

WATER PERMIT NO. 2650-2

Name of Applicant: **W Matt Thompson**

Address: **PO Box 6, Wilson WY 83014**

Phone: **307 413-4015**

Amount of Water Claimed: **33.2 AF**

Total Acres: **NA**

Source of Water Supply: **runoff**

Water to be used for: **fish & wildlife and livestock**

County: **Lyman**

Type of Waste Disposal System:

Location: **1 ½ east of Reliance**

PRIORITY Date Received: **3-1-10**

Application/License Fee: **\$700**

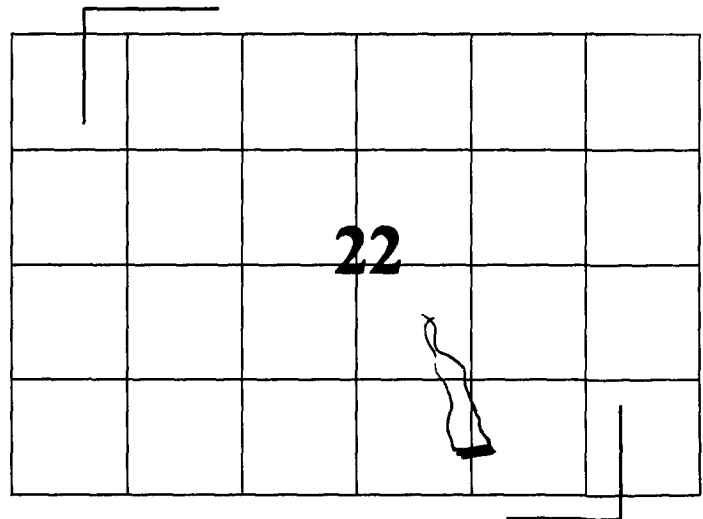
Corrected Application Received: **3-16-10**

Period of Annual Use: **Jan 1 – Dec 31**

Remarks:

Diversion Point: **S ½ SE ¼ Sec 22-T105N-R73W**

Land to be Irrigated: **S ½ SE ¼, NW ¼ SE ¼ Sec**
22-T105N-R73W



Depth of Well: **NA**

Well Driller:

Remarks:

Type of Map: **topo**

Prepared by: **John Schmidt, NRCS**

Reviewed and the Number Assigned on: **4-20-10**

By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____

Mail to: PMB 2020 DENR - Water Rights 523 E Capitol Ave Pierre, SD 57501-3182 ph. (605) 773-3352	No. <u>2650-2</u> (office use only) Hydrologic Unit <u>10140101</u>
	Basin <u>Missouri River</u>
	Newspaper <u>Lyman County Herald PO Box</u> <u>605-895-6397 Pierre 57568 518</u>

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MAR - 1 2010

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 Livestock	

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. _____

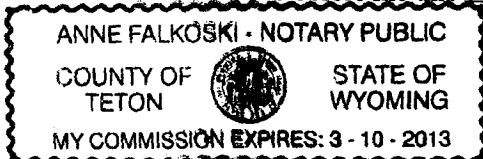
Description of amendment/correction: (i.e. change diversion point(s), add diversion point(s), change use, etc.)

1. Name of Applicant W. Matt Thompson Phone 307-413-4015(check one) ☒ Owner ☐ Tenant/lesseeMailing Address P.O. Box 6 Wilson WY 83014
(Address) (City) (State) (Zip Code)2. Amount of water claimed *CFS or **GPM 33.2 ***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 Runoff from 592 Acre watershed above the dam4. Location of point of diversion (example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W) County Lyman
Dam in S 1/2, SE 1/4, Section 22, T 105 N, R 73 W on an unnamed draw that flows into American Crow
Creek. Water impounded S 1/2 SE 1/4, NW 1/4 SE 1/4 Sec 22 T 105N R 73W5. County or counties where water will be used Lyman6. Annual period during which water is to be used 365 day per year 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 a new dam to meet NRCS 378 Pond Standard. Construction will included an embankment across an unnamed draw with a 24" PVC pipe principal spillway and 80 ft. wide grassed auxiliary spillway.STATE OF SOUTH DAKOTA)
County of Lyman) SS

Attachments: Attach Form 2A if diversion is from a well or dugout, or if storage of water is proposed. Also, attach map and any other technical information. (see instructions)

I, W. Matt Thompson, the applicant, certify that I have read this application, have examined the attached map and that the matters stated are true and that I intend, and am able to complete the necessary construction.Applicant's signature W. Matt ThompsonSubscribed and sworn to before me this 5th day of March 20 10Notary Public signature

**SOUTH DAKOTA
WATER PERMIT NO. 2650-2**

Date of first receipt of application March 1, 2010.

Date of return to applicant for corrections, amendments or changes March 1, 2010.

Date of receipt of corrected application April 16, 2010.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 2650-2 to W Matt Thompson, PO Box 6, Wilson WY 83014 authorizing the construction of a dam and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 2650-2 authorizes impoundment of 33.2 acre-feet of water from runoff by constructing a dam located in the S ½ SE ¼ Section 22 with water impounded in the S ½ SE ¼, NW ¼ SE ¼ Section 22; all in T105N-R73W.
2. The water appropriated shall be used for fish & wildlife propagation and livestock water purposes 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. 2650-2 is June 1, 2010.
5. The date from which applicant may claim right is March 1, 2010.
6. One-fifth of the construction is to be completed on or before December 1, 2012.
7. All construction is to be completed on or before June 1, 2015.
8. Water is to be put to beneficial use on or before June 1, 2019.
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. 2650-2 authorizes a dam with a storage capacity of 33.2 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.

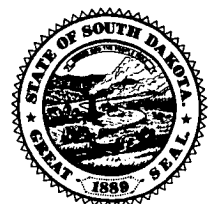
WATER MANAGEMENT BOARD

By: Garland Erbele

Garland Erbele, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

JUL 15 2010

date



Supplemental Information

(type or print in ink)

1. Well Information - Proposed Construction

- a) Drill Hole Diameter _____ Depth _____
- b) Casing Type _____ Diameter _____ Thickness _____
- c) Screen Type _____ Diameter _____ Thickness _____
- d) Gravel Pack _____ Length of Gravel Pack _____
- e) Depth to Top of Water Bearing Material _____
- f) Depth to Water (ground surface to water level) _____
- g) 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:

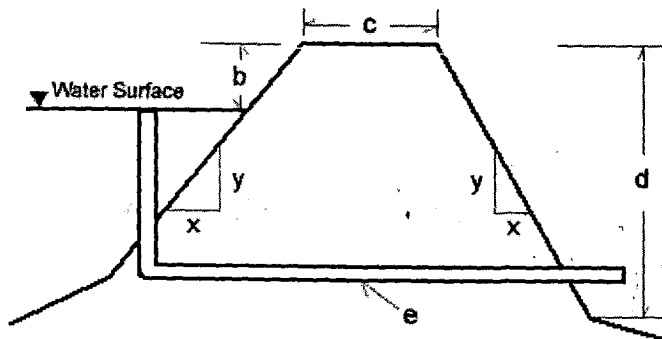
John Schmidt
USDA-NRCS
1717 N Lincoln Ave, Suite 104
Pierre, SD 57501-7800

- b) Freeboard 5.5 ft
- c) Crest Width 12 ft
Crest Length 292 ft
- d) Height 23.1 ft
- e) Primary Outlet Capacity 68 cfs

If pipe, diameter 24 inch

- f) Secondary Spillway Capacity 366 cfs
Spillway Width 80 ft
- g) X & Y Slope (e.g. 3 to 1 is a typical slope)
Upstream 3:1
Downstream 3:1

- h) Surface Area of Impoundment 5.7 Acres
- i) Storage 33.2 Acre Feet
- j) Drainage Area Above Dam 592.0 Acres



Supplemental Information

(type or print in ink)

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- d) Gravel Pack _____ Length of Gravel Pack _____
- e) Depth to Top of Water Bearing Material _____
- f) Depth to Water (ground surface to water level) _____
- g) Distance to nearest existing domestic well:
- On applicant's property _____ On property owned by others _____

2. Wastewater Disposal System Information

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- b) System Capacity (gallons) _____ Year Constructed _____
- c) Connected to the City of _____ Sanitary System _____

3. Dugout Information

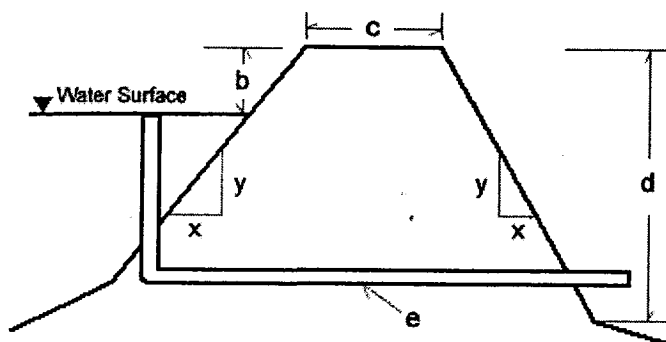
- a) Surface Dimensions _____ Depth _____
- b) Depth to water (ground surface to water level) _____

4. Water Storage Dams

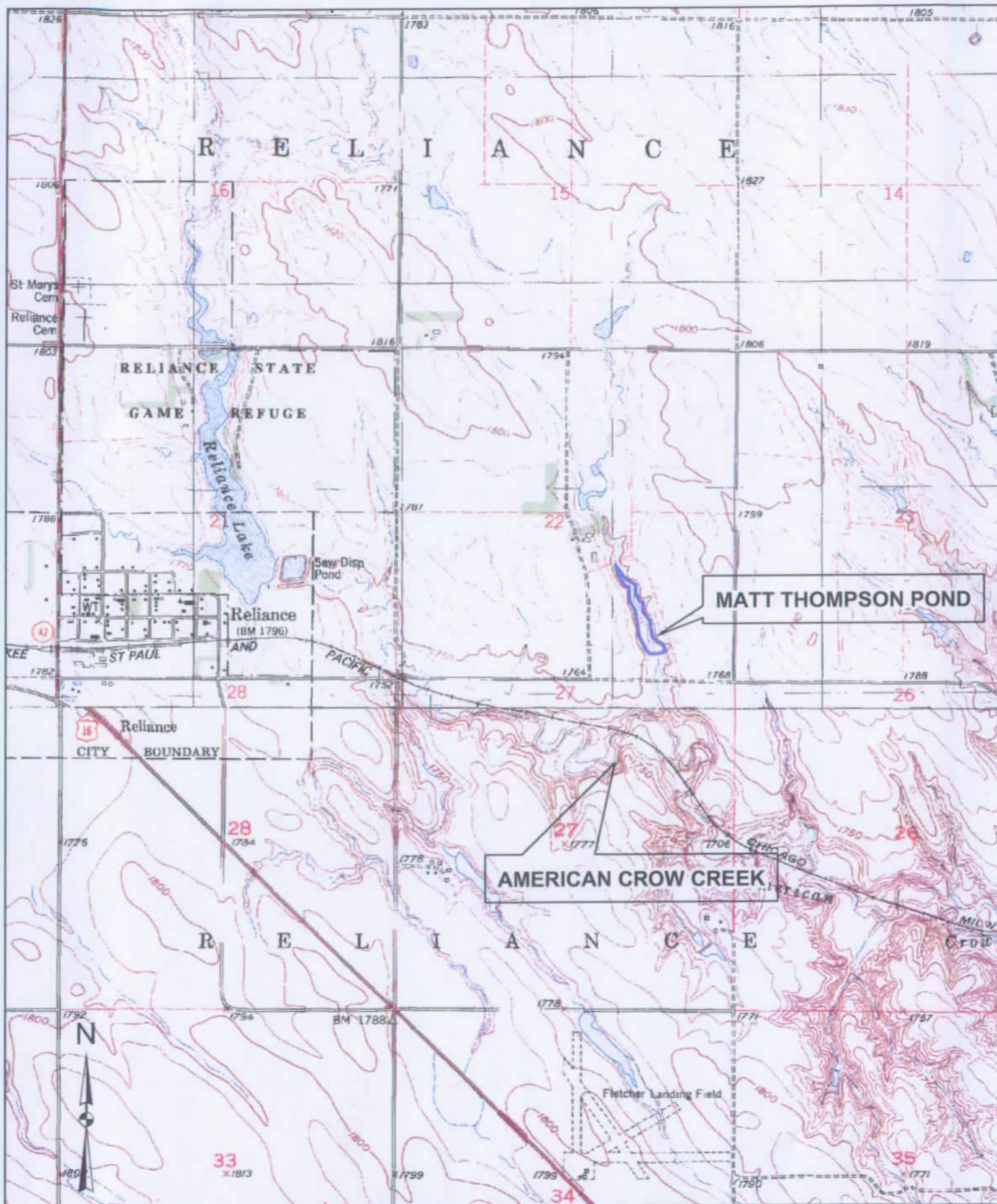
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John Schmidt
USDA-NRCS
1717 N Lincoln Ave, Suite 104
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Upstream 3:1
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RECEIPT
WATER RIGHTS PROGRAM
South Dakota Department of Environment and Natural Resources

Date 3/8, 20 10

RECEIVED OF William M Thompson PO Box 6 Williston WY 83014

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

Fee for Application for Permit No. <u>2650-2</u> 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. <u>2650-2</u>	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.

04500

By

David O. Erickson
Chief Engineer

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**WATER RIGHTS
PROGRAM**



**U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE**

CONSTRUCTION PLANS AND SPECIFICATIONS

MATT THOMPSON

POND

**SE ¼ Section 22, T. 105 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**

PARTICIPANT RESPONSIBILITIES

PARTICIPANT Matt Thompson		County Lyman		
PRACTICE(S) 378 - Pond				
LEGAL DESCRIPTION SE 1/4		Sec. 22	T 105N	R 73W
GPS				

GENERAL: Policies and regulations of the United States Department of Agriculture (USDA) assistance programs place responsibility on the participant for obtaining necessary local, state, and federal permits, adequate real property rights and interests, applicable water rights, and necessary approvals, easements, and licenses. The participant must also meet requirements for installation, inspection, and operation and maintenance. For copies of South Dakota (SD) laws, please see the Internet at:
<http://www.state.sd.us/state/legis/lrc/statutes/lrcmenu.htm>.

For ALL conservation practices, if the participant elects to install proposed practices in locations **other than where approved by the Natural Resources Conservation Service (NRCS)**, the participant may be in violation of applicable NRCS policy, federal, state, or Tribal laws, and said action may result in the termination of their NRCS contract or withdrawal of financial and technical assistance related to the project. By initialing, the producer **acknowledges understanding of their responsibilities**: _____ [Producer initials here.]

1. CULTURAL/HISTORICAL RESOURCES

An NRCS approved cultural/historical evaluation **must** be made of all contracted and/or technically assisted practices that have the potential to affect historic properties or culturally significant sites **prior** to construction. If the NRCS approved construction activities expose cultural/historical resources, human remains (bones), or similar objects, the participant and/or contractor **must** immediately stop construction and notify the NRCS. Any further construction without clearance **could jeopardize assistance** (financial/technical) and may be a **violation of state or federal law**. By initialing, the producer **acknowledges understanding of their responsibilities** under this section: _____ [Producer initials here.]

2. ENDANGERED AND THREATENED SPECIES

For ALL conservation practices, occasional and/or transient endangered species may visit the project site or site vicinity. If any endangered species visits the site or vicinity of the site then the participant, Technical Service Provider (TSP), and/or the contractor must stop work immediately and contact the local NRCS office. By initialing, the producer **acknowledges understanding of their responsibilities** under this section: _____ [Producer initials here.]

3. CLEAN WATER ACT

Clean Water Act Section 10 or 404 permits from the **US Army Corps of Engineers (COE)** are required where proposed construction will involve dredging or filling a wetland or stream. Information may be obtained by contacting: **US Army Corps of Engineers, South Dakota Regulatory Office, 28563 Powerhouse Road, Room 120, Pierre, SD 57501, (Phone (605) 224-8531)**. Forms are available on the Internet at: <https://www.nwo.usace.army.mil/html/od-rsd/applications.html>.

National Pollutant Discharge Elimination System permits or approval from the **SD Department of Environment and Natural Resources (DENR)** may be needed where discharge of polluted water or wastewater (ag waste, etc.) to waters of the state (including wetlands) may occur or have occurred. In addition, a **Storm Water Permit** is needed for any **construction** disturbance of over one acre. Information is available by telephone at **(605) 773-3351**, or on the Internet at:
<http://www.state.sd.us/denr/DES/Surfacewater/surface.htm>.

4. WATER RIGHTS, CONSTRUCTION PERMIT, AND LOCATION NOTICE

South Dakota Codified Law 46-5 requires securing a permit from the **SD Chief Engineer** before construction work begins for any development involving storage or use of water. Small user exceptions are explained on the Internet. Forms and information are available on the Internet at:
<http://www.state.sd.us/denr/DES/WaterRights/waterprg.htm>.

