WATER PERMIT NO. 8572-3

Name of Applicant: **Ray Martinmaas**

Address: **3521- 176th St, Orient SD 57467** Phone: **605 450-0990**

Amount of Water Claimed: **43.5 AF** Total Acres: **NA**

Source of Water Supply: **runoff**

Water to be used for: **livestock and recreation** County: **Hand**

Type of Waste Disposal System:

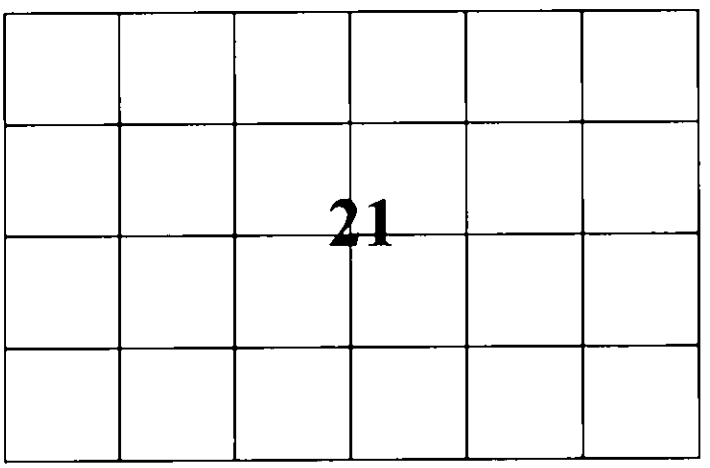
Location: **4 miles southwest of Orient**

PRIORITY Date Received: **12-1-21** Application/License Fee: **$ 700**

Corrected Application Received: **1-3-22** Period of Annual Use: **January 1 – December 31**

Remarks:

Diversion Point: **E 1/2 NW 1/4 Sec 21-T116N-R69W**



Land to be Irrigated: **NA**

Depth of Well: **NA**

Well Driller:

Remarks:

Type of Map: **aerial**

Prepared by:

Reviewed and the Number Assigned on: **1-4-22** By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____ _____ _____ _____ _____

SOUTH DAKOTA
WATER PERMIT NO. 8572-3

Date of first receipt of application December 1, 2021.
Date of return to applicant for corrections, amendments or changes December 1, 2021.
Date of receipt of corrected application January 3, 2022.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 8572-3 to Ray Martinmaas, 35210 176th St, Orient SD 57467 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. 8572-3 authorizes impoundment of 43.5 acre-feet of water from runoff by constructing a dam on Matter Creek located in the E 1/2 NW 1/4 Section 21 with water impounded in the N 1/2 NW 1/4 Section 21; all in T116N-R69W. This permit authorizes impoundment of sufficient water to maintain water to the outlet elevation. This site is located approximately 4 miles southwest of Orient SD.

2. The water appropriated shall be used for the purpose of 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 from which applicant may claim right is December 1, 2021.

5. The date of approval of Permit No. 8572-3 is May 23, 2022.

6. One-fifth of the construction is to be completed on or before December 23, 2024.

7. All construction is to be completed on or before May 23, 2027.

8. Water is to be put to beneficial use on or before May 23, 2031.

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. 8572-3 authorizes storage of up to 43.5 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: Eric Gronlund
Eric Gronlund, Chief Engineer
Water Rights Program
Department of Agriculture and Natural Resources

JUN 2 1 2022
date

SD EForm - 1585LD V5
FORM 2: Application for uses other than irrigation
(type or print)

RECEIVED
DEC - 1 2021
WATER RIGHTS PROGRAM

Mail to:
DENR - Water Rights
523 E Capitol Ave
Pierre, SD 57501-3182
ph. (605) 773-3352

(office use only)
No. 8572-3 Hydrologic Unit 10160009
Basin James R.
Newspaper Miller Press
American News

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

Check use(s) of water:

- [ ] Municipal
- [ ] Rural Water System
- [ ] Domestic (over 18 gpm)
- [ ] Water Distribution System
- [ ] Commercial
- [ ] Industrial
- [x] Recreational
- [ ] Fish & Wildlife
- [x] Other livestock and recreation
- [ ] Institutional
- [ ] Geothermal

Type of Application: (check one)

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

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

1. Name to Appear on Water Permit Ray Martinmaas

   Mailing Address 35210 176th Street (Address) Orient (City) SD (State) 57467 (Zip Code)

   Phone _____ Mobile 605-450-0990 Email meanwoman56@hotmail.com

2. Amount of water claimed _____ *CFS or _____ **GPM and 43.5 ***AF or _____ Gallons
   Flow rate and volume are both required (*Cubic Feet per Second) (**Gallons per Minute) (***Acre Feet - storage capacity of dam dugout or annual use)

3. Source of water supply runoff

4. Location of point of diversion E1/2, NW 1/4 Sec 21, T116N, R69W (example - 3 wells in SW1/4 NE1/4 section 12 T104N R53W) County Hand

   If not a public water supply (e.g. municipal), will water be used outside of the area described above? [ ] Yes [x] No

   If "Yes," where will water be used? _____ (example - NW1/4 section 12 T104N R53W)

5. County or counties where water will be used Hand

6. Annual period during which water is to be used all year

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)

   Earthen embankment dam to be constructed with a concrete riser and PVC barrel principal spillway and a 100' wide vegetated auxiliary spillway.

I, Ray Martinmaas (Name of Person) _____ (Title (if applicable)), the applicant, certify under penalty of perjury that I have read this application, examined the attached map, and that the matters stated are true. I further certify, if acting on behalf of an entity or individual other than myself, that I am authorized to submit this application.

2015.10

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

Form 2A
(Complete applicable portions only)

Supplemental Information

(type or print)

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

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

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

For either Existing or Proposed Wells:

c) Well Depth (required) ___ Depth to Top of Water Bearing Material _____ Depth to Water from Surface _____

d) Distance to nearest domestic well on applicant's property _____ 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 _____

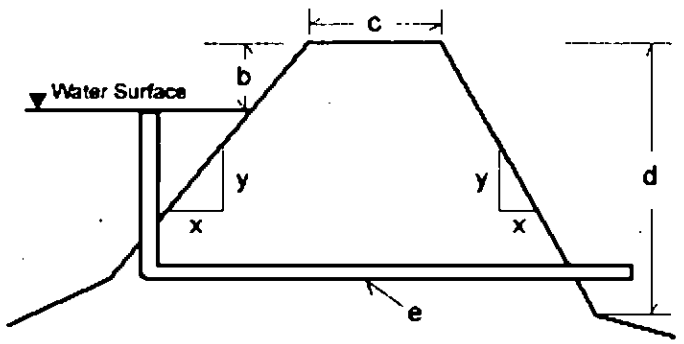
b) Depth to water (ground surface to water level) _____

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:

USDA-NRCS
Angela Roman
1717 N. Lincoln, Suite #104
Pierre, SD 57501



b) Freeboard 4.2'

c) Crest Width 12'

Crest Length 388'

d) Height 17.0'

e) Primary Outlet Capacity 24.1 cfs

If pipe, diameter 16"

f) Secondary Spillway Capacity 371.6 cfs

Spillway Width 100'

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

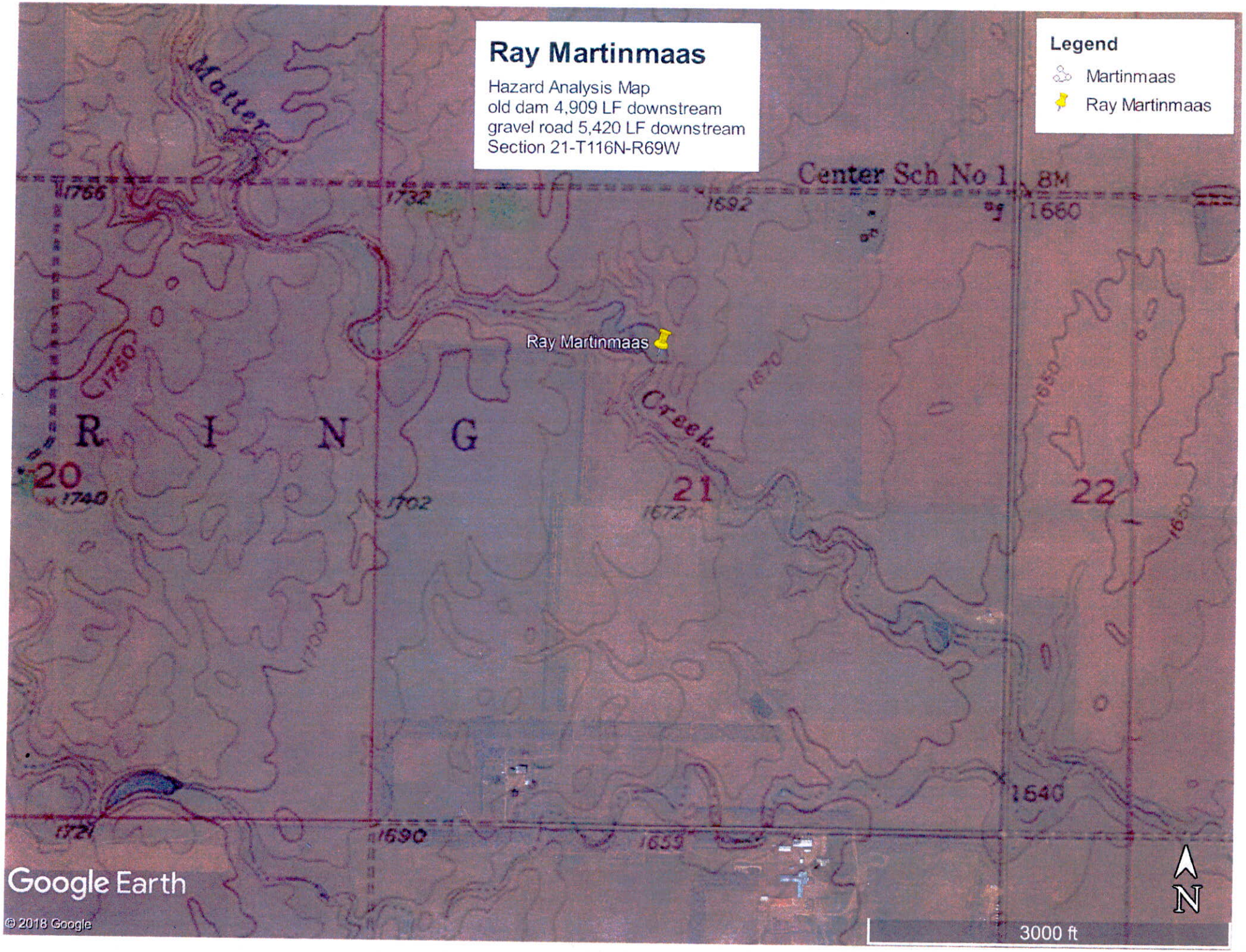
Upstream 3:1

Downstream 3:1

h) Surface Area of Impoundment 7.91 Acres

i) Storage 43.5 Acre Feet

j) Drainage Area Above Dam 561.8 Acres


Ray Martinmaas
Hazard Analysis Map
old dam 4,909 LF downstream
gravel road 5,420 LF downstream
Section 21-T116N-R69W
Legend
Martinmaas
Ray Martinmaas
Center Sch No 1
Ray Martinmaas
Creek
R I N G
20
21
22
1766
1732
1692
1660
1750
1740
1702
1672
1650
1640
1690
1653
1721
Google Earth
© 2018 Google
N
3000 ft

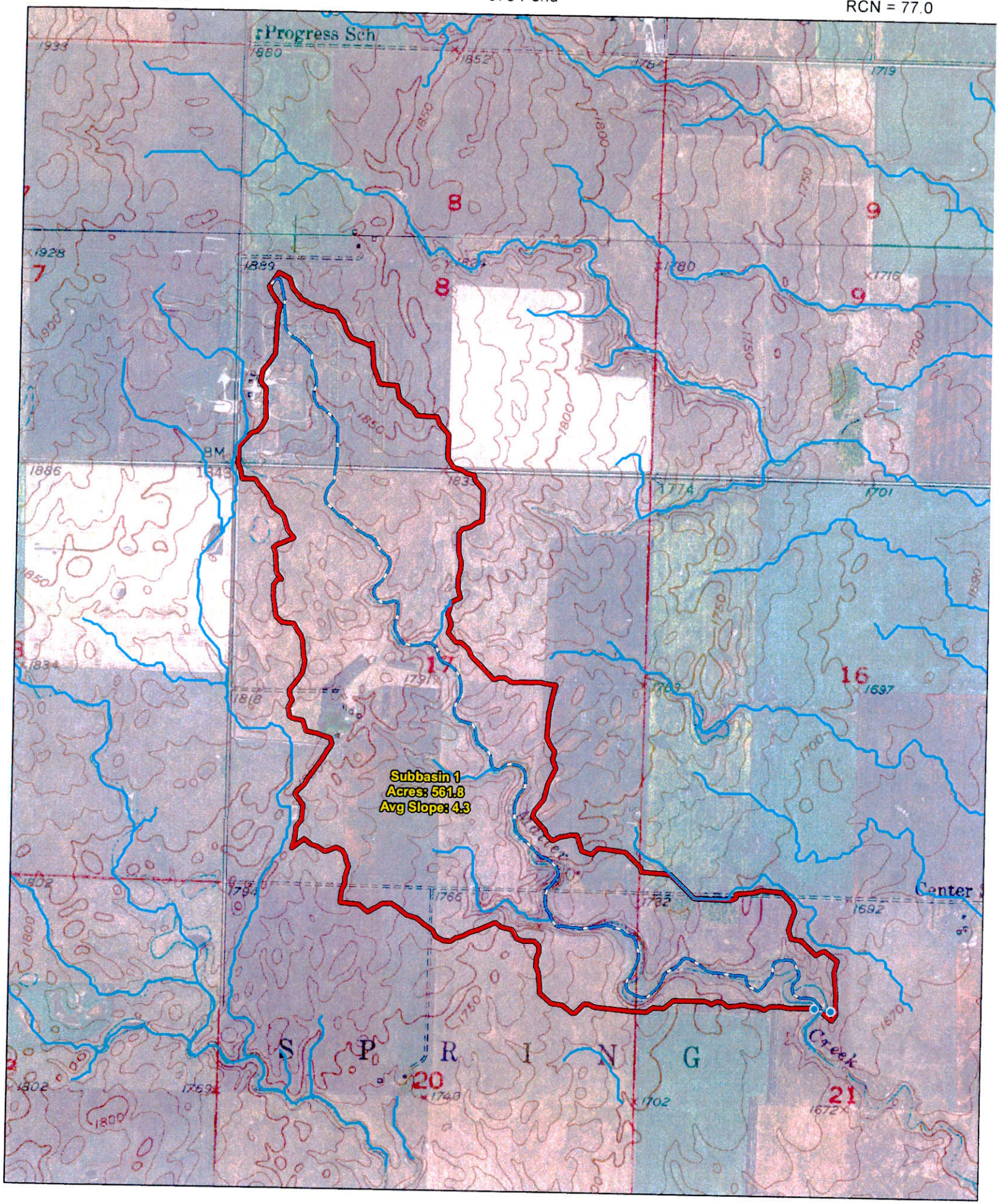
Ray Martinmaas

Hand County
378 Pond

N

1 inch = 1,500 feet

Watershed = 561.8 Acres
Slope = 4.3
Flow Length = 16,280.5 ft
RCN = 77.0



UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

SD-ENG-57
Rev. 10/09

DOCUMENTATION FOR HAZARD CLASSIFICATION

Producer: **Ray Martinmaas**
County: **Hand**
Field # :
Location

Name of Site: **Dam**
Watershed:

1/4 Section: **NW** Section: **21** Township: **116N** Range: **69W**

Latitude: Longitude:

Dam in Series: **No**
Explain: dam downstream is breached

Dam and Reservoir Data

Assumed Job Class	**III**
Assumed Hazard Class	**A**
Centerline Elevation Channel Bottom*	**1667.2**
Centerline Elevation Flood Plain*	**1668**
Centerline Elevation Top of Dam*	**1684.2**
Centerline Elevation Auxiliary Spillway Crest*	**1681.7**

*Elevation is based on Mean Sea Level Datum

Max. Depth of Water within Reservoir **10** Ft.

Storage

Storage Below Principal Spillway	**43.5** Ac.-Ft.
Storage between Principal Spillway and Auxiliary Spillway	**13.9** Ac.-Ft.
Storage between Auxiliary Spillway and Top of Dam	**28.5** Ac.-Ft.
Other	Ac.-Ft.
Total Storage to Top of Dam	**85.9** Ac.-Ft.

Downstream Conditions

1. Valley Conditions Downstream of Structure: **Divergent**
   Approximate Slope of Channel: **1%**
2. Stream Channel Size

Depth	**8** Ft.
Bottom Width	**1** Ft.
Top Width	**14** Ft.

3. Valley Characteristics

Width	**100** Ft.
Roughness Coeffecient	**0.035**
Slope	**3%**

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'	5.3 miles		○	◉
Township or County Gravel Road D<2'	5,240 feet	5'	○	◉
			○	◉
Bridges: Describe type and opening size				
			○	◉
Railroads:				
Major Railroad, Describe:			○	◉
Buildings and Utilities:				
Farm Building(s)			○	◉
Public, Industrial or Commercial Buildings			○	◉
Rel. Import. Utility serving mult. rural users			○	◉
			○	◉

Describe: Matter Creek. Landowner stated creek regularly overtops county gravel road every spring. Channel diverges greatly before the county gravel road.

Location:

Is Dam located within five miles of urban development? No

Describe Potential Development:

Rural area. Any downstream development very unlikely.

Rational For Determining Hazard Class:

Land below is unaccessible to general public.

Method Used for Evaluation of Impact Area: Visual Assessment

Further Evaluation Needed: No

Attached: Breach Routings ☐ Maps ☑

Other supporting documents:

Actual Hazard Class* **A** Final Job Class **III**

Hazard Analysis by: Angela Roman **Date:** 11/17/2019

Approved by Angela Roman **Date:** 11/17/2019

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

Client: Ray Martinmaas
County: HAND MSE 2 State: SD
Practice: 378 Pond
Calculated By: N. Benson Date: 11/20/2019
Checked By: aRoman Date: 12/4/19

Drainage Area:	561.8	Acres (user entered value)
Curve Number:	77	(user entered value)
Watershed Length:	16280	Feet
Watershed Slope:	4.3	Percent
Time of Concentration:	2.61	Hours (calculated value)
Rainfall Type:	MSE2	

Storm Number	1	2	3	4	5	6	7
Frequency (yrs)	1	2	5	10	25	50	100
24-Hr rainfall (in)	1.90	2.20	2.70	3.20	4.10	4.80	5.50
Ia/P Ratio	0.31	0.27	0.22	0.19	0.15	0.12	0.11
Used	0.31	0.27	0.22	0.19	0.15	0.12	0.11
Runoff (in)	.40	.56	.87	1.21	1.89	2.46	3.05
(ac-ft)	18.73	26.22	40.73	56.65	88.48	115.17	142.79
Unit Peak Discharge (cfs/acre/in)	0.282	0.293	0.304	0.311	0.318	0.322	0.325
Peak Discharge (cfs)	63	92	148	211	338	444	556

Project Name: *Ray Martinmaas*
Computed by: *N. Benson*
Date: *11/30/2021*
Checked by: *CKman*
Date: *11/30/21*

IaDropInlet.xls Ver 1.02

Input Data

Riser Type & Diameter (in)	**Circular**	***36***
Length of Weir Obstruction(ft)		***0.5***
		6
Principal Spillway Crest Elev (ft)		***1680***
Invert of Barrel Elevation (ft)		***1676***
Barrel Orifice Coefficient (C)		***0.6***
Pipe Diameter (in)		***16***
Pipe Length (ft)		***80***
Entrance Coefficient 'Ke'		***1***
Mannings 'n-value'		***0.009***
Elbow Elev (if None, Leave 'BLANK')		
Length of Outlet ('BLANK' if none)		
Outlet Type	***Cantilever***	
Outlet Elevation (ft)		***1669.2***
Tailwater Elev (if unknown, leave 'Blank')		
Auxiliary Spillway Elev (ft)		***1681.7***
Maximum Headwater Elev (ft)		***1685***
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):	8.92
Riser Area (Sq Ft):	7.07
Barrel Area (Sq Ft):	1.40
Kp:	0.01022
Friction Slope (HW at the A.S. Crest):	0.04244
Pipe Slope:	0.08531
Outlet Elbow Angle (deg):	0.0
Maximum Barrel Invert Elevation for avoiding Barrel Orifice Control:	1669.49
Km:	0.00000
Tailwater Elev Used For Full Pipe Flow:	1670

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.

		Outflow, CFS					
Elev	HW Ft	Weir	Inlet Orfice	Barrel Orifice	Full Pipe	Structure Outflow, CFS	Controlling Factor
1680.0	0.0	0.00	0.00	12.27	21.11	0.00	Weir Flow
1680.1	0.1	0.87	10.76	12.46	21.21	0.87	Weir Flow
1680.2	0.2	2.47	15.22	12.64	21.32	2.47	Weir Flow
1680.3	0.3	4.55	18.64	12.81	21.42	4.55	Weir Flow
1680.4	0.4	7.00	21.53	12.99	21.53	7.00	Weir Flow
1680.5	0.5	9.78	24.07	13.16	21.63	9.78	Weir Flow
1680.6	0.6	12.86	26.36	13.33	21.73	12.86	Weir Flow
1680.7	0.7	16.20	28.48	13.50	21.84	13.50	Barrel Orifice
1680.8	0.8	19.80	30.44	13.67	21.94	13.67	Barrel Orifice
1680.9	0.9	23.62	32.29	13.83	22.04	13.83	Barrel Orifice
1681.0	1.0	27.67	34.04	13.99	22.14	13.99	Barrel Orifice
1681.1	1.1	31.92	35.70	14.16	22.24	14.16	Barrel Orifice
1681.2	1.2	36.37	37.28	14.31	22.34	14.31	Barrel Orifice
1681.3	1.3	41.01	38.81	14.47	22.44	14.47	Barrel Orifice
1681.4	1.4	45.83	40.27	14.63	22.54	14.63	Barrel Orifice
1681.5	1.5	50.83	41.68	14.78	22.64	14.78	Barrel Orifice
1681.6	1.6	55.99	43.05	14.93	22.74	14.93	Barrel Orifice
1681.7	1.7	61.32	44.38	15.08	22.83	15.08	Barrel Orifice
1681.8	1.8	66.81	45.66	15.23	22.93	15.23	Barrel Orifice
1681.9	1.9	72.46	46.91	15.38	23.03	15.38	Barrel Orifice
1682.0	2.0	78.25	48.13	15.53	23.12	15.53	Barrel Orifice
1682.1	2.1	84.20	49.32	15.67	23.22	15.67	Barrel Orifice
1682.2	2.2	90.28	50.48	15.81	23.32	15.81	Barrel Orifice
1682.3	2.3	96.51	51.62	15.96	23.41	15.96	Barrel Orifice
1682.4	2.4	102.87	52.73	16.10	23.51	16.10	Barrel Orifice
1682.5	2.5	109.36	53.81	16.24	23.60	16.24	Barrel Orifice
1682.6	2.6	115.99	54.88	16.38	23.69	16.38	Barrel Orifice
1682.7	2.7	122.75	55.93	16.51	23.79	16.51	Barrel Orifice
1682.8	2.8	129.63	56.95	16.65	23.88	16.65	Barrel Orifice
1682.9	2.9	136.63	57.96	16.79	23.98	16.79	Barrel Orifice
1683.0	3.0	143.76	58.95	16.92	24.07	16.92	Barrel Orifice
1683.1	3.1	151.01	59.92	17.05	24.16	17.05	Barrel Orifice
1683.2	3.2	158.37	60.88	17.18	24.25	17.18	Barrel Orifice
1683.3	3.3	165.86	61.83	17.32	24.34	17.32	Barrel Orifice
1683.4	3.4	173.45	62.76	17.45	24.44	17.45	Barrel Orifice
1683.5	3.5	181.16	63.67	17.57	24.53	17.57	Barrel Orifice
1683.6	3.6	188.98	64.58	17.70	24.62	17.70	Barrel Orifice
1683.7	3.7	196.91	65.47	17.83	24.71	17.83	Barrel Orifice
1683.8	3.8	204.94	66.35	17.96	24.80	17.96	Barrel Orifice
1683.9	3.9	213.09	67.21	18.08	24.89	18.08	Barrel Orifice
1684.0	4.0	221.33	68.07	18.21	24.98	18.21	Barrel Orifice
1684.1	4.1	229.69	68.92	18.33	25.07	18.33	Barrel Orifice
1684.2	4.2	238.14	69.75	18.45	25.15	18.45	Barrel Orifice
1684.3	4.3	246.70	70.58	18.57	25.24	18.57	Barrel Orifice
1684.4	4.4	255.35	71.39	18.70	25.33	18.70	Barrel Orifice
1684.5	4.5	264.11	72.20	18.82	25.42	18.82	Barrel Orifice
1684.6	4.6	272.96	73.00	18.94	25.51	18.94	Barrel Orifice
1684.7	4.7	281.91	73.79	19.06	25.59	19.06	Barrel Orifice
1684.8	4.8	290.95	74.57	19.17	25.68	19.17	Barrel Orifice
1684.9	4.9	300.09	75.34	19.29	25.77	19.29	Barrel Orifice
1685.0	5.0	309.32	76.10	19.41	25.85	19.41	Barrel Orifice

Numbers used in STTES

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**********************************************************************************
SITES XEQ 11/25/2019   WATER RESOURCE SITE ANALYSIS COMPUTER PROGRAM
     VER 2005.1.8                (USER MANUAL - DATED DECEMBER 2005)
     TIME 13:30:15
**************************** 80-80 LIST OF INPUT Data ****************************

SITES     01/01/2005          Martinmaas Pond                    0.8778125 H5
SAVMOV    0    101
SAVMOV    101  1                                                          1
STRUCTURE                Martinmaas Pond
                         1669       0
                         1680       7.91       0
                         1681       8.86       22.14
                         1682       9.87       23.12
                         1683       11.25      24.07
                         1684       12.16      24.98
                         1684.2     12.41      25.15
                         1685       13.39      25.85
ENDTABLE
WSDATA    5A1    AC 77          561.8      16280.5    4.3
RAINTABLE MSE2      24          MSE2 WinTR-20rfdist
                    0.000000   0.000170   0.000359   0.000565   0.000790
                    0.001030   0.001290   0.001570   0.001870   0.002180
                    0.002510   0.002860   0.003230   0.003620   0.004020
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                    0.009640   0.010260   0.010900   0.011550   0.012230
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                    0.036010   0.037170   0.038350   0.039540   0.040750
                    0.041980   0.043220   0.044490   0.045770   0.047070
                    0.048390   0.049730   0.051080   0.052450   0.053840
                    0.055250   0.056680   0.058120   0.059580   0.061060
                    0.062560   0.064080   0.065610   0.067160   0.068730
                    0.070320   0.071930   0.073550   0.075190   0.076850
                    0.078530   0.080220   0.081940   0.083670   0.085420
                    0.087180   0.090120   0.093100   0.096120   0.099190
                    0.102290   0.105450   0.108640   0.111880   0.115160
                    0.118490   0.121850   0.125270   0.128720   0.132220
                    0.135760   0.141150   0.147320   0.154280   0.162030
                    0.170560   0.179880   0.189980   0.200870   0.212540
                    0.225000   0.243980   0.269120   0.304660   0.356220
                    0.456270   0.643780   0.695340   0.730880   0.756020
                    0.775000   0.787460   0.799130   0.810020   0.820120
                    0.829440   0.837970   0.845720   0.852680   0.858850
                    0.864240   0.867780   0.871280   0.874730   0.878150
                    0.881510   0.884840   0.888120   0.891360   0.894550
                    0.897710   0.900810   0.903880   0.906900   0.909880
                    0.912820   0.914580   0.916330   0.918060   0.919780
                    0.921470   0.923150   0.924810   0.926450   0.928070
                    0.929680   0.931270   0.932840   0.934390   0.935920
                    0.937440   0.938940   0.940420   0.941880   0.943320
                    0.944750   0.946160   0.947550   0.948920   0.950270
```

notes by: Angela Roman 11/30/21

Elev. Surface Area (Acres)

Ray Martinmaas
36" concrete riser
4' tall
16" PVC barrel

Pipe flow of principal spillway-hood inlet in riser.

← Rainfall Data

```
                    0.951610  0.952930  0.954230  0.955510  0.956780
                    0.958020  0.959250  0.960460  0.961650  0.962830
                    0.963990  0.965130  0.966250  0.967350  0.968440
                    0.969500  0.970550  0.971580  0.972600  0.973590
                    0.974570  0.975530  0.976470  0.977400  0.978300
                    0.979190  0.980060  0.980910  0.981750  0.982560
                    0.983360  0.984140  0.984900  0.985650  0.986370
                    0.987080  0.987770  0.988450  0.989100  0.989740
                    0.990360  0.990960  0.991540  0.992110  0.992650
                    0.993180  0.993690  0.994190  0.994660  0.995120
                    0.995560  0.995980  0.996380  0.996770  0.997140
                    0.997490  0.997820  0.998130  0.998430  0.998710
                    0.998970  0.999210  0.999435  0.999641  0.999830
                    1.000000
ENDTABLE
PDIRECT                       2.2"= 2year storm (24hr)          4.80"= 50 year storm (24 hr)
POOLDATA  ELEV      1680      1669      1680      1667.8    1667
ASDATA    41 300    100                 3                   .1        2
ASINSURF  41                  .035
ASINLET   41        0.0       0.0       100       0.0                 3
                    200       0
ENDTABLE                      Auxiliary Spillway Criteria
ASEXSURF  41                  .035- Mannings
                              0.67      0
                              2
                              2         0
                              .0075
ENDTABLE
ASEXIT    41        N
BTMWIDTH  FEET      100  Aux. Bottom Width                        100
GRAPHICS  I
GO,DESIGN HL        MSE2      24        MSE2 378  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 11/25/2019                Martinmaas Pond                      WSID=
 VER 2005.1.8                    Martinmaas Pond                      SUBW=   A
 TIME 13:30:15           SITE = S   1              PASS=     1      PART=    1

