

WATER PERMIT NO. 7249-3

Name of Applicant: Charles Ross

Address: 21185 Scattergun Ridge Rd, Pierre SD 57501

Phone: 605 875-3500

Amount of Water Claimed: ~~61.7~~ AF

Total Acres: NA

Source of Water Supply: runoff 56.2

Water to be used for: fwp, livestock, recreational

County: Hughes

Type of Waste Disposal System: NA

Location: approximately 20 miles east of Pierre

PRIORITY

Date Received: 5-5-11

Application/License Fee: \$700

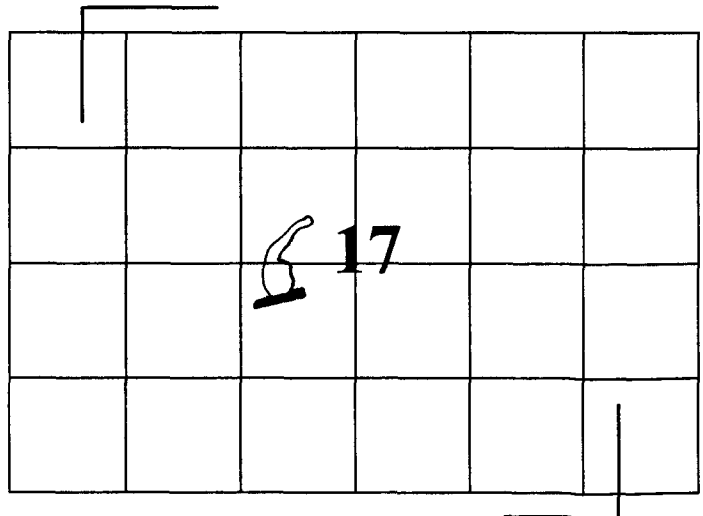
Corrected Application Received:

Period of Annual Use: Jan 1 – Dec 31

Remarks:

Diversion Point: NE ¼ SW ¼ Sec 17-T110N-
R75W

Water Impounded: NE ¼ SW ¼, SE ¼ NW ¼ Sec
17-T110-R75W



Depth of Well:

Well Driller:

Remarks:

Type of Map: topo

Prepared by: Angel Roman, NRCS

Reviewed and the Number Assigned on: 5-5-11

By: Karen Schlaak

Notice of Hearing - date to intervene: _____

SD EForm - 1585 V3
FORM 2: Application for uses other than irrigation
(type or print)

Mail to: Water Rights Program Joe Foss Building 523 E. Capitol Pierre, SD 57501-3181 (605) 773-3352	No. <u>7249-3</u> (office use only)
	Hydrologic Unit <u>10140101</u>
	Basin <u>Missouri River</u>
	Newspaper <u>Capital Journal P.O. Box 878</u> <u>(605-224-7301) Pierre 57501</u>

RECEIVED
MAY - 5 2011
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>Agricultural & Wildlife uses</u>	

Type of Application:
(check one)

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

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

1. Name of Applicant Charles Ross Phone 605-875-3500
(check one) ☐ Owner ☐ Tenant/lessee
Mailing Address 21185 Scattergun Ridge Road Pierre State SD 57501
(Street, RR, or Box and City) (Zip Code)

2. Amount of water claimed _____ *CFS or _____ **GPM 56.2 ***AF
(*Cubic Feet per Second) (**Gallons per Minute) (***)Acre Feet - storage capacity of dam/dugout or annual use if applicable)

3. Source of water supply Surface Runoff

4. Location of point of diversion (example - 3 wells in SW 1/4 NE 1/4 section 12-T104N-R53W) County Hughes
NE 1/4, SW 1/4, Sec. 17, T110N, R75W Water impounded NE 1/4 SW 1/4 SE 1/4 NW 1/4
Sec 17 T110N R75W

5. County or counties where water will be used Hughes

6. Annual period during which water is to be used year - Around Jan. 1 - Dec 31

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

The project will consist of a 25.6' high, and 372' wide earthen dam which will on average pond approximately 27.0 acre feet of water per year.

STATE OF SOUTH DAKOTA)

County of Hughes

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, Charles Ross, 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 [Signature]

Subscribed and sworn to before me this 2 day of May 2012

Brett M. Koenecke
My Commission Expires
August 7, 2015

Notary Public signature [Signature]

**SOUTH DAKOTA
WATER PERMIT NO. 7249-3**

Date of first receipt of application May 5, 2011.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 7249-3 to Charles Ross, 21185 Scattergun Ridge Rd, Pierre SD 57501 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. 7249-3 authorizes impoundment of 56.2 acre-feet of water from runoff by constructing a dam located in the NE 1/4 SW 1/4 Section 17 with water impounded in the NE 1/4 SW 1/4, SE 1/4 NW 1/4 Section 17; all in T110N-R75W.
2. The water appropriated shall be used for fish and wildlife propagation, recreation and livestock water purposes and may not exceed the amount of water needed for beneficial use.
3. The water is to be used during the following described annual period: January 1 – December 31.
4. The date of approval of Permit No. 7249-3 is July 11, 2011.
5. The date from which applicant may claim right is May 5, 2011.
6. One-fifth of the construction is to be completed on or before January 11, 2014.
7. All construction is to be completed on or before July 11, 2016.
8. Water is to be put to beneficial use on or before July 11, 2020.
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. 7249-3 authorizes a dam with a storage capacity of 56.2 acre feet of water and sufficient water annually to maintain the water level to the outlet elevation.
2. Low flows as needed for downstream domestic use, including livestock water and prior water rights must be by-passed.

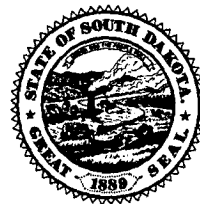
WATER MANAGEMENT BOARD

By: Garland Erbele

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

JUL 25 2011

date



(type or print in ink)

1. Well Information - Proposed Construction

N/A

- 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

N/A

- 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

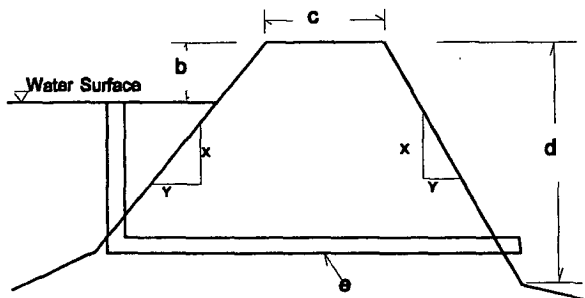
- a) Surface Dimensions NA _____ Depth _____
- b) Depth to water (ground surface to water level) _____

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:

USDA-NRCS
1717 N. Lincoln Ave. Suite #104
Pierre, SD 57501
605-224-2476 x5



- b) Freeboard _____ 4.5'
- c) Crest Width _____ 14'
- Crest Length _____ 387.4'
- d) Height _____ 26'
- e) Primary Outlet Capacity _____ 71.6cfs
If pipe, diameter _____ 24"
- f) Secondary Spillway Capacity _____ 346 cfs
Spillway Width _____ 100'
- g) X & Y Slope _____
Upstream _____ 3:1
Downstream _____ 3:1
- h) Surface Area of Impoundment _____ 11.6Acres
- i) Storage _____ 56.2 _____ Acre Feet
- j) Drainage Area Above Dam _____ 1,828.4 _____ Acres



Charles Ross
17-110-75
Proposed Pond Location and Pool Area

1:24,000



RECEIPT

WATER RIGHTS PROGRAM

South Dakota Department of Environment and Natural Resources

Date 5/5, 2011

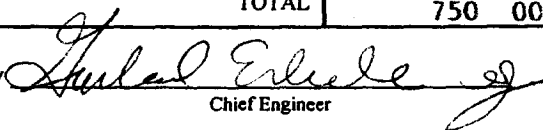
RECEIVED OF Scattergun Lodge 21185 Scattergun Ridge Rd Pierre SD 57501

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

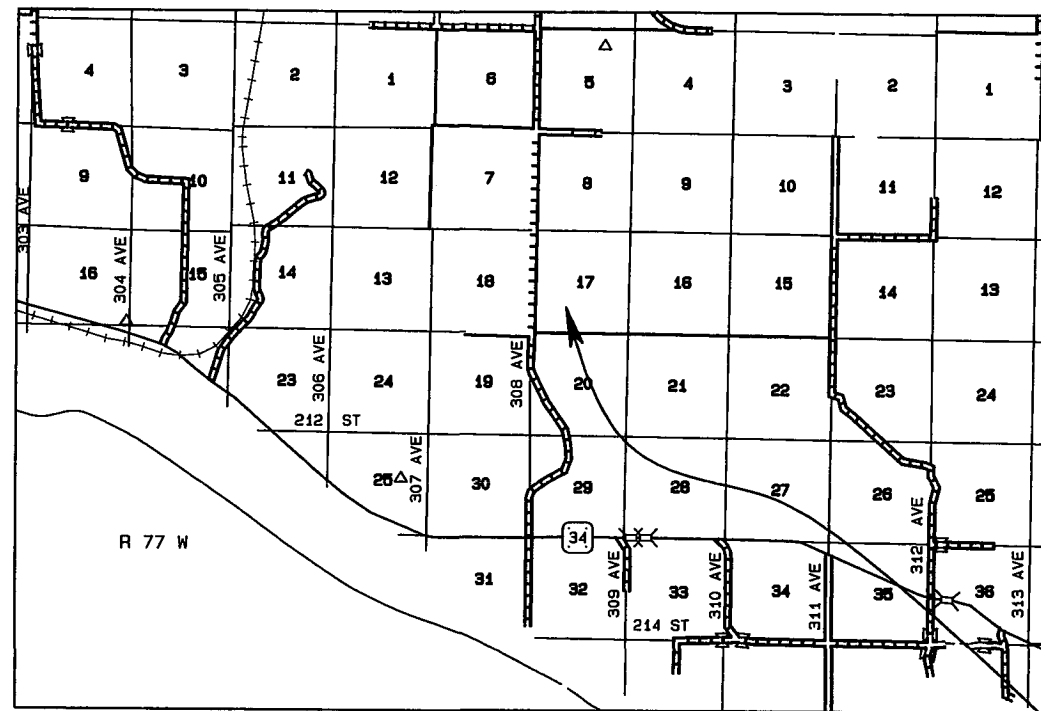
Fee for Application for Permit No. <u>7249-3</u> to Appropriate Water, to construct and to put water to beneficial use	550	00
Fee for Application for Permit No. _____ to Appropriate Water for Future use		
Fee to retain Future Use Permit No. _____ after period of seven years.		
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. <u>7249-3</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	750 00

No. **04977**

By


Chief Engineer

Charles Ross Pond (SW 1/4, Section 17, T110N, R75W)



PLAN NOTES:

1. A preconstruction meeting is required before construction between NRCS, the Landowner, and the contractor.
2. A Water Rights Permit and a Safety of Dams Review is required by South Dakota Department of Environment and Natural Resources. This is the responsibility of the landowner.
3. According to State Law, no excavator may begin any excavation without first notifying the One-Call Notification Center of the proposed excavation. 1-800-781-7474

Sheet Index

- 1 Cover
- 2 Plan
- 3 General Layout
- 4 Cross Section of Dam
- 5 Profile of Dam
- 6 Concrete Riser
- 7 Drainage Diaphragm
- 8 Trash Rack
- 9 Timber Pipe Support

Contact Information

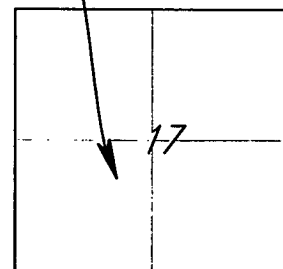
Charles Ross
21185 Scattergun Ridge Rd.
Pierre, SD 57501
605-875-3501

Job Class IV
Hazard Class A

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

JAA

Date



Project Location

TABLE OF QUANTITIES

ITEM	UNIT	QUANTITY	AS BUILT
Excavation			
Core Trench	Cu. Yd.	1,661	
Spillway	Cu. Yd.	813	
Earth Fill Class S	Cu. Yd.	8,710	
Topsoil (Emergency Spillway)	Cu. Yd.	513	
Seeding	Acre	1.4	
60" dia. x 5' deep concrete drop structure	Each	1	
24" dia. PVC SDR 26 min. (PS115)	L.F.	118	
Rock Riprap	Cu. Yd.	10	
Geotextile Cloth	Sq. Yd.	27	
Fine Drainfill	Cu. Yd.	22	
Trash Rack	Each	1	
Pipe Outlet Structure	Each	1	

Construction Specifications

Clearing and Grubbing	SD-2
Stripping	SD-4
Excavation	SD-5
Earth Fill, Class S	SD-7
Rock Riprap	SD-61C
Drainfill	SD-24A
Salvaging and Spreading Topsoil	SD-10
Concrete for Minor Structures	SD-12B
Steel Reinforcement	SD-13
PVC Pipe	SD-19
Wood Fabrication and Installation	SD-16
Seeding	SD-28
Geotextile and Material Spec	SD-592
Plastic Pipe Material Spec	SD-55

Hydraulic Data

Drainage Area	1,828 Acres
Time of Concentration	9.58 Hours
Runoff Curve Number	79
Principal Spillway, 2yr, 24-hr. Rainfall	2.2 Inches
Emergency Spillway, 50 yr, 24 hr. Rainfall	4.6 Inches
Principal Spillway Discharge at ES (Q2)	71.6 CFS
Emergency Spillway Discharge (Q50)	346 CFS
Estimated 25 year Sediment Yield	26.5 AcFt
Estimated Sediment Yield Below Crest	21.2 AcFt
Estimated Sediment Yield Above Crest	5.3 AcFt
Crest of Normal Pool	11.6 Acres 56.2 AcFt
Crest of Emergency Spillway	16.4 Acres 83.6 AcFt
Top of Dam	37.5 Acres 152.12 AcFt

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MAY - 5 2011
WATER RIGHTS
PROGRAM

Date 1/6/2010
Designed A. Roman
Drawn A. Roman
Checked [Signature]
Approved [Signature]

PRODUCER Charles Ross
SW 1/4, SECT. 17, T. 110 North, R. 75 West
Hughes COUNTY
Hughes 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:
Chuck Ross Pond 1111

