

Information for File #2014-02243-BGO

Applicant: Mr. Maynard Beyer

Corps Contact: Benjamin Orne

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Phone: (651) 290-5280

Project Location: SW 1/4 Sec. 28, T. 109N., R. 36W., Redwood County, Minnesota

Information Complete On: April 14, 2015

Posting Expires On: April 24, 2015

Authorization Type: LOP-05-MN

This application is being reviewed in accordance with the practices for documenting Corps jurisdiction under Sections 9 & 10 of the Rivers and Harbor Act of 1899 and Section 404 of the Clean Water Act identified in Regulatory Guidance Letter 07-01. We have made a preliminary determination that the aquatic resources that would be impacted by the proposed project are regulated by the Corps of Engineers under Section 404 of the Clean Water Act. Our jurisdictional review and final jurisdictional determination could result in modifications to the scope of the project's regulated waterbody/wetland impacts and compensatory mitigation requirements identified above.

Project Description

The project consists of the construction of a dam structure in order to reduce flooding, provide wildlife habitat, capture sediment and control erosion which is occurring on an unnamed tributary to Cottonwood River. The approximate maximum dimensions of the dam are 330 feet long by 190 feet wide by 27 feet high. The principal spillway will be a water level control structure comprised of a 66-inch-diameter concrete riser and 42-inch-diameter concrete outlet pipe. An approximately 1.7 acre permanent pond will be excavated upstream of the dam as a source of clay material for the dam and to act as a sediment and wildlife enhancement pond. The approximate maximum dimensions of the area excavated for the pond are 320 feet long by 270 feet wide by 18 feet deep. A 30-foot-wide earthen emergency spillway will be excavated into the south abutment and a riprap scour hole at the culvert outlet will be constructed to dissipate energy. The 100-year storage volume is 57-acre feet over a temporary flood pool of 7.9 acres.

Construction of the dam and excavation of the permanent pond will impact an area of approximately 0.63 acre of fresh (wet) meadow (Type 2) wetland and 596 linear feet (0.06 acre) of the unnamed tributary. The permanent pond would inundate an additional 0.40 acre of fresh meadow wetland and 580 linear feet (0.05 acre) of the unnamed tributary. The 100-year storm event would temporarily inundate an additional 2.08 acre of fresh meadow wetland and 1,288 linear feet (0.12 acre) of the unnamed tributary.

This project was designed and will be partially funded by Area II Minnesota River Basin Projects, Inc. of Marshall, Minnesota. Area II provides technical, administrative, and local cost-share assistance for projects, in cooperation with the Board of Water and Soil Resources. Counties included in Area II are Brown, Cottonwood, Lac qui Parle, Lincoln, Lyon, Murray,

Pipestone, Redwood, and Yellow Medicine. Area II seeks to construct dams and downsize road culvert crossings to retain flood waters in the upper portions of the Minnesota River watershed. This area of the Minnesota River Watershed has a unique topography, characterized by the Coteau de Prairies (otherwise known as the Buffalo Ridge). This program provides grants to local units of government covering up to 75% of eligible costs when federal funds are not utilized or 50% of the non-federal costs when federal funds are utilized. The remaining project costs will be borne by the landowner, Redwood-Cottonwood Rivers Control area, the Environmental Quality Incentives Program administered by the Natural Resources Conservation Service and possibly other local funds.

Alternatives as Described by Applicant

1. The “do nothing” alternative was considered. However, this alternative will not achieve the County's Water Management Plan goals of reducing downstream flooding, capturing sediment from the upstream agricultural watershed and controlling erosion of the ravine. Bank erosion has been shown to be a major contributor to sediment loads in the Cottonwood River.
2. Another alternative which was considered would be to build the structure without a permanent pond. If this approach were taken, the dam would still serve the function of downstream flood and erosion reduction. However, the goal of sediment reduction would not be accomplished to the same extent, since ponding and detention have been shown to be much more effective at removing sediment from stream flows.
3. The project could possibly be moved to another location on the same or other tributary streams. However, the topography of the present site is most suitable for such a structure with nearly 25 feet of elevation difference between the stream elevation and the adjacent uplands. This type of landscape makes the structure design possible and achieves the goals of creating a permanent pond and providing for flood storage.
4. The project purpose of streambank stabilization could be accomplished by other measures such as hard armoring or using vegetative tools along the channel. However, the other project purposes would not be accomplished by this approach.

Federally Listed Threatened and Endangered Species

According to the USFWS Midwest Region website, which was checked on April 13, 2015, the Northern long-eared bat (threatened) and Prairie bush clover (Threatened) are found in Redwood County, Minnesota.

Historic Properties

The latest version of the National Register of Historic Places has been consulted and no listed properties (known to be eligible for inclusion, or included in the Register) are located in the project area.

State Listed Impaired (Section 303(d)) Waters

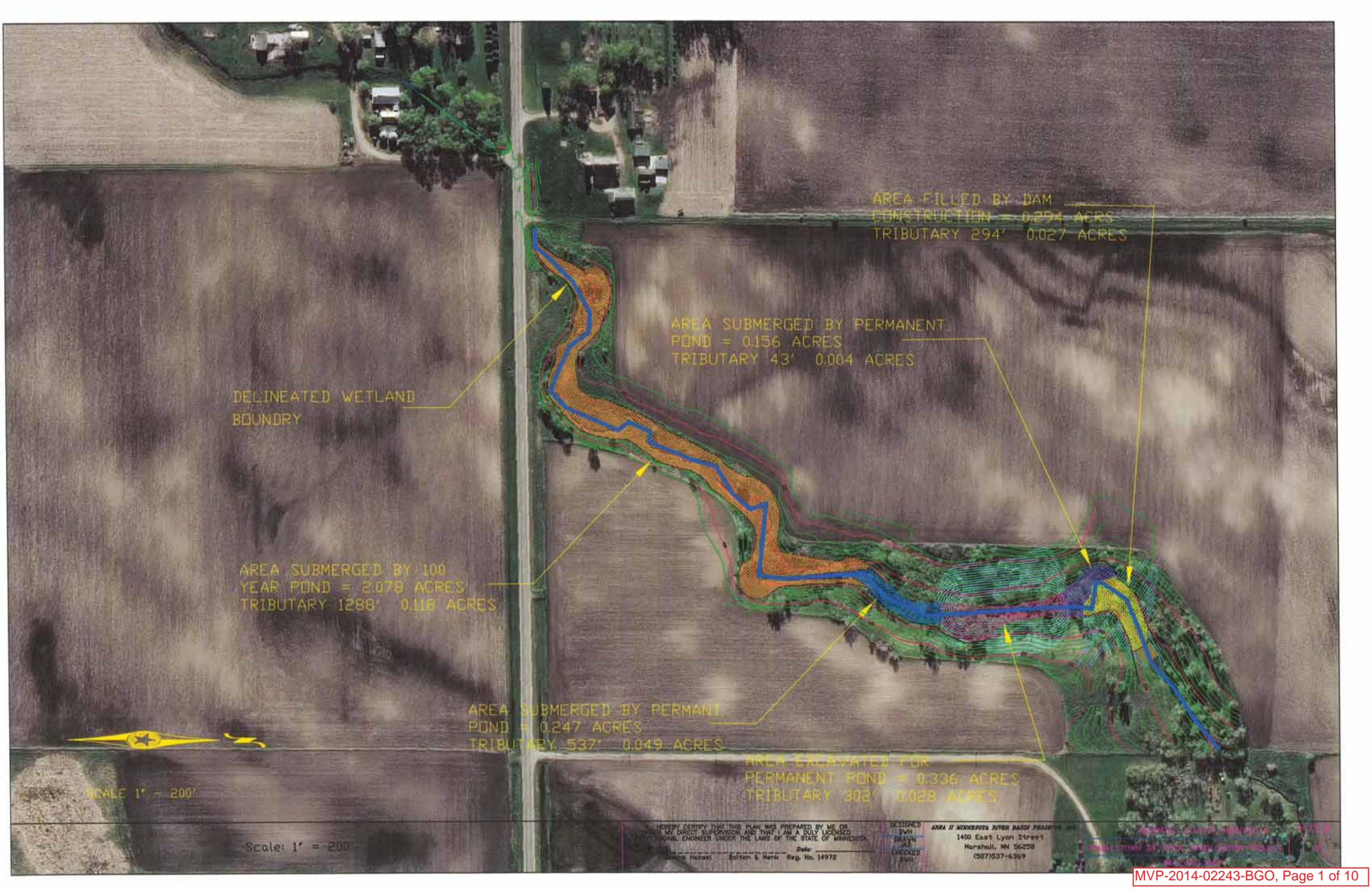
According to the Minnesota Pollution Control Agency's Impaired Waters Viewer, which was checked on April 13, 2015, the portion of the Cottonwood River located immediately downstream of the project site is listed as impaired for aquatic consumption due to excess concentrations of mercury in fish tissue. The project site is located approximately 4,500 linear feet upstream from the Cottonwood River.