Compliance with all requirements of SD water laws is necessary to avoid possible penalties and/or loss of your rights. Forms, signed map, fees, and other pertinent information for filing a **SD Water Right** application should be submitted to: **DENR Water Rights Program, Joe Foss Building, 523 East Capitol, Pierre, SD 57501-3181 (Phone (605) 773-3352).**

South Dakota Codified Law 46-4 requires the filing of a **Location Notice** for small nonnavigable stream and dry draw dams. **South Dakota Codified Law 46A-10A** regulates **drainage**, in SD, generally through **County Drainage Commissions**. **Administrative Rules (Dam Safety, etc.)** are located at:
http://www.state.sd.us/denr/DES/WaterRights/WR_laws.htm.

Other Laws may also apply. The participant is responsible for obtaining all necessary rights and permits, including but not limited to easements, rights-of-way, zoning approval, permits to construct, etc., required by any applicable level of government.

5. PROPERTY RIGHTS (INCLUDING WETLAND EASEMENTS)

The participant is responsible, financially and otherwise, for any costs incurred by the failure to obtain adequate and necessary real property rights and interests, easements, subordination agreements, permits, and/or licenses required for the installation. Participants are cautioned to be sure the area to be affected is either not covered by a **wetland easement** or a written agreement is reached with the easement owner. Property rights documents should be recorded for your future protection.

6. CONSTRUCTION SUPERVISION AND INSPECTION PARTICIPANT RESPONSIBILITIES

(A) South Dakota Codified Law 49-7A, (also know as **SD One-Call**) requires that no **excavator** may **begin** any excavation without first notifying the One-Call Notification Center of the proposed excavation (Phone 1-800-781-7474).

The NRCS makes no representation as to the existence or nonexistence of any utility or buried object, and assumes no liability for damage to utilities or buried objects caused by construction of this or other conservation practices.

(B) All conservation practice standards (CPS) require onsite supervision and inspection during construction. The NRCS cannot provide all of the assistance or inspection that may be needed to assure the practice is installed correctly. **Participants must actively lead construction supervision and inspection efforts.** Items requiring **inspection by you** are as follows:

The NRCS must be notified and given the opportunity to inspect the following items **prior to installation**:
Excavation of the core trench. Installation of the principle spillway pipe and the drainage diaphragm.

(C) If you employ a contractor to do your construction work, it is your responsibility to clearly inform the contractor, **prior** to start of construction, that materials and construction must be in accordance with the plans and specifications.

(D) If necessary, the plans can be modified during construction. However, any changes to project location and/or design such as sizes, grades, elevations, etc., **must be approved by the NRCS** for permits, certifications, and payment to be assured. **Get approvals before construction!**

(E) The completed practice must be checked and/or approved by the NRCS. The NRCS will ask for written certification from you and/or the contractor for those items not inspected by the NRCS and for those items you agreed to inspect. **Certification for practice payment** will be made by the NRCS when it has been determined that the NRCS approved design has been completed. Otherwise, the NRCS will either require construction changes before certification or the practice will not be certified.

(F) The NRCS designed practices, as well as, financially assisted practices designed by contractors (or others), must meet NRCS CPSs and must be approved by a NRCS employee with appropriate Job Approval Authority prior to construction.

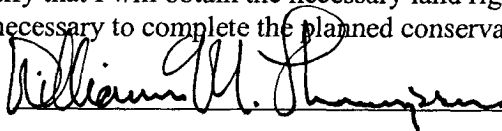
7. OPERATION AND MAINTENANCE (O&M)

The participant is responsible for the safe O&M of the improvements for the life of the practice. The O&M requirements or special O&M plans are listed below and/or attached.

8. PARTICIPANT RESPONSIBILITIES AND CERTIFICATION

I have reviewed the conservation plan, associated job sheets, and plans and specifications provided to me. I understand my responsibility to follow the conservation plan, job sheets, and plans and specifications for proper installation of the CPSs. I understand the endangered species and cultural/historical resources requirements and certify that I will obtain the necessary land rights, easements, water rights, permits, and other authorizations necessary to complete the planned conservation improvements.

Participant signature:



Date: 2/13/10

I have reviewed the requirements as set forth in this document with the participant.

NRCS

Employee:

Date:

**OPERATION AND MAINTENANCE PLAN
POND
CODE 378**

Landowner/Operator Matt Thompson

Job Location SE $\frac{1}{4}$ Sec 22, T 105N, R 73 W, Lyman County GPS _____

Prepared by John Schmidt Date 1/21/2010

Operation and Maintenance Items

A properly operated and maintained pond is an asset to your farm. This structure was designed and installed to provide storage to runoff water for beneficial use. The estimated life span of this installation is at least 10-20 years. The life of this installation can be assured and usually increased by developing and carrying out an effective operation and maintenance program. Here are some recommendations for effective operation and maintenance:

- ☐ Inspect the pond after the first significant rainfall and again after each rain until the pond is filled to the inlet elevation.
- ☐ Avoid using vegetated spillways as a travel lane for vehicles and/or farm machinery.
- ☐ Excessive erosion, settlement, and/or cracks in earthen sections must be investigated (to determine the cause) and repaired.
- ☐ Periodically inspect spillways and control gates, valves, and weirs for proper functioning and their ability to maintain the water level to design elevations. Remove debris or flow blockages.
- ☐ Inspect metal surfaces for rust and other damage. Especially inspect sections in contact with earthfill and/or other materials. Repair or replace damaged sections and apply a protective covering.
- ☐ Inspect concrete for accelerated weathering, spalling, settlement, misalignment, or cracks. Repair defects.
- ☐ Inspect rock riprap for accelerated weathering and displacement. Repair to original grades if necessary.
- ☐ Check for unusual seepage on the backside of the dam. Check for water flowing underneath the pipe at the outlet, water flowing in the inlet but not out the outlet, and for water flowing out the outlet but not in the inlet. Make sure all structure drains are functional and soil is not being transported through the drainage system. Screens and/or rodent guards must be maintained and in place.
- ☐ Repair any rodent, burrowing animal, vandalism, vehicle, or livestock damage.
- ☐ Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization, and application of herbicides when necessary. Periodic mowing or short-term grazing may also be needed.
- ☐ Remove all shrubs and woody vegetation. This includes shrubs and trees that are growing close enough to the structure to impact earth embankments with root growth.
- ☐ If fences are installed, they must be maintained to prevent unauthorized entry.

Other _____

DOCUMENTATION FOR HAZARD CLASSIFICATION

Producer: **Matt Thompson** Name of Site: **Pond**
 County: **Lyman**
 Field #: **1** Watershed: **American Crow Creek**
 Location
 1/4 Section: **SE** Section: **22** Township: **105 N** Range: **73 W**
 Latitude: **43 52' 37" N** Longitude: **99 34' 13" W**

Dam in Series: **Yes**
 Explain: **Two small dams upstream have limited storage.**

Dam and Reservoir Data

Assumed Job Class	III
Assumed Hazard Class	A
Centerline Elevation Channel Bottom*	1723
Centerline Elevation Flood Plain*	1724
Centerline Elevation Top of Dam*	1745.7
Centerline Elevation Auxiliary Spillway Crest*	1742.7

*Elevation is based on Mean Sea Level Datum

Max. Depth of Water within Reservoir **1740.2 Ft.**

Storage

Storage Below Principal Spillway	33.2 Ac.-Ft.
Storage between Principal Spillway and Auxiliary Spillway	16.3 Ac.-Ft.
Storage between Auxiliary Spillway and Top of Dam	25.2 Ac.-Ft.
Other	0 Ac.-Ft.
Total Storage to Top of Dam	74.7 Ac.-Ft.

Downstream Conditions

1. Valley Conditions Downstream of Structure	Parallel
Approximate Slope of Channel	
2. Stream Channel Size	
Depth	23 Ft.
Bottom Width	50 Ft.
Top Width	250 Ft.
3. Valley Characteristics	
Width	250 Ft.
Roughness Coefficient	0.05
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'	300 ft		☒	☐
			☐	☒
			☐	☒
Bridges: Describe type and opening size			☐	☒
Railroads:			☐	☒
Buildings and Utilities:			☐	☒
			☐	☒
			☐	☒
			☐	☒
Describe: Dirt road is graded and drained will not be impacted if dam would fail. Culvert under road.				

Location:

Is Dam located within five miles of urban development?

No

Describe Potential Development:

None

Rational For Determining Hazard Class:

Site is located in rural Lyman Co. Development in this area is unlikely.

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

III

Hazard Analysis by:

John Schmidt

Date:

1/25/2010

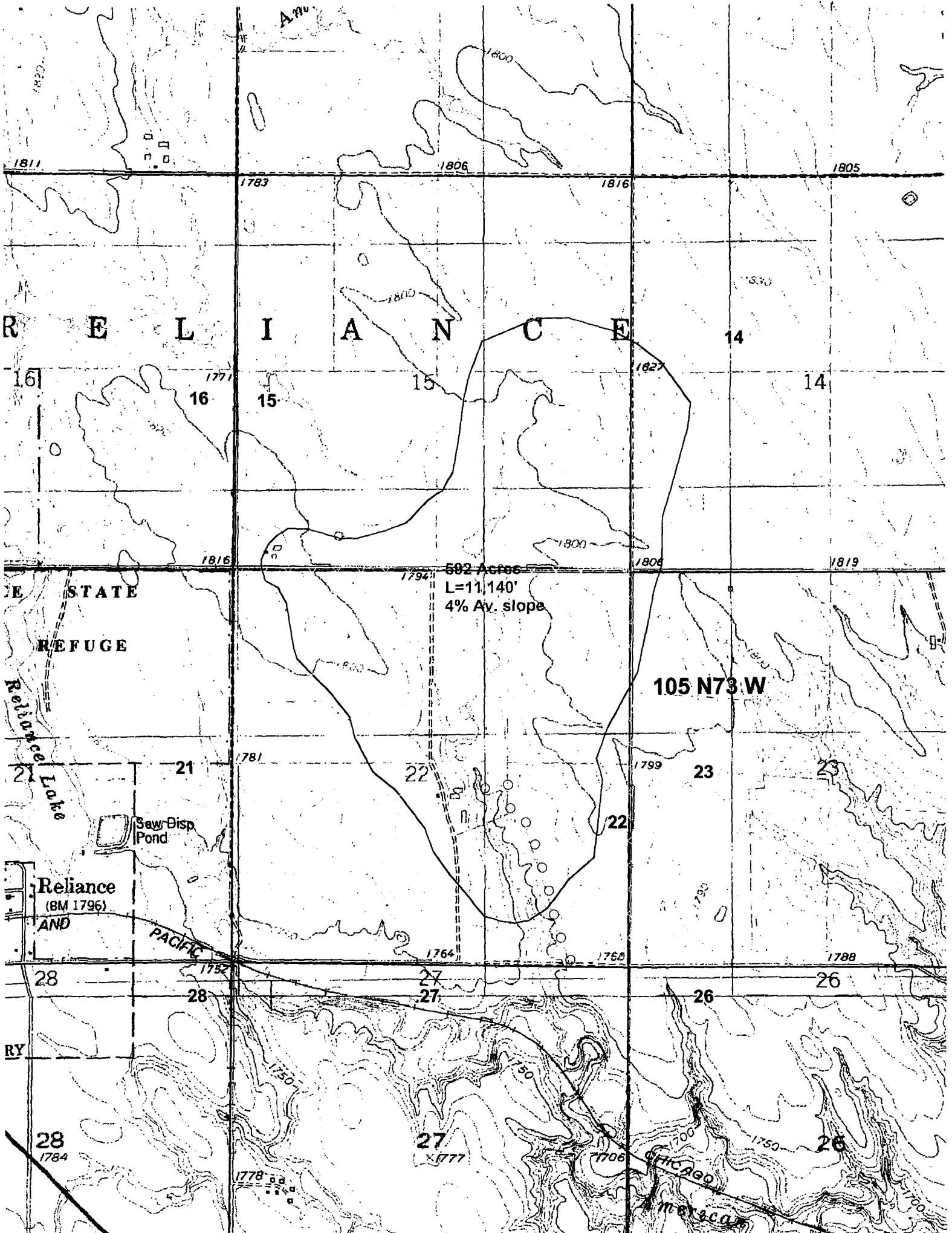
Approved by

John Schmidt

Date:

1/25/2010

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



R E L I A N C E

STATE
REFUGE

Reliance Lock

Sew. Disp. Pond

Reliance
(BM 1796)
AND

PACIFIC

RY

592 Acres
L=11,140'
4% Av. slope

105 N73 W

CHICAGO

American

Client: W. Matt Thompson
 County: LYMAN State: SD
 Practice: Pond
 Calculated By: LDO Date: 10/7/2009
 Checked By: _____ Date: _____

Drainage Area: 592 Acres (provided from RCN Calculator)
 Curve Number: 83 (provided from RCN Calculator)
 Watershed Length: 11140 Feet
 Watershed Slope: 4 Percent
 Time of Concentration: 1.65 Hours (calculated value)
 Rainfall Type: II

Storm Number	1	2	3	4	5	6	7
Frequency (yrs)	1	2	5	10	25	50	100
24-Hr rainfall (in)	1.80	2.30	3.10	3.60	4.20	4.70	5.30
Ia/P Ratio	0.23	0.18	0.13	0.11	0.10	0.09	0.08
Used	0.23	0.18	0.13	0.11	0.10	0.10	0.10
Runoff (in)	0.56	0.91	1.53	1.94	2.46	2.90	3.45
(ac-ft)	27.63	44.89	75.48	95.71	121.36	143.07	170.20
Unit Peak Discharge (cfs/acre/in)	0.356	0.374	0.391	0.398	0.403	0.403	0.403
Peak Discharge (cfs)	118	201	353	457	586	692	822

Curve number Computation

Client: W. Matt Thompson
 County: LYMAN State: SD
 Practice: Pond
 Calculated By: LDO Date: 10/7/2009
 Checked By: _____ Date: _____

COVER DESCRIPTION	Acres (CN)			
	Hydrologic Soil Group			
	A	B	C	D
CULTIVATED AGRICULTURAL LANDS Row crops SR + Crop residue good	-	-	-	396(85)
OTHER AGRICULTURAL LANDS Pasture, grassland or range good	-	-	-	196(80)
Total Area (by Hydrologic Soil Group)				592
TOTAL DRAINAGE AREA: 592 Acres		WEIGHTED CURVE NUMBER: 83		

Project Name: Matt Thompson

Computed by: Schmidt

Date: 1/11/2010

Checked by: _____

Date: _____

laDropInlet.xls Ver 1.02

			Outflow, CFS					Structure Outflow, CFS	Controlling Factor
			Elev	HW Ft	Weir	Inlet Orifice	Barrel Orifice	Full Pipe	
Input Data			1740.2	0.0	0.00	0.00	23.92	59.11	0.00
Riser Type & Diameter (in)	Circular	48	1740.3	0.1	1.18	19.13	24.39	59.32	1.18
Length of Weir Obstruction (ft)		0.5	1740.4	0.2	3.35	27.06	24.86	59.52	3.35
		6	1740.5	0.3	6.15	33.14	25.31	59.73	6.15
Principal Spillway Crest Elev (ft)		1740.2	1740.6	0.4	9.46	38.27	25.76	59.93	9.46
Invert of Barrel Elevation (ft)		1736.7	1740.7	0.5	13.22	42.78	26.20	60.14	13.22
Barrel Orifice Coefficient (C)		0.6	1740.8	0.6	17.38	46.87	26.63	60.34	17.38
Pipe Diameter (in)		24	1740.9	0.7	21.91	50.62	27.06	60.54	21.91
Pipe Length (ft)		101	1741.0	0.8	26.77	54.12	27.48	60.74	26.77
Entrance Coefficient 'Ke'		1	1741.1	0.9	31.94	57.40	27.89	60.94	27.89
Mannings 'n'-value		0.009	1741.2	1.0	37.41	60.51	28.30	61.14	28.30
Elbow Elev (if None, Leave 'BLANK')			1741.3	1.1	43.15	63.46	28.70	61.34	28.70
Length of Outlet ('BLANK' if none)			1741.4	1.2	49.17	66.28	29.10	61.54	29.10
Outlet Type	Cantilever		1741.5	1.3	55.44	68.99	29.49	61.74	29.49
Outlet Elevation (ft)		1724.7	1741.6	1.4	61.96	71.59	29.87	61.94	29.87
Tailwater Elev (if unknown, leave 'Blank')			1741.7	1.5	68.72	74.11	30.25	62.14	30.25
Auxiliary Spillway Elev (ft)		1742.7	1741.8	1.6	75.70	76.54	30.63	62.33	30.63
Maximum Headwater Elev (ft)		1745.7	1741.9	1.7	82.91	78.89	31.00	62.53	31.00
Elev Increment After Full Pipe Flow		0.1	1742.0	1.8	90.33	81.18	31.37	62.72	31.37
Basic Output			1742.1	1.9	97.96	83.40	31.73	62.92	31.73
Full Pipe Flow - Max. Outflow (cfs):	0.00		1742.2	2.0	105.80	85.57	32.09	63.11	32.09
Full Pipe Flow - Max. Velocity (fps):	0.00		1742.3	2.1	113.83	87.68	32.44	63.30	32.44
Useable Weir Length (Ft):	12.07		1742.4	2.2	122.06	89.75	32.79	63.50	32.79
Riser Area (Sq Ft):	12.57		1742.5	2.3	130.48	91.76	33.14	63.69	33.14
Barrel Area (Sq Ft):	3.14		1742.6	2.4	139.08	93.74	33.48	63.88	33.48
Kp: 0.005952			1742.7	2.5	147.86	95.67	33.82	64.07	33.82
Friction Slope (HW at the A.S. Crest):	0.03844		1742.8	2.6	156.82	97.56	34.16	64.26	34.16
Pipe Slope: 0.11966			1742.9	2.7	165.95	99.42	34.49	64.45	34.49
Outlet Elbow Angle (deg):	0.0		1743.0	2.8	175.26	101.25	34.82	64.64	34.82
Maximum Barrel Invert Elevation for avoiding Barrel Orifice Control:	1723.83		1743.1	2.9	184.73	103.04	35.15	64.83	35.15
Km: 0.00000			1743.2	3.0	194.37	104.80	35.48	65.02	35.48
Tailwater Elev Used For Full Pipe Flow:	1725.9		1743.3	3.1	204.16	106.53	35.80	65.21	35.80
			1743.4	3.2	214.12	108.24	36.11	65.39	36.11
			1743.5	3.3	224.24	109.92	36.43	65.58	36.43
			1743.6	3.4	234.51	111.57	36.74	65.77	36.74
			1743.7	3.5	244.93	113.20	37.05	65.95	37.05
			1743.8	3.6	255.50	114.80	37.36	66.14	37.36
			1743.9	3.7	266.22	116.39	37.67	66.32	37.67
			1744.0	3.8	277.09	117.95	37.97	66.50	37.97
			1744.1	3.9	288.09	119.49	38.27	66.69	38.27
			1744.2	4.0	299.25	121.01	38.57	66.87	38.57
			1744.3	4.1	310.54	122.52	38.86	67.05	38.86
			1744.4	4.2	321.97	124.00	39.15	67.24	39.15
			1744.5	4.3	333.53	125.47	39.45	67.42	39.45
			1744.6	4.4	345.24	126.92	39.73	67.60	39.73
			1744.7	4.5	357.07	128.35	40.02	67.78	40.02
			1744.8	4.6	369.04	129.77	40.31	67.96	40.31
			1744.9	4.7	381.14	131.18	40.59	68.14	40.59
			1745.0	4.8	393.37	132.56	40.87	68.32	40.87
			1745.1	4.9	405.73	133.94	41.15	68.50	41.15
			1745.2	5.0	418.21	135.30	41.43	68.67	41.43
			1745.3	5.1	430.82	136.64	41.70	68.85	41.70
			1745.4	5.2	443.55	137.98	41.97	69.03	41.97
			1745.5	5.3	456.41	139.30	42.25	69.21	42.25
			1745.6	5.4	469.38	140.61	42.52	69.38	42.52
			1745.7	5.5	482.48	141.90	42.78	69.56	42.78