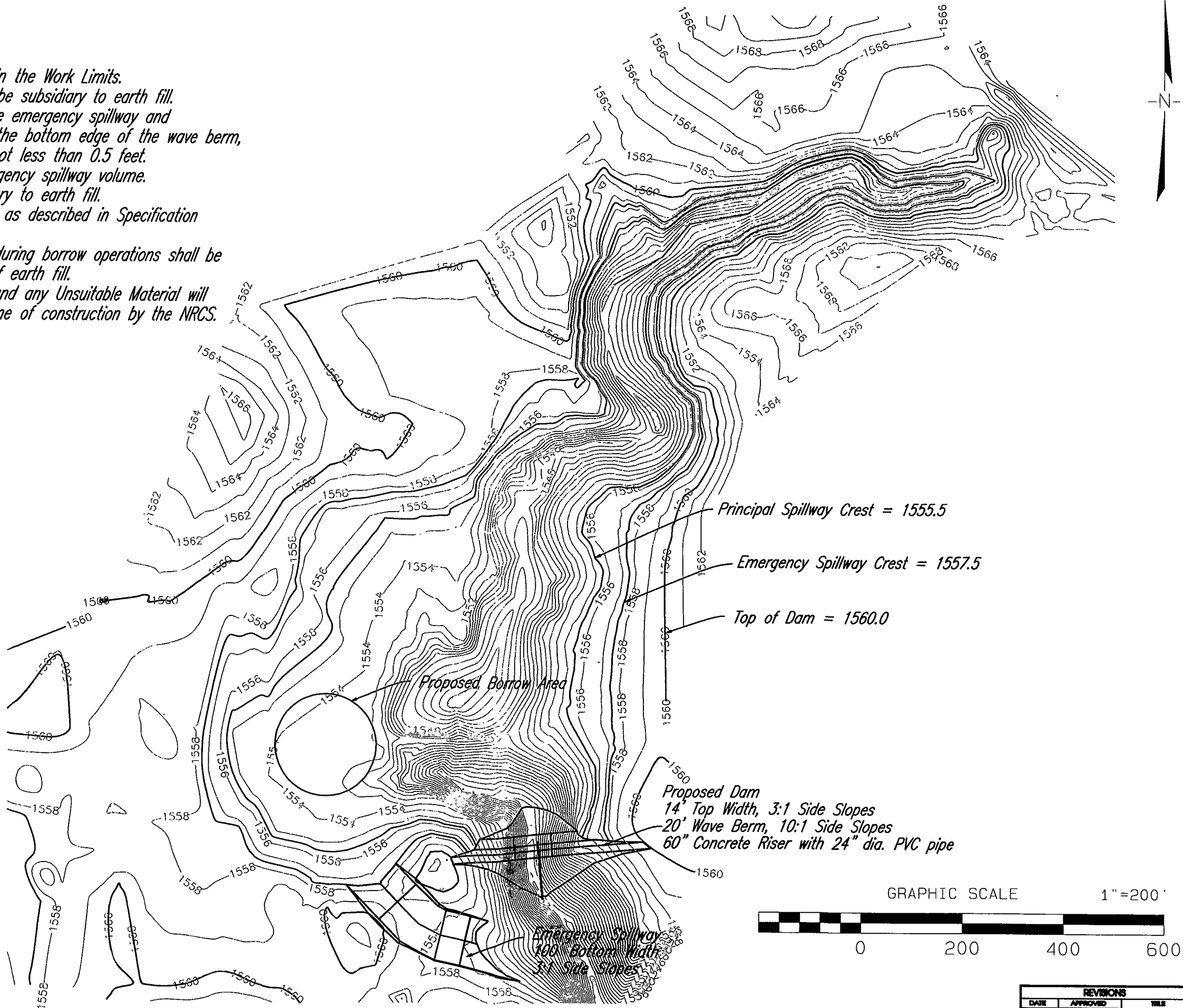
Drawing No.

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Sheet 1 of 9

Construction Notes

1. Clear and Grub the entire area within the Work Limits.
2. Emergency spillway excavation shall be subsidiary to earth fill.
3. Spread topsoil on all surfaces of the emergency spillway and dam embankment downstream of the bottom edge of the wave berm, (@ elev. 1554.2), to a depth of not less than 0.5 feet.
4. Topsoil quantity based only on emergency spillway volume.
Topsoil on embankment is subsidiary to earth fill.
5. All borrow material must be suitable as described in Specification SD-7S.
6. Any shale or sand that is exposed during borrow operations shall be immediately backfilled with 2 feet of earth fill.
7. The Excavation of the Core Trench and any Unsuitable Material will be verified and measured at the time of construction by the NRCS.



Date	12/31/2009
Designed	A. Roman
Drawn	A. Roman
Checked	[Signature]
Approved	[Signature]

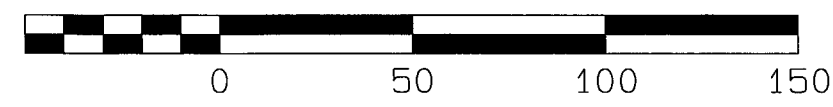
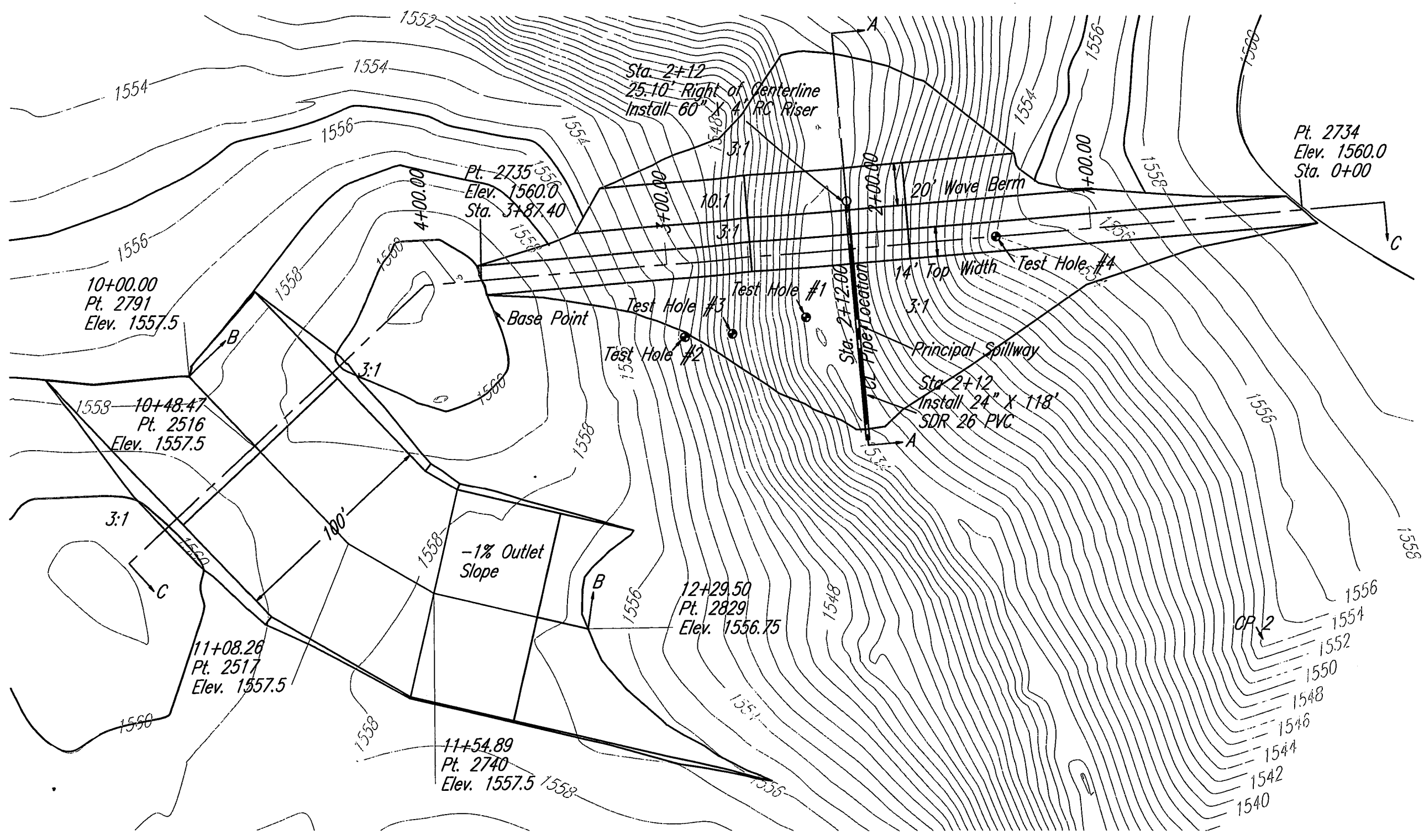
PRODUCER Charles Ross
1/4 SECT. 17 T. 110 North R. 75 West
Hughes COUNTY
Hughes CONSERVATION DISTRICT

USDA - NRCS
FIELD SUPPORT OFFICE
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PIERRE, SOUTH DAKOTA 57501



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12/31/2009 9:56AM	
Sheet 2 of 9	

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DATE	APPROVED	TITLE



REVISIONS		
DATE	APPROVED	WKS



Natural Resources Conservation Service
United States Department of Agriculture

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Chuck Ross Pond/14th

Drawing No.
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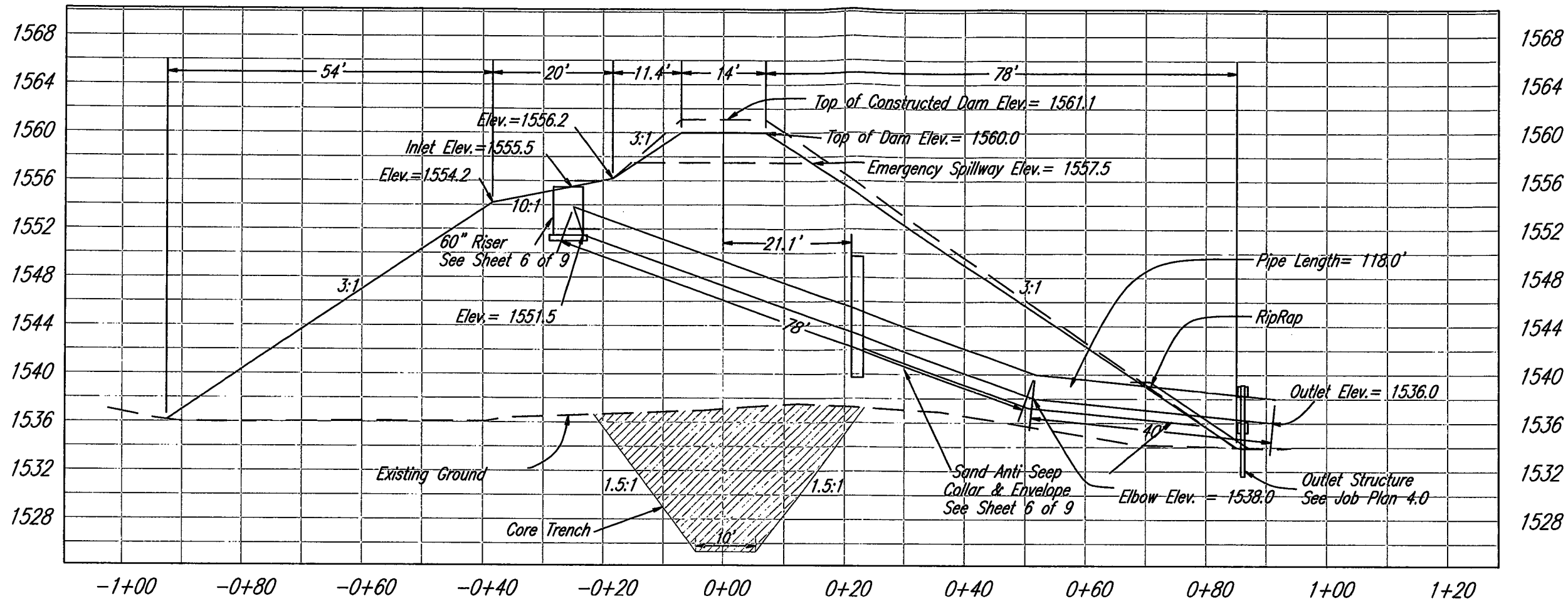
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FIELD SUPPORT OFFICE
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PIERRE, SOUTH DAKOTA 57501

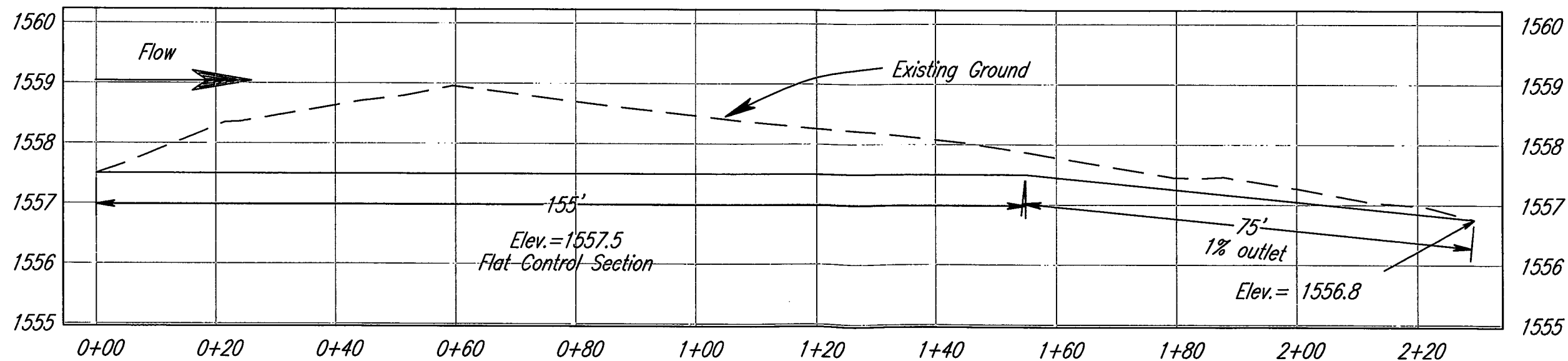
PRODUCER Charles Ross
SW 1/4 SECT. 17, T.110 North R. 75 West
Hughes COUNTY
Hughes CONSERVATION DISTRICT

Designed A. Roman
Drawn A. Roman
Checked [Signature]
Approved [Signature]

Date
12/31/2009
12/31/2009
1/6/10
1/10/10



CROSS SECTION OF DAM A-A
Vertical Scale: 1"=10'; Horizontal Scale: 1"=20'



EMERGENCY SPILLWAY PROFILE SECTION B-B
Vertical Scale: 1"=4'; Horizontal Scale: 1"=40'

Date 1/5/2010
Designed A. Roman
Drawn A. Roman
Checked [Signature]
Approved [Signature]

