

WATER PERMIT NO. 6149-3

Name of Applicant: Kip Krull

Address: 20834 318 Ave, Harrold 57536

Phone: 605 875-3349

Amount of Water Claimed: 96.5 AF

Total Acres: NA

Source of Water Supply: runoff

Water to be used for: fish & wildlife propagation & livestock water

County: Hughes

Type of Waste Disposal System: NA

Location: 16 miles south of Harrold

PRIORITY

Date Received: 9-24-1999

Fee: \$150

Corrected Application Received:

Period of Annual Use: January 1 – December 31

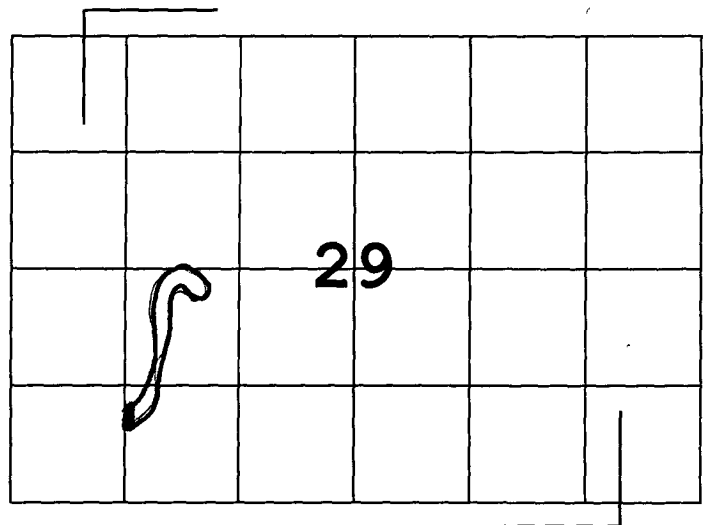
Remarks:

Diversion Point: SW ¼ SW 1/4

Sec 29-T110N-R74W

Water Impounded: W ½ SW ¼

Sec 29-T110N-R74W



Depth of Well: NA

Well Driller:

Remarks:

Type of Map: aerial photo

Prepared by: Kevin L Paulson, NRCS

Reviewed and the Number Assigned on: 9-24-1999

By: Karen Schlaak

Notice of Hearing - date to intervene: _____

**SOUTH DAKOTA
WATER PERMIT NO. 6149-3**

Date of first receipt of application September 24, 1999.

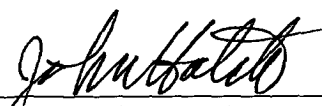
The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 6149-3 to Kip Krull, 20834 318 Ave, Harrold SD 57536 authorizing the construction of the dam and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 6149-3 authorizes impoundment of 96.5 acre-feet of water from runoff by constructing a dam located in the SW ¼ SW ¼ Section 29 with water impounded in the W ½ SW ¼ Section 29; all in T110N-R74W. This permit authorizes impoundment of sufficient water to maintain water at the outlet elevation.
2. The water appropriated shall be used for the purpose of supplying water provide habitat for fish and wildlife propagation and livestock water and may not exceed the amount of water needed for beneficial use.
3. The water is to be used during the following described annual period: January 1 – December 31.
4. The date of approval of Permit No. 6149-3 is November 1, 1999.
5. The date from which applicant may claim right is September 24, 1999.
6. One-fifth of the construction is to be completed on or before May 1, 2002.
7. All construction is to be completed on or before November 1, 2004.
8. Water is to be put to beneficial use on or before November 1, 2008.
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. 6149-3 authorizes a dam with storage capacity of 96.5 acre feet of water and sufficient water annually to maintain the water level to the outlet elevation.
2. Low flows as needed for downstream domestic use, including livestock water and prior water rights must be by-passed.

WATER MANAGEMENT BOARD

By: 
John Hatch, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

NOV 16 1999

date



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

Mail to:
Water Rights Division
Joe Foss Building
523 E Capitol
Pierre SD 57501-3181
605 773-3352

No. 6149-3 Hydrologic Unit 10140101
Basin Missouri River
Newspaper Capital Journal, Pierre, SD
(office use only)



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

Check use of water:

☐ Municipal ☐ Suburban Housing ☐ Recreational ☐ Institutional
☐ Rural Water System ☐ Commercial ☐ Fish & Wildlife ☐ Geothermal Heat
☐ Domestic ☐ Industrial ☒ Other Livestock
(over 18 gpm)

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

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

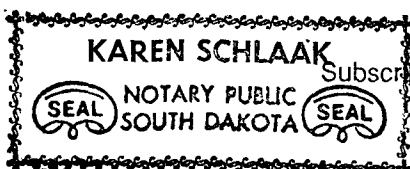
- Name of Applicant Kip Krull Phone 875-3349
(check one) ☒ Owner ☐ Tenant/lessee
Mailing Address 20834 318 Ave Harold State So. Dak 57536
(Street, RR, or Box) (City) (Zip Code)
- Amount of water claimed _____ *CFS or _____ **GPM 96.5 ***AF
(*Cubic Feet per Second) (**Gallons per Minute) (**Acre Feet -- storage capacity of dam/dugout or annual use if applicable)
- Source of water supply Runoff
- Location of point of diversion (example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W) _____
1,000' No. of the SW corner of sec. 29 T.110N. R. 74W.
(SW1/4 SW1/4) Water Impounded: W1/2 SW1/4 County Hughes
- County or counties where water will be used Hughes
- Annual period during which water is to be used Year around Jan 1 - Dec 31
- Give a description of the project. When available include any preliminary engineering report or other reports or information that will help explain the project. (Attach sheet if more space is needed)
Pond will be constructed to provide livestock water and enhance wildlife habitat.

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)

STATE OF SOUTH DAKOTA)

County of Hughes)^{SS}

I, Kip Krull, 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.



Signed Kip Krull
Subscribed and sworn to before me this 24th day of September 19 99
KAREN SCHLAAK, Notary Public
My Commission Expires April 1, 2001
Karen Schlaak

Supplemental Information

(type or print in ink)

1. Well Information - Proposed Construction

- a) Drill Hole Diameter _____ Depth _____
- b) Casing Type _____ Diameter _____ Thickness _____
- c) Screen Type _____ Diameter _____ Thickness _____
- d) Gravel Pack Thickness _____ 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) _____ c) Year Constructed _____
- d) Connected to the City of _____ Sanitary System.



3. Dugout Information

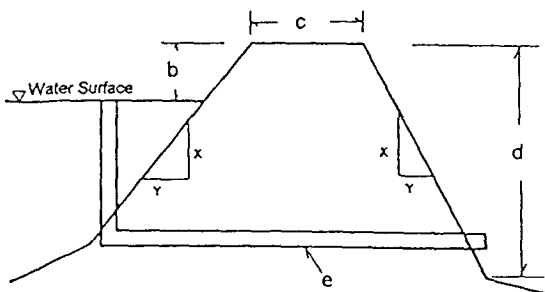
- a) Surface Dimensions _____ Depth _____
- b) Depth to water (ground surface to water level) _____

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:

Kevin Paulsen NRCS
316. So. Coteau
Pierre, So. Dak. 57501



- b) Freeboard 3.0'
- c) Crest Width 12.0'
Crest Length 446.0'
- d) Height 27.0'
- e) Primary Outlet Capacity 41.8 cfs
If pipe, diameter 18"
- f) Secondary Spillway Capacity 363 cfs
Spillway Width ~~78.0'~~ 85'
- g) X & Y Slope
Upstream 3:1
Downstream 3:1
- h) Surface Area of Impoundment 12.0
- i) Storage 96.5 Acre Feet
- j) Drainage Area Above Dam 2,000 Acres

