

WATER PERMIT NO. 2726-2

Name of Applicant: **Brad Havemeier, JBH Dakota LLC**

Address: **2212 Majestic Ct N, Naples FL 34110** Phone: **239 298-9955**

Amount of Water Claimed: **44.9 AF** Total Acres: **NA**

Source of Water Supply: **runoff – unnamed tributary to Bull Creek**

Water to be used for: **fish & wildlife propagation, recreation, livestock** County: **Lyman**

Type of Waste Disposal System:

Location: **22 miles south of Reliance**

PRIORITY Date Received: **4-18-14** Application/License Fee: **\$ 700**

Corrected Application Received: **-** Period of Annual Use: **Jan 1- Dec 31**

Remarks:

Diversion Point: **SE 1/4 NW 1/4 Sec 19-T101N-R73W**

Water Impounded: **S 1/2 NW 1/4, NW 1/4 NW 1/4 Sec 19-T101N-R73W**

Depth of Well: **NA**

Well Driller:

Remarks:

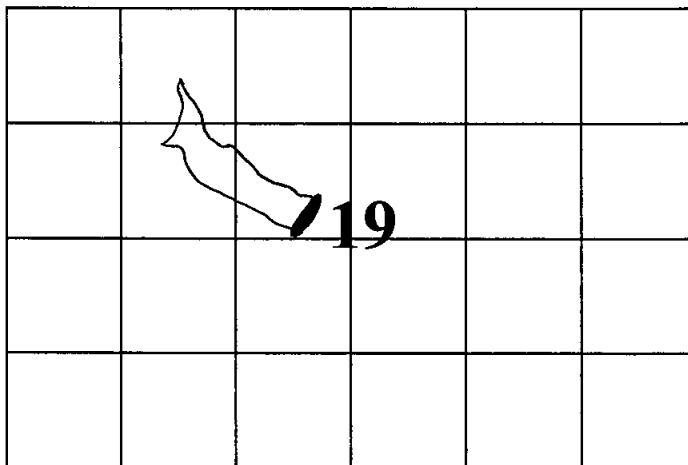
Type of Map: **aerial**

Prepared by:

Reviewed and the Number Assigned on: **4-21-14**

By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____



FORM 2: Application for uses other than irrigation
(type or print)

Mail to: PMB 2020 DENR - Water Rights 523 E Capitol Ave Pierre, SD 57501-3182 ph. (605) 773-3352	(office use only)	
	No. <u>2726-2</u>	Hydrologic Unit <u>10140101</u>
	Basin <u>Missouri River</u>	<u>605-895-6397</u>
	Newspaper <u>Lyman Co. Herald Box 518 Pierre</u>	<u>605-224 7301</u>
	<u>Capital Journal Box 878 Pierre 57501</u>	

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APR 18 2014

WATER RIGHTS
PROGRAM

Application For Permit To Appropriate Water Within The State Of South Dakota

Check use(s) of water:

☐ Municipal	☐ Suburban Housing	☒ Recreational	☐ Institutional
☐ Rural Water System	☐ Commercial	☒ Fish & Wildlife	☐ Geothermal Heat
☐ Domestic (over 18 gpm)	☐ Industrial	☒ Other <u>Livestock</u>	

Type of Application:

(check one)

☒ New	☐ Vested Right (Use predates Mar 2, 1955)	☐ Future Use Reservation
☐ Place to Beneficial Use Water Reserved by Future Use Permit No. _____		
☐ Amendment/Correction to Permit No. _____		

Description of amendment/correction: (i.e. change diversion point(s), add diversion point(s), change use, etc.)

1. Name to Appear on Water Permit Brad Havemeier, JBH Dakota, LLC(check one) ☒ Owner ☐ Tenant/lessee ☐ Owner's Legal Agent

(name and complete address if different than above name)

Mailing Address 2212 Majestic Ct. N. Naples FL 34110
(Address) (City) (State) (Zip Code)Home Phone 239-597-9708 Cell 239-298-9955 Email _____2. Amount of water claimed _____ *CFS or _____ **GPM 44.9 ***AF
(*Cubic Feet per Second) (**Gallons per Minute) (***)Acre Feet - storage capacity of dam/dugout or annual use if applicable)3. Source of water supply Unnamed tributary to Bull Creek4. Location of point of diversion SE 1/4, NW 1/4, Sec. 19, T 101 N, R 73 W County Lyman

(example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W)

If not a public water supply (e.g. municipal), will water be used outside of the area described above? ☐ Yes ☒ NoIf "Yes," where will water be used? water impounded: NW 1/4 Sec 19 - T101N - R 73W
(example - NW1/4 section 12-T104N-R53W)5. County or counties where water will be used Lyman6. Annual period during which water is to be used Year-round Jan 1 - Dec 31

7. Give a description of the project. When available include any preliminary engineering report or other reports or information that will help explain the project. (Attach sheet if more space is needed)

Construction of an earth dam. The dam consists of placement of earthfill downstream of an existing dam that has washed out. The new dam will have a wave berm, a 48 inch diameter drop inlet with a 16 inch barrel pipe, and an 100 feet wide auxiliary spillway on the southwest end of the dam.

I, Brad Havemeier Brad A. Havemeier, the applicant, certify that I have read this application, have examined the attached map, and that the matters stated are true.

**SOUTH DAKOTA
WATER PERMIT NO. 2726-2**

Date of first receipt of application April 18, 2014.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 2726-2 to Brad Havemeier, JBH Dakota LLC, 2212 Majestic Ct N., Naples FL 34110 authorizing the construction of the dam water use system and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 2726-2 authorizes impoundment of 44.9 acre-feet of water from an unnamed tributary to Bull Creek by reconstructing a dam located in the SE 1/4 NW 1/4 Section 19 with water impounded in the NW 1/4 Section 19; all in T101N-R73W.
2. The water appropriated shall be used for the purpose of fish and wildlife propagation, recreation and livestock water and may not exceed the amount of water needed for beneficial use.
3. The water is to be used during the following described annual period: January 1 – December 31.
4. The date of approval of Permit No. 2726-2 is June 30, 2014.
5. The date from which applicant may claim right is April 18, 2014.
6. One-fifth of the construction is to be completed on or before December 30, 2016.
7. All construction is to be completed on or before June 30, 2019.
8. Water is to be put to beneficial use on or before June 30, 2023.
9. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

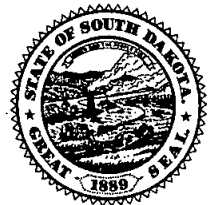
1. Water Permit No. 2726-2 authorizes an impoundment with a storage capacity of 44.9 acre feet of water and sufficient water annually to maintain the water level to the outlet elevation.
2. Low flows as needed for downstream domestic use, including livestock water and prior water rights must be by-passed.

WATER MANAGEMENT BOARD

By: *Jeanne Goodman*
Jeanne Goodman, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

JUL 11 2014

date



Supplemental Information

(type or print)

1. Well Information (check one or both as applicable) ☐ Drilling new well(s) ☐ Using existing well(s)

a) If new wells, how many ____ Have test holes been drilled ☐ Yes ☐ No Drilled by ____
(if yes, please provide copies of logs)

b) If existing wells, how many ____ Provide copy of log(s), if available. Drilled by ____

c) Well Depth ____ Depth to Top of Water Bearing Material ____ Depth to Water from Surface ____

d) Distance to nearest existing domestic well:

On applicant's property ____ On property owned by others ____

2. Wastewater Disposal System Information

a) Type of System (i.e. septic tank, drain field) ____

b) System Capacity (gallons) ____ Year Constructed ____

c) Connected to the City of ____ Sanitary System

3. Dugout Information

a) Surface Dimensions ____ Depth ____

b) Depth to water (ground surface to water level) ____

4. Water Storage Dams

If the proposed water use system contains one or more storage dams, please furnish the information requested below for each dam. The locations of the dams need to be shown on the map submitted with the application.

a) If a private engineering firm or government agency was involved in the design of this dam, please give their name and address:

John Schmidt
Agricultural Engineer
USDA-NRCS
1717 N. Lincoln Ave, Suite 104
Pierre, SD 57501-7800

b) Freeboard 5.5 Feet

c) Crest Width 12 Feet

Crest Length 445 Feet

d) Height 18.8 Feet

e) Primary Outlet Capacity 24 CFS

If pipe, diameter 16 Inches

f) Secondary Spillway Capacity 368 CFS

Spillway Width 100 Feet

g) X & Y Slope (e.g. 3 to 1 is a typical slope)

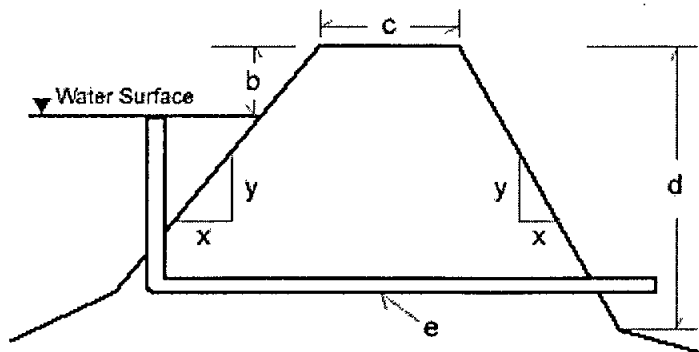
Upstream 3:1

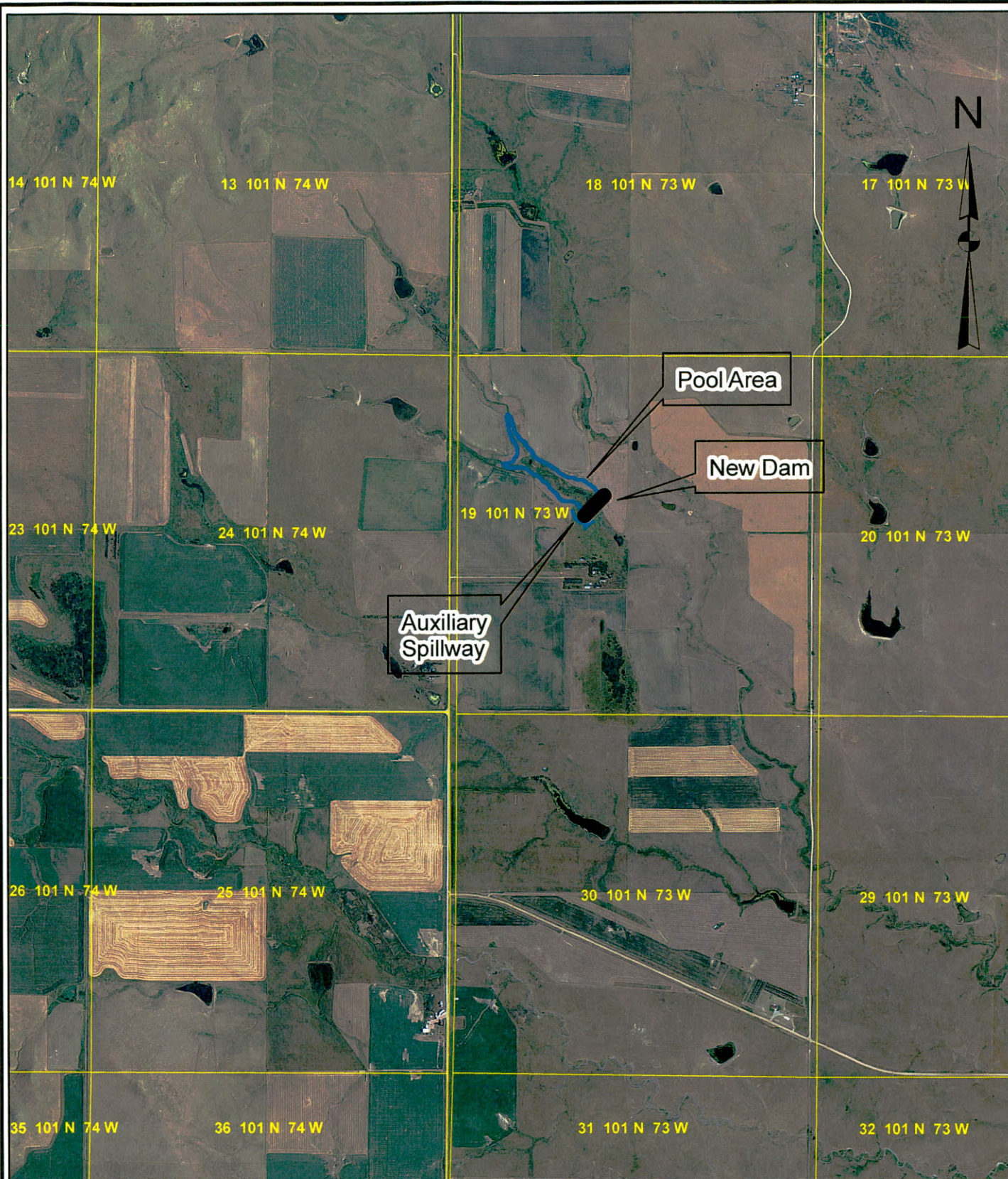
Downstream 3:1

h) Surface Area of Impoundment 9.5 Acres

i) Storage 44.9 Acre Feet

j) Drainage Area Above Dam 709.0 Acres





LOCATION MAP

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0 1,000 2,000 4,000 6,000 Feet



Natural Resources Conservation Service
United States Department of Agriculture

WATER RIGHTS
PROGRAM

Brad Havemeier
378 Pond
Sec. 19, T 101 N, R 73 W
Lyman County, South Dakota

Designed: <u>John Schmidt</u>	Date: <u>4/4/2014</u>	File Name
Drawn: _____	Checked: _____	Drawing Name
Approved: _____		4/4/2014
		Sheet 1 of 1

RECEIPT

WATER RIGHTS PROGRAM

South Dakota Department of Environment and Natural Resources

Date 4/21, 20 14

RECEIVED OF JBH Dakota LLC 2212 Majestic Ct N Naples FL 34110

The following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. _____ to Appropriate Water, to construct and to put water to beneficial use	500	00
Fee for Application for Permit No. _____ to Appropriate Water for Future use		
Fee to retain Future Use Permit No. _____ after period of seven years.		
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. _____	200	00
Fee for Filing Transfer Form _____		
Fee for _____		
Fee for Issuing New Well Driller's License No. _____ for C.Y. _____		
Fee for Renewal of Well Driller's License No. _____ for C.Y. _____		
Fee for Issuing Well Pump Installer's License No. _____ for C.Y. _____		
Fee for Renewal of Well Pump Installer's License No. _____ for C.Y. _____		
(Any Other Work Provided by Law) TOTAL	700	00

No. **06833**

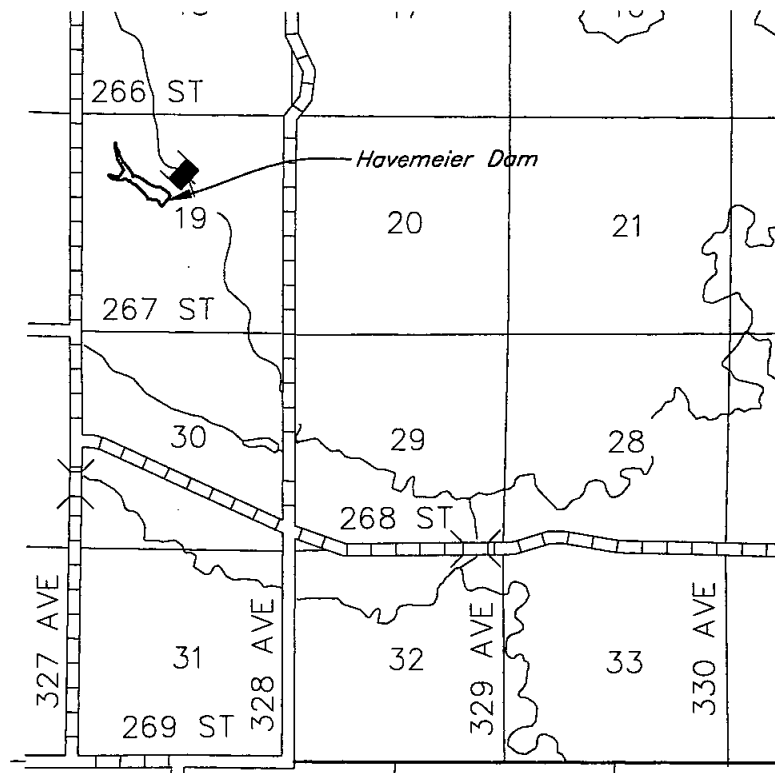
By Jeanne Goodman
Chief Engineer



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NW 1/4, Sec 19, T 101 N, R 73 W

Lyman County, South Dakota

LOCATION MAP

GENERAL NOTES

1. If cultural resources are discovered during construction, discontinue construction and notify the local Natural Resources Conservation Service office.
2. The landowner is responsible for complying with all federal, state, and local laws.

CONSTRUCTION NOTES

1. Clear and grub the entire area within the work limits.
2. All fill material must not contain frozen material, sod, roots, or other perishable material, or rock larger than eight inches in diameter as described in SD Construction Specification SD-7S.
3. Any shale, gravel, or sand that is exposed during borrow operations shall be immediately backfilled with 2 feet of clay material.
4. Six inches topsoil will be incorporated into the earthfill to meet the neat lines shown on the typical section.
5. All areas top-dressed with topsoil and disturbed during construction will be seeded according to SD Construction Specification SD-28.
6. Remove old concrete weir water structure from the existing dam location. Remove fence identified on plan map in the new pool area.
7. Choose one of the two Concrete Riser types (Option A or Option B).

NO EXCAVATOR MAY BEGIN ANY EXCAVATION WITHOUT FIRST NOTIFYING THE ONE-CALL NOTIFICATION CENTER OF THE PROPOSED EXCAVATION AT 1-800-781-7474.

NRCS HAZARD CLASS A
NRCS JOB CLASS IV

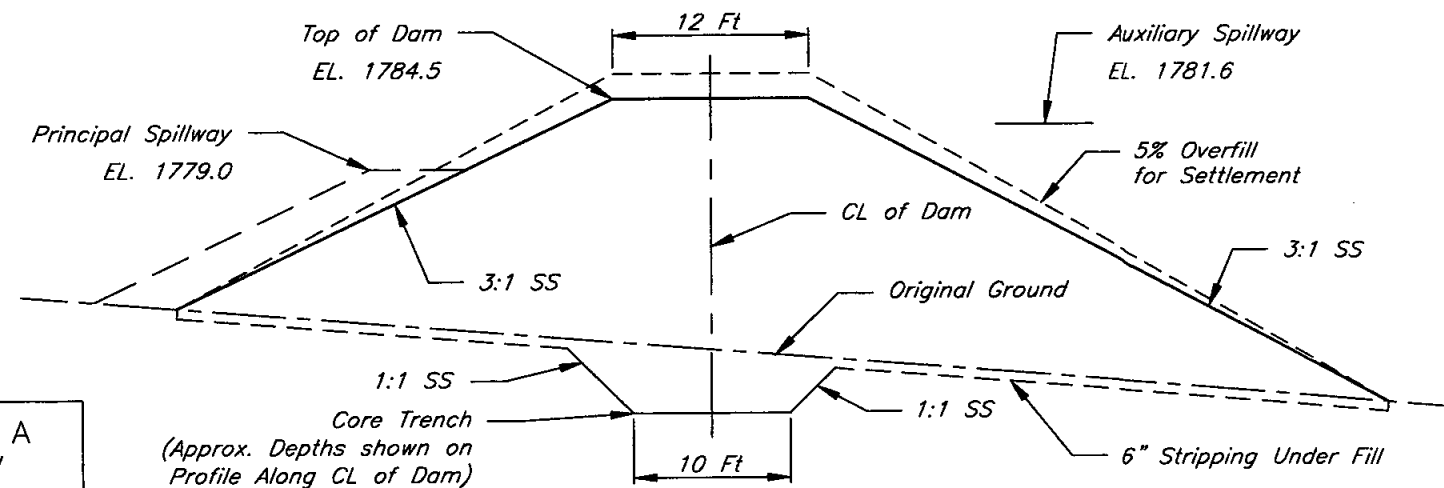
SD CONSTRUCTION AND MATERIAL SPECIFICATIONS

SD-4 Stripping
SD-5 Excavation
SD-7S Earthfill - Class S
SD-8 Rock Riprap And Bedding
SD-10 Salvaging And Spreading Topsoil
SD-12B Concrete for Minor Structures
SD-13 Steel Reinforcement
SD-14 Wood And Steel Structures
SD-28 Seeding
SD-55 Plastic Pipe
SD-95 Geotextile
SD-592 Geotextile

For A Full Text Version See
http://www.sd.usda.gov/technical/SD_Engineering.html

TABLE OF QUANTITIES

ITEM	UNIT	QUANTITY	AS-BUILT
Earthfill Class S - Embankment	Cu. Yd.	10121	
Earthfill Class S - Core Trench	Cu. Yd.	501	
Earthfill Class S - Stripping	Cu. Yd.	683	
Total Earthfill	Cu. Yd.	11305	
Topsoil Auxiliary Spillway	Cu. Yd.	748	
Seeding (Earthfill and Auxiliary Spillway)	Acre	2.0	
Principal Spillway Pipe			
16" Dia. AWWA C-905 DR-18 PVC Pipe	Lin. Ft.	58	
16" Dia. AWWA C-905 DR-25 PVC Pipe	Lin. Ft.	38	
48" Dia. 4 Feet Tall Riser and Base	Each	1	
Trash Rack and Baffle	Each	1	
Drainage Diaphragm	Each	1	
Timber Pipe Support	Each	1	
Removal of Fence	Lin. Ft.	3745	
Removal of Concrete Weir	Job	1	



TYPICAL CROSS SECTION OF DAM

INDEX OF DRAWINGS

1. Cover Sheet
2. Plan View and Design Data
3. Detail Plan View
4. Profile of Dam and Auxiliary Spillway and Cross-Section of Auxiliary Spillway
5. Profile of Principal Spillway
- 6A. Concrete Riser Detail (Option A)
- 6B. Concrete Riser Detail (Option B)
7. Trash Rack and Baffle Detail
8. Drainage Diaphragm Detail
9. Timber Pipe Support Detail

STATEMENT OF COMPLIANCE

Construction (was) (was not) completed in accordance with approved construction plans and specifications.

JAA

Date

POND WITH PRINCIPAL SPILLWAY PIPE
JOB PLAN 1.0P REV. 1/2012

Designed John Schmidt 4/11/2014
Drawn John Schmidt 4/11/2014
Checked [Signature] 4/11/2014
Approved [Signature] 4/11/2014

BRAD HAVEMEIER
378 POND
COVER SHEET

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United States Department of Agriculture

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Sheet 1 of 9



Existing Fence
Remove Fence
Field Boundary

Temporary Pool
Elev. 1781.6

Field Boundary

Top of Dam
Elev. 1784.5

Permanent Pool
Elev. 1779.0

Soils are High Plastic Clay or CH.

Field Boundary

Field Boundary

Remove Fence

Fence

Remove Fence

Additional
Borrow Area

Wave Berm
Elev. 1779.0

Top of
New Dam
Elev. 1784.5

Principal
Spillway
Pipe

Remove of Old Concrete Weir

Auxiliary Spillway
1765

BM2
10297.12
9937.12
1789.40

BM1
10000.00
10000.00
1798.00

Topsoil and seed all areas
above the wave berm
elevation, the top of dam,
the downstream slope, and
the auxiliary spillway.

Keep the disturbed area of
the additional borrow area
below the permanent pool
elevation.

HYDRAULIC DATA

Drainage Area	709	Acres
Annual Runoff Yield (50% Chance)	59.1	Ac. Ft
Time of Concentration	1.4	Hours
Runoff Curve Number	82	
Principal Spillway, 2 Year - 24 Hour Rainfall	2.3	Inches
Auxiliary Spillway, 25 Year - 24 Hour Rainfall	4.2	Inches
Peak Runoff 2 Year - 24 Hour Rainfall	249	CFS
Principal Spillway Discharge	24	CFS
Peak Runoff 25 Year - 24 Hour Rainfall	755	CFS
Auxiliary Spillway Discharge	368	CFS
Auxiliary Spillway Flow Depth	1.8	Feet
Auxiliary Spillway Width	100	Feet

SEDIMENT YIELD

Erodibility Area	Gross Rate (A.F./Ac./Yr.)	Drainage Area (Acres)	Delivery Rate (%)	Design Period (Years)	Required Sediment Volume (Ac.-Ft.)
P	0.0044	709	29	25	22.6

STRUCTURE DATA

Length of Top of Dam	445	Feet
Water Depth to Crest of Principal Spillway	12.0	Feet
Height of Downstream Toe to Top of Dam	18.8	Feet
Effective Height	14.8	Feet
Product of Storage X Effective Height	1107	

POOL DATA

	ELEV.	AREA	STORAGE
Crest of Principal Spillway	1779.0	9.5 Ac.	44.9 Ac.-Ft.
Crest of Auxiliary Spillway	1781.6	13.5 Ac.	74.8 Ac.-Ft.
Top of Dam	1784.5	18.8 Ac.	121.3 Ac.-Ft.

BENCHMARK POINTS TABLE

NO.	ID	ELEVATION	NORTHING	EASTING	BENCHMARK DESCRIPTION
1	BM1	1798.0	10000.0	10000.0	Top of 1/2" Rebar, two feet from wooden fence post.
2	BM2	1789.40	10297.12	9937.12	Top of 1/2" Rebar, two feet from wooden fence post.