Notes & Warnings

NOTE: Pipe slope computed to be greater than friction slope - a 2D riser might improve flow characteristics.

NOTE: Barrel Orifice control can be eliminated by increasing the riser depth.

Project Name: Matt Thompson

laHoodInlet.xls Ver 1.10

Computed by: Schmidt

Date: 1/11/2010

Checked by: _____

Date: _____

Computed by: Schmidt			Outflow, CFS						
Date: 1/11/2010			Weir	Slug Flow	Full Pipe	Structure Outflow, CFS	Controlling Factor		
Checked by: _____	Date: _____								
Elev			HW Ft						
Input Data			1736.7	0.0	0.00	0.00	51.61	0.00	Weir Flow
			1736.8	0.1	0.23	0.00	51.84	0.23	Weir Flow
			1736.9	0.2	0.45	0.00	52.08	0.45	Weir Flow
			1737.0	0.3	0.68	0.00	52.31	0.68	Weir Flow
Principal Spillway Crest Elev (ft)		1736.7	1737.1	0.4	0.91	0.00	52.55	0.91	Weir Flow
			1737.2	0.5	1.33	0.00	52.78	1.33	Weir Flow
Inside Wall - Type		Smooth	1737.3	0.6	1.75	0.00	53.01	1.75	Weir Flow
Pipe Diameter (in)		24	1737.4	0.7	2.18	0.00	53.24	2.18	Weir Flow
Pipe Length (ft)		101	1737.5	0.8	2.60	0.00	53.47	2.60	Weir Flow
Entrance Coefficient 'Ke'		1	1737.6	0.9	3.14	0.00	53.70	3.14	Weir Flow
Mannings 'n-value'		0.009	1737.7	1.0	3.68	0.00	53.92	3.68	Weir Flow
Elbow Elev (if None, Leave 'BLANK')			1737.8	1.1	4.33	0.00	54.15	4.33	Weir Flow
Length of Outlet ('BLANK' if none)			1737.9	1.2	4.98	0.00	54.38	4.98	Weir Flow
Outlet Type		Cantilever	1738.0	1.3	5.94	0.00	54.60	5.94	Weir Flow
Outlet Elevation (ft)		1724.6	1738.1	1.4	6.90	0.00	54.82	6.90	Weir Flow
Tailwater Elev (if unknown, leave 'Blank')			1738.2	1.5	7.86	0.00	55.05	7.86	Weir Flow
Auxiliary Spillway Elev (ft)		1742.7	1738.3	1.6	8.82	0.00	55.27	8.82	Weir Flow
Maximum Headwater Elev (ft)		1746	1738.4	1.7	9.73	0.00	55.49	9.73	Weir Flow
Elev Increment After Full Pipe Flow		0.1	1738.5	1.8	10.63	0.00	55.71	10.63	Weir Flow
Basic Output			1738.6	1.9	11.54	0.00	55.93	11.54	Weir Flow
			1738.7	2.0	12.45	0.00	56.14	12.45	Weir Flow
Full Pipe Flow - Max. Outflow (cfs):		70.26	1738.8	2.1	13.29	0.00	56.36	13.29	Weir Flow
Full Pipe Flow - Max. Velocity (fps):		22.36	1738.9	2.2	14.14	11.31	56.58	14.14	Weir Flow
			1739.0	2.3	14.99	22.63	56.79	22.63	Slug Flow
			1739.1	2.4	15.84	33.94	57.01	33.94	Slug Flow
Barrel Area (Sq Ft):		3.14	1739.2	2.5	16.55	45.25	57.22	45.25	Slug Flow
Kp:		0.005952	1739.3	2.6	17.25	56.57	57.43	56.57	Slug Flow
Friction Slope (HW at the A.S. Crest):		0.03867	1739.4	2.7	17.96	67.88	57.65	57.65	Full Pipe Flow
Pipe Slope:		0.12067	1739.5	2.8	18.67	79.20	57.86	57.86	Full Pipe Flow
Outlet Elbow Angle (deg):		0.0	1739.6	2.9	19.37	90.51	58.07	58.07	Full Pipe Flow
			1739.7	3.0	20.08	101.82	58.28	58.28	Full Pipe Flow
			1739.8	3.1	20.79	113.14	58.49	58.49	Full Pipe Flow
Km:		0.00000	1739.9	3.2	21.50	124.45	58.70	58.70	Full Pipe Flow
Tailwater Elev Used For Full Pipe Flow:		1725.8	1740.0	3.3	22.20	135.76	58.91	58.91	Full Pipe Flow
Notes & Warnings			1740.1	3.4	22.91	147.08	59.11	59.11	Full Pipe Flow
			1740.2	3.5	23.62	158.39	59.32	59.32	Full Pipe Flow
			1740.3	3.6	24.32	169.71	59.52	59.52	Full Pipe Flow
			1740.4	3.7			59.73	59.73	Full Pipe Flow
			1740.5	3.8			59.93	59.93	Full Pipe Flow
			1740.6	3.9			60.14	60.14	Full Pipe Flow
			1740.7	4.0			60.34	60.34	Full Pipe Flow
			1740.8	4.1			60.54	60.54	Full Pipe Flow
			1740.9	4.2			60.74	60.74	Full Pipe Flow
			1741.0	4.3			60.94	60.94	Full Pipe Flow
			1741.1	4.4			61.14	61.14	Full Pipe Flow
			1741.2	4.5			61.34	61.34	Full Pipe Flow
			1741.3	4.6			61.54	61.54	Full Pipe Flow
			1741.4	4.7			61.74	61.74	Full Pipe Flow
			1741.5	4.8			61.94	61.94	Full Pipe Flow
			1741.6	4.9			62.14	62.14	Full Pipe Flow
			1741.7	5.0			62.33	62.33	Full Pipe Flow
			1741.8	5.1			62.53	62.53	Full Pipe Flow
			1741.9	5.2			62.72	62.72	Full Pipe Flow
			1742.0	5.3			62.92	62.92	Full Pipe Flow
			1742.1	5.4			63.11	63.11	Full Pipe Flow
			1742.2	5.5			63.30	63.30	Full Pipe Flow
			1742.3	5.6			63.50	63.50	Full Pipe Flow
			1742.4	5.7			63.69	63.69	Full Pipe Flow
			1742.5	5.8			63.88	63.88	Full Pipe Flow
			1742.6	5.9			64.07	64.07	Full Pipe Flow
			1742.7	6.0			64.26	64.26	Full Pipe Flow
			1742.8	6.1			64.45	64.45	Full Pipe Flow

Hood Inlet

Project Name: *Matt Thompson*

laHoodInlet.xls Ver 1.10

Computed by: *Schmidt*Date: *1/11/2010*

Checked by: _____

Date: _____

Elev	HW Ft	Outflow, CFS			Structure Outflow, CFS	Controlling Factor
		Weir	Slug Flow	Full Pipe		
1742.9	6.2			64.64	64.64	Full Pipe Flow
1743.0	6.3			64.83	64.83	Full Pipe Flow
1743.1	6.4			65.02	65.02	Full Pipe Flow
1743.2	6.5			65.21	65.21	Full Pipe Flow
1743.3	6.6			65.39	65.39	Full Pipe Flow
1743.4	6.7			65.58	65.58	Full Pipe Flow
1743.5	6.8			65.77	65.77	Full Pipe Flow
1743.6	6.9			65.95	65.95	Full Pipe Flow
1743.7	7.0			66.14	66.14	Full Pipe Flow
1743.8	7.1			66.32	66.32	Full Pipe Flow
1743.9	7.2			66.50	66.50	Full Pipe Flow
1744.0	7.3			66.69	66.69	Full Pipe Flow
1744.1	7.4			66.87	66.87	Full Pipe Flow
1744.2	7.5			67.05	67.05	Full Pipe Flow
1744.3	7.6			67.24	67.24	Full Pipe Flow
1744.4	7.7			67.42	67.42	Full Pipe Flow
1744.5	7.8			67.60	67.60	Full Pipe Flow
1744.6	7.9			67.78	67.78	Full Pipe Flow
1744.7	8.0			67.96	67.96	Full Pipe Flow
1744.8	8.1			68.14	68.14	Full Pipe Flow
1744.9	8.2			68.32	68.32	Full Pipe Flow
1745.0	8.3			68.50	68.50	Full Pipe Flow
1745.1	8.4			68.67	68.67	Full Pipe Flow
1745.2	8.5			68.85	68.85	Full Pipe Flow
1745.3	8.6			69.03	69.03	Full Pipe Flow
1745.4	8.7			69.21	69.21	Full Pipe Flow
1745.5	8.8			69.38	69.38	Full Pipe Flow
1745.6	8.9			69.56	69.56	Full Pipe Flow
1745.7	9.0			69.73	69.73	Full Pipe Flow
1745.8	9.1			69.91	69.91	Full Pipe Flow
1745.9	9.2			70.08	70.08	Full Pipe Flow
1746.0	9.3			70.26	70.26	Full Pipe Flow

1*****
 SITES XEQ 01/25/2010 WATER RESOURCE SITE ANALYSIS COMPUTER PROGRAM
 VER 2005.1.04 (USER MANUAL - DATED DECEMBER 2005)
 TIME 15:58:26

***** 80-80 LIST OF INPUT DATA *****

SITES	01/01/2005A	Matt Thompson Dam	0.925	H5
SAVMOV	0 101			
SAVMOV	101 1			1
*	24" Barrel and 48" Riser			
*	PS 1740.2			
*	AS 1742.7			
*	Top 1745.7			
STRUCTURE MT	Thompson Pond			
	1723.7 0			
	1724 0.04			
	1726 0.30			
	1728 0.64			
	1730 1.00			
	1732 1.54			
	1734 2.29			
	1736 3.19			
	1738 4.28			
	1740 5.55			
	1740.2 5.69	.0001		
	1740.3 5.7	1.18		
	1741 6.26	26.77		
	1742 6.93	62.92		
	1744 8.56	66.69		
	1745.5 9.92	69.38		
	1746 10.5	70.26		
ENDTABLE				
WSDATA	5A1A AC 83	592	11200	4
PDIRECT	2.3			4.20
POOLDATA	ELEV 1740.2	1723.7	1735	1723.7
ASDATA	41 300		3	.1
ASINSURF	41	0.035	0.035	
ASINLET	41	0.0	215	0.0
	300	5		
ENDTABLE				
ASEXSURF	41	0.035	0.035	
		0.65	0.65	
		3	3	
		2	2	
		0.02		
ENDTABLE				
ASEXIT	41 N	0.5		
BTMWIDTH	FEET 80			
ASMATERIAL	1			
	1	30	0.001	50 95 0.1
ENDTABLE				
ASCOORD	1 SbE N			
	0	1739	85	1744 100 1745
	200	1748	300	1744 800 1723.7
ENDTABLE				
GRAPHICS	I			
GO, DESIGN	L	TYPE2	24	TYPE2378 24
SAVMOV	2 101 1			MT

ENDJOB

1SITES XEQ 01/25/2010 ----- COMMENT PAGE -----
VER 2005.1.04 Matt Thompson Dam WSID = A

24" Barrel and 48" Riser

PS 1740.2

AS 1742.7

Top 1745.7

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

1SITES -----
XEQ 01/25/2010 Matt Thompson Dam WSID= A
VER 2005.1.04 Thompson Pond SUBW= A
TIME 15:58:26 SITE = MT PASS= 1 PART= 1

***** MATERIAL PROPERTIES *****						
MATERIAL	PI	DRY DENSITY lbs/CuFt	Kh	PERCENT CLAY	DETACH. RATE (Ft/H) / (lb/SqFt)	REP. DIAMETER inches
SbE	30.	95.	0.10	50.0	--	0.00100
TS_FILL	30.	95.	0.10	50.0	--	0.00100
GEN_FILL	30.	95.	0.10	50.0	--	0.00100

***** 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
83.00	0.93	11200.00	4.00	0.00
SITEDATA- PERM POOL	CREST PS	FP SED	VALLEY FL	378?
1740.20	1723.70	1735.00	1723.70	YES
BASEFLOW	INITIAL EL	EXTRA VOL	SITE TYPE	
0.00	0.00	0.00	DESIGN	
PSDATA - NO. COND	COND L	DIA/W	-/H	
0.00	0.00	0.00	0.00	
PS N	KE	WEIR L	TW EL	
0.000	0.00	0.00	0.00	

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	0	
AUX.DATA - INLET N	SIDE SLOPE	EXIT N	EXIT SLOPE	ACTUAL AUX?
0.035	3.00	0.035	0.100	NO
BTM WIDTH - BW1	BW2	BW3	BW4	BW5
ft 80.00	0.00	0.00	0.00	0.00

AUXILIARY SPILLWAY RATING DEVELOPED USING WSPVRT.

1SITES -----
 XEQ 01/25/2010 Matt Thompson Dam WSID= A
 VER 2005.1.04 Thompson Pond SUBW= A
 TIME 15:58:26 SITE = MT PASS= 1 PART= 2

PERM POOL	1740.20 FT	33.2 ACFT	5.69 AC	0.0 CFS
CREST PS	1723.70 FT	0.0 ACFT	0.00 AC	0.0 CFS
SED ACCUM	1735.00 FT	11.8 ACFT	2.74 AC	0.0 CFS
START ELEV	1735.00 FT	11.8 ACFT	2.74 AC	0.0 CFS
NRCS-PSH	D= 24.00 HR	P= 2.30 IN	Q= 0.91 IN	DA= 0.93 SM
	TC= 1.66 HR	CN= 83.00	VOL= 44.7 ACFT	

PEAK = 195.5 CFS, AT 13.1 HRS.

ROUTED RESULT - HYD TYPE	EMAX	VOL-MAX	AMAX	QMAX
NRCS-PSH	1742.68 FT	49.5 ACFT	7.49 AC	64.1 CFS

PS STORAGE 37.6 ACFT, BETWEEN AUX. CREST AND SED. ACCUM ELEVATIONS.

DRAWDOWN (DDT) TEST 1723.70 FT 0.0 ACFT 0.00 CFS
 CONTROL IS 0.000 DETENTION STORAGE

***** MESSAGE - DRAWDOWN TEST ELEVATION CANNOT BE LESS THAN SEDIMENT,
 BASEFLOW ELEVATION, OR INPUT DRAWDOWN ELEVATION;
 DDT TEST USED 1735.00 FT, 11.8 ACFT, 0.0 CFS.

