

WATER PERMIT NO. 1978-1

Name of Applicant: SD DOT

Address: 700 E Broadway Ave, Pierre SD 57501

Phone: 605 773-3608

Amount of Water Claimed: 240 AF

Total Acres: NA

Source of Water Supply: tributary of Irish Creek

Water to be used for:

County: Ziebach

Type of Waste Disposal System:

Location: 23 miles north of Dupree

PRIORITY

Date Received: 4-16-18

Application/License Fee: \$ 950

Corrected Application Received:

Period of Annual Use: Jan 1 – Dec 31

Remarks: A highway project to rehabilitate and stabilize embankment along SD Hwy 20

Diversion Point: SE 1/4 SW 1/4 Sec 31-T17N-
R21E

Land to be Irrigated: NA

Depth of Well: NA

Well Driller:

Remarks:

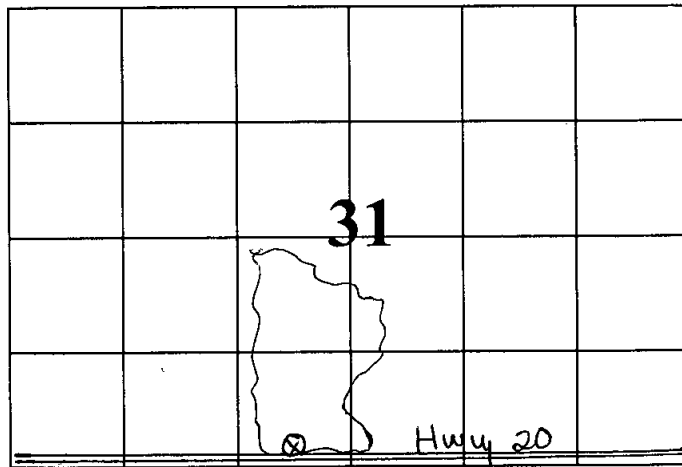
Type of Map: aerial

Prepared by:

Reviewed and the Number Assigned on: 4-16-18

By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____



RECEIVED

APR 16 2018

WATER RIGHTS
PROGRAM

Mail to: DENR - Water Rights 523 E Capitol Ave Pierre, SD 57501-3182 ph. (605) 773-3352	No. <u>1978-1</u>	(office use only) Hydrologic Unit <u>10130306</u>
	Basin <u>Moreau River</u>	
	Newspaper <u>West River Eagle, Eagle Butte</u> <u>Capital Journal</u>	

Application For Permit To Appropriate Water Within The State Of South Dakota**Check use(s) of water:**

☐ Municipal	☐ Water Distribution System	☐ Recreational	☐ Institutional
☐ Rural Water System	☐ Commercial	☐ Fish & Wildlife	☐ Geothermal
☐ Domestic (over 18 gpm)	☐ Industrial	☒ Other <u>stock dam</u>	

Type of Application:

(check one)

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

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

1. Name to Appear on Water Permit SD Department of Transportation (Steve Van Mullem)Mailing Address 700 East Broadway Ave. Pierre SD 57501
(Address) (City) (State) (Zip Code)Phone 605-773-3608 Mobile _____ Email Stephen.VanMullem@state.sd.us2. Amount of water claimed _____ *CFS or ¹⁹⁸~~240~~ ***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 use3. Source of water supply Dam (Tributary to Irish Creek)4. Location of point of diversion SE 1/4 SW 1/4 of Section 31 - T17N - R21E County Ziebach
(example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W)If not a public water supply (e.g. municipal), will water be used outside of the area described above? ☐ Yes ☒ No

If "Yes," where will water be used? _____

(example - NW1/4 section 12-T104N-R53W)

5. County or counties where water will be used Ziebach6. Annual period during which water is to be used N/A

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

The purpose of this highway project is to rehabilitate a pipe culvert and to stabilize the highway embankment from scour and erosion. Pipe repair includes partial slip-lining, removal, and replacement. Outlet scour and erosion protection consists of riprap on the south side of SD Highway 20.

I, Steve Van Mullem Water Resources Engineer, the applicant, certify under
Name of Person Title (if applicable)

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.

SOUTH DAKOTA
WATER PERMIT NO. 1978-1

Date of first receipt of application April 16, 2018.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 1978-1 to South Dakota Department of Transportation, 700 E Broadway Ave, Pierre SD 57501 authorizing the reconstruction of the dam and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 1978-1 authorizes impoundment of 198 acre-feet of water from a tributary to Irish Creek by reconstructing a dam located in the SE 1/4 SW 1/4 Section 31 with water impounded in the E 1/2 SW 1/4 and the W 1/2 SE 1/4 Section 31; all in T17N-R21W. This permit authorizes appropriation of sufficient runoff to fill the dam annually. The project consists of rehabilitation of a pipe culvert and stabilization of the embankment along SD Highway 20 which is located approximately 23 miles north of Dupree SD.
2. The water appropriated shall be used for the purpose of livestock water and may not exceed the amount of water needed for beneficial use.
3. The water is to be used during the following described annual period: January 1 – December 31.
4. The date of approval of Permit No. 1978-1 is June 25, 2018.
5. The date from which applicant may claim right is April 16, 2018.
6. One-fifth of the construction is to be completed on or before December 25, 2020.
7. All construction is to be completed on or before June 25, 2023.
8. Water is to be put to beneficial use on or before June 25, 2027.
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. 1978-1 authorizes a dam with a storage capacity of 198 acre feet of water annually to the primary outlet elevation.
2. Low flows as needed for downstream domestic use, including livestock water and prior water rights must be by-passed.

WATER MANAGEMENT BOARD

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

JUL 06 2018

date



Supplemental Information

(type or print)

1. Well Information

(check one or both as applicable) ☐ Drilling new well(s) ☐ Using existing well(s)

- a) If new wells, how many ____ Have test holes been drilled ☐ Yes ☐ No Drilled by ____
(if yes, please provide copies of logs)
- b) If existing wells, how many ____ Provide copy of log(s), if available. Drilled by ____

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:

South Dakota Department of Transportation
700 East Broadway Ave.
Pierre, SD 57501

b) Freeboard 11.6-ft

c) Crest Width 30-ft (highway)

Crest Length ____

d) Height 32.1-ft

e) Primary Outlet Capacity ____

If pipe, diameter 24-in opening

f) Secondary Spillway Capacity ____

Spillway Width ____

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

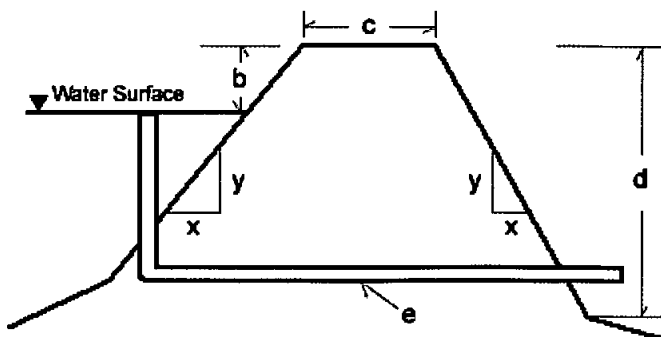
Upstream 4 to 1

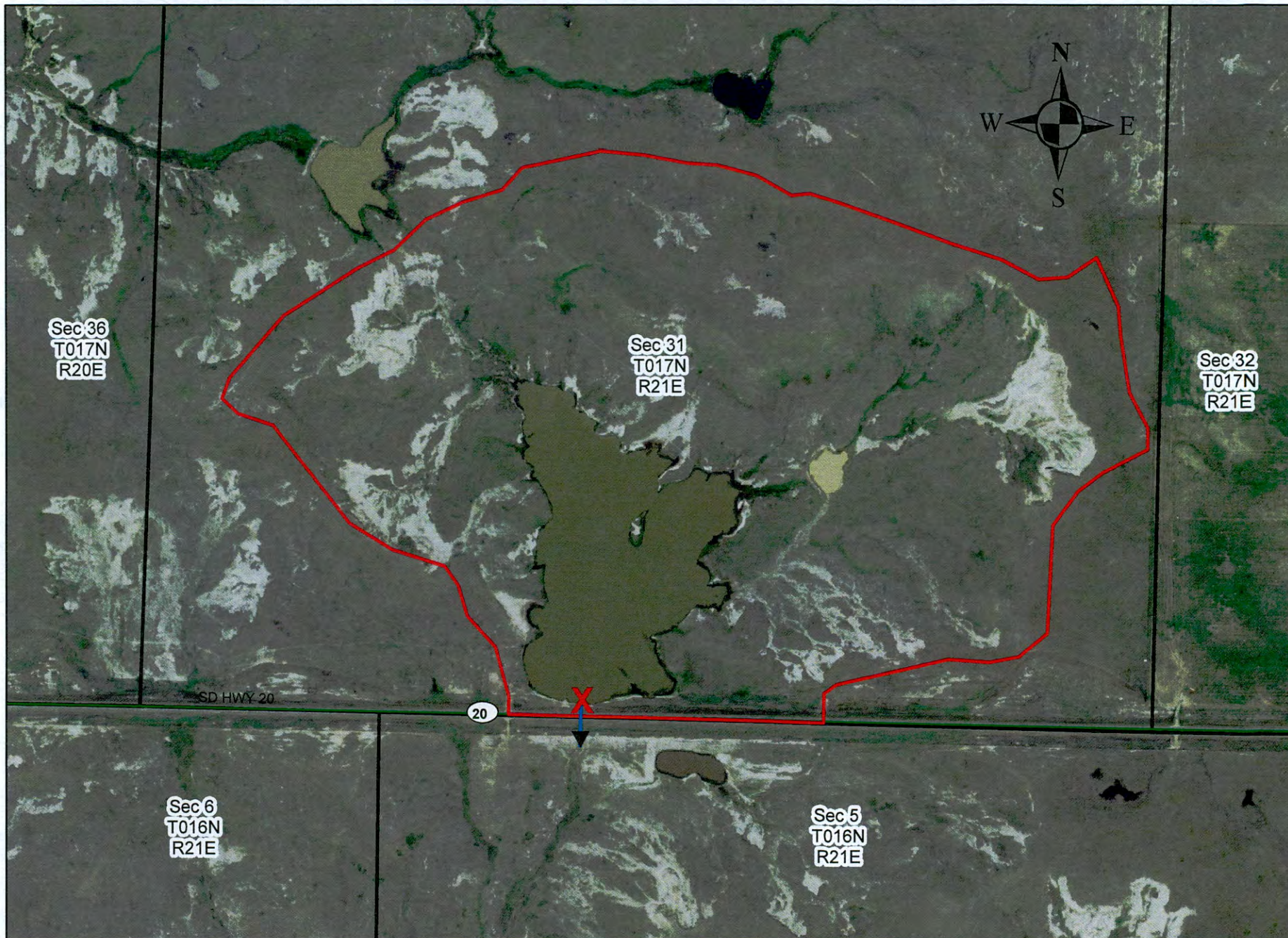
Downstream 4 to 1

h) Surface Area of Impoundment 30 acres

i) Storage 240.0 Acre Feet

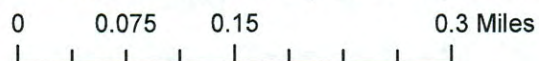
j) Drainage Area Above Dam 221.0 Acres





Location of Diversion Point & Upstream Drainage Boundary

M 020-372, Ziebach County, PCN I4YV



State of South Dakota
VOUCHER

#REF!

APPL. AREA 75 APPROVAL NUMBER _____
D A T E 04.11.2018 APPROVAL DATE _____
DOCUMENT ID N20804004 D A T A T Y P E 1

FROM: DENR

to: Kevin Marton
DOT

LINE	COMP	ACCOUNT	CENTER	AMOUNT	SIGN
1	3072	4299802	2020000800	750.00	CR
2	3072	4299803	2020000800	200.00	CR
3					CR
4					CR
5					
6					
7					
8					

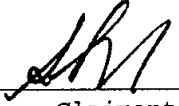
TOTAL	DR
TOTAL	CR

VOUCHER TOTAL	\$1,900.00
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DESCRIPTION OF SERVICE, PRODUCT, OR TRANSFER