PLAN VIEW

Date 4/11/2014
Designed John Schmidt
Drawn John Schmidt
Checked John Schmidt
Approved John Schmidt

BRAD HAVEMEIER
378 POND
PLAN VIEW AND DESIGN DATA

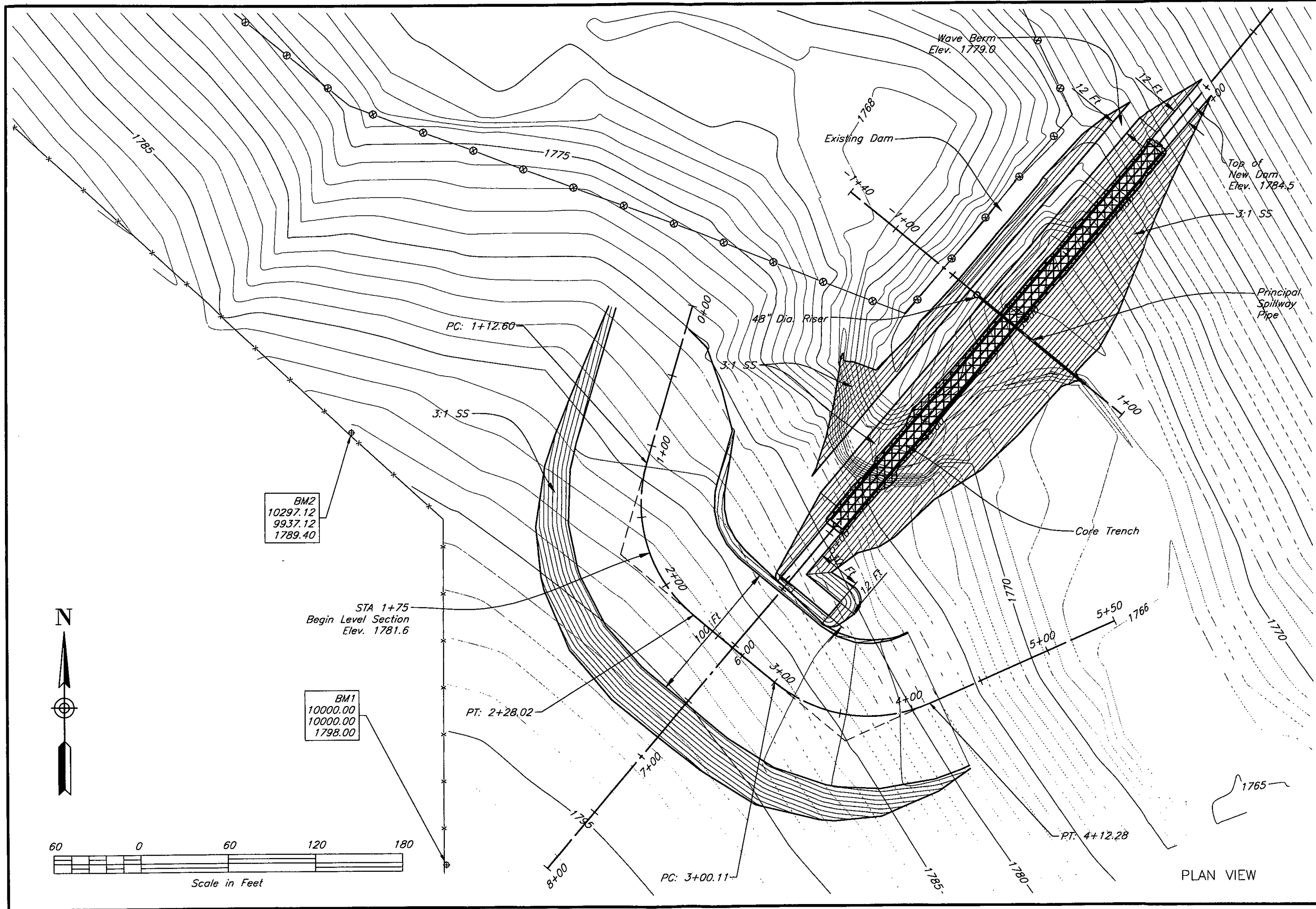
NW 1/4, Sec. 19, T. 101 N., R. 73 W. Lyman County, South Dakota

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Sheet 2 of 9



Designed	John Schmidt	Date	4/11/2014
Drawn	John Schmidt		
Checked	John Schmidt		
Approved	John Schmidt		

BRAD HAVEMEIER
378 POND
PLAN VIEW

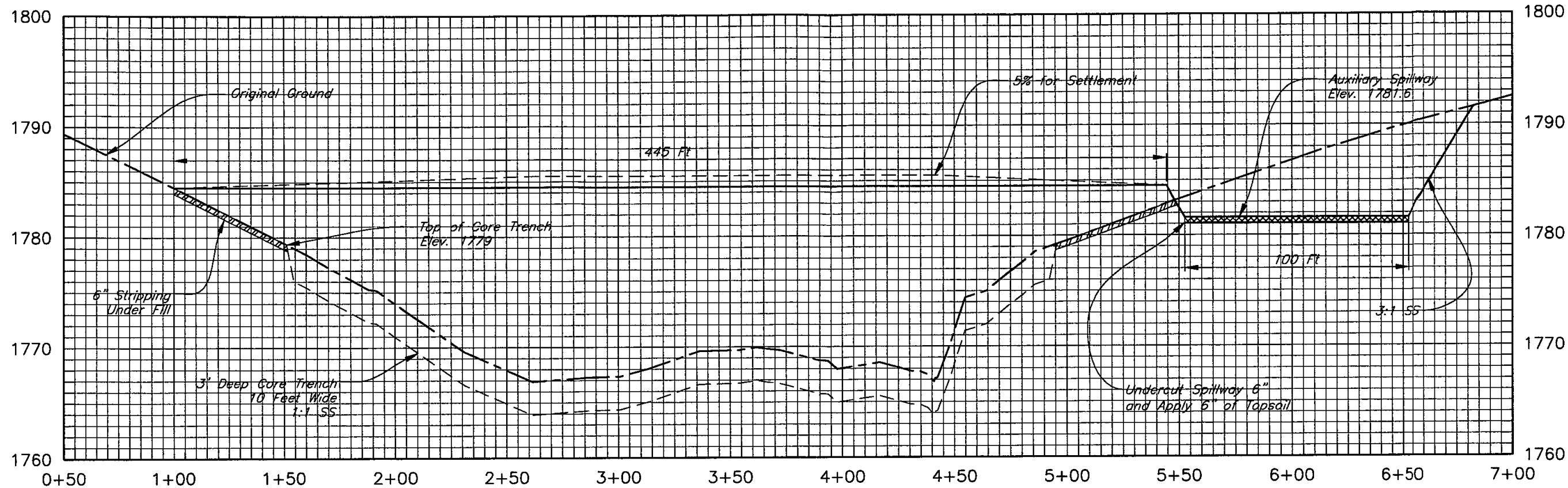
Lyman County, South Dakota
NW 1/4, Sec. 19, T. 101 N, R. 73 W

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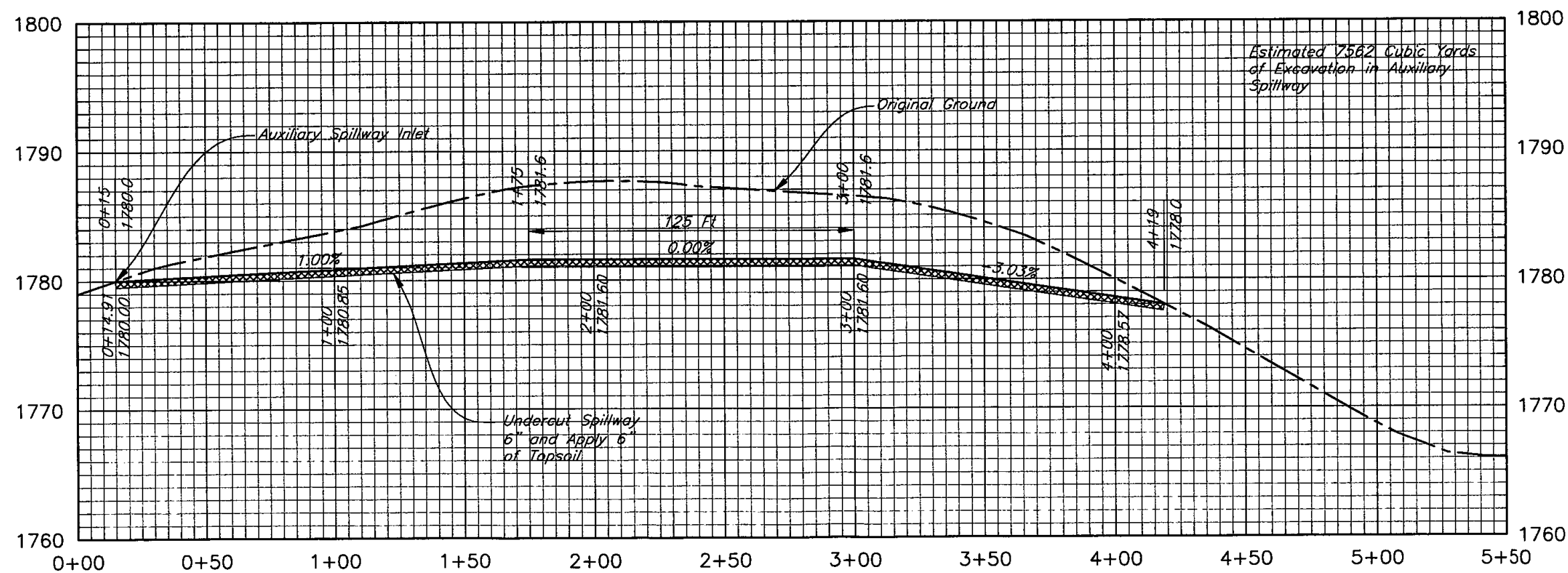
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Sheet 3 of 9



DAM CENTERLINE PROFILE



AUXILIARY SPILLWAY PROFILE

PROFILE OF DAM AND AUXILIARY SPILLWAY
AND CROSS-SECTION OF AUXILIARY SPILLWAY

Date 4/11/2014
Designed John Schmidt
Drawn John Schmidt
Checked John Schmidt
Approved John Schmidt

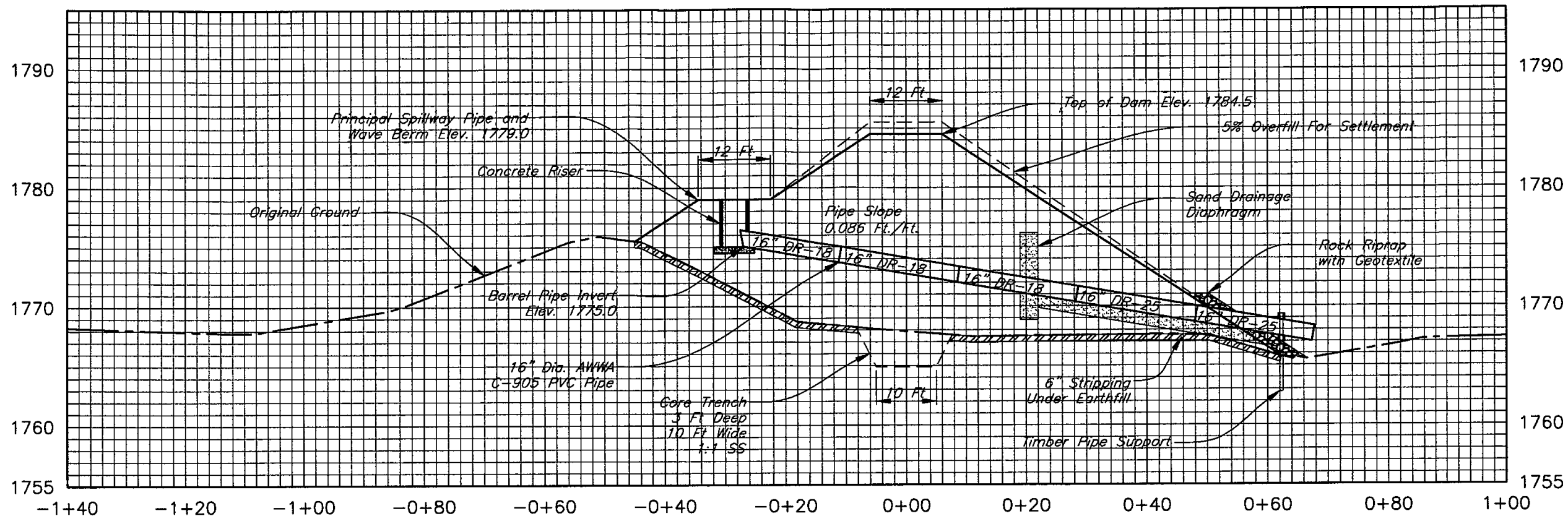
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378 POND
PROFILES AND CROSS-SECTIONS OF DAM AND AUXILIARY SPILLWAY
NW 1/4, Sec 19, T 101 N, R 73 W
Lyman County, South Dakota



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Sheet 4 of 9



STA 3+10 - PIPE PROFILE

PIPE NOTES

1. The 16 Inch diameter AWWA C-905 PVC pipe comes in 20 foot lengths. Use 3 sections of DR-18 or 235 PSI rated pipe under the center of the dam. Two sections (40 feet) of DR-25 or 165 PSI pipe may be used at the downstream outlet.
2. The heavier pipe is used under the area of the dam with the highest fill above the pipe. The thicker walled pipe (DR-18) is needed to limit the deflection of the pipe walls from the soil loads on the pipe.
3. If a base for the concrete riser is going to be poured in place, use a riser that is 4.5 feet tall so the riser can be embedded in 6 inches of concrete base. (See Sheet 6A)
4. If the concrete riser and base are precast as one unit, then the riser should be 4 feet tall. (See Sheet 6B)

TRENCH SAFETY NOTES

1. All trench work shall comply with the Occupational Safety and Health Administration (OSHA) regulations.
2. Any trench over four (4) feet deep shall have a means of egress from the trench by a ladder, ramp, or other means of egress; and
3. Any trench over five (5) feet deep shall be protected from cave-ins by a sloping, benching or shoring protection system. Benches must be constructed so the overall slope meets the slope required by OSHA regulations.

PRINCIPAL SPILLWAY PIPE PROFILE

Designed John Schmidt 4/11/2014
 Drawn John Schmidt 4/11/2014
 Checked John Schmidt 4/11/2014
 Approved John Schmidt 4/11/2014

BRAD HAVEMEIER
 378 POND
 PROFILE OF PRINCIPAL SPILLWAY

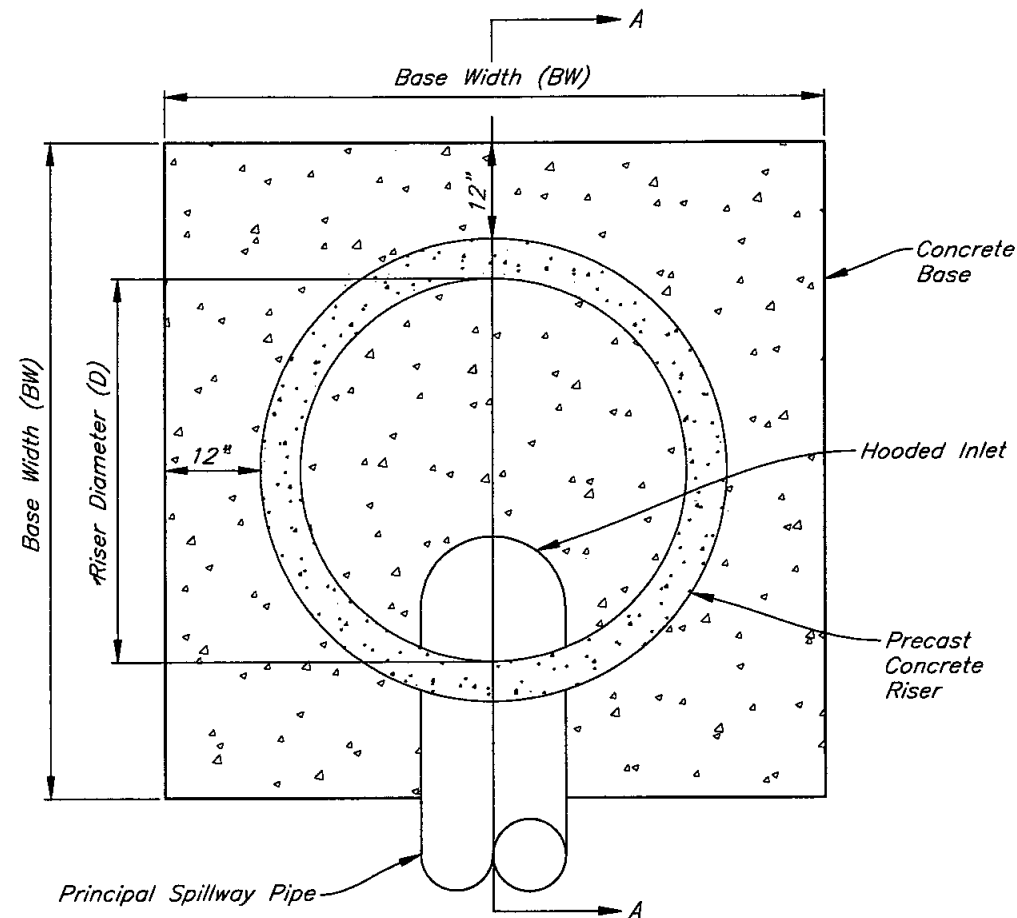
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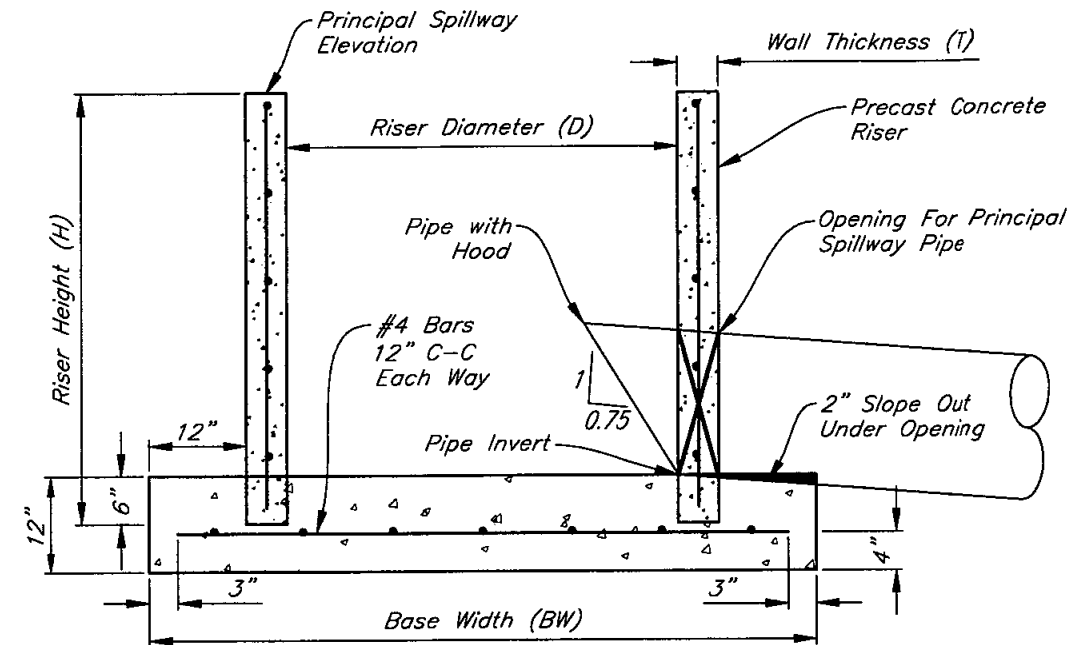
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 Sheet 5 of 9



PLAN VIEW PRECAST RISER
AND POURED BASE

CONSTRUCTION NOTES

1. The riser is precast reinforced concrete and is manufactured according to ASTM C478 Standard Specification For Precast Reinforced Concrete Manhole Sections.
2. Provide watertight joints between the precast concrete riser and the principal spillway pipe barrel and between the precast concrete riser and poured based. Consolidate the concrete with a vibrator to prevent air voids from developing around the riser, rebar, and pipe.
3. The concrete must have a minimum 28 day compressive strength of 3500 PSI and a maximum water/cement ratio of 0.5. The concrete mix must contain a minimum of 6 bags of cement per cubic yard and the mix must contain less than 5 1/2 gallons of water per bag of cement.
4. Portland Cement Type II shall be used.
5. A slump of 2 to 5 inches is required. The maximum size aggregate shall be 1 inch. Air entrainment shall be 4 to 7 percent by volume.
6. Apply a curing compound to the surface as recommended by the manufacturer.
7. Contact NRCS prior to installation for other options for the construction of the riser if a precast riser and poured in place concrete base is not used.



SECTION VIEW A-A

GUIDE TABLE FOR PRECAST RISER AND POURED BASE DIMENSIONS

RISER DIAMETER (D)	RISER HEIGHT (H)	WALL THICKNESS (T)	PRECAST RISER WEIGHT	BASE WIDTH (BW)	CONCRETE BASE VOL.	#4 REBAR LENGTH	PIPE DIA. BARREL
30"	4.0'	3.5"	1,534 LBS	5'-1"	1.0 CY	45'-10"	10" to 18"
30"	4.5'	3.5"	1,726 LBS	5'-1"	1.0 CY	45'-10"	10" to 18"
30"	5.0'	3.5"	1,918 LBS	5'-1"	1.0 CY	45'-10"	10" to 18"
36"	4.0'	4"	2,093 LBS	5'-8"	1.2 CY	72'-4"	10" to 24"
36"	4.5'	4"	2,355 LBS	5'-8"	1.2 CY	72'-4"	10" to 24"
36"	5.0'	4"	2,617 LBS	5'-8"	1.2 CY	72'-4"	10" to 24"
36"	5.5'	4"	2,878 LBS	5'-8"	1.2 CY	72'-4"	10" to 24"
36"	6.0'	4"	3,140 LBS	5'-8"	1.2 CY	72'-4"	10" to 24"
48"	4.0'	5"	3,467 LBS	6'-10"	1.7 CY	101'-4"	10" to 30"
48"	4.5'	5"	3,900 LBS	6'-10"	1.7 CY	101'-4"	10" to 36"
48"	5.0'	5"	4,334 LBS	6'-10"	1.7 CY	101'-4"	10" to 36"
48"	5.5'	5"	4,767 LBS	6'-10"	1.7 CY	101'-4"	10" to 36"
48"	6.0'	5"	5,201 LBS	6'-10"	1.7 CY	101'-4"	10" to 36"
60"	4.0'	6"	5,181 LBS	8'-0"	2.4 CY	135'-0"	10" to 30"
60"	4.5'	6"	5,829 LBS	8'-0"	2.4 CY	135'-0"	10" to 36"
60"	5.0'	6"	6,476 LBS	8'-0"	2.4 CY	135'-0"	10" to 48"
60"	5.5'	6"	7,124 LBS	8'-0"	2.4 CY	135'-0"	10" to 48"
60"	6.0'	6"	7,772 LBS	8'-0"	2.4 CY	135'-0"	10" to 48"

PRECAST CONCRETE RISER AND POURED CONCRETE BASE
WITH HOODED INLET

REV. 1/2012

Date
4/11/2014
Designed
John Schmidt
Drawn
John Schmidt
Checked
John Schmidt
Approved
John Schmidt

BRAD HAVEMEIER
378 POND
PRECAST CONCRETE RISER AND POURED CONCRETE BASE WITH HOODED INLET

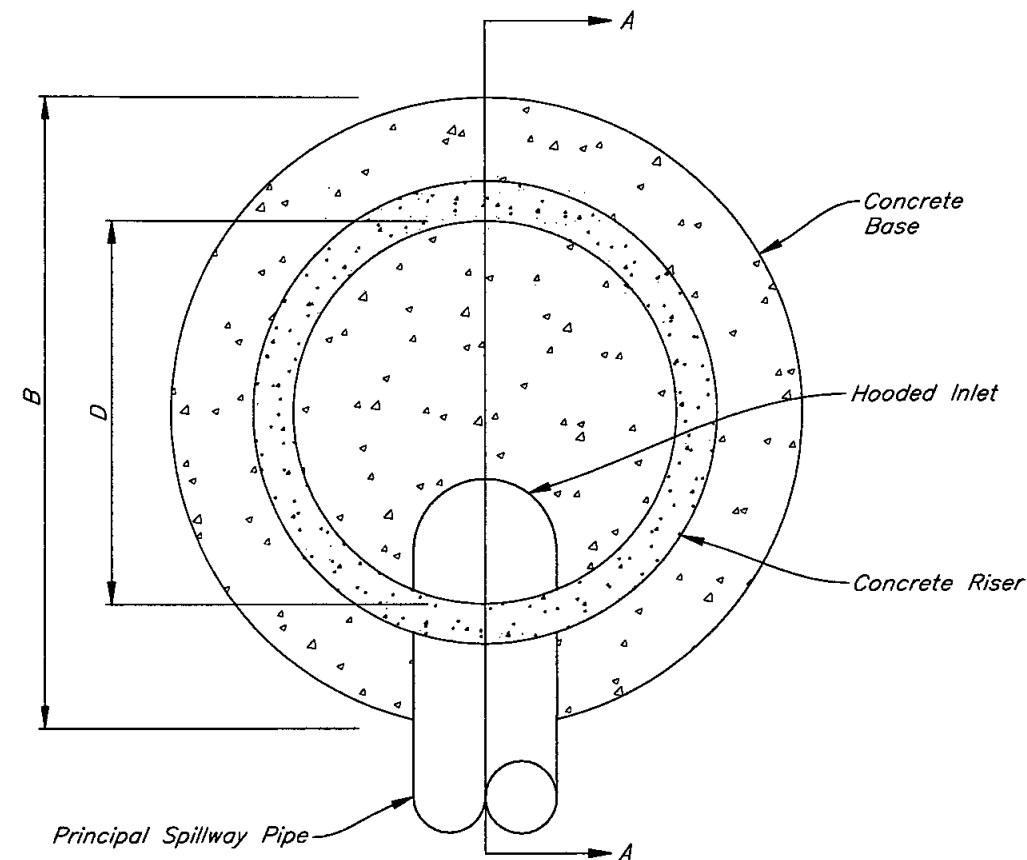
NW 1/4, Sec 19, T 101 N, R 73 W Lyman County, South Dakota

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

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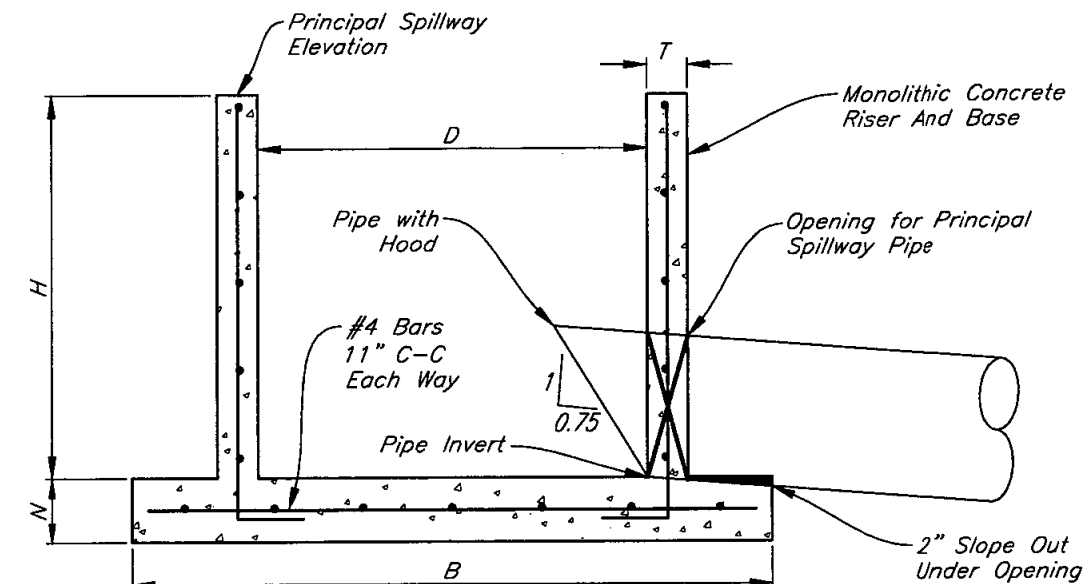
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Sheet 6A of 9



PLAN VIEW PRECAST RISER AND BASE

CONSTRUCTION NOTES

1. The riser and base is precast reinforced concrete and is manufactured according to ASTM C478 Standard Specification For Precast Reinforced Concrete Manhole Sections.
2. Provide a watertight joint between the precast concrete riser and the principal spillway pipe barrel.
3. Contact NRCS prior to installation for other options for the construction of the riser if a precast monolithic riser and base is not used.