DRAWDOWN TIME = 1.43 DAYS, TO 0.0 CFS (LIMIT = 10.00 DAYS)

 RATING TABLE DEVELOPED, SITE = MT :
 WITH PS GIVEN AND AUX. COMPUTED BY PROGRAM
 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	1723.70	0.00	0.00	0.00	0.00	0.00
2	1724.00	0.00	0.00	0.00	0.01	0.04
3	1726.00	0.00	0.00	0.00	0.35	0.30
4	1728.00	0.00	0.00	0.00	1.29	0.64
5	1730.00	0.00	0.00	0.00	2.93	1.00
6	1732.00	0.00	0.00	0.00	5.47	1.54
7	1734.00	0.00	0.00	0.00	9.30	2.29
8	1736.00	0.00	0.00	0.00	14.78	3.19
9	1738.00	0.00	0.00	0.00	22.25	4.28
10	1740.00	0.00	0.00	0.00	32.08	5.55
11	1740.20	0.00	0.00	0.00	33.20	5.69
12	1740.30	1.18	1.18	0.00	33.77	5.70
13	1741.00	26.77	26.77	0.00	37.96	6.26
14	1742.00	62.92	62.92	0.00	44.55	6.93
15	1744.00	66.69	66.69	0.00	60.04	8.56
16	1745.50	69.38	69.38	0.00	73.90	9.92
17	1746.00	70.26	70.26	0.00	79.01	10.50

1SITES

XEQ 01/25/2010
VER 2005.1.04
TIME 15:58:26

Matt Thompson Dam
Thompson Pond
SITE = MT

WSID= A
SUBW= A
PASS= 1
PART= 3

AUX. CREST 1742.68 FT 49.5 ACFT 7.49 AC 64.1 CFS
PS STORAGE 37.6 ACFT, BETWEEN AUX. CREST AND SED. ACCUM ELEVATIONS.
START ELEV 1740.20 FT 33.2 ACFT 5.69 AC 0.0 CFS
EFFECTIVE HEIGHT(H)= 19.0 FEET, PRODUCT= 939. (H * STORAGE AT CREST AUX.).
INPUT DESIGN CLASS = A1 = LT 3000. PRODUCT.
NRCS-FBH D= 24.00 HR P= 4.20 IN Q= 2.46 IN DA= 0.93 SM
TC= 1.66 HR CN= 83.00 VOL= 121.4 ACFT
PEAK = 555.3 CFS, AT 13.0 HRS.

***** WARNING - EXIT CHANNEL INTERSECTS VALLEY FLOOR AT STATION 490. BEFORE
REACHING LAST POINT OF NATURAL GROUND AT STATION 800.

RATING TABLE DEVELOPED, SITE = MT :
WITH PS GIVEN AND AUX. COMPUTED BY PROGRAM
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	1723.70	0.00	0.00	0.00	0.00	0.00
2	1725.28	0.00	0.00	0.00	0.16	0.21

3	1726.86	0.00	0.00	0.00	0.67	0.45
4	1728.45	0.00	0.00	0.00	1.59	0.72
5	1730.03	0.00	0.00	0.00	2.95	1.01
6	1731.61	0.00	0.00	0.00	4.88	1.43
7	1733.19	0.00	0.00	0.00	7.57	1.99
8	1734.77	0.00	0.00	0.00	11.20	2.64
9	1736.35	0.00	0.00	0.00	15.94	3.38
10	1737.94	0.00	0.00	0.00	21.97	4.25
11	1739.52	0.00	0.00	0.00	29.47	5.24
12	1741.10	30.37	30.37	0.00	38.58	6.33
13	1742.68	64.20	64.20	0.00	49.46	7.49
14	1742.85	70.94	64.52	6.43	50.71	7.62
15	1743.01	77.68	64.83	12.85	51.99	7.76
16	1743.31	104.17	65.39	38.78	54.34	8.00
17	1743.68	163.92	66.08	97.84	57.32	8.30
18	1744.34	348.31	67.30	281.01	63.01	8.87
19	1745.17	671.52	68.79	602.73	70.68	9.62
20	1746.00	1106.03	70.26	1035.77	79.01	10.50

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.	85.	-5.9	0.035	**	**	**	INLET
2	85.	300.	0.0	0.035	**	**	**	CREST
3	300.	490.	10.0	0.035	0.65	3	2.0	EXIT !

@ The program interprets retardance curve index entries of less than 1 as Manning's n values.

* 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 1742.68 FT.

DRAWDOWN (DDT) TEST 1723.70 FT 0.0 ACFT 0.00 CFS
CONTROL IS 0.000 DETENTION STORAGE

***** MESSAGE - DRAWDOWN TEST ELEVATION CANNOT BE LESS THAN SEDIMENT,
BASEFLOW ELEVATION, OR INPUT DRAWDOWN ELEVATION;
DDT TEST USED 1735.00 FT, 11.8 ACFT, 0.0 CFS.

DRAWDOWN TIME = 1.31 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	80.0	1744.57	65.0	9.1	1.88	15.6

^^^^ NOTE -- ACTUAL Hp OF 1.88 RAISED TO MEET MIN. 378 CRITERIA.

PEAK - CFS	Q-PS	Q-AUX.	Q-TOT.
DISCHARGE =	67.7	365.7	433.4

CRITICAL CRITICAL CRITICAL 25% OF Q

	DEPTH	VELOCITY	SLOPE-Sc	Sc
	FT	FT/SEC	FT/FT	FT/FT
AUXILIARY				
SPILLWAY ---	0.86	5.17	0.019	0.026

EROSIONALLY EFFECTIVE STRESS FOR STABILITY ANALYSIS OF AUX. EXIT CHANNEL
(Refer to Ag. Handbook 667, Chapt. 3, for allowable stresses.)

Aux. Spillway Discharge = 366. cfs; Bottom Width = 80. ft

REACH	FROM	TO	SLOPE	MANNING'S	VELOCITY	TOTAL EFFECTIVE	STRESS	STRESS
NO.	STA	STA	%	n	ft/s	lb/ft^2	lb/ft^2	lb/ft^2
3	300.	490.	10.00	0.035	8.58	3.26	1.983	

INTEGRITY ANALYSIS - REACH SURFACE PERFORMANCE SUMMARY

(The auxiliary spillway began flow at time = 12.6 hours
and peaked at time = 13.5 hours.)

REACH 3: FROM STATION 300. TO 490. ON 10.0% SLOPE.
Surface unfailed: Stressed to 69% of allowable.

INTEGRITY ANALYSIS - HEADCUT EROSION DAMAGE SUMMARY

No headcut formed in the spillway.

	DURATION	ATTACK	DIST. FROM MOST U/S
	FLOW	OE/B	HEADCUT TO U/S EDGE
	HRS	ACFT/FT	AUX. CREST, FT
AUXILIARY			
SPILLWAY ---	5.9	0.6	405.

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

EXIT CHANNEL FLOW SUPERCRITICAL: MAX VELOCITY= 8.6 FT/SEC
EXIT SLOPE = 0.100 FT/FT
FLOW DEPTH = 0.5 FT

>>>>> NHCP378 RUN - MINIMUM DEPTH, CREST AUX. TO TOP OF DAM IS 2.00 FT.
NEW TOP OF DAM ELEVATION = 1744.68.

ROUTED	BTM WIDTH	MAX ELEV	VOL-MAX	AREA-MAX	AUX.HP	VOL-AUX.
RESULTS	FT	FT	ACFT	AC	FT	ACFT
MINIMUM AUX.	80.0	1744.68	66.2	9.2	2.01	16.7

PEAK - CFS	Q-PS	Q-AUX.	Q-TOT.
DISCHARGES =	67.9	413.1	481.0

	CRITICAL	CRITICAL	CRITICAL	25% OF Q
	DEPTH	VELOCITY	SLOPE-Sc	Sc
	FT	FT/SEC	FT/FT	FT/FT
AUXILIARY				
SPILLWAY ---	0.93	5.38	0.019	0.025

>>>>> NHCP378 RUN - MINIMUM DEPTH, DESIGN FLOW TO TOP OF DAM; 1.00 FT REQUIRED

FOR THIS PASS. NEW TOP OF DAM ELEVATION = 1745.57.

ROUTED	BTM WIDTH	MAX ELEV	VOL-MAX	AREA-MAX	AUX.HP	VOL-AUX.
RESULTS	FT	FT	ACFT	AC	FT	ACFT
MINIMUM AUX.	80.0	1745.57	74.6	10.0	2.89	25.2

PEAK - CFS	Q-PS	Q-AUX.	Q-TOT.
DISCHARGES =	69.5	809.1	878.6

	CRITICAL	CRITICAL	CRITICAL	25% OF Q
	DEPTH	VELOCITY	SLOPE-Sc	Sc
AUXILIARY	FT	FT/SEC	FT/FT	FT/FT
SPILLWAY ---	1.44	6.65	0.016	0.022

Inflow Hyd 1 PSH-Peak = 64.11 CFS at 14.76 hrs., Location Point

Inflow Hyd 1 FBH-Peak = 433.37 CFS at 13.54 hrs., Location Point
HYDOUT 1 MT

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

A Matt Thompson 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

1	SUMMARY TABLE 1	SITES VERSION 2005.1.04
	-----	DATED 01/01/2005

WATERSHED ID	RUN DATE	RUN TIME
-----	-----	-----
A	01/25/2010	15:58:26

>>>	SITE	SUBWS	SUBWS DA	CURVE	TC	TOTAL DA	TYPE	STRUC	<<<
	ID	ID	(SQ MI)	NO.	(HRS)	(SQ MI)	DESIGN	CLASS	
	-----	-----	-----	-----	-----	-----	-----	-----	
	MT	A	0.93	83.	1.66	0.93	378CR	A1	

PASS	DIA./	AUX.CREST	BTM.	MAX.	MAX.	EMB.	INTEGR.*	EXIT*	TYPE
NO.	WIDTH	ELEV	WIDTH	HP	ELEV	VOL.	DIST.	VEL.	HYD
	(IN/FT)	(FT)	(FT)	(FT)	(FT)	(CY)	(FT)	(FT/SEC)	
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
1	0.0	1742.7	80.0	2.9	1745.6	0.	405.	8.6	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 2005.1.04 ,01/01/2005
A FILES

INPUT = H:\SITES_Data\Thompson\Thompson.D2C
OUTPUT = H:\SITES_Data\Thompson\Thompson.OUT
DATED 01/25/2010 15:58:26

GRAPHICS FILES GENERATED

OPTION "L" = H:\SITES_Data\Thompson\Thompson.DRG DATED 01/25/2010 15:58:26
OPTION "P" = H:\SITES_Data\Thompson\Thompson.DHY DATED 01/25/2010 15:58:26
OPTION "E" = H:\SITES_Data\Thompson\Thompson.DEM DATED 01/25/2010 15:58:26
AUX.GRAPHICS = H:\SITES_Data\Thompson\Thompson.DG* DATED 01/25/2010 15:58:26

Structural Design of Solid Wall, Plastic Pipe

Version 1.0 (1/30/06)

Proposed Pipe

Description	PVC 1120 PS115 SDR 26
D _o	24.803 in
SDR or SDR?	SDR 26
wall thickness, t	0.889 in
E _{long}	140,000 psi
E _{short}	400,000 psi
allow comp stress, σ	2000 psi (from table 52C-1)

Loads

SOIL			WHEEL		
depth of soil cover, h	12	ft	Load class	Field Equipment	
unit weight of soil, γ _s	105	psf	Load, P _L	10,000	lb
water ht. above pipe, h _w	0	ft	Do-t < 2.67h x 12 ?	N/A	(b14>2, use Eq. 52-22)
P _s	1260	psf	Impact factor, I _f	1	
W _s	2604.315	lb/ft	W _L	47	lb/ft
			P _w	23	psf
VACUUM					
P _v	0	psf	Total Load	1,283	psf
U _i	23.025	in	P _s + P _w + P _v		
W _v	0.0	lb/ft			

1. Wall Crushing (solid wall pipe)

Thrust in pipe wall, T _{pw}	1,326	lb/ft	
Required wall area, A _{pw}	0.055	in ² /in	Proposed Pipe okay for wall crushing
Thickness, t	0.889	in	

2. Deflection (solid wall pipe)

Deflection Lag Factor, D _L	1.5	(varies from 1.0 to 1.5)
Bedding Constant, K	0.1	(generally 0.1)
Modulus of soil reaction, E'	200	(see table 52-2)

Using Eq. 52-29 for SDR pipe

Deflection (% ΔX / D)	4.54	%	Proposed Pipe okay for deflection
Maximum deflection	5.0	%	

3. Wall Buckling

Use E_{long} or E_{short} ?	E_{long}	
$E =$	<u>140,000</u>	psi
Factor of Safety, FS	<u>2.5</u>	$h / (D_o/12) > 2$
R_w	<u>1.0</u>	ft
Coeff of elastic support, B'	<u>0.662</u>	
Moment of Inertia, I_{pw}	<u>0.059</u>	in^4 / in
Modulus of soil reaction, E'	<u>200</u>	psi
Allowable buckling, q_a	<u>19.09</u>	psi
Reduction factor, C	0.67	
Adj. allow. Buckling, $q_a C$	12.72	psi
$q_a C$	<u>1,832</u>	psf
Total pressure, P	<u>1,283</u>	psf
		<i>Proposed Pipe okay for wall buckling</i>

4. Strain (solid wall pipe)

Max strain, flexure, e _f	0.0058	
Max strain, hoop strain, e _h	0.0003	
e _h due to external load?	Yes	
Max combined strain, e	0.0055	e = e _f - e _h
Allowable strain, e _{all}	0.05	Proposed Pipe okay for strain

SURFACE TO SURFACE VOLUME REPORT

USDA-NRCS
1717 N. Lincoln Ave, Suite 104
Pierre, SD 57501-7800
605-224-2476 Ext. 5

Project: H:\Terramodel_Pierre\Matt_Thompson_Dam.pro
Report Generated: Friday, January 22, 2010 1:09:33 PM

Where the second surface is above the first the volume is reported as fill.
Where the second surface is below the first the volume is reported as excavation.

Shrinkage/swell factors:	Excavation	1.0000	Fill	1.0000
First Surface Layer Name	Number of Points	Second Surface Layer Name	Number of Points	
POINTS	826	*DAM	90	
Excavation Volume (yd3)	Fill Volume (yd3)			
0.0	10,316.7			

Net Difference: 10,316.7 yd3 Borrow

SURFACE TO SURFACE VOLUME REPORT

USDA-NRCS
1717 N. Lincoln Ave, Suite 104
Pierre, SD 57501-7800
605-224-2476 Ext. 5

Project: H:\Terramodel_Pierre\Matt_Thompson_Dam.pro
Report Generated: Friday, January 22, 2010 1:10:30 PM

Where the second surface is above the first the volume is reported as fill.
Where the second surface is below the first the volume is reported as excavation.

Shrinkage/swell factors:	Excavation	1.0000	Fill	1.0000
First Surface Layer Name	Number of Points	Second Surface Layer Name	Number of Points	
POINTS	826	*CORE TRENCH	79	
Excavation Volume (yd3)	Fill Volume (yd3)			
497.0	0.0			

Net Difference: 497.0 yd3 Waste

SURFACE TO SURFACE VOLUME REPORT

USDA-NRCS
1717 N. Lincoln Ave, Suite 104
Pierre, SD 57501-7800
605-224-2476 Ext. 5

Project: H:\Terramodel_Pierre\Matt_Thompson_Dam.pro
Report Generated: Friday, January 22, 2010 1:10:56 PM

Where the second surface is above the first the volume is reported as fill.
Where the second surface is below the first the volume is reported as
excavation.

Shrinkage/swell factors:	Excavation	1.0000	Fill	1.0000
First Surface Layer Name	Number of Points	Second Surface Layer Name	Number of Points	
-----	-----	-----	-----	
POINTS	826	*AUX_SPLWY	72	
Excavation Volume (yd3)		Fill Volume (yd3)		
-----		-----		
3,756.2		0.0		

Net Difference: 3,756.2 yd3 Waste

DAM EARTHFILL

10,317 CY * 1.05 = 10,833 CY for fill with 5% for Settlement

STRIPPING UNDER FILL

30,905 sq. ft. * 0.5 ft = 572 CY
27 cu.ft. / CY

TOPSOIL FOR AUXILIARY SPILLWAY

240 ft Long * 80 ft Wide * 0.5 ft Thickness = 356 CY
27 cu.ft. / CY

CONSTRUCTION SPECIFICATION

SD-2 CLEARING AND GRUBBING

1. Scope

The work shall consist of clearing, grubbing and disposal of trees, snags, logs, brush, shrubs, stumps, and rubbish from the designated areas.

2. Protection of Existing Vegetation

Trees and other woody vegetation designated to remain undisturbed shall be protected from damage throughout the entire construction period. Vehicles, stockpiled materials, and/or ground disturbance shall not be allowed within the dripline of the vegetation designated to remain in place. The contractor shall repair any damage resulting from the contractor's operations or neglect.

3. Marking

Limits of the areas to be cleared and grubbed will be marked by stakes, flags, tree markings, or other suitable methods. Trees to be left standing and uninjured will be designated by special markings placed on the trunks at a height of about six feet above the ground surface.