Water Permit Application #6149-3 Kip Krull

Top of Dam Elev. 100
 P. Spway Elev. 95
 2nd Spway Elev. 97
 D/S Toe Elev. 73

Ht. = 27 ft

Cat. 3 Low Hazard Dam

Normal Storage Capacity - 96.5 Ac-Ft
 Int. Storage Capacity - 122.5
 Max. Storage Capacity - 169

Int. Storage Capacity x Eff Ht. = $122.5 \times 24 = 2940 < 3000 \therefore 25\text{yr}$
Minimum Spillway Design

From USGS WRI 80-80 "Tech. for Est. Flood Peaks ... in SD"

$$DA = 2000 \text{ Ac} = 3.12 \text{ mi}^2$$

$$S_{100} = 40 \text{ ft/mi}$$

$$S_i = 3.16$$

$$\begin{aligned} Q_{100} &= 83.4 A^{.6} S_i^{.44} S^{-.72} \\ &= 83.4 (3.12)^{.6} (40)^{.44} (3.16)^{-.72} \\ &= 83.4 (1.98) (5.07) (0.44) \\ &= \underline{365 \text{ cfs}} \end{aligned}$$

$$\begin{aligned} Q_{100} &= 132 A^{.65} S_i^{.46} S^{-.67} \\ &= 132 (3.12)^{.65} (40)^{.46} (3.16)^{-.67} \\ &= 132 (2.10) (5.45) (0.46) \\ &= \underline{700 \text{ cfs}} \end{aligned}$$

Secondary Spillway Flow

$$\begin{aligned} Q &= CLH^{3/2} \quad C = 2.8 \\ &= (2.8)(68)(3)^{1.5} \quad L = 68 \text{ ft} \quad H = 3 \\ &= \underline{990 \text{ cfs}} \end{aligned}$$

$$\begin{aligned} Q &= CLH^{3/2} \\ &= (2.8)(85)(3)^{1.5} \\ &= \underline{1236 \text{ cfs}} \end{aligned}$$

Section 74:02:08:09

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

NRCS Annual Yield

$$DA = 2000 \text{ Ac} \quad CN = 77 \quad ISO = 2$$

$$\begin{aligned} 80\% \text{ chance} &= 0.17 \\ 0.17 \times 2000/12 &= \underline{28 \text{ Ac-Ft}} \end{aligned}$$

$$\begin{aligned} 50\% \text{ chance} &= 0.46 \\ 0.46 \times 2000/12 &= \underline{77 \text{ Ac-Ft}} \end{aligned}$$

$$\begin{aligned} 10\% \text{ chance} &= 2.10 \\ 2.10 \times 2000/12 &= \underline{350 \text{ Ac-Ft.}} \end{aligned}$$

RECEIPT

Water Rights Program

South Dakota Department of Environment and Natural Resources

N^o 416202

Pierre, September 24, 19 99

RECEIVED OF Kip Krull, 20834 ~ 318th Ave., Harrold, SD 57536-9516
the following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. <u>6149-3</u> to Appropriate Water, to construct and to put water to beneficial use _____	150	00
Fee for Application for Permit No. _____ to Appropriate Water, for Future Use _____		
Fee to retain Future Use Permit No. _____ after period of seven years.		
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. <u>6149-3</u> _____	50	00
Fee for Filing Transfer Form _____		
Fee for Filing Extension Request _____		
Fee for _____		

(Any Other Work Provided by Law)	Total	200 00

By

Chief Engineer

John Hatch



MAP NOT TO SCALE
THIS IS NOT AN OFFICIAL WETLAND MAP

Kevin L. Paulsen
Natural Resource Conservation Service
Resource Conservation Tech



SE 1/4
Sec 30
T110N. R. 74W

Client : Krull Ranch
County : Hughes
Practice: Pond

State: SD

By: klp
Checked: _____

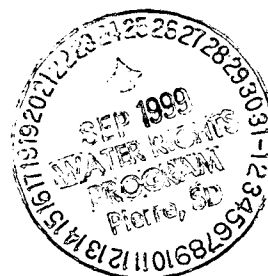
Date: 08-31-98
Date: _____

Drainage Area : 2000 * Acres
Curve Number : 77 *
Watershed Length : 26000 Feet
Watershed Slope : .7 Percent
Time of Concentration: 9.40 Hours
Rainfall Type : II

Storm Number	1	2	3	4	5	6	7
Frequency (yrs)	1	2	5	10	25	50	100
24-Hr Rainfall (in)	1.8	2.2	3	3.5	4.1	4.6	5.2
Ia/P Ratio	0.33	0.27	0.20	0.17	0.15	0.13	0.11
Runoff (in)	0.35	0.56	1.07	1.43	1.89	2.29	2.79
Unit Peak Discharge (cfs/acre/in)	0.086	0.089	0.093	0.095	0.096	0.097	0.098
Peak Discharge (cfs)	59	100	199	271	363	444	545

* - Value(s) provided by CN subroutine (F9)

85'
~~68'~~ spillway bottom



EFM-2 ESTIMATING RUNOFF AND PEAK DISCHARGE
Curve Number Computation

VERSION 1.10

Client : Krull Ranch
County : Hughes
Practice: Pond

State: SD

By: klp
Checked: _____

Date: 08-31-98
Date: _____

COVER DESCRIPTION	Hydrologic Soil Group			
	A	B	C	D
	Acres (CN)			

OTHER AGRICULTURAL LANDS				
Pasture, grassland or range	good	-	-	1000(74) 1000(80)
Total Area (by Hydrologic Soil Group)		1000	1000	
		-----	-----	

TOTAL DRAINAGE AREA: 2000 Acres

WEIGHTED CURVE NUMBER: 77

30" x 8' Riser w/ 100' of 18" Barrel



OH-Ver 2.0

US Department of Agriculture
Soil Conservation ServiceDESIGN WORKSHEET
for
Orifice Flow Formula Solution

prepared for

KRULL

in

HUGHES County, South Dakota

Designer : J. REEDY
Date : 09/28/98Checker _____
Date _____

8 FT RISER @ 95.0

Orifice Coefficient	0.75	
Diameter of Orifice	30.0 in.	Riser
Head on Orifice	2.0 ft	

Orifice Capacity 41.8 cfs

Flow at riser crest
(EL. 95.0)

1DAMS2 XEQ 09/28/98 STRUCTURE SITE ANALYSIS COMPUTER PROGRAM
 REV 01/01/90 SCS TECHNICAL RELEASE 48, (USER MANUAL) DATED JAN. 1990
 TIME 11:36:58

***** THIS PROGRAM IS IN TEST STATUS *****

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

DAMS2 01/01/90 Krull Dam (9-28-98) K.Paulsen
 STRUCTURE Krull

	76	0.0			
	80	2.0			
	85	4.5			
	90	7.0			
	95	12.0			
	100	17.0			

ENDTABLE

WSDATA	1A101	AC	77	2000	9.40		
PDIRECT	1.0		3.0		4.6	4.6	
PSDATA	1		100	18		0.0120	75.0
PSINLET	ELEV		1.0	7.854	95.0		
POOLDATA	ELEV			95.0			
ESCREST	ELEV		97.0				
ESDATA	29		150	0.03	3	0.04	5
BTMWIDTH	FEET		85				

COMMENT

COMMENT 378 Criteria. Route a 5-year storm through the principal
 COMMENT spillway (drop inlet 30" riser, 18" barrel), a 50-year storm
 COMMENT through the emergency spillway.