Mitigation

The applicant proposes to satisfy wetland compensatory mitigation requirements by debiting wetland credits from a Corps-approved mitigation bank serving Bank Service Area 9.

Drawings

See attached MVP-2014-02243-BGO, Page 1 of 10 through Page 10 of 10.



AREA FILLED BY DAM
CONSTRUCTION = 0.294 ACRES
TRIBUTARY 294' 0.027 ACRES

AREA SUBMERGED BY PERMANENT
POND = 0.156 ACRES
TRIBUTARY 43' 0.004 ACRES

DELINEATED WETLAND
BOUNDARY

AREA SUBMERGED BY 100
YEAR POND = 2.078 ACRES
TRIBUTARY 1288' 0.118 ACRES

AREA SUBMERGED BY PERMANT
POND = 0.247 ACRES
TRIBUTARY 537' 0.049 ACRES

AREA EXCAVATED FOR
PERMANENT POND = 0.336 ACRES
TRIBUTARY 302' 0.028 ACRES



SCALE 1" = 200'

Scale: 1" = 200'

HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
Date: _____
Dennis Hensel Bolton & Herk Reg. No. 14972

DESIGNED: SWH
DRAWN: JAT
CHECKED: Evt
AREA II MINNESOTA RIVER BARRI PROJECTS, INC.
1400 East Lyon Street
Marshall, MN 56258
(507)537-6369

PLAN SYMBOLS

STATE LINE	----
COUNTY LINE	----
TOWNSHIP OR RANGE LINE	----
SECTION LINE	----
QUARTER LINE	----
SIXTEENTH LINE	----
RIGHT OF WAY LINE	----
SLOPE EASEMENT	----
PRESENT RIGHT OF WAY LINE	----
CONTROL OF ACCESS LINE	----
PROPERTY LINES	----
VACATED PLATTED PROPERTY	----

CORPORATE HIGHWAY CENTER LINE	====
TRUNK HIGHWAY CENTER LINE	====

RETAINING WALL	====
RAILROAD RIGHT OF WAY LINE	====
RIVER OR CREEK	====
DRY RUN	====
DRAINAGE DITCH	====
DRAIN TILE	====
CULVERT	====
DROP INLET	====
GUARD RAIL	====
BARBED WIRE FENCE	====
WOVEN WIRE FENCE	====
CHAIN LINK FENCE	====
RAILROAD SHOW FENCE	====
STONE WALL OR FENCE	====
HEDGE	====

RAILROAD CROSSING SIGN	X
RAILROAD CROSSING BELL	⊗
ELECTRIC WARNING SIGN	⊗
CROSSING GATE	←
MEANDER CORNER	⊕
SPRINGS	⊕
MARSH	⊕

TIMBER	⊕
ORCHARD	⊕
BRUSH	⊕
NURSERY	⊕

CATCH BASIN	⊕
FIRE HYDRANT	⊕

CATTLE GUARD	====
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OVERPASS (HIGHWAY OVER)	====
UNDERPASS (HIGHWAY UNDER)	====
BRIDGE	====

BUILDING (ONE STORY FRAME)	I-S-FR
F - FRAME	C - CONCRETE
S - STONE	T - TILE
B - BRICK	ST - STUCCO

IRON PIPE OR ROD	⊕
MONUMENT (STONE, CONCRETE, OR METAL)	⊕
WOODEN HUB	⊕

GRAVEL PIT	⊕
SAND PIT	⊕
BORROW PIT	⊕
ROCK QUARRY	⊕

UTILITIES SYMBOLS

POWER POLE LINE	⊕
TELEPHONE POLE LINE	⊕
JOINT TELEPHONE AND POWER	⊕
ON POWER POLES	⊕
ON TELEPHONE POLES	⊕

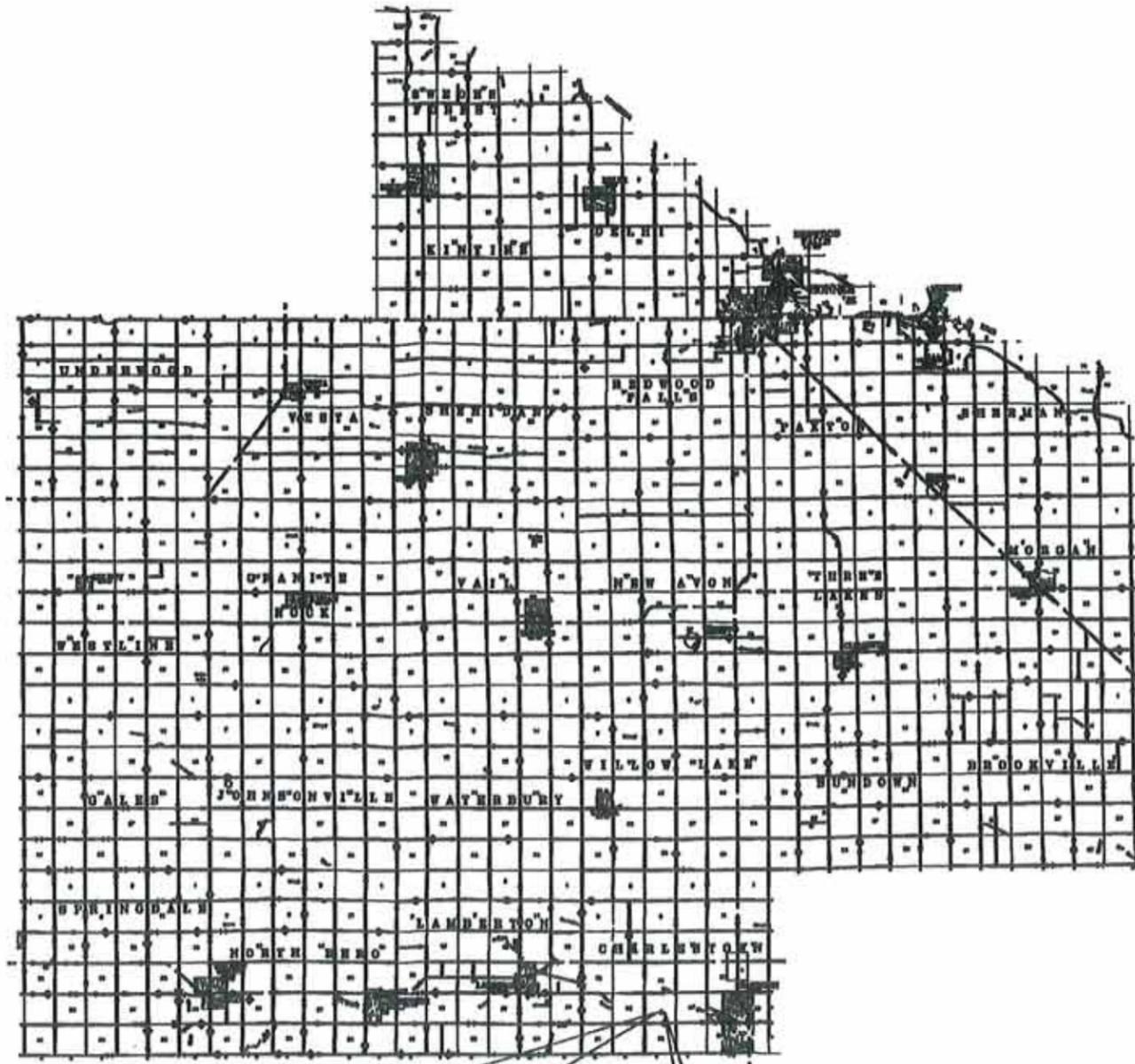
ANCHOR	⊕
STEEL TOWER	⊕
STREET LIGHT	⊕
PEDESTAL	⊕
GAS MAIN	⊕
WATER MAIN	⊕
CONDUIT	⊕
TELEPHONE CABLE IN CONDUIT	⊕
ELECTRIC CABLE IN CONDUIT	⊕
TELEPHONE MANHOLE	⊕
ELECTRIC MANHOLE	⊕
BURIED TELEPHONE CABLE	T-BUR
BURIED ELECTRIC CABLE	T-AC
AERIAL TELEPHONE CABLE	T-AC
SEWER (SANITARY OR STORM)	⊕
SEWER MANHOLE	⊕

AREA II MINNESOTA RIVER BASIN PROJECTS INC.