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

 STORM DISTRIBUTION-PSH MSE2 WinTR-20rfdist
```

PRINCIPAL SPILLWAY DURATION = 24.00 HOURS

STORM DISTRIBUTION AUX. -MSE2 WinTR-20rfdist

PRECIP. -	P-PS,1-DAY	P-PS,10-DAY	P-SD	P-FB	
	2.20	0.00	0.00	4.80	
	2yr-24hr			50yr-24hr	
WSDATA -	CN	DA-SM	TC/L	-/H	QRF
Runoff Curve # =	77.00	0.88	16280.50	4.30	0.00
SITEDATA-	PERM POOL	CREST PS	FP SED	VALLEY FL	378?
	1680.00	1669.00	1680.00	1667.00	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	300.00	100	
AUX.Data -	INLET N	SIDE SLOPE	EXIT N	EXIT SLOPE	ACTUAL AUX?
	0.035	3.00	0.035	0.100	NO
BTM WIDTH -	BW1	BW2	BW3	BW4	BW5
ft	100.00	0.00	0.00	0.00	0.00

AUXILIARY SPILLWAY RATING DEVELOPED USING WSPVRT.

1SITES ----------

XEQ 11/25/2019 Martinmaas Pond WSID=
VER 2005.1.8 Martinmaas Pond SUBW= A
TIME 13:30:15 SITE = S 1 PASS= 1 PART= 2

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

PERM POOL	1680.00 FT	43.5 ACFT	7.91 AC	0.0 CFS
CREST PS	1669.00 FT	0.0 ACFT	0.00 AC	0.0 CFS
SED ACCUM	1680.00 FT	43.5 ACFT	7.91 AC	0.0 CFS
START ELEV	1680.00 FT	43.5 ACFT	7.91 AC	0.0 CFS

9 ← Starting elevation of Flood Routing

NRCS-PSH D= 24.00 HR P= 2.20 IN Q= 0.56 IN DA= 0.88 SM
TC= 2.61 HR CN= 77.00 VOL= 26.2 ACFT

Time of Concentration

OF Runoff

PEAK = 91.2 CFS, AT 13.9 HRS.

Flow of principal spillway

ROUTED RESULT -	HYD TYPE	EMAX	VOL-MAX	AMAX	QMAX
	NRCS-PSH	1681.60 FT	57.4 ACFT	9.46 AC	22.7 CFS

PS STORAGE 13.9 ACFT, BETWEEN AUX. CREST AND SED. ACCUM ELEVATIONS.

DRAWDOWN (DDT) TEST 1669.00 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 1680.00 FT, 43.5 ACFT, 0.0 CFS.

DRAWDOWN TIME = 1.95 DAYS, TO 0.0 CFS (LIMIT = 10.00 DAYS)

Time pipe will flow after runoff from 2yr 24hr storm

****

RATING TABLE DEVELOPED, SITE = S 1:
WITH PS GIVEN AND AUX. COMPUTED BY PROGRAM
AUX. RATING USED WSPVRT METHOD.

Discharge Capacity

RATING TABLE NUMBER 1

	ELEV. FEET	Q-TOTAL CFS	Q-PS CFS	Q-AUX. CFS	VOLUME AC-FT	AREA ACRE
1	1669.00	0.00	0.00	0.00	0.00	0.00
2	1680.00	0.00	0.00	0.00	43.50	7.91
3	1681.00	22.14	22.14	0.00	51.89	8.86
4	1682.00	23.12	23.12	0.00	61.25	9.87
5	1683.00	24.07	24.07	0.00	71.81	11.25
6	1684.00	24.98	24.98	0.00	83.52	12.16
7	1684.20	25.15	25.15	0.00	85.98	12.41
8	1685.00	25.85	25.85	0.00	96.30	13.39

1SITES ----------

XEQ 11/25/2019 Martinmaas Pond WSID=
VER 2005.1.8 Martinmaas Pond SUBW= A
TIME 13:30:15 SITE = S 1 PASS= 1 PART= 3

Auxiliary Elev.

Storage (ACFT) Surface (Acres)

AUX. CREST = 1681.60 FT 57.4 ACFT 9.46 AC 22.7 CFS

PS STORAGE 13.9 ACFT, BETWEEN AUX. CREST AND SED. ACCUM ELEVATIONS.

START ELEV 1680.00 FT 43.5 ACFT 7.91 AC 0.0 CFS

EFFECTIVE HEIGHT(H)= 13.8 FEET, PRODUCT= 792. (H * STORAGE AT CREST AUX.).

INPUT DESIGN CLASS = A1 = LT 3000. PRODUCT.

50yr 24hr

NRCS-FBH D= 24.00 HR P= 4.80 IN Q= 2.46 IN DA= 0.88 SM
TC= 2.61 HR CN= 77.00 VOL= 115.0 ACFT

FBH = Auxiliary

PEAK = 441.0 CFS, AT 13.8 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 (Pipe) CFS	Q-AUX. (Aux) CFS	VOLUME AC-FT	AREA (Surface) ACRE
1	1669.00	0.00	0.00	0.00	0.00	0.00
2	1670.05	0.00	0.00	0.00	0.40	0.75
3	1671.10	0.00	0.00	0.00	1.59	1.51
4	1672.15	0.00	0.00	0.00	3.57	2.26
5	1673.20	0.00	0.00	0.00	6.34	3.02
6	1674.25	0.00	0.00	0.00	9.91	3.77
7	1675.30	0.00	0.00	0.00	14.27	4.53
8	1676.35	0.00	0.00	0.00	19.42	5.28
9	1677.40	0.00	0.00	0.00	25.37	6.04
10	1678.45	0.00	0.00	0.00	32.10	6.79
11	1679.50	0.00	0.00	0.00	39.63	7.55
12	1680.55	12.16	12.16	0.00	47.99	8.43
13	1681.60	22.73	22.73	0.00	57.38	9.47
14	1681.77	32.44	22.89	9.55	59.00	9.64
15	1681.94	42.20	23.06	19.14	60.66	9.81
16	1682.25	92.81	23.35	69.45	63.72	10.21
17	1682.62	196.03	23.71	172.32	67.63	10.72
18	1683.30	492.36	24.34	468.02	75.23	11.52
19	1684.15	991.47	25.11	966.37	85.36	12.35
20	1685.00	1629.97	25.85	1604.12	96.30	13.39

****

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	200.	300.	0.0	0.035	**	**	**	CREST
2	300.	400.	10.0	0.035	0.67	2	2.0	EXIT !

100' level crest (Auxiliary)

outlet slope = 10%

@ 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 2 used in computing exit channel velocities.

****

DRAWDOWN USING FREEBOARD STORM FOLLOWS, STARTING AT ELEVATION 1681.60 FT.

DRAWDOWN (DDT) TEST 1680.00 FT 43.5 ACFT 5.63 CFS
CONTROL IS 0.000 DETENTION STORAGE

DRAWDOWN TIME = 0.59 DAYS, TO 0.0 CFS (LIMIT = 10.00 DAYS)

Aux Elev = 1681.7 + 1.5′ + 1′ = 1684.2
(Flow depth) (freeboard) (Top of Dam)

Auxiliary Depth of Flow

ROUTED RESULTS NRCS-FBH	BTM WIDTH FT 100.0	MAX ELEV FT 1683.08	VOL-MAX ACFT 72.8	AREA-MAX AC 11.3	AUX.-HP FT 1.48	VOL-AUX. ACFT 15.4

^^^^^ NOTE -- ACTUAL Hp OF 1.48 RAISED TO MEET MIN. 378 CRITERIA.

Auxiliary

PEAK - CFS DISCHARGE =	Q-PS 24.1	Q-AUX. 371.6	Q-TOT. 395.8

Velocity on level section

	CRITICAL DEPTH FT	CRITICAL VELOCITY FT/SEC	CRITICAL SLOPE-Sc FT/FT	25% OF Q Sc FT/FT
AUXILIARY SPILLWAY ---	0.75	4.86	0.020	0.027

EROSIONALLY EFFECTIVE STRESS FOR STABILITY ANALYSIS OF AUX. EXIT CHANNEL
(Refer to Ag. Handbook 667, Chapt. 3, for allowable stresses.)
Aux. Spillway Discharge = 372. cfs; Bottom Width = 100. ft

Exit Channel →

REACH NO.	FROM STA	TO STA	SLOPE %	MANNING'S n	VELOCITY ft/s	TOTAL STRESS lb/ft^2	EFFECTIVE STRESS lb/ft^2
2	300.	400.	10.00	0.035	7.94	2.88	0.572

AUXILIARY SPILLWAY DURATION FLOW = 10.4 HOURS
ATTACK, OE/B = 0.8 ACFT/FT

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

EXIT CHANNEL FLOW SUPERCRITICAL: MAX VELOCITY= 7.9 FT/SEC
EXIT SLOPE = 0.100 FT/FT
FLOW DEPTH = 0.5 FT

This run not evaluated or required

>>>>> NHCP378 RUN - MINIMUM DEPTH, CREST AUX. TO TOP OF DAM IS 2.00 FT.
NEW TOP OF DAM ELEVATION = 1683.60.

ROUTED RESULTS MINIMUM AUX.	BTM WIDTH FT 100.0	MAX ELEV FT 1683.60	VOL-MAX ACFT 78.8	AREA-MAX AC 11.8	AUX.HP FT 2.00	VOL-AUX. ACFT 21.4

PEAK - CFS DISCHARGES =	Q-PS 24.6	Q-AUX. 643.6	Q-TOT. 668.2

	CRITICAL DEPTH FT	CRITICAL VELOCITY FT/SEC	CRITICAL SLOPE-Sc FT/FT	25% OF Q Sc FT/FT
AUXILIARY SPILLWAY ---	1.08	5.80	0.018	0.024

>>>>> NHCP378 RUN - MINIMUM DEPTH, DESIGN FLOW TO TOP OF DAM; 1.00 FT REQUIRED FOR THIS PASS. NEW TOP OF DAM ELEVATION = 1684.08.

```
ROUTED        BTM WIDTH   MAX ELEV    VOL MAX   AREA-MAX     AUX.RP    VOL-AUX.
RESULTS          FT          FT         ACFT       AC          FT        ACFT
MINIMUM AUX.     100.0     1694.06      94.6       12.3       2.48       21.2

          PEAK   CFS        Q-DS       Q-AUX.     Q-TOT.
          DISCHARGES =      25.1       927.2      902.1

                          CRITICAL   CRITICAL    CRITICAL    25% OF Q
                            DEPTH   VELOCITY    SLOPE-Sc       Sc
          AUXILIARY           FT      FT/SEC      FT/FT       FT/FT
          SPILLWAY          1.37        6.51      0.016       0.022
-------------------  ---  ----------------------------  -------------

Inflow Hyd 1 PSH-Peak          22.1 CFS  at   16.66 hrs.,  Junction Point

Inflow Hyd 1 FBH-Peak         395.9 CFS  at   14.14 hrs.,  Junction Point
HYDOUT    1

ISTAQS....JOB NO.   1 COMPLETE.
----------  ----  ---  ------------------------  ---------------

                Multiframe Runs

      0 SUBCATCHMENT(S) ANALYZED.

      1 STRUCTURE(S) ANALYZED.

      2 HYDROGRAPHS ROUTED AT DOWNST SITE.

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

.....