4. Clearing and Grubbing

Unless otherwise specified, all stumps, roots, and root clusters that have a diameter one inch or larger shall be grubbed out to a depth of at least two feet below subgrade for concrete structures and one foot below ground surface for embankment and other designated sites. All trees not marked for preservation, and all snags, logs, brush, shrubs, stumps, rubbish, and similar materials shall be cleared from within the limits of the marked areas.

5. Disposal

Where brush piles for wildlife are not specified on the drawings, cleared, and grubbed materials shall be disposed of by burning and/or burying at locations shown on the drawings or shall be disposed of by methods and at sites selected by the contractor and approved by the Natural Resources Conservation Service inspector. Materials to be buried shall be placed at least two feet below the surrounding ground line and shall be covered by at least two feet of soil with the soil surface graded to drain.

The contractor is responsible for complying with all applicable laws and regulations and the payment of any and all fees that may result from disposal at locations away from the construction site.

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 period:

Early Spring prior to 5/15 or
Late Summer 8/1 to 9/1 or
Dormant 11/1 to Spring Thaw

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.

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 P₂O₅ 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. Five 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. 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 one year of its latest germination test.

	Grass	Seeding Rate (PLS/Acre)	
		Drilled	Broadcast
☐	Smooth Bromegrass ¹	16	20
☒	Western Wheatgrass	10	12
	Intermediate Wheatgrass	10	12
	Slender Wheatgrass	3	3
☐	Western Wheatgrass	20	25
☐	Reed Canarygrass	5	7
☐	Other, See Attached Seeding Sheet		

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

5. **Cover Crops**

If permanent seeding is not completed during the early spring period, a cover crop meeting the following rates and dates will be planted immediately after construction.

Cover Crop	Seeding rate (lbs./acre)	Spring Dates	Fall Dates
Oats	15-30	April 15-June 1	Aug.15 - Sept.15

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.

6. **Companion Crops**

Companion Crops are ☐ Required ☒ Not Required
to be seeded during the permanent seeding period. The companion crops shall be seeded as follows:

Crop	Seeding rate (lbs./acre)
None	

The companion crop should be clipped and removed or mowed before it becomes competitive with the perennial species or sets seed.

7. **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 three inches. The seedbed should be firm enough so that the boot heel of an average adult penetrates the soil to a depth of approximately one-half inch. The contractor shall suspend operations when the soil is too wet.

8. **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 ¼ to ¾ 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 8, serpentine, etc.).

9. **Mulching**

Mulching is ☐ Required ☒ Not Required

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).

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.

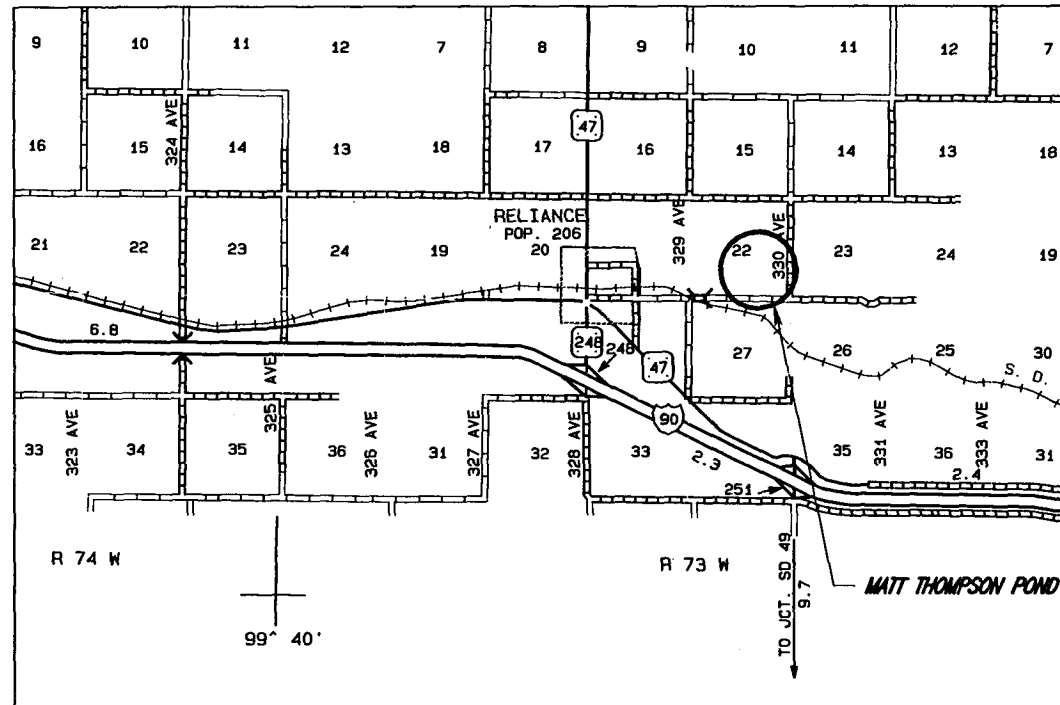
^{3/} CWO is a US Army Corps of Engineers reference.

W. MATT THOMPSON POND

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MAR - 1 2010
WATER RIGHTS
PROGRAM

TABLE OF QUANTITIES

ITEM	UNIT	QUANTITY	"AS BUILT" QUANTITY
Earthfill - Class S	Cu. Yd.	10,833	
Earthfill - Core Trench	Cu. Yd.	497	
Earthfill - Stripping	Cu. Yd.	572	
TOTAL EARTHFILL	Cu. Yd.	11,902	
Topsoil - Auxiliary Spillway	Cu. Yd.	356	
48" Dia. Concrete Riser 4 Ft. Tall (Cutout for 24" Pipe)	Each	1	
Concrete for Bottom of Riser (3000 PSI)	Cu. Yd.	2.0	
24" Dia. SDR 26 Heavy Wall Sewer PVC Pipe (PS115)	Lin. Ft.	108	
Rock Riprap	Cu. Yd.	9.2	
Geotextile Cloth	Sq. Yd.	26.4	
Fine Drainfill	Cu. Yd.	20.0	
Trash Rack	Each	1	
Timber Pipe Support	Each	1	
Seeding	Acre	1.4	



LOCATION MAP

GENERAL NOTES

- IF CULTURAL RESOURCES ARE DISCOVERED DURING CONSTRUCTION, DISCONTINUE CONSTRUCTION AND NOTIFY THE LOCAL NATURAL RESOURCES CONSERVATION SERVICE OFFICE.
- ACCORDING TO SOUTH DAKOTA STATE LAW, "NO EXCAVATOR MAY BEGIN ANY EXCAVATION WITHOUT FIRST NOTIFYING THE ONE-CALL NOTIFICATION CENTER OF THE PROPOSED EXCAVATION" AT (800) 781-7474.
- THE LANDOWNER IS RESPONSIBLE FOR COMPLYING WITH ALL FEDERAL, STATE, AND LOCAL LAWS. (WATER RIGHTS PERMIT AND SAFETY OF DAMS REVIEW)

CONSTRUCTION NOTES

- CLEAR AND GRUB THE ENTIRE AREA WITHIN THE WORK LIMITS.
- ALL BORROW MATERIAL MUST NOT CONTAIN FROZEN MATERIAL, SOD, ROOTS, OR OTHER PERISHABLE MATERIAL, OR ROCK LARGER THAN EIGHT INCHES IN DIAMETER AS DESCRIBED IN SD SPECIFICATION SD-7S.
- ANY SHALE OR SAND THAT IS EXPOSED DURING BORROW OPERATIONS SHALL BE IMMEDIATELY BACKFILLED WITH 2 FEET OF CLAY MATERIAL.
- SPREAD TOPSOIL ON ALL SURFACES OF THE AUXILIARY SPILLWAY, TOP OF DAM, AND THE EMBANKMENT SLOPES. ALL TOPSOILED AREAS WILL BE SEED.
- TO PROTECT PVC PIPE FROM ULTRAVIOLET LIGHT, PORTIONS OF PIPE THAT WILL BE PERMANENTLY EXPOSED TO SUNLIGHT MUST BE PRIMED WITH PVC SOLVENT AND PAINTED WITH TWO COATS OF HIGH QUALITY EXTERIOR LATEX PAINT.

NOTE: SOIL BORINGS WERE NOT DONE AT THE TIME OF DESIGN BECAUSE OF WEATHER CONDITIONS. ASSUME 3.0 FT DEEP CORE. A SOILS INVESTIGATION WILL NEED TO BE DONE TO SEE IF THE ASSUMED CORE TRENCH IS ADEQUATE.

SD CONSTRUCTION AND MATERIAL SPECIFICATIONS

SD-2 CLEARING AND GRUBBING
SD-4 STRIPPING
SD-5 EXCAVATION
SD-7S EARTHFILL - CLASS S (Method Controlled Compaction)
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-592 GEOTEXTILE
FOR A FULL TEXT VERSION SEE
http://www.sd.nrcs.usda.gov/technical/SD_Engineering.html

"STATEMENT OF COMPLIANCE"
Construction (was) (was not)
completed in accordance with
approved construction plans
and specifications.

COVER SHEET

NRCS HAZARD CLASS A
NRCS JOB CLASS III

JAA

Date

REVISIONS		
DATE	APPROVED	TITLE

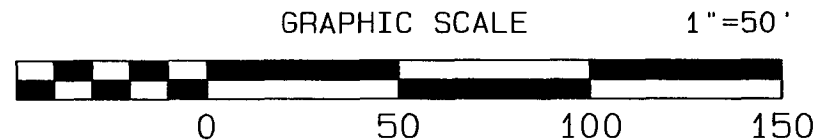
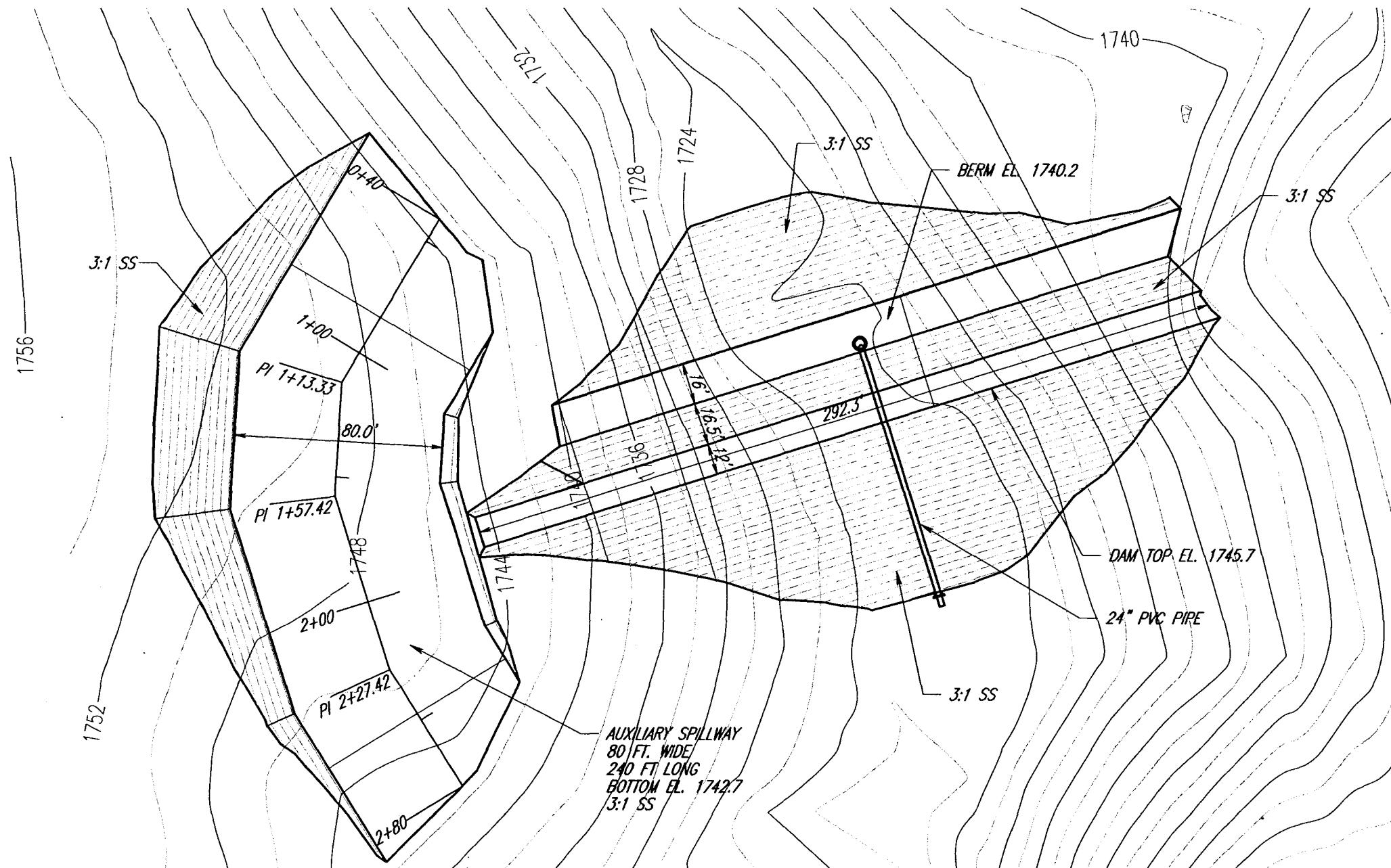
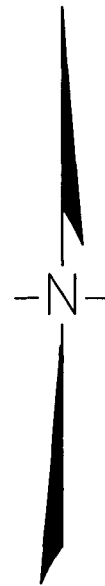
Date 1/26/2010
Designed JOHN SCHMIDT
Drawn JOHN SCHMIDT
Checked [Signature]
Approved [Signature]

PRODUCER W. MATT THOMPSON
SE 1/4, SECT. 22, T.105 North R. 73 West
AMERICAN CREEK COUNTY
LYMAN CONSERVATION DISTRICT

USDA - NRCS
FIELD SUPPORT OFFICE
1717 N. LINCOLN AVE. SUITE 104
PIERRE, SOUTH DAKOTA 57501

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

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Sheet 1 of 8



COORDINATE TABLE CL DAM AND CL AUXILIARY SPILLWAY				
Pt #	Northing	Easting	Elevation	Descriptor
3001	10386.91	10424.38	1745.70	DAM CL BEGIN
3002	10385.75	10420.70	1745.70	DAM CL BERM
3003	10347.47	10299.10	1745.70	DAM CL PIPE
3004	10311.17	10183.75	1745.70	DAM CL BERM
3005	10299.16	10145.59	1745.70	DAM CL END
3011	10420.07	10130.03	1742.70	AUX SPLWY BEGIN
3012	10382.17	10107.44	1742.70	AUX SPLWY
3013	10357.09	10092.48	1742.70	AUX SPLWY
3014	10313.07	10089.85	1742.70	AUX SPLWY
3015	10246.30	10110.86	1742.70	AUX SPLWY
3016	10229.49	10121.27	1742.70	AUX SPLWY
3017	10201.60	10138.55	1742.70	AUX SPLWY END

PLAN MAP

REVISIONS		
DATE	APPROVED	TITLE

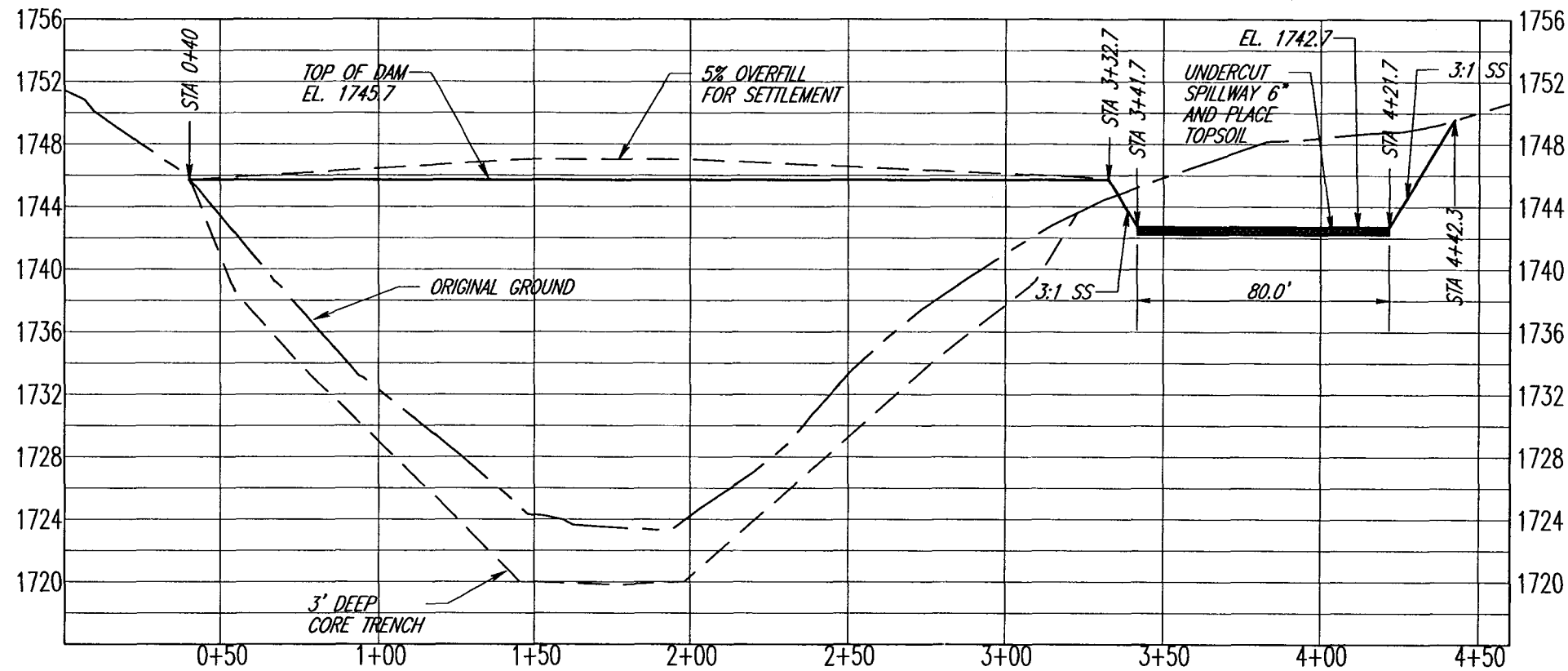
Designed	JOHN SCHMIDT	Date	1/26/2010
Drawn	JOHN SCHMIDT		1/26/2010
Checked			
Approved			