SECTION VIEW A-A

GUIDE TABLE FOR PRECAST RISER AND BASE DIMENSIONS

(D) RISER DIAMETER	(H) RISER HEIGHT	(T) WALL THICKNESS	(B) BASE DIAMETER	(N) BASE THICKNESS	ESTIMATED WEIGHT	DIA. PIPE BARREL
30"	4'	3.5"	51"	6"	2,600 LBS	10" to 18"
30"	4.5'	3.5"	51"	6"	2,790 LBS	10" to 18"
30"	5'	3.5"	51"	6"	2,980 LBS	10" to 18"
36"	4'	4"	64"	6"	3,770 LBS	10" to 24"
36"	4.5'	4"	64"	6"	4,030 LBS	10" to 24"
36"	5'	4"	64"	6"	4,290 LBS	10" to 24"
36"	5.5'	4"	64"	6"	4,550 LBS	10" to 24"
36"	6'	4"	64"	6"	4,815 LBS	10" to 24"
48"	4'	5"	79"	8"	6,870 LBS	10" to 30"
48"	4.5'	5"	79"	8"	7,300 LBS	10" to 36"
48"	5'	5"	79"	8"	7,740 LBS	10" to 36"
48"	5.5'	5"	79"	8"	8,170 LBS	10" to 36"
48"	6'	5"	79"	8"	8,600 LBS	10" to 36"

PRECAST CONCRETE RISER AND BASE
WITH HOODED INLET
REV. 1/2012

Date 4/11/2014
Designed John Schmidt
Drawn John Schmidt
Checked [Signature]
Approved [Signature]

BRAD HAVEMEIER
378 POND
PRECAST CONCRETE RISER AND BASE WITH HOODED INLET

NW 1/4, Sec 19, T 101 N, R 73 W

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United States Department of Agriculture

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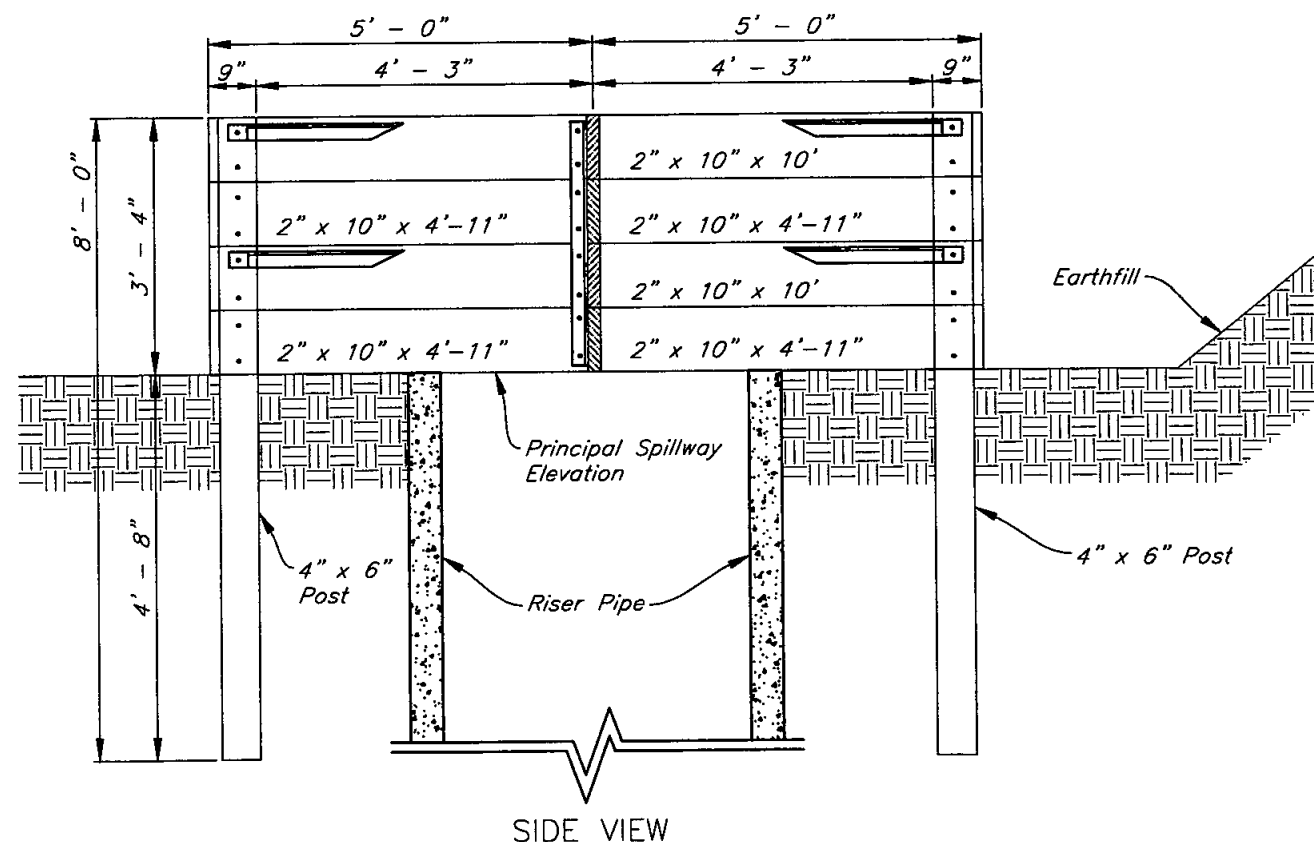
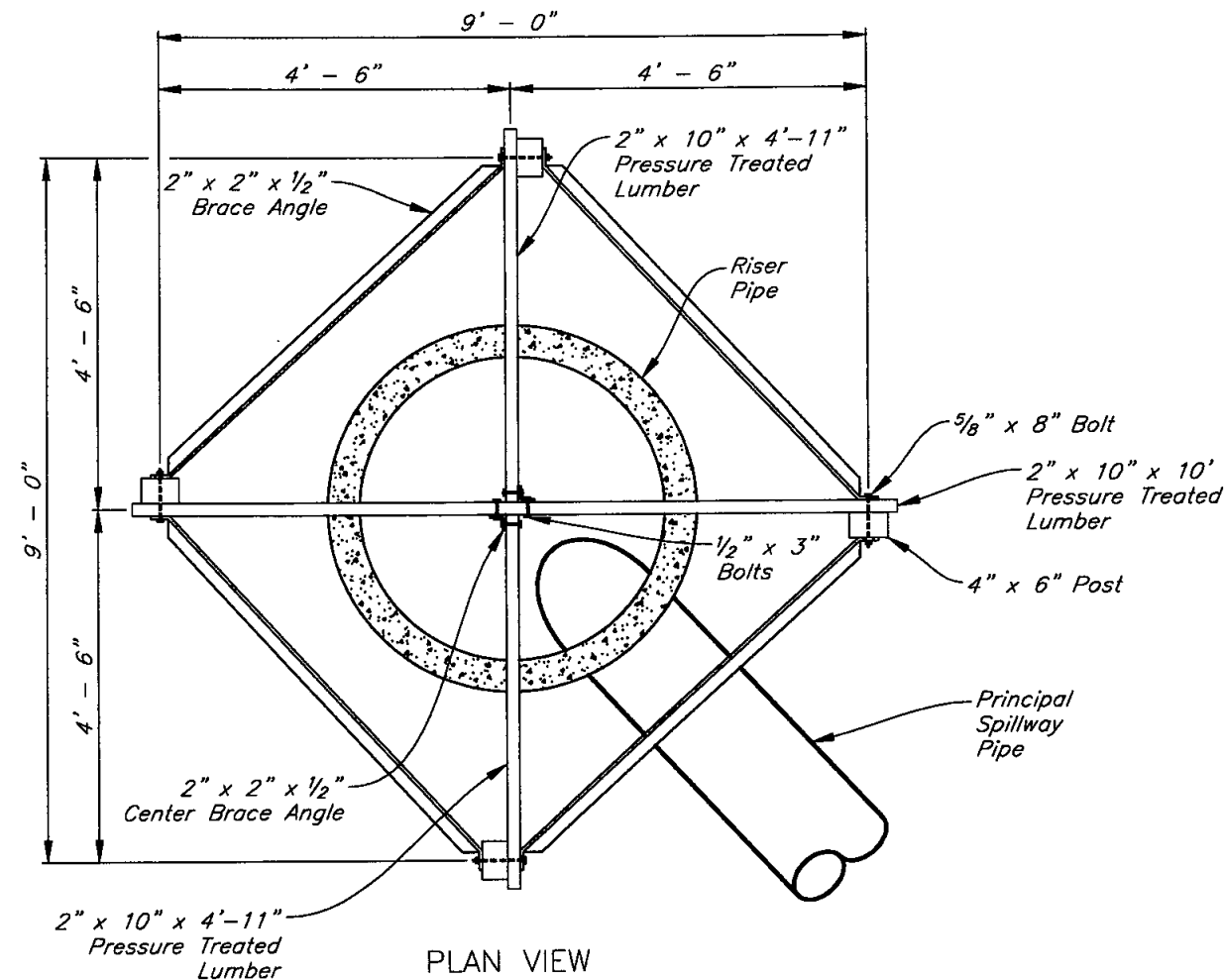
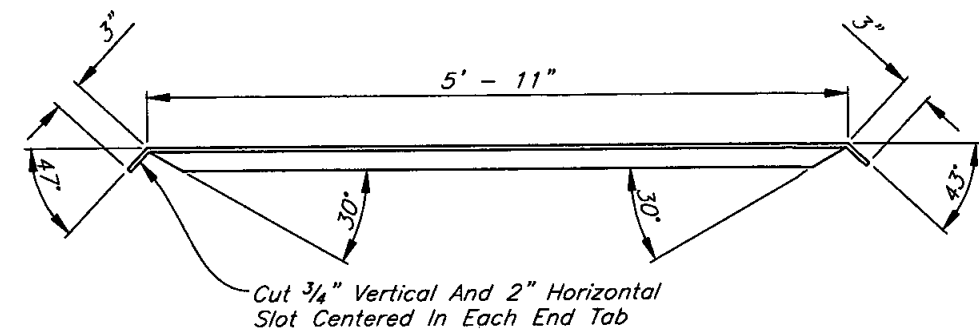


TABLE OF QUANTITIES			
ITEM	LENGTH OR SIZE	UNIT	QUANTITY
4" X 6" Pressure Treated Post	8 Ft	Each	4
2" X 10" Pressure Treated Lumber	10 Ft	Each	4
2" X 10" Pressure Treated Lumber	4' - 11"	Each	8
2" X 2" X 1/4" Steel Angle	6' - 5"	Each	8
2" X 2" X 1/4" Steel Angle	3' - 2"	Each	2
Steel Bolt (with nut and 2 washers)	5/8" X 8"	Sets	32
Steel Bolt (with nut and 2 washers)	1/2" X 3"	Sets	32

CONSTRUCTION NOTES

1. Bolt 4" x 6" posts and 2" x 10" lumber together using two 5/8" x 8" bolts. Do not place bolts closer than 1 1/2" from edge of board.
2. For center brace angles drill eight, 9/16" holes, 5/8" from outer edge of each leg of each angle and centered 5 1/4" apart along the leg.
3. Attach brace angles to top bolt on top of 2" x 10" board and to top bolt on next to bottom board.
4. All nuts, bolts, and washers shall be galvanized.



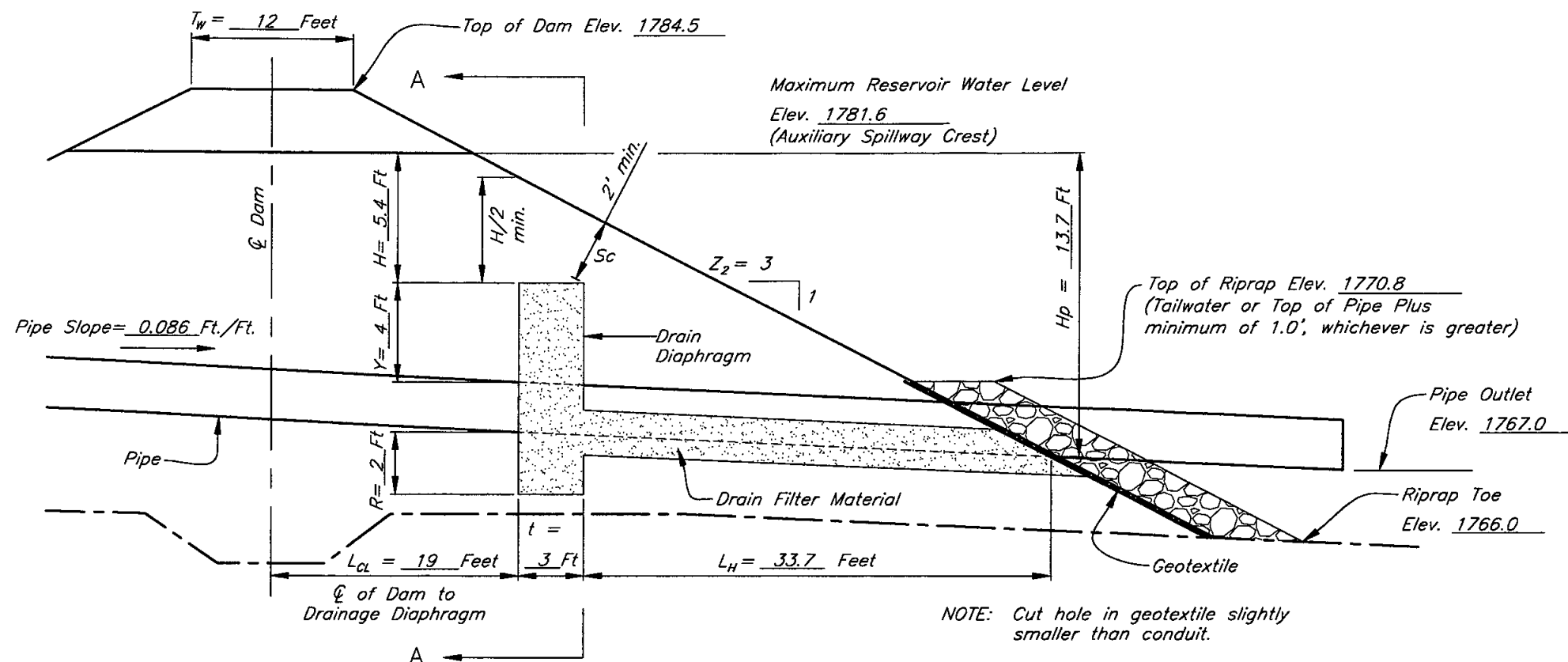
TRASH RACK AND BAFFLE FOR RISER DIA. 36" TO 60"
JOB PLAN NO. 6.4 REV. 1/2012

Designed John Schmidt 4/11/2014
Drawn John Schmidt 4/11/2014
Checked [Signature] 4/11/2014
Approved [Signature] 4/11/2014

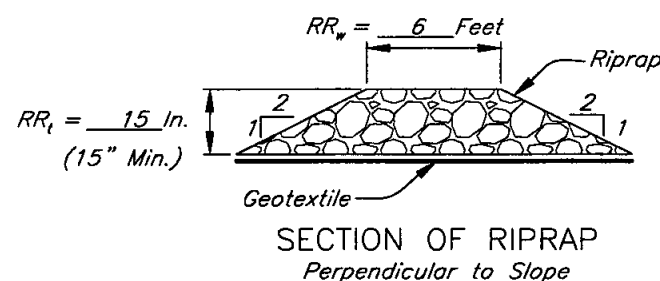
BRAD HAVEMEIER
378 POND
TRASH RACK AND BAFFLE FOR RISER DIA. 36" TO 60"
NW 1/4, Sec 19, T 101 N, R 73 W
Lyman County, South Dakota

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

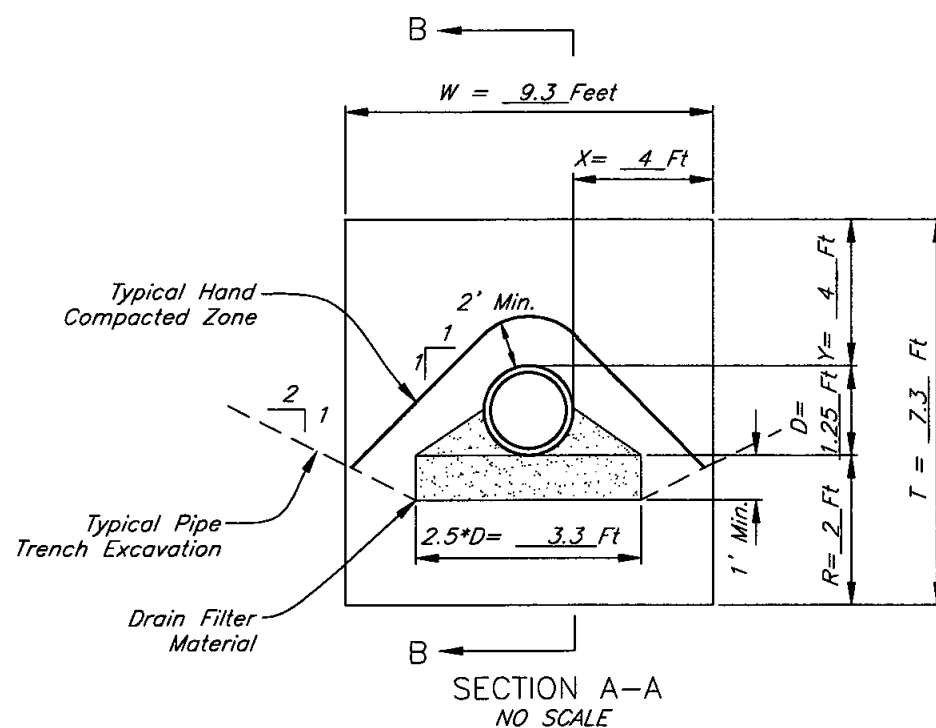
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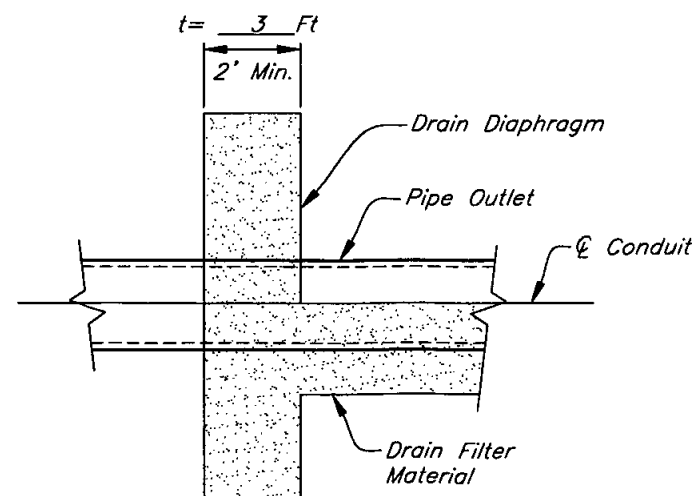
PROFILE ALONG $\varnothing$ OF CONDUIT
NO SCALE



SECTION OF RIPRAP
Perpendicular to Slope



SECTION A-A
NO SCALE



SECTION B-B
NO SCALE

SUMMARY OF SAND DRAINFILL DIMENSIONS

$W =$	9.3 Feet	(Total Width of Drain Diaphragm)
$T =$	7.3 Feet	(Total Height of Drain Diaphragm)
$t =$	3 Feet	(Thickness of Single Filter)
$L_{DF} =$	33.8 Feet	(Length of Sand Along Pipe)

SUMMARY OF GEOTEXTILE DIMENSIONS

$G_W =$	11 Feet	(Total Width of Geotextile)
$G_L =$	15.2 Feet	(Total Length of Geotextile)

SUMMARY OF ROCK RIPRAP DIMENSIONS

$RR_t =$	1.25 Feet	(Total Thickness of Rock Riprap)
$RR_w =$	6 Feet	(Total Width of Rock Riprap)

TABLE OF QUANTITIES

ITEM	UNIT	QUANTITY
Sand Drain Filter Material	Cu. Yds.	13
Geotextile	Sq. Yds.	15
Rock Riprap	Cu. Yds.	6

DRAIN FILTER GRADATION

SIEVE SIZE	PERCENT PASSING
3/8	100
4	95-100
8	80-100
16	50-85
30	25-60
50	2-30
100	0-10

ASTM, C-33
FINE CONCRETE
AGGREGATE GRADATION

RIPRAP GRADATION

PERCENT SMALLER	WEIGHT RANGE (LBS.)	SIZE RANGE (IN.)
100	50 lb.	10"
50-85	30 lb.	7"
15-50	10 lb.	5"
0-15	3 lb.	3"

CONSTRUCTION NOTES

- The Drainage Diaphragm and envelope will be installed by placing Drain Filter Material in maximum 15 inch thick uncompacted lifts. Each lift will be saturated uniformly with approximately 1.2 gallons of water per cubic foot of loose Drain filter Material prior to compaction. Each lift will then be compacted by a minimum of two passes of a hand-directed vibratory compactor over the entire lift surface. No compaction of the drain envelope above the pipe invert will be required.
- The maximum height of drop of the Riprap onto the Geotextile in the pipe outlet area shall be 3 feet.

MATERIAL NOTES

- The geotextile shall conform to the Class I requirements in Table 2 for Nonwoven Geotextiles in Material Specification SD-592.

DRAINAGE DIAPHRAGM DETAILS
REV. 3/2014

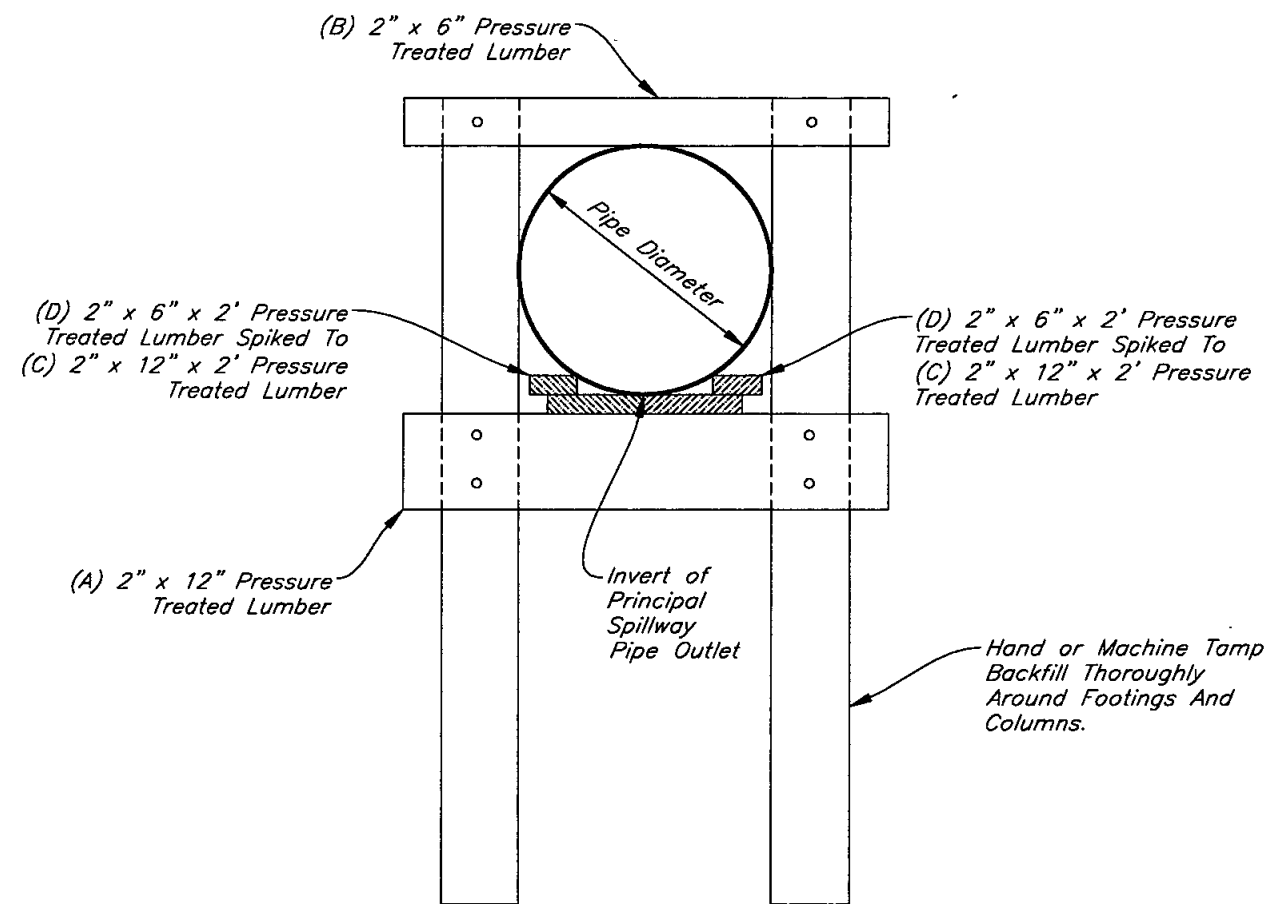
Designed John Schmidt 4/11/2014
Drawn John Schmidt 4/11/2014
Checked John Schmidt 4/11/2014
Approved John Schmidt 4/11/2014

BRAD HAVEMEIER
378 POND
DRAINAGE DIAPHRAGM DETAILS

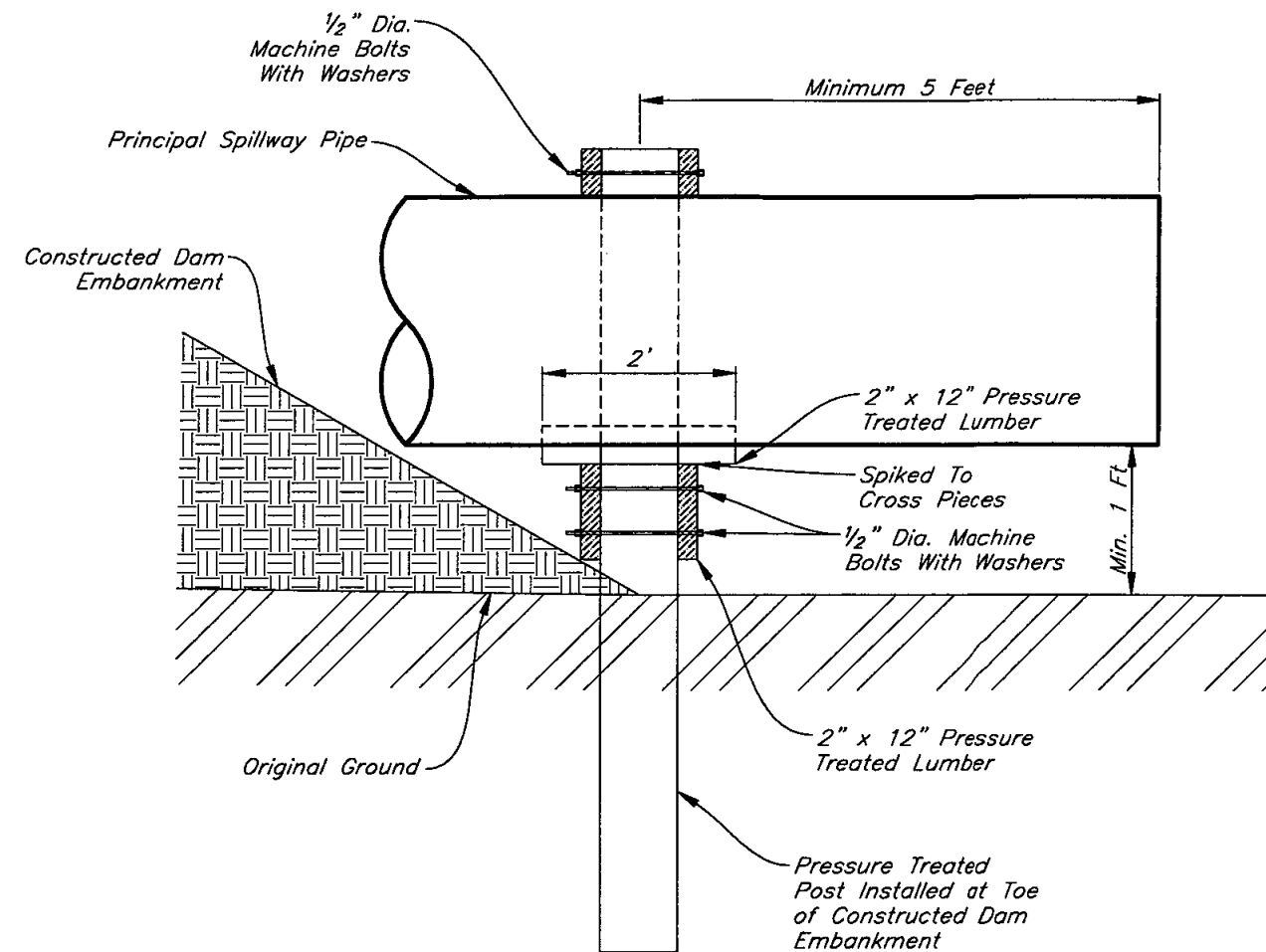
NW 1/4, Sec 19, T 101 N, R 73 W
Lyman County, South Dakota

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Sheet 8 of 9



CROSS-SECTION VIEW



PROFILE VIEW

LENGTHS REQUIRED FOR DIFFERENT PIPE DIAMETERS

ITEM	MATERIAL SIZES BASED ON PIPE DIAMETER				UNIT	QUANTITY
	12" TO 18"	21" TO 24"	30" TO 36"	42" TO 48"		
8" Dia. Pressure Treated Post	8 Ft	--	--	--	Each	2
10" Dia. Pressure Treated Post	--	10 Ft	10 Ft	12 Ft		
(A) 2" X 12" Pressure Treated Lumber	4 Ft	4 Ft	5 Ft	6 Ft	Each	2
(B) 2" X 6" Pressure Treated Lumber	4 Ft	4 Ft	5 Ft	6 Ft	Each	2
(C) 2" X 12" Pressure Treated Lumber	2 Ft	2 Ft	2 Ft	2 Ft	Each	2
(D) 2" X 6" Pressure Treated Lumber	2 Ft	2 Ft	2 Ft	2 Ft	Each	2
1/2" Dia. Machine Bolts With Nuts	12 In.	14 In.	14 In.	14 In.	Each	6
1/2" Dia. Washers					Each	12
Spike Nails					Each	20

CONSTRUCTION NOTES

1. All nuts, bolts, and washers shall be galvanized.
2. If PVC pipe is used, protect the portions of pipe that will be permanently exposed to ultraviolet light from sunlight by priming the pipe with PVC solvent and painting with two coats high quality exterior latex paint.
3. Hand or machine tamp backfill thoroughly around footings and columns.

