

WATER PERMIT NO. 2645-2

Name of Applicant: **Trent Schindler**

Address: **32824 242 St, Reliance SD 57569**

Phone: **605 473-5321**

Amount of Water Claimed: **50.2 AF**

Total Acres:

Source of Water Supply: **runoff**

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

County: **Lyman**

Type of Waste Disposal System:

Location: **3^{miles} west of Reliance**

PRIORITY

Date Received: **1-29-10**

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

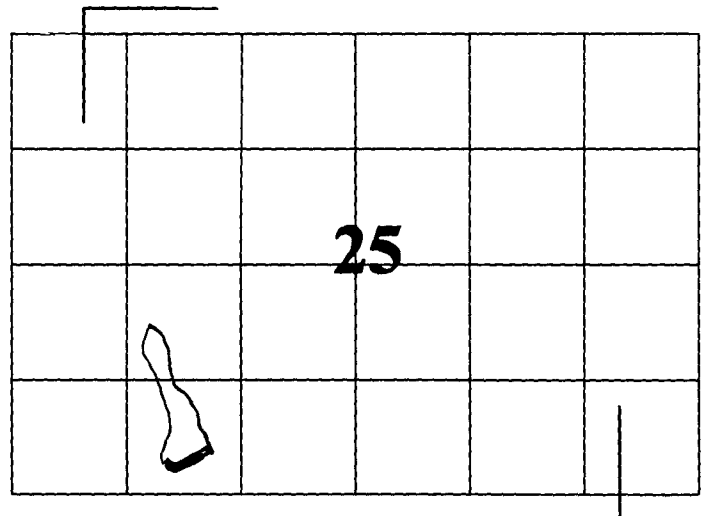
Corrected Application Received:

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

Remarks: **Reconstruction of old dam**

Diversion Point: **SW ¼ SW ¼ Sec 25-T105N-
R74W**

Water Impounded: **W ½ SW ¼ Sec 25-T105N-
74W**



Depth of Well: **na**

Well Driller:

Remarks:

Type of Map: **topo**

Prepared by: **John Schmidt, NRCS**

Reviewed and the Number Assigned on: **2-1-10**

By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____

Mail to: Water Rights Program Joe Foss Building 523 E. Capitol Pierre, SD 57501-3181 (605) 773-3352	(office use only)	
	No. <u>2645-2</u>	Hydrologic Unit <u>10140104</u>
	Basin <u>Missouri River</u>	
	Newspaper <u>Lyman Co. Herald</u>	<u>PO Box 518</u> <u>1605-895-6397</u> <u>Presho 57568</u>

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JAN 29 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 <u>Livestock</u> | |

Type of Application: (check one)

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

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

- Name of Applicant Trent Schindler Phone (605) 473-5321
(check one) ☒ Owner ☐ Tenant/lessee
Mailing Address 32824 242 St Reliance State SD 57569
(Street, RR, or Box and City) (Zip Code)
- Amount of water claimed _____ *CFS or _____ **GPM 50.2 ***AF
(*Cubic Feet per Second) (**Gallons per Minute) (***)Acre Feet - storage capacity of dam/dugout or annual use if applicable)
- Source of water supply Runoff from 540 Acre Watershed above dam
- Location of point of diversion (example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W) County Lyman
Dam is in the SW 1/4, SW 1/4, Sec. 25, T 105 N, R 74 W Water impounded: W 1/2 SW 1/4
Sec 25 T 105 N R 74 W
- County or counties where water will be used Lyman
- Annual period during which water is to be used 365 days per year Jan. 1 - Dec. 31
- 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)

Rebuild of an old dam to meet NRCS 378 Pond Standard. Construction will include raising the top of dam and adding a core trench under the new fill. Add a 18" PVC pipe and construct a 125 ft wide 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. Attach map and any other technical information. (see instructions)

I, Trent Schindler, 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 Trent Schindler

Subscribed and sworn to before me this 25th day of January 20 10

Peggy Jensen
Notary Public signature

(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 applicants 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

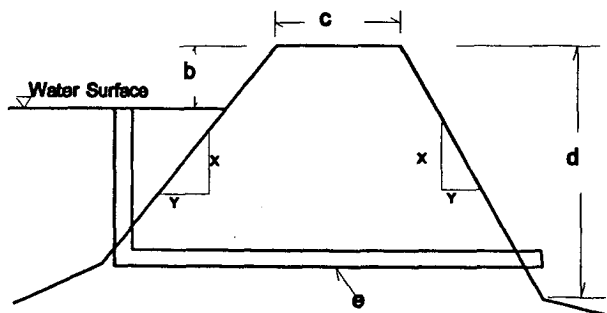
- a) Surface Dimensions _____ Depth _____
- b) Depth to water (ground surface to water level) _____

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 _____ 4.3ft
- c) Crest Width _____ 12ft
Crest Length _____ 452ft
- d) Height _____ 15.8ft
- e) Primary Outlet Capacity _____ 18.3cfs
If pipe, diameter _____ 18"
- f) Secondary Spillway Capacity _____ 528cfs
Spillway Width _____ 125ft
- g) X & Y Slope _____
Upstream _____
Downstream _____
- h) Surface Area of Impoundment _____ 11.2 Acres
- i) Storage _____ 50.2 Acre Feet
- j) Drainage Area Above Dam _____ 540.0 Acres

SOUTH DAKOTA
WATER PERMIT NO. 2645-2

Date of first receipt of application January 29, 2010.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 2645-2 to Trent Schindler, 32824 242 St, Reliance SD 57569 authorizing the construction of the dam and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 2645-2 authorizes impoundment of 50.2 acre-feet of water from runoff by reconstructing a dam located in the SW 1/4 SW 1/4 Section 25 with water impounded in the W 1/2 SW 1/4 Section 25; all in T105N-R74W.
2. The water appropriated shall be used for the purpose of fish and wildlife propagation and livestock water and may not exceed the amount of water needed for beneficial use.
3. The water is to be used during the following described annual period: January 1 – December 31.
4. The date of approval of Permit No. 2645-2 is March 15, 2010.
5. The date from which applicant may claim right is January 29, 2010.
6. One-fifth of the construction is to be completed on or before September 15, 2012.
7. All construction is to be completed on or before March 15, 2015.
8. Water is to be put to beneficial use on or before March 15, 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. 2645-2 authorizes a dam with a storage capacity of 50.2 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.

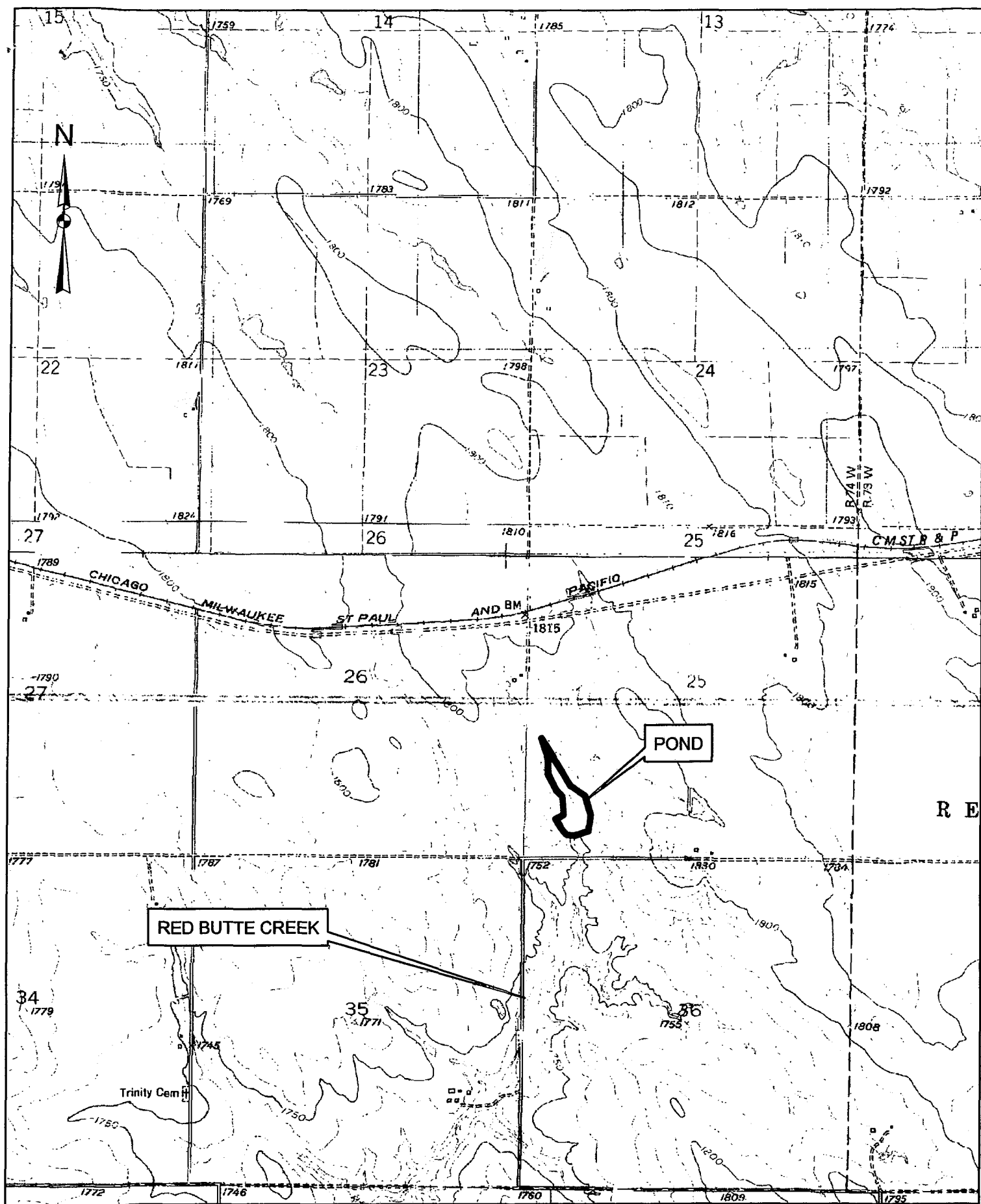
WATER MANAGEMENT BOARD

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

APR 28 2010

date





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JAN 29 2010

TRENT SCHINDLER
POND

SEC. 25, T 105 N, R 74 W, LYMAN COUNTY

John Schmitt
Ag Engineer
USDA - NRCS
1/6/2010

0 1,000 2,000 4,000 6,000 8,000 Feet
WATER RIGHTS PROGRAM

RECEIPT

WATER RIGHTS PROGRAM

South Dakota Department of Environment and Natural Resources

Date 1/29, 20 10

RECEIVED OF Trent Schindler 32824 242nd St Reliance SD 57569

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

Fee for Application for Permit No. <u>2645-2</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>2645-2</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.

By

[Signature]
Chief Engineer

044.40

FEB - 1 2010



Natural Resources Conservation Service
Field Support Office
1717 N Lincoln Ave, Suite 104
Pierre, South Dakota 57501

**WATER RIGHTS
PROGRAM**

Phone: (605) 224-2476, ext. 5
Fax: (605) 224-6615

January 29, 2010

Mr. Tim Schaal
PMB 2020
Water Rights Program
Joe Foss Building
523 E. Capitol Avenue
Pierre, SD 57501

Dear Mr. Schaal:

Enclosed is the design for a dam for Trent Schindler in Lyman County, South Dakota for your review for Safety of Dams.

Please contact me with any questions or concerns at 605-224-2476 ext. 138 or by email at john.schmidt@sd.usda.gov.

Sincerely,

A handwritten signature in black ink that reads "John Schmidt".

JOHN SCHMIDT, PE
Agricultural Engineer

Attachments

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WATER RIGHTS
PROGRAM



U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

CONSTRUCTION PLANS AND SPECIFICATIONS

TRENT SCHINDLER

POND

**SW ¼ Section 25, T. 105 N, R. 74 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 Trent Schindler		County Lyman		
PRACTICE(S) 378 - Pond				
LEGAL DESCRIPTION SW 1/4		Sec. 25	T 105N	R 74W
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: _____

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 Trent Schindler

Job Location SW $\frac{1}{4}$ Sec 25, T 105N, R 74 W, Lyman County GPS _____

Prepared by John Schmidt Date 12/21/2009

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: **Trent Schindler** Name of Site: **Pond**
 County: **Lyman**
 Field #: **1** Watershed: **Red Butte Creek**
 Location:
 1/4 Section: **SW** Section: **25** Township: **105 N** Range: **74 W**
 Latitude: **43 51' 46" N** Longitude: **99 39' 45" W**

Dam in Series: **No**
 Explain: **Small dam upstream has limited storage and the volume of water in the event of a breach would be stored in Schnindler Dam.**

Dam and Reservoir Data

Assumed Job Class	III
Assumed Hazard Class	A
Centerline Elevation Channel Bottom*	1736
Centerline Elevation Flood Plain*	1741
Centerline Elevation Top of Dam*	1751.3
Centerline Elevation Auxiliary Spillway Crest*	1748.3
*Elevation is based on Mean Sea Level Datum	

Max. Depth of Water within Reservoir 11 Ft.

Storage

Storage Below Principal Spillway	50.2 Ac.-Ft.
Storage between Principal Spillway and Auxiliary Spillway	15.7 Ac.-Ft.
Storage between Auxiliary Spillway and Top of Dam	45.9 Ac.-Ft.
Other	0 Ac.-Ft.
Total Storage to Top of Dam	111.8 Ac.-Ft.

Downstream Conditions

1. Valley Conditions Downstream of Structure	Parallel
Approximate Slope of Channel	
2. Stream Channel Size	
Depth	5 Ft.
Bottom Width	50 Ft.
Top Width	150 Ft.
3. Valley Characteristics	
Width	500 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'	1/2 mile	5 ft	☒	☐
Township or County Gravel Road D<2'	1 mile		☐	☒
Township or County Gravel Road D<2'	2 miles		☐	☒
Bridges: Describe type and opening size			☐	☒
Railroads:			☐	☒
Buildings and Utilities:				
Farm Building(s)	3/4 mile	10 to 15 feet	☐	☒
			☐	☒
			☐	☒
			☐	☒
Describe: Gravel roads will not be impacted if dam would fail.				

