WATER PERMIT NO. 1671-1

Name of Applicant: **Bureau of Land Management**

Address: **310 Roundup St, Belle Fourche SD 57717** Phone: **605 892-2526**

Amount of Water Claimed: **156.33 AF** Total Acres: **NA**

Source of Water Supply: **runoff – Alkali Creek**

Water to be used for: **recreation, fish & wildlife, livestock** County: **Butte & Harding**

Type of Waste Disposal System:

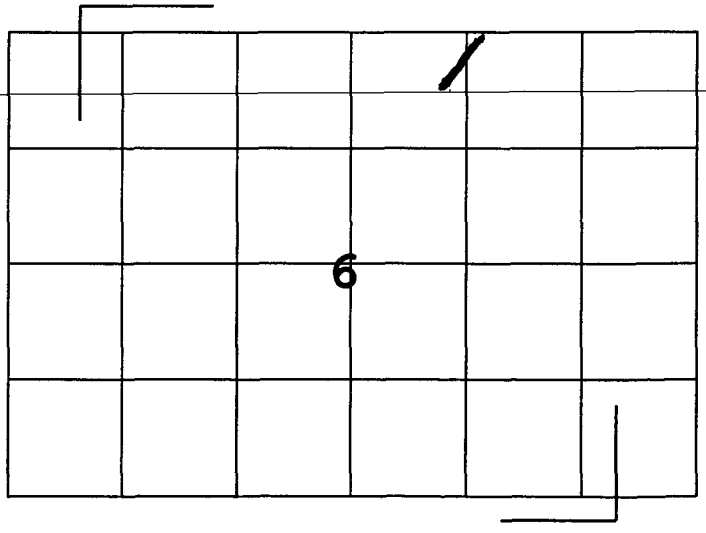
Location: **about 36 miles north of Belle Fouche**

PRIORITY Date Received: **5-13-1998** Fee: **$225.00**

Corrected Application Received: **6-23-1998** Period of Annual Use: **January 1- December 31**

Remarks:

Diversion Point: **N ½ NE ¼ Sec 6-T14N-R3E**



Water Impounded: **N ½ NE ¼, NW ¼ Sec 6-T14N-R3E; S ½ SW ¼ Sec 31 and SE ¼ Sec 36; all in T15N-R2E** T15N, R3E

Depth of Well: **NA**

Well Driller:

Remarks:

Type of Map: **topo**

Prepared by: **Roger Smith, PE**

Reviewed and the Number Assigned on: **6-23-1998** By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____

SOUTH DAKOTA
WATER PERMIT NO. 1671-1

Date of first receipt of application May 13, 1998.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 1671-1 to Bureau of Land Management, 310 Roundup Street, Belle Fourche SD 57717 authorizing the construction of a dam and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 1671-1 authorizes impoundment of 156.33 acre-feet of water from runoff in Alkali Creek by constructing a dam located in the N ½ NE ¼ Section 6-T14N-R3E. Water will be impounded in the N ½ NE ¼, N ½ NW ¼ Section 6-T14N-R3E; S ½ SW ¼ Section 31-T15N-R3E and SE ¼ Section 36-T15N-R2E.

2. The water appropriated shall be used for the purpose of providing habitat for fish and wildlife propagation, recreational use and livestock water use and may not exceed the amount of water needed for beneficial use for these purposes.

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. 1671-1 is August 24, 1998.

5. The date from which applicant may claim right is May 13, 1998.

6. One-fifth of the construction is to be completed on or before February 24, 2000.

7. All construction is to be completed on or before August 24, 2003.

8. Water is to be put to beneficial use on or before August 24, 2007.

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. 1671-1 authorizes a dam with storage capacity of 156.33 acre-feet of water and sufficient water annually to maintain the water level to the outlet elevation of 3,074.0 feet mean sea level.

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

WATER MANAGEMENT BOARD

By: _____ SEP 1 0 1998

John Hatch, Chief Engineer — date
Water Rights Program
Department of Environment and Natural Resources

FORM 2: Application for uses other than irrigation
(Type or print)

Mail to:	(office use only)
Water Rights Program Joe Foss Building 523 E. Capitol Pierre, SD 57501-3181 (605) 773-3352	No. 1671-1 Hydrologic Unit 10110201 Basin Little Missouri Newspaper Nation's Center News, Buffalo, SD



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

Check use(s) of water:

____ Municipal	____ Suburban Housing	X Recreational	____ Institutional
____ Rural Water System	____ Commercial	X Fish & Wildlife	____ Geothermal Heat
____ Domestic (over 18 gpm)	____ Industrial	X Other LIVESTOCK	

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 of Applicant Bureau of Land Management Phone 605-892-2526
(check one) ____ Owner ____ Tenant/lessee
Mailing Address 310 Roundup Street, Belle Fourche State SD 57717
(Street, RR, or Box and City) (Zip Code)

2. Amount of water claimed T *CFS or ____ **GPM 156.33 ***AF
(*Cubic Feet per Second) (**Gallons per Minute) (***Acre Feet - storage capacity of dam/dugout or annual use if applicable)

3. Source of water supply Surface Runoff - Alkali Creek

4. Location of point of diversion (example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W) N½NE¼, Section 6 - T. 14 N., R. 3 E. Water Impounded: N1/2 NE1/4, NW1/4 Sec. 6-T14N-R3E; S1/2 SW1/4 Sec. 3-T15N-R3E and SE1/4 Sec. 6; all in T15N-R2E County Butte

5. County or counties where water will be used Butte and Harding

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

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

The project description is found in the attached Design Report.

STATE OF SOUTH DAKOTA) SS
County of Butte)

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

I, BLM Charles A Berdan, the applicant, certify that I have read this application, have examined the attached map and that the matters stated are true and that I intend, and am able to complete the necessary construction.

Applicant's signature Charles A Berdan, BLM

Subscribed and sworn to before me this 12th day of May 19 98

ELSIE GORDER
NOTARY PUBLIC SOUTH DAKOTA
SEAL SEAL
3-98

Elsie Gorder
Notary Public signature
Comm Expires 12-20-99

Form 2A
(Complete applicable portions only)

Supplemental Information

(type or print in ink)

MAY 1998
WATER RIGHTS
PROGRAM
Pierre, SD

1. Well Information - Proposed Construction

a) Drill Hole Diameter _____ Depth _____

b) Casing Type _____ Diameter _____ Thickness _____

c) Screen Type _____ Diameter _____ Thickness _____

d) Gravel Pack _____ Length of Gravel Pack _____

e) Depth to Top of Water Bearing Material _____

f) Depth to Water (ground surface to water level) _____

g) Distance to nearest existing domestic well:

On applicants property _____ On property owned by others _____

2. Wastewater Disposal System Information

a) Type of System (i.e. septic tank, drain field) _____

b) System Capacity (gallons) _____ Year Constructed _____

c) Connected to the City of _____ Sanitary System

3. Dugout Information

a) Surface Dimensions _____ Depth _____

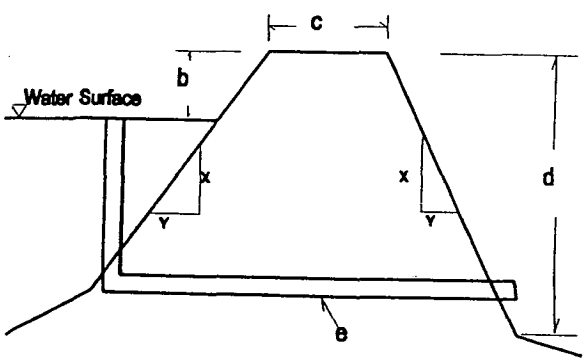
b) Depth to water (ground surface to water level) _____

4. Water Storage Dams

If the proposed water use system contains one or more storage dams, please furnish the information requested below for each dam. The locations of the dams need to be shown on the map submitted with the application.

a) If a private engineering firm or government agency was involved in the design of this dam, please give their name and address:

DUCKS UNLIMITED



b) Freeboard 4'

c) Crest Width 12'

Crest Length 1167'

d) Height 31'

e) Primary Outlet Capacity _____

If pipe, diameter 42"

f) Secondary Spillway Capacity _____

Spillway Width 150'

g) X & Y Slope _____

Upstream 3:1

Downstream 3:1

h) Surface Area of Impoundment 37.71

i) Storage 156.33 Acre Feet

j) Drainage Area Above Dam 4600 Acres
(7.2 sq.mi.)

RECEIPT

Water Rights Program

South Dakota Department of Environment and Natural Resources

№ 415809

Pierre, June 23, 1998

RECEIVED OF Bureau of Land Management, 310 Roundup Street, Belle Fourche, SD 57[illegible]

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

Fee for Application for Permit No. 1671-1 to Appropriate Water, to construct and to put water to beneficial use	225	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 Filing Extension Request		
Fee for		
(Any Other Work Provided by Law) **Total**	225	00

By _____ Chief Engineer John Hatch

P & S Review | 6/29/98 TGS

Water Permit Application No. 1671-1
Bureau of Land Management

Cat. 3 - Low Hazard Dam

Top of Dam Elev. - 3079
P. Spillway Elev. - 3074
2nd. Spillway Elev. - 3076.5
D/S Toe Elev. - 3048

Height: 31 ft.

Normal Storage Capacity - 156.33 Ac-Ft.
Int. Storage Capacity - 270 Ac-Ft.
Max. Storage Capacity - 412 Ac-Ft.

Eff Height x Int. Storage Capacity = 28.5' x 270 = 7695 > 3000 ∴
50 year Frequency Min. Spillway Design

From USGS WRI 80-80 - "Tech. for Est. Flood Peaks ... in SD"
DA = 4600 Ac = 7.2 mi²
Slope = 35 ft/mile
SI = 2.50

$Q_{50} = 106 (A)^{.63} S^{.43} SI^{-.69}$
$= 106 (7.2)^{.63} (35)^{.43} (2.50)^{-.69}$
$= 106 (3.47)(4.93)(0.53)$
$= 960$ cfs

$Q_{100} = 132 A^{.65} S^{.46} SI^{-.67}$
$= 132 (7.2)^{.65} (35)^{.46} (2.50)^{-.67}$
$= 132 (3.60)(5.13)(0.54)$
$= 1300$ cfs

Secondary Spillway Flow

$Q = CLH^{3/2}$ C = 2.6 H = 2.5 L = 150
$= (2.6)(150)(2.5)^{1.5}$
$= 1540$ cfs

Ducks Unlimited used the NRCS TR-20 model to route a Q100 peak of 1250 cfs through the dam with 1.18' of available freeboard remaining.