TIMBER PIPE SUPPORT
JOB PLAN NO. 4.0 REV. 1/2012

Designed John Schmidt 4/11/2014
Drawn John Schmidt 4/11/2014
Checked John Schmidt 4/11/2014
Approved John Schmidt 4/11/2014

BRAD HAVEMEIER
378 POND
TIMBER PIPE SUPPORT
NW 1/4, Sec 19, T 101 N, R 73 W
Lyman County, South Dakota

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PROGRAM

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

CONSTRUCTION PLANS AND SPECIFICATIONS

BRAD HAVEMEIER

378 POND

**NW ¼ Section 19, T. 101 N, R. 73 W
Lyman County, South Dakota**

Prepared By:

**Natural Resources Conservation Service
Pierre Field Support Office
605-224-2476 Ext. 5**

Assisting:

**American Creek Conservation District
NRCS Kennebec Field Office
605-869-2216 Ext. 3**

DOCUMENTATION FOR HAZARD CLASSIFICATION

Producer: **Brad Havemeier** Name of Site: **Site # 1**
County: **Lyman**
Field #: Watershed: **Bull Creek**
Location
1/4 Section: **NW** Section: **19** Township: **101 N** Range: **73 W**
Latitude: **43 32' 14" N** Longitude: **99 36' 56" W**

Dam in Series: **No**
Explain: **Gravel road is located between upstream dams and this dam.**

Dam and Reservoir Data

Assumed Job Class	IV
Assumed Hazard Class	A
Centerline Elevation Channel Bottom*	1766
Centerline Elevation Flood Plain*	1770
Centerline Elevation Top of Dam*	1784.5
Centerline Elevation Auxiliary Spillway Crest*	1781.6

*Elevation is based on Mean Sea Level Datum

Max. Depth of Water within Reservoir **12 Ft.**

Storage

Storage Below Principal Spillway	44.9 Ac.-Ft.
Storage between Principal Spillway and Auxiliary Spillway	29.9 Ac.-Ft.
Storage between Auxiliary Spillway and Top of Dam	46.5 Ac.-Ft.
Other	0 Ac.-Ft.
Total Storage to Top of Dam	121.3 Ac.-Ft.

Downstream Conditions

1. Valley Conditions Downstream of Structure	Parallel
Approximate Slope of Channel	
2. Stream Channel Size	
Depth	1 Ft.
Bottom Width	10 Ft.
Top Width	40 Ft.
3. Valley Characteristics	
Width	560 Ft.
Roughness Coefficient	0.035
Slope	1%

Downstream valley may be described in breach routing rather than on this form.

Describe Type of Infrastructure, Distance Downstream and Distance Above Floodplain Elevation	Distance Downstream From Dam	Approx. Distance Above Floodplain Elevation	Location in Potential Impact Area?	
			YES	NO
Roads				
Township or County Gravel Road D<2'	1.5 miles	5 feet	☐	☒
			☐	☒
			☐	☒
Bridges: Describe type and opening size			☐	☒
Railroads:			☐	☒
Buildings and Utilities:			☐	☒
			☐	☒
			☐	☒
			☐	☒
Describe:				

Location:

Is Dam located within five miles of urban development?

No

Describe Potential Development:

No development likely in area.

Rational For Determining Hazard Class:

Development in this area is unlikely. Would have little impact to gravel road. The watershed at the gravel road is much larger than the drainage area of the dam.

Method Used for Evaluation of Impact Area

Visual Assessment

Further Evaluation Needed

No

Attached: Breach Routings ☐

Maps ☒

Other supporting documents:

Actual Hazard Class*

A

Final Job Class

IV

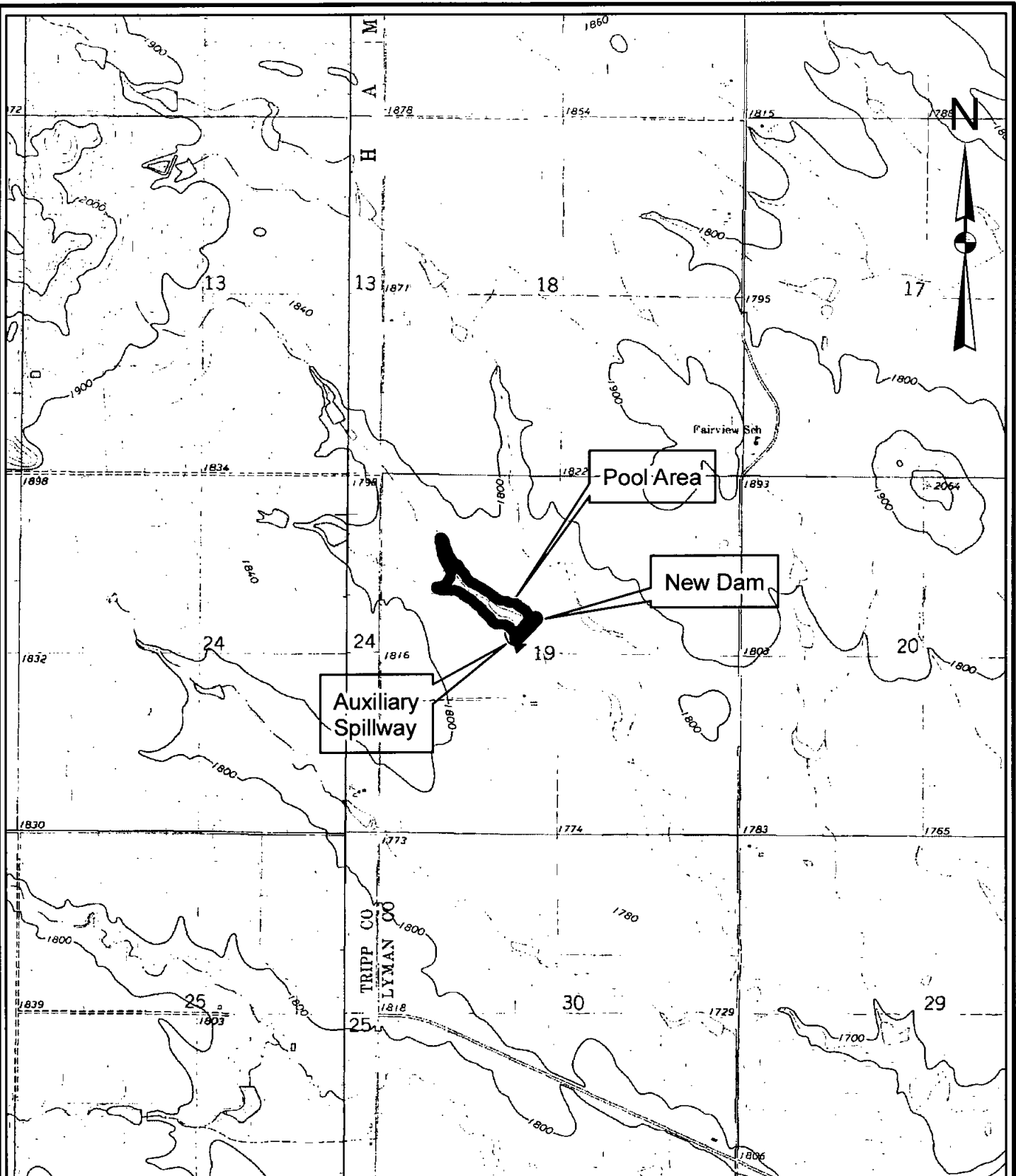
Hazard Analysis by: John Schmidt

Date: 4/3/2014

Approved by: John Schmidt

Date: 4/3/2014

*Definition of Hazard Classification in National Engineering Manual 520.21 and SD Amendment 19



LOCATION MAP

0 1,000 2,000 4,000 6,000 Feet



Natural Resources Conservation Service
United States Department of Agriculture

Brad Havemeier
378 Pond
Sec. 19, T 101 N, R 73 W
Lyman County, South Dakota

	Date	File Name
Designed: <u>John Schmidt</u>		
Drawn: <u>4/4/2014</u>		Drawing Name
Checked: _____		<u>4/4/2014</u>
Approved: _____		Sheet 1 of 1

CONSTRUCTION SPECIFICATION

SD-4 STRIPPING

1. **Scope**

The work shall consist of removing topsoil and other undesirable materials from borrow areas and foundations of structures and earth fills.

2. **General**

Required stripping excavation depth will be the depth needed to expose subsoil reasonably free of roots and other perishable material. Excavated earth material suitable for fill shall be placed in earth fills as appropriate. Stripped material suitable for topsoil shall be stockpiled and placed over disturbed areas as shown on the drawings or as approved by the Natural Resources Conservation Service (NRCS) inspector. All waste material shall be disposed of as shown on the drawings or as approved by the NRCS inspector.

3. **Foundation Stripping**

Remove loose soil and extend stripping to a reasonably smooth surface in consolidated subsoil. Except as shown on the drawings, foundation slopes shall be excavated to one horizontal to one vertical, or flatter.

4. **Borrow Area Stripping**

Borrow areas shall be stripped to expose material suitable for earth fill.

CONSTRUCTION SPECIFICATION

SD-5 EXCAVATION

1. Scope

The work shall consist of excavation required by the drawings and specifications and disposal of the excavated material.

2. Classification

Common Excavation is defined as the excavation of all materials that can be excavated, transported, and unloaded using heavy ripping equipment and heavy rubber tired loaders or scrapers with pusher tractors. This classification includes rocks smaller than one cubic yard.

Rock Excavation is defined as the excavation of all hard, compacted, or cemented materials that require blasting or the use of unusually large ripping and excavating equipment. This classification includes the removal of isolated rocks larger than one cubic yard.

Unclassified Excavation is defined as the excavation of all materials (including rock) encountered, regardless of the nature of the material or the excavation method needed.

3. Use of Excavated Materials

To the extent needed, all suitable materials from excavations shall be used in the construction of specified earth or rock fills. Suitability of materials for specific purposes will be determined by the Natural Resources Conservation Service (NRCS) inspector. The contractor shall not waste or otherwise dispose of suitable excavated materials.

4. Disposal of Waste Materials

All surplus and unsuitable excavated materials will be disposed of at the locations shown on the drawings or designated by the landowner or NRCS inspector. The disposal site shall be left in a neat condition and sloped to provide drainage.

5. Excavation Limits

Excavated surfaces too steep to be safe without support, shall be supported as necessary to safeguard the work and workers. The width of the excavation shall be increased if necessary to provide space for sheeting, bracing, shoring, and other supporting installations. The contractor shall furnish, place, and subsequently remove such supporting installations. Excavation side slopes may be flattened for safety reasons where approved by the NRCS inspector.

Excavations shall be completed to specified lines and grades prior to placement of earth fill or construction of structures.

7. Borrow Excavation

When suitable materials from specified excavations are insufficient to construct specified fills, additional material shall be obtained from designated borrow areas. The extent and depth of borrow pits shall be as approved by the NRCS inspector. Borrow pits must be shaped to eliminate unsightly conditions and steep or unstable slopes.

CONSTRUCTION SPECIFICATION

SD-7S EARTHFILL-CLASS S

1. Scope

The work shall consist of the construction of compacted earth fills where the amount of compaction is to be controlled by specifying a construction method.

2. Materials

All fill materials shall be obtained from required excavations and designated borrow areas. Selection, blending, placement, and compaction of fill will be subject to approval of the Natural Resources Conservation Service inspector.

Fill materials shall contain no frozen material, sod, roots or other perishable material, or rocks larger than eight inches in diameter. Fill shall not be placed on a frozen surface.

3. Foundation Preparation

All foundation (including abutment) surfaces shall be shaped one horizontal to one vertical or flatter except as otherwise specified.

After stripping (see stripping specification), the foundation shall be loosened thoroughly by scarifying or plowing to a minimum depth of four inches. The foundation shall then be compacted by the process specified for the fill.

4. Placement

All foundation excavation and preparation shall be completed before placing fill. Except as required by the drawings, fill material shall be mixed and uniformly placed throughout the entire fill without lenses, streaks, pockets, or layers of material that differ significantly from surrounding material.

Placement and compaction methods must prevent damage to structures and allow the structure to assume backfill loads gradually and uniformly. Within 2 feet of any structure, fill layer thickness must not exceed 4 inches and equipment loads must not exceed 400 pounds.

Fill shall be placed in approximately horizontal layers. Except as described above, fill layer thickness shall not exceed nine inches for compaction by large machines or four inches for small hand directed power tampers.

If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be scarified parallel to the axis of the fill, to a depth of not less than two inches, before the next layer is placed.

Except as otherwise specified, openings temporarily left in dam fills (for pipe installation, stream flow, etc.,) shall have side slopes three horizontal to one vertical or flatter. When filling the opening, the bonding surface of the fill in place shall be stripped of all material not meeting the requirements of this specification and shall be scarified, moistened, and recompacted as new earthfill is placed.

5. Control of Moisture Content

At the time of compaction, earth fill shall have a moisture content that when kneaded in the hand will form a ball that does not easily crumble when pressed between the hands. If the soil is too wet, it will yield free water when kneaded in the hand.

Fill materials must be wetted or dried as needed to achieve proper moisture prior to compaction.

6. Compaction (Class S)

Fill layers shall be compacted by one of the following methods.

- a. By routing the hauling and spreading equipment such that all points of the fill are traversed by at least one tread track of the loaded equipment traveling parallel to the centerline of the fill.
- b. By at least 2 passes of a tamping (sheepsfoot) roller weighing at least 100 pounds per square inch of bearing area.

Fill adjacent to structures shall be compacted to a density equivalent to that of the surrounding fill by means of hand tamping or manually directed power tampers or plate vibrators. Within 2 feet of any structure, equipment loads must not exceed 400 pounds.

Compaction of fill adjacent to concrete structures shall not be started for at least the following number of days after placement of the concrete.

Concrete Structure	Days After Concrete Placement
Vertical or near-vertical walls with earth load on one side only	14
Walls backfilled on both sides simultaneously	7
Conduits and spillway risers, cast-in-place (with inside forms in place)	7
Conduits and spillway risers, cast-in-place (forms removed)	14
Conduits, pre-cast, cradled	2
Conduits, pre-cast, bedded	1
Anti-seep collars and cantilever pipe supports (backfill both sides simultaneously)	3

CONSTRUCTION SPECIFICATION

SD-8 ROCK RIPRAP AND BEDDING

1. Scope

The work shall consist of furnishing and installing loose rock riprap and blankets, including filter layers, bedding, or geotextiles as shown on the drawings.

2. Materials

Rock Riprap - Individual rock fragments shall be dense, hard, durable, and free from cracks, seams, and other defects conducive to accelerated weathering. Except as otherwise specified, rock fragments shall be angular or sub-rounded. The least dimension of an individual rock fragment shall be not less than one-third the greatest dimension of the fragment. ASTN D4992 provides guidance on selecting rock from a source.

Rock that fails to meet the above requirements will be accepted only if similar rock from the same source has been demonstrated to be sound after three years of exposure to conditions similar to conditions where the riprap is to be placed.

The rock shall conform to the grading limits shown on the drawings. Sand, rock fines, and dirt shall be less than five percent of the total weight of the riprap.

Sand, Gravel Filter - Filter aggregates shall be sand, gravel, crushed stone, or mixtures thereof. Aggregates shall be composed of clean, hard, durable mineral particles free of organic matter, clay balls, soft particles, or other substances that would interfere with free-draining properties of the aggregates.

Not more than 5 percent of the material of the material may be limestone and not more than 15 percent may be flat, elongated particles.

Except as otherwise shown on the drawings, the aggregate shall meet the following gradation requirements after placement.

Filter Aggregate Size	Percent Finer by Weight
3"	100
1"	90 to 100
#4	50 to 85
#50	10 to 40
#200	0 to 5

Geotextile - Geotextiles shall conform to the National Engineering Handbook Material Specification 592-Geotextile. The geotextile fabric shall be protected from moisture, dust, dirt, debris, and ultraviolet light prior to installation.

3. Subgrade Preparation

Subgrade surfaces on which riprap, bedding, or geotextile will be placed shall be cut or filled to the lines and grades shown on the drawings. When fill to subgrade lines is required, it shall consist of approved materials and shall conform to the requirements of the specified class of fill.

Riprap, bedding, or geotextile shall not be placed until the foundation preparation is completed and the surfaces have been inspected and approved by the Natural Resources Conservation Service inspector.

4. Equipment-placed Rock Riprap

Rock riprap shall be placed by equipment on the surface and to the depth specified. It shall be installed to the full course thickness in one operation and in a manner as to avoid serious displacement of the underlying material. The rock shall be delivered and placed in a manner that ensures the riprap in place is reasonably homogenous with the larger rocks uniformly distributed and firmly in contact one to another and with the smaller rocks and spalls filling the voids between the larger rocks. Some hand placing may be required to provide a neat and uniform surface.

Rock riprap shall be placed in a manner to prevent damage to structures. Hand placing is required as necessary to prevent damage to new and existing structures.

5. Hand-placed Rock Riprap

The rock riprap shall be placed on the surface and to the depth specified. It shall be securely bedded with the larger rocks firmly in contact one to another without bridging. Spaces between the larger rocks shall be filled with smaller rocks and spalls. Smaller rocks shall not be grouped as a substitute for larger rocks. Flat slab rock shall be laid on its vertical edge except where it is laid like paving stone and the thickness of the rock equals the specified depth of the riprap course.

6. Filters, Bedding, or Geotextiles

When the drawings specify filters, bedding, or geotextile beneath the rock riprap, the designated material shall be placed on the prepared subgrade surface as specified. Compaction of filter or bedding aggregate is not required, but the surface of such material shall be furnished reasonably smooth and free of mounds, dips, or windrows.

Where drawings require geotextiles beneath riprap, the geotextile shall be laid on the prepared subgrade surfaces with no folds or ripples. The geotextile fabric should be in direct contact with the subgrade surface. Except as otherwise specified, the fabric should be placed parallel to stream alignments and perpendicular to lake shorelines. Except as otherwise specified, the geotextile splices shall overlap at least 18 inches, or shall be sewn following the geotextile manufacturer's recommendations. Anchoring pins shall be placed as recommended by the geotextile manufacturer except as otherwise specified.

CONSTRUCTION SPECIFICATION
SD-10 SALVAGING AND SPREADING TOPSOIL

1. Scope

The work shall consist of salvaging topsoil from borrow pits or other excavations and spreading it in the designated areas to the specified depths.

2. Quality of Topsoil

Topsoil shall consist of friable soil reasonably free of grass, roots, weeds, sticks, stones, or other foreign materials.

3. Excavation

Topsoil shall be removed after clearing, grubbing and removing vegetation and shall be stockpiled. Objectionable materials shall be removed and buried, or disposed of, at locations approved by the Natural Resources Conservation Service inspector.

4. Spreading

Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work. Surfaces to be covered shall be lightly scarified just prior to the spreading operation.

All earth fills not to be submerged shall be covered with topsoil to a depth of 6 to 18 inches measured perpendicular to the surface of the fill and placed to the neat lines shown on the drawings.

After placement is completed, the topsoil surface shall be left in a condition that will permit seeding equipment to be operated without excessive smoothing.

CONSTRUCTION SPECIFICATION
SD-12B CONCRETE FOR MINOR STRUCTURES
(GENERALLY FOR STRUCTURES <10 CU. YD.)

1. Scope

The work shall consist of proportioning, forming, placing, finishing, and curing Portland cement concrete.

2. Materials

Portland Cement shall conform to ASTM C150, Type II or IIA, and shall be low alkali. Partially hydrated or damaged cement shall not be used.

Aggregates shall conform to the requirements of ASTM C33. Coarse aggregates shall be size 467 (1/2 inch to #4 sieve) unless otherwise specified. Aggregates must be free of contamination and segregation.

Water shall be clean, free of harmful chemicals, and suitable for drinking.

Air-entraining admixtures must follow the Manufacturer's recommendations.

3. Concrete Mix Design

The contractor or person in charge of construction shall be responsible for designing a concrete mix that will produce 3,000 pounds per square inch compressive strength at 28 days and meet the following requirements:

The concrete mix must contain less than six gallons of water per bag of cement.

The mix must contain at least six bags of cement per cubic yard of concrete.

Air-entrainment shall be between four and seven percent by volume.

Concrete slump after mixing must be between two and five inches.

Use of ready mixed concrete meeting this specification is encouraged. Upon request, the vendor must provide the owner and the Natural Resources Conservation Service inspector a signed delivery ticket giving the quantities of concrete, cement, fine aggregate, coarse aggregate, and water contained in the batch.

Calcium chloride, Sodium chloride (salt) or other corrosive accelerators shall not be used.

4. Concrete Forms

Forms shall be wood, plywood, metal, fiberglass, or other approved material. The forms and associated false work shall be substantial and unyielding and shall be constructed so that the finished concrete will conform to the specified dimensions and contours. Form surfaces shall be smooth and free from holes, dents, sags, or other irregularities. Forms shall not be embedded in the concrete.

5. Placing Concrete

Concrete shall be placed in final position within one and one-half hours after adding cement (water if using sack-crete premix) to the mix.

Earth surfaces under concrete shall be compacted and free of debris, frost, ice, or flowing water. Concrete shall not be dropped more than five feet vertically without use of equipment designed to prevent segregation.

Each layer of concrete must be completely consolidated by spading, hand tamping, and/or mechanical vibration. Vibration shall compact the concrete and bring it into intimate contact with the forms, reinforcing steel, and other embedded items while removing voids and pockets of trapped air.

Unformed concrete surfaces (excluding slip-formed surfaces) exposed in the completed work shall be accurately struck off to grade and then float finished. Concrete edges exposed in the final work shall be chamfered or finished with molding tools.

Concrete shall be placed at air temperatures between 40°F and 80°F unless special measures are taken to protect the concrete. Concrete must be protected from freezing for 24 hours after placement.

6. Curing

All concrete shall be cured by keeping all exposed surfaces wet for 7 days (counting only days above 50°F). Alternately, the wet cure process can be stopped when curing compound is applied as recommended by the manufacturer.

7. Defective Concrete

Honey combed areas and other voids in concrete must be promptly repaired with mortar patching immediately upon discovery.

Damaged concrete and concrete not meeting requirements of this specification will be rejected.

CONSTRUCTION SPECIFICATION

SD-13 STEEL REINFORCEMENT

1. Scope

The work shall consist of furnishing and placing steel reinforcement for reinforced concrete or pneumatically applied mortar.

2. Materials

Steel reinforcement shall be free of flaky rust, oil, grease, paint, mill scale, or other deleterious matter.

Steel bar reinforcement (except as otherwise specified) shall be grade 40, 50, or 60 deformed bars conforming to one of the following specifications.

- a. Deformed and Plain Billet-steel Bars for Concrete Reinforcement ASTM A615
- b. Rail-steel Deformed and Plain Bars for Concrete Reinforcement ASTM A616 with S1 Supplement Requirements
- c. Axle-steel Deformed and Plain Bars for Concrete Reinforcement ASTM A617

Dowels shall be plain round bars conforming to the above specifications.

Fabricated deformed steel bar mats for concrete reinforcement shall meet ASTM A184.

Plain steel welded wire fabric for concrete reinforcement shall meet ASTM A185.

Deformed steel welded wire fabric for concrete reinforcement shall meet ASTM A497.

Epoxy-coated steel bars for concrete reinforcement shall meet ASTM A775.

3. Cutting and Bending

Reinforcing bars may be shop or field cut and/or bent. All bends must be made without heating or otherwise weakening the bar. Shop bends must meet American Concrete Institute Standard 315. Bars with kinks, cracks, or improper bends will be rejected.

4. Splicing Bar Reinforcement

Except as otherwise specified, splices of reinforcing bars shall provide an overlap of at least 30 times the smaller bar diameter, but not less than 12 inches.

5. Splicing Welded Wire Fabric

Welded wire fabric shall be overlapped one full mesh (rectangle) not counting cut portions.

6. Placing

Reinforcing shall be accurately placed and secured in position to prevent its displacement during concrete placement. Tack welding of bars is not permitted. Dimensions shown on the plans indicating concrete cover are the clear distances from the concrete surface to the reinforcing steel.

Metal hangers, spacers, and ties shall be placed in a manner that they are not exposed in the finished concrete surface. The legs of metal chairs or side form spacers that may be exposed on any surface of slabs, walls, beams, or other concrete surfaces shall be a design that will not corrode at the concrete surface. Precast concrete chairs shall be clean and moist at the time of concrete placement.

On structures exceeding four cubic yard of concrete, concrete shall not be placed until the reinforcement has been inspected and approved by the Natural Resources Conservation Service (NRCS) inspector. For any size pour, inspection of reinforcement embedded in concrete may be performed by the NRCS inspector using radar or other inspection instruments.