S TRS.....COMPUTATIONS COMPLETE
```

>>>	SITE ID	SUBAR ID	SUBAR DA (SQ MI)	CURVE NO.	TC (HRS)	TOTAL DA (SQ MI)	TYPE OF STRUC	STRUC CLASS	<<<
	S	1	A	0.89	77.	0.61	0.95	FBCB	A1	

PASS NO.	DIS./ WIDTH (FT/FT)	AUX.CREST ELEV (FT)	BTM. WIDTH (FT)	MAX. SP (FT)	MAX. ELEV (FT)	PMR. VOL. (CY)	INTEGR.* DIST. (FT)	EXIT* VEL. (FT/SEC)	TYPE PYD
1	3.0	1691.6	100.0	2.5	1694.1	0.	0.	7.9	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 2005.1.8 ,01/01/2005
FILES

INPUT S:\NRCS\PierrePSO\3_Engineering\HandCounty\MartinmeasRay\SITES\16droppslOOas.D
OUTPUT = S:\NRCS\PierrePSO\3_Engineering\HandCounty\MartinmeasRay\SITES\16droppslOOas.o
DATED 11/29/2018 12:30:15

GRAPHICS FILES GENERATED

OPTION "L" S:\NRCS\PierrePSO\3_Engineering\HandCounty\MartinmeasRay\SITES\16droppslO

OPTION "P" S:\NRCS\PierrePSO\3_Engineering\HandCounty\MartinmeasRay\SITES\16droppslO

OPTION "S" S:\NRCS\PierrePSO\3_Engineering\HandCounty\MartinmeasRay\SITES\16droppsl

Cut/Fill Report

Generated: 2019-12-03 14:51:51
By user: Nathan Benson
Drawing: S:\NRCS Pierre\SO 3 Engineering\HandCounty\MartinmaasRay S:\NRCS Pierre\SO 3 Engineering\HandCounty\MartinmaasRay MartinmaasDam1.dwg

Volume Summary

Name	Type	Cut Factor	Fill Factor	2d Area (Sq Ft)		Cut (Cu Yd)	Fill (Cu Yd)	Net (Cu Yd)
LDamVol	full	1.000	1.000	25063.09	464 CY	0.12	5749.44	5749.32<Fill>
AuxVol	full	1.000	1.000	21935.84	406 CY	1930.71	22.51	1908.21<Cut>
Berm (1)	full	1.000	1.000	4283.60	79 CY	0.00	384.72	384.21<Fill>

Totals

	2d Area (Sq Ft)	Cut (Cu Yd)	Fill (Cu Yd)	Net (Cu Yd)
Total	51282.53	1930.83	6156.66	4225.83<Fill>

* Value adjusted by cut or fill factor other than 1.0

Fill
Pond = 5749 CY
Stripping (Pond) = 464 CY
Berm = 385 CY
Stripping (Berm) = 79 CY
Core Trench = 287 CY → 5% = 348 CY

$\frac{310 \times 10 \times 25}{27} = 287$

Topsoil Aux = 406 CY

PROJECT	Ray Martinmaas		
SUBJECT	378 Pond	**COUNTY**	Hand
BY	Nathan Benson	**DATE**	12/4/2019

PIPE LENGTH AND SLOPE CALCULATOR FOR EARTH DAM

Version 1.0

U.S. Department of Agriculture
Natural Resources Conservation Service
Rev. 02/2017

Skew Angle of Pipe = 90 Degrees

Elevation of Top of Dam = 1684.2

Top Width of Dam = 12 Feet

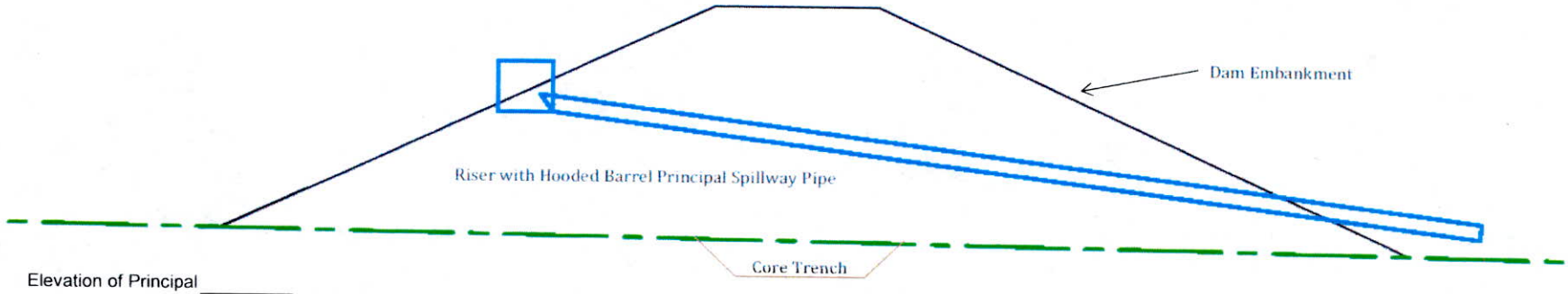
Settlement of Fill = 5 %

Elevation of Aux. Spillway = 1681.7

Downstream SS = 3 :1

Length of Pipe Past Toe = 5 Feet

Elevation of Pipe Outlet = 1669.2



Elevation of Principal Spillway Crest = 1680

Elevation of Barrel Invert = 1676

Upstream SS = 3 :1

Elevation of Upstream Toe = 1670

Pipe Diameter = 16 Inches

Is the Riser Round or Rectangular? Circular

Riser Diameter = 36 Inches

Riser Wall Thickness = 4 Inches

Elevation of Downstream Toe = 1667.2

Pipe Length = 81.2 Feet

Pipe Slope = 0.0840 Ft./Ft.

Maximum Fill Over Pipe = 9.4 Feet


Profile of Principal Spillway Pipe
Dam Embankment
Original Ground
Pipe
Riser
Seal Collar
1700
1690
1680
1670
1660
1650
-18.9, 1,680.0
6.0, 1,684.2
6.0, 1,684.2
17.3, 1,678.3
48.6, 1,670.0
48.6, 1,670.0
48.6, 1,670.0
18.9, 1,676.0
17.3, 1,671.5
62.0, 1,669.2
57.0, 1,667.2
60
50
40
30
20
10
0
10
20
30
40
50
60
70

COMPUTATION SHEET

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

STATE: South Dakota		PROJECT: Ray Martinmaas	378 Pond
BY: Nathan Benson	DATE: 12/4/2019	CHECKED BY: ARoman 12/4/19	JOB NO.
SUBJECT: Drainage Diaphragm Calculations			SHEET 1 OF 1

Rev. 02/2017

Drain Filter Material

(T_W) Top Width of Dam	12	Feet
(Z_1) Side Slope (Pool)	3	:1
(Z_2) Side Slope (Downstream)	3	:1
(B) Dist on Wave Berm	0.0	Feet
(D) Pipe Diameter	16	Inches
(F) Length of Pipe Past Fill	5	Feet
(L_P) Pipe Length	81.2	Feet
(S1) Pipe Slope	0.0840	Ft/Ft
(R) Depth of Sand Below Pipe	1.5	Feet

Elev. Top of Dam	1684.20
Elev. Auxiliary Spillway	1681.70
Elev. Principal Spillway	1680.00
Elev. Barrel Inlet Invert	1676.00
Elev. Pipe Outlet Invert	1669.20
Elev. Downstream Toe	1667.20

Design Data

H	3.4	Feet	D	1.33	Feet
X	4	Feet	Y	4	Feet
H_p	11.3	Feet	2.5*D	3.33	Feet

(L_{CL}) CL of Dam to Diaphragm	15.3	Feet
(L_T) Total Length (Horizontal)	47.3	Feet
(L_{DF}) Length of Envelope	30.1	Feet
(W) Sand Width	9.3	Feet
(T) Sand Height	6.8	Feet
(t) Sand Thickness	2	Feet
Total Volume of Sand	9.4	Cu. Yds

(L_H) Length of Drain Filter (Horizontal): 30 Feet

(SC) Sand Clearence (Perpendicular to Downstream Dam Surface - Minimum 2 Ft.): 2.0 Feet

Sand Clearance is Good

Is the fill over the sand collar greater than H/2?

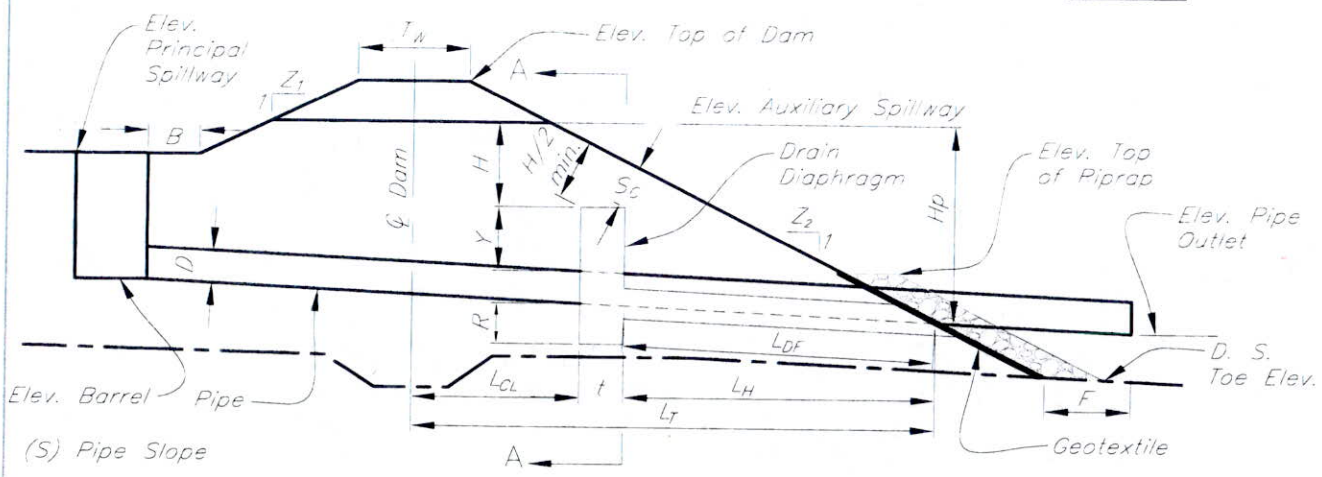
Yes - Sand Clearance is Good

Geotextile

(G_W) Width of Geotextile	10.0	Feet
(G_L) Length of Geotextile	18.1	Feet
Area of Geotextile	20.1	Sq. Yd.

Rock Riprap

(RR_t) Rock Riprap Thickness	12	Inches
(RR_w) Rock Riprap Width	6	Feet
Elevation Top of Rock	1672.9	
Elevation Bottom of Rock	1667.2	
Total Volume of Rock Riprap	5.3	Cu. Yds



PROFILE ALONG ℄ OF CONDUIT

NO SCALE

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 12/4/19
aRoman 12/4/19

~~Clifford Tibbs~~ Ray Martinmaas

Proposed Pipe

Description	16" DR 25 C905		
D_o	17.4	in	
SDR or SIDR?	SDR 25		
wall thickness, t	0.481	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	9.5	ft
unit weight of soil, γ_s	120	psf
water ht. above pipe, h_w	0	ft
P_S	1140	psf
W_S	1653	lb/ft

VACUUM

P_V	0	psf
D_i	16.438	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	52	lb/ft
P_W	36	psf

Total Load 1,176 psf
$P_s + P_w + P_v$

1. Wall Crushing (solid wall pipe)

Thrust in pipe wall, T_{pw}	853	lb/ft	
Required wall area, A_{pw}	0.036	in^2/in	*Proposed Pipe okay for wall crushing*
Thickness, t	0.481	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'	300	*(see table 52-2 chose 300 based on installation compaction in combination with soil type)*

Using Eq. 52-29 for SDR pipe

Deflection (% ΔX / D)	3.23	%	*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 / (Do/12) > 2*
R_w	1.0	ft	
Coeff of elastic support, B'	0.663		
Moment of Inertia, I_{pw}	0.009	in^4 / in	
Modulus of soil reaction, E'	300	psi	
Allowable buckling, q_a	15.85	psi	
Reduction factor, C	0.75		
Adj. allow. Buckling, q_aC	11.87	psi	
q_aC	1,709	psf	
Total pressure, P	1,176	psf	*Proposed Pipe okay for wall buckling*

4. Strain (solid wall pipe)

Max strain, flexure, e_f	0.0041		
Max strain, hoop strain, e_h	0.0004		
e_h due to external load?	Yes		
Max combined strain, e	0.0038		*e = ef - eh*
Allowable strain, e_{all}	0.05		*Proposed Pipe okay for strain*

Reference: Structural Design of Flexible Conduits
NEH 636, Chp 52

Annual Yield and Sediment Storage

Project: Ray Martinmaas
Calculations By: Nathan Benson
Checked By: Angela Roman 12/4/19

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

Input Data

Isogram # =	2 1/2
Curve Number =	77
Contributing Acres =	561.8
% chance =	50

runoff= 0.46 inches

$$\frac{\text{Contributing Acres* Inches of Runoff}}{12} = 21.5 \text{ ACFT}$$

Storage at Prinicpal Spillway = 35.3 ACFT

Spring fed

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

Input Data

Erodibility Area =	H	
Gross Rate =	0.0003	<25% cultivated
Drainage Area =	561.8	
Delivery Rate =	30	minimum-median, upstream dam and culvert in road above dam
Design Life =	25	

Gross Rate * Drainage Area* Delivery Rate*Years = 1.3 ACFT

Available Sediment Storage = 698.2 years

REF:
EFM 2-83 Method A

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

11/29/2019

PARTICIPANT RESPONSIBILITIES

PARTICIPANT Ray Martinmaas	**County Hand**		
PRACTICE(S) 378 Pond			
LEGAL DESCRIPTION NW ¼	**Sec. 21**	**T 116N**	R 69W
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.

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**.

2. 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, SD 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.**

3. 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.

4. 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.

5. 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**: Pipe Material and drain fill materials.

(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 Ray Martinmaas

Job Location NW 1/4, Sec 21, T116N, R69W GPS

Prepared by Nathan Benson Date 12/2/2019

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.
- ☐ If fences are installed, they must be maintained to prevent unauthorized entry.

Other

U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

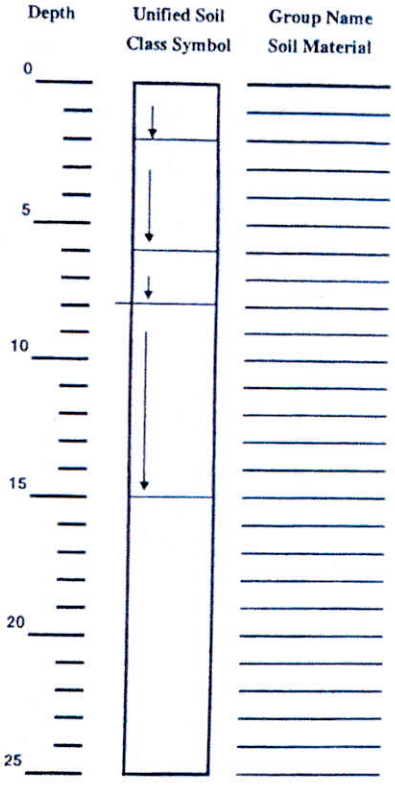
SD-ENG-10

EARTH BORING DOCUMENTATION

Cooperator: Ray Martin Heas
Practice: Dam
Farm: Tract: Field:
Site Investigator/s: A. Oxford
Drilling Location: Near old berm on centerline - Sta. 2+50 CL of dam

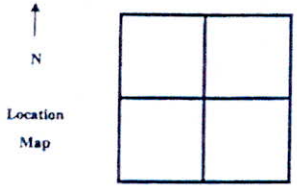
County: Hand
Conservation District:
NW¼ Sec. 21 T 116 R 69
Hole Elevation: 1673.6

Date: 11-18-2021
Hole No: SP2
Soil Name:
Sample Taken:



Description of Material							
Depth (ft)	Munsell Color	USDA Texture	Unified Classification	Geological Material Oxidized/ Unoxidized	WT:	Permeability Group *	Other: (Consistency, Stratification, Moisture C
0-27		Loam	CL	Alluvium	N	III	topsoil; Friable no salts
27-62		Clay Loam	CL	Alluvium	N	III	Friable; 3-5% salts 1% gravels
62-133		Silty Clay	CL-CH	Alluvium	N	IV	Hard; 10-15% Carbs; 1-5% gyp 1% gravels
133-160		Loamy Sand 80% Sand	SM	Alluvium	N	II	Layers of stratified Sand and loamy material; 5% carbs 3-5% gravs
160-198		Sandy clay Loam	SC	Alluvium	N	III	Friable; 5-10% gravels 2-5% Carbs; 2-3% redox
198-225		Loamy Sand	SM	Alluvium	N	II	10-15% gravels
225-250		Clay	CH	Glacial till	Y	IV	3-5% salts; Redox; 3-5% gravels

Comments:
Angela's thinking 8-9' core trench to get the material at very bottom



Unified Symbols & Group Names

GW:	well graded gravel	SW:	well graded sand	CL:	lean clay
GP:	poorly graded gravel	SP:	poorly graded sand	CL-ML:	silty clay
GC:	clayey gravel	SC:	clayey sand	ML:	silt
GM:	silty gravel	SM:	silty sand	CH:	fat clay
				MH:	elastic silt

Table 10D-3**

Soil Group	Median K cm/s	Median K ft/d *
I	7.2x10-4	2.0
I	3.5x10-4	1.0
II	4.8x10-6	##
II	1.5x10-6	##
III	8.8x10-7	##
III	2.1x10-7	##
IV	4.9x10-7	##
IV	3.5x10-8	##

** "Table 10D-3 summarizes a total of 1,161 tests."

Agricultural Waste Management Field Har
Chapter 10

Table 10D-2
Unified Classification vs. Soil Permeability Groups

Unified Class	Permeability Group: I	II	III	IV	In Permeability Group:
CH	N	N	S	U	
MH	N	S	U	S	A= Always
CI	N	S	U	S	N= Never
ML	N	U	S	N	S= Sometimes
CL-ML	N	A	N	N	U= Usually
GC	N	S	U	S	
GM	S	U	S	S	
GW	A	N	N	N	
SM	S	S	S	S	
SC	N	N	U	S	
SW	A	N	N	N	
SP	A	N	N	N	
GP	A	N	N	N	

U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

SD-ENG-10

EARTH BORING DOCUMENTATION

Cooperator: Ray Martinhaas
Practice: Dam
Farm: Tract: Field:
Site Investigator/s: A. Retford
Drilling Location: Centerline - Bottom of draw sta 1+15 CL Dam

County:
Conservation District:
Sec. T R
Hole Elevation: 1669.6

Date: 11-18-2021
Hole No: SP3
Soil Name:
Sample Taken:

Depth (ft)	Unified Soil Class Symbol	Group Name Soil Material	Munsell Color	USDA Texture	Unified Classification	Geological Material Oxidized/ Unoxidized	WT:	Permeability Group *	Other: (Consistency, Stratification, Moisture C
0-27				Loam	CL-ML	Alluvium	Y	II	topsoil; no salts
27-76				Loam	CL-ML	Alluvium	Y	II	few carbs + salts
76-190				Clay	CH	Alluvium	Y	III	redox; gleyed; 3-5% salts

Comments: Perched WT from 0-100 - dry from 100-150
WT at 150

Agricultural Waste Management Field Har
Chapter 10

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Unified Classification vs. Soil Permeability Groups

Unified Class	Permeability Group: I	II	III	IV	In Permeability Group:
CH	N	N	S	U	
MH	N	S	U	S	A= Always
CI	N	S	U	S	N= Never
ML	N	U	S	N	S= Sometimes
CL-ML	N	A	N	N	U= Usually
GC	N	S	U	S	
GM	S	U	S	S	
GW	A	N	N	N	
SM	S	S	S	S	
SC	N	N	U	S	
SW	A	N	N	N	
SP	A	N	N	N	
GP	A	N	N	N	

Depth: 0, 5, 10, 15, 20, 25

N
Location Map

Unified Symbols & Group Names

GW:	well graded gravel	SW:	well graded sand	CL:	lean clay
GP:	poorly graded gravel	SP:	poorly graded sand	CL-ML:	silty clay
GC:	clayey gravel	SC:	clayey sand	ML:	silt
GM:	silty gravel	SM:	silty sand	CH:	fat clay
				MH:	elastic silt

Table 10D-3**

Soil Group	Median K cm/s	Median K ft/d *
I	7.2x10-4	2.0
I	3.5x10-4	1.0
II	4.6x10-6	##
II	1.5x10-6	##
III	8.8x10-7	##
III	2.1x10-7	##
IV	4.9x10-7	##
IV	3.5x10-8	##

** "Table 10D-3 summarizes a total of 1,161 tests."

U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

SD-ENG-10

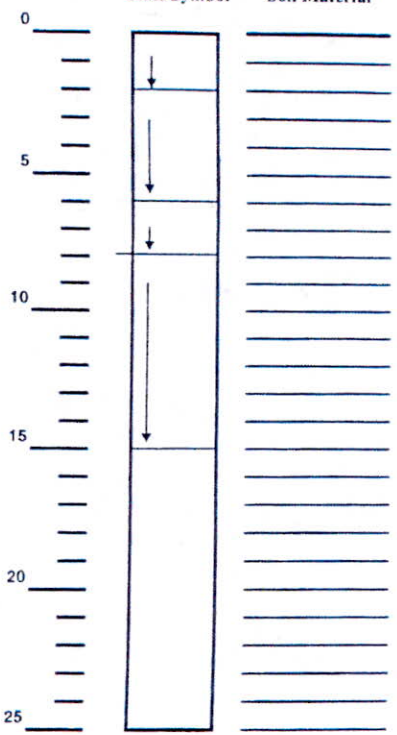
EARTH BORING DOCUMENTATION

Cooperator: Ray Martinhaas
Practice: Dam
Farm: _____ Tract: _____ Field: _____
Site Investigator/s: _____
Drilling Location: Top of dam - east side sta 0+20 CL dam

County: Hand
Conservation District: _____
NW¼ Sec. 21 T 116 R 69
Hole Elevation: 1684.0

Date: 11-18-2021
Hole No: SP4
Soil Name: _____
Sample Taken: _____

Depth | Unified Soil Class Symbol | Group Name Soil Material



Description of Material							
Depth (ft)	Munsell Color	USDA Texture	Unified Classification	Geological Material Oxidized/ Unoxidized	WT:	Permeability Group *	Other: (Consistency, Stratification, Moisture C
0-23		Loam	CL-ML	Glacial Till	N	II	topsoil no salts
23-200		clay	CH	Glacial Till	N	IV	Redox - 30% 3-5% gravels, 3-5% salts

Comments: _____

Agricultural Waste Management Field Har
Chapter 10

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MH	N	S	U	S	A= Always
CI	N	S	U	S	N= Never
ML	N	U	S	N	S= Sometimes
CL-ML	N	A	N	N	U= Usually
GC	N	S	U	S	
GM	S	U	S	S	
GW	A	N	N	N	
SM	S	S	S	S	
SC	N	N	U	S	
SW	A	N	N	N	
SP	A	N	N	N	
GP	A	N	N	N	

N
Location Map

Unified Symbols & Group Names

GW: well graded gravel
GP: poorly graded gravel
GC: clayey gravel
GM: silty gravel
SW: well graded sand
SP: poorly graded sand
SC: clayey sand
SM: silty sand
CL: lean clay
CL-ML: silty clay
ML: silt
CH: fat clay
MH: elastic silt

Table 10D-3**

Soil Group	Median K cm/s	Median K ft/d *
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II	1.5x10-6	##
III	8.8x10-7	##
III	2.1x10-7	##
IV	4.9x10-7	##
IV	3.5x10-8	##

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U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

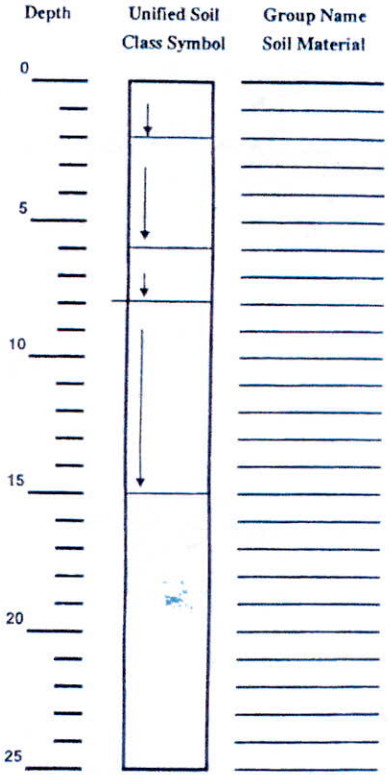
SD-ENG-10

EARTH BORING DOCUMENTATION

Cooperator: Ray Martinhaas
Practice: Dam
Farm: _____ Tract: _____ Field: _____
Site Investigator/s: A. Oxford
Drilling Location: Spillway – Station 0+75 CL Aux

County: Hand
Conservation District: _____
NW¼ Sec. 21 T 116 R 69
Hole Elevation: 1685.1

Date: 11-19-2021
Hole No: 1
Soil Name: _____
Sample Taken: _____



Description of Material							
Depth @ cm	Munsell Color	USDA Texture	Unified Classification	Geological Material Oxidized/ Unoxidized	WT:	Permeability Group *	Other: (Consistency, Stratification, Moisture C
0 - 26		Loam 25%	CL	Glacial till	N	III	topSoil; High om, Friable; no salts
26 - 59		Clay Loam 32%	CL	Glacial till	N	III	Friable; 3% carbs;
59 - 118		Silty Clay 43%	CL-CH	Glacial till	N	IV	Hard; 10-15% carbs; 2-3% gyp; 1-2% gravels
118 - 160		Silty Clay 40%	CL-CH	Glacial till	N	IV	Friable; 10-15% gyp; 1-2% carbs; redox; Parent material 1-2% gravels

Comments: 25-30% Sand in 1st 2 layers; 10-15% in 3rd
15-20% in 4th

N

Location Map

Unified Symbols & Group Names

GW:	well graded gravel	SW:	well graded sand	CL:	lean clay
GP:	poorly graded gravel	SP:	poorly graded sand	CL-ML:	silty clay
GC:	clayey gravel	SC:	clayey sand	ML:	silt
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III	8.8x10-7	##
III	2.1x10-7	##
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IV	3.5x10-8	##

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Agricultural Waste Management Field Har
Chapter 10

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MH	N	S	U	S	A= Always
CI	N	S	U	S	N= Never
ML	N	U	S	N	S= Sometimes
CL-ML	N	A	N	N	U= Usually
GC	N	S	U	S	
GM	S	U	S	S	
GW	A	N	N	N	
SM	S	S	S	S	
SC	N	N	U	S	
SW	A	N	N	N	
SP	A	N	N	N	
GP	A	N	N	N	

USDA

United States Department of Agriculture

November 30, 2021

USDA-NRCS
1717 North Lincoln Avenue
Suite #104
Pierre, SD 57501

RECEIVED
DEC - 1 2021
WATER RIGHTS PROGRAM

Whitney Kilts
Water Rights Program
Departmetnt of Agriculture and Natural Resources
523 E. Capitol Avenue
Pierre, SD 57501

Dear Ms. Kilts:

Attached are plans, specifications, and design data for a size small, category 3 dam for Ray Martinmaas in Hand County. The producer has found a contractor that is planning on building the dam in 2021, as long as the weather cooperates. I have also included the water rights application with a check from Mr. Martinmaas, as well as a storm water permit application and an additional check from Mr. Martinmaas.

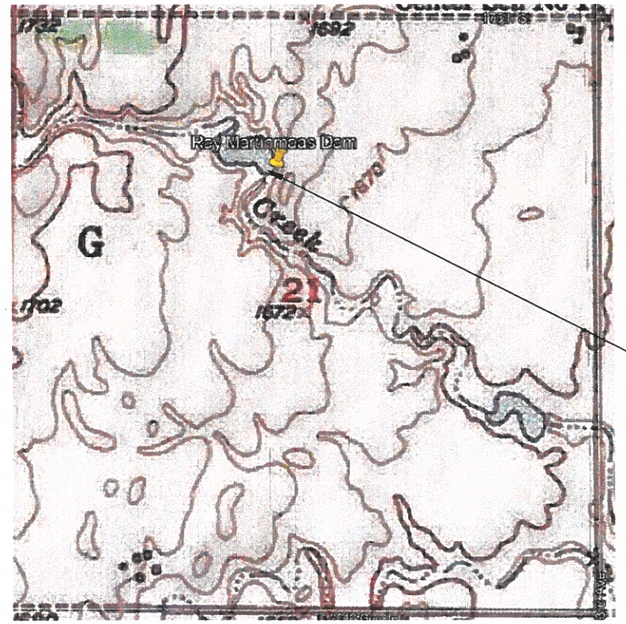
Our office will be providing the construction inspection for the project. There are more details in the SD-ENG-11 document included in the attachments.

Please don't hesitate to call me at the above number with any concerns or questions.

Sincerely,

ANGELA ROMAN
Agricultural Engineer
USDA-NRCS
Pierre Field Support Office
605-301-3422

Attachments



NW 1/4, Sec 21, T116N, R69W

Hand County, South Dakota

LOCATION MAP

GENERAL NOTES

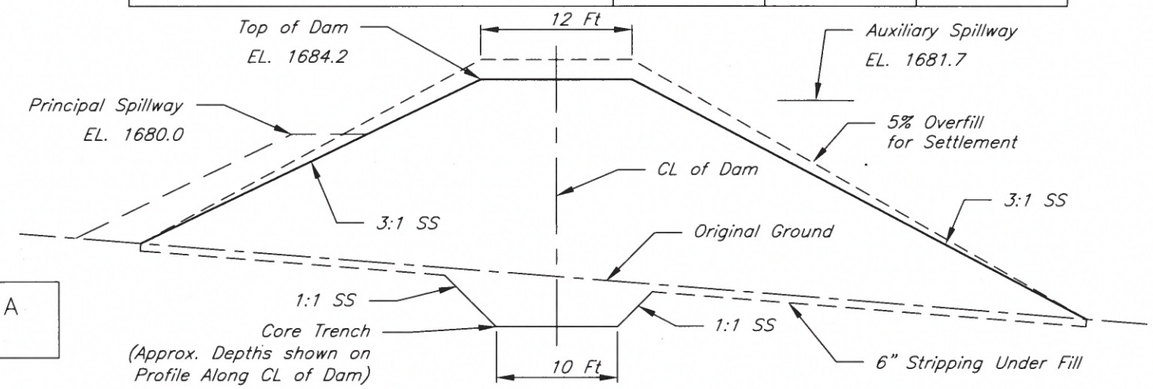
1. If cultural resources are discovered during construction, discontinue construction and notify the local Natural Resources Conservation Service office.
2. The landowner is responsible for complying with all federal, state, and local laws.

CONSTRUCTION NOTES

1. Clear and grub the entire area within the work limits.
2. All fill material must not contain frozen material, sod, roots, or other perishable material, or rock larger than eight inches in diameter as described in SD Construction Specification SD-7S.
3. Any shale, gravel, or sand that is exposed during borrow operations shall be immediately backfilled with 2 feet of clay material.
4. Six inches topsoil will be incorporated into the earthfill to meet the neat lines shown on the typical section.
5. All areas top-dressed with topsoil and disturbed during construction will be seeded according to SD Construction Specification SD-28.

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

TABLE OF QUANTITIES			
ITEM	UNIT	QUANTITY	AS-BUILT
Earthfill Class S – Embankment	Cu. Yd.	5,749	
Earthfill Class S – Core Trench	Cu. Yd.	287	
Earthfill Class S – Stripping	Cu. Yd.	543	
Earthfill Class S – Berm	Cu. Yd.	385	
Earthfill Class S – 5%	Cu. Yd.	348	
Total Earthfill	Cu. Yd.	7,312	
Topsoil Auxiliary Spillway	Cu. Yd.	406	
Seeding (Earthfill and Auxiliary Spillway)	Acre	1.1	
Principal Spillway Pipe			
16" Dia. DR 25 C905 PVC Pipe	Lin. Ft.	80	
36" Dia. 4' Tall Riser and Base	Each	1	
with Trash Rack and Baffle	Each	1	
Drainage Diaphragm	Each	1	
Timber Pipe Support	Each	1	



TYPICAL CROSS SECTION OF DAM

NRCS HAZARD CLASS A
NRCS JOB CLASS III

SD CONSTRUCTION AND MATERIAL SPECIFICATIONS

SD-4	Stripping
SD-5	Excavation
SD-7S	Earthfill – Class S
SD-8	Rock Riprap And Bedding
SD-10	Salvaging And Spreading Topsoil
SD-12A	Concrete (Class 3500)
SD-13	Steel Reinforcement
SD-14	Wood And Steel Structures
SD-28	Seeding
SD-55	Plastic Pipe

