of 48 |

25-JUN-2002 10:20  
 a:\p\01\14\135\25p32b11.dgn



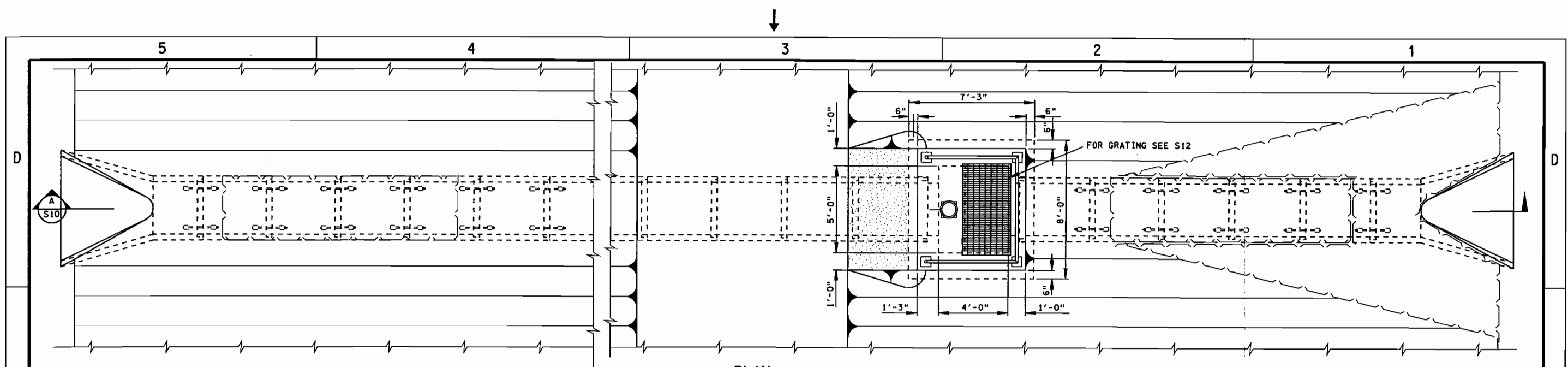
NOTE: SEE MECHANICAL SHEETS FOR SPECIFICS ON HYDRAULIC PUMP, PUMP ENGINE, DISCHARGE PIPE, AND ASSOCIATED EQUIPMENT.

| Symbol | Revisions Description | Date Approved    |
|--------|-----------------------|------------------|
| △      | AS CONSTRUCTED        | 4 MAY 01 A/E/DAR |

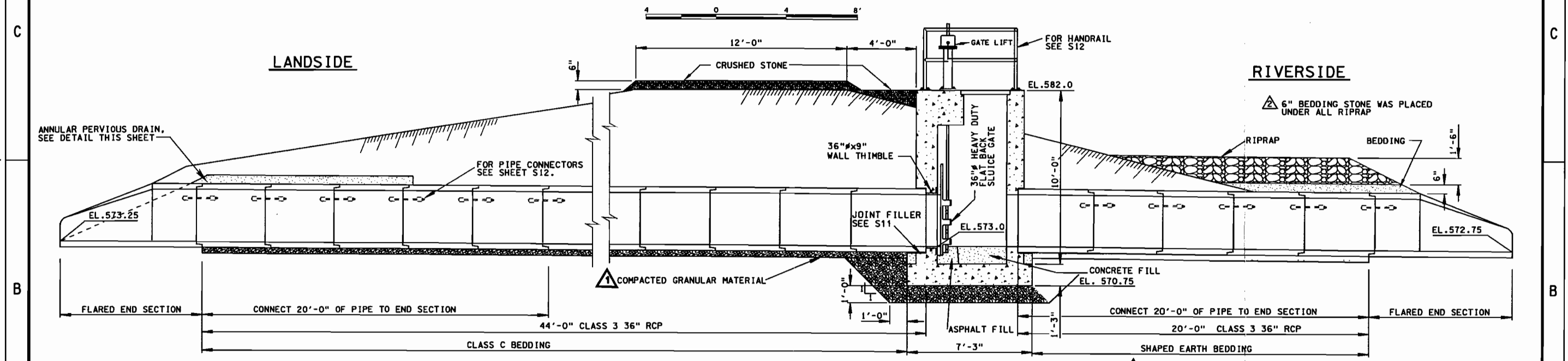
  

|                                                                            |                                                                               |
|----------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| U.S. ARMY ENGINEER DISTRICT<br>CORPS OF ENGINEERS<br>ROCK ISLAND, ILLINOIS |                                                                               |
| Designed by:<br>CHJ                                                        | UPPER MISSISSIPPI RIVER SYSTEM<br>ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 14 |
| Drawn by:<br>JRK                                                           | RIVER MILES SECTION THRU 506.4<br>WILDLIFE MANAGEMENT AREA                    |
| Checked by:<br>CHJ                                                         |                                                                               |
| Reviewed by:<br>RCA                                                        | Scale: AS SHOWN                                                               |
| Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS                 | Date: 20 OCT. 1995<br>Drawing M-L 14-135                                      |
| Sheet 20 of 48                                                             |                                                                               |

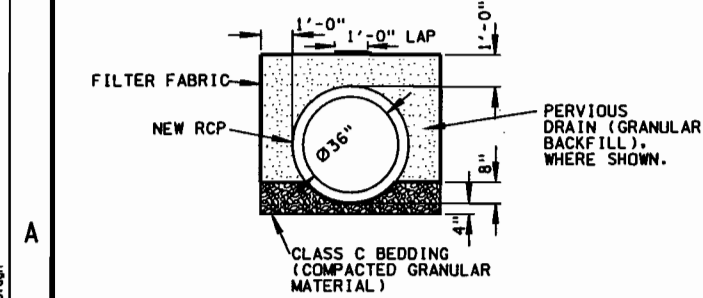




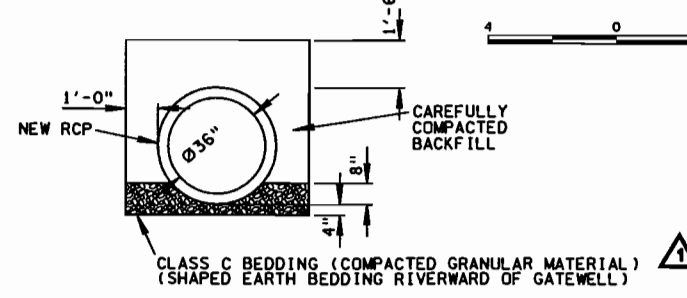
PLAN



SECTION A S10



BEDDING AND DRAIN DETAIL



BEDDING DETAIL

GATE OPERATOR NOTES:  
 SEATING HEAD = 8.5'  
 UNSEATING HEAD = 8.5'  
 OPERATING HEAD = 8.5'

- REFERENCES:
- FOR LOCATION OF GATEWELL SEE SHEET S1.
  - FOR EXISTING GRADE SEE SHEET S1.

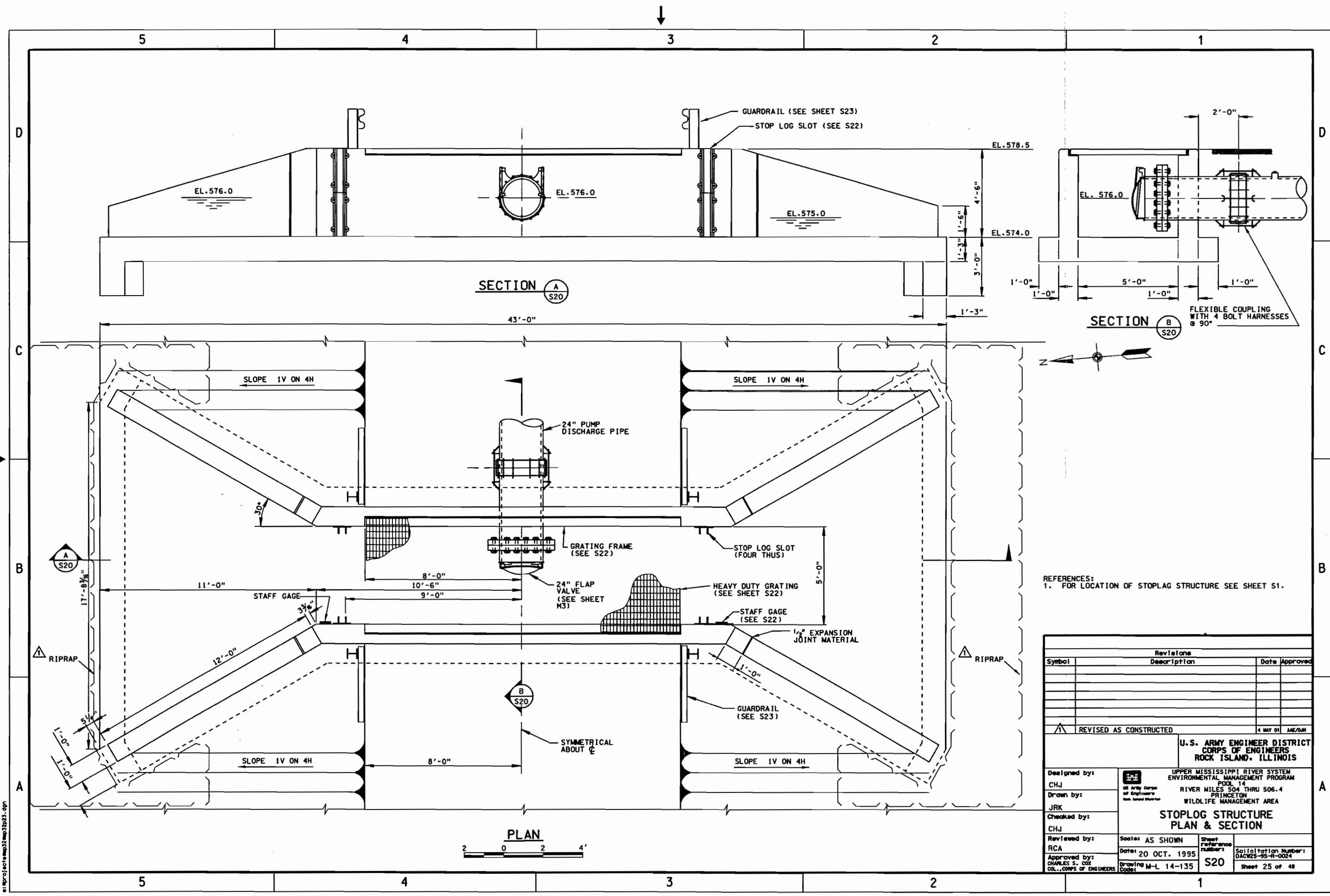
| Revisions |                                                                 |          |          |
|-----------|-----------------------------------------------------------------|----------|----------|
| Symbol    | Description                                                     | Date     | Approved |
| △         | REVISED AS CONSTRUCTED                                          | 4 MAY 01 | AME/DM   |
| △         | AMD. #1 REMOVED COMPACTED GRAVEL BEDDING RIVERWARD OF GATEWELL. | 8DEC95   |          |

|                                                                            |                                                                                                                                                      |                                        |                                          |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------------------|
| U.S. ARMY ENGINEER DISTRICT<br>CORPS OF ENGINEERS<br>ROCK ISLAND, ILLINOIS |                                                                                                                                                      |                                        |                                          |
| Designed by:<br>CHJ                                                        | UPPER MISSISSIPPI RIVER SYSTEM<br>ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 14<br>RIVER MILES 504 THRU 506.4<br>PRINCETON<br>WILDLIFE MANAGEMENT AREA | <b>GATEWELL<br/>PLAN AND ELEVATION</b> |                                          |
| Drawn by:<br>JRK                                                           |                                                                                                                                                      |                                        |                                          |
| Checked by:<br>CHJ                                                         | Scale: AS SHOWN                                                                                                                                      | Sheet reference number:<br>S10         | Solicitation Number:<br>DACW25-95-R-0024 |
| Reviewed by:<br>RCA                                                        | Date: 20 OCT. 1995                                                                                                                                   | Drawing M-L 14-135                     | Sheet 22 of 48                           |
| Approved by:<br>CHARLES S. COE<br>COL., CORPS OF ENGINEERS                 |                                                                                                                                                      |                                        |                                          |







REFERENCES:  
1. FOR LOCATION OF STOPLAG STRUCTURE SEE SHEET S1.

| Revisions |             |               |
|-----------|-------------|---------------|
| Symbol    | Description | Date Approved |
|           |             |               |
|           |             |               |
|           |             |               |
|           |             |               |
|           |             |               |
|           |             |               |
|           |             |               |
|           |             |               |
|           |             |               |

REVISAS CONSTRUCTED 4 MAY 01 ABE/DJH

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

UPPER MISSISSIPPI RIVER SYSTEM  
ENVIRONMENTAL MANAGEMENT PROGRAM  
POOL 14  
RIVER MILES 504 THRU 506.4  
PRINCETON  
WILDLIFE MANAGEMENT AREA

**STOPLOG STRUCTURE  
PLAN & SECTION**

|                                                            |                    |                                          |
|------------------------------------------------------------|--------------------|------------------------------------------|
| Designed by:<br>CHJ                                        | Scale: AS SHOWN    | Sheet<br>Reference<br>Number:<br>S20     |
| Drawn by:<br>JRK                                           | Date: 20 OCT. 1995 | Solicitation Number:<br>DACW25-95-R-0024 |
| Checked by:<br>CHJ                                         | Drawing M-L 14-135 | Sheet 25 of 48                           |
| Reviewed by:<br>RCA                                        |                    |                                          |
| Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS |                    |                                          |

21-JUN-2002 10:45  
c:\p\proj\comp\2p3\2p3.dgn













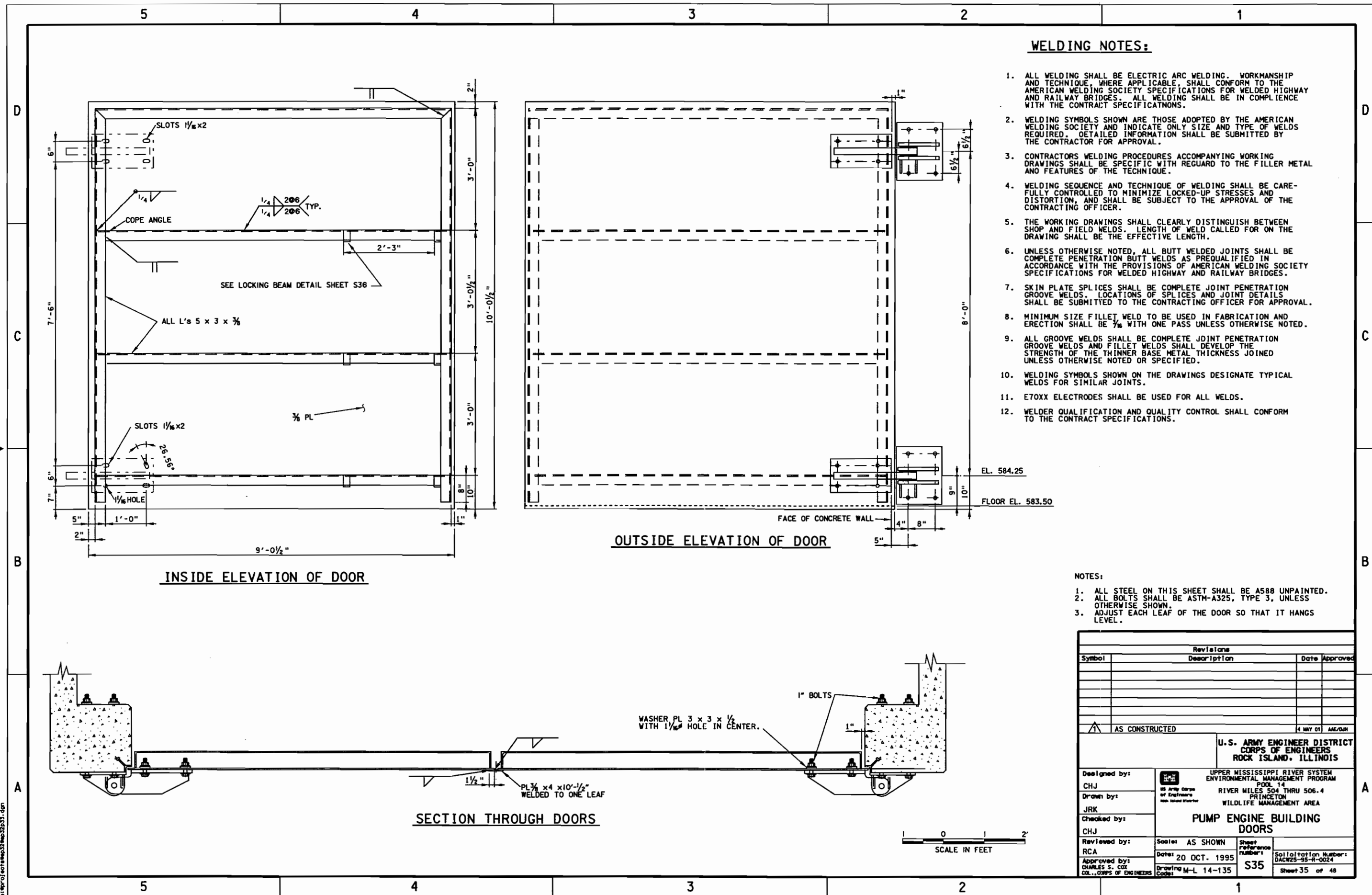












**WELDING NOTES:**

1. ALL WELDING SHALL BE ELECTRIC ARC WELDING. WORKMANSHIP AND TECHNIQUE, WHERE APPLICABLE, SHALL CONFORM TO THE AMERICAN WELDING SOCIETY SPECIFICATIONS FOR WELDED HIGHWAY AND RAILWAY BRIDGES. ALL WELDING SHALL BE IN COMPLIANCE WITH THE CONTRACT SPECIFICATIONS.
2. WELDING SYMBOLS SHOWN ARE THOSE ADOPTED BY THE AMERICAN WELDING SOCIETY AND INDICATE ONLY SIZE AND TYPE OF WELDS REQUIRED. DETAILED INFORMATION SHALL BE SUBMITTED BY THE CONTRACTOR FOR APPROVAL.
3. CONTRACTOR'S WELDING PROCEDURES ACCOMPANYING WORKING DRAWINGS SHALL BE SPECIFIC WITH REGARD TO THE FILLER METAL AND FEATURES OF THE TECHNIQUE.
4. WELDING SEQUENCE AND TECHNIQUE OF WELDING SHALL BE CAREFULLY CONTROLLED TO MINIMIZE LOCKED-UP STRESSES AND DISTORTION, AND SHALL BE SUBJECT TO THE APPROVAL OF THE CONTRACTING OFFICER.
5. THE WORKING DRAWINGS SHALL CLEARLY DISTINGUISH BETWEEN SHOP AND FIELD WELDS. LENGTH OF WELD CALLED FOR ON THE DRAWING SHALL BE THE EFFECTIVE LENGTH.
6. UNLESS OTHERWISE NOTED, ALL BUTT WELDED JOINTS SHALL BE COMPLETE PENETRATION BUTT WELDS AS PREQUALIFIED IN ACCORDANCE WITH THE PROVISIONS OF AMERICAN WELDING SOCIETY SPECIFICATIONS FOR WELDED HIGHWAY AND RAILWAY BRIDGES.
7. SKIN PLATE SPLICES SHALL BE COMPLETE JOINT PENETRATION GROOVE WELDS. LOCATIONS OF SPLICES AND JOINT DETAILS SHALL BE SUBMITTED TO THE CONTRACTING OFFICER FOR APPROVAL.
8. MINIMUM SIZE FILLET WELD TO BE USED IN FABRICATION AND ERECTION SHALL BE 3/16" WITH ONE PASS UNLESS OTHERWISE NOTED.
9. ALL GROOVE WELDS SHALL BE COMPLETE JOINT PENETRATION GROOVE WELDS AND FILLET WELDS SHALL DEVELOP THE STRENGTH OF THE THINNER BASE METAL THICKNESS JOINED UNLESS OTHERWISE NOTED OR SPECIFIED.
10. WELDING SYMBOLS SHOWN ON THE DRAWINGS DESIGNATE TYPICAL WELDS FOR SIMILAR JOINTS.
11. E70XX ELECTRODES SHALL BE USED FOR ALL WELDS.
12. WELDER QUALIFICATION AND QUALITY CONTROL SHALL CONFORM TO THE CONTRACT SPECIFICATIONS.