PRODUCER W. MATT THOMPSON
SE 1/4 SECT. 22, T.105 North R. 23 West
AMERICAN CREEK COUNTY
LYMAN CONSERVATION DISTRICT

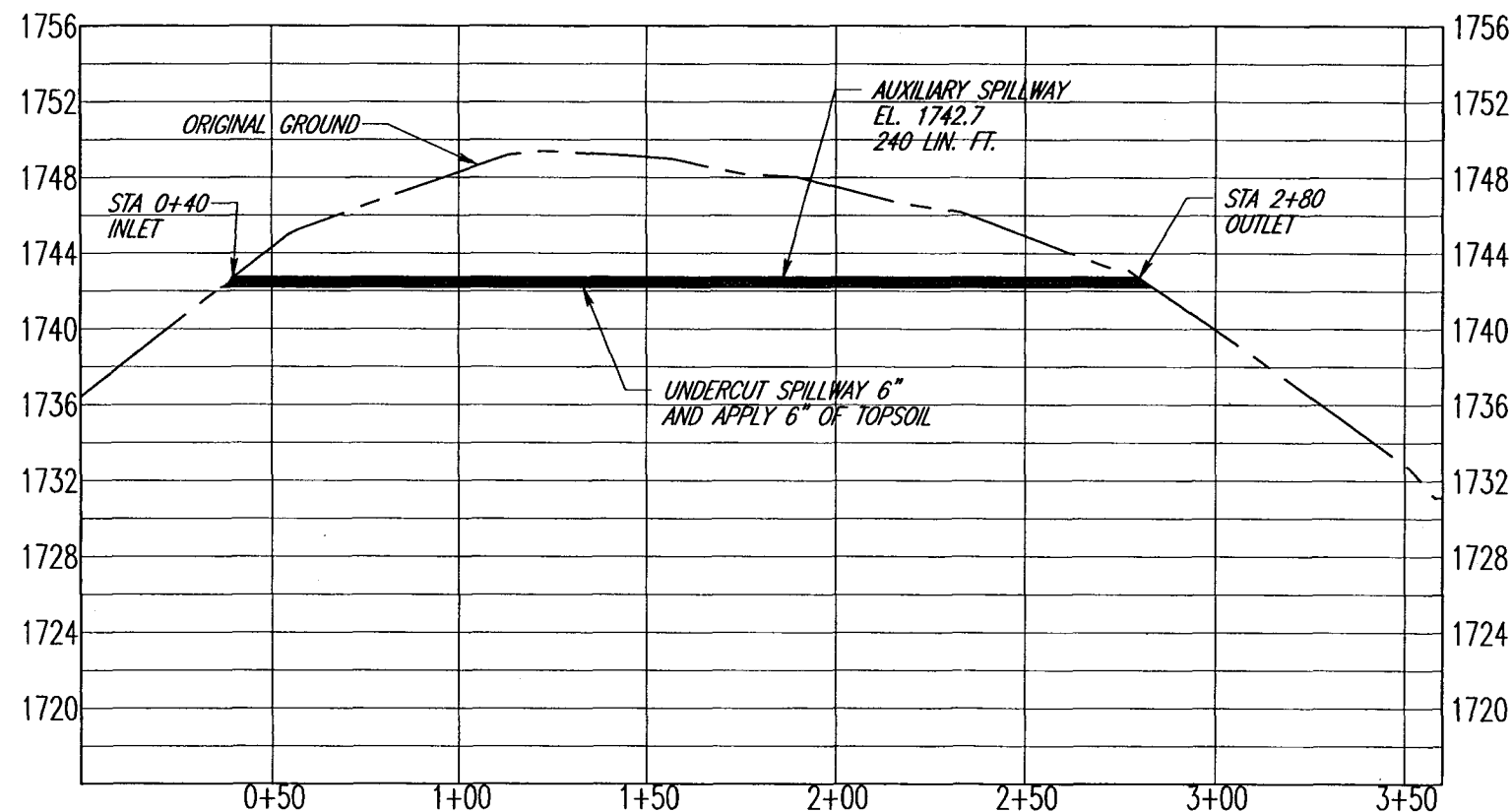
USDA - NRCS
FIELD SUPPORT OFFICE
1717 N. LINCOLN AVE. SUITE 104
PIERRE, SOUTH DAKOTA 57501



File Name: Matt_Thompson_Dampro
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Sheet 3 of 8



PROFILE OF DAM



PROFILE OF AUXILIARY SPILLWAY

EARTH DAM PROFILE
AUXILIARY SPILLWAY PROFILE

REVISIONS		
DATE	APPROVED	TITLE

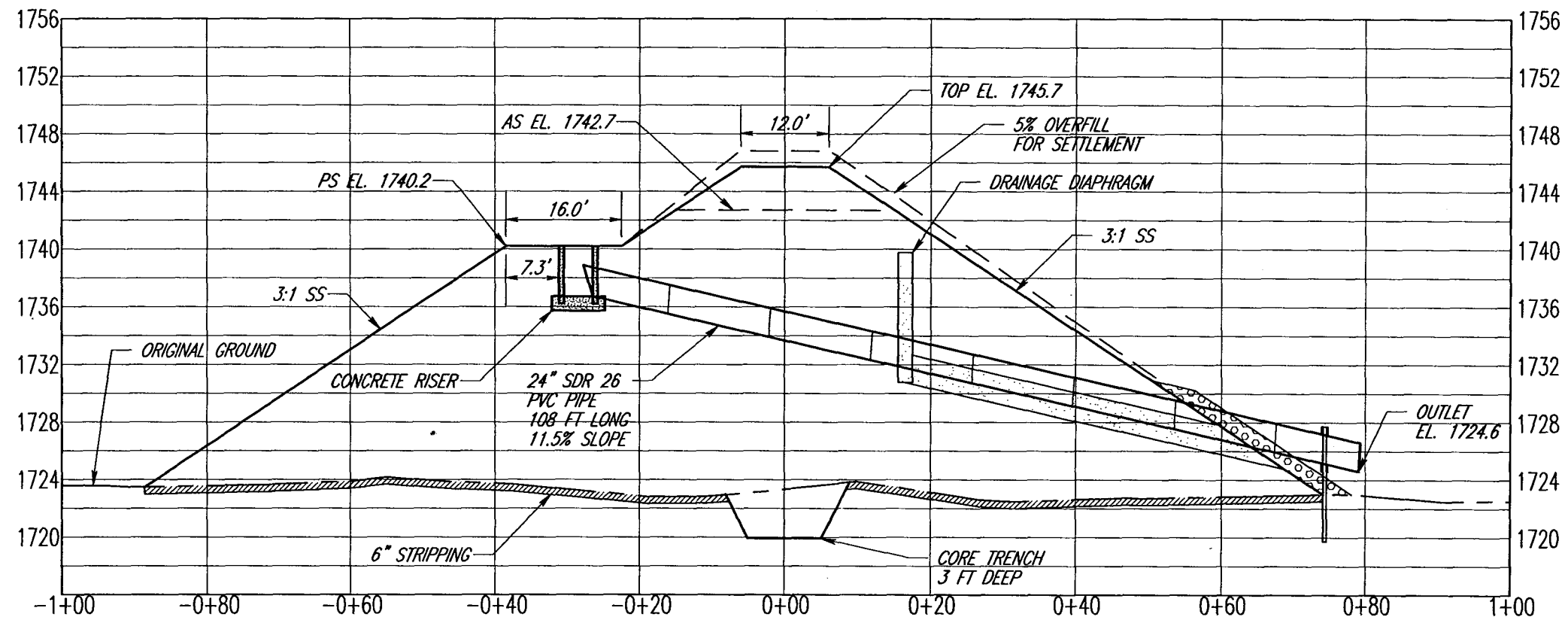
Date 1/26/2010
Designed JOHN SCHMIDT
Drawn JOHN SCHMIDT
Checked
Approved

PRODUCER W. MATT THOMPSON
SE 1/4 SECT. 22 T.105N R. 73W
AMERICAN CREEK COUNTY
LYMAN CONSERVATION DISTRICT

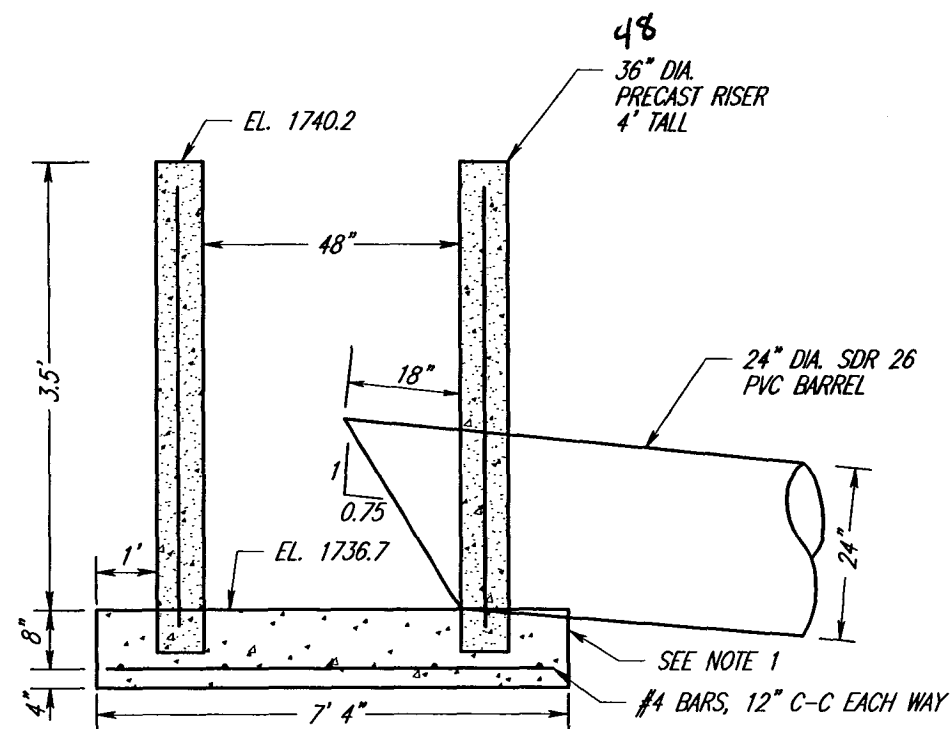
USDA - NRCS
FIELD SUPPORT OFFICE
1717 N. LINCOLN AVE. SUITE 104
PIERRE, SOUTH DAKOTA 57501

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

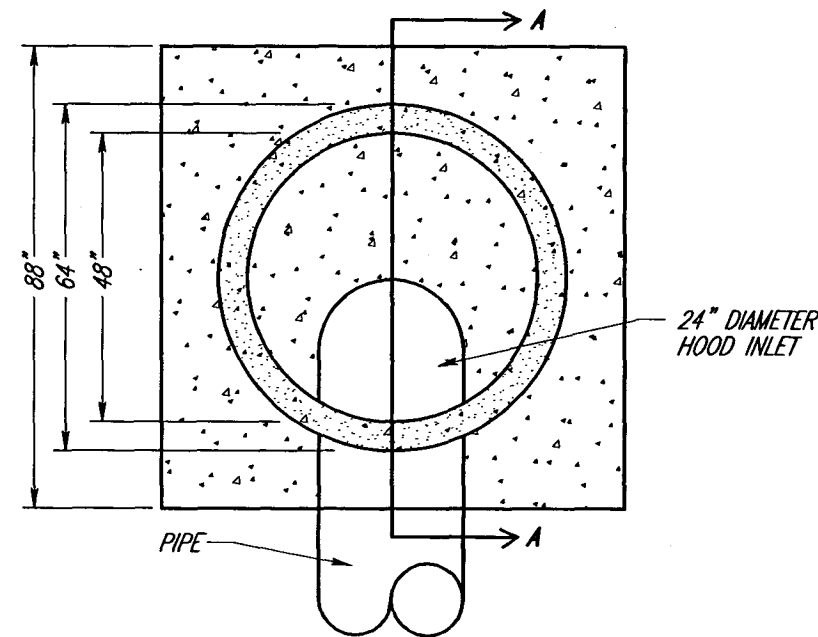
File Name: Matt_Thompson_Dam.pro
Drawing No.
1/26/2010 9:50AM
Sheet 4 of 8



CROSS SECTION OF DAM



CONCRETE RISER
SECTION VIEW A-A



CONCRETE RISER
PLAN VIEW

CONSTRUCTION NOTES

- 1) BOTTOM OF CONCRETE RISER PIPE NEEDS TO BE EMBEDDED IN CONCRETE FLOOR 6" TO ACHIEVE DESIGN INVERT ELEVATION SO RISER WILL DRAIN.
- 2) CONCRETE AROUND RISER PIPE NEEDS TO BE VIBRATED TO INSURE A GOOD SEAL AROUND PIPE.
- 3) DROP STRUCTURE TO BE PRECAST REINFORCED CONCRETE.
- 4) PROVIDE A WATERTIGHT SEAL AROUND THE PVC BARREL AND CONCRETE RISER JOINT.
- 5) BASE FOR CONCRETE RISER WILL REQUIRE 2.0 CY CONCRETE WITH THE DESIGN MIX SPECIFIED IN CONSTRUCTION SPEC SD-12B CONCRETE FOR MINOR STRUCTURES.