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

Further Evaluation Needed

Visual Assessment

No

Attached: Breach Routings ☐

Maps ☒

Other supporting documents:

Simple Dambreak printout

Actual Hazard Class*

A

Final Job Class

III

Hazard Analysis by:

John Schmidt

Date:

12/7/2009

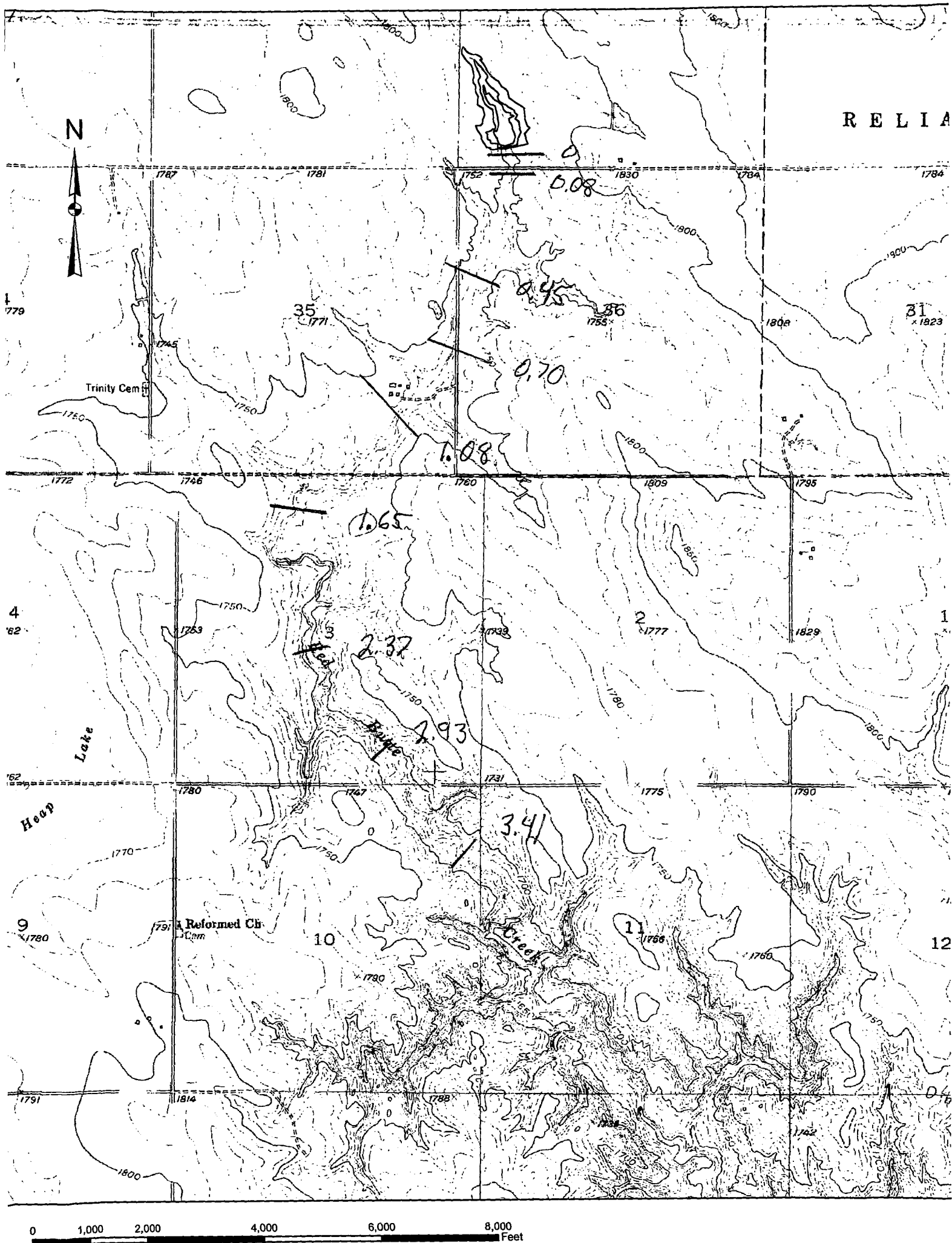
Approved by

John Schmidt

Date:

1/6/2010

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



SIMPLIFIED DAMBREAK MODEL (SMPDBK) VERSION: 9/91
 BY D.L. FREAD, J.M. LEWIS, & J.N. WETMORE - PHONE: (301) 427-7640
 NWS HYDROLOGIC RESEARCH LAB W/OH3, 1325 EAST-WEST HIGHWAY,
 SILVER SPRING, MD 20910

Trent Schindler Dam Red Butte Creek							
	IBC	ISH	JNK	IDAM	IPLT	IREC	
	1	0	0	0	1	0	
	HDE	BME	VOL	SA	BW	TFM	QO
C4	1751.3	1736.0	112.	17.1	61.1	18.8	1.
C5	NS= 9	NCS= 4	CMS=.50	DISTTN= 2.93			
	X-S NO. 1						
C6-1	D= .00	FLD=	5.00				
C7-1	HS= 1735.00	BS=	25.	BSS=	0.	CM=	.050
C7-2	HS= 1736.00	BS=	150.	BSS=	0.	CM=	.050
C7-3	HS= 1745.00	BS=	360.	BSS=	0.	CM=	.050
C7-4	HS= 1755.00	BS=	770.	BSS=	0.	CM=	.050
	X-S NO. 2						
C6-2	D= .08	FLD=	5.00				
C7-1	HS= 1730.00	BS=	25.	BSS=	0.	CM=	.050
C7-2	HS= 1735.00	BS=	150.	BSS=	0.	CM=	.050
C7-3	HS= 1740.00	BS=	300.	BSS=	0.	CM=	.050
C7-4	HS= 1750.00	BS=	800.	BSS=	0.	CM=	.050
	X-S NO. 3						
C6-3	D= .45	FLD=	5.00				
C7-1	HS= 1729.00	BS=	25.	BSS=	0.	CM=	.050
C7-2	HS= 1735.00	BS=	400.	BSS=	0.	CM=	.050
C7-3	HS= 1740.00	BS=	600.	BSS=	0.	CM=	.050
C7-4	HS= 1750.00	BS=	1100.	BSS=	0.	CM=	.050
	X-S NO. 4						
C6-4	D= .70	FLD=	5.00				
C7-1	HS= 1725.00	BS=	50.	BSS=	0.	CM=	.050
C7-2	HS= 1730.00	BS=	200.	BSS=	0.	CM=	.050
C7-3	HS= 1740.00	BS=	500.	BSS=	0.	CM=	.050
C7-4	HS= 1750.00	BS=	1200.	BSS=	0.	CM=	.050
	X-S NO. 5						
C6-5	D= 1.08	FLD=	5.00				
C7-1	HS= 1715.00	BS=	50.	BSS=	0.	CM=	.050
C7-2	HS= 1720.00	BS=	100.	BSS=	0.	CM=	.050
C7-3	HS= 1730.00	BS=	300.	BSS=	0.	CM=	.050
C7-4	HS= 1740.00	BS=	700.	BSS=	0.	CM=	.050
	X-S NO. 6						
C6-6	D= 1.65	FLD=	5.00				
C7-1	HS= 1705.00	BS=	50.	BSS=	0.	CM=	.050
C7-2	HS= 1710.00	BS=	100.	BSS=	0.	CM=	.050
C7-3	HS= 1720.00	BS=	350.	BSS=	0.	CM=	.050
C7-4	HS= 1730.00	BS=	900.	BSS=	0.	CM=	.050
	X-S NO. 7						
C6-7	D= 2.37	FLD=	5.00				
C7-1	HS= 1695.00	BS=	40.	BSS=	0.	CM=	.050
C7-2	HS= 1700.00	BS=	140.	BSS=	0.	CM=	.050
C7-3	HS= 1710.00	BS=	400.	BSS=	0.	CM=	.050
C7-4	HS= 1720.00	BS=	650.	BSS=	0.	CM=	.050
	X-S NO. 8						
C6-8	D= 2.93	FLD=	5.00				
C7-1	HS= 1675.00	BS=	30.	BSS=	0.	CM=	.050
C7-2	HS= 1680.00	BS=	250.	BSS=	0.	CM=	.050
C7-3	HS= 1690.00	BS=	300.	BSS=	0.	CM=	.050
C7-4	HS= 1700.00	BS=	450.	BSS=	0.	CM=	.050

	X-S NO.	9					
C6-9	D=	3.41	FLD=	5.00			
C7-1	HS=	1665.00	BS=	20.	BSS=	0.	CM= .050
C7-2	HS=	1670.00	BS=	100.	BSS=	0.	CM= .050
C7-3	HS=	1680.00	BS=	300.	BSS=	0.	CM= .050
C7-4	HS=	1690.00	BS=	600.	BSS=	0.	CM= .050

***** DISTANCE TO PRIMARY POINT OF INTEREST MOVED TO THE CROSS SECTION
 ***** CLOSEST TO THIS LOCATION (MI 2.93)

THE DATA FOR THIS DAM IS AS FOLLOWS:

TYPE OF DAM (IDAM)	EARTH
DAM BREACH ELEVATION (HDE)	1751.30 FT
FINAL BREACH ELEVATION (BME)	1736.00 FT
VOLUME OF RESERVOIR (VOL)	112. ACRE-FT
SURFACE AREA OF RESERVOIR (SA)	17.10 ACRES
FINAL BREACH WIDTH (BW)	61.10 FT
TIME OF DAM FAILURE (TFM)	18.82 MINUTES
NON-BREACH FLOW (QO)	1.00 CFS
DISTANCE TO PRIMARY PT OF INTEREST (DISTTN)	2.93 MILES
DEAD STORAGE EQUIV. MANN. N (CMS)	.50

CROSS SECTION NO. 1

FLOOD DEPTH (FLD) 5.00 FT

ELEV.(FT) (HS)	1735.0	1736.0	1745.0	1755.0
TWIDTHS(FT) (BS)	25.0	150.0	360.0	770.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.050	.050	.050	.050

CROSS SECTION NO. 2

REACH LENGTH (D) .08 MI

FLOOD DEPTH (FLD) 5.00 FT

ELEV.(FT) (HS)	1730.0	1735.0	1740.0	1750.0
TWIDTHS(FT) (BS)	25.0	150.0	300.0	800.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.050	.050	.050	.050

CROSS SECTION NO. 3

REACH LENGTH (D) .45 MI

FLOOD DEPTH (FLD) 5.00 FT

ELEV.(FT) (HS)	1729.0	1735.0	1740.0	1750.0
TWIDTHS(FT) (BS)	25.0	400.0	600.0	1100.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.050	.050	.050	.050

CROSS SECTION NO. 4

REACH LENGTH (D) .70 MI

FLOOD DEPTH (FLD) 5.00 FT

ELEV.(FT) (HS)	1725.0	1730.0	1740.0	1750.0
TWIDTHS(FT) (BS)	50.0	200.0	500.0	1200.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.050	.050	.050	.050

CROSS SECTION NO. 5

REACH LENGTH (D)	1.08 MI
FLOOD DEPTH (FLD)	5.00 FT

ELEV.(FT) (HS)	1715.0	1720.0	1730.0	1740.0
TWIDTHS(FT) (BS)	50.0	100.0	300.0	700.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.050	.050	.050	.050

CROSS SECTION NO. 6

REACH LENGTH (D)	1.65 MI
FLOOD DEPTH (FLD)	5.00 FT

ELEV.(FT) (HS)	1705.0	1710.0	1720.0	1730.0
TWIDTHS(FT) (BS)	50.0	100.0	350.0	900.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.050	.050	.050	.050

CROSS SECTION NO. 7

REACH LENGTH (D)	2.37 MI
FLOOD DEPTH (FLD)	5.00 FT

ELEV.(FT) (HS)	1695.0	1700.0	1710.0	1720.0
TWIDTHS(FT) (BS)	40.0	140.0	400.0	650.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.050	.050	.050	.050

CROSS SECTION NO. 8

REACH LENGTH (D)	2.93 MI
FLOOD DEPTH (FLD)	5.00 FT

ELEV.(FT) (HS)	1675.0	1680.0	1690.0	1700.0
TWIDTHS(FT) (BS)	30.0	250.0	300.0	450.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.050	.050	.050	.050

CROSS SECTION NO. 9

REACH LENGTH (D)	3.41 MI
FLOOD DEPTH (FLD)	5.00 FT

ELEV.(FT) (HS)	1665.0	1670.0	1680.0	1690.0
TWIDTHS(FT) (BS)	20.0	100.0	300.0	600.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.050	.050	.050	.050

AN ASTERISK (*) BESIDE A PARAMETER IMPLIES THAT A DEFAULT VALUE WAS COMPUTED

NAME OF DAM: Trent Schindler Dam

NAME OF RIVER: Red Butte Creek

RVR MILE FROM DAM	MAX FLOW (CFS)	MAX ELEV (FT-MSL)	MAX DEPTH (FT)	TIME (HR) MAX DEPTH	TIME (HR) FLOOD	TIME (HR) DEFLOOD	FLOOD DEPTH (FT)
*****	*****	*****	*****	*****	*****	*****	*****
.00	6773.	1740.02	5.02	.31	.31	.31	5.00
.08	5915.	1736.73	6.73	.33	.17	.40	5.00
.45	4795.	1734.03	5.03	.46	.45	.46	5.00
.70	4320.	1731.38	6.38	.54	.41	.67	5.00
1.08	4047.	1722.56	7.56	.63	.47	.82	5.00
1.65	3591.	1712.21	7.21	.79	.65	1.00	5.00
2.37	3080.	1701.50	6.50	1.03	.90	1.27	5.00
2.93	2977.	1679.99	4.99	1.07	.00	.00	5.00
3.41	2788.	1672.25	7.25	1.31	1.17	1.60	5.00

ANALYSIS IS COMPLETE

USF&W POND

Date: 10/6/2009

Customer(s): TRENT SCHINDLER

District: AMERICAN CREEK CONSERVATION DISTRICT

Field Office: KENNEBEC FIELD OFFICE

Agency: NRCS

Assisted By: Ozanne, Lee D

Legal Description: SW 25-105N-74W



Legend



Client: Trent Schindler
 County: LYMAN
 Practice: Pond
 Calculated By: LDO
 Checked By: _____

State: SD

Date: 10/6/2009

Date: _____

Drainage Area: 540 Acres (provided from RCN Calculator)
 Curve Number: 83 (provided from RCN Calculator)
 Watershed Length: 6500 Feet
 Watershed Slope: 3 Percent
 Time of Concentration: 1.24 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)	25.20	40.95	68.85	87.30	110.70	130.50	155.25
Unit Peak Discharge (cfs/acre/in)	0.430	0.453	0.473	0.481	0.488	0.488	0.488
Peak Discharge (cfs)	131	222	390	505	648	764	907

Client: Trent Schindler
 County: LYMAN State: SD
 Practice: Pond
 Calculated By: LDO Date: 10/6/2009
 Checked By: _____ Date: _____

COVER DESCRIPTION	Acres (CN)			
	Hydrologic Soil Group			
	A	B	C	D
FULLY DEVELOPED URBAN AREAS (Veg Estab.) Streets and roads Paved; open ditches (w/right-of-way)	-	-	-	28(93)
CULTIVATED AGRICULTURAL LANDS Row crops SR + Crop residue good	-	-	-	290(85)
OTHER AGRICULTURAL LANDS Pasture, grassland or range good	-	-	-	222(80)
Total Area (by Hydrologic Soil Group)				540
TOTAL DRAINAGE AREA: 540 Acres		WEIGHTED CURVE NUMBER: 83		

USDA-NRCS
 1717 N. Lincoln Ave, Suite 104
 Pierre, SD 57501-7800
 605-224-2476 Ext. 5
 Wednesday, December 09, 2009 8:32:13 AM

PROJECT: H:\Terramodel_Pierre\Trent_Schindler_Dam.pro

Perimeter / Area Measurements of Selected Lines

Object Name	Layer	Perimeter Length (ft)	Enclosed Area (SQ FT)	
1743.5	AREA STAGE-STOR	3811.1665	266437.77	6.1 AC
1744.0	AREA STAGE-STOR	3979.6449	319475.67	7.3 AC
1745.0	AREA STAGE-STOR	4170.3324	384011.99	8.8 AC
1748.0	AREA STAGE-STOR	4442.5843	540339.14	12.4 AC
1746.0	AREA STAGE-STOR	4194.0002	436738.96	10.0 AC
1747.0	AREA STAGE-STOR	4309.9054	488681.64	11.2 AC