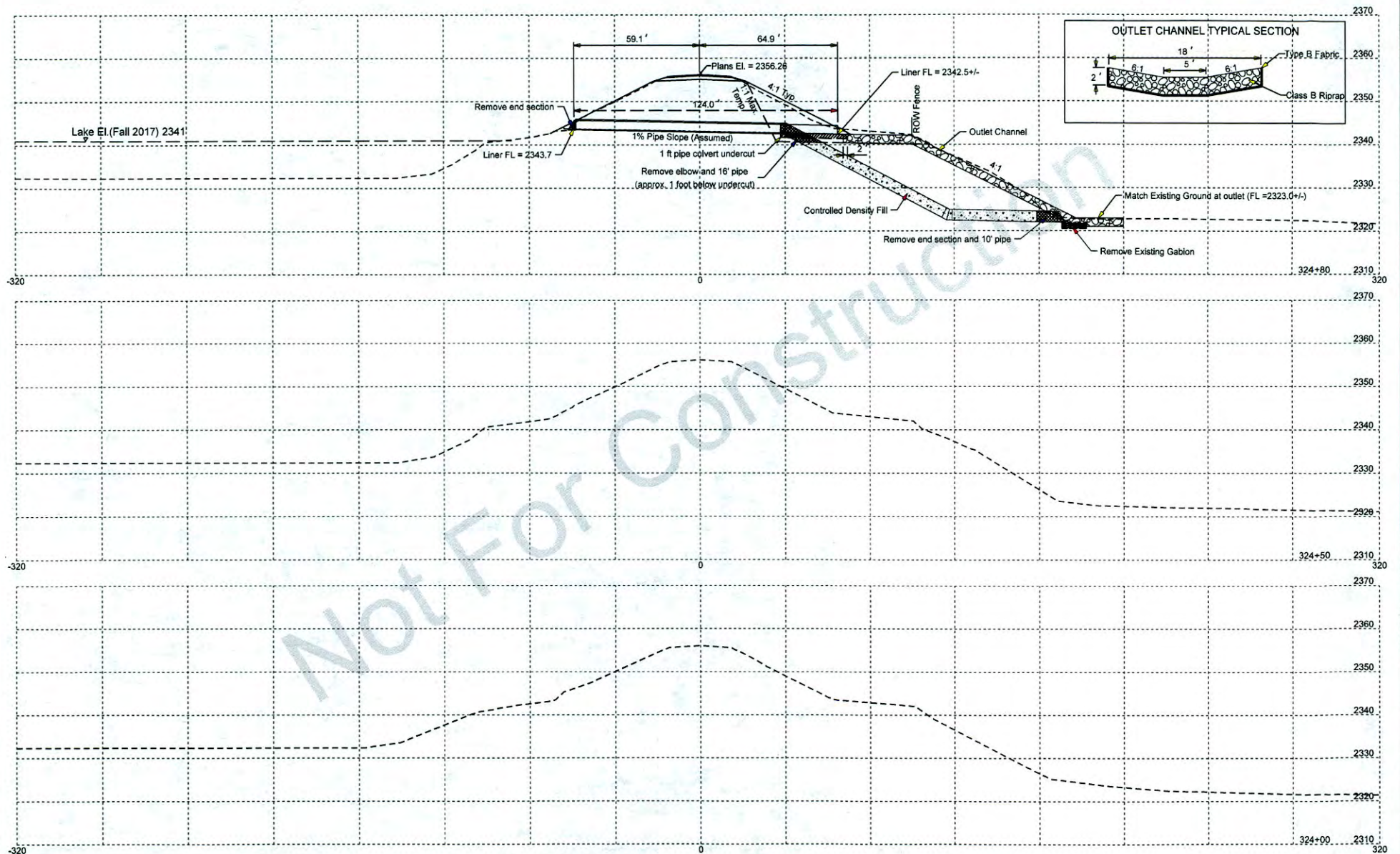
Water permit Application Fee and Licensing Fee

I declare and affirm under the penalties of perjury that this claim has been examined by me, and to the best of my knowledge and belief, is in all things true and correct.

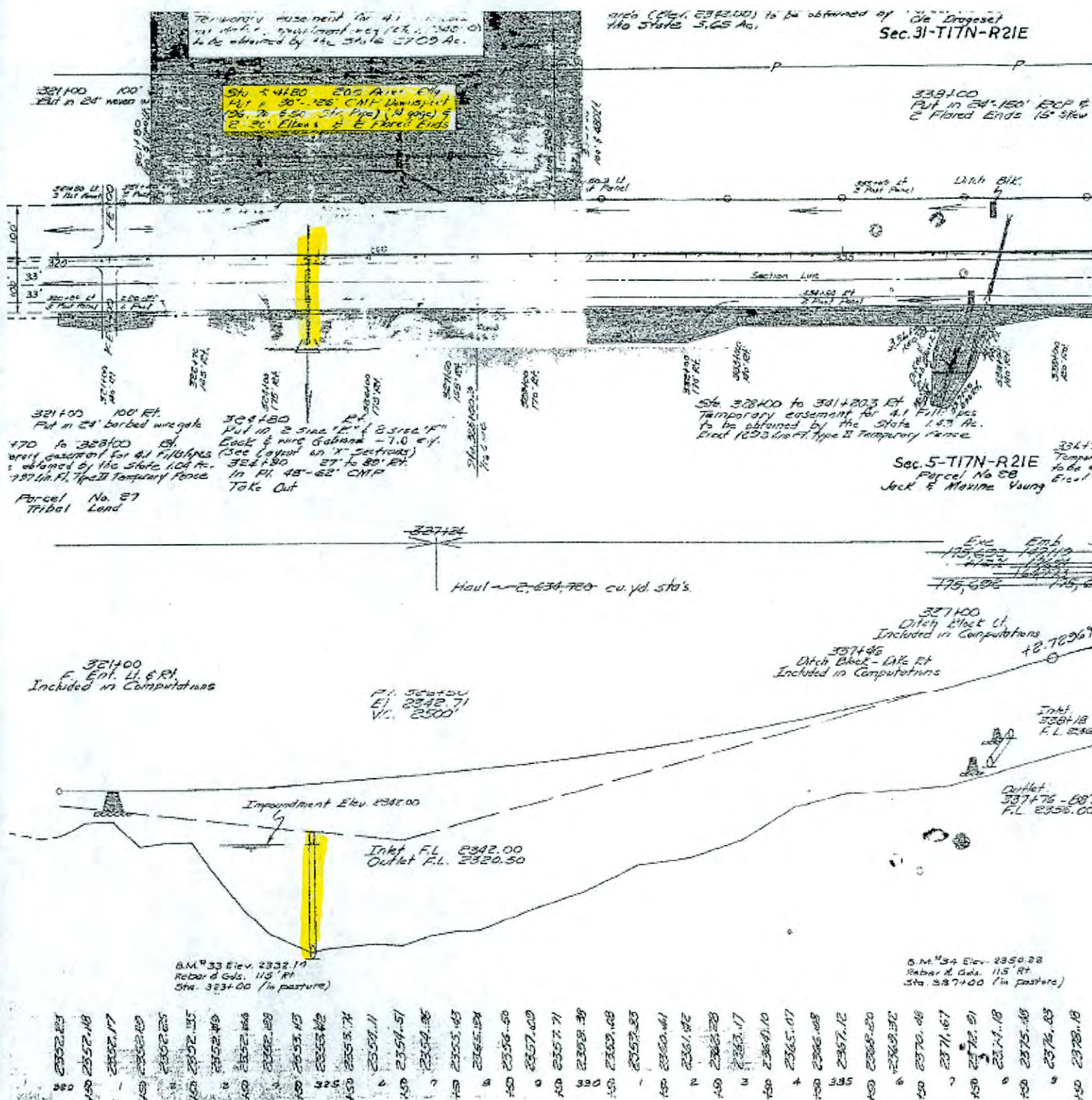
	4-11-18		
Claimant	Date	Authorization	Date
Sandy Verhelst			
773-5242			
		Authorization	Date

Plotting Date: 04/10/2018

STATE OF SOUTH DAKOTA	PROJECT 020-372 PCN 14YV	SHEET NO.	TOTAL SHEETS



(NGVD 1929 Vertical Datum)



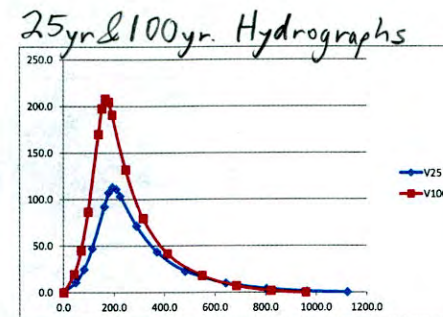
PCN I4VY Ziebach County
M 020-372, Ziebach County, PCN I4VY
SD20, 5 miles west of Jct. SD20/SD65 west of Isabel Inslope Erosion Repair & Downspout Replacement

USGS 1998 Techniques for Estimating Peak-Flow
Magnitude and
Frequency Relations for South Dakota Streams

equation	Frequency	Contributing Area (sq mi)	Peak flow (cfs)
25.0 CA 0.569	25	0.569	2
5 Q = 72.5 CA 0.578	72.5	0.578	5
10 Q = 125 CA 0.579	125	0.579	10
25 Q = 207 CA 0.573	207	0.573	25
50 Q = 286 CA 0.570	286	0.57	50
100 Q = 379 CA 0.566	379	0.566	100
500 Q = 664 CA 0.556	664	0.556	500

USGS, W-RI 80-80 "Techniques for Estimating
Flood Peaks, Volumes, and Hydrographs on
Small Streams in South Dakota, 1980

equation	Frequency	Contributing Area (sq mi)	SI	Volume
V2 = 129 A0.72 SI-1.74 (Equation 7.12)	129	0.72	-1.74	2
V5 = 222 A0.72 SI-1.69 (Equation 7.13)	222	0.72	-1.69	5
V10 = 296 A0.73 SI-1.65 (Equation 7.14)	296	0.73	-1.65	10
V25 = 403 A0.75 SI-1.59 (Equation 7.15)	403	0.75	-1.59	25
V50 = 491 A0.76 SI-1.54 (Equation 7.16)	491	0.76	-1.54	50
V100 = 589 A0.77 SI-1.49 (Equation 7.17)	589	0.77	-1.49	100



Inflow Q25-yr. Hydrograph

V25		Q25		40.22		112.56		Time		Constant		Discharge		Discharge	
(i)	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')
1	0	16.04727	0.0	0	1.876	0.0	0.0	0	1.876	0.0	0.0	0.0	0.0	0.0	0.0
2	3	16.04727	48.1	5.6	1.876	10.5	10.5	5.6	1.876	10.5	10.5	10.5	10.5	10.5	10.5
3	5	16.04727	80.2	13	1.876	24.4	24.4	13	1.876	24.4	24.4	24.4	24.4	24.4	24.4
4	7	16.04727	112.3	25	1.876	46.9	46.9	25	1.876	46.9	46.9	46.9	46.9	46.9	46.9
5	10	16.04727	160.5	49	1.876	91.9	91.9	49	1.876	91.9	91.9	91.9	91.9	91.9	91.9
6	11	16.04727	176.5	57	1.876	106.9	106.9	57	1.876	106.9	106.9	106.9	106.9	106.9	106.9
7	12	16.04727	192.6	60	1.876	112.6	112.6	60	1.876	112.6	112.6	112.6	112.6	112.6	112.6
8	13	16.04727	208.6	59	1.876	110.7	110.7	59	1.876	110.7	110.7	110.7	110.7	110.7	110.7
9	14	16.04727	224.7	55	1.876	103.2	103.2	55	1.876	103.2	103.2	103.2	103.2	103.2	103.2
10	18	16.04727	288.9	38	1.876	71.3	71.3	38	1.876	71.3	71.3	71.3	71.3	71.3	71.3
11	23	16.04727	369.1	23	1.876	43.1	43.1	23	1.876	43.1	43.1	43.1	43.1	43.1	43.1
12	30	16.04727	481.4	12	1.876	22.5	22.5	12	1.876	22.5	22.5	22.5	22.5	22.5	22.5
13	40	16.04727	641.9	5.2	1.876	9.8	9.8	5.2	1.876	9.8	9.8	9.8	9.8	9.8	9.8
14	50	16.04727	802.4	2	1.876	3.8	3.8	2	1.876	3.8	3.8	3.8	3.8	3.8	3.8
15	60	16.04727	962.8	0.5	1.876	0.9	0.9	0.5	1.876	0.9	0.9	0.9	0.9	0.9	0.9
16	70	16.04727	1123.3	0	1.876	0.0	0.0	0	1.876	0.0	0.0	0.0	0.0	0.0	0.0

Inflow Q100-yr Hydrograph

V100		Q100		63.27		207.62		Time		Constant		Discharge		Discharge	
(i)	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')	Time Units (t')
1	0	13.68585	0.0	0	3.4603333	0.0	0.0	0	3.4603333	0.0	0.0	0.0	0.0	0.0	0.0
2	3	13.68585	41.1	5.6	3.4603333	19.4	19.4	5.6	3.4603333	19.4	19.4	19.4	19.4	19.4	19.4
3	5	13.68585	68.4	13	3.4603333	45.0	45.0	13	3.4603333	45.0	45.0	45.0	45.0	45.0	45.0
4	7	13.68585	95.8	25	3.4603333	86.5	86.5	25	3.4603333	86.5	86.5	86.5	86.5	86.5	86.5
5	10	13.68585	136.9	49	3.4603333	169.6	169.6	49	3.4603333	169.6	169.6	169.6	169.6	169.6	169.6
6	11	13.68585	150.5	57	3.4603333	197.2	197.2	57	3.4603333	197.2	197.2	197.2	197.2	197.2	197.2
7	12	13.68585	164.2	60	3.4603333	207.6	207.6	60	3.4603333	207.6	207.6	207.6	207.6	207.6	207.6
8	13	13.68585	177.9	59	3.4603333	204.2	204.2	59	3.4603333	204.2	204.2	204.2	204.2	204.2	204.2
9	14	13.68585	191.6	55	3.4603333	190.3	190.3	55	3.4603333	190.3	190.3	190.3	190.3	190.3	190.3
10	18	13.68585	246.3	38	3.4603333	131.5	131.5	38	3.4603333	131.5	131.5	131.5	131.5	131.5	131.5
11	23	13.68585	314.8	23	3.4603333	79.6	79.6	23	3.4603333	79.6	79.6	79.6	79.6	79.6	79.6
12	30	13.68585	410.6	12	3.4603333	41.5	41.5	12	3.4603333	41.5	41.5	41.5	41.5	41.5	41.5
13	40	13.68585	547.4	5.2	3.4603333	18.0	18.0	5.2	3.4603333	18.0	18.0	18.0	18.0	18.0	18.0
14	50	13.68585	684.3	2	3.4603333	6.9	6.9	2	3.4603333	6.9	6.9	6.9	6.9	6.9	6.9
15	60	13.68585	821.2	0.5	3.4603333	1.7	1.7	0.5	3.4603333	1.7	1.7	1.7	1.7	1.7	1.7
16	70	13.68585	958.0	0	3.4603333	0.0	0.0	0	3.4603333	0.0	0.0	0.0	0.0	0.0	0.0