Section 7 : 02 : 08 : 09

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

NRCS Annual Yield

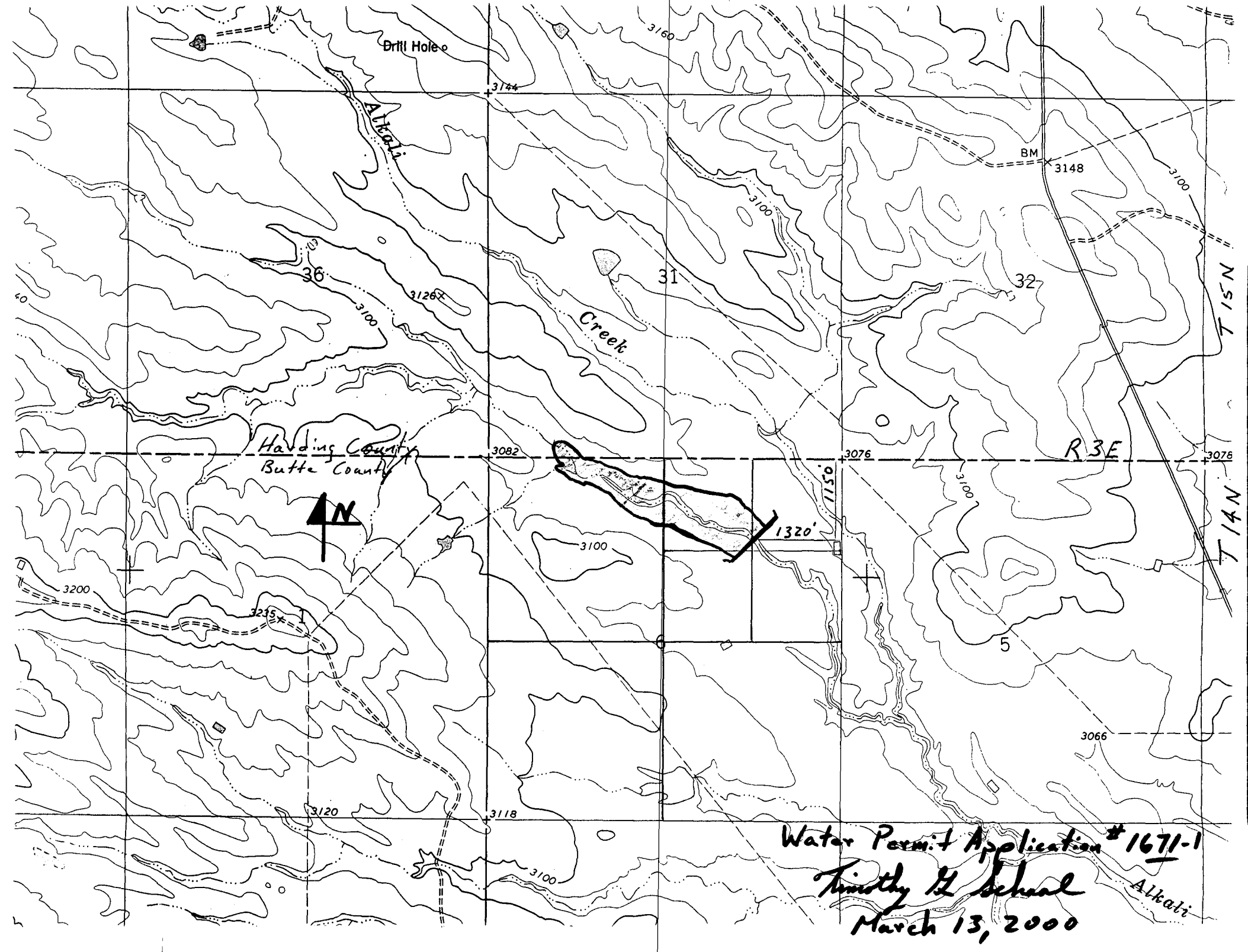
DA = 4600 Ac CN = 78 ISD = 1

80% chance = 0.08
$0.08 \times 4600/12 =$ 31 Ac-Ft.

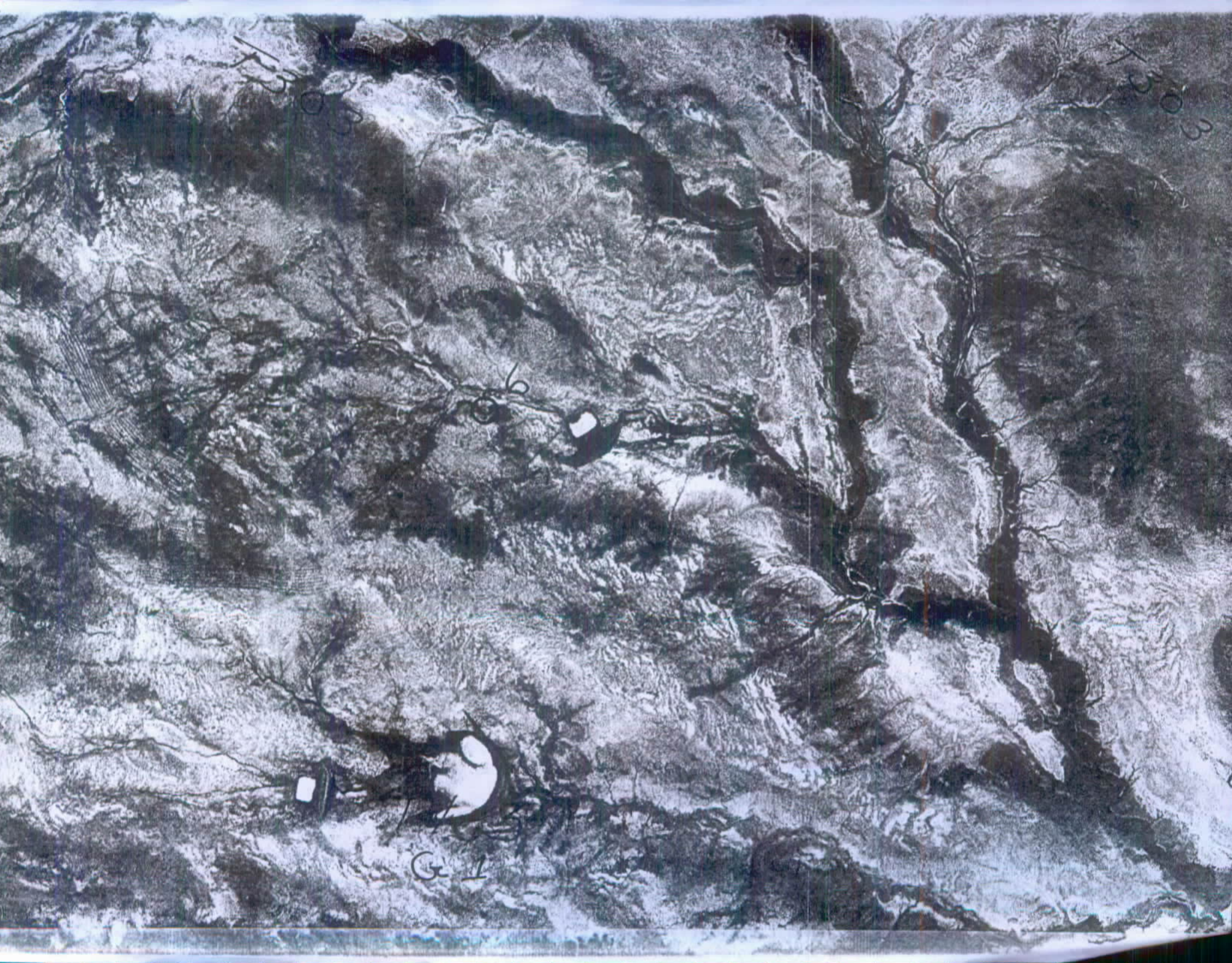
50% chance = 0.25
$0.25 \times 4600/12 =$ 96 Ac-Ft.

10% chance = 1.3
$1.3 \times 4600/12 =$ 500 Ac-Ft.

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD



Water Permit Application #1671-1
Timothy G. Schaal
March 13, 2000



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
South Dakota Resource Area
310 Roundup Street
Belle Fourche, South Dakota 57717-1698

IN REPLY REFER TO:



Water Rights Program
Joe Foss Building
523 E. Capitol
Pierre, SD 57501-3181

May 12, 1998

Dear Mr. Gronlund,

Enclosed you will find two applications for a impoundment on public lands on the Butte-Harding county line. The engineering was done and the construction and construction monitoring will be the responsiblity of Ducks Unlimited.

The payment for the applcation fee will becoming in a check from another location. Thank you.

I will be the BLM contact for this project. if you have any questions you can contact me at (605) 892-2526

Sincerely,

Charles A. Berdan

Charles A. Berdan

DESIGN REPORT

for

ALKALI CREEK

FALL RIVER COUNTY, SD (SD-0242-001)

MAY 1998
WATER RIGHTS
PROGRAM
Pierre, SD

April 7, 1998

Prepared by:

Ducks Unlimited, Inc.
3502 Franklin Avenue
Bismarck, ND 58501

DESIGN REPORT

PROJECT: Alkali Creek
SD -0242-01

LOCATIONS: Dam Location - ~~NW¼~~ N½ NE¼ Section 6 Twp. 14N Rge. 3E., Butte County, SD
Reservoir - above description + SW¼ 31-T15N-R3E, SE¼ 36-T15N-R2E, Harding County, SD

MARSH DATA: Full Service Level (FSL) @ 3074.0 (mean sea level)
37.71 Surface Acres @ FSL
156.33 Acre-Feet Capacity @ FSL
Maximum Depth - 11 feet

PROJECT DATA: Top of Dam - elevation 3079.0
Maximum Fill - 16'
Primary Spillway - 84" riser / 42" barrel @ invert el. 3059.0 outlet el. 3048.0
Emergency Spillway - elevation 3076.5 (150' wide control section)
Upstream Berm - elevation 3074.0 (10' wide)
Side Slopes - 3 (horizontal):1 (vertical)

CLASSIFICATION: Based on the classification criteria outlined in Chapter 74:02:08 "Safety of Dams," it is recommended that the proposed dam be classified as a small, Category 3 dam. No loss of life and minimal economic loss is expected should failure occur. The product of the "maximum storage capacity" times the "effective height" is 5356. (412 x 13)

PRELIMINARY RISK ASSESSMENT: The proposed construction is on Alkali Creek, a tributary to the South Fork Moreau River. Alkali Creek runs through public and private pasture land. The first downstream structure is a roadway located 2.65 channel miles southeast of the proposed dam. No other structures or roadways exist on Alkali Creek.

BACKGROUND: The project was proposed to Ducks Unlimited by the U.S. Bureau of Land Management. The project involves the construction of a new dam and subsequent reservoir on BLM land. The construction of the dam will address an existing erosion problem with the main channel.

PROPOSED CONSTRUCTION: An earthen embankment of compacted local material will be constructed to the elevation and dimensions described above as part of Project Data. Borrow material will be obtained from the excavation of the emergency spillway. Additional borrow area will be developed downstream of the dam by widening the bottom and flattening the slopes of the eroded channel. A primary spillway consisting of a corrugated metal riser and barrel will pass inflows from a 10 year event. Drawdown will be provided via a separate variable level water control structure.