**NOTES:**

1. ALL STEEL ON THIS SHEET SHALL BE A588 UNPAINTED.
2. ALL BOLTS SHALL BE ASTM-A325, TYPE 3, UNLESS OTHERWISE SHOWN.
3. ADJUST EACH LEAF OF THE DOOR SO THAT IT HANGS LEVEL.

| Revisions      |             |          |          |
|----------------|-------------|----------|----------|
| Symbol         | Description | Date     | Approved |
|                |             |          |          |
|                |             |          |          |
|                |             |          |          |
|                |             |          |          |
| AS CONSTRUCTED |             | 4 MAY 01 | AME/DJH  |

|                                                                                                                                                      |                                                             |                                       |                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|---------------------------------------|------------------------------------------------------------|
| <b>U.S. ARMY ENGINEER DISTRICT<br/>CORPS OF ENGINEERS<br/>ROCK ISLAND, ILLINOIS</b>                                                                  |                                                             |                                       |                                                            |
| UPPER MISSISSIPPI RIVER SYSTEM<br>ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 14<br>RIVER MILES 504 THRU 506.4<br>PRINCETON<br>WILDLIFE MANAGEMENT AREA |                                                             |                                       |                                                            |
| Designed by:<br>CHJ<br>Drawn by:<br>JRK<br>Checked by:<br>CHJ                                                                                        | <b>PUMP ENGINE BUILDING<br/>DOORS</b>                       |                                       |                                                            |
| Reviewed by:<br>RCA<br>Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS                                                                    | Scale: AS SHOWN<br>Date: 20 OCT. 1995<br>Drawing M-L 14-135 | Sheet Reference Number:<br><b>S35</b> | Solicitation Number:<br>DACW25-95-R-0024<br>Sheet 35 of 48 |

21-JUL-2002 10:47  
s:\proj\act\emp\3p33.dgn



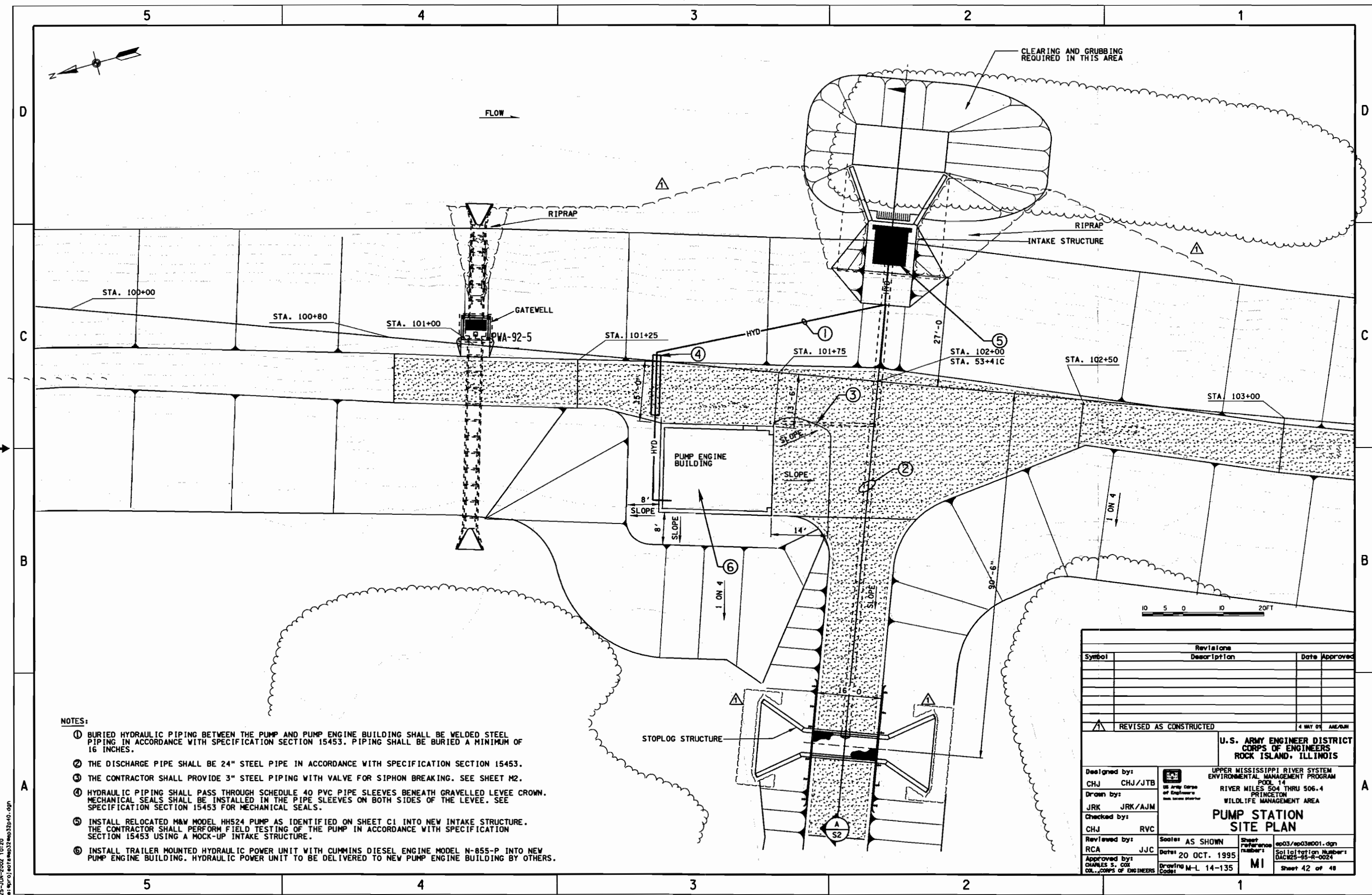












- NOTES:**
- ① BURIED HYDRAULIC PIPING BETWEEN THE PUMP AND PUMP ENGINE BUILDING SHALL BE WELDED STEEL PIPING IN ACCORDANCE WITH SPECIFICATION SECTION 15453. PIPING SHALL BE BURIED A MINIMUM OF 16 INCHES.
  - ② THE DISCHARGE PIPE SHALL BE 24" STEEL PIPE IN ACCORDANCE WITH SPECIFICATION SECTION 15453.
  - ③ THE CONTRACTOR SHALL PROVIDE 3" STEEL PIPING WITH VALVE FOR SIPHON BREAKING. SEE SHEET M2.
  - ④ HYDRAULIC PIPING SHALL PASS THROUGH SCHEDULE 40 PVC PIPE SLEEVES BENEATH GRAVELLED LEVEE CROWN. MECHANICAL SEALS SHALL BE INSTALLED IN THE PIPE SLEEVES ON BOTH SIDES OF THE LEVEE. SEE SPECIFICATION SECTION 15453 FOR MECHANICAL SEALS.
  - ⑤ INSTALL RELOCATED M&W MODEL HH524 PUMP AS IDENTIFIED ON SHEET C1 INTO NEW INTAKE STRUCTURE. THE CONTRACTOR SHALL PERFORM FIELD TESTING OF THE PUMP IN ACCORDANCE WITH SPECIFICATION SECTION 15453 USING A MOCK-UP INTAKE STRUCTURE.
  - ⑥ INSTALL TRAILER MOUNTED HYDRAULIC POWER UNIT WITH CUMMINS DIESEL ENGINE MODEL N-855-P INTO NEW PUMP ENGINE BUILDING. HYDRAULIC POWER UNIT TO BE DELIVERED TO NEW PUMP ENGINE BUILDING BY OTHERS.

| Revisions |                        | Date Approved |        |
|-----------|------------------------|---------------|--------|
| Symbol    | Description            |               |        |
| ▲         | REVISED AS CONSTRUCTED | 4 MAY 01      | AME/BN |

|                                                            |  |                                                                                                                                                      |                                           |
|------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| Designed by:<br>CHJ CHJ/JTB                                |  | UPPER MISSISSIPPI RIVER SYSTEM<br>ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 14<br>RIVER MILES 504 THRU 506.4<br>PRINCETON<br>WILDLIFE MANAGEMENT AREA |                                           |
| Drawn by:<br>JRK JRK/AJM                                   |  | <b>PUMP STATION<br/>SITE PLAN</b>                                                                                                                    |                                           |
| Checked by:<br>CHJ RVC                                     |  | Scale: AS SHOWN                                                                                                                                      | Sheet Reference Number: ep03/ep03m001.dgn |
| Reviewed by:<br>RCA JJC                                    |  | Date: 20 OCT. 1995                                                                                                                                   | Solicitation Number: DACW25-95-R-0024     |
| Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS |  | Drawing M-L 14-135                                                                                                                                   | MI<br>Sheet 42 of 48                      |

25-JUN-2002 10:20  
e:\ep03\m03\ep03m001.dgn



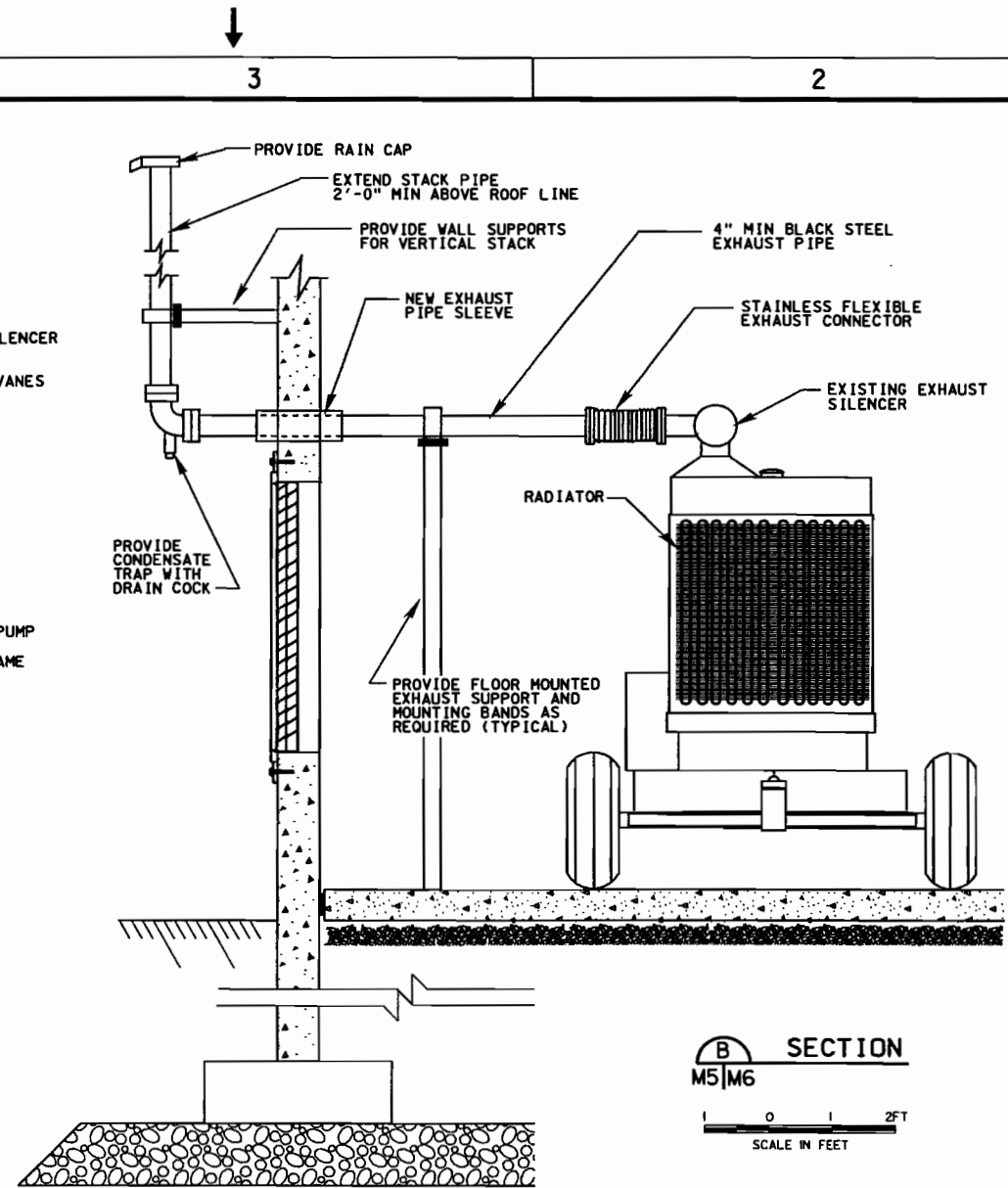




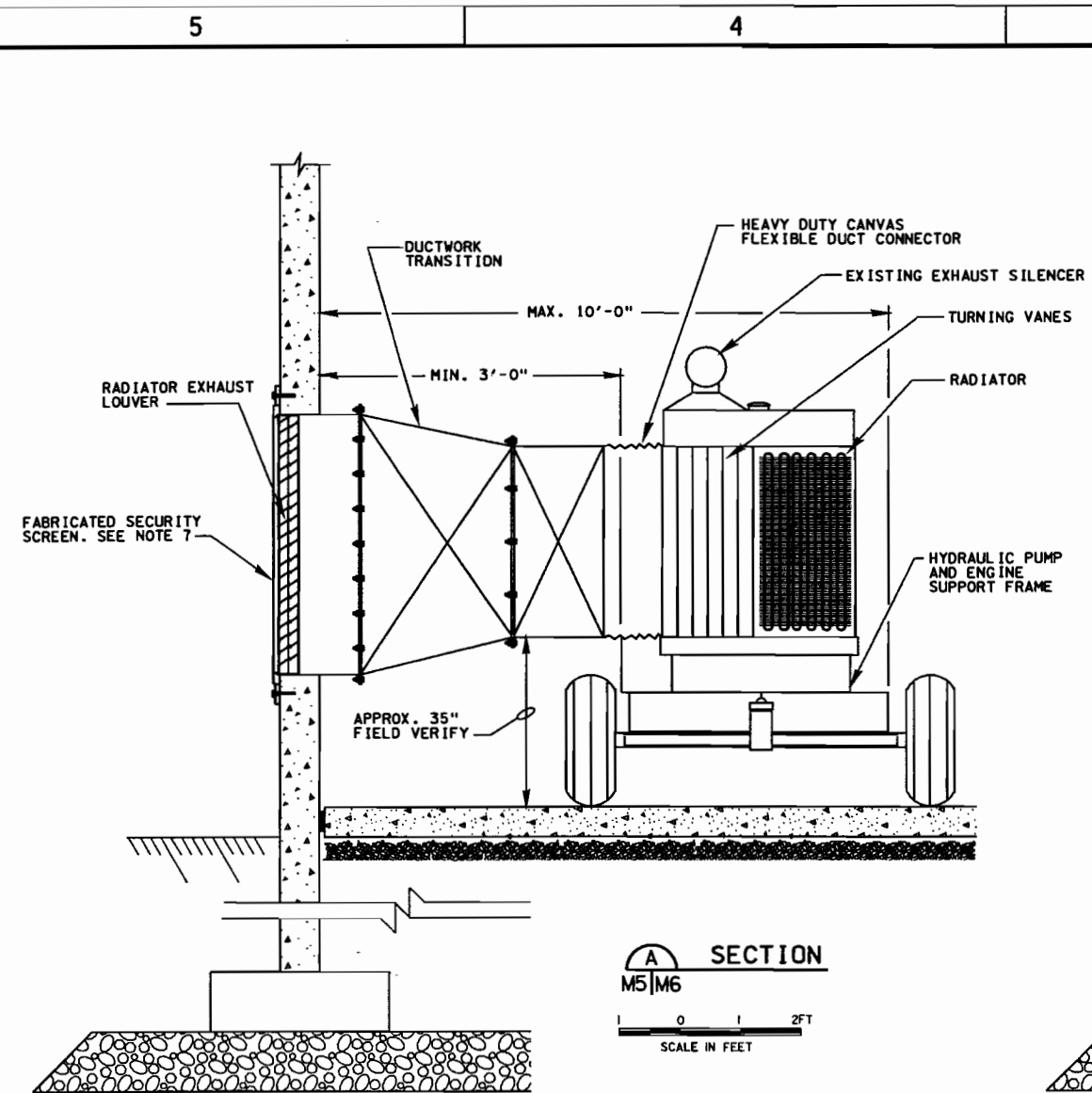




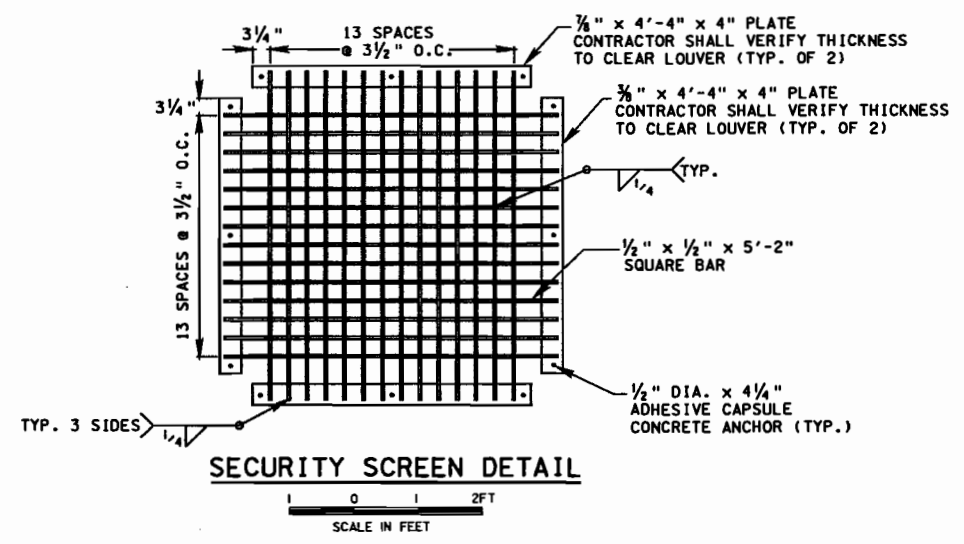
- NOTES:**
1. ALL DUCTWORK SHALL BE 24 GAUGE GALVANIZED STEEL.
  2. ALL DUCTWORK SHALL BE SUPPORTED BY STRUCTURAL STEEL MEMBERS BOLTED TO CONCRETE FLOOR.
  3. PROVIDE AN EXHAUST PIPE SLEEVE AT PENETRATION THROUGH WALL FOR EXHAUST PIPE.
  4. TRAILER AND HYDRAULIC POWER UNIT SHALL BE CAPABLE OF BEING REMOVED FROM BUILDING WITH THE DISCONNECTION OF ALL FLEXIBLE CONNECTIONS.
  5. CONTRACTOR SHALL PROVIDE ALL NECESSARY HANGARS AND SUPPORTS TO SUPPORT DUCTWORK AND FUEL PIPING WHEN TRAILER IS REMOVED.
  6. EXHAUST PIPING AND ACCESSORIES SHALL BE ALL NEW FROM SILENCER TO RAIN CAP.
  7. THE CONTRACTOR SHALL FABRICATE AND INSTALL A HEAVY DUTY PAINTED STEEL SECURITY SCREEN FASTENED TO THE CONCRETE WALL. SEE SECURITY SCREEN DETAIL THIS SHEET.
  8. ALL SCREEN ANCHORS TO BE GALVANIZED.
  9. ADHESIVE CAPSULE CONCRETE SCREEN ANCHORS SHALL HAVE THE FOLLOWING PROPERTIES:  
 ADHESIVE - VINYLESTER RESIN WITH DIBENZOYL PEROXIDE HARDENER  
 THREADED ROD - ASTM A36  
 NUT - ASTM A536, GRADE A  
 WASHER - ANSI B18.22.1 TYPE A PLAIN  
 DIAMETER - 1/2"  
 EMBEDMENT DEPTH - 4"  
 BOND STRENGTH TENSILE LOAD - 3330 LB (4000 PSI CONCRETE)  
 ANCHOR ROD ALLOWABLE LOADS  
 TENSILE - 2840 LB      SHEAR - 2090 LB