PRODUCER Charles Ross
SW 1/4 SECT. 17 T. 110 North R. 75 West
Hughes COUNTY
Hughes CONSERVATION DISTRICT

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

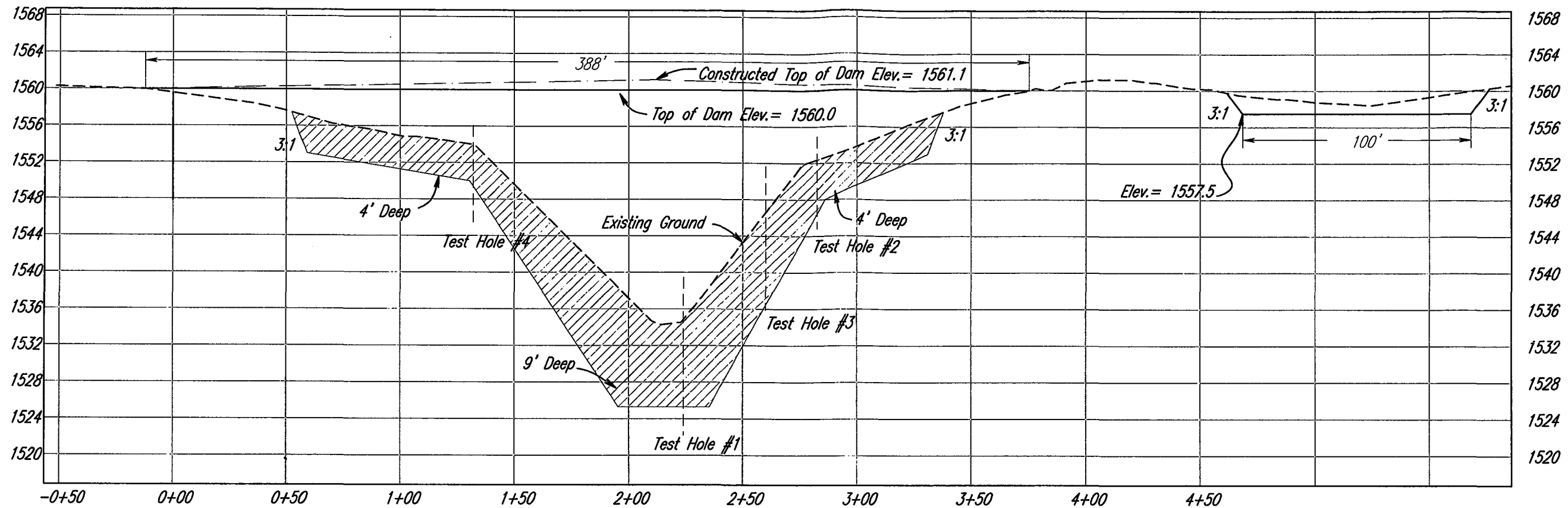
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United States Department of Agriculture

File Name:
Chuck Rom Pond 18th
Drawing No.

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DATE	APPROVED	REVISION

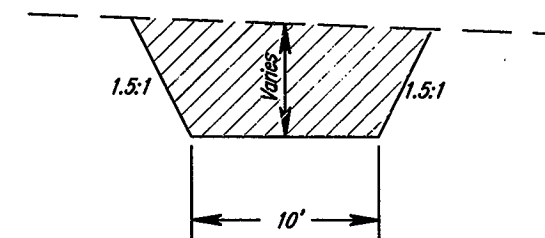
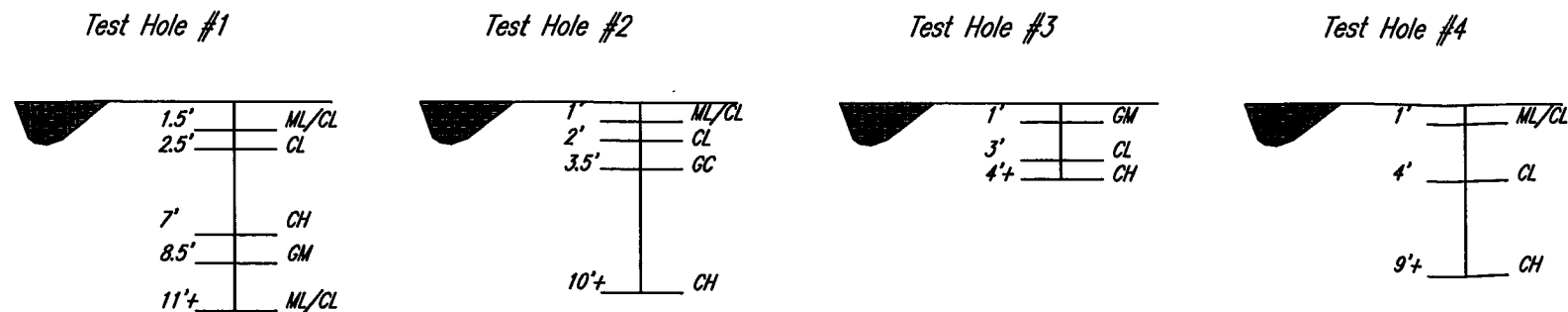
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Sheet 4 of 9



DAM PROFILE C-C
Vertical Scale: 1"=12.5'; Horizontal Scale: 1"=50'

LOG OF TEST HOLES
Vertical Scale: 1"=10'



TYPICAL CORE TRENCH
Dam Centerline - 1.5:1 Side Slopes
(NOT TO SCALE)

Date 12/31/2009
Designed A. Roman
Drawn A. Roman
Checked [Signature]
Approved [Signature]

PRODUCER Charles Ross
SW 1/4, SECT. 17, T. 110 North, R. 75 West
Hughes COUNTY
Hughes CONSERVATION DISTRICT

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

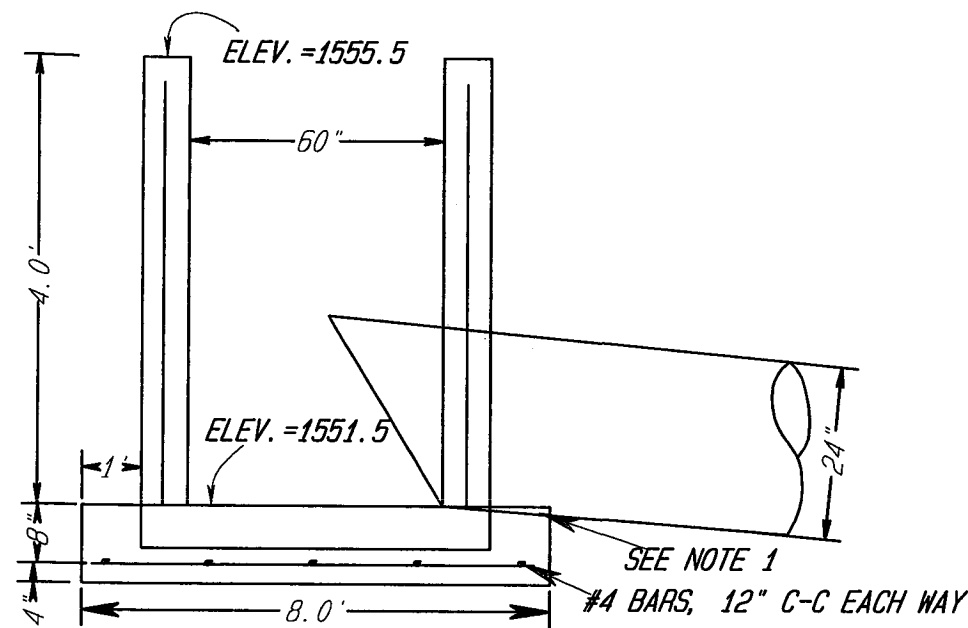
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United States Department of Agriculture

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Drawing No.

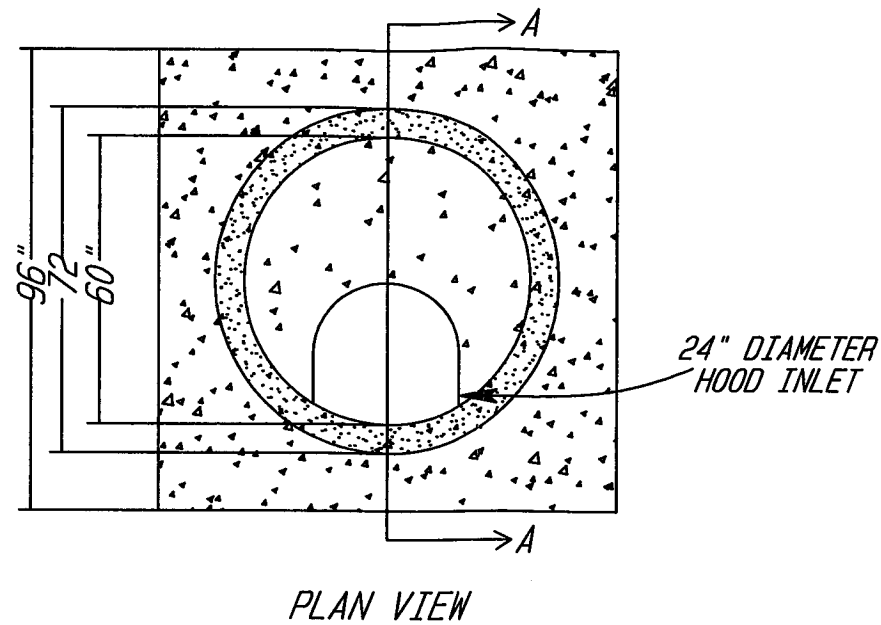
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Sheet 5 of 9



SECTIONAL ELEVATION A-A



- Note 1) BOTTOM OF PIPE NEEDS TO BE EMBEDDED IN CONCRETE FLOOR TO ACHIEVE DESIGN INVERT ELEVATION SO RISER WILL DRAIN
- Note 2) CONCRETE AROUND PIPE NEEDS TO BE VIBRATED TO INSURE A GOOD SEAL AROUND PIPE.
- Note 3) DROP STRUCTURE TO BE PRECAST REINFORCED CONCRETE.
- Note 4) BASE FOR CONCRETE RISER WILL REQUIRE 2.4 CY CONCRETE.

Coordinate Table				
Pt #	Northing	Easting	Elevation	Descriptor
1855	9844.7250	10362.1320	1554.38	CP2
2516	9933.4925	9889.6945	1557.50	10+48.47 CL Emergency Spillway
2517	9890.2758	9931.0112	1557.50	11+08.26 CL Emergency Spillway
2734	10047.8399	10380.2485	1560.00	0+00 CL Dam
2735	10014.3047	9994.2937	1550.00	3+87.40 CL Dam
2740	9867.0595	9971.4548	1557.50	11+54.89 CL Emergency Spillway
2791	9968.6543	9856.3388	1557.50	10+00 CL Emergency Spillway
2829	9850.3860	10044.1831	1556.75	12+29.50 Emergency Spillway
BASE	10000.0000	10000.0000	1560.00	BASE

Date 12/31/2009
 Designed A. Roman
 Drawn A. Roman
 Checked [Signature]
 Approved [Signature]

PRODUCER Charles Ross
 SW 1/4 SECT. 17, T.110 North R. 75 West
 Hughes COUNTY
 CONSERVATION DISTRICT