HYDROLOGY / HYDRAULICS: A hydrologic analysis of surface water runoff was performed using two methods. A peak discharge was determined from regression equations developed in WATER-RESOURCE INVESTIGATIONS REPORT 80-80 USGS. The NRCS TR-20 METHOD was used to determine the inflow hydrograph. The NRCS Curve Number used in the TR-20 Method was manipulated to create peak discharges similar to those developed from the regression equation. Other assumptions made in developing inflow hydrographs by the TR-20 METHOD were:

Rain Duration = 1.00
Rain Table # = 1
Antecedent moisture condition = 2
Rainfall from NRCS charts

Inflow hydrographs developed from the TR-20 METHOD were routed through the primary and emergency spillways. This yielded outflow hydrographs reveling peak discharges at maximum reservoir elevations corresponding to various runoff events. The following table is a summary of that printout:

PARAMETERS:
Watershed - 7.2 Square Miles
Time of Concentration - 4.0 Hours
Curve #'s - 5 Year - 75, 10 Year - 78, 25 Year - 78, 100 Year - 82

Event	Rain (in)	Runoff (ac-ft)	Peak Inflow (cfs)	Peak Outflow (cfs)	Max Reservoir Elevation	Free-Board (ft)*	Flow in E.S. (cfs)
5 Year	2.20	185	219	126	3075.50	2.83	
10 Year	2.40	278	372	188	3076.15	3.18	5
25 Year	3.00	433	627	349	3077.05	2.28	157
100Year	3.80	780	1250	896	3078.20	1.18	695

*calculated from top of compacted fill 3079.0 + 0.33' to finish grade

The primary spillway capacity was calculated by comparing discharges developed by the weir flow formula and formulas for calculating head loss through corrugated metal pipe. The emergency spillway capacity was calculated using FLOWPROF. A discharge rating curve is attached to the end of the report.

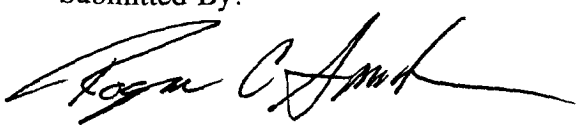
DROUGHT ANALYSIS: It is difficult to determine the frequency in which there will be adequate runoff to sustain the marsh through the brood-rearing period, a criteria important to project sponsors. Using NRCS methods, the 80% and 50% annual runoff will generate 31 and 96 acre-feet respectively. The annual requirement assuming an evaporative loss of approximately 3 feet is 64 acre-feet.

SOIL INVESTIGATION: As of this writing a soil investigation has not been completed. A soil investigation report, to be completed in the near future, will be available upon request. The plans will be modified to show the approved borrow areas as well as any other modifications recommended by the

geotechnicial consultant.

IMPACTS TO SURROUNDING PROPERTY: The planned construction and subsequent reservoir will be contained within land owned by the United States Government and managed by the Bureau of Land Management.

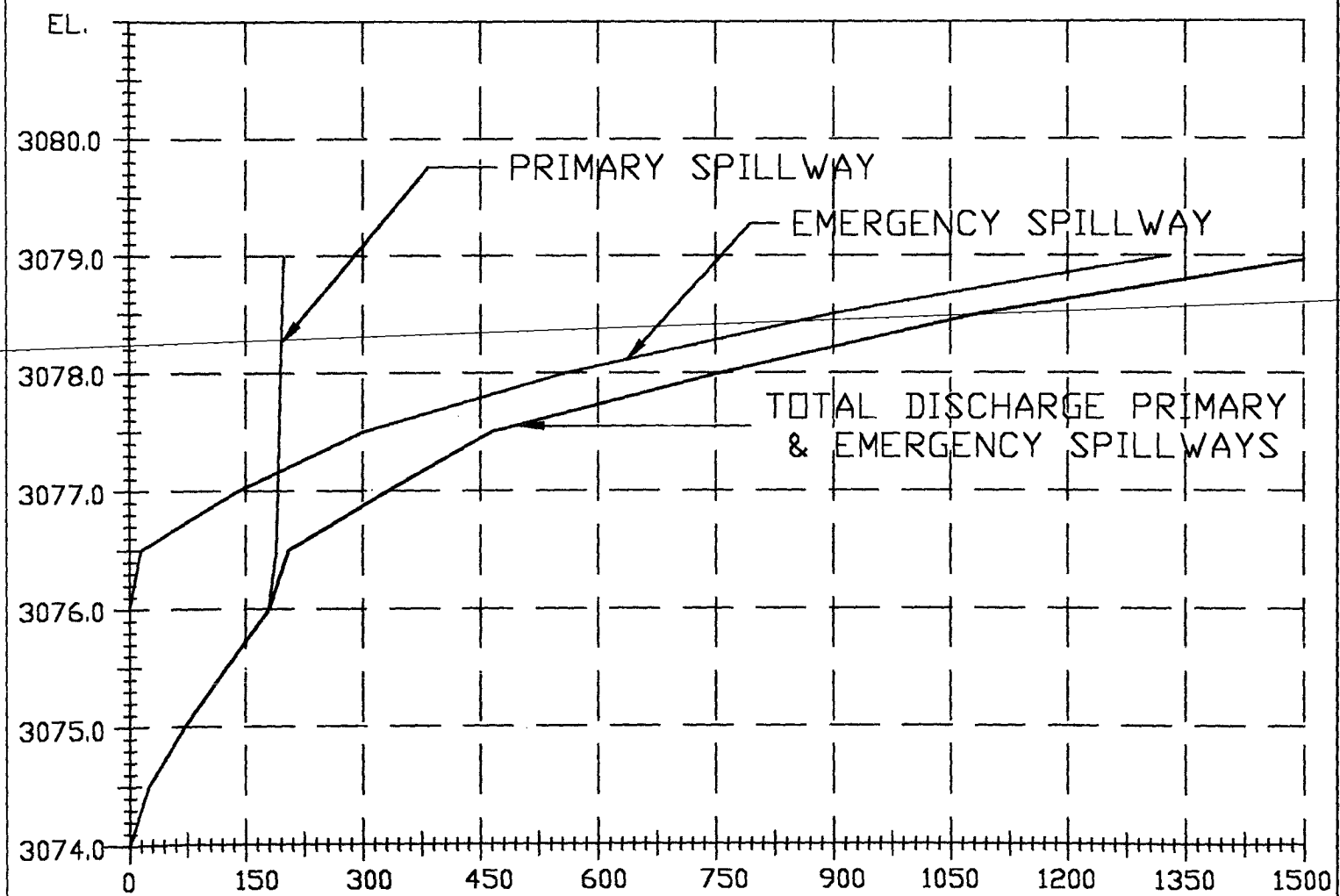
Dated: April 9, 1998
Submitted By:



Roger Smith, P.E (PE-4325)
Regional Engineer
Ducks Unlimited
Great Plains Regional Office

ALKALI IMPOUNDMENT

DISCHARGE CURVE



File No.

Water Rights Program - File Documentation

NAME: Bureau of Land Management

ADDRESS: 310 Roundup St, Belle Fourche SD

DATE: 5-19-98 **COUNTY:** Butte **TELEPHONE:** 605 892-2526

RE: Pending application

COMMENTS:

I called Charles A Berdan with BLM inquiring about the application fee. Mr. Berdan indicated the fee was coming from another BLM office. He stated he was aware that the fee was $225.00 and we should be receiving the fee within a couple of weeks.

Karen Schlaak

Karen Schlaak
Environmental Scientist

DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

JUN 1998
Bureau of Land Management
Belle Fourche
South Dakota

JUN1998
WATER RIGHTS
PROGRAM
Pierre, SD

****
INVOICE
****

Invoice No. 2020-8-6/10/98

Bureau of Land Management
%Charles Berdan
310 Roundup Street
Belle Fourche, SD 57717

Fee for Application for a Water Permit to Appropriate Water.

PLEASE PAY THIS AMOUNT: $225.00

Cheryl F. Frost

CHERYL F. FROST
Secretary
Water Rights Program
(605) 773-3352

RECEIVED
JUN 17 1998
BUR. OF LAND MGMT.
LEWISTOWN DISTRICT OFFICE
LEWISTOWN, MONTANA

DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

July 28, 1998

Charles A. Berdan
Bureau of Land Management
310 Roundup Street
Belle Fourche, SD 57717

Dear Mr Berdan:

We have reviewed the plans and specifications for your proposed dam located in the N ½ NE ¼ of Section 6-T14N-R3E, in Butte County. The plans and specifications as submitted are approved. Approval of the plans and specifications does not authorize construction of the project. Construction of the project may not begin until Water Permit Application No. 1671-1 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 Bureau of Land Management, 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 Alkali Creek Dam will be classified as a small size Category 3, Low Hazard dam with a dam height of 31 feet and a normal storage capacity of 156.33 acre-feet and a maximum storage capacity of 412 acre-feet.

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

Sincerely,

Gale N. Selken

Gale N. Selken, P.E.
Natural Resources Engineer IV
for John Hatch, Chief Engineer
Water Rights Program
(605) 773-3352

c: Roger Smith, Ducks Unlimited, Inc

RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT APPLICATION NO. 1671-1, Bureau of Land Management

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. 1671-1, Bureau of Land Management, c/o Charles A. Berdan, 310 Roundup Street, Belle Fourche, SD 57717.

The Chief Engineer is recommending APPROVAL of Application No. 1671-1 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. 1671-1 authorizes a dam with storage capacity of 156.33 acre feet of water and sufficient water annually to maintain the water level to the outlet elevation of 3,074.0 feet mean sea level.

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.

Dale N Sellken

for JOHN HATCH, Chief Engineer
July 24, 1998

REPORT ON
WATER PERMIT APPLICATION NO. 1671-1
Bureau of Land Management
July 7, 1998

Water Permit Application No. 1671-1 has been filed by the Bureau of Land Management to impound 156.33 acre-feet of water from runoff by constructing a dam located in the N ½ NE ¼ of Section 6-T14N-R3E, in Butte County. The application also requests impoundment of sufficient water to maintain the reservoir at the outlet elevation of 3074.0 feet mean sea level. The water will be used for fish and wildlife propagation, recreation, and livestock watering.

Discussion:

The Alkali Creek Dam will be classified as a Category 3, Low Hazard dam. It has been designed by Ducks Unlimited, Inc. The plans and specifications have been reviewed and will be approved; however, construction of the dam can not begin until Water Permit Application No. 1671-1 is approved.

The Alkali Creek Dam will be 31 feet high with a normal storage capacity of 156.33 acre-feet with a reservoir level at the spillway elevation, and a maximum storage capacity of 412 acre-feet with a reservoir level at the top of dam elevation. A dam of this size and hazard classification is required to have a minimum spillway design capable of passing a 50-year frequency event.

The dam is designed to have a CMP drop inlet spillway with an 84 inch riser and 60 inch barrel with 5 feet of available head as the primary spillway structure and a 150 foot wide earthcut secondary spillway with 3.0 feet of available head. The dam will have a drainage area of 4600 acres (7.2 square miles). Ducks Unlimited, Inc. used the NRCS TR-20 model to route a 100-year frequency event peak of 1250 cfs through the spillways with 1.18 feet of available freeboard remaining.