Total perimeter length = 24907.6337 ft
 Total enclosed area = 2435685.17 SQ FT

Project Name: Trent Schindler

Computed by: John Schmidt

Date: 12/9/2009

Checked by: _____

Date: _____

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			Outflow, CFS			Structure Outflow, CFS	Controlling Factor
	Elev	HW Ft	Weir	Slug Flow	Full Pipe		
Input Data							
	1743.5	0.0	0.00	0.00	0.00	0.00	Weir Flow
	1743.6	0.1	0.15	0.00	0.00	0.15	Weir Flow
	1743.7	0.2	0.29	0.00	0.00	0.29	Weir Flow
	1743.8	0.3	0.44	0.00	0.00	0.44	Weir Flow
Principal Spillway Crest Elev (ft)	1743.5	0.4	0.72	0.00	0.00	0.72	Weir Flow
	1744.0	0.5	0.99	0.00	0.00	0.99	Weir Flow
Inside Wall - Type	Smooth	0.6	1.27	0.00	2.79	1.27	Weir Flow
Pipe Diameter (in)	18	0.7	1.62	0.00	3.95	1.62	Weir Flow
Pipe Length (ft)	66	0.8	2.00	0.00	4.84	2.00	Weir Flow
Entrance Coefficient 'Ke'	1	0.9	2.42	0.00	5.59	2.42	Weir Flow
Mannings 'n-value'	0.009	1.0	3.05	0.00	6.25	3.05	Weir Flow
Elbow Elev (if None, Leave 'BLANK')		1.1	3.67	0.00	6.84	3.67	Weir Flow
Length of Outlet ('BLANK' if none)		1.2	4.30	0.00	7.39	4.30	Weir Flow
Outlet Type	Cantilever	1.3	4.89	0.00	7.90	4.89	Weir Flow
Outlet Elevation (ft)	1743.1	1.4	5.47	0.00	8.38	5.47	Weir Flow
Tailwater Elev (if unknown, leave 'Blank')		1.5	6.06	0.00	8.83	6.06	Weir Flow
Auxiliary Spillway Elev (ft)	1749	1.6	6.61	1.84	9.27	6.61	Weir Flow
Maximum Headwater Elev (ft)	1752	1.7	7.16	9.19	9.68	9.19	Slug Flow
Elev Increment After Full Pipe Flow	0.1	1.8	7.72	16.53	10.07	10.07	Full Pipe Flow
Basic Output							
Full Pipe Flow - Max. Outflow (cfs):	24.99	1.9	8.18	23.88	10.45	10.45	Full Pipe Flow
Full Pipe Flow - Max. Velocity (fps):	14.14	2.0	8.63	31.23	10.82	10.82	Full Pipe Flow
		2.1	9.09	38.58	11.18	11.18	Full Pipe Flow
		2.2	9.55	45.93	11.52	11.52	Full Pipe Flow
		2.3	10.01	53.28	11.85	11.85	Full Pipe Flow
		2.4	10.47	60.62	12.18	12.18	Full Pipe Flow
Barrel Area (Sq Ft):	1.77	2.5	10.93	67.97	12.49	12.49	Full Pipe Flow
Kp: 0.008735		2.6	11.39	75.32	12.80	12.80	Full Pipe Flow
Friction Slope (HW at the A.S. Crest):	0.01695	2.7	11.85	82.67	13.10	13.10	Full Pipe Flow
Pipe Slope: 0.00606		2.8			13.40	13.40	Full Pipe Flow
Outlet Elbow Angle (deg): 0.0		2.9			13.69	13.69	Full Pipe Flow
		3.0			13.97	13.97	Full Pipe Flow
		3.1			14.25	14.25	Full Pipe Flow
Km: 0.00000		3.2			14.52	14.52	Full Pipe Flow
Tailwater Elev Used For Full Pipe Flow: 1744		3.3			14.78	14.78	Full Pipe Flow
		3.4			15.05	15.05	Full Pipe Flow
Notes & Warnings							
		3.5			15.30	15.30	Full Pipe Flow
		3.6			15.56	15.56	Full Pipe Flow
		3.7			15.80	15.80	Full Pipe Flow
		3.8			16.05	16.05	Full Pipe Flow
		3.9			16.29	16.29	Full Pipe Flow
		4.0			16.53	16.53	Full Pipe Flow
		4.1			16.76	16.76	Full Pipe Flow
		4.2			16.99	16.99	Full Pipe Flow
		4.3			17.22	17.22	Full Pipe Flow
		4.4			17.45	17.45	Full Pipe Flow
		4.5			17.67	17.67	Full Pipe Flow
		4.6			17.89	17.89	Full Pipe Flow
		4.7			18.11	18.11	Full Pipe Flow
		4.8			18.32	18.32	Full Pipe Flow
		4.9			18.53	18.53	Full Pipe Flow
		5.0			18.74	18.74	Full Pipe Flow
		5.1			18.95	18.95	Full Pipe Flow
		5.2			19.15	19.15	Full Pipe Flow
		5.3			19.36	19.36	Full Pipe Flow
		5.4			19.56	19.56	Full Pipe Flow
		5.5			19.76	19.76	Full Pipe Flow
		5.6			19.95	19.95	Full Pipe Flow
		5.7			20.15	20.15	Full Pipe Flow
		5.8			20.34	20.34	Full Pipe Flow
		5.9			20.53	20.53	Full Pipe Flow
		6.0			20.72	20.72	Full Pipe Flow
		6.1			20.91	20.91	Full Pipe Flow

Project Name: *Trent Schindler*

laHoodInlet.xls Ver 1.10

Computed by: *John Schmidt*Date: *12/9/2009*

Checked by: _____

Date: _____

Elev	HW Ft	Outflow, CFS			Structure Outflow, CFS	Controlling Factor
		Weir	Slug Flow	Full Pipe		
1749.7	6.2			21.09	21.09	Full Pipe Flow
1749.8	6.3			21.28	21.28	Full Pipe Flow
1749.9	6.4			21.46	21.46	Full Pipe Flow
1750.0	6.5			21.64	21.64	Full Pipe Flow
1750.1	6.6			21.82	21.82	Full Pipe Flow
1750.2	6.7			22.00	22.00	Full Pipe Flow
1750.3	6.8			22.18	22.18	Full Pipe Flow
1750.4	6.9			22.35	22.35	Full Pipe Flow
1750.5	7.0			22.52	22.52	Full Pipe Flow
1750.6	7.1			22.70	22.70	Full Pipe Flow
1750.7	7.2			22.87	22.87	Full Pipe Flow
1750.8	7.3			23.04	23.04	Full Pipe Flow
1750.9	7.4			23.21	23.21	Full Pipe Flow
1751.0	7.5			23.37	23.37	Full Pipe Flow
1751.1	7.6			23.54	23.54	Full Pipe Flow
1751.2	7.7			23.71	23.71	Full Pipe Flow
1751.3	7.8			23.87	23.87	Full Pipe Flow
1751.4	7.9			24.03	24.03	Full Pipe Flow
1751.5	8.0			24.20	24.20	Full Pipe Flow
1751.6	8.1			24.36	24.36	Full Pipe Flow
1751.7	8.2			24.52	24.52	Full Pipe Flow
1751.8	8.3			24.67	24.67	Full Pipe Flow
1751.9	8.4			24.83	24.83	Full Pipe Flow
1752.0	8.5			24.99	24.99	Full Pipe Flow

Project Name: Trent Schindler

Computed by: John Schmidt

Date: 12/9/2009

Checked by: _____

Date: _____

			Outflow, CFS					Structure Outflow, CFS	Controlling Factor
			Elev	HW Ft	Weir	Inlet Orifice	Barrel Orifice	Full Pipe	
Input Data			1747.0	0.0	0.00	0.00	14.11	15.30	0.00
Riser Type & Diameter (in)	Circular	36	1747.1	0.1	0.87	10.76	14.36	15.56	0.87
Length of Weir Obstruction (ft)		0.5	1747.2	0.2	2.47	15.22	14.61	15.80	2.47
		6	1747.3	0.3	4.55	18.64	14.86	16.05	4.55
Principal Spillway Crest Elev (ft)		1747	1747.4	0.4	7.00	21.53	15.10	16.29	7.00
Invert of Barrel Elevation (ft)		1743.5	1747.5	0.5	9.78	24.07	15.34	16.53	9.78
Barrel Orifice Coefficient (C)		0.6	1747.6	0.6	12.86	26.36	15.57	16.76	12.86
Pipe Diameter (in)		18	1747.7	0.7	16.20	28.48	15.80	16.99	15.80
Pipe Length (ft)		66	1747.8	0.8	19.80	30.44	16.03	17.22	16.03
Entrance Coefficient 'Ke'		1	1747.9	0.9	23.62	32.29	16.26	17.45	16.26
Mannings 'n-value'		0.009	1748.0	1.0	27.67	34.04	16.48	17.67	16.48
Elbow Elev (if None, Leave 'BLANK')			1748.1	1.1	31.92	35.70	16.70	17.89	16.70
Length of Outlet ('BLANK' if none)			1748.2	1.2	36.37	37.28	16.91	18.11	16.91
Outlet Type	Cantilever		1748.3	1.3	41.01	38.81	17.12	18.32	17.12
Outlet Elevation (ft)		1743.1	1748.4	1.4	45.83	40.27	17.33	18.53	17.33
Tailwater Elev (if unknown, leave 'Blank')			1748.5	1.5	50.83	41.68	17.54	18.74	17.54
Auxiliary Spillway Elev (ft)		1749	1748.6	1.6	55.99	43.05	17.75	18.95	17.75
Maximum Headwater Elev (ft)		1752	1748.7	1.7	61.32	44.38	17.95	19.15	17.95
Elev Increment After Full Pipe Flow		0.1	1748.8	1.8	66.81	45.66	18.15	19.36	18.15
Basic Output			1748.9	1.9	72.46	46.91	18.35	19.56	18.35
Full Pipe Flow - Max. Outflow (cfs):	0.00		1749.0	2.0	78.25	48.13	18.54	19.76	18.54
Full Pipe Flow - Max. Velocity (fps):	0.00		1749.1	2.1	84.20	49.32	18.74	19.95	18.74
Useable Weir Length (Ft):	8.92		1749.2	2.2	90.28	50.48	18.93	20.15	18.93
Riser Area (Sq Ft):	7.07		1749.3	2.3	96.51	51.62	19.12	20.34	19.12
Barrel Area (Sq Ft):	1.77		1749.4	2.4	102.87	52.73	19.31	20.53	19.31
Kp: 0.008735			1749.5	2.5	109.36	53.81	19.50	20.72	19.50
Friction Slope (HW at the A.S. Crest):	0.01695		1749.6	2.6	115.99	54.88	19.68	20.91	19.68
Pipe Slope:	0.00606		1749.7	2.7	122.75	55.93	19.86	21.09	19.86
Outlet Elbow Angle (deg):	0.0		1749.8	2.8	129.63	56.95	20.05	21.28	20.05
Maximum Barrel Invert Elevation for avoiding Barrel Orifice Control:	1742.96		1749.9	2.9	136.63	57.96	20.23	21.46	20.23
Km: 0.00000			1750.0	3.0	143.76	58.95	20.40	21.64	20.40
Tailwater Elev Used For Full Pipe Flow:	1744		1750.1	3.1	151.01	59.92	20.58	21.82	20.58
Notes & Warnings			1750.2	3.2	158.37	60.88	20.76	22.00	20.76
NOTE: Barrel Orifice control can be eliminated by increasing the riser depth.			1750.3	3.3	165.86	61.83	20.93	22.18	20.93
			1750.4	3.4	173.45	62.76	21.10	22.35	21.10
			1750.5	3.5	181.16	63.67	21.27	22.52	21.27
			1750.6	3.6	188.98	64.58	21.44	22.70	21.44
			1750.7	3.7	196.91	65.47	21.61	22.87	21.61
			1750.8	3.8	204.94	66.35	21.78	23.04	21.78
			1750.9	3.9	213.09	67.21	21.94	23.21	21.94
			1751.0	4.0	221.33	68.07	22.11	23.37	22.11
			1751.1	4.1	229.69	68.92	22.27	23.54	22.27
			1751.2	4.2	238.14	69.75	22.43	23.71	22.43
			1751.3	4.3	246.70	70.58	22.59	23.87	22.59
			1751.4	4.4	255.35	71.39	22.75	24.03	22.75
			1751.5	4.5	264.11	72.20	22.91	24.20	22.91
			1751.6	4.6	272.96	73.00	23.07	24.36	23.07
			1751.7	4.7	281.91	73.79	23.22	24.52	23.22
			1751.8	4.8	290.95	74.57	23.38	24.67	23.38
			1751.9	4.9	300.09	75.34	23.53	24.83	23.53
			1752.0	5.0	309.32	76.10	23.69	24.99	23.69

1*****

SITES XEQ 12/11/2009 WATER RESOURCE SITE ANALYSIS COMPUTER PROGRAM
 VER 2005.1.04 (USER MANUAL - DATED DECEMBER 2005)
 TIME 14:45:24

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

SITES	01/01/2005POND1	Trent Schindler Pond Rebuild	0.84375	H5
SAVMOV	0 101			
SAVMOV	101 1			1
*	18" dia. Barrel			
*	36" dia. Drop			
STRUCTURE	S1 Schindler Dam			
	1736	0	0	
	1737	0.1	0	
	1738	0.6	0	
	1743.5	6.1	0	
	1744	7.3	0	
	1745	8.8	0	
	1746	10.0	0	
	1747	11.2	.01	
	1747.2	11.5	2.47	
	1747.4	11.8	7.00	
	1747.6	12.0	12.86	
	1747.8	12.2	17.22	
	1748	12.4	17.67	
	1749.0	14	19.76	
	1750	15.5	21.64	
	1752	18	24.99	
ENDTABLE				
WSDATA	5A1A AC 83	540	6500	3
PDIRECT	2.3			4.70
POOLDATA	ELEV 1747	1736	1738	1736
ASDATA	41 300		3	.095
ASINSURF	41	0.035	0.035	
ASINLET	41	0.0	200	0.0
	250	5		3
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 125			
ASMATERIAL	1			
	1	30	.001	50 95 0.1
ENDTABLE				
ASCOORD	1	Opal Clay N		
	0	1743	100	1749 200 1753
	300	1749	437	1736 500 1735
ENDTABLE				
GRAPHICS	I			
GO,DESIGN	L	TYPE2	24	TYPE2378 24
SAVMOV	2 101 1			S1
ENDJOB				

 1SITES XEQ 12/11/2009 ----- COMMENT PAGE -----
 VER 2005.1.04 Trent Schindler Pond Rebuild WSID = POND1

18" dia. Barrel

36" dia. Drop

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

1SITES -----
 XEQ 12/11/2009 Trent Schindler Pond Rebuild WSID= POND1
 VER 2005.1.04 Schindler Dam SUBW= A
 TIME 14:45:24 SITE = S1 PASS= 1 PART= 1

***** MATERIAL PROPERTIES *****						
MATERIAL	PI	DRY DENSITY lbs/CuFt	Kh	PERCENT CLAY	DETACH. RATE (Ft/H) / (lb/SqFt)	REP. DIAMETER inches
Opal Clay	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	4.70
WSDATA - CN	DA-SM	TC/L	-/H
83.00	0.84	6500.00	3.00
SITEDATA- PERM POOL	CREST PS	FP SED	VALLEY FL
1747.00	1736.00	1738.00	1736.00
			378?
			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	0.095	NO
BTM WIDTH -	BW1	BW2	BW3	BW4	BW5
ft	125.00	0.00	0.00	0.00	0.00

AUXILIARY SPILLWAY RATING DEVELOPED USING WSPVRT.

1SITES -----
 XEQ 12/11/2009 Trent Schindler Pond Rebuild WSID= POND1
 VER 2005.1.04 Schindler Dam SUBW= A
 TIME 14:45:24 SITE = S1 PASS= 1 PART= 2

PERM POOL	1747.00 FT	50.2 ACFT	11.20 AC	0.0 CFS
CREST PS	1736.00 FT	0.0 ACFT	0.00 AC	0.0 CFS
SED ACCUM	1738.00 FT	0.4 ACFT	0.60 AC	0.0 CFS
START ELEV	1738.00 FT	0.4 ACFT	0.60 AC	0.0 CFS
NRCS-PSH	D= 24.00 HR	P= 2.30 IN	Q= 0.91 IN	DA= 0.84 SM
	TC= 1.24 HR	CN= 83.00	VOL= 40.8 ACFT	

PEAK = 223.0 CFS, AT 12.7 HRS.

ROUTED RESULT -	HYD TYPE	EMAX	VOL-MAX	AMAX	QMAX
	NRCS-PSH	1748.30 FT	65.9 ACFT	12.88 AC	18.3 CFS

PS STORAGE 65.5 ACFT, BETWEEN AUX. CREST AND SED. ACCUM ELEVATIONS.

DRAWDOWN (DDT) TEST	1736.00 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 1738.00 FT, 0.4 ACFT, 0.0 CFS.