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

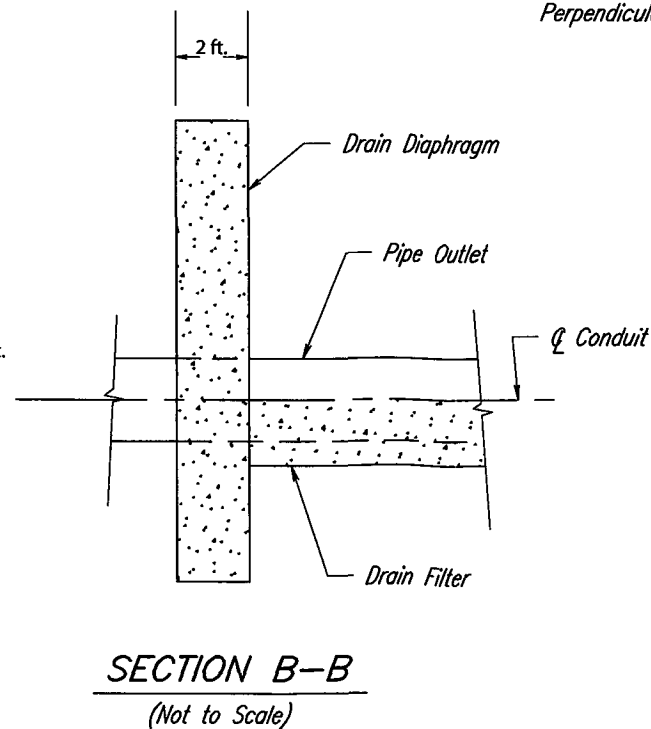
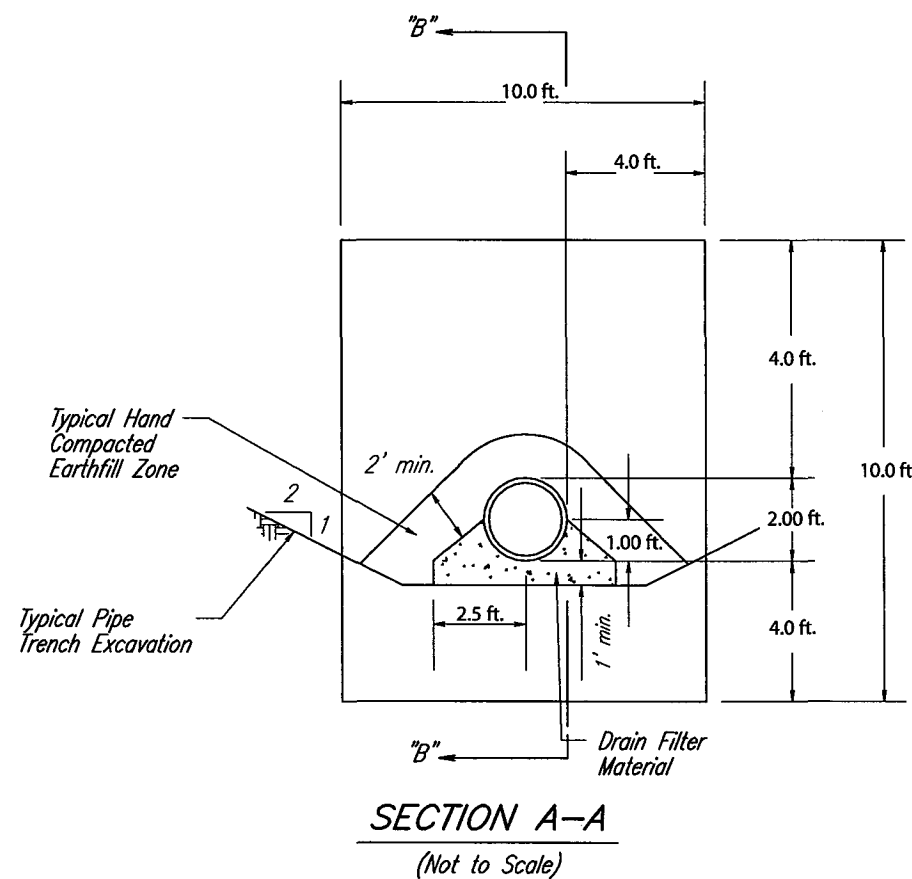
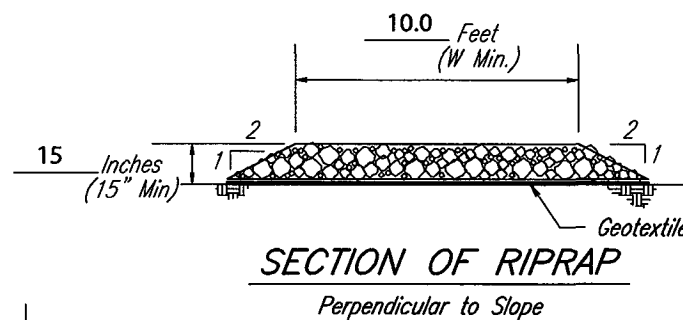
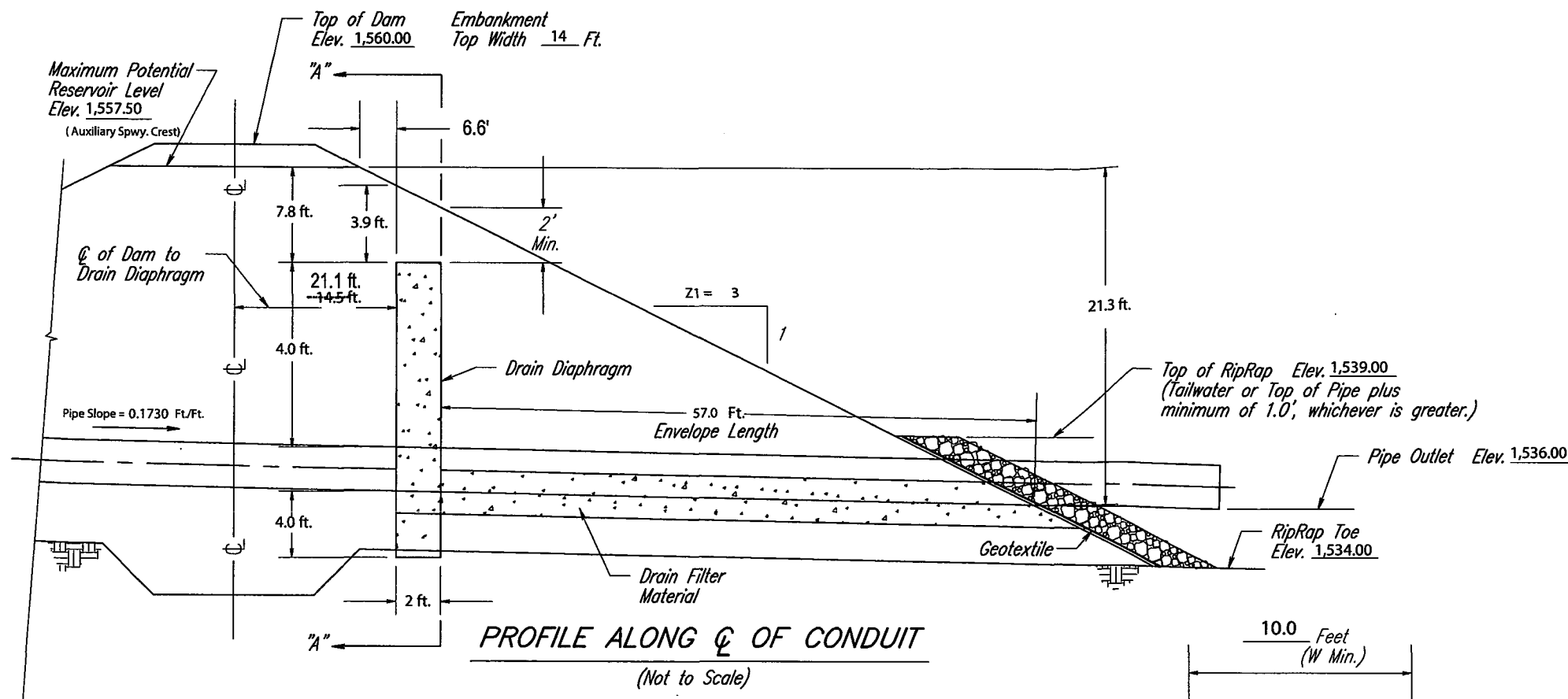
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 United States Department of Agriculture

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 Chuck Rice Pond18h
 Drawing No.

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Sheet 6 of 9

REVISIONS		
DATE	APPROVED	TITLE



SUMMARY OF DESIGN AND DIMENSIONS

DESIGN DATA	
H = 7.8 Feet	Hd = 21.25 Feet
X = 4.0 Feet	D = 24 Inches
R = 4.0 Feet	Y = 4.0 Feet
C = 6.6 Feet	Aggregate Gradation # 1
Embankment Backslope (Z1) = 3 Pipe Slope (S) 0.1730 Ft./Ft.	

DIMENSIONS	
W = 10.0 Feet	(Total Width of Drain Diaphragm)
T = 10.0 Feet	(Total Height of Drain Diaphragm)
t = 2 Feet	(Thickness of Single Filter)

ESTIMATED QUANTITIES

Drain Filter Material	21.8 Cubic Yards
Geotextile	26.4 Square Yards
Rock Riprap	9.2 Cubic Yards

DRAIN FILTER MATERIAL GRADATION

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

ASTM C-#33
FINE CONCRETE
AGGREGATE GRADATION

ROCK RIPRAP GRADATION

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

CONSTRUCTION NOTES

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

MATERIAL NOTES

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

DRAINAGE DIAPHRAGM DETAILS

JOB PLAN 3.8 (07/2009)

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

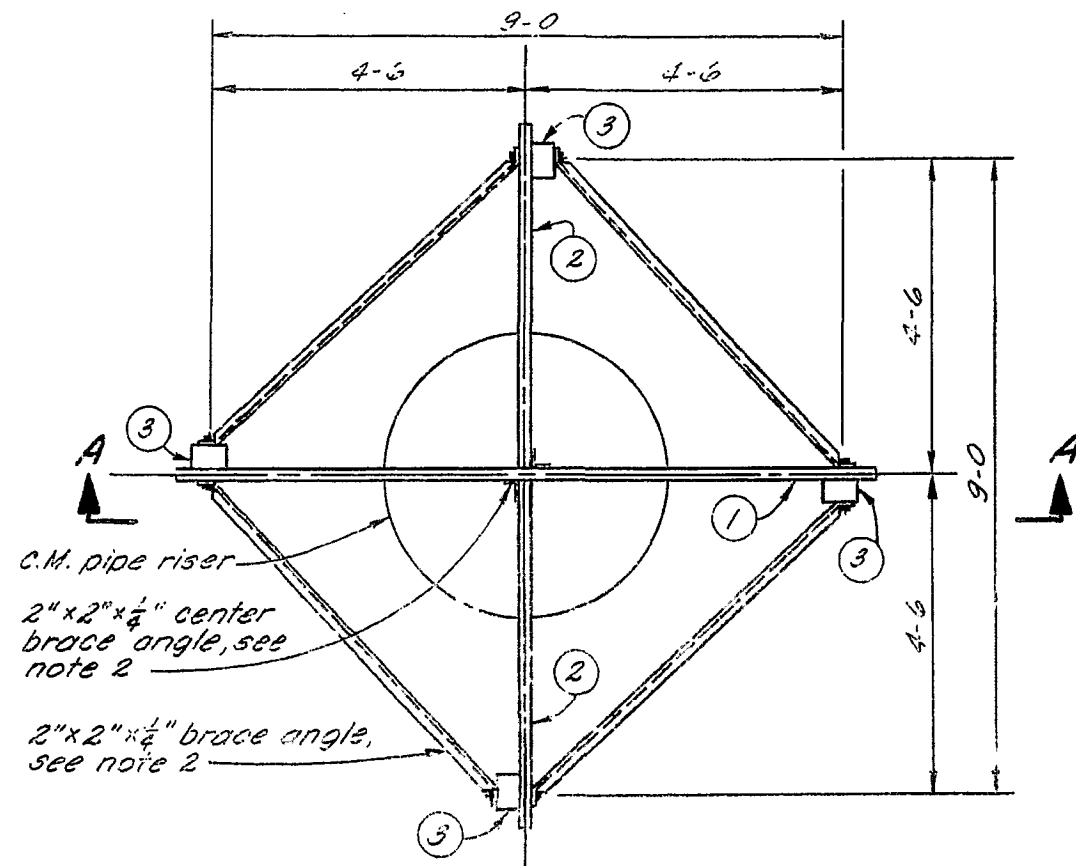
Designed	ADR	12/23/09
Drawn	ADR	12/23/09
Checked		
Approved		

PRODUCER	Charles Ross
SECTION	17
110 N. R. 75 W.	
Hughes COUNTY	
Hughes/Stanley CONSERVATION DISTRICT	

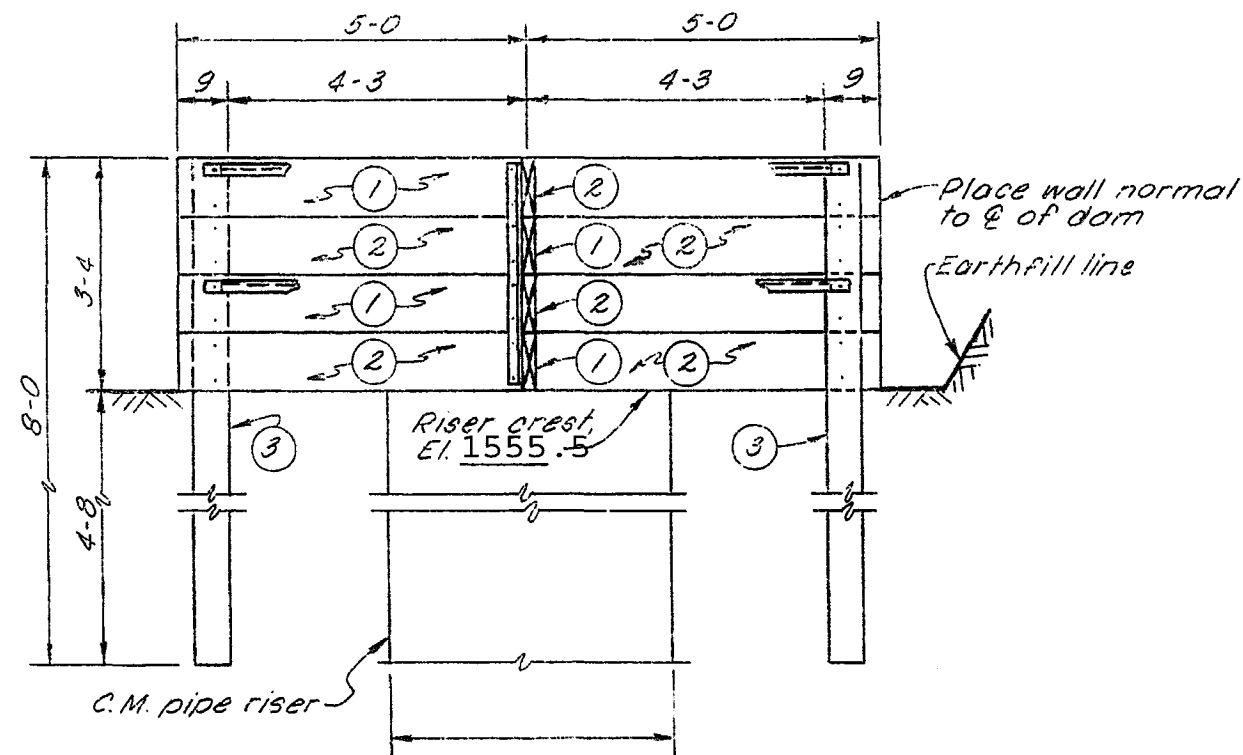
USDA - NRCS
State Office Engineering Staff
200 Fourth Street SW
Huron, South Dakota 57350

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

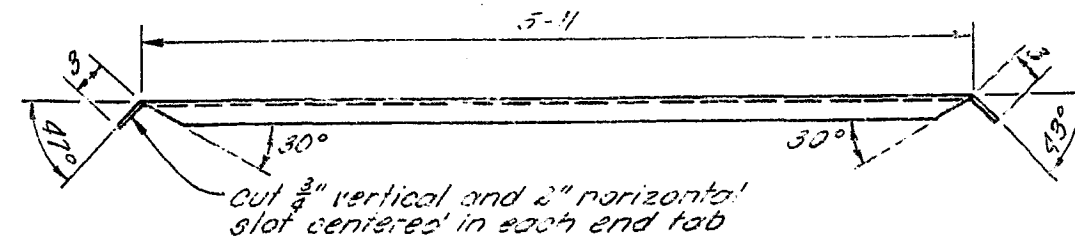
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Sheet 1 of 1	



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	154 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:

- 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.
- 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.
- 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"