COUNTY OF REDWOOD

CHARLESTOWN 28 GRADE STABILIZATION PROJECT

CONSTRUCTION PLANS FOR 42" CULVERT MAIN, 66" RCP RISER AND EMBANKMENT
LOCATED IN SECTION 28 CHARLESTOWN TOWNSHIP 2.5 MILES WEST OF SANBORN MN, IN REDWOOD COUNTY



WRP 14-10
CHARLESTOWN 28 GRADE STABILIZATION PROJECT

GOVERNING SPECIFICATIONS

THE 2014 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATION FOR CONSTRUCTION" & "MATERIALS LAB SUPPLEMENTAL SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN

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SHEET NO. 8	DAM & SPILLWAY DETAILS SHEET
SHEET NO. 9	PROFILE THROUGH DAM & POND

THIS PLAN CONTAINS 9 SHEETS

NOTE:
EXISTING UTILITY INFORMATION SHOWN ON THIS PLAN HAS BEEN PROVIDED BY THE UTILITY OWNER. STATE LAW AND NRCS POLICY REQUIRE THAT THE EXCAVATING CONTRACTOR CONTACT GOPHER STATE ONE-CALL @ 1-800-252-1188 FOR UTILITY LOCATIONS 48 HOURS PRIOR TO THE START OF EXCAVATION WORK.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".

TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, JUDGEMENT, AND BELIEF THESE PLANS AND SPECIFICATIONS MEET APPLICABLE NRCS STANDARDS

Duane W. Hansel Bolton and Menk Inc. Lic. NO. 14972

DATE: 7/30/14

TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, JUDGEMENT, AND BELIEF, THIS PRACTICE IS INSTALLED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS AND MEETS NRCS STANDARDS

Duane W. Hansel Bolton and Menk Inc. Lic. NO. 14972

DATE: _____

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

Duane W. Hansel Bolton and Menk Inc. LIC. NO. 14972

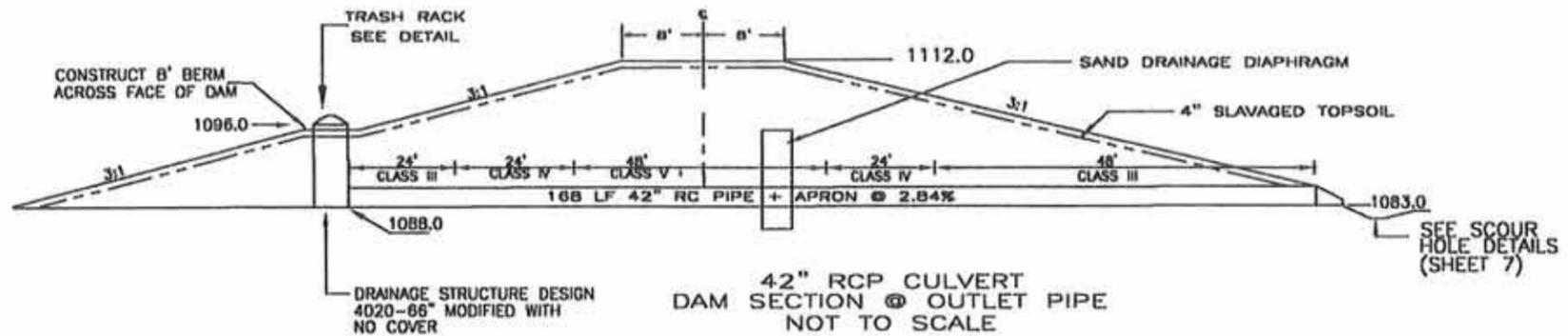
DATE: 7/30/14

AREA II MINNESOTA RIVER BASIN PROJECTS, INC.
1400 East Lyon Street
Marshall, MN 56258
(507)537-6369

WRP 14-10
SHEET 1 OF 9 SHEETS

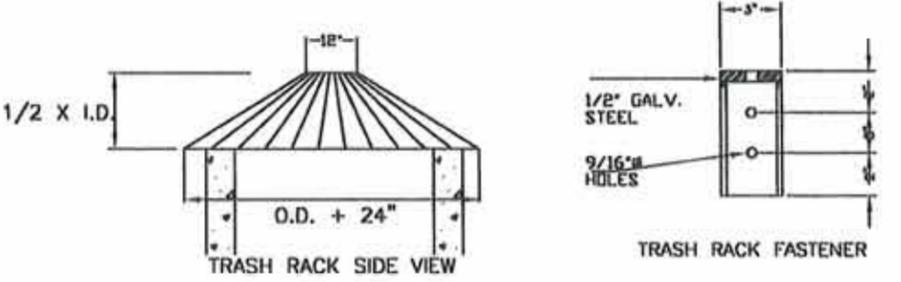
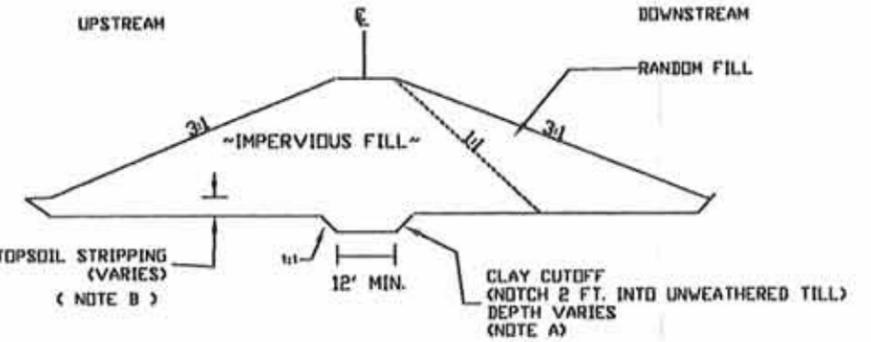
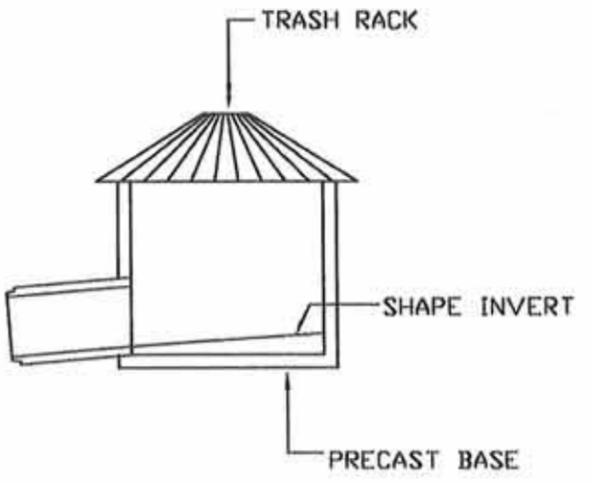
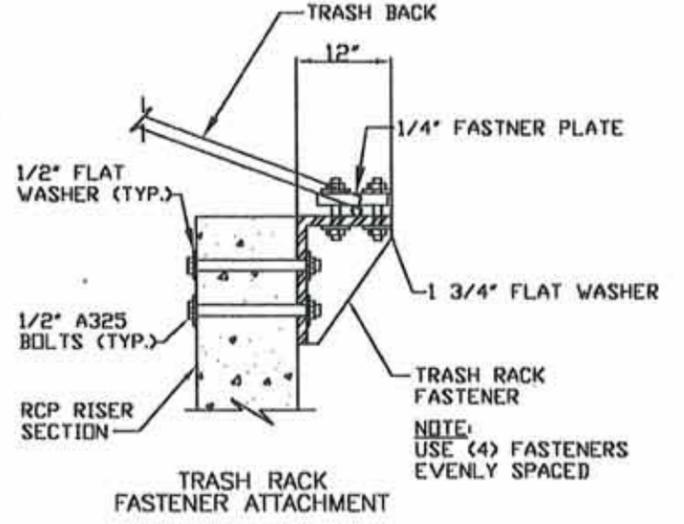
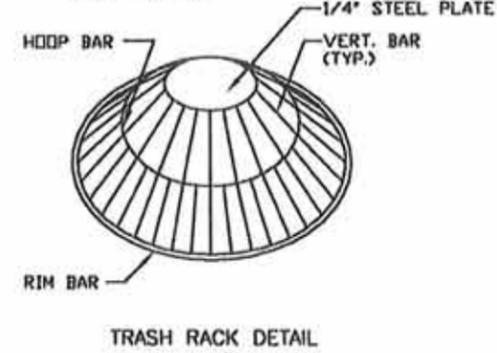
ESTIMATED QUANTITIES