DRAWDOWN TIME = 2.78 DAYS, TO 0.0 CFS (LIMIT = 10.00 DAYS)

 RATING TABLE DEVELOPED, SITE = S1 :
 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	1736.00	0.00	0.00	0.00	0.00	0.00
2	1737.00	0.00	0.00	0.00	0.05	0.10
3	1738.00	0.00	0.00	0.00	0.40	0.60
4	1743.50	0.00	0.00	0.00	18.83	6.10
5	1744.00	0.00	0.00	0.00	22.18	7.30
6	1745.00	0.00	0.00	0.00	30.23	8.80
7	1746.00	0.00	0.00	0.00	39.63	10.00
8	1747.00	0.01	0.01	0.00	50.23	11.20
9	1747.20	2.47	2.47	0.00	52.49	11.50
10	1747.40	7.00	7.00	0.00	54.83	11.80
11	1747.60	12.86	12.86	0.00	57.20	12.00
12	1747.80	17.22	17.22	0.00	59.63	12.20
13	1748.00	17.67	17.67	0.00	62.09	12.40
14	1749.00	19.76	19.76	0.00	75.29	14.00
15	1750.00	21.64	21.64	0.00	90.04	15.50
16	1752.00	24.99	24.99	0.00	123.54	18.00

1SITES

XEQ 12/11/2009 Trent Schindler Pond Rebuild WSID= POND1
 VER 2005.1.04 Schindler Dam SUBW= A
 TIME 14:45:24 SITE = S1 PASS= 1 PART= 3

AUX. CREST 1748.30 FT 65.9 ACFT 12.88 AC 18.3 CFS
 PS STORAGE 65.5 ACFT, BETWEEN AUX. CREST AND SED. ACCUM ELEVATIONS.
 START ELEV 1747.00 FT 50.3 ACFT 11.20 AC 0.0 CFS
 EFFECTIVE HEIGHT(H)= 12.3 FEET, PRODUCT= 811. (H * STORAGE AT CREST AUX.).
 INPUT DESIGN CLASS = A1 = LT 3000. PRODUCT.
 NRCS-FBH D= 24.00 HR P= 4.70 IN Q= 2.90 IN DA= 0.84 SM
 TC= 1.24 HR CN= 83.00 VOL= 130.7 ACFT
 PEAK = 748.9 CFS, AT 12.7 HRS.

***** WARNING - EXIT CHANNEL INTERSECTS VALLEY FLOOR AT STATION 429. BEFORE REACHING LAST POINT OF NATURAL GROUND AT STATION 437.

 RATING TABLE DEVELOPED, SITE = S1 :
 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	1736.00	0.00	0.00	0.00	0.00	0.00
2	1737.03	0.00	0.00	0.00	0.05	0.11

3	1738.05	0.00	0.00	0.00	0.43	0.65
4	1739.08	0.00	0.00	0.00	1.62	1.68
5	1740.10	0.00	0.00	0.00	3.87	2.70
6	1741.13	0.00	0.00	0.00	7.16	3.73
7	1742.15	0.00	0.00	0.00	11.51	4.75
8	1743.18	0.00	0.00	0.00	16.90	5.78
9	1744.20	0.00	0.00	0.00	23.67	7.60
10	1745.23	0.00	0.00	0.00	32.25	9.07
11	1746.25	0.00	0.00	0.00	42.18	10.30
12	1747.28	4.21	4.21	0.00	53.38	11.61
13	1748.30	18.30	18.30	0.00	65.90	12.88
14	1748.49	29.87	18.69	11.18	68.31	13.18
15	1748.67	41.47	19.07	22.39	70.77	13.47
16	1749.00	97.25	19.77	77.48	75.35	14.01
17	1749.41	216.43	20.53	195.90	81.17	14.62
18	1750.15	576.08	21.89	554.19	92.39	15.69
19	1751.08	1198.00	23.44	1174.56	107.43	16.84
20	1752.00	2008.11	24.99	1983.12	123.54	18.00

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.	100.	-10.0	0.035	**	**	**	INLET
2	100.	300.	0.0	0.035	**	**	**	CREST
3	300.	429.	9.5	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 1748.30 FT.

DRAWDOWN (DDT) TEST 1736.00 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 1738.00 FT, 0.4 ACFT, 0.0 CFS.

DRAWDOWN TIME = 6.92 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	125.0	1750.06	90.9	15.6	1.75	25.0

^^^^ NOTE -- ACTUAL Hp OF 1.75 RAISED TO MEET MIN. 378 CRITERIA.

PEAK - CFS	Q-PS	Q-AUX.	Q-TOT.
DISCHARGE =	21.7	506.7	528.4

	CRITICAL DEPTH	CRITICAL VELOCITY	CRITICAL SLOPE-Sc	25% OF Q Sc
AUXILIARY	FT	FT/SEC	FT/FT	FT/FT
SPILLWAY ---	0.79	5.01	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 = 507. cfs; Bottom Width = 125. ft

REACH NO.	FROM STA	TO STA	SLOPE %	MANNING'S n	VELOCITY ft/s	TOTAL STRESS lb/ft^2	EFFECTIVE STRESS lb/ft^2
3	300.	429.	9.50	0.035	8.11	2.93	1.782

INTEGRITY ANALYSIS - REACH SURFACE PERFORMANCE SUMMARY
(The auxiliary spillway began flow at time = 12.2 hours
and peaked at time = 13.2 hours.)

REACH 3: FROM STATION 300. TO 429. ON 9.5% SLOPE.
Surface unfailed: Stressed to 99% of allowable.

INTEGRITY ANALYSIS - HEADCUT EROSION DAMAGE SUMMARY

No headcut formed in the spillway.

	DURATION FLOW HRS	ATTACK OE/B ACFT/FT	DIST. FROM MOST U/S HEADCUT TO U/S EDGE AUX. CREST, FT
AUXILIARY SPILLWAY ---	14.0	0.7	329.

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

EXIT CHANNEL FLOW SUPERCRITICAL: MAX VELOCITY= 8.1 FT/SEC
EXIT SLOPE = 0.095 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 = 1750.30.

ROUTED RESULTS	BTM WIDTH FT	MAX ELEV FT	VOL-MAX ACFT	AREA-MAX AC	AUX.HP FT	VOL-AUX. ACFT
MINIMUM AUX.	125.0	1750.30	94.8	15.9	2.00	28.9

PEAK - CFS	Q-PS	Q-AUX.	Q-TOT.
DISCHARGES =	22.1	655.5	677.6

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

SPILLWAY --- 0.94 5.45 0.018 0.025

>>>> NHCP378 RUN - MINIMUM DEPTH, DESIGN FLOW TO TOP OF DAM; 1.00 FT REQUIRED
FOR THIS PASS. NEW TOP OF DAM ELEVATION = 1751.06.

ROUTED RESULTS	BTM WIDTH FT	MAX ELEV FT	VOL-MAX ACFT	AREA-MAX AC	AUX.HP FT	VOL-AUX. ACFT
MINIMUM AUX.	125.0	1751.06	107.1	16.8	2.75	41.2

PEAK - CFS DISCHARGES =	Q-PS 23.3	Q-AUX. 1161.4	Q-TOT. 1184.8
----------------------------	--------------	------------------	------------------

AUXILIARY SPILLWAY ---	CRITICAL DEPTH FT	CRITICAL VELOCITY FT/SEC	CRITICAL SLOPE-Sc FT/FT	25% OF Q Sc FT/FT
	1.37	6.55	0.016	0.022

Inflow Hyd 1 PSH-Peak = 18.28 CFS at 17.96 hrs., Location Point

Inflow Hyd 1 FBH-Peak = 528.44 CFS at 13.18 hrs., Location Point
HYDOUT 1 S1

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

POND1 Trent Schindler Pond Rebuild

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
POND1	12/11/2009	14:45:24

>>>	SITE ID	SUBWS ID	SUBWS DA (SQ MI)	CURVE NO.	TC (HRS)	TOTAL DA (SQ MI)	TYPE DESIGN	STRUC CLASS	<<<
	S1	A	0.84	83.	1.24	0.84	378CR	A1	

PASS NO.	DIA./ WIDTH (IN/FT)	AUX.CREST ELEV (FT)	BTM. WIDTH (FT)	MAX. HP (FT)	MAX. ELEV (FT)	EMB. VOL. (CY)	INTEGR.* DIST. (FT)	EXIT* VEL. (FT/SEC)	TYPE HYD
1	0.0	1748.3	125.0	2.8	1751.1	0.	330.	8.1	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
POND1 FILES

INPUT = H:\SITES_Data\Schindler\Dam_18_barrel.D2C
OUTPUT = H:\SITES_Data\Schindler\Dam_18_barrel.OUT
DATED 12/11/2009 14:45:24

GRAPHICS FILES GENERATED

OPTION "L" = H:\SITES_Data\Schindler\Dam_18_barrel.DRG DATED 12/11/2009 14:45:24
OPTION "P" = H:\SITES_Data\Schindler\Dam_18_barrel.DHY DATED 12/11/2009 14:45:24
OPTION "E" = H:\SITES_Data\Schindler\Dam_18_barrel.DEM DATED 12/11/2009 14:45:24
AUX.GRAPHICS = H:\SITES_Data\Schindler\Dam_18_barrel.DG* DATED 12/11/2009 14:45:24

Structural Design of Solid Wall, Plastic Pipe

Version 1.0 (1/30/06)

Proposed Pipe

Description	PVC 1120 SDR 35
D_o	18.701 in
SDR or SDR?	SDR 35
wall thickness, t	0.499 in
E_{long}	140,000 psi
E_{short}	400,000 psi
allow comp stress, σ	2000 psi (from table 52C-1)

Loads

SOIL	
depth of soil cover, h	7.5 ft
unit weight of soil, γ_s	105 psf
water ht. above pipe, h_w	0 ft
P_s	787.5 psf
W_s	1227.2531 lb/ft

VACUUM

P_v	0 psf
U_i	17.703 in
W_v	0.0 lb/ft

WHEEL	
Load class	Field Equipment
Load, P_L	10,000 lb
Do-t < 2.67h x 12 ?	N/A (b14>2, use Eq. 52-22)
Impact factor, I_f	1
W_L	90 lb/ft
P_w	58 psf
Total Load	846 psf
$P_s + P_w + P_v$	

1. Wall Crushing (solid wall pipe)

Thrust in pipe wall, T_{pw}	659 lb/ft	
Required wall area, A_{pw}	0.027 in ² /in	Proposed Pipe okay for wall crushing
Thickness, t	0.499 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 (% $\Delta X / D$)	4.53 %	Proposed Pipe okay for deflection
Maximum deflection	5.0 %	

3. Wall Buckling

Use E_{long} or E_{short} ?	E-long	
$E =$	140,000 psi	
Factor of Safety, FS	2.5	$h / (D_o/12) > 2$
R_w	1.0 ft	
Coeff of elastic support, B'	0.661	
Moment of Inertia, I_{pw}	0.010 in ⁴ / in	
Modulus of soil reaction, E'	200 psi	
Allowable buckling, q_a	12.25 psi	
Reduction factor, C	0.67	
Adj. allow. Buckling, $q_a C$	8.17 psi	
$q_a C$	1,176 psf	
Total pressure, P	846 psf	Proposed Pipe okay for wall buckling

4. Strain (solid wall pipe)

Max strain, flexure, e_f	0.0043	
Max strain, hoop strain, e_h	0.0003	
e_h due to external load?	Yes	
Max combined strain, e	0.0040	$e = e_f - e_h$
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\Trent_Schindler_Dam.pro
Report Generated: Monday, December 21, 2009 11:29:51 AM

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	768	*DAM	153	
Excavation Volume (yd3)	Fill Volume (yd3)			
0.0	4,858.1			

Net Difference: 4,858.1 yd3 Borrow

4,858 CY X 1.05 = 5,101 CY

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\Trent_Schindler_Dam.pro
Report Generated: Monday, December 21, 2009 11:30:29 AM

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	768	*ES	96	
Excavation Volume (yd3)	Fill Volume (yd3)			
5,021.8	0.0			

Net Difference: 5,021.8 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\Trent_Schindler_Dam.pro
Report Generated: Monday, December 21, 2009 11:30:55 AM

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	Number	Second Surface		Number
Layer Name	of Points	Layer Name		of Points
-----	-----	-----		-----
POINTS	768	*CORE TRENCH		112
Excavation Volume (yd3)		Fill Volume (yd3)		
-----		-----		
1,170.1		0.0		

Net Difference: 1,170.1 yd3 Waste

Stripping Area Under Dam= 27,675 sq. ft.

27,675 sq. ft. X 0.5 ft. / 27 cu.ft / CY = 513 CY Stripping

Stripping Area in Auxiliary Spillway = 40,119

40,119 sq. ft. X 0.5 ft. / 27 cu.ft / CY = 743 CY Stripping

Topsoil Area for Auxiliary Spillway = 33,885 sq. ft.

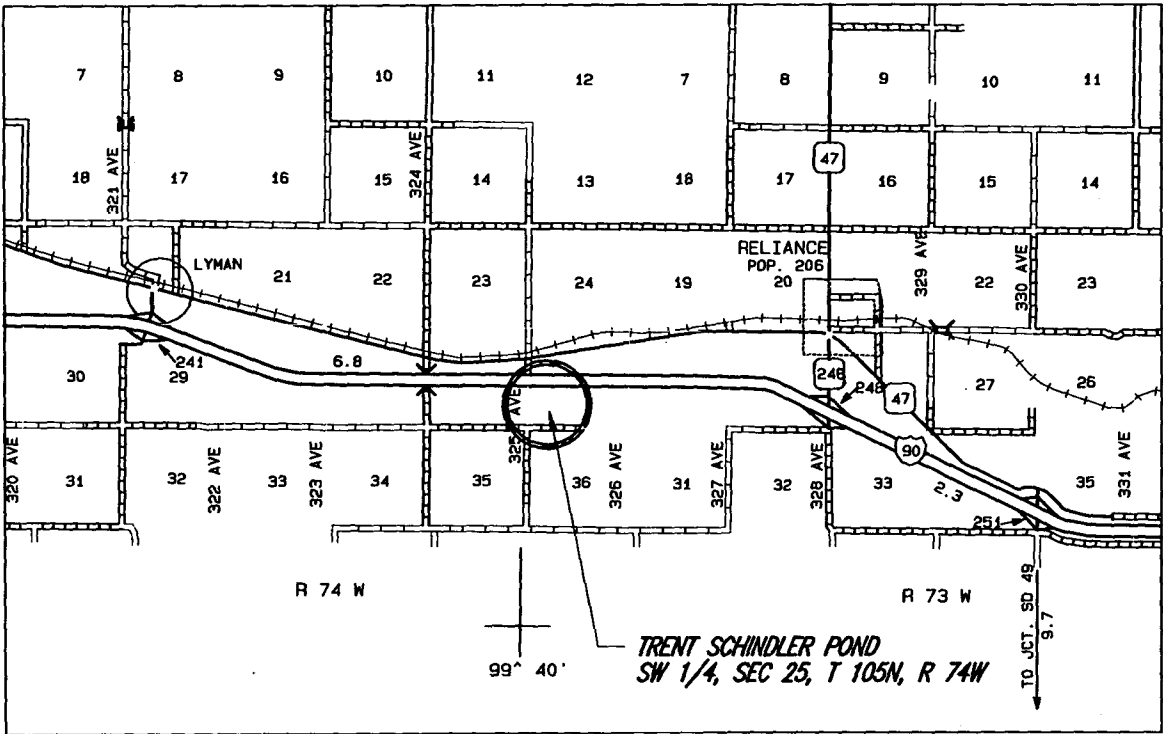
33,885 sq. ft. X 0.5 ft. / 27 cu.ft / CY = 628 CY Topsoil

TRENT SCHINDLER POND

RECEIVED
FEB - 1 2010
WATER RIGHTS
PROGRAM

TABLE OF QUANTITIES

ITEM	UNIT	QUANTITY	"AS BUILT" QUANTITY
Earthfill - Class S	Cu. Yd.	5,101	
Earthfill - Core Trench	Cu. Yd.	1,170	
Earthfill - Stripping	Cu. Yd.	513	
TOTAL EARTHFILL	Cu. Yd.	6,784	
Topsoil - Auxiliary Spillway	Cu. Yd.	628	
36" Dia. Concrete Riser 4 Ft. Tall (Cutout for 18" Pipe)	Each	1	
Concrete for Bottom of Riser (3000 PSI)	Cu. Yd.	1.3	
18" Dia. SDR 35 PVC Sewer Pipe	Lin. Ft.	64	
Rock Riprap	Cu. Yd.	6.4	
Geotextile Cloth	Sq. Yd.	18.4	
Fine Drainfill	Cu. Yd.	7.4	
Trash Rack	Each	1	
Timber Pipe Support	Each	1	
Seeding	Acre	1.7	



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 SEEDDED.
- 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 4.5 FT DEEP CORE TO GET BELOW THE SEEPAGE. 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.