[Peak Flow Calculations for 221 ac. drainage basin area]

Hydraulic Summary from HY8 v7.50 software

Proposed Conditions --- HY-8 input:

Crossing Data - Proposed Highway OT ROUTED Qs

Crossing Properties
Name: Proposed Highway OT ROUTE

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	User-Defined	
Discharge List	Define...	
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	5.000	ft
Side Slope (H:V)	6.000	:1
Channel Slope	0.2500	ft/ft
Manning's n (channel)	0.035	
Channel Invert Elevation	2342.500	ft
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Irregular	
Irregular Shape	Define...	
Roadway Surface	Paved	
Top Width	44.000	ft

Culvert Properties

24in effective diam

Add Culvert
Duplicate Culvert
Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	24in effective diam	
Shape	Circular	
Material	Smooth HDPE	
Diameter	2.000	ft
Embedment Depth	0.000	in
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	ft
Inlet Elevation	2343.700	ft
Outlet Station	124.000	ft
Outlet Elevation	2342.500	ft
Number of Barrels	1	

Highway Overtopping Section

Irregular Roadway Shape

Number of Coordinates (3 -15): 12

Number	Station (ft)	Elevation (ft)
1	0.00	2359.90
2	100.00	2358.60
3	200.00	2357.60
4	300.00	2356.90
5	400.00	2356.40
6	500.00	2356.00
7	600.00	2355.60
8	700.00	2355.40
9	800.00	2355.30
10	900.00	2355.30
11	1100.00	2355.90
12	1500.00	2358.80

Approach Overtopping Section

Irregular Roadway Shape

Number of Coordinates (3 -15): 12

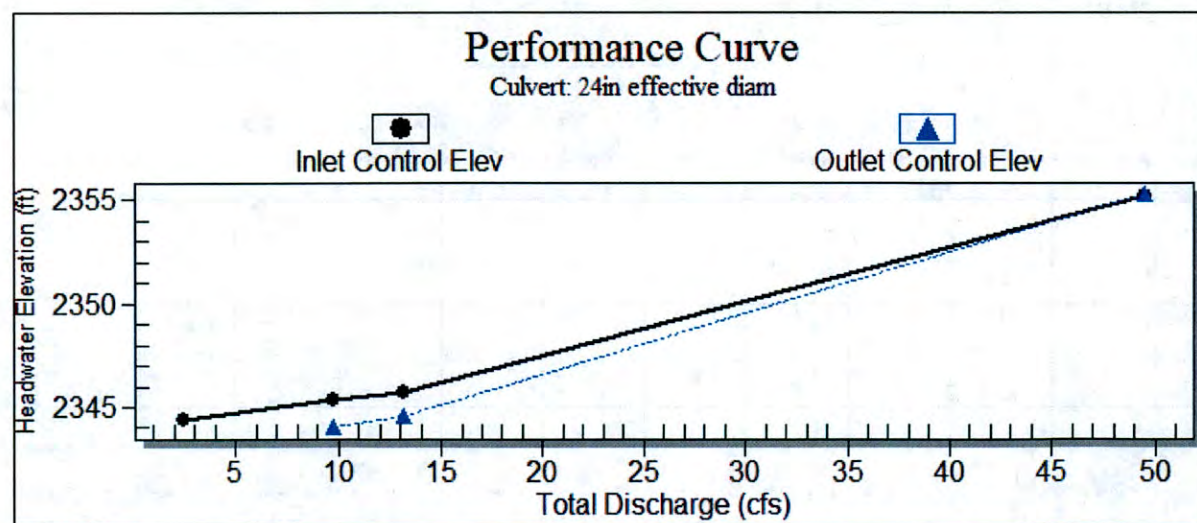
Number	Station (ft)	Elevation (ft)
1	400.00	2355.30
2	449.30	2353.20
3	500.00	2352.30
4	505.60	2351.80
5	509.50	2350.50
6	535.20	2349.70
7	545.50	2349.70
8	580.60	2350.20
9	612.90	2350.40
10	680.40	2351.30
11	768.40	2351.80
12	828.60	2353.00

Proposed Conditions --- HY8 output

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	24in effective diam	Roadway Discharge (cfs)	Iterations
2344.43	Q2	2.40	2.40	0.00	1
2345.38	Q25	9.80	9.80	0.00	1
2345.74	Q100	13.20	13.20	0.00	1
2355.30	Overtopping	49.47	0.00	1.00	

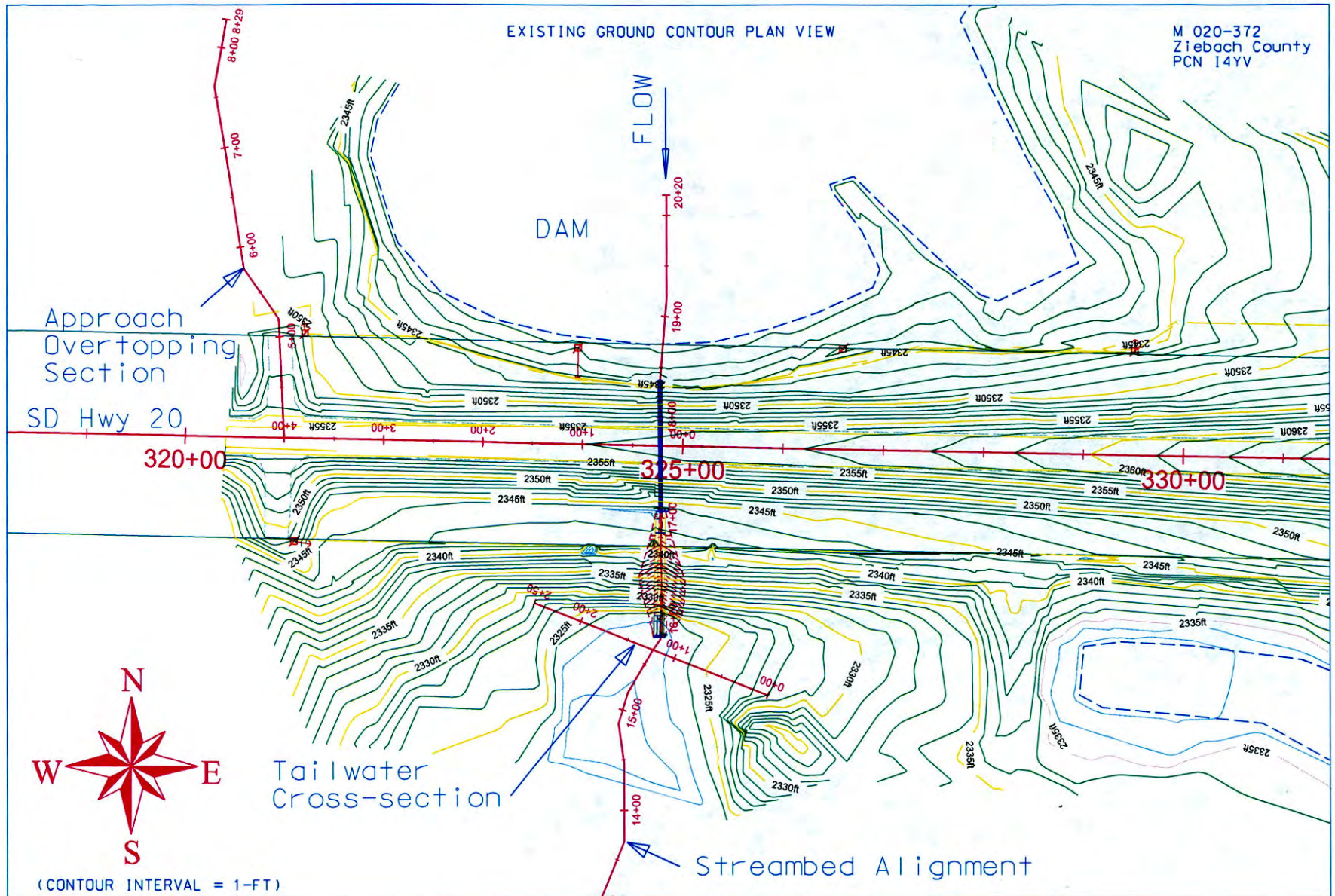
Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	24in effective diam	Roadway Discharge (cfs)	Iterations
2344.43	Q2	2.40	2.40	0.00	1
2345.38	Q25	9.80	9.80	0.00	1
2345.74	Q100	13.20	13.20	0.00	1
2349.70	Overtopping	34.05	0.00	1.00	

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
Q2	2.40	2.40	2344.43	0.73	-0.64	1-S2n	0.41	0.53	0.43	0.10	4.69	4.27
Q25	9.80	9.80	2345.38	1.68	0.34	1-S2n	0.86	1.12	0.89	0.22	7.01	6.88
Q100	13.20	13.20	2345.74	2.04	0.87	5-S2n	1.03	1.30	1.03	0.27	7.86	7.56

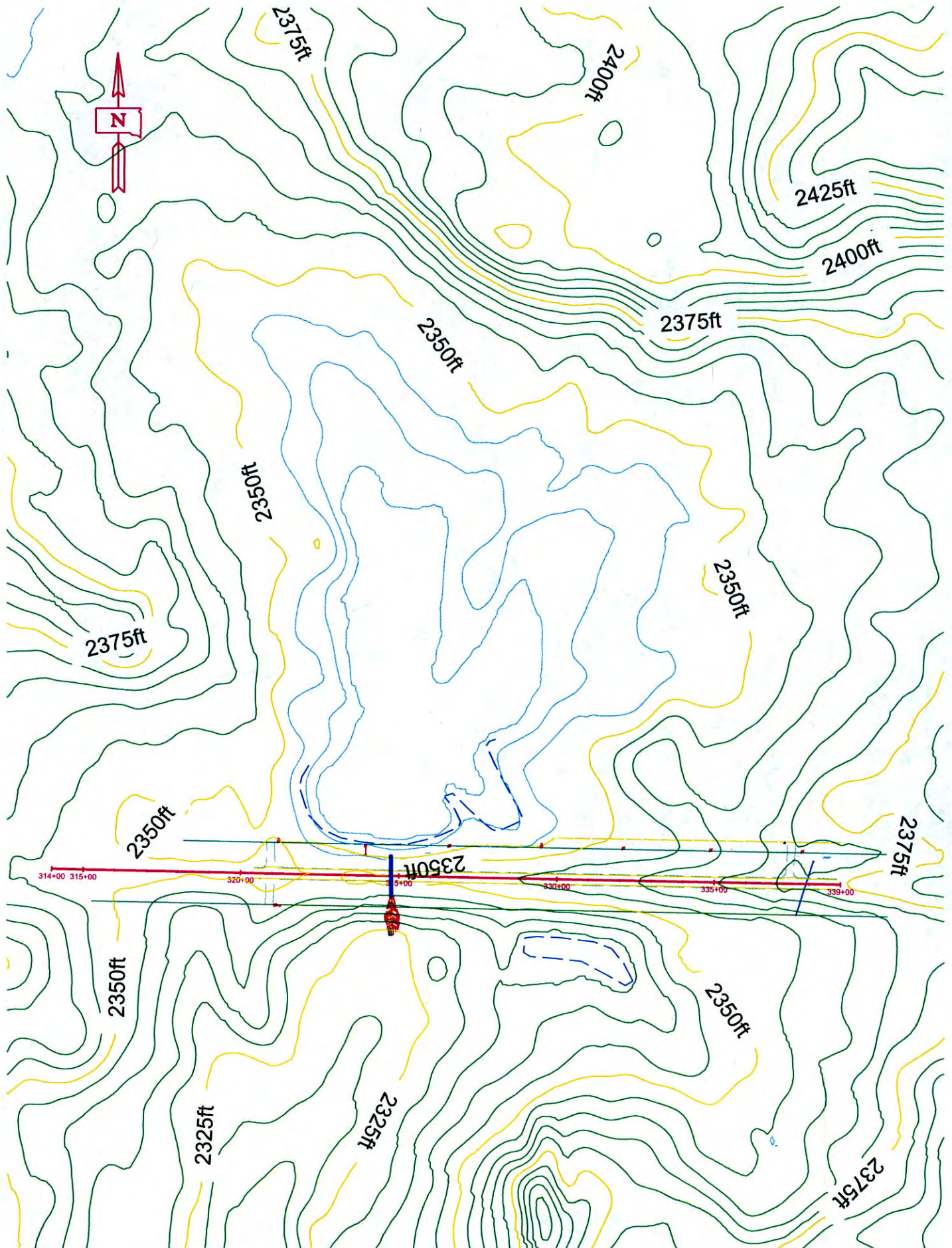


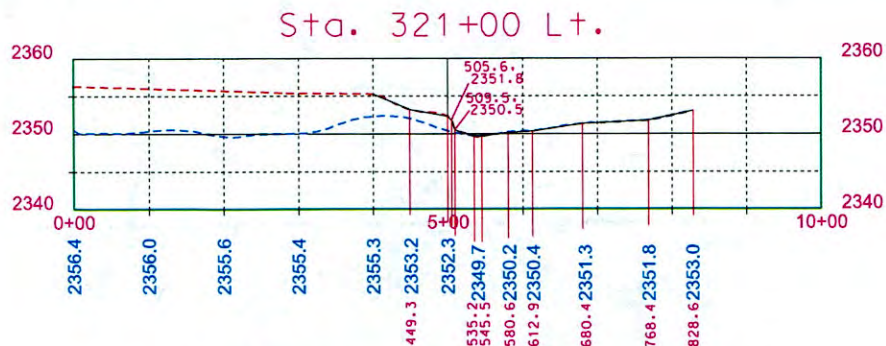
EXISTING GROUND CONTOUR PLAN VIEW

M 020-372
Ziebach County
PCN 14YV



Contour Plot (5-ft interval) of upstream storage (IFSAR contours)