CROSS SECTION EARTH DAM
CONCRETE RISER

REVISIONS		
DATE	APPROVED	TITLE

Date 1/26/2010
Designed JOHN SCHMIDT
Drawn JOHN SCHMIDT
Checked
Approved

PRODUCER W. MATT THOMPSON
SE 1/4, SECT. 22, T.105 North R. 73 West
AMERICAN CREEK COUNTY
LYMAN CONSERVATION DISTRICT

USDA - NRCS
FIELD SUPPORT OFFICE
1717 N. LINCOLN AVE. SUITE 104
PIERRE, SOUTH DAKOTA 57501

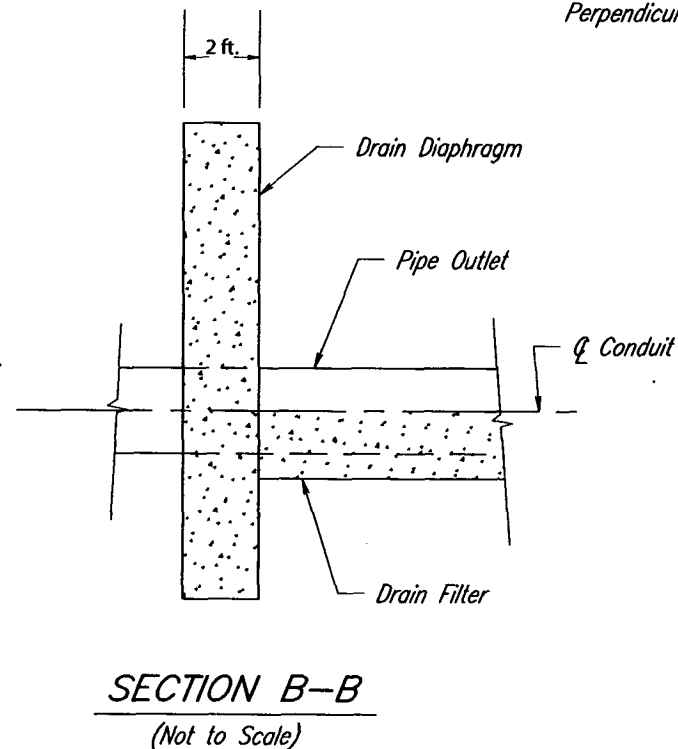
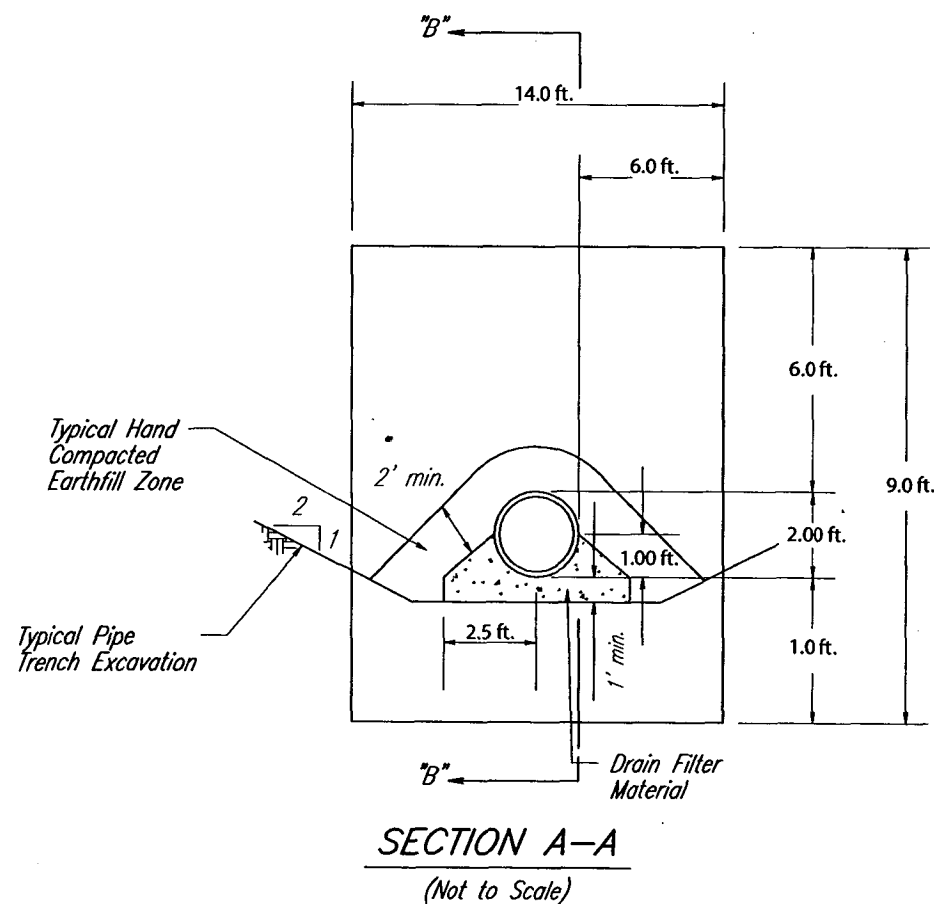
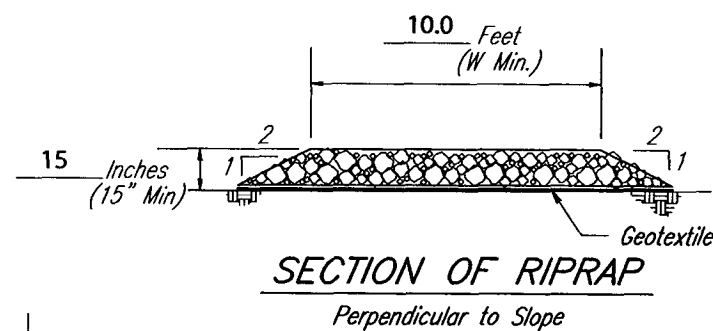
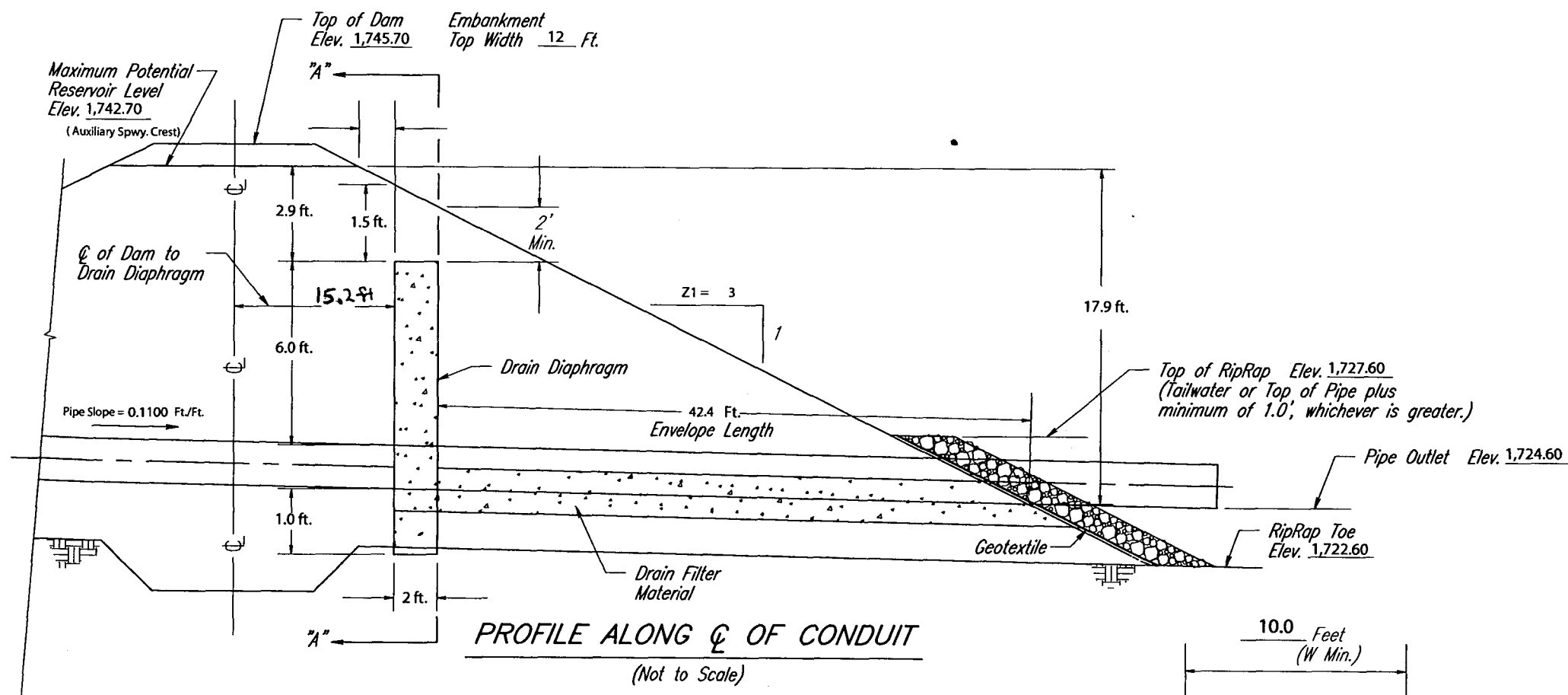
NRCS
Natural Resources Conservation Service
United States Department of Agriculture

File Name:
Matt_Thompson_Dam.pro

Drawing No.

1/26/2010 9:51AM

Sheet 6 of 8



SUMMARY OF DESIGN AND DIMENSIONS

DESIGN DATA			
H = <u>2.9</u> Feet	Hd = <u>17.85</u> Feet		
X = <u>6.0</u> Feet	D = <u>24</u> Inches		
R = <u>1.0</u> Feet	Y = <u>6.0</u> Feet		
C = _____ Feet	Aggregate Gradation # <u>1</u>		
Embankment Backslope (Z1) = <u>3</u> Pipe Slope (S) <u>0.1100</u> Ft./Ft.			

DIMENSIONS	
W = 14.0 Feet (Total Width of Drain Diaphragm)	
T = 9.0 Feet (Total Height of Drain Diaphragm)	
t = 2 Feet (Thickness of Single Filter)	

ESTIMATED QUANTITIES

Drain Filter Material	20.0 Cubic Yards
Geotextile	26.4 Square Yards
Rock Riprap	9.2 Cubic Yards

DRAIN FILTER MATERIAL GRADATION

SIEVE SIZE	PERCENT PASSING
3/8 in.	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

ROCK RIPRAP GRADATION

PERCENT SMALLER	WEIGHT RANGE (LBS.)	AVERAGE CUBIC DIMENSION
100	50 lb.	10"
50-80	30 lb.	7"
15-50	10 lb.	5"
0-15	3 lb.	3"

CONSTRUCTION NOTES

- 1.) 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.
- 2.) The maximum height of drop of the Riprap onto the Geotextile in the pipe outlet area shall be 3 feet.

MATERIAL NOTES

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

DRAINAGE DIAPHRAGM DETAILS

JOB PLAN 3.8 (07/2009)

REVISIONS		
DATE	APPROVED	TITLE
07/21/2009	Jay S. Cobb	State Conservation Engineer

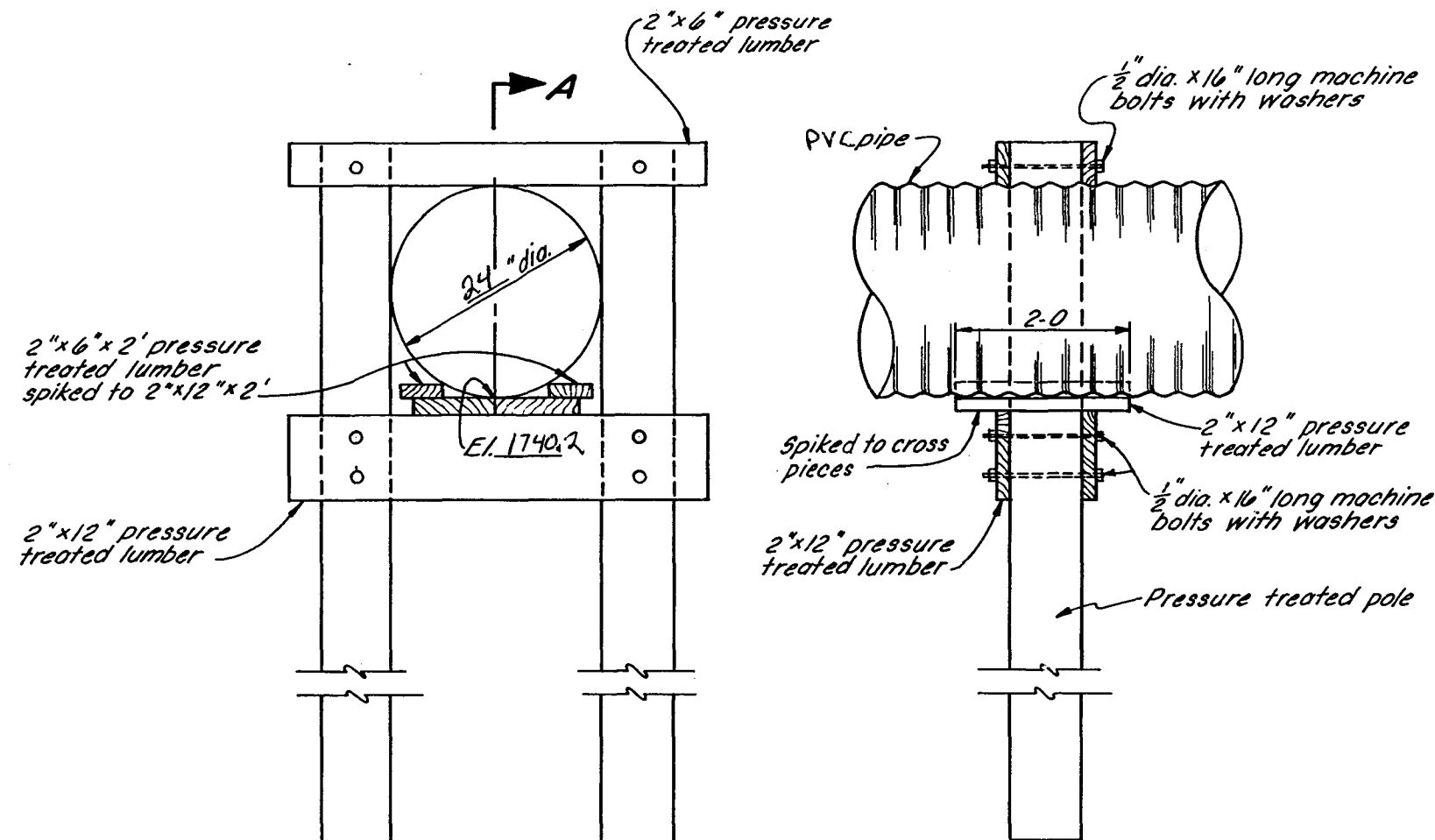
Designed	J. Schmidt	Date	1/15/2010
Drawn	J. Schmidt	Date	1/15/2010
Checked			
Approved			

PRODUCER	Matt Thompson
SECTION	22
LYMAN COUNTY	73 W
AMERICAN CREEK CONSERVATION DISTRICT	

USDA - NRCS
State Office Engineering Staff
200 Fourth Street SW
Huron, South Dakota 57350

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

File Name:	20100721.Drainage Diaphragm.DWG
Drawing No.	
Sheet	6 of 8



ELEVATION

SECTIONAL ELEVATION A-A

TABLE OF QUANTITIES

ITEM	LENGTH FOR 24" DIA. PVC PIPE	UNIT	QUANTITY
PRESSURE TREATED POLE 10" DIA.	10' 0"	EACH	2
2" X 12" PRESSURE TREATED LUMBER	4' 0"	EACH	2
2" X 6" PRESSURE TREATED LUMBER	4' 0"	EACH	2
2" X 12" PRESSURE TREATED LUMBER	2' 0"	EACH	2
2" X 6" PRESSURE TREATED LUMBER	2' 0"	EACH	2
1/2" DIA. MACHINE BOLTS WITH NUTS	16"	EACH	6
1/2" DIA. WASHERS		EACH	12

NOTES:

- HAND OR MACHINE TAMP BACKFILL THOROUGHLY AROUND FOOTINGS AND COLUMNS.