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

INDEX OF DRAWINGS

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

STATEMENT OF COMPLIANCE

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

JAA Date

POND WITH PRINCIPAL SPILLWAY PIPE
JOB PLAN 1.0P REV. 4/2016

Date
Designed Nathan Benson 11/22/2019
Drawn Nathan Benson 11/22/2019
Checked Angela Romer 12/4/19
Approved Angela Romer 12/4/19

RAY MARTINMAAS
378 POND

COVER SHEET

NW 1/4, Sec 21, T116N, R69W

Hand County, South Dakota

United States Department of Agriculture
Natural Resources Conservation Service

File No. MartinmaasDamL.dwg

Drawing No. –

12/3/19 3:02 PM
Sheet 1 of 9

HYDRAULIC DATA		
Drainage Area	561.8	Acres
Annual Runoff Yield (50% Chance)	21.5	Ac. Ft
Time of Concentration	2.61	Hours
Runoff Curve Number	77	
Principal Spillway, 2 Year – 24 Hour Rainfall	2.20	Inches
Auxiliary Spillway, 50 Year – 24 Hour Rainfall	4.80	Inches
Peak Runoff 2 Year – 24 Hour Rainfall	91.2	CFS
Principal Spillway Discharge	24.1	CFS
Peak Runoff 50 Year – 24 Hour Rainfall	441	CFS
Auxiliary Spillway Discharge	371.6	CFS
Auxiliary Spillway Flow Depth	1.480	Feet

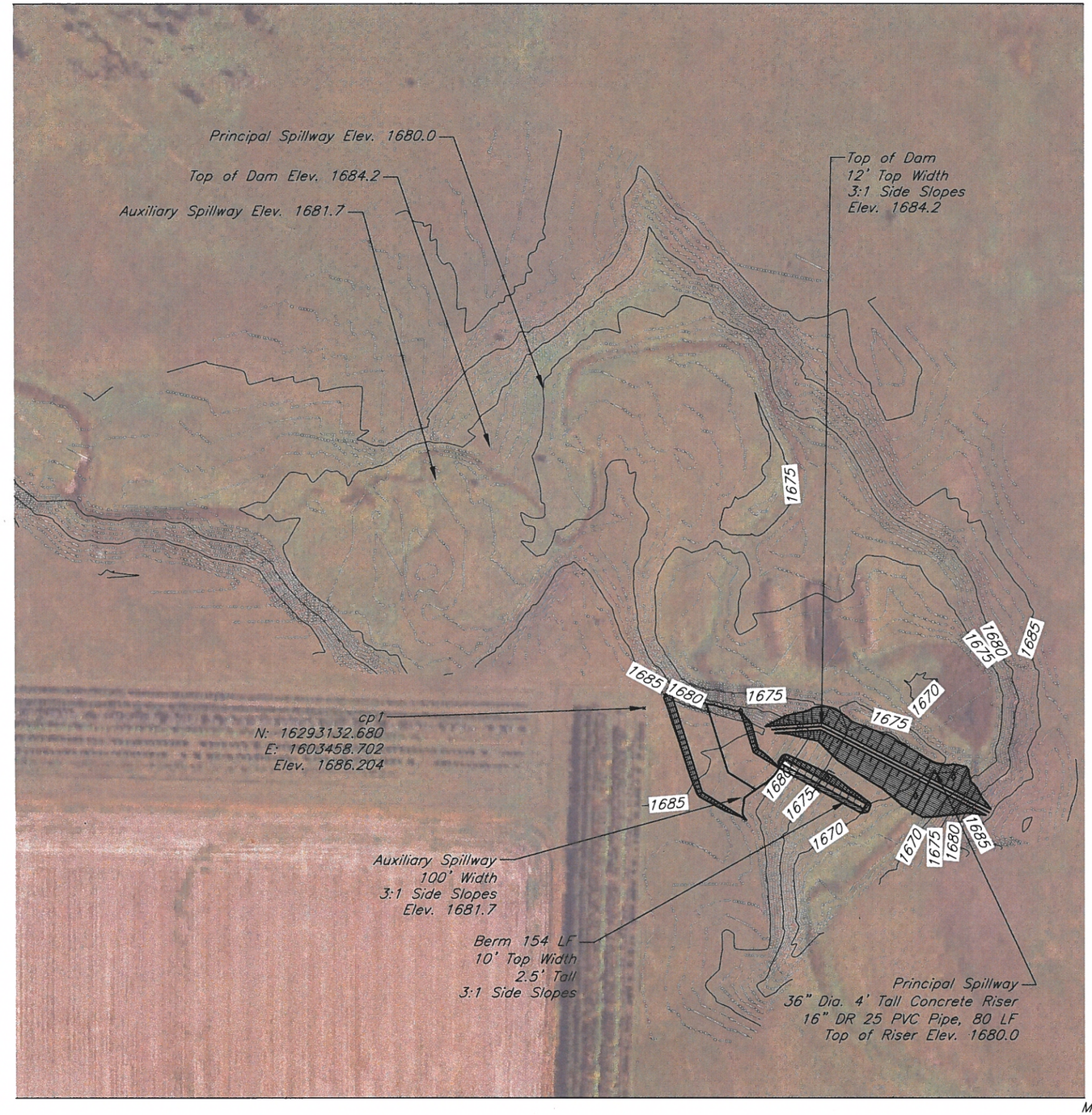
STRUCTURE DATA		
Length of Top of Dam	388	Feet
Water Depth to Crest of Principal Spillway	10	Feet
Height of Downstream Toe to Top of Dam	17.0	Feet
Effective Height	13.8	Feet
Product of Storage X Effective Height	792	

POOL DATA			
	ELEV.	AREA	STORAGE
Crest of Principal Spillway	1680.0	7.91 Ac.	43.5 Ac.-Ft
Crest of Auxiliary Spillway	1681.7	9.46 Ac.	57.4 Ac.-Ft
Top of Dam	1684.2	12.41 Ac.	85.9 Ac.-Ft

SEDIMENT YIELD					
Erodibility Area	Gross Rate (A.F./Ac./Yr.)	Drainage Area (Acres)	Delivery Rate (%)	Design Period (Years)	Required Sediment Volume (Ac.-Ft.)
H	0.0003	561.8	30	25	1.300

BENCHMARK POINTS TABLE					
NO.	ID	ELEVATION	NORTHING	EASTING	BENCHMARK DESCRIPTION
1	cp1	1686.204	16293132.680	1603458.702	Steel rebar near south post of H-brace south of corner of fence line.

N



PLAN VIEW

200 0 200 400 600

Scale in Feet

Date
Designed Nathan Benson 11/22/2019
Drawn Nathan Benson 11/22/2019
Checked Angela Roman 12/4/19
Approved Angela Roman 12/4/19

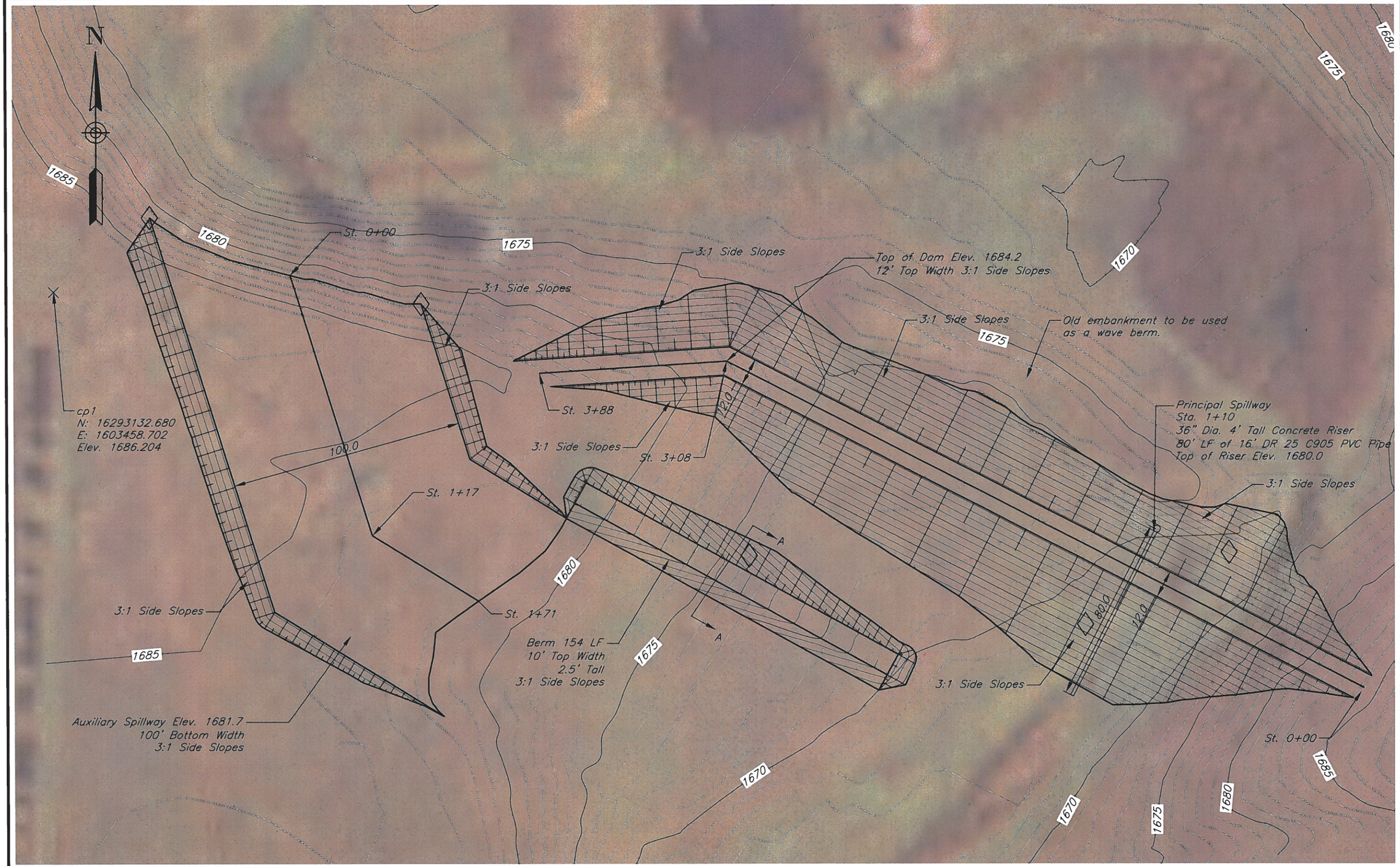
RAY MARTINMAAS
378 POND
PLAN VIEW AND DESIGN DATA
NW 1/4, Sec 21, T116N, R69W
Hand County, South Dakota

United States Department of Agriculture
USDA Natural Resources Conservation Service

File No.
MartinmaasDamL.dw

Drawing No.
–

12/3/19 2:50 PM
Sheet 2 of 9



Auxiliary Spillway Excavation = 1931 CY

PLAN VIEW

40 0 40 80 120

Scale in Feet

Date
Designed Nathan Benson 11/22/2019
Drawn Nathan Benson 11/22/2019
Checked Angela Roman 12/4/19
Approved Angela Roman 12/4/19

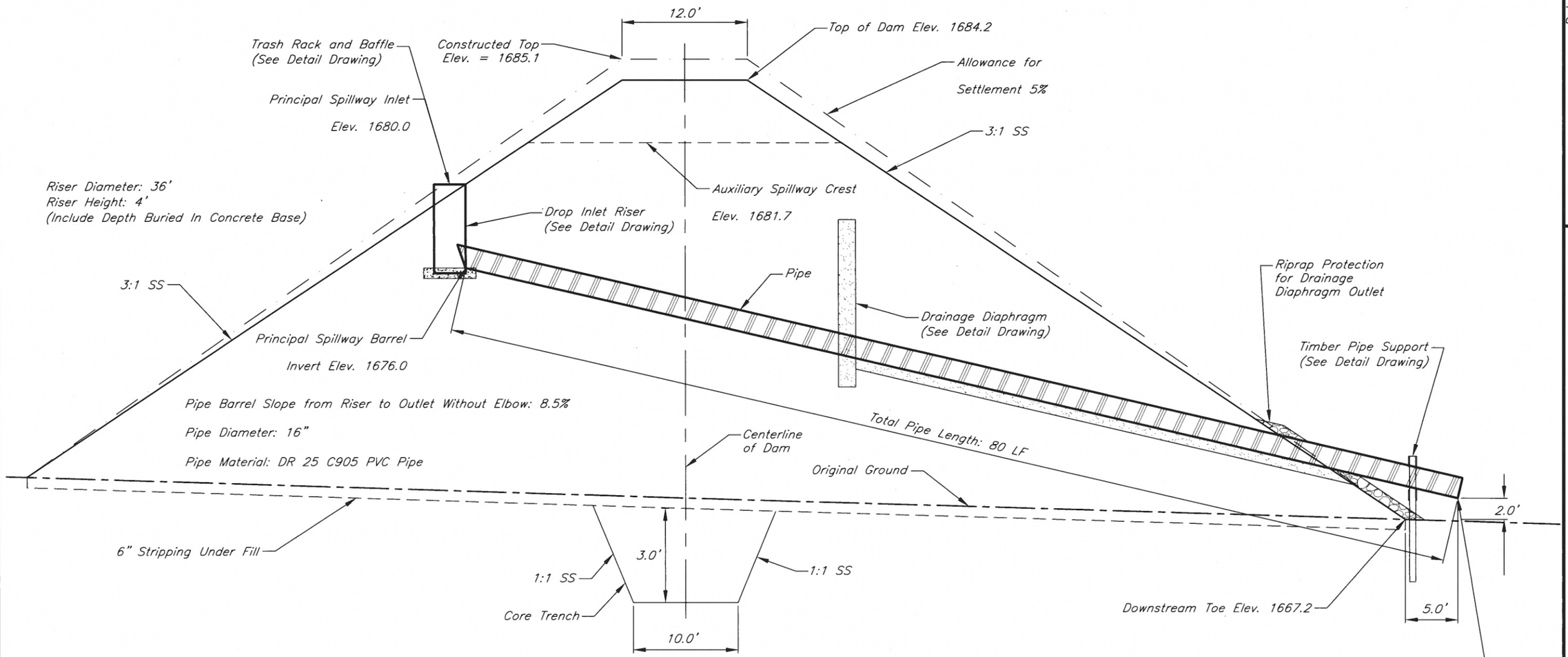
RAY MARTINMAAS
378 POND
PLAN VIEW
Hand County, South Dakota
NW 1/4, Sec 21, T116N, R69W

United States Department of Agriculture
Natural Resources Conservation Service

File No.
MartinmaasDamL.dwg

Drawing No.
1

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Sheet 3 of 9



DROP INLET PRINCIPAL SPILLWAY PROFILE
(No Scale)

TRENCH SAFETY NOTES

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

DROP INLET PRINCIPAL SPILLWAY PROFILE

Date
Designed Nathan Benson 11/22/2019
Drawn Nathan Benson 11/22/2019
Checked Angela Ranan 12/4/19
Approved Angela Ranan 12/4/19

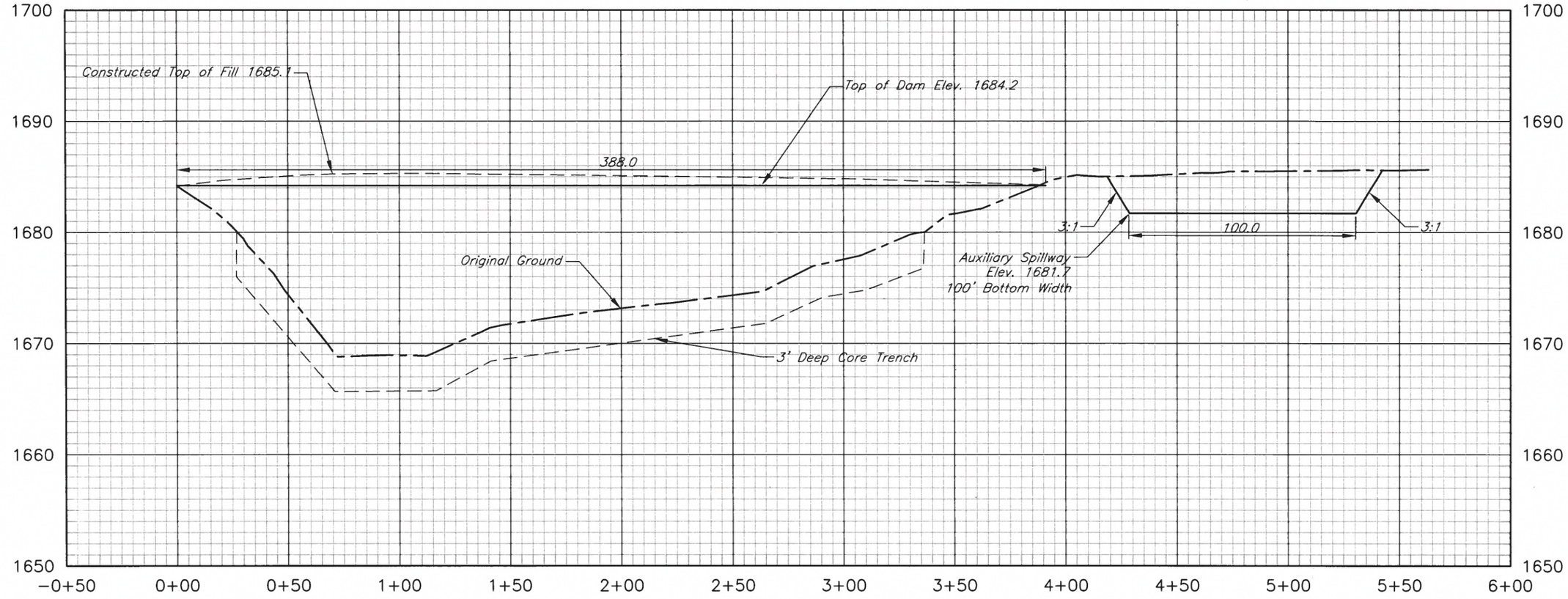
RAY MARTINMAAS
378 POND
PROFILE OF PRINCIPAL SPILLWAY
NW 1/4, Sec 21, T116N, R69W Hand County, South Dakota

United States Department of Agriculture
Natural Resources Conservation Service

File No.
MartinmaasDamL.dw

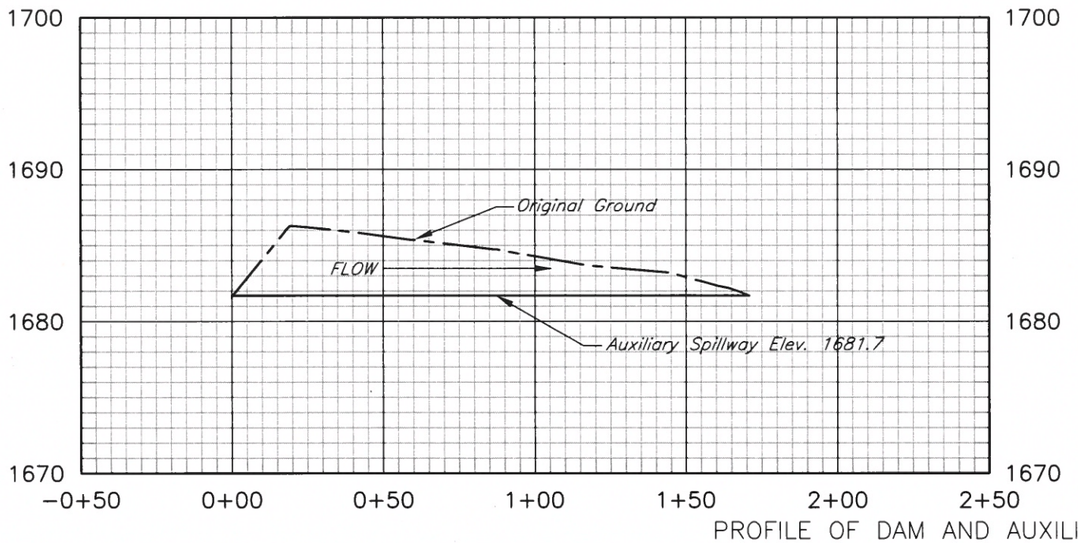
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Sheet 4 of 9



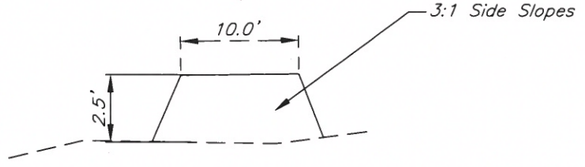
Horizontal Scale: 1"=50' Vertical Scale 1" =10'

DamCL PROFILE



Horizontal Scale: 1"=50' Vertical Scale 1" =10'

CLAux PROFILE



Typical Cross Section of Berm
(not to scale)

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

Date
Designed Nathan Benson 11/22/2019
Drawn Nathan Benson 11/22/2019
Checked Angela Roman 12/4/19
Approved Angela Roman 12/4/19

RAY MARTINMAAS
378 POND

PROFILES AND CROSS-SECTIONS OF DAM AND AUXILIARY SPILLWAY

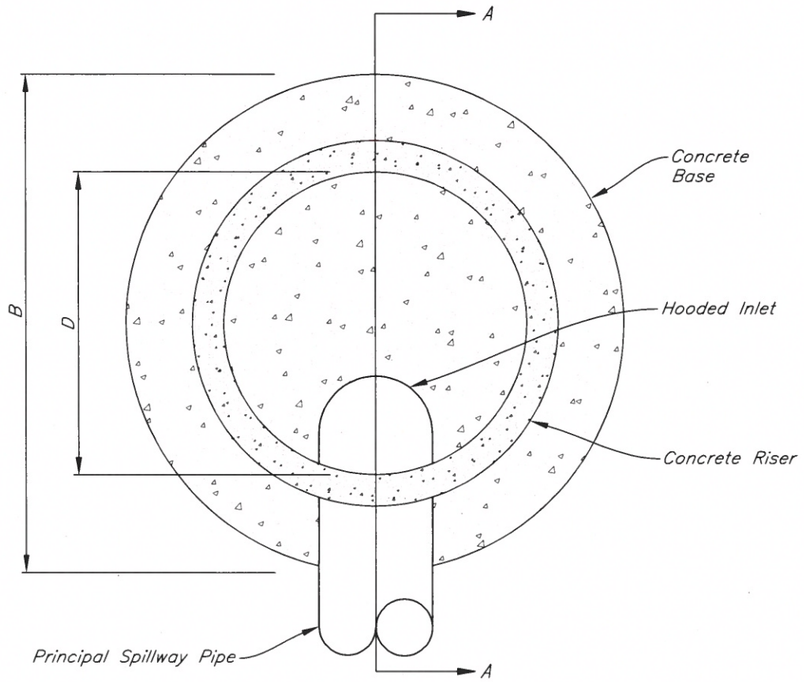
NW 1/4, Sec 21, T116N, R69W Hand County, South Dakota

United States Department of Agriculture
Natural Resources Conservation Service

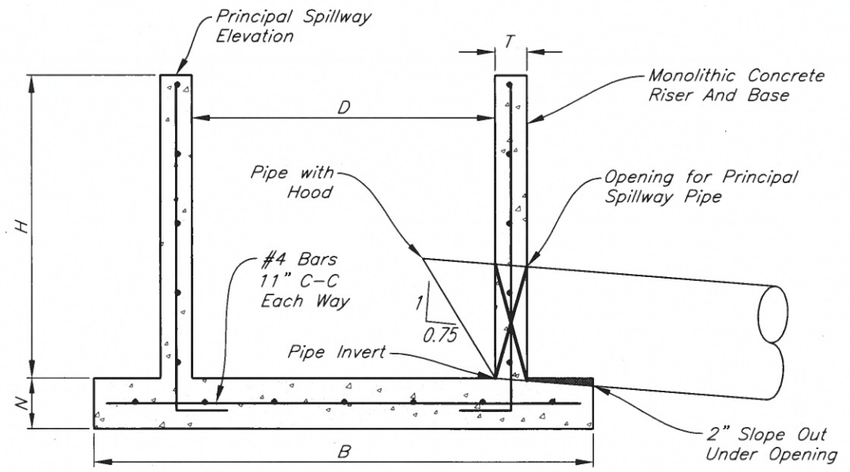
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Sheet 5 of 9



PLAN VIEW PRECAST RISER AND BASE



SECTION VIEW A–A

CONSTRUCTION NOTES

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

GUIDE TABLE FOR PRECAST RISER AND BASE DIMENSIONS

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

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

Date
Designed Nathan Benson 11/22/2019
Drawn Nathan Benson 11/22/2019
Checked Angela Roman 12/4/19
Approved Angela Roman 12/4/19

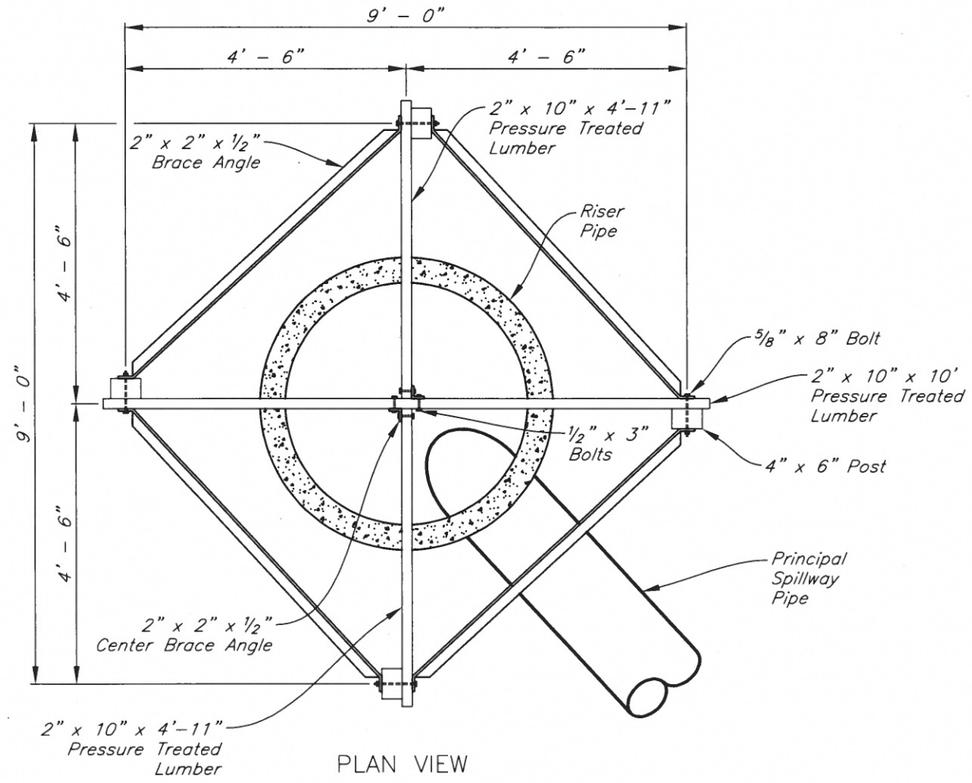
RAY MARTINMAAS
378 POND
PRECAST CONCRETE RISER AND BASE WITH HOODED INLET
NW 1/4, Sec 21, T116N, R69W
Hand County, South Dakota

United States Department of Agriculture
Natural Resources Conservation Service

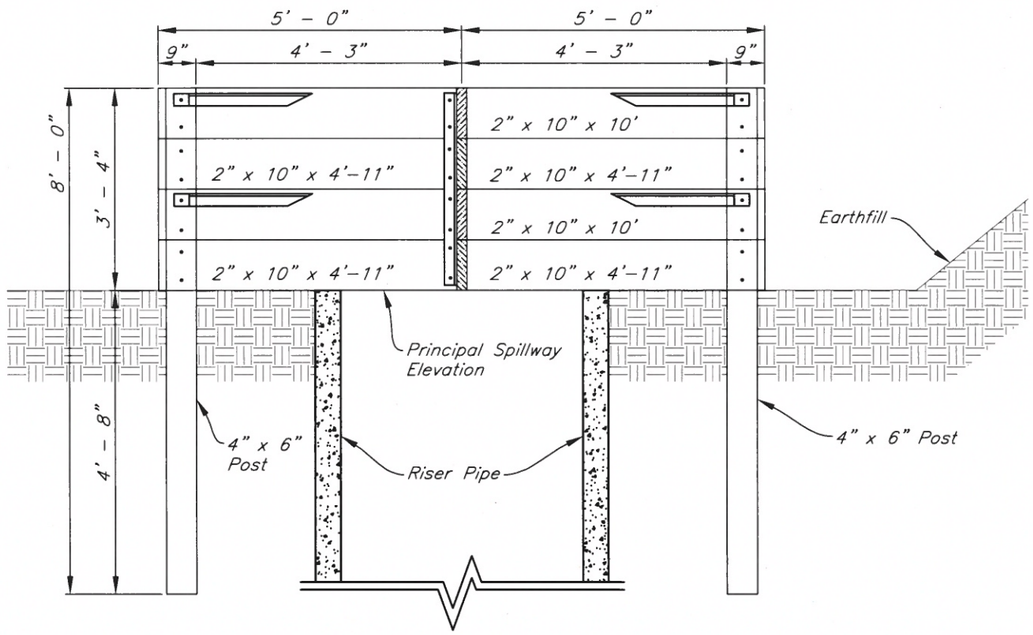
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Drawing No.
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Sheet 6 of 9



PLAN VIEW

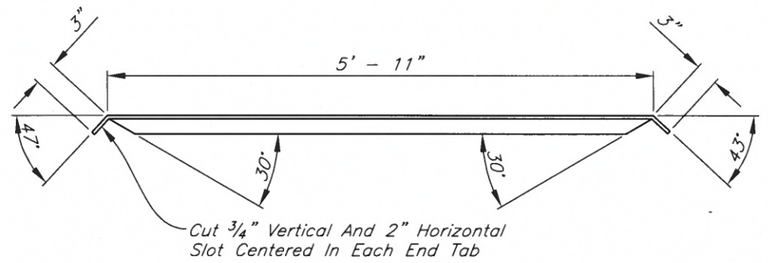


SIDE VIEW

TABLE OF QUANTITIES			
ITEM	LENGTH OR SIZE	UNIT	QUANTITY
4" X 6" Pressure Treated Post	8 Ft	Each	4
2" X 10" Pressure Treated Lumber	10 Ft	Each	4
2" X 10" Pressure Treated Lumber	4' – 11"	Each	8
2" X 2" X ¼" Steel Angle	6' – 5"	Each	8
2" X 2" X ¼" Steel Angle	3' – 2"	Each	2
Steel Bolt (with nut and 2 washers)	⅝" X 8"	Sets	32
Steel Bolt (with nut and 2 washers)	½" X 3"	Sets	32

CONSTRUCTION NOTES

1. Bolt 4" x 6" posts and 2" x 10" lumber together using two ⅝" x 8" bolts. Do not place bolts closer than 1 ½" from edge of board.
2. For center brace angles drill eight, 9/16" holes, ⅝" from outer edge of each leg of each angle and centered 5 ¼" apart along the leg.
3. Attach brace angles to top bolt on top of 2" x 10" board and to top bolt on next to bottom board.
4. All nuts, bolts, and washers shall be galvanized.



PLAN VIEW OF BRACE ANGLE

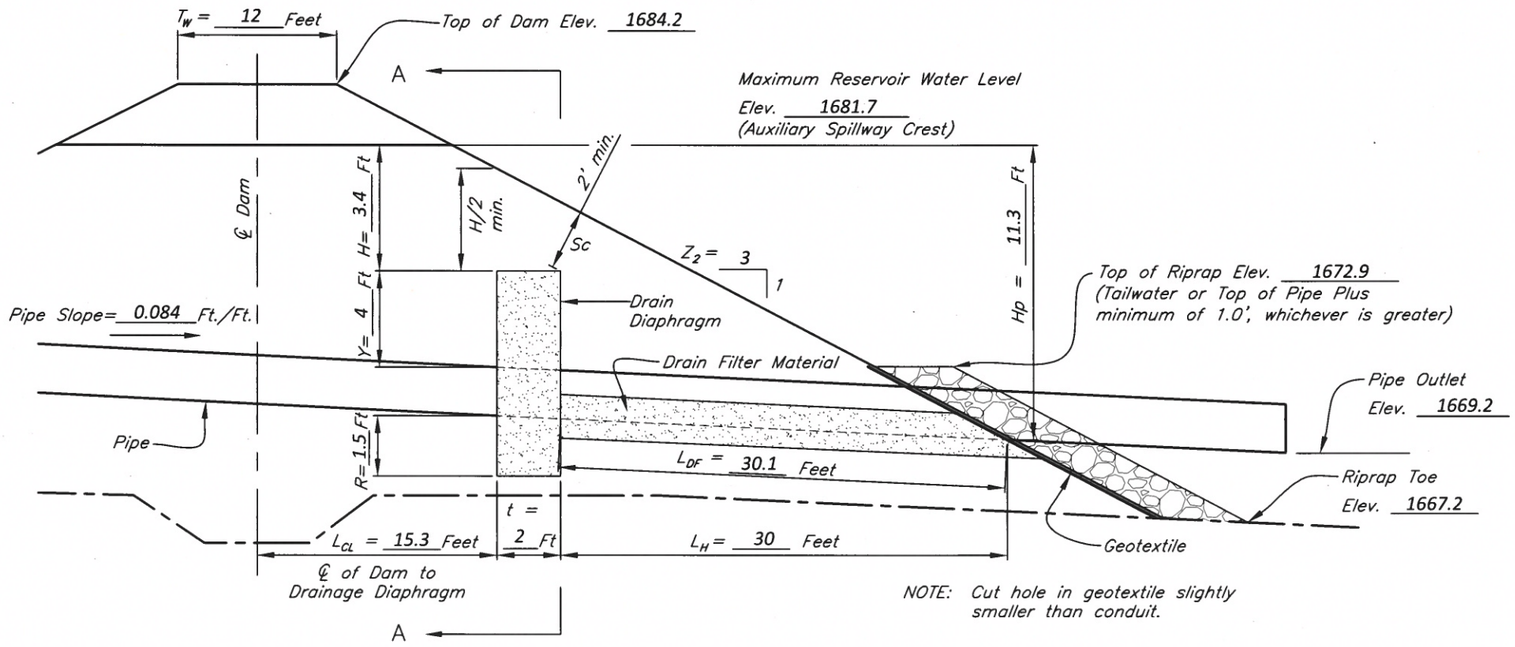
TRASH RACK AND BAFFLE FOR RISER DIA. 36" TO 60"
JOB PLAN NO. 6.4 REV. 1/2012

Designed Nathan Benson 11/22/2019
Drawn Nathan Benson 11/22/2019
Checked Angela Roman 12/4/19
Approved Angela Roman 12/4/19

RAY MARTINMAAS
378 POND
TRASH RACK AND BAFFLE FOR RISER DIA. 36" TO 60"
NW 1/4, Sec 21, T116N, R69W
Hand County, South Dakota

United States Department of Agriculture
Natural Resources Conservation Service

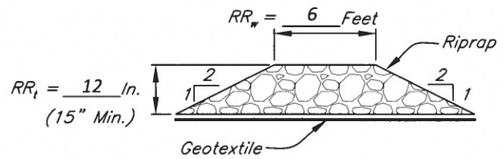
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Drawing No. –
11/25/19 4:11 PM
Sheet 7 of 9



NOTE: Cut hole in geotextile slightly smaller than conduit.

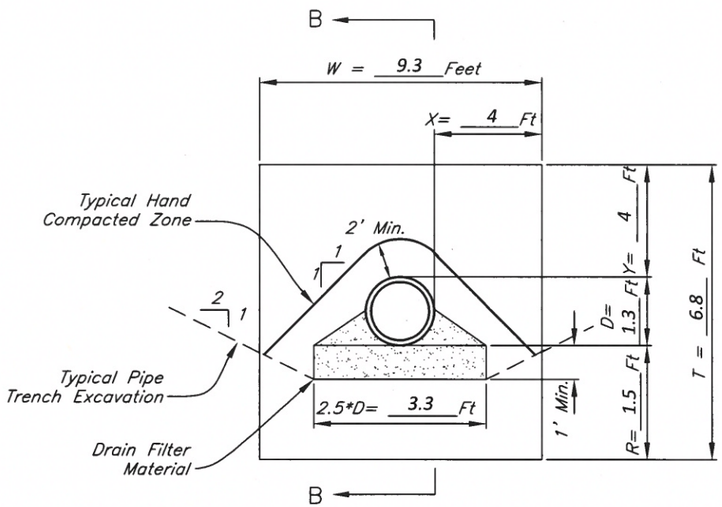
PROFILE ALONG ℄ OF CONDUIT

NO SCALE



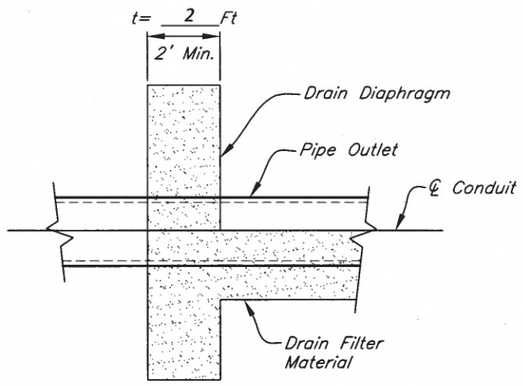
SECTION OF RIPRAP

Perpendicular to Slope



SECTION A–A

NO SCALE



SECTION B–B

NO SCALE

SUMMARY OF SAND DRAINFILL DIMENSIONS			
W =	9.3	Feet	(Total Width of Drain Diaphragm)
T =	6.8	Feet	(Total Height of Drain Diaphragm)
t =	2	Feet	(Thickness of Single Filter)
L_{DF} =	30.1	Feet	(Length of Sand Along Pipe)

SUMMARY OF GEOTEXTILE DIMENSIONS			
G_W =	10	Feet	(Total Width of Geotextile)
G_L =	18.1	Feet	(Total Length of Geotextile)

SUMMARY OF ROCK RIPRAP DIMENSIONS			
RR_t =	12	Inches	(Total Thickness of Rock Riprap)
RR_W =	6	Feet	(Total Width of Rock Riprap)

ESTIMATED TABLE OF QUANTITIES

ITEM	UNIT	QUANTITY
Sand Drain Filter Material	Cu. Yds.	9.4
Geotextile	Sq. Yds.	20.1
Rock Riprap	Cu. Yds.	5.3

DRAIN FILTER GRADATION

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

ASTM, C–33
FINE CONCRETE
AGGREGATE GRADATION

RIPRAP GRADATION

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

CONSTRUCTION NOTES

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 rock riprap onto the Geotextile in the pipe outlet area shall be 3 feet. Rock riprap shall be placed without damaging the underlying geotextile.

MATERIAL NOTE

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

DRAINAGE DIAPHRAGM DETAILS
JOB PLAN 3.8 REV. 02/2017

Date
Designed Nathan Benson 11/25/2014
Drawn 12/4/19
Checked 12/4/19
Approved

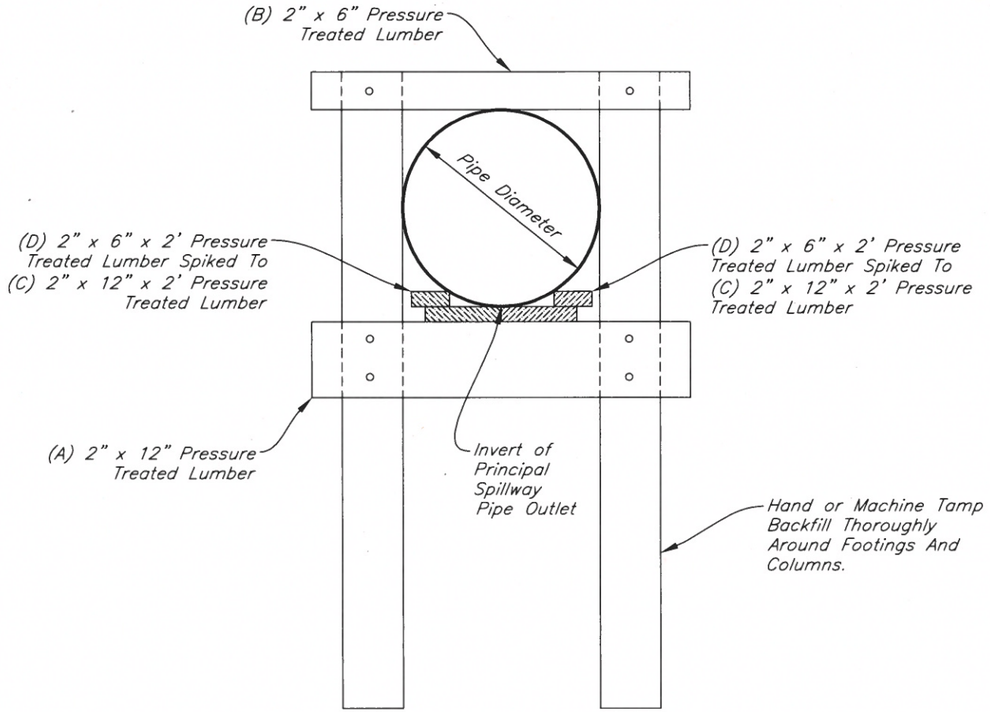
NAME: Ray Martinmaas
378 – POND
Drainage Diaphragm Detail
NW 1/4, Sect. 21, T. 116N, R. 69W
Hand County, South Dakota

United States Department of Agriculture
Natural Resources Conservation Service

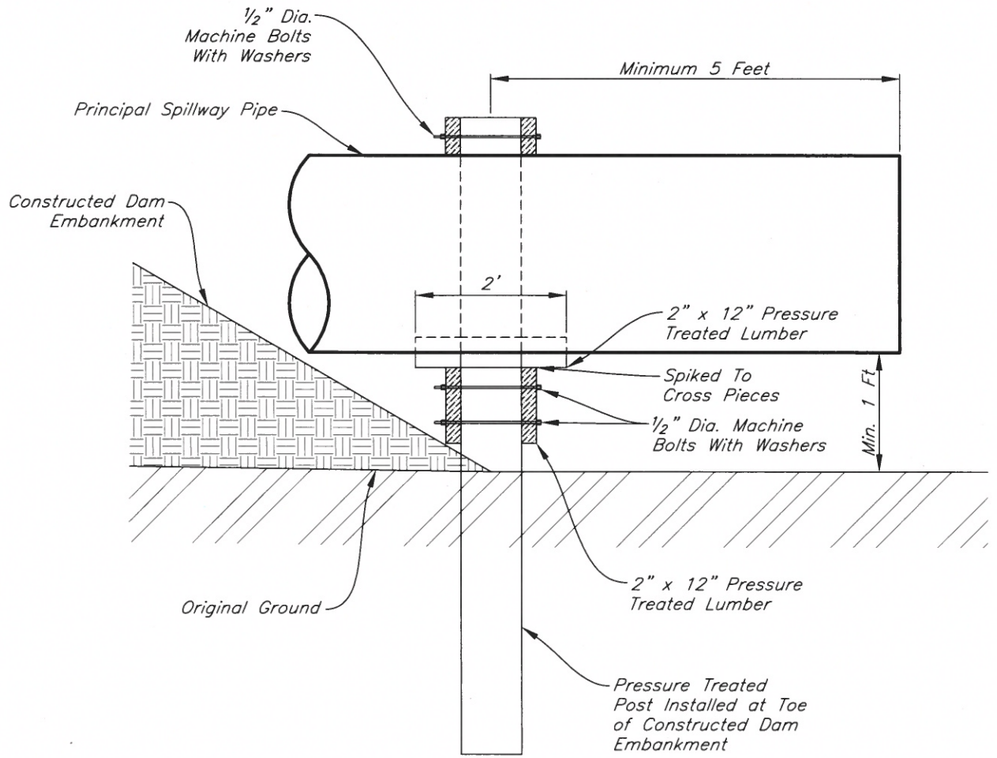
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Sheet 8 of 9



CROSS–SECTION VIEW



PROFILE VIEW

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

CONSTRUCTION NOTES

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

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

Date
Designed Nathan Benson 11/22/2019
Drawn Nathan Benson 11/22/2019
Checked Angela Roman 12/4/19
Approved Angela Roman 12/4/19

RAY MARTINMAAS
378 POND
TIMBER PIPE SUPPORT
Hand County, South Dakota
NW 1/4, Sec 21, T116N, R69W

United States Department of Agriculture
Natural Resources Conservation Service

File No.
MartinmaasDamL.dgn

Drawing No.
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11/25/19 4:11 PM
Sheet 9 of 9

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

December 1, 2021

Ray Martinmaas
35210 176th St
Orient SD 57467

Dear Mr. Martinmaas:

Thank you for submitting the *Application for a Permit to Appropriate Water* for dam located in Hand County. In order to complete the application, the following is required.

- The application was submitted with a check for $500.00. The inspection fee is also required at this time. Please submit an additional $200.00.

If you have any questions, please contact me.

Sincerely,

Karen Schlaak

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

RECEIPT

WATER RIGHTS PROGRAM
South Dakota Department of Agriculture and Natural Resources

Date January 3, 2022

RECEIVED OF Martinmaas Dairy Inc/Ray or Randy Martinmaas 35210 176th St., Orient SD 57467

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

Fee for Application for Permit No. _____ to Appropriate Water, to construct and to put water to beneficial use	$_____
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. 8572-3	$200.00
Fee for Filing Transfer Form _____	$_____
Fee for _____	$
Fee for Issuing New Well Driller's License No. _____	$_____
Fee for Renewal of Well Driller's License No. _____	$
Fee for Issuing Well Pump Installer's License No. _____	$
Fee for Renewal of Well Pump Installer's License No. _____	$
(Any Other Work Provided by Law) TOTAL	$200.00

By Eric Gronlund
Chief Engineer
VM

RECEIPT

WATER RIGHTS PROGRAM
South Dakota Department of Agriculture and Natural Resources

Date December 2, 2021

RECEIVED OF Martinmaas Dairy, Inc. Ray/Randy Martinmaas 35210 176th St., Orient SD 57467

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

Fee for Application for Permit No. 8572-3 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. _____	$____
Fee for Filing Transfer Form _____	$____
Fee for _____	$
Fee for Issuing New Well Driller's License No. _____	$____
Fee for Renewal of Well Driller's License No. _____	$
Fee for Issuing Well Pump Installer's License No. _____	$
Fee for Renewal of Well Pump Installer's License No. _____	$
(Any Other Work Provided by Law) TOTAL	$500.00

By Eric Gronlund
Chief Engineer
VM

USDA

United States Department of Agriculture

December 29, 2021

USDA-NRCS
1717 North Lincoln Avenue
Suite #104
Pierre, SD 57501
605-301-3422

RECEIVED
JAN 0 3 2022
WATER RIGHTS
PROGRAM

PAID
JAN 3 2022
Check # 13171

Karen Schlaak
Water Rights Program
Department of Agriculture and Natural Resources
523 E. Capitol Avenue
Pierre, SD 57501

Dear Ms. Schlaak:

Enclosed is the check from Ray Martinmaas we discussed over the phone on December 29, 2021. This check applies to his water rights application for a dam to be constructed.

Please don't hesitate to call me at the above number with any concerns or questions.

Sincerely,

Angela Roman

ANGELA ROMAN
Agricultural Engineer
USDA-NRCS
Pierre Field Support Office
605-301-3422

Kilts, Whitney (DENR)

From: Ostrem, Daniel - NRCS,Brookings, SD <daniel.ostrem@usda.gov>
Sent: Thursday, March 17, 2022 10:37 AM
To: Kilts, Whitney (DENR); Gronlund, Eric
Cc: Roman, Angela - NRCS, Pierre, SD; dana.edwards
Subject: RE: [EXT] HEC-RAS Breach Analysis Martinmaas.pdf
Attachments: NRCS 0.5 hour breach development.pdf; NRCS 2.5 hour breach development.pdf; SD-Oct-21.pdf; TR60 breach peak TR66 breach hydrograph 7.5 HR.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Whitney, Eric,

Thanks for your patience here. This is a new process for me as I try and learn the HEC-RAS software. I think this method is much preferred for these smaller structures than DSS-WISE because I have ability to use LiDAR data to determine more accurate elevations.

You will find responses to your questions in the breach development notes attached as well as a copy of our most recent version of the SD supplement to the National Engineering Manual.

For my initial runs here I had a dam breach development of 0.5 hour. This was based on the example I was using to learn the HEC-RAS software and not specific to the site.
Both Angela and I didn't feel this was very realistic. It created a wave front surge and elevations that seemed more un-realistic, but this is only an opinion.

If I changed the breach development to match the hydrograph of 2.5 hours, the risk at the cabin is significantly lower. I think this is a more realistic approach as the breach will tear the dam wall down at the same rate of the water release.

If you'd like to do a teams meeting to see my runs on the computer with time lapse, we can schedule a time to do this.

Please let Angela or myself know any further questions you may have. Thank you,

Daniel Ostrem
Acting State Hydraulic Engineer
Daniel Ostrem P.E.
NRCS Agricultural Engineer
Agricultural Nutrient Management Team (ANMT)
520 3rd Ave; Brookings, SD 57006
(605) 656-1842 - Cell
(605) 692-2344 - Ext. 102 - Office

From: Kilts, Whitney (DENR) <Whitney.Kilts@state.sd.us>
Sent: Thursday, March 10, 2022 12:25 PM
To: Roman, Angela - NRCS, Pierre, SD <angela.roman@usda.gov>; Ostrem, Daniel - NRCS,Brookings, SD

<daniel.ostrem@usda.gov>
Cc: Gronlund, Eric <Eric.Gronlund@state.sd.us>
Subject: RE: HEC-RAS Breach Analysis Martinmaas.pdf

Greetings Angela and Daniel,

It would really help if the figures in the breach analysis included a legend so there was a sense of scale to them. I can guess dark blue is deeper depths and red is higher velocities, but have no sense of how much deeper than the shallower area the dark blue would be or how much higher the velocity is in the higher areas might be compared to the lower velocities area.

I talked to the Chief Engineer, we are willing to use NRCS depth and velocity standards for determining potential for damages on this, like we did for Belvidere and Murdo. Is Appendix A (pages 9-12) of the attached still valid for what NRCS uses or has it been updated? If it has been updated, can I get updated versions of what SD NRCS uses for depth and velocities? Also can I get a velocity (preferably max if you have it) for the cabin and a maximum depth and velocity (preferably max if you have it) for the SE most structure at the next farmstead down? Are this analysis going to trigger NRCS to change the design or are you wanting a hazard classification decision from us first? Also do you know if the downstream cabin is occupied or not? Is the owner of the cabin the owner of the dam?

Also a couple of side questions to enhance my understanding of how NRCS does things. On page 11 of the attached part b under the requirements sections, does "inventory sized" refer to the National Inventory of Dams sized requirement or some other inventory? Also in the same section is the description for a method for a conservative estimate in place of a breach analysis what is used when the NRCS engineers when doing SD-ENG-57 Documentation of Hazard Classification review? Also can I get a copy of the SD NRCS hazard class (A,B,C, etc) and job class definitions?

Thanks,

Whitney Kilts
Water Rights Program
Department of Agriculture and Natural Resources
523 E. Capitol Ave. Pierre SD, 57501
605.773.3352
danr.sd.gov

From: Roman, Angela - NRCS, Pierre, SD <angela.roman@usda.gov>
Sent: Thursday, March 10, 2022 8:11 AM
To: Kilts, Whitney (DENR) <Whitney.Kilts@state.sd.us>
Subject: [EXT] HEC-RAS Breach Analysis Martinmaas.pdf

Whitney,
Attached is the breach analysis. This report was completed by Daniel Ostrem, our acting State Hydraulic Engineer. Please contact Daniel or myself with any questions.

Thanks,
Angela Roman

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unauthorized interception of this message or the use or disclosure of the information it contains may violate the law and subject the violator to civil or criminal penalties. If you believe you have received this message in error, please notify the sender and delete the email immediately.

Kilts, Whitney (DENR)

From: Gronlund, Eric
Sent: Wednesday, April 13, 2022 4:43 PM
To: Kilts, Whitney (DENR)
Subject: RE: [EXT] Correction for Breach Report

Based on what Daniel provided water no longer comes up to the cabin based on the inundation mapping.

If that is the case it doesn't seem necessary for the applicant to sign a document. Do you agree?

From: Ostrem, Daniel - NRCS,Brookings, SD <daniel.ostrem@usda.gov>
Sent: Wednesday, April 13, 2022 4:30 PM
To: Gronlund, Eric <Eric.Gronlund@state.sd.us>
Cc: Kilts, Whitney (DENR) <Whitney.Kilts@state.sd.us>; dana.edwards <dana.edwards@usda.gov>; Roman, Angela - NRCS, Pierre, SD <angela.roman@usda.gov>
Subject: [EXT] Correction for Breach Report

Eric,

As I mentioned earlier, I am very new to trying to use HEC-RAS software for conducting Breach Analyses. I have been learning quite a bit in the last month. My suspicions on the breach formation time and the effect they had on the results we had discussed were spot on. I was overdoing my analysis by adding in a storage area and dam criteria. This extra information allowed HEC-RAS to calculate its own hydrograph based on the headcutting through the dam geometry and the given breach formation time, rather than use the hydrograph which we wanted it to utilize. After conferring with other NRCS engineers from NE and KS, they have taught me to remove the other pieces from the model that are not required and then allows HEC-RAS to utilize the hydrograph we desired it use.