COMMENT

COMMENT

COMMENT

GO, DESIGN L

TYPE2378 24

ENDJOB

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

1DAMS2 XEQ 09/28/98

REV 01/01/90 (9-28-98) K.Paulsen

WSID = Krull Da

378 Criteria. Route a 5-year storm through the principal
 spillway (drop inlet 30" riser, 18" barrel), a 50-year storm
 through the emergency spillway.

1DAMS2

XEQ 09/28/98 (9-28-98) K.Paulsen

REV 01/01/90

TIME 11:36:58

SITE = Krull

PASS= 1

WSID= Krull Da

SUBW= 01

PAGE= 1

 ARID- SEMIARID CLIMATE AREA

BASIC DATA

DESIGN CLASS A1 =LT 3000

STORM DISTRIBUTION-PSH 24 HOUR TYPE II RAINFALL DISTRIBUTION

STORM DISTRIBUTION USED FOR EMERGENCY SPILLWAY IS;
SCS DESIGN STORM RAINFALL DISTRIBUTION. (CHAPTER 21 NEH4 AND SCS TR-60)

PRECIP.-	P-PS1 DAY 3.00	P-PS10 DAY .00	P-ES 4.60	P-FB 4.60
WSDATA-	CN 77.00	DA-SM 3.13	TC/L 9.40	-/H .00
SITEDATA-	PERM POOL .00	CREST PS 95.00	FP SED .00	QRF .00
	BASEFLOW .00	INITIAL EL .00	EXTRA VOL. .00	
PSDATA-	NO. COND. 1.00	COND L 100.00	D/W 18.00	-/H .00
	PS N .012	KE 1.00	WEIR L 7.85	TW EL 75.00
	2ND STG 95.00	ORF H .00	ORF L .00	START ES .00
CRESTS-	ES1 97.00	ES2 .00	ES3 .00	ES4 .00
				ES5 .00
EMG DATA-	SIDE SLOPE 3.00	EXIT N .040	EXIT SLOPE .050	
EMG DATA-	ES TYPE 29	ES LENGTH 150	ES ENTRANCE N .030	
BTM WIDTH-	BW1 85.00	BW2 .00	BW3 .00	BW4 .00
				BW5 .00

***** NOTE - THIS IS ONLY A PRELIMINARY EMG RATING CURVE OF DISCHARGE/FT
OF WIDTH AND DOES NOT INCLUDE SIDESLOPE CORRECTION OR
REVISED RATING USING ACTUAL EMG. CONFIGURATION.

EMG ID CODE	29	ELEVATION INCREMENT (FT) = 1.000	
DISCHARGES-Q1	Q2	Q3	Q4
2.007	6.672	13.137	21.099
Q5	Q6	Q7	Q8
30.281	40.580	51.859	64.101
Q9	Q10	Q11	Q12
77.199	91.066	105.699	121.072

1DAMS2 -----
XEQ 09/28/98 (9-28-98) K.Paulsen WSID= Krull Da
REV 01/01/90 SUBW= 01
TIME 11:36:58 SITE = Krull PASS= 1 PAGE= 2

CREST PS	95.00 FT	96.5 ACFT	12.00 AC	.0 CFS
SED ACCUM	95.00 FT	96.5 ACFT	12.00 AC	.0 CFS
2ND STAGE	95.00 FT	96.5 ACFT	12.00 AC	.0 CFS
STARTING E	95.00 FT	96.5 ACFT	12.00 AC	.0 CFS

1DAMS2 -----
 XEQ 09/28/98 (9-28-98) K.Paulsen WSID= Krull Da
 REV 01/01/90 SUBW= 01
 TIME 11:36:58 SITE = Krull PASS= 1 PAGE= 3

ES CREST 97.00 FT 122.5 ACFT 14.00 AC 35.3 CFS

PS STORAGE 26.0 ACFT BETWEEN ES CREST AND SED ACCUM ELEVATIONS

STARTING E 95.00 FT 96.5 ACFT 12.00 AC .0 CFS

ELEVATION OF LOW POINT IS ZERO. NO CRITERIA CHECK MADE FOR
 STRUCTURE CLASSIFICATION

SCS-ESH D= 6.00 HR P= 4.60 IN Q= 2.29 IN DA = 3.13 SM
 TC= 9.40 HR CN= 77.00 VOL= 382.0 ACFT

PEAK = 560.2 CFS, AT 8.9 HRS.

***** WARNING - TR-60 REQUIRES AN INCREASE IN RAINFALL AMOUNT COMPATIBLE
 WITH INCREASE IN EMERGENCY STORM DURATION WHEN TC EXCEEDS 6-HRS.

SCS-FBH D= 6.00 HR P= 4.60 IN Q= 2.29 IN DA = 3.13 SM
 TC= 9.40 HR CN= 77.00 VOL= 382.0 ACFT

PEAK = 560.2 CFS, AT 8.9 HRS.

 RATING TABLE DEVELOPED, SITE = Krull
 BY PROGRAM FOR PS AND EMG SPILLWAYS

RATING TABLE NUMBER 2

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	95.00	.00	.00	96.50	12.00
2	95.32	4.33	4.33	100.35	12.32
3	95.63	12.25	12.25	104.29	12.63
4	95.95	22.50	22.50	108.34	12.95
5	96.27	34.64	34.64	112.48	13.27
6	96.36	34.76	34.76	113.70	13.36
7	96.45	34.83	34.83	114.93	13.45
8	96.54	34.91	34.91	116.17	13.54
9	96.63	34.98	34.98	117.42	13.63
10	96.72	35.05	35.05	118.68	13.72
11	96.82	35.13	35.13	119.94	13.82
12	96.91	35.20	35.20	121.22	13.91
13	97.00	35.28	35.28	122.50	14.00
14	97.15	61.12	35.40	124.61	14.15
15	97.30	87.11	35.52	126.75	14.30
16	97.57	134.17	35.73	130.64	14.57
17	97.90	192.09	35.99	135.51	14.90
18	98.50	416.24	36.46	144.63	15.50
19	99.25	773.57	37.04	156.53	16.25
20	100.00	1223.23	37.60	169.00	17.00

FULL CONDUIT FLOW, ELEV = 96.27 FT

ROUTED RESULTS	BTM WIDTH FT	MAX ELEV FT	VOL-MAX ACFT	AREA-MAX AC	EMG. HP FT	VOL-ES ACFT
SCS-ESH	85.0	98.80	149.2	15.8	1.80	26.7

PEAK - CFS	Q-PS	Q-ES	Q-TOT
DISCHARGE =	36.7	518.3	555.0

	CRITICAL	CRITICAL	CRITICAL	25% OF
	DEPTH	VELOCITY	SLOPE-S/C	S/C
EMERGENCY	FT	FT/SEC	FT/FT	FT/FT
SPILLWAY----	1.04	5.68	.023	.032

	DURATION	ATTACK	SUMMATION
	FLOW	OE/B	VEL**2 DELTA T
EMERGENCY	HRS	ACFT/FT	(FT/SEC)**2 HRS
SPILLWAY----	15.8	3.5	399.2

***** MESSAGE - ES378 CRITERIA USED BUT EMERGENCY SPILLWAY NOT BASED ON RETARDANCE.

EXIT CHANNEL FLOW SUPERCRITICAL: MAX VELOCITY= 7.17 FT/SEC
EXIT SLOPE = .050 FT/FT
FLOW DEPTH = .827

DRAWDOWN USING FREEBOARD STORM FOLLOWS, STARTING AT ELEVATION 97.00 FT.