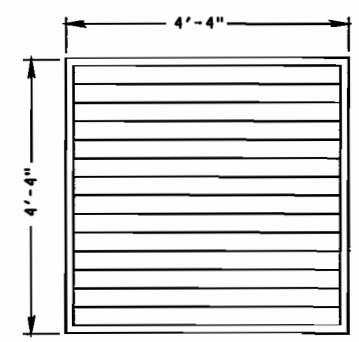
**SECTION B**  
M5/M6  
SCALE IN FEET



**SECTION A**  
M5/M6  
SCALE IN FEET



**SECURITY SCREEN DETAIL**  
SCALE IN FEET



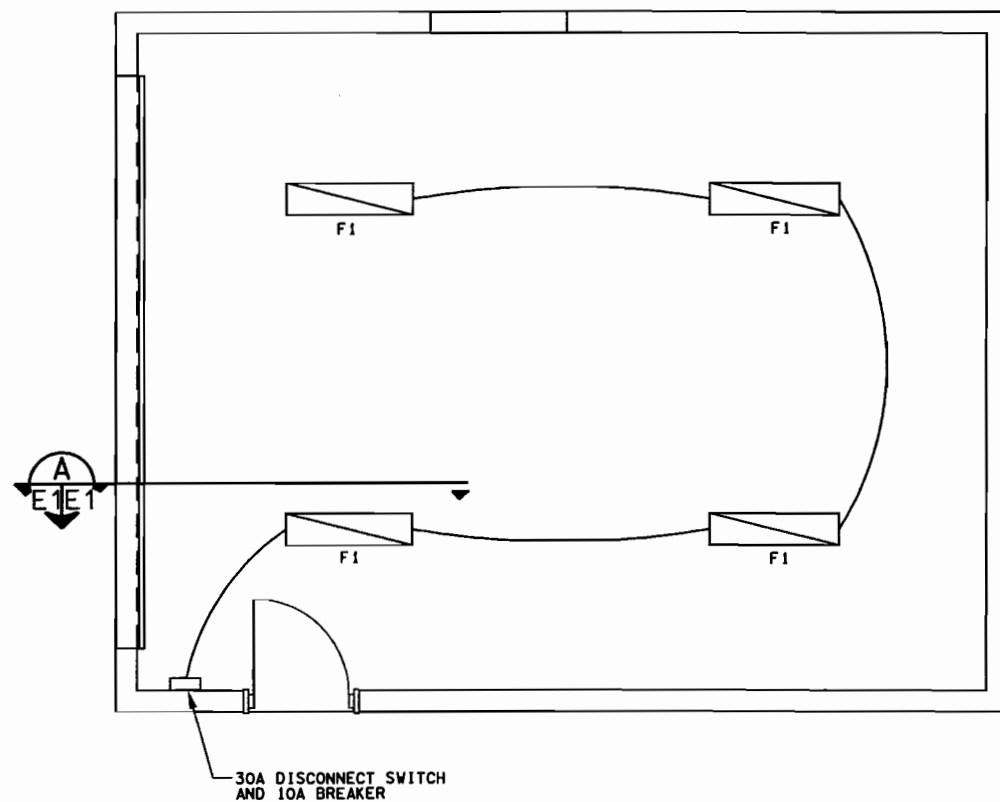
**RADIATOR EXHAUST LOUVER**  
RADIATOR EXHAUST LOUVER SHALL BE 52" X 52" WITH A MINIMUM FREE AREA OF 10.5 SQ. FT.. LOUVER SHALL BE 16 GAUGE GALVANIZED STEEL WITH INSECT SCREEN.

| Revisions |                |          |          |
|-----------|----------------|----------|----------|
| Symbol    | Description    | Date     | Approved |
| 1         | AS CONSTRUCTED | 4 MAY 01 | ME/DM    |

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

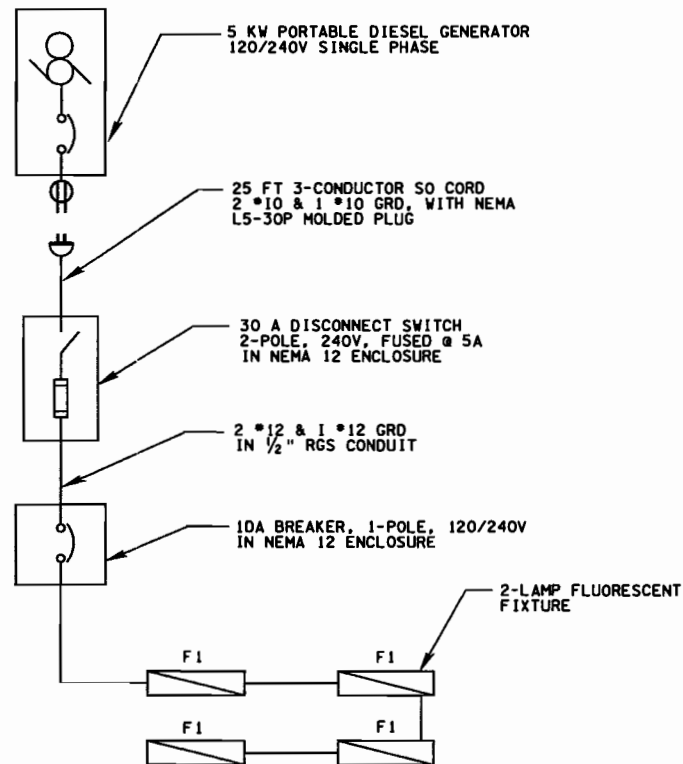
|                                                            |                                                                                                                                                      |                                                   |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Designed by:<br>CHJ JTB                                    | UPPER MISSISSIPPI RIVER SYSTEM<br>ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 14<br>RIVER MILES 504 THRU 506.4<br>PRINCETON<br>WILDLIFE MANAGEMENT AREA | <b>ENGINE VENTILATION<br/>AND EXHAUST DETAILS</b> |
| Drawn by:<br>JRK AJM                                       |                                                                                                                                                      |                                                   |
| Checked by:<br>CHJ RVC                                     | Scale: AS SHOWN                                                                                                                                      | Sheet Reference Number: ep03/ep03m06.dgn          |
| Reviewed by:<br>RCA JJC                                    | Date: 20 OCT. 1995                                                                                                                                   | Solicitation Number: DACW25-95-R-0024             |
| Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS | Drawing Code: M-L 14-135                                                                                                                             | Sheet 47 of 48                                    |

21-JUN-2002 10:55  
a:\ep03\ep03m06\ep03m06.dgn



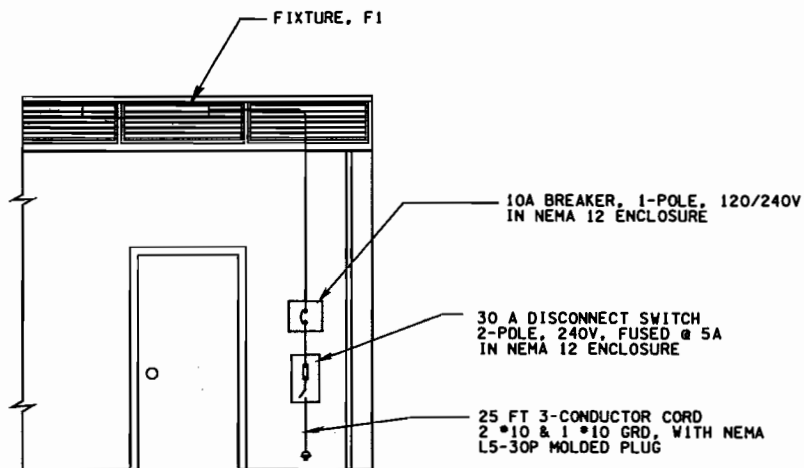
**ELECTRICAL POWER PLAN**

SCALE IN FEET



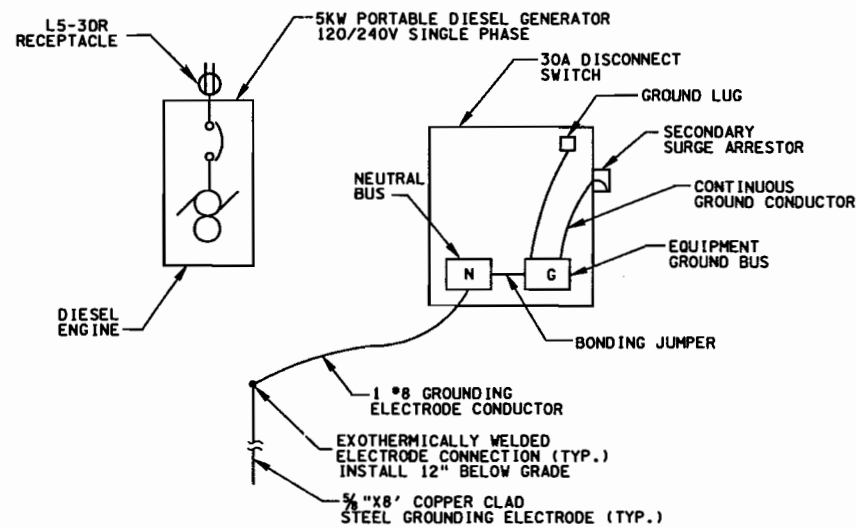
**ELECTRICAL ONE-LINE DIAGRAM**

NO SCALE



**SECTION A-A**

SCALE IN FEET



**ELECTRICAL GROUNDING SYSTEM DETAIL**

NO SCALE

**NOTES:**

1. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS, ALL DIMENSIONS, EQUIPMENT LOCATIONS AND SIZES.
2. MOUNT LIGHT FIXTURE, F1, TO BOTTOM OF WOOD TRUSS, APPROXIMATELY 12 FT. ABOVE FINISH FLOOR.
3. CONDUCTORS FOR LIGHTING CIRCUIT SHALL CONSIST OF 2-#12 AND 1-#12 GRD IN 1/2" RGS CONDUIT.
4. ELECTRICAL COMPONENTS SHALL HAVE A MINIMUM INTERRUPTING CAPACITY OF 10,000AMP SYMMETRICAL.
5. FOR PUMP STATION SITE PLAN, SEE SHEET S1.
6. FOR PUMP ENGINE BUILDING FRAMING DETAILS, SEE SHEET S30.

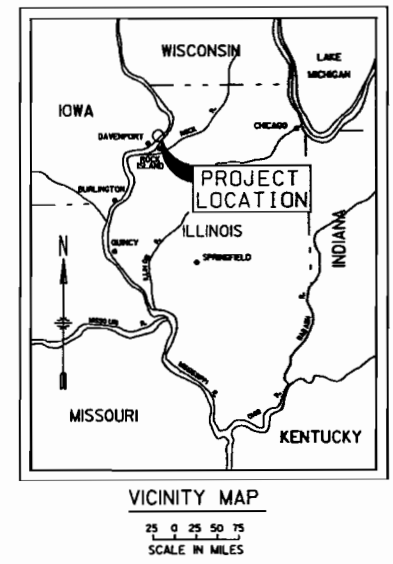
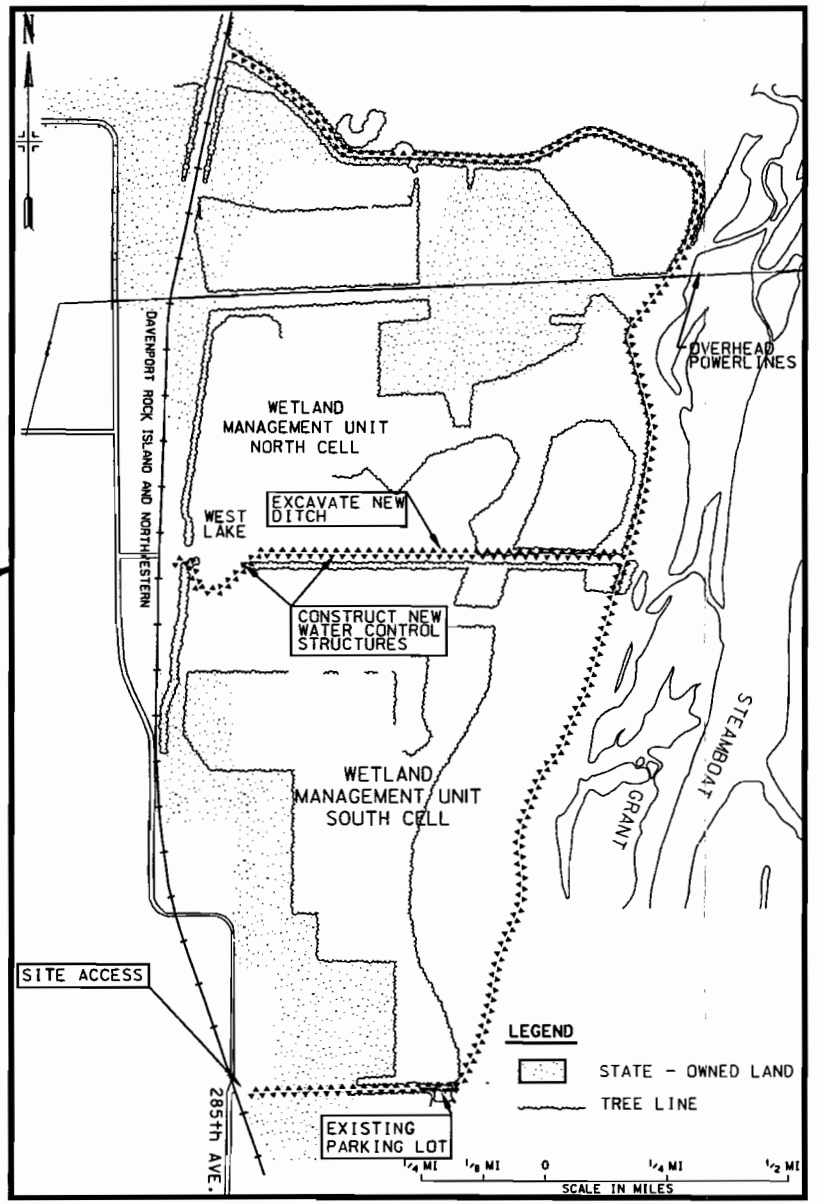
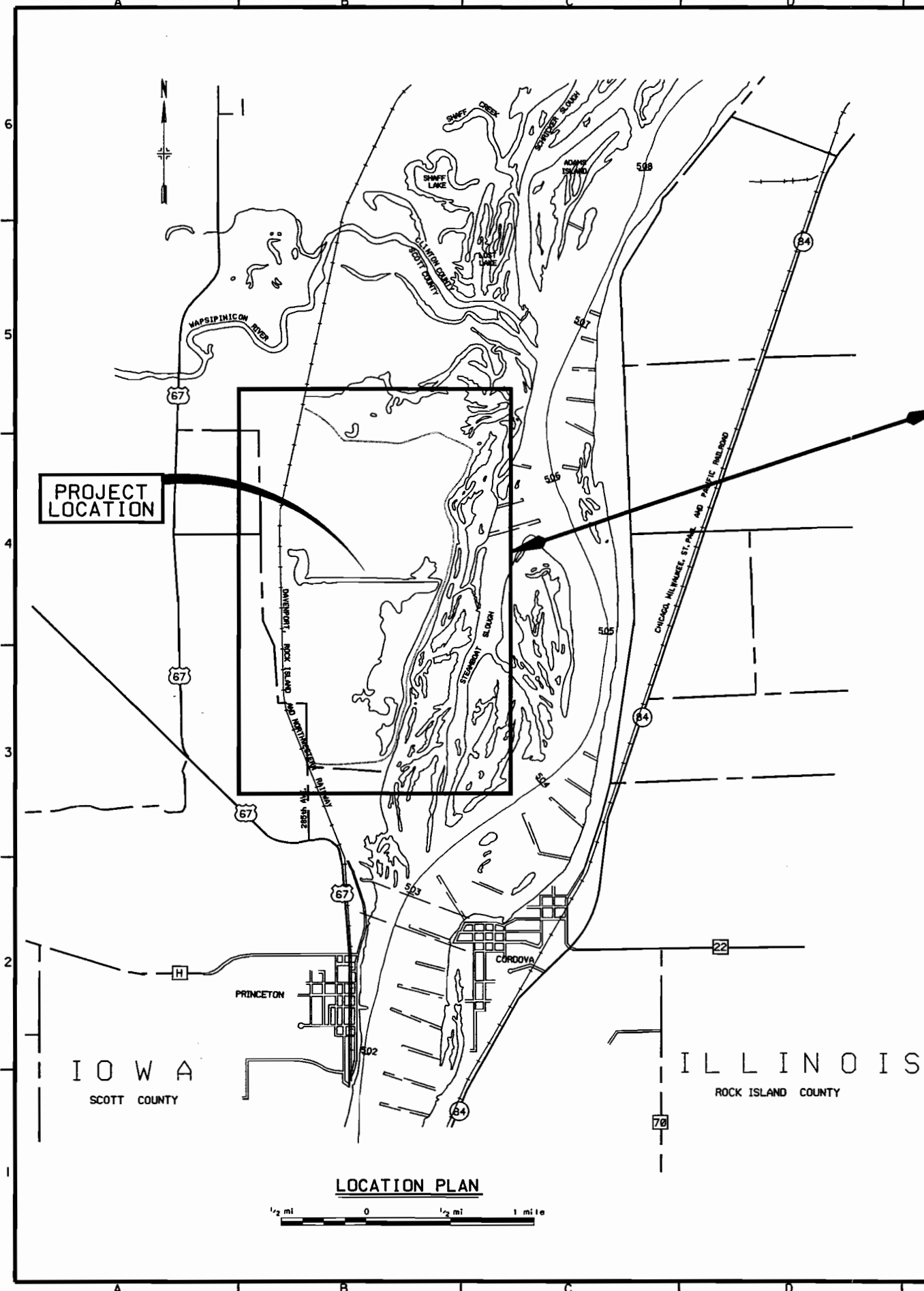
| Revisions |                | Date | Approved |
|-----------|----------------|------|----------|
| Symbol    | Description    |      |          |
|           | AS CONSTRUCTED |      |          |