Upon doing this, the corrected report is attached and is less sever than the old estimates. Even this run should be conservative as I didn't input culverts into the road crossings. I also raised the mannings "n" to 0.08 from the initial 0.04. This had very little impact but the added roughness did raise the water level slightly. In the future, we are going to be working on Land Use maps with mannign's "n"s built into the 2D map.

We are also working developing new procedural documentation for our breach analyses and will be running those by you for feedback in the near future.

With this new corrected run, Angela is curious if the producer signed document will still be required.

Thank you, and thanks again for your patience with me as I have been learning this process.

Daniel

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USDA

United States Department of Agriculture

Wed, April 13, 2022

Chief Engineer
Eric Gronlund
South Dakota DANR
Joe Foss Building
523 E Capitol Ave
Pierre, SD 57501

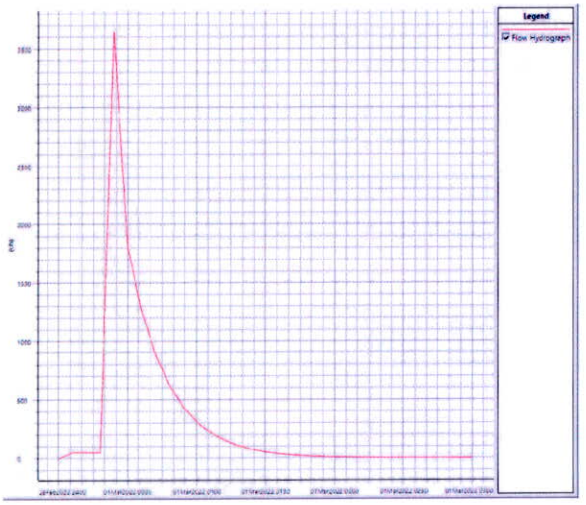
Dear Eric,

I have attatched a **corrected** prelimary breach analysis for the proposed dam for Ray Martinmaas in Hand County which was designed by Angela Roman.

The analysis was conducted using a LiDAR data clipped into HEC-RAS 6.1.0 and an unsteady flow simulation was performed.

Analysis assumptions were:

- A watershed mannings "n" of 0.08
- A 2.5 hour hydrograph with a 6 min time interval (attached)
    - I added additional flow to the start of the hydrograph to prime the model.
    - Peak Hydrograph flow 3,647 cfs
- Water surface at top of dam – 1,684.2



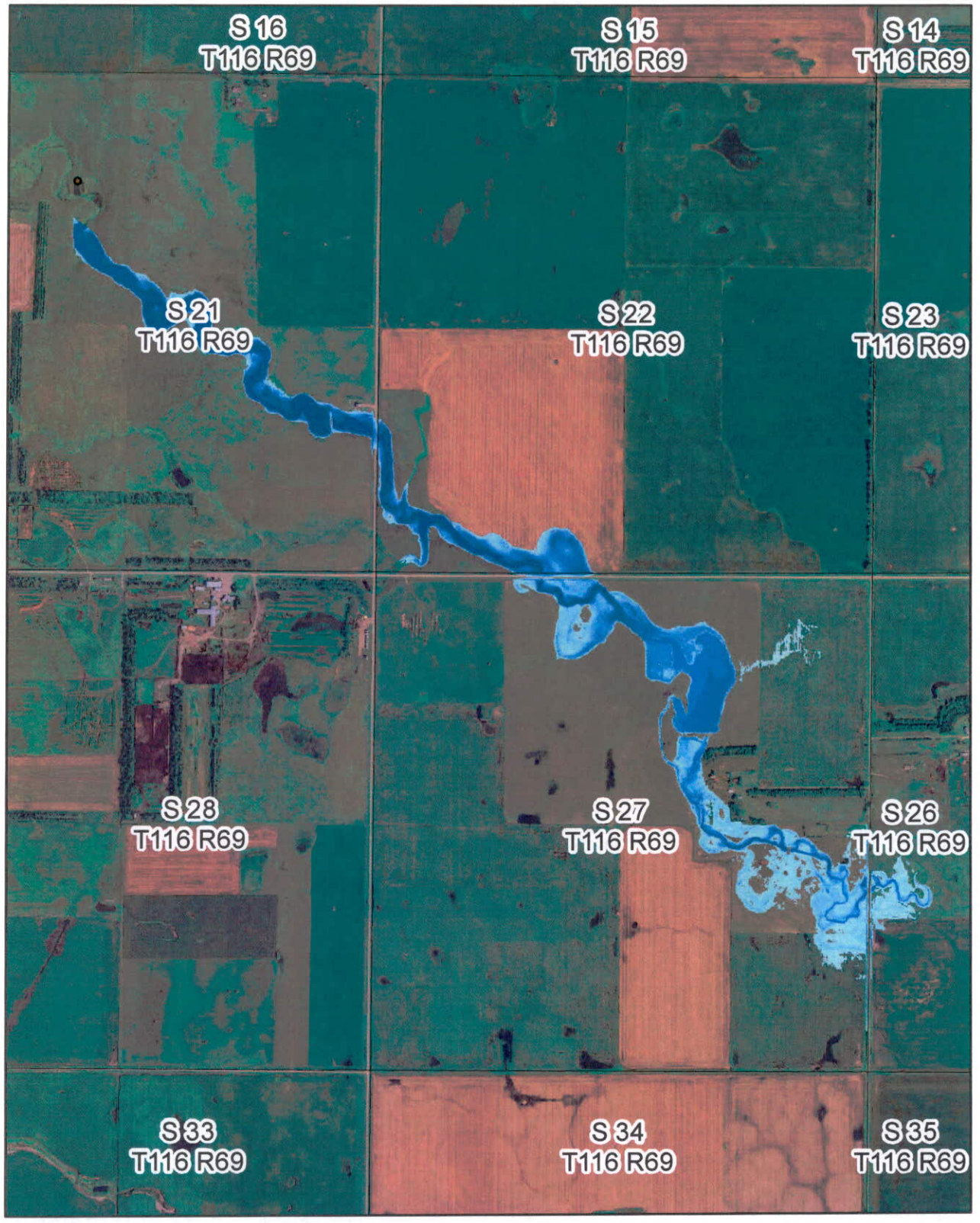
If you have any questions or need any further information, you can reach me at (605) 656-1842 daniel.ostrem@usda.gov, or Angela Roman at (605) 224-8870 angela.roman@usda.gov.

Sincerely,

Daniel Ostrem, PE
USDA-NRCS ANMT

CC: Whitney Kilts, SD DANR, Pierre, SD

Natural Resources Conservation Service
520 3rd Ave. Brookings, SD 57006
Voice: 605.656.1842
An Equal Opportunity Provider and Employer



Legend

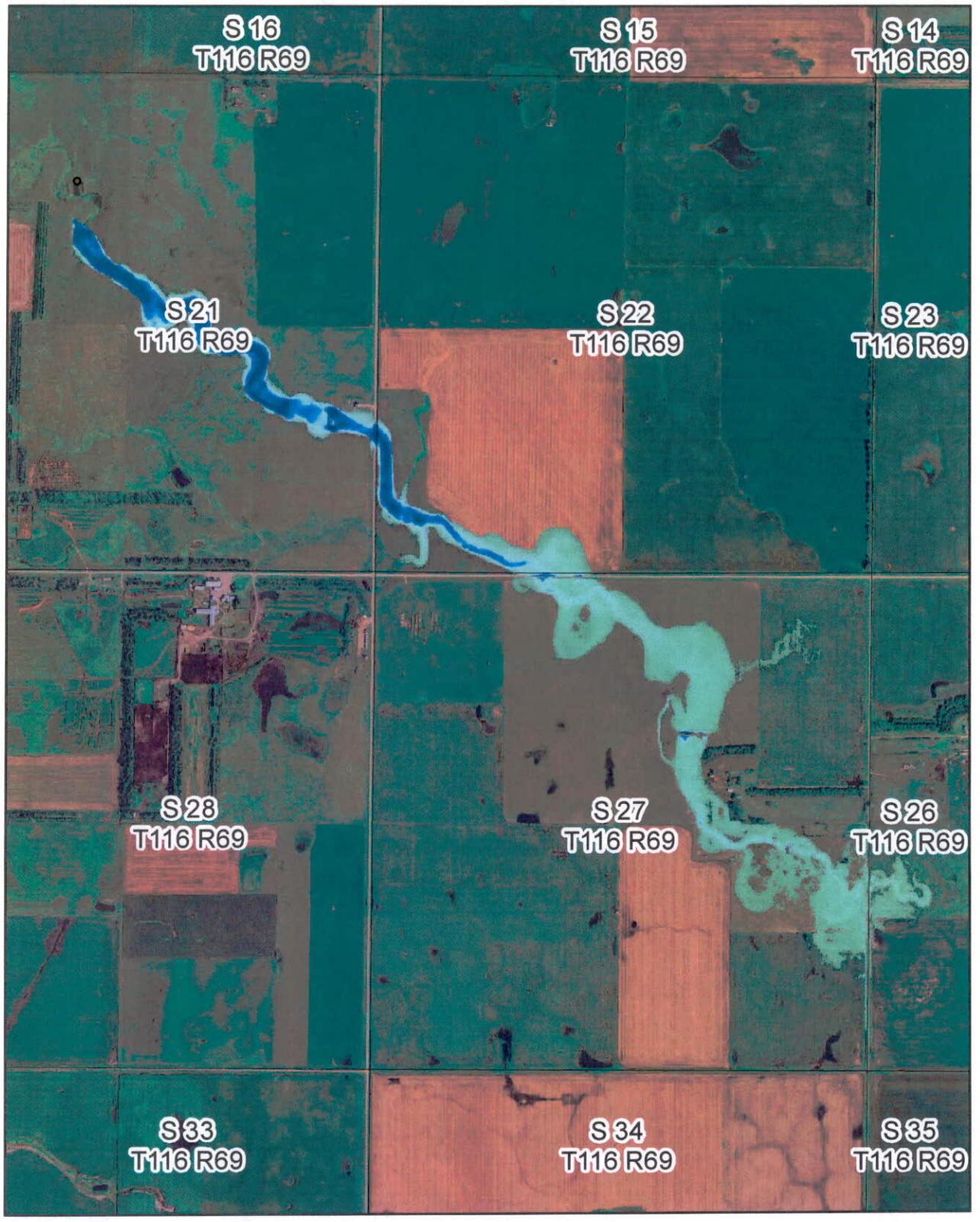
High : 7.00

Low : 0.00

Maximum Depth - Feet

N
W
E
S

0 0.125 0.25 0.5 0.75 1 Miles



Legend

High : 7.2

Low : 0

Maximum Velocity - FT/S

N

W E

S

0 0.125 0.25 0.5 0.75 1

Miles



Legend

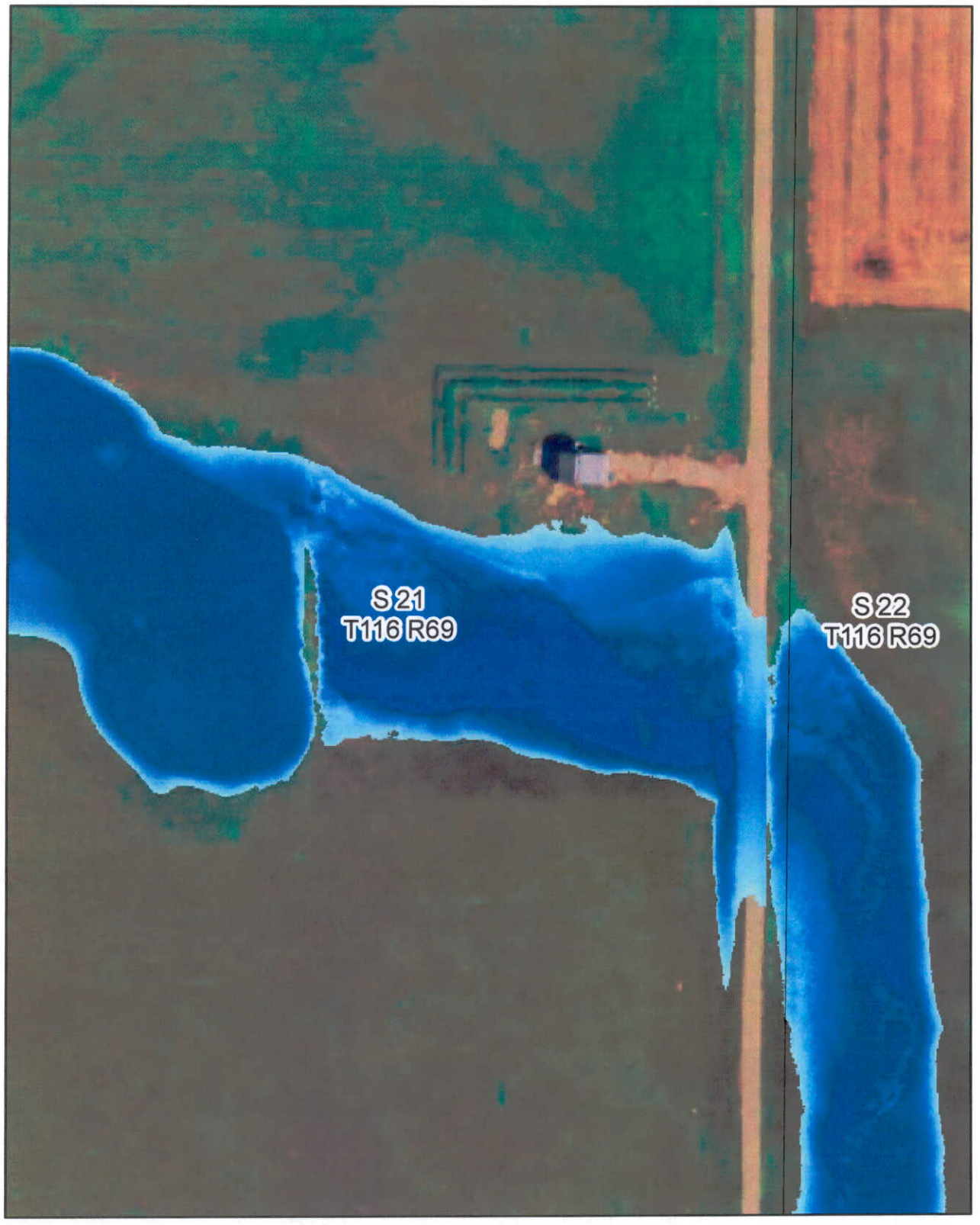
High : 7.00

Low : 0.00

Maximum Depth - Feet

N
W
E
S

0 125 250 500 750 1,000 Feet



Legend

High : 7.00

Low : 0.00

Maximum Depth - Feet

N
W
E
S

0 62.5 125 250 375 500 Feet



Legend

High : 7.2

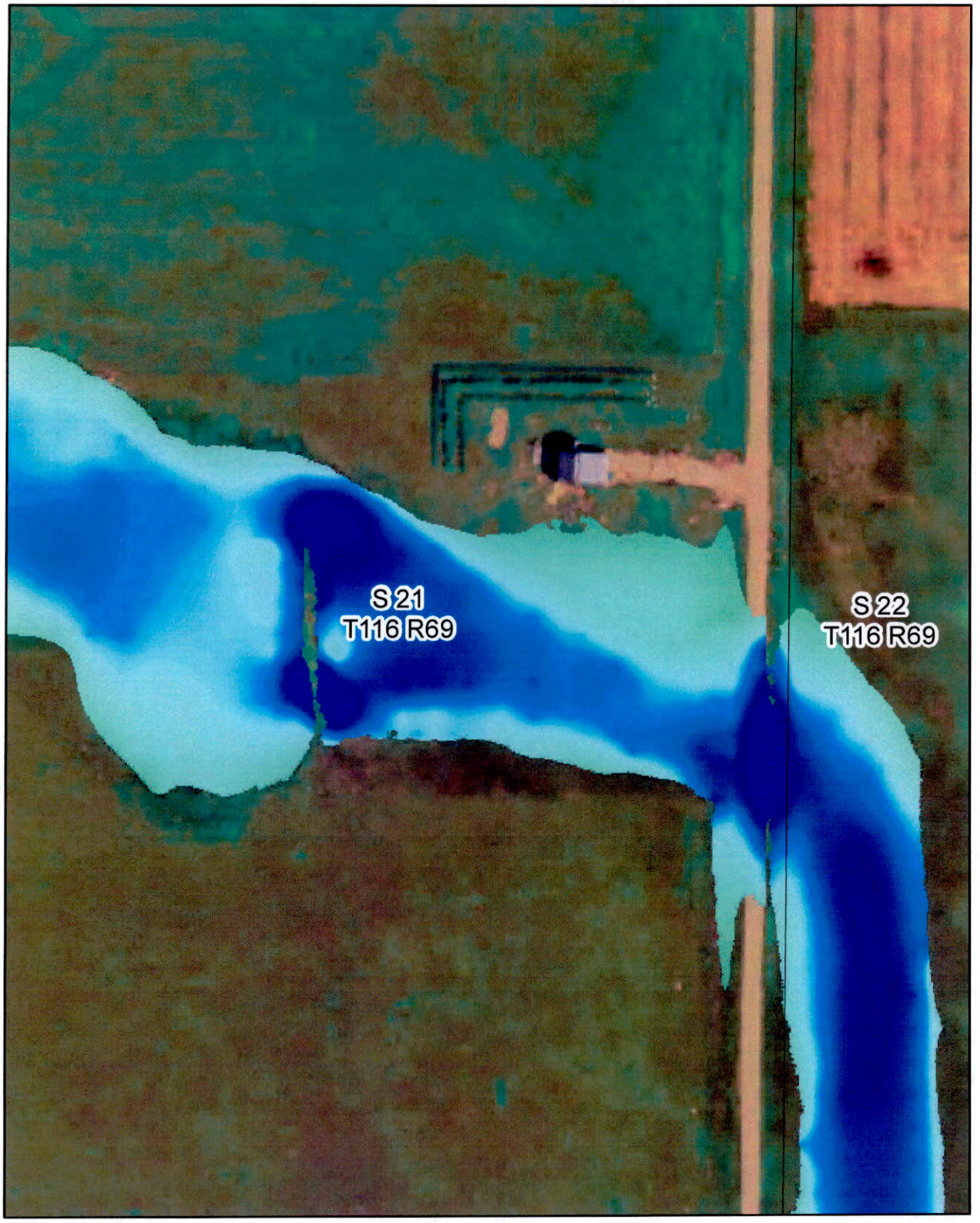
Low : 0

Maximum Velocity - FT/S

N
W
E
S

0 187.5 375 750 1,125 1,500

Feet



Legend

High : 7.2

Low : 0

Maximum Velocity - FT/S

N
W
E
S

0 62.5 125 250 375 500 Feet

Justification of Hazard Classification

LOW

Damage to gravel roads downstream of the dam is expected but is considered acceptable for the low hazard definition and class.

The model does not show any further risk to other infrastructure that would impact the hazard class

Description of a LOW Hazard Dam per NRCS SD-520.21 Definition and Classes.

Low Hazard Potential dams are dams in rural or agricultural areas where failure may damage farm buildings, agricultural land, minor utilities, or township and county roads. Urban housing developments do not exist, and none are expected during the structure's design life. Failure may damage an isolated utility serving a limited area.
Damage to gravel roads and farm buildings is an acceptable risk. Damage to gravel surfaced roads will occur when the depth of flow exceeds two feet. Flow over a paved county or township road less than two feet deep is acceptable. Flow greater than two feet over a paved county or township road or overtopping main highways at any depth will change the hazard classification to Significant Hazard. Serious damage to farm buildings will occur when the depth of flow exceeds three feet or velocities become excessive. If the risk of damage is not acceptable, a more conservative design should be considered.

Watershed or Owner Name: Martinmaas

Site No.1

Curvilinear, Exponential Decay Breach Hydrograph

Version 4.5
Ver Date: Aug 31, 2021

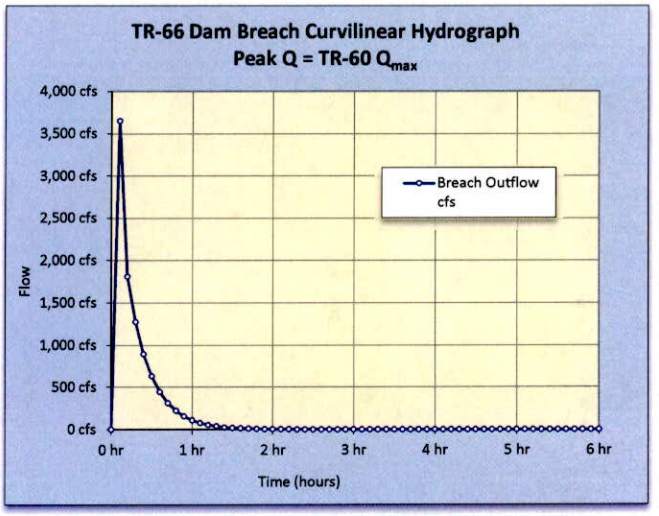
Breach Q_{max}

Q_i= **3,650 cfs**

Reservoir Volume at Time of Failure ac-ft

V_i= **86 ac-ft**

TR-66 Eqn (15) exponent *t*	Time *min*	Time *hr*	*TR-66 Equation (7)* Breach Outflow *cfs*	Incremental Outflow *ac-ft*	Total Outflow *ac-ft*
0		0.0 hr	0		
0.000	6 min	0.1 hr	3650	15 ac-ft	15 ac-ft
0.702	12 min	0.2 hr	1808	23 ac-ft	38 ac-ft
1.054	18 min	0.3 hr	1273	13 ac-ft	50 ac-ft
1.405	24 min	0.4 hr	896	9 ac-ft	59 ac-ft
1.756	30 min	0.5 hr	631	6 ac-ft	66 ac-ft
2.107	36 min	0.6 hr	444	4 ac-ft	70 ac-ft
2.458	42 min	0.7 hr	312	3 ac-ft	73 ac-ft
2.809	48 min	0.8 hr	220	2 ac-ft	75 ac-ft
3.161	54 min	0.9 hr	155	2 ac-ft	77 ac-ft
3.512	60 min	1.0 hr	109	1 ac-ft	78 ac-ft
3.863	66 min	1.1 hr	77	1 ac-ft	79 ac-ft
4.214	72 min	1.2 hr	54	1 ac-ft	79 ac-ft
4.565	78 min	1.3 hr	38	0 ac-ft	80 ac-ft
4.916	84 min	1.4 hr	27	0 ac-ft	80 ac-ft
5.268	90 min	1.5 hr	19	0 ac-ft	80 ac-ft
5.619	96 min	1.6 hr	13	0 ac-ft	80 ac-ft
5.970	102 min	1.7 hr	9	0 ac-ft	80 ac-ft
6.321	108 min	1.8 hr	7	0 ac-ft	80 ac-ft
6.672	114 min	1.9 hr	5	0 ac-ft	81 ac-ft
7.023	120 min	2.0 hr	3	0 ac-ft	81 ac-ft
7.375	126 min	2.1 hr	2	0 ac-ft	81 ac-ft
7.726	132 min	2.2 hr	2	0 ac-ft	81 ac-ft
8.077	138 min	2.3 hr	1	0 ac-ft	81 ac-ft
8.428	144 min	2.4 hr	1	0 ac-ft	81 ac-ft
8.779	150 min	2.5 hr	1	0 ac-ft	81 ac-ft
9.130	156 min	2.6 hr	0	0 ac-ft	81 ac-ft
9.482	162 min	2.7 hr	0	0 ac-ft	81 ac-ft
9.833	168 min	2.8 hr	0	0 ac-ft	81 ac-ft

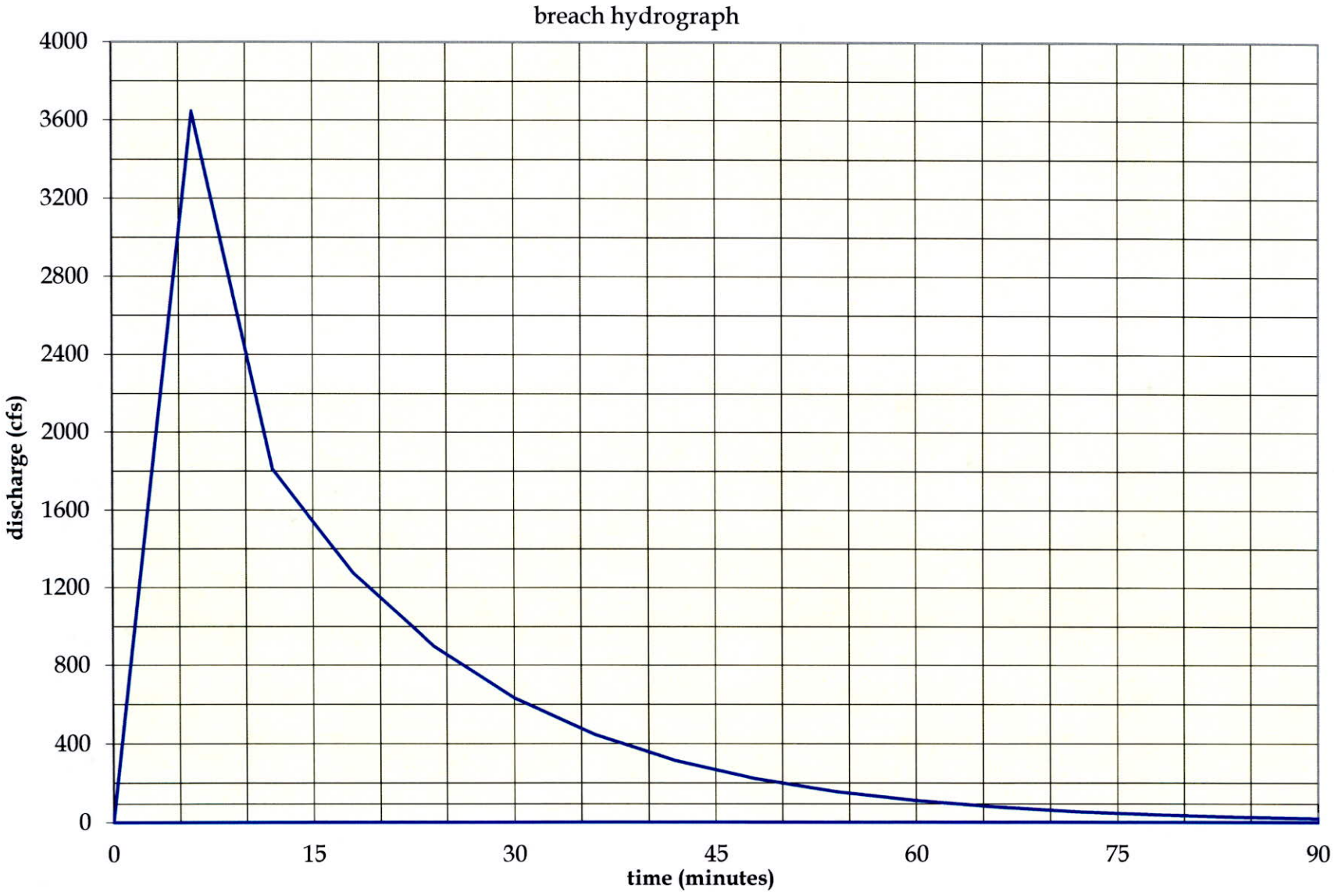


Notes: Hydrograph time increment arbitrarily set to 0.1 hr
Therefore, time to breach set to 0.1 hr or 6 minute to match arbitrary hydrograph time increment

For HEC-RAS unsteady 1D flow, recommend setting Min Flow to ~5% of peak flow
For HEC-RAS unsteady 2D flow, initial conditions are more flexible.

TR-66 Equation (7) for curvilinear hydrograph $Q_i = Q_i e^{-t^*}$

TR-66 Equation (15) t* decay exponent: $t^* = (tQ_i)/(V_i)$


breach hydrograph
4000
3600
3200
2800
2400
2000
1600
1200
800
400
0
discharge (cfs)
0
15
30
45
60
75
90
time (minutes)

SD520.21 Definition and Classes

E. All dams shall be evaluated for hazard classification. The minimum documentation shall consist of form SD-ENG-57, Documentation for Hazard Classification, Exhibit B, Page SD520-73(2) and (3). The method of delineating impact areas for Low and Significant Hazard class dams shall follow the requirements of the National Engineering Manual, Part 520.28 and SD520.28.

The following minimum criteria shall be used in determining the hazard classification. Additionally, other factors may need to be evaluated which may result in upgrading the hazard classification such as: (1) Is the township road with a gravel surface the only access to homes or communities? If so, it may be considered a main highway. (2) Will an expensive bridge on a township or county road or railroad sustain severe damage in the event of a failure? If so, it should result in an upgrade of hazard classification. (3) Is there a means of providing warning time to people downstream of the dam in the event of a failure? Most South Dakota Natural Resources Conservation Service designed dams will lack the means of warning people ahead of a failure. Therefore, the hazard classification should be based upon the assumption that homes, commercial buildings, and public buildings are occupied.

a. Low Hazard Potential dams are dams in rural or agricultural areas where failure may damage farm buildings, agricultural land, minor utilities, or township and county roads. Urban housing developments do not exist and none are expected during the structure's design life. Failure may damage an isolated utility serving a limited area.

Damage to gravel roads and farm buildings is an acceptable risk. Damage to gravel surfaced roads will occur when the depth of flow exceeds two feet. Flow over a paved county or township road less than two feet deep is acceptable. Flow greater than two feet over a paved county or township road or overtopping main highways at any depth will change the hazard classification to Significant Hazard. Serious damage to farm buildings will occur when the depth of flow exceeds three feet or velocities become excessive. If the risk of damage is not acceptable, a more conservative design should be considered.

b. Significant Hazard Potential dams are dams in predominately rural or agricultural areas where failure may damage (i) isolated homes, (ii) main highways, (iii) minor railroads or (iv) interrupt service of relatively important public utilities.

1. Failure may damage isolated homes. Isolated homes are single family dwellings on farms and ranches. Does not include homes in developing areas. Damage to homes will occur when flooding is above ground floor level. However, no flooding above one foot is allowed due to the potential for loss of life.

2. Failure may damage main interstates, federal and state highways. Main highways are mainly paved roads. A gravel road may be considered a main highway if it is the sole access to a community.

3. Failure may damage minor railroads. A minor railroad is a spur line or a railroad used no more often than once a day. Materials carried are

relatively nonperishable, agricultural products, or products if delivery was disrupted would not adversely affect local economy, safety, or general well-being of area. Damage may occur when railroad surface acts as weir and flow depth exceeds two feet.

4. Failure may damage relatively important utilities servicing multiple rural users. Utilities providing power should be considered important. Damage may occur when buried lines are exposed by erosion and when towers, poles, and above ground lines can be damaged by undermining or by debris produced from the floodplain.

c. High Hazard Potential dams are dams where failure may cause (i) loss of life, (ii) serious damage to homes, industrial, commercial, and public buildings, (iii) important public utilities, or (iv) main highways or railroads.

1. Potential loss of life should be considered for flood depth greater than one foot in living quarters such as residences, apartments, nursing homes, motels, hotels, and hospitals, and on escape routes from such living quarters. Potential of loss of life should be considered for schools and recreational areas where adequate warning systems are not available.

2. Serious damage to homes, industrial, commercial, and public buildings may occur at a depth of less than three feet and velocities less than five feet per second. Kind, construction, and content of building must be evaluated.

3. Important public utilities include interstate and intrastate power and communication lines serving towns, communities, and significant military and commercial facilities in which disruption of power and communication would adversely affect the economy, safety, and general well-being of the area. Serious damage includes interruption of service for more than one day.

4. Failure may damage main highways or railroads. A main highway is a highway with a Major Collector or greater classification (from South Dakota Department of Transportation). A main railroad is a railroad used more often than once a day. Disruption would adversely affect local economy, safety, or general well-being of area. Damage may occur when railroad surface acts as weir and flow depth exceeds two feet.

SD520.28 Potential Impact Area—Low Hazard Potential Dams of Inventory Size and All Significant Hazard Potential Dams

A. Applicability. The potential impact area shall be evaluated. The evaluation of the impacts shall follow the National Engineering Manual 520.21 and SD520.21.

B. Requirements.

a. For low hazard potential dams which are not inventory size, the individual exercising Job Approval Authority (JAA) will make a visual assessment of the potential inundation area and potential impact in the event of a breach. A breach routing will be performed if the visual assessment shows a potential for impacting any paved roads, railroads, homes, buildings, important utilities, or loss of life.

Form SD-ENG-57, Documentation for Hazard Classification, Exhibit B, shall be used to document the downstream assessment.

b. For low hazard potential dams which are inventory size and all dams which the visual assessment shows a need for a breach routing, use breach routing procedures. For low hazard potential dams, the individual exercising JAA will determine the need for a breach routing. A conservative estimate may be made in place of breach routing. A conservative estimate of the potential impacted area could be as follows: The area flooded from the dam downstream to a major receiving stream. Depth of the flood wave is to be two-thirds of the dam height at the upper end and decreasing uniformly to a depth which covers the floodplain at the lower end. A simplified breach routing will be performed. If the simplified breach routing shows a potential for impacting any paved roads, railroads, homes, buildings, important utilities, or for loss of life, a detailed breach routing shall be conducted according to SD520.28(B)(3).

   If the simplified breach routing shows no impact to paved roads, railroads, homes, buildings, important utilities, or potential for loss of life, SD-ENG-57 shall be used to document the downstream assessment. A narrative description of the potential impact area and precautions about downstream development shall be transmitted to the landowner according to SD520.28(C). A potential impact area map may need to be developed showing the affected areas.

c. For all significant hazard potential dams and low hazard potential dams which show a potential for impacting paved roads, railroads, homes, buildings, and relatively important utilities, a detailed breach routing, such as HEC-RAS Unsteady State will be conducted. The detailed breach analysis may be performed by the design engineer or the state office engineering staff. The detailed breach routing will be reviewed by the state conservation engineer (SCE).

   A potential impact area map shall be developed showing the affected areas. A narrative description of the potential impact area, the potential impact area map, and precautions about downstream development shall be transmitted to the landowner according to SD520.28(C).

C. Distribution.

a. A narrative description of the potential impact area and precautions about downstream development is to be developed by the person exercising JAA in a letter form as outlined in Exhibit A, Page SD520-15. This letter, along with the potential impact area map, shall be transmitted to the state conservationist (STC) for review and then transmitted to the owner or sponsor. For Class VII jobs, the SCE will prepare the letter.

b. The STC will send copies of the letter to the local conservation district, South Dakota Department of Agriculture and Natural Resources, and others as appropriate.

Plans prepare by an engineer as defined by ARSD Chapter 74:02:08 _-signed by Angela Roman- works under the NRCS job approval authority system with supervising PE being Dana Edwards __

Dam size and Storage (Plan sheet 2)

Top of Dam Elevation __ 1684.2ft_____ Maximum Storage Capacity____ 85.9ac-ft_____

2nd Spillway (auxiliary) Elevation __1681.7 ft_____ Intermediate Storage Capacity_ 57.4 ac-ft_____

P. Spillway Elevation __ 1680.0 ft_____ Normal Storage Capacity_43.5 ac-ft_____

Downstream embankment toe elevation_1667.2 ft (elevation contours have limited legibility but number provided in design information) _____

Height _____17 ft____

Effective height (per ARSD 74:02:08:01(8)) __13.8 ft (1681.7-1667.2, from plan sheet 2 & 5) _

Minimum design flood requirement under ARSD 74:02:08:07

Dam hazard category _recommended category 3__ (low)_____ Dam size__ small____

Additional ARSD requirements/notes:

NRCS ran a breach analysis for the dam using a sunny day failure scenario, which assumes the dam fails with a water level at the top of dam but no large runoff event occurring and LiDAR elevation data. The simulated breach development time was 2.5 hours to simulate an overtopping type of failure where the embankment would be cut down from the top of the dam to the bottom of the draw and the reservoir would be emptied in 2.5 hours. The analysis indicated that the flood waters from a dam breach could potentially affect the hunting cabin belonging to the owner of the proposed dam in the NE ¼ SE ¼ of Section 21-T116N-R69W. The estimated flood water elevation is one foot below the existing ground elevation of the cabin. The analysis is not showing water on the main level of the home, but the walk out basement could potentially be flooded. Under ARSD 74:02:08:05, economic loss potential for category 3, low hazard dams, is listed as "minimal (undeveloped to occasional structures)", and the owner of the proposed dam and hunting cabin has signed the letter prepared by NRCS acknowledging and accepting the potential for damage to the cabin should a dam failure occur.

ARSD 74:02:08:07.01 category 3 exemption check
maximum storage capacity*effective height=85.9*13.8=1185.42 <30000, therefore qualifies

Minimum design flood required _ 25 year, 24 hr___

Review of design flows and comments:

-rainfall 25 yr, 24 hour from NOAA 14atlas is 4.27 inches

-rainfall 50yr, 24 hours used by designer 4.80 inches, from NOAA atlas 14 is 4.99 inches

Design peak flow in plans ___ 50 yr, 24 hour event _____

Comments:

ARSD 74:02:08:09 Requirements

1. Top map _partially provided _____
   - topographic map of the dam site specifying the legal description of the proposed dam __Sheet 1 and map in design information___
   - shows location of the spillway and outlet works? __Sheet 3_____
   - shows location of all test borings, test pits, and borrow pits? ___No ___
     - the logs have sufficient information to determine location
   - map shows all property contiguous to the dam site and contiguous to the flood zone behind the dam and the owners of the contiguous property? ___ No___
     - check Hand County plat-reservoir area appears to be all owned by Martinmaas
2. Dam Profile
   - Dam axis profile __sheet 5 __
   - Shows location, elevations, and depth of borings or test pits? __ No __
     - the logs have sufficient information to determine location
     - checked with NRCS all units on soil logs should be centimeters not ft
   - Includes logs of bore holes or test pits _____in design information ___
3. Dam max X-section __sheet 4 __
   - Shows elevation and width of the crest? _ yes ___
   - Shows slopes of upstream and downstream faces? _yes_
   - Shows thickness of riprap? _ no riprap indicated for the upstream face, thickness show for riprap at conduit outlet__