DRAWDOWN (DDT) TEST 95.00 FT 96.5 ACFT .00 CFS
CONTROL IS .000 DETENTION STORAGE

TIME = 2.83 DAYS, TO .0 CFS (LIMIT = 10.00 DAYS)

ROUTED	BTM WIDTH	MAX ELEV	VOL-MAX	AREA-MAX	EMG. HP	VOL-ES
RESULTS	FT	FT	ACFT	AC	FT	ACFT
SCS-FBH	85.0	98.80	149.2	15.8	1.80	26.7

PEAK - CFS	Q-PS	Q-ES	Q-TOT
DISCHARGE =	36.7	518.3	555.0

	CRITICAL	CRITICAL	CRITICAL	25% OF
	DEPTH	VELOCITY	SLOPE-S/C	S/C
EMERGENCY	FT	FT/SEC	FT/FT	FT/FT
SPILLWAY----	1.04	5.68	.023	.032

	DURATION	ATTACK	SUMMATION
	FLOW	OE/B	VEL**2 DELTA T
EMERGENCY	HRS	ACFT/FT	(FT/SEC)**2 HRS
SPILLWAY----	15.8	3.5	399.2

***** MESSAGE - ES378 CRITERIA USED BUT EMERGENCY SPILLWAY NOT BASED ON RETARDANCE.

EXIT CHANNEL FLOW SUPERCRITICAL: MAX VELOCITY= 7.17 FT/SEC
EXIT SLOPE = .050 FT/FT
FLOW DEPTH = .827

***** ES378 RUN - MINIMUM DEPTH, CREST EMG TO TOP OF DAM IS 2.00 FT
NEW TOP OF DAM ELEVATION = 99.00

ROUTED	BTM WIDTH	MAX ELEV	VOL-MAX	AREA-MAX	EMG. HP	VOL-ES
RESULTS	FT	FT	ACFT	AC	FT	ACFT
MINIMUM ES	85.0	99.00	152.6	16.0	2.00	30.1

PEAK - CFS	Q-PS	Q-ES	Q-TOT
DISCHARGES =	36.8	617.6	654.5

	CRITICAL	CRITICAL	CRITICAL	25% OF
	DEPTH	VELOCITY	SLOPE-S/C	S/C
EMERGENCY	FT	FT/SEC	FT/FT	FT/FT
SPILLWAY----	1.16	6.00	.023	.030

***** ES378 RUN - MINIMUM DEPTH, DESIGN FLOW TO TOP OF DAM, REQUIRED

FOR THIS PASS. NEW TOP OF DAM ELEVATION = 99.80

ROUTED RESULTS	BTM WIDTH FT	MAX ELEV FT	VOL-MAX ACFT	AREA-MAX AC	EMG. HP FT	VOL-ES ACFT
MINIMUM ES	85.0	99.80	165.6	16.8	2.80	43.1

PEAK - CFS DISCHARGES =	Q-PS 37.5	Q-ES 1063.1	Q-TOT 1100.6
----------------------------	--------------	----------------	-----------------

EMERGENCY SPILLWAY----	CRITICAL DEPTH FT	CRITICAL VELOCITY FT/SEC	CRITICAL SLOPE-S/C FT/FT	25% OF S/C FT/FT
	1.66	7.12	.020	.027

1DAMS2....JOB NO. 1 COMPLETE

Krull Da (9-28-98) K.Paulsen

0 SUBWATERSHED(S) ANALYZED

1 STRUCTURE(S) ANALYZED

2 HYDROGRAPHS ROUTED AT LOWEST SITE

0 TRIALS TO OBTAIN BOTTOM WIDTH FOR SPECIFIED VELOCITY(S)

DAMS2.....COMPUTATIONS COMPLETE

SUMMARY TABLE 1

DAMS2 VERSION 01/01/90

WATERSHED ID

RUN DATE

RUN TIME

Krull Da

09/28/98

11:36:58

>>>	SITE ID	SUBWS ID	SUBWS DA (SQ MI)	CURVE NO.	TC (HRS)	TOTAL DA (SQ MI)	TYPE DESIGN	STRUC CLASS	<<<
	Krull	01	3.13	77.	9.40	3.13	378CR	A1	

PASS NO.	DIA/ WIDTH (IN/FT)	ES CREST ELEV (FT)	BTM WIDTH (FT)	MAX HP (FT)	MAX ELEV (FT)	YARDAGE EMB (CY)	OE/B* (AF/FT)	EXIT* VELOCITY (FT/SEC)	TYPE HYD
1	18.0	97.00	85.00	2.80	99.80	0.	3.5	7.17	MINIMUM ES

* OE/B AND EXIT VELOCITY ARE BASED ON THE ROUTED HYDROGRAPH
AND WILL NOT RELATE TO THE MAX. ELEV. (TOP OF DAM),
WHICH IS SET BY MINIMUM DESIGN CRITERIA.

DAMS2.....SUMMARY TABLE 1 COMPLETED

SCS DAMS2 VERSION 01/01/90
Krull Da FILES

REPORT ON
WATER PERMIT APPLICATION NO. 6149-3
Kip Krull
September 30, 1999

Water Permit Application No. 6149-3 has been filed by Kip Krull to impound 96.5 acre-feet of water from runoff by constructing a dam located in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 29-T110N-R74W, in Hughes County. The application also requests impoundment of sufficient water to maintain the reservoir at the outlet elevation. The water will be used for fish and wildlife propagation and livestock watering.

Discussion:

The Kip Krull Dam No.2 Dam will be classified as a Category 3, Low Hazard dam. The dam has been designed by the Natural Resources Conservation Service. The plans and specifications have been reviewed and will be approved; however, construction of the dam can not begin until Water Permit Application No. 6149-3 is approved.

The dam will be 27 feet high with a normal storage capacity of 96.5 acre-feet with a reservoir level at the spillway elevation, and a maximum storage capacity of 169 acre-feet with a reservoir level at the top of dam elevation. A dam of this size and hazard classification is required to have a minimum spillway design capable of passing a 25-year frequency event.

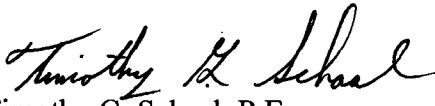
The dam is designed to have a 30 inch concrete riser with an 18 inch CPE barrel with 5 feet of available freeboard as the primary spillway, and an earthcut spillway 85 feet wide with 3 feet of available freeboard as the secondary spillway. The dam will have a drainage area of 2000 acres (3.12 square miles). A 25-year frequency event will produce a peak of approximately 365 cfs and a 100-year frequency event will produce a peak of approximately 700 cfs. The 85 foot wide earthcut secondary spillway will have a capacity of approximately 1236 cfs.

The annual yield for this drainage area with a 10 percent chance of occurrence, or 1 out of 10 years, is expected to be 350 acre-feet. The annual yield with a 50 percent chance of occurrence, or 1 out of 2 years, is expected to be 77 acre-feet and the annual yield with a 80 percent chance of occurrence, or 8 out of 10 years, is expected to be 28 acre-feet.

The Kip Krull No. 2 Dam will be located in the SW $\frac{1}{4}$ of Section 29-T110N-R74W on an unnamed tributary to the South Fork of Chapelle Creek, about four miles upstream of the confluence of the unnamed tributary and Chapelle Creek.. There are no existing Water Permits/Rights located on the unnamed tributary or the South Fork of Chapelle Creek.