The annual yield for this drainage area with a 10 percent chance of occurrence, or 1 out of 10 years, is expected to be 500 acre-feet. The annual yield with a 50 percent chance of occurrence, or 1 out of 2 years, is expected to be 96 acre-feet and the annual yield with a 80 percent chance of occurrence, or 8 out of 10 years, is expected to be 31 acre-feet.

The Alkali Creek Dam will be located in the N ½ NE 1/4 of Section 6-T14N-R3E on Alkali Creek about 7 miles upstream of the confluence of Alkali Creek and the South Fork of the Moreau River. There are no existing Water Permits/Rights located on Alkali Creek between the proposed dam and the South Fork of the Moreau River.

Conclusions:

1. Water Permit Application No. 1671-1 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. 1671-1.

Timothy G. Schaal, P.E.
Natural Resources Engineer III

Approved by:

Gale N. Selken, P.E.
Natural Resources Engineer IV

DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

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

July 28, 1998

Bureau of Land Management
%Charles A. Berdan
310 Roundup St.
Belle Fourche, SD 57717

Dear Mr. Berdan:

Water Permit Application No. 1671-1 for recreation, fish and wildlife, and livestock use has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice of hearing has been sent to the Publisher of the Nation's Center News printed at Buffalo, SD (Ph # (605) 375-3228), and the Publisher of the Belle Fourche Post printed at Belle Fourche, SD (Ph # (605) 892-2528). For your information, a copy of the notice, the recommendation of the Chief Engineer and a 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 of Hearing and to arrange for payment. Early contact with the papers can eliminate delays. The publishers have been instructed to publish your notice once each week for two consecutive weeks with the last publication to occur twenty days before the board meeting. The newspapers have 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.

DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

July 28, 1998

Belle Fourche Post
Box 400
Belle Fourche, SD 57717-0400

ATTENTION: Legal Department

Enclosed is a Notice of Hearing on Application No. 1671-1 to Appropriate Water to be published twice. Please publish the first notice on August 5, 1998, with the second publication 7 days later.

The applicant must verify to you that the notice is to be published, before you make the first publication. **Please BILL the APPLICANT for the cost of publication.** The APPLICANT is Bureau of Land Management, %Charles A. Berdan, 310 Roundup St., Belle Fourche, SD 57717 (Ph # (605) 892-2526).

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

After the second publication, **please send us an affidavit or use the enclosed Proof of Publication form.** The applicant pays the cost of publication, but the Water Rights Program records require an affidavit or Proof of Publication. Delays in receiving the affidavit can be costly to the applicant.

Sincerely,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

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

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

No. 1671-1

Date_____
We are in receipt of your letter of July 28, 1998, enclosing Notice of Hearing to Appropriate Water by Application No. 1671-1 which was first published in our issue of_____. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

_____ _____
Name Newspaper

DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

July 28, 1998

Nation's Center News
Box 107
Buffalo, SD 57720-0107

ATTENTION: Legal Department

Enclosed is a Notice of Hearing on Application No. 1671-1 to Appropriate Water to be published twice. Please publish the first notice on August 5, 1998, with the second publication 7 days later.

The applicant must verify to you that the notice is to be published, before you make the first publication. **Please BILL the APPLICANT for the cost of publication.** The APPLICANT is Bureau of Land management, %Charles A. Berdan, 310 Roundup St., Belle Fourche, SD 57717 (Ph # (605) 892-2526).

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Notice is given that the Bureau of Land Management, c/o Charles A Berdan, 310 Roundup St, Belle Fourche SD 57717 has filed an application for a water permit to impound 156.33 acre-feet of water from runoff in Alkali Creek by constructing a dam located in the N ½ NE ¼ Section 6-T14N-R3E. Water will be impounded in the N ½ NE ¼, N ½ NW ¼ Section 6-T14N-R3E; S ½ SW ¼ Section 31-T15N-R3E and SE ¼ Section 36-T15N-R2E. The application requests impoundment of sufficient water to maintain water at the outlet elevation of 3074.0 feet mean sea level and is to be used to provide habitat for fish and wildlife propagation, recreation and livestock water use.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 1671-1 because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the chief engineer will act on the application, as recommended, unless a petition is filed opposing the application or the applicant files a petition contesting the chief engineer's recommendation. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled and the Water Management Board will consider the application. Notice of the hearing will be given to the applicant and any person filing a petition.

Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and chief engineer. The applicant must file a petition if contesting the chief engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by August 24, 1998.

The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application. Nettie H. Myers, Secretary, Department of Environment and Natural Resources.



AFFIDAVIT OF PUBLICATION

STATE OF SOUTH DAKOTA
COUNTY OF BUTTE

Joan M. Lewis, being duly sworn, says: That the **Belle Fourche Post**, is and, during all the times hereinafter mentioned, was a legal newspaper as defined in SDCL 17-2-2, as amended, published at Belle Fourche, Butte County, South Dakota, by Dickson Media, Inc.; that affiant is and, during all of said times, was employed as an accountant by the publisher of such newspaper and has personal knowledge of the facts stated in the affidavit; the the notice, order or advertisement, a printed copy of which is attached, was published in said newspaper for successive issues, bearing the following dates:

Aug. 5	1998		199
Aug 12	1998		199
	199		199
	199		199
	199		199

that the full amount of the fee charged for publishing the same, to-wit, the sum of $ 37.89, inures solely to the benefit of the publisher of said newspaper; that no agreement or understanding for the division of the fee has been made with any person, and that no part of the fee has been agreed to be paid to any other person.

Joan M. Lewis
Bookkeeper

Subscribed and sworn to before me this

24th day of August, 1998

Rosarita Brunner
Notary Public, South Dakota

My Commission Expires
February 1, 2001



NOTICE OF APPLICATION
No. 1671-1 to Appropriate Water

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Nettie H. Myers,
Secretary
Department of
Environment and
Natural Resources

P2t8/5-12

Form 8



PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
) SS
County of Harding)

I, LaVerne E Helms

certify that the attached printed Notice was taken from the Nation's Center News

printed and published in Buffalo, SD 57720

County of Harding and state of South Dakota. The notice was published in the newspaper on the following two dates:

August 5, 1998

August 12, 1998

Cost of Printing $39.92

LaVerne E Helms
(Signature)

Bus. Mgr.
(Title)

8-13-98
(Date Signed)

NOTICE OF APPLICATION NO. 1671 TO APPROPRIATE WATER

Notice is given that the Bureau of Land Management, % Charles A. Berdan, 310 Roundup St., Belle Fourche, SD 57717 has filed an application for a water permit to impound 156.33 acre-feet of water from runoff in Alkali Creek by constructing a dam located in the N1/2NE1/4 Section 6-T14N-R3E. Water will be impounded in the N1/2NE1/4, N1/2NW1/4 Section 6-T14N-R3E, S1/2SW1/4 Section 31-T15N-R3E and SE1/4 Section 36-T15N-R2E. The application requests impoundment of sufficient water to maintain water at the outlet elevation of 3074.0 feet mean sea level and is to be used to provide habitat for fish and wildlife propagation, recreation and livestock water use.

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Nettie H. Myers,
Secretary,
Department of Environment and Natural Resources.
8-5, 12

DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

SEP 10 1998

Bureau of Land Management
%Charles A. Berdan
310 Roundup Street
Belle Fourche, SD 57717

Dear Mr. Berdan:

Enclosed is Water Permit No. 1671-1 authorizing construction of your water diversion system and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

Also enclosed is Form 10, Notice of Completion of Works and Application of Water to Beneficial Use, which you are to complete and submit to the Chief Engineer when you have completed the system and/or have put the water to beneficial use. An inspection can then be scheduled so that the Water License may be issued, thus completing your acquisition of a Water Right.

Very truly yours,

John Hatch

JOHN HATCH, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures

PLEASE NOTE: Certain changes may be made to your water permit usually without affecting the priority date. The location of a point of diversion may be changed or additional points of diversion may be approved if the water source remains unchanged; no additional water is appropriated; and, if irrigating, no additional land is irrigated. The change may be allowed without application or publication, if the Water Rights Program is contacted and the chief engineer makes a finding that the change does not increase the potential for interference with existing diversions.

A new water permit application is required to change water sources, increase the permitted diversion rate, or increase the irrigated acreage. If the application is approved, the water permit will receive a new priority date.

DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

March 15, 2000

1638-1
1671-1

Bureau of Land Management
%Tom Steger, Area Manager
310 Roundup Street
Belle Fourche, SD 57717

Dear Mr. Steger:

The investigation of your water use systems was conducted on August 31, 1999, by Timothy G. Schaal, staff engineer. The investigation included the extent of application of water to beneficial use, as developed under Water Permit Nos. 1638-1 and 1671-1. Your final water right documents, the Water Licenses, can now be issued.

Statutes require that we charge a $50.00 fee per license ($100.00 total) for the investigation and issuance of the Water Licenses. Upon receipt of the $50.00 fee per license ($100.00 total) from you, we will begin processing your Water Licenses. If you require an Invoice from our office prior to issuing a check or money order, please contact me and I will send you one.

Please remit fee to:
Department of Environment & Natural Resources
Water Rights Program
523 E. Capitol
Pierre, SD 57501-3181

Sincerely,

Cheryl F. Frost

Cheryl F. Frost
Secretary
Water Rights Program
(605) 773-3352

NOTE: On check or money order, please specify your permit number. This will insure proper handling of the fee.

RECEIPT

Water Rights Program

South Dakota Department of Environment and Natural Resources

№ 416432

Pierre, March 21, 2000

RECEIVED OF Nancy M. Rime, (Bureau of Land Management), 310 Roundup St., Belle Fourche, SD 57717 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. 1671-1	50	00
Fee for Filing Transfer Form _____		
Fee for Filing Extension Request _____		
Fee for _____		
_____		
_____		
_____		
(Any Other Work Provided by Law) **Total**	50	00

By Garland Erbele
Chief Engineer

Form 12

Permit No. 1671-1

Moreau River - Water District

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

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

I have this day, **August 31, 1999**, made a thorough examination of the water use system constructed by **Bureau of Land Management** of **310 Roundup Street, Belle Fourche, SD 57717** holder of Permit No. **1671-1**, bearing the priority of **May 13, 1998** authorizing the storage of **156.33** acre-feet of the waters of **runoff** for **recreation, fish & wildlife and livestock use** purposes, in **Butte & Harding** County.

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

A. Works used to divert the water:
31 foot high earth dam with 156.33 ac-ft storage capacity

B. Works used to transport water to place of use:
N/A

C. Works used to apply water to beneficial use:
31 foot high earth dam with 156.33 ac-ft storage capacity

The system is in the following condition **Good**. The point of diversion is located **1150 ft. south & 1320 ft. west of the NE corner of Sec. 6-T14N-R3E (N 1/2 NE 1/4)**. The works are capable of storing **156.33** acre-feet of water which is to be used for **recreation, fish & wildlife and livestock use**. ~~Water has been put to beneficial use to the maximum extent~~ as follows:

31 foot high earth dam with 156.33 ac-ft storage capacity

and the license should be issued for **156.33** acre-feet of storage.