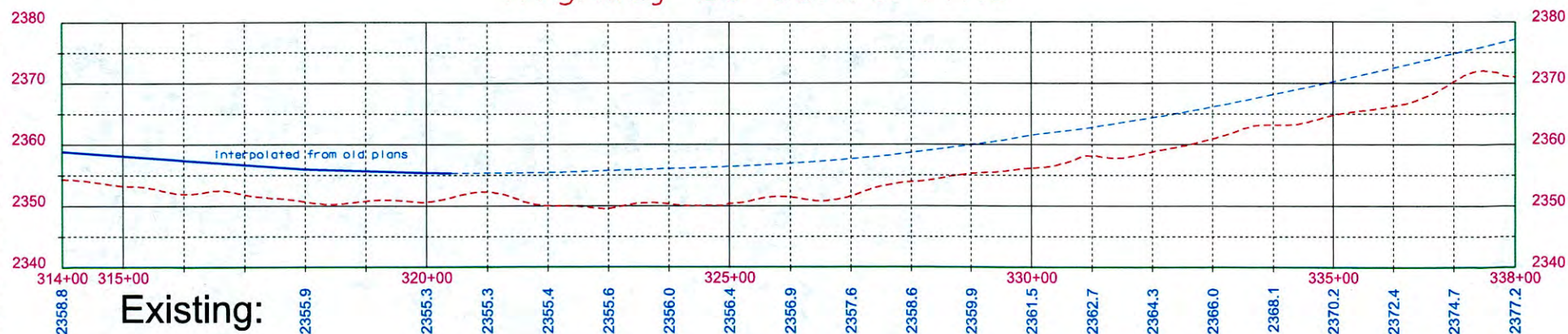


Zieb I4YV
Sta. 324+80
svm
3/9/2018

LINE	SURFACE	OFFSET
---	IFSAR_Ziebl4YV	0.00
---	I4YVorg	0.00
Scaled 10.0000 Times Ver. Scaled 1.0000 Times Hor.		

Low flow overtopping

Highway 20 Centerline



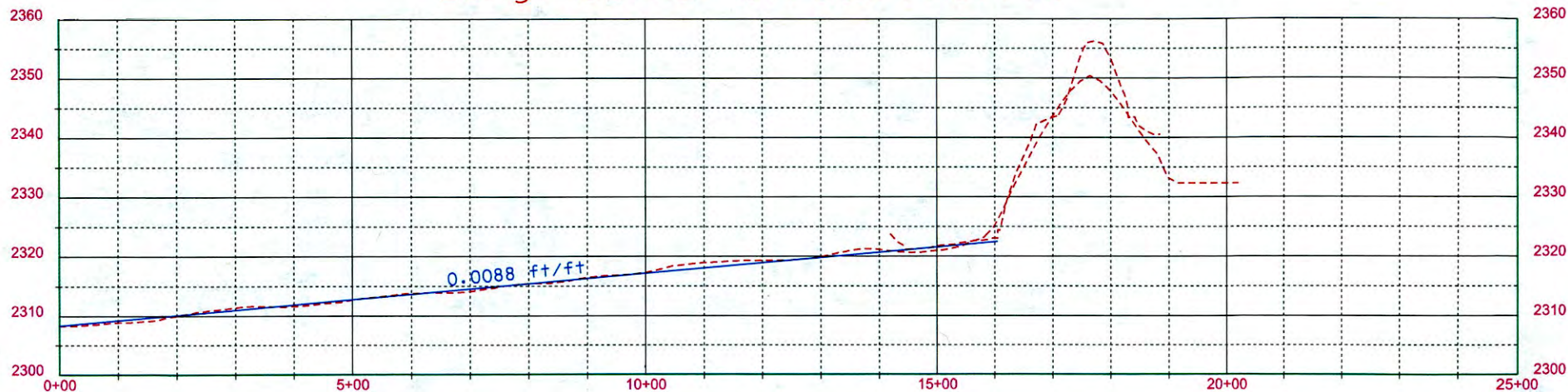
Existing:

High flow overtopping

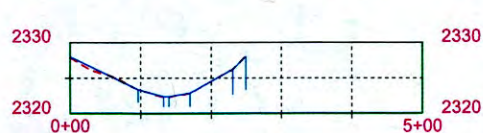
LINE	SURFACE	OFFSET
---	IFSAR_Ziebl4YV	0.00
---	I4YVorg	0.00
Scaled 10.0000 Times Ver. Scaled 1.0000 Times Hor.		

Zieb I4YV
Sta. 324+80
svm
3/9/2018

Longitudinal Stream Profile



Tailwater Cross Section



Sta.	Elev.
0	2327.96
96.1	2323.33
132.2	2322.34
140.0	2322.35
170.1	2322.84
231.1	2326.20
249.7	2328.02

LINE	SURFACE	OFFSET
-----	IFSAR_ZiebI4YV	0.00
-----	I4YVorg	0.00
Scaled 10.0000 Times Ver. Scaled 1.0000 Times Hor.		

LINE	SURFACE	OFFSET
-----	I4YVorg	0.00
Scaled 10.0000 Times Ver. Scaled 1.0000 Times Hor.		

Hydraulic Analysis Report

Project Data

Project Title: Ziebl4YV

Designer: SDDOT

Project Date: Friday, March 09, 2018

Project Units: U.S. Customary Units

Detention Basin Analysis: Q100yr Routing Analysis EXISTING CONDITION

1. Storage Capacity Curve from upstream contours
2. Stage/Discharge Curve from HY-8 hydraulic model w/highway culvert
3. Elevation/Storage/Discharge Curve
4. Inflow Hydrograph
5. Routed Hydrograph

Storage Input Parameters

Storage Capacity: Known volume

Elevation ft	Volume acre-ft
2332.00	0.00
2333.00	5.72
2334.00	15.22
2335.00	25.44
2336.00	36.52
2337.00	49.05
2338.00	63.62
2339.00	80.69
2340.00	100.15
2341.00	121.88
2342.00	146.17
2343.00	172.90
2343.47	186.35
2344.00	202.22
2345.00	234.30
2346.00	269.26
2347.00	307.37
2348.00	349.08
2349.00	394.53
2350.00	444.53

Discharge Input Parameters

Known Discharge: HWstagedischarge

Elevation ft	Discharge cfs
2343.47	0.00
2345.41	13.65
2347.50	39.21
2349.69	54.00
2354.48	67.54
2355.30	70.42
2355.48	112.56
2355.56	156.01
2355.63	207.62

Storage & Discharge Input Parameters

Elevation - Storage - Discharge

Elevation ft	Storage acre-ft	Discharge cfs
2332.00	0.00	0.00
2333.00	5.72	0.00
2334.00	15.22	0.00
2335.00	25.44	0.00
2336.00	36.52	0.00
2337.00	49.05	0.00
2338.00	63.62	0.00
2339.00	80.69	0.00
2340.00	100.15	0.00
2341.00	121.88	0.00
2342.00	146.17	0.00
2343.00	172.90	0.00
2343.47	186.35	0.00
2344.00	202.22	3.73
2345.00	234.30	10.77
2346.00	269.26	20.87
2347.00	307.37	33.10
2348.00	349.08	42.59
2349.00	394.53	49.34
2350.00	444.53	54.88

Detention Basin Input Parameters

Inflow Hydrograph

Peak Inflow Discharge: 207.600 cfs, Time to Peak: 164.20 (min), Total Inflow Volume: 2846619.60 ft³

Time (min)	Discharge cfs
0.00	0.00
41.10	19.40
68.40	45.00
95.80	86.50
136.90	169.60
150.50	197.20
164.20	207.60
177.90	204.20
191.60	190.30
246.30	131.50
314.80	79.60
410.60	41.50
547.40	18.00
684.30	6.90
821.20	1.70
958.00	0.00

Initial Storage = 186.3500 acre-ft

Detention Basin Result Parameters

Routed Hydrograph

Peak Outflow Discharge: 17.859 cfs, Time to Peak: 547.40 (min),
Total Outflow Volume: 3879150.32 ft³

Routed Hydrograph (Q100-yr flood)

Time min	Discharge cfs	Storage acre-ft
0.00	0.00	186.350000
41.10	0.13	187.441004
68.40	0.55	189.957265
95.80	1.41	194.774122
136.90	3.09	204.200646
150.50	5.35	215.061274
164.20	7.79	226.373008
177.90	10.23	237.353865
191.60	13.10	247.385586
246.30	15.49	253.952817
314.80	16.96	257.499212
410.60	17.66	258.848678
547.40	17.86	258.856676
684.30	17.77	258.548965
821.20	17.55	257.792541
958.00	17.28	256.854664
999.10	17.00	255.892207
1040.20	16.73	254.945365
1081.30	16.45	254.013883
1122.40	16.19	253.097513
1163.50	15.92	252.196008
1204.60	15.67	251.309129
1245.70	15.41	250.436638
1286.80	15.16	249.578300
1327.90	14.92	248.733888
1369.00	14.67	247.903175
1410.10	14.44	247.085938
1451.20	14.20	246.281959
1492.30	13.97	245.491023
1533.40	13.74	244.712918
1574.50	13.52	243.947436
1615.60	13.30	243.194373
1656.70	13.09	242.453526
1697.80	12.87	241.724699
1738.90	12.67	241.007695
1780.00	12.46	240.302322
1821.10	12.26	239.608394
1862.20	12.06	238.925722
1903.30	11.86	238.254126
1944.40	11.67	237.593424
1985.50	11.48	236.943442
2026.60	11.30	236.304004
2067.70	11.11	235.674939
2108.80	10.93	235.056080
2149.90	10.76	234.447114
2191.00	10.62	233.845662

2232.10	10.49	233.251632
2273.20	10.36	232.664932
2314.30	10.24	232.085473
2355.40	10.11	231.513163
2396.50	9.98	230.947916
2437.60	9.86	230.389644
2478.70	9.74	229.838261
2519.80	9.62	229.293682
2560.90	9.50	228.755824
2602.00	9.38	228.224602
2643.10	9.27	227.699935
2684.20	9.15	227.181743
2725.30	9.04	226.669946
2766.40	8.93	226.164463
2807.50	8.82	225.665219
2848.60	8.71	225.172135
2889.70	8.60	224.685136
2930.80	8.50	224.204146
2971.90	8.39	223.729091
3013.00	8.29	223.259899
3054.10	8.19	222.796497
3095.20	8.08	222.338813
3136.30	7.98	221.886776
3177.40	7.89	221.440318
3218.50	7.79	220.999369
3259.60	7.69	220.563861
3300.70	7.60	220.133728
3341.80	7.50	219.708902
3382.90	7.41	219.289318
3424.00	7.32	218.874913
3465.10	7.23	218.465620
3506.20	7.14	218.061379
3547.30	7.05	217.662126
3588.40	6.97	217.267799
3629.50	6.88	216.878339
3670.60	6.79	216.493684
3711.70	6.71	216.113776
3752.80	6.63	215.738556
3793.90	6.55	215.367967
3835.00	6.47	215.001950
3876.10	6.39	214.640450
3917.20	6.31	214.283411
3958.30	6.23	213.930777
3999.40	6.15	213.582495
4040.50	6.08	213.238511
4081.60	6.00	212.898772
4122.70	5.93	212.563225
4163.80	5.85	212.231818
4204.90	5.78	211.904501
4246.00	5.71	211.581224
4287.10	5.64	211.261935
4328.20	5.57	210.946586
4369.30	5.50	210.635129
4410.40	5.43	210.327515
4451.50	5.37	210.023697
4492.60	5.30	209.723628
4533.70	5.24	209.427262

4574.80	5.17	209.134553
4615.90	5.11	208.845456
4657.00	5.04	208.559927
4698.10	4.98	208.277921
4739.20	4.92	207.999395
4780.30	4.86	207.724306
4821.40	4.80	207.452611
4862.50	4.74	207.184269
4903.60	4.68	206.919239
4944.70	4.62	206.657478
4985.80	4.57	206.398948
5026.90	4.51	206.143609
5068.00	4.45	205.891420
5109.10	4.40	205.642343
5150.20	4.35	205.396339
5191.30	4.29	205.153372
5232.40	4.24	204.913402
5273.50	4.19	204.676394
5314.60	4.13	204.442310
5355.70	4.08	204.211115
5396.80	4.03	203.982773
5437.90	3.98	203.757249
5479.00	3.93	203.534507
5520.10	3.89	203.314515
5561.20	3.84	203.097236
5602.30	3.79	202.882640
5643.40	3.74	202.670691
5684.50	3.70	202.461483
5725.60	3.65	202.255040
5766.70	3.60	202.051326
5807.80	3.55	201.850303
5848.90	3.50	201.651937
5890.00	3.46	201.456192
5931.10	3.41	201.263033
5972.20	3.37	201.072427
6013.30	3.32	200.884340
6054.40	3.28	200.698739
6095.50	3.24	200.515590
6136.60	3.19	200.334862
6177.70	3.15	200.156521
6218.80	3.11	199.980537
6259.90	3.07	199.806879
6301.00	3.03	199.635516
6342.10	2.99	199.466417
6383.20	2.95	199.299553
6424.30	2.91	199.134894
6465.40	2.87	198.972411
6506.50	2.83	198.812075
6547.60	2.79	198.653857
6588.70	2.76	198.497731
6629.80	2.72	198.343667
6670.90	2.69	198.191640
6712.00	2.65	198.041621
6753.10	2.61	197.893585
6794.20	2.58	197.747505
6835.30	2.55	197.603356
6876.40	2.51	197.461111