CONSTRUCTION SPECIFICATION

SD-14 WOOD AND STEEL STRUCTURES

1. Scope

The work shall consist of furnishing and constructing wood and/or steel structures.

2. Materials

Plywood. Plywood and Oriented Strand Board (OSB) for use in above ground sheltered construction (buildings etc.) shall meet Product Standard PS-1 and shall conform to the requirements shown on the drawings.

Plywood for use in exposed above ground construction shall be exterior grade, meet Product Standard PS-1 and shall conform to the requirements shown on the drawings.

Treated plywood for use above ground shall meet Product Standard PS-1 and be pressure treated with waterborne preservatives (Arsenicals) to a retention level of at least 0.4 pounds per cubic foot except as shown on the drawings.

Treated plywood that is to be in permanent contact with water or the earth must meet Product Standard PS-1 and be pressure treated with waterborne preservatives (Arsenicals) to a retention level of 0.6 pounds per cubic foot, except as shown on the drawings.

Structural poles, posts, and lumber. All wood material shall be sound, new wood free from decay and disease damage, shall be straight, not cracked, and shall meet the requirements shown on the drawings. Structural timber and lumber shall be structural grade or better.

Unless otherwise specified, all poles, posts, and all nominal lumber sizes 2X10 or larger shall be pressure treated by one of the following preservatives:

Creosote

Pentachlorophenol

Waterborne Preservatives (Arsenicals) treated to 0.4 pounds per cubic foot retention

Unless otherwise specified, all nominal lumber sizes 2X8 or smaller shall be pressure treated using waterborne preservatives (Arsenicals). Wood for use above ground shall be treated to a retention level of at least 0.4 pounds per cubic foot. Wood for use in permanent contact with water or earth shall be treated to a retention level of at least 0.6 pounds per cubic foot.

Hardware. Bolts, rods, nuts, washers, and other hardware shall be an appropriate grade of steel and shall be galvanized except as shown otherwise on the drawings.

Structural Steel. Except as shown on the drawings, steel shall be malleable, weldable, carbon steel.

Galvanizing of Steel. Except as otherwise specified, items shown on the drawings to be galvanized, shall be galvanized according to ASTM A123, except bolts, screws, and other fasteners 0.5 inch or less in diameter may be coated with electro-deposited zinc or cadmium coating following ASTM B766 or B633.

Zinc Painting of Steel - For items specified to be painted with zinc paint, the surfaces shall be cleaned and painted as follows.

Cleaning - Surfaces to be painted must be clean and dry. Remove oil and grease using a solvent. Clean surfaces to be painted using sand blasting, power disk sanding, or wire brushing.

Paint - Apply 2 coats of zinc-rich cold galvanized compound using brush, or aerosol application (example: Rust-Oleum Professional Galvanizing Compound) or zinc dust - zinc oxide primer ASTM D79, D520, or D4146.

3. Installation

Structures shall be installed accurately to the dimensions shown on the drawings.

Nails and spikes shall be driven in wood with just sufficient force to set the heads flush with the surface of the wood.

Bolt holes shall be drilled for snug fit. Holes for lag screws shall be bored with a bit not larger than the body of the screw at the base of the thread.

Washers shall be used in contact with all bolt heads and nuts that would otherwise be in contact with wood.

Steel welds shall be heavy duty with obvious strength equal to the strength of the structural steel.

4. Measurement and Payment

Material quantities will not be measured. Payment for each structure, complete in place, will be made at the contract lump sum price for that structure. Such payment will be considered full compensation for all labor, transportation, equipment, materials, and all other items necessary and incidental to completion of the work.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary.

CONSTRUCTION SPECIFICATION SD-28 SEEDING

1. Scope

The work shall consist of furnishing all labor, equipment, and materials needed for seeding the areas shown on the drawings.

2. General

Permanent Seeding and related operations shall be performed in the following time periods:

Early Spring prior to 5/15 – Cool-season species only.

Late Spring 5/15 to 6/15 – Warm-season species only with a companion crop.

Late Summer 8/1 to 9/1 – Cool-season species with a cover crop.

Dormant 11/1 to Spring Thaw - Cool season species with mulch.

Permanent seeding must be completed as soon as possible during the first allowable seeding time period after construction. If construction ends between 5/15 and 9/15, a cover crop shall be planted immediately after construction. The cover crop shall be clipped or chemically killed and perennial species shall be planted during the next available establishment period. Consider the previous two years of herbicide application. Any potential carryover problems should be addressed by delaying construction and seeding, establishing a cover crop, and/or changing the species to be planted.

3. Fertilizer

Fertilizer is ☐ Required ☒ Not Required

If fertilizer is used it shall be supplied and applied as follows: Apply fertilizer based on the recommendations from a soil test or apply 30 to 40 pounds of actual N and 40 to 60 pounds of P_2O_5 per acre. Ten to 15 tons of manure per acre may be used in lieu of the commercial fertilizer and will also increase organic matter. Do not use manure on areas that will drain directly into a water body or stream. 5 to 10 pounds of zinc per acre may be added to speed up growth on medium-textured soils. Thoroughly mix all fertilizer and/or manure into the upper three to five inches of the soil during final seedbed preparation.

4. Seedbed Preparation

The area to be seeded shall be made reasonably smooth and firm. Ditches shall be filled to conform to design lines and grades before seedbed preparation is begun. The seedbed will be worked to a depth of three to five inches. Drag or pack to break up large clods and firm the seedbed. Prior to seeding, required fertilizer shall be applied and mixed with the soil surface to a depth of 3 inches. The seedbed should be firm enough so that the boot heel of an average adult penetrates the soil to a depth of approximately 1/2 inch. The contractor shall suspend operations when the soil is too wet.

5. Sowing Seed

Except as otherwise specified, seeding shall be performed immediately after seedbed preparation. Seeding shall be drilled or broadcast and incorporated in a manner that will achieve uniform distribution of seed placed at appropriate soil depth. Optimum seeding depths are 1/4 to 3/4 inch.

When seeding waterways or similar water flow areas, machinery operations must be performed in a direction that is not parallel to water flow (use figure-eight or serpentine pattern, etc.).

6. **Permanent Seeding**

Seed requirements and seeding rates are listed below. Documentation must be provided showing the seed meets current South Dakota laws and regulations. The seed must be planted within nine months of its latest germination test.

	Grass	Seeding Rate (PLS lbs./Acre)	
		Drilled	Broadcast
☐	Smooth Brome grass ¹	12	16
☐	Western Wheatgrass	8	10
☒	Intermediate Wheatgrass	8	10
☐	Slender Wheatgrass	5	6
☐	Western Wheatgrass	15	20
☐	Reed Canarygrass	5	7
☐	Other, See Attached Seeding Sheet		

¹ Smooth brome grass is not recommended where the adjacent vegetation is predominantly native, as smooth brome grass is highly invasive.

7. **Cover Crops**

If permanent seeding is not completed during the early or late spring period, a cover crop meeting the following rates and dates will be planted immediately after construction. Cover crops are required for all practices constructed after the early or late spring seeding period and before September 15 (those designed to be seeded between August 1 to September 1). Cover crops are not recommended to be seeded between September 15 and November 1 since it is likely that most of the seeds will remain in the soil and compete with the planned seeded species.

Cover Crop	Seeding rate (lbs./acre)	Spring Dates	Fall Dates
None			

The cover crop will be clipped to 8-10 inches in height or chemically killed during the boot stage to prevent seed formation. Remove or spread excess residues that would interfere with drilling the perennial species.

8. **Companion Crops**

Companion Crops are ☐ Required ☒ Not Required to be seeded during the permanent seeding period. Companion crops are only to be used for warm-season species seeded in the late spring period (5/15 to 6/15). The companion crops shall be seeded as follows:

Companion Crop	Seeding rate (lbs./acre)
None	

Companion crops shall be seeded at the same time as the permanent seeding. The companion crop should be clipped and removed or mowed before it becomes competitive with the perennial species or sets seed.

9. **Mulching**
Mulching is ☐ Required ☒ Not Required

Mulching is encouraged but not required for all construction and seeding dates. Mulching is required for all waterways constructed between September 15 and the spring thaw and when seeding into a bare seedbed during the early spring period where the design velocity is greater than 2.5 fps. Except as otherwise specified, required mulching must be performed as soon as possible after seeding. Mulch shall be applied uniformly as follows. Straw will be applied uniformly at a rate of 3,000 pounds minimum to 4,000 pounds maximum per acre. The straw will be anchored using an anchoring tool (or a farm disk set straight with adequate weight) that has serrated straight disk blades spaced 6-10" apart that punches mulch into the ground with a depth of approximately 2 inches. All anchoring should be at right angles to the slope.

If late summer or dormant seeding dates are used, seed just prior to mulching.

PLASTIC PIPE (SD-55)
MATERIAL SPECIFICATION

1. Scope

This specification covers the quality of Poly Vinyl Chloride (PVC), Polyethylene (PE), High Density Polyethylene (HDPE), and Acrylonitrile-Butadiene-Styrene (ABS) plastic pipe, fittings, and joint materials.

2. Material

The pipe and fittings shall be free of visible cracks, holes, foreign inclusions, or other defects, and shall have dimensions measured as prescribed in ASTM D2122. Joints and fittings shall be as described in the pipe AWWA or ASTM specification and shall be compatible with and have pressure ratings at least equal to the specified pipe. Rubber gaskets for pipe joints shall conform to ASTM F477 Elastomeric Seals (Gaskets for Joining Plastic Pipe). Except as otherwise specified, pipe must conform to the following specifications.

Poly vinyl chloride (PVC) Pipe

Plastic pipe - Schedule 40, 80, or 120	ASTM D1785 or D2466
Pressure rated pipe - SDR Series	AWWA C900 or ASTM D2241
Plastic drain, waste, and vent pipe and fittings	ASTM D2665
Composite sewer pipe	ASTM D2680
Type PSM PVC sewer pipe and fittings	ASTM F3034
Large-diameter gravity sewer pipe and fittings	ASTM F679
Smooth-wall Underdrain Systems for Highway, Airport, and Similar Drainage	ASTM F758
Type PS-46 gravity flow sewer pipe and fittings	ASTM F789
Profile gravity sewer pipe and fittings based on controlled inside diameter	ASTM F794
Corrugated sewer pipe with a smooth interior and fittings	ASTM F949
Pressure pipe, 4-inch through 12-inch for water distribution	AWWA C900
Water transmission pipe, nominal diameters 14-inch through 36-inch	AWWA C905

Polyethylene (PE) pipe

Schedule 40	ASTM D2104
SDR-PR based on controlled inside diameter	ASTM D2239
Schedules 40 and 80 based on outside diameter	ASTM D2447
SDR-PR based on controlled outside diameter	ASTM D3035

High density polyethylene (HDPE) pipe

Plastic pipe and fittings	ASTM D3350
SDR-PR based on controlled outside diameter	ASTM F714
Plastic moldings and extrusion compounds	ASTM D1248
Heat joining polyolefin pipe and fittings	ASTM D2657

Acrylonitrile-butadiene-styrene (ABS) pipe

Plastic pipe, schedules 40 and 80	ASTM D1527
Plastic pipe, SDR-PR	ASTM D2282
Schedule 40 plastic drain, waste, and vent pipe	ASTM D2661
Composite sewer pipe	ASTM D2680
Sewer pipe and fittings	ASTM 2751

3. Perforations

Except as otherwise specified, perforations of perforated pipe shall meet the following requirements:

- a. Perforations may be circular or slots, but must be free of materials that reduce effective openings.
- b. Circular perforations shall be 3/16 to 5/16 inch diameter holes arranged in rows parallel to the axis of the pipe. Center-to-center perforation spacing along rows shall not exceed 2.5 inches. Perforations may appear at the ends of short and random lengths. Rows shall be arranged in equal groups at equal distance from pipe bottom vertical centerline. Lowermost rows shall be separated by 60 to 125 degrees. Uppermost rows shall be separated by an arc of 166 degrees or less. Other rows shall be uniformly spaced.

- c. Slot perforations shall be located within two rows, with one row in each of the lower quadrants of the pipe. Slots shall be no wider than 1/8 inch and spaced no more than 1.5 inches apart.
- d. Row numbers and minimum openings must be as follows.

Nominal pipe size, inch	Perforations		Minimum opening/foot, square inches
	Minimum number of rows circular	slot	
3 to 4	2	2	0.22
6 to 10	4	2	0.44
12 or larger	6	2	0.66

4. **Potable use pipeline**

Pipelines specified for use to carry potable water shall meet requirements of the National Sanitation Foundation (NSF).

CONSTRUCTION SPECIFICATION

SD-95 GEOTEXTILE

1. Scope

The work shall consist of furnishing all material, equipment, and labor necessary for the installation of geotextiles.

2. Quality

Geotextiles shall conform to the requirements of Material Specification SD-592 and this specification.

3. Storage

Before installation, geotextile shall be protected from damage by weather, sunlight, and other causes.

4. Surface Preparation

The surface on which geotextile is to be placed shall be graded to the lines and grades shown on the drawings. Except as shown on the drawings, the surface shall be reasonably free of loose rock and clods, holes, depressions, projections, water, and muddy conditions.

5. Placement

Before geotextile is placed, the soil surface will be inspected for quality assurance. Geotextile shall be unrolled along the placement area and loosely laid without stretching so that it will conform to surface irregularities without tearing when upper materials are placed. The geotextile may be folded and/or overlapped as needed for proper placement. Geotextile sections shall be joined by sewing or overlapping.

Geotextile sections joined by sewing shall have seams producing minimum seam strength equal to 90 percent of minimum fabric strength. The sewn overlap shall be at least six inches, and the sewing shall consist of at least two parallel stitched rows at least one-half inch apart with rows at least two inches from fabric edges. The stitching must be a lock-type stitch. Installed geotextile must be secured to prevent movement during construction.

Geotextile sections joined by overlapping shall be overlapped a minimum of 18 inches and secured to the underlying soil surface using securing pins as provided and recommended by the geotextile manufacturer. Upstream or upslope geotextile sections shall overlap abutting downslope geotextile.

Geotextile tears shall be repaired by overlap (described above) of additional geotextile placed in contact with the torn geotextile.

GEOTEXTILE (SD-592)

MATERIAL SPECIFICATION

1. Scope

This specification covers the quality of geotextile.

2. General Requirements

Geotextiles shall be a minimum of 85 percent by weight polypropylenes, polyesters, polyamides, polyethylene, polyolefins, or polyvinylidenechlorides. They shall be formed into a stable network of filaments or yarns retaining dimensional stability relative to each other. The geotextile shall be defect free and conform to Table 1 or 2 requirements as applicable to the material specified. The geotextile shall be free of chemical treatments or coatings that reduce its porosity. Geotextiles shall have enhanced resistance to ultraviolet light.

Thread used for sewing shall be high strength polypropylene, polyester, or polyamide, and shall be at least as resistant to ultraviolet light as the geotextile.

3. Classification

Woven - Fabrics formed by interweaving monofilament yarn, creating distinct and measurable openings. The edges of woven fabric shall be selvaged or otherwise finished to prevent the outer yarn from unraveling.

Nonwoven - Fabrics formed by random placement of threads in a mat and bonded by needle punching.

4. Shipping and Storage

Geotextile shall be shipped in rolls wrapped with a cover. Each roll shall be labeled to clearly identify the brand, class, and production run following ASTM D4873.

Table 1. Requirements for Woven Geotextile

Property	Test Method	Class I	Class II&III	Class IV
Tensile strength, lb. ^{1/}	ASTM D4632	200 min.	120 min.	180 min.
Elongation at failure, % ^{1/}	ASTM D4632	<50	<50	<50
Puncture, lb. ^{1/}	ASTM D4833	90 min.	60 min.	60 min.
Ultraviolet light, % residual tensile strength	ASTM D4355	70 min.	70 min.	70 min.
Apparent opening size (AOS)	150-hr. exposure ASTM D4751	As specified, but >.212mm (#70 ^{2/})	As specified, but >.212 mm (#70)	As specified, but >.212mm (#70)
Percent open area (%)	CWO-02215-86 ^{3/}	4.0 min.	4.0 min	1.0 min.
Permeability, permittivity Sec. ⁻¹	ASTM D4491	0.10 min.	0.10 min.	0.10 min.

Table 2. Requirements for Needle-Punched Nonwoven Geotextile

Property	Test Method	Class I	Class II	Class III	Class IV
Tensile Strength, lb. ^{1/}	ASTM D4632	180 min.	120 min.	90 min.	115 min.
Elongation at failure, % ^{1/}	ASTM D4632	≥ 50	≥ 50	≥ 50	≥ 50
Puncture, lb.	ASTM D4833	80 min.	60 min.	40 min.	40 min.
Ultraviolet light, % residual tensile strength	ASTM D4355	70 min.	70 min.	70 min.	70 min.
Apparent Opening Size (AOS)	150-hr. exposure ASTM D4751	As specified max. #40 ^{2/}	As specified max. #40 ^{2/}	As specified max. #40 ^{2/}	As specified max. #40 ^{2/}
Permeability permittivity sec ⁻¹	ASTM D4491	0.70 min.	0.70 min.	0.70 min.	0.70 min.

^{1/} Minimum average roll value (weakest principal direction).

^{2/} US standard sieve size.

^{3/} CWO is a US Army Corps of Engineers reference.

RECEIVED

APR 18 2014

WATER RIGHTS
PROGRAM

 SITES XEQ 04/01/2014 WATER RESOURCE SITE ANALYSIS COMPUTER PROGRAM
 VER 2005.1.7 (USER MANUAL - DATED DECEMBER 2005)
 TIME 16:08:14

***** 80-80 LIST OF INPUT Data *****

SITES	01/01/2005A	Havemeier Dam	1.108125	H5
SAVMOV	0 101			
SAVMOV	101 1			1
STRUCTURE A	Planning Data			
	1768	0.12		
	1770	0.91		
	1772	2.34		
	1774	4.27		
	1776	6.20		
	1778	8.38		
	1779	9.54		
	1780	11.02		
	1782	14.09		
	1784	17.69		
	1786	22.10		
ENDTABLE				
WSDATA	5A1A AC 82	709.2	10955	5.8
PDIRECT	2.3			4.20
POOLDATA	ELEV 1779	1779	1768	1766.8 SC
PSINLET	1.0	12.56		
PSDATA	1 96	16	0.009	1767.6
ASDATA	41 300 300		3	0.03 2
ASINSURF	41	5.6		
ASINLET	41 0.0	0.0	125	0.0 3
	285	1.6		
ENDTABLE				
ASEXSURF	41	5.6		
		0.65	0	
		3		
		2	0	
		0.02		
ENDTABLE				
ASEXIT	41 N			120
BTMWIDTH	FEET 100			
GRAPHICS	I			
GO, DESIGN	HL TYPE2 24		TYPE2378 24	
SAVMOV	2 101 1		A	
ENDJOB				

***** MESSAGE - DRAINAGE AREA FROM WSDATA CONTROL BEING CONVERTED FROM
 ACRES TO SQUARE MILES FOR COMPUTATION PURPOSES.

1SITES	-----			
XEQ 04/01/2014	Havemeier Dam	WSID= A		
VER 2005.1.7	Planning Data	SUBW= A		
TIME 16:08:14	SITE = A	PASS= 1	PART= 1	

***** BASIC Data *****
 CLIMATE AREA - NOT DEFINED DESIGN CLASS A1 = LT 3000.

STORM DISTRIBUTION-PSH 24 HOUR TYPE II RAINFALL DISTRIBUTION

STORM DISTRIBUTION AUX. -24 HOUR TYPE II RAINFALL DISTRIBUTION

PRECIP. - P-PS,1-DAY	P-PS,10-DAY	P-SD	P-FB	
2.30	0.00	0.00	4.20	
WSDATA - CN	DA-SM	TC/L	-/H	QRF
82.00	1.11	10955.00	5.80	0.00
SITEDATA- PERM POOL	CREST PS	FP SED	VALLEY FL	378?
1779.00	1779.00	1768.00	1766.80	YES
BASEFLOW	INITIAL EL	EXTRA VOL	SITE TYPE	
0.00	0.00	0.00	DESIGN	
PSDATA - NO. COND	COND L	DIA/W	-/H	
1.00	96.00	16.00	0.00	
PS N	KE	WEIR L	TW EL	
0.009	1.00	12.56	1767.60	
2ND STG	ORF H	ORF L	START AUX.	
0.00	0.00	0.00	0.00	
ASCRESTS - AUX.1	AUX.2	AUX.3	AUX.4	AUX.5
0.00	0.00	0.00	0.00	0.00
AUX.Data - REF.NO.	RETARD. Ci	TIE STATION	INLET LENGTH	
41	0.00	300.00	300	
AUX.Data - INLET Ci	SIDE SLOPE	EXIT Ci	EXIT SLOPE	ACTUAL AUX?
5.600	3.00	5.600	0.030	NO
BTM WIDTH - BW1	BW2	BW3	BW4	BW5
ft 100.00	0.00	0.00	0.00	0.00

AUXILIARY SPILLWAY RATING DEVELOPED USING WSPVRT.

1SITES -----
 XEQ 04/01/2014 Havemeier Dam WSID= A
 VER 2005.1.7 Planning Data SUBW= A
 TIME 16:08:14 SITE = A PASS= 1 PART= 2

MESSAGE ---- Climatic Index changed from 0.0 to 1.0 for this run.

PERM POOL	1779.00 FT	44.9 ACFT	9.54 AC	24.0 CFS
CREST PS	1779.00 FT	44.9 ACFT	9.54 AC	24.0 CFS
SED ACCUM	1779.00 FT	44.9 ACFT	9.54 AC	24.0 CFS

START ELEV 1779.00 FT 44.9 ACFT 9.54 AC 0.0 CFS
 NRCS-PSH D= 24.00 HR P= 2.30 IN Q= 0.85 IN DA= 1.11 SM
 TC= 1.40 HR CN= 82.00 VOL= 50.5 ACFT
 PEAK = 248.8 CFS, AT 12.8 HRS.

ROUTED RESULT - HYD TYPE EMAX VOL-MAX AMAX QMAX
 NRCS-PSH 1781.60 FT 74.8 ACFT 13.48 AC 24.3 CFS

PS STORAGE 29.9 ACFT, BETWEEN AUX. CREST AND SED. ACCUM ELEVATIONS.

DRAWDOWN (DDT) TEST 1779.00 FT 44.9 ACFT 0.00 CFS
 CONTROL IS 0.000 DETENTION STORAGE

DRAWDOWN TIME = 3.05 DAYS, TO 0.0 CFS (LIMIT = 10.00 DAYS)

 RATING TABLE DEVELOPED, SITE = A :
 BY PROGRAM FOR PS AND AUX. SPILLWAYS
 AUX. RATING USED WSPVRT METHOD.

RATING TABLE NUMBER 1

	ELEV. FEET	Q-TOTAL CFS	Q-PS CFS	Q-AUX. CFS	VOLUME AC-FT	AREA ACRE
1	1779.00	0.00	0.00	0.00	44.90	9.54
2	1779.17	2.82	2.82	0.00	46.58	9.80
3	1779.35	7.97	7.97	0.00	48.30	10.05
4	1779.52	14.65	14.65	0.00	50.07	10.31
					FULL CONDUIT FLOW, ELEV = 1779.69 FT	
5	1779.69	22.55	22.55	0.00	51.89	10.57
6	1780.48	23.28	23.28	0.00	60.68	11.76
7	1781.27	23.98	23.98	0.00	70.43	12.97
8	1782.06	24.67	24.67	0.00	81.13	14.20
9	1782.85	25.33	25.33	0.00	92.87	15.61
10	1783.64	25.98	25.98	0.00	105.74	17.03
11	1784.42	26.61	26.61	0.00	119.76	18.62
12	1785.21	27.22	27.22	0.00	135.12	20.36
13	1786.00	27.82	27.82	0.00	151.85	22.10

1SITES -----
 XEQ 04/01/2014 Havemeier Dam WSID= A
 VER 2005.1.7 Planning Data SUBW= A
 TIME 16:08:14 SITE = A PASS= 1 PART= 3

AUX. CREST 1781.60 FT 74.8 ACFT 13.48 AC 24.3 CFS

PS STORAGE 29.9 ACFT, BETWEEN AUX. CREST AND SED. ACCUM ELEVATIONS.

START ELEV 1779.00 FT 44.9 ACFT 9.54 AC 0.0 CFS

EFFECTIVE HEIGHT(H)= 14.8 FEET, PRODUCT= 1108. (H * STORAGE AT CREST AUX.).

INPUT DESIGN CLASS = A1 = LT 3000. PRODUCT.

NRCS-FBH D= 24.00 HR P= 4.20 IN Q= 2.37 IN DA= 1.11 SM
TC= 1.40 HR CN= 82.00 VOL= 140.4 ACFT

PEAK = 732.3 CFS, AT 12.7 HRS.

RATING TABLE DEVELOPED, SITE = A :
BY PROGRAM FOR PS AND AUX. SPILLWAYS
AUX. RATING USED WSPVRT METHOD.

RATING TABLE NUMBER 2

	ELEV. FEET	Q-TOTAL CFS	Q-PS CFS	Q-AUX. CFS	VOLUME AC-FT	AREA ACRE
1	1779.00	0.00	0.00	0.00	44.90	9.54
2	1779.17	2.82	2.82	0.00	46.58	9.80
3	1779.35	7.97	7.97	0.00	48.30	10.05
4	1779.52	14.65	14.65	0.00	50.07	10.31
FULL CONDUIT FLOW, ELEV = 1779.69 FT						
5	1779.69	22.55	22.55	0.00	51.89	10.57
6	1779.93	22.78	22.78	0.00	54.45	10.92
7	1780.17	23.00	23.00	0.00	57.10	11.28
8	1780.41	23.22	23.22	0.00	59.84	11.65
9	1780.65	23.43	23.43	0.00	62.66	12.02
10	1780.89	23.65	23.65	0.00	65.57	12.38
11	1781.13	23.86	23.86	0.00	68.57	12.75
12	1781.37	24.07	24.07	0.00	71.66	13.12
13	1781.60	24.27	24.27	0.00	74.83	13.48
14	1781.82	29.25	24.46	4.78	77.84	13.82
15	1782.04	34.28	24.65	9.62	80.91	14.17
16	1782.44	43.36	24.99	18.37	86.66	14.88
17	1782.92	151.21	25.39	125.82	94.06	15.75
18	1783.80	595.15	26.11	569.04	108.60	17.33
19	1784.90	1347.55	26.98	1320.56	128.91	19.68
20	1786.00	2301.66	27.83	2273.84	151.86	22.10

SUMMARY OF AUXILIARY SPILLWAY SURFACE CONDITIONS USED IN COMPUTATIONS BY REACH

REACH	FROM STA (ft)	TO STA (ft)	SLOPE (%)	RETARDANCE CURVE INDEX	VEGETAL COVER FACTOR	MAINT. CODE	ROOTING DEPTH (ft)	REACH LOCATION *
1	0.	175.	-1.0	5.6	**	**	**	INLET
2	175.	300.	0.0	5.6	**	**	**	CREST
3	300.	420.	3.0	5.6	0.65	3	2.0	EXIT !

* Upper case indicates a reach of constructed spillway channel.

** The program does not use vegetal cover factor, maintenance code, and
rooting depth for inlet and crest reaches in computations.

! Reach 3 used in computing exit channel velocities.