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

UPPER MISSISSIPPI RIVER SYSTEM  
ENVIRONMENTAL MANAGEMENT PROGRAM  
POL. 14  
RIVER MILES 504 THRU 506.4  
PRINCETON  
WILDLIFE MANAGEMENT AREA

**ELECTRICAL DETAILS**

|                                                            |     |                             |                                         |
|------------------------------------------------------------|-----|-----------------------------|-----------------------------------------|
| Designed by:<br>CHJ                                        | CJA | Scale: AS SHOWN             | Sheet reference number:<br>E1           |
| Drawn by:<br>JRK                                           | AJM | Date: 20 OCT. 1995          | Colligation Number:<br>DACW25-95-R-0024 |
| Checked by:<br>CHJ                                         | CJA | Drawing Code:<br>M-L 14-135 | Sheet 48 of 48                          |
| Reviewed by:<br>RCA                                        | JJC |                             |                                         |
| Approved by:<br>CHARLES S. COX<br>COL., CORPS OF ENGINEERS |     |                             |                                         |



**LEGEND:**

SECTION 0/107 SECTION DESIGNATION  
 LOOK ON THIS SHEET FOR SECTION CUT LOCATION

SECTION 1/107 SECTION DESIGNATION  
 LOOK ON THIS SHEET FOR SECTION

STATE - OWNED LAND  
 TREE LINE

| INDEX     |                |                                          |
|-----------|----------------|------------------------------------------|
| SHEET NO. | SHEET REF. NO. | TITLE OF DRAWING                         |
| 1         | X1             | COVER SHEET                              |
| 2         | X2             | LOCATION PLAN, VICINITY MAP, AND INDEX   |
| 3         | C1             | SITE PLAN                                |
| 4         | C2             | BORING LOGS                              |
| 5         | C3             | WATER CONTROL STRUCTURE PLAN AND SECTION |
| 6         | S1             | WATER CONTROL STRUCTURE DETAILS I        |
| 7         | S2             | WATER CONTROL STRUCTURE DETAILS II       |

- GENERAL NOTES:**
- THE SCOPE OF WORK GENERALLY CONSISTS OF, BUT IS NOT LIMITED TO:
    - CONSTRUCT APPROXIMATELY 3900 FEET OF DITCH.
    - CONSTRUCT TWO WATER CONTROL STRUCTURES.
    - SEED DISTURBED AREAS ON CROSS DIKE.
    - SEED PERIMETER LEVEE. TOTAL AREA APPROXIMATELY 1/2 ACRE.
  - THE ENTIRE INTERIOR OF THE CONSTRUCTION SITE IS PROTECTED BY LEVEES, AND THE GROUNDWATER LEVELS ARE HIGHLY INFLUENCED BY VARYING RIVER STAGES. SEE SPECIFICATIONS FOR HYDRAULIC DATA.
  - THE LAYOUT OF THE PROJECT FEATURES AND CONSTRUCTION WORK LIMITS AS SHOWN SHALL BE FIELD STAKED AND APPROVED BY THE CONTRACTING OFFICER PRIOR TO CONSTRUCTION.
  - THE MAJORITY OF THE TOPOGRAPHICAL CONTOURS SHOWN WERE DEVELOPED FROM FIELD AND AERIAL SURVEYS TAKEN PRIOR TO THE FLOOD OF 1993. ACTUAL CONTOURS MAY VARY.
  - HORIZONTAL AND VERTICAL DATA AVAILABLE UPON REQUEST.

US Army Corps of Engineers  
 Rock Island District

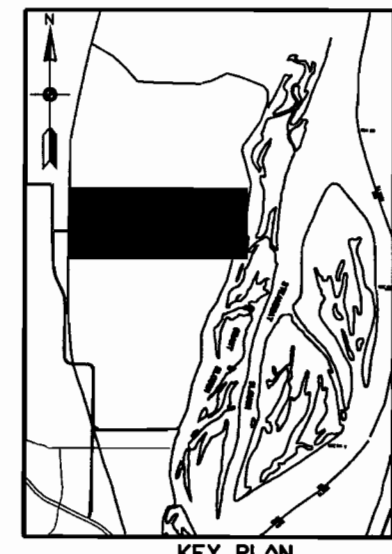
| Symbol                  | Description | Revisions |
|-------------------------|-------------|-----------|
| AS CONSTRUCTED          |             |           |
| AND 25 - REVISED NOTE 1 |             |           |
| 3 MAY 93                | DATE        | APPROVED  |
| 3 MAY 93                | DATE        | APPROVED  |

|                  |                    |                                   |
|------------------|--------------------|-----------------------------------|
| Designed By: KJD | Date: 25 OCT. 1999 | Scale: AS SHOWN                   |
| Drawn By: TPD    | Checked By: EGR    | Soil Citation Number: M-L 14-141  |
| Reviewed By: BLK |                    | District Number: DUCRIS-00-1-0003 |

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

FOR THE MISSISSIPPI RIVER SYSTEM  
 ENVIRONMENTAL MANAGEMENT PROGRAM  
 PRINCETON WETLANDS SOIL TREATMENT AREA  
 LOCATION MAP, VICINITY MAP, AND INDEX

Sheet Reference Number:  
**X2**  
 Sheet 2 of 7



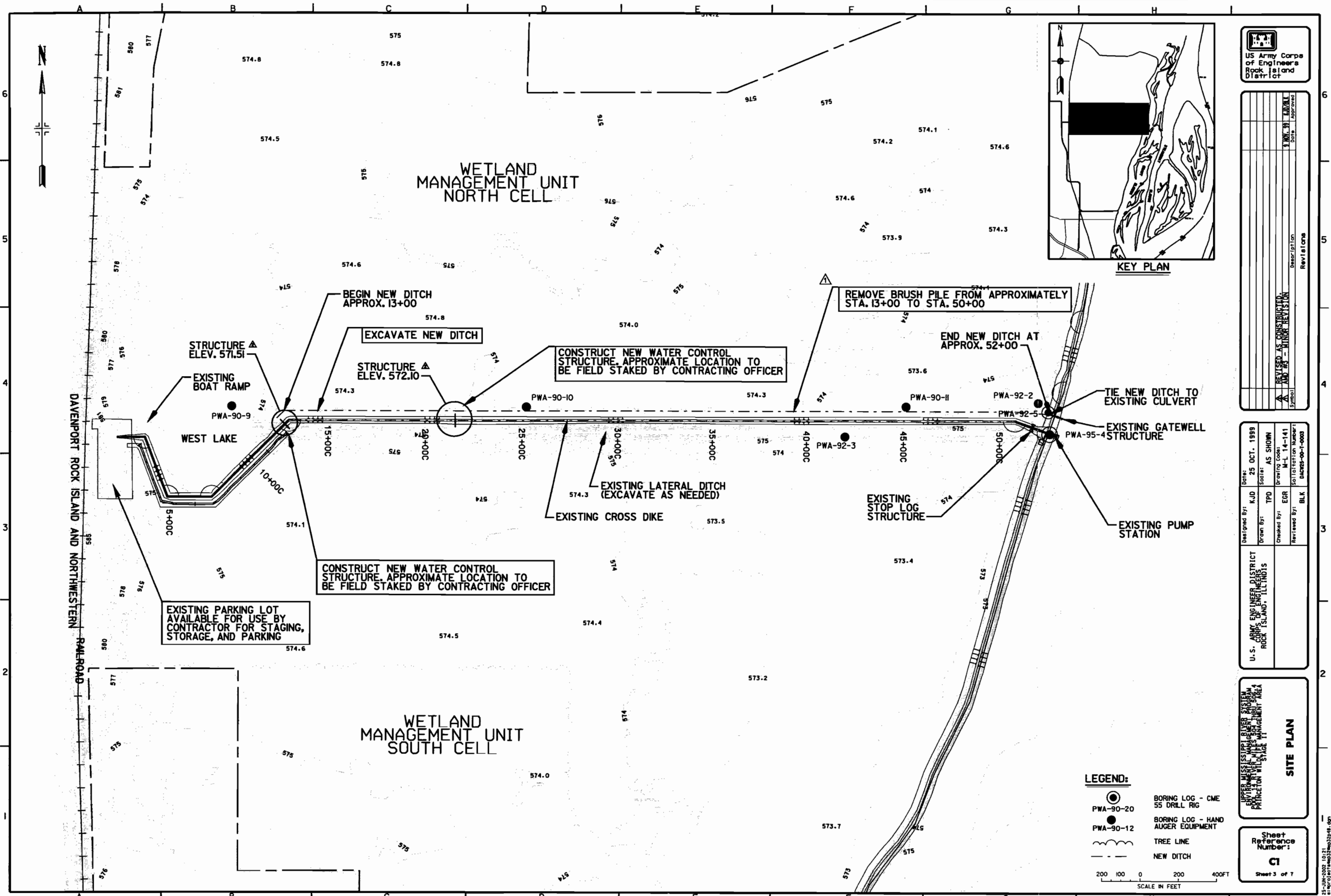
| Symbol | Description             | Date     | Revised By | Approved |
|--------|-------------------------|----------|------------|----------|
| ▲      | REVISED AS CONSTRUCTED  | 9 NOV 99 | MAZAL      |          |
| ▲      | AND 95 - MINOR REVISION |          |            |          |

|              |     |                      |                  |
|--------------|-----|----------------------|------------------|
| Designed By: | KJD | Date:                | 25 OCT. 1999     |
| Drawn By:    | TPD | Scale:               | AS SHOWN         |
| Checked By:  | EGR | Drawing Code:        | M-L 14-141       |
| Reviewed By: | BLK | Solicitation Number: | DACR95-00-T-0003 |

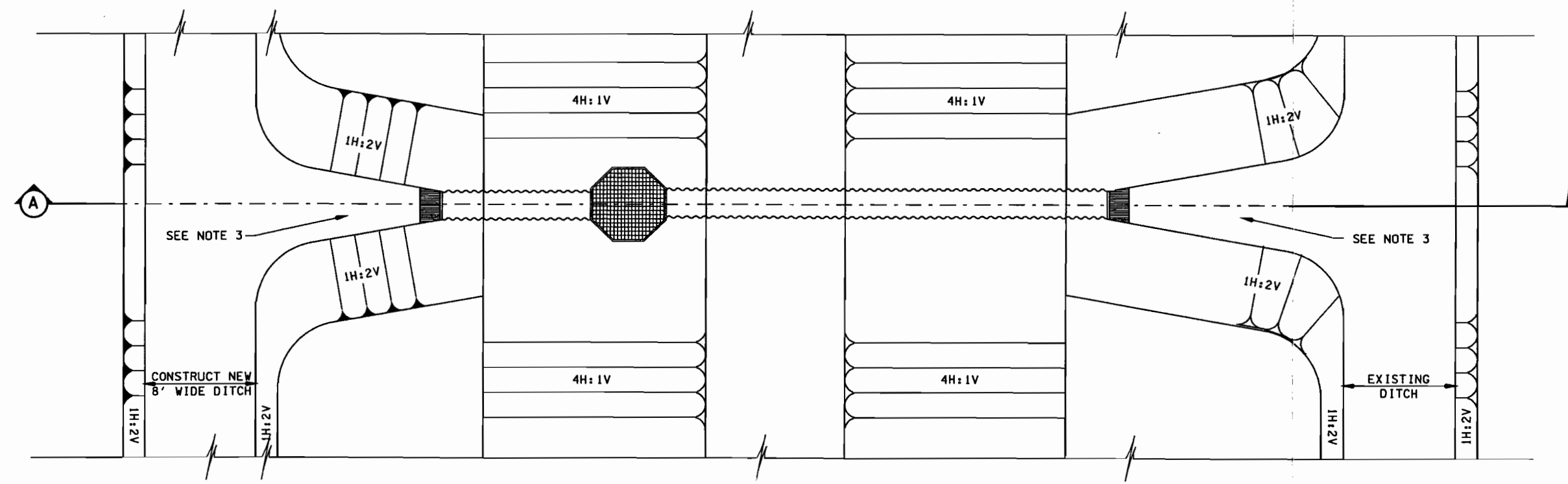
UPPER MISSISSIPPI RIVER SYSTEM  
ENVIRONMENTAL MANAGEMENT PROGRAM  
ROCK ISLAND DISTRICT  
PRINCETON WILDLIFE MANAGEMENT AREA 4  
WETLAND RESTORATION AND MANAGEMENT PLAN

**SITE PLAN**

Sheet Reference Number:  
**C1**  
Sheet 3 of 7







**TYPICAL WATER CONTROL STRUCTURE DITCH PLAN**  
NO SCALE

|                          |             |          |
|--------------------------|-------------|----------|
| AS CONSTRUCTED           | DATE        | APPROVED |
| AMOUNT - MINOR REVISIONS | NOV. 91     | ADRIAN   |
| Symbol                   | Description | Revision |
|                          |             |          |

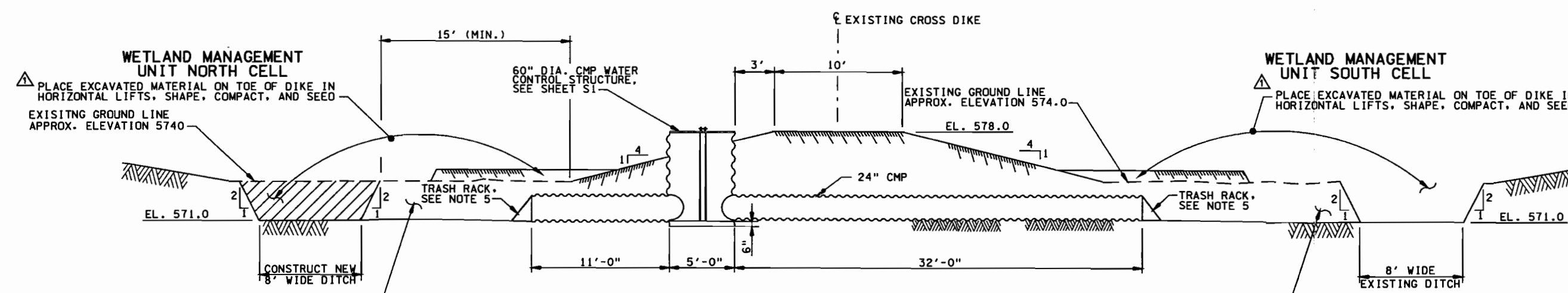
|                       |                   |
|-----------------------|-------------------|
| Date:                 | 25 OCT. 1999      |
| Scale:                | AS SHOWN          |
| Designed By:          | KJD               |
| Drawn By:             | TPD               |
| Checked By:           | EGR               |
| Reviewed By:          | BLK               |
| Drawing Code:         | M-L 14-141        |
| Specification Number: | District-00-T-000 |

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

UPPER MISSISSIPPI RIVER SYSTEM  
ENVIRONMENTAL MANAGEMENT PROGRAM  
PRINCETON WETLAND MANAGEMENT AREA

**WATER CONTROL STRUCTURE PLAN AND SECTION**

Sheet Reference Number:  
**63**  
Sheet 5 of 7

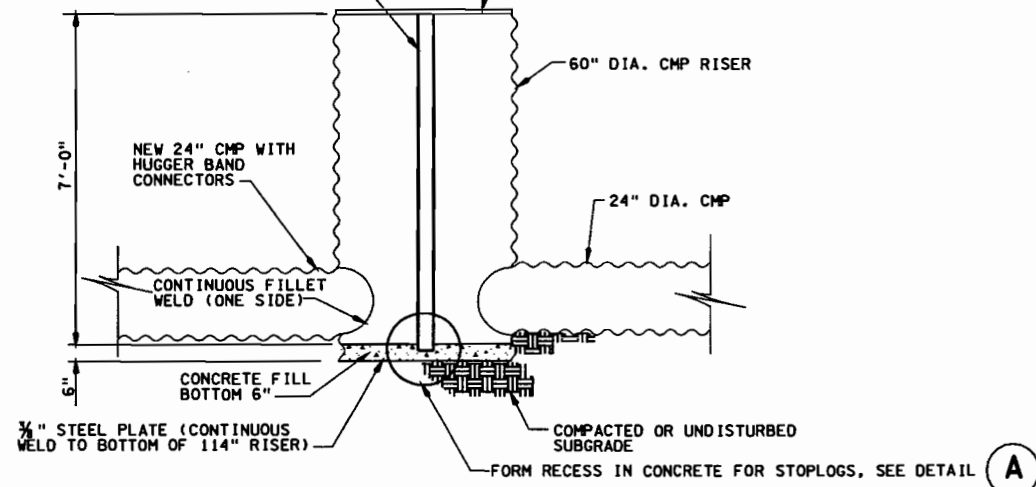


**TYPICAL WATER CONTROL STRUCTURE DITCH SECTION**  
NO SCALE

- NOTES:**
- FOR DETAILS OF WATER CONTROL STRUCTURE, SEE SHEET S1.
  - 24" CMP'S SHALL BE UNDERCUT BY HALF THEIR DIAMETER WHEN PLACED.
  - DITCHES SHALL BE CUT BACK INTO CMP'S TO OBTAIN DRAINAGE.
  - EXISTING DITCH ON SOUTH SIDE OF DIKE SHALL BE EXCAVATED AS NEEDED TO OBTAIN BOTTOM ELEVATION OF 571.0'.
  - FOR TRASH RACK, PLACE 1/2" SOLID BAR VERTICALLY AND WELD IN PLACE.
  - EXISTING BRUSH PILE FROM APPROXIMATELY STA. 13+00 TO STA. 50+00 SHALL BE REMOVED.

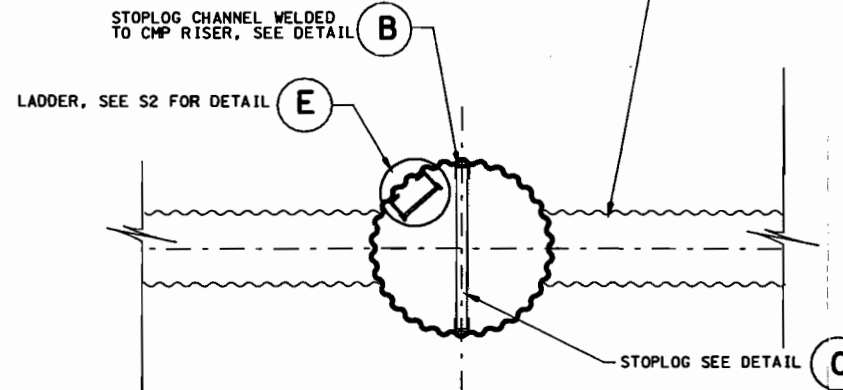
STOPLOG SUPPORT CHANNEL  
(UPSTREAM SIDE - CONTINUOUS WELD WITH VOIDS FILLED)  
(DOWNSTREAM SIDE - SPOT WELD AT CORRUGATE)

GRATING SUPPORT & GRATING -  
FOR SPECIFIC FABRICATION  
INFORMATION REFER TO DETAIL (D) ON SHEET S2



**ELEVATION**

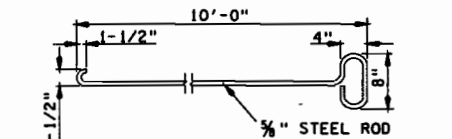
FABRICATE AND CONNECT PIPE STUBS TO RISER  
PIPE PRIOR TO DELIVERY. PIPE STUBS ON  
BOTH ENDS TO BE MINIMUM 2 FEET LONG,  
MEASURED FROM RISER EDGE.