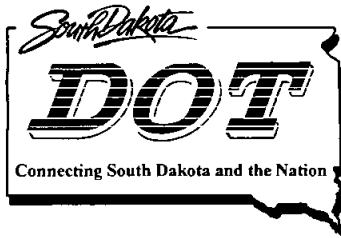
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6999.70	2.41	197.045557
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7081.90	2.35	196.777592
7123.00	2.32	196.646260
7164.10	2.29	196.516663
7205.20	2.26	196.388778
7246.30	2.23	196.262584
7287.40	2.20	196.138057
7328.50	2.17	196.015176
7369.60	2.14	195.893919
7410.70	2.11	195.774264
7451.80	2.09	195.656190
7492.90	2.06	195.539676
7534.00	2.03	195.424702
7575.10	2.00	195.311248
7616.20	1.98	195.199292
7657.30	1.95	195.088817
7698.40	1.93	194.979801
7739.50	1.90	194.872225
7780.60	1.88	194.766072
7821.70	1.85	194.661321
7862.80	1.83	194.557954
7903.90	1.80	194.455953
7945.00	1.78	194.355300
7986.10	1.75	194.255977
8027.20	1.73	194.157967
8068.30	1.71	194.061252
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8150.50	1.66	193.871639
8191.60	1.64	193.778708
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8273.80	1.60	193.596513
8314.90	1.58	193.507217
8356.00	1.56	193.419101
8397.10	1.54	193.332150
8438.20	1.52	193.246348
8479.30	1.50	193.161679
8520.40	1.48	193.078130
8561.50	1.46	192.995684
8602.60	1.44	192.914328
8643.70	1.42	192.834047
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8725.90	1.38	192.676654
8767.00	1.36	192.599514
8808.10	1.34	192.523393
8849.20	1.33	192.448278
8890.30	1.31	192.374156
8931.40	1.29	192.301013
8972.50	1.27	192.228837
9013.60	1.26	192.157615
9054.70	1.24	192.087333
9095.80	1.23	192.017981
9136.90	1.21	191.949545
9178.00	1.19	191.882013
9219.10	1.18	191.815374

9260.20	1.16	191.749615
9301.30	1.15	191.684726
9342.40	1.13	191.620693
9383.50	1.12	191.557507
9424.60	1.10	191.495156
9465.70	1.09	191.433629
9506.80	1.07	191.372915
9547.90	1.06	191.313003
9589.00	1.04	191.253883
9630.10	1.03	191.195545
9671.20	1.02	191.137977
9712.30	1.00	191.081170
9753.40	0.99	191.025113
9794.50	0.98	190.969797
9835.60	0.96	190.915213
9876.70	0.95	190.861349
9917.80	0.94	190.808198
9958.90	0.93	190.755749
10000.00	0.91	190.703992
10041.10	0.90	190.652920
10082.20	0.89	190.602523
10123.30	0.88	190.552792
10164.40	0.87	190.503717
10205.50	0.86	190.455292
10246.60	0.84	190.407506
10287.70	0.83	190.360352
10328.80	0.82	190.313821
10369.90	0.81	190.267904
10411.00	0.80	190.222595
10452.10	0.79	190.177884
10493.20	0.78	190.133764
10534.30	0.77	190.090228
10575.40	0.76	190.047266
10616.50	0.75	190.004872
10657.60	0.74	189.963039
10698.70	0.73	189.921758
10739.80	0.72	189.881023
10780.90	0.71	189.840826
10822.00	0.70	189.801160
10863.10	0.69	189.762018
10904.20	0.68	189.723394
10945.30	0.67	189.685280
10986.40	0.66	189.647670
11027.50	0.66	189.610556
11068.60	0.65	189.573933
11109.70	0.64	189.537794
11150.80	0.63	189.502133
11191.90	0.62	189.466943
11233.00	0.61	189.432218
11274.10	0.61	189.397952
11315.20	0.60	189.364138
11356.30	0.59	189.330772
11397.40	0.58	189.297846
11438.50	0.57	189.265356
11479.60	0.57	189.233294
11520.70	0.56	189.201657
11561.80	0.55	189.170438

11602.90	0.54	189.139631
11644.00	0.54	189.109231
11685.10	0.53	189.079233
11726.20	0.52	189.049631
11767.30	0.52	189.020421
11808.40	0.51	188.991596
11849.50	0.50	188.963153
11890.60	0.50	188.935085
11931.70	0.49	188.907388
11972.80	0.48	188.880058
12013.90	0.48	188.853088
12055.00	0.47	188.826475
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12137.20	0.46	188.774299
12178.30	0.45	188.748727
12219.40	0.45	188.723492
12260.50	0.44	188.698592
12301.60	0.43	188.674020
12342.70	0.43	188.649773
12383.80	0.42	188.625847
12424.90	0.42	188.602236
12466.00	0.41	188.578938
12507.10	0.41	188.555948
12548.20	0.40	188.533261
12589.30	0.40	188.510874
12630.40	0.39	188.488783
12671.50	0.39	188.466984
12712.60	0.38	188.445473
12753.70	0.37	188.424246
12794.80	0.37	188.403300
12835.90	0.37	188.382631
12877.00	0.36	188.362234
12918.10	0.36	188.342108
12959.20	0.35	188.322247
13000.30	0.35	188.302648
13041.40	0.34	188.283309
13082.50	0.34	188.264225
13123.60	0.33	188.245394
13164.70	0.33	188.226811
13205.80	0.32	188.208474
13246.90	0.32	188.190379
13288.00	0.32	188.172523
13329.10	0.31	188.154903
13370.20	0.31	188.137516
13411.30	0.30	188.120359
13452.40	0.30	188.103428
13493.50	0.30	188.086722
13534.60	0.29	188.070236
13575.70	0.29	188.053968
13616.80	0.28	188.037914
13657.90	0.28	188.022073
13699.00	0.28	188.006442
13740.10	0.27	187.991017
13781.20	0.27	187.975795
13822.30	0.27	187.960775
13863.40	0.26	187.945954
13904.50	0.26	187.931328

13945.60	0.25	187.916895
13986.70	0.25	187.902653
14027.80	0.25	187.888600
14068.90	0.24	187.874732
14110.00	0.24	187.861047
14151.10	0.24	187.847544
14192.20	0.24	187.834218
14233.30	0.23	187.821069
14274.40	0.23	187.808093
14315.50	0.23	187.795289
14356.60	0.22	187.782655
14397.70	0.22	187.770187
14438.80	0.22	187.757884
14479.90	0.21	187.745743
14521.00	0.21	187.733763
14562.10	0.21	187.721941
14603.20	0.21	187.710276
14644.30	0.20	187.698764
14685.40	0.20	187.687405
14726.50	0.20	187.676196
14767.60	0.20	187.665135
14808.70	0.19	187.654220
14849.80	0.19	187.643449
14890.90	0.19	187.632821
14932.00	0.19	187.622333
14973.10	0.18	187.611984
15014.20	0.18	187.601771
15055.30	0.18	187.591694
15096.40	0.18	187.581749
15137.50	0.17	187.571936
15178.60	0.17	187.562253
15219.70	0.17	187.552698
15260.80	0.17	187.543269
15301.90	0.16	187.533964
15343.00	0.16	187.524783
15384.10	0.16	187.515722
15425.20	0.16	187.506782
15466.30	0.16	187.497960
15507.40	0.15	187.489254
15548.50	0.15	187.480663
15589.60	0.15	187.472186
15630.70	0.15	187.463821
15671.80	0.15	187.455566
15712.90	0.14	187.447421
15754.00	0.14	187.439383
15795.10	0.14	187.431451
15836.20	0.14	187.423624
15877.30	0.14	187.415901
15918.40	0.13	187.408280
15959.50	0.13	187.400759
16000.60	0.13	187.393338
16041.70	0.13	187.386015
16082.80	0.13	187.378788
16123.90	0.13	187.371657
16165.00	0.12	187.364621
16206.10	0.12	187.357677
16247.20	0.12	187.350825

16288.30	0.12	187.344063
16329.40	0.12	187.337391
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16411.60	0.11	187.324311
16452.70	0.11	187.317900
16493.80	0.11	187.311573
16534.90	0.11	187.305331
16576.00	0.11	187.299170
16617.10	0.11	187.293092
16658.20	0.11	187.287093
16699.30	0.10	187.281174
16740.40	0.10	187.275333
16781.50	0.00	186.350000
16822.60	0.00	186.350000
16863.70	0.00	186.350000
16904.80	0.00	186.350000
16945.90	0.00	186.350000
16987.00	0.00	186.350000
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17069.20	0.00	186.350000
17110.30	0.00	186.350000
17151.40	0.00	186.350000
17192.50	0.00	186.350000
17233.60	0.00	186.350000
17274.70	0.00	186.350000
17315.80	0.00	186.350000
17356.90	0.00	186.350000
17398.00	0.00	186.350000



Department of Transportation

Division of Planning/Engineering

Office of Bridge Design

700 E Broadway Avenue

Pierre, South Dakota 57501-2586

Phone: 605-773-3285 FAX: 605-773-2614

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APR 16 2018

WATER RIGHTS
PROGRAM

April 12, 2018

Eric Gronlund
SD Dept. of Environmental and Natural Resources
Water Rights Program
523 E Capitol Ave.
Pierre, SD 57501-3182

Re: **M 020-372, Ziebach County, PCN I4YV**
SD20, 5 miles west of Jct. SD20/SD65 west of Isabel
Inslope Erosion Repair & Downspout Replacement

Dear Mr. Gronlund:

Enclosed are a Water Rights Permit Application (Form 2), Safety of Dams Submittal (Form 2A), aerial photo, proposed project plan and pipe layout sheet, original 1977 highway plan/profile sheet, peak flow calculations, hydraulic calculations, contour plots, profile plots of highway/approach, streambed, and channel cross-section.

This project provides for the replacement of a downspout culvert, culvert outlet scour protection, and erosion control to help stabilize the highway embankment.

We are seeking your approval of this application for a letting in 2018. An application fee is being processed between our state agencies. If you have questions or require more information, please contact this office.

Sincerely,

DEPARTMENT OF TRANSPORTATION

Steve Van Mullem, PE
Water Resources Engineer III

Schaal, Tim

From: Schaal, Tim
Sent: Friday, May 25, 2018 8:36 AM
To: Van Mullem, Stephen; Gronlund, Eric
Cc: Marton, Kevin
Subject: RE: Water Rights Permit/Safety of Dams --- M 020-372, Ziebach County, PCN I4YV

OK thanks Steve—we can make the change over here.

From: Van Mullem, Stephen
Sent: Friday, May 25, 2018 8:25 AM
To: Schaal, Tim; Gronlund, Eric
Cc: Marton, Kevin
Subject: RE: Water Rights Permit/Safety of Dams --- M 020-372, Ziebach County, PCN I4YV

Tim,
You are correct, the storage claimed on the application should be 198 ac-ft based on what was used in the calculations. Would you like me to re-submit the application? At one point I had thought the storage would be greater than 198 ac-ft because the IFSAR survey does not likely extend to the very bottom of the lake bed. The original highway plans from 1977 showed something deeper but it was under the highway and not upstream under the lake bed, so my later estimate of 240 ac-ft was taken conservatively and apparently I didn't use it in the calculations. It is probably best therefore to just run with 198 ac-ft as it was taken from available survey and not interpolated based on somewhat subjective information. I hope that sounds reasonable to you. Otherwise, you could request SDDOT to provide a detailed bathymetry survey of the lake bed to be absolutely sure.

The maximum reservoir elevation it reaches when routing the 100yr event through the structure is 2345.74 ft.

Let me know what else you need and I'll do my best to help,
Steve

From: Schaal, Tim
Sent: Thursday, May 24, 2018 11:03 AM
To: Van Mullem, Stephen <Stephen.VanMullem@state.sd.us>; Gronlund, Eric <Eric.Gronlund@state.sd.us>
Subject: RE: Water Rights Permit/Safety of Dams --- M 020-372, Ziebach County, PCN I4YV

Steve—I have a couple of questions—it looks like the amount of storage claimed on the application should be 198 Ac-ft. not 240 as on the application (see attachment), and could you confirm the maximum reservoir elevation it reaches when routing the 100 yr. event through the structure (Sorry I'm not very familiar with HY8).

Thanks

Tim

From: Van Mullem, Stephen
Sent: Tuesday, April 17, 2018 9:10 AM

To: Schaal, Tim; Gronlund, Eric

Subject: RE: Water Rights Permit/Safety of Dams --- M 020-372, Ziebach County, PCN I4YV

Okay, that sounds good. Thanks

Steve Van Mullem

From: Schaal, Tim

Sent: Tuesday, April 17, 2018 9:03 AM

To: Gronlund, Eric <Eric.Gronlund@state.sd.us>

Cc: Van Mullem, Stephen <Stephen.VanMullem@state.sd.us>

Subject: RE: Water Rights Permit/Safety of Dams --- M 020-372, Ziebach County, PCN I4YV

I'd say no; however, it would be nice to know if they anticipate dealing with anything unusual.