Conclusions:

1. Water Permit Application No. 6149-3 should be approved since unappropriated water is available and approval should not have any adverse effect on existing Water Permits/Rights.
2. If approved, the low flow bypass requirement for downstream domestic use should be a qualification on Water Permit Application No. 6149-3.



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

Approved by:



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

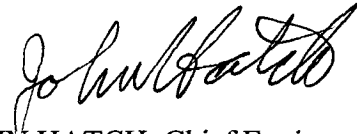
**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 6149-3, Kip Krull**

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. 6149-3, Kip Krull, 20834 318th Avenue, Harrold SD 57536.

The Chief Engineer is recommending APPROVAL of Application No. 6149-3 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing rights, 3) the proposed use is a beneficial use and 4) it is in the public interest with the following qualifications:

1. Water Permit No. 6149-3 authorizes a dam with storage capacity of 96.5 acre feet of water and sufficient water annually to maintain the water level to the outlet elevation.
2. Low flows as needed for downstream domestic use, including livestock water and prior water rights must be by-passed.

See report on application for additional information.

A handwritten signature in black ink, appearing to read "John Hatch", written in a cursive style.

JOHN HATCH, Chief Engineer
October 7, 1999



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

October 7, 1999

Kip Krull
20834 318 Ave.
Harrold, SD 57536

Dear Mr. Krull:

We have reviewed the plans and specifications for your dam located in the SW ¼ SW ¼ of Section 29-T110N-R74W, in Hughes 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. 6149-3 is approved.

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

The Krull Dam No. 2 will be classified as a small size Category 3, Low Hazard dam with a dam height of 27 feet and a normal storage capacity of 96.5 acre-feet and a maximum storage capacity of 169 acre-feet.

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

Sincerely,

A handwritten signature in black ink, reading "Gale N. Selken". The signature is written in a cursive, flowing style.

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

c: Kevin Paulsen, NRCS



**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.

October 7, 1999

Kip Krull
20834 318 Ave.
Harrold, SD 57536

Dear Mr. Krull:

Water Permit Application No. 6149-3 for fish and wildlife propagation and livestock water 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 Capital Journal printed at Pierre, SD (Ph # (605) 224-7301). 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 newspaper to authorize publication of your Notice of Hearing and to arrange for payment. Early contact with the paper can eliminate delays. The publisher has 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 newspaper has 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 /K5

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

October 7, 1999

Capital Journal
P.O. Box 878
Pierre, SD 57501-0878

ATTENTION: Legal Public Notice

Enclosed is a Notice of Hearing on Application No. 6149-3 to Appropriate Water to be published twice. Please publish the first notice on October 14, 1999, 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 Kip Krull, 20834 318 Ave., Harrold, SD 57536 (Ph # (605) 875-3349).

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 /ks
Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

-----CU T HERE-----

No. 6149-3

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

Date _____

We are in receipt of your letter of October 7, 1999, enclosing Notice of Hearing to Appropriate Water by Application No. 6149-3 which was first published in our issue of _____. **ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.**

Name

Newspaper

Instruction to Newspaper - Publish first Notice on October 14, 1999, with the second publication 7 days later. The applicant is responsible for payment.

NOTICE OF APPLICATION NO. 6149-3 to Appropriate Water

Notice is given that Kip Krull, 20834 318 Ave, Harrold SD 57536 has filed an application for a water permit to impound 96.5 acre-feet of water from runoff by constructing a dam located in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 29 with water impounded in the W $\frac{1}{2}$ SW $\frac{1}{4}$ Section 29; all in T110N-R74W. This application requests impoundment of sufficient water to maintain water at the outlet elevation and is to be used to provide habitat for fish & wildlife propagation and livestock water.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 6149-3 because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on 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 November 1, 1999.

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.

Form 8



PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
County of Hughes) SS

I, Peggy Warner

certify that the attached printed Notice was taken

from the Capital Journal

printed and published in Pierre

County of Hughes and

state of South Dakota. The notice was published

in the newspaper on the following two dates:

October 14, 1999

October 21, 1999

Cost of Printing \$39.00

Peggy Warner
(Signature)

legal representative
(Title)

10-22-99
(Date Signed)

No. 2718 2tdly 10/14, 10/21

NOTICE OF APPLICATION NO. 6149-3 to Appropriate Water

Notice is given that Kip Krull, 20834 318 Ave., Harrold SD 57536 has filed an application for a water permit to impound 96.5 acre-feet of water from runoff by constructing a dam located in the SW 1/4 SW 1/4 Section 29 with water impounded in the W 1/2 SW 1/4 Section 29; all in T110N-R74W. This application requests impoundment of sufficient water to maintain water at the outlet elevation and is to be used to provide habitat for fish & wildlife propagation and livestock water.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 6149-3 because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on 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.

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tained. 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

LOCATION NOTICE FOR DAM/DUGOUT

Mail to: Water Rights Div.
DENR, Foss Bldg.
523 E. Capitol
Pierre, SD 57501
(605) 773-3352

Hughes
County

Location Notice No. (office use)

I, Kip Krull, of

Name

20834 318 Ave. Harrold, So. Dak Hughes
Address & Zip Code County

Owner, of the following described land, do hereby
(owner or operator)

notify the Water Management Board of the State of South Dakota and all others concerned that I am exercising my right
under SDCL 46-4, for construction of a dam for the purpose of impounding runoff waters
(dam or dugout)

for livestock purposes.
(type of use i.e. livestock, recreation, etc.)

The following data is presented in compliance with SDCL 46-4-3 and 46-4-4.

(1) Date of:

(a) This notice _____

(b) Proposed construction _____



(2) Legal description of the land upon which the dam/dugout is located:

SW 1/4 SW 1/4 Sec. 29 T. 110 N. R. 74 W.
(describe to the nearest 40 acre subdivision)

(3) Location of the dam/dugout from a section corner:

1000' No. of SW 1/4 corner of Sec. 29 T. 110 N. R. 74 W.
(describe distance N.S.E.W. in feet from the corner)

(4) County Hughes Co.

(5) The owner of the land Kip Krull

(6) Acre feet of water claimed annually 96.5

Notes: If the storage of the proposed structure at the spillway crest or overflow elevation exceeds twenty five (25) acre feet, a water permit from the Water Management Board is required.

A location notice is only required on a dugout, if the dugout captures surface runoff waters.



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

NOV 16 1999

Kip Krull
20834 318 Ave.
Harrold, SD 57536

Dear Mr. Krull:

Enclosed is Water Permit No. 6149-3 authorizing construction of your water diversion system and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

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

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

Very truly yours,

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

enclosures

WATER RIGHTS PROGRAM -- FILE DOCUMENTATION

NAME & ADDRESS: Kip Krull, Harrold, SD

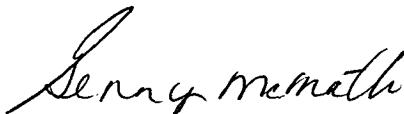
DATE: May 1, 2000

RE: completion of works for Permit No. 6149-3

COMMENTS:

Mr. Krull indicated he would be completed with the storage dam authorized by Permit No. 6149-3 in about 3 weeks.

I told him I would make a notation in the file as to when he expected to be completed with the project and that would enable us to do an on-site investigation.