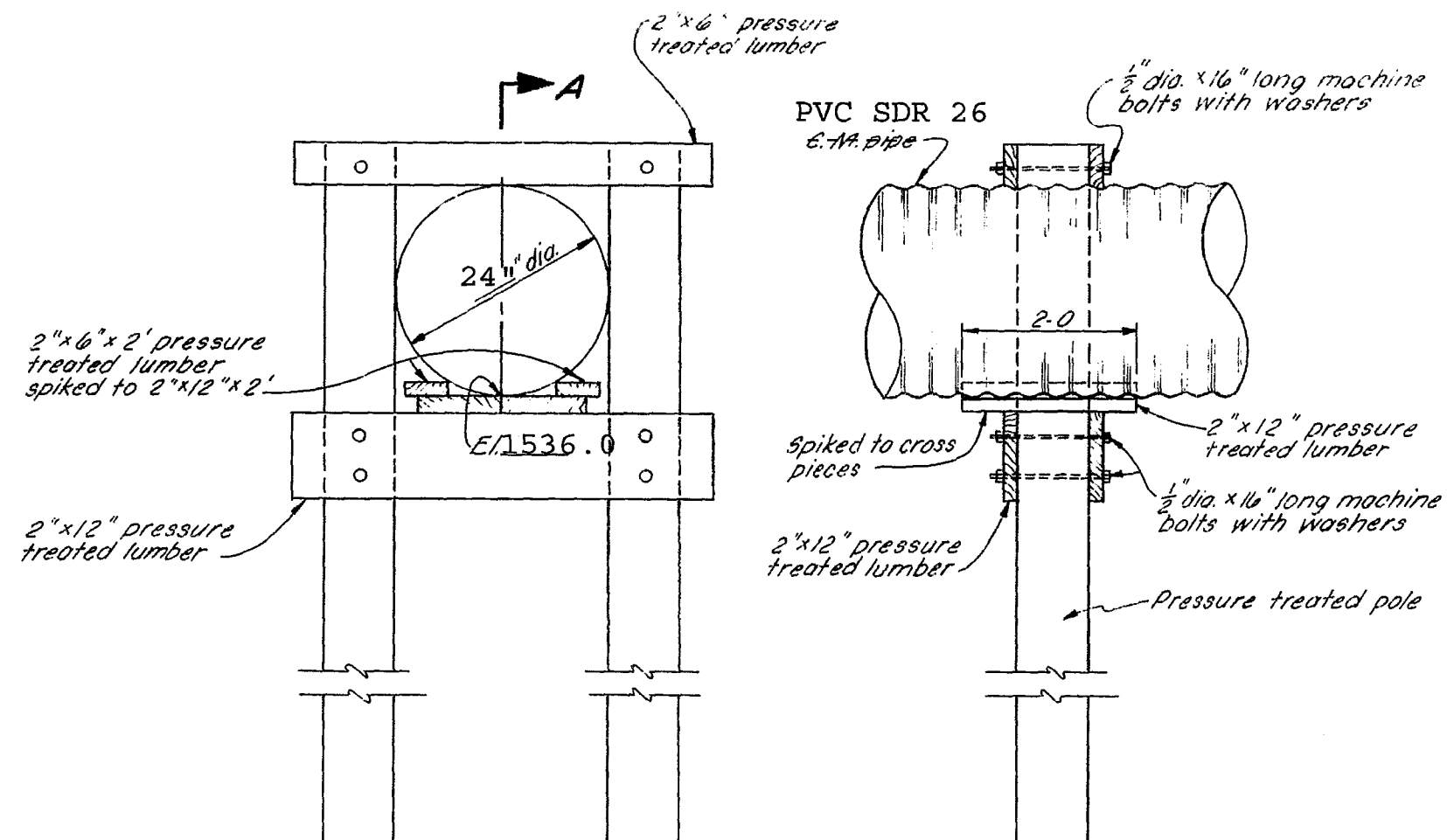
OPERATOR: Charles Ross
CONSERVATION DISTRICT: Hughes County

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed by A. Roman Date 1/2/2016
Drawn by A. Roman Title Ag. Engineer
Traced by Kim R. Roman Sheet 8 of 9

JOB PLAN NO. 6.4

5, N-29, 073.6-4a



ELEVATION

SECTIONAL ELEVATION A-A

TABLE OF QUANTITIES

ITEM	LENGTH FOR 24" DIA. C.M. PIPE	UNIT	QUANTITY
PRESSURE TREATED POLE 10" DIA.	8-0	EACH	2
2" X 12" PRESSURE TREATED LUMBER	4-0	EACH	2
2" X 6" PRESSURE TREATED LUMBER	4-0	EACH	2
2" X 12" PRESSURE TREATED LUMBER	2-0	EACH	2
2" X 6" PRESSURE TREATED LUMBER	2-0	EACH	2
1/2" DIA. MACHINE BOLTS WITH NUTS	1-4	EACH	6
1/2" DIA. WASHERS		EACH	12

REFERENCE: GUIDE PLAN NO. 4.0

NOTES:

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

TIMBER PIPE SUPPORT

OPERATOR: <u>Charles Ross</u>	
CONSERVATION DISTRICT: <u>Hughes County</u>	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Designed <u>A. Roman</u>	Date <u>1/6/2016</u>
Drawn <u>A. Roman</u>	Approved by <u>A. Roman</u>
Traced <u>K. Roman</u>	Title <u>Ag. Engineer</u>
Checked <u>K. Roman</u>	Sheet <u>9</u> of <u>9</u>

JOB PLAN NO. 4.0

5, N-29, 073.4a

DOCUMENTATION FOR HAZARD CLASSIFICATION

Producer: **Charles Ross** Name of Site: **Charles Ross Pond**
County: **Hughes**
Field #: Watershed:
Location
1/4 Section: **SW** Section: **17** Township: **110N** Range: **75W**
Latitude: Longitude:

Dam in Series: **Yes**

Explain: **Small dam upstream has limited storage and the volume of water in the event of a breach would be stored.**

Dam and Reservoir Data

Assumed Job Class	IV
Assumed Hazard Class	A
Centerline Elevation Channel Bottom*	1584
Centerline Elevation Flood Plain*	0
Centerline Elevation Top of Dam*	1610
Centerline Elevation Auxiliary Spillway Crest*	1607.5

*Elevation is based on Mean Sea Level Datum

Max. Depth of Water within Reservoir **21.5 Ft.**

Storage

Storage Below Principal Spillway	56.2 Ac.-Ft.
Storage between Principal Spillway and Auxiliary Spillway	27.4 Ac.-Ft.
Storage between Auxiliary Spillway and Top of Dam	68.52 Ac.-Ft.
Other	Ac.-Ft.
Total Storage to Top of Dam	152.12 Ac.-Ft.

Downstream Conditions

1. Valley Conditions Downstream of Structure	Parallel
Approximate Slope of Channel	1%
2. Stream Channel Size	
Depth	2 Ft.
Bottom Width	4 Ft.
Top Width	25 Ft.
3. Valley Characteristics	
Width	150 Ft.
Roughness Coefficient	0.035
Slope	1%

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

Describe Type of Infrastructure, Distance Downstream and Distance Above Floodplain Elevation	Distance Downstream From Dam	Approx. Distance Above Floodplain Elevation	Location in Potential Impact Area?	
			YES	NO
Roads				
Paved Township or Paved County Road, D>2'	6115		☐	☒
Township or County Gravel Road D<2'			☒	☐
			☐	☒
Bridges: Describe type and opening size Bridge-concrete deck, 30' long, 10' high	6115		☐	☒
Railroads: Major Railroad, Describe:			☐	☒
Buildings and Utilities:				
Farm Building(s)	5000	100'	☒	☐
Public, Industrial or Commercial Buildings			☐	☒
Rel. Import. Utility serving mult. rural users			☐	☒
			☐	☒
Describe: Some farm buildings located along the channel appr. 1 mile down stream. Closest building is Appr. 100' from CL of channel. Flow will be contained to channel, depth not to exceed 2'. Existing channel 8'-10' deep.				

Location:

Is Dam located within five miles of urban development?

No

Describe Potential Development:

1 mile downstream is farm site with trailer, additional farmsite appr. 1.25 miles downstream. Both residences are elevated 20'-30' above predicted flood depths. No additional developments are planned.

Rational For Determining Hazard Class:

Floe depth is predicted to be less than 2' deep. Channel has bed and bank and is far enough down stream that flood waters from the dam failing will not cause structural damage.

Method Used for Evaluation of Impact Area

Simple Dam Break

Further Evaluation Needed

No

Attached: Breach Routings ☒

Maps ☒

Other supporting documents:

Actual Hazard Class*

A

Final Job Class

VI

Hazard Analysis by: Angela Roman

Date: 1/4/2010

Approved by

Angela Roman

Date: 1/4/2010

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

Charles Ross Pond



Scale: 1"=1,000'

17-110-75

A. Roman
1/4/2010

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

		Ross unnamed					
		IBC	ISH	JNK	IDAM	IPLT	IREC
		1	0	0	0	1	0
		HDE	BME	VOL	SA	BW	TFM
QO	C4	1610.0	1605.0	152.	37.5	49.9	60.6
1.	C5	NS= 5	NCS= 4	CMS=.50	DISTTN= 1.16		
		X-S NO. 1					
	C6-1	D= .00	FLD=	2.00			
	C7-1	HS= 1585.00	BS=	1.	BSS=	0.	CM= .050
	C7-2	HS= 1607.00	BS=	100.	BSS=	0.	CM= .050
	C7-3	HS= 1610.00	BS=	195.	BSS=	0.	CM= .050
	C7-4	HS= 1620.00	BS=	1770.	BSS=	0.	CM= .050
		X-S NO. 2					
	C6-2	D= .41	FLD=	2.00			
	C7-1	HS= 1584.00	BS=	1.	BSS=	0.	CM= .050
	C7-2	HS= 1590.00	BS=	88.	BSS=	0.	CM= .050
	C7-3	HS= 1600.00	BS=	250.	BSS=	0.	CM= .050
	C7-4	HS= 1610.00	BS=	600.	BSS=	0.	CM= .050
		X-S NO. 3					
	C6-3	D= .80	FLD=	2.00			
	C7-1	HS= 1524.00	BS=	1.	BSS=	0.	CM= .050
	C7-2	HS= 1530.00	BS=	258.	BSS=	0.	CM= .050
	C7-3	HS= 1540.00	BS=	776.	BSS=	0.	CM= .050
	C7-4	HS= 1550.00	BS=	867.	BSS=	0.	CM= .050
		X-S NO. 4					
	C6-4	D= 1.16	FLD=	2.00			
	C7-1	HS= 1515.00	BS=	1.	BSS=	0.	CM= .050
	C7-2	HS= 1520.00	BS=	90.	BSS=	0.	CM= .050
	C7-3	HS= 1530.00	BS=	892.	BSS=	0.	CM= .050
	C7-4	HS= 1540.00	BS=	1105.	BSS=	0.	CM= .050
		X-S NO. 5					
	C6-5	D= 1.40	FLD=	2.00			
	C7-1	HS= 1512.00	BS=	1.	BSS=	0.	CM= .050
	C7-2	HS= 1520.00	BS=	98.	BSS=	0.	CM= .050
	C7-3	HS= 1530.00	BS=	315.	BSS=	0.	CM= .050
	C7-4	HS= 1540.00	BS=	1150.	BSS=	0.	CM= .050

***** DISTANCE TO PRIMARY POINT OF INTEREST MOVED TO THE CROSS SECTION
 ***** CLOSEST TO THIS LOCATION (MI 1.16)

THE DATA FOR THIS DAM IS AS FOLLOWS:

TYPE OF DAM (IDAM)	EARTH
DAM BREACH ELEVATION (HDE)	1610.00 FT
FINAL BREACH ELEVATION (BME)	1605.00 FT
VOLUME OF RESERVOIR (VOL)	152. ACRE-FT
SURFACE AREA OF RESERVOIR (SA)	37.50 ACRES
FINAL BREACH WIDTH (BW)	49.89 FT
TIME OF DAM FAILURE (TFM)	60.64 MINUTES
NON-BREACH FLOW (QO)	1.00 CFS

DISTANCE TO PRIMARY PT OF INTEREST (DISTTN)	1.16 MILES
DEAD STORAGE EQUIV. MANN. N (CMS)	.50

CROSS SECTION NO. 1

FLOOD DEPTH (FLD)	2.00 FT
-------------------	---------

ELEV. (FT) (HS)	1585.0	1607.0	1610.0	1620.0
TWIDTHS (FT) (BS)	1.0	100.0	195.0	1770.0
INACTIVE TW (FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.050	.050	.050	.050

CROSS SECTION NO. 2

REACH LENGTH (D)	.41 MI
FLOOD DEPTH (FLD)	2.00 FT

ELEV. (FT) (HS)	1584.0	1590.0	1600.0	1610.0
TWIDTHS (FT) (BS)	1.0	88.0	250.0	600.0
INACTIVE TW (FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.050	.050	.050	.050

CROSS SECTION NO. 3

REACH LENGTH (D)	.80 MI
FLOOD DEPTH (FLD)	2.00 FT

ELEV. (FT) (HS)	1524.0	1530.0	1540.0	1550.0
TWIDTHS (FT) (BS)	1.0	258.0	776.0	867.0
INACTIVE TW (FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.050	.050	.050	.050

CROSS SECTION NO. 4

REACH LENGTH (D)	1.16 MI
FLOOD DEPTH (FLD)	2.00 FT

ELEV. (FT) (HS)	1515.0	1520.0	1530.0	1540.0
TWIDTHS (FT) (BS)	1.0	90.0	892.0	1105.0
INACTIVE TW (FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.050	.050	.050	.050

CROSS SECTION NO. 5

REACH LENGTH (D)	1.40 MI
FLOOD DEPTH (FLD)	2.00 FT

ELEV. (FT) (HS)	1512.0	1520.0	1530.0	1540.0
TWIDTHS (FT) (BS)	1.0	98.0	315.0	1150.0
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: Ross

NAME OF RIVER: unnamed

RVR MILE FLOOD FROM DAM DEPTH (FT)	MAX FLOW (CFS)	MAX ELEV (FT-MSL)	MAX DEPTH (FT)	TIME (HR) MAX DEPTH	TIME (HR) FLOOD	TIME (HR) DEFLOOD
*****	*****	*****	*****	*****	*****	*****

CANNOT CONVERGE ON A TAILWATER DEPTH WHICH IS LESS THAN THE HEADWATER DEPTH EVEN WITH 90% SUBMERGENCE
 (Q= 121.3 HW= 5.00 Y= 3.93) SUGGEST YOU INCREASE SLOPE OR
 MODIFIY CROSS SECTION

2.00	.00	121.	1590.00	5.00	1.01	.10	27.81
2.00	.41	82.	1586.77	2.77	1.51	.93	26.93
2.00	.80	82.	1525.18	1.18	1.53	.00	.00
2.00	1.16	81.	1516.58	1.58	1.58	.00	.00
2.00	1.40	80.	1514.61	2.61	1.66	1.35	15.58
2.00							

ANALYSIS IS COMPLETE

Charles Ross Pond
Breach Routing
1:7200



Structural Design of Solid Wall, Plastic Pipe

Version 1.0 (1/30/06)

Ref: Part 636 Structural Engineering National Engineering Handbook
Chapter 52 Structural Design of Flexible Conduits