Applicable permit qualifications have been complied with: Yes **X**

Exceptions to compliance are: **none** Date Report Completed: **March 13, 2000**

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

REPORT ON INSPECTION OF PERMIT NO. 1671-1

Other permit(s) associated with the project: **XXXX**

DATE OF INSPECTION: **August 31, 1999**

NAME & ADDRESS OF INSPECTION CONTACT/ **Roger Smith, P.E., Ducks Unlimited**
RELATIONSHIP TO PERMIT HOLDER, IF APPLICABLE: **designer**

NAME & ADDRESS OF PERMIT HOLDER: **Bureau of Land Management, 310 Roundup Street, Belle Fourche, SD 57717**

DIVERSION POINT LEGAL LOCATION: 1150 feet south & 1320 feet west of the NE corner of Section 6-T14N-R3E (N1/2 NE 1/4).

DAM INFORMATION:

1) Height to crest **31** feet
2) Height to primary spillway **26** feet
3) Height to secondary spillway **28.5** feet
4) Crest width **12** feet
5) Crest length **1167** feet
6) Spillway length **XXX** feet
7) Spillway width **150** feet
8) Approx. storage (Normal) **156.33** acre-feet
9) Approx. storage (Maximum) **412** acre-feet
10) Date constructed: **1999**

PERMIT QUALIFICATIONS AND REGULATIONS:

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

STATE OF SOUTH DAKOTA

WATER LICENSE NO. 1671-1

(1) Bureau of Land Management, 310 Roundup Street, Belle Fourche SD 57717 made Application No. 1671-1, May 13, 1998 for a water permit to impound 156.33 acre-feet of water from runoff in Alkali Creek, Butte & Harding County, South Dakota for fish & wildlife propagation, recreation and livestock watering purposes. Permit No. 1671-1, with a priority date of May 13, 1998 was approved August 24, 1998 and issued to the applicant for diversion of water with construction of the described water supply system to be completed on or before August 24, 2003 and for the application to beneficial use of said water on or before August 24, 2007.

(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 storage dam and is entitled to impound 156.33 acre-feet of water for beneficial use with sufficient water annually to maintain the water level to the outlet elevation of 3,074.0 feet mean sea level. The location of the storage dam is 1,150 feet south and 1,320 feet west of the northeast corner of Section 6-T14N-R3E (N ½ NE ¼).

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

(4) Pursuant to South Dakota Water Law 46-5-30.1 Bureau of Land Management, 310 Roundup Street, Belle Fourche SD 57717 the holder and/or owner of Water Right No. 1671-1 is issued a license to appropriate water, the right to impound 156.33 acre-feet of water from ~~runoff in Alkali Creek~~ with sufficient water annually to maintain the water level to the outlet elevation of 3,074.0 feet mean sea level with a priority date of May 13, 1998 from the location specified in (2) of this license for fish & wildlife propagation, recreation and livestock watering. This license is subject to any limitations or qualifications listed in Water Right No. 1671-1 and subject to South Dakota State Law.

Garland Erbele

APR 1 0 2000

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

date

DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

APR 1 0 2000

1638-1
1671-1

Bureau of Land Management
%Tom Steger, Area Manager
310 Roundup Street
Belle Fourche, SD 57717

Dear Mr. Steger:

Enclosed are Water License Nos. 1638-1 and 1671-1 and Receipt Nos. 416431 and 416432 for $50.00 each which was assessed for an investigation and issuance of the licenses. Water License Nos. 1638-1 and 1671-1 are the final documents which completes the process of obtaining a water right.

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

Sincerely,

Garland Erbele

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

ks
enclosures

1671-1 1671-1

MAY 1999 WATER RIGHTS PROGRAM Pierre, SD

DUCKS UNLIMITED

DUCKS UNLIMITED

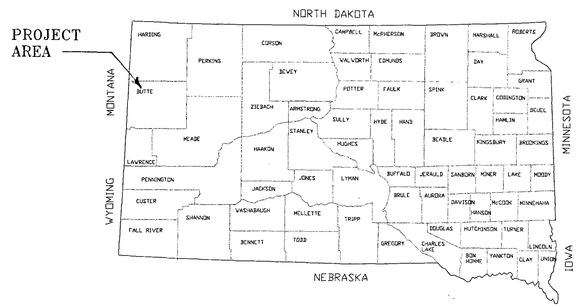
PROJECT

ALKALI CREEK

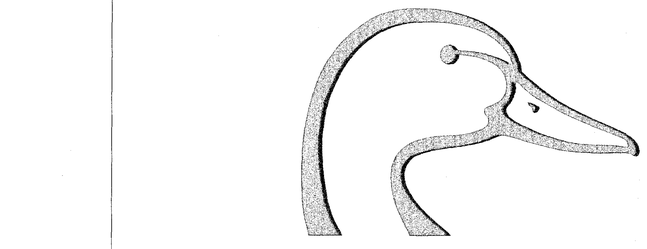
SECTION 6, T 14 N, R 3 E, BUTTE COUNTY, SOUTH DAKOTA

IN COOPERATION WITH

DEPT. OF THE INTERIOR – BUREAU OF LAND MANAGEMENT



SOUTH DAKOTA



SPECIFICATIONS

GENERAL CONDITIONS	101
MOBILIZATION	201
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EXCAVATION	203
EMBANKMENT CONSTRUCTION	204
WATER	205
WATER CONTROL STRUCTURE INSTALLATION	206
WATER CONTROL STRUCTURE & CULVERT APPURTENANCES	206A
CULVERT INSTALLATION	207
CAST-IN-PLACE REINFORCED CONCRETE	208
RIPRAP PLACEMENT	209

PLAN INDEX

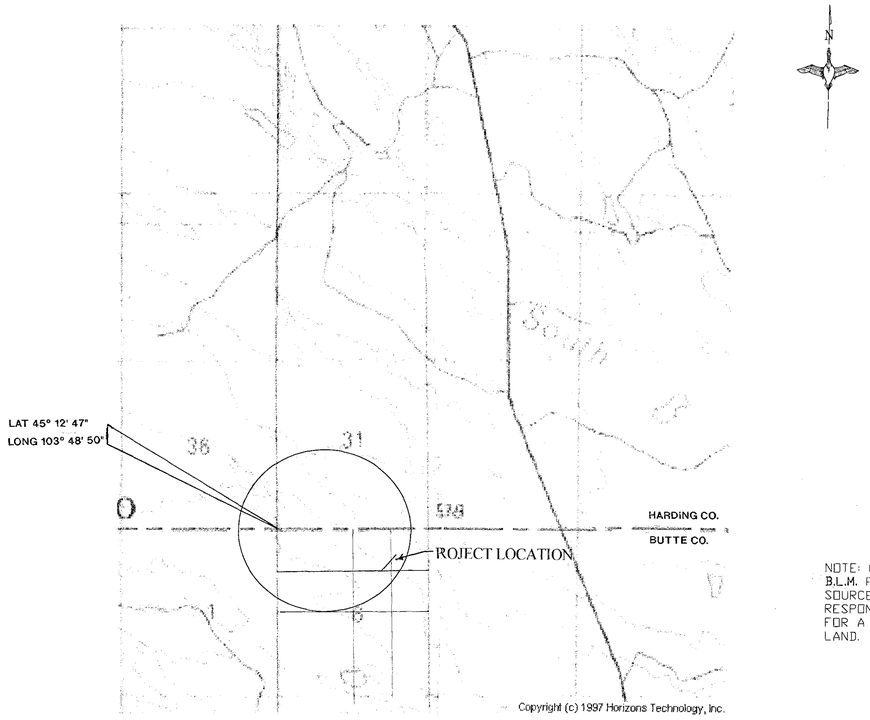
VICINITY MAP	1
PROJECT TOPOGRAPHY	2
EMBANKMENT PLAN & PROFILE	3
STRUCTURE PLAN & PROFILE	4
STRUCTURE DETAILS	5

QUANTITIES

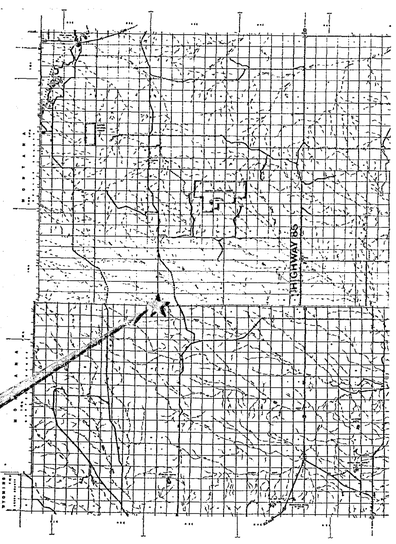
MOBILIZATION	1	L.S.
SITE PREPARATION	1385	C.Y.-P
EXCAVATION		
STRUCTURE EXCAVATION	1430	C.Y.-INC.
EMERGENCY SPILLWAY	9155	C.Y.-INC.
MINIMUM OUTLET CHANNEL & PLUNGE POOL	1575	C.Y.-INC.
EMBANKMENT CONSTRUCTION	18960	C.Y.-S*
WATER	570	M-GAL.**
WATER CONTROL STRUCTURE		
84"ø CMP RISER	1	L.S.
INLINE DRAWDOWN STRUCTURE	1	L.S.
APPURTENANCES	1	INC.
CULVERT INSTALLATION		
42"ø CMP	106	L.F.
12"ø PVC	30	L.F.
RIPRAP PLACEMENT		
CLASS I	5	C.Y.-P
CLASS II	86	C.Y.-P

*INCLUDES 5% FOR SHRINKAGE
**BASED ON 30 GAL./C.Y.

Staked quantities listed above are estimated quantities for design and bidding purposes. Final as-staked quantities derived from the construction staking data will establish quantities for final payment. Project construction staking and final as-staked quantity calculations have not been completed prior to the bid solicitation.



VICINITY MAP



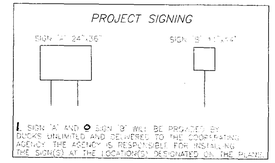
NOTE: CONTRACTOR SHALL CONTACT B.L.M. FOR INFORMATION ON WATER SOURCE. CONTRACTOR SHALL BE RESPONSIBLE TO SECURE PERMISSION FOR A WATER SOURCE ON PRIVATE LAND.



AGENCY CONTACT:

CHUCK BERDAN
BUREAU OF LAND MANAGEMENT
BELLE FOURCHE
605-892-2526

PROJECT SIGNING



1. SIGN 'A' AND ● SIGN 'B' WILL BE PROVIDED BY DUCKS UNLIMITED AND DELIVERED TO THE COOPERATING AGENCY. THE AGENCY IS RESPONSIBLE FOR INSTALLING THE SIGN(S) AT THE LOCATION(S) DESIGNATED ON THE PLANS.