Genny McMath
Environmental Scientist

REPORT ON INSPECTION OF PERMIT NO. 6149-3

DATE OF INSPECTION: September 25, 2001

Other permit(s) associated with the project: none

NAME & ADDRESS OF INSPECTION CONTACT: Kip Krull, 20834 318 Ave., Harrold, SD 57536

RELATIONSHIP TO PERMIT HOLDER, IF APPLICABLE: owner

NAME & ADDRESS OF PERMIT HOLDER: same as above

DIVERSION POINT LEGAL LOCATION: 930' N and 190' W of the SE corner in the SE $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 30, T110N-R74W.

DAM INFORMATION:

- 1) Height to crest 27 feet
- 2) Height to primary spillway 22 feet
- 3) Height to secondary spillway 24 feet
- 4) Crest width 12 feet
- 5) Crest length 460 feet
- 6) Spillway length 100 feet
- 7) Spillway width 98 feet
- 8) Approx. storage 96.5 ac-ft
- 9) Approx. Storage to crest 169 ac-ft
- 10) Date constructed: May 2000
- 11) Outlet tubes:
 - a) diameter 18 inches
 - b) type polyethylene corrugated pipe
 - c) valved no
 - d) location on structure 109' N of the S groin of the dam
- 12) Category of Dam 3
- 13) Inspection Sheet Completed no

PERMIT QUALIFICATIONS AND REGULATIONS:

- 1) Special qualifications to permit being abided by yes
- 2) All structures, wells and lands on map yes
- 3) Comments: the dam embankment needs cover and there is some moisture on the downstream side of the south groin.

Permit No. 6149-3
Missouri River - Water District

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

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

I have this day, September 25, 2001 made a thorough examination of the water use system constructed by Kip Krull of 20834 318 Ave., Harrold, SD 57536 holder of Permit No. 6149-3, bearing the priority of September 24, 1999 authorizing the storage of 96.5 acre-feet of the waters of unnamed drainage for fish and wildlife propagation and livestock purposes, in Hughes County.

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

A. Works used to divert the water:

Category 3 dam 460' long and 27' in height to the crest and 22' to the primary spillway. The primary spillway is a 30" concrete riser with an 18" polyethylene corrugated outlet tube. The secondary spillway is an earthen spillway 98' wide and 100' long.

B. Works used to apply water to beneficial use:

Same as above.

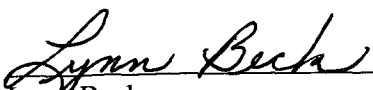
The system is in the following condition good/new. The point of diversion is located 930' N and 190' W of the SE corner in the SE¼ SE¼ of Section 30, T110N-R74W. The works are capable of diverting and storing 96.5 acre feet of water which is to be used for fish and wildlife propagation and livestock. Water has been put to beneficial use to the maximum extent as follows:

Water is impounded in the NW¼ SW¼, SW¼ SW¼ Section 29 and the SE¼ SE¼ of Section 30 all in T110N-R74W.

The license should be issued for 96.5 acre-feet of storage.

Applicable permit qualifications have been complied with: yes

Exceptions to compliance are: none


Lynn Beck

Natural Resources Engineer
DENR, Water Rights Program

10-9-01
Date

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

NAME: Kip Krull

ADDRESS: 20834 318 Ave., Harrold, SD 57536

DATE: October 9, 2001

COUNTY: Hughes

TELEPHONE: (605) 875-3349

AUTHORITY:

Pursuant to SDCL 46-5-13.1, the location of a diversion point may be changed or additional diversion points may be licensed 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**

Yes, 6149-3 authorizes a diversion located in the SW¼ SW¼ Section 29, T110N-R74W. The diversion was developed in the SE¼ SE¼ Section 30, T110N-R74W on the same unnamed creek.

- **If irrigation, no new land is irrigated**

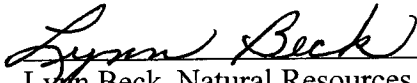
No irrigation.

- **Review of Existing Diversions**

No other diversions below the diversion authorized by 6149-3 on the same unnamed drainage.

RECOMMENDED ACTION

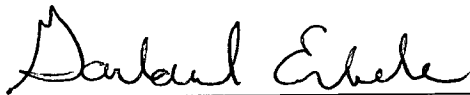
Based on the above criteria, it is recommended that the diversion point(s) be licensed as developed.



Lynn Beck, Natural Resources Engineer
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.



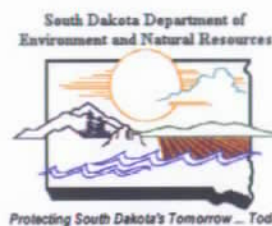
Garland Erbele, Chief Engineer
Water Rights Program

WATER PERMIT NO. 6149-3 KIP KRULL



Lynn Beck
Natural Resources Engineer Specialist
Water Rights Program, DENR
October 1, 2001

Lynn Beck



STATE OF SOUTH DAKOTA

WATER LICENSE NO. 6149-3

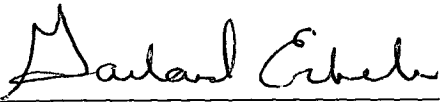
(1) Kip Krull, 20834 318 Ave, Harrold SD 57536 made Application No. 6149-3, September 24, 1999 for a water permit to impound 96.5 acre-feet of water from runoff, Hughes County, South Dakota for fish & wildlife propagation and livestock watering purposes. Permit No. 6149-3, with a priority date of September 24, 1999 was approved November 1, 1999 and issued to the applicant for diversion of water with construction of the described water supply system to be completed on or before November 1, 2004 and for the application to beneficial use of said water on or before November 1, 2008.

An investigation conducted for licensing purposes found the diversion point under Water Permit No. 6149-3 was not in the location authorized by the permit. Pursuant to SDCL 46-5-13.1, the Chief Engineer makes a finding that the change in location of diversion point does not increase the potential for interference with existing water rights.

(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 96.5 acre-feet of water for beneficial use with sufficient water annually to maintain the water level to the outlet elevation. The location of the storage dam (spillway) is 930 feet north and 190 feet west of the southeast corner of Section 30-T110N-R74W (SE ¼ SE 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 Kip Krull, 20834 318 Ave, Harrold SD 57536 the holder and/or owner of Water Right No. 6149-3 is issued a license to appropriate water, the right to impound 96.5 acre-feet of water from runoff with sufficient water annually to maintain the water level to the outlet elevation with a priority date of September 24, 1999 from the location specified in (2) of this license for fish & wildlife propagation and livestock watering purposes. This license is subject to any limitations or qualifications listed in Water Right No. 6149-3 and subject to South Dakota State Law.



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

DEC 07 2001

date





**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

DEC 07 2001

6149-3

Kip Krull
20834 318 Ave.
Harold, SD 57536

Dear Mr. Krull:

Enclosed is Water License No. 6149-3. This is the final water right document completing your process of obtaining a Water Right.