By: Angela Roman 12/15/09

Proposed Pipe

Description	24" PVC SDR 26
D _o	24 in
SDR or SDR?	SDR 26
wall thickness, t	0.889 in Table 52C-15
E _{long}	140,000 psi Page 52-12
E _{short}	400,000 psi Page 52B-25
allow comp stress, σ	2000 psi (from table 52C-1)

Loads

SOIL		
depth of soil cover, h	13.2	ft
unit weight of soil, γ _s	125	psf
water ht. above pipe, h _w	0	ft
P _s	1650	psf
W _s	3300	lb/ft

VACUUM		
P _v	0	psf
U _i	22.222	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 _r	1	
W _L	37	lb/ft
P _w	19	psf

Total Load	1,669	psf
P _s + P _w + P _v		

1. Wall Crushing (solid wall pipe)

Thrust in pipe wall, T _{pw}	1,669	lb/ft
Required wall area, A _{pw}	0.070	in ² /in
Thickness, t	0.889	in

Proposed Pipe okay for wall crushing

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'	400	(see table 52-2) (soils reviewed with D. Vanderbusch)

A. Roman 11/18/2009

Using Eq. 52-29 for SDR pipe

Deflection (% ΔX / D)	4.18	%
Maximum deflection	5.0	%

Proposed Pipe okay for deflection

3. Wall Buckling

Use E _{long} or E _{short} ?	E-long
E =	140,000 psi
Factor of Safety, FS	2.5
R _w	1.0 ft
Coef of elastic support, B'	0.663
Moment of Inertia, I _{pw}	0.059 in ⁴ / in
Modulus of soil reaction, E'	400 psi
Allowable buckling, q _a	28.38 psi
Reduction factor, C	0.69
Adj. allow. Buckling, q _a C	19.54 psi
q _a C	2.813 psf
Total pressure, P	1,669 psf

Proposed Pipe okay for wall buckling

4. Strain (solid wall pipe)

Max strain, flexure, e _f	0.0053
Max strain, hoop strain, e _h	0.0004
e _h due to external load?	Yes
Max combined strain, e	0.0049
Allowable strain, e _{all}	0.05

Proposed Pipe okay for strain

Client:
 County: HUGHES
 Practice:
 Calculated By:
 Checked By: _____

State: SD
 Date: 11/20/2009
 Date: _____

Drainage Area: Acres (user entered value)
 Curve Number: (user entered value)
 Watershed Length: Feet
 Watershed Slope: Percent
 Time of Concentration: Hours (user entered value)
 Rainfall Type:

Storm Number	1	2	3	4	5	6	7
Frequency (yrs)	1	2	5	10	25	50	100
24-Hr rainfall (in)	1.80	2.20	3.00	3.50	4.10	4.60	5.20
Ia/P Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Used	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Runoff (in)							
(ac-ft)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unit Peak Discharge (cfs/acre/in)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Peak Discharge (cfs)							

Annual Yield and Sediment Storage

Project: Charles Ross
Calculations By: Angela Roman 12/23/09
Checked By:

*****Annual Surface Yield*****

Input Data

Isogram # = 2
Curve Number = 79
Contributing Acres = 1827.6
% chance = 50
runoff = 0.5 inches

$$\frac{\text{Contributing Acres} * \text{Inches of Runoff}}{12} = 76.2 \text{ ACFT}$$

$$\text{Storage at Principal Spillway} = 56.2 \text{ ACFT}$$

*****Sediment Yield*****

Input Data

Erodibility Area = J
Gross Rate = 0.002 25%-50% Cultivated
Drainage Area = 1827.6
Delivery Rate = 29 Median
Design Life = 25

$$\text{Gross Rate} * \text{Drainage Area} * \text{Delivery Rate} * \text{Years} = 26.5 \text{ ACFT}$$

$$\text{Available Sediment Storage} = 53.0 \text{ years}$$

REF:
EFM 2-83 Method A

Prepared By Angela Roman, Pierre FSO
9/21/04

12/28/2009

Hood Inlet

Project Name: Charles Ross
 Computed by: Angela Roman
 Date: 12/23/2009
 Checked by: _____
 Date: _____

IaHoodInlet.xls Ver 1.10

Computed by: Angela Roman			Outflow, CFS						
Date: 12/23/2009				Weir	Slug	Full Pipe	Structure		
Checked by: _____				Flow			Outflow,		
Date: _____			Elev	HW Ft			CFS	Controlling Factor	
Input Data			1551.5	0.0	0.00	0.00	58.19	0.00	Weir Flow
			1551.6	0.1	0.23	0.00	58.39	0.23	Weir Flow
			1551.7	0.2	0.45	0.00	58.59	0.45	Weir Flow
			1551.8	0.3	0.68	0.00	58.79	0.68	Weir Flow
Principal Spillway Crest Elev (ft)		1551.5	1551.9	0.4	0.91	0.00	58.99	0.91	Weir Flow
Inside Wall - Type			1552.0	0.5	1.33	0.00	59.19	1.33	Weir Flow
			1552.1	0.6	1.75	0.00	59.39	1.75	Weir Flow
			1552.2	0.7	2.18	0.00	59.59	2.18	Weir Flow
			1552.3	0.8	2.60	0.00	59.79	2.60	Weir Flow
Pipe Diameter (in)		24	1552.4	0.9	3.14	0.00	59.99	3.14	Weir Flow
Pipe Length (ft)		111	1552.5	1.0	3.68	0.00	60.19	3.68	Weir Flow
Entrance Coefficient 'Ke'		1	1552.6	1.1	4.33	0.00	60.38	4.33	Weir Flow
Mannings 'n-value'		0.009	1552.7	1.2	4.98	0.00	60.58	4.98	Weir Flow
Elbow Elev (if None, Leave 'BLANK')		1538	1552.8	1.3	5.94	0.00	60.77	5.94	Weir Flow
Length of Outlet ('BLANK' if none)		40	1552.9	1.4	6.90	0.00	60.97	6.90	Weir Flow
Outlet Type		Cantilever	1553.0	1.5	7.86	0.00	61.16	7.86	Weir Flow
Outlet Elevation (ft)		1536	1553.1	1.6	8.82	0.00	61.35	8.82	Weir Flow
Tailwater Elev (if unknown, leave 'Blank')			1553.2	1.7	9.73	0.00	61.55	9.73	Weir Flow
Auxiliary Spillway Elev (ft)		1557.5	1553.3	1.8	10.63	0.00	61.74	10.63	Weir Flow
Maximum Headwater Elev (ft)		1560	1553.4	1.9	11.54	0.00	61.93	11.54	Weir Flow
Elev Increment After Full Pipe Flow		0.5	1553.5	2.0	12.45	0.00	62.12	12.45	Weir Flow
Basic Output			1553.6	2.1	13.29	0.00	62.31	13.29	Weir Flow
			1553.7	2.2	14.14	11.31	62.50	14.14	Weir Flow
			1553.8	2.3	14.99	22.63	62.69	22.63	Slug Flow
			1553.9	2.4	15.84	33.94	62.88	33.94	Slug Flow
Full Pipe Flow - Max. Outflow (cfs):	73.47		1554.0	2.5	16.55	45.25	63.07	45.25	Slug Flow
Full Pipe Flow - Max. Velocity (fps):	23.39		1554.1	2.6	17.25	56.57	63.25	56.57	Slug Flow
Barrel Area (Sq Ft):	3.14		1554.2	2.7	17.96	67.88	63.44	63.44	Full Pipe Flow
Kp:	0.005952		1554.5	3.0	20.08	101.82	64.00	64.00	Full Pipe Flow
Friction Slope (HW at the A.S. Crest):	0.04541		1555.0	3.5	23.62	158.39	64.92	64.92	Full Pipe Flow
Pipe Slope:	0.19367		1555.5	4.0			65.82	65.82	Full Pipe Flow
Outlet Elbow Angle (deg):	8.0		1556.0	4.5			66.72	66.72	Full Pipe Flow
Km:	0.02400		1556.5	5.0			67.60	67.60	Full Pipe Flow
Tailwater Elev Used For Full Pipe Flow:	1537.2		1557.0	5.5			68.47	68.47	Full Pipe Flow
Notes & Warnings			1557.5	6.0			69.33	69.33	Full Pipe Flow
			1558.0	6.5			70.17	70.17	Full Pipe Flow
			1558.5	7.0			71.01	71.01	Full Pipe Flow
			1559.0	7.5			71.84	71.84	Full Pipe Flow
			1559.5	8.0			72.66	72.66	Full Pipe Flow
			1560.0	8.5			73.47	73.47	Full Pipe Flow

DROP Inlet

Project Name: Charles Ross
Computed by: Angola Roman

laDropInlet.xls Ver 1.02

Date: 12/23/2009

Checked by: _____

Date: _____

Input Data

Riser Type & Diameter (in)	Circular	60
Length of Weir Obstruction (ft)		0.5
		6
Principal Spillway Crest Elev (ft)		1555.5
Invert of Barrel Elevation (ft)		1551.5
Barrel Orifice Coefficient (C)		0.6
Pipe Diameter (in)		24
Pipe Length (ft)		111
Entrance Coefficient 'Ke'		1
Mannings 'n-value'		0.013
Elbow Elev (if None, Leave 'BLANK')		
Length of Outlet ('BLANK' if none)		
Outlet Type	Cantilever	
Outlet Elevation (ft)		1536
Tailwater Elev (if unknown, leave 'Blank')		
Auxiliary Spillway Elev (ft)		1557
Maximum Headwater Elev (ft)		1560.1
Elev Increment After Full Pipe Flow		0.5

Basic Output

Full Pipe Flow - Max. Outflow (cfs):	0.00
Full Pipe Flow - Max. Velocity (fps):	0.00
Useable Weir Length (ft):	15.21
Riser Area (Sq Ft):	19.63
Barrel Area (Sq Ft):	3.14
Kp:	0.012418
Friction Slope (HW at the A.S. Crest):	0.07278
Pipe Slope:	0.14102
Outlet Elbow Angle (deg):	0.0
Maximum Barrel Invert Elevation for avoiding Barrel Orifice Control:	1539.66
Km:	0.00000
Tailwater Elev Used For Full Pipe Flow:	1537.2

Notes & Warnings

NOTE: Pipe slope computed to be greater than friction slope - a 5D riser can eliminate flow problems NOTE: Barrel Orifice control can be eliminated by increasing the riser depth.		1559.0	3.5	308.70	176.87	38.57	64.04	38.57	Barrel Orifice
		1559.1	3.6	322.02	179.38	38.86	64.19	38.86	Barrel Orifice
		1559.2	3.7	335.53	181.85	39.15	64.33	39.15	Barrel Orifice
		1559.3	3.8	349.23	184.30	39.45	64.48	39.45	Barrel Orifice
		1559.4	3.9	363.10	186.71	39.73	64.63	39.73	Barrel Orifice
		1559.5	4.0	377.16	189.08	40.02	64.77	40.02	Barrel Orifice
		1559.6	4.1	391.39	191.43	40.31	64.92	40.31	Barrel Orifice
		1559.7	4.2	405.79	193.75	40.59	65.06	40.59	Barrel Orifice
		1559.8	4.3	420.37	196.05	40.87	65.21	40.87	Barrel Orifice
		1559.9	4.4	435.12	198.31	41.15	65.35	41.15	Barrel Orifice
		1560.0	4.5	450.04	200.55	41.43	65.49	41.43	Barrel Orifice
		1560.1	4.6	465.12	202.77	41.70	65.64	41.70	Barrel Orifice

		Outflow, CFS				Structure Outflow, CFS	Controlling Factor	
Elev	HW Ft	Weir	Inlet Orifice	Barrel Orifice	Full Pipe			
	1555.5	0.0	0.00	0.00	26.20	58.68	0.00	Weir Flow
0	1555.6	0.1	1.49	29.90	26.63	58.84	1.49	Weir Flow
5	1555.7	0.2	4.22	42.28	27.06	59.00	4.22	Weir Flow
5	1555.8	0.3	7.75	51.78	27.48	59.15	7.75	Weir Flow
5	1555.9	0.4	11.93	59.79	27.89	59.31	11.93	Weir Flow
5	1556.0	0.5	16.67	66.85	28.30	59.47	16.67	Weir Flow
	1556.1	0.6	21.91	73.23	28.70	59.63	21.91	Weir Flow
	1556.2	0.7	27.61	79.10	29.10	59.79	27.61	Weir Flow
7	1556.3	0.8	33.73	84.56	29.49	59.94	29.49	Barrel Orifice
	1556.4	0.9	40.25	89.69	29.87	60.10	29.87	Barrel Orifice
9	1556.5	1.0	47.14	94.54	30.25	60.26	30.25	Barrel Orifice
	1556.6	1.1	54.39	99.16	30.63	60.41	30.63	Barrel Orifice
	1556.7	1.2	61.97	103.57	31.00	60.57	31.00	Barrel Orifice
	1556.8	1.3	69.88	107.79	31.37	60.72	31.37	Barrel Orifice
5	1556.9	1.4	78.10	111.86	31.73	60.88	31.73	Barrel Orifice
	1557.0	1.5	86.61	115.79	32.09	61.03	32.09	Barrel Orifice
7	1557.1	1.6	95.41	119.59	32.44	61.19	32.44	Barrel Orifice
1	1557.2	1.7	104.50	123.27	32.79	61.34	32.79	Barrel Orifice
5	1557.3	1.8	113.85	126.84	33.14	61.49	33.14	Barrel Orifice
	1557.4	1.9	123.47	130.32	33.48	61.65	33.48	Barrel Orifice
	1557.5	2.0	133.35	133.70	33.82	61.80	33.82	Barrel Orifice
0	1557.6	2.1	143.47	137.00	34.16	61.95	34.16	Barrel Orifice
	1557.7	2.2	153.84	140.23	34.49	62.10	34.49	Barrel Orifice
1	1557.8	2.3	164.45	143.38	34.82	62.25	34.82	Barrel Orifice
3	1557.9	2.4	175.29	146.46	35.15	62.41	35.15	Barrel Orifice
4	1558.0	2.5	186.36	149.48	35.48	62.56	35.48	Barrel Orifice
8	1558.1	2.6	197.65	152.44	35.80	62.71	35.80	Barrel Orifice
8	1558.2	2.7	209.16	155.35	36.11	62.86	36.11	Barrel Orifice
2	1558.3	2.8	220.89	158.20	36.43	63.01	36.43	Barrel Orifice
0	1558.4	2.9	232.83	161.00	36.74	63.15	36.74	Barrel Orifice
	1558.5	3.0	244.97	163.75	37.05	63.30	37.05	Barrel Orifice
6	1558.6	3.1	257.32	166.46	37.36	63.45	37.36	Barrel Orifice
0	1558.7	3.2	269.87	169.12	37.67	63.60	37.67	Barrel Orifice
2	1558.8	3.3	282.62	171.74	37.97	63.75	37.97	Barrel Orifice
	1558.9	3.4	295.56	174.33	38.27	63.89	38.27	Barrel Orifice
	1559.0	3.5	308.70	176.87	38.57	64.04	38.57	Barrel Orifice
	1559.1	3.6	322.02	179.38	38.86	64.19	38.86	Barrel Orifice
	1559.2	3.7	335.53	181.85	39.15	64.33	39.15	Barrel Orifice
	1559.3	3.8	349.23	184.30	39.45	64.48	39.45	Barrel Orifice
1	1559.4	3.9	363.10	186.71	39.73	64.63	39.73	Barrel Orifice
	1559.5	4.0	377.16	189.08	40.02	64.77	40.02	Barrel Orifice
	1559.6	4.1	391.39	191.43	40.31	64.92	40.31	Barrel Orifice
	1559.7	4.2	405.79	193.75	40.59	65.06	40.59	Barrel Orifice
	1559.8	4.3	420.37	196.05	40.87	65.21	40.87	Barrel Orifice
	1559.9	4.4	435.12	198.31	41.15	65.35	41.15	Barrel Orifice
	1560.0	4.5	450.04	200.55	41.43	65.49	41.43	Barrel Orifice
	1560.1	4.6	465.12	202.77	41.70	65.64	41.70	Barrel Orifice