DUCKS UNLIMITED INC. GREAT PLAINS REGIONAL OFFICE	PROJECT NO. SD-0242-001		DESIGNED BY: R.C.S.
	ALKALI CREEK		DRAWN BY: J.A.S.
	VICINITY MAP		SURVEYED BY:
			CHECKED BY: B.R.K.
DATE: 3-19-98	SHEET NO. 1 OF 5	APPROVED BY:	APPROVED BY:

1671-1

1671-1

1671-1

RECEIVED 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
4
MAY 1998
WATER RIGHTS PROGRAM
Pierre, SD

DUCKS UNLIMITED

DUCKS UNLIMITED

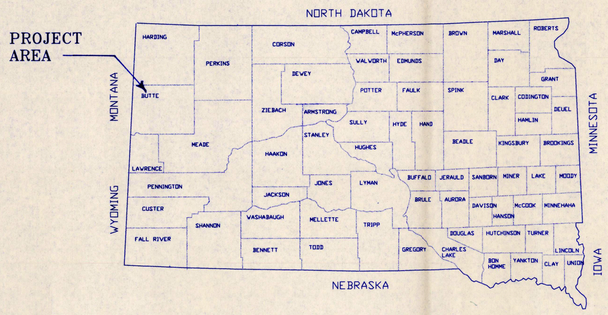
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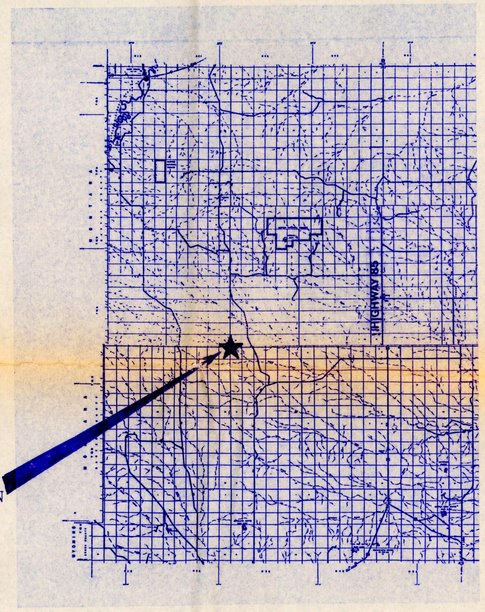
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SOUTH DAKOTA



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RIPRAP PLACEMENT	209

PLAN INDEX

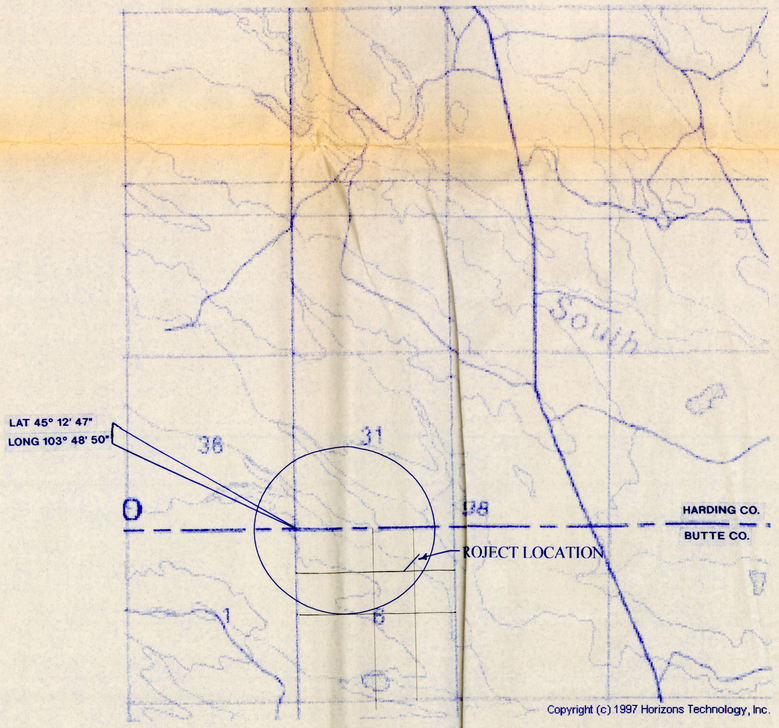
VICINITY MAP	1
PROJECT TOPOGRAPHY	2
EMBANKMENT PLAN & PROFILE	3
STRUCTURE PLAN & PROFILE	4
STRUCTURE DETAILS	5

QUANTITIES

MOBILIZATION	1	L.S.
SITE PREPARATION	1385	C.Y.-P
EXCAVATION		
STRUCTURE EXCAVATION	1430	C.Y.-INC.
EMERGENCY SPILLWAY	9155	C.Y.-INC.
MINIMUM OUTLET CHANNEL & PLUNGE POOL	1575	C.Y.-INC.
EMBANKMENT CONSTRUCTION	18960	C.Y.-S*
WATER	570	M-GAL.**
WATER CONTROL STRUCTURE		
84"ø CMP RISER	1	L.S.
INLINE DRAWDOWN STRUCTURE	1	L.S.
APPURTENANCES	1	INC.
CULVERT INSTALLATION		
42"ø CMP	106	L.F.
12"ø PVC	30	L.F.
RIPRAP PLACEMENT		
CLASS I	5	C.Y.-P
CLASS II	86	C.Y.-P

*INCLUDES 5% FOR SHRINKAGE
**BASED ON 30 GAL./C.Y.

Staked quantities listed above are estimated quantities for design and bidding purposes. Final as-staked quantities derived from the construction staking data will establish quantities for final payment. Project construction staking and final as-staked quantity calculations have not been completed prior to the bid solicitation.



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VICINITY MAP

NOTE: CONTRACTOR SHALL CONTACT B.L.M. FOR INFORMATION ON WATER SOURCE. CONTRACTOR SHALL BE RESPONSIBLE TO SECURE PERMISSION FOR A WATER SOURCE ON PRIVATE LAND.

AGENCY CONTACT:
CHUCK BERDAN
BUREAU OF LAND MANAGEMENT
BELLE FOURCHE
605-892-2526

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 4375
ROGER D. SMITH
SOUTH DAKOTA

PROJECT SIGNING

SIGN 'A' 24"x36" — SIGN 'B' 11"x14"

SIGN 'A' AND SIGN 'B' WILL BE PROVIDED BY DUCKS UNLIMITED AND DELIVERED TO THE COOPERATING AGENCY. THE AGENCY IS RESPONSIBLE FOR INSTALLING THE SIGN(S) AT THE LOCATION(S) DESIGNATED ON THE PLANS.

DUCKS UNLIMITED INC. GREAT PLAINS REGIONAL OFFICE	PROJECT NO. SD-0242-001		DESIGNED BY: R.C.S.
	ALKALI CREEK		DRAWN BY: J.A.S.
	VICINITY MAP		SURVEYED BY:
			CHECKED BY: B.R.K.
DATE: 3-19-98	SHEET NO. 1 OF 5	APPROVED BY:	APPROVED BY:

1671-1

1671-1

CONTROL POINTS

	NORTH	EAST	ELEV.	LAT.	LONG.
CP #4	2709.65	11677.66	3078.41	45° 12' 33"	103° 48' 05"
CP #5	4156.99	8667.28	3092.46	45° 12' 47"	103° 48' 50"
CP #10	3067.40	10488.84	3086.30		
CP #11	2626.63	10369.75	3105.63		
CP #12	1315.47	13146.87	3061.06		
CP #13	4703.71	8325.93	3095.31		
CP #14	4788.59	9876.22	3106.59		

NOTE: LATITUDE AND LONGITUDES SHOWN ARE APPROXIMATE, SCALED FROM QUAD. MAP FOR GENERAL LOCATIONS.

AREA--CAPACITY DATA

ELEVATION	AREA (ACRES)	CAPACITY (ACRE-FEET)
3063.0	005	0.00
3064.0	17	0.09
3065.0	1.05	0.70
3066.0	2.75	2.60
3067.0	6.39	7.17
3068.0	9.74	15.23
3069.0	13.97	27.09
3070.0	19.42	43.78
3071.0	23.70	65.34
3072.0	27.95	91.17
3073.0	32.33	121.31
FSL 3074.0	37.71	156.31
3075.0	44.15	197.26
3076.0 3076.5	48.83	243.75 261.46
3077.0	53.83	295.08
3078.0	58.49	351.24
3079.0	63.90	412.43
3080.0	70.17	479.47

MARSH DATA
FULL SERVICE LEVEL (FSL) @ 3074.0
SURFACE AREA @ FSL = 37.7 ACRES
CAPACITY @ FSL = 156.3 ACRE-FT

MAY 1998 WATER RIGHTS PROGRAM Pierre, SD

N

N-5000
N-4000
N-3000
N-2000
E-8000
E-9000
E-10000
E-11000
E-12000
E-13000

3095.31 CP
3092.46 CP
3106.59 CP
3086.30 CP
3105.63 CP
3078.41 CP

EXISTING TRAIL

LAT 45° 12' 47"
LONG 103° 48' 50"

CONSTRUCT EMBANKMENT SEE SHEET 3 OF 5 FOR DETAILS.

INSTALL WATER CONTROL STRUCTURE. SEE SHEET 4 OF 5 FOR DETAILS.

EXCAVATE EMERGENCY SPILLWAY. SEE SHEET 3 OF 5 FOR DETAILS.

PROJECT TOPOGRAPHY

SCALE: 1" = 200'