SPECIFICATIONS NUMBER	ITEM	UNIT	Approximate Quantity
2021.501	MOBILIZATION	LS	1
2101.511	CLEARING & GRUBBING	LS	1
3. 2105.501	COMMON EXCAVATION (P)	C.Y.	20567
2. 2105.535	SALVAGE TOPSOIL (C.V.) (P)	C.Y.	1164
4. 2123.509	DOZER	HOUR	10
4. 2123.601	TRACTOR MOUNTED BACKHOE	HOUR	10
2451.513	DRAINAGE DIAPHRAGM AGGREGATE (C.V.)(P)	C.Y.	138
2501.515	42" RC PIPE APRON	EACH	1
2501.561	42" RC PIPE CULVERT DESIGN 3006G CLASS III	L.F.	72
2501.561	42" RC PIPE CULVERT DESIGN 3006G CLASS IV	L.F.	48
2501.561	42" RC PIPE CULVERT DESIGN 3006G CLASS V	L.F.	48
2501.569	GALVANIZED TRASH RACK	EACH	1
7. 2506.501	CONSTRUCT DRAINAGE STRUCTURE, DESIGN 4020-66" MODIFIED	L.F.	6.7
5. 2511.501	RANDOM RIPRAP CL III, QUARRY	C.Y.	120
6. 2573.502	SILT FENCE, TYPE HAND INSTALLED	L.F.	50
2573.515	FILTER BERM TYPE 3 (ROCK WEEPER)	L.F.	15
2573.533	SEDIMENT CONTROL LOG, TYPE 9" WOOD FIBER	L.F.	120
2574.508	FERTILIZER TYPE 24-2-24	Lb.	1400
2575.501	SEEDING	ACRE	3.5
2575.502	SEED MIXTURE 35-241 MESIC PRAIRIE GENERAL	Lb.	175
2575.511	MULCH TYPE 1	TON	2.0
2575.519	DISK ANCHORING	ACRE	3.5
6. 2575.523	EROSION CONTROL BLANKETS, CATEGORY 3 INCLUDES MAINTENANCE	S.Y.	1560



	EXC.	EMBANK
CLAY CUTOFF	789	789
STRIP DAM FOOTPRINT	2511	2511
POND	17537	
SPILLWAY	518	
DAM		11682
SALVAGED TOPSOIL		1164
TOTALS	21355	16146
EXC/EMB		1.32

NOTE:
 - ALL BARS TO BE GALV. 1"
 - VERT. & HORIZ. BARS TO BE 6" D.C. MAX.



INLET STRUCTURE DETAIL NOT TO SCALE

TYPICAL DAM SECTION

TRASH RACK DETAILS NOT TO SCALE

CONSTRUCTION NOTES

- IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONTRACT PROPER AUTHORITIES FOR LOCATIONS OF ALL BURIED STRUCTURES ON THIS PROJECT PRIOR TO COMMENCING ANY EXCAVATION OPERATIONS.
- TOPSOIL SHALL BE STRIPPED FROM DESIGNATED AREAS WITHIN THE CONSTRUCTION LIMITS AND USED TO COVER SLOPES AND DITCHES. THIS WORK SHALL BE CONSIDERED AS PART OF ITEM 2105.535 SALVAGED TOPSOIL.
- COMPACTION OF ALL EMBANKMENTS SHALL BE BY THE QUALITY COMPACTION METHOD AS PER MN/DOT SPEC. 2105.372
- EQUIPMENT HOURS HAVE BEEN PROVIDED FOR ADDITIONAL SHAPING, TILE LOCATIONS AND OTHER UNANTICIPATED WORK.
- THE EXCAVATION OF THE SCOUR HOLE AND THE PLACING OF GEOTEXTILE FABRIC SHALL BE INCIDENTAL TO THE CONSTRUCTION OF RIPRAP AS SHOWN ON THIS SHEET.
- INCLUDES MAINTENANCE
- 6" OF 1 1/2" ROCK SHALL BE INCIDENTAL TO THE ITEM 2506.001 CONSTRUCT DRAINAGE STRUCTURE

THE FOLLOWING MN DOT STANDARD PLATES, APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION, SHALL APPLY ON THIS PLAN.

PLATE NO.	DESCRIPTION
0005A	SPECIFICATIONS REFERENCE TO STANDARD PLATES
3000 L	REINFORCED CONCRETE PIPE
3006 G	GASKET JOINT FOR R.C. PIPE
3133 D	RIPRAP AT R.C.P. OUTLETS
3145 E	CONCRETE PIPE TIES
4011 E	PRECAST CONCRETE BASE
4020 J	MANHOLE OR CATCH BASIN COVER

NOTE: DETAILS ARE NOT TO SCALE

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA
 Signed: *Duane Hansel* Date: 7/23/14
 Duane Hansel Bolton & Harsh Reg. No. 14972

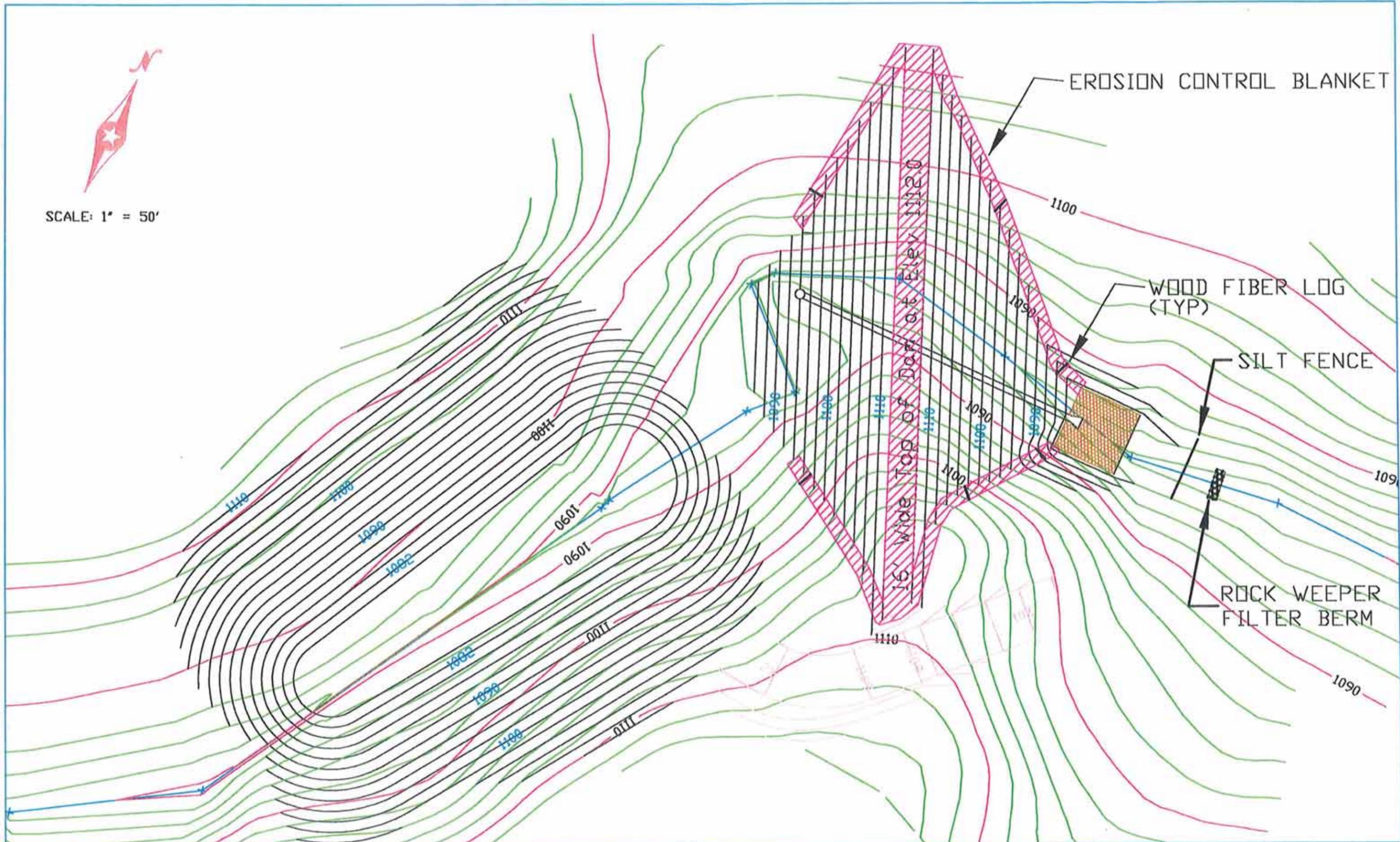
DESIGNED BY: AREA II MINNESOTA RIVER BASIN PROJECTS, INC.
 1400 East Lyon Street
 Marshall, MN 56258
 (507)537-6369

REDWOOD COUNTY, MINNESOTA
 CHARLESTOWN 28 GRADE STABILIZATION PROJECT SDP 14-10
 ESTIMATED QUANTITIES SHEET

SHEET # 2 OF 8



SCALE: 1" = 50'