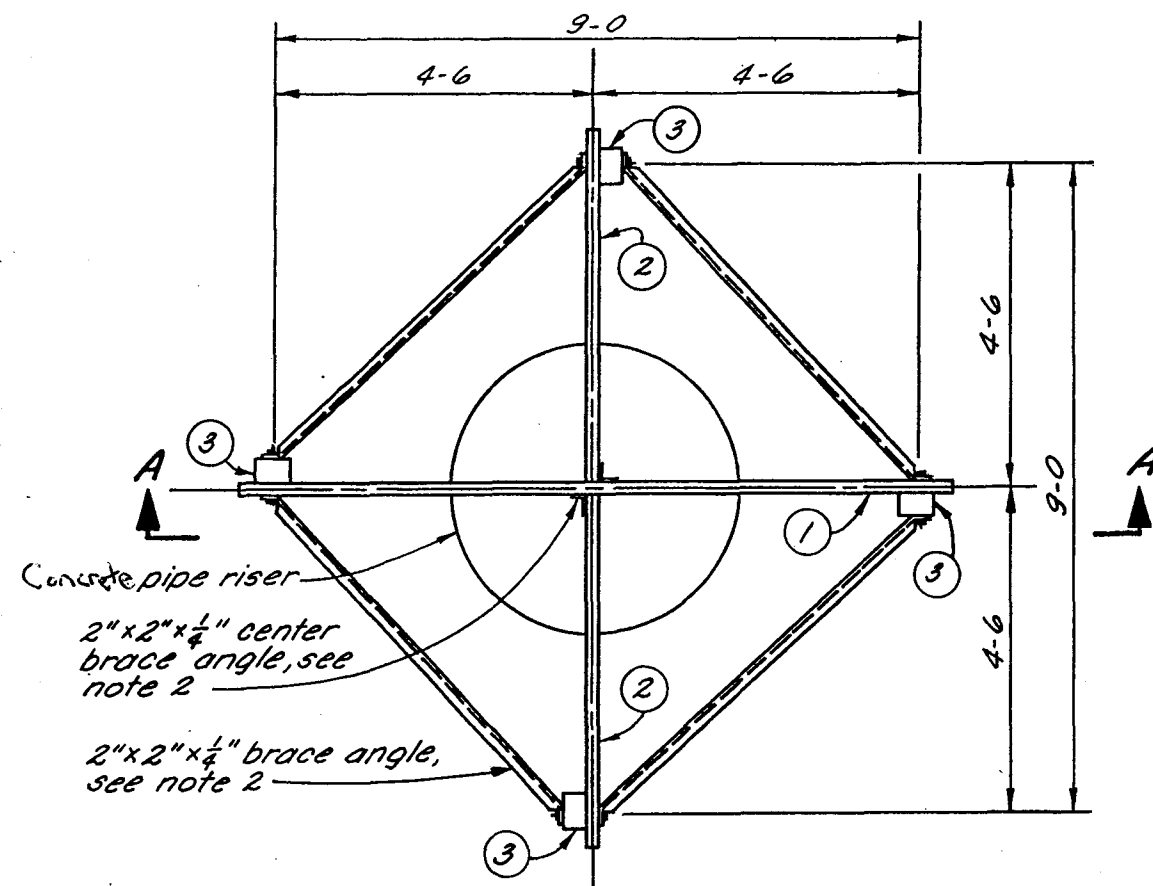
REFERENCE: GUIDE PLAN NO. 4.0

JOB PLAN NO. 4.0

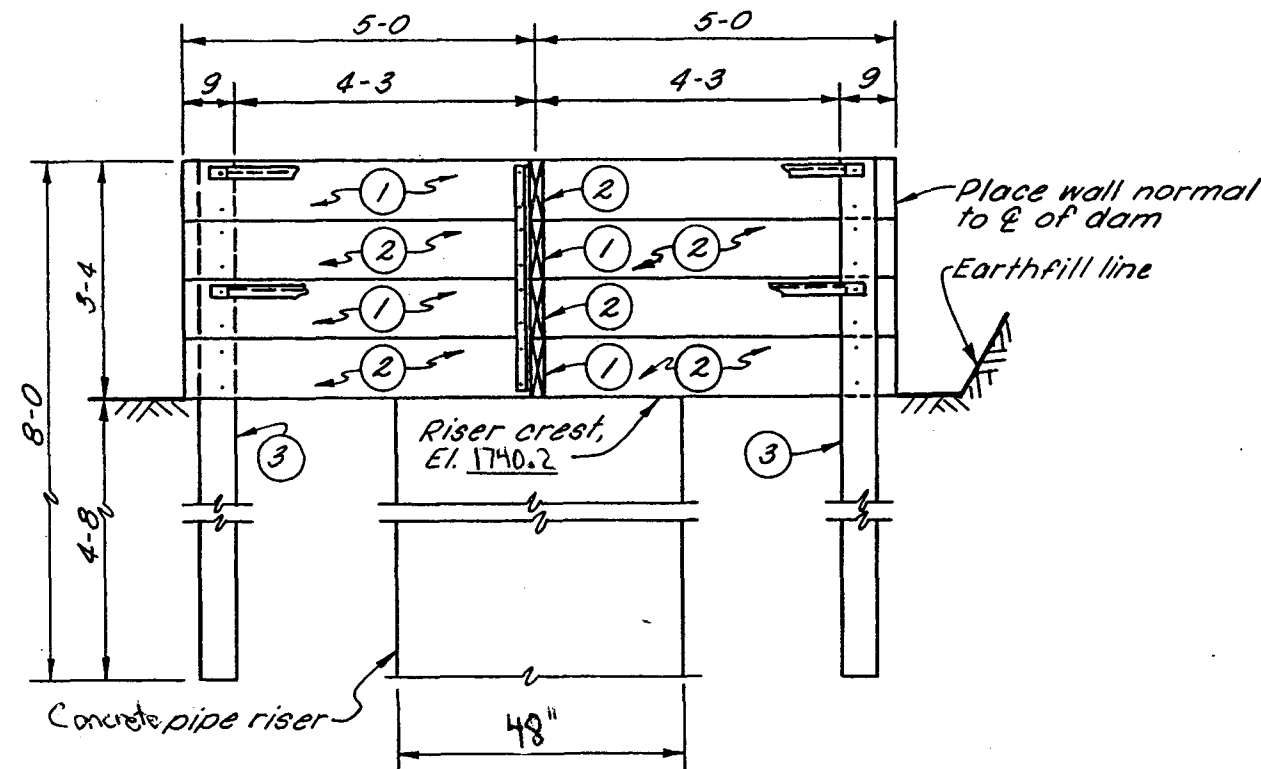
TIMBER PIPE SUPPORT

OPERATOR: <u>MATT THOMPSON</u>	
CONSERVATION DISTRICT: <u>AMERICAN CREEK</u>	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Designed: <u>J. SCHMIDT</u>	Date: <u>1/2010</u>
Drawn: _____	Approved by: _____
Traced: _____	Title: _____
Checked: _____	Title: _____
	Sheet No. <u>7</u> of <u>8</u>
	Drawing No. _____

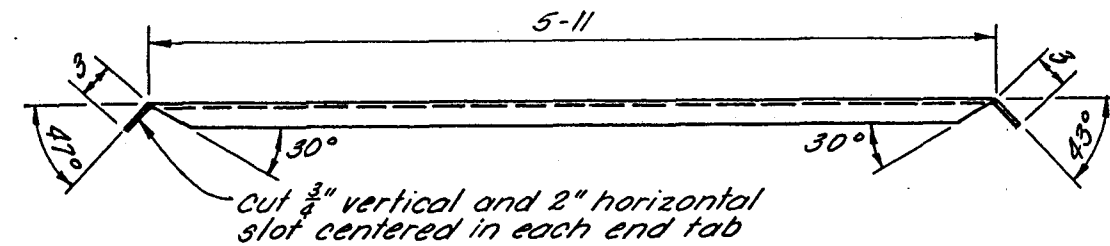
5, N-29,073.4a



PLAN VIEW



SECTIONAL ELEVATION A-A



PLAN VIEW OF BRACE ANGLE

TABLE OF QUANTITIES

ITEM	MARK	NO. REQ'D.	QUANTITY
2" X 10" X 10' PRESSURE TREATED LUMBER	1	4	67 BD. FT.
2" X 10" X 4'-11" PRESSURE TREATED LUMBER	2	8	66 BD. FT.
4" X 6" X 8' PRESSURE TREATED POST	3	4	64 BD. FT.
2" X 2" X 1/4" X 6'-5" STEEL ANGLE		8	164 LB.
2" X 2" X 1/4" X 3'-2" STEEL ANGLE		2	20 LB.
5/8" X 8" STEEL BOLTS, NUTS, 2 WASHERS		32	32 SETS
1/2" X 3" STEEL BOLTS, NUTS, 2 WASHERS		32	32 SETS

NOTES:

1. TO 4" X 6" POSTS (4 REQUIRED) BOLT 2" X 10" BOARDS USING TWO 5/8" X 8" BOLTS PER 2" X 10" BOARD. DO NOT PLACE BOLTS CLOSER THAN 1 1/2" FROM EDGE OF BOARD.
2. FOR CENTER BRACE ANGLES DRILL 8 - 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 2" X 10" BOARD AND TO TOP BOLT ON NEXT TO BOTTOM BOARD.

TRASH RACK AND BAFFLE
FOR RISER DIA. 36" THRU 60"

OPERATOR: MATT THOMPSON
CONSERVATION DISTRICT: AMERICAN CREEK

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed: J. SCHMIDT Date: 1/20/10 Approved by: _____
Drawn: _____ Title: _____
Traced: _____ Sheet: _____ Drawing No. _____
Checked: _____ No. 3 of 3

JOB PLAN NO. 6.4

5, N-29, 073.6-4a

Water Permit Application No. 2650-2
W. Matt Thompson

Top of Dam Elev. - 1745.7	}	<u>Cat. 3 - Low Hazard Dam</u>
2nd Spillway Elev. - 1742.7		
P. Spillway Elev. - 1740.2		
DS Emb. Toe Elev. - 1722.6		
		<u>Ht. = 23.1 ft</u>

Normal Storage Capacity - 33.2 A.-Ft
 Int. Storage Capacity - 49.5
 Max. Storage Capacity - 73.9

Int. Capacity x Eff. Ht. = $49.5 \times 19 = 940.5 < 3000 \therefore$ 25 year
Minimum Spillway Design

From USGS WRI 98-4055 "Tech. Serv. Est. Peak Flows ... in SD"
 Region D DA = 592 Ac. = 0.93 mi.²

$$Q_{25} = 676 CA^{.585}$$

$$= 676 (.93)^{.585}$$

$$= \underline{647 \text{ cfs}}$$

$$Q_{100} = 1270 CA^{.663}$$

$$= 1270 (.93)^{.663}$$

$$= \underline{1210 \text{ cfs}}$$

Secondary Spillway Capacity

$$Q = CLH^{3/2} \quad C = 2.6$$

$$= (2.6)(80)(3)^{1.5} \quad L = 80$$

$$= \underline{1080 \text{ cfs}} \quad H = 3$$

Section 74:02:08:09

1. Topo Map - OK
2. Dam Axis Profile - OK
3. 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

NRCS Annual Yield

DA = 592 ISO = 2 1/2 CN = 83

$$80\% \text{ chance} = 0.5$$

$$0.5 \times 592^{1/2} = \underline{25 \text{ A.-Ft}}$$

$$50\% \text{ chance} = 1.1$$

$$1.1 \times 592^{1/2} = \underline{54 \text{ A.-Ft}}$$

$$10\% \text{ chance} = 3.7$$

$$3.7 \times 592^{1/2} = \underline{182 \text{ A.-Ft}}$$



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov

March 1, 2010

W Matt Thompson
PO Box 6
Wilson WY 83014

Dear Mr. Thompson:

Thank you for submitting the *Application for a Permit to Appropriate Water* for the storage dam to be used for fish & wildlife propagation and livestock watering. In order to complete the application the following is required.

- Enclosed is the application. The bottom portion of the application needs to be signed by a notary public.
- The application/license filing fee will be \$700.00.

Upon receipt of the notarized application and filing fee, further processing of the application will continue. If you have any questions, please contact me.

Sincerely,

Karen Schlaak
Water Rights Program
605 773-3352
karen.schlaak@state.sd.us

enclosure



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov

March 9, 2010

RECEIVED

APR 16 2010

WATER RIGHTS
PROGRAM

W Matt Thompson
PO Box 6
Wilson WY 83014

Dear Mr. Thompson:

Regarding your *Application for a Permit to Appropriate Water* for a stock dam in Lyman County, we received your check for the application/license filing fee on March 8th. This letter is just a reminder that the signed and notarized application needs to be returned also.

If you have any questions, please contact me.

Sincerely,

Karen Schlaak
Water Rights Program
605 773-3352
karen.schlaak@state.sd.us



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov

**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 2650-2, W. Matt Thompson**

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. 2650-2, W. Matt Thompson, PO Box 6, Wilson WY 83014.

The Chief Engineer is recommending APPROVAL of Application No. 2650-2 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. 2650-2 authorizes a dam with a storage capacity of 33.2 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.

Garland Erbele, Chief Engineer
April 30, 2010



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov

April 30, 2010

W. Matt Thompson
PO Box 6
Wilson, WY 83014

Dear Mr. Thompson:

We have reviewed the plans and specifications for your dam project located in the S ½ SE ¼ of Section 22-T105N-R73W, in Lyman County. The plans and specifications for the project are approved. Approval of the plans and specifications does not authorize construction of the dam. The construction of the dam may not begin until Water Permit No. 2650-2 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 Thompson Dam will be classified as a small size Category 3, Low Hazard dam with a dam height of 23.1 feet and a normal storage capacity of 33.2 acre-feet and a maximum storage capacity of 74 acre-feet.

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

Sincerely,

Timothy G. Schaal, P.E.
Natural Resources Engineering Specialist
for Garland Erbele, Chief Engineer
Water Rights Program
(605) 773-3352

c: John Schmidt, NRCS, Pierre

REPORT ON
WATER PERMIT APPLICATION No. 2650-2
W. Matt Thompson
April 20, 2010

Water Permit Application No. 2650-2 has been filed by W. Matt Thompson to impound 33.2 acre-feet of water from runoff by constructing a dam located in the S $\frac{1}{2}$ SE $\frac{1}{4}$ Section 22-T105N-R73W, in Lyman County. The application also requests impoundment of sufficient water to maintain water to the outlet elevation. The water will be used for fish and wildlife production 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, construction of the dam can not begin until Water Permit Application No. 2650-2 is approved.

The dam will be 23.1 feet high with a normal storage capacity of 33.2 acre-feet with a reservoir level at the primary spillway elevation, and a maximum storage capacity of 74 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 592 acres or 0.93 square miles. The dam is designed to have a 48 inch diameter concrete riser with a 24 inch diameter PVC barrel with 5.5 feet of freeboard as the primary spillway, and an 80 foot wide earthcut secondary spillway with 3 feet of freeboard. A 25 year frequency event produces a peak runoff of approximately 647 cfs and a 100 year frequency event produces a peak runoff of approximately 1210 cfs. The earthcut spillway will have a capacity of approximately 1080 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 54 acre-feet and the annual yield with a 10 percent chance, or 1 out of 10 years, is expected to be 182 acre-feet.

The Thompson Dam will be located in the S $\frac{1}{2}$ SE $\frac{1}{4}$ of Section 22-T105N-R73W on an unnamed tributary to American Crow Creek, about one-half mile upstream of the confluence of the unnamed tributary and American Crow Creek. There are no existing Water Permits/Rights filed on the unnamed tributary between the proposed dam and American Crow Creek.

Conclusions:

1. Water Permit Application No. 2650-2 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. 2650-2.



Timothy G. Schaal, P.E.
Natural Resources Engineering Specialist

Publisher's Affidavit of Publication

STATE OF SOUTH DAKOTA)
)SS
COUNTY OF LYMAN)

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

Notice of Application
84 Lines

a printed copy of which is hereto attached and published in the said 2 consecutive week(s).

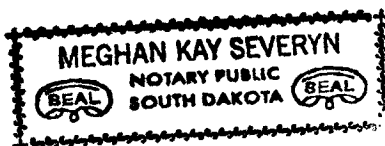
The first publication of said notice in said newspaper aforesaid was on Wednesday, the 12 day of May, A.D., 2010 and that the succeeding publications were severally
Wednesday, the 19 day of May, A.D., 2010
Wednesday, the _____ day of _____, A.D., 2010
Wednesday, the _____ day of _____, A.D., 2010
Wednesday, the _____ day of _____, A.D., 2010
Wednesday, the _____ day of _____, A.D., 2010
Wednesday, the _____ day of _____, A.D., 2010
Wednesday, the _____ day of _____, A.D., 2010
Wednesday, the _____ day of _____, A.D., 2010

and the last publication on Wednesday, the 19 day of May, 2010, that the full sum of fees charged for publishing the same, to-wit; the sum of \$ 50.04 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
Meghan Kay Severyn
Notary Public

Subscribed and sworn to before me this 20 day of May, 2010
My Commission expires _____, 20____

Meghan Kay Severyn
My Commission Expires
March 12, 2015



NOTICE OF APPLICATION NO. 2650-2 to Appropriate Water

Notice is given that W. Matt Thompson, PO Box 6, Wilson WY 83014 has filed an application for a water permit to impound 33.2 acre-feet of water from runoff by constructing a dam located in the S 1/2 SE 1/4 Section 22 with water impounded in the S 1/2 SE 1/4, NW 1/4 SE 1/4 Section 22; all in T105N-R73W. This application requests impoundment of sufficient water to maintain water to the outlet elevation. The water is for fish and wildlife propagation and livestock water purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 2650-2 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 1, 2010.

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 twice at the total approximate cost of \$44.68.

RECEIVED

MAY 21 2010

WATER RIGHTS
PROGRAM



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov

April 30, 2010

Lyman County Herald
PO Box 518
Presho SD 57568

ATTENTION: Legal Public Notice

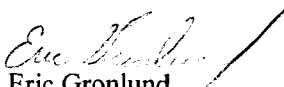
Enclosed is a Notice on Application No. 2650-2 to Appropriate Water to be published twice. Please publish the first notice on May 12, 2010 with the second publication 7 days later. The text of the notice can be e-mailed to your paper by contacting Karen Schlaak at (605) 773-3352.

The applicant must verify to you that the notice is to be published, before you make the first publication. **Please BILL the APPLICANT for the cost of publication.** The APPLICANT is W Matt Thompson, PO Box 6, Wilson WY 83014 (Ph # 307-413-4015).

Please send the Water Rights Program the first publication immediately. The publication is checked for accuracy so any corrections can be made in the second publication. You may use the form below or fax a copy of the first publication. Any fax should be sent to the attention of Karen Schlaak at (605) 773-4068. Publication errors can invalidate the public notice.

After the second publication, **please send us an affidavit or use the enclosed Proof of Publication form.** 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

-----CUT HERE-----

No. 2650-2

TO: Eric Gronlund
Water Rights Program
Joe Foss Building
Pierre SD 57501-3181

Date _____

We are in receipt of your letter of April 30, 2010 enclosing Notice to Appropriate Water by Application No. 2650-2 which was first published in our issue of _____. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

Name _____

Newspaper _____



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

PMB 2020
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 RIGHT AWAY.

April 30, 2010

W Matt Thompson
PO Box 6
Wilson WY 83014

Dear Mr. Thompson:

Water Permit Application No. 2650-2 for fish & wildlife use has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice has been sent to the Publisher of the Lyman County Herald printed at Presho SD (Ph # 605-895-6397). You will need to contact the newspaper 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 to authorize publication of your Notice and to arrange for payment. Early contact with the paper can eliminate delays. Upon receiving authorization, the publisher has been instructed to publish your notice once each week for two consecutive weeks. 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
eric.gronlund@state.sd.us

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 first Notice on May 12, 2010 with the second publication 7 days later. 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. 2650-2 to Appropriate Water

Notice is given that W. Matt Thompson, PO Box 6, Wilson WY 83014 has filed an application for a water permit to impound 33.2 acre-feet of water from runoff by constructing a dam located in the S $\frac{1}{2}$ SE $\frac{1}{4}$ Section 22 with water impounded in the S $\frac{1}{2}$ SE $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$ Section 22; all in T105N-R73W. This application requests impoundment of sufficient water to maintain water to the outlet elevation. The water is for fish and wildlife propagation and livestock water purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 2650-2 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 1, 2010.

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 twice at the total approximate cost of_____.



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov

JUL 15 2010

W Matt Thompson
PO Box 6
Wilson WY 83014

Dear Mr. Thompson:

Enclosed is Water Permit No. 2650-2 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,

Garland Erbele, Chief Engineer
Water Rights Program
(605) 773-3352

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