DRAWDOWN USING FREEBOARD STORM FOLLOWS, STARTING AT ELEVATION 1781.60 FT.

DRAWDOWN (DDT) TEST 1779.00 FT 44.9 ACFT 0.00 CFS
CONTROL IS 0.000 DETENTION STORAGE

DRAWDOWN TIME = 2.87 DAYS, TO 0.0 CFS (LIMIT = 10.00 DAYS)

ROUTED RESULTS	BTM WIDTH FT	MAX ELEV FT	VOL-MAX ACFT	AREA-MAX AC	AUX.-HP FT	VOL-AUX. ACFT
NRCS-FBH	100.0	1783.41	102.0	16.6	1.81	27.2

^^^^ NOTE -- ACTUAL Hp OF 1.81 RAISED TO MEET MIN. 378 CRITERIA.

PEAK - CFS	Q-PS	Q-AUX.	Q-TOT.
DISCHARGE =	25.8	367.9	393.6

	CRITICAL DEPTH FT	CRITICAL VELOCITY FT/SEC	CRITICAL SLOPE-Sc FT/FT	25% OF Q Sc FT/FT
AUXILIARY SPILLWAY ---	0.74	4.84	0.036	0.167

EROSIONALLY EFFECTIVE STRESS FOR STABILITY ANALYSIS OF AUX. EXIT CHANNEL
(Refer to Ag. Handbook 667, Chapt. 3, for allowable stresses.)
Aux. Spillway Discharge = 368. cfs; Bottom Width = 100. ft

REACH NO.	FROM STA	TO STA	SLOPE %	MANNING'S n	VELOCITY ft/s	TOTAL STRESS lb/ft^2	EFFECTIVE STRESS lb/ft^2
3	300.	420.	3.00	0.047	4.56	1.48	0.898

AUXILIARY SPILLWAY DURATION FLOW = 15.9 HOURS
ATTACK, OE/B = 0.8 ACFT/FT

***** MESSAGE - NHCP378 CRITERIA USED BUT AUXILIARY SPILLWAY RATING NOT
BASED ON ASFILE RATINGS.

EXIT CHANNEL FLOW SUBCRITICAL: MAX VELOCITY= 4.6 FT/SEC
EXIT SLOPE = 0.030 FT/FT
FLOW DEPTH = 0.8 FT

>>>> NHCP378 RUN - MINIMUM DEPTH, CREST AUX. TO TOP OF DAM IS 2.00 FT.
NEW TOP OF DAM ELEVATION = 1783.60.

ROUTED RESULTS	BTM WIDTH FT	MAX ELEV FT	VOL-MAX ACFT	AREA-MAX AC	AUX.HP FT	VOL-AUX. ACFT
MINIMUM AUX.	100.0	1783.60	105.3	17.0	2.00	30.5

PEAK - CFS	Q-PS	Q-AUX.	Q-TOT.
DISCHARGES =	26.0	469.3	495.2

	CRITICAL DEPTH FT	CRITICAL VELOCITY FT/SEC	CRITICAL SLOPE-Sc FT/FT	25% OF Q Sc FT/FT
AUXILIARY				

SPILLWAY --- 0.87 5.24 0.030 0.122

>>>> NHCP378 RUN - MINIMUM DEPTH, DESIGN FLOW TO TOP OF DAM; 1.00 FT REQUIRED
FOR THIS PASS. NEW TOP OF DAM ELEVATION = 1784.41.

ROUTED RESULTS	BTM WIDTH FT	MAX ELEV FT	VOL-MAX ACFT	AREA-MAX AC	AUX.HP FT	VOL-AUX. ACFT
MINIMUM AUX.	100.0	1784.41	119.9	18.6	2.81	45.1

PEAK - CFS DISCHARGES =	Q-PS	Q-AUX.	Q-TOT.
	26.6	987.1	1013.7

AUXILIARY SPILLWAY ---	CRITICAL DEPTH FT	CRITICAL VELOCITY FT/SEC	CRITICAL SLOPE-Sc FT/FT	25% OF Q Sc FT/FT
	1.43	6.64	0.018	0.053

Inflow Hyd 1 PSH-Peak = 24.27 CFS at 17.53 hrs., Location Point
Inflow Hyd 1 FBH-Peak = 393.65 CFS at 13.35 hrs., Location Point
HYDOUT 1 A

1SITES....JOB NO. 1 COMPLETE.

A Havemeier Dam

0 SUBWATERSHED(S) ANALYZED.

1 STRUCTURE(S) ANALYZED.

2 HYDROGRAPHS ROUTED AT LOWEST SITE.

0 TRIALS TO OBTAIN BOTTOM WIDTH FOR SPECIFIED STRESS OR VELOCITY.

SITES.....COMPUTATIONS COMPLETE

SUMMARY TABLE 1

SITES VERSION 2005.1.7
DATED 01/01/2005

WATERSHED ID	RUN DATE					RUN TIME			
A	04/01/2014					16:08:14			
>>>	SITE ID	SUBWS ID	SUBWS DA (SQ MI)	CURVE NO.	TC (HRS)	TOTAL DA (SQ MI)	TYPE DESIGN	STRUC CLASS	<<<
	A	A	1.11	82.	1.40	1.11	378NR	A1	

PASS NO.	DIA./ WIDTH (IN/FT)	AUX.CREST ELEV (FT)	BTM. WIDTH (FT)	MAX. HP (FT)	MAX. ELEV (FT)	EMB. VOL. (CY)	INTEGR.* DIST. (FT)	EXIT* VEL. (FT/SEC)	TYPE HYD
1	16.0	1781.6	100.0	2.8	1784.4	0.	0.	4.6	MIN. AUX.

* INTEGRITY DIST. AND EXIT VEL. ARE BASED ON THE ROUTED HYDROGRAPH AND WILL NOT RELATE TO THE MAX. ELEV. (TOP OF DAM), WHICH IS SET BY MINIMUM DESIGN CRITERIA.

SITES.....SUMMARY TABLE 1 COMPLETED.

NRCS SITES VERSION 2005.1.7 ,01/01/2005
A FILES

INPUT = H:\SITES_Data\Havemeier\Planning.D2C
OUTPUT = H:\SITES_Data\Havemeier\Planning.OUT
DATED 04/01/2014 16:08:14

GRAPHICS FILES GENERATED

OPTION "L" = H:\SITES_Data\Havemeier\Planning.DRG DATED 04/01/2014 16:08:14
OPTION "P" = H:\SITES_Data\Havemeier\Planning.DHY DATED 04/01/2014 16:08:14
OPTION "E" = H:\SITES_Data\Havemeier\Planning.DEM DATED 04/01/2014 16:08:14

Water Permit Application No. 2726-2
Brad Havemeier

Top of Dam Elev. - 1784.5
2nd Spillway Elev. - 1781.6
P. Spillway Elev. - 1779.0
Dis Emb. Toe Elev. - 1765.7

Cat. 3 - Low Hazard Dam
Ht. = 18.8 ft

Normal Storage Capacity - 44.9 Ac-Ft
Int. Storage Capacity - 74.8
Max. Storage Capacity - 121.3

Int. Capacity x Eff. Ht. = $74.8 \times 14.8 = 1107 \approx 3000$ in 25 yr
Minimum Spillway Design

From USGS NRI 48-4255 "Tech. Ser. Est. Peak Flows... in SD"
Region C DA = 709 Ac = 1.11 mi²

$$Q_{25} = 207 CA^{.573}$$

$$= 207 (1.11)^{.573}$$

$$= 207 (1.0616)$$

$$= \underline{220 \text{ cfs}}$$

$$Q_{100} = 379 CA^{.566}$$

$$= 379 (1.11)^{.566}$$

$$= 379 (1.0608)$$

$$= \underline{403 \text{ cfs}}$$

Secondary Spillway Capacity

$$Q = CLH^{3/2}$$

$C = 2.6$
 $L = 100$
 $H = 2.9$

$$= (2.6)(100)(2.9)^{1.5}$$

$$= \underline{1285 \text{ cfs}}$$

NRCS Annual Yield

$$CN = 82 \text{ DA} = 709 \text{ Ac ISO} = 2^{1/2}$$

Section 74:02:08:09

1. Topo Map - OK
2. Dam Axis Profile - OK
3. Dam Max X-Sec. - OK
4. Area Capacity - OK
5. Outlet Details - OK
6. Spillway Rating - OK
7. Spillway Details - OK
8. Specs - Std NRCS - OK
9. EPP - N/A Cat. 3 - OK

$$80\% \text{ chance} = 0.42$$

$$0.42 \times 709^{1/2} = \underline{25 \text{ Ac-Ft}}$$

$$50\% \text{ chance} = 1.0$$

$$1.0 \times 709^{1/2} = \underline{59 \text{ Ac-Ft}}$$

$$10\% \text{ chance} = 3.5$$

$$3.5 \times 709^{1/2} = \underline{207 \text{ Ac-Ft}}$$



**DEPARTMENT OF ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov



June 9, 2014

Brad Havemeier
JBH Dakota, LLC
2212 Majestic Ct. N.
Naples, FL 34110

Dear Mr. Havemeier:

We have reviewed the plans and specifications for your dam project located in the SE ¼ NW ¼ of Section 19-T101N-R73W, in Lyman County. The plans and specifications for the reconstruction of the dam are approved. Approval of the plans and specifications does not authorize reconstruction of the dam. The reconstruction of the dam may not begin until Water Permit No. 2726-2 is approved.

Our review was to determine compliance with the requirements of the Water Management Board Safety of Dams Rules, Chapter 74:02:08. Approval of these plans and specifications does not release you, as owner of the dam, from the responsibility for operating and maintaining the dam in good repair to ensure the safety of the dam.

The Havemeier Dam will be classified as a small size Category 3, Low Hazard dam with a dam height of 18.8 feet a normal storage capacity of 44.9 acre-feet, and a maximum storage capacity of 121.3 acre-feet.

If you have any questions, please feel free to contact us.

Sincerely,

A handwritten signature in black ink that reads "Timothy G. Schaal". The signature is written in a cursive, flowing style.

Timothy G. Schaal, P.E.
Engineer IV
for Jeanne Goodman, Chief Engineer
Water Rights Program
(605) 773-3352

c: John Schmidt, NRCS, Kennebec



**DEPARTMENT OF ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov



**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 2726-2, Brad Havemeier**

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Environment and Natural Resources concerning Water Permit Application No. 2726-2, Brad Havemeier, JBH Dakota LLC, 2212 Majestic Ct. N, Naples FL 34110.

The Chief Engineer is recommending APPROVAL of Application No. 2726-2 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing rights, 3) the proposed use is a beneficial use and 4) it is in the public interest with the following qualifications:

1. Water Permit No. 2726-2 authorizes an impoundment with a storage capacity of 44.9 acre feet of water and sufficient water annually to maintain the water level to the outlet elevation.
2. Low flows as needed for downstream domestic use, including livestock water and prior water rights must be by-passed.

See report on application for additional information.

Jeanne Goodman, Chief Engineer
June 9, 2014

REPORT ON
WATER PERMIT APPLICATION No. 2726-2
Brad Havemeier
JBH Dakota, LLC
May 30, 2014

Water Permit Application No. 2726-2 has been filed by Brad Havemeier, JBH Dakota, LLC to impound 44.9 acre-feet of water from runoff by reconstructing a dam located in the SE ¼ NW ¼ of Section 19-T101N-R73W, in Lyman County. The application also requests impoundment of sufficient water to maintain water at the outlet elevation. The water will also be used for fish and wildlife propagation, recreation and livestock water purposes.

Discussion:

The dam will be classified as a small size, Category 3, Low Hazard dam. The dam has been designed by the Natural Resources Conservation Service (NRCS). The plans and specifications have been reviewed and will be approved; however, reconstruction of the dam cannot begin until Water Permit Application No. 2726-2 is approved.

The dam will be 18.8 feet high with a normal storage capacity of 44.9 acre-feet with a reservoir level at the primary spillway elevation, and a maximum storage capacity of 121.3 acre-feet with a reservoir level at the top of dam elevation. A dam of this size and hazard classification is required to have a minimum spillway design capable of passing a 25-year frequency event.

The dam has a drainage area of 709 acres or 1.11 square miles. The dam has a 48-inch diameter concrete riser with a 16 inch diameter PVC barrel with 5.5 feet of freeboard as the primary spillway, and a 100 foot wide earthcut spillway with 2.9 feet of available freeboard as the secondary spillway. A 25-year frequency event produces a peak runoff of approximately 220 cfs, and a 100-year frequency event produces a peak runoff of approximately 400 cfs. The earthcut secondary spillway will have a capacity of approximately 1,285 cfs.

The annual yield for this drainage area with an 80 percent chance of occurrence, or 8 out of 10 years, is expected to be 25 acre-feet. The annual yield with a 50 percent chance of occurrence, or 1 out of 2 years, is expected to be 59 acre-feet, and the annual yield with a 10 percent chance of occurrence, or 1 out of 10 years, is expected to be 207 acre-feet.

The Havemeier Dam will be located in the NW ¼ of Section 19-T101N-R73W on an unnamed tributary to Bull Creek, about 2 miles upstream of the confluence of the unnamed tributary and Bull Creek, and about 15 miles upstream of the confluence of Bull Creek and Lake Francis Case on the Missouri River. There are no existing Water Rights/Permits filed on the unnamed tributary or Bull Creek between the proposed dam and Lake Francis Case.

Conclusions:

1. Water Permit Application No. 2726-2 should be approved since unappropriated water is available and approval should not have any adverse effect on existing Water Permits/Rights.
2. If approved, the low flow bypass requirement for domestic use should be a qualification on Water Permit Application No. 2726-2.



Timothy G. Schaal, P.E.
Engineer IV

Publisher's Affidavit of Publication

RECEIVED

JUN 20 2014

STATE OF SOUTH DAKOTA)
)SS
COUNTY OF LYMAN)

WATER RIGHTS
PROGRAM

Connie Penny, of said county and state being duly sworn on her oath says: The Lyman County Herald is a weekly newspaper of general circulation and published in Presho, Lyman County, and State of South Dakota; and has been such newspaper during the times hereinafter mentioned; That said newspaper is a legal weekly, that it has a bonafide circulation of more than 200 copies weekly, that it has been published within said County of Lyman more than fifty-two successive weeks next prior to publication of the notice hereinafter mentioned and maintained at the place of publication; That I, the undersigned am editor of said newspaper, in charge of the advertising department thereof, and have personal knowledge of all the facts stated in this affidavit; that the advertisement headed:

Notice of Application No 2726-2
83 Lines

a printed copy of which is hereto attached and published in the said newspaper for 1 consecutive week(s).

The first publication of said notice in said newspaper aforesaid was on Wednesday, the 18 day of June, A.D., 2014 and that the succeeding publications were severally

Wednesday, the _____ day of _____ A.D., 2014
Wednesday, the _____ day of _____ A.D., 2014
Wednesday, the _____ day of _____ A.D., 2014
Wednesday, the _____ day of _____ A.D., 2014
Wednesday, the _____ day of _____ A.D., 2014
Wednesday, the _____ day of _____ A.D., 2014
Wednesday, the _____ day of _____ A.D., 2014
Wednesday, the _____ day of _____ A.D., 2014

and the last publication on Wednesday, the 18 day of June, 2014, that the full sum of fees charged for publishing the same, to-wit; the sum of \$ 27.47 insures solely to the editor of The Lyman County Herald. That no agreement or understanding for any division thereof had been made with any other person, and that no part thereof has been agreed to be paid to any person whatsoever.

Connie Penny
mud & son



Subscribed and sworn to before me this 19 day of June, 2014

My Commission expires _____, 20____

MICHAEL J. SPRENGER
NOTARY PUBLIC - SOUTH DAKOTA
My Commission Expires
March 27, 2015

The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application. Steven M. Pirner, Secretary, Department of Environment and Natural Resources.

Published once at the total approximate cost of \$25.81.

NOTICE OF APPLICATION NO. 2726-2 to Appropriate Water

Notice is given that Brad Havemeier, JBH Dakota, LLC, 2212 Majestic Ct. N, Naples FL 34110 has filed an application for a water permit to impound 44.9 acre-feet of water from an unnamed tributary to Bull Creek by reconstructing a dam located in the SE 1/4 NW 1/4 Section 19 with water impounded in the NW 1/4 Section 19; all in T101N-R73W. This application requests impoundment of sufficient water to maintain water to the outlet elevation. The water is for fish and wildlife propagation, recreation and livestock water purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 2726-2 because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on this application, as recommended, unless a petition is filed opposing the application or the applicant files a petition contesting the Chief Engineer's recommendation. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled and the Water Management Board will consider this application. Notice of the hearing will be given to the applicant and any person filing a petition.

Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605-773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by June 30, 2014.

RECEIVED

JUN 23 2014

WATER RIGHTS
PROGRAM

Form 8

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)

County of Hughes) SSI, Marylinn Bakercertify that the attached printed Notice was
takenfrom the Capital Journalprinted and published in PierreCounty of Hughes andstate of South Dakota. The notice was
published

in the newspaper on the following date:

June 18, 2014Cost of Printing \$30.75Marylinn Baker
(Signature)Bookkeeper
(Title)6-19-14
(Date Signed)

Wednesday, June 18, 2014

Public Notice

petition is filed opposing the application of the applicant files a petition contesting the Chief Engineer's recommendation. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled and the Water Management Board will consider this application. Notice of the hearing will be given to the applicant and any person filing a petition.

Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605) 773-3352" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by June 30, 2014.

SNAXLP-13600

NOTICE OF APPLICATION NO. 2728-2 to Appropriate Water

Notice is given that Brad Havermeier, JBH Dakota, LLC, 2212 Majestic Ct., N Naples FL 34110 has filed an application for a water permit to impound 44.9 acres-feet of water from an unnamed tributary to Bull Creek by reconstructing a dam located in the SE 1/4 NW 1/4 Section 19 with water impounded in the NW 1/4 Section 18; all in T101N-R73W. This application requests impoundment of sufficient water to maintain water to the outlet elevation. The water is for fish and wildlife propagation, recreation and livestock water purposes.

Published once at the total approximate cost of \$30.75.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 2728-2 because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on this application, as recommended, unless a



DEPARTMENT OF ENVIRONMENT
and NATURAL RESOURCES

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov



June 9, 2014

Lyman County Herald
PO Box 518
Prescho SD 57568

ATTENTION: Legal Public Notice

Enclosed is a Notice on Application No. 2726-2 to Appropriate Water. Please publish the notice once on June 18, 2014. The text of the notice can be e-mailed to your paper by contacting Karen Schlaak at (605) 773-3352.

The applicant must verify to you that the notice is to be published and arrange for payment. **Please BILL the APPLICANT for the cost of publication.** The APPLICANT is Brad Havemeier, JBH Dakota LLC, 2212 Majestic Ct. N, Naples FL 34110 (Ph # 239-597-9708).

Please send the Water Rights Program an affidavit or the enclosed Proof of Publication form immediately.

The applicant pays the cost of publication, but the Water Rights Program records require an affidavit or Proof of Publication. Delays in receiving the affidavit can be costly to the applicant.

Sincerely,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

Schlaak, Karen

From: Schlaak, Karen
Sent: Wednesday, June 11, 2014 3:50 PM
To: 'news@lcherald.com'
Subject: Notice of Application No. 2726-2, Brad Havemeier

Attached is a Notice of Application No. 2726-2, Brad Havemeier. Mr. Havemeier has been notified to contact you to authorize publication and arrange for payment. The Notice is to be published June 18, 2014. You should or will be receiving the information in the mail. I will be out of the office Thursday and Friday, so if you have questions, please contact Eric Gronlund with this office.

Karen Schlaak
Water Rights Program
523 E Capitol Ave
Pierre SD 57501
Phone: 605 773-3352



DEPARTMENT OF ENVIRONMENT
and NATURAL RESOURCES

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
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June 9, 2014

Capital Journal
PO Box 878
Pierre SD 57501

ATTENTION: Legal Public Notice

Enclosed is a Notice on Application No. 2726-2 to Appropriate Water. Please publish the notice once on June 18, 2014. The text of the notice can be e-mailed to your paper by contacting Karen Schlaak at (605) 773-3352.

The applicant must verify to you that the notice is to be published and arrange for payment. **Please BILL the APPLICANT for the cost of publication.** The APPLICANT is Brad Havemeier, JBH Dakota LLC, 2212 Majestic Ct. N, Naples FL 34110 (Ph # 239-597-9708).

Please send the Water Rights Program an affidavit or the enclosed Proof of Publication form immediately.

The applicant pays the cost of publication, but the Water Rights Program records require an affidavit or Proof of Publication. Delays in receiving the affidavit can be costly to the applicant.

Sincerely,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures



DEPARTMENT OF ENVIRONMENT
and NATURAL RESOURCES

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov



**NOTE: TO BE SURE OF PUBLICATION ON
THE CORRECT DATES, CONTACT
THE NEWSPAPER(S) RIGHT AWAY.**

June 9, 2014

Brad Havemeier
JBH Dakota LLC
2212 Majestic Ct N
Naples FL 34110

Dear Mr. Havemeire:

Water Permit Application No. 2726-3 for fish and wildlife propagation, recreation and livestock water purposes use has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice has been sent to the Lyman County Herald printed at Presho SD (Ph # 605-895-6597) and the Capital Journal printed at Pierre SD (Ph # 605-224-7301). You will need to contact the newspaper(s) and authorize publication of this notice. For your information, a copy of the notice, the recommendation of the Chief Engineer and report on the application are enclosed. Please review the notice prior to publication and notify this office, if you have any corrections or questions.

Be sure to contact the above newspaper(s) to authorize publication of your Notice and to arrange for payment. Early contact with the paper(s) can eliminate delays. Upon receiving authorization from you, the publisher has been instructed to publish your notice. The newspaper has also been instructed to send us the Proof of Publication. We must receive Proof of Publication before action can be taken on the application.

Sincerely,

Eric Gronlund
Natural Resources Engineer
(605) 773-3352
enclosures

NOTE: If you plan to contest any part of the Chief Engineer's recommendation, you must file a petition pursuant to the procedures outlined in the attached notice of hearing. The Water Management Board will then consider your concerns during a hearing on the application.

Instruction to Newspaper - Publish the Notice on June 18, 2014. The applicant is responsible for payment. The text of the notice can be e-mailed to your paper by contacting Karen Schlaak at (605) 773-3352 or email: Karen.schlaak@state.sd.us.

NOTICE OF APPLICATION NO. 2726-2 to Appropriate Water

Notice is given that Brad Havemeier, JBH Dakota, LLC, 2212 Majestic Ct. N, Naples FL 34110 has filed an application for a water permit to impound 44.9 acre-feet of water from an unnamed tributary to Bull Creek by reconstructing a dam located in the SE 1/4 NW 1/4 Section 19 with water impounded in the NW 1/4 Section 19; all in T101N-R73W. This application requests impoundment of sufficient water to maintain water to the outlet elevation. The water is for fish and wildlife propagation, recreation and livestock water purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 2726-2 because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on this application, as recommended, unless a petition is filed opposing the application or the applicant files a petition contesting the Chief Engineer's recommendation. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled and the Water Management Board will consider this application. Notice of the hearing will be given to the applicant and any person filing a petition.

Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by June 30, 2014.

The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application. Steven M. Pirner, Secretary, Department of Environment and Natural Resources.

Published once at the total approximate cost of_____.



DEPARTMENT OF ENVIRONMENT
and NATURAL RESOURCES

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov



JUL 11 2014

Brad Havemeier
JBH Dakota LLC
2212 Majestic Ct N
Naples FL 34110

Dear Mr. Havemeier:

Enclosed is Water Permit No. 2726-2 authorizing construction of your water diversion system and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

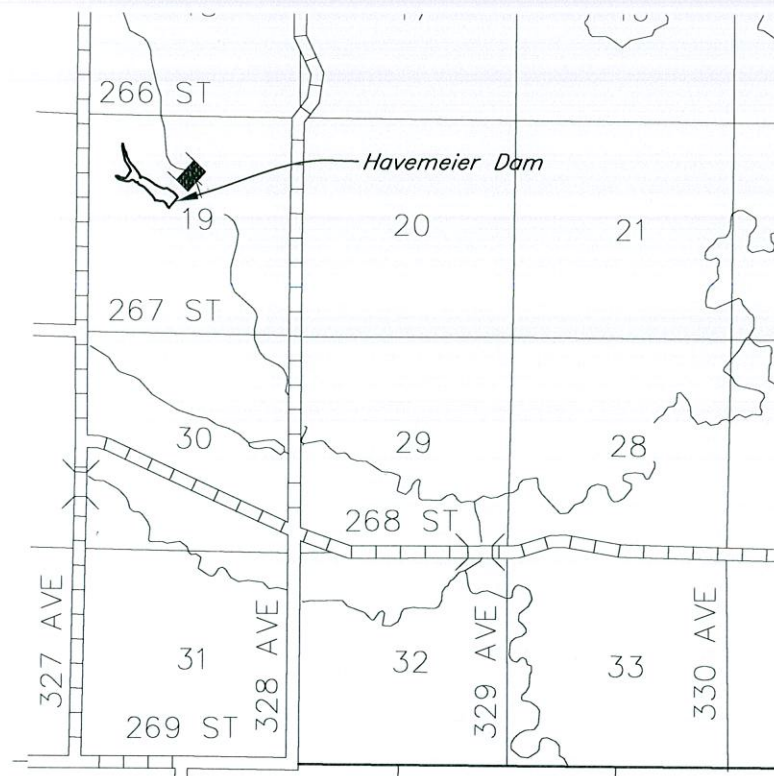
Form 10, *Notice of Completion of Works and Application of Water to Beneficial Use*, is enclosed. Please return this completed form after you have finished the system and have put the water to beneficial use. An investigation can then be scheduled so the water license may be issued, thus completing the acquisition of a water right.

An informational sheet *Common Water Right Questions* is also enclosed. This sheet is intended to answer some of the questions associated with obtaining and keeping a water right.

Sincerely,

Jeanne Goodman, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures



NW 1/4, Sec 19, T 101 N, R 73 W

Lyman County, South Dakota

LOCATION MAP

As-Built By:
John Schmidt 10/29/2014

Seeded area with winter wheat
as a cover crop. Grass not
seeded as of 10/29/2014
when as-built survey was
completed.