From: Gronlund, Eric

Sent: Tuesday, April 17, 2018 8:52 AM

To: Schaal, Tim

Subject: FW: Water Rights Permit/Safety of Dams --- M 020-372, Ziebach County, PCN I4YV

??

From: Van Mullem, Stephen

Sent: Tuesday, April 17, 2018 8:52 AM

To: Gronlund, Eric

Cc: Marton, Kevin; Jacobs, Steven; Rosecky, Jacob; Larson, Shelley

Subject: Water Rights Permit/Safety of Dams --- M 020-372, Ziebach County, PCN I4YV

Hello Eric,

One more question here regarding the Water Rights Permit and Safety of Dams application that we submitted to DENR last week. If SDDOT is approved a permit for the above referenced project, are there any special construction plan notes that are needed for the project plans regarding the permit? The Area has the final plans for this project out for a review and wants to let the project this summer.

Thank you,

Steve Van Mullem

Water Resources Engineer, P.E.

Office of Bridge Design – Hydraulics Section

SD Dept. of Transportation, Pierre, SD

605-773-3608

Water Permit Application No. 1978-1 SD DOT

Top of Dam Elev - 2355.3
P. Spillway Elev - 2343.7
OIS Emb Toe Elev - 2323.2

H_h = 32.1 ft.

Cat 2 - Sig. Hazard Dam

Normal Storage Capacity - 198 A.-ft
Max Storage Capacity - 700

Small Site Sig. Hazard Dam - Minimum Spillway Design = 100 yr Event

From USGS WRI 94-4055 "Tech In Est Peak Flow ... in SD"
Region C DA = 221 A. = 0.745 mi²

$$Q_{100} = 379 \text{ cfs}^{.566}$$

$$= 379 (548)$$

$$= \underline{\underline{207.5 \text{ cfs}}}$$

This is a DOT culvert (Spillway) repair project on an existing State Highway (Hwy 20). DOT used the HY-8 hydraulic model to route a Q₁₀₀ peak inflow of 207.5 cfs through the structure, reaching a peak reservoir level of elevation 2345.74.

Section 74:02:08:09

1. Type Map - OIS
2. Dam Area Profile - OIS
3. Dam Map & Plan - OIS
4. Area - Capacity - OIS
5. Outlet Details - OIS
6. Spillway Rating - OIS
7. Spillway Details - OIS
8. Spill - OIS
9. EPR - N/A Cat 2 - OIS

NRCs Annual Yield

$$DA = 221 \text{ A. } CN = 82 \text{ ISD} = 2$$

$$80\% \text{ chance} = 0.34$$

$$0.34 \times 221 \text{ A.} = \underline{\underline{6 \text{ A.-ft}}}$$

$$50\% \text{ chance} = 0.8$$

$$0.8 \times 221 \text{ A.} = \underline{\underline{15 \text{ A.-ft}}}$$

$$10\% \text{ chance} = 2.9$$

$$2.9 \times 221 \text{ A.} = \underline{\underline{54 \text{ A.-ft}}}$$



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3182
<http://denr.sd.gov>

**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 1978-1, South Dakota Department of Transportation**

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Environment and Natural Resources concerning Water Permit Application No. 1978-1, South Dakota Department of Transportation, c/o Steve Van Mullem, Water Resources Engineer, 700 E Broadway Avenue, Pierre SD 57501.

The Chief Engineer is recommending APPROVAL of Application No. 1978-1 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing rights, 3) the proposed use is a beneficial use and 4) it is in the public interest with the following qualifications:

1. Water Permit No. 1978-1 authorizes a dam with a storage capacity of 198 acre feet of water annually to the primary outlet elevation.
2. Low flows as needed for downstream domestic use, including livestock water and prior water rights must be by-passed.

See report on application for additional information.

Jeanne Goodman, Chief Engineer
June 7, 2018

REPORT ON
WATER PERMIT APPLICATION No. 1978-1
South Dakota Department of Transportation
June 1, 2018

Water Permit Application No. 1978-1 has been filed by the South Dakota Department of Transportation to impound 198 acre-feet of water from runoff by reconstructing an existing dam located in SE $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 31-T17N-R21W, in Ziebach County. This is an existing road grade embankment on State Highway 20. The purpose of this project is to rehabilitate a pipe culvert (spillway) and to stabilize the highway embankment from scour and erosion. If approved, this application appropriates sufficient runoff to fill the dam annually. The water will be used for livestock water purposes.

Discussion:

The dam will be classified as a small size, Category 2, Significant Hazard dam. The dam has been designed by the South Dakota Department of Transportation. The plans and specifications have been reviewed and will be approved; however, reconstruction of the dam cannot begin until Water Permit Application No. 1978-1 is approved.

The dam will be 32 feet high with a normal storage capacity of 198 acre-feet with a reservoir level at the primary spillway elevation (2343.7), and a maximum storage capacity of 700 acre-feet with a reservoir level at the top of dam elevation (2355.3). A dam of this size and hazard classification is required to have a minimum spillway design capable of passing a 100-year frequency event.

The dam has a drainage area of 221 acres or 0.345 square miles. The dam will have a 24 inch diameter smooth HDPE culvert with 11.6 feet of freeboard as the primary spillway. The DOT uses the HY-8 hydraulic model to route a 100-year frequency event peak of 207.5 cfs through the structure with the reservoir reaching a peak elevation of 2345.74

The annual yield for this drainage area with an 80 percent chance of occurrence, or 8 out of 10 years, is expected to be 6.0 acre-feet. The annual yield with a 50 percent chance of occurrence, or 1 out of 2 years, is expected to be 15.0 acre-feet; and the annual yield with a 10 percent chance of occurrence, or 1 out of 10 years, is expected to be 54.0 acre-feet.

The Drageset Dam is located in the SE $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 31-T17N-R21W on an unnamed tributary to Irish Creek, about 5 miles upstream of the confluence of unnamed tributary and Irish Creek and about 15 miles upstream of the confluence of Irish Creek and the Moreau River. There are no existing Water Rights/Permits or Location Notices filed on the unnamed tributary or Irish Creek between the Highway 20 dam and the Moreau River.

Conclusions:

1. Water Permit Application No. 1978-1 should be approved since unappropriated water is available and approval should not have any adverse effect on existing Water Permits/Rights.
2. If approved, the low flow bypass requirement for downstream domestic use should be a qualification on Water Permit Application No. 1978-1.



Timothy G. Schaal, P.E.
Engineer IV

Schlaak, Karen

From: Schlaak, Karen
Sent: Friday, June 08, 2018 8:27 AM
To: Van Mullem, Stephen
Subject: Water Permit Application No. 1978-1
Attachments: DOC060818-06082018082318.pdf

Mr. Van Mullen,

Attached is a copy of the report and recommendation for Water Permit Application No. 1978-1 located in Ziebach County. As stated in our letter, please contact the two papers to authorize publication and arrange for payment ASAP so the notice will be published on June 14th. Paper copy being send inter-office today.

If you have questions, contact Eric Gronlund or me.

Karen Schlaak
SD DENR, Water Rights Program
(605) 773-3352



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

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

denr.sd.gov

June 7, 2018

Steve Van Mullem
Water Resources Engineer
SD Dept. of Transportation
700 E. Broadway Ave.
Pierre, SD 57501

Dear Mr. Van Mullem:

We have reviewed the plans and specifications for your dam repair project located SE $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 31-T17N-R21W, in Ziebach County. The plans and specifications for the reconstruction of the dam are approved. Approval of the plans and specifications does not authorize reconstruction of the dam. The reconstruction of the dam may not begin until Water Permit No. 1978-1 is approved.

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

The Drageset Dam will be classified as a small size Category 2, Significant Hazard dam with a dam height of 32 feet and a normal storage capacity of 198 acre-feet and a maximum storage capacity of 700 acre-feet.

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

Sincerely,

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

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

Form 8

RECEIVED

JUN 27 2018

WATER RIGHTS
PROGRAM

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
County of Hughes) SS

I, Marylinn Baker

certify that the attached printed Notice was taken
from the Capital Journal

printed and published in Pierre

County of Hughes and

state of South Dakota. The notice was published

in the newspaper on the following date:

6-14-18

Cost of Printing \$31.92

Marylinn Baker
(Signature)

Business Office Asst.
(Title)

6-25-18
(Date Signed)

SNAPLP 16415
July 9/14
NOTICE OF
APPLICATION NO. 1978-1
to Appropriate Water
Notice is given that the
South Dakota Department
of Transportation, c/o
Steve Van Mullen, Water
Resources Engineer, 700 E
Broadway Ave, Pierre SD
57501 has filed an applica-
tion for a water permit to
impound 198 acre-feet of
water from a tributary to
Irish Creek by reconstruct-
ing a dam located in the SE
1/4 SW 1/4 Section 31 with
water impounded in the E

capjournal.com | A7

Legal Notice
1/2 SW 1/4 and the W 1/2
SE 1/4 Section 31; all in
T17N-R21W. This applica-
tion appropriates sufficient
runoff to fill the dam annu-
ally. The project consists
of rehabilitation of a pipe
culvert and stabilization of
the embankment along SD
highway 20 which is locat-
ed approximately 23 miles
north of Dupree SD. The
water is for livestock pur-
poses.
Pursuant to SDCL 46-2A-
2, the Chief Engineer re-
commends APPROVAL of
Application No. 1978-1 with
qualifications because (1)
unappropriated water is
available, (2) existing rights
will not be unduly im-
paired, (3) it is a beneficial
use of water, and (4) it is in
the public interest. The
Chief Engineer's recom-
mendation with qualifica-
tions, the application, and
staff report are available at
<http://denr.sd.gov/public> or
contact Eric Gronlund for
this information, or other in-
formation, at the Water
Rights Program address
provided below.
Any person interested in
opposing or supporting this
application or recommen-
dation must file a written
petition with BOTH the ap-
plicant and Chief Engineer.
The applicant must file a
petition if contesting the
Chief Engineer's recom-
mendation. The Chief Engi-
neer's address is "Water
Rights Program, P.O. Box
Building, 523 E Capitol,
Pierre SD 57501 (605 773-
3352)" and the applicant's
mailing address is given
above. A petition filed by
either an interested person
or the applicant must be
filed by June 25, 2018.
The petition may be infor-
mal, but must include a
statement describing the
petitioner's interest in the
application, the petitioner's
reasons for opposing or
supporting the application,
and the signature and mail-
ing address of the petitioner
or the petitioner's legal
counsel, if legal counsel is
obtained.
If the applicant does not
contest the recommenda-
tion 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.
Steven M. Pimer,
Secretary,
Department of Environment
and Natural Resources.
Published once at the total
approximate cost of \$31.92.

Notice 1978-1 to appropriate water

NOTICE OF APPLICATION NO. 1978-1 to Appropriate Water
Notice is given that the South Dakota Department of Transportation, c/o Steve Van Mullen, Water Resources Engineer, 700 E Broadway Ave, Pierre SD 57501 has filed an application for a water permit to impound 198 acre-feet of water from a tributary to Irish Creek by reconstructing a dam located in the SE 1/4 SW 1/4 Section 31 with water impounded in the E 1/2 SW 1/4 and the W 1/2 SE 1/4 Section 31; all in T17N-R21W. This application appropriates sufficient runoff to fill the dam annually. The project consists of rehabilitation of a pipe culvert and stabilization of the embankment along SD Highway 20 which is located approximately 23 miles north of Dupree SD. The water is for livestock purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 1978-1 with qualifications because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. The Chief Engineer's recommendation with qualifications, the application, and staff report are available at <http://denr.sd.gov/public> or contact Eric Gronlund for this information, or other information, at the Water Rights Program address provided below.

Any person interested in opposing or supporting this application or petition with BOTH the applicant and Chief Engineer, The applicant must file a petition if contesting the Chief

Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by June 25, 2018.

The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained.

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.

/s/ Steven M. Pirner, Secretary,
Department of Environment and
Natural Resources
Published once at the total
approximate cost of \$31.76
-061418

RECEIVED

JUN 25 2018

WATER RIGHTS
PROGRAM

Affidavit of Publication

STATE OF SOUTH DAKOTA,
COUNTY OF DEWEY, ss.

I, Lori Cox, being first duly sworn, on oath says, that she is the bookkeeper of the WEST RIVER EAGLE, a weekly newspaper published in Eagle Butte, County of Dewey, and has full and personal knowledge of all the facts herein stated; that said newspaper is a legal newspaper and has a bona fide circulation of at least two hundred copies weekly, and has been published within said county for fifty-two successive weeks next prior to the publication of the notice herein mentioned; that the

Notice 1978-1 to appropriate water

SD Department of Transportation

a printed copy of which, taken from the paper in which 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 weeks, on the day of each week on which said newspaper was regularly published to-wit:

June 14, 2018

That the full amount of the fees for
the publication of the annexed notice is \$31.76

Lori Cox

Subscribed and sworn to before me this 25th

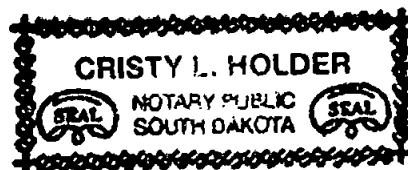
day of June, 2018

Cristy L Holder

Cristy L Holder, Notary Public

State of South Dakota

My commission expires August 9, 2021



Schlaak, Karen

From: Schlaak, Karen
Sent: Friday, June 08, 2018 8:33 AM
To: legals@capjournal.com
Subject: 1978-1, SD Department of Transportation
Attachments: 1978-1public.short.docx; FORM8.FRM.doc

Attached is a notice to be published on June 14, 2018.