     - old embankment serving as wave berm
   - Shows zoning of earth embankment? _no zoning indicated for this project __
   - Shows location of cutoff and bonding trenches? _ Sheet 4&5 __
   - Shows elevations, size, and type of outlet conduit, valves, and operating mechanism? _ conduit information provided other items not part of design__
4. Area-capacity curves __ table in SITES output pages 5 ___
5. Outlet details ___Sheets 7-9 _____
   - Provided detailed drawings showing outlet plans? ___ Sheets 8&9 _____
   - Provided cross and longitudinal sections of the outlet conduits? ___ Sheet 8____
   - Shows valves and controls for operating the outlet? __n/a uncontrolled spillways ___
   - Shows trash racks? ____Sheet 7_____
6. Spillway Rating ____SITES output with dam design information _____
   - Provides discharge capacity in cubic feet per second of the spillway for each foot in water depth above the spillway crest up to the maximum high-water level? __ SITES output page 5__
   - Provides the formula used in making the calculations? _close enough ___

- Primary-weir flow and barrel orifice
- Secondary- manning's by SITES

7. Spillway details __ Sheets 2-9 ___
   - Provided detailed plans of spillway structures? _ Sheets 2-9 ____
   - cross-section of the channel heading to and from the spillway? _close enough between Sheets 2 &5 ___
   - spillway profile? _____ Sheet 5____
   - procedures for operation of the spillway structure? _spillways are uncontrolled, so operation is driven be reservoir level __

8. Specs ____available online_____
   - Specifications __ NRCS Standard list and link to find them online on Sheet 1, couple items specified in plans ____
     - List on sheet 1 missing SD-592, which is mentioned on sheet 8
     - https://www.nrcs.usda.gov/wps/portal/nrcs/detail/sd/technical/engineering/?cid=nrcs141p2_036654
     - https://www.nrcs.usda.gov/wps/portal/nrcs/detail/sd/technical/engineering/?cid=nrcs141p2_036653
   - Includes provisions during the period of construction for supervision by an engineer? _ yes_
     - form SD-ENG-11 with dam design information has supervision

9. If category 1 EPP/EAP _n/a__

Additional comment/notes:

NRCS Annual Yield
(From SD Engineering Field Manual for Conservation Practices)
See water permit application report

Qualifies for the National Inventory of Dams_ Yes __
-recommend requesting a set of as-builts if prepared

Additional notes:
-secondary spillway curves toward the dam, however the design appears to includes a berm near the exit of the secondary to mitigate the potential for discharged water to erode the embankment
-NRCS included O&M Plan

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT APPLICATION NO. 8572-3, Ray Martinmaas

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit Application No. 8572-3, Ray Martinmaas, 35210 176th Street, Orient SD 57467.

The Chief Engineer is recommending APPROVAL of Application No. 8572-3 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 domestic water uses and water rights, 3) the proposed use is a beneficial use and 4) it is in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management Board with the following qualifications:

1. Water Permit No. 8572-3 authorizes storage of up to 43.5 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.

Eric Gronlund
Eric Gronlund, Chief Engineer
April 14, 2022

Report to the Chief Engineer
Water Permit Application No. 8572-3
February 25, 2022

Water Permit Application No. 8572-3 by Ray Martinmaas proposes to impound 43.5 acre-feet of water from runoff by constructing a dam on Matter Creek located in the E ½ NW ¼ Section 21 with water impounded in the N ½ NW ¼ Section 21; all in T116N-R69W in Hand County. This application requests impoundment of sufficient water to maintain water to the outlet elevation. The water is for recreation and livestock water purposes. This site is located approximately 4 miles southwest of Orient, SD.

Water Source: Matter Creek

South Dakota Codified Laws (SDCL) and Administrative Rule of South Dakota (ARSD)

SDCL 46-2A-9

Pursuant to SDCL 46-2A-9, a permit to appropriate water may be issued only if there is a reasonable probability there is unappropriated water available for the applicant's proposed use, the proposed diversion can be developed without unlawful impairment of existing domestic water uses and water rights, and the proposed use is a beneficial use and in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management Board. This report will address availability of unappropriated water and potential for unlawful impairment to existing rights that are pertinent to this application.

ARSD Chapter 74:02:08

ARSD Chapter 74:02:08 provides the minimum design standards for dams above the heights and storages specified in ARSD 74:02:07:01(7). Construction may not begin on a new dam as defined by ARSD 74:02:07:01(7) until plans and specifications have been approved by the chief engineer and a water permit application, if needed, has been approved.

Review of the Water Source

Water Permit Application No. 8572-3 proposes to impound 43.5 acre-feet of water by constructing a dam across Matter Creek. Matter Creek is an intermittent stream located within the James River Basin with its headwaters in the southeastern flank of the Orient Hills in northwestern Hand County (Koch, 1980). Matter Creek flows in a generally southeasterly direction to its confluence with Shaefer Creek, which eventually confluences with North Wolf Creek and the Wolf Creek in eastern Hand County (shown in Figure 1). In Hand County, streamflow and flooding generally occurs in the spring and early summer because of snowmelt and precipitation; as a result, the duration of streamflow can be very short in most creeks (Koch, 1980).

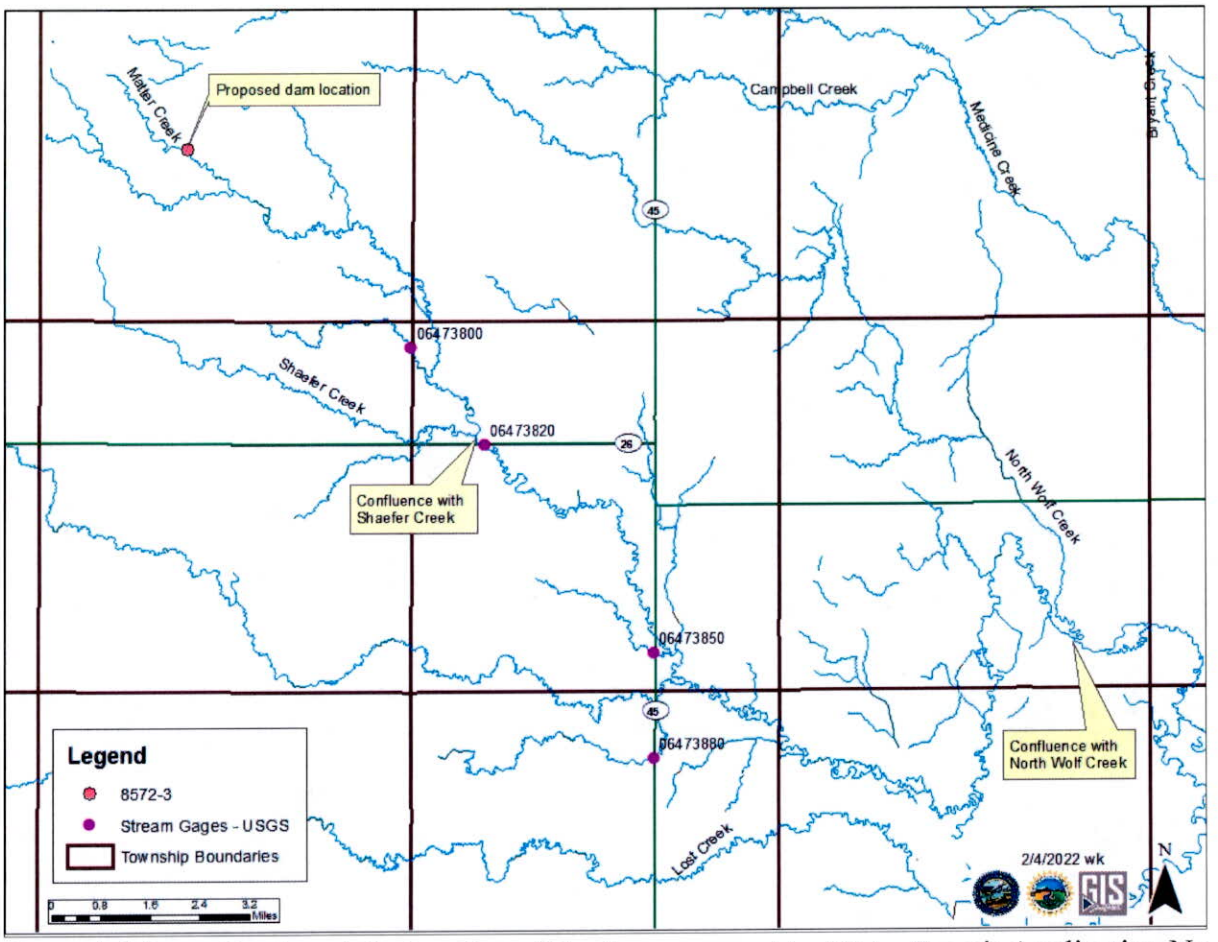


Figure 1: Matter Creek and the location of the dam proposed by Water Permit Application No. 8572-3

Water Availability

The Natural Resources Conservation Service (NRCS) engineer that did the design work for the dam delineated a watershed area upstream of the dam of 561.8 acres (approximately 0.88 square miles). The NRCS annual surface yield method for South Dakota was used to estimate annual surface yield for the drainage area upstream of the inlet into the southern wetland (USDA-NRCS, 1984). The method estimates the volume of runoff which can be expected for a twelve-month period at certain annual probabilities (USDA-NRCS, 1984). For example, the 80 percent occurrence estimate has an 80 percent chance of occurring each year. The annual surface yields for the drainage area at the percent chances of occurrence provided by the NRCS method are presented in Table 2.

Table 1: Estimated Total Annual Yield of Surface Runoff (USDA-NRCS, 1984)

Percent Chance of Occurrence	Total Runoff (acre inches per acre	Total Runoff (acre-feet)
80	0.235	11.0
50	0.615	28.8
20	1.600	74.9
10	2.500	117.0

To estimate the percent chance of occurrence of enough annual runoff to provide a full fill of the reservoir to the elevation of the primary spillway (normal storage, 43.5 acre-feet), the total runoff from Table 1 was plotted against probability of occurrence (showing in Figure 2) (chance of occurrence was converted to probability of occurrence). The plotted data shows a very good correlation (the closer a r square value is to 1 the better the fit or correlation of the trendline to the data points) to a logarithmic trendline (shown on Figure 2). Solving the trendline for a volume of 43.5 acre-feet results in an estimated percent chance of annual occurrence of 39.6% to go from dry to full normal storage. Typically, a lessor amount of runoff will be needed since the dam will not be starting from a dry condition each year.

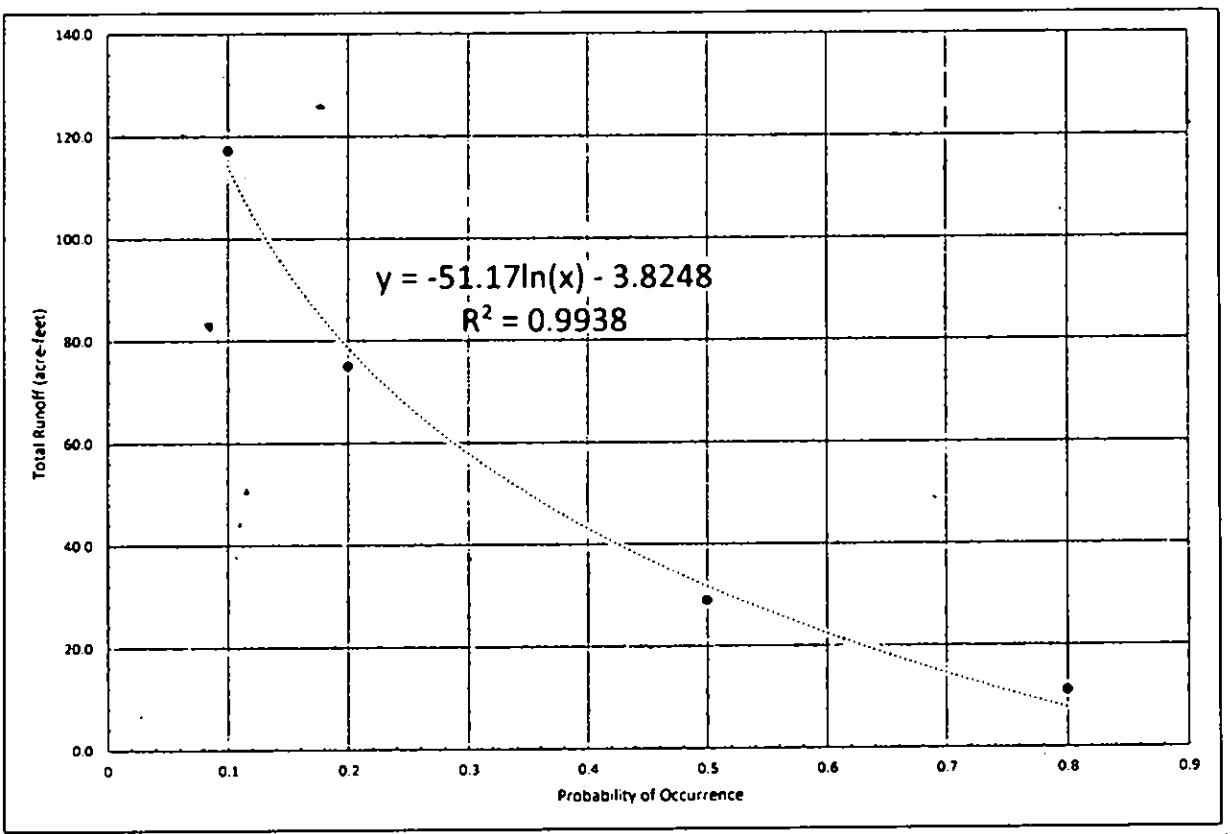


Figure 2: Plot of total runoff for the watershed above the proposed dam against probability of occurrence (note percent in Table 1 have been converted to decimal). Note this plot and trendline is only applicable for this specific watershed location and area.

During the late 1950's through most of the 1970's, the United State Geological Survey (USGS) monitored peak streamflow at several sites in Hand County. Two of those sites are in the vicinity of the proposed location for this dam and the annual peak streamflow discharge is provided in Figures 3 and 4. USGS Site 06473800 (Figure 3) is on a tributary of Matter Creek that flows into Matter Creek below the proposed dam site. The site is close enough that the tributary is expected to have similar runoff patterns to the watershed above the proposed dam. This is due to Site 06473800 being approximately 4.7 miles to the southeast, so the tributary would be expected to receive on average similar amounts of precipitation. Site 06473800 has a contributing drainage area of 7.75 square miles (approximately 4,960 acres) (USGS, 2022). USGS Site 06473820 (Figure 4) is located approximately 6.7 miles (as the crow flies) to the southeast of the proposed dam site and approximately 0.36 stream miles downstream of the confluence of Matter and Shaefer Creeks.

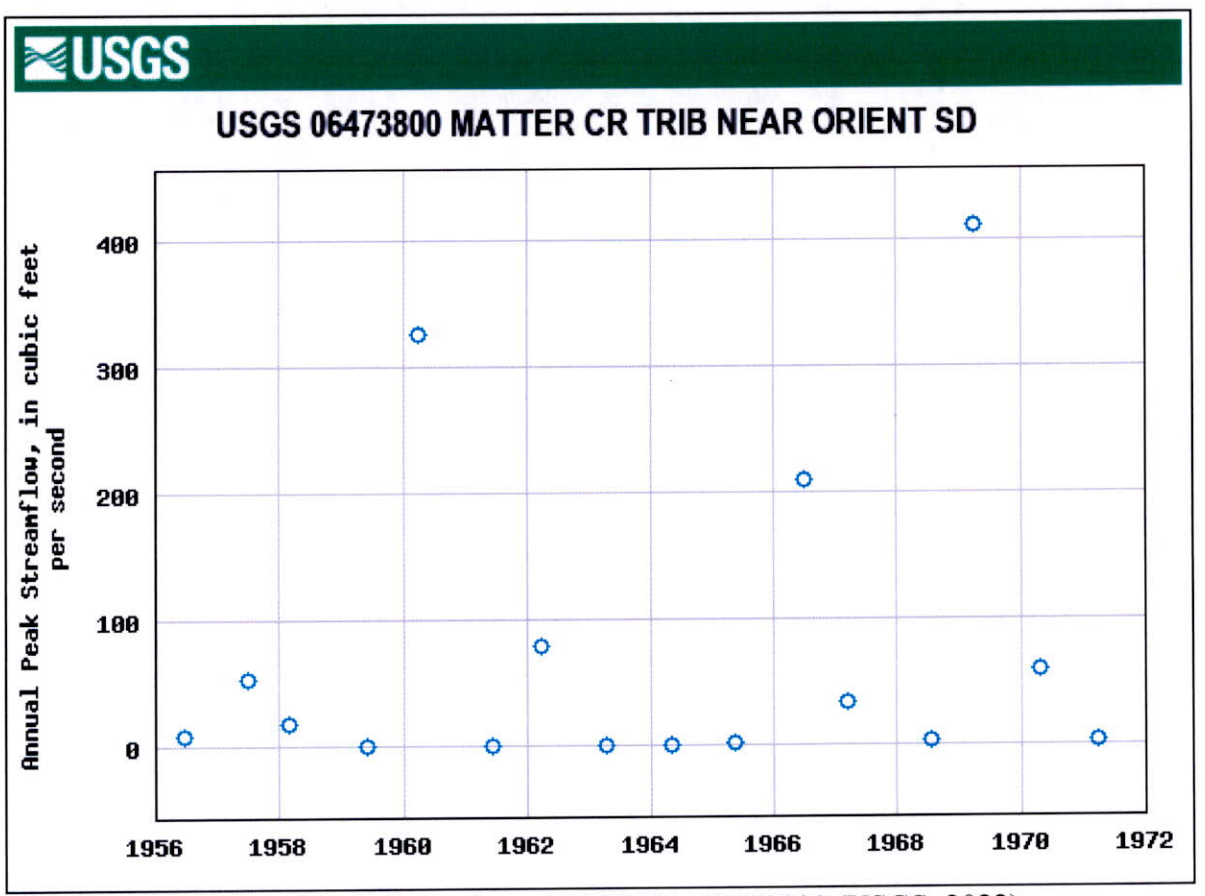


Figure 3: Peak Streamflow information at USGS Site 06473800 (USGS, 2022)

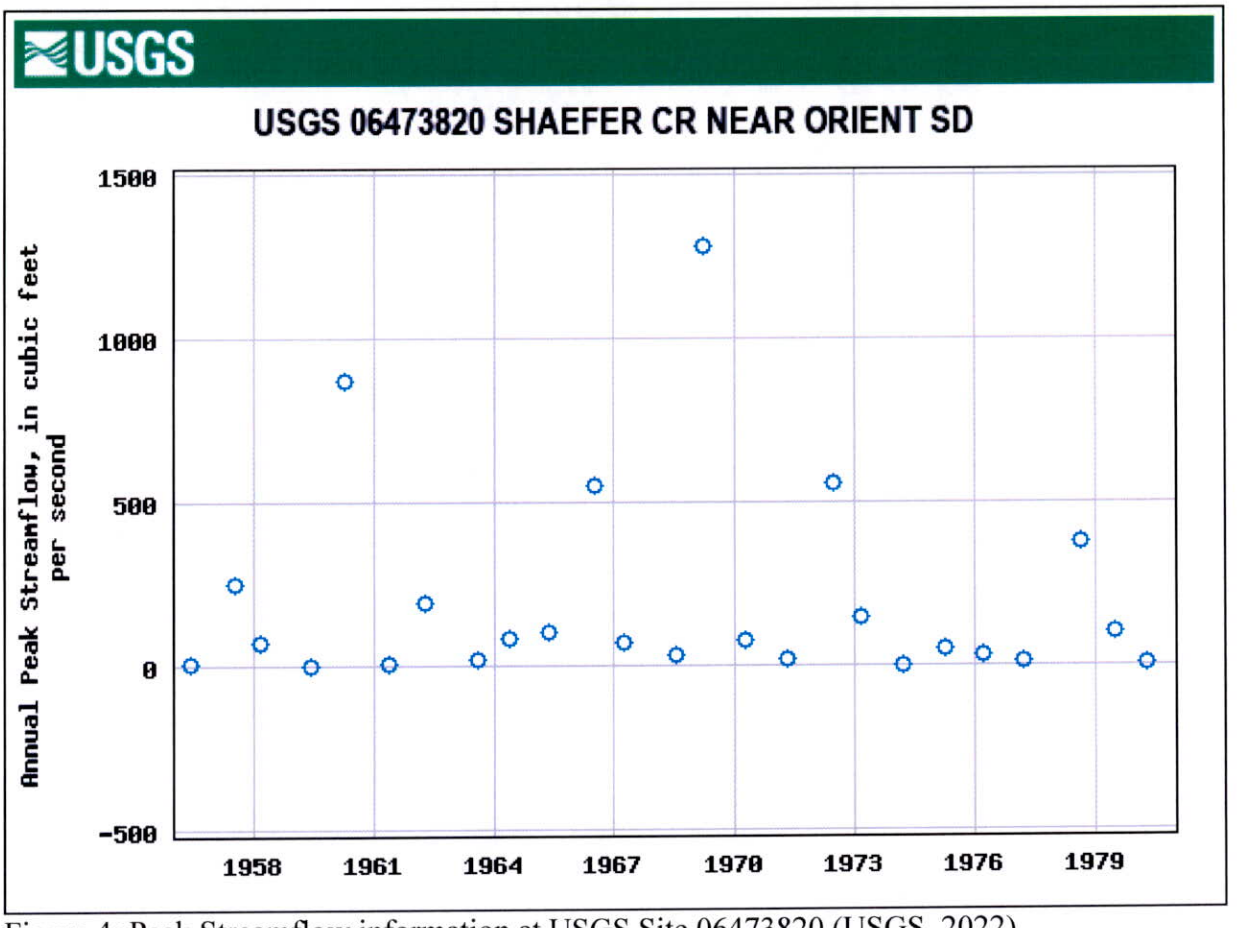


Figure 4: Peak Streamflow information at USGS Site 06473820 (USGS, 2022)

Annual peak streamflow consists of a single streamflow reading that is the highest streamflow reading for the year. The insight provided by annual peak streamflow on water availability is limited, since information is not included on duration of streamflow or number of days which streamflow occurred. What the annual peak streamflow does offer is support for the estimates of the annual surface runoff volume. For example, in examining the data for Site 06473800 (due to its small drainage area and closer proximity to the proposed dam site) of the 16 years of data, nine years have annual peak flows in the range of 0 to 20 cubic feet per second (cfs).

Once filled annual water losses from the reservoir will be likely due to evaporation, livestock use, and seepage. Using data from 1956 to 1970, NOAA (1982) provided annual free water surface evaporation data for the contiguous United States. Utilizing NOAA (1982), the estimated annual free water surface evaporation for the proposed dam site is 44 inches per year (approximately 3.67 ft per year). Poudyal (2006) created average pan evaporation maps for the State of South Dakota. Utilizing Poudyal (2006), average April-October pan evaporation rate is estimated at 46 inches and average November-March pan evaporation rate is estimated at 8.5 inches for the proposed dam site. Poudyal (2006) suggests a correction factor of 0.7 to adjust pan evaporation to reservoir or lake evaporation. Based on the submitted plans for the dam, the area of the proposed reservoir at the primary spillway elevation (normal pool) is 7.91 acres. Applying the presented evaporation

rates over the area of the reservoir results in an estimated average annual evaporation loss range of 25 to 29 acre-ft per year. Information is not available to estimate losses to livestock use or seepage. Livestock use will be highly dependent on pasture management. While the submitted plans for the dam include a cutoff trench and indicated the dam will be located on generally clayey soils which should reduce seepage, most earth embankment dam have some seepage losses but what is average loss to seepage for a dam is usually not known until after years of operation.

Based on the annual surface runoff yield estimates the amount of runoff needed to fill the proposed reservoir to the primary spillway elevation from dry only has an approximately 39.6 percent chance of occurrence annually. To put this into a frame of reference of a 10 year period, on average enough annual runoff to fill the reservoir to normal storage is estimated to occur about 4 years out of a 10 year period. There is a 50% chance of annual runoff being approximately equal to estimated average annual evaporation losses so, on average, enough annual runoff to equal evaporation loss occurs about every 5 years out of a 10 year period. These estimates are not a guarantee of what will occur in any given 10 year period, but an on average, over time estimate.

The annual surface runoff yield estimates indicated that during wetter years sufficient water is expected to be available for the project. However, the water sources cannot be depended upon as a reliable source during times of drier climatic conditions. Especially, during multi-year drier periods when annual evaporation losses from the reservoir are not fully replaced for several years, which could eventually dry up the reservoir until refilled during a wetter period.

Existing Users

There are no water rights/permits on Matter Creek downstream of the proposed dam site to its confluence with Shaefer Creek (Water Rights, 2022a). There are also no water rights/permits between the confluence of Shaefer and Matter Creeks and the confluence of Shaefer Creek and North Wolf Creek (Water Rights, 2022a). These confluences are shown in Figure 1.

In looking at the 2020 USDA Farm Service Agency (FSA) imagery, there are several impoundments located on Matter Creek downstream of the proposed dam location (shown in Figure 4). The nearest of these is approximately 0.93 stream miles downstream of the proposed dam location in the NE ¼ SE ¼ Section 21-T116N-R69W. Based on the available land ownership information it is likely that this impoundment belongs to the applicant (County-Wide Directory, 2020 and First District, 2022). The next downstream impoundment visible on the 2020 FSA imagery is located approximately 2.1 stream miles downstream (of the proposed dam site) in the NE ¼ of Section 27-T116N-R69W. This impoundment is also located approximately 0.85 stream miles downstream of where a tributary of Matter Creek confluences with Matter Creek. A review of location notices on file with the Water Right Program did not result in a location notice being matched to either structure (Water Rights. 2022b).

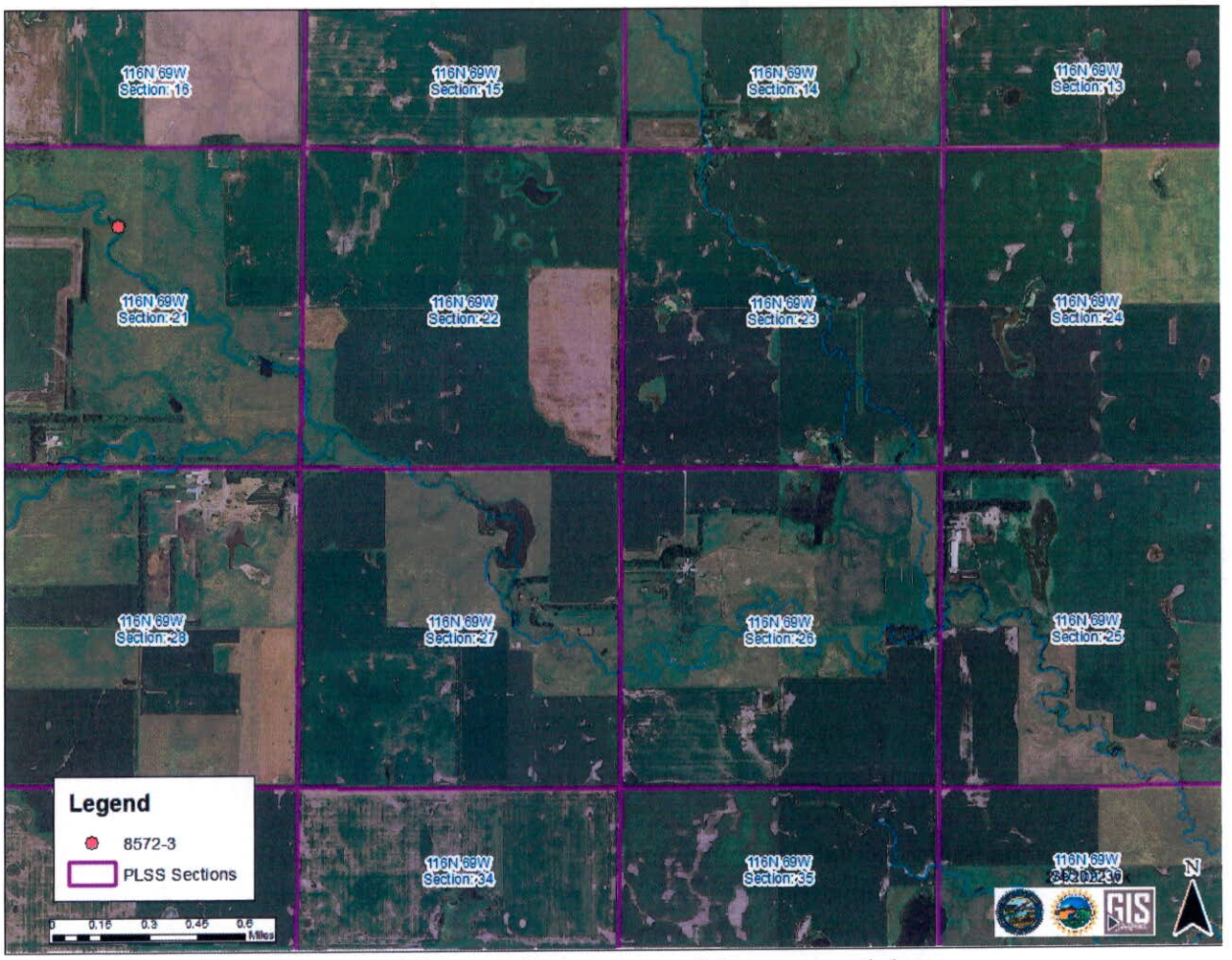


Figure 4: 2020 FSA imagery of the area downstream of the proposed dam

Based on the 2020 FSA imagery, the downstream impoundment that is located approximately 2.1 stream miles downstream (of the proposed dam site) has an approximate areal extent of 11 acres. Estimated annual evaporation from the 11 acres impoundment ranges from 40 to 42 acre-ft per year (Poudyal, 2006 and NOAA, 1982). The tributary of Matter Creek that confluences with Matter Creek between this impoundment and the proposed dam has a water shed area of approximately 6,217 acres (9.7 square miles). The estimated total annual surface yields from runoff for the watershed are presented in Table 3. The upper half of the watershed has multiple prairie pothole type features, and the NRCS annual surface yield method suggests shallow potholes be considered as non-contributing for more dependable yield forecasts; therefore, the estimated total annual surface yields from runoff from just the lower half of the watershed (an approximately 2,532 acre area) are also included in Table 3. Given the estimated 80 percent chance of occurrence for annual runoff for just the lower portion of the downstream tributary is slightly above estimated annual evaporation losses from the downstream impoundment, this application is not expected to unlawfully impair existing domestic users. However, out of an abundance of caution a low flow bypass qualification is recommended as a qualification if this application is approved.

Table 3: Estimated Total Annual Yield of Surface Runoff (USDA-NRCS, 1984)

Percent Chance of Occurrence	Full Watershed Total Runoff (acre-feet)	Lower Portion of Watershed Total Runoff (acre-feet)
80	121.7	49.6
50	318.6	129.8
20	828.9	337.6
10	1295.2	527.5

Review of the Proposed Dam

The proposed dam was designed by the Natural Resources Conservation Service (NRCS). The dam is designed to have a height of 17 feet. Pool data for the dam is summarized in Table 3.

Table 4: Summary of Storage Information

	Elevation (ft)	Storage (acre-ft)	Area (acres)
Normal Storage (primary spillway)	1680	43.5	7.91
Intermediate Storage (secondary spillway)	1681.7	57.4	9.46
Maximum Storage (top of dam)	1684.2	85.9	12.41

NRCS conducted a breach analysis with HEC-RAS for the proposed dam utilizing LiDAR elevation data with dam failure occurring with the water level at the top of dam. The simulated breach development time was 2.5 hours with a watershed Mannings n value of 0.08. The resulting inundation map indicates the downstream structures in the NE ¼ SE ¼ Sec. 21-T116-69W and NE ¼ Sec. 27-T1116N-69W would not be expected to be affected by the modeled dam breach. Therefore, the dam will be classified as a small sized, category 3 dam under the ARSD Chapter 74:02:08 Safety of Dams rules. A category 3 dam is defined as a low hazard dam whose failure may cause limited damage to agricultural lands or county and township roads or minimum economic loss. A dam of this size and hazard classification that qualifies for an ARSD 74:02:08:07.01 category 3 design flood exemption (and the proposed dam qualifies) must be able to pass a minimum design flood of the 25 year, 24 hour flood event.

The designed primary spillway for the dam consists of a 36 inch precast concrete riser into a 16 inch diameter DR 25 C905 PVC conduit. The primary spillway has an estimated maximum discharge capacity of approximately 25.8 cubic feet per second (cfs). The secondary (or auxiliary) spillway is an earthcut structure with a bottom width of 100 feet and an estimated maximum discharge capacity of approximately 966 cfs.

The NRCS design engineer for this dam analyzed the design using the NRCS SITES program. The NRCS SITES program is a program commonly used by NRCS as part of dam design. The program was used to model the dam during a 50 year, 24 hour design storm (which is a larger event than required design storm for this structure under SD Safety of Dams Rules). When the 50 year, 24 hour design storm was routed (which accounts for both spillway capacity and detention storage in the dam) through the proposed dam with a starting reservoir level at normal pool; the principal spillway operates at maximum capacity and the modeled secondary spillway discharge is 371.6

cfs with a flow depth of 1.480 ft. So, at the 50 year, 24 hour design storm maximum reservoir level is expected to reach an approximate elevation of 1683.18 ft, which is below the top of the dam (elevation 1684.2 ft). Therefore, since the proposed dam can handle a larger design storm than required by rule, the spillway system capacity of the proposed dam meets SD Safety of Dams rules.

Conclusions

1. Water Permit Application No. 8572-3 proposes to impound 43.5 acre-feet of water from runoff by constructing a dam located in the E ½ NW ¼ Section 21 T116N-R69W for recreation and livestock water purposes.

2. The annual surface runoff yield estimates indicated that during wetter years sufficient water is expected to be available for the project. However, the water sources cannot be depended upon as a reliable source during times of drier climatic conditions.

3. Approval of this application is not expected to unlawfully impair existing water rights/permits.

4. If the application is approved, a low flow bypass requirement for downstream domestic use is recommended as a qualification.

5. The plans and specifications for this small sized, category 3 dam will be approved for compliance with ARSD Chapter 74:02:08; however, construction cannot begin until the Water Permit Application No. 8572-3 has been approved.

Whitney Kilts
SDDANR-Water Rights Program

Reviewed by:

Mark Rath
SDDANR-Water Rights Program

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Water Rights. 2022b. Location Notices. SD DANR-Water Rights Program, Joe Foss Building, Pierre, South Dakota.

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PROGRAM

AFFIDAVIT OF PUBLICATION
The Miller Press

STATE OF SOUTH DAKOTA)
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County of Hand)

Michael G. Caviness of said county being first duly sworn, on oath, says that he is the publisher of *The Miller Press*, a weekly newspaper published in Miller, said County of Hand by Hand County Publishing Co., Inc. and has full and personal knowledge of all the facts herein stated: that said newspaper is a legal newspaper and has been published within said County for fifty weeks next prior to the publication of the notice, herein mentioned, and was and is printed wholly or in part in an office maintained at said place of publication; that the

Martinmaas files water appropriation permit

a printed copy of which, taken from the paper in which the same was published, is attached to this sheet, and is made a part of this Affidavit, was published in said newspaper at least once each week for 1 successive week(s), on the day of each week on which said newspaper was regularly published, to wit:

4/30 20 22; _____ 20___;

_____ 20___; _____ 20___

_____ 20___; _____ 20___

that the full amount of the fees for the publication of the annexed notice is

$ 40.02

Michael G. Caviness, Publisher

Subscribed and sworn to before me this 10 day of May 2022.

Janet L. Kittelsen, Notary Public
My Commission expires: 7-25-26

Martinmaas files water appropriation permit

NOTICE OF APPLICATION NO. 8572-3 to Appropriate Water

Notice is given that Ray Martinmaas, 35210 176th St, Orient SD 57467 has filed an application for a water permit to impound 43.5 acre-feet of water from runoff by constructing a dam on Matter Creek located in the E 1/2 NW 1/4 Section 21 with water impounded in the N 1/2 NW 1/4 Section 21; all in T116N-R69W. This application requests impoundment of sufficient water to maintain water to the outlet elevation. The water is for recreation and livestock water purposes. This site is located approximately 4 miles southwest of Orient SD.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 8572-3 with qualifications because 1) unappropriated water is available, 2) existing domestic water uses and water rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest as it pertains to matters within the regulatory authority of the Water Management Board. The Chief Engineer's recommendation with qualifications, the application, and staff report are available at https://danr.sd.gov/public or contact Ron Duvall for this information, or other information, at the Water Rights Program address provided below.

Any person interested in opposing this application or recommendation shall allege that the application, upon approval, will cause injury to the person that is unique from any injury suffered by the public in general. The injury must concern a matter either within the regulatory authority found in SDCL 46-2A-9 for approval or denial of the application, or other matter concerning the application within the regulatory authority of the board to act upon as defined by SDCL 46-2-9 and 46-2-11, or both. Any person meeting the petitioner requirements and wishing to be a party of record in a contested case hearing shall file a written petition to oppose the application with BOTH the applicant and Chief Engineer. A petition opposing the application shall be filed on a form provided by the Chief Engineer. The petition form is available online at https://danr.sd.gov/public or by contacting the Chief Engineer. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501" or call (605) 773-3352. The applicant's mailing address is given above. If contesting the Chief Engineer's recommendation, the applicant shall also file a petition. A petition filed by either an interested person or the applicant must be filed by May 10, 2022.

The petition shall include a statement describing the unique injury upon approval of the application on the petitioner, the petitioner's reasons for opposing the application, and the name and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained.

Any interested person may file a comment on the application with the Chief Engineer. The comment shall be filed on a form provided by the Chief Engineer and is available online at https://danr.sd.gov/public or by calling (605) 773-3352 or writing the Chief Engineer at the address provided above. Filing a comment does not make the commenter a party of record or a participant in any hearing that may be held. Any comment must be filed by May 10, 2022.

If the applicant does not contest the recommendation of the Chief Engineer and no petition to oppose the application is received, the Chief Engineer shall act on the application pursuant to the recommendation with no hearing held before the Water Management Board. 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.

Published April 30, 2022, at the total approximate cost of $40.02.

LOCALiQ
Aberdeen News
Watertown Public Opinion
PO Box 630567 Cincinnati, OH 45263-0567

PROOF OF PUBLICATION

Karen Schlaak
Ray Martinmaas
35210 176Th ST
Orient SD 57467-5104

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STATE OF SOUTH DAKOTA, COUNTY OF BROWN

The AMERICAN NEWS is a daily newspaper of general circulation, printed and published in Aberdeen, Brown County, South Dakota, and has been such a newspaper during the times hereinafter mentioned; and personal knowledge of the facts herein state that the notice hereto annexed was Published in said newspapers in the issue dated:

05/13/2022

That said newspaper is a legal newspaper published five days or more each week; with a bona fide circulation of more than two hundred copies daily; published in the English language within the said county of Brown for more than one year prior to the first publication of said notice; and printed in whole in an office maintained at the place of publication of said newspaper.
Sworn to and subscribed before on 05/13/2022

Legal Clerk

Notary, State of WI, County of Brown

9-19-25

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NOTICE OF
APPLICATION NO. 8572-3
to Appropriate Water

Notice is given that Ray Martinmaas, 35210 176th St, Orient SD 57467 has filed an application for a water permit to impound 43.5 acre-feet of water from runoff by constructing a dam on Matter Creek located in the E 1/2 NW 1/4 Section 21 with water impounded in the N 1/2 NW 1/4 Section 21; all in T116N-R69W. This application requests impoundment of sufficient water to maintain water to the outlet elevation. The water is for recreation and livestock water purposes. This site is located approximately 4 miles southwest of Orient SD.

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https://danr.sd.gov/public
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The petition shall include a statement describing the unique injury upon approval of the application on the petitioner, the petitioner's reasons for opposing the application, and the name and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained.

Any interested person may file a comment on the application with the Chief Engineer. The comment shall be filed on a form provided by the Chief Engineer and is available online at https://danr.sd.gov/public or by calling (605) 773-3352 or writing the Chief Engineer at the address provided above. Filing a comment does not make the commenter a party of record or a participant in any hearing that may be held. Any comment must be filed by May 23, 2022.

If the applicant does not contest the recommendation of the Chief Engineer and no petition to oppose the application is received, the Chief Engineer shall act on the application pursuant to the recommendation with no hearing held before the Water Management Board. 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.

Published once at the total approximate cost of $48.12.

May 13, 2022 #7282184

Schlaak, Karen

From: Schlaak, Karen
Sent: Tuesday, April 19, 2022 12:30 PM
To: Miller Press (news@themillerpress.com)
Subject: 8572-3, Ray Martinmaas
Attachments: 8572-3public.short_final.docx; FORM8.FRM.doc

Attached is a notice to be published on April 30, 2022.

Ray Martinmaas, 35210 176th St, Orient SD 57467 (605 450-0990) has been notified to contact you to authorize publication and arrange for payment.

Please send the affidavit or return the attached Proof of Publication form ASAP to the Water Rights Program, 523 E Capitol, Pierre SD 57501.

Let me know if you have questions. Please acknowledge receipt of this email.

Karen Schlaak
DANR - Water Rights Program
(605) 773-3352
Website: https://danr.sd.gov

Schlaak, Karen

From: Schlaak, Karen
Sent: Tuesday, April 19, 2022 12:31 PM
To: Aberdeen News Legals (aan-legals@aberdeennews.com)
Subject: 8572-3, Ray Martinmaas
Attachments: 8572-3public.short_final.docx; FORM8.FRM.doc

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(605) 773-3352
Website: https://danr.sd.gov

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
JOE FOSS BUILDING
523 E CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

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

April 19, 2022

Ray Martinmaas
35210 176th St
Orient SD 57467

Dear Mr. Martinmaas:

Water Permit Application No. 8572-3 for recreation and livestock water use have been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice has been sent to the Miller Press printed at Miller (Ph # 605 853-3575) and the American News printed at Aberdeen (Ph # 605 225-4100). You will need to contact the newspapers 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 newspapers to authorize publication of your Notice and to arrange for payment. Early contact with the papers can eliminate delays. Upon receiving authorization from you, the publishers have been instructed to publish your notice. The newspapers have 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,

Karen Schlaak

Karen Schlaak
Water Rights Program
(605) 773-3352

enclosures

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

Instruction to Newspaper - Publish the Notice on April 30, 2022. The applicant is responsible for payment.

NOTICE OF APPLICATION NO. 8572-3 to Appropriate Water

Notice is given that Ray Martinmaas, 35210 176th St, Orient SD 57467 has filed an application for a water permit to impound 43.5 acre-feet of water from runoff by constructing a dam on Matter Creek located in the E 1/2 NW 1/4 Section 21 with water impounded in the N 1/2 NW 1/4 Section 21; all in T116N-R69W. This application requests impoundment of sufficient water to maintain water to the outlet elevation. The water is for recreation and livestock water purposes. This site is located approximately 4 miles southwest of Orient SD.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 8572-3 with qualifications because 1) unappropriated water is available, 2) existing domestic water uses and water rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest as it pertains to matters within the regulatory authority of the Water Management Board. The Chief Engineer's recommendation with qualifications, the application, and staff report are available at https://danr.sd.gov/public or contact Ron Duvall for this information, or other information, at the Water Rights Program address provided below.

Any person interested in opposing this application or recommendation shall allege that the application, upon approval, will cause injury to the person that is unique from any injury suffered by the public in general. The injury must concern a matter either within the regulatory authority found in SDCL 46-2A-9 for approval or denial of the application, or other matter concerning the application within the regulatory authority of the board to act upon as defined by SDCL 46-2-9 and 46-2-11, or both. Any person meeting the petitioner requirements and wishing to be a party of record in a contested case hearing shall file a written petition to oppose the application with BOTH the applicant and Chief Engineer. A petition opposing the application shall be filed on a form provided by the Chief Engineer. The petition form is available online at https://danr.sd.gov/public or by contacting the Chief Engineer. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501" or call (605) 773-3352. The applicant's mailing address is given above. If contesting the Chief Engineer's recommendation, the applicant shall also file a petition. A petition filed by either an interested person or the applicant must be filed by May 10, 2022.

The petition shall include a statement describing the unique injury upon approval of the application on the petitioner, the petitioner's reasons for opposing the application, and the name and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained.

Any interested person may file a comment on the application with the Chief Engineer. The comment shall be filed on a form provided by the Chief Engineer and is available online at https://danr.sd.gov/public or by calling (605) 773-3352 or writing the Chief Engineer at the address provided above. Filing a comment does not make the commenter a party of record or a participant in any hearing that may be held. Any comment must be filed by May 10, 2022.

If the applicant does not contest the recommendation of the Chief Engineer and no petition to oppose the application is received, the Chief Engineer shall act on the application pursuant to the recommendation with no hearing held before the Water Management Board. 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.

Published once at the total approximate cost of_

Schlaak, Karen

From: Gannett Legals Public Notices 4 <ganlegpubnotices4@gannett.com>
Sent: Monday, May 9, 2022 12:07 PM
To: Schlaak, Karen
Subject: RE: [EXT] 7195113 8572-3, Ray Martinmaas

Good Afternoon,

It appears that this ad did not publish as we never received prepayment.

Thank you!

Brittany Grady
Public Notice Representative

USA TODAY NETWORK LOCALiQ

Office: 844-254-5287

From: Schlaak, Karen <Karen.Schlaak@state.sd.us>
Sent: Monday, May 9, 2022 11:26 AM
To: Gannett Legals Public Notices 4 <ganlegpubnotices4@gannett.com>
Subject: RE: 7195113 8572-3, Ray Martinmaas

Please send me the affidavit for this publication.
Thanks

From: Gannett Legals Public Notices 4 <ganlegpubnotices4@gannett.com>
Sent: Tuesday, April 19, 2022 1:54 PM
To: Schlaak, Karen <Karen.Schlaak@state.sd.us>
Subject: RE: [EXT] 7195113 8572-3, Ray Martinmaas

Good afternoon,

The notice is scheduled to publish in the American News on April 30. The total cost is $48.12 and a proof is attached.

Thank you!

Brittany Grady
Public Notice Representative

USA TODAY NETWORK LOCALiQ

Office: 844-254-5287

Schlaak, Karen

From: Schlaak, Karen
Sent: Tuesday, May 10, 2022 10:49 AM
To: Aberdeen News Legals (aan-legals@aberdeennews.com)
Subject: 8572-3, Ray Martinmaas
Attachments: 8572-3public.short_final.docx; FORM8.FRM.doc

Attached is a notice to be published on May 13, 2022.

Ray Martinmaas, 35210 176th St, Orient SD 57467 (605 450-0990) has been notified to contact you to authorize publication and arrange for payment.

Please send the affidavit or return the attached Proof of Publication form ASAP to the Water Rights Program, 523 E Capitol, Pierre SD 57501.

Let me know if you have questions. Please acknowledge receipt of this email.

Karen Schlaak
DANR - Water Rights Program
(605) 773-3352
Website: https://danr.sd.gov

Instruction to Newspaper - Publish the Notice on May 13, 2022. The applicant is responsible for payment.

NOTICE OF APPLICATION NO. 8572-3 to Appropriate Water

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Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 8572-3 with qualifications because 1) unappropriated water is available, 2) existing domestic water uses and water rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest as it pertains to matters within the regulatory authority of the Water Management Board. The Chief Engineer's recommendation with qualifications, the application, and staff report are available at https://danr.sd.gov/public or contact Ron Duvall for this information, or other information, at the Water Rights Program address provided below.

Any person interested in opposing this application or recommendation shall allege that the application, upon approval, will cause injury to the person that is unique from any injury suffered by the public in general. The injury must concern a matter either within the regulatory authority found in SDCL 46-2A-9 for approval or denial of the application, or other matter concerning the application within the regulatory authority of the board to act upon as defined by SDCL 46-2-9 and 46-2-11, or both. Any person meeting the petitioner requirements and wishing to be a party of record in a contested case hearing shall file a written petition to oppose the application with BOTH the applicant and Chief Engineer. A petition opposing the application shall be filed on a form provided by the Chief Engineer. The petition form is available online at https://danr.sd.gov/public or by contacting the Chief Engineer. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501" or call (605) 773-3352. The applicant's mailing address is given above. If contesting the Chief Engineer's recommendation, the applicant shall also file a petition. A petition filed by either an interested person or the applicant must be filed by May 23, 2022.

The petition shall include a statement describing the unique injury upon approval of the application on the petitioner, the petitioner's reasons for opposing the application, and the name and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained.

Any interested person may file a comment on the application with the Chief Engineer. The comment shall be filed on a form provided by the Chief Engineer and is available online at https://danr.sd.gov/public or by calling (605) 773-3352 or writing the Chief Engineer at the address provided above. Filing a comment does not make the commenter a party of record or a participant in any hearing that may be held. Any comment must be filed by May 23, 2022.

If the applicant does not contest the recommendation of the Chief Engineer and no petition to oppose the application is received, the Chief Engineer shall act on the application pursuant to the recommendation with no hearing held before the Water Management Board. 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.

Published once at the total approximate cost of _

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

JUN 2 1 2022

Ray Martinmaas
35210 176th St
Orient SD 57467

Dear Mr. Martinmaas:

Enclosed is Water Permit No. 8572-3 authorizing construction of the dam 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.

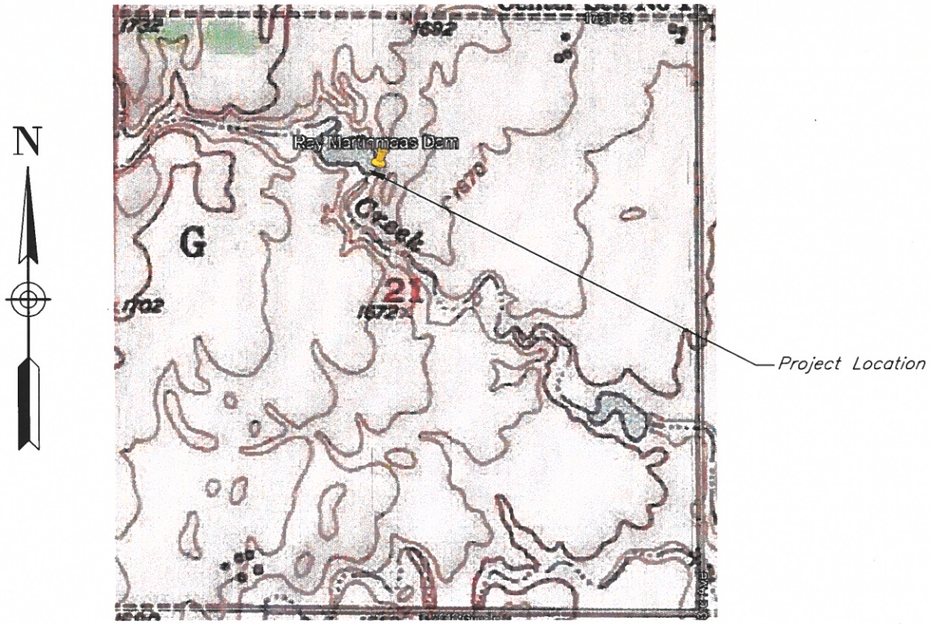
Sincerely,

Eric Gronlund

Eric Gronlund, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures

ASBUILTS



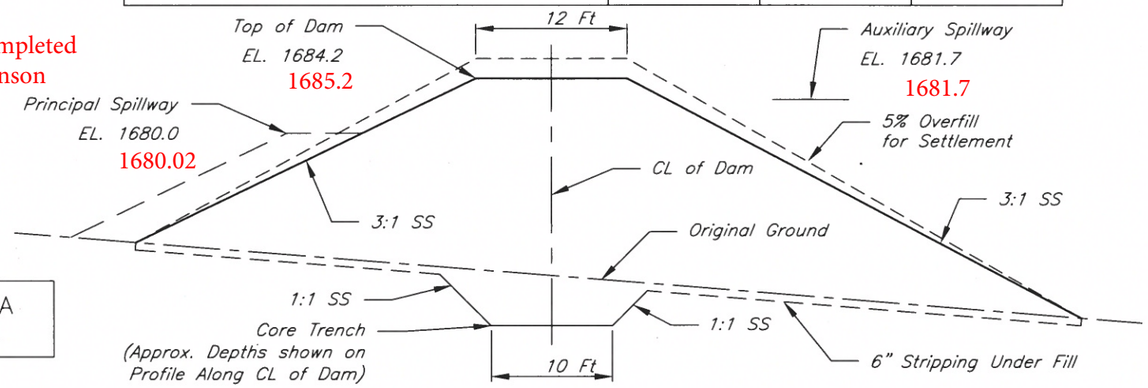
NW 1/4, Sec 21, T116N, R69W

Hand County, South Dakota

LOCATION MAP

As built survey and inspection completed by Angela Roman and Nathan Benson on October 14, 2022.

TABLE OF QUANTITIES			
ITEM	UNIT	QUANTITY	AS–BUILT
Earthfill Class S – Embankment	Cu. Yd.	5,749	5,749
Earthfill Class S – Core Trench	Cu. Yd.	287	2,112
Earthfill Class S – Stripping	Cu. Yd.	543	543
Earthfill Class S – Berm	Cu. Yd.	385	385
Earthfill Class S – 5%	Cu. Yd.	348	439
Total Earthfill	Cu. Yd.	7,312	9,228
Topsoil Auxiliary Spillway	Cu. Yd.	406	406
Seeding (Earthfill and Auxiliary Spillway)	Acre	1.1	
Seeding not completed at time of survey 10/14/22			
Principal Spillway Pipe			
16" Dia. DR 25 C905 PVC Pipe 15" Dia. SDR 26 PVC Pipe ASTM D3034	Lin. Ft.	80	82
36" Dia. 4' Tall Riser and Base	Each	1	1
with Trash Rack and Baffle	Each	1	1
Drainage Diaphragm	Each	1	1
Timber Pipe Support	Each	1	1



TYPICAL CROSS SECTION OF DAM

NRCS HAZARD CLASS A
NRCS JOB CLASS III

GENERAL NOTES

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

CONSTRUCTION NOTES

1. Clear and grub the entire area within the work limits.
2. All fill material must not contain frozen material, sod, roots, or other perishable material, or rock larger than eight inches in diameter as described in SD Construction Specification SD–7S.
3. Any shale, gravel, or sand that is exposed during borrow operations shall be immediately backfilled with 2 feet of clay material.
4. Six inches topsoil will be incorporated into the earthfill to meet the neat lines shown on the typical section.
5. All areas top–dressed with topsoil and disturbed during construction will be seeded according to SD Construction Specification SD–28.

SD CONSTRUCTION AND MATERIAL SPECIFICATIONS

SD–4 Stripping
SD–5 Excavation
SD–7S Earthfill – Class S
SD–8 Rock Riprap And Bedding
SD–10 Salvaging And Spreading Topsoil
SD–12A Concrete (Class 3500)
SD–13 Steel Reinforcement
SD–14 Wood And Steel Structures
SD–28 Seeding
SD–55 Plastic Pipe
For A Full Text Version See
http://www.sd.usda.gov/technical/SD_Engineering.html

INDEX OF DRAWINGS

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

STATEMENT OF COMPLIANCE

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

JAA Date

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

POND WITH PRINCIPAL SPILLWAY PIPE
JOB PLAN 1.0P REV. 4/2016

Date
Designed Nathan Benson 11/22/2019
Drawn Nathan Benson 11/22/2019
Checked Angela Roman 12/4/19
Approved Angela Roman 12/4/19

RAY MARTINMAAS
378 POND
COVER SHEET
Hand County, South Dakota
NW 1/4, Sec 21, T116N, R69W

United States Department of Agriculture
USDA Natural Resources Conservation Service

File No. MartinmaasDamL.dgn
Drawing No. –
12/3/19 3:02 PM
Sheet 1 of 9

HYDRAULIC DATA		
Drainage Area	561.8	Acres
Annual Runoff Yield (50% Chance)	21.5	Ac. Ft
Time of Concentration	2.61	Hours
Runoff Curve Number	77	
Principal Spillway, 2 Year – 24 Hour Rainfall	2.20	Inches
Auxiliary Spillway, 50 Year – 24 Hour Rainfall	4.80	Inches
Peak Runoff 2 Year – 24 Hour Rainfall	91.2	CFS
Principal Spillway Discharge	24.1	CFS
Peak Runoff 50 Year – 24 Hour Rainfall	441	CFS
Auxiliary Spillway Discharge	371.6	CFS
Auxiliary Spillway Flow Depth	1.480	Feet

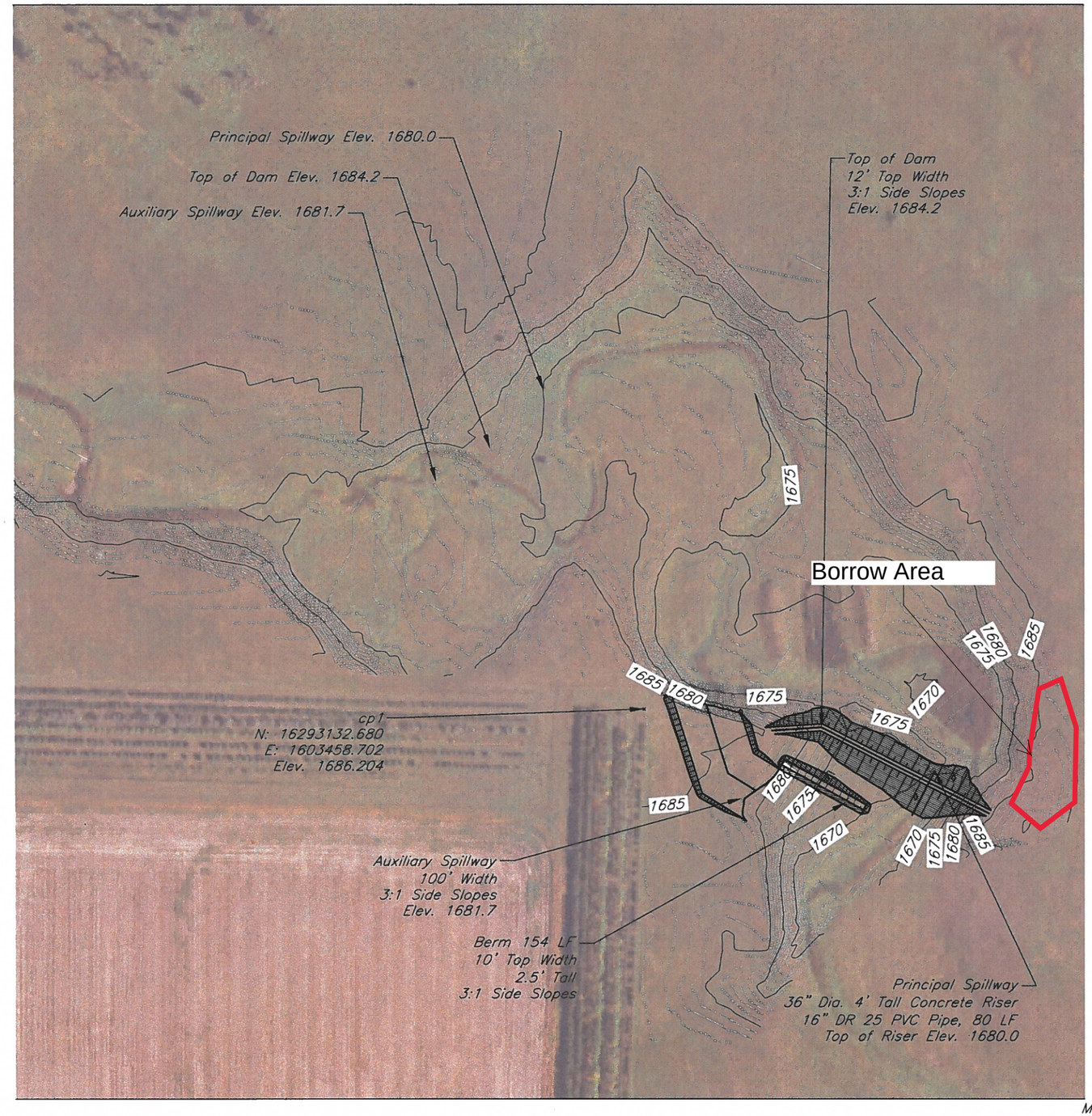
STRUCTURE DATA		
Length of Top of Dam	388	Feet
Water Depth to Crest of Principal Spillway	10	Feet
Height of Downstream Toe to Top of Dam	17.0	Feet
Effective Height	13.8	Feet
Product of Storage X Effective Height	792	

POOL DATA			
	ELEV.	AREA	STORAGE
Crest of Principal Spillway	1680.0	7.91 Ac.	43.5 Ac.–Ft
Crest of Auxiliary Spillway	1681.7	9.46 Ac.	57.4 Ac.–Ft
Top of Dam	1684.2	12.41 Ac.	85.9 Ac.–Ft

SEDIMENT YIELD					
Erodibility Area	Gross Rate (A.F./Ac./Yr.)	Drainage Area (Acres)	Delivery Rate (%)	Design Period (Years)	Required Sediment Volume (Ac.–Ft.)
H	0.0003	561.8	30	25	1.300

BENCHMARK POINTS TABLE					
NO.	ID	ELEVATION	NORTHING	EASTING	BENCHMARK DESCRIPTION
1	cp1	1686.204	16293132.680	1603458.702	Steel rebar near south post of H–brace south of corner of fence line.

N



PLAN VIEW

200 0 200 400 600

Scale in Feet

Date
Designed Nathan Benson 11/22/2019
Drawn Nathan Benson 11/22/2019
Checked Angela Roman 12/4/19
Approved Angela Roman 12/4/19

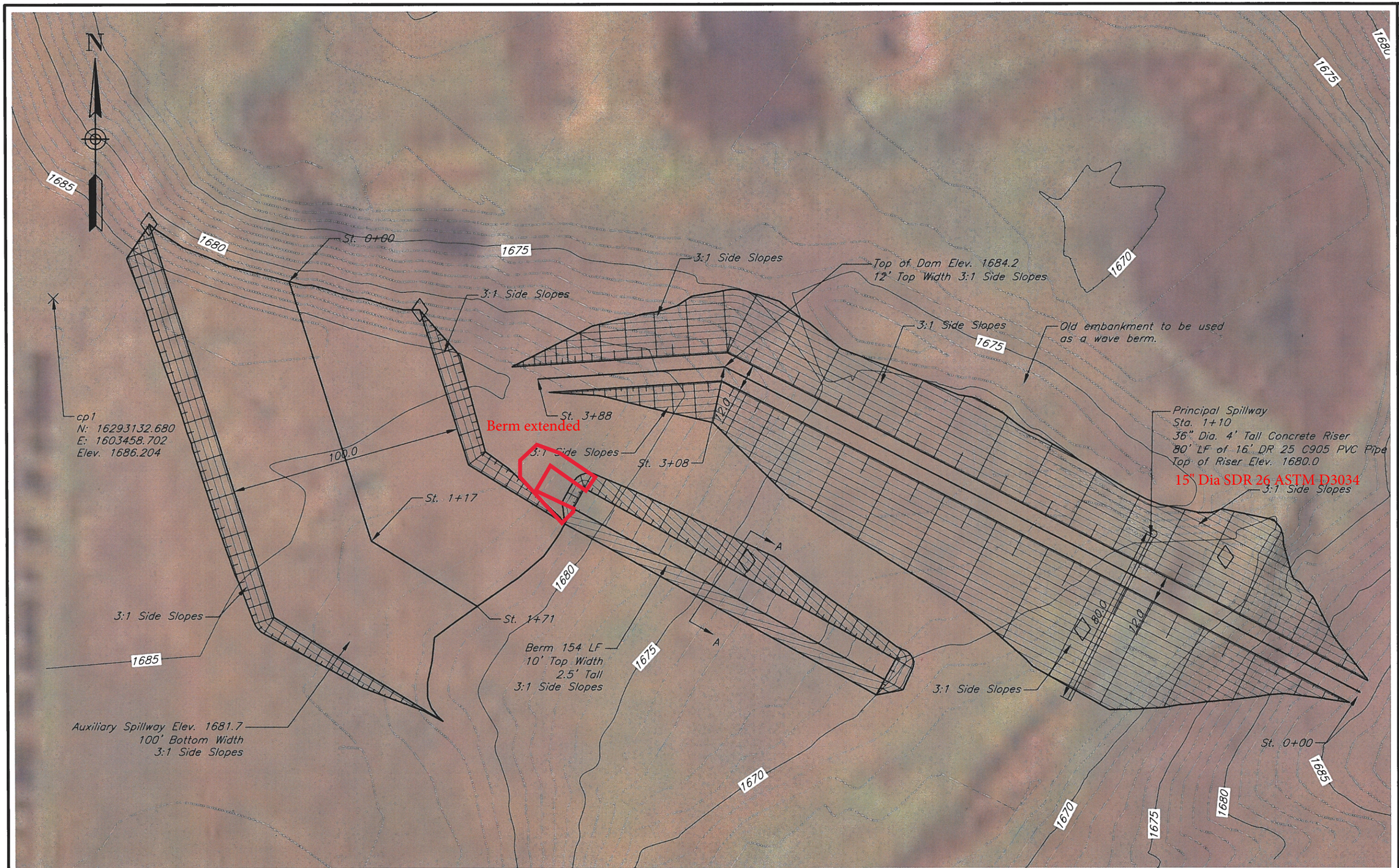
RAY MARTINMAAS
378 POND
PLAN VIEW AND DESIGN DATA
NW 1/4, Sec 21, T116N, R69W
Hand County, South Dakota

United States Department of Agriculture
Natural Resources Conservation Service

File No.
MartinmaasDamL.dw

Drawing No.
–

12/3/19 2:50 PM
Sheet 2 of 9



Auxiliary Spillway Excavation = 1931 CY

PLAN VIEW

40 0 40 80 120

Scale in Feet

Date
Designed Nathan Benson 11/22/2019
Drawn Nathan Benson 11/22/2019
Checked Angela Roman 12/4/19
Approved Angela Roman 12/4/19

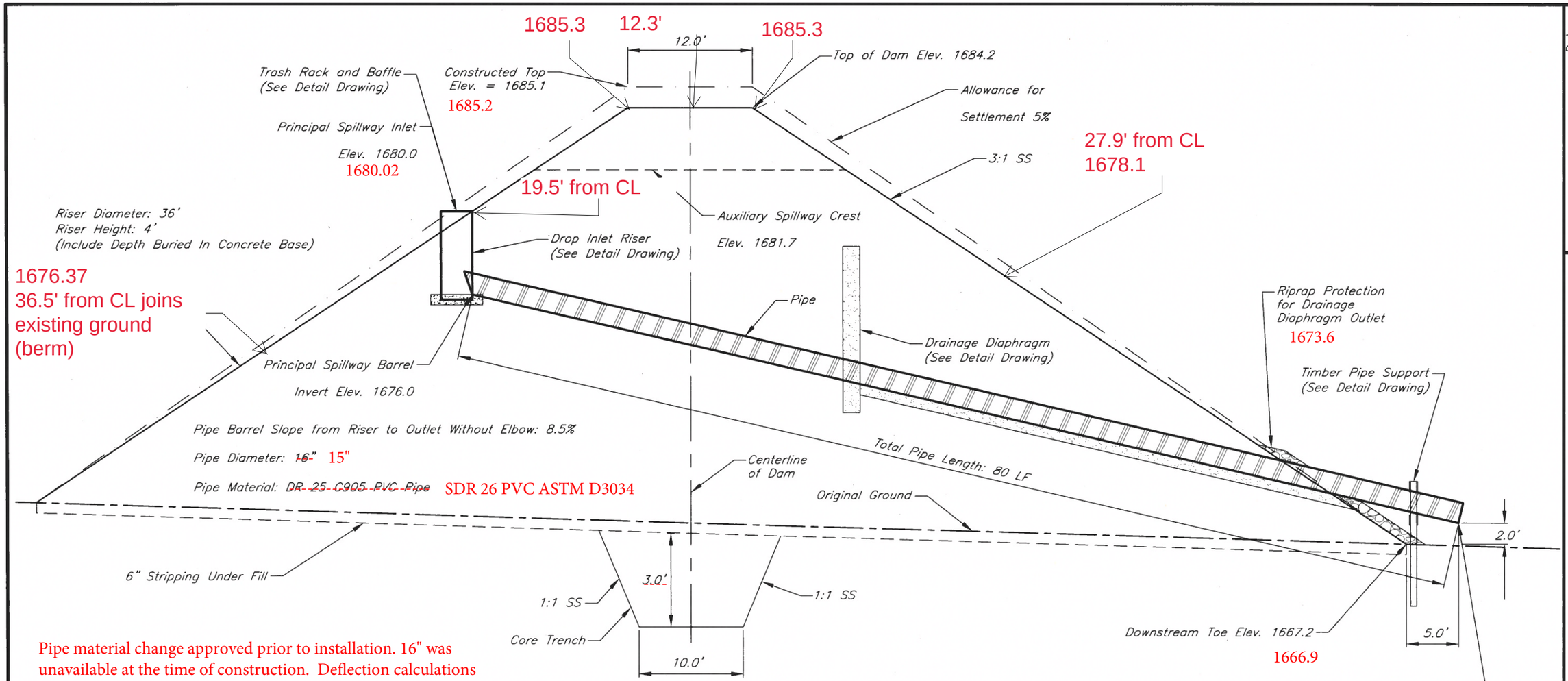
RAY MARTINMAAS
378 POND
PLAN VIEW
NW 1/4, Sec 21, T116N, R69W
Hand County, South Dakota

United States Department of Agriculture
Natural Resources Conservation Service

File No.
MartinmaasDamL.dgn

Drawing No.
-

12/3/19 2:50 PM
Sheet 3 of 9



DROP INLET PRINCIPAL SPILLWAY PROFILE
(No Scale)

Pipe material change approved prior to installation. 16" was unavailable at the time of construction. Deflection calculations were acceptable and original auxiliary spillway elevation still met standards. See file for calculation sheets.
Angela Roman

Core trench, original plans called for 3' core trench, after project was funded and a contractor was located, NRCS completed soil borings on site. At station 2+50 a sand/gravel layer was found approx. 7'-8' below. Planned for a 10' core trench at station 2+50, at station 0+70 good clay was found from surface to 6' depth. During construction, a 2' thick sand layer was found at 7' at station 0+70. Contractor was instructed by Angela Roman to follow sand layer and excavate until good clay. This resulted in a very deep core trench. As built core trench depths are documented on sheet 5. The sand and gravel layers had water moving through them. Contractor noted water was moving from South to North near station 2 +50. Material was excavated and back filled with excellent yellow clay material from borrow site. Bottom of core trench was 2' minimum depth of blue clay.

TRENCH SAFETY NOTES

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

DROP INLET PRINCIPAL SPILLWAY PROFILE

Date
Designed Nathan Benson 11/22/2019
Drawn Nathan Benson 11/22/2019
Checked Angela Roman 12/4/19
Approved Angela Roman 12/4/19

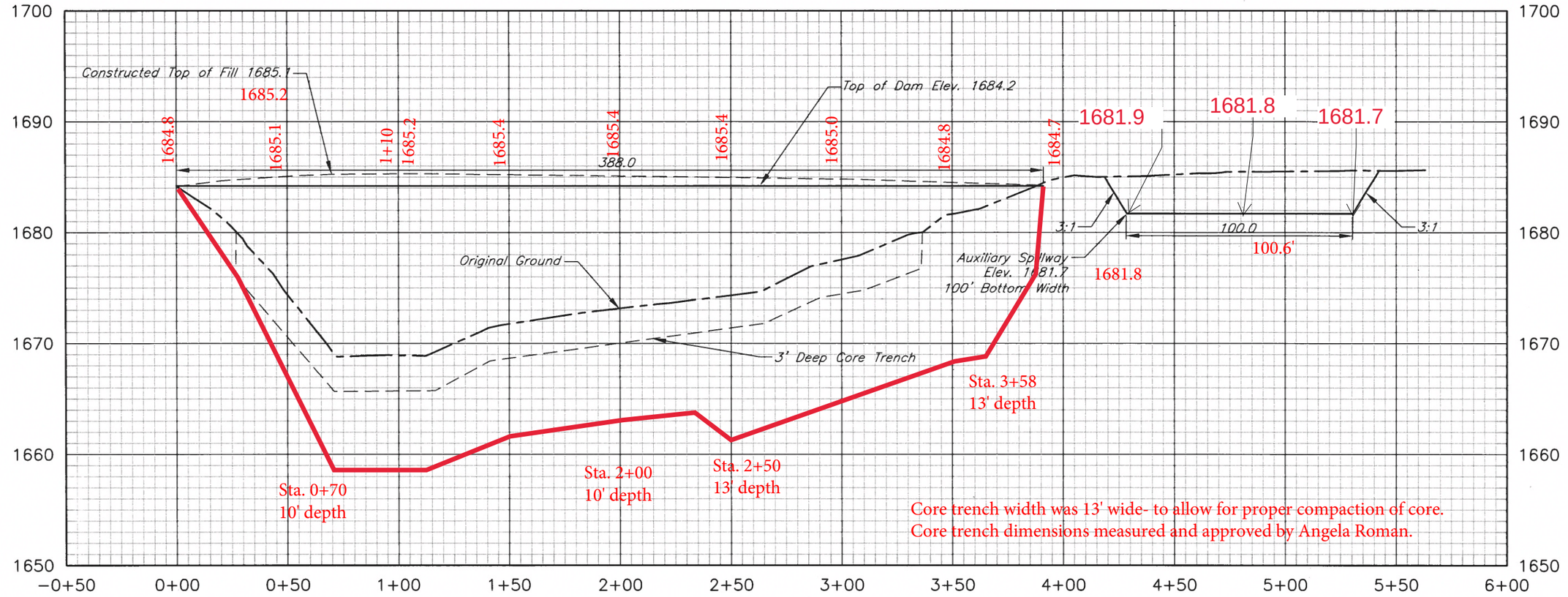
RAY MARTINMAAS
378 POND
PROFILE OF PRINCIPAL SPILLWAY
NW 1/4, Sec 21, T116N, R69W, Hand County, South Dakota

United States Department of Agriculture
Natural Resources Conservation Service

File No.
MartinmaasDamL.dw

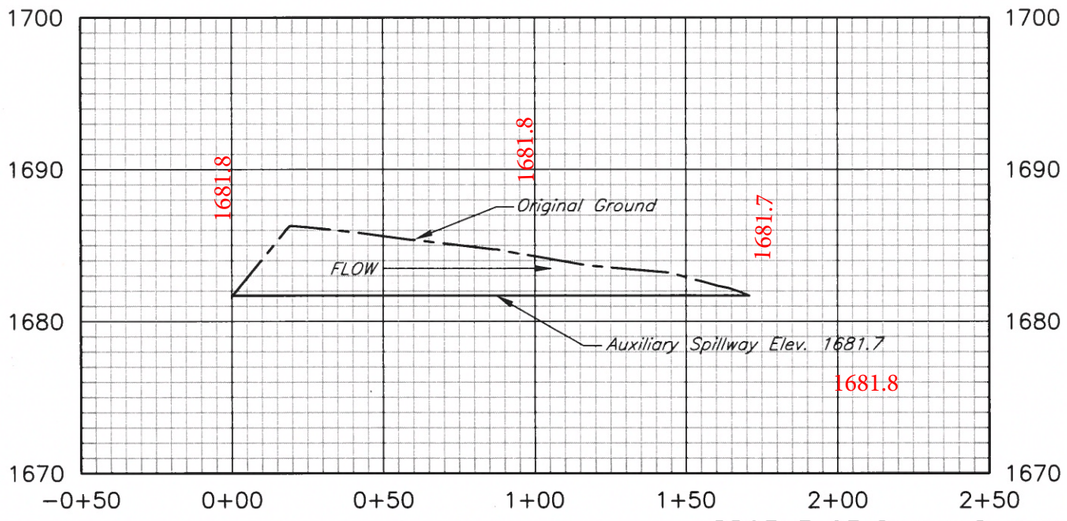
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Sheet 4 of 9



Horizontal Scale: 1"=50' Vertical Scale 1" =10'

DamCL PROFILE

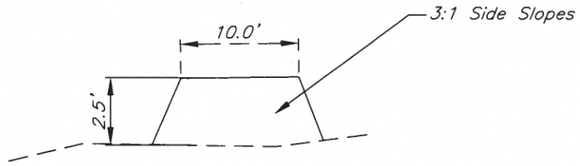


Horizontal Scale: 1"=50' Vertical Scale 1" =10'

CLAux PROFILE

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

Diversion Berm overbuilt as a result of using up material excavated from core trench. Approved by Angela Roman.



Typical Cross Section of Berm (not to scale)

Date
Designed Nathan Benson 11/22/2019
Drawn Nathan Benson 11/22/2019
Checked Angela Roman 12/4/19
Approved Angela Roman 12/4/19

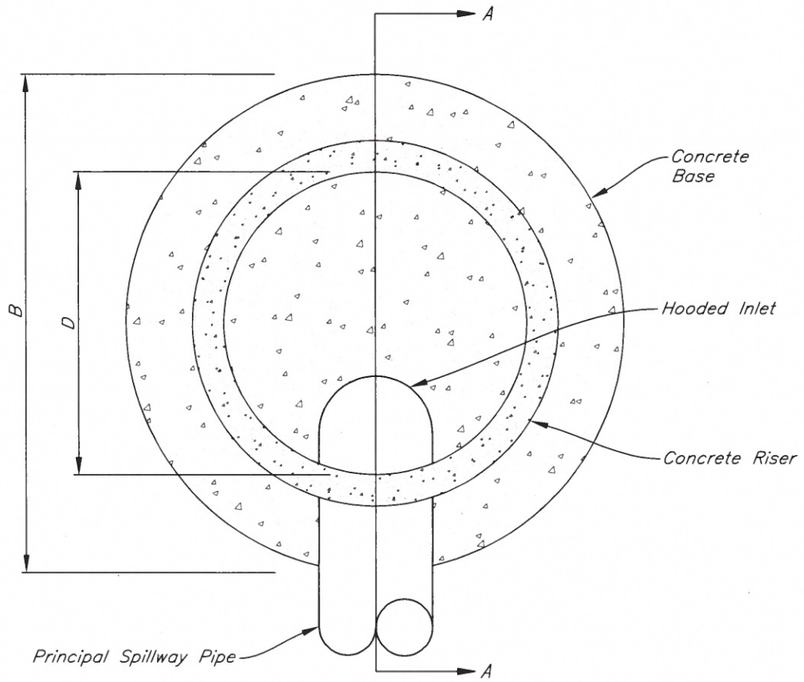
RAY MARTINMAAS
378 POND
PROFILES AND CROSS-SECTIONS OF DAM AND AUXILIARY SPILLWAY
NW 1/4, Sec 21, T116N, R69W
Hand County, South Dakota

United States Department of Agriculture
Natural Resources Conservation Service

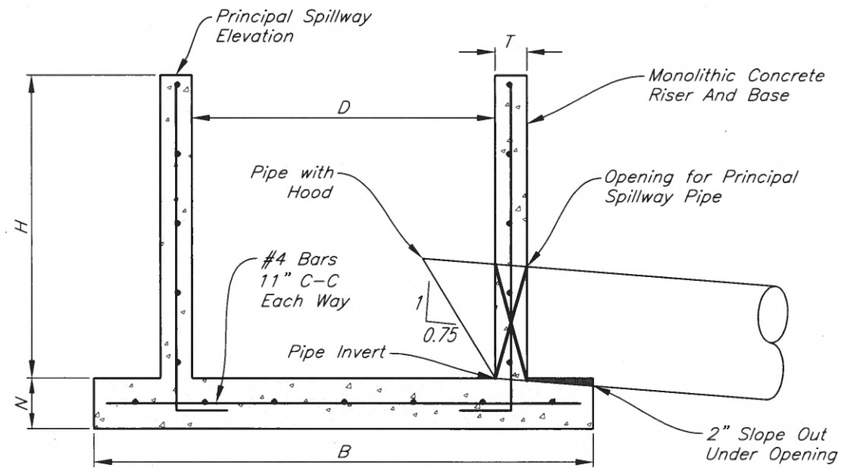
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MartinmaasDamL.dw

Drawing No.
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12/3/19 2:50 PM
Sheet 5 of 9



PLAN VIEW PRECAST RISER AND BASE



SECTION VIEW A–A

CONSTRUCTION NOTES

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

GUIDE TABLE FOR PRECAST RISER AND BASE DIMENSIONS

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

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

Date
Designed Nathan Benson 11/22/2019
Drawn Nathan Benson 11/22/2019
Checked Angela Roman 12/4/19
Approved Angela Roman 12/4/19

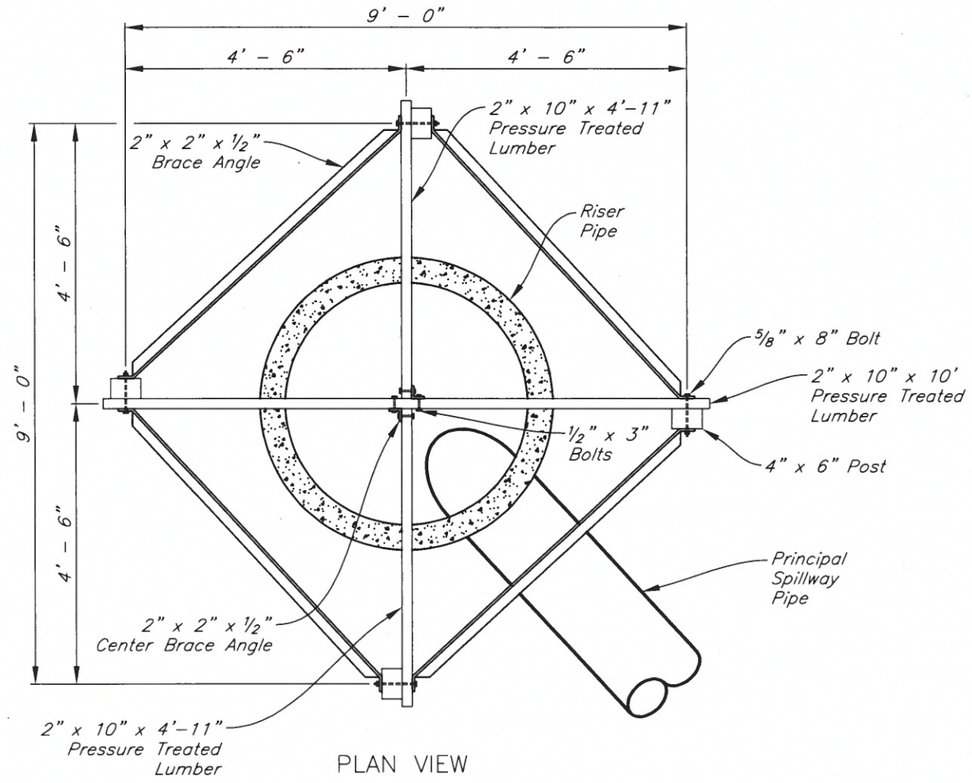
RAY MARTINMAAS
378 POND
PRECAST CONCRETE RISER AND BASE WITH HOODED INLET
NW 1/4, Sec 21, T116N, R69W
Hand County, South Dakota

United States Department of Agriculture
Natural Resources Conservation Service

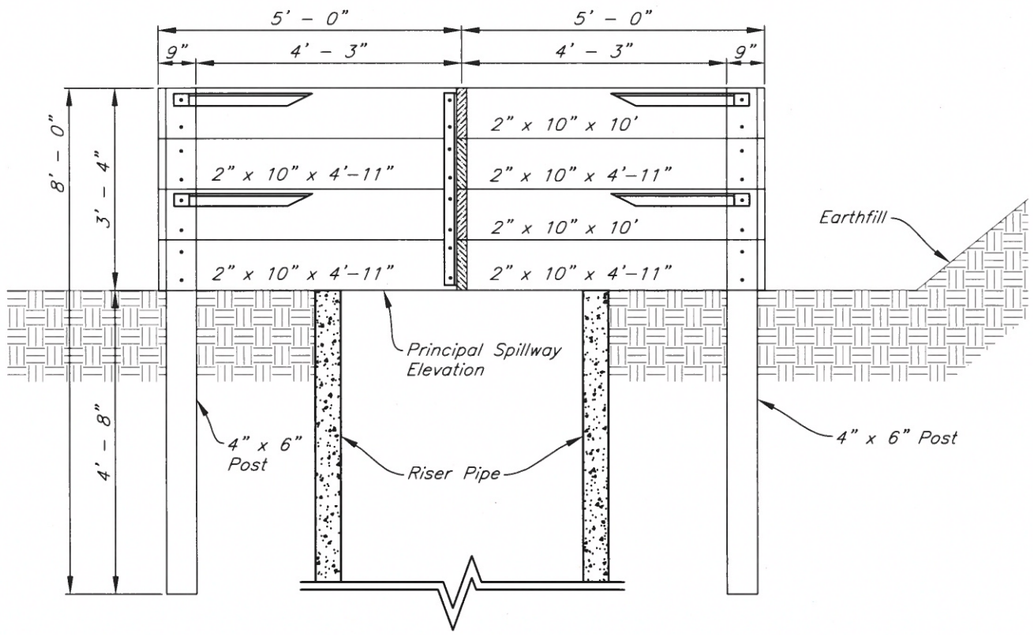
File No.
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Drawing No.
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PLAN VIEW

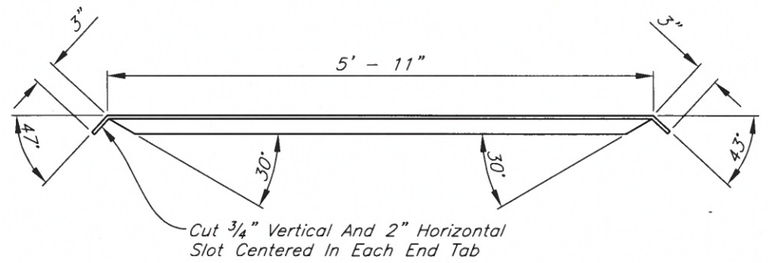


SIDE VIEW

TABLE OF QUANTITIES			
ITEM	LENGTH OR SIZE	UNIT	QUANTITY
4" X 6" Pressure Treated Post	8 Ft	Each	4
2" X 10" Pressure Treated Lumber	10 Ft	Each	4
2" X 10" Pressure Treated Lumber	4' – 11"	Each	8
2" X 2" X ¼" Steel Angle	6' – 5"	Each	8
2" X 2" X ¼" Steel Angle	3' – 2"	Each	2
Steel Bolt (with nut and 2 washers)	⅝" X 8"	Sets	32
Steel Bolt (with nut and 2 washers)	½" X 3"	Sets	32

CONSTRUCTION NOTES

1. Bolt 4" x 6" posts and 2" x 10" lumber together using two ⅝" x 8" bolts. Do not place bolts closer than 1 ½" from edge of board.
2. For center brace angles drill eight, 9/16" holes, ⅝" from outer edge of each leg of each angle and centered 5 ¼" apart along the leg.
3. Attach brace angles to top bolt on top of 2" x 10" board and to top bolt on next to bottom board.
4. All nuts, bolts, and washers shall be galvanized.



PLAN VIEW OF BRACE ANGLE

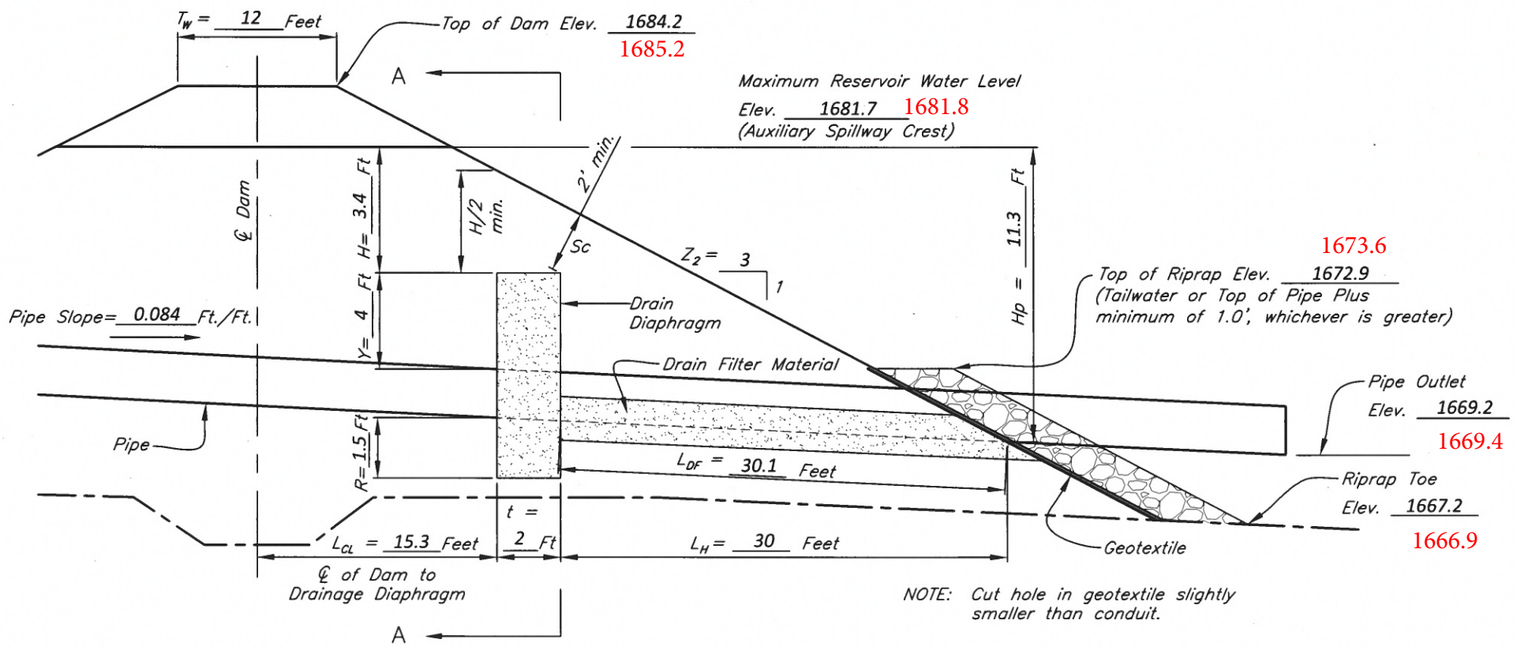
TRASH RACK AND BAFFLE FOR RISER DIA. 36" TO 60"
JOB PLAN NO. 6.4 REV. 1/2012

Designed Nathan Benson 11/22/2019
Drawn Nathan Benson 11/22/2019
Checked Angela Roman 12/4/19
Approved Angela Roman 12/4/19

RAY MARTINMAAS
378 POND
TRASH RACK AND BAFFLE FOR RISER DIA. 36" TO 60"
NW 1/4, Sec 21, T116N, R69W
Hand County, South Dakota

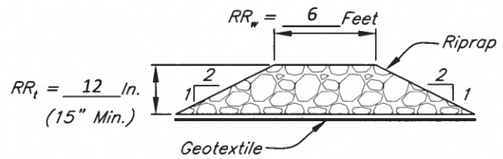
United States Department of Agriculture
Natural Resources Conservation Service

File No. MartinmaasDamL.dwg
Drawing No. –
11/25/19 4:11 PM
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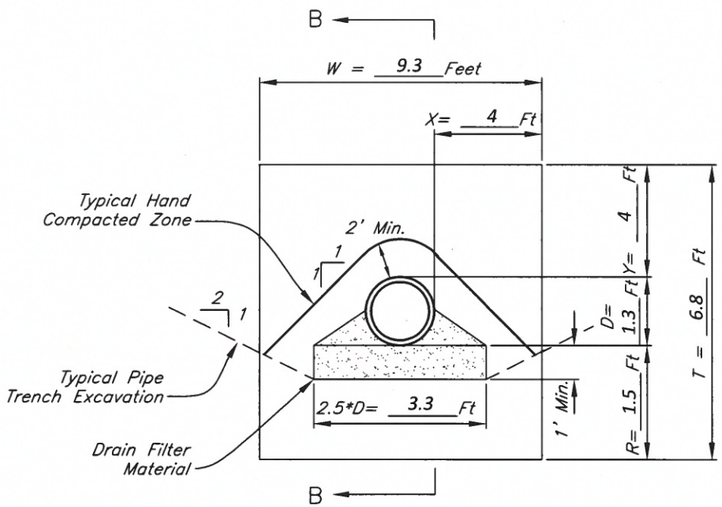


NOTE: Cut hole in geotextile slightly smaller than conduit.

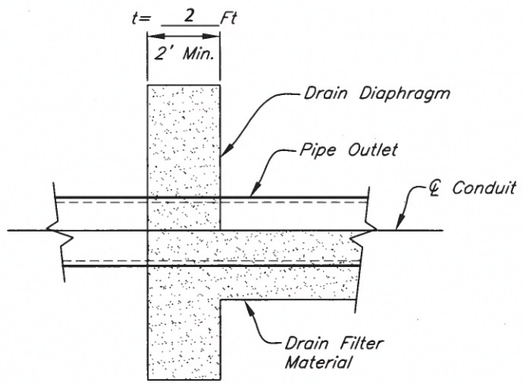
PROFILE ALONG ℄ OF CONDUIT
NO SCALE



SECTION OF RIPRAP
Perpendicular to Slope



SECTION A–A
NO SCALE



SECTION B–B
NO SCALE

SUMMARY OF SAND DRAINFILL DIMENSIONS			
W =	9.3	Feet	(Total Width of Drain Diaphragm)
T =	6.8	Feet	(Total Height of Drain Diaphragm)
t =	2	Feet	(Thickness of Single Filter)
L_{DF} =	30.1	Feet	(Length of Sand Along Pipe)

SUMMARY OF GEOTEXTILE DIMENSIONS			
G_W =	10	Feet	(Total Width of Geotextile)
G_L =	18.1	Feet	(Total Length of Geotextile)

SUMMARY OF ROCK RIPRAP DIMENSIONS			
RR_t =	12	Inches	(Total Thickness of Rock Riprap)
RR_W =	6	Feet	(Total Width of Rock Riprap)

ESTIMATED TABLE OF QUANTITIES

ITEM	UNIT	QUANTITY
Sand Drain Filter Material	Cu. Yds.	9.4
Geotextile	Sq. Yds.	20.1
Rock Riprap	Cu. Yds.	5.3

DRAIN FILTER GRADATION

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

ASTM, C–33
FINE CONCRETE
AGGREGATE GRADATION

RIPRAP GRADATION

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

CONSTRUCTION NOTES

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 rock riprap onto the Geotextile in the pipe outlet area shall be 3 feet. Rock riprap shall be placed without damaging the underlying geotextile.

MATERIAL NOTE

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

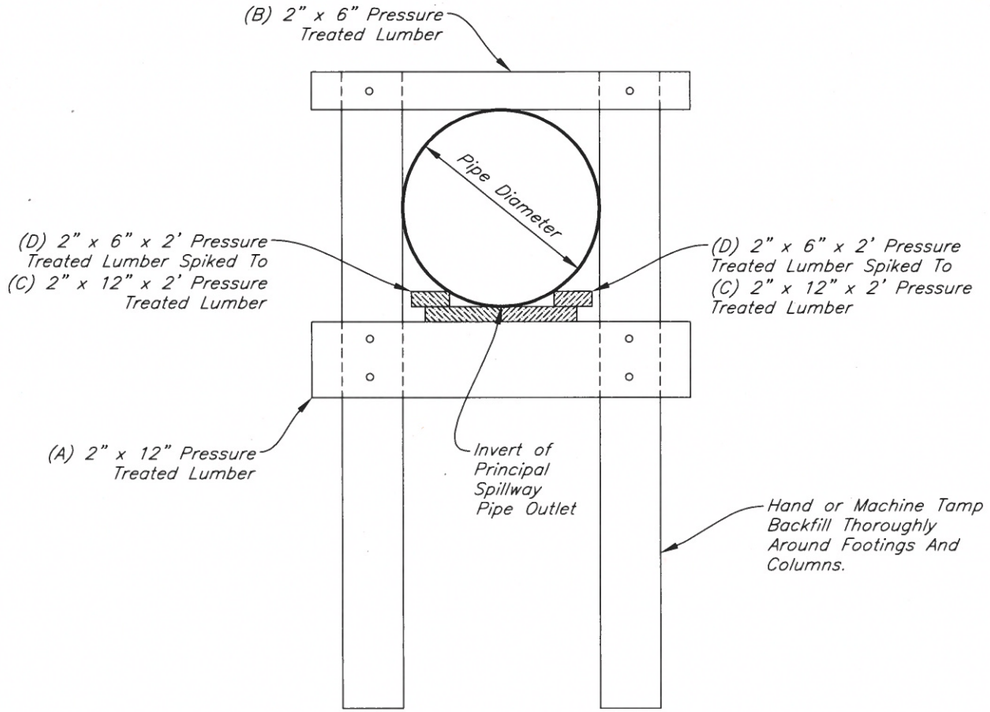
DRAINAGE DIAPHRAGM DETAILS
JOB PLAN 3.8 REV. 02/2017

Designed Nathan Benson 11/25/2014
Drawn Angela Romero 12/4/19
Checked Angela Romero 12/4/19
Approved Angela Romero 12/4/19

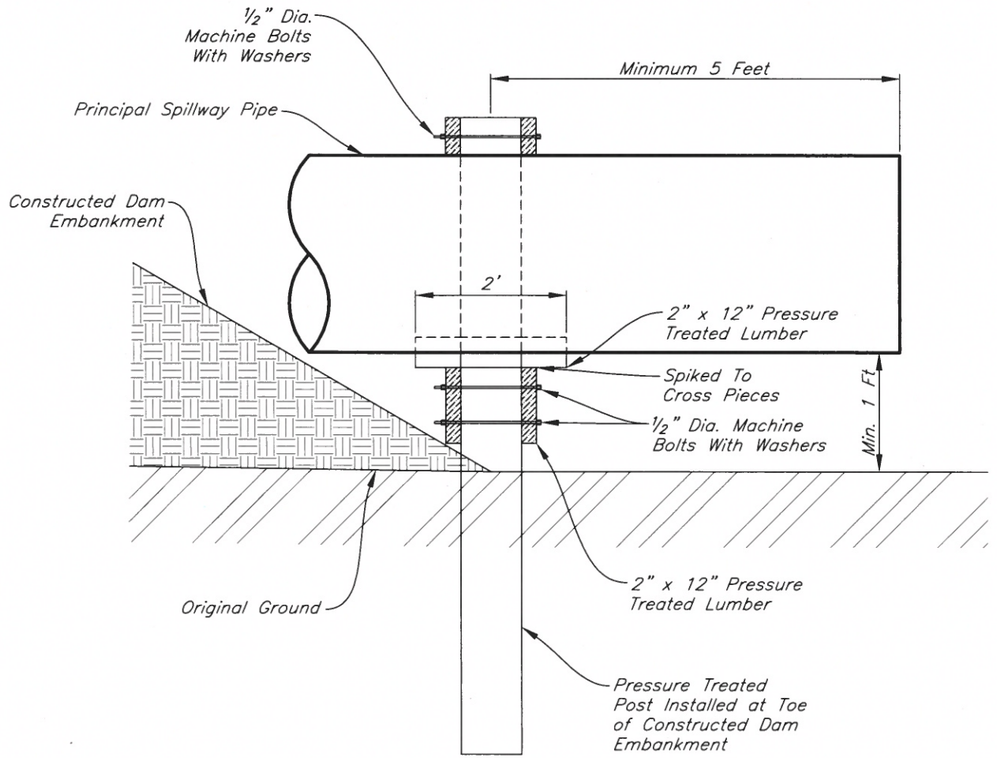
NAME: Ray Martinmaas
378 – POND
Drainage Diaphragm Detail
NW 1/4, Sect. 21, T. 116N, R. 69W, Hand County, South Dakota

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Natural Resources Conservation Service

File No. JP3–8_2017.dwg
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CROSS–SECTION VIEW



PROFILE VIEW

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

CONSTRUCTION NOTES

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

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

Date
Designed Nathan Benson 11/22/2019
Drawn Nathan Benson 11/22/2019
Checked Angela Roman 12/4/19
Approved Angela Roman 12/4/19

RAY MARTINMAAS
378 POND
TIMBER PIPE SUPPORT
Hand County, South Dakota
NW 1/4, Sec 21, T116N, R69W

United States Department of Agriculture
Natural Resources Conservation Service

File No.
MartinmaasDamL.dgn

Drawing No.
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Form 12

Report of Examination of Works and/or Application of Water to Beneficial Use For Permit No. 8572-3

I have this day, **August 6, 2024**, made a thorough examination of the water use system constructed by **Ray Martinmaas** of **3521 176th St, Orient SD 57467** holder of Permit No. **8572-3**, bearing the priority of **December 1, 2021,** authorizing the storage of **43.5** acre-feet of the waters of **Matter Creek & runoff** for **domestic & rec** purposes, in **Hand** County.

Inspection contact & relationship **Becky Martinmaas, wife**

A. Works used to divert the water:

Dam Information:

1) Height to crest **17** feet
2) Height to primary spillway **13** feet
3) Height to secondary spillway **12** ft
4) Crest width **12** feet
5) Crest length **390** feet
6) Spillway length **300** feet
7) Spillway width **100** feet
8) Approx. storage **43.5** ac-ft
9) Approx. storage to crest **86** ac-ft
10) Date constructed: **11/22/2019**

D. Compliance with Permit Requirements:

1) Permit qualifications being abided by **Y**
2) Exceptions to compliance are: **none**

E. Condition and Location:

1. The system is in **good** condition with the point(s) of diversion located as follows: **from the NW corner of Sec 21 T116N-R69W 2225 ft E and 1430 ft S, latitude of 44.84829 and longitude of -99.14082 , SE ¼ NW ¼**.
2. The license should be issued for **43.5** acre-feet of storage.
3. All structures, wells and lands on map **Y**

F. Comments or other permit(s) associated with the project: none

Mark D Rath
Water Right Inspector
DANR, Water Rights Program

Date report completed: **08/28/2024**

No. 8572-3



Mark D Rath
Water Right Inspector
DANR-Water Rights Program

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
JOE FOSS BUILDING
523 E CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

SEP 24 2024

8572-3

Ray Martinmaas
35210 176th St
Orient SD 57467

Dear Mr. Martinmaas:

Enclosed is Water License No. 8572-3. This is the final water right document completing your process of obtaining a Water Right. Included with your license is a map prepared by the staff engineer who conducted the field investigation.

So 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,

Eric Gronlund

Eric Gronlund, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures

STATE OF SOUTH DAKOTA
WATER LICENSE NO. 8572-3

(1) Ray Martinmaas, 35210 176th St, Orient SD 57467, made Application No. 8572-3, December 1, 2021, for a water permit to impound 43.5 acre-feet of water from runoff by constructing a dam on Matter Creek, Hand County, South Dakota for recreational & livestock watering purposes. Permit No. 8572-3, with a priority date of December 1, 2021, was approved May 23, 2022, and issued to the applicant for diversion of water with construction of the dam to be completed on or before May 23, 2027, and for the application to beneficial use of water on or before May 23, 2031. The permit authorized impoundment of sufficient water to maintain water to the outlet elevation.

(2) It is certified that the permit holder has complied with the provisions of South Dakota State Law relating to completion of construction of the dam and is entitled to impound 43.5 acre-feet of water for beneficial use. The location of the diversion point is:

- 2,225 ft E & 1,430 ft S of the NW corner Section 21, T116N, R69W (SE ¼ NW ¼)
  (Latitude 44.84829 & Longitude -99.14082)

(3) The water is to be used during the following described annual period: January 1 – December 31.

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

(5) Pursuant to South Dakota Water Law 46-5-30.1 Ray Martinmaas, the holder and/or owner of Water Right No. 8572-3 is issued a license to appropriate water, the right to impound 43.5 acre-feet of water from runoff in a dam constructed on Matter Creek, with a priority date of December 1, 2021, from the location specified in (2) of this license for recreational & livestock watering purposes.

This license is subject to South Dakota Water Law, any limitations or conditions listed in Water Right No. 8572-3 and subject to the following qualifications:

1. Water Permit No. 8572-3 authorizes storage of up to 43.5 acre-feet of water and sufficient water annually to maintain a water level to the outlet elevation.

2. Low flows as needed for downstream domestic use, including livestock water and prior water rights must be bypassed.

Eric Gronlund

Eric Gronlund, Chief Engineer
Water Rights Program
Department of Agriculture and Natural Resources

SEP 2 4 2024
date