NRCS HAZARD CLASS A
NRCS JOB CLASS III

JAA Date

COVER SHEET

REVISIONS		
DATE	APPROVED	TITLE

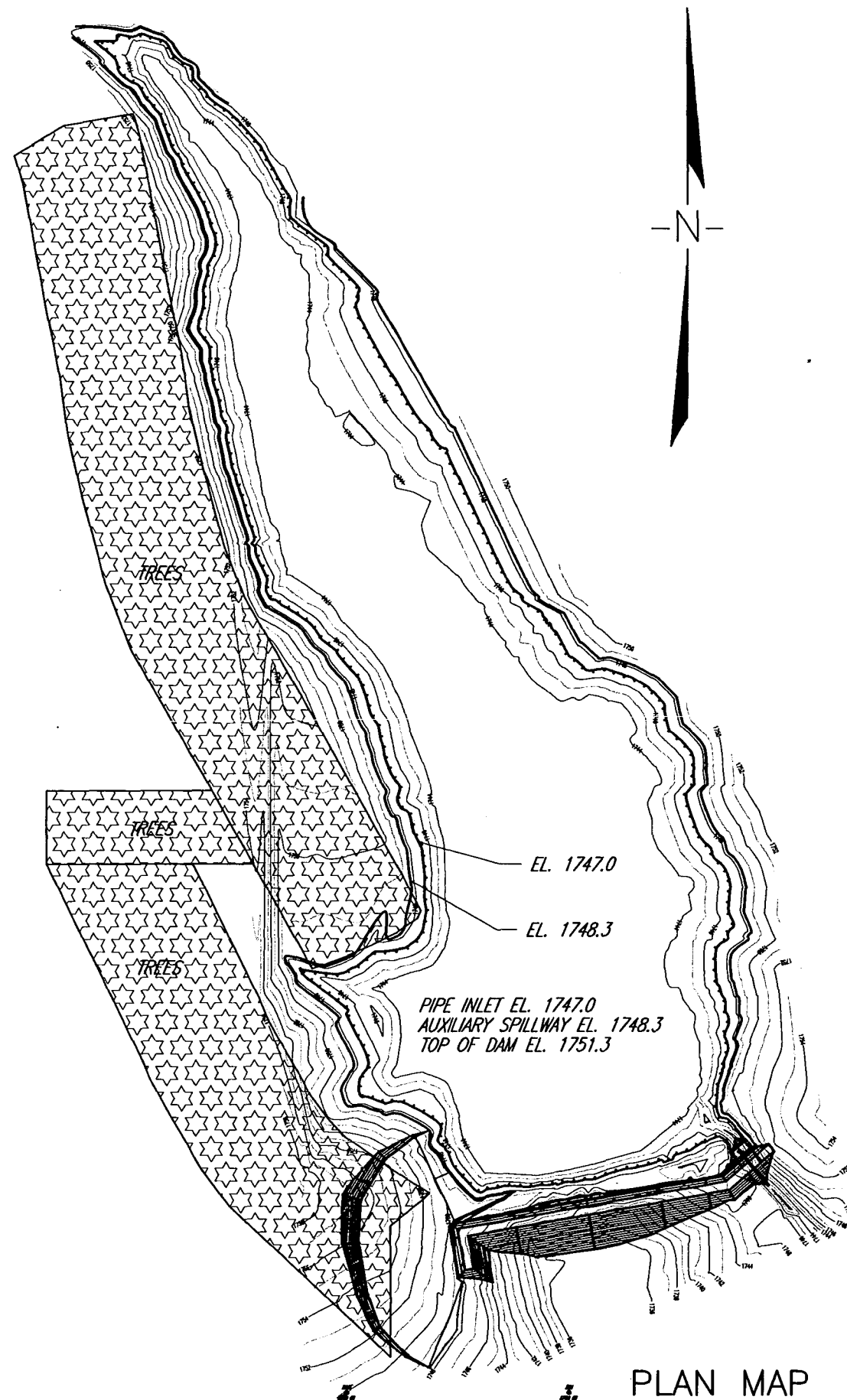
Date
Designed JOHN SCHMIDT 12/21/2009
Drawn JOHN SCHMIDT 12/21/2009
Checked
Approved

PRODUCER TRENT SCHINDLER
SW 1/4 SEC. 25 T. 105N. R. 74 West
LYMAN COUNTY
AMERICAN CREEK CONSERVATION DISTRICT

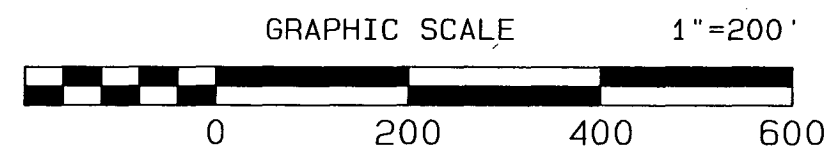
USDA - NRCS
FIELD SUPPORT OFFICE
1717 N. LINCOLN AVE. SUITE 104
PIERRE, SOUTH DAKOTA 57501

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

File Name:
SD_Plane_Template_2-06.pro
Drawing No.
12/21/2009 10:49AM
Sheet 1 of 9



PLAN MAP



GRAPHIC SCALE

1"=200'

POOL AREA MAP

HYDRAULIC DATA

DRAINAGE AREA	540 ACRES
ANNUAL RUNOFF YIELD	49.5 AC.FT.
TIME OF CONCENTRATION	1.24 HOURS
RUNOFF CURVE NUMBER	83
PRINCIPAL SPILLWAY, 2 YR, 24 HR. RAINFALL	2.3 INCHES
AUXILLIARY SPILLWAY, 50 YR, 24 HR. RAINFALL	4.7 INCHES
PEAK RUNOFF 2 YR, 24 HR.	223 CFS
PRINCIPAL SPILLWAY DISCHARGE AT AUX. SPWY.	18.3 CFS
PEAK RUNOFF 50 YR, 24 HR.	749 CFS
AUXILLIARY SPILLWAY DISCHARGE	528 CFS
ESTIMATED 20 YEAR SEDIMENT YIELD	14.3 AC.FT.
ESTIMATED SEDIMENT YIELD BELOW P.S. CREST	11.4 AC.FT.
ESTIMATED SEDIMENT YIELD ABOVE P.S. CREST	2.9 AC.FT.
WATER DEPTH TO CREST OF PRINCIPAL SPILLWAY	11.0 FT
PRODUCT OF STORAGE TIMES EFFECTIVE HEIGHT	811

POOL DATA

	ELEVATION	AREA	STORAGE
CREST OF PRINCIPAL SPILLWAY	1747.0	11.2 ACRES	50.2 AC.FT.
CREST OF AUXILLIARY SPILLWAY	1748.3	12.9 ACRES	65.9 AC.FT.
TOP OF DAM	1751.3	17.1 ACRES	111.8 AC.FT.

ANNUAL YIELD ISOGRAM 2 1/2, CN = 83

$(1.1 \text{ AC IN./AC}) \times (540 \text{ AC}) / (12 \text{ IN/FT}) = 49.5 \text{ AC. FT.}$

SEDIMENT YIELD AREA P WITH 25-50% CULTIVATED

$(0.0044 \text{ AC FT/AC}) \times (540 \text{ AC}) \times (20 \text{ YRS}) \times (0.3 \text{ DELIVERY RATIO}) = 14.3 \text{ AC. FT.}$

Date
 12/21/2009
 Designed JOHN SCHMIDT
 Drawn JOHN SCHMIDT
 Checked
 Approved

PRODUCER TRENT SCHINDLER
 SW 1/4, SECT. 25, T.105 North R. 74 West
 LYMAN COUNTY
 AMERICAN CREEK CONSERVATION DISTRICT

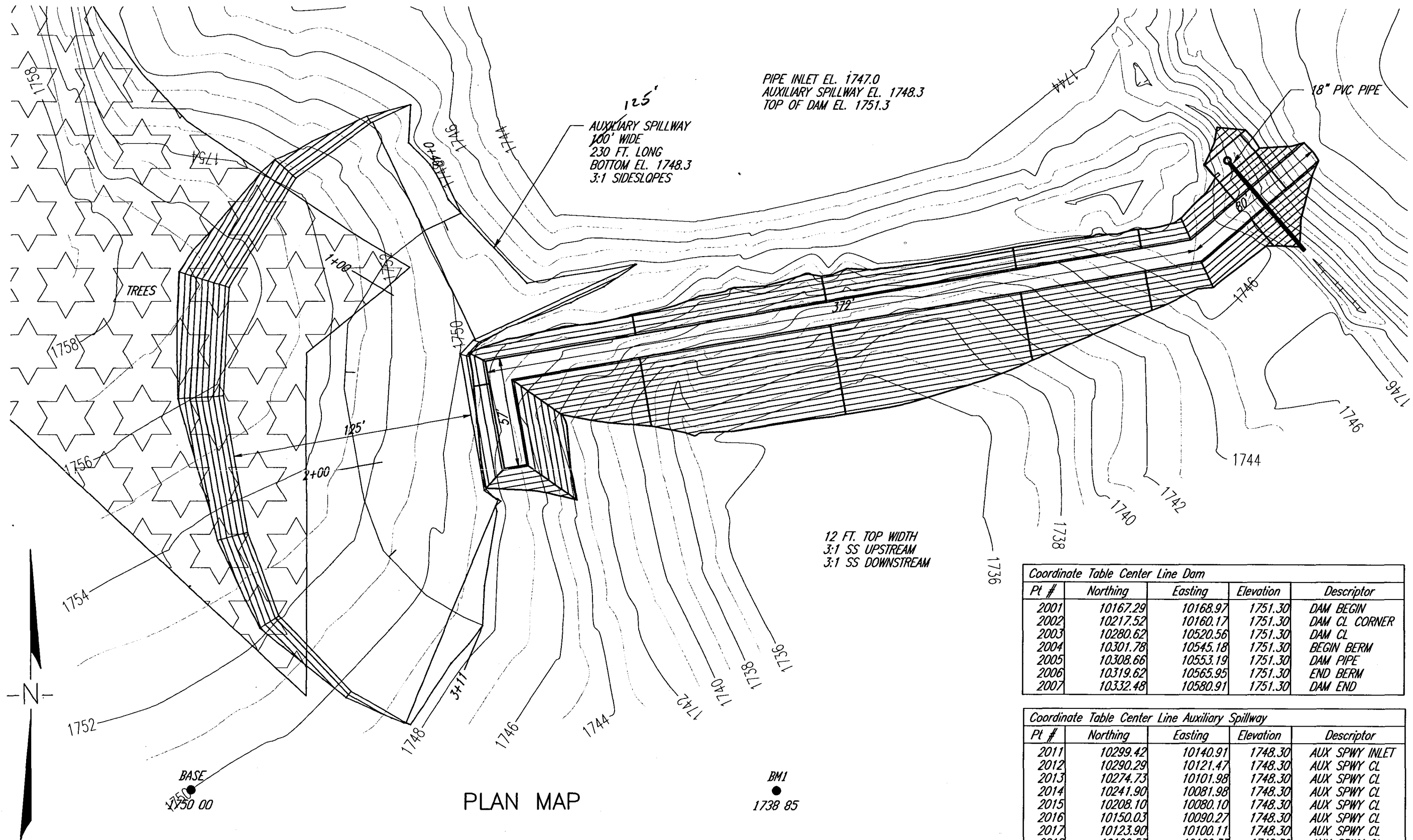
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 Drawing No.

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Sheet 2 of 9



PIPE INLET EL. 1747.0
AUXILIARY SPILLWAY EL. 1748.3
TOP OF DAM EL. 1751.3

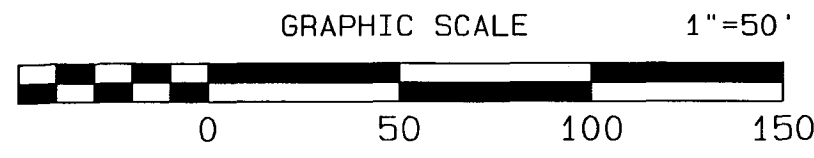
125'
AUXILIARY SPILLWAY
100' WIDE
230 FT. LONG
BOTTOM EL. 1748.3
3:1 SIDESLOPES

12 FT. TOP WIDTH
3:1 SS UPSTREAM
3:1 SS DOWNSTREAM

Coordinate Table Center Line Dam				
Pt #	Northing	Easting	Elevation	Descriptor
2001	10167.29	10168.97	1751.30	DAM BEGIN
2002	10217.52	10160.17	1751.30	DAM CL CORNER
2003	10280.62	10520.56	1751.30	DAM CL
2004	10301.78	10545.18	1751.30	BEGIN BERM
2005	10308.66	10553.19	1751.30	DAM PIPE
2006	10319.62	10565.95	1751.30	END BERM
2007	10332.48	10580.91	1751.30	DAM END

Coordinate Table Center Line Auxiliary Spillway				
Pt #	Northing	Easting	Elevation	Descriptor
2011	10299.42	10140.91	1748.30	AUX SPWY INLET
2012	10290.29	10121.47	1748.30	AUX SPWY CL
2013	10274.73	10101.98	1748.30	AUX SPWY CL
2014	10241.90	10081.98	1748.30	AUX SPWY CL
2015	10208.10	10080.10	1748.30	AUX SPWY CL
2016	10150.03	10090.27	1748.30	AUX SPWY CL
2017	10123.90	10100.11	1748.30	AUX SPWY CL
2018	10100.53	10122.33	1748.30	AUX SPWY CL
2019	10089.17	10142.08	1748.30	AUX SPWY CL
2020	10085.01	10151.83	1748.30	AUX SPWY OUTLET

Coordinate Table Benchmarks				
Pt #	Northing	Easting	Elevation	Descriptor
575	9999.38	10304.15	1738.85	BM1
CAL	10000.00	10000.00	1750.00	BASE



Date 12/21/2009
Designed JOHN SCHMIDT
Drawn JOHN SCHMIDT
Checked
Approved

PRODUCER TRENT SCHINDLER
SW 1/4 SECT. 25 T.105 North R. 74 West
LYMAN COUNTY
AMERICAN CREEK CONSERVATION DISTRICT

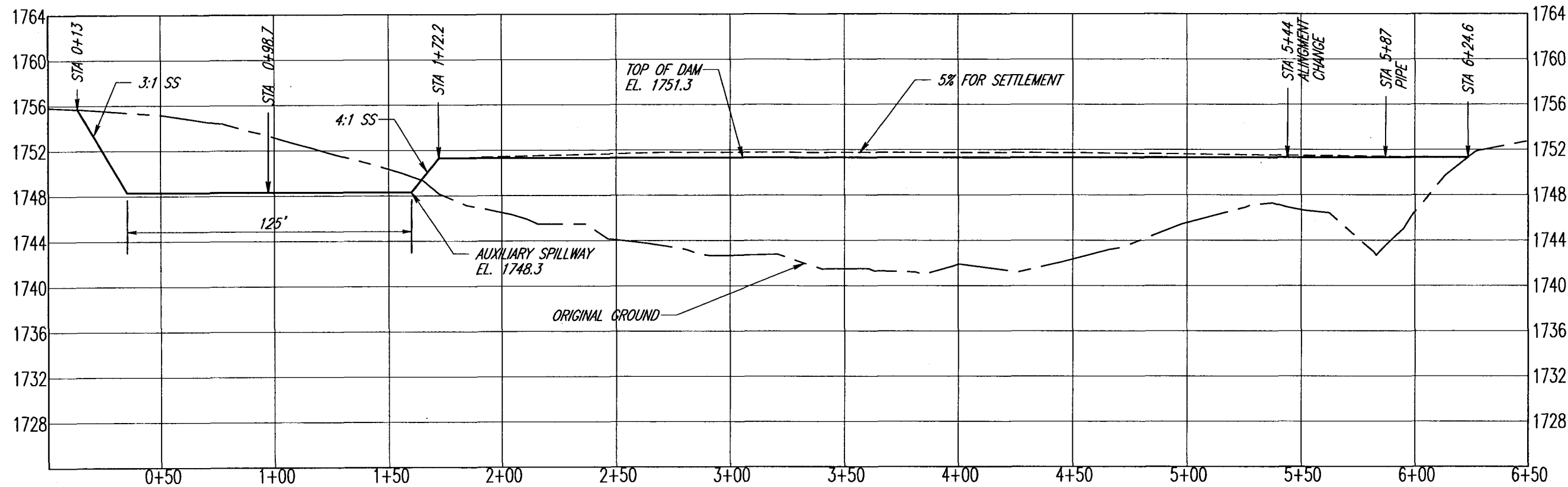
USDA - NRCS
FIELD SUPPORT OFFICE
1717 N. LINCOLN AVE. SUITE 104
PIERRE, SOUTH DAKOTA 57501