The SD Department of Transportation, c/o Steven Van Mullem, 700 E Broadway, Pierre SD 57501 (605 773-3608) 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
SD DENR, Water Rights Program
(605) 773-3352



Schlaak, Karen

From: Schlaak, Karen
Sent: Friday, June 08, 2018 8:32 AM
To: 'wreagle@westrivereagle.com'
Subject: 1978-1, SD Department of Transportation
Attachments: 1978-1public.short.docx; FORM8.FRM.doc

Attached is a notice to be published on June 14, 2018.

The SD Department of Transportation, c/o Steven Van Mullem, 700 E Broadway, Pierre SD 57501 (605 773-3608) 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
SD DENR, Water Rights Program
(605) 773-3352





DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

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

denr.sd.gov

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

June 8, 2018

South Dakota Department of Transportation
c/o Steven Van Mullem, Water Resources Engineer
700 E Broadway Ave
Pierre SD 57501

Dear Mr. Van Mullem:

Water Permit Application No. 1978-1 for livestock use has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice has been sent to the West River Eagle printed at Eagle Butte SD (Ph # 605 964-2100) and the Capital Journal printed at Pierre SD (Ph # 605 224-7301). 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 publisher has been instructed to publish your notice. The newspaper has also been instructed to send us the Proof of Publication. We must receive Proof of Publication before action can be taken on the application.

Sincerely,

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

enclosures

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

NOTICE OF APPLICATION NO. 1978-1 to Appropriate Water

Notice is given that the South Dakota Department of Transportation, c/o Steve Van Mullem, Water Resources Engineer, 700 E Broadway Ave, Pierre SD 57501 has filed an application for a water permit to impound 198 acre-feet of water from a tributary to Irish Creek by reconstructing a dam located in the SE 1/4 SW 1/4 Section 31 with water impounded in the E 1/2 SW 1/4 and the W 1/2 SE 1/4 Section 31; all in T17N-R21W. This application appropriates sufficient runoff to fill the dam annually. The project consists of rehabilitation of a pipe culvert and stabilization of the embankment along SD Highway 20 which is located approximately 23 miles north of Dupree SD. The water is for livestock purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 1978-1 with qualifications because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. The Chief Engineer's recommendation with qualifications, the application, and staff report are available at <http://denr.sd.gov/public> or contact Eric Gronlund for this information, or other information, at the Water Rights Program address provided below.

Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by June 25, 2018.

The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained.

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.

Steven M. Pirner, Secretary, Department of Environment and Natural Resources. Published once at the total approximate cost of_____.



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3182
<http://denr.sd.gov>

JUL 06 2018

South Dakota Department of Transportation
c/o Steven Van Mullen
700 E Broadway Ave
Pierre SD 57501

Dear Mr. Van Mullen:

Enclosed is Water Permit No. 1978-1 authorizing construction of the water diversion system and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

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

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

Sincerely,

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

enclosures

Rodriguez, Rachel

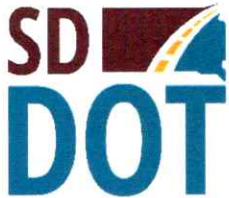
From: Kilts, Whitney (DENR)
Sent: Friday, November 3, 2023 10:35 AM
To: Rodriguez, Rachel
Subject: FW: Drageset Dam on Hwy 20 in Ziebach (Ziebach I4YV-Inslope Erosion Repair & Downspout Replacement)

Please add this email chain to the file for Water Permit No. 1978-1. DOT is indicating that 1978-1 has been constructed. Thanks.

From: Jacobs, Steven <Steven.Jacobs@state.sd.us>
Sent: Friday, November 3, 2023 9:48 AM
To: Kilts, Whitney (DENR) <Whitney.Kilts@state.sd.us>
Cc: Villbrandt, John <John.Villbrandt@state.sd.us>; Van Mullem, Stephen <Stephen.VanMullem@state.sd.us>; Marton, Kevin <Kevin.Marton@state.sd.us>
Subject: RE: Drageset Dam on Hwy 20 in Ziebach (Ziebach I4YV-Inslope Erosion Repair & Downspout Replacement)

The Project was completed September 2020 the work was completed as per the plans sheets in the permit.

Sincerely,



Steven Jacobs P.E.
Engineer 2 | South Dakota Department of Transportation
Better Lives Through Better Transportation
Mobridge Area Office | 2311 W. Highway 12 | Mobridge, SD
O: 605.845.3844 | Direct: 605.845.4605 | C: 605.845.6601 | F: 605.845.7153 | dot.sd.gov

From: Villbrandt, John <John.Villbrandt@state.sd.us>
Sent: Friday, November 3, 2023 9:28 AM
To: Jacobs, Steven <Steven.Jacobs@state.sd.us>
Subject: FW: Drageset Dam on Hwy 20 in Ziebach (Ziebach I4YV-Inslope Erosion Repair & Downspout Replacement)

Steven,

I think this was your project. Can you please get Whitney the info she's looking for.

Thanks,

John W. Villbrandt
SDDOT Mobridge Area Engineer
605-845-3844

From: Van Mullem, Stephen <Stephen.VanMullem@state.sd.us>
Sent: Thursday, November 2, 2023 2:21 PM
To: Villbrandt, John <John.Villbrandt@state.sd.us>
Cc: Marton, Kevin <Kevin.Marton@state.sd.us>; Kilts, Whitney (DENR) <Whitney.Kilts@state.sd.us>
Subject: FW: Drageset Dam on Hwy 20 in Ziebach (Ziebach I4YV-Inslope Erosion Repair & Downspout Replacement)

Hi John,

Do you have the information that Whitney is requesting regarding this project (Zieb PCN I4YV ?) Attached is the permit file.

Thank you,

Steve

From: Kilts, Whitney (DENR) <Whitney.Kilts@state.sd.us>

Sent: Thursday, November 2, 2023 11:59 AM

To: Van Mullem, Stephen <Stephen.VanMullem@state.sd.us>

Subject: Drageset Dam on Hwy 20 in Ziebach

Greetings Steve,

It looks like you worked on this back when the initial water rights permitting and dam safety review was done, so I am emailing you. But please forward to the appropriate person if you no longer deal with this.

I want to check if the rehab project for Drageset Dam on Hwy 20 in Ziebach County that was scheduled for 2018 got done (more information attached)? And if there were as-built (or as constructed) plans done for the project could I please get a copy of those?

I am working on updating SD dam inventory, so am following up on reviewed dam projects to check if they have been constructed. I also ask for as-built plans since they help with the Water Rights licensing inspection and getting the as constructed information for the dam reflected in the inventory.

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

Report of Examination of Works and/or Application of Water to Beneficial Use For Permit No. 1978-1

I have this day, October 24, 2024, made a thorough examination of the water use system constructed by South Dakota Department of Transportation, 700 East Broadway Ave. Pierre SD of Permit No. 1978-1, bearing the priority of April 16, 2018 authorizing the storage of 198 acre-feet of the waters of unnamed tributary to Irish Creek for livestock purposes, in Ziebach County.

Inspection contact & relationship to permit holder, if applicable: **Steven Jacobs, SD DOT (project engineer, see email in permit file)**

A. Works used to divert the water:

Well Information: n/a

Dam Information: SD DOT engineer indicated dam was reconstruction to plans in permit file

- 1) Height to crest 32.1 feet
- 2) Primary spillway approximately 11.6 ft below top of dam, height to primary spillway 20.5 ft
- 3) Crest width 30 feet
- 4) Crest length approx. 650 ft feet
- 5) Spillway is 24 in diameter conduit
- 6) Approx. storage 198 ac-ft (normal storage)
- 7) Approx. storage to crest 700 ac-ft (maximum storage)
- 8) Date of completion: Sept. 2020

Pump: n/a

Motor: n/a

B. Works used to transport water to place of use: n/a

C. Works used to apply water to beneficial use: n/a

D. Compliance with Permit Requirements:

- 1) Permit qualifications being abided by Yes
If no, describe: **xx**
- 2) Irrigation Questionnaires checked to determine if permit owner started irrigation by the end of construction period n/a
- 3) Exceptions to compliance are: none

E. Condition and Location:

1. The system is in **fair to poor** condition with the point of diversion located as follows: **dam center is approx. 101.5852289 °W and 45.385826° N and from the SW corner of Section 31- T17N-R21E 2,195 ft east and 40 ft north**
2. The works are capable storing **198** acre-feet of water which is to be used for **livestock**. Water has been put to beneficial use to the maximum extent as follows:
Dam location: SE ¼ SW ¼ Sec. 31-T17N-R21E
Impounded water location: E ½ SW ¼ and W ½ SE ¼ Sec. 31 all in T17N-R21E

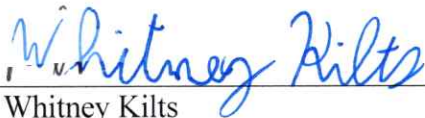
the license should be issued for **198** acre-feet of storage.

3. All structures, wells and lands on map **Yes**
If no, describe: **n/a**

F. Comments or other permit(s) associated with the project:

Several issues were noted with the condition of the dam during this inspection, see attached dam inspection report for repair and maintenance issues.

The downstream hazard classification of category 2, significant hazard, is appropriate due to the state highway across the crest of the dam.

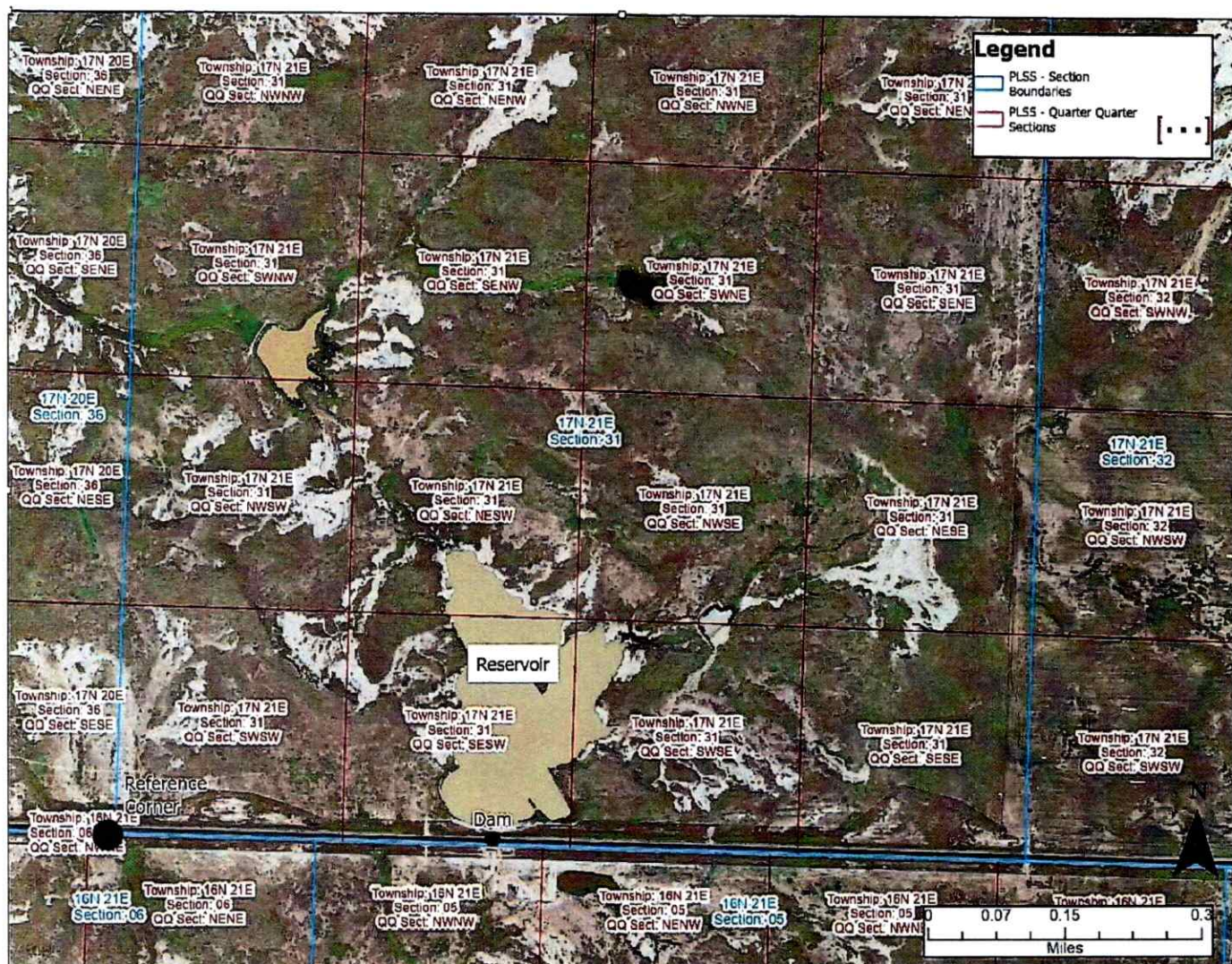

Whitney Kilts

DANR, Water Rights Program

Date report completed: **12/13/2024**

Report of Examination of Works

Permit No. 1978-1



Map by: Whitney Kilts, DANR Water Rights 12/13/2024

Summary Report on Dragest Dam

County: Ziebach

Inventory No.: SD02664

Hazard Category: significant (2)

Legal Location: SW Sec 31-T17N-R21E

Date of Inspection: October 24, 2024

Inspection Team: Whitney Kilts (report author) and Austin Settje, DANR

Dragest Dam is classified as a category two or significant hazard dam due to Hwy 20 crossing the crest of the dam. Since this dam is part of a state highway grade SD DOT is the owner of the dam and holds Water Permit No. 1978-1 for the impoundment (the licensing inspection for this dam was done concurrent to this inspection). Permit No. 1978-1 was issued in 2018, however based on FSA imagery the highway grade was impounding water prior to that. It appears likely the permit was applied for when design work for a road construction project on the highway identified that the impoundment was large enough to fall under the Safety of Dams Rules and includes a copy of the original plan sheet from 1977. The dam has an estimated normal storage capacity of 198 acre-feet with a pool elevation at the top of the spillway. The estimated maximum storage capacity for the dam is 700 acre-feet with an elevation at the top of the dam. This is the first inspection of the dam conducted by the Water Rights Safety of Dams staff. Note right and left in dam inspections is in reference to facing in the downstream direction in relation to the dam.