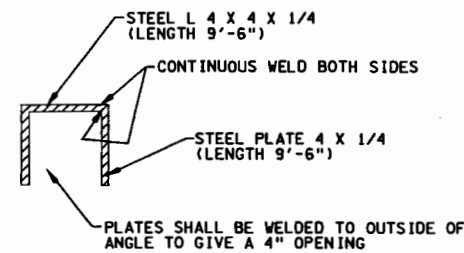
**TOP VIEW**

**DETAIL - CMP RISER WATER CONTROL STRUCTURE**

NO SCALE

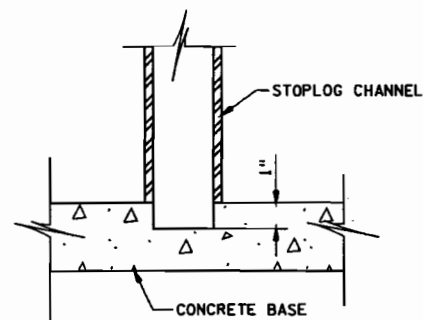


**DETAIL - STOPLOG HOOKS**  
NO SCALE



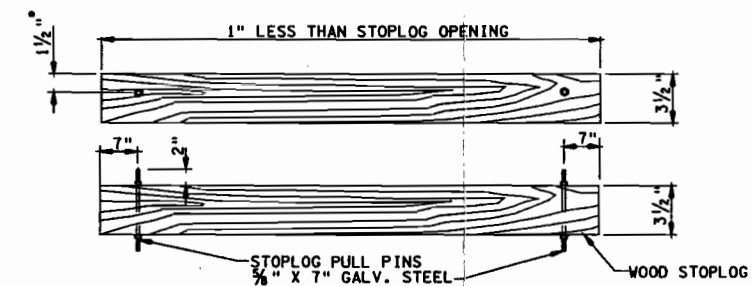
**DETAIL - STOPLOG CHANNEL**

NO SCALE



**DETAIL - STOPLOG RECESS**

NO SCALE



NOTE:  
21 STOPLOGS REQUIRED PER STRUCTURE

**DETAIL - STOPLOG**

NO SCALE

\*ADJUST PIN ELEVATION ON  
BOTTOM STOPLOG TO ALLOW  
STOPLOG HOOKS TO ENGAGE  
WHEN STOPLOG IS IN RECESS



|          |                 |
|----------|-----------------|
| Symbol   | AS CONSTRUCTED. |
| Date     | 10/25/99        |
| Revision | 1               |

|              |     |                       |                   |
|--------------|-----|-----------------------|-------------------|
| Designed By: | BMA | Date:                 | 25 OCT. 1999      |
| Drawn By:    | TPD | Scale:                | AS SHOWN          |
| Checked By:  | CHU | Project Code:         | M-L 14-141        |
| Reviewed By: | MM  | Specification Number: | District-00-1-003 |

UPPER MISSISSIPPI RIVER SYSTEM  
DOWNSTREAM WATERSHED TRIBUTARY AREA  
PARTICULAR WATERSHED MANAGEMENT  
STAGE II

**WATER CONTROL  
STRUCTURE DETAILS I**

Sheet  
Reference  
Number:  
**S1**  
Sheet 6 of 7

| Symbol | Description    | Date | Approved |
|--------|----------------|------|----------|
| AS     | AS CONSTRUCTED |      |          |

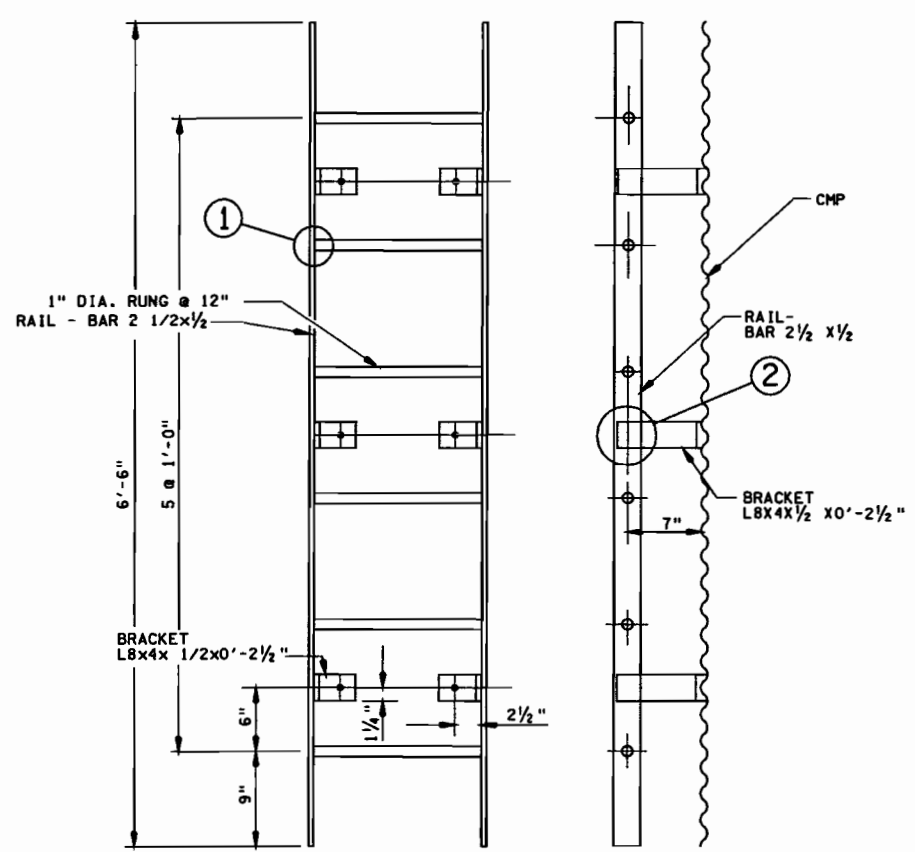
|              |     |                       |                  |
|--------------|-----|-----------------------|------------------|
| Designed By: | KJD | Date:                 | 25 OCT. 1999     |
| Drawn By:    | TPD | Scale:                | AS SHOWN         |
| Checked By:  | EGR | Drawing Code:         | M-L 14-141       |
| Reviewed By: | BLK | Specification Number: | DACR23-00-1-0003 |

U.S. ARMY ENGINEER DISTRICT  
ROCK ISLAND, ILLINOIS

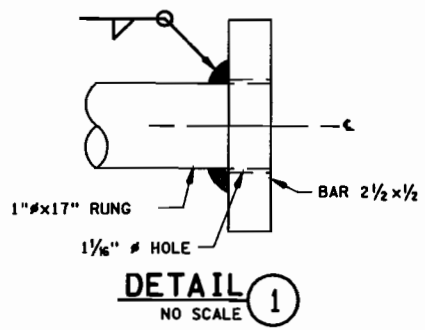
ENVIRONMENTAL MANAGEMENT SYSTEM  
POLYMER MANAGEMENT SYSTEM  
PRINCETON WASTE MANAGEMENT AREA

**WATER CONTROL  
STRUCTURE DETAILS II**

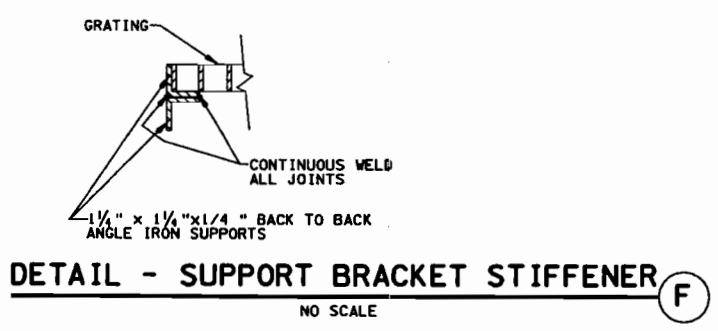
Sheet Reference Number:  
**S2**  
Sheet 7 of 7



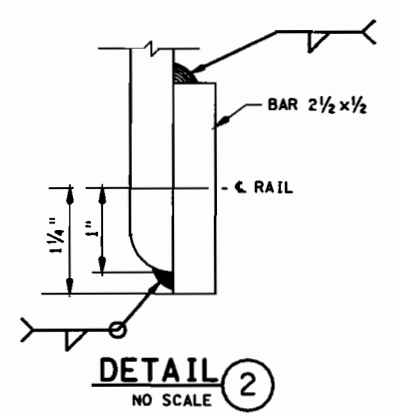
**ELEVATION SIDE VIEW**  
**LADDER DETAILS** (E)  
1 0 1 2'



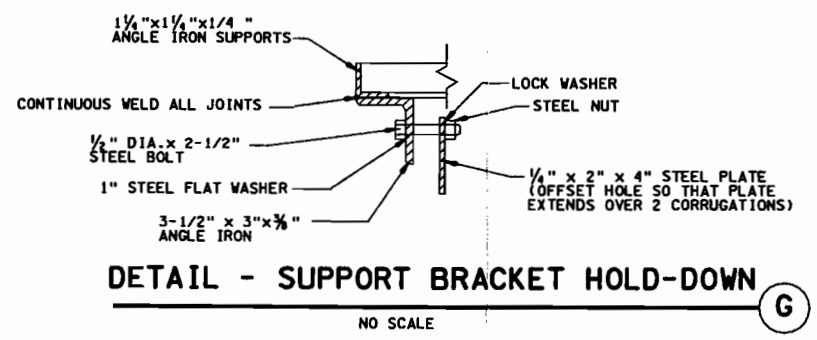
**DETAIL 1**  
NO SCALE



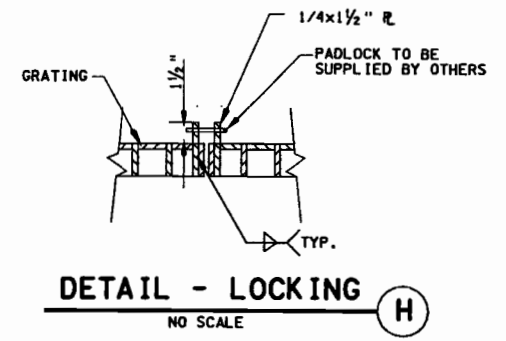
**DETAIL - SUPPORT BRACKET STIFFENER** (F)  
NO SCALE



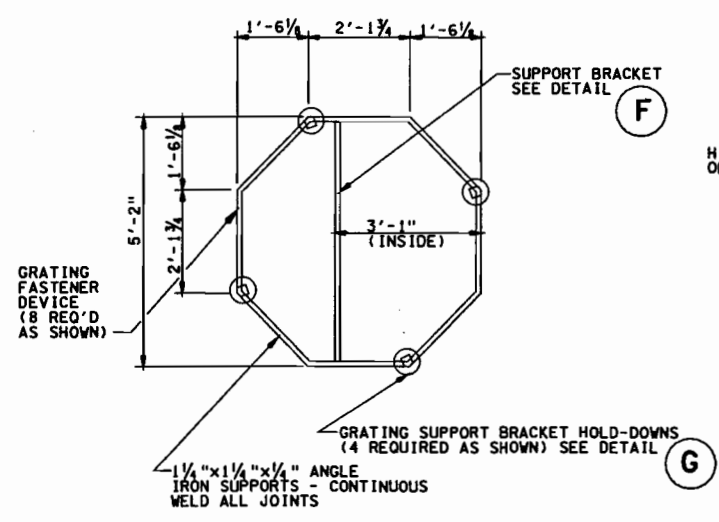
**DETAIL 2**  
NO SCALE



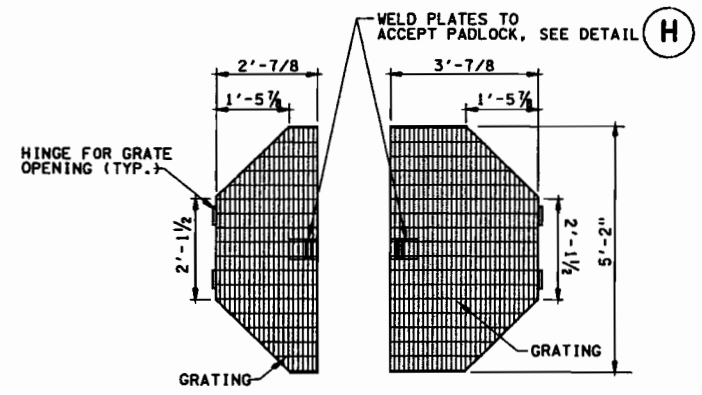
**DETAIL - SUPPORT BRACKET HOLD-DOWN** (G)  
NO SCALE



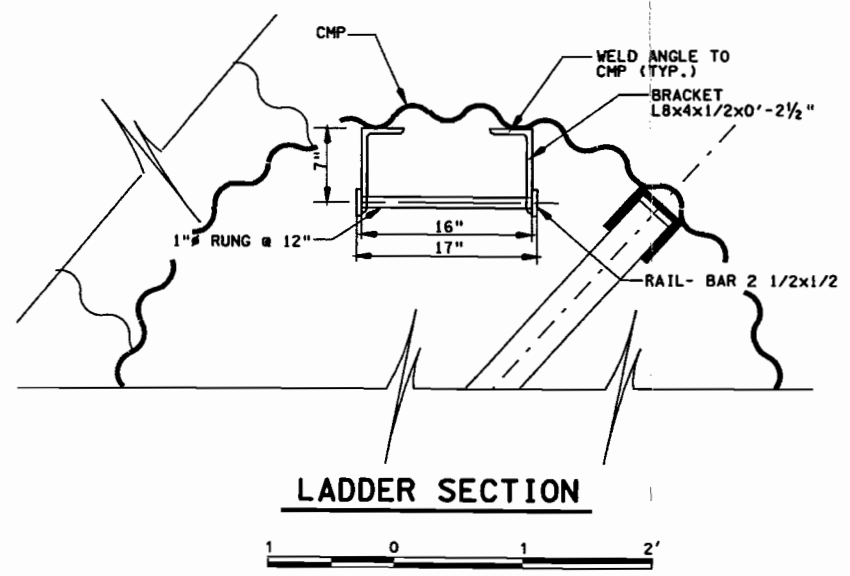
**DETAIL - LOCKING** (H)  
NO SCALE



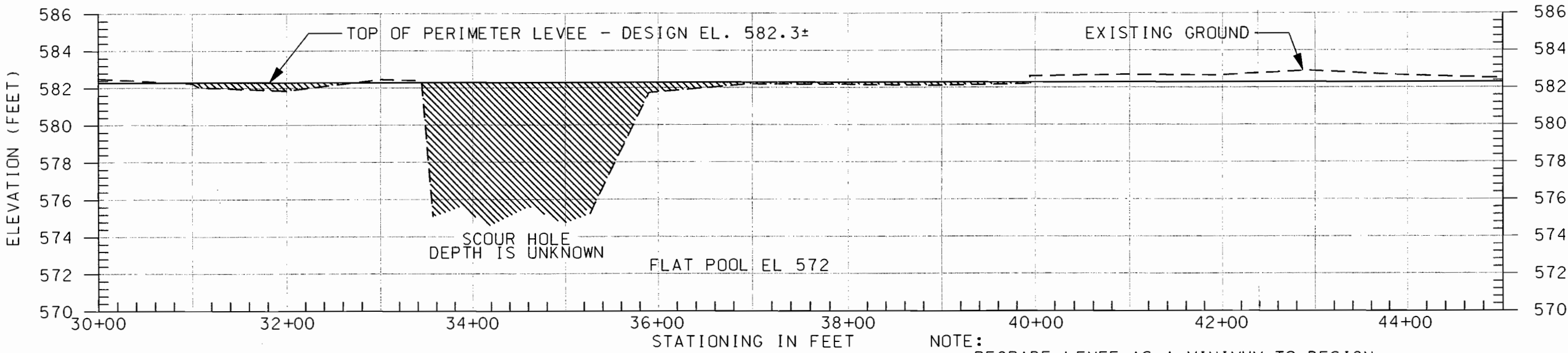
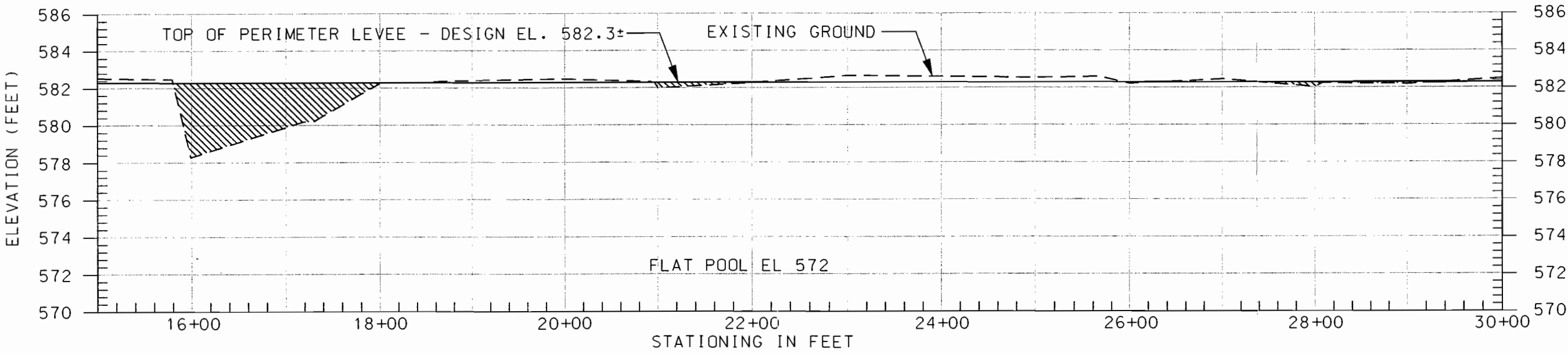
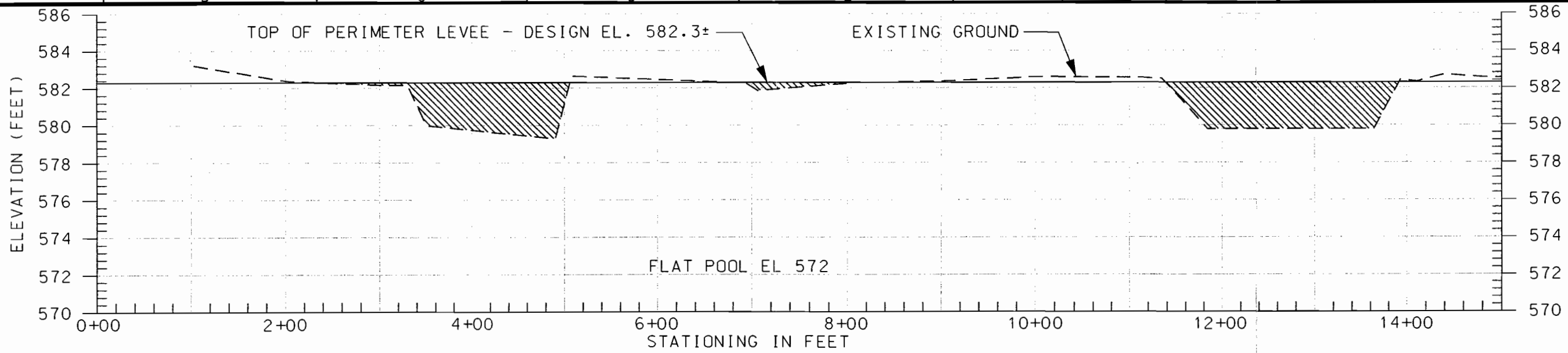
**DETAIL - GRATING SUPPORT BRACKET & GRATING** (D)  
NO SCALE



- GENERAL GRATING NOTES:**
- BAND ALL EDGES OF GRATING.
  - DIMENSIONS SHOWN ON DETAIL SHALL BE VERIFIED PRIOR TO FABRICATION. DIMENSIONS SHALL BE ADJUSTED AS REQUIRED TO MATCH GRATING SUPPORT BRACKET DIMENSIONS.
  - HINGES SHALL ALLOW MINIMUM 270° MOTION OF HATCHES.