1*****
 SITES XEQ 12/10/2009 WATER RESOURCE SITE ANALYSIS COMPUTER PROGRAM
 VER 2005.1.04 (USER MANUAL - DATED DECEMBER 2005)
 TIME 15:46:22

A. Roman 12/10/09

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

SITES 01/01/2005 2.855625 H5
 SAVMOV 0 101
 SAVMOV 101 1 1
 STRUCTURE

1535	0
1536	.031
1538	.16
1540	.32
1542	.6
1544	1.11
1546	1.99
1548	2.94
1550	4.12
1552	5.63
1553	6.66
1554	8.09
1555	10.04
1555.5	11.64365 0
1556	13.1473 16.67
1557	14.93 68.47
1558	18.1953 70.17
1559	31.3272 71.84
1560	37.4762 73.47

*PS= 1555.5
 ES= 1557.5
 TD= 1560.0
 100' BW on ES*

ENDTABLE
 WSDATA 5A1 AC 79 1827.6 35462 0.98
 PDIRECT 2.2 4.60
 POOLDATA ELEV 1555.5 1535 1555.5 1535 1535
 ASDATA 41 200 100 3 .01 2
 ASINSURF 41 .035
 ASINLET 41 0.0 0.0 80 0.0 3
 180 10
 ENDTABLE
 ASEXSURF 41 .035
 .65 0
 3
 2 0
 .02
 ENDTABLE
 ASEXIT 41 N 100
 BTMWIDTH FEET 100
 GRAPHICS I
 GO,DESIGN HL TYPE2 24 TYPE2378 24
 SAVMOV 2 101 1
 ENDJOB

***** MESSAGE - ALTERNATE STRUCTURE ID (S 1) BEING USED
 SINCE USER DID NOT INPUT AN ID.

***** MESSAGE - ALTERNATE SUBWATERSHED ID (A) BEING USED SINCE
USER DID NOT INPUT AN ID.

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

1SITES -----
XEQ 12/10/2009
VER 2005.1.04
TIME 15:46:22
SITE = S 1
PASS= 1
WSID=
SUBW= A
PART= 1

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

STORM DISTRIBUTION-PSH 24 HOUR TYPE II RAINFALL DISTRIBUTION

STORM DISTRIBUTION AUX. -24 HOUR TYPE II RAINFALL DISTRIBUTION

PRECIP. - P-PS,1-DAY	P-PS,10-DAY	P-SD	P-FB	
2.20	0.00	0.00	4.60	
WSDATA - CN	DA-SM	TC/L	-/H	QRF
79.00	2.86	35462.00	0.98	0.00
SITEDATA- PERM POOL	CREST PS	FP SED	VALLEY FL	378?
1555.50	1535.00	1555.50	1535.00	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	200.00	100	
AUX.DATA - INLET N	SIDE SLOPE	EXIT N	EXIT SLOPE	ACTUAL AUX?
0.035	3.00	0.035	0.010	NO
BTM WIDTH - BW1	BW2	BW3	BW4	BW5
ft 100.00	0.00	0.00	0.00	0.00

AUXILIARY SPILLWAY RATING DEVELOPED USING WSPVRT.

1SITES -----

XEQ 12/10/2009
 VER 2005.1.04
 TIME 15:46:22

SITE = S 1

PASS= 1

WSID=
 SUBW= A
 PART= 2

PERM POOL	1555.50 FT	56.2 ACFT	11.64 AC	0.0 CFS
CREST PS	1535.00 FT	0.0 ACFT	0.00 AC	0.0 CFS
SED ACCUM	1555.50 FT	56.2 ACFT	11.64 AC	0.0 CFS
START ELEV	1555.50 FT	56.2 ACFT	11.64 AC	0.0 CFS
NRCS-PSH	D= 24.00 HR TC= 9.58 HR	P= 2.20 IN CN= 79.00	Q= 0.64 IN VOL= 97.9 ACFT	DA= 2.86 SM

PEAK = 106.4 CFS, AT 19.6 HRS.

ROUTED RESULT - HYD TYPE	EMAX	VOL-MAX	AMAX	QMAX
NRCS-PSH	1557.46 FT	83.6 ACFT	16.43 AC	69.2 CFS

PS STORAGE 27.5 ACFT, BETWEEN AUX. CREST AND SED. ACCUM ELEVATIONS.

DRAWDOWN (DDT) TEST 1535.00 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 1555.50 FT, 56.2 ACFT, 0.0 CFS.

DRAWDOWN TIME = 1.13 DAYS, TO 0.0 CFS (LIMIT = 10.00 DAYS)

RATING TABLE DEVELOPED, SITE = S 1:
 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	1535.00	0.00	0.00	0.00	0.00	0.00
2	1536.00	0.00	0.00	0.00	0.02	0.03
3	1538.00	0.00	0.00	0.00	0.21	0.16
4	1540.00	0.00	0.00	0.00	0.69	0.32
5	1542.00	0.00	0.00	0.00	1.61	0.60
6	1544.00	0.00	0.00	0.00	3.32	1.11
7	1546.00	0.00	0.00	0.00	6.42	1.99
8	1548.00	0.00	0.00	0.00	11.35	2.94
9	1550.00	0.00	0.00	0.00	18.41	4.12
10	1552.00	0.00	0.00	0.00	28.16	5.63
11	1553.00	0.00	0.00	0.00	34.30	6.66
12	1554.00	0.00	0.00	0.00	41.68	8.09
13	1555.00	0.00	0.00	0.00	50.74	10.04
14	1555.50	0.00	0.00	0.00	56.16	11.64

15	1556.00	16.67	16.67	0.00	62.36	13.15
16	1557.00	68.47	68.47	0.00	76.40	14.93
17	1558.00	70.17	70.17	0.00	92.96	18.20
18	1559.00	71.84	71.84	0.00	117.72	31.33
19	1560.00	73.47	73.47	0.00	152.12	37.48

1SITES -----
 XEQ 12/10/2009
 VER 2005.1.04
 TIME 15:46:22 SITE = S 1 PASS= 1 PART= 3
 WSID=
 SUBW= A

AUX. CREST 1557.46 FT 83.6 ACFT 16.43 AC 69.2 CFS

PS STORAGE 27.5 ACFT, BETWEEN AUX. CREST AND SED. ACCUM ELEVATIONS.

START ELEV 1555.50 FT 56.2 ACFT 11.64 AC 0.0 CFS

EFFECTIVE HEIGHT(H) = 22.5 FEET, $PRODUCT = 1878.4 (H * STORAGE AT CREST AUX.)$.

INPUT DESIGN CLASS = A1 = LT 3000. PRODUCT.

NRCS-FBH D= 24.00 HR P= 4.60 IN Q= 2.46 IN DA= 2.86 SM
 TC= 9.58 HR CN= 79.00 VOL= 374.6 ACFT

PEAK = 431.3 CFS, AT 18.7 HRS.

 RATING TABLE DEVELOPED, SITE = S 1:
 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	1535.00	0.00	0.00	0.00	0.00	0.00
2	1536.87	0.00	0.00	0.00	0.07	0.09
3	1538.74	0.00	0.00	0.00	0.35	0.22
4	1540.62	0.00	0.00	0.00	0.91	0.41
5	1542.49	0.00	0.00	0.00	1.93	0.72
6	1544.36	0.00	0.00	0.00	3.74	1.27
7	1546.23	0.00	0.00	0.00	6.89	2.10
8	1548.10	0.00	0.00	0.00	11.65	3.00
9	1549.97	0.00	0.00	0.00	18.30	4.10
10	1551.85	0.00	0.00	0.00	27.29	5.51
11	1553.72	0.00	0.00	0.00	39.44	7.69
12	1555.59	2.96	2.96	0.00	57.21	11.91
13	1557.46	69.25	69.25	0.00	83.62	16.43
14	1557.59	76.92	69.47	7.45	85.73	16.85
15	1557.71	84.67	69.68	14.98	87.90	17.26
16	1557.94	111.48	70.07	41.40	91.93	18.01
17	1558.22	171.99	70.54	101.45	97.33	21.11
18	1558.73	351.62	71.39	280.23	109.75	27.78
19	1559.37	653.83	72.44	581.39	129.57	33.57

20 1560.00 1043.08 73.47 969.61 152.12 37.48

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	100.	120.	-10.0	0.035	**	**	**	INLET
2	120.	200.	0.0	0.035	**	**	**	CREST
3	200.	300.	1.0	0.035	0.65	3	2.0	EXIT !

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

* Upper case indicates a reach of constructed spillway channel.

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

! Reach 3 used in computing exit channel velocities.

DRAWDOWN USING FREEBOARD STORM FOLLOWS, STARTING AT ELEVATION 1557.46 FT.

DRAWDOWN (DDT) TEST 1555.50 FT 56.2 ACFT 2.78 CFS
 CONTROL IS 0.000 DETENTION STORAGE

TIME TO DDT TEST DISCHARGE IS 0.93 DAYS - DRAWDOWN CONTINUING.

DRAWDOWN TIME = 0.96 DAYS, TO 0.0 CFS (LIMIT = 10.00 DAYS)

ROUTED RESULTS	BTM WIDTH FT	MAX ELEV FT	VOL-MAX ACFT	AREA-MAX AC	AUX.-HP FT	VOL-AUX. ACFT
NRCS-FBH	100.0	1558.88	114.1	29.7	1.42	30.4

^^^^ NOTE -- ACTUAL Hp OF 1.42 RAISED TO MEET MIN. 378 CRITERIA.

PEAK - CFS	Q-PS	Q-AUX.	Q-TOT.
DISCHARGE =	71.6	345.6	417.2

	CRITICAL DEPTH FT	CRITICAL VELOCITY FT/SEC	CRITICAL SLOPE-Sc FT/FT	25% OF Q Sc FT/FT
AUXILIARY SPILLWAY ---	0.71	4.74	0.020	0.027

***** 1557.5
 + 1.42
 1558.92
 1' freeboard
 1559.92
 EROSIONALLY EFFECTIVE STRESS FOR STABILITY ANALYSIS OF AUX. EXIT CHANNEL used
 (Refer to Ag. Handbook 667, Chapt. 3, for allowable stresses.) 1560.0
 Aux. Spillway Discharge = 346. cfs; Bottom Width = 100. ft

REACH NO.	FROM STA	TO STA	SLOPE %	MANNING'S n	VELOCITY ft/s	TOTAL STRESS lb/ft^2	EFFECTIVE STRESS lb/ft^2
3	200.	300.	1.00	0.035	3.83	0.55	0.334

AUXILIARY SPILLWAY DURATION FLOW = 18.1 HOURS
 ATTACK, OE/B = 2.3 ACFT/FT

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

EXIT CHANNEL FLOW SUBCRITICAL: MAX VELOCITY= 3.8 FT/SEC
EXIT SLOPE = 0.010 FT/FT
FLOW DEPTH = 0.9 FT

***** WARNING - USER SUPPLIED RATING CURVE DID NOT MEET CRITERIA FOR
MINIMUM FLOW THROUGH AUXILIARY SPILLWAY (397.57 CFS).

>>>> NHCP378 RUN - MINIMUM DEPTH, CREST AUX. TO TOP OF DAM IS 2.00 FT.
NEW TOP OF DAM ELEVATION = 1559.46.

ROUTED RESULTS	BTM WIDTH FT	MAX ELEV FT	VOL-MAX ACFT	AREA-MAX AC	AUX.HP FT	VOL-AUX. ACFT
MINIMUM AUX.	100.0	1559.46	133.0	34.2	2.00	49.3
PEAK - CFS DISCHARGES =		Q-PS 72.6	Q-AUX. 639.7	Q-TOT. 712.3		
		CRITICAL DEPTH	CRITICAL VELOCITY	CRITICAL SLOPE-Sc	25% OF Q Sc	
AUXILIARY SPILLWAY ---		FT 1.07	FT/SEC 5.78	FT/FT 0.018	FT/FT 0.024	

>>>> NHCP378 RUN - MINIMUM DEPTH, DESIGN FLOW TO TOP OF DAM; 1.00 FT REQUIRED
FOR THIS PASS. NEW TOP OF DAM ELEVATION = 1559.88.