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

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Drawing No.
12/21/2009 10:50AM
Sheet 3 of 9

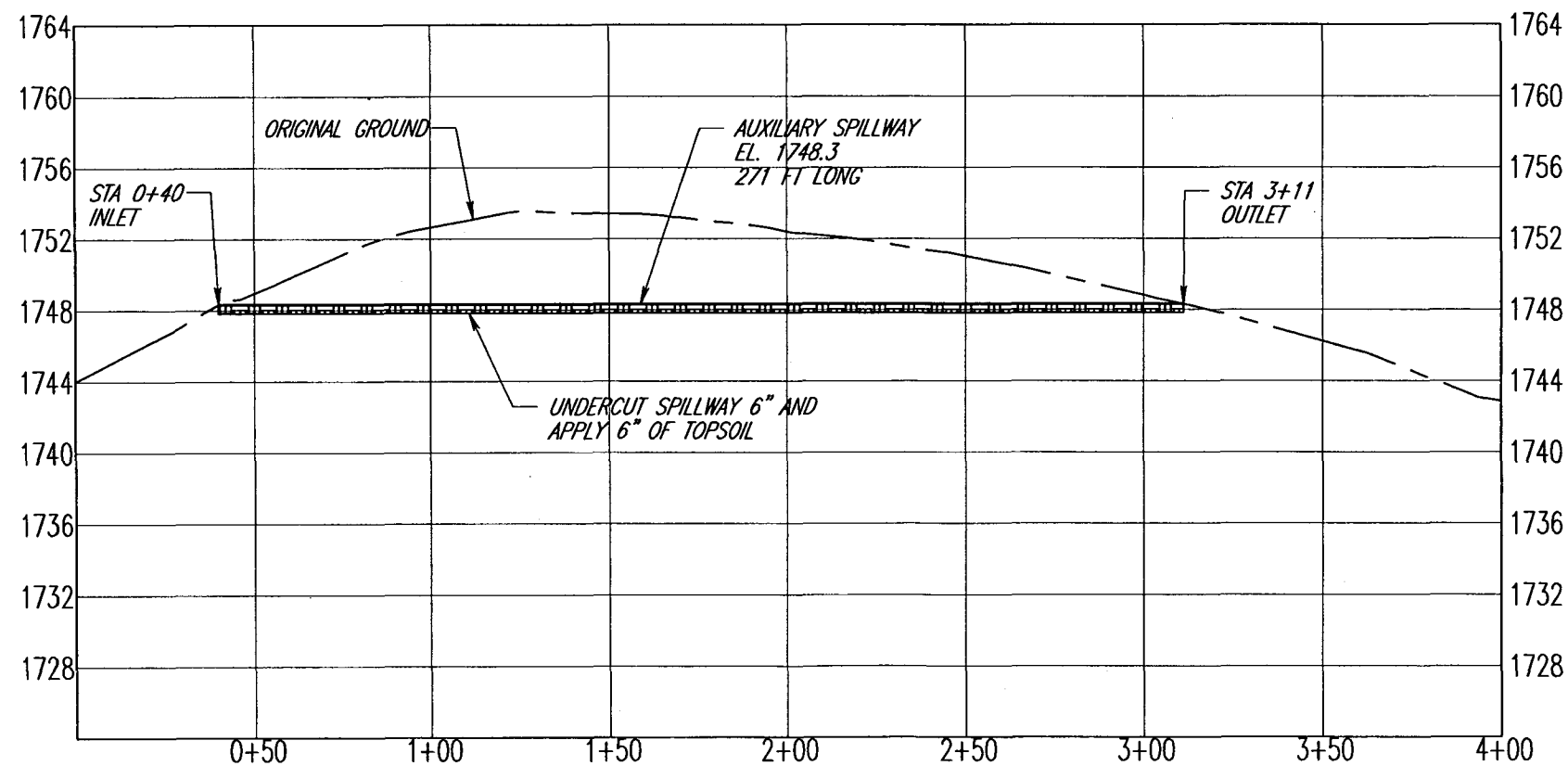
REVISIONS		
DATE	APPROVED	TITLE

PLAN MAP



PROFILE ALONG CENTERLINE OF EARTH DAM

HOR. 1" = 50' VERT. 1" = 10'



PROFILE ALONG CENTERLINE OF AUXILIARY SPILLWAY

HOR. 1" = 20' VERT. 1" = 10'

EARTH DAM PROFILE
AUXILIARY SPILLWAY PROFILE

REVISIONS		
DATE	APPROVED	TITLE

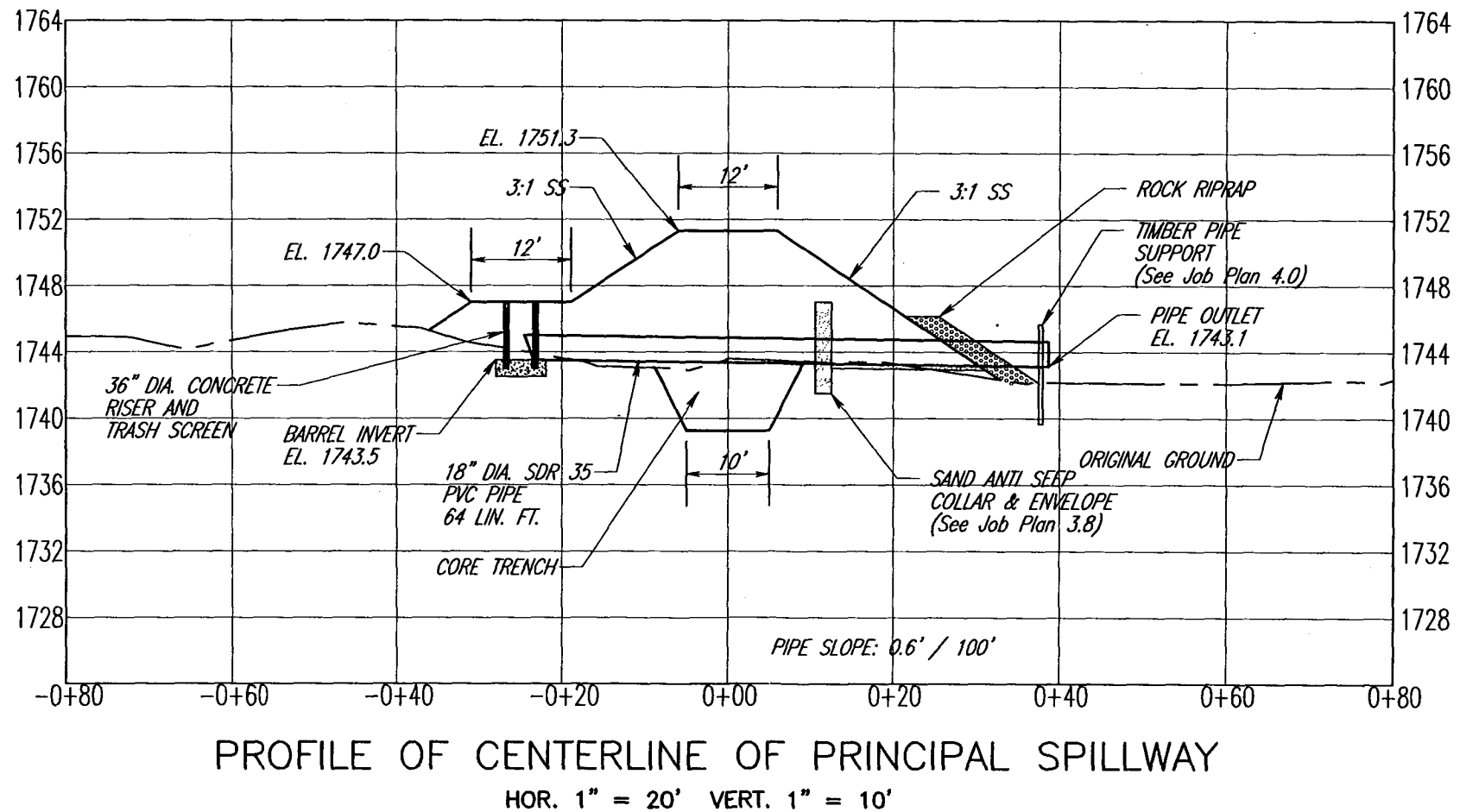
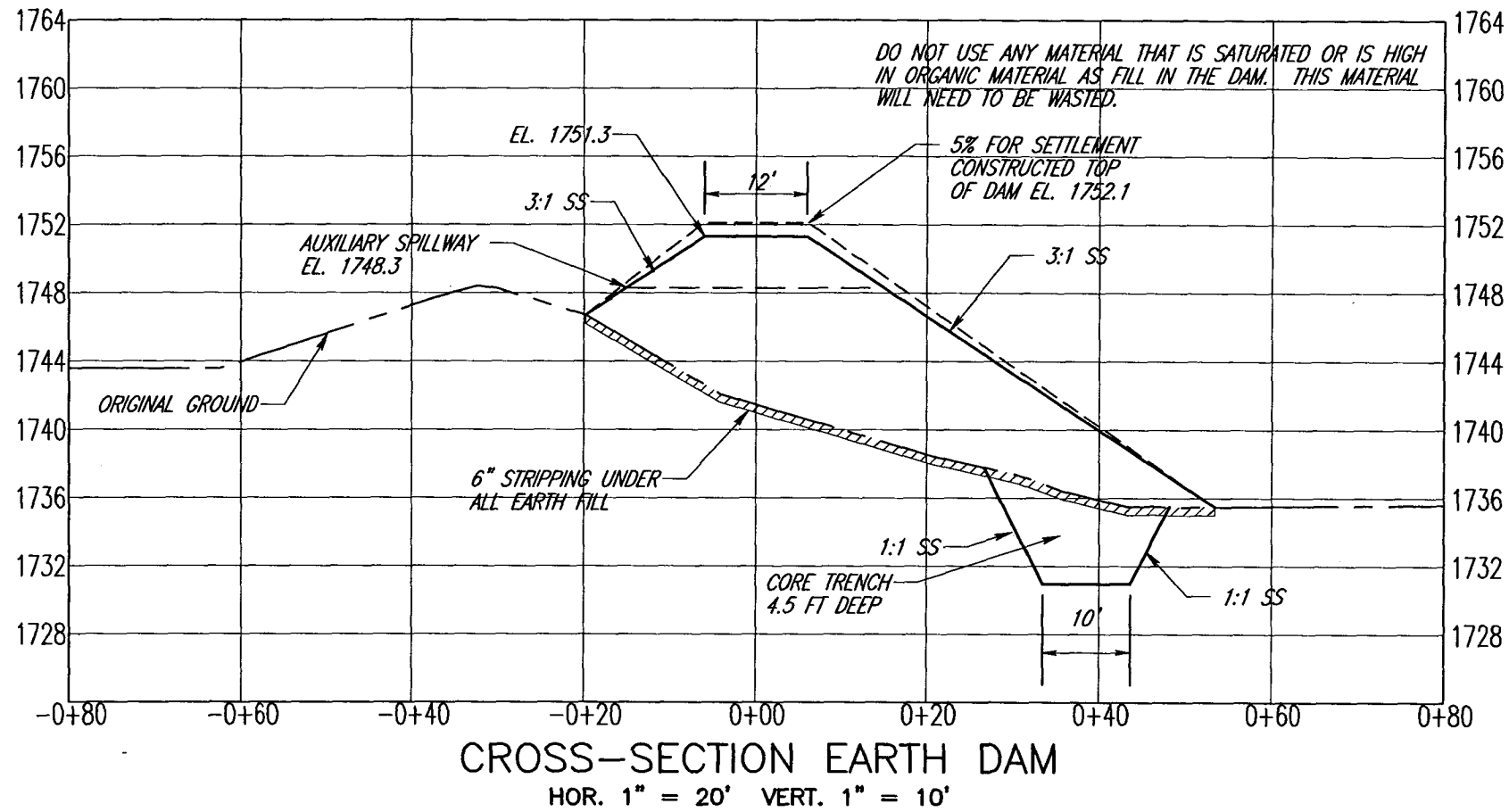
Date	12/21/2009
Designed	JOHN SCHMIDT
Drawn	JOHN SCHMIDT
Checked	
Approved	

PRODUCER TRENT SCHINDLER
SW 1/4 SECT. 25 T.105 North R. 74 West
LYMAN COUNTY
AMERICAN CREEK CONSERVATION DISTRICT

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



File Name: SD_Plane_Template_2-06.pro
Drawing No. 12/21/2009 10:52AM
Sheet 4 of 9



CROSS-SECTIONS
EARTH DAM AND PIPE

REVISIONS		
DATE	APPROVED	TITLE

Date
12/21/2009

Designed
JOHN SCHMIDT

Drawn
JOHN SCHMIDT

Checked
JOHN SCHMIDT

Approved
JOHN SCHMIDT

PRODUCER
TRENT SCHINDLER

SW 1/4 SECT. 25 T.105 North R. 74 West
LYMAN COUNTY
AMERICAN CREEK CONSERVATION DISTRICT

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

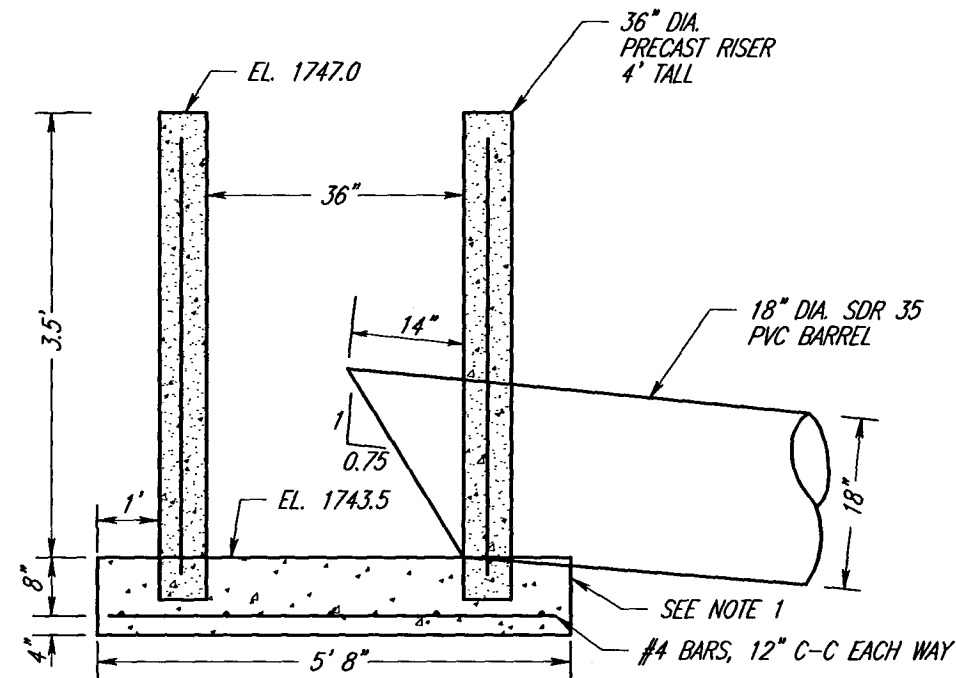
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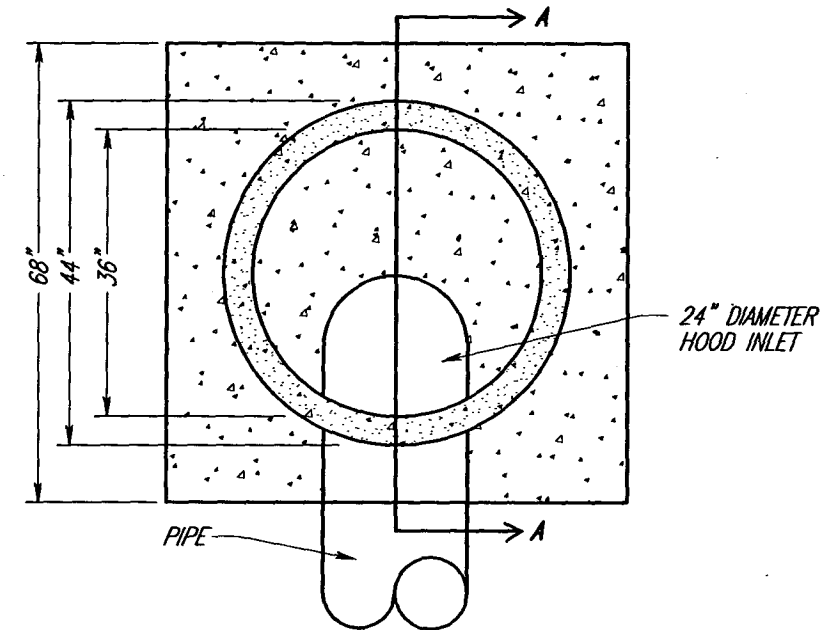
Drawing No.