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

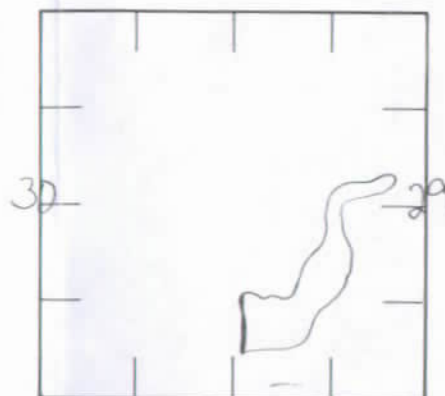
Sincerely,

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

enclosures

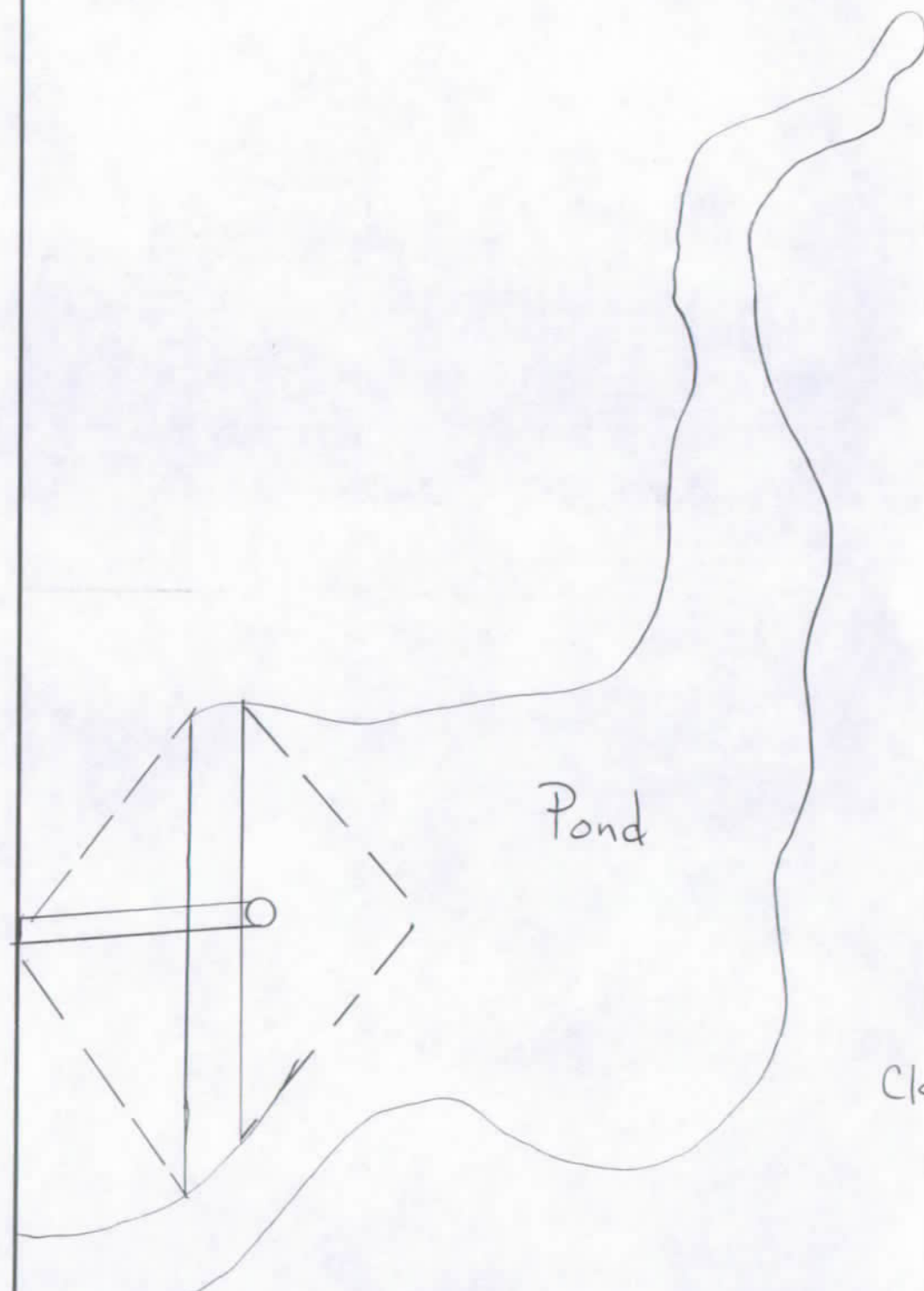
DRAINAGE AREA	ANNUAL YIELD	PEAK RUNOFF	EMERG. SPLWY. CAPACITY	WATER DEPTH	SURFACE AREA	SEDIMENT STORAGE	TOTAL STORAGE
ACRES	AC. FT.	25-YR.	C. F. S.	FEET	ACRES	AC. FT.	AC. FT.
2000	58	363	5.3	20	13.0		

DRAINAGE AREA	ANNUAL YIELD	PEAK RUNOFF	EMERG. SPLWY. CAPACITY	WATER DEPTH	SURFACE AREA	SEDIMENT STORAGE	TOTAL STORAGE
ACRES	AC. FT.	25-YR.	C. F. S.	FEET	ACRES	AC. FT.	AC. FT.
2000	58	363	5.3	20	13.0		



Sec. 3D.T. 110N. R. 74W
Hughes County

LOCATION

[illegible]

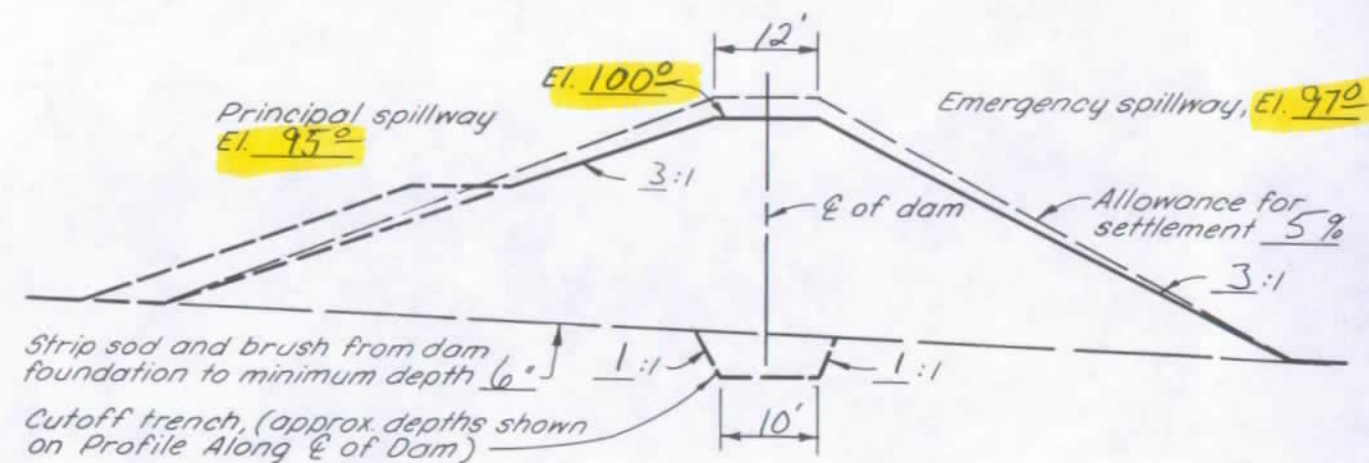
Pond

Class "A"
Hazard

SKETCH PLAN OF DAM AND RESERVOIR AREA

Approximate scale $1'' = NA$

REFERENCE: GUIDE PLAN NO. 1.0



TYPICAL CROSS SECTION OF DAM

S.D. CONSTRUCTION AND MATERIAL SPECIFICATIONS:

- SD-4 Stripping
- SD-7 Earth Fill Class-S
- SD-12B Concrete for Minor Structures
- SD-16 Timber Fabrication
- SD-55 Plastic Pipe