NRCS HAZARD CLASS A
NRCS JOB CLASS IV

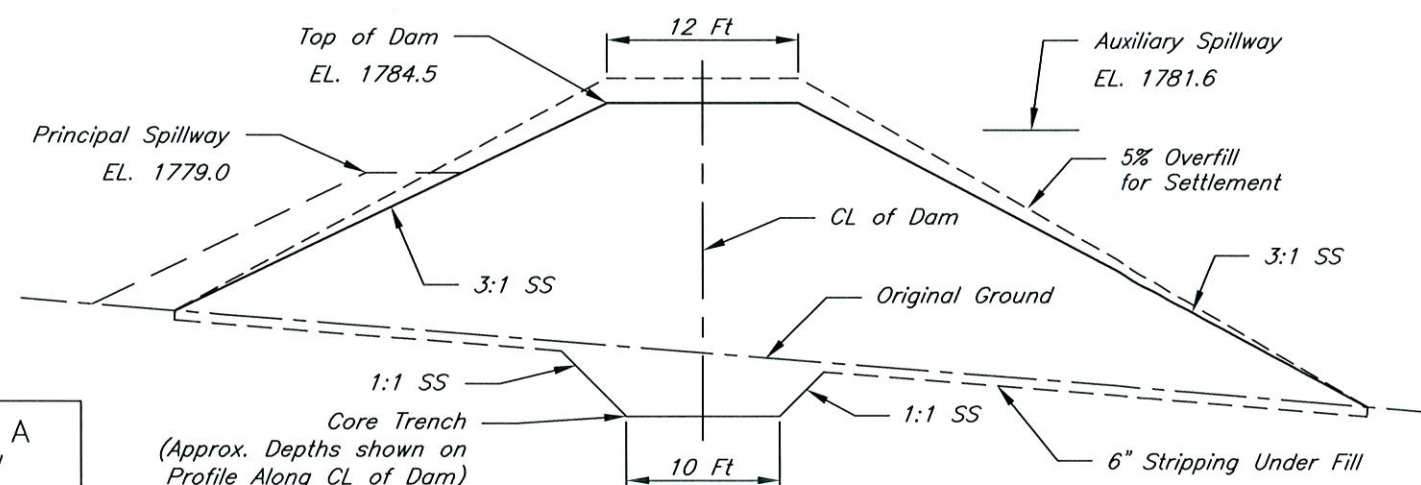
SD CONSTRUCTION AND MATERIAL SPECIFICATIONS

SD-4 Stripping
SD-5 Excavation
SD-7S Earthfill - Class S
SD-8 Rock Riprap And Bedding
SD-10 Salvaging And Spreading Topsoil
SD-12B Concrete for Minor Structures
SD-13 Steel Reinforcement
SD-14 Wood And Steel Structures
SD-28 Seeding
SD-55 Plastic Pipe
SD-95 Geotextile
SD-592 Geotextile

For A Full Text Version See
http://www.sd.usda.gov/technical/SD_Engineering.html

NO EXCAVATOR MAY BEGIN ANY EXCAVATION WITHOUT
FIRST NOTIFYING THE ONE-CALL NOTIFICATION CENTER
OF THE PROPOSED EXCAVATION AT 1-800-781-7474.

TABLE OF QUANTITIES			
ITEM	UNIT	QUANTITY	AS-BUILT
Earthfill Class S - Embankment	Cu. Yd.	10121	10121
Earthfill Class S - Core Trench	Cu. Yd.	501	501
Earthfill Class S - Stripping	Cu. Yd.	683	683
Total Earthfill	Cu. Yd.	11305	11305
Topsoil Auxiliary Spillway	Cu. Yd.	748	748
Seeding (Earthfill and Auxiliary Spillway)	Acre	2.0	2
Principal Spillway Pipe			
16" Dia. AWWA C-905 DR-18 PVC Pipe	Lin. Ft.	58	90
16" Dia. AWWA C-905 DR-25 PVC Pipe	Lin. Ft.	38	0
48" Dia. 4 Feet Tall Riser and Base	Each	1	0
Trash Rack and Baffle	Each	1	1
Drainage Diaphragm	Each	1	1
Timber Pipe Support	Each	1	1
36" Dia. Riser	Each	1	1
Removal of Fence	Lin. Ft.	3745	3745
Removal of Concrete Weir	Job	1	1



TYPICAL CROSS SECTION OF DAM

INDEX OF DRAWINGS

- Cover Sheet
- Plan View and Design Data
- Detail Plan View
- Profile of Dam and Auxiliary Spillway and Cross-Section of Auxiliary Spillway
- Profile of Principal Spillway
- 6A. Concrete Riser Detail (Option A)
- 6B. Concrete Riser Detail (Option B)
- Trash Rack and Baffle Detail
- Drainage Diaphragm Detail
- Timber Pipe Support Detail

STATEMENT OF COMPLIANCE

Construction (was) (was not)
completed in accordance with
approved construction plans and
specifications.

John Schmidt 11/6/2014
JAA Date

POND WITH PRINCIPAL SPILLWAY PIPE
JOB PLAN 1.OP REV. 1/2012

Date 4/11/2014
Designed John Schmidt
Drawn John Schmidt
Checked John Schmidt
Approved John Schmidt

BRAD HAVEMEIER
378 POND
COVER SHEET

NW 1/4, Sec 19, T 101 N, R 73 W

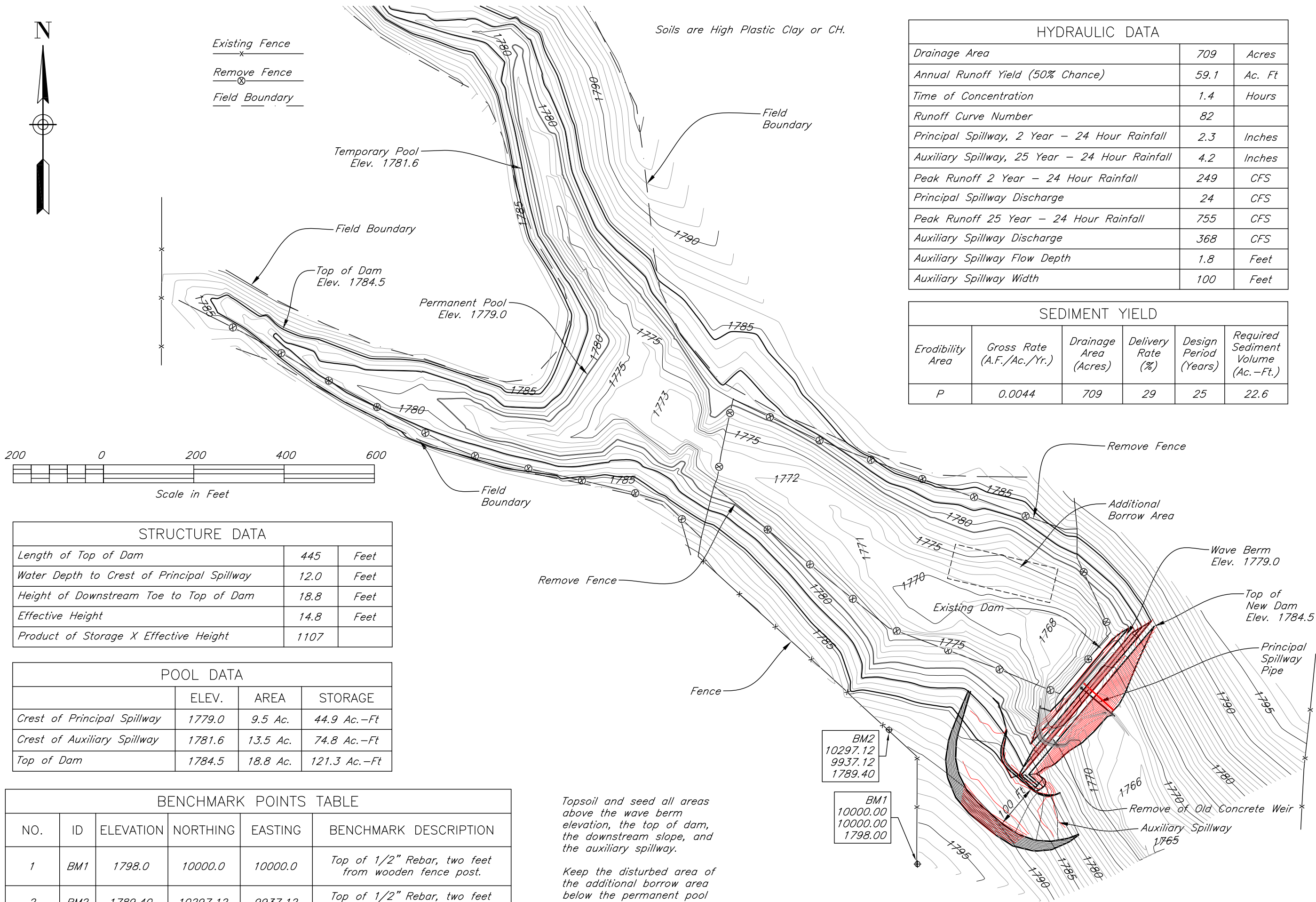
Lyman County, South Dakota

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

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Drawing No.
-

11/6/14 10:19 AM
Sheet 1 of 9



Existing Fence
Remove Fence
Field Boundary

Temporary Pool
Elev. 1781.6

Field Boundary

Top of Dam
Elev. 1784.5

Permanent Pool
Elev. 1779.0

Field Boundary

Remove Fence

Fence

BM2
10297.12
9937.12
1789.40

BM1
10000.00
10000.00
1798.00

Topsoil and seed all areas
above the wave berm
elevation, the top of dam,
the downstream slope, and
the auxiliary spillway.

Keep the disturbed area of
the additional borrow area
below the permanent pool
elevation.

HYDRAULIC DATA

Drainage Area	709	Acres
Annual Runoff Yield (50% Chance)	59.1	Ac. Ft
Time of Concentration	1.4	Hours
Runoff Curve Number	82	
Principal Spillway, 2 Year - 24 Hour Rainfall	2.3	Inches
Auxiliary Spillway, 25 Year - 24 Hour Rainfall	4.2	Inches
Peak Runoff 2 Year - 24 Hour Rainfall	249	CFS
Principal Spillway Discharge	24	CFS
Peak Runoff 25 Year - 24 Hour Rainfall	755	CFS
Auxiliary Spillway Discharge	368	CFS
Auxiliary Spillway Flow Depth	1.8	Feet
Auxiliary Spillway Width	100	Feet

SEDIMENT YIELD

Erodibility Area	Gross Rate (A.F./Ac./Yr.)	Drainage Area (Acres)	Delivery Rate (%)	Design Period (Years)	Required Sediment Volume (Ac.-Ft.)
P	0.0044	709	29	25	22.6

STRUCTURE DATA

Length of Top of Dam	445	Feet
Water Depth to Crest of Principal Spillway	12.0	Feet
Height of Downstream Toe to Top of Dam	18.8	Feet
Effective Height	14.8	Feet
Product of Storage X Effective Height	1107	

POOL DATA

	ELEV.	AREA	STORAGE
Crest of Principal Spillway	1779.0	9.5 Ac.	44.9 Ac.-Ft
Crest of Auxiliary Spillway	1781.6	13.5 Ac.	74.8 Ac.-Ft
Top of Dam	1784.5	18.8 Ac.	121.3 Ac.-Ft

BENCHMARK POINTS TABLE

NO.	ID	ELEVATION	NORTHING	EASTING	BENCHMARK DESCRIPTION
1	BM1	1798.0	10000.0	10000.0	Top of 1/2" Rebar, two feet from wooden fence post.
2	BM2	1789.40	10297.12	9937.12	Top of 1/2" Rebar, two feet from wooden fence post.

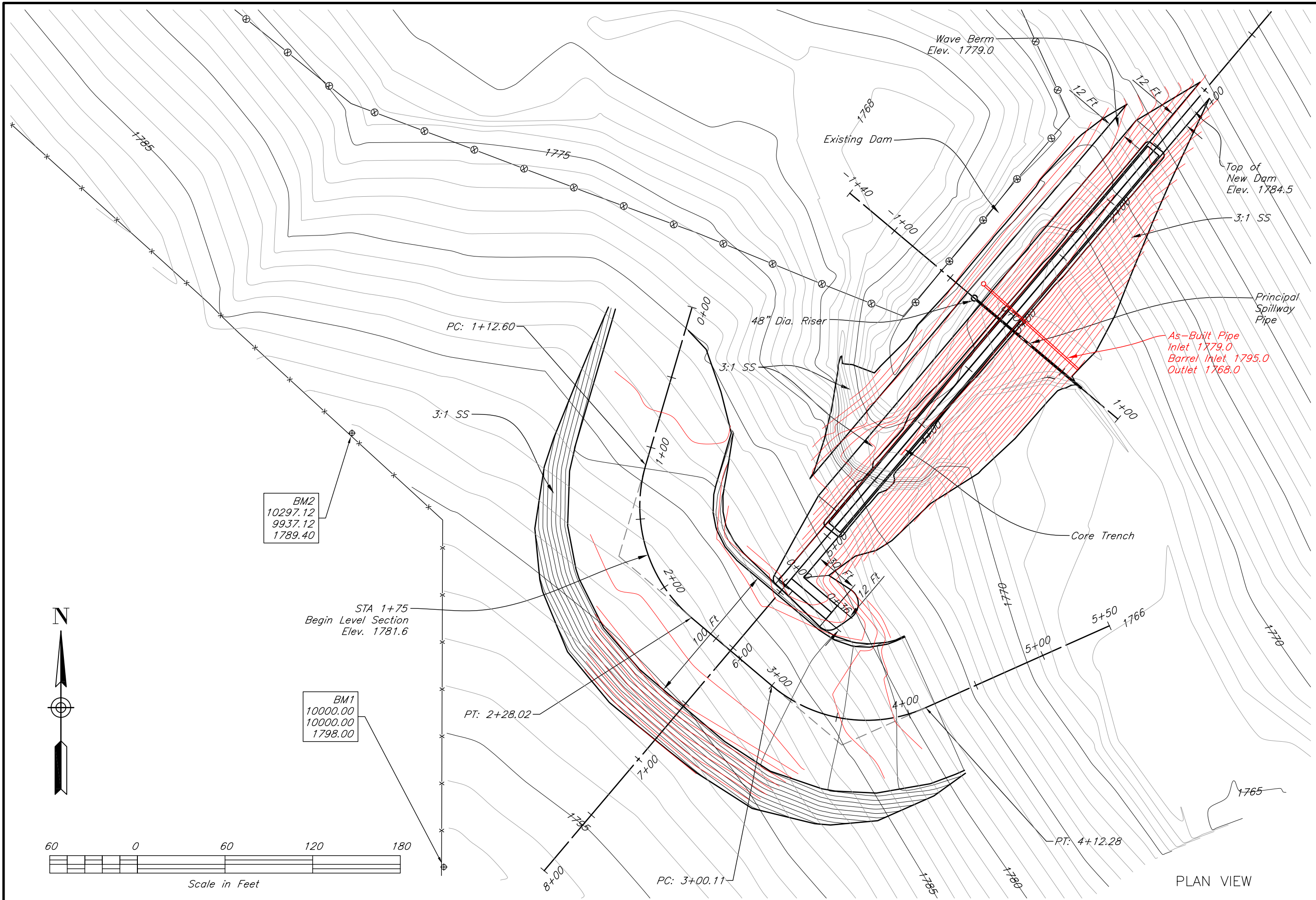
PLAN VIEW

Date	4/11/2014
Designed	John Schmidt
Drawn	John Schmidt
Checked	John Schmidt
Approved	John Schmidt

BRAD HAVEMEIER
378 POND
PLAN VIEW AND DESIGN DATA



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Drawing No.
-
11/6/14 10:19 AM
Sheet 2 of 9



Date	4/11/2014
Designed	John Schmidt
Drawn	John Schmidt
Checked	John Schmidt
Approved	John Schmidt

BRAD HAVEMEIER
378 POND
PLAN VIEW

NW 1/4, Sec 19, T 101 N, R 73 W
Lyman County, South Dakota

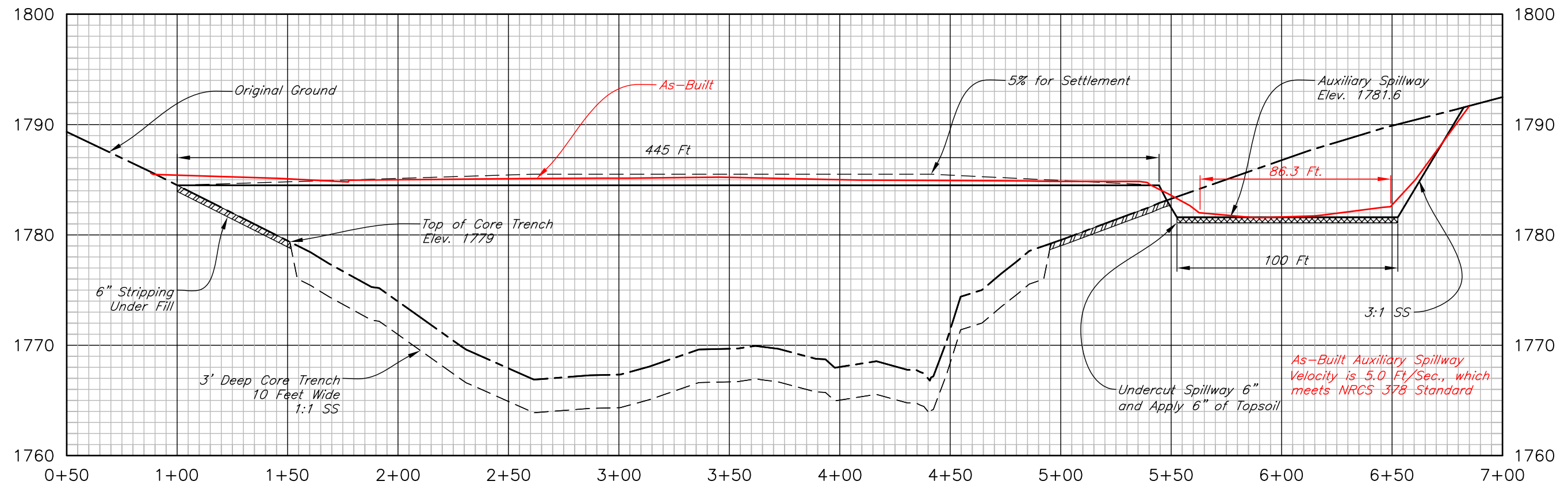


Natural Resources Conservation Service
United States Department of Agriculture

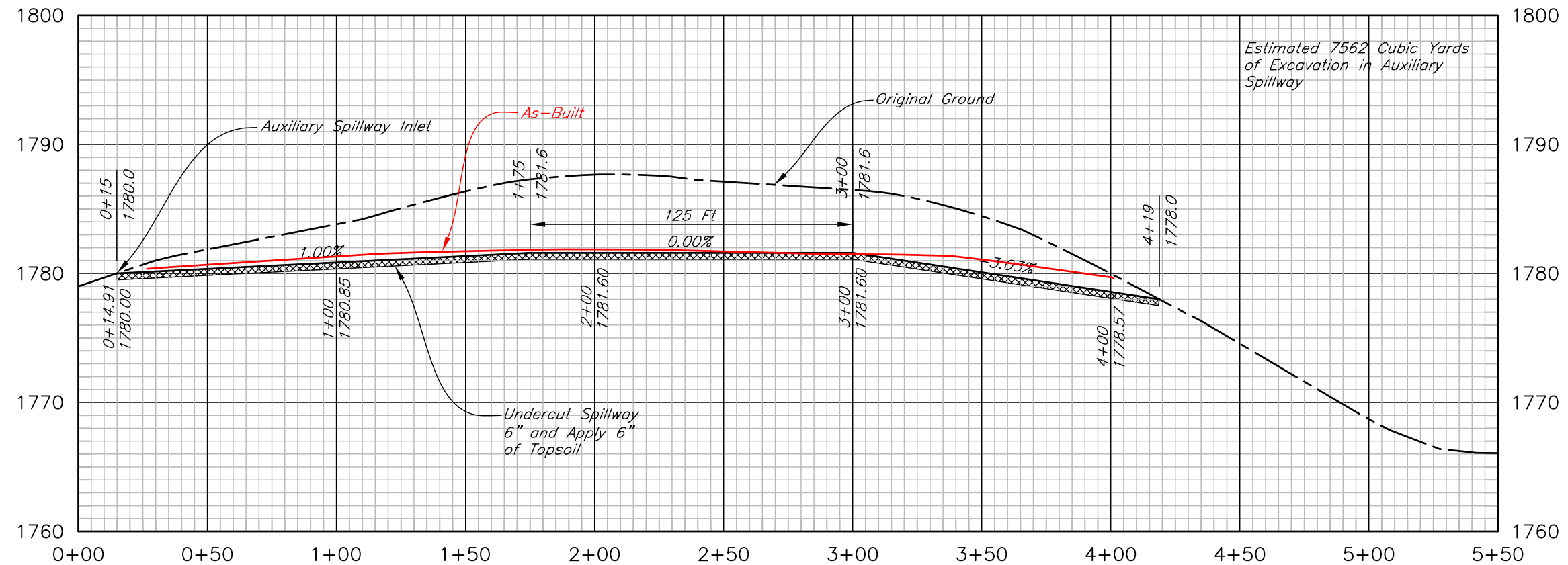
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Sheet 3 of 9



DAM CENTERLINE PROFILE



AUXILIARY SPILLWAY PROFILE

PROFILE OF DAM AND AUXILIARY SPILLWAY
AND CROSS-SECTION OF AUXILIARY SPILLWAY

Date	4/11/2014
Designed	John Schmidt
Drawn	John Schmidt
Checked	John Schmidt
Approved	John Schmidt

BRAD HAVEMEIER
378 POND
PROFILES AND CROSS-SECTIONS OF DAM AND AUXILIARY SPILLWAY

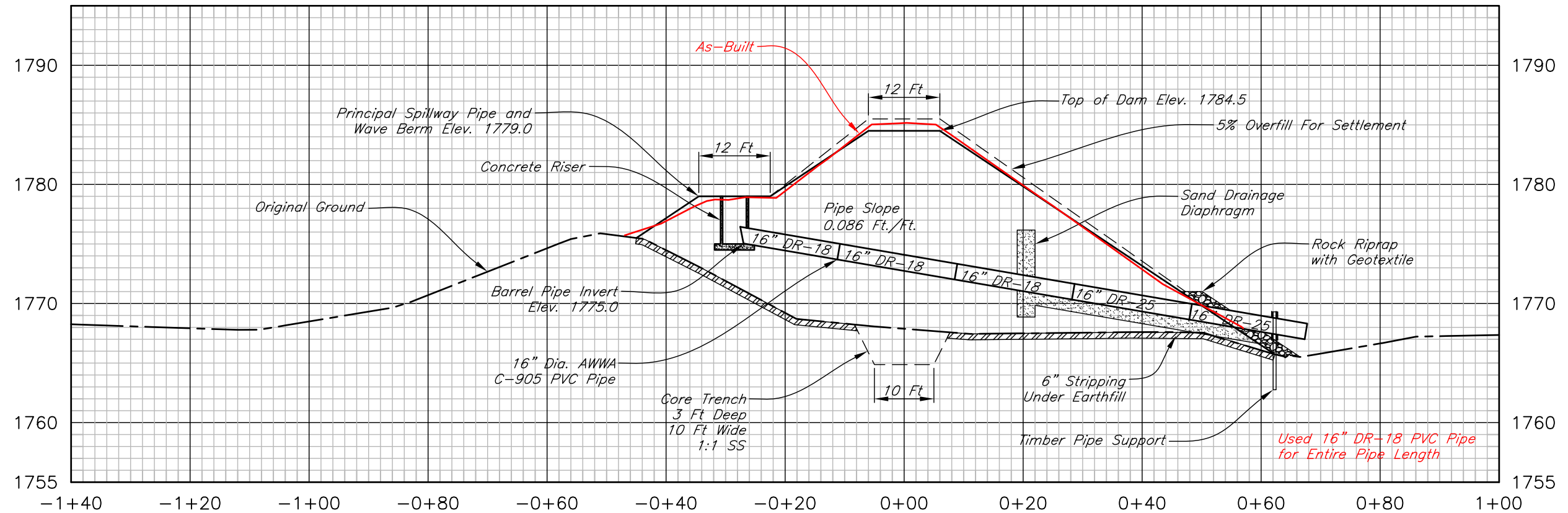


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NW 1/4, Sec 19, T 101 N, R 73 W
Lyman County, South Dakota



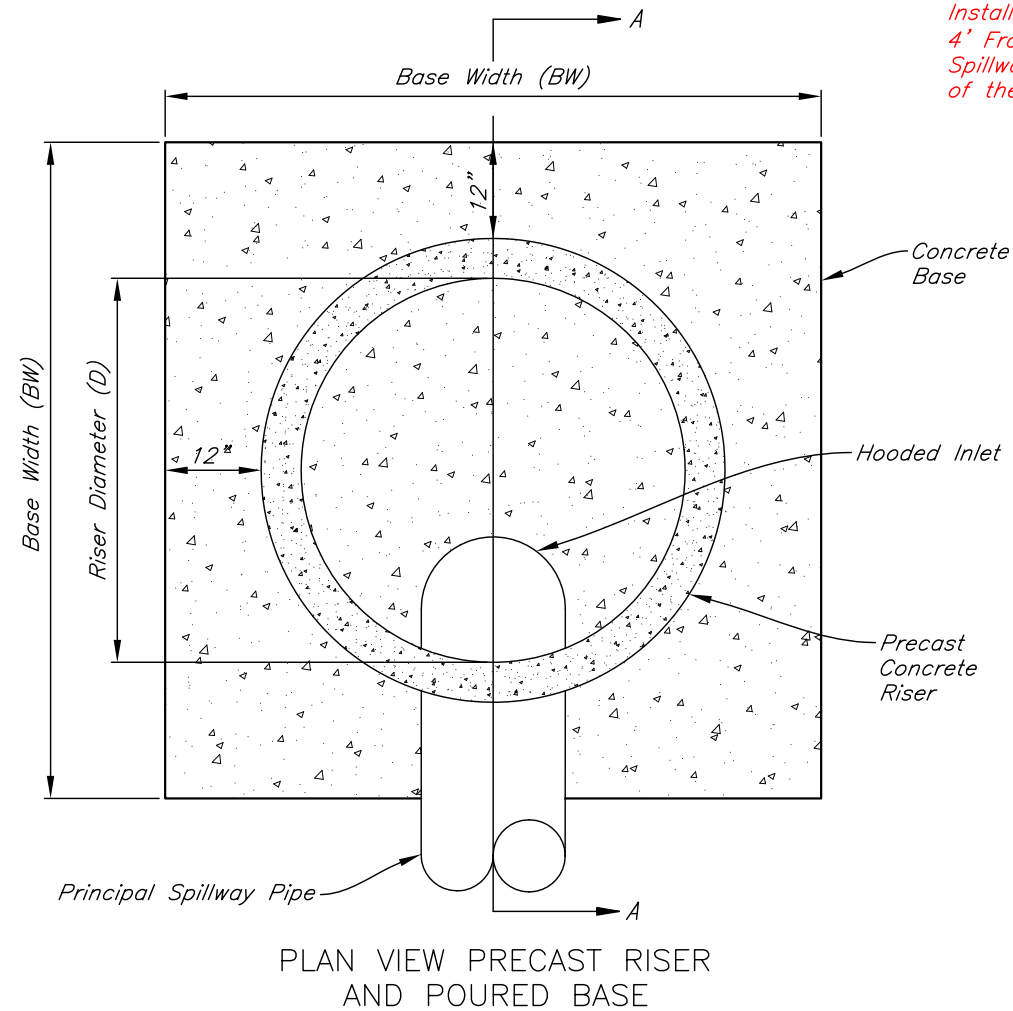
STA 3+10 - PIPE PROFILE

PIPE NOTES

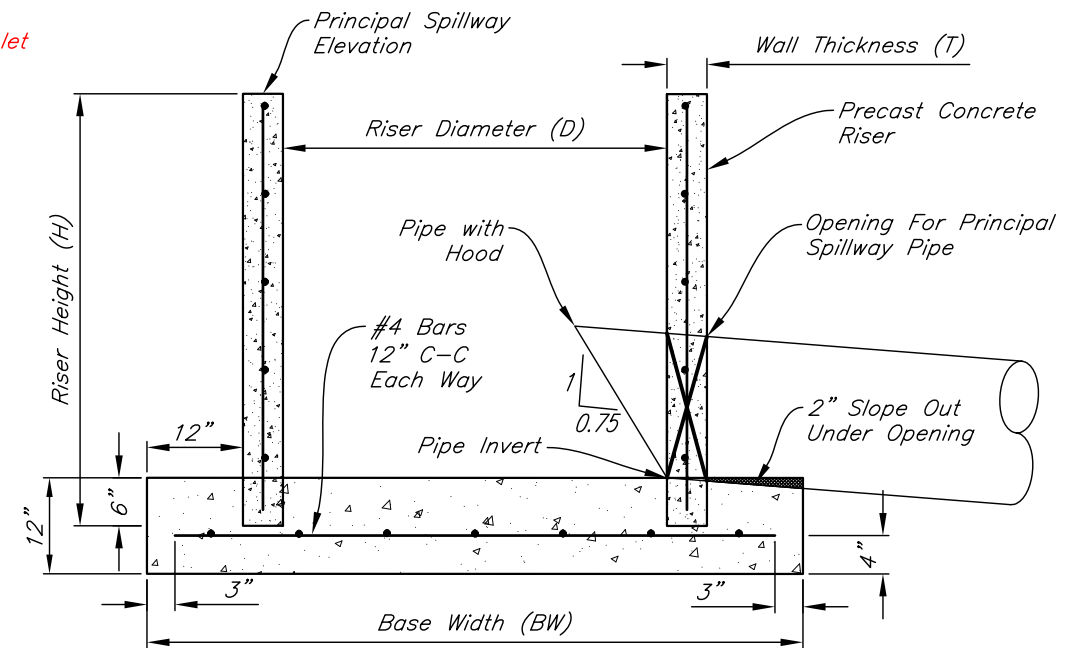
1. The 16 Inch diameter AWWA C-905 PVC pipe comes in 20 foot lengths. Use 3 sections of DR-18 or 235 PSI rated pipe under the center of the dam. Two sections (40 feet) of DR-25 or 165 PSI pipe may be used at the downstream outlet.
2. The heavier pipe is used under the area of the dam with the highest fill above the pipe. The thicker walled pipe (DR-18) is needed to limit the deflection of the pipe walls from the soil loads on the pipe.
3. If a base for the concrete riser is going to be poured in place, use a riser that is 4.5 feet tall so the riser can be embedded in 6 inches of concrete base. (See Sheet 6A)
4. If the concrete riser and base are precast as one unit, then the riser should be 4 feet tall. (See Sheet 6B)

TRENCH SAFETY NOTES

1. All trench work shall comply with the Occupational Safety and Health Administration (OSHA) regulations.
2. Any trench over four (4) feet deep shall have a means of egress from the trench by a ladder, ramp, or other means of egress; and
3. Any trench over five (5) feet deep shall be protected from cave-ins by a sloping, benching or shoring protection system. Benches must be constructed so the overall slope meets the slope required by OSHA regulations.