12/21/2009 10:52AM

Sheet 5 of 9



SECTION VIEW A-A



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 1.3 CY CONCRETE WITH THE DESIGN MIX SPECIFIED IN CONSTRUCTION SPEC SD-12B CONCRETE FOR MINOR STRUCTURES.

CONCRETE RISER

REVISIONS		
DATE	APPROVED	TITLE

Date
 12/21/2009
 Designed JOHN SCHMIDT
 Drawn JOHN SCHMIDT
 Checked
 Approved

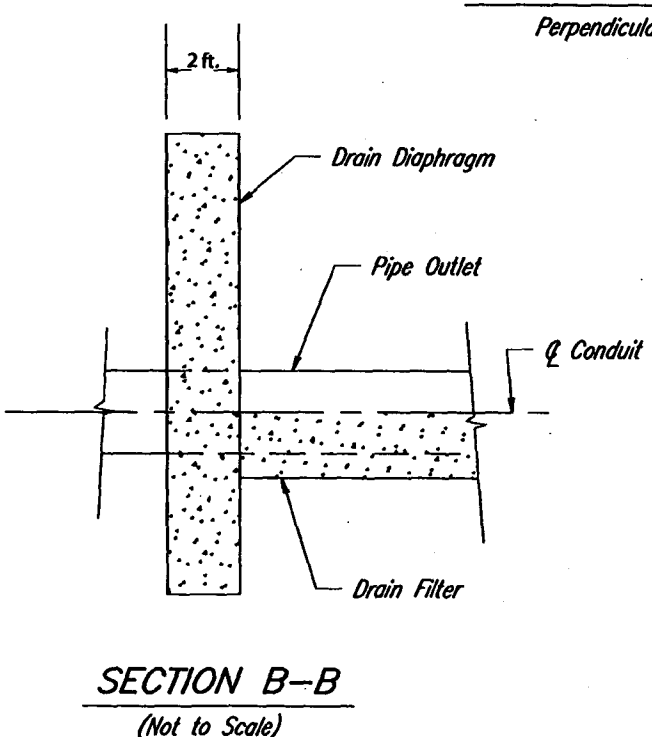
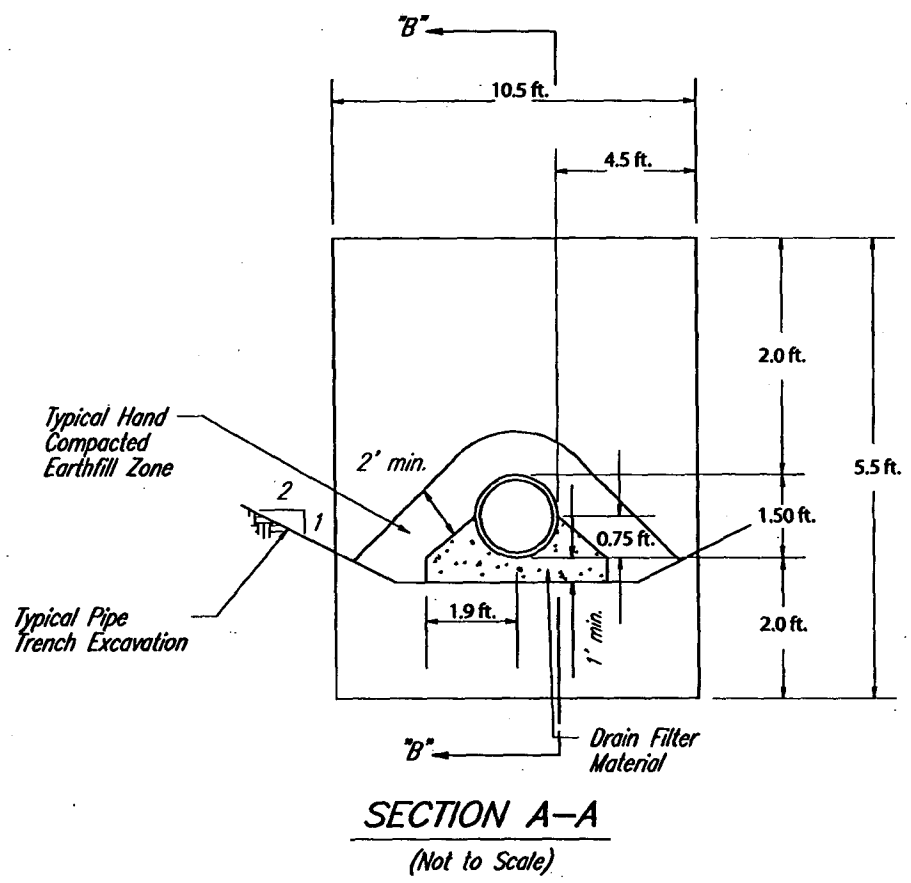
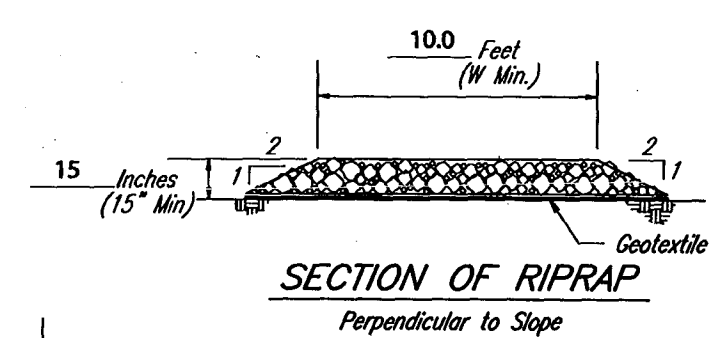
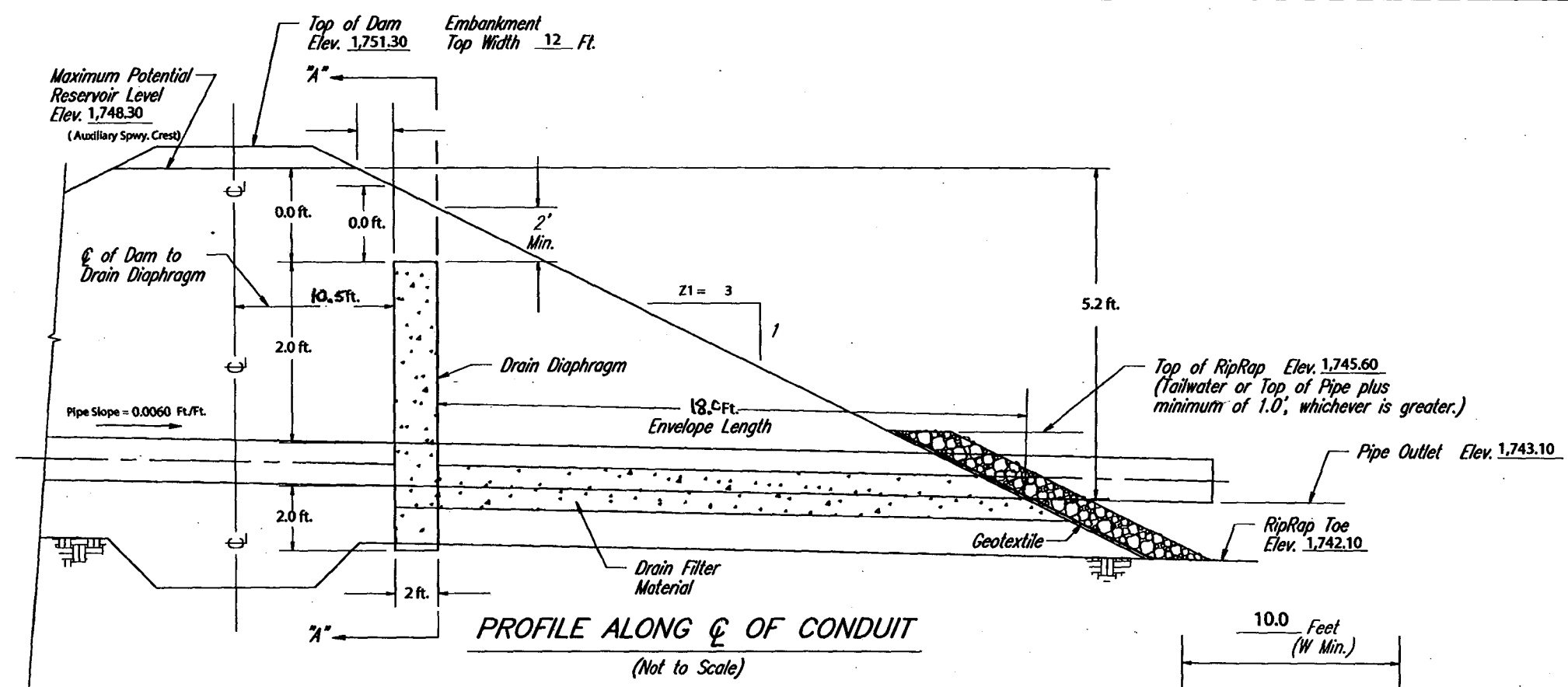
PRODUCER TRENT SCHINDLER
 SW SECT. 25 T.105 North R. 24 West
 LYMAN COUNTY
 AMERICAN CREEK CONSERVATION DISTRICT

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

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 Natural Resources Conservation Service
 United States Department of Agriculture

File Name:
 SD_Plane_Template_2-06.pro
 Drawing No.

12/21/2009 10:53AM
 Sheet 6 of 9



SUMMARY OF DESIGN AND DIMENSIONS

DESIGN DATA	
H = 0.0 Feet	Hd = 5.17 Feet
X = 4.5 Feet	D = 18 Inches
R = 2.0 Feet	Y = 2.0 Feet
C = Feet	Aggregate Gradation # 1
Embankment Backslope (Z1) = 3 Pipe Slope (S) 0.0060 Ft./Ft.	
DIMENSIONS	
W = 10.5 Feet	(Total Width of Drain Diaphragm)
T = 5.5 Feet	(Total Height of Drain Diaphragm)
t = 2 Feet	(Thickness of Single Filter)

ESTIMATED QUANTITIES

Drain Filter Material	7.4 Cubic Yards
Geotextile	18.4 Square Yards
Rock Riprap	6.4 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 1 requirements specified in Table 2 for Nonwoven Geotextiles in Material Specification SD-592.

DRAINAGE DIAPHRAGM DETAILS

REVISIONS			
DATE	APPROVED	TITLE	
07/21/2009	J. Schmidt	Drainage Diaphragm Details	7/21/2009 2:23PM

JOB PLAN 3.8 (07/2009)

Designed J. Schmidt 10/30/2009
 Drawn J. Schmidt 10/30/2009
 Checked J. Schmidt
 Approved J. Schmidt

PRODUCER Trent Schindler
 SECTION 25 105N R. 74W
 LYMAN COUNTY
 American City CONSERVATION DISTRICT

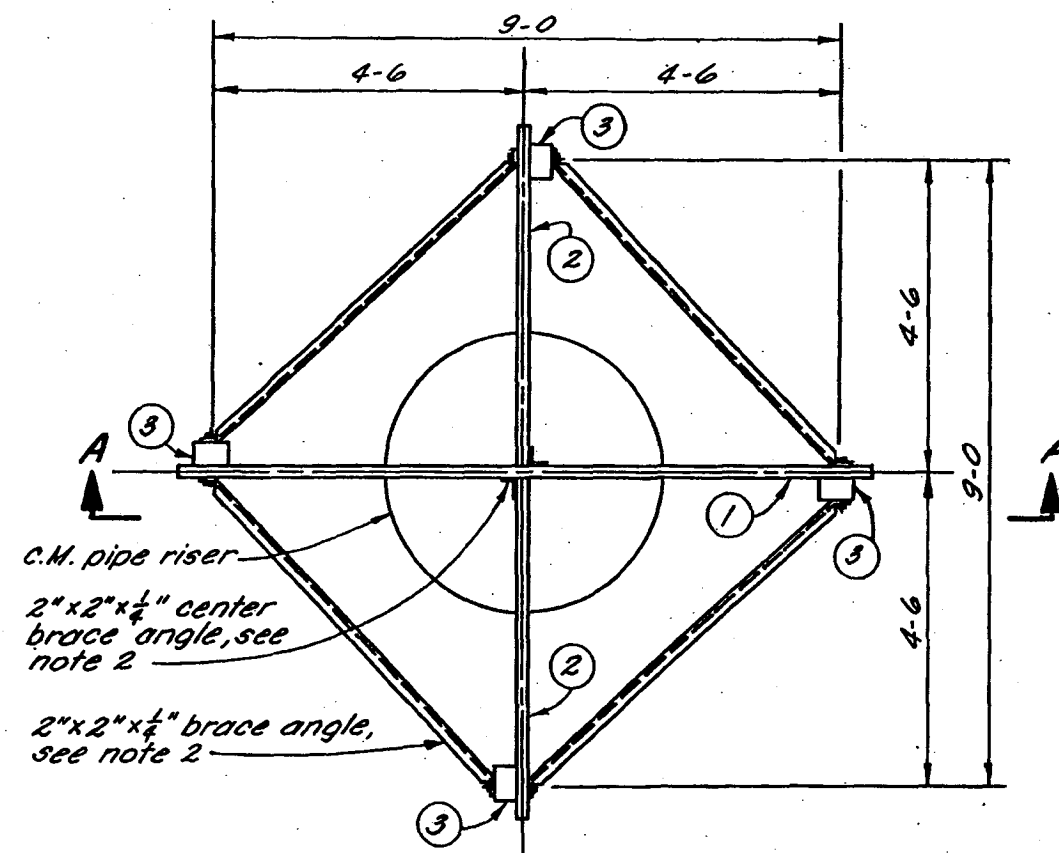
USDA - NRCS
 State Office Engineering Staff
 200 Fourth Street SW
 Huron, South Dakota 57350

NRCS
 Natural Resources Conservation Service
 United States Department of Agriculture