**LADDER SECTION**  
1 0 1 2'



LEGEND:  
 SCOUR AREAS

NOTE:  
 REGRADE LEVEE AS A MINIMUM TO DESIGN EL. 582.3 OR TO MATCH EXISTING GROUND AT EITHER END OF SCOUR AREAS FROM STA. 0+00 TO NEW SETBACK LEVEE.



| Symbol | Description    | Date    | Approved |
|--------|----------------|---------|----------|
|        | AS CONSTRUCTED | 6/27/02 | JMG/RCF  |

|              |     |                      |                  |
|--------------|-----|----------------------|------------------|
| Designed By: | RCF | Date:                | 18 OCT 2001      |
| Drawn By:    | PDU | Scale:               | AS SHOWN         |
| Checked By:  | KJD | Project Code:        | EP67             |
| Reviewed By: | KJS | Solicitation Number: | DACW25-02-B-0001 |

UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM  
 POOL 14, RIVER MILES 504.0-506.4  
 SCOTT COUNTY, IOWA  
**SCOUR REPAIR STATION 0+00 TO STATION 40+00**

Sheet Reference Number:  
**C2**  
 Sheet 4 of 5

| Symbol         | Description | Date    | Approved |
|----------------|-------------|---------|----------|
| AS CONSTRUCTED |             | 6/27/05 | JMB/RCE  |

|                  |                  |
|------------------|------------------|
| Date:            | 18 OCT 2001      |
| Scale:           | AS SHOWN         |
| Project Code:    | EP67             |
| Soil/Log Number: | DACW25-02-B-0001 |
| Designed By:     | RCF              |
| Drawn By:        | RLC              |
| Created By:      | KJD              |
| Reviewed By:     | KJS              |

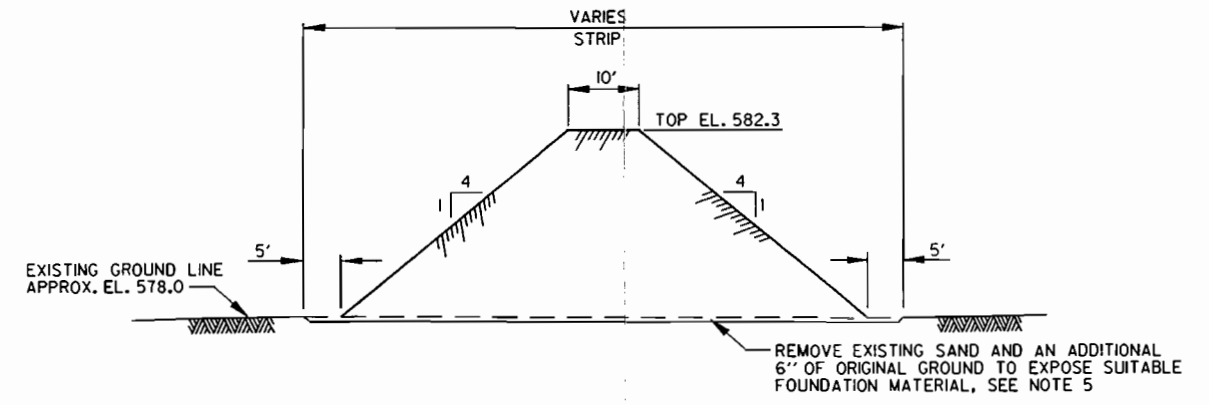
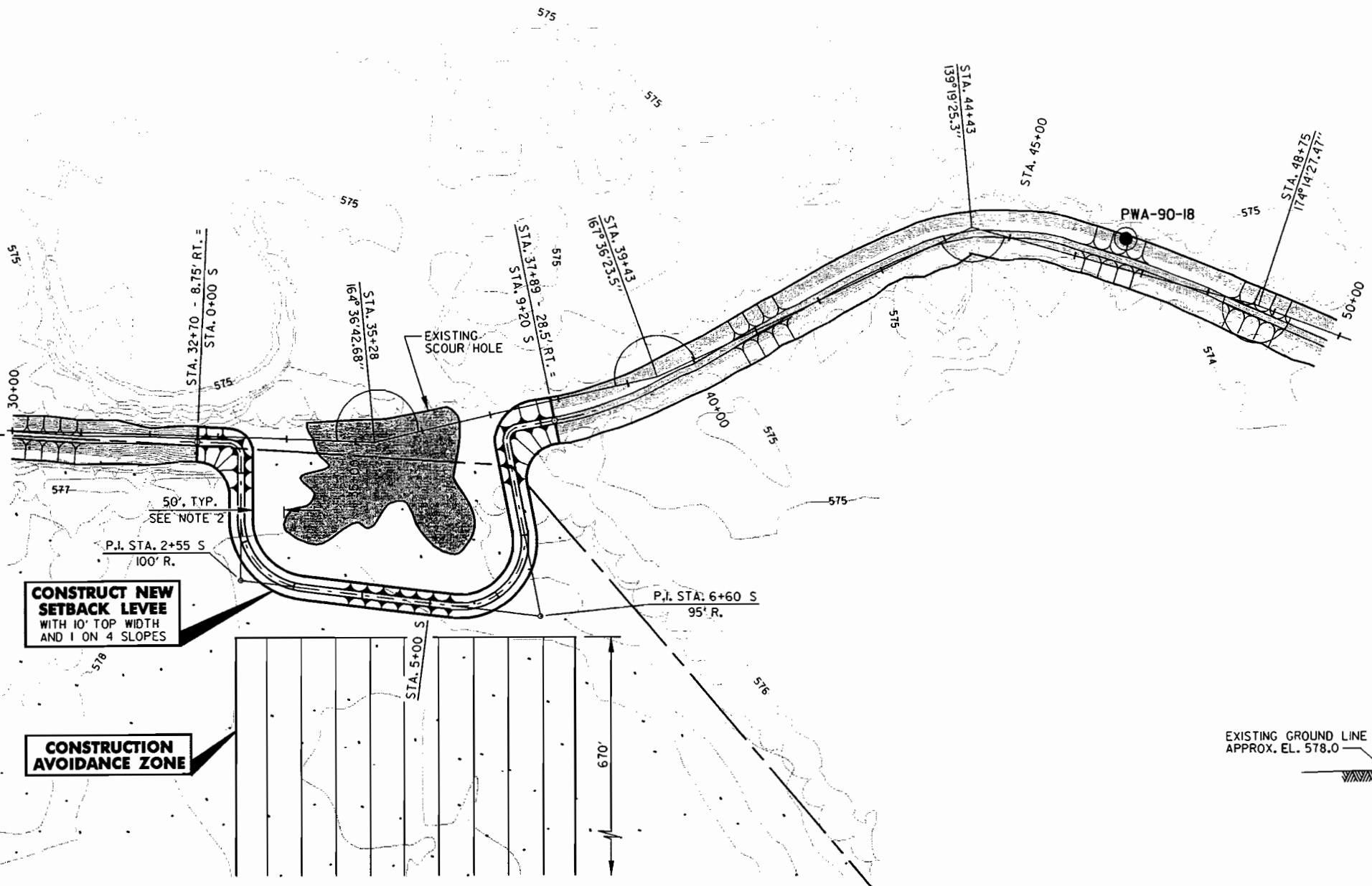
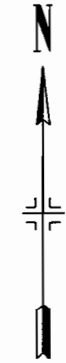
UPPER MISSISSIPPI RIVER SYSTEM  
ENVIRONMENTAL MANAGEMENT PROGRAM  
POOL 14, RIVER MILES 504.0-506.4  
SCOTT COUNTY, IOWA

**BREACH REPAIR  
SETBACK LEVEL**

Sheet Reference Number:  
**C3**  
Sheet 5 of 5

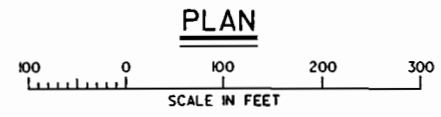
**LEGEND:**

- STATE BOUNDARY
- ▭ STATE - OWNED LAND
- ▨ SCOUR HOLE
- BORING LOCATION
- ~ TREE LINE

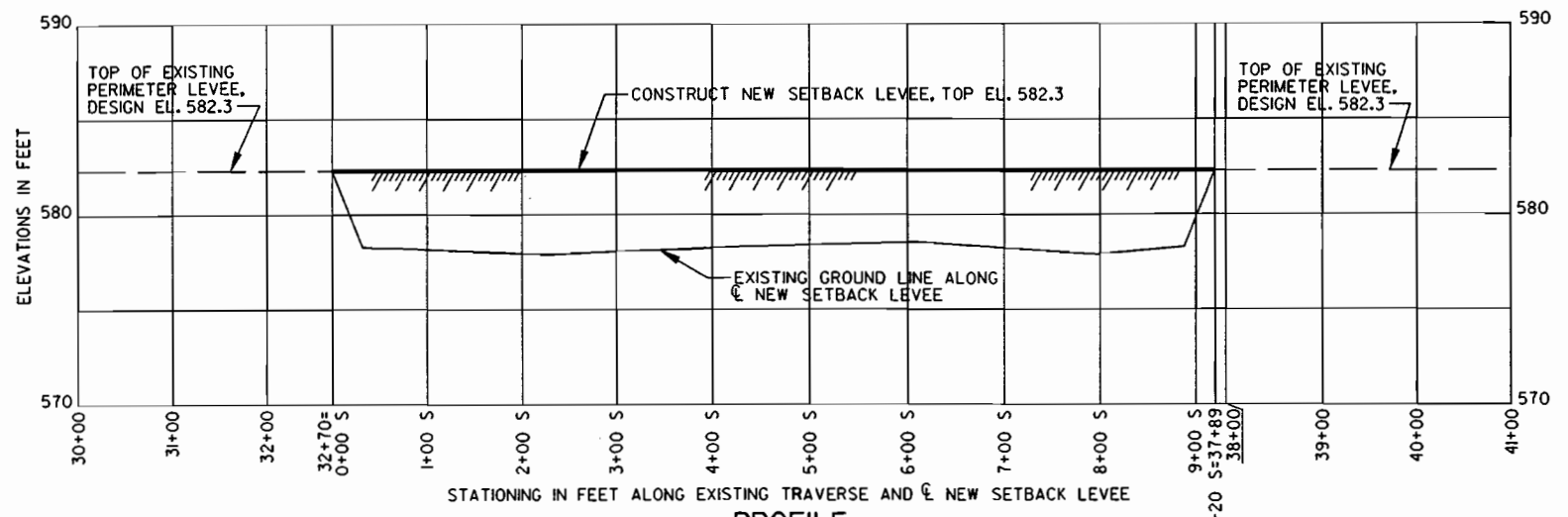


**TYPICAL SETBACK LEVEL SECTION**

NO SCALE



**PLAN**



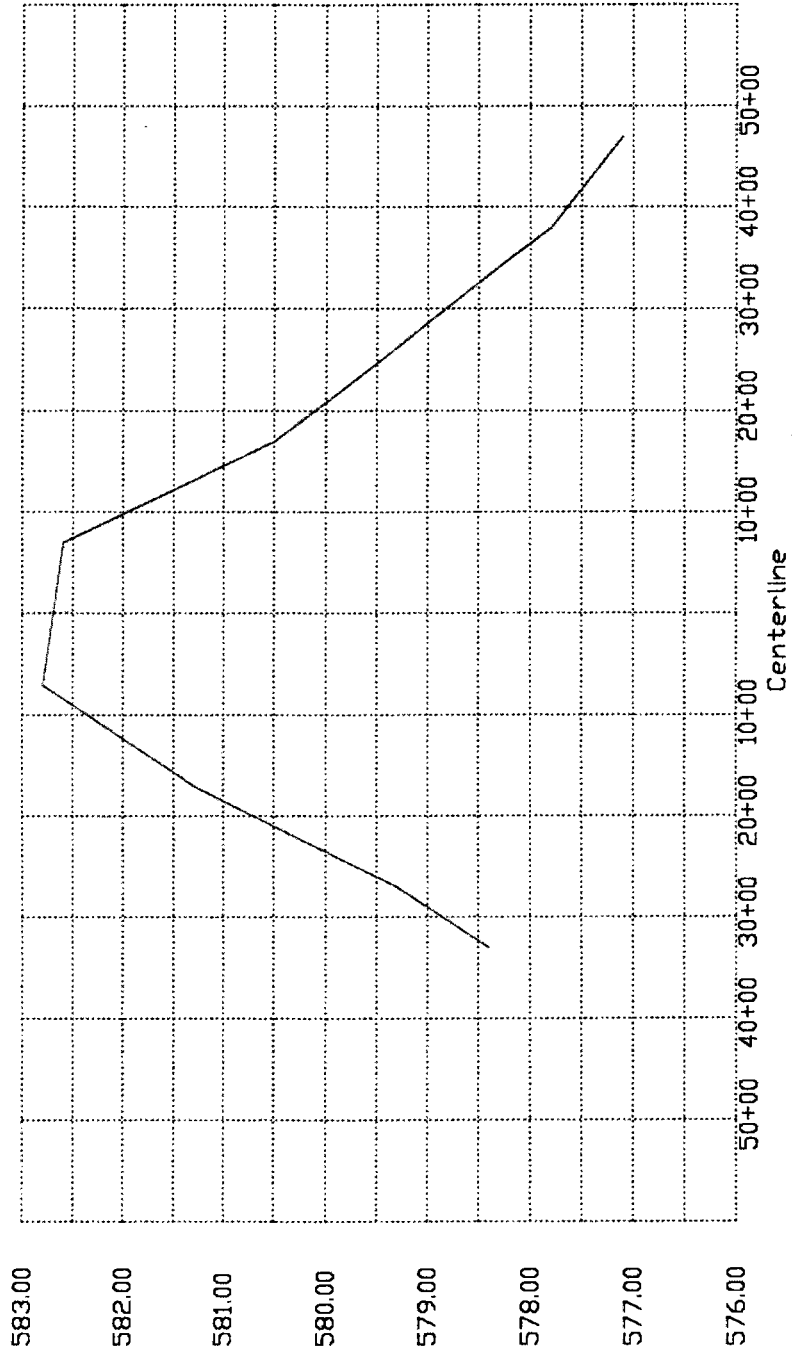
**PROFILE**

**NOTES:**

1. LOCATION OF SCOUR HOLE IS APPROXIMATE.
2. MINIMUM DISTANCE ALLOWED BETWEEN TOE OF SETBACK LEVEL AND SCOUR HOLE IS 50 FEET.
3. EXTENT OF MATERIAL RECLAMATION FROM THE FIELD AND PLACEMENT SHALL BE DETERMINED BY THE CONTRACTING OFFICER.
4. CONSTRUCTION AVOIDANCE ZONE WILL BE STAKED BY THE CONTRACTING OFFICER PRIOR TO START OF CONSTRUCTION.
5. AFTER REMOVING EXISTING SAND DEPOSITED FROM THE SCOUR HOLE, STRIP EXISTING VEGETATION FROM THE ORIGINAL GROUND LINE (PRIOR TO BREACH) TO EXPOSE SUITABLE FOUNDATION MATERIAL. SUITABLE FOUNDATION MATERIAL SHALL CONSIST OF IMPERVIOUS CLAY MATERIAL THAT IS FREE OF VEGETATION AND ORGANIC MATERIAL.