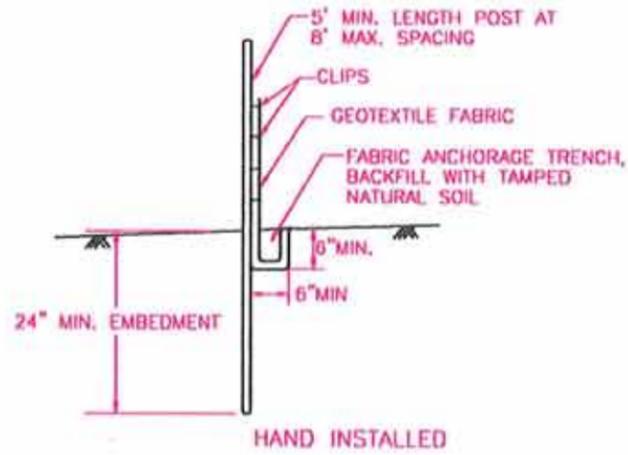


SCALE: 1" = 50'

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			CHARLESTOWN 28 GRADE STABILIZATION PROJECT 14-10	

SILT FENCE DETAILS

NOT TO SCALE

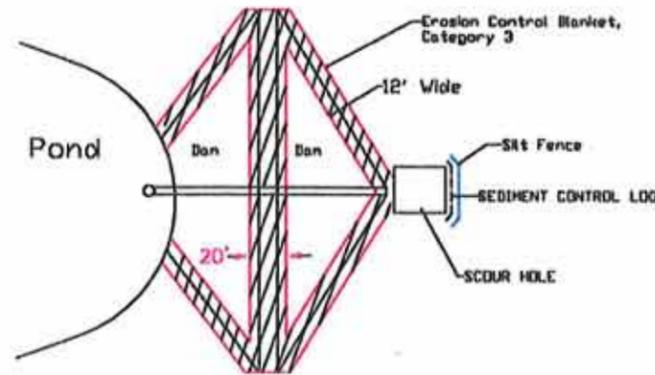


SILT FENCE DETAILS

ALL SILT FENCE MATERIALS AND ASSEMBLY SHALL COMPLY WITH MN/DOT SPEC 3886 SILT FENCE EXCEPT AS MODIFIED BY THIS PLAN OR ON THE SPECIAL PROVISIONS. STAKING INTERVAL SHALL BE 6 FT MAXIMUM WITH THE OUTER 6 FT OF DITCH BLOCK ANGLED 45 DEGREES TO THE UPSTREAM DIRECTION.

EROSION CONTROL

1. It shall be the intent of this plan to stage construction so that no area will remain open to potential erosion for unnecessarily long periods of time. Each excavated area shall be stabilized prior to opening the next excavated area.
2. All areas disturbed by construction activities shall be stabilized against potential erosion immediately after final grade has been attained. Stabilizing methods shall consist of, but not limited to, replacement of topsoil, dragging, seeding, mulch, initial lift of aggregate, or any other erosion control method specified by the contract.
3. Temporary erosion control devices specified by this plan shall be installed as directed whenever practical, however actual locations may be modified by the project engineer to fit existing conditions in the field.
4. Silt fence shall be installed and maintained by the contractor.
5. Final dragging will be required on all areas within the project limits to the extent that sufficient friability is attained within the top 4 inches to provide an adequate bed for seeding operations. The work shall be incidental to Item 2105.535 salvage topsoil and no further compensation will be allowed therefor.

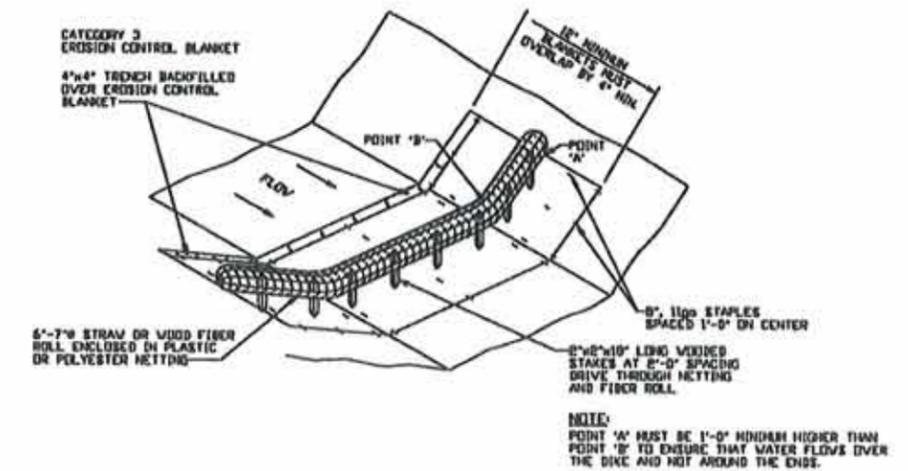


Blanket Placement

Note: All other disturbed areas to be seeded, mulched and disk anchored.

EROSION CONTROL PLAN

NOT TO SCALE



BIOROLL DITCH CHECK

NOT TO SCALE

NOTE: DETAILS ARE NOT TO SCALE

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Signed: *Duane Hansel* Date: 7/2/14
 Duane Hansel Bolton & Merrick Reg. No. 14972

DESIGNED
 DRAWN
 CHECKED
 DWG

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 1400 East Lyon Street
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REDWOOD COUNTY, MINNESOTA
 CHARLESTOWN 28 GRADE STABILIZATION PROJECT SDP 14-10
 EROSION CONTROL PLAN

SHEET #
 4 OF 9

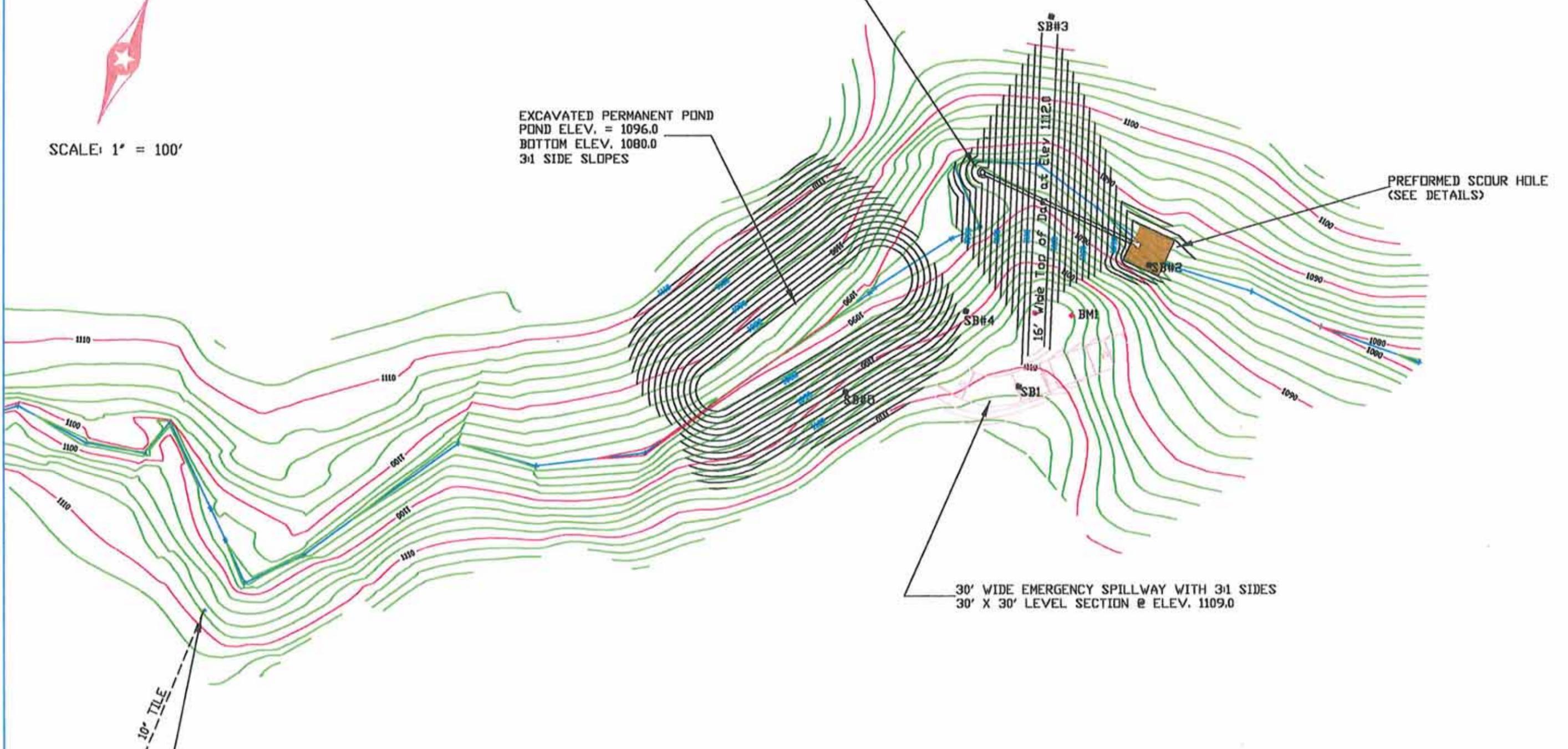


SCALE: 1" = 100'

EXCAVATED PERMANENT POND
POND ELEV. = 1096.0
BOTTOM ELEV. 1080.0
3:1 SIDE SLOPES

42" RC PIPE CULVERT
WITH 66" RCP RISER

PREFORMED SCOUR HOLE
(SEE DETAILS)



10" TILE

TILE TO BE ABANDONED BY OWNER

30' WIDE EMERGENCY SPILLWAY WITH 3:1 SIDES
30' X 30' LEVEL SECTION @ ELEV. 1109.0

BM1 ELEVATION: 1108.32
DESCRIPTION: 2' X 2' WOOD HUB FLUSH WITH GROUND
APPROX. 172' NORTHEAST OF PIPE INLET.

SCALE: 1" = 100'

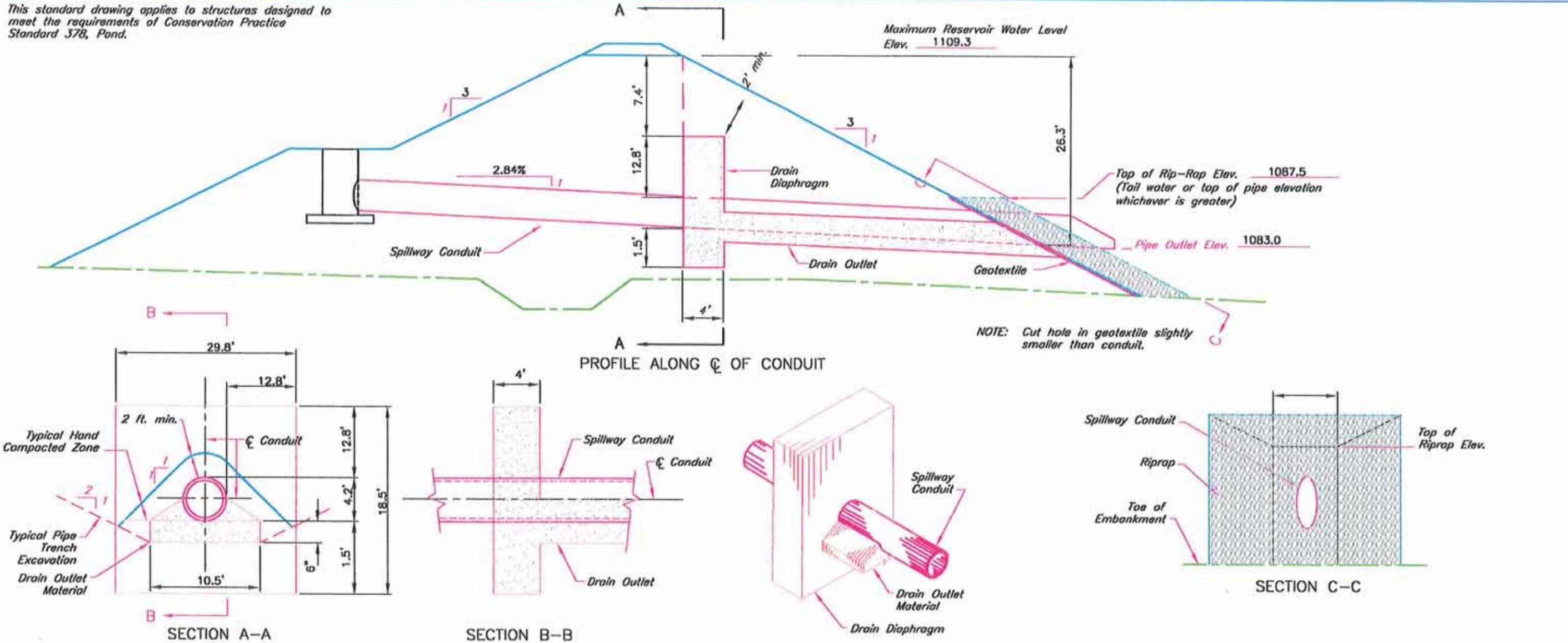
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DESIGNED: DVH
DRAWN: JAD
CHECKED: DVH
AREA II MINNESOTA RIVER BARRI PROJECTS, INC.
1400 East Lyon Street
Marshall, MN 56250
(507)537-6369

REDWOOD COUNTY, MINNESOTA
CHARLESTOWN 28 GRADE STABILIZATION PROJECT 14-10
PLAN SHEET

SHEET #
5
OF
9

This standard drawing applies to structures designed to meet the requirements of Conservation Practice Standard 378, Pond.



CONSTRUCTION NOTES:

- Placement of the drain filter material shall be by one of the following methods:
 - The drain filter material shall be placed in 12 inch lifts. Each lift shall be saturated uniformly with approximately 1.2 gallons of water per cubic foot of loose drain material.
 - Drain filter material shall be moist sand and shall be compacted using 6-inch lifts with at least 2 passes over the entire surface with a portable plate vibrator exerting a vertical vibrating force of not less than 700 pounds per square foot at least 4,000 times per minute.
- Rock riprap shall be placed without damaging underlying geotextile.
- When the drain outlet material is placed on bedrock, additional geotextile may be placed under the drain outlet to prevent migration of the drain outlet material into fractures in the bedrock.

MATERIAL NOTE

The geotextile shall conform to the Class IV requirements of MNDOT 3733

DRAIN FILTER GRADATION		RIPRAP GRADATION		
SIEVE SIZE	PERCENT PASSING	PERCENT SMALLER	WEIGHT RANGE (LBS.)	SIZE RANGE (IN.)
3/8	100	100	400	18
4	90-100	75	120	12
10	45-90	50	50	9
40	5-35	10	2	3
200	0-3			

MNDOT 3149.2 J FINE FILTER AGGREGATE
Min. gradation MNDOT Class III

ESTIMATED QUANTITIES
 Drain Filter Material 138 Cubic Yards (C.V.)
 Rip-Rap 120 Cubic Yards

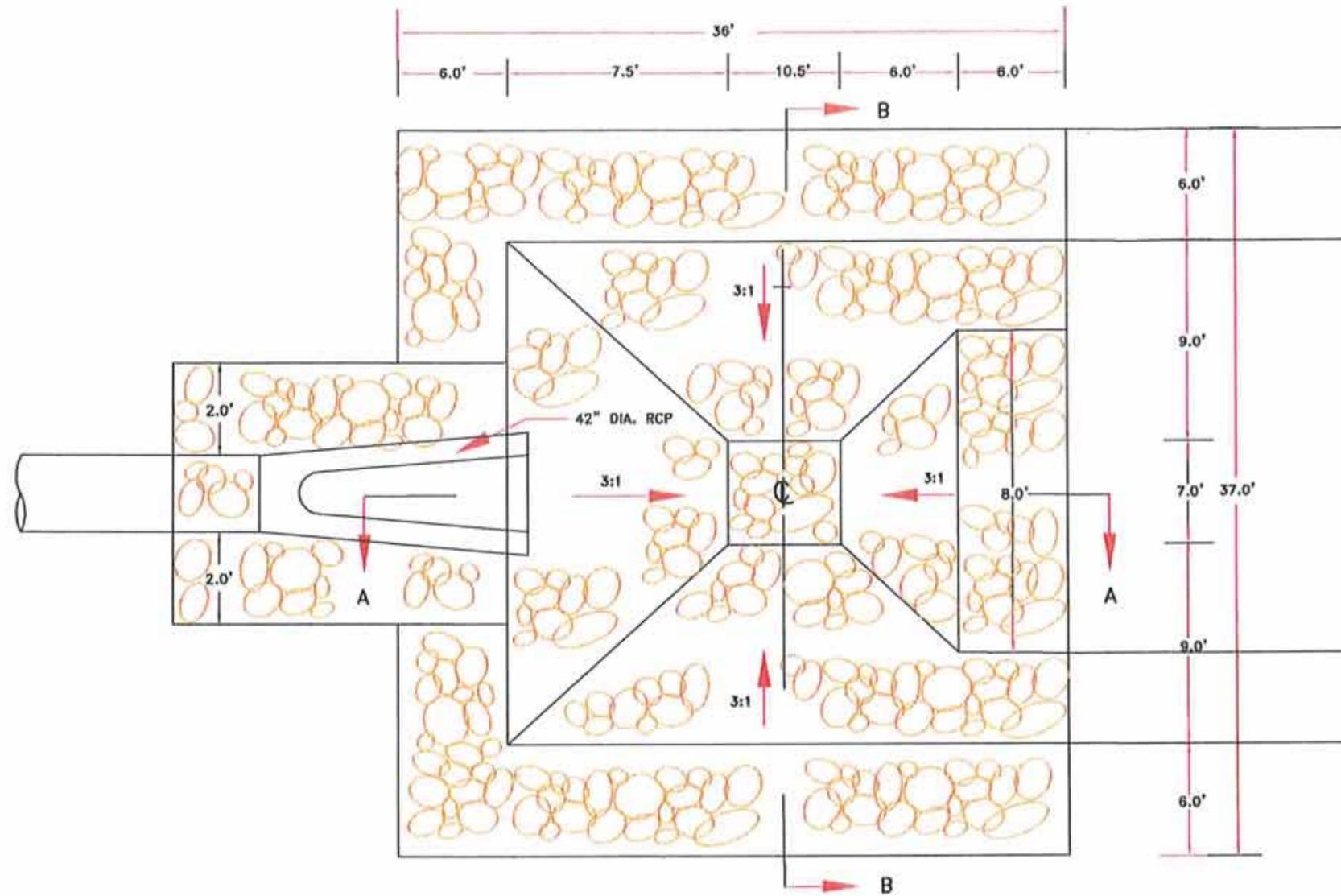
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 Duane Honsel Bolton & Mark Reg. No. 14972