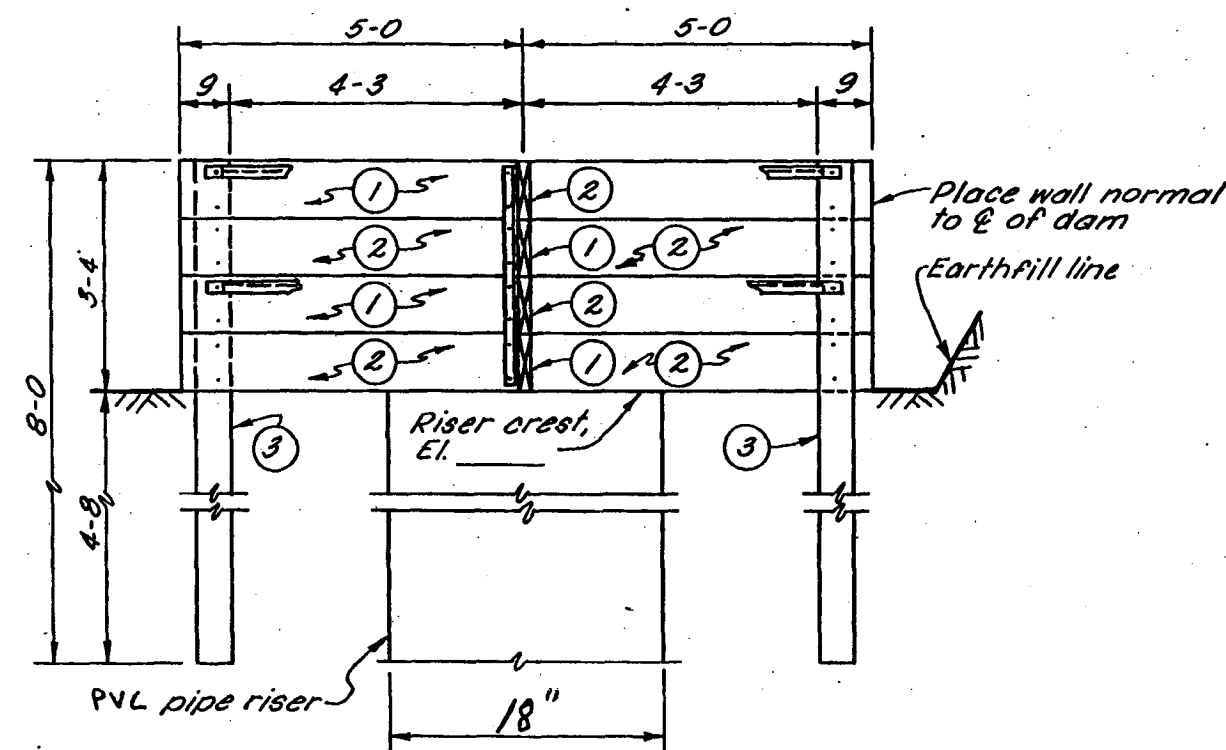
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 Drawing No. 7 of 9



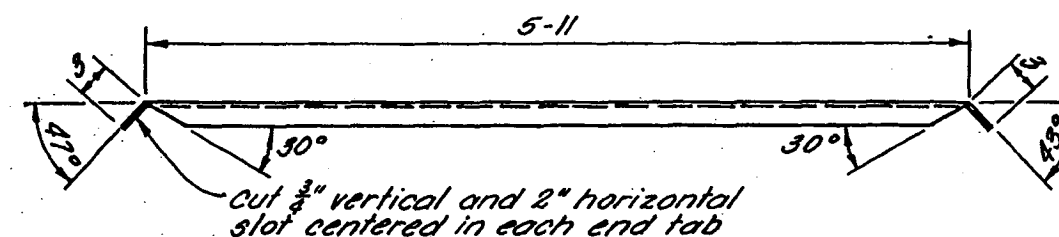
5, N-29, 073.4a



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: TRENT SCHINDLER
CONSERVATION DISTRICT: AMERICAN CREEK

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed: John Schmidt Date: 12/09 Approved by: _____
Drawn: _____ Title: _____
Traced: _____ Title: _____
Checked: _____ Sheet No. 9 Drawing No. _____

JOB PLAN NO. 6.4

5, N-29, 073.6-40

P & S Review

Trent Schindler
Water Permit Application No. 2645-2

Top of Dam Elev - 1751.3
2nd Spillway Elev - 1748.3
P. Spillway Elev - 1747.0
DIS Emb. Toe Elev - 1735.5

Cat. 3 - Low Hazard Dam

} HL = 15.8 ft

Normal Storage Capacity - 50.2 Ac-Ft
Int. Storage Capacity - 65.9
Max. Storage Capacity - 111.8

Int. Cap. x Est HL = $65.9 \times 12.3 = 811 < 3000 \therefore 25 \text{ year}$
Minimum Spillway Design

From USGS WRI 98-4055 "Tech. Serv. Est. Peak Flows ... in SD"
Region D CA = 0.84 mi^2

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

$$= 676 (0.84)^{.585}$$

$$= \underline{\underline{610 \text{ cfs}}}$$

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

$$= 1270 (0.84)^{.663}$$

$$= \underline{\underline{1130 \text{ cfs}}}$$

Secondary Spillway Capacity

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

$$= (2.6)(125)(3)^{1.5} \quad L = 125'$$

$$= \underline{\underline{1688 \text{ cfs}}} \quad H = 3 \text{ ft}$$

Section 74:02:08:09

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

NRCS Annual Yield

DA = 538 Ac CN = 83 Iso = 242

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

$$0.5 \times 538/12 = \underline{\underline{22 \text{ Ac-Ft}}}$$

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

$$1.1 \times 538/12 = \underline{\underline{49 \text{ Ac-Ft}}}$$

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

$$3.7 \times 538/12 = \underline{\underline{167 \text{ Ac-Ft}}}$$



**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. 2645-2, Trent Schindler**

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. 2645-2, Trent Schindler, 32824 242 Street, Reliance SD 57569.

The Chief Engineer is recommending APPROVAL of Application No. 2645-2 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. 2645-2 authorizes a dam with a storage capacity of 50.2 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
February 16, 2010

REPORT ON
WATER PERMIT APPLICATION No. 2645-2
Trent Schindler
February 10, 2010

Water Permit Application No. 2645-2 has been filed by Trent Schindler to impound 50.2 acre-feet of water from runoff by reconstructing an existing dam located in the SW ¼ SW ¼ Section 25-T105N-R74W, 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. 2645-2 is approved.

The dam will be 15.8 feet high with a normal storage capacity of 50.2 acre-feet with a reservoir level at the primary spillway elevation, and a maximum storage capacity of 111.8 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 538 acres or 0.84 square miles. The dam is designed to have a 36 inch diameter concrete riser with a 30 inch diameter PVC barrel with 4.3 feet of freeboard as the primary spillway, and a 125 foot wide earthcut secondary spillway with 3 feet of freeboard. A 25 year frequency event produces a peak runoff of approximately 610 cfs and a 100 year frequency event produces a peak runoff of approximately 1130 cfs. The earthcut spillway will have a capacity of approximately 1688 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 22 acre-feet. The annual yield with a 50 percent chance of occurrence, or 1 out of 2 years, is expected to be 49 acre-feet and the annual yield with a 10 percent chance, or 1 out of 10 years, is expected to be 167 acre-feet.

The Schindler Dam will be located in the SW ¼ SW ¼ of Section 25-T105N-R74W on an unnamed tributary to Red Butte Creek, about nine miles upstream of the confluence of Red Butte Creek and the White River. There are no existing Water Permits/Rights filed on Red Butte Creek between the proposed dam and the White River.

Conclusions:

1. Water Permit Application No. 2645-2 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. 2645-2.



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



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

February 16, 2010

Trent Schindler
32824 242 St.
Reliance, SD 57569

Dear Mr. Schindler:

We have reviewed the plans and specifications for your dam repair project located in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ of Sec. 25-T105N-R74W, 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. 2645-2 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 Schindler Dam will be classified as a small size Category 3, Low Hazard dam with a dam height of 15.8 feet and a normal storage capacity of 50.2 acre-feet and a maximum storage capacity of 111.8 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

Publisher's Affidavit of Publication

RECEIVED

MAR - 5 2010

WATER RIGHTS
PROGRAM

STATE OF SOUTH DAKOTA)
COUNTY OF LYMAN)SS

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

Notice of Application
84 Lines

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

The first publication of said notice in said newspaper aforesaid was on Wednesday, the 24 day of Feb A.D., 2010 and that the succeeding publications were severally
Wednesday, the 3 day of March 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 3 day of March, 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 4th day of March, 2010

My Commission expires Meghan Kay Severyn, 20____
My Commission Expires
March 12, 2015



NOTICE OF APPLICATION NO. 2645-2 to Appropriate Water

Notice is given that Trent Schindler, 32824 242 St, Reliance SD 57569 has filed an application for a water permit to impound 50.2 acre-feet of water from runoff by reconstructing a dam located in the SW 1/4 SW 1/4 Section 25 with water impounded in the W 1/2 SW 1/4 Section 25; all in T105N-R74W. 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. 2645-2 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 March 15, 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 \$45.27.



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

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

February 17, 2010

Lyman Co Herald
PO Box 518
Presho SD 57568

ATTENTION: Legal Public Notice

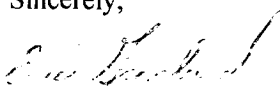
Enclosed is a Notice on Application No. 2645-2 to Appropriate Water to be published twice. Please publish the first notice on February 24, 2010 with the second publication 7 days later. The text of the notice can be e-mailed to your paper by contacting Karen Schlaak at (605) 773-3352.

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 Trent Schindler, 32824 242nd St., Reliance SD 57569 (Ph # 605-473-5321).

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. 2645-2

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

Date _____

We are in receipt of your letter of February 17, 2010 enclosing Notice to Appropriate Water by Application No. 2645-2 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.

February 17, 2010

Trent Schindler
32824 242nd St
Reliance SD 57569

Dear Mr. Schindler:

Water Permit Application No. 2645-2 for livestock 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 Co. 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 applications 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 applications.

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 February 24, 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. 2645-2 to Appropriate Water

Notice is given that Trent Schindler, 32824 242 St, Reliance SD 57569 has filed an application for a water permit to impound 50.2 acre-feet of water from runoff by reconstructing a dam located in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 25 with water impounded in the W $\frac{1}{2}$ SW $\frac{1}{4}$ Section 25; all in T105N-R74W. 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. 2645-2 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 March 15, 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

APR 28 2010

Trent Schindler
32824 242 St
Reliance SD 57569

Dear Mr. Schindler:

Enclosed is Water Permit No. 2645-2 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

enclosures

Permit No. 2645-2
Missouri River - Water District

Report Of Examination Of Works And/Or Application of Water To Beneficial Use

TO: Chief Engineer, Water Rights Program, DENR, Foss Bldg., Pierre, SD 57501

I have this day, June 8, 2011, made a thorough examination of the water use system constructed by Trent Schindler of 32824 242 St., Reliance, SD 57569 holder of Permit No. 2645-2, bearing the priority of January 28, 2010 authorizing the storage of 50.2 acre-feet of the waters of runoff for fish & wildlife propagation, livestock use purposes, in Lyman County.

I have to report on the conditions of the same as follows:

A. Works used to divert the water:

A 15.8 foot high earthen dam with a normal storage capacity of 50.2 acre-feet of water.

B. Works used to transport water to place of use:

N/A

C. Works used to apply water to beneficial use:

A 15.8 foot high earthen dam with a normal storage capacity of 50.2 acre-feet of water.

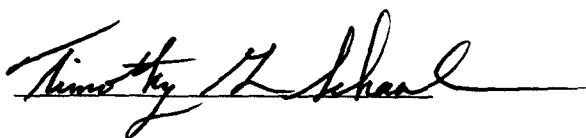
The system is in the following condition good. The point of diversion is located 350 ft. north & 850 ft. east of the SW corner of Section 25-T105N-R74W (SW ¼ SW ¼), Lat. 43.862739 Long. -99.662633. The works are capable of storing 50.2 acre-feet of water which is to be used for fish & wildlife propagation, livestock use. Water has been put to beneficial use to the maximum extent as follows:

A 15.8 foot high earthen dam with a normal storage capacity of 50.2 acre-feet of water.

and the license should be issued for 50.2 acre-feet of storage.

Applicable permit qualifications have been complied with: Yes X

Exceptions to compliance are: none Date Report Completed: February 9, 2012



Timothy G. Schaal, P.E.
Engineer IV
DENR, Water Rights Program

REPORT ON INSPECTION OF PERMIT NO. 2645-2

DATE OF INSPECTION: June 8, 2011

NAME & ADDRESS OF PERMIT HOLDER: Trent Schindler, 32824 242 St., Reliance, SD 57569

DIVERSION POINT LEGAL LOCATION: 350 ft. north & 850 ft. east of the SW corner of Section 25-T105N-R74W, (SW ¼ SW ¼), Lat. 43.862739 Long. -99.662633.

DAM INFORMATION:

- 1) Height to crest 15.8 feet
- 2) Height to primary spillway 11.5 feet
- 3) Height to secondary spillway 12.8 feet
- 4) Crest width 12 feet
- 5) Crest length 452 feet
- 6) Spillway length XXX feet
- 7) Spillway width 125 feet
- 8) Approx. storage (Normal) 50.2 acre-feet
- 9) Approx. storage (Maximum) 111.8 acre-feet
- 10) Date constructed: 2010

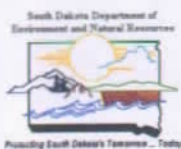
PERMIT QUALIFICATIONS AND REGULATIONS:

- 1) Soil and water permit lands agree with lands being irrigated and lands listed on permit N/A
- 2) Special qualifications to permit being abided by yes
- 3) All structures, wells and lands on map yes
- 4) Irrigation Questionnaires checked to determine if permit owner started irrigation by the end of construction period N/A

Water Permit Application No. 2645-2



0 0.25 0.5 1 Miles



Timothy G. Schaal

Timothy G. Schaal, P.E.
Engineer IV
SD DENR, Water Rights Program

2/9/12



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

MAR 08 2012

2645-2

Trent Schindler
32824 242nd St
Reliance SD 57569

Dear Mr. Schindler:

Enclosed is your Water License No. 2645-2. The license is the final document which completes the process of obtaining a water right. Included with the license is a map prepared by the staff engineer who conducted the field investigation.

As long as you use the water beneficially, as stated in the Water License, State Water Laws provide that you have a continuing right to use the water.

Sincerely,

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

enclosures

STATE OF SOUTH DAKOTA

WATER LICENSE NO. 2645-2

(1) Trent Schindler, 32824 242nd St, Reliance SD 57569 made Application No. 2645-2, January 29, 2010 for a water permit to impound 50.2 acre feet of runoff water by reconstructing a storage dam in Lyman County, South Dakota for fish and wildlife propagation and domestic livestock water purposes. Permit No. 2645-2, with a priority date of January 29, 2010 was approved March 15, 2010 and issued to the applicant for impoundment of water with construction of the storage dam to be completed on or before March 15, 2015 and the application to beneficial use of said water on or before March 15, 2019.

(2) It is certified that the permit holder has complied with the provisions of South Dakota State Law relating to completion of the storage dam and is entitled to impound 50.2 acre feet of water annually for beneficial use with sufficient water annually to maintain the water level to the outlet elevation.

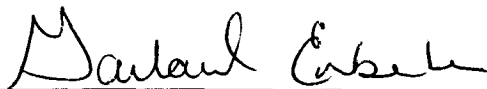
The location of the storage dam (spillway) is 350 feet north and 850 feet east of the SW corner of Section 25, T105N, R74W (SW ¼ SW ¼).

(3) The permit holder has complied with the provisions of South Dakota State Law relating to the application of water to beneficial use.

(4) Pursuant to South Dakota Water Law 46-5-30.1 Trent Schindler, 32824 242nd St, Reliance SD 57569 the holder and/or owner of Water Right No. 2645-2 is issued a license to appropriate water, the right to impound 50.2 acre feet of water annually from runoff with a priority date of January 29, 2010 from the location specified in (2) of this license for fish and wildlife propagation and domestic livestock water purposes.

This license is subject to South Dakota Water Law, any limitations or conditions listed in Water Right No. 2645-2 and subject to the following qualifications:

- Water Right No. 2645-2 authorizes a dam with a storage capacity of 50.2 acre feet of water and sufficient water annually to maintain the water level to the outlet elevation.
- Low flows as needed for downstream domestic use, including livestock water and prior water rights must be bypassed.



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

MAR 08 2012

date