ROUTED RESULTS	BTM WIDTH FT	MAX ELEV FT	VOL-MAX ACFT	AREA-MAX AC	AUX.HP FT	VOL-AUX. ACFT
MINIMUM AUX.	100.0	1559.88	147.9	36.8	2.42	64.2
PEAK - CFS DISCHARGES =		Q-PS 73.3	Q-AUX. 896.1	Q-TOT. 969.4		
		CRITICAL DEPTH	CRITICAL VELOCITY	CRITICAL SLOPE-Sc	25% OF Q Sc	
AUXILIARY SPILLWAY ---		FT 1.34	FT/SEC 6.44	FT/FT 0.017	FT/FT 0.022	

Inflow Hyd 1 PSH-Peak = 69.21 CFS at 24.40 hrs., Location Point

Inflow Hyd 1 FBH-Peak = 417.21 CFS at 19.90 hrs., Location Point
HYDOUT 1

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

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

>>>	SITE ID	SUBWS ID	SUBWS DA (SQ MI)	CURVE NO.	TC (HRS)	TOTAL DA (SQ MI)	TYPE DESIGN	STRUC CLASS	<<<
	S 1	A	2.86	79.	9.58	2.86	378NR	A1	

PASS NO.	DIA./ WIDTH (IN/FT)	AUX.CREST ELEV (FT)	BTM. WIDTH (FT)	MAX. HP (FT)	MAX. ELEV (FT)	EMB. VOL. (CY)	INTEGR.* DIST. (FT)	EXIT* VEL. (FT/SEC)	TYPE HYD
1	0.0	1557.5	100.0	2.4	1559.9	0.	0.	3.8	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
FILES

INPUT = S:\PierreFSO\engineering\Charles Ross Pond\sites\12.10.09.1555.5.D2C
OUTPUT = S:\PierreFSO\engineering\Charles Ross Pond\sites\12.10.09.1555.5.OUT
DATED 12/10/2009 15:46:22

GRAPHICS FILES GENERATED

OPTION "L" = S:\PierreFSO\engineering\Charles Ross Pond\sites\12.10.09.1555.5.DRG DATE
OPTION "P" = S:\PierreFSO\engineering\Charles Ross Pond\sites\12.10.09.1555.5.DHY DATE
OPTION "E" = S:\PierreFSO\engineering\Charles Ross Pond\sites\12.10.09.1555.5.DEM DATE

Water Permit Application No. 7249-3
Charles Ross

Top of Dam Elev. - 1560.0
2nd Spillway Elev. - 1557.5
P. Spillway Elev. - 1555.5
D/S Emb. Toe Elev. - 1534.0

Cat. 3. Low Hazard Dam

Ht. = 26 ft.

Normal Storage Capacity - 56.2 A.-Ft
Int. Storage Capacity - 83.6
Max. Storage Capacity - 152.12

Int. Capacity x Eff Ht. = $83.6 \times 22.5 = 1881 < 3000 \therefore 25 \text{ yr}$
Minimum Spillway Design

From USGS WRI 80-80 "Tech. for Est. Flood Peaks ... in 50"
DA = 2.86 mi.² Slope = 50'/mi Si = 3.70

$$Q_{25} = 83.4 A^{.60} S^{.44} S_i^{-.72}$$

$$= 83.4 (2.86)^{.60} (50)^{.44} (3.70)^{-.72}$$

$$= 83.4 (1.8785) (5.5907) (0.3819)$$

$$= \underline{342 \text{ cfs}}$$

$$Q_{100} = 132 A^{.65} S^{.46} S_i^{-.67}$$

$$= 132 (2.86)^{.65} (50)^{.46} (3.70)^{-.67}$$

$$= 132 (1.9789) (6.0468) (0.4162)$$

$$= \underline{658 \text{ cfs}}$$

Secondary Spillway Capacity

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

$$= (2.6)(100)(2.5)^{1.5} \quad L = 100$$

$$= \underline{1028 \text{ cfs}} \quad H = 2.5$$

NRCS Annual Yield

Section 74:08:08:09

DA = 1828 Ac CN = 75 ISO = 2

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

80% chance = 0.2
 $0.2 \times 1828^{1/2} = \underline{30 \text{ A.-Ft}}$

50% chance = 0.5
 $0.5 \times 1828^{1/2} = \underline{76 \text{ A.-Ft}}$

10% chance = 2.20
 $2.2 \times 1828^{1/2} = \underline{335 \text{ A.-Ft}}$

LAW OFFICES
MAY, ADAM, GERDES & THOMPSON LLP
503 SOUTH PIERRE STREET
P.O. BOX 160
PIERRE, SOUTH DAKOTA 57501-0160

DAVID A. GERDES
CHARLES M. THOMPSON
ROBERT B. ANDERSON
TIMOTHY M. ENGEL
MICHAEL F. SHAW
BRETT KOENECKE
CHRISTINA L. KLINGER
MARCOS A. AGUILAR
JUSTIN L. BELL
DOUGLAS A. ABRAHAM

SINCE 1881
www.magt.com

May 3, 2011

Writer's Email: koenecke@magt.com

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WATER RIGHTS
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RETIRED
WARREN W. MAY
THOMAS C. ADAM

GLENN W. MARTENS 1881-1963
KARL GOLDSMITH 1885-1966
BRENT A. WILBUR 1949-2006

TELEPHONE
605 224-8803

TELECOPIER
605 224-6289

**SD Dept. of Environment & Natural Resources
Water Rights Program
523 E. Capitol Ave.
Pierre SD 57501**

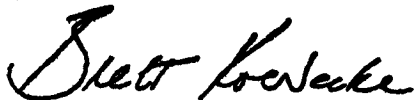
RE: Charles Ross Application for Water Right Permit

Dear Sir:

Enclosed please find an original application for permit to appropriate water which I am filing on behalf of my client Chuck Ross. Mr. Ross seeks to divert surface runoff into a proposed earthen dam. Please see attached plans drafted by the National Resource Conservation Service Office located herein Pierre. At this time we are only applying for a permit to appropriate surface runoff water. We may apply for a well permit in the future. If you have questions or concerns please do let either me or Mr. Ross know at the contact points provided. We have enclosed a check for \$750 which we believe to be the correct fee.

Thanks very much in advance for your consideration.

Very Truly Yours,



BRETT KOENECKE

BK/slg

Enclosure

Water Rights Division -DENR
Conversation or File Documentation

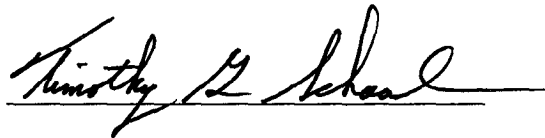
NAME OF PERSON OR FILE: Charles Ross

ADDRESS: 21185 Scattergun Ridge Rd. COUNTY: Hughes

DATE: May 9, 2011 TELEPHONE: (605) 875-3500

RE:

I talked to Angela Roman, from the NRCS, today about the storage capacity of the dam for Water Permit Application No 7249-3. She agrees with me that the storage capacity of the dam should be 56.2 acre-feet as mentioned on the P&S data and Form 2A, and not the 61.7 acre-feet listed on the first page of the application.

A handwritten signature in black ink, reading "Timothy G. Schaal", is written over a horizontal line.

Timothy G. Schaal, P.E.
Natural Resources Engineering Specialist
Water Rights Program



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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PIERRE, SOUTH DAKOTA 57501-3182
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**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 7249-3, Charles Ross**

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. 7249-3, Charles Ross, 21185 Scattergun Ridge Road, Pierre SD 57501.

The Chief Engineer is recommending APPROVAL of Application No. 7249-3 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. 7249-3 authorizes a dam with a storage capacity of 56.2 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
June 13, 2011

REPORT ON
WATER PERMIT APPLICATION NO. 7249-3
Charles Ross
May 9, 2011

Water Permit Application No. 7249-3 has been filed by Charles Ross to impound 56.2 acre-feet of water from runoff by constructing a dam located in the NE ¼ SW ¼ of Section 17-T110N-R75W, in Hughes 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 propagation, recreation and livestock water purposes.

Discussion:

The dam will be classified as a small size, Category 3, Low Hazard dam. The dam has been designed by the Natural Resources Conservation Service (NRCS). The plans and specifications have been reviewed and will be approved; however, construction of the dam can not begin until Water Permit Application No. 7249-3 is approved.

The dam will be 26 feet high with a normal storage capacity of 56.2 acre-feet with a reservoir level at the primary spillway elevation, and a maximum storage capacity of 152 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 1828 acres or 2.86 square miles. The dam is designed to have a 60 inch diameter concrete riser with a 24 inch diameter PVC barrel with 4.5 feet of freeboard as the primary spillway, and a 100 foot wide earthcut secondary spillway with 2.5 feet of freeboard. A 25 year frequency event produces a peak runoff of approximately 342 cfs and a 100 year frequency event produces a peak runoff of approximately 658 cfs. The earthcut spillway will have a capacity of approximately 1028 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 30 acre-feet; the annual yield with a 50 percent chance of occurrence, or 1 out of 2 years, is expected to be 76 acre-feet; and the annual yield with a 10 percent chance, or 1 out of 10 years, is expected to be 335 acre-feet.

The Ross Dam will be located in the NE ¼ SW ¼ of Section 17-T110N-R75W on an unnamed tributary to Chapelle Creek, about one-half mile upstream of the confluence of the unnamed tributary and Chapelle Creek and about 4 miles upstream of the confluence of Chapelle Creek and Lake Sharpe on the Missouri River. There are no existing Water Permits/Rights filed on the unnamed tributary or Chapelle Creek between the Ross Dam and the Missouri River.

Conclusions:

1. Water Permit Application No. 7249-3 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. 7249-3.



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



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

June 14, 2011

Charles Ross
21185 Scattergun Ridge Rd.
Pierre, SD 57501

Dear Mr. Ross:

We have reviewed the plans and specifications for your dam project located in the NE $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 17-T110N-R75W, in Hughes 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. 7249-3 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 Ross Dam will be classified as a small size Category 3, Low Hazard dam with a dam height of 26 feet and a normal storage capacity of 56.2 acre-feet and a maximum storage capacity of 152 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: Angela Roman, NRCS, Pierre

Form 8

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JUL - 1 2011

WATER RIGHTS
PROGRAM

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
County of Hughes) SS

I, Marylinn Baker

certify that the attached printed Notice was
taken

from the Capital Journal

printed and published in Pierre

County of Hughes and

state of South Dakota. The notice was
published

in the newspaper on the following two dates:

June 22, 2011

June 29, 2011

Cost of Printing \$54.61

Marylinn Baker
(Signature)

Bookkeeper
(Title)

6-29-2011
(Date Signed)

B6 - WEDNESDAY, JUNE 29, 2011

440 Carage Sales 800 Public Notice 800 Public Notice 800 Public Notice 800 Public Notice

SNAXLP 11454
July 6/22, 6/29
NOTICE OF
APPLICATION
NO. 7249-3 to
Appropriate
Water
Notice is given
that Charles Ross,
21185 Scattergun
Rd, Pierre, SD
57501, has filed
an application for
a water permit
to impound 56.2
acre-feet of water
from runoff by
constructing a
dam located in the
NE 1/4 SW 1/4
Section 17 with
1/4, SE 1/4 NW
1/4 Section 17;
all of which is
in T110N-R75W,
or supporting this
application or re-
quests impound-
ment of sufficient
water to maintain
water to the outlet
elevation. The
water is for fish
and wildlife prop-
erty, recreation
and livestock wa-
ter purposes.
Pursuant to da-
tion. The Chief
Engineer's ad-
vice is "Water
Rights Program,
PROVAL of Appli-
cation No. 7249-3
because 1) unap-
propriated water
is available, 2) ex-
isting rights will
not be unlawfully
beneficial use of
water, and 4) it is
the public inter-
est. In accordance
with SDCL 2011,
46-2A-23, the
Chief Engineer will
act on this appli-
cation, as recom-
mended, unless a
petitioner's

Interest in the ap-
plication, the peti-
tioner's reasons
for opposing or
contesting the ap-
plication, and the
recommendation, signature and
mailing address of
the petitioner or
the petitioner's le-
gal counsel, if le-
gal counsel is ob-
tained, shall be
included in the ap-
plication. Notice of
this application shall
be published twice
at the total ap-
proximate cost of
\$54.61.



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

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PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

June 14, 2011

Capital Journal
PO Box 878
Pierre SD 57501

ATTENTION: Legal Public Notice

Enclosed is a Notice on Application No. 7249-3 to Appropriate Water to be published twice. Please publish the first notice on June 22, 2011 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 Chuck Ross, 21185 Scattergun Ridge Rd., Pierre SD 57501 (Ph # 605-875-3500).

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. 7249-3

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

Date _____

We are in receipt of your letter of June 14, 2011 enclosing Notice to Appropriate Water by Application No. 7249-3 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
www.state.sd.us/denr

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

June 14, 2011

Chuck Ross
21185 Scattergun Ridge Rd
Pierre SD 57501

Dear Mr. Ross:

Water Permit Application No. 7249-3 for fish & wildlife use has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice has been sent to the Publisher of the Capital Journal printed at Pierre SD (Ph # 605-224-7301). You will need to contact the newspaper and authorize publication of this notice. For your information, a copy of the notice, the recommendation of the Chief Engineer and report on the application are enclosed. Please review the notice prior to publication and notify this office, if you have any corrections or questions.

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

Sincerely,

Eric Gronlund

Natural Resources Engineer

(605) 773-3352

eric.gronlund@state.sd.us

c: Angela Roman, NRCS, 1717 N Lincoln # 104, Pierre SD 57501

Brett Koenecke, PO Box 160, Pierre SD 57501

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 June 22, 2011 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. 7249-3 to Appropriate Water

Notice is given that Charles Ross, 21185 Scattergun Ridge Rd, Pierre SD 57501 has filed an application for a water permit to impound 56.2 acre-feet of water from runoff by constructing a dam located in the NE $\frac{1}{4}$ SW $\frac{1}{4}$ Section 17 with water impounded in the NE $\frac{1}{4}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$ Section 17; all in T110N-R75W. This application requests impoundment of sufficient water to maintain water to the outlet elevation. The water is for fish and wildlife propagation, recreation and livestock water purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 7249-3 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 July 11, 2011.

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_____.

July 25, 2011

PAYMENT REQUEST FORM

PAYEE: Charles Ross
21185 Scattergun Ridge Rd
Pierre SD 57501

FROM: DENR Water Rights Program
523 E. Capitol Ave
Pierre, SD 57501-3181

DESCRIPTION OF SERVICE, PRODUCE OR TRANSFER

Refund on overpayment of permit No. 7249-3

AMOUNT: \$50.00

FUNDING SOURCE:

GENERAL: X

FEDERAL:

COMMENTS:

AUTHORIZATION:

Barbault Esbel 7/25/11

I declare and affirm under the penalties of perjury that this claim is in all things, true and correct. I further agree to comply with the provisions of the Civil Rights Act of 1964 and regulations issued thereunder relating to nondiscrimination in federal assisted programs.



**DEPARTMENT of ENVIRONMENT
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www.state.sd.us/denr

JUL 25 2011

Charles Ross
21185 Scattergun Ridge Rd
Pierre SD 57501

Dear Mr. Ross:

Enclosed is Water Permit No. 7249-3 authorizing construction of your dam and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

This application was submitted with a \$750.00 fee. The correct fee is \$700.00. Therefore, \$50.00 will be refunded to Scattergun Lodge. The refund check should be received within the next couple of weeks.

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

c: Brett Koenecke, Attorney, PO Box 160, Pierre SD 57501

enclosures