LEGEND

- 10 3086.30 CP — B.O.R. SURVEY CONTROL POINT
- FENCE LINE
- BH- — SOIL BORE HOLE

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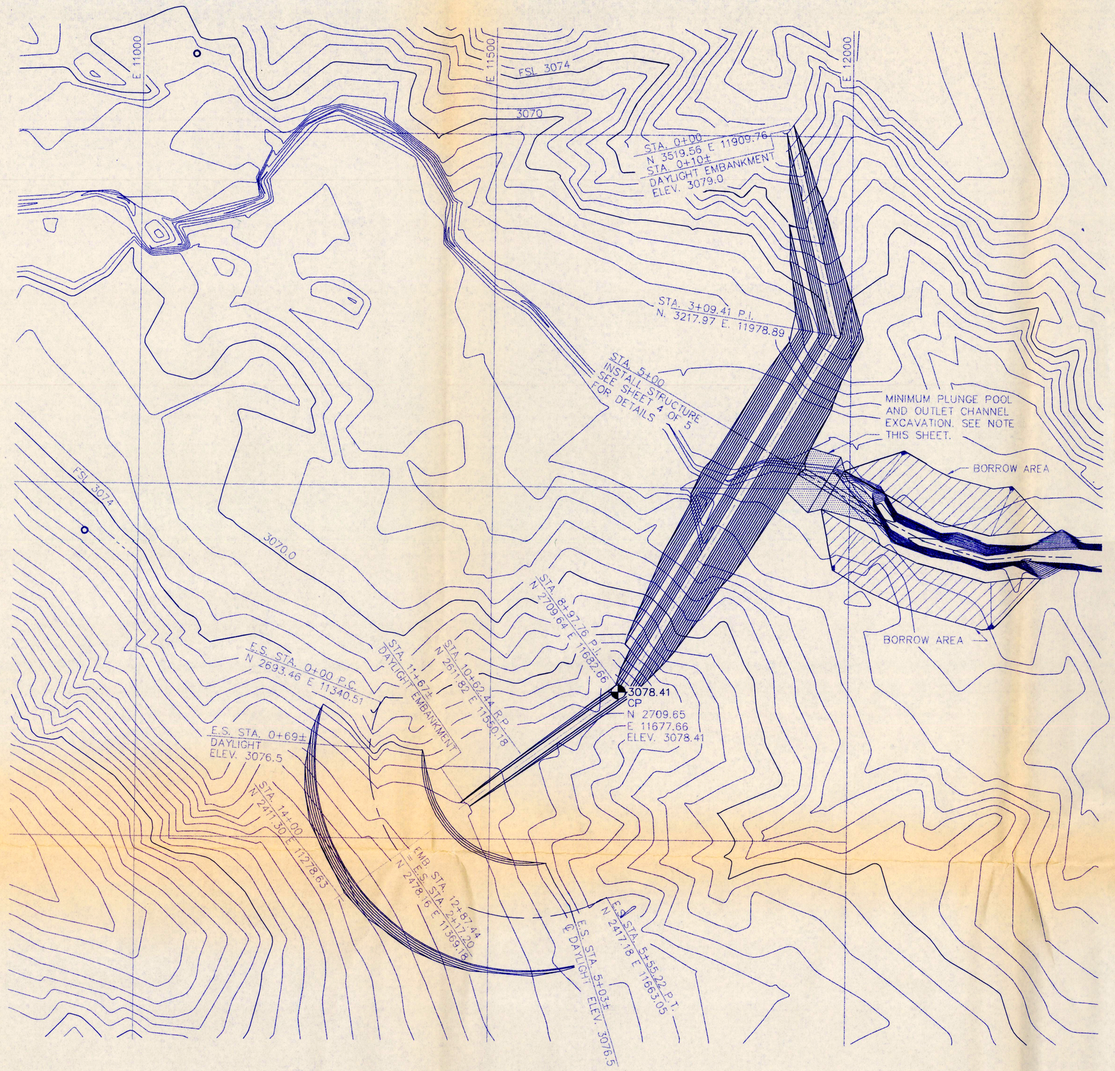
PROJECT NO. SD-0242-001
ALKALI CREEK
PROJECT TOPOGRAPHY

DESIGNED BY: R.C.S.
DRAWN BY: J.A.S.
SURVEYED BY:
CHECKED BY: B.R.K.

DATE: 3-16-98
SHEET NO. 2 OF 5
APPROVED BY:
APPROVED BY:

1671-1

MAY 1998
WATER RIGHTS
PROGRAM
Pierre, SD



SITE PLAN
SCALE: 1" = 100'

CONSTRUCTION NOTES:

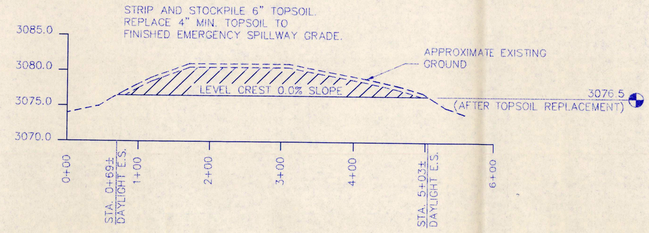
BORROW AREA SHALL BE DEVELOPED ADJACENT TO AND ALONG DOWNSTREAM CHANNEL. EXISTING CREEK SHALL BE WIDENED AND SIDESLOPES FLATTENED AS REQUIRED. ALTERNATE BORROW AREAS NEED TO BE APPROVED BY FIELD ENGINEER.

MATERIAL EXCAVATED FROM EMERGENCY SPILLWAY, (APPROXIMATELY 9155 C.Y.) SHALL BE USED AS AND PAID FOR AS "EMBANKMENT CONSTRUCTION".

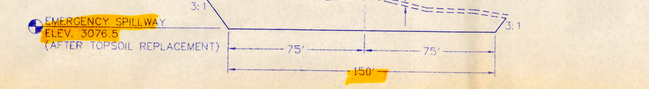
MATERIAL EXCAVATED FROM PLUNGE POOL AND MINIMUM OUTLET CHANNEL (APPROXIMATELY 1575 C.Y.) SHALL BE USED AS AND PAID FOR AS "EMBANKMENT CONSTRUCTION".

EXCAVATION REQUIRED FOR STRUCTURE AND OUTLET PIPE INSTALLATION, (APPROXIMATELY 1430 C.Y.) SHALL BE CONSIDERED INCIDENTAL TO "42" ø CULVERT INSTALLATION".

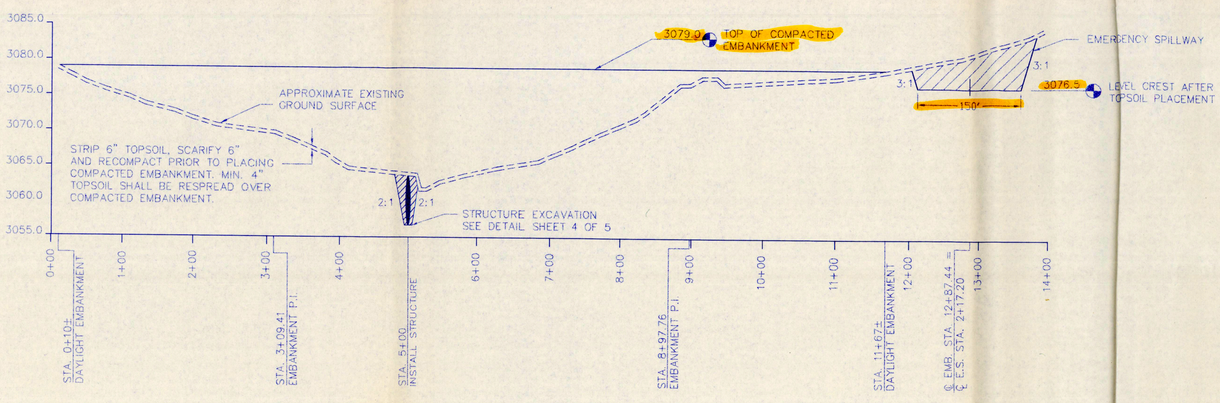
E.S. ℄ CURVE DATA
DELTA = 141° 23' 07"
T = 842.23'
L = 555.22'
M = 150.61
R = 225.00'
RADIUS PT. N 2611.82
E 11550.18



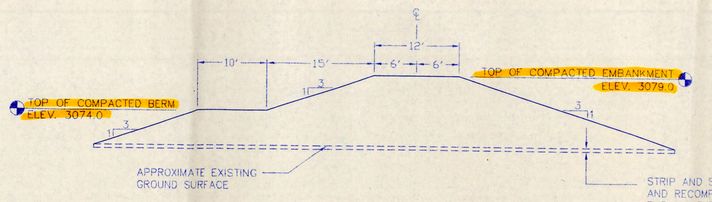
℄ PROFILE EMERGENCY SPILLWAY
SCALE: 1" = 100' HOR.
1" = 10' VERT.



TYPICAL EMERGENCY SPILLWAY SECTION
SCALE: 1" = 40' HOR.
1" = 10' VERT.



℄ EMBANKMENT PROFILE
SCALE: 1" = 100' HOR.
1" = 10' VERT.



TYPICAL EMBANKMENT SECTION
SCALE: 1" = 10' HOR. & VERT.

DUCKS UNLIMITED INC.
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PROJECT NO. SD-0242-001
ALKALI CREEK
EMBANKMENT PLAN & PROFILE

DESIGNED BY: R.C.S.
DRAWN BY: J.A.S.
SURVEYED BY:
CHECKED BY: B.R.K.

DATE: 3-10-98
SHEET NO. 3 OF 5
APPROVED BY:
APPROVED BY:

1671-1

MAY 1998
WATER RIGHTS
PROGRAM
Pierre, SD

MINIMUM OUTLET CHANNEL EXCAVATION & PLUNGE POOL (APPROXIMATELY 1575 C.Y.) SHALL BE 12' BOTTOM WIDTH CHANNEL WITH 2:1 SIDE SLOPES DAYLIGHTING IN EXISTING CREEK AT ELEVATION 3050.0. CHANNEL MAY BE WIDENED AND SIDE SLOPES FLATTENED TO OBTAIN ADDITIONAL BORROW MATERIAL FOR EMBANKMENT CONSTRUCTION. OUTLET CHANNEL EXCAVATION SHALL BE CONSIDERED INCIDENTAL TO EMBANKMENT CONSTRUCTION.

24" DEPTH CLASS II
RIPRAP W/ FILTER FABRIC
ESTIMATED QUANTITY, 86 C.Y.

12" DEPTH CLASS 1 ROCK
RIPRAP W/ FILTER FABRIC
ESTIMATED QUANTITY- 5 C.Y.

10' BERM

12' TOP OF EMBANKMENT

30 L.F. (TOTAL LENGTH)
12" Ø SDR-35

90° PVC BEND

STRUCTURE EXCAVATION LINES

INSTALL 12" AGRI-DRAIN RAT GUARD ON PVC PIPE

AGRI DRAIN INLINE STRUCTURE

USE A MECHANICAL JOINT TO SPLICE WSP TO PVC AS PER MANUFACTURERS RECOMMENDATIONS.

106 L.F. OF 42"Ø 14 GA. CMP, S=10.2 FT/FT

84"Ø CMP RISER
16 L.F., 14 GA., 3x1 CORR.

CONCRETE BASE

3:1 2:1 20' 12' 14' 16' ± 2' 8' 90°

STA 0+49
END 12"Ø PVC PIPE

STA 0+74
℄ STRUCTURE/BERM

STA 1+00
EMBANKMENT ℄

STA 1+54
END 3:1 SLOPE/BEGIN 2:1 SLOPE
TOP OF RIPRAP

STA 1+85
END OF 42" CMP

STA 1+95
BOTTOM OF PLUNGE POOL

STA 2+09
BEGIN CHANNEL ELEV. 3050.0

STA 2+93
DAYLIGHT CHANNEL EXCAVATION
ELEV. 3050.0

APPROXIMATE EXISTING GROUND

STRIP AND STOCKPILE 6' TOPSOIL. REPLACE MIN. 4' TOPSOIL OVER OUTLET CHANNEL SIDESLOPES.

2:1 VARIES 6' 6' 12'

NOTE: STRUCTURE EXCAVATION (APPROXIMATELY 1430 C.Y.) SHALL BE CONSIDERED INCIDENTAL TO 42"Ø CULVERT INSTALLATION.

TYPICAL STRUCTURE & OUTLET CHANNEL EXCAVATION DETAIL
SCALE: 1" = 10' HOR. & VERT.