The dam crest is a paved highway with no apparent settlement or misalignment. The upstream slope has extensive erosion, especially along and above the conduit inlet (see pictures). The erosion has undermined several fence posts of the fence on the upstream slope and will undermine more if not addressed. The upstream slope has no riprap protection. The area of the upstream slope inside the fence line (opposite of the road) has inadequate grass cover and the erosion areas above the fence line also have inadequate grass cover. The lower portion of the downstream slope is grazed and has inadequate grass cover especially on the lower right side (see picture). The lower right side of the downstream slope has erosion and erosion gullies. A sinkhole was observed along the fence line just on the roadside of the fence three wooden fence posts to the right (west) of the primary spillway riprap (see pictures). Cracking was observed in the area of the riprap along the transverse fence line across the downstream slope (see picture). No seepage and no signs of seepage were observed.

The primary spillway is a CMP lined with 24" plastic pipe that outlet into a riprapped earthen channel across the downstream berm to the downstream toe (see pictures). The fence around the riprap portion of the primary spillway was down at the time of inspection. The plans in the permit file indicate an overflow area in the right abutment area. This area was grass covered and free of obstruction.

Recommended Repairs, Maintenance, and Monitoring:

1. **The sinkhole on the downstream slope should be repaired and the cause investigated and addressed.** The areas of erosion on the downstream slope should be repaired and stabilized to prevent further erosions. Livestock grazing on the embankment should be managed to maintain an adequate grass cover and limit erosion.
2. **The erosion of the upstream slope along the waterline should be repaired and riprap added to prevent further erosion.**
3. The cracking on the downstream slope should be monitored. If the cracking worsens or does not behave like a drying crack and self-heal with wetter conditions, the cracking should be repaired.
4. The repaired/modified primary spillway should be monitored to ensure it is performing as intended, especially during higher flows.
5. Any seepage should be monitored for changes in quantity or clarity.



Upstream slope, note extensive erosion and proximate to fence line.



Erosion line in relation to inlet. Note erosion area are present above conduit and older erosion above fence line and lack of riprap and grass cover.



Primary spillway.



Downstream slope sinkhole right side of dam near fence. Survey rod picture is 4ft long.



Picture shows approximat location of downstream sinkhole. Note lack of grass cover in grazed area of the slope.



Example of inadequate grass cover and erosion of the lower right side of the downstream slope.



Ripraped channel below conduit outlet.



Conduit outlet.



Example of cracking on downstream slope.



Dam overview picture. Note cattle in the downstream area.

South Dakota Dam Inspection Checklist

Name of Dam:	Dragest	Owner:	SD DOT
County:	Ziebach	Date Inspected:	10/24/2024
Inventory No.:	SD02664	Weather:	cool, cloudy, windy
Hazard Category:	2	Pool Elevation:	low several feet
Inspection Team:	Whitney & Austin		
Item	Yes	No	Remarks
1. Crest			paved highway
a. Any visual settlements?		x	
b. Misalignment?		x	
c. Cracking?		x	typical for highways in this area
d. Destructive animal activity?		x	
f. Tree or woody vegetation growth?		x	
2. Upstream Slope			
a. Adequate grass cover?		x	lots of bare area below fence line
b. Any erosion?	x		extensive
c. Tree or woody vegetation growth?		x	
d. Destructive animal activity?	x		live stock activity
e. Cracking?		x	
f. Adequate riprap protection?		x	no riprap and based on erosion needs riprap
g. Visual settlements or depressions?	x		erosion
h. Visual bulges?		x	
3. Downstream Slope			lower slope grazed
a. Adequate grass cover?		x	lower slope mostly bare
b. Any erosion?	x		extensive lower slope, right side erosion gullies
c. Tree or woody vegetation growth?		x	
d. Destructive animal activity?	x		cattle activity
e. Cracking?	x		around riprap spillway section
f. Visual bulges?		x	
g. Visual settlements or depressions?	x		
h. Is toe drain dry?			n/a
i. Are boils present at toe?		x	
j. Is seepage present?		x	
4. Abutment Contacts			
a. Any erosion?	x		
b. Visual differential movement?		x	
c. Any cracks noted?		x	
d. Is seepage present?		x	
e. Destructive animal activity?	x		lower part of all contacts grazed
5. Intake Structure			24" sloped metal end section at inlet and outlet
a. Does concrete surface show:		x	
(1)Spalling?			
(2)Cracking?			
(3)Erosion?			
(4)Scaling?			
(5) Exposed reinforcement?			

Item	Yes	No	Remarks
(6) Other?			
b. Do the joints show:			
(1) Displacement or offset?			
(2) Loss of joint material?			
(3) Leakage?			
c. Metal appurtenances?			
(1) Corrosion present?		x	
(2) Breakage present?		x	
(3) Anchor system secure?	x		
6. Conduit			CMP lined with plastic pipe approx. 24" diameter
a. Is the conduit concrete?		x	
b. Do concrete surfaces show:			n/a
(1) Spalling?			
(2) Cracking?			
(3) Erosion?			
(4) Scaling?			
(5) Exposed reinforcement?			
(6) Other?			
c. Do the joints show:			
(1) Displacement or offset?			
(2) Loss of joint material?			
(3) Leakage?			
d. Is the conduit metal?			
(1) Corrosion present?			
(2) Protective coating adequate?			
(3) Is the conduit misaligned?			
7. Spillway/s			
a. Does spillway concrete show?		x	n/a
(1) Spalling?			
(2) Cracking?			
(3) Erosion?			
(4) Scaling?			
(5) Exposed reinforcement?			
(6) Other?			
b. Do the joints show:		x	n/a
(1) Displacement or offset?			
(2) Loss of joint material?			
(3) Leakage?			
c. Do the energy dissipators show?		x	
(1) Signs of deterioration?			
(2) Are they covered with debris?			
(3) Other?			
d. Is the spillway earthcut?			see comments
(1) Are slopes eroding?			
(2) Are slopes sloughing?			
(3) Other?			

Item	Yes	No	Remarks
e. Is the downstream channel:			
(1) Eroding or backcutting?		x	
(2) Obstructed?		x	
f. Has released water?			
(1) Eroded the embankment?		x	
(2) Undercut the outlet?		x	
(3) Other?		x	
g. Approach channel condition?	no approach channel		
8. Stilling Basin			riprap channel below conduit serves as basin
a. Does concrete surface show:		x	
(1) Spalling?			
(2) Cracking?			
(3) Erosion?			
(4) Scaling?			
(5) Exposed reinforcement?			
(6) Other?			
b. Do the joints show:		x	
(1) Displacement or offset?			
(2) Loss of joint material?			
(3) Leakage?			
c. Do the energy dissipators show?			riprap
(1) Signs of deterioration?		x	
(2) Are they covered with debris?		x	
(3) Other?		x	
9. Low level outlet			n/a
a. Is the low level gate operational?			
b. Access locked?			
c. Condition?			
10. Instrumentation			none noted
a. List type(s) of instrumentation.			
b. In good condition?			

Comments:

based on plans there should be a overtopping section of the road for extreme events with an earthen approach channel on the right side of the dam- this area could not be easily distinguished from the dam and surrounding area- which could be considered a secondary spillway the general area were this is shown on the plans is free of obstructions and has adequate grass cover in the road ditch but entrance and exit areas are grazed

Approval of Location Change and/or Additional Diversion Point(s)

NAME: South Dakota Department of Transportation

COUNTY: Ziebach

ADDRESS: 700 Broadway Ave, Pierre, SD 57501

DATE: June 4, 2025

GENERAL DESCRIPTION OF AUTHORIZED PROJECT:

Water Permit No. 1978-1 authorizes the reconstruction of a dam and impound 198 acre-feet of water annually from a tributary to Irish Creek and runoff located in the E ½ SW ¼ and the W ½ SE ¼ Section 31, T17N, R21W for livestock watering purposes.

AUTHORITY:

Pursuant to SDCL 46-5-13.1, the location of a diversion point may be changed, or additional diversion points may be added, provided the following conditions are met and the potential for interference with other existing diversions is not increased:

Developed water source same as permitted source and no additional water appropriated,

The dam authorized under Permit No. 1978-1 was developed in the SE ¼ SW ¼ Section 31, T17N, R21E.

If irrigation, no new land is irrigated,

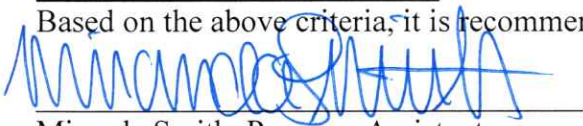
N/A

Review of Existing Diversions

The legal description of the dam for Water Permit No. 1978-1 was public noticed for the location to be in the E ½ SW ¼ and the W ½ SE ¼ Section 31, T17N, R21W. R21W does not exist, and this location change document is to correct the legal description.

RECOMMENDED ACTION

Based on the above criteria, it is recommended that the change in diversion point location be approved.



Miranda Smith, Program Assistant

Water Rights Program

The Chief Engineer makes a finding pursuant SDCL 46-5-13.1 and ARSD 74:02:01:14.01 that:

This change in location and/or additional diversion point(s) does not increase the potential for adverse effects to existing diversions.



Mark Mayer, PE

Director of Office of Water



**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

JUN 06 2025

SD Department of Transportation
c/o Steve Van Mullem
700 Broadway Ave
Pierre, SD 57501

No. 1978-1

Dear Mr. Van Mullem:

Enclosed is Water License No. 1978-1. 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.

Recommended Repairs, Maintenance, and Monitoring

1. The sinkhole on the downstream slope should be repaired and the cause investigated and addressed. The areas of erosion on the downstream slope should be repaired and stabilized to prevent further erosions. Livestock grazing on the embankment should be managed to maintain an adequate grass cover and limit erosion.
2. The erosion of the upstream slope along the waterline should be repaired and riprap added to prevent further erosion.
3. The cracking on the downstream slope should be monitored. If the cracking worsens or does not behave like a drying crack and self-heal with wetter conditions, the cracking should be repaired.
4. The repaired/modified primary spillway should be monitored to ensure it is performing as intended, especially during higher flows.
5. Any seepage should be monitored for changes in quantity or clarity.

Sincerely,

Mark Mayer, PE
Director of Office of Water
(605) 773-3352

Note: The dam authorized by Water Right No. 1978-1 bears a downstream hazard classification of Category 2-significant hazard. Please contact Whitney Kilts with the Water Rights Program with any questions regarding the recommended repairs, maintenance, monitoring, or hazard classification.
Whitney.Kilts@state.sd.us

enclosures

**STATE OF SOUTH DAKOTA
WATER LICENSE NO. 1978-1**

(1) South Dakota Department of Transportation, 700 Broadway Ave, Pierre, SD 57501, made Application No. 1978-1, April 16, 2018, for a water permit to reconstruct a dam and impound 198 acre-feet of water annually from a tributary to Irish Creek and runoff, Ziebach County, South Dakota for livestock watering purposes. Permit No. 1978-1, with a priority date of April 16, 2018, was approved June 25, 2018, and issued to the applicant for diversion of water with construction of the described water supply system to be completed on or before June 25, 2023, and for the application to beneficial use of water on or before June 25, 2027.

An investigation conducted for licensing purposes found the diversion point developed outside of the permitted area. Pursuant to SDCL 46-5-13.1 and ARSD 74:02:01:14.01, the Chief Engineer made a finding that the change in the diversion point location did not increase the potential for adverse effects to existing diversions.

(2) It is certified that the permit holder has complied with the provisions of South Dakota State Law relating to completion of the construction of the water supply system and is entitled to impound 198 acre-feet of water annually for beneficial use. The location of the dam is:

- 2,195 feet E and 40 feet N from the SW corner of Section 31, T17N, R21E (SE ¼ SW ¼)
(Latitude 45.38583 and Longitude -101.585229)

(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 South Dakota Department of Transportation, the holder and/or owner of Water Right No. 1978-1 is issued a license to appropriate water, the right to impound 198 acre-feet of water annually from a tributary to Irish Creek and runoff, with a priority date of April 16, 2018, from the location specified in (2) of this license for livestock watering purposes.

This license is subject to South Dakota Water Law, any limitations or conditions listed in Water Right No. 1978-1 and subject to the following qualifications:

1. Water Permit No. 1978-1 authorizes a dam with a storage capacity of 198 acre-feet of water annually to the primary outlet elevation.

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



Mark Mayer, PE
Director of Office of Water

6/6/25
date