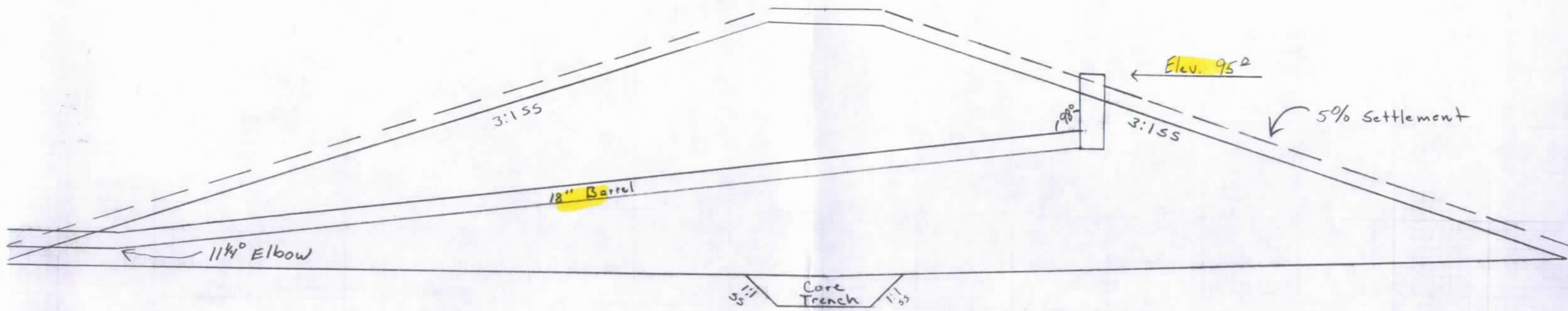
EARTH DAM

OPERATOR: Kip Krull
CONSERVATION DISTRICT: Hughes Co.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

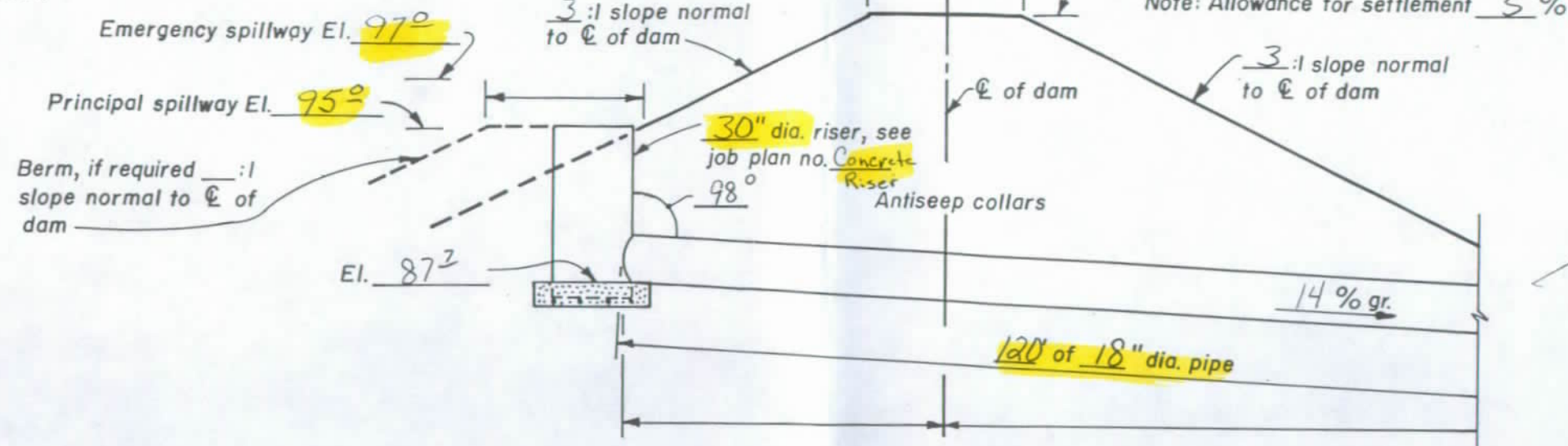
Designed	K. Paulsen	Date	9-99	Approved by	
Drawn				Title	
Traced				Title	
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		No			
		of			

JOB PLAN NO. 1.0



0+80 0+70 0+60 0+50 0+40 0+30 0+20 0+10 0+00 0+10 0+20 0+30 0+40 0+50 0+60 0+70 0+80

Locate principal spillway pipe at $\mathcal{C}$ of dam sta. $2+75$ at an angle of 90° to the $\mathcal{C}$ of the dam.



CROSS SECTION OF DAM ALONG $\mathcal{C}$ OF PRINCIPAL SPILLWAY
(Not to scale)

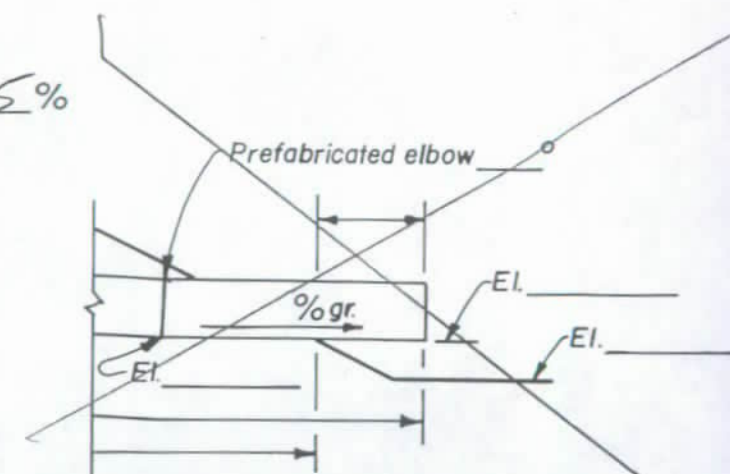
SPECIFICATION NOTES

- ELBOW, IF REQUIRED, MAY BE FABRICATED BY CONTINUOUS WELDING SEPERATE PIPE SECTIONS OR BY FABRICATING A CONTINUOUS WELDED JOINT ON THE UPSTREAM END OF LAST SECTION OF PIPE.
- PIPE WALL THICKNESS SHALL BE _____ GAGE OR _____ INCHES.

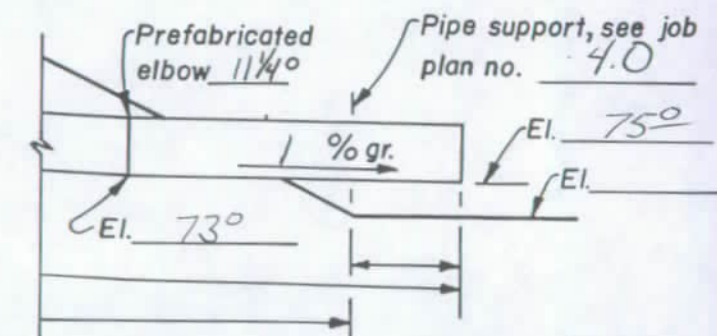
TABLE OF QUANTITIES

ITEM	UNIT	QUANTITY
Pond & 5% Shrink	Cu. yds	21,822
Core Trench	Cu. yds	536
Stripping	Cu. yds	934
Total	Cu. yds	23,292
Concrete Riser 30" Dia. x 8' High	Ea.	1
Sand Seep Collar (See Job Plan 3.8)	Ea.	1
Timber Pipe Support (See Job Plan 4.0)	Ea.	1
Trash Rack + Baffle (See Job Plan 6.4)	Ea.	1

APPLICABLE STANDARD S.C.S. SPECIFICATIONS
 SD-4 Stripping
 SD-7 Earth Fill Class-5
 SD-12B Concrete for Minor Structures
 SD-16 Timber Fabrication
 SD-55 Plastic Pipe



OUTLET DETAIL WITHOUT
PIPE SUPPORT