DESIGNED DWH
 DRAWN JAD
 CHECKED DWH
 AREA 11 MINNESOTA RIVER BASIN PROJECTS, INC.
 1400 East Lyon Street
 Marshall, MN 56258
 (507)537-6388

REDWOOD COUNTY, MINNESOTA
 CHALESTOWN 2B GRADE STABILIZATION PROJECT 14-10
 DRAIN DIAPHRAGM DETAILS

SHEET # 6 OF 9

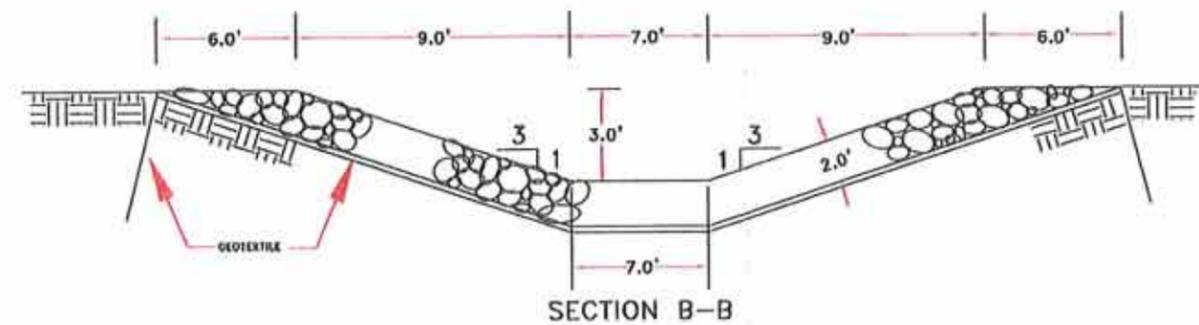
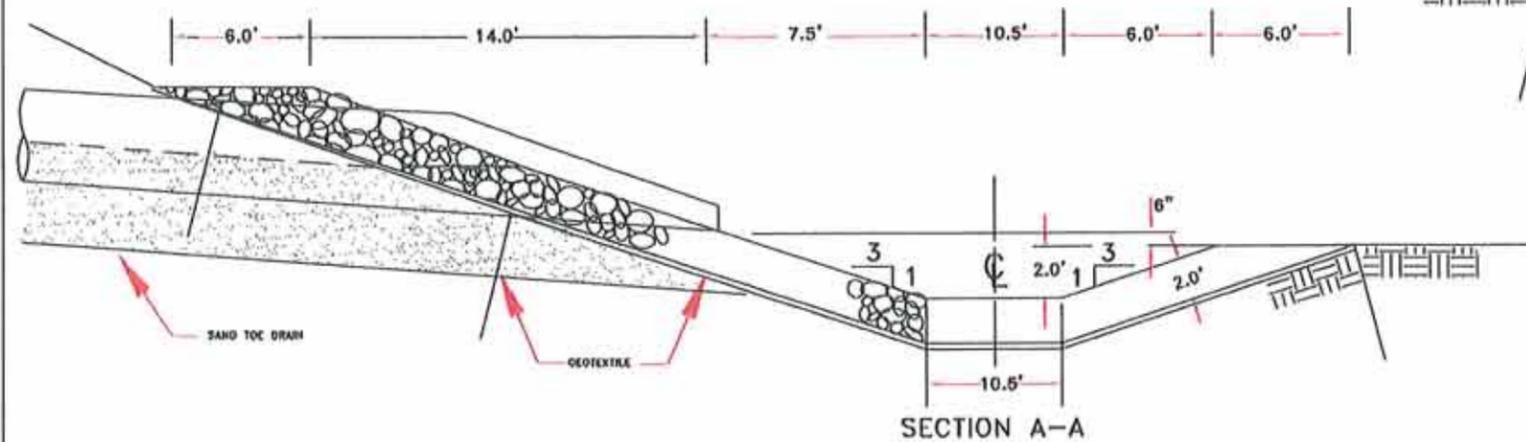


NOTES

RIPRAP MEETING THE GRADATION AND SPECIFICATION REQUIREMENTS OF MINNESOTA DEPARTMENT OF TRANSPORTATION CLASS III RIPRAP WILL BE ACCEPTABLE.

GEOTEXTILE SHALL BE NON-WOVEN, TYPE IV FILTER FABRIC. UNLESS OTHERWISE SPECIFIED GEOTEXTILE SHALL BE OVERLAPPED A MINIMUM OF 18 INCHES AT ALL SPLICES.

GEOTEXTILE SHALL BE ANCHORED IN TRENCH A MINIMUM OF 2 FEET.



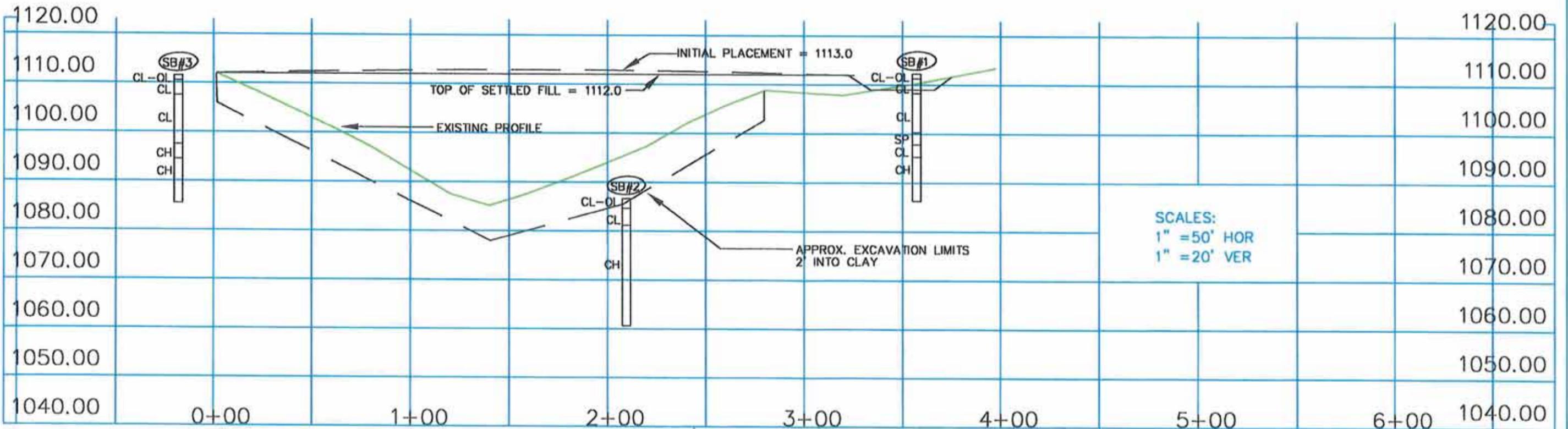
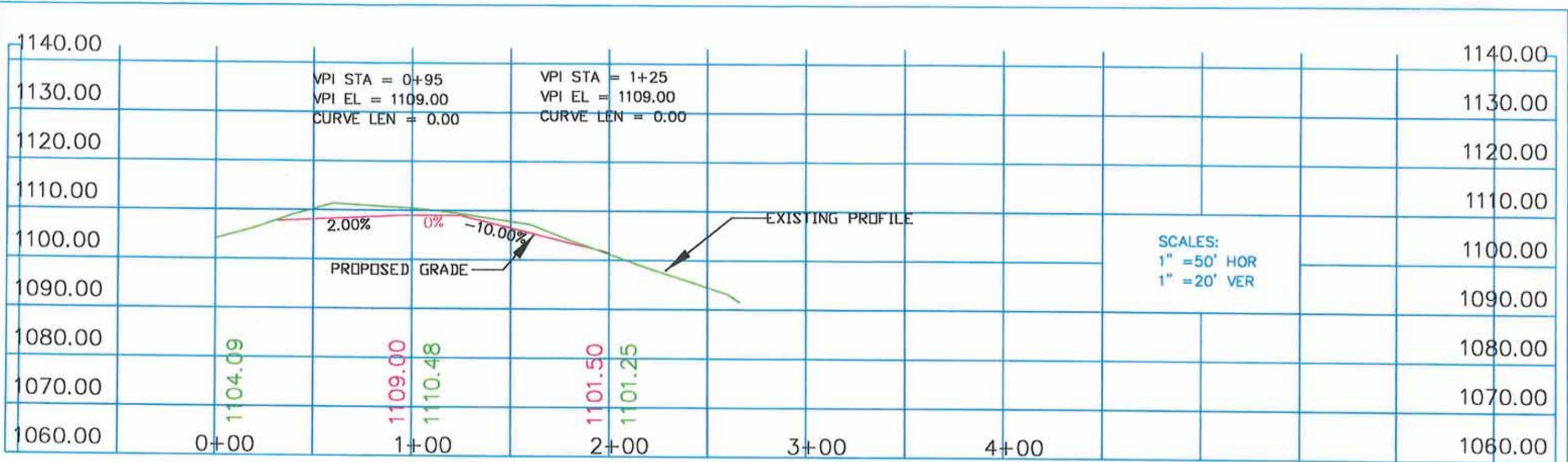
NOTE: DETAILS ARE NOT TO SCALE

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
 Signed: *[Signature]* Date: 7/20/14
 Duane Hansel Balton & Menk Reg. No. 14972

DESIGNED: DVH
 DRAWN: JAD
 CHECKED: DVH
 AREA II MINNESOTA RIVER BASIN PROJECTS, INC.
 1400 East Lyon Street
 Marshall, MN 56258
 (507)537-6369

REDWOOD COUNTY, MINNESOTA
 CHARLESTOWN 28 SMALL DAM PROJECT SDP 10--08
 PREFORMED SCOUR HOLE DETAILS

SHEET #
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 OF
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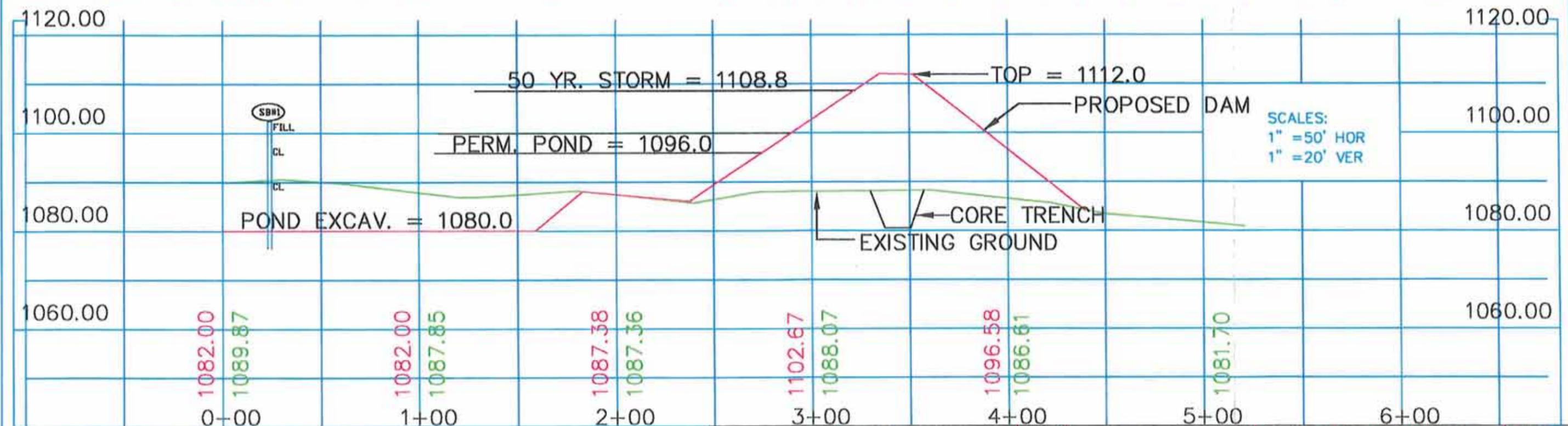
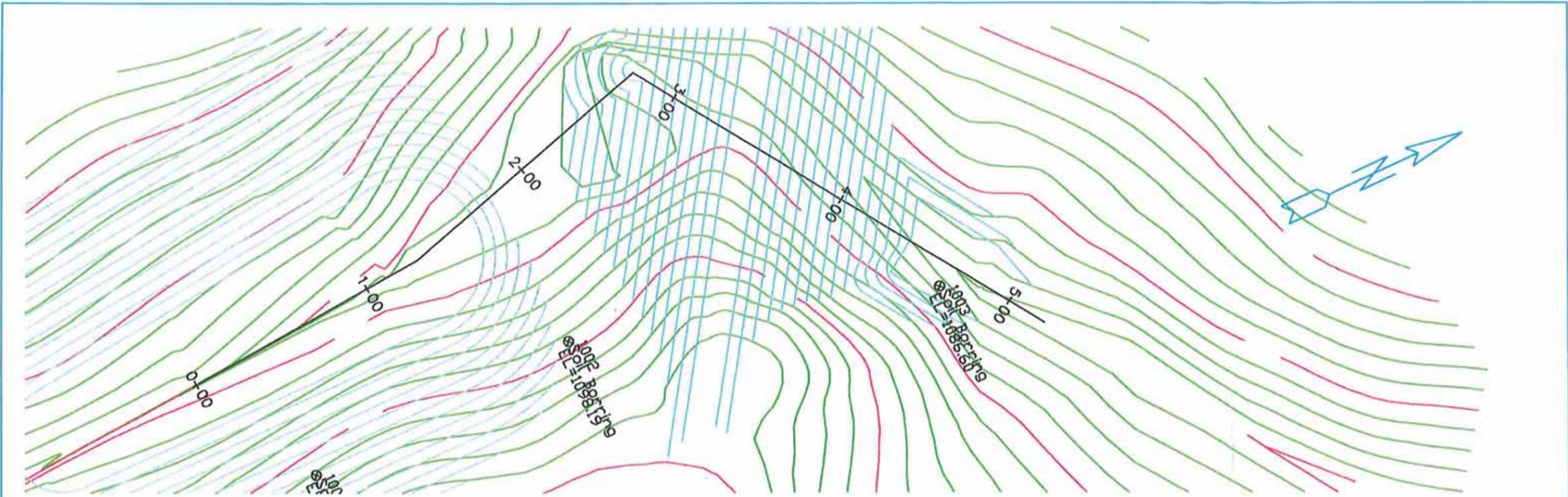


I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
 Signed: Duane Hanzel Date: 7/30/14
 Duane Hanzel Bolton & Herik Reg. No. 14972

DESIGNED DVH
 DRAWN JAB
 CHECKED DVH
 AREA II MINNESOTA RIVER BASIN PROJECTS, INC.
 1400 East Lyon Street
 Marshall, MN 56258
 (507)537-6369

REDWOOD COUNTY, MINNESOTA
 CHARLESTOWN 28 SMALL DAM PROJECT WRP 14-10
 DAM & SPILLWAY SECTIONS

SHEET #
 B
 OF
 9



I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA
 Signed: *[Signature]* Date: *2/20/14*
 Duane Hansel Bolton & Herk Reg. No. 14972

DESIGNED: DVH
 DRAWN: JAB
 CHECKED: DVH
 ARKA II MINNESOTA RIVER BASIN PROJECTS, INC.
 1400 East Lyon Street
 Marshall, MN 56258
 (507)537-6369

REDWOOD COUNTY, MINNESOTA
 CHARLESTOWN 28 SMALL DAM PROJECT WRP 10-08
 PROFILE THROUGH DAM & POND

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