Installed Riser has about 4' From the Principal Spillway Crest to the inlet of the PVC Pipe



SECTION VIEW A-A

GUIDE TABLE FOR PRECAST RISER AND POURED BASE DIMENSIONS

RISER DIAMETER (D)	RISER HEIGHT (H)	WALL THICKNESS (T)	PRECAST RISER WEIGHT	BASE WIDTH (BW)	CONCRETE BASE VOL.	#4 REBAR LENGTH	PIPE DIA. BARREL
30"	4.0'	3.5"	1,534 LBS	5'-1"	1.0 CY	45'-10"	10" to 18"
30"	4.5'	3.5"	1,726 LBS	5'-1"	1.0 CY	45'-10"	10" to 18"
30"	5.0'	3.5"	1,918 LBS	5'-1"	1.0 CY	45'-10"	10" to 18"
36"	4.0'	4"	2,093 LBS	5'-8"	1.2 CY	72'-4"	10" to 24"
36"	4.5'	4"	2,355 LBS	5'-8"	1.2 CY	72'-4"	10" to 24"
36"	5.0'	4"	2,617 LBS	5'-8"	1.2 CY	72'-4"	10" to 24"
36"	5.5'	4"	2,878 LBS	5'-8"	1.2 CY	72'-4"	10" to 24"
36"	6.0'	4"	3,140 LBS	5'-8"	1.2 CY	72'-4"	10" to 24"
48"	4.0'	5"	3,467 LBS	6'-10"	1.7 CY	101'-4"	10" to 30"
48"	4.5'	5"	3,900 LBS	6'-10"	1.7 CY	101'-4"	10" to 36"
48"	5.0'	5"	4,334 LBS	6'-10"	1.7 CY	101'-4"	10" to 36"
48"	5.5'	5"	4,767 LBS	6'-10"	1.7 CY	101'-4"	10" to 36"
48"	6.0'	5"	5,201 LBS	6'-10"	1.7 CY	101'-4"	10" to 36"
60"	4.0'	6"	5,181 LBS	8'-0"	2.4 CY	135'-0"	10" to 30"
60"	4.5'	6"	5,829 LBS	8'-0"	2.4 CY	135'-0"	10" to 36"
60"	5.0'	6"	6,476 LBS	8'-0"	2.4 CY	135'-0"	10" to 48"
60"	5.5'	6"	7,124 LBS	8'-0"	2.4 CY	135'-0"	10" to 48"
60"	6.0'	6"	7,772 LBS	8'-0"	2.4 CY	135'-0"	10" to 48"

As-Built Riser

CONSTRUCTION NOTES

- The riser is precast reinforced concrete and is manufactured according to ASTM C478 Standard Specification For Precast Reinforced Concrete Manhole Sections.
- Provide watertight joints between the precast concrete riser and the principal spillway pipe barrel and between the precast concrete riser and poured based. Consolidate the concrete with a vibrator to prevent air voids from developing around the riser, rebar, and pipe.
- The concrete must have a minimum 28 day compressive strength of 3500 PSI and a maximum water/cement ratio of 0.5. The concrete mix must contain a minimum of 6 bags of cement per cubic yard and the mix must contain less than 5 1/2 gallons of water per bag of cement.
- Portland Cement Type II shall be used.
- A slump of 2 to 5 inches is required. The maximum size aggregate shall be 1 inch. Air entrainment shall be 4 to 7 percent by volume.
- Apply a curing compound to the surface as recommended by the manufacturer.
- Contact NRCS prior to installation for other options for the construction of the riser if a precast riser and poured in place concrete base is not used.

PRECAST CONCRETE RISER AND POURED CONCRETE BASE WITH HOODED INLET
REV. 1/2012

Designed John Schmidt 4/11/2014
Drawn John Schmidt 4/11/2014
Checked John Schmidt 4/11/2014
Approved John Schmidt 4/11/2014

BRAD HAVEMEIER
378 POND
PRECAST CONCRETE RISER AND POURED CONCRETE BASE WITH HOODED INLET

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

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Sheet 64 of 9



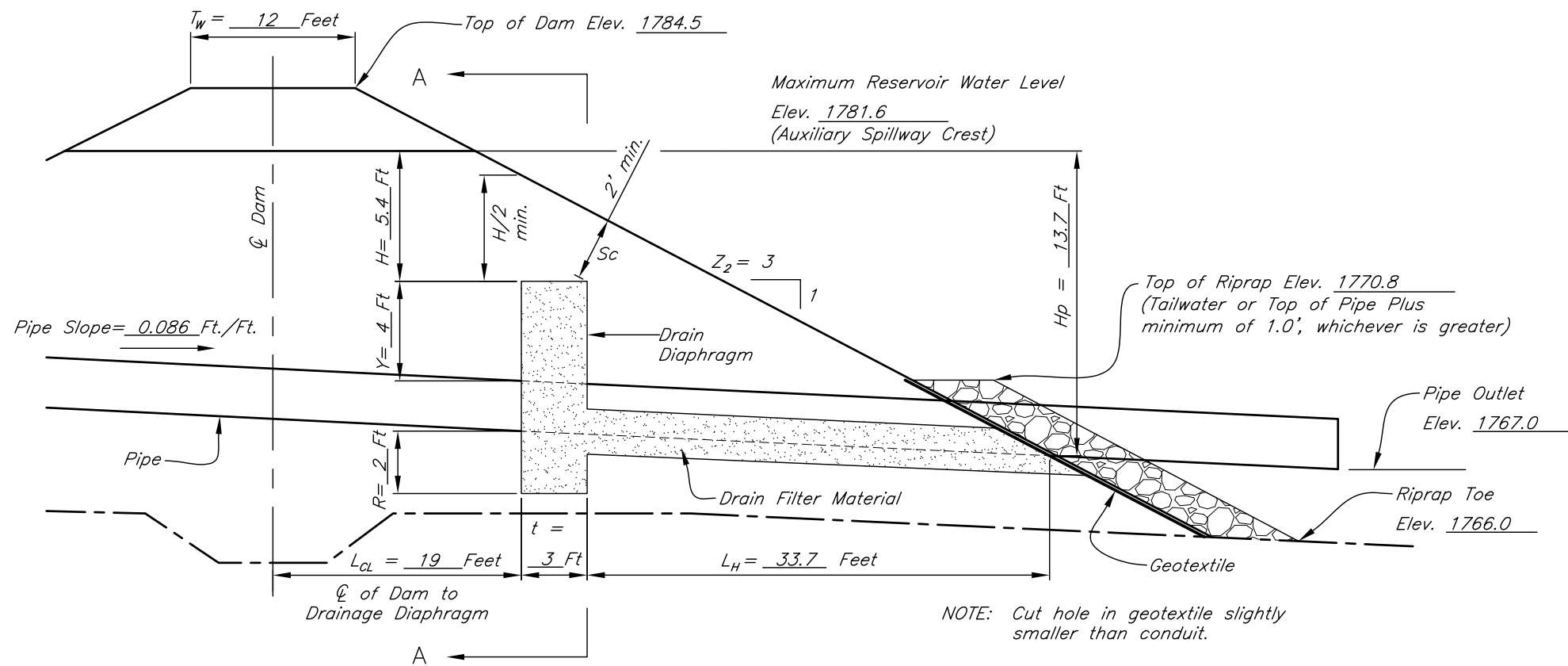
The installed baffle is steel with a steel angle brace on each side bolted to the concrete riser. All the steel is coated with black tar.

TABLE OF QUANTITIES			
ITEM	LENGTH OR SIZE	UNIT	QUANTITY
4" X 6" Pressure Treated Post	8 Ft	Each	4
2" X 10" Pressure Treated Lumber	10 Ft	Each	4
2" X 10" Pressure Treated Lumber	4' – 11"	Each	8
2" X 2" X 1/4" Steel Angle	6' – 5"	Each	8
2" X 2" X 1/4" Steel Angle	3' – 2"	Each	2
Steel Bolt (with nut and 2 washers)	5/8" X 8"	Sets	32
Steel Bolt (with nut and 2 washers)	1/2" X 3"	Sets	32

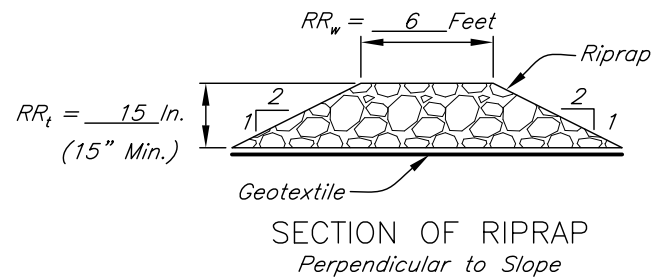
1. Bolt 4" x 6" posts and 2" x 10" lumber together using two 5/8" x 8" bolts. Do not place bolts closer than 1 1/2" from edge of board.
2. For center brace angles drill eight, 9/16" holes, 5/8" from outer edge of each leg of each angle and centered 5 1/4" apart along the leg.
3. Attach brace angles to top bolt on top of 2" x 10" board and to top bolt on next to bottom board.
4. All nuts, bolts, and washers shall be galvanized.



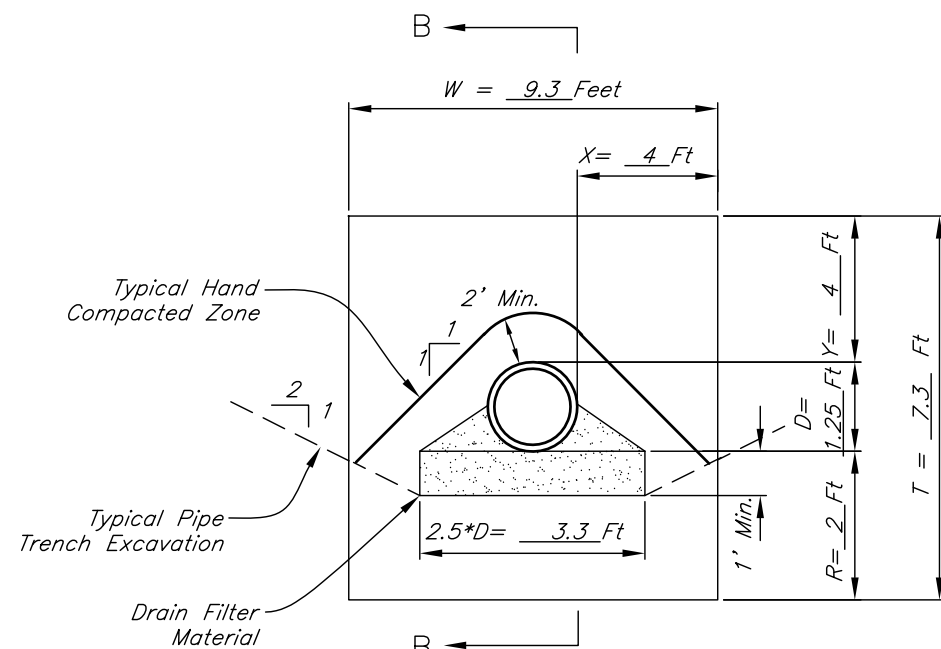
TRASH RACK AND BAFFLE FOR RISER DIA. 36" TO 60"
JOB PLAN NO. 6.4 REV. 1/2012



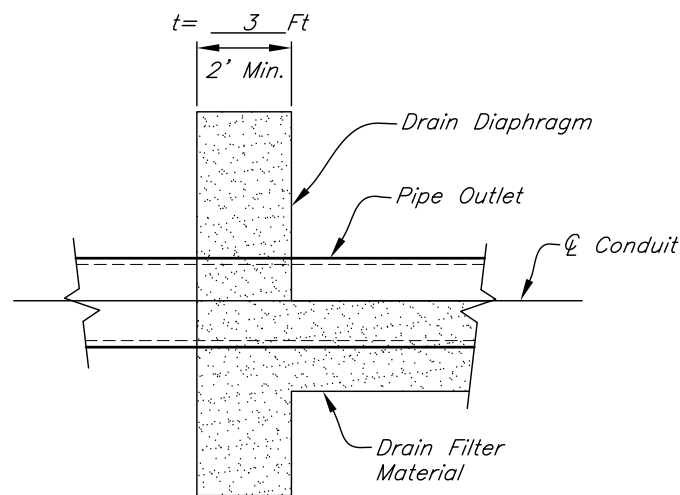
PROFILE ALONG $\mathcal{Q}$ OF CONDUIT
NO SCALE



SECTION OF RIPRAP
Perpendicular to Slope



SECTION A-A
NO SCALE



SECTION B-B
NO SCALE

An NRCS Inspector was not on site when the Pipe and Drainage Diaphragm was installed.

SUMMARY OF SAND DRAINFILL DIMENSIONS		
W	= 9.3 Feet	(Total Width of Drain Diaphragm)
T	= 7.3 Feet	(Total Height of Drain Diaphragm)
t	= 3 Feet	(Thickness of Single Filter)
L_{DF}	= 33.8 Feet	(Length of Sand Along Pipe)

SUMMARY OF GEOTEXTILE DIMENSIONS		
G_W	= 11 Feet	(Total Width of Geotextile)
G_L	= 15.2 Feet	(Total Length of Geotextile)

SUMMARY OF ROCK RIPRAP DIMENSIONS		
RR_t	= 1.25 Feet	(Total Thickness of Rock Riprap)
RR_W	= 6 Feet	(Total Width of Rock Riprap)

TABLE OF QUANTITIES		
ITEM	UNIT	QUANTITY
Sand Drain Filter Material	Cu. Yds.	13
Geotextile	Sq. Yds.	15
Rock Riprap	Cu. Yds.	6

DRAIN FILTER
GRADATION

SIEVE SIZE	PERCENT PASSING
3/8	100
4	95-100
8	80-100
16	50-85
30	25-60
50	2-30
100	0-10

ASTM, C-33
FINE CONCRETE
AGGREGATE GRADATION

RIPRAP
GRADATION

PERCENT SMALLER	WEIGHT RANGE (LBS.)	SIZE RANGE (IN.)
100	50 lb.	10"
50-85	30 lb.	7"
15-50	10 lb.	5"
0-15	3 lb.	3"

CONSTRUCTION NOTES

- The Drainage Diaphragm and envelope will be installed by placing Drain Filter Material in maximum 15 inch thick uncompacted lifts. Each lift will be saturated uniformly with approximately 1.2 gallons of water per cubic foot of loose Drain filter Material prior to compaction. Each lift will then be compacted by a minimum of two passes of a hand-directed vibratory compactor over the entire lift surface. No compaction of the drain envelope above the pipe invert will be required.
- The maximum height of drop of the Riprap onto the Geotextile in the pipe outlet area shall be 3 feet.

MATERIAL NOTES

- The geotextile shall conform to the Class I requirements in Table 2 for Nonwoven Geotextiles in Material Specification SD-592.

DRAINAGE DIAPHRAGM DETAILS
REV. 3/2014

BRAD HAVEMEIER
378 POND
DRAINAGE DIAPHRAGM DETAILS



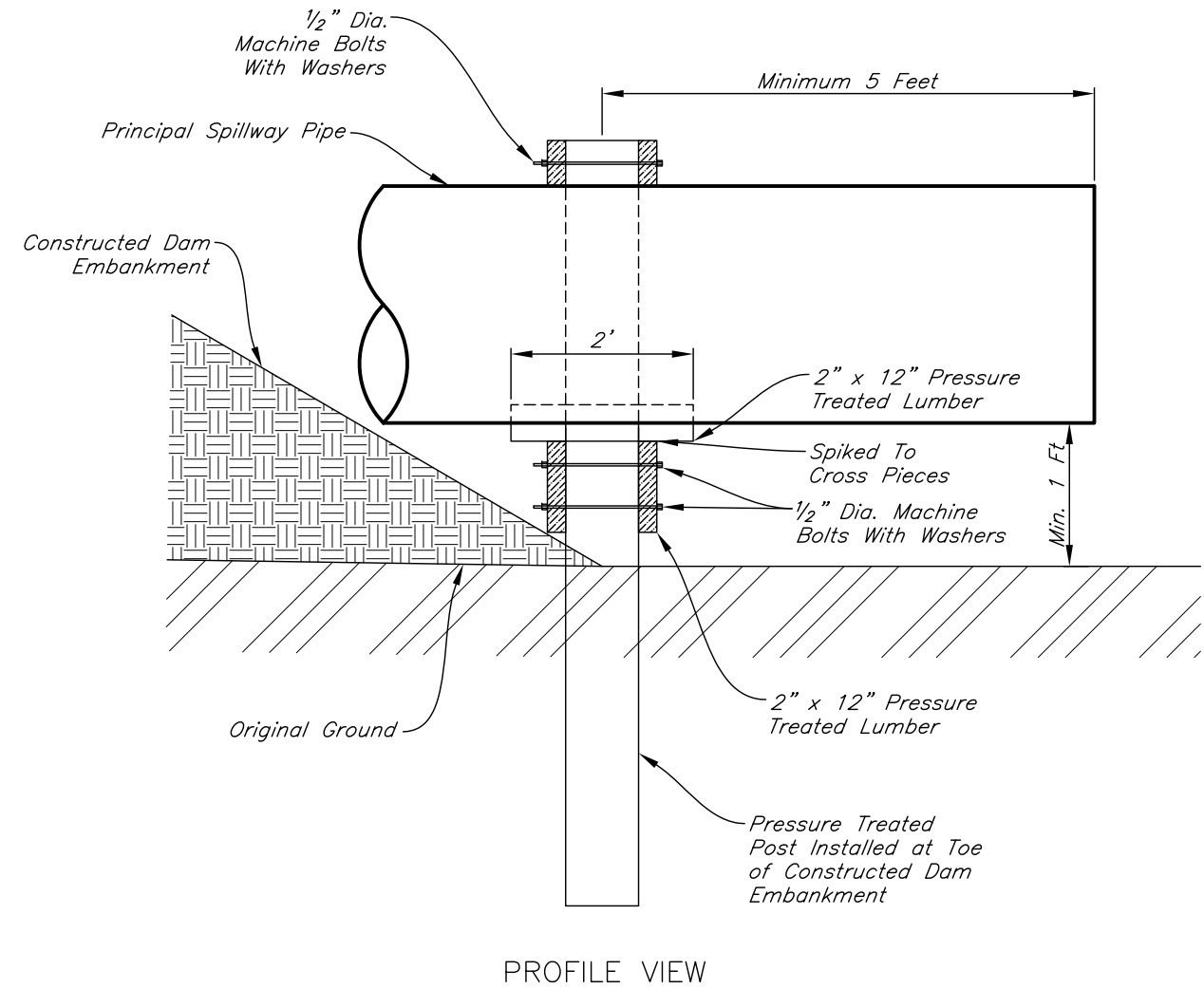
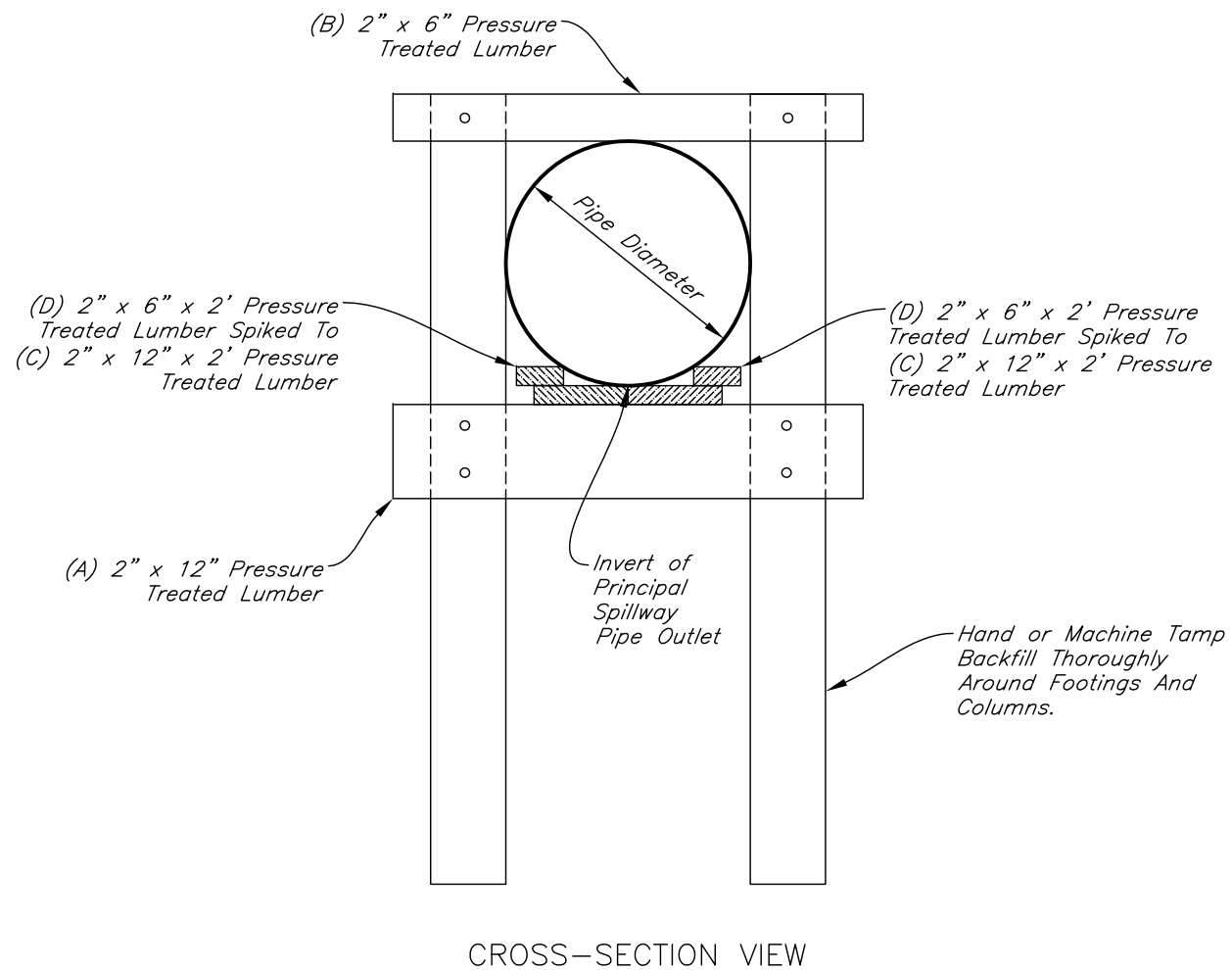
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Sheet 8 of 9

Designed John Schmidt 4/11/2014
Drawn John Schmidt 4/11/2014
Checked John Schmidt 4/11/2014
Approved John Schmidt 4/11/2014

NW 1/4, Sec 19, T 101 N, R 73 W
Lyman County, South Dakota



LENGTHS REQUIRED FOR DIFFERENT PIPE DIAMETERS						
ITEM	MATERIAL SIZES BASED ON PIPE DIAMETER				UNIT	QUANTITY
	12" TO 18"	21" TO 24"	30" TO 36"	42" TO 48"		
8" Dia. Pressure Treated Post	8 Ft	--	--	--	Each	2
10" Dia. Pressure Treated Post	--	10 Ft	10 Ft	12 Ft		
(A) 2" X 12" Pressure Treated Lumber	4 Ft	4 Ft	5 Ft	6 Ft	Each	2
(B) 2" X 6" Pressure Treated Lumber	4 Ft	4 Ft	5 Ft	6 Ft	Each	2
(C) 2" X 12" Pressure Treated Lumber	2 Ft	2 Ft	2 Ft	2 Ft	Each	2
(D) 2" X 6" Pressure Treated Lumber	2 Ft	2 Ft	2 Ft	2 Ft	Each	2
1/2" Dia. Machine Bolts With Nuts	12 In.	14 In.	14 In.	14 In.	Each	6
1/2" Dia. Washers					Each	12
Spike Nails					Each	20

CONSTRUCTION NOTES

1. All nuts, bolts, and washers shall be galvanized.
2. If PVC pipe is used, protect the portions of pipe that will be permanently exposed to ultraviolet light from sunlight by priming the pipe with PVC solvent and painting with two coats high quality exterior latex paint.
3. Hand or machine tamp backfill thoroughly around footings and columns.

Timber Pipe Support Installed

TIMBER PIPE SUPPORT
JOB PLAN NO. 4.0 REV. 1/2012

Designed	John Schmidt	Date	4/11/2014
Drawn	John Schmidt		
Checked			
Approved	John Schmidt		

BRAD HAVEMEIER
378 POND
TIMBER PIPE SUPPORT



File No.
Havemeier2.dwg

Drawing No.
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NW 1/4, Sec 19, T 101 N, R 73 W Lyman County, South Dakota