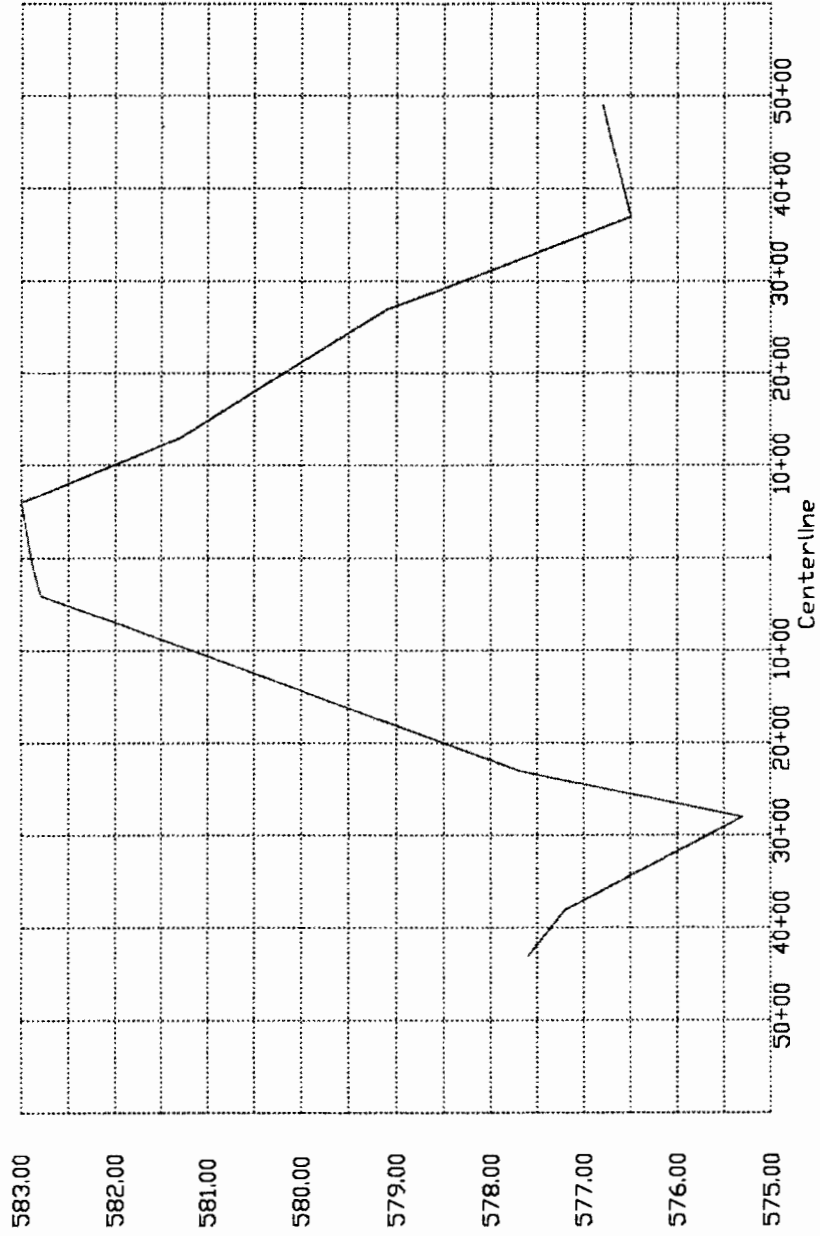
27-JUN-2002 14:31  
6: apr of cts sep 32 sep

EMERGENCY LEVEE REPAIR  
PRINCETON, IOWA  
DACW 24-02-C-0011



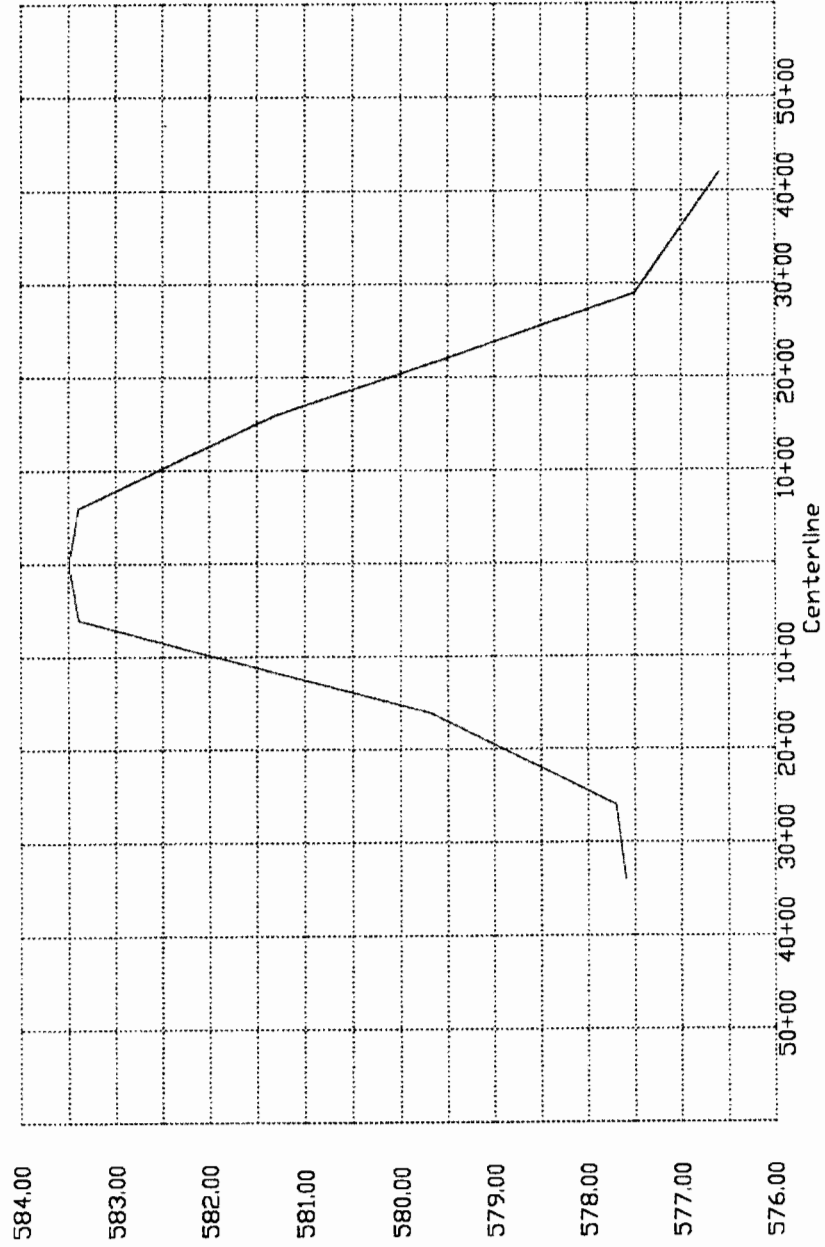
4+00 MAINLINE LEVEE

EMERGENCY LEVEE REPAIR  
PRINCETON, IOWA  
DACW 24-02-C-0011



13+00 MAINLINE LEVEE

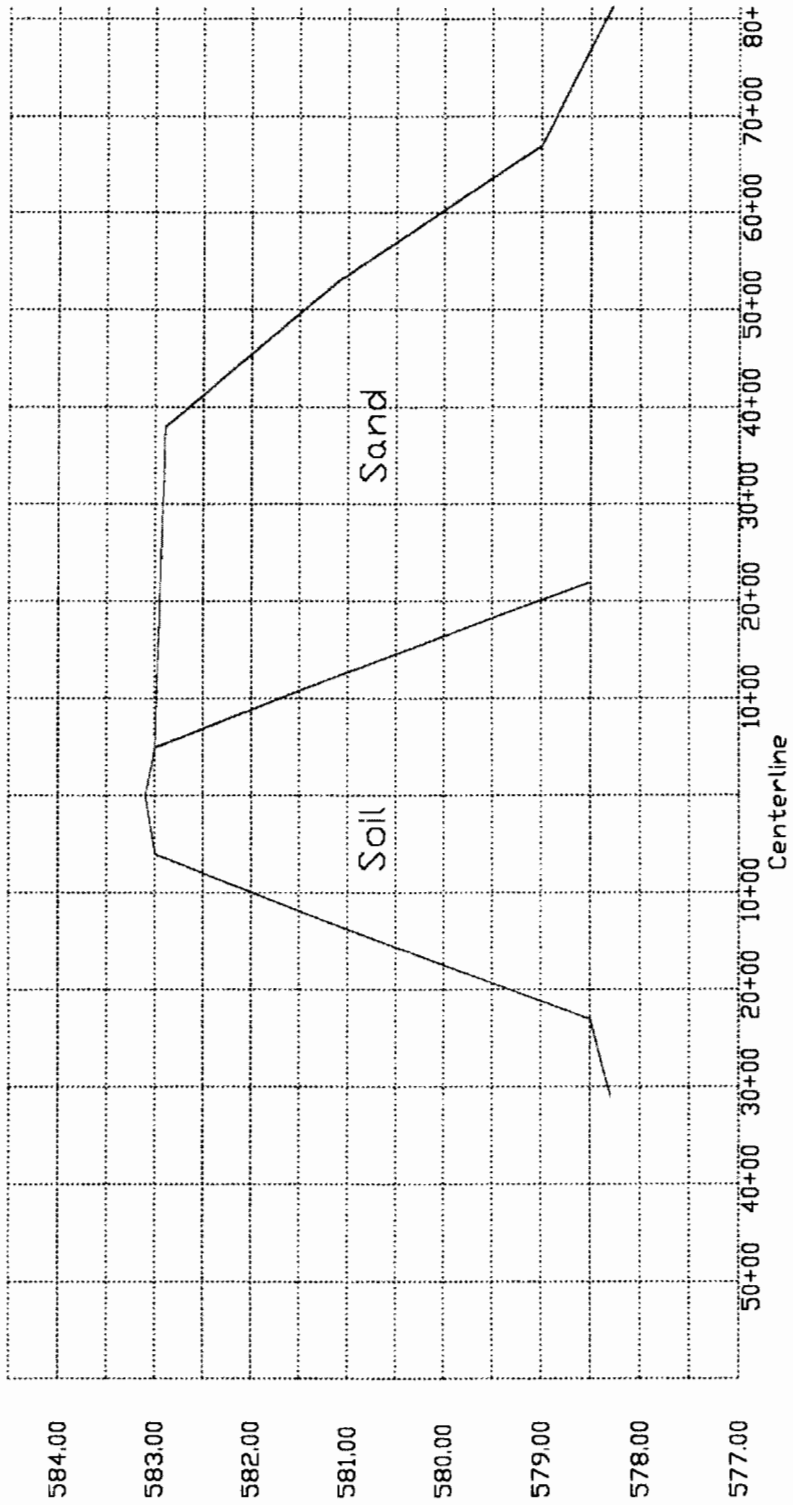
EMERGENCY LEVEE REPAIR  
PRINCETON, IOWA  
DACW 24-02-C-0011



16+00 MAINLINE LEVEE

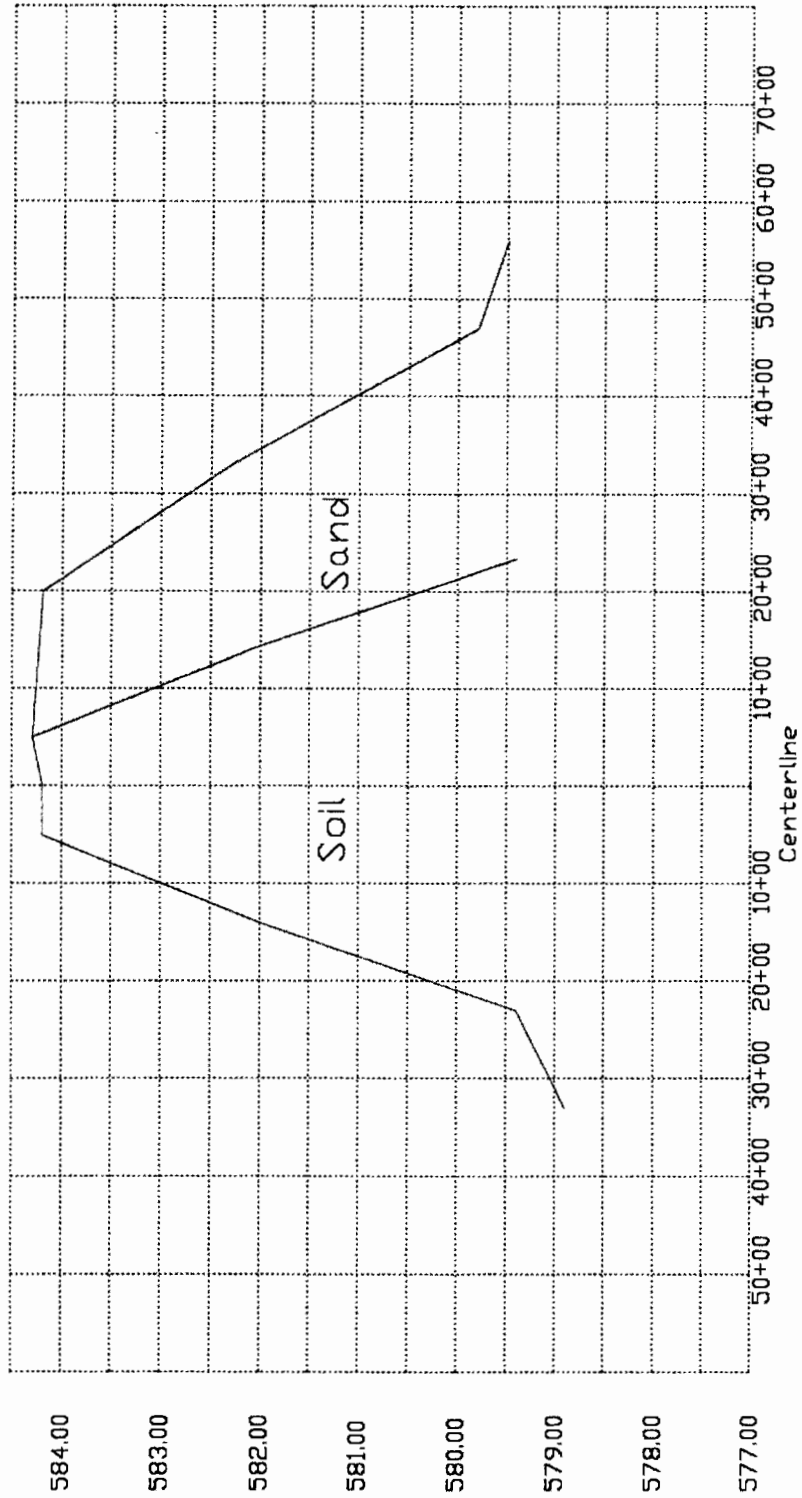


EMERGENCY LEVEE REPAIR  
PRINCETON, IOWA  
DACW 24-02-C-0011



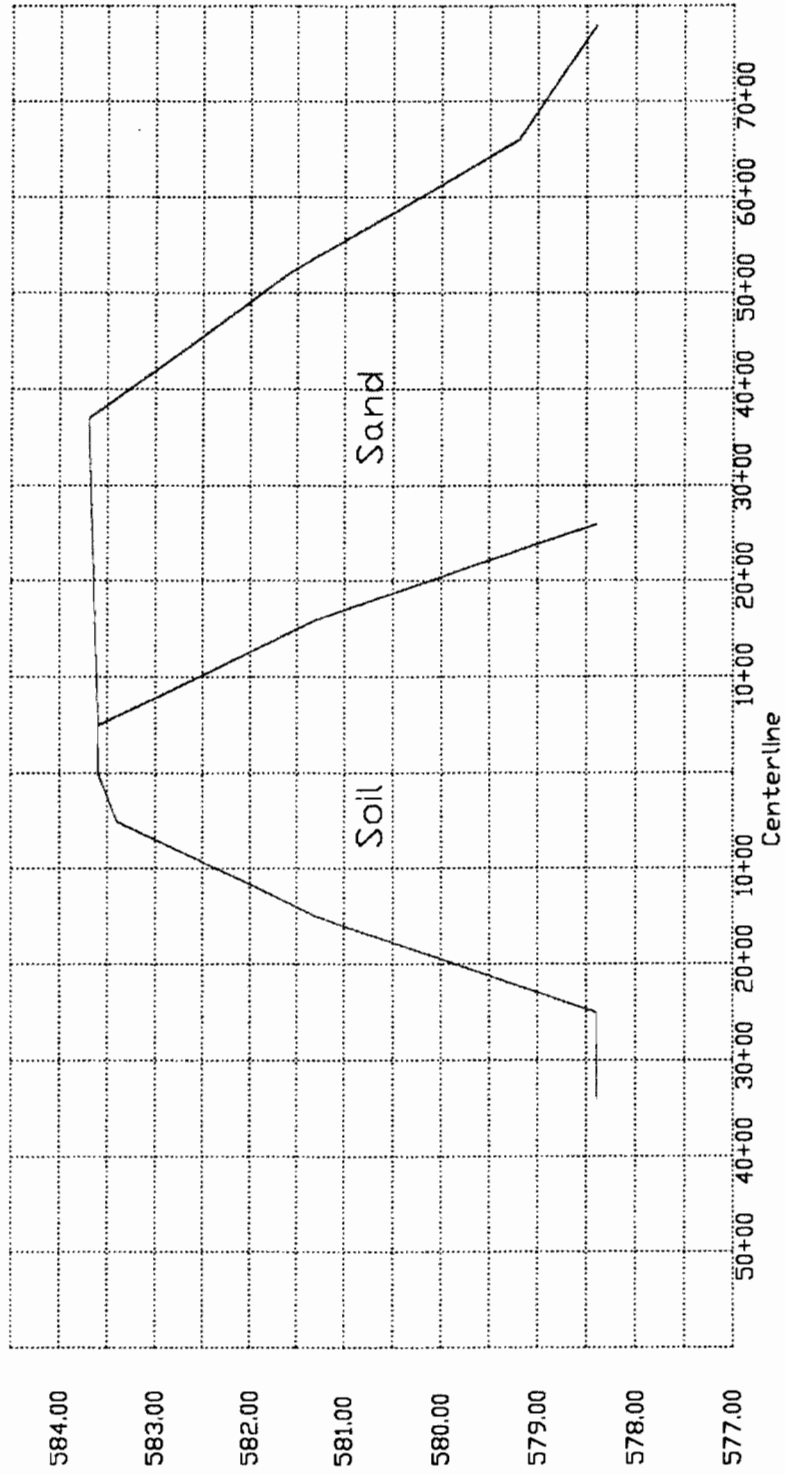
1+00 SETBACK LEVEE

EMERGENCY LEVEE REPAIR  
PRINCETON, IOWA  
DACW 24-02-C-0011

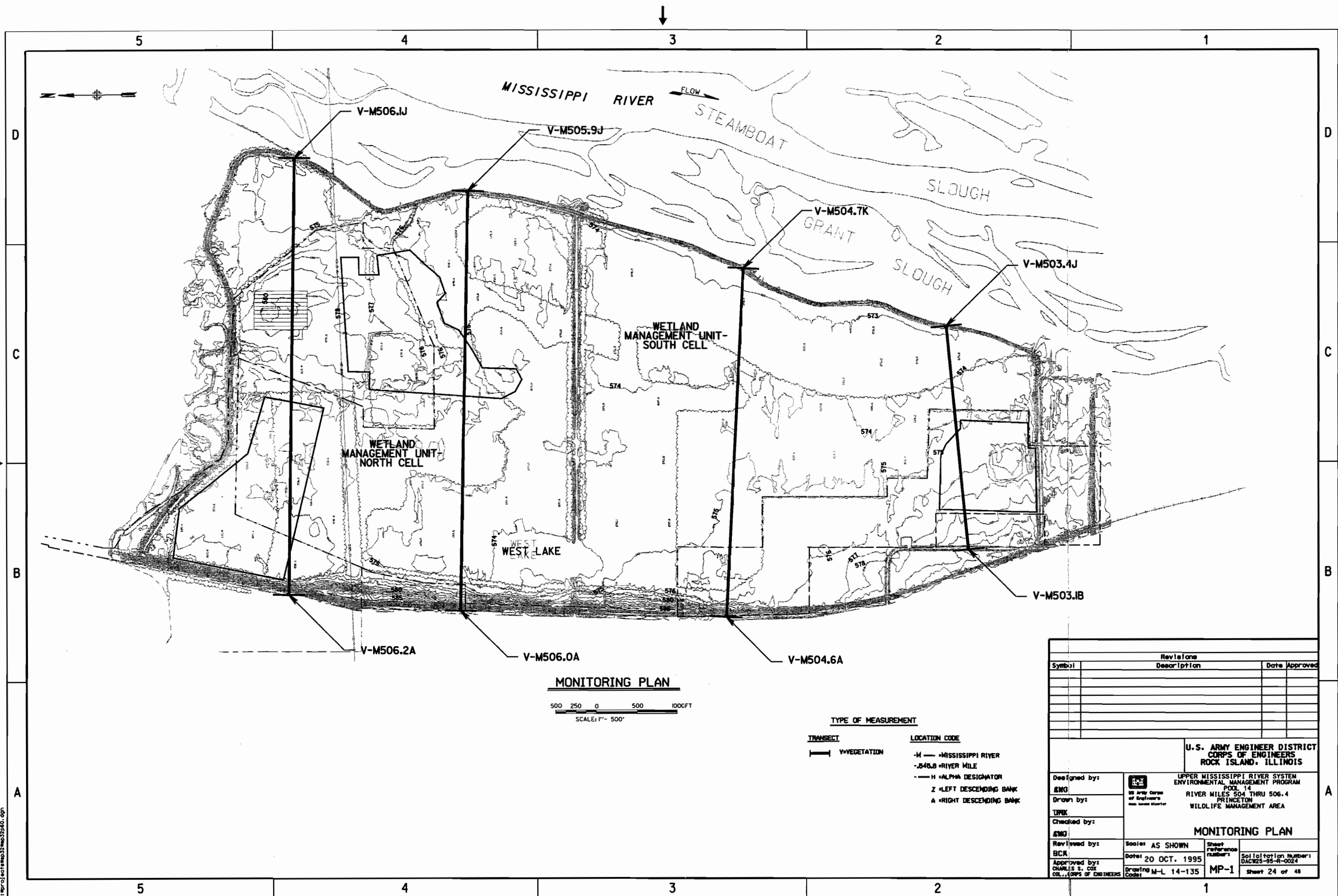


4+00 SETBACK LEVEE

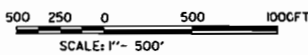
EMERGENCY LEVEE REPAIR  
PRINCETON, IOWA  
DACW 24-02-C-0011



7+50 SETBACK LEVEE



**MONITORING PLAN**



- TYPE OF MEASUREMENT**
- |                 |                           |
|-----------------|---------------------------|
| <b>TRANSECT</b> | <b>LOCATION CODE</b>      |
| — V-VEGETATION  | -M — MISSISSIPPI RIVER    |
|                 | -S46.8 — RIVER MILE       |
|                 | -H — ALPHA DESIGNATOR     |
|                 | Z — LEFT DESCENDING BANK  |
|                 | A — RIGHT DESCENDING BANK |

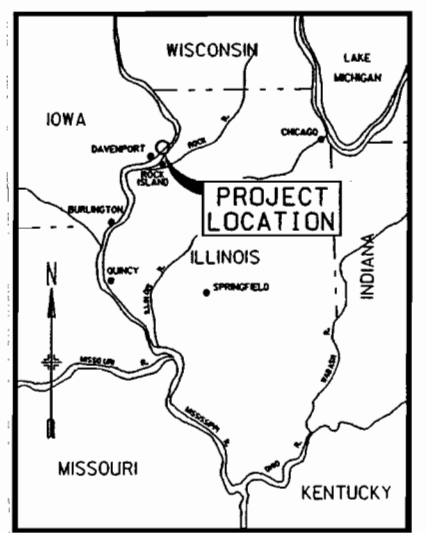
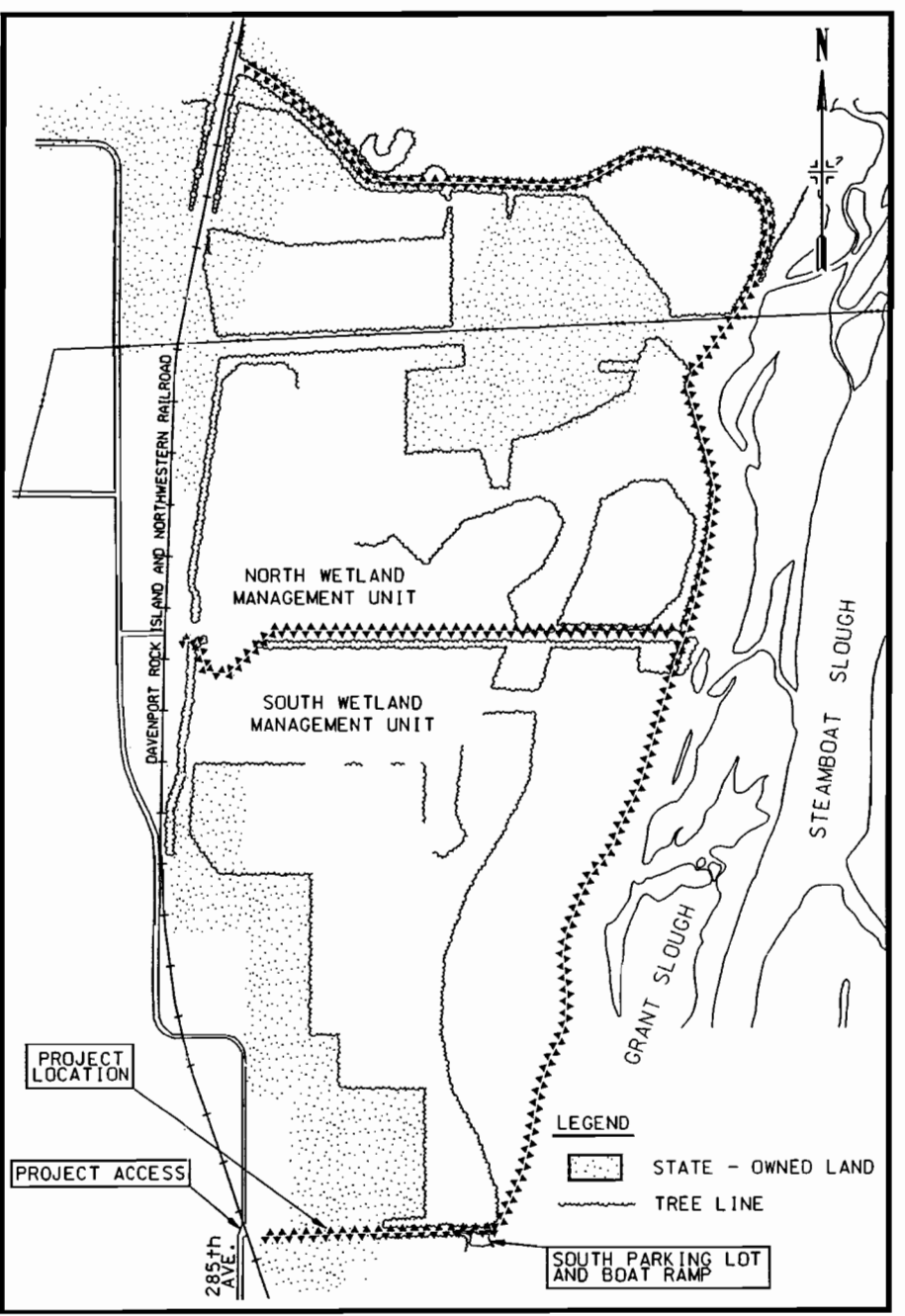
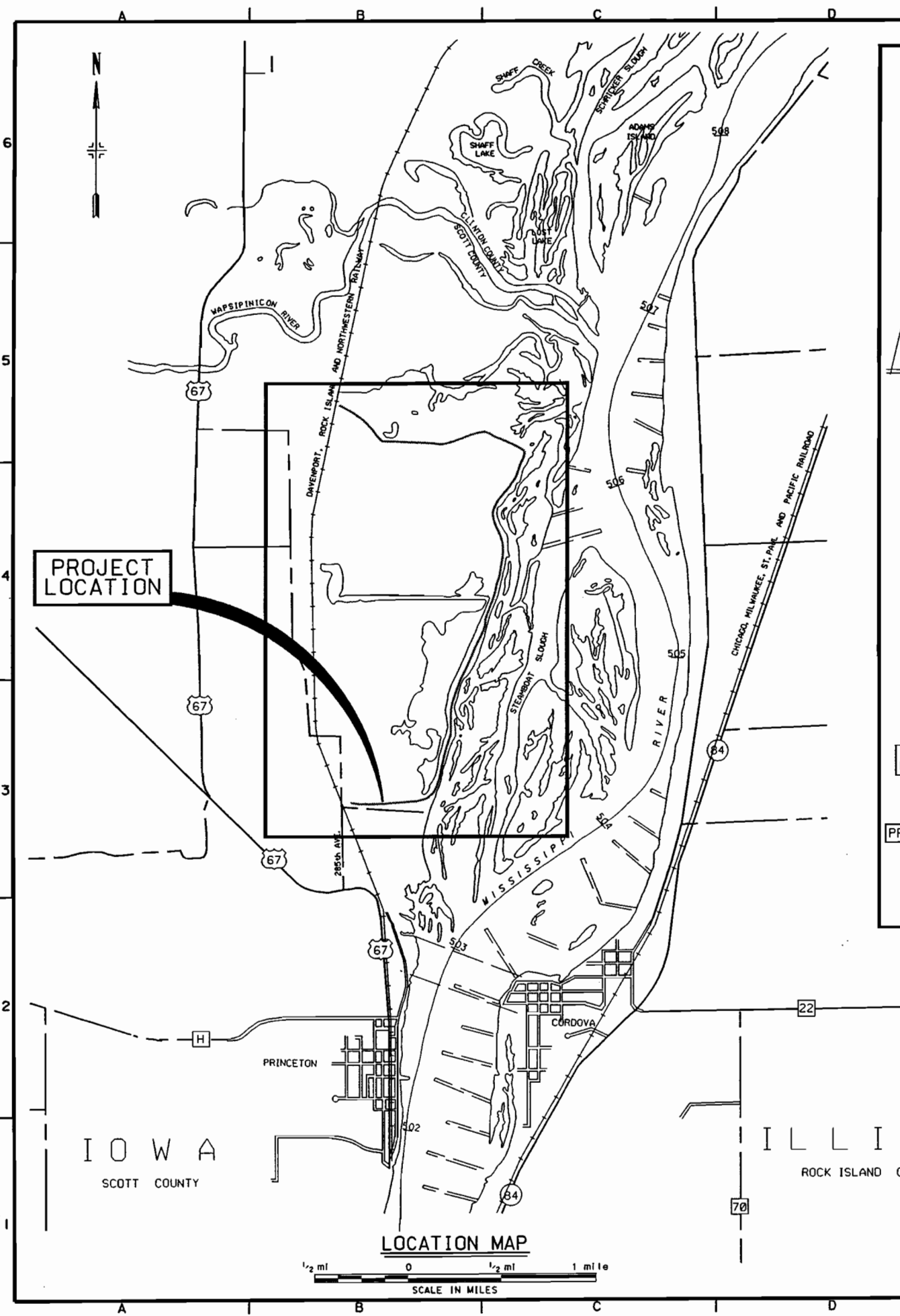
| Revisions |             |               |
|-----------|-------------|---------------|
| Symbol    | Description | Date Approved |
|           |             |               |
|           |             |               |
|           |             |               |
|           |             |               |
|           |             |               |
|           |             |               |

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

|                                                                    |                                                                                                                                                      |
|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Designed by:<br><b>ENG</b>                                         | UPPER MISSISSIPPI RIVER SYSTEM<br>ENVIRONMENTAL MANAGEMENT PROGRAM<br>POOL 14<br>RIVER MILES 504 THRU 506.4<br>PRINCETON<br>WILDLIFE MANAGEMENT AREA |
| Drawn by:<br><b>TRK</b>                                            |                                                                                                                                                      |
| Checked by:<br><b>ENG</b>                                          | <b>MONITORING PLAN</b>                                                                                                                               |
| Reviewed by:<br><b>BCR</b>                                         | Scale: AS SHOWN<br>Date: 20 OCT. 1995<br>Drawing M-L 14-135<br>Code:                                                                                 |
| Approved by:<br><b>CHARLES S. COX<br/>COL., CORPS OF ENGINEERS</b> | Sheet Reference Number:<br><b>MP-1</b><br>Solitation Number:<br>DACR25-95-R-0024<br>Sheet 24 of 48                                                   |

25-JUN-2002 10:25  
e:\proj\ar11\map32\map32p40.dgn

15-JUL-2005 01:53  
 emwdfscodmproj\ectrs\EP8\005\dmw\3x02.dgn



**GENERAL NOTES:**

1. THE SCOPE OF WORK GENERALLY CONSISTS OF, BUT IS NOT LIMITED TO:
  - A. LOWER APPROXIMATELY 2300 FEET OF OVERFLOW ROADWAY.
  - B. PLACE APPROXIMATELY 3 INCHES OF GRANULAR SURFACING.
2. THE ENTIRE INTERIOR OF THE CONSTRUCTION SITE IS PROTECTED BY LEVEES, AND THE GROUNDWATER LEVELS ARE HIGHLY INFLUENCED BY VARYING RIVER STAGES.
3. THE LAYOUT OF THE PROJECT FEATURES AND CONSTRUCTION WORK LIMITS AS SHOWN SHALL BE FIELD STAKED AND APPROVED BY THE CONTRACTING OFFICER PRIOR TO CONSTRUCTION.
4. THE MAJORITY OF THE TOPOGRAPHICAL CONTOURS SHOWN WERE DEVELOPED FROM FIELD AND AERIAL SURVEYS TAKEN PRIOR TO THE FLOOD OF 1993. ACTUAL CONTOURS MAY VARY.

| INDEX     |                |                                         |
|-----------|----------------|-----------------------------------------|
| SHEET NO. | SHEET REF. NO. | TITLE OF DRAWING                        |
| 1         | X1             | COVER SHEET                             |
| 2         | X2             | LOCATION MAPS, GENERAL NOTES, AND INDEX |
| 3         | C1             | SITE PLAN                               |
| 4         | C2             | LOWER OVERFLOW ROADWAY (SPILLWAY)       |



| Symbol | Description | Date | Approved |
|--------|-------------|------|----------|
|        |             |      |          |
|        |             |      |          |
|        |             |      |          |

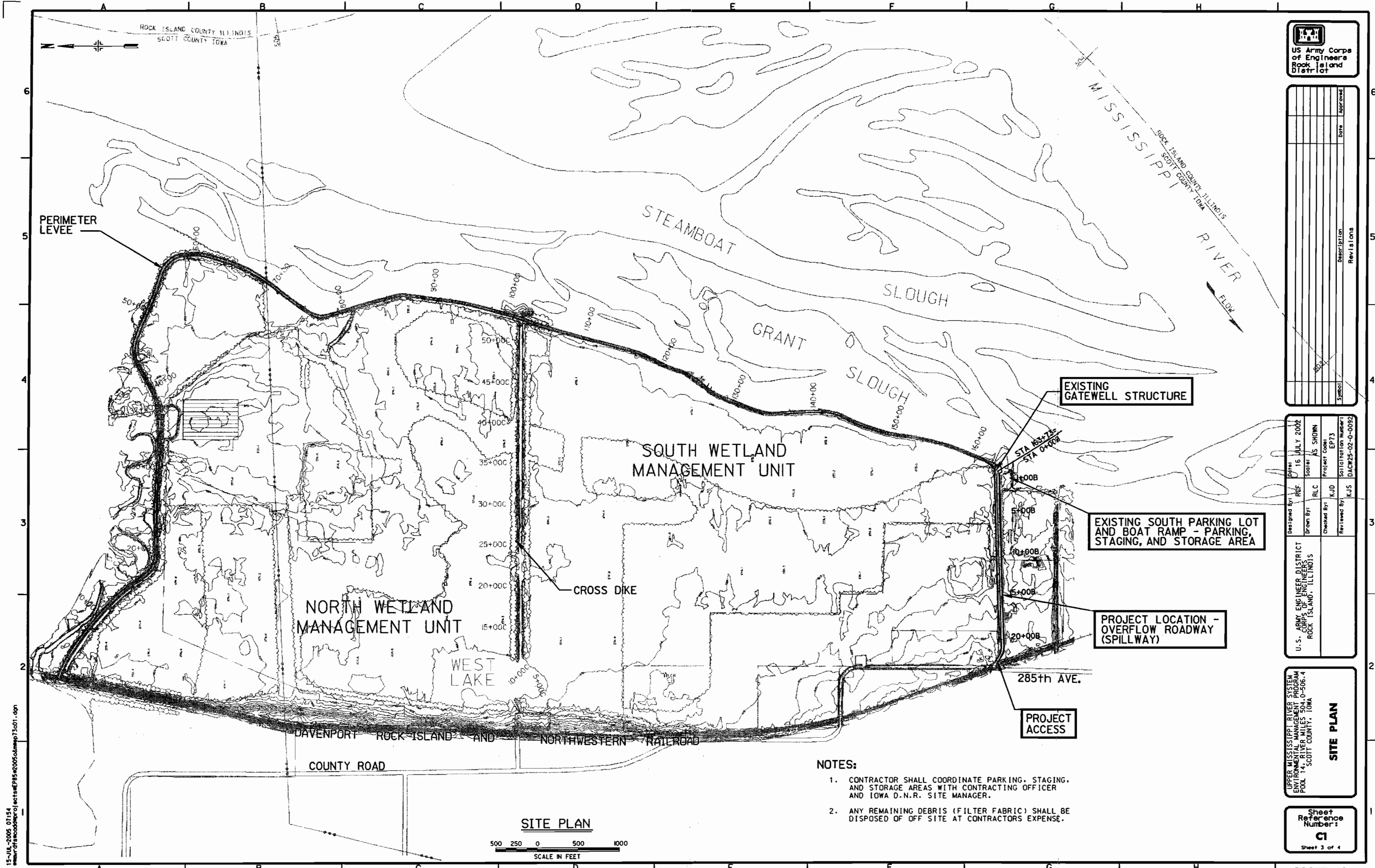
|              |     |                       |                  |
|--------------|-----|-----------------------|------------------|
| Designed By: | RCF | Date:                 | 16 JULY 2002     |
| Drawn By:    | RLC | Scale:                | AS SHOWN         |
| Checked By:  | KJD | Project Code:         | EPT3             |
| Reviewed By: | KJS | Specification Number: | DACW25-02-0-0092 |

U.S. ARMY ENGINEER DISTRICT  
 ROCK ISLAND, ILLINOIS

UPPER MISSISSIPPI RIVER SYSTEM  
 ENVIRONMENTAL MANAGEMENT PROGRAM  
 POOL 14, RIVER MILES 504.0-506.4  
 SCOTT COUNTY, IOWA

**LOCATION MAPS,  
 GENERAL NOTES,  
 AND INDEX**

Sheet Reference Number:  
**X2**  
 Sheet 2 of 4



ROCK ISLAND COUNTY ILLINOIS  
SCOTT COUNTY IOWA



| Symbol | Description | Date | Approved |
|--------|-------------|------|----------|
|        |             |      |          |
|        |             |      |          |
|        |             |      |          |
|        |             |      |          |
|        |             |      |          |

|              |     |                       |                 |
|--------------|-----|-----------------------|-----------------|
| Designed By: | RFB | Date:                 | 16 JULY 2002    |
| Drawn By:    | RLC | Scale:                | AS SHOWN        |
| Checked By:  | KJD | Project Code:         | EPT3            |
| Reviewed By: | KJS | Soil Citation Number: | DAW25-02-0-0092 |

UPPER MISSISSIPPI RIVER SYSTEM  
ENVIRONMENTAL MANAGEMENT PROGRAM  
POOL 14, RIVER MILES 504.0-506.4  
SCOTT COUNTY, IOWA

Sheet Reference Number:  
**C1**  
Sheet 3 of 4

- NOTES:**
- CONTRACTOR SHALL COORDINATE PARKING, STAGING, AND STORAGE AREAS WITH CONTRACTING OFFICER AND IOWA D.N.R. SITE MANAGER.
  - ANY REMAINING DEBRIS (FILTER FABRIC) SHALL BE DISPOSED OF OFF SITE AT CONTRACTORS EXPENSE.

**SITE PLAN**



15-JUL-2005 07:54  
c:\work\project\p18\2005\olmwp13.s01.dgn