TRASHRACK NOT SHOWN
SEE SHEET 5 OF 5 FOR DETAILS

25' 10' 26' 15' 12' 6' 6' 85'

INLINE DRAWDOWN RISER
SEE SHEET 5 OF 5

3075.0

TOP OF COMPACTED FILL 3079.0
(BEFORE TOPSOIL PLACEMENT)

TOP OF COMPACTED BERM 3074.0
(BEFORE TOPSOIL PLACEMENT)

BOTTOM OF RIPRAP
3073.0

PVC INVERT
3067.0

12"Ø SDR-35, S=0%
30 L.F. REQUIRED

3075.0 ROCK RIPRAP

12" THICK LAYER
CLASS I ROCK RIPRAP
W/ FILTER FABRIC BENEATH

84"Ø CMP RISER
12 GA. 16 L.F., 3x1 CORR.

3059.0 INVERT

INSTALL AGRI-DRAIN
RAT GUARD

EXCAVATION LINE

AGRI DRAIN IN-LINE WATER CONTROL STRUCTURE. HEIGHT = 8 L.F. AND PIPE SIZE = 12" PVC. SEE SHEET 5 OF 5 FOR DETAILS.

CAST-IN-PLACE CONCRETE RISER BASE 9'x9'x1'

3057.5 BOTTOM OF CONCRETE BASE

106 L.F. OF 42" 14 GA CMP SLOPE = 10.2 FT/FT

TOP OF RIPRAP
ELEV. 3054.5

3048.0 INVERT

24" THICK LAYER
CLASS II ROCK RIPRAP
W/ FILTER FABRIC BENEATH
ESTIMATED QUANTITY 86 C.Y.

APPROXIMATE EXISTING GROUND SURFACE

STRIP AND STOCKPILE 6' TOPSOIL
REPLACE MIN. 4' TOPSOIL OVER
OUTLET CHANNEL SIDESLOPES.

3050.0 OUTLET CHANNEL

2:1

BOTTOM OF PLUNGE
POOL EXCAVATION EL. 3043.0

STRUCTURE PLAN & PROFILE
SCALE: 1" = 10' HOR. & VERT.

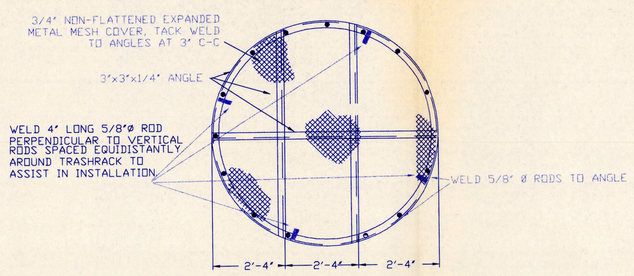
DUCKS UNLIMITED INC.
GREAT PLAINS REGIONAL OFFICE

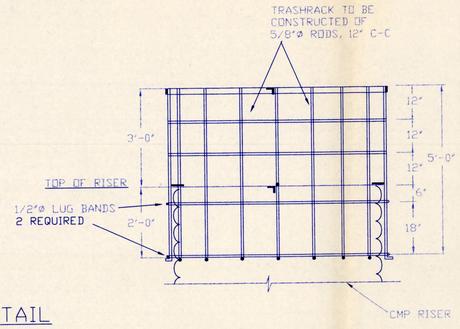
PROJECT NO. SD-0242-001
ALKALI CREEK
STRUCTURE PLAN & PROFILE

DESIGNED BY: R.C.S.
DRAWN BY: J.A.S.
SURVEYED BY:
CHECKED BY: B.R.K.

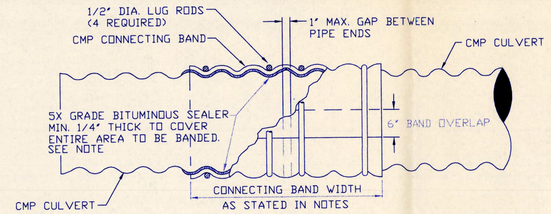
DATE: 3-16-98
SHEET NO. 4 OF 5
APPROVED BY:
APPROVED BY:

167/-1





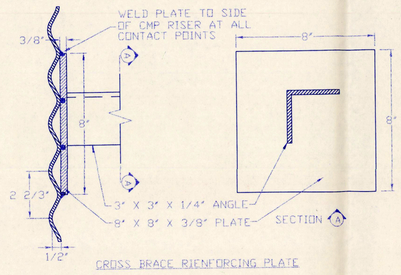
TRASHRACK DETAIL
NOT TO SCALE



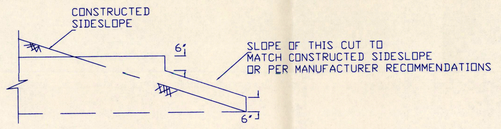
AFTER BANDS HAVE BEEN TIGHTENED, A COAT OF 5X SEALER SHALL BE APPLIED AROUND THE CULVERT AT THE ENDS OF THE CONNECTING BAND AND ALONG THE SEAM OF THE BAND OVERLAP.

NOTE TO SUPPLIERS:
IF ANNULAR PIPE IS USED, USE A 2 FT. WIDE ANNULAR BAND. IF HELICAL PIPE WITH 4 CORRUGATIONS REROLLED TO ANNULAR IS USED, USE A 21 INCH WIDE ANNULAR BAND. SEE SPECIFICATION 207.2.

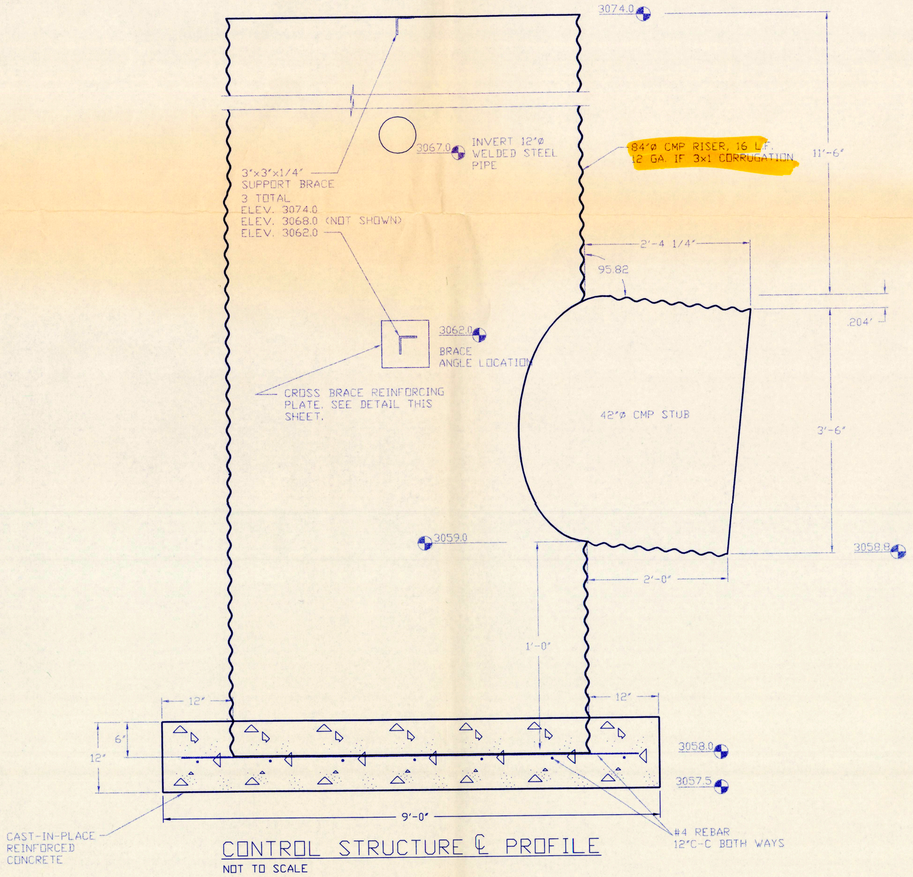
CONNECTING BAND DETAIL
NOT TO SCALE



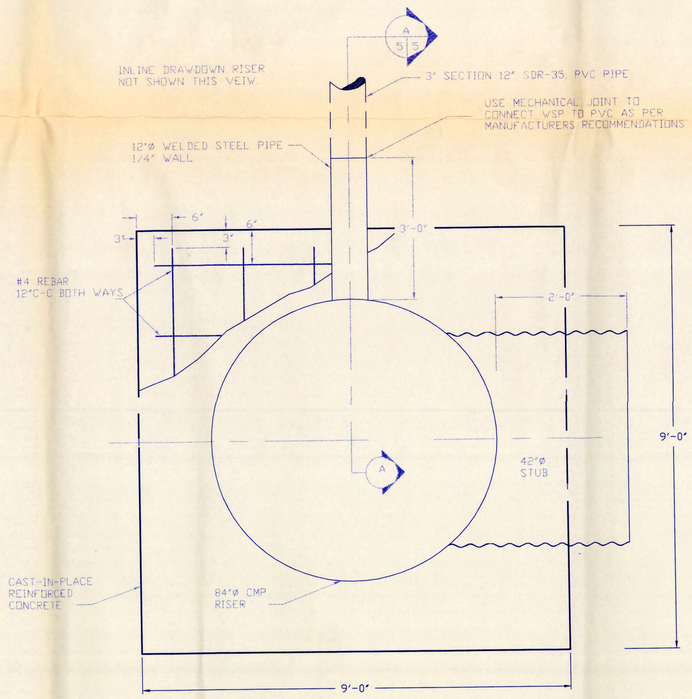
CROSS BRACE REINFORCING PLATE



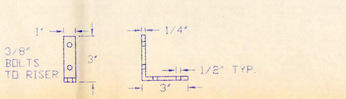
STEP BEVEL DETAIL
NOT TO SCALE



CONTROL STRUCTURE ℄ PROFILE
NOT TO SCALE

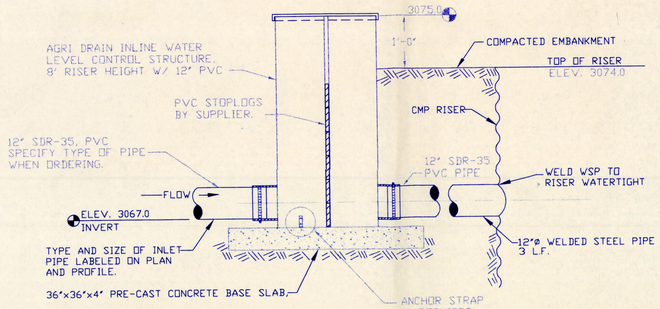


CONTROL STRUCTURE PLAN
NOT TO SCALE



ANCHOR TO CONCRETE W/ 3/8"ø ANCHORS

ANCHOR STRAP DETAIL
NTS



NOTE:
COST OF INLINE WATER CONTROL STRUCTURE AND INSTALLATION SHALL BE PAID AS BID ITEM "WATER CONTROL STRUCTURE - INLINE DRAWDOWN"

INLINE DRAWDOWN STRUCTURE - SECTION
NOT TO SCALE

DUCKS UNLIMITED INC.
GREAT PLAINS REGIONAL OFFICE

PROJECT NO. SD-0242-001
ALKALI CREEK
STRUCTURE DETAILS

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SURVEYED BY:
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DATE: 3-16-98
SHEET NO. 5 OF 5
APPROVED BY:
APPROVED BY: