



US Army Corps
Of Engineers
St. Paul District

OPERATION AND MAINTENANCE MANUAL

ENVIRONMENTAL MANAGEMENT PROGRAM

RICE LAKE HREP

SCOTT COUNTY, MINNESOTA

September 1999

PREFACE

The Rice Lake Habitat Rehabilitation and Enhancement Project, constructed by the Corps of Engineers, was completed in November 1998. In accordance with Section 906(e) of the Water Resources Development Act of 1986 and the policies set forth in the Fourth and Fifth Annual Addendums, the U.S. Fish and Wildlife Service has the responsibility for the operation and maintenance of project features located on the Minnesota Valley National Wildlife Refuge. The Corps of Engineers has prepared this manual to assist the U.S. Fish and Wildlife Service in fulfilling this responsibility.

The manual and appendices contain the latest information pertinent to operation and maintenance of this project. The project as designed and constructed will improve the ability to manage water levels in Rice Lake for a variety of wildlife, primarily migratory water birds. The project will also help maintain a natural perched marsh and accelerate the revegetation of former agricultural lands to forest habitat. The planning, design, and construction of the project was the result of a cooperative effort on the part of the involved Federal and State agencies and the public. The continuation of this cooperation and coordination as part of the operation and maintenance of the project will be important to the success of the project and is strongly recommended.

DEPARTMENT OF THE ARMY
St. Paul District, Corps of Engineers
Army Corps of Engineers Centre, 190 Fifth Street East
St. Paul, Minnesota 55101-1638

UPPER MISSISSIPPI RIVER SYSTEM
ENVIRONMENTAL MANAGEMENT PROGRAM

RICE LAKE, MINNESOTA RIVER
SCOTT COUNTY, MINNESOTA

OPERATION AND MAINTENANCE MANUAL

TABLE OF CONTENTS

<u>ITEM</u>	<u>PAGE</u>
PREFACE	
INTRODUCTION	1
PART I - PROJECT FEATURES AND CONSTRUCTION HISTORY	1
AUTHORIZATION AND LOCATION	1
DESCRIPTION OF PROJECT	2
General/Background	2
Design Considerations	3
CONSTRUCTION HISTORY	4
PART II - OPERATION AND MAINTENANCE	5
GENERAL RESPONSIBILITIES AND PROCEDURES	5
Approved Responsibilities	5
Refuge Manager	5
Inspections	5
Annual Report	6

ITEM CONT'D

PAGE

OPERATION

6

MAINTENANCE

6

INSPECTIONS, TESTS, AND OPERATIONS FOLLOWING
MAJOR STORMS OR FLOODS

7

PROJECT MONITORING AND EVALUATION

7

APPENDICES

A PROJECT DRAWINGS

B MEMORANDUM OF AGREEMENT

C REPLACEMENT SPECIFICATIONS

INTRODUCTION

This manual has been prepared to serve as a guide for the operation and maintenance of the Rice Lake Habitat Rehabilitation and Enhancement Project in Scott County, Minnesota. Operation and maintenance instructions presented are consistent with the general procedures found in the Rice Lake Definite Project Report dated July 1995. This manual has been written for project and management personnel familiar with the project. It does not contain detailed information which is common knowledge to personnel or which is presented in other existing manuals or regulations.

For ease in use, this manual is divided into two sections.

Part I. This section describes the project features and provides historical information on the project.

Part II. This section gives details on the operation and maintenance of the project.

PART I - PROJECT FEATURES AND CONSTRUCTION HISTORY

AUTHORIZATION AND LOCATION

The Rice Lake project was authorized under the provisions of the 1985 Supplemental Appropriations Act (Public Law 99-88) and Section 1103 of the Water Resources Development Act of 1986 (Public Law 99- 662). Rice Lake is a shallow floodplain lake located on the right bank of the Minnesota River approximately 16.7 river miles above the confluence of the Minnesota and Mississippi Rivers. The project lies within the Minnesota Valley National Wildlife Refuge (Refuge). Project drawings (appendix A) show the location of the project.

Because the Rice Lake project is located on Federal lands managed as a National Wildlife Refuge, operation and maintenance of those features are to be carried out in compliance with Section 906(e) of the 1986 Water Resources Development Act and policies set forth in the Fourth and Fifth Annual Addendums.

DESCRIPTION OF THE PROJECT

General/Background

Rice Lake is located just west of Savage, Minnesota, at Minnesota River mile 16.7. Rice Lake covers about 170 acres, and ranges in depth from 18 inches to 3 feet during most growing seasons. The lake provides habitat for migratory waterfowl, other migratory birds, and aquatic furbearers. Rice Lake experienced highly variable water levels from year to year, much of which resulted from high water events on the Minnesota River. During years of high water, the water in Rice Lake was too deep for the growth of aquatic vegetation, especially emergent vegetation. During years of low water, emergent vegetation choked the lake, reducing habitat value for waterfowl and other wildlife. It is estimated that optimal water level conditions for aquatic vegetation in Rice Lake occurred about 3 out of 10 years. There was no capability for the Refuge to manage water levels in Rice Lake to improve this situation.

In the early 1990's, the Refuge purchased a 40-acre agricultural field adjacent to Rice Lake. The opportunity existed to plant trees on this field to accelerate and promote reforestation with a species mix similar to the native floodplain forest in this region.

A short distance below Rice Lake is a 70-acre emergent marsh that is a perched wetland maintained by a natural river levee. Erosion from interior drainage had created a breach in the natural levee, which if left unchecked, would have resulted in drainage and a reduction in size of this wetland.

The planning process considered a number of alternatives for the habitat problems and opportunities in the Rice Lake area. For Rice Lake itself, alternatives evaluation focused on providing the capability for the Refuge to manage water levels in Rice Lake to promote optimal growth of aquatic vegetation, especially emergent plant species. Alternatives were identified and evaluated that would allow the Refuge to both draw down Rice Lake and to impound water in Rice Lake.

For the agricultural field a number of planting options were considered ranging from species composition to measures that would enhance survival and growth of the trees, such as pretreating planting sites and the use of tree tubes, mats, and mulch.

For the natural levee breach two alternatives were evaluated. The first was to stabilize the river bank and the natural levee through the use of riprap. The second was to reconstruct a temporary berm previously constructed by the Refuge to make it a more permanent solution.

The selected plan for Rice Lake was the excavation of a channel in and adjacent to the lake which would provide the Refuge the capability to draw down Rice Lake for habitat management purposes. At the outlet of the channel, a stop log control structure was designed to provide the Refuge with the capability to raise Rice Lake water levels for habitat management purposes. It is estimated that with this water management capability, the Refuge will be able to optimize aquatic vegetation growth for migratory waterfowl and other wildlife approximately 3

out of 4 years, versus the estimated 3 out of 10 years that occurred under unregulated conditions.

The selected plan for the agricultural field was to plant 2-year old seedlings of floodplain forest tree species. The species mixture was an approximation that which occurs in the natural floodplain forest in this area. Some measures were used on a limited basis to enhance survival and growth of the trees. These include mechanical and chemical pre-treatment of planting sites, and the use of tree tubes, mats, and mulch for a limited number of trees.

The selected plan for the natural levee was to reconstruct the temporary berm previously constructed by the Refuge to make it more permanent. An overflow spillway was provided in the berm to prevent erosion of the berm when overtopped by interior drainage.

The Definite Project Report/Environmental Assessment (SP-18), Rice Lake Habitat Rehabilitation and Enhancement Project, July 1995, provides additional details on the project.

Design Considerations

Rice Lake Outlet Channel and Structure - The natural drainage for Rice Lake is to the east via an unnamed channel to Eagle Creek and thence to the Minnesota River. It was decided to reroute the drainage to the west because excavation of a channel in Rice Lake to allow for drawdown and construction of a control structure on the natural outlet channel would have required substantial environmental disturbance. In addition, an outlet channel to the west would need to pass through an existing road (old County Road 18) which provided a convenient location for the construction and operation and maintenance of a control structure.

The purpose of the control structure is to give the Refuge the capability to control water levels in Rice Lake when Minnesota River discharges are below bankfull conditions. During typical operating conditions, the culvert will have a range of flows for +30 cfs to - 30 cfs depending upon the stoplog settings and the elevation of the Minnesota River relative to Rice Lake (a negative number means that flow is into Rice Lake). The maximum flow through the culvert is approximately 65 cfs and the preformed scour holes were designed for this discharge. Preformed scour holes were required on both ends of the culvert due to the bi-directional flow.

The existing culvert through Cty Rd 18 was oval in shape and deteriorated. It was replaced with an 42-inch round corrugated metal pipe (CMP). Hydraulic analysis indicated a 36-inch culvert would be sufficient for the design flow of 30 cfs.. A 42-inch culvert was installed to provide for a margin of error and additional management flexibility.

A stoplog control structure was considered sufficient for the type of water level management under consideration by the Refuge. Wooden stoplogs were selected over aluminum stoplogs because of their better sealing characteristics.

Rice Lake is shallow with a relatively flat bottom topography. The excavated channel to provide drawdown capability was terminated in the deepest portion of the lake as determined by surveys conducted by the construction contractor. The channel was excavated 0.6-foot below

the invert of the outlet culvert to provide some capacity to accommodate future sedimentation.

The natural outlet for Rice Lake was plugged with an earthen plug. The plug was capped with rock to prevent its erosion by overtopping flows.

Wetland Berm/Spillway - The berm was constructed to an elevation matching the topography of the natural levee in this reach, which is equal to the 1.5-year flood event of 11,000 cfs.. The rock-lined overflow spillway was designed to mimic the swales that typically connect the river to the floodplain. It will convey flow from the wetland back to the river channel during the receding limb of the hydrograph after a bankfull event has occurred.

CONSTRUCTION HISTORY

The contract for the Rice Lake project was awarded in September 1996 to Abe Construction Company, Suite 307, 2525 Nevada Avenue North, Golden Valley, Minnesota 55427. Construction of substantial portions of the project (excavation of the channel in Rice Lake, the natural outlet plug, the wetland berm and rock spillway) was subcontracted to Lametti and Sons, Inc., 16028 Forest Boulevard North, P.O. Box 477, Hugo, Minnesota 55038.

Construction began in December 1996 and was completed in November 1998. All features of the project, except for the Rice Lake portion of the outlet channel, were completed during the 1997 construction season. Mechanical excavation of the Rice Lake portion of the outlet channel was originally scheduled for the winter of 1996-97, and then rescheduled for the winter of 1997-98. The work could not be accomplished in either winter due to inadequate ice conditions. The excavation was accomplished by hydraulic dredging during the fall of 1998.

The construction cost of the project was \$386,455.31 broken down as follows:

Mobilization/demobilization	\$ 30,941.46
Outlet channel excavation	153,436.05
Outlet culvert/control structure	40,750.60
Outlet plug	24,815.97
Wetland berm/rock spillway	74,890.26
Tree plantings	54,594.88
Performance bonds	<u>7,026.09</u>
	\$386,455.31

PART II - OPERATION AND MAINTENANCE

GENERAL RESPONSIBILITIES AND PROCEDURES

Approved Responsibilities

Operation and maintenance responsibilities for the Rice Lake project were originally outlined in the Definite Project Report for the project. The acceptance of these responsibilities was formally recognized by an agreement signed by the U.S. Fish and Wildlife Service (USFWS) and the St. Paul District, Corps of Engineers. This agreement, dated October 24, 1995, is contained in appendix B. The capability of the USFWS to carry out the responsibilities described below will be contingent upon the passage of sufficient appropriations by Congress.

Refuge Manager

Typically, the USFWS operation and maintenance responsibility for habitat projects is given to the Refuge Manager in charge of the appropriate National Wildlife Refuge. For the Rice Lake project, the current address for the Refuge Manager is Minnesota Valley National Wildlife Refuge, 3815 East 80th Street, Bloomington, Minnesota 55425. Hereafter, for the purposes of this manual, when describing responsibilities, etc., the term "Refuge Manager" will be used.

Inspections

The District Engineer or his representative will be kept informed on operation and maintenance activities for the Rice Lake habitat project through periodic inspection of the project by the Corps and through review of an annual report submitted by the USFWS. A representative of the Corps will coordinate the periodic inspection in advance with the USFWS. The first inspection will occur within 5 years after project completion. Subsequent inspections will occur at 5 year intervals. After the first 10 years of project operation, the Corps and the USFWS will jointly review the inspection plans and make any appropriate revisions.

The findings of the periodic inspections will be transmitted to the USFWS and could include recommendations for any remedial work considered necessary to maintain the habitat project in a satisfactory condition. Any agreed upon remedial work should be completed as soon as possible by the USFWS as provided in the Memorandum of Agreement between the USFWS and the Corps.

An inspection of the project should be made by the Refuge Manager or a designated representative at a minimum frequency of once a year. The frequency for inspection will be subject to review by the USFWS and Corps and could change upon mutual agreement of both parties. The timing of the inspection can be made at the discretion of the Refuge Manager. No special inspections are required after high water events as they occur on an almost annual basis. The annual inspections should be sufficient to reveal any problems or damage caused by high water events.

Annual Report

An annual report covering inspection of the habitat project shall be submitted to the St. Paul District, attn: Construction-Operations Division, at the end of the calendar year. The report should briefly summarize the condition of the project and any maintenance or repairs required during the reporting period.

OPERATION

The U.S. Fish and Wildlife Service will operate the Rice Lake structure to maximize the habitat benefits for which the project was designed and constructed as described in the Definite Project Report. In general, the Refuge proposes to operate the structure to maximize habitat values for migratory waterbirds and other wetland wildlife. In most years, the structure will be used to drain off Minnesota River flood waters as rapidly as practical. In some years, Rice Lake will be dewatered as much as practical to promote the growth of emergent wetland vegetation while in others, the lake may be held artificially high to control willow and other woody growth. How water levels in the lake are managed will rely primarily upon annual Refuge management plans and Minnesota River water levels.

MAINTENANCE

No maintenance of the Rice Lake dredged channel is anticipated as the channel was over-depth dredged to account for future sedimentation. Should inspections reveal that sedimentation in the channel has reached the point where the channel no longer serves the function for which it was designed, redredging will be considered "project rehabilitation" and the procedures outlined in the section of this manual entitled "Inspections, Tests, and Operations Following Major Storms or Floods" will be followed.

The U.S. Fish and Wildlife Service will maintain all other features of the project necessary for the project to function properly and provide the benefits for which it was designed. No special maintenance instructions are considered necessary. Pertinent sections of the construction specification are contained in appendix C to be used as applicable in procuring replacement rock or other materials.

INSPECTIONS, TESTS, AND OPERATIONS FOLLOWING MAJOR STORMS OR FLOODS

As stated in the Memorandum of Agreement between the USFWS and the Corps, the Corps will be responsible for any mutually agreed upon repair and rehabilitation of the Rice Lake project that may be needed as a result of a specific storm or flood.

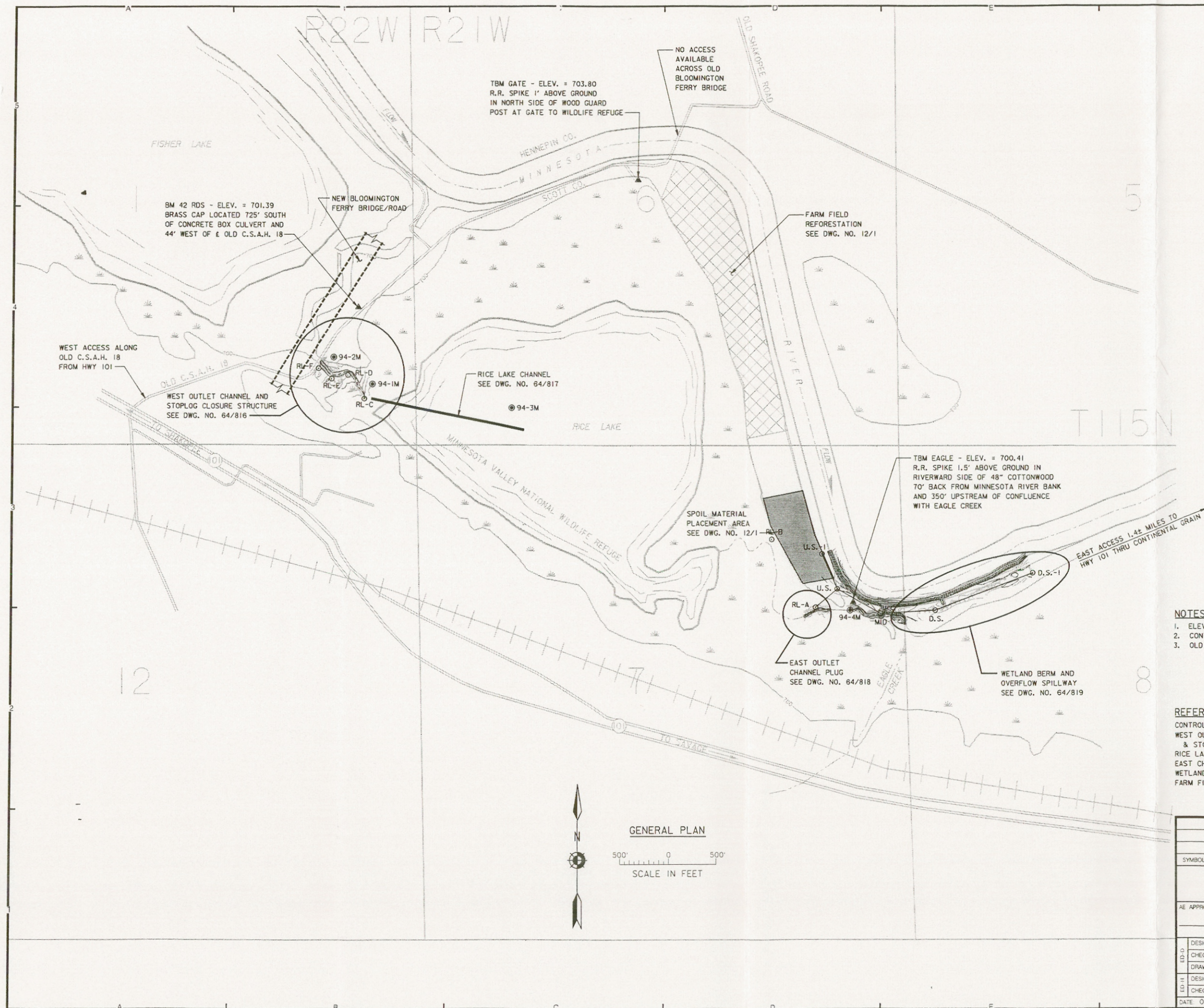
Should inspection of the project area following a major flood or natural disaster disclose substantial damage to the project, the Corps and USFWS will meet and discuss the appropriate course of action in light of original project design. The options of rehabilitation or abandonment of the project may be considered at this time. Any decision would be carried forth only upon written mutual agreement of the USFWS and the Corps. Included within such agreement would be a description of the agreed upon course of action and funding responsibilities, if any.

PROJECT MONITORING AND EVALUATION

Performance monitoring of the Rice Lake project will be conducted by the Corps of Engineers to help determine the extent to which the design meets the habitat improvement objectives. Information from this monitoring will also be used, if required, when ascertaining whether rehabilitation or abandonment of portions of this project would be the wisest choice.

APPENDIX A

PROJECT DRAWINGS

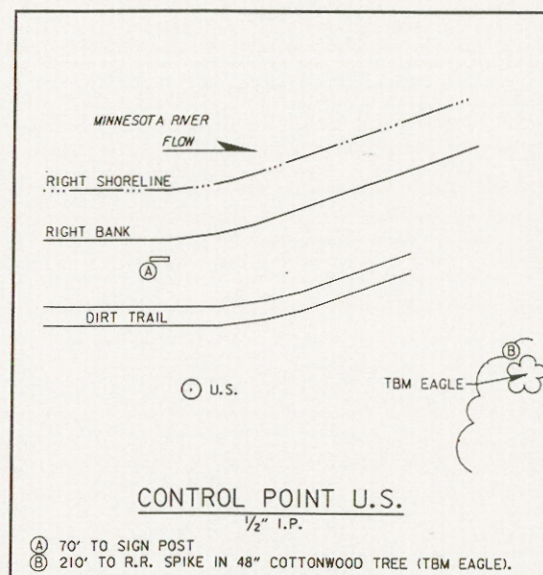
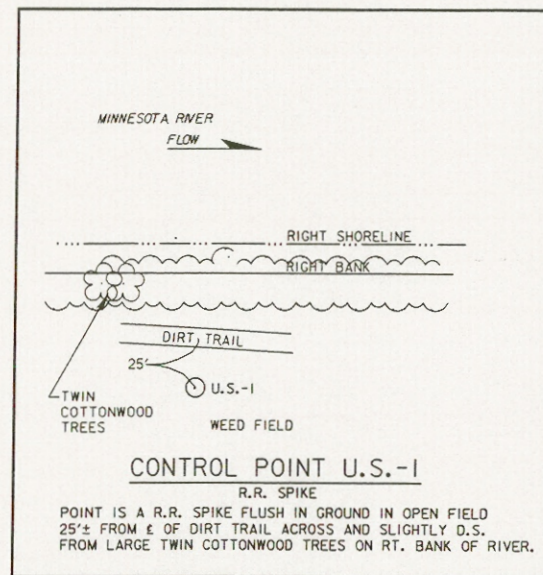
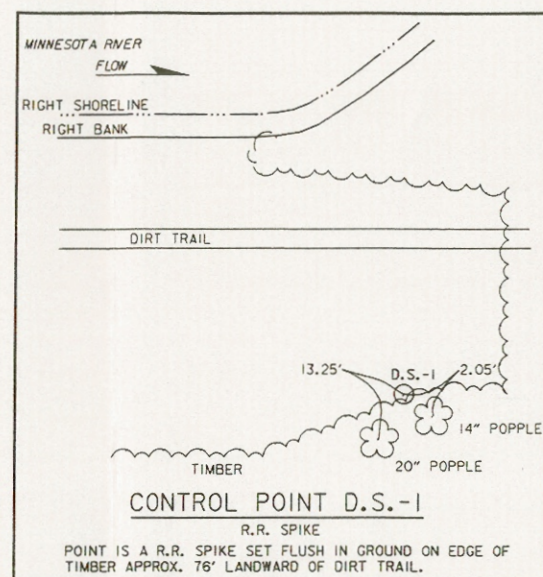
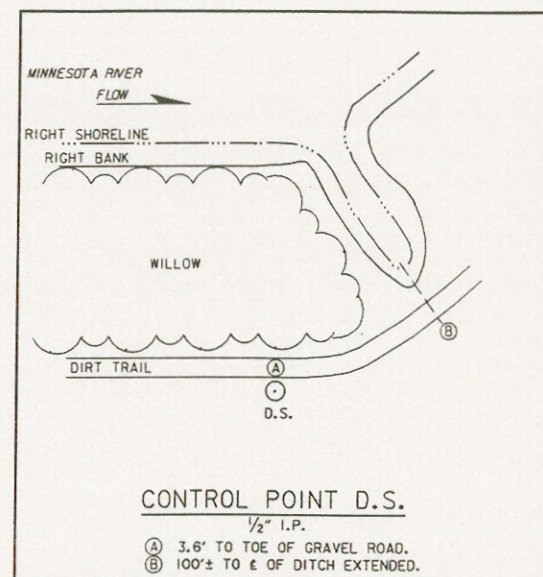
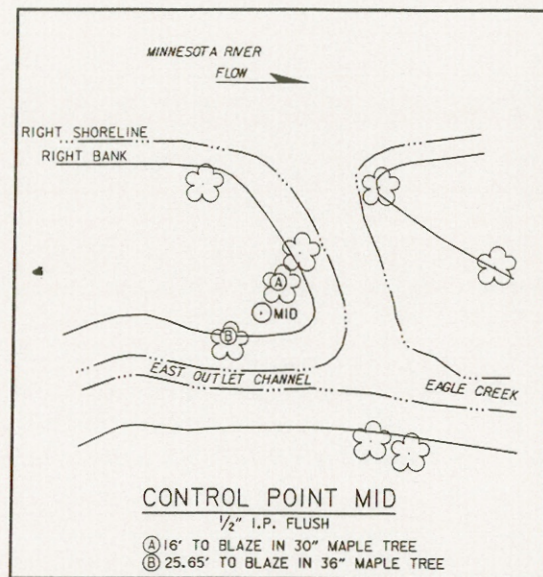


- LEGEND**
- ⊙ BORING
 - HORIZONTAL CONTROL POINT
 - ▲ VERTICAL BENCH MARK
 - △ PI POINT
 - CUT
 - FILL
 - - - EXISTING DRAINAGE
 - ▨ RIPRAP

- NOTES:**
- ELEVATIONS REFER TO MEAN SEA LEVEL (N.G.V.D. 1929 ADJ.).
 - CONTRACTOR MAY USE THE FARM FIELD RESTORATION AREA AS A STAGING AREA.
 - OLD C.S.A.H. 18 IS CLOSED TO PUBLIC VEHICULAR TRAFFIC.

REFERENCES:		DWG. NO.
CONTROL POINT TIES AND DATA		64/815
WEST OUTLET CHANNEL PLAN/TYPICAL SECTION & STOPLOG CLOSURE STRUCTURE LOCATION		64/816
RICE LAKE CHANNEL PLAN AND TYPICAL SECTION		64/817
EAST CHANNEL OUTLET PLUG PLAN AND TYPICAL SECTION		64/818
WETLAND BERM & OVERFLOW SPILLWAY PLAN		64/819
FARM FIELD REFORESTATION PLAN AND DETAILS		12/1

AS-BUILT AS OF MAR 1999		DATE	APPROVAL
SYMBOL		DESCRIPTION	
AE APPROVING OFFICIAL		CONTRACT DRAWING RICE LAKE HREP	
DESIGNED: JJC		ENVIRONMENTAL MANAGEMENT PROGRAM - MINNESOTA RIVER	
CHECKED: JBM		RICE LAKE SCOTT COUNTY, MINNESOTA	
DRAWN: JJC/TJ		DRAINAGE/BERM FEATURES & REFORESTATION	
DESIGNED: CAS, MTH		GENERAL PLAN AND LEGEND	
CHECKED: JSH		CAD FILE NAME: GENPLANA.D	CEMVP-0000012965
DATE: 01-10-96	SOL NO: DACW37-96-R-0011	M34-P-64/814	SHT 2 OF 11



NOTES:

1. ELEVATIONS REFER TO MEAN SEA LEVEL (N.G.V.D. 1929 ADJ.).

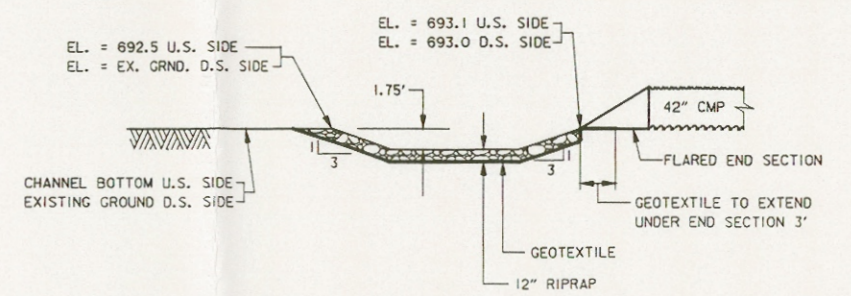
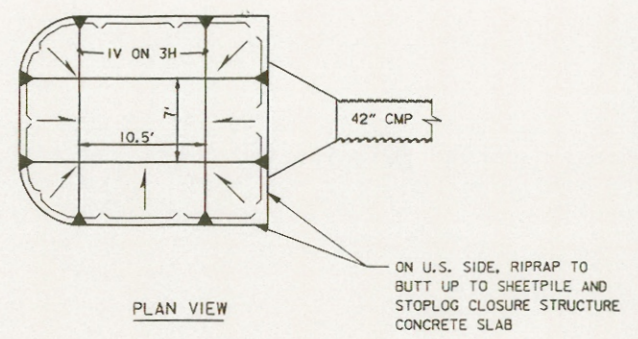
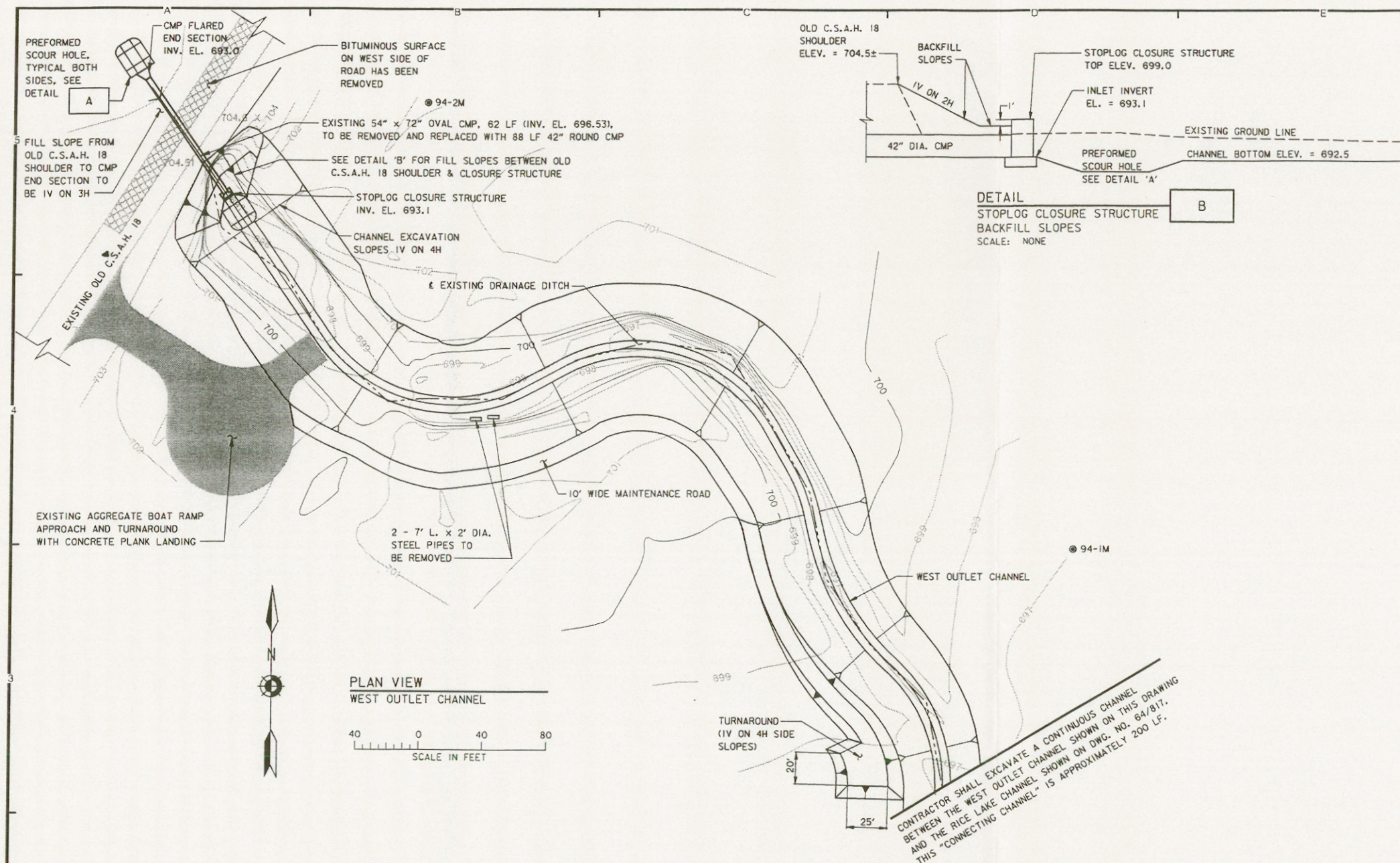
REFERENCES:

GENERAL PLAN AND LEGEND

DWG. NO.

64/814

AS-BUILT AS OF MAR 1999		DATE		APPROVAL	
SYMBOL		DESCRIPTION		DATE	
AE APPROVING OFFICIAL:		CONTRACT DRAWING RICE LAKE HREP			
DESIGNED: JJG		ENVIRONMENTAL MANAGEMENT PROGRAM - MINNESOTA RIVER			
CHECKED: JBM		RICE LAKE SCOTT COUNTY, MINNESOTA			
DRAWN: TJ		DRAINAGE/BERM FEATURES & REFORESTATION			
DESIGNED:		CONTROL POINT TIES AND DATA			
CHECKED:		CEMVP-0000012965			
DATE 01-10-96		CAD FILE NAME RICETIEA.DGN		DRAWING NUMBER	
SOL NO DACW37-96-R-0011		M34-P-64/815		SHT 3	
				OF 11	



U.S. = UPSTREAM SIDE (CONTROL STRUCTURE SIDE)
D.S. = DOWNSTREAM SIDE (FLARED END SECTION SIDE)

DETAIL PREFORMED SCOUR HOLE DOWNSTREAM (D.S.) SIDE SHOWN SCALE: NONE

- NOTES:**
- ELEVATIONS REFER TO MEAN SEA LEVEL (N.G.V.D. 1929 ADJ.).
 - TOPOGRAPHY SURVEYED 23 MAR 95.
 - EXISTING TOPOGRAPHY MAY VARY FROM TOPOGRAPHY SHOWN.
 - LOCATIONS OF FEATURES SHOWN ARE APPROXIMATE. CONTRACTOR TO FIELD STAKE ALIGNMENTS FOR GOVERNMENT APPROVAL PRIOR TO START OF CHANNEL, MAINTENANCE ROAD, AND STOPLOG CLOSURE STRUCTURE CONSTRUCTION.
 - WORK LIMITS SHALL BE 10' FROM OUTSIDE PERIMETER OF WORK SHOWN.
 - WEST OUTLET CHANNEL ALIGNMENT TO FOLLOW THE EXISTING DRAINAGE DITCH AS MUCH AS PRACTICABLE, WHILE ELIMINATING ANY SHARP BENDS AND STRAIGHTENING THE CHANNEL ENTRANCE TO THE STOPLOG CLOSURE STRUCTURE.
 - CONTRACTOR SHALL NOT DISTURB EXISTING BOAT RAMP AND LANDING. WEST OUTLET CHANNEL EXCAVATION SIDE SLOPES IN VICINITY OF BOAT LANDING SHALL MATCH THE LANDINGS SLOPE.

REFERENCES:	DWG. NO.
GENERAL PLAN AND LEGEND	64/814
RICE LAKE CHANNEL	64/817
STOPLOG CLOSURE STRUCTURE PLAN AND SECTIONS	64/821

NOTE: WHERE EXISTING GROUND ELEVATION IS ABOVE ELEVATION 700.0, GRADE A SMOOTH, FREE DRAINING, 10' WIDE DRIVEABLE MAINTENANCE ROAD. GRADING SHALL BE SUCH THAT RAIN AND SURFACE RUNOFF FROM THE SURROUNDING AREA WILL NOT POND ON ROAD. SEED MAINTENANCE ROAD AND SIDE SLOPES.

TYPICAL SECTION WEST OUTLET & CONNECTING CHANNEL SCALE: NONE

AS-BUILT AS OF MAR 1999		DATE 7/99	
SYMBOL	DESCRIPTION	DATE	APPROVAL
US Army Corps of Engineers St. Paul District			
AE APPROVING OFFICIAL: DESIGNED: JJC/JJF CHECKED: JBM DRAWN: JJC DESIGNED: CAS, MTH CHECKED: JSH		CONTRACT DRAWING RICE LAKE HREP ENVIRONMENTAL MANAGEMENT PROGRAM - MINNESOTA RIVER RICE LAKE SCOTT COUNTY, MINNESOTA DRAINAGE/BERM FEATURES & REFORESTATION WEST OUTLET CHANNEL PLAN/TYPICAL SECTION & STOPLOG CLOSURE STRUCTURE LOCATION CEMVP-0000012965	
DATE: 01-10-96		CAD FILE NAME: CULVPLAA.DGN	SHT 4
SOL NO: DACW37-96-R-0011		DRAWING NUMBER: M34-P-64/816	OF 11

CONTRACTOR SHALL EXCAVATE A CONTINUOUS CHANNEL
BETWEEN THE RICE LAKE CHANNEL SHOWN ON THIS DRAWING
AND THE WEST OUTLET CHANNEL SHOWN ON DWG. NO. 64/816.
THIS "CONNECTING CHANNEL" IS APPROXIMATELY 200 LF.

SHORELINE

696

695.5

695

RICE LAKE

694.5

94-3M

RICE LAKE CHANNEL (1,700 ± 100 L.F.)

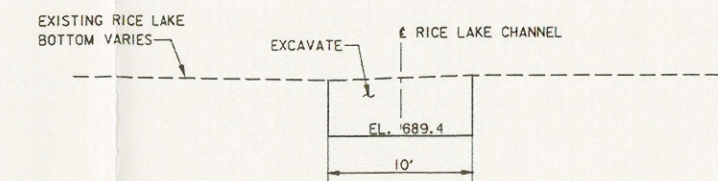
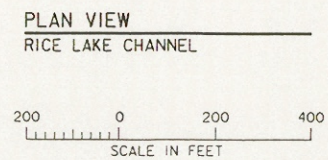
ALIGNMENT OF CHANNEL SHOWN IS APPROXIMATE,
CONTRACTOR TO FIELD LOCATE DEEPEST
POINT IN CENTER OF LAKE AND STAKE
CHANNEL ALIGNMENT FOR GOVERNMENT
APPROVAL PRIOR TO STARTING EXCAVATION

695

695.5

696

SHORELINE



TYPICAL SECTION
RICE LAKE CHANNEL
SCALE: NONE

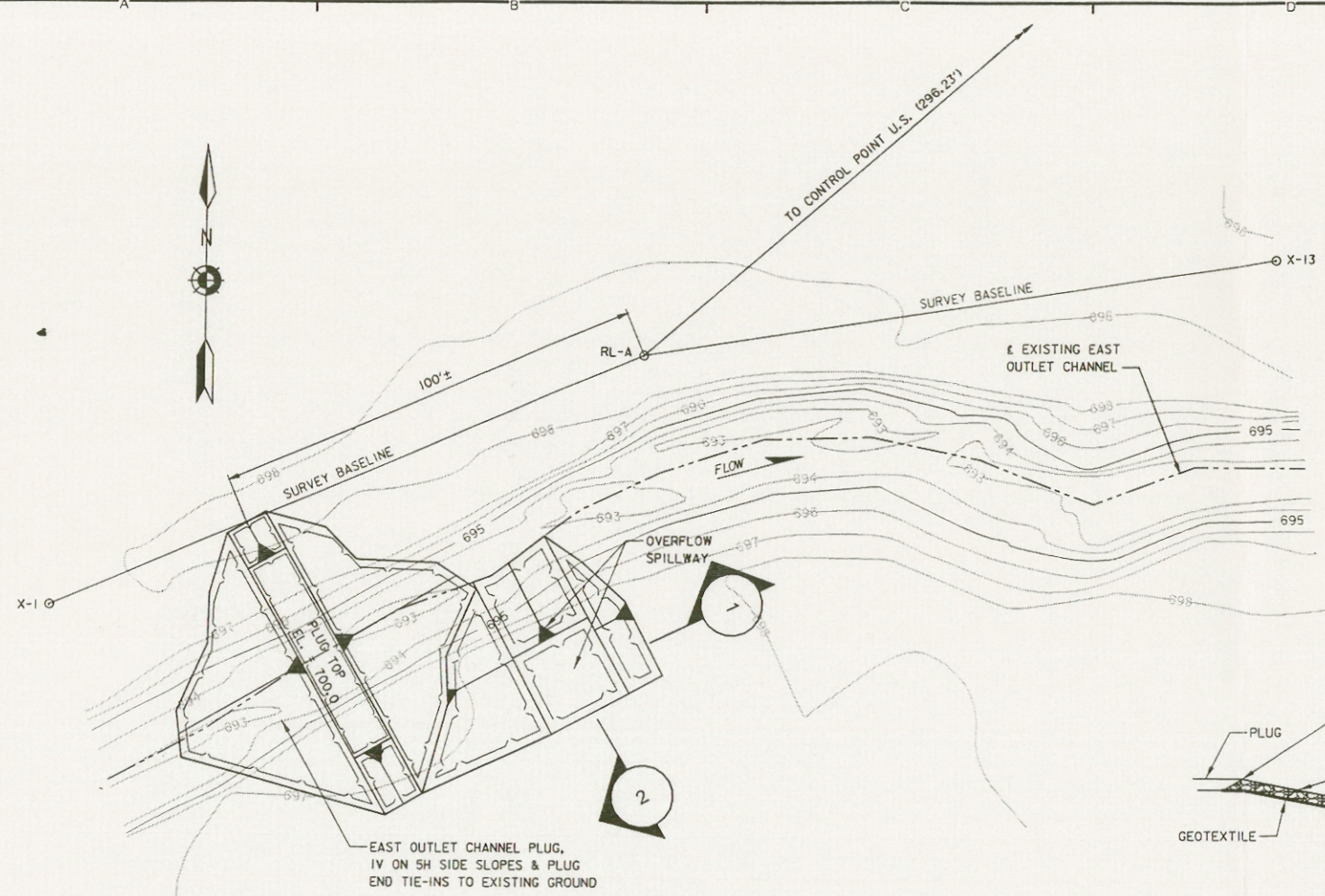
- NOTES:
- ELEVATIONS REFER TO MEAN SEA LEVEL (N.G.V.D. 1929 ADJ.).
 - BATHYMETRY BASED ON DATA FROM 1993.
 - EXISTING BATHYMETRY MAY VARY FROM BATHYMETRIC CONTOURS SHOWN.
 - WORK LIMITS SHALL BE 50' FROM TOP EDGE OF CHANNEL CUT.

REFERENCES:
GENERAL PLAN AND LEGEND
CONTROL POINT TIES AND DATA
WEST OUTLET CHANNEL PLAN/TYPICAL SECTION

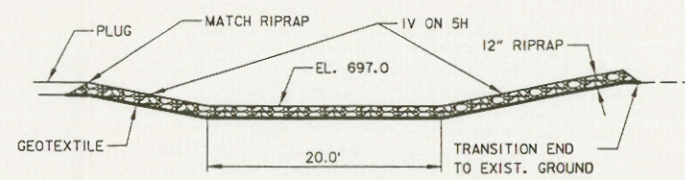
DWG. NO.
64/814
64/815
64/816

AS-BUILT AS OF MAR 1999		DATE	APPROVAL
SYMBOL	DESCRIPTION	DATE	APPROVAL
		TW 7/99	
		US Army Corps of Engineers St. Paul District	
AE APPROVING OFFICIAL:		CONTRACT DRAWING RICE LAKE HREP	
		ENVIRONMENTAL MANAGEMENT PROGRAM - MINNESOTA RIVER	
		RICE LAKE SCOTT COUNTY, MINNESOTA	
		DRAINAGE/BERM FEATURES & REFORESTATION	
		RICE LAKE CHANNEL	
		PLAN AND TYPICAL SECTION	
DESIGNED: JJG	CAD FILE NAME: LAKEA.DGN	SHT 5	
CHECKED: JBM	SOL NO: DACW37-96-R-0011	OF 11	
DRAWN: JJG/TJ			
DESIGNED: CAS			
CHECKED: JSH			
DATE 01-10-96			

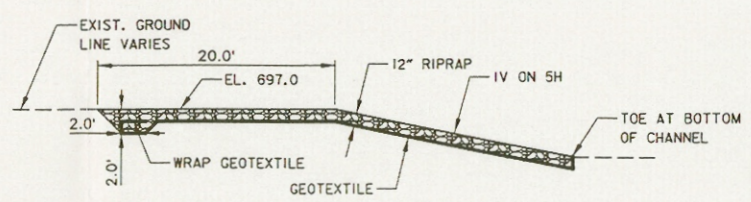
CEMVP-0000012965



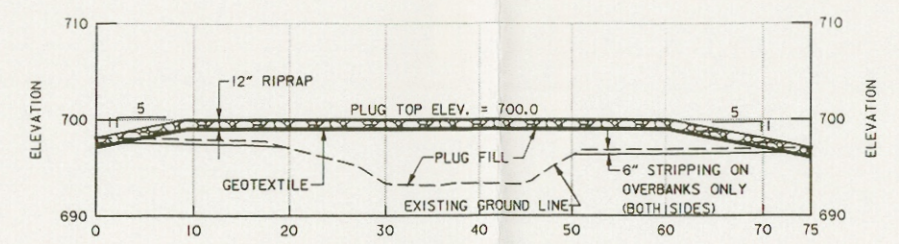
PLAN VIEW
EAST OUTLET CHANNEL PLUG
SCALE IN FEET
20 0 20 40



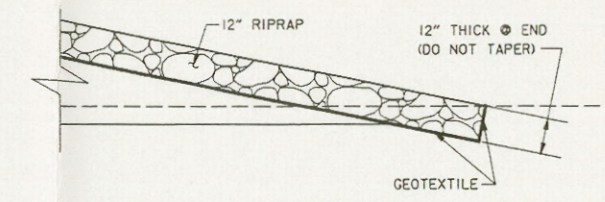
TYPICAL SECTION
EAST OVERFLOW SPILLWAY
SCALE: AS SHOWN



TYPICAL SECTION
EAST OVERFLOW SPILLWAY
SCALE: AS SHOWN



PROFILE ALONG PLUG
LOOKING DOWNSTREAM
SCALE: AS SHOWN



RIPRAP END DETAIL
EAST OUTLET CHANNEL PLUG
SCALE: AS SHOWN

AS-BUILT NOTES:

- OVERFLOW SPILLWAY ADDED DURING CONSTRUCTION AFTER BREACH OCCURRED.

NOTES:

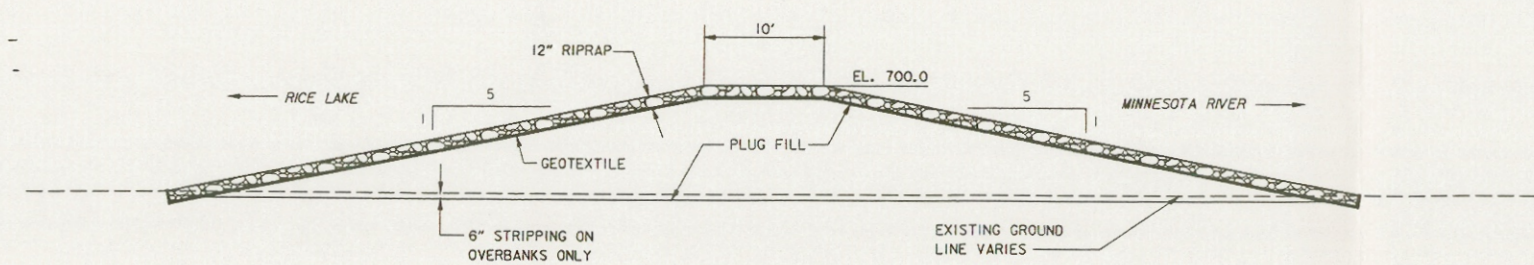
- ELEVATIONS REFER TO MEAN SEA LEVEL (N.G.V.D. 1929 ADJ.).
- TOPOGRAPHY SURVEYED 23 MAR 95.
- EXISTING TOPOGRAPHY MAY VARY FROM TOPOGRAPHIC LINES SHOWN.
- LOCATION OF EAST OUTLET CHANNEL PLUG IS APPROXIMATE, CONTRACTOR TO FIELD STAKE PLUG ALIGNMENT FOR GOVERNMENT APPROVAL PRIOR TO START OF PLUG CONSTRUCTION.
- WORK LIMITS SHALL BE 20' FROM TOE OF PLUG.

REFERENCES:

- GENERAL PLAN AND LEGEND
CONTROL POINT TIES AND DATA

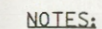
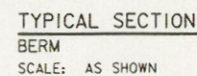
DWG. NO.

- 64/814
64/815



TYPICAL SECTION
EAST OUTLET CHANNEL PLUG
SCALE: NONE

AS-BUILT AS OF MAR 1999		DATE	7/99
SYMBOL	DESCRIPTION	DATE	APPROVAL
US Army Corps of Engineers St. Paul District			
AE APPROVING OFFICIAL: DESIGNED: JJC/JJF CHECKED: JBM DRAWN: JJC DESIGNED: CAS CHECKED: JSH		CONTRACT DRAWING RICE LAKE HREP ENVIRONMENTAL MANAGEMENT PROGRAM RICE LAKE SCOTT COUNTY, MINNESOTA DRAINAGE/BERM FEATURES & REFORESTATION EAST OUTLET CHANNEL PLUG PLAN AND TYPICAL SECTION CEMVP-0000012965	
DATE: 01-10-96 SOL NO: DACW37-96-R-0011		SHEET 6 OF 11	






1. ELEVATIONS REFER TO MEAN SEA LEVEL (N.G.V.D. 1929 ADJ.).
2. TOPOGRAPHY SURVEYED 3 JUN 94.
3. EXISTING TOPOGRAPHY MAY VARY FROM TOPOGRAPHY SHOWN.
4. LOCATION OF BERM SHOWN IS APPROXIMATE, CONTRACTOR TO FIELD STAKE BERM ALIGNMENT FOR GOVERNMENT APPROVAL PRIOR TO START OF BERM CONSTRUCTION. TOE OF NEW BERM, ON WETLAND SIDE, SHALL FOLLOW TOE OF EXISTING GRAVEL TRAIL, AND SHALL NOT ENCRATCH INTO WETLAND IN ANY AREAS. BERM LENGTH $\pm 1,460$ LF.
5. WORK LIMITS SHALL BE 10' FROM OUTSIDE TOE OF WORK SHOWN, EXCEPT ON THE WETLAND SIDE OF THE NEW BERM THE TOE OF THE EXISTING GRAVEL TRAIL IS THE WORK LIMIT.

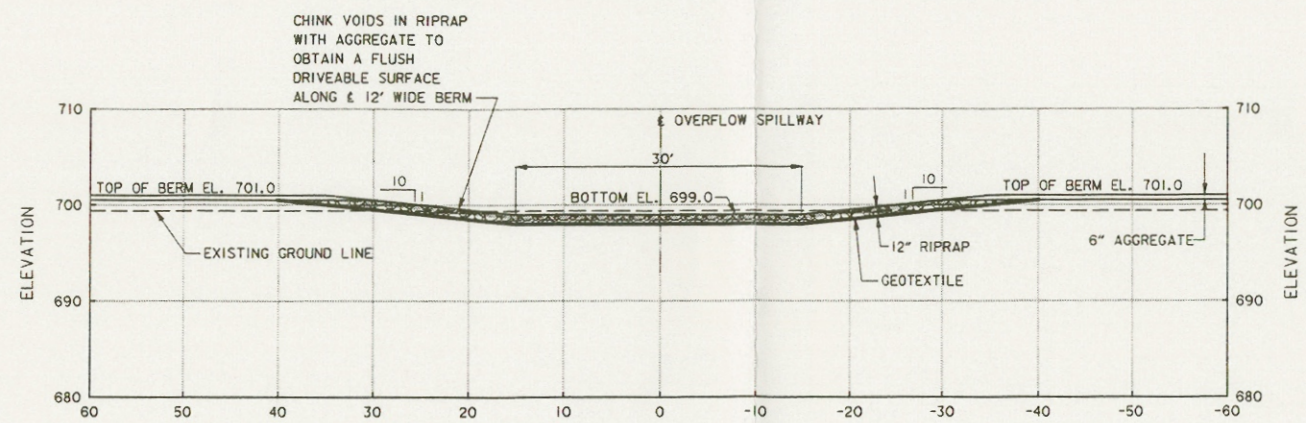
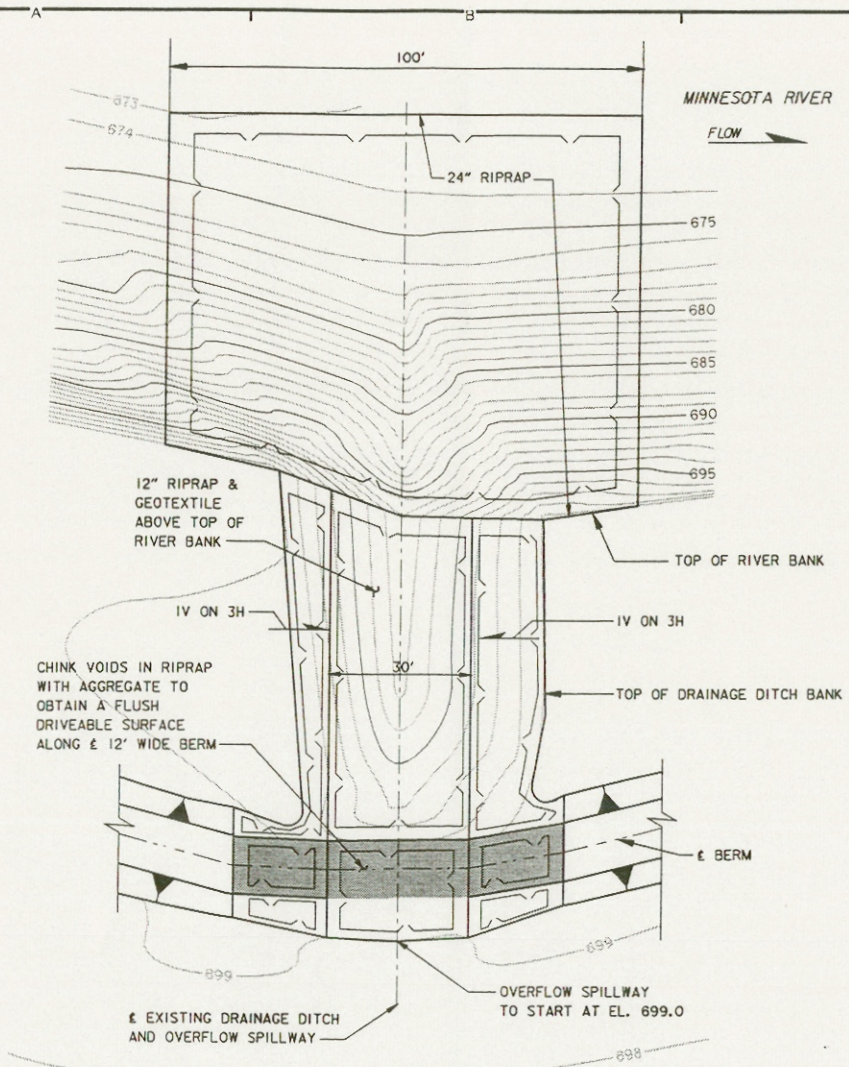
REFERENCES:

GENERAL PLAN AND LEGEND
CONTROL POINT TIES AND DATA
BERM & OVERFLOW SPILLWAY SECTIONS/DETAILS

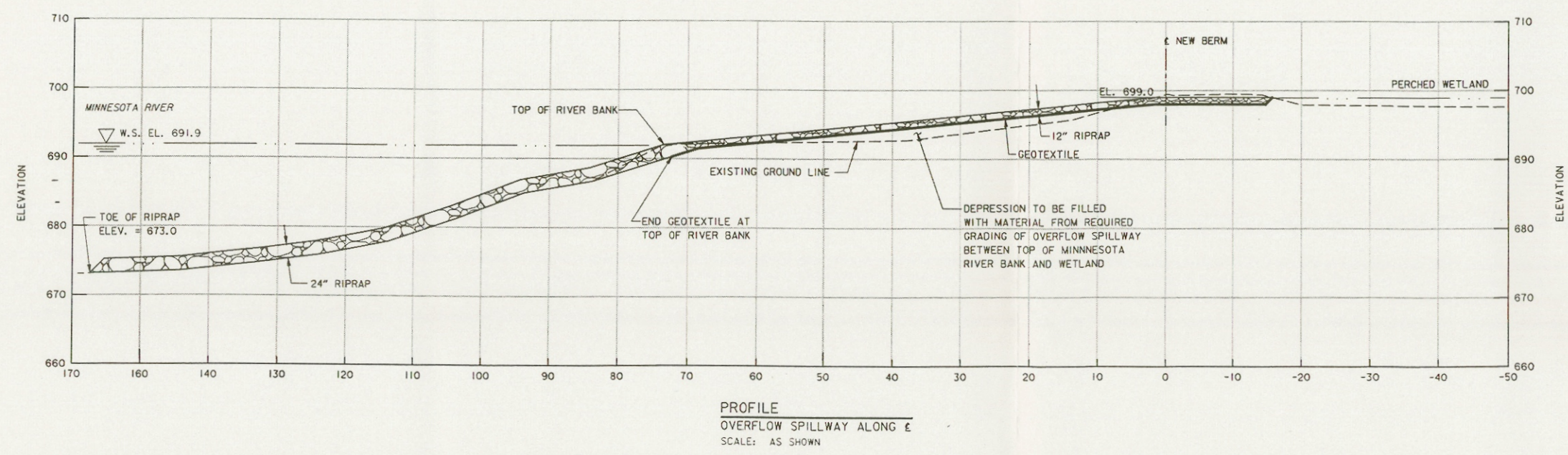
DWG. NO.

64/814
64/815
64/820

		AS-BUILT AS OF MAR 1999		 DATE		 APPROVAL		
SYMBOL		DESCRIPTION						
				US Army Corps of Engineers St. Paul District				
AE APPROVING OFFICIAL:		CONTRACT DRAWING RICE LAKE HREP ENVIRONMENTAL MANAGEMENT PROGRAM - MINNESOTA RIVER RICE LAKE SCOTT COUNTY, MINNESOTA DRAINAGE/BERM FEATURES & REFORESTATION WETLAND BERM & OVERFLOW SPILLWAY PLAN						
ED-0	DESIGNED: JUG/JJF	CAD FILE NAME: LEVEEA.DGN SOL NO: DACW37-96-R-0011 CEMVP-0000012965 M34-P-64/819						SHT 7
	CHECKED: JBM							OF 11
DRAWN: JUG								
ED-11	DESIGNED: CAS							
	CHECKED: JSH							
DATE 01-10-96								



SECTION
OVERFLOW SPILLWAY ALONG E BERM
SCALE: AS SHOWN



NOTES:

- ELEVATIONS REFER TO MEAN SEA LEVEL (N.G.V.D. 1929 ADJ.).
- TOPOGRAPHY SURVEYED 3 JUN 94.
- EXISTING TOPOGRAPHY MAY VARY FROM TOPOGRAPHY SHOWN.
- LOCATION OF OVERFLOW SPILLWAY SHOWN IS APPROXIMATE, CONTRACTOR TO FIELD STAKE ALIGNMENT FOR GOVERNMENT APPROVAL PRIOR TO START OF OVERFLOW SPILLWAY CONSTRUCTION. ON WETLAND SIDE, OVERFLOW SPILLWAY TO START AT EL. 699.0, AND SHALL NOT ENCROACH INTO WETLAND BEYOND THIS POINT.
- WORK LIMITS SHALL BE 10' FROM OUTSIDE TOE OF WORK SHOWN, EXCEPT ON THE WETLAND SIDE OF THE NEW BERM THE TOE OF THE EXISTING GRAVEL TRAIL IS THE WORK LIMIT.

REFERENCES:

GENERAL PLAN AND LEGEND
WETLAND BERM & OVERFLOW SPILLWAY PLAN

DWG. NO.

64/814
64/819

AS-BUILT AS OF MAR 1999		DATE 7/99	
SYMBOL	DESCRIPTION	DATE	APPROVAL
		US Army Corps of Engineers St. Paul District	
AE APPROVING OFFICIAL: DESIGNED: JJC/JJF CHECKED: JBM DRAWN: JJC DESIGNED: CAS CHECKED: JSH DATE: 01-10-96		CONTRACT DOCUMENT RICE LAKE HREP ENVIRONMENTAL MANAGEMENT PROGRAM - MINNESOTA RIVER RICE LAKE SCOTT COUNTY, MINNESOTA DRAINAGE/BERM FEATURES & REFORESTATION OVERFLOW SPILLWAY SECTIONS & DETAILS SUPPLEMENTAL INFORMATION CEMVP-0000012965 CAD FILE NAME: SPILLWAA.DWG SOL NO: DACW37-96-R-0011 M34-P-64/820 SHEET 8 OF 11	



RICE LAKE

RIVER

FLOW



PLAN VIEW
FARM FIELD REFORESTATION

200 0 200 400
SCALE IN FEET

AS-BUILT NOTES:

1. REFORESTATION AREA SHIFTED 60 FT. WEST.

NOTES:

1. ELEVATIONS REFER TO MEAN SEA LEVEL (N.G.V.D. 1929 ADJ.).
2. WIDTHS AND EXTENT OF SPOIL MATERIAL AREA, & FARM FIELD AND TEST PLOT REFORESTATION AREAS SHOWN ARE APPROXIMATE, CONTRACTOR TO FIELD STAKE PERIMETER OF EACH FEATURE AREA, INCLUDING TEST PLOTS, FOR GOVERNMENT APPROVAL PRIOR TO START OF ANY CONSTRUCTION ACTIVITIES IN THIS AREA.
3. WORK LIMITS SHALL BE THE OUTERMOST, GOVERNMENT APPROVED, STAKED PERIMETER.

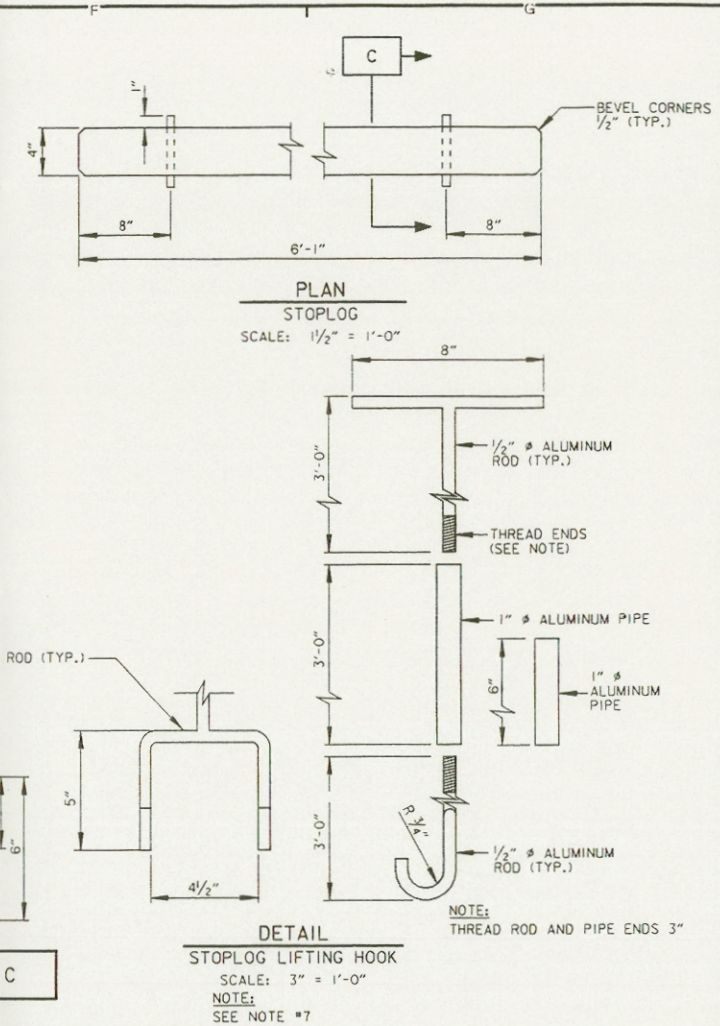
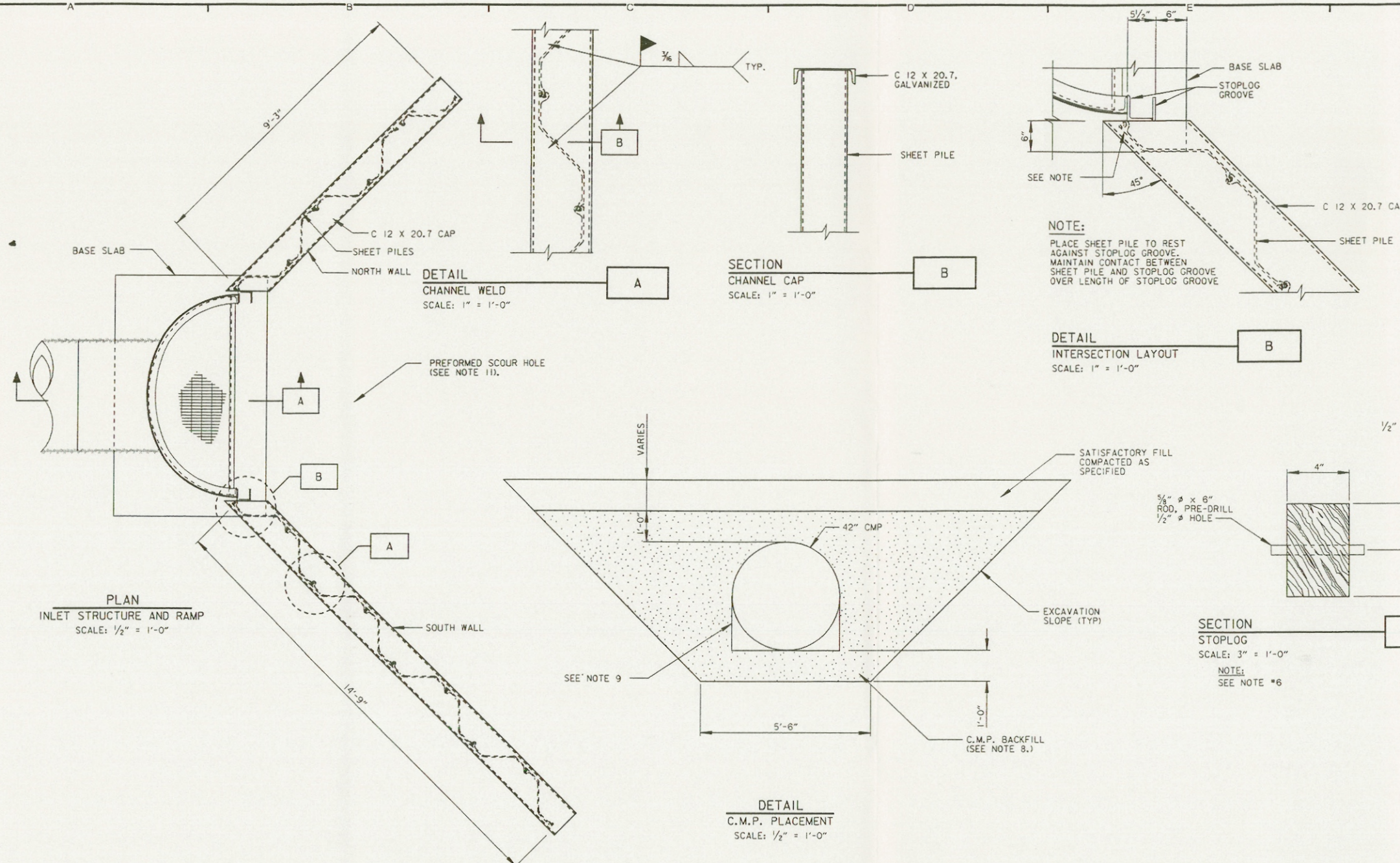
REFERENCES:

GENERAL PLAN AND LEGEND

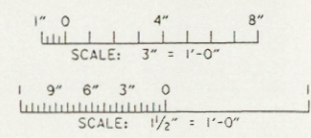
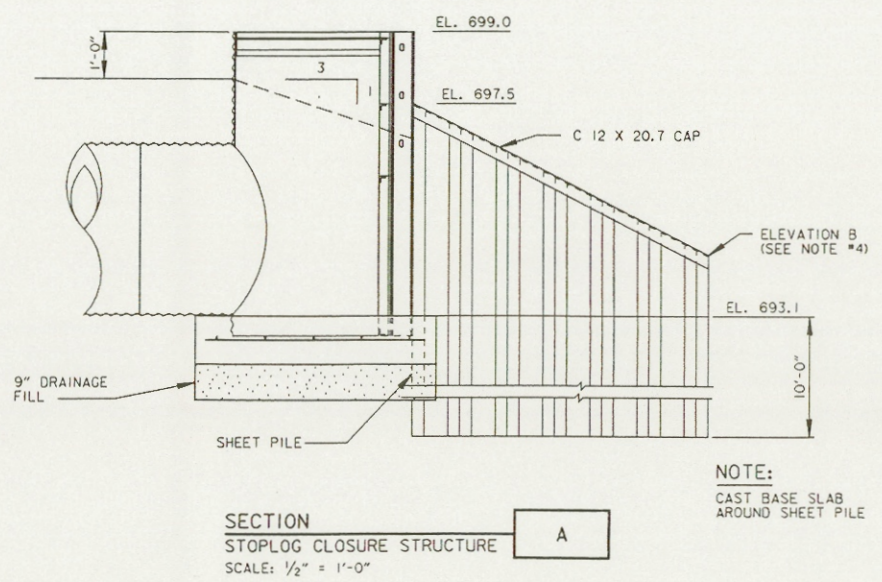
DWG. NO.

64/814

AS-BUILT AS OF MAR 1999		DATE	APPROVAL
SYMBOL	DESCRIPTION		
		US Army Corps of Engineers St. Paul District	
AE APPROVING OFFICIAL: DESIGNED: JJG CHECKED: JBM DRAWN: JJG DESIGNED: CAS CHECKED: JSH		CONTRACT DOCUMENT RICE LAKE HREP ENVIRONMENTAL MANAGEMENT PROGRAM - MINNESOTA RIVER RICE LAKE SCOTT COUNTY, MINNESOTA DRAINAGE/BERM FEATURES & REFORESTATION FARM FIELD REFORESTATION PLAN AND DETAILS CEMVP-0000012965	
DATE 01-10-96	CAD FILE NAME FORESTA.DGN SOL NO DACW37-96-R-0011	DRAWING NUMBER M34-P-12/1	SHT 9 OF 11



- NOTES:**
- ELEVATIONS REFER TO MEAN SEA LEVEL (N.G.V.D. 1929 ADJ.)
 - ALL BOLTS FOR METAL CONSTRUCTION AND ANCHORS SHALL BE ASTM A325, GALVANIZED AS SPECIFIED.
 - ALL CMP JOINT CONNECTIONS SHALL USE HUGGER BANDS AND RUBBER O-RING GASKETS AS SPECIFIED.
 - ELEVATION B, END OF SHEET PILE WALL, IS 694.5 ON THE SOUTH WALL AND 693.5 ON THE NORTH WALL.
 - SHEET PILE SHALL BE OF THICKNESS AND SECTION MODULUS SPECIFIED.
 - PROVIDE 13 STOPLOGS.
 - PROVIDE 2 STOPLOG LIFTING HOOKS.
 - PLACE C.M.P. BACKFILL TO A MINIMUM OF ONE FOOT ABOVE TOP OF PIPE. COMPACT BACKFILL WITH HAND EQUIPMENT TO SPECIFIED COMPACTION.
 - HAND PLACE AND HAND TAMP UNDER CMP HAUNCHES.
 - SEE DRWG. 64/816 FOR PREFORMED SCOUR HOLE DETAILS.



AS-BUILT AS OF MAR 1999		DATE	7/89
SYMBOL	DESCRIPTION	DATE	APPROVAL
US Army Corps of Engineers St. Paul District			
AE APPROVING OFFICIAL DESIGNED: TSF CHECKED: PWS DRAWN: HPA		CONTRACT DOCUMENT RICE LAKE HREP ENVIRONMENTAL MANAGEMENT PROGRAM - MINNESOTA RIVER RICE LAKE SCOTT COUNTY, MINNESOTA DITCHES, CULVERTS, AND DIKES STOPLOG CLOSURE STRUCTURE PLAN AND SECTIONS CEMVP-0000012965	
DATE 1-12-96	CAD FILE NAME: RICELK23.DGN	DRAWING NUMBER	SHT 10
SOL NO: DACW37-96-R-0011	M34-P-64/821	GF 11	

PLAN
STOPLOG CLOSURE STRUCTURE
SCALE: $\frac{3}{4}" = 1'-0"$

ELEVATION
STOPLOG GROOVE FRAME
SCALE: $1\frac{1}{2}" = 1'-0"$

SECTION
STOPLOG CLOSURE STRUCTURE
SCALE: $\frac{3}{4}" = 1'-0"$

SECTION
STOPLOG CLOSURE STRUCTURE
SCALE: $\frac{3}{4}" = 1'-0"$

DETAIL
TYPICAL GRATING
SCALE: 3" = 1'-0"

DETAIL
STOPLOG LOCKING CHANNEL
SCALE: 1 1/2" = 1'-0"

SECTION
LOCKING BOLT
SCALE: 3" = 1'-0"

DETAIL
TYPICAL GRATING ANCHOR
SCALE: NO SCALE


DETAIL
LOCKING ROD HOLE
SCALE: 6" = 1'-0"

SECTION
STOPLOG GROOVE FRAME
SCALE: 1 1/2" = 1'-0"

DETAIL
STOPLOG GROOVE
SCALE: 6" = 1'-0"

NOTES:

1. ELEVATIONS REFER TO MEAN SEA LEVEL (N.G.V.D. 1929 ADJ.)
2. CMP AND RISER SHALL BE OF MATERIAL SPECIFIED WITH 2 2/3" X 1/2" CORRELATIONS. 42" CMP SHALL BE 14 GAUGE THICKNESS AND RISER SHALL BE 8 GAUGE THICKNESS.
3. ALL ALUMINIZED SURFACES IN CONTACT WITH CONCRETE SHALL BE COATED WITH AN APPROVED BITUMINUS MATERIAL
4. ALL STEEL SECTIONS, BARS AND PLATES SHALL BE ASTM A36, GALVANIZED AFTER FABRICATION AS SPECIFIED
5. REPAIR OF GALVANIZED COATING SHALL BE CONDUCTED AFTER WELDING AS SPECIFIED

				AS-BUILT AS OF MAR 1999		TW		7/97	
SYMBOL		DESCRIPTION				DATE		APPROVAL	
						US Army Corps of Engineers St. Paul District			
AE APPROVING OFFICIAL:				CONTRACT DOCUMENT RICE LAKE HREP					
				ENVIRONMENTAL MANAGEMENT PROGRAM - MINNESOTA RIVER RICE LAKE SCOTT COUNTY, MINNESOTA					
DESIGNED: TSF				DITCHES, CULVERTS, AND DIKES					
CHECKED: PWS				STOPLOG CLOSURE STRUCTURE					
DRAWN: HPA				ELEVATION, PLAN, SECTIONS AND DETAILS					
DESIGNED:									
CHECKED:				CAD FILE NAME: RICELK24.DWG					
DATE: 1-12-96				SOL NO: DACW37-96-R-0011				SHT 11	
				M34-P-64/822				OF 11	

APPENDIX B

MEMORANDUM OF 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
RICE LAKE
SCOTT COUNTY, MINNESOTA

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 Rice Lake separable element of the Upper Mississippi River System - Environmental Management Program (UMRS-EMP).

II. BACKGROUND

Section 1103 of the Water Resources Development Act of 1986, Public Law 99-662, authorizes construction of measures for the purpose of enhancing fish and wildlife resources in the Upper Mississippi River System. The project area is managed by the USFWS and is on land managed as a national 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 for the Rice Lake project 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 Rice Lake project are 100 percent Federal.

III. GENERAL SCOPE

The project to be accomplished pursuant to this MOA shall consist of rehabilitating and improving the fish and wildlife habitat at Rice Lake on the Minnesota Valley National Wildlife Refuge. This would involve excavation of a channel in and adjacent to Rice Lake to permit the drawdown of Rice Lake for habitat management; the installation of a culvert with stop log controls to permit regulation of Rice Lake water levels for habitat management; tree plantings to promote revegetation of a former agricultural field; and the construction of a low berm with an overflow spillway to prevent drainage of a wetland adjacent to Eagle Creek.

IV. RESPONSIBILITIES

A. DOA is responsible for:

1. Construction: Construction of the project which consists of excavating a 1,730-foot channel in and adjacent to Rice Lake; installation of a 42-inch CMP with a stop log control structure through old County Road 18; placing an earthen plug in the natural outlet of Rice Lake; planting approximately 24,000 trees; and constructing a low berm with a rock lined overflow spillway between a 70-acre wetland and the Minnesota River.

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 the Rice Lake project as described in the Definite Project Report/Environmental Assessment, Rice Lake Habitat Rehabilitation and Enhancement Project, dated July 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. USFWS is responsible for operation, maintenance, and repair: Upon completion of construction as determined by the District Engineer, St. Paul, the USFWS shall accept the project and shall operate, maintain, and repair the project as defined in the Definite Project Report/Environmental Assessment entitled "Rice Lake Habitat Rehabilitation and Enhancement Project," dated July 1995, in accordance with Section 107(b) of the Water Resources Development Act of 1992, Public Law 102-580.

V. MODIFICATION AND TERMINATION

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

VI. REPRESENTATIVES

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

USFWS: Regional Director
U.S. Fish and Wildlife Service
Bishop Henry Whipple Federal Building
1 Federal Drive
Fort Snelling, Minnesota 55111-4056

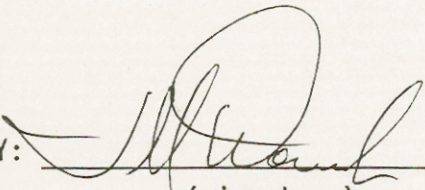
DOA: District Engineer
U.S. Army Corps of Engineers, St. Paul District
Army Corps of Engineers Centre
190 Fifth Street East
St. Paul, Minnesota 55101-1638

VII. EFFECTIVE DATE OF MOA

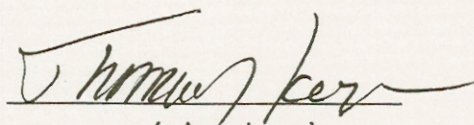
This MOA shall become effective when signed by the appropriate representatives of both parties.

THE DEPARTMENT OF THE ARMY

THE U.S. FISH AND WILDLIFE SERVICE

BY: 
(signature)

J.M. WONSIK
Colonel, Corps of Engineers
St. Paul District

BY: 
(signature)

for WILLIAM F. HARTWIG
Regional Director
U.S. Fish and Wildlife Service

DATE: 10 OCT 95

DATE: 10-24-95

APPENDIX C

REPLACEMENT SPECIFICATIONS

SECTION 02271
STONE PROTECTION

INDEX

<u>PARAGRAPH</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
1	GENERAL	02271-1
2	PRODUCTS	02271-3
3	EXECUTION	02271-5

SECTION 02271

STONE PROTECTION

1. GENERAL.

1.1 SCOPE. This section covers riprap for erosion protection.

1.2 RELATED WORK OF OTHER SECTIONS. The following items of related work are covered under other sections:

- 1) Dewatering: SECTION 01000: GENERAL.
- 2) Excavation for erosion protection: SECTION 02222: EXCAVATION.
- 3) Installation of geotextile: SECTION 02272: GEOTEXTILE.

1.3 APPLICABLE PUBLICATIONS. The following publications of the issues listed below, but referenced to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

American Society for Testing and Materials (ASTM).

D 2487-93

Classification of Soils for Engineering Purposes.

1.4 SUBMITTALS. The following shall be submitted in accordance with SECTION 01300: SUBMITTAL PROCEDURES:

1.4.1 Gradation and testing procedures as specified in PARAGRAPH: TESTS FOR GRADATION AND SHAPE.

1.4.2 Material sources as specified in PARAGRAPH: SOURCES AND EVALUATION.

1.4.3 Test results as specified in PARAGRAPH: TESTS FOR GRADATION AND SHAPE.

1.5 MEASUREMENT AND PAYMENT.

1.5.1 Measurement. Riprap shall be weighed on accurate, approved scales furnished or made available by the Contractor. Before being approved for use, the scales shall be tested by the Department of Weights and Measures or by a reliable scale servicing company so as to operate within a degree of error not greater than one percent and be sensitive to a change in load of 1/5 of one percent, both percentages being used on the total required weight of material normally weighed as a unit on the scale. Scales shall be spot checked for accuracy and sensitivity at least once each week as the work progresses. When materials are weighed in hauling vehicles, gross weights shall be checked and the vehicle tare weight determined as often as the Contracting Officer directs. The Contractor shall furnish such weights, accessories, and assistance as the Contracting Officer may require for making weighing equipment tests.

1.5.1.1 Weighing operations shall be performed offsite, as approved, in the presence of a representative of the Contracting Officer. The Contracting Officer reserves the right to waive his/her presence during weighing operations. Each load shall be accompanied by duplicate copies of delivery tickets certified by the weighmaster. As a minimum, each ticket shall contain the following information:

- (1) Date and time.
- (2) Vehicle number.
- (3) Gross weight.
- (4) Vehicle tare weight.
- (5) Net weight.
- (6) Material weight.
- (7) Signature of weighmaster.

Delivery tickets shall be collected by the Contractor and one copy thereof furnished to the Contracting Officer at the close of each day's operation.

1.5.2 Payment for riprap shall be by the ton (2000 pounds avoirdupois) of material acceptably placed within the tolerances specified. Payment shall constitute full compensation for all work specified in this section, including surveys, foundation preparation, and delivery and placement as shown and specified.

1.5.2.1 Deductions. All riprap permitted by the Contracting Officer to remain outside of the tolerances specified will be deducted from the quantity to be paid for. Volume of excess riprap will be computed using the average-end-area of excess above the tolerance line. The excess volume will be deducted from the payment quantity at a rate of 1.35 tons per cubic yard, regardless of actual weight per cubic foot.

1.6 BIDDING SCHEDULE ITEMS applicable to the work of this section are as follows:

<u>Item</u>	<u>Item</u>
42" CMP	
Riprap	Ton
Drainage Structure	
Riprap	Ton
Overflow Spillway	
Riprap	Ton
East Outlet Channel Plug	
Riprap	Ton

2. PRODUCTS.

2.1 Riprap shall be a durable quarried stone of suitable quality to ensure permanence in the Minnesota River environment. Stone shall be free from cracks, seams and other defects that would unduly increase its deterioration from natural causes.

2.1.1 Specific gravity. Stone shall have a specific gravity of not less than 2.55 and not more than 2.75.

2.1.2 Shape. Neither the breadth nor thickness of any individual stone shall be less than one-third its length.

2.1.3 Gradation.

2.1.3.1 Riprap shall be reasonably well graded within the limits shown on the riprap gradation curve located at the end of this section. The stone shall be reasonably well graded within these specified limits to permit construction of relatively dense and impervious riprap blankets. Inclusion of objectionable quantities of dirt, sand, clay, rock fines or other deleterious materials will not be allowed.

2.1.4 Processing. Included in the Contractor's Plan of Operations submittal, as specified in SECTION 01000: GENERAL, the Contractor shall indicate a method of processing riprap at the quarry that will preclude the inclusion of objectionable amounts of fine material or organic matter. All riprap shall be processed in accordance with the method approved.

2.2 SOURCES AND EVALUATION. Stone materials shall be produced from the sources listed in CONTRACT CLAUSE: MATERIAL SOURCES. If the Contractor proposes to furnish materials from a source not listed, the Government geologist will make such investigations and evaluations as necessary to determine whether or not materials meeting the requirements of this project can be produced from the proposed source. The Contractor shall be responsible for making his own investigations for sources of suitable materials and for making his own arrangements with the owners of the quarries or land for procuring the required quantities of suitable materials. Sources from which the Contractor proposes to obtain the materials shall be selected and submitted for approval at least 60 days in advance of the time when the material will be required in the work.

2.3 TESTS FOR ACCEPTABILITY.

2.3.1 Quality tests and service records will be used to determine the acceptability of stone materials. In the event suitable test reports and satisfactory service records are not available, as in the case of newly operated sources, the materials will be tested to determine acceptability. Tests to which the materials may be subjected include petrographic analysis, specific gravity, soundness, abrasion, absorption, freezing and thawing, and other tests considered necessary to demonstrate acceptability. Tests will be made by, or under the supervision of, the Government and at the Government's expense.

2.3.2 Samples. If directed, suitable samples of materials shall be submitted for approval prior to delivery of materials to the work site. Unless otherwise directed, samples shall be obtained by the Contractor, in the presence of the Contracting Officer, and delivered at the Contractor's expense to a point designated by the Contracting Officer, at least 30 days in advance of the date that the stone protection is expected to begin. The materials must be approved by the Contracting Officer before commencing placement.

2.4 TESTS FOR GRADATION AND SHAPE.

2.4.1 Riprap. Tests shall be performed by and at the expense of the Contractor. Testing shall be under the direction of the Contracting Officer, unless waived. Gradation test results shall be submitted on ENG Form 4055 and on the Gradation Analysis Worksheet provided at the end of this section. One sample for each type of material shall be taken from stockpiled materials and the remaining samples shall be taken from loads prior to dumping or from in-place material, when and where directed. Prior to placing materials, the Contractor shall submit for approval proposed testing and procedures. The Contractor shall state, in writing, methods of processing and handling samples and shall notify the Contracting Officer immediately when production methods are changed. A minimum of 5 weight classes shall be used in the gradation testing. The Contractor shall select weight classes to yield approximately 75, 50 and 30 percent finer by weight gradation points. The Contractor shall weigh that portion smaller than 4 inches in each sample of riprap and indicate that weight in the total weight of the gradation test sample. Determination of the gradation of riprap material smaller than 4 inches is not required.

2.4.2 Testing results shall be submitted to the Contracting Officer immediately after testing completion. The minimum sample size for tests shall be as follows:

<u>Material</u>	<u>Minimum Sample Size</u>
Riprap	6 tons.

2.4.3 Frequency. The minimum gradation tests shall be performed as follows. The Contractor shall take as many additional tests under the Contractor's quality control program as is needed to ensure that the gradation is being met. Tests performed on materials that do not meet requirements will not be counted as part of the minimum required.

<u>Material</u>	<u>Minimum Number of Tests</u>
Riprap	1 test prior to placement

2.4.4 Corrective Action. If materials fail to meet gradation or shape requirements, the Contractor shall adjust his operations and verify with necessary tests that acceptable materials are being produced, or he shall propose another source and verify, with necessary tests, that acceptable material can be produced from that source. Payment will not be made for material which fails to meet requirements. Material already in place that fails to meet requirements will be removed by the Contractor at no additional cost to the Government.

3. EXECUTION.

3.1 TOLERANCES. The riprap shall be placed to the thickness specified with a tolerance of plus 3 inches.

3.2 FOUNDATION PREPARATION. Foundation areas shall be excavated or filled to the lines and grades shown, or otherwise established, within a tolerance of plus or minus 2 inches. Filling shall be with earth similar to the adjacent material and well compacted. When overexcavation occurs the filling shall be at no additional expense to the Government. Immediately prior to placing the geotextile, the prepared subgrade will be inspected by the Contracting Officer and no material shall be placed thereon until that area has been approved.

3.3 PLACEMENT.

3.3.1 Riprap. Riprap shall be constructed to the lines and grades shown or established within a tolerance of 6 inches above and 3 inches below the prescribed grade, except either extreme shall not be continuous over an area greater than 200 square feet. Riprap shall be placed to the full surface course thickness in one operation and in such a manner as to avoid displacing the underlying materials. Dewatering will be required in accordance with SECTION 01000: GENERAL. Placing riprap in layers shall not be permitted. All riprap shall be placed in such a manner as to produce a mass of unsegregated stone with maximum interlocking and stone to stone contact and a minimum of voids. The finished mass shall be free from pockets of small stones, clusters or larger stones and excessive voids. Placing riprap by dumping into chutes or by similar methods likely to cause segregation shall not be permitted. The Contractor shall maintain the riprap protection until accepted, and displaced material must be replaced by the Contractor at no additional cost to the Government.

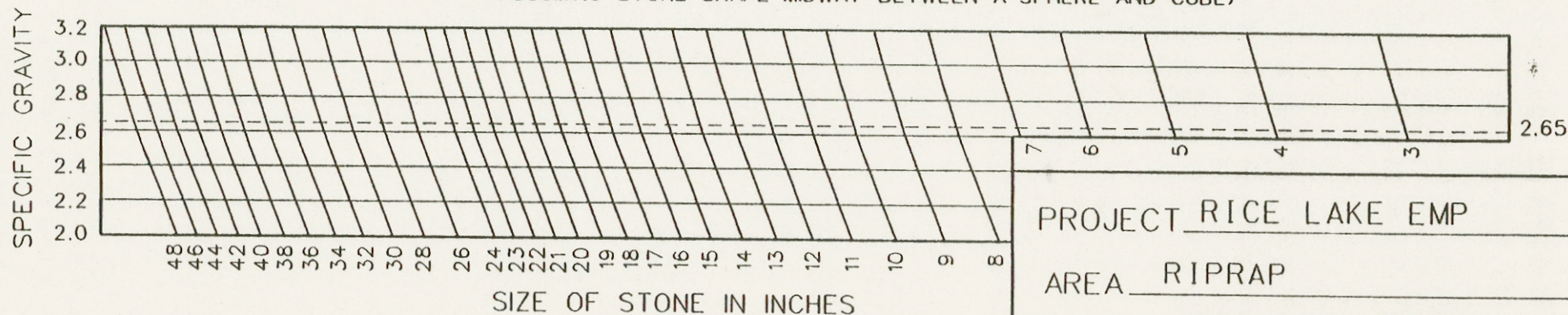
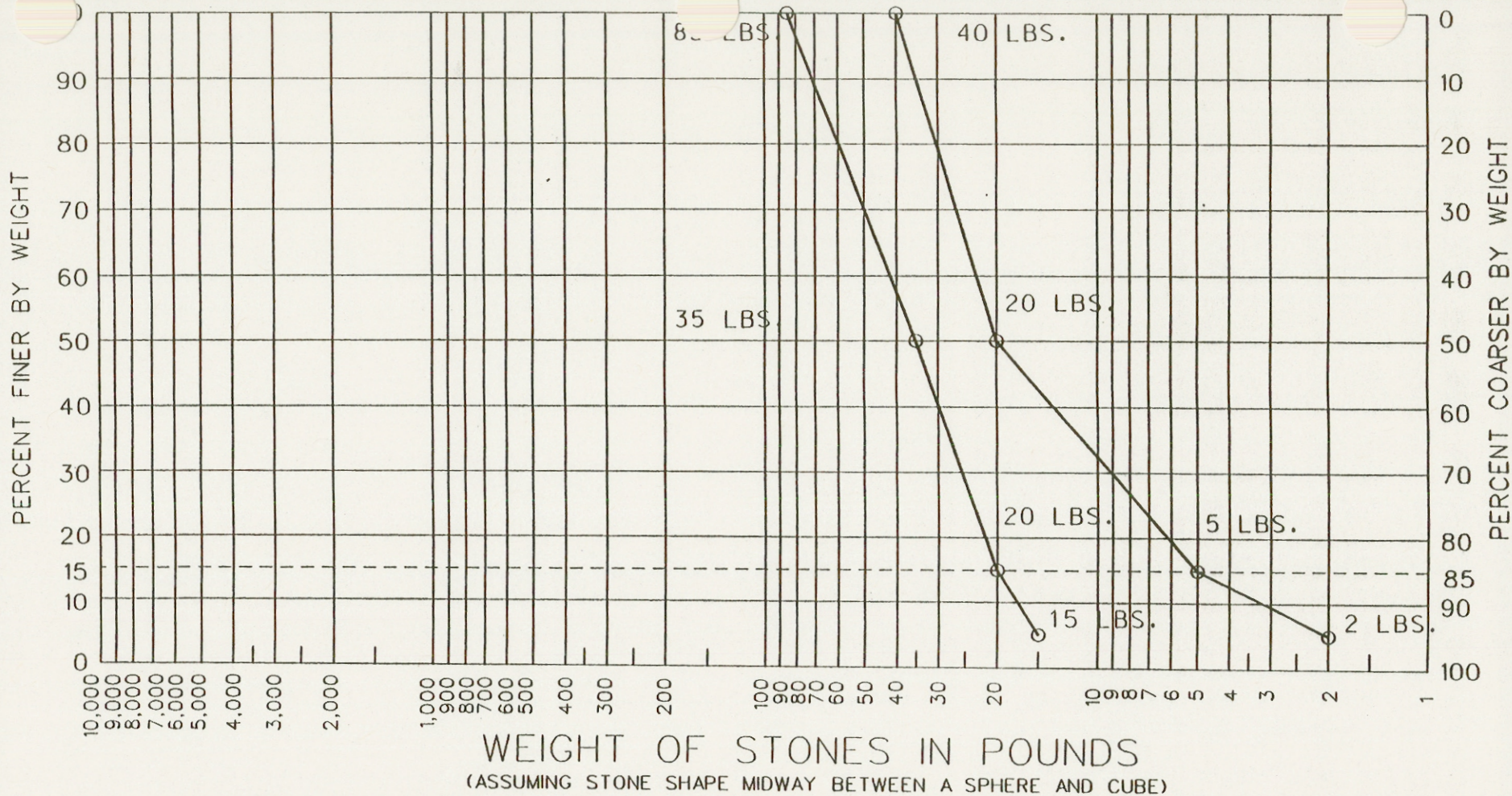
3.3.2 Placement of Riprap on Geotextile. The geotextile shall be in place prior to placement of the riprap thereon. Placement of the geotextile is specified in SECTION 02272: GEOTEXTILE. The riprap shall be placed on the geotextile with care so as not to rupture the geotextile and shall not be dropped from a height greater than one (1) foot. Riprap placement shall generally be initiated at the channel invert and progress up the banks towards the bank crest. Stone for riprap shall not be allowed to roll down the geotextile. Riprap in direct contact with the geotextile shall not be pushed or moved by mechanical equipment. Any damage to the geotextile that occurs during placement shall be repaired by the Contractor at no additional cost to the Government.

3.3.3 Placement of riprap under water shall meet the gradation requirements in the bucket or container used for placing, and shall be placed in a systematic manner so as to ensure a continuous uniform layer of well-graded stone of the required thickness. Stone to be placed under water shall not be cast across the surface of the water.

-- END OF SECTION --

02271-6

DACW37-96-R-0011



SPECIFIC GRAVITY OF STONE = 2.65

PROJECT RICE LAKE EMP

AREA RIPRAP

DATE 12 OCT. 1995

RIPRAP GRADATION CURVE

CEMVP-0000012965

SECTION 02272

GEOTEXTILE

INDEX

<u>PARAGRAPH</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
1	GENERAL	02272-1
2	PRODUCTS	02272-2
3	EXECUTION	02272-3

SECTION 02272

GEOTEXTILE

1. GENERAL.

1.1 SCOPE. The work provided for herein consists of furnishing all plant, labor, material, and equipment and performing all operations required for furnishing, hauling, and placing the geotextile, complete, as specified herein and shown on the contract drawings, and maintaining the geotextile until the structures are completed and accepted.

1.2 RELATED WORK OF OTHER SECTIONS. The following items of related work are covered under other sections:

- 1) Dewatering: SECTION 01000: GENERAL.
- 2) Excavation for erosion protection: SECTION 02222: EXCAVATION.
- 3) Placement of riprap: SECTION 02271: STONE PROTECTION.

1.3 APPLICABLE PUBLICATIONS. The current issues of the publications listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

American Society for Testing and Materials (ASTM).

D 123-93	Terminology Relating to Textile/Materials.
D 3776-85	Mass Per Unit Area (Weight) of Woven Fabric.
D 4632-91	Grab Breaking Load and Elongation of Geotextiles.
D 4751-93	Determining Apparent Opening Size of a Geotextile.
D 4833-88	Index Puncture Resistance of Geotextiles, Geomembranes and Related Products.

U. S. Army Corps of Engineers.

EM 1110-2-1906 Laboratory Soils Testing.

1.4 SUBMITTALS. The following items shall be submitted in accordance with SECTION 01300: SUBMITTAL PROCEDURES:

1.4.1 Manufacturers Data. The Contractor shall submit descriptive technical data on the geotextiles.

1.4.2 Manufacturer's Roll Labels from the geotextile delivered to the site.

1.4.3 Samples. The Contractor shall submit a 8-1/2" by 11", minimum size,

sample of the geotextile to the Contracting Officer.

1.5 MEASUREMENT AND PAYMENT.

1.5.1 Geotextile used under erosion protection materials shall be measured in place to the nearest square yard of protected area as delineated in the drawings. Payment shall be made at the contract unit price for each item and shall constitute full compensation to the Contractor for providing all plant, labor, material, and equipment and performing all operations necessary for the complete and satisfactory installation of the geotextile. Payment for the following items is included in the contract unit price for "Geotextile" and shall not be counted a second time in the process of determining the extent of geotextile placed:

- a. material and associated equipment and operation used in laps or extra length;
- b. securing anchors and associated material, equipment, and operations.

1.5.2 No payment shall be made for geotextile replaced because of contamination or damage.

1.6 BIDDING SCHEDULE ITEMS applicable to the work of this section are as follows:

<u>Item</u>	<u>Unit</u>
42" CMP	
Geotextile Fabric	SY
Drainage Structure	
Geotextile Fabric	SY
East Outlet Channel Plug	
Geotextile Fabric	SY
Overflow Spillway	
Geotextile Fabric	SY

2. PRODUCTS.

2.1 MATERIALS.

2.1.1 Geotextile. The geotextile shall be a needle punched non-woven fabric composed of plastic yarn. The geotextile shall meet the physical requirements listed in Table No. 1 at the end of this section. The geotextile fiber shall consist of a long-chain synthetic polymer composed of at least 85 percent by

weight of propylene, ethylene, ester, amide or vinylidene-chloride, and shall contain stabilizers and/or inhibitors added to the base plastic to make the filament resistant to deterioration due to ultra-violet and heat exposure. The edge of the geotextile shall be finished to prevent the outer fiber from pulling away from the geotextile.

2.2 SHIPMENT AND STORAGE. During all periods of shipment and storage, the geotextile shall be protected from direct sunlight, ultra-violet rays, temperatures greater than 140 degrees fahrenheit, mud, dirt, dust and debris. To the extent possible, the geotextiles shall be maintained wrapped in a heavy duty protective covering. All rolls of geotextile delivered to the project site shall be labeled. Labels shall include the manufacturer, product identification, roll and lot identification, and date of manufacture. The manufacturer's roll labels shall be pulled from the rolls, in the presence of the Contracting Officer, and submitted to the Contracting Officer.

3. EXECUTION.

3.1 INSTALLATION OF THE GEOTEXTILE. The geotextile shall be placed in the manner and at the locations shown on the drawings. At the time of installation, the geotextile shall be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation or storage. The surface to receive the geotextile shall be prepared to a relatively smooth condition free of obstructions, depressions, debris and soft or low density pockets of material. Erosion features such as rills, gullies, etc. shall be graded out of the surface before geotextile placement. The geotextile shall be laid smooth and free of tension, stress, folds, wrinkles, or creases. All upstream panels shall be laid over the downstream panels at overlaps. Connecting panels shall be overlapped 2 feet.

3.1.1 Temporary pinning of the geotextile to help hold it in place until the riprap is placed shall not be allowed. The geotextile shall be securely anchored with sand bags or stones to prevent it from moving during placement of riprap.

3.1.2 Protection. The geotextile shall be protected at all times during construction from contamination by surface run-off and any geotextile so contaminated shall be removed and replaced with uncontaminated geotextile. Any damage to the geotextile during its installation or during placement of riprap shall be replaced by the Contractor at no cost to the Government. The work shall be scheduled so that the covering of the geotextile with a layer of the specified material is accomplished within 3 calendar days after placement of the geotextile. Failure to comply shall require replacement of geotextile. The geotextile shall be protected from damage prior to and during the placement of riprap. Before placement of the riprap, the Contractor shall demonstrate that the placement technique will prevent damage to the geotextile. In no case shall any type of equipment be allowed on the unprotected geotextile.

-- END OF SECTION --

TABLE NO. 1 - PHYSICAL REQUIREMENTS

<u>Physical Property</u>	<u>Test Procedure</u>	<u>Acceptable Values</u>
Tensile Strength (unaged geotextile)*	ASTM D 4632 grab method using 1 inch by 2 inch jaws and a 12 inches per minute constant rate of traverse.	200 pound minimum in all principal directions.
Breaking Elongation (unaged geotextile)*	ASTM D 4632 determine apparent breaking elongation.	15 percent minimum in all principal directions.
Puncture Strength (unaged geotextile)*	ASTM D 3787 except polished steel ball replaced with a 5/16-inch diameter solid steel cylinder with a hemispherical tip centered within the ring clamp.	80 pound minimum.
Abrasion Resistance	ASTM D 3884 Rubber-base abrasive wheels equal to CS-17 "Calibrase" by Taber Instrument Co; 1 kilogram load per wheel; 1000 revolutions, determine residual breaking load.	55 pound minimum residual breaking load in all principle directions.
Permittivity	ASTM D-4491	0.2 per second
Apparent Opening Size (AOS)	ASTM D-4751 determine apparent opening size.	No finer than U.S. Standard Sieve No. 120 and no coarser than U.S. Standard Sieve No. 30.
Tear Strength	ASTM D 4533 trapezoid tearing strength.	30 pounds minimum in all principal directions.

*Unaged geotextile is defined as geotextile in the condition received from the manufacturer or distributor.

++All numerical values represent minimum average roll values (i.e., any roll in a lot should meet or exceed the minimum in the table).

SECTION 02361

SHEET PILE

INDEX

<u>PARAGRAPH</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
1	GENERAL	02361-1
2	PRODUCTS	02361-2
3	EXECUTION	02361-2

SECTION 02361

SHEET PILE

1. GENERAL

1.1 SCOPE This section covers the requirement for the steel sheet pile for the retaining walls adjacent to the Stoplog Closure Structure.

1.2 RELATED WORK OF OTHER SECTIONS. The following items of related work are covered under other sections:

- (1) Welding and Miscellaneous Metals: SECTION: MISCELLANEOUS METALS, STANDARD ARTICLES, AND SHOP FABRICATED ITEMS.

1.3 APPLICABLE PUBLICATIONS. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

1.3.1 American Society for Testing and Materials (ASTM).

A 328-90 Steel Sheet Pile

1.3.2 American Welding Society (AWS).

D1.1-92 Structural Welding Code.

1.4 SUBMITTALS. The following shall be submitted in accordance with SECTION: SUBMITTAL PROCEDURES.

1.4.1 Not Used.

1.4.2 Shop Drawings. Shop drawings for proposed sheet pile, including fabricated sections, shall:

- (1) show complete piling layout dimensions and details, driving sequence and location of installed piling;
- (2) include details and dimensions of templates and other temporary guide structures for installing piling; and
- (3) include details of the method of handling piling in order to prevent permanent deflection, distortion, or damage to piling interlocks.

1.4.3 Certificates.

1.4.3.1 Piling. The Contractor shall furnish the Contracting Officer a certificate showing the piling type, dimensions and section properties. Piling shall not be delivered to the site prior to the receipt by the Contractor of a written notice of acceptance from the Contracting Officer.

1.4.3.2 Welding. Welding procedures and operator qualifications shall be submitted for approval. Welding shall be in accordance with SECTION: MISCELLANEOUS METALS, STANDARD ARTICLES, AND SHOP FABRICATED ITEMS.

1.5 MEASUREMENT AND PAYMENT

1.5.1 The work of this section will be measured for separate payment by the square foot of sheet pile wall (projected area) to the lines and dimensions shown

on the drawings and shall include all costs for furnishing and installing the sheet pile.

1.6 BIDDING SCHEDULE ITEMS applicable to the work of this section are as follows:

<u>Item</u>	<u>Unit</u>
Drainage Structure	
Steel Sheet Pile	SF

2. PRODUCTS

2.1 Steel Sheet Pile. Steel for sheet pile shall meet the requirements of ASTM A 328. Sheet pile shall be of a design such that when in place they shall interlock with the adjacent sheet pile and be continuously interlocked throughout their entire length. All piling shall be provided with standard pulling holes located approximately 6 inches below the top of the pile, unless otherwise shown or directed. Sheet pile including special fabricated sections shall be full-length sections of the dimensions shown or specified. Fabricated sections shall conform to the requirements shown or specified and piling manufacturer's recommendations for fabricated sections. Piling shall have a section modulus per linear foot of wall of 18.1 or more inches cubed. The piling thickness shall be at least 0.375 inches.

3. EXECUTION

3.1 Placing. Piles shall be carefully located as shown or directed and driven in a plumb position, each pile interlocked with adjoining piles for its entire length, so as to form a continuous diaphragm throughout the length of each run of wall. Interlocks shall be properly engaged. The Contractor shall drive all piles as true to line as practicable and shall provide suitable temporary walls or guide structures to insure that the piles are driven in correct alignment. Piles shall be driven to the depths or lengths shown on the drawings and shall extend to the elevations indicated for the tops of the piles. A tolerance of plus or minus one inch from the final top elevation will be permitted.

3.2 Driving. Sheet pile shall be driven by approved methods in such manner as not to subject the piles to serious injury and to insure proper interlocking throughout the length of the piles. Pile hammers shall be approved sizes and types and shall be maintained in proper alignment during driving operations by use of suitable leads or by guides attached to the hammer. A protecting cap of approved design shall be employed in driving, when required, to prevent damage to the tops of piles. All piles shall be driven without the aid of a water jet, unless otherwise authorized in writing. Adequate precautions shall be taken to insure that piles are driven as nearly plumb as practicable. If at times the forward or leading edge of the piling wall is found to be out of plumb in the plane of the wall, the piles already assembled and partly driven shall be driven to full depth and the Contractor shall provide and drive tapered piles or take other corrective measures to insure the plumbness of succeeding piles. The maximum permissible taper for any tapered pile will be one eighth of an inch per foot of length. Each sheet pile shall be driven to a lower grade than those behind it in the same run, except as shown, and when the pile cannot be driven deeper. If the pile next to the one being driven tends to follow below final grade, it may be pinned to the next adjacent pile. Should boulders or other obstructions render it impracticable to drive a pile to the specified

penetration, the Contractor shall make such changes in design or alignment of the pile structure as may be deemed necessary by the Contracting Officer to insure the adequacy and stability of the structure. Payment for the additional labor and materials necessitated by such changes will be made in accordance with CONTRACT CLAUSE: CHANGES. Piles driven out of interlock with adjacent piles or otherwise injured shall be removed and replaced by new piles at the Contractor's expense. Piling shall not be driven within 100 feet of new concrete which has a compressive strength less than 3000 psi.

3.3 CUTTING AND SPLICING PILES. Piles extending above grade shall be cut off to required grade. Piles driven below grade and piles which because of damaged heads have been cut off to permit further driving and are then too short to reach final grade shall be extended to the required grade by welding an additional length, when directed, without cost to the Government. The Contractor shall trim the tops of piles excessively battered during driving, when directed to do so, at no cost to the Government. Cut-offs shall become the property of the Contractor and shall be removed from the work site. All cutting shall be done in a neat and workmanlike manner. Should splicing of piles be necessary, the splice shall be made by an approved butt weld making full penetration of the web. Piles adjoining spliced piles shall be full length piles. Pulling and handling holes not embedded in at least 6 inches of concrete shall be plugged by welding steel plates, of a thickness equal to the piling thickness over the holes.

3.4 PULLING AND REDRIVING. The Contractor may be required to pull certain selected piles after driving, for test and inspection, to determine the conditions of the piles. Each pile so pulled and found to be damaged to such extent as would impair its usefulness in the structure shall be removed from the work and the Contractor shall furnish and drive a new pile to replace the damaged pile. Piles pulled and found to be in a satisfactory condition shall be redriven and the payment for the added cost to the Contractor for pulling and redriving will be in accordance with CONTRACT CLAUSE: CHANGES.

3.5 WELDING ACCESSORIES. Welding shall conform to the provisions of AWS D1.1. Welders and welding operators shall pass successfully the qualification tests prescribed by Section 5 of AWS D1.1. The Contractor shall submit to the Contracting Officer the names of the welders and welding operators so qualified, the date qualified, and the code under which qualified. Prior qualification will be acceptable only when the Contractor certifies that the welder has performed satisfactory work at the process, and in all positions, for which qualified, within the preceding three months. The Contractor shall require any welder to repeat the qualifying tests when, in the opinion of the Contracting Officer, the work of the welder indicated a reasonable doubt of his proficiency. In such cases, the welder shall be recertified, as above, if he successfully passes the retest. All expense in connection with qualification and requalification shall be borne by the Contractor.

-- END OF SECTION --

SECTION 02720

DRAINAGE PIPE

INDEX

<u>PARAGRAPH</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
1	GENERAL	02720-1
2	PRODUCTS	02720-2
3	EXECUTION	02720-3

SECTION 02720

DRAINAGE PIPE

1. GENERAL.

1.1 SCOPE. This section covers corrugated metal pipe (CMP) used for the culvert at the end of the West Outlet Channel.

1.2 RELATED WORK OF OTHER SECTIONS. The following items of related work are covered under other sections:

1) Excavation, trenching and backfilling: SECTION 02221: EXCAVATION, TRENCHING AND BACKFILLING FOR DRAINAGE SYSTEMS.

2) Appurtenant metal items and welding: SECTION 05500: MISCELLANEOUS METALS, STANDARD ARTICLES, SHOP FABRICATED ITEMS AND METALWORK FABRICATION.

3) Dewatering: SECTION 01000: GENERAL.

1.3 APPLICABLE PUBLICATIONS. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

American Society for Testing and Materials (ASTM).

A 153-82	Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
A 307-94	Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
A 563-93	Carbon and Alloy Steel Nuts.
A 742-93	Steel Sheet, Metallic Coated and Polymer Precoated for Corrugated Steel Pipe.
A 760-93a	Corrugated Steel Pipe, Metallic Coated for Sewers and Drains.
A 762-93a	Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains.
B 745-93	Corrugated Aluminum Pipe for Sewers and Drains.
D 1056-91	Flexible Cellular Materials - Sponge or Expanded Rubber.

1.4 SUBMITTALS. The following items shall be submitted in accordance with SECTION 01300: SUBMITTAL PROCEDURES:

1.4.1 Shop drawings shall be submitted for approval for the proposed pipe joint including bands, gaskets and bolts, and for the CMP end section. Drawings shall

show connection details, material types and coatings.

1.4.2 Manufacturers' Recommendations. Prior to the delivery of bands, gaskets, and lubricants to the work site, submit the manufacturers' recommended procedures for installing such materials.

1.4.3 Certificates of Compliance for each type of gasket shall be provided.

1.4.4 Certified Copies of Test Results. Certified copies of test reports demonstrating conformance of pipe to applicable pipe specifications shall be submitted to the Contracting Officer before delivery of pipe to the work site.

1.4.5 Shop drawings showing details of the connection of the drainage pipe to the inlet structure and a plan for pipe installation shall be submitted for approval for the drainage pipe.

1.5 MEASUREMENT AND PAYMENT.

1.5.1 Drainage Pipe. Corrugated metal pipe will be measured by the linear foot along the centerline of the pipe between the end section and where it is banded to the Inlet Structure, in place, complete. Bedding and backfill, excavation beyond that which is necessary to remove the existing pipe, and restoration of the bituminous roadway shall be included in the price bid for the CMP.

1.5.2 Flared end section will be measured for payment by the unit, in place, complete.

1.6 BIDDING SCHEDULE ITEMS. Bidding schedule items applicable to the work of this section are as follows:

<u>Item</u>	<u>Unit</u>
42" CMP	
42" CMP	LF
42" CMP Flared End Section	EA

2. PRODUCTS.

2.1 DELIVERY, STORAGE AND HANDLING.

2.1.1 Delivery and Storage. Materials delivered to the site shall be inspected for damage, unloaded, and stored with a minimum of handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. Gasket materials and plastic materials shall be protected from exposure to the direct sunlight over extended periods.

2.1.2 Handling. Materials shall be handled in such a manner as to ensure delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

2.2 MATERIALS.

2.2.1 Drainage Pipe. Corrugated metal pipe (CMP), flared end section, and connecting bands shall be of the sizes indicated on the drawings and shall conform to one of the following:

a) Aluminum coated, Type I pipe with either annular or helical corrugations and in accordance with ASTM A 760; or

b) Polymer precoated, Type I, Grade 10/10 pipe with either annular or helical corrugations and in accordance with ASTM A 742 and ASTM A 762; or

c) Aluminum alloy, Type I pipe with either annular or helical corrugations and in accordance with ASTM B 745.

2.2.2 Corrugated metal pipe joints. A metal band shall be used to connect pieces of corrugated metal piping. The band shall be a manufacturer's standard product. The band metal shall be a minimum of the diameter and width as recommended by the manufacturer. The band metal gage thickness shall be the same as the CMP gage thickness. The band shall be of the same materials and meet the same requirements and standards as the pipe it is to be used with.

2.2.2.1 Rubber gaskets shall be in accordance with ASTM D 1056.

2.2.2.2 Bolts shall be in accordance with ASTM A 307. All nuts shall be in accordance with ASTM A 563, Grade A. All bolts and nuts shall be zinc coated by the hot-dip process in accordance with ASTM A 153.

3. EXECUTION.

3.1 INSTALLATION.

3.1.1 Placing Pipe. Each pipe shall be carefully examined before being laid; defective or damaged pipe shall not be used. Pipe shall be laid to the elevations indicated. Pipe alignment shall be staked by the Contractor and approved by the Contracting Officer prior to pipe excavation. Proper facilities shall be provided for lowering sections of pipe into trenches. Dewatering shall be in accordance with SECTION 01000: GENERAL. Under no circumstances shall pipe be laid in water, and no pipe shall be laid when trench or weather conditions are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. Foundation preparation, backfilling, and compaction for pipes shall be as specified in SECTION 02221: EXCAVATION, TRENCHING, AND BACKFILLING FOR DRAINAGE SYSTEMS. All pipe in place shall be inspected before backfilling, and those damaged during placement shall be removed and replaced at no additional cost to the Government.

3.2 JOINTS.

3.2.1 Corrugated metal pipe.

3.2.1.1 Banded joints. The connection between each length of corrugated metal pipe and between corrugated metal pipe and flared end sections and inlet

structure, shall be externally sealed with a rubber gasket embedded in mastic as recommended by the manufacturer and then clamped in place over the joint with a corrugated metal band. The gasket shall consist of o-ring gaskets. The o-ring gaskets shall be installed in accordance with the written recommendations of the gasket manufacturer. Connecting bands shall then be centered over the adjoining sections and bolts placed in position and nuts tightened. The band shall be tightened keeping even tension on the bolts and the gasket shall be closely observed to see that it is seating properly in the corrugations. Joints shall remain dewatered for a period of time designated by the manufacturer. The tightness of the nuts shall be checked prior to removing dewatering facilities. If the unit has loosened it shall be retightened and shall remain dewatered until a tight, permanent joint is assured.

3.2.1.2 Welded joints. Welding of the joints shall only be performed in areas as indicated on the drawings. Welding procedures shall be in accordance with SECTION 05500: MISCELLANEOUS METALS, STANDARD ARTICLES, SHOP FABRICATED ITEMS AND METALWORK FABRICATION.

-- END OF SECTION --

SECTION 05500

MISCELLANEOUS METALS, STANDARD ARTICLES,
SHOP FABRICATED ITEMS AND METALWORK FABRICATION

INDEX

<u>PARAGRAPH</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
1	GENERAL	05500-1
2	PRODUCTS	05500-3
3	EXECUTION	05500-4

SECTION 05500

MISCELLANEOUS METALS, STANDARD ARTICLES,
SHOP FABRICATED ITEMS AND METALWORK FABRICATION

1. GENERAL.

1.1 SCOPE. The work covered by this section consists of providing all equipment, materials, and labor for fabricating, furnishing, and installing miscellaneous metal materials, standard articles, and shop fabricated items which includes:

- (1) Stoplog lifting hooks.
- (2) Stoplog Closure Structure.
- (3) Sheet pile Cap.
- (4) Metal items not specified elsewhere.

1.2 RELATED WORK OF OTHER SECTIONS. The following items of related work are covered under other sections:

1) Excavation, backfilling, and compaction for stoplog storage CMP:
SECTION 02221: EXCAVATION, TRENCHING, AND BACKFILLING FOR DRAINAGE SYSTEMS.

2) Corrugated metal pipe (CMP) and coatings: SECTION 02720: DRAINAGE
PIPE.

3) Geotextile fabric: SECTION 02272: GEOTEXTILE.

5) Stoplogs: SECTION 06100: TIMBER STOPLOGS.

6) Concrete footing for Inlet Structure: SECTION 03300: CONCRETE.

1.3 APPLICABLE PUBLICATIONS. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

American Institute of Steel Construction (AISC) Publication.

Specification for the Design, Fabrication and Erection of Structural Steel
for Buildings (Nov. 1989 with Commentary).

American Welding Society (AWS).

D1.1-92 Structural Welding Code.

American Society for Testing and Materials (ASTM).

A 36/36M Rev B-93 Structural Steel.

A53 Rev A-93	Pipe, Steel, Black and Hot-Dipped, Welded and Seamless.
A 108-93	Steel Bars, Carbon, Cold-Finished, Standard Quality.
A 123-89a	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
A 153-82	Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
A 307-94	Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
A 325M-93	High-Strength Bolts for Structural Steel Joints.
A 385-80	Providing High-Quality Zinc Coatings (Hot Dip).
B 209-93	Aluminum and Aluminum-Alloy Sheet and Plate.
B 211-93	Aluminum and Aluminum-Alloy Bar, Rod, and Wire.
B 241/B241M-93	Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube.

American Society of Mechanical Engineers Boiler and Pressure Vessel Code.

Section IX Welding and Brazing Qualifications.

American National Standards Institute (ANSI).

B 18.22.1 (R 1990)	Plain Washers.
B 18.21.1-90	Lock Washers.

Federal Specifications (Fed. Spec.).

RR-G-661E (as amended)	Grating, Metal, Bar Type.
---------------------------	---------------------------

1.4 SUBMITTALS. The following items shall be submitted in accordance with SECTION 01300: SUBMITTAL PROCEDURES:

1.4.1 Shop Drawings shall be submitted for approval. Drawings shall include catalog cuts, templates, fabrication and assembly details and type, grade and class of materials as appropriate. Elements of fabricated items inadvertently omitted on contract drawings shall be detailed by the fabricator and indicated on the shop drawings. Shop drawings shall be submitted for the following items:

- (1) Stoplog lifting hooks
- (2) Stoplog Closure Structure
- (3) Sheet Pile Cap.

1.4.2 Certificates of Compliance stating that materials provided and work performed meet the requirements specified.

1.4.3 Welding procedures, welding operator qualifications and weld schedule shall be submitted for approval.

1.5 MEASUREMENT AND PAYMENT.

1.5.1 Stoplog lifting hooks will not be measured for separate and costs shall be included in the price bid for the item - Stoplog Closure Structure.

1.5.2 Stoplog Closure Structure will not be measured for payment and will be paid for on a job basis, in place, complete. Payment will constitute full compensation for furnishing and installing all materials, including concrete base, drainage fill and backfill materials, as specified and indicated.

1.5.3 Sheet Pile Cap will not be measured for separate and costs shall be included in the price bid for the item - Stoplog Closure Structure.

1.5.4 The remaining work of this section will not be measured for separate payment and costs therefore shall be included in the price bid for the feature to which the work pertains.

1.6 BIDDING SCHEDULE ITEMS applicable to the work of this section are as follows:

<u>Item</u>	<u>Unit</u>
Drainage Structure	
Stoplog Closure Structure	JB

2. PRODUCTS.

2.1 MATERIALS.

2.1.1 Not Used.

2.1.2 Structural steel shall be in accordance with ASTM A 36. All structural steel items shall be galvanized in accordance with ASTM A 123 and ASTM A 385.

2.1.3 Bolts, nuts, washers and other fasteners shall be of the material, grade, type, class, style, and finish indicated; or best suited for the intended use as determined by the Contracting Officer.

2.1.3.1 High-strength bolts, nuts, and washers. ASTM A 325.

2.1.3.2 Bolts, nuts, and washers (other than high-strength).

2.1.3.2.1 Bolts and nuts. ASTM A 307, Grade A.

2.1.3.2.2 Washers.

2.1.3.2.2.1 Plain. ANSI B18.22.1, Type B.

2.1.3.2.2.2 Lock. ANSI B18.21.1.

2.1.4 Corrugated metal pipe (CMP) and coatings shall meet the requirements specified in SECTION 02720: DRAINAGE PIPE.

2.1.5 Galvanizing repair coating. Repair of damaged galvanized coatings and regalvanizing after welding shall be done with a galvanizing paint having a high zinc dust content.

2.1.6 Aluminum.

2.1.6.1 Plates. ASTM B 209, Alloy 6061, Temper T6.

2.1.6.2 Bars and Rods. ASTM B 211, Alloy 6061, Temper T6.

2.1.6.3 Tubes and pipe. ASTM B 241, Alloy 6061, Temper T6.

2.1.7 Grating. Fed. Spec. RR-G-661E, Type I, Class 1 or 2, Material S. Grating bars shall be of the size shown. The surface of the bearing bars shall be serrated. Edges of gratings which require the cutting of more than one bearing bar shall be banded. Grating shall be galvanized after fabrication in accordance with ASTM A 123 and ASTM A 385. Grating shall be fastened as indicated on the drawings or as approved.

3. EXECUTION.

3.1 GENERAL.

3.1.1 The AISC Specification for Design, Fabrication and Erection of Structural Steel Buildings shall govern the work.

3.1.2 The Contractor shall verify dimensions and shall take field measurements necessary before fabrication. Exposed accessories shall be compatible, and shall match in color and finish with the material to which the accessories are being applied. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Miscellaneous supports, braces and connections necessary for completion of the metal-work shall be provided. Fastenings shall be concealed where practicable. Joints shall be formed to exclude water.

3.2 SHOP FABRICATED METAL ITEMS. Shop fabricated metal items shall conform to the requirements and details as specified and/or shown on the drawings and to the workmanship provisions and other applicable fabrication requirements as specified herein.

3.3 WORKMANSHIP. Workmanship shall be of the highest grade and in accordance with the best modern practices to conform with the specifications and approved shop drawings for the item of work being furnished. Metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean, true lines and surfaces. Welding shall be

continuous along the entire area of contact, except where tack welding is permitted. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish, unless otherwise specified.

3.4 STRUCTURAL FABRICATION.

3.4.1 General. Material must be straight before being laid off or worked. If straightening is necessary it shall be done by methods that will not impair the metal. Sharp kinks or bends shall be cause for rejection of the material. Material with welds will not be accepted except where welding is definitely specified, indicated on the drawings or otherwise approved. Bends shall be made by approved dies, press brakes or bending rolls. Where heating is required precautions shall be taken to avoid overheating the metal and it shall be allowed to cool in a manner that will not impair the original properties of the metal. Proposed flame cutting of material other than structural steel shall be subject to approval and shall be indicated on shop drawings. Shearing shall be accurate and all portions of the work shall be neatly finished. Corners shall be square and true unless otherwise shown on the drawings. Re-entrant cuts shall be filleted to a minimum radius of 3/4-inch unless otherwise approved. Finished members shall be free of twists, bends and open joints. Bolts, nuts and screws shall be tight.

3.4.2 Dimensional Tolerances for Structural Work. Dimensions shall be measured by an approved calibrated steel tape of approximately the same temperature as the material being measured at the time of measurement. The overall dimensions of an assembled structural unit shall be within the tolerances indicated on the drawings or as specified in the particular section of these specifications for the item of work. Where tolerances are not specified in other sections of these specifications or shown on the drawings an allowable variation of 1/32-inch is permissible in the overall length of component members with both ends milled and component members without milled ends shall not deviate from the dimensions shown on the drawings by more than 1/16-inch for members 30 feet or less in length and by more than 1/8-inch for members 30 feet in length.

3.4.3 Structural Steel Fabrication. Structural steel may be cut by mechanically guided or hand guides or hand guided torches provided an accurate profile with a surface that is smooth and free from cracks and notches is obtained. Surfaces and edges to be welded shall be prepared in accordance with AWS D1.1, Subsection

3.4.4 Where structural steel is not to be welded chipping or grinding will not be required except as necessary to removed slag and sharp edges of mechanically guided or hand guided cuts not exposed to view. Hand guided cuts which are to be exposed or visible shall be chipped, ground or machined to sound metal.

3.5 WELDING.

3.5.1 Welding Process. Welding, unless otherwise specified, shall meet the applicable requirements of AWS D1.1.

3.5.2 Qualifications of Welders and Welding Operators. Welders and welding operators shall pass successfully the qualification tests as prescribed by Section 5 of AWS D1.1, or Section IX or ASME Boiler and Pressure Vessel Code,

before being assigned to production work. The Contractor shall certify by name the welders and welding operators so qualified, the date of qualification and code and procedures under which qualified. Prior qualification will be accepted if welders have performed satisfactory work under the codes for which qualified within the preceding three months. The Contractor shall require welders and welding operators to repeat the qualifying tests when in the opinion of the Contracting Officer their work indicates a reasonable doubt as to proficiency. Those passing the requalification tests shall be recertified. Those not passing shall be disqualified until passing. All expenses in connection with qualification and requalification shall be borne by the Contractor.

3.6 INSTALLATION.

3.6.1 General. All parts to be installed shall be thoroughly cleaned; all packing compounds, rust, dirt, grit and other foreign matter removed; and all enclosed chambers or passages examined to make sure that they are free from injurious materials. When units or items are shipped as assemblies, they will be inspected by the Contracting Officer prior to installation. Disassembly, cleaning and lubrication will not be required, except where there is indication that such work is necessary to place the assembly in a clean and properly lubricated condition. Pipe wrenches, cold chisels or other tools likely to cause injury to the surfaces of rods, nuts or other parts shall not be used for the work of assembling and tightening parts. Bolts and screws shall be tightened firmly and uniformly, but care shall be taken not to overstress the threads. When a half nut is placed for the purpose of locking a full nut, the half nut shall be placed first and followed by the full nut. Threads of all nuts, screws, bolts, except for high-strength bolts, shall be lubricated by graphite and oil before assembly. Threads of corrosion-resisting steel bolts and nuts shall be coated with a suitable anti-galling compound. Driving and drifting bolts or keys will not be permitted.

3.6.2 Alignment and Setting. Each unit shall be accurately aligned by the use of steel shims or other approved methods, such that binding or distortion of any member will not occur before it is finally fastened in place. The alignment of all parts with respect to each other shall be true within the respective tolerances required. The units shall be set true to the elevations shown on the drawings.

-- END OF SECTION --

SECTION 06100

TIMBER STOPLOGS

INDEX

<u>PARAGRAPH</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
1	GENERAL	06100-1
2	PRODUCTS	06100-2
3	EXECUTION	06100-3

SECTION 06100

TIMBER STOPLOGS

1. GENERAL.

1.1 SCOPE. This section covers timber stoplogs.

1.2 RELATED WORK OF OTHER SECTIONS. The following items of related work are covered under other sections:

1) Lifting bars for stoplogs: SECTION 05500: MISCELLANEOUS METALS, STANDARD ARTICLES, SHOP FABRICATED ITEMS AND METALWORK FABRICATION.

2) Bolts, nuts, and washers: SECTION 05500: MISCELLANEOUS METALS, STANDARD ARTICLES, SHOP FABRICATED ITEMS AND METALWORK FABRICATION.

1.3 APPLICABLE PUBLICATIONS. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

American Wood Preservers (AWPB) Bureau.

AWPB LP 44	Standard for High Pressure-Treated Lumber, and Plywood with Volatile Hydrocarbon Solvent (LPG) - Penta Solution for Ground Contact.
------------	---

American Wood Preservers (AWPA) Association.

M4-1991	The Care of Preservative-Treated Wood Products.
---------	---

National Forest Products Association (NFOPA) Publication.

NFOPA-01 (1991)	(Supple; Errata/Addenda Mar 1992 and Jul 1992) National Design Specification for Wood Construction
--------------------	--

Northeastern Lumber Manufacturers Association (NELMA) Publication.

NELMA-01 (1994)	Standard Grading Rules for Northeastern Lumber
--------------------	--

1.4 SUBMITTALS. The following items shall be submitted in accordance with SECTION 01300: SUBMITTAL PROCEDURES:

1.4.1 Certificates of Compliance for timber. The Contractor shall furnish the Contracting Officer a certificate showing that the timber meets the requirements of this contract, including, but not limited to the type of timber provided, cross sectional properties, design values, and preservative treatment.

1.5 MEASUREMENT AND PAYMENT.

1.5.1 Timber stoplogs shall be measured for payment by the unit, in place, complete. The Contractor will not be allowed payment for broken or rejected stoplogs.

1.6 BIDDING SCHEDULE ITEMS applicable to the work of this section are as follows:

<u>Item</u>	<u>Unit</u>
Timber Stoplogs	EA

2. PRODUCTS.

2.1 TIMBER STOPLOGS.

2.1.1 Grading and Marking. All timber materials shall bear the grademark, stamp or other identifying marks indicating grades of materials and rules or standards under which produced. Such identifying marks on materials shall be in accordance with the rules or standards under which the material is produced, including requirements for qualifications and authority of the inspection organization, usage of authorized identification, and information included in the identification. The inspection agency for lumbar shall be the Board of Review, American Lumbar Standards Committee, to grade species used.

2.1.2 Material Requirements. Stoplogs shall be made of kiln dried white or red oak rough sawn lumber, No. 1 structural grade or better, as graded by NELMA-01. The stoplogs shall be cut to the dimensions shown on the drawings and treated with preservatives. All drilling and cutting shall be completed prior to treatment with preservatives. At the time the stoplogs are delivered to the site for installation, their moisture content shall be 19 percent maximum.

2.1.3 Stress Values. The species and grade provided shall meet or exceed the following stress values for single members when adjusted for normal load duration, size factors, and wet use factors. Design values for species and grade shall be as listed in NFOPA-01.

Bending (F_b)	800 psi
Horizontal Shear (F_v):	80 psi
Compression Perpendicular to Grain: (f_c):	300 psi
Modulus of Elasticity (E):	800,000 psi
Tension Parallel to Grain (F_t):	500 psi

2.1.4 Preservative Treatment. The treatment of stoplogs shall meet the requirements of AWPB LP44 for below ground use. All products shall bear the appropriate AWPB Quality Mark. The wood shall then be dried to the moisture content specified and marked with the word "DRY". Surfaces of lumber that will be exposed shall not be incised. Exposed areas of treated wood that are cut or drilled after treatment shall receive a field treatment in accordance with AWPB

M4.

2.2 Fasteners.

2.2.1 All bolts, nuts, and washers shall be of the type and size indicated on the drawings and as specified in SECTION 05500: MISCELLANEOUS METALS, STANDARD ARTICLES, SHOP FABRICATED ITEMS AND METALWORK FABRICATION.

3. EXECUTION.

3.1 DELIVERY, STORAGE AND INSTALLATION.

3.1.1 Delivery and Storage. Materials shall be delivered to the site in an undamaged condition, stored off ground in fully covered, well ventilated areas, and protected from extreme changes in temperature and humidity. Materials that are warped or twisted, contain unsound sections, or do not meet the requirements of this section will be rejected and replaced by the Contractor at no additional cost to the Government.

3.1.2 Stoplog Operation. Prior to acceptance, stoplogs shall be placed in the stoplog grooves so that the top of the top stoplog is at the elevation indicated on the drawings. The stoplogs shall be inspected when in place to ensure proper fit within the stoplog grooves, proper fit of each stoplog relative to adjacent stoplogs, and ease of stoplog installation and removal. Stoplogs shall not bind or have to be forced into place. When in place, stoplogs shall have continuous contact along the entire face with abutting stoplogs.

-- END OF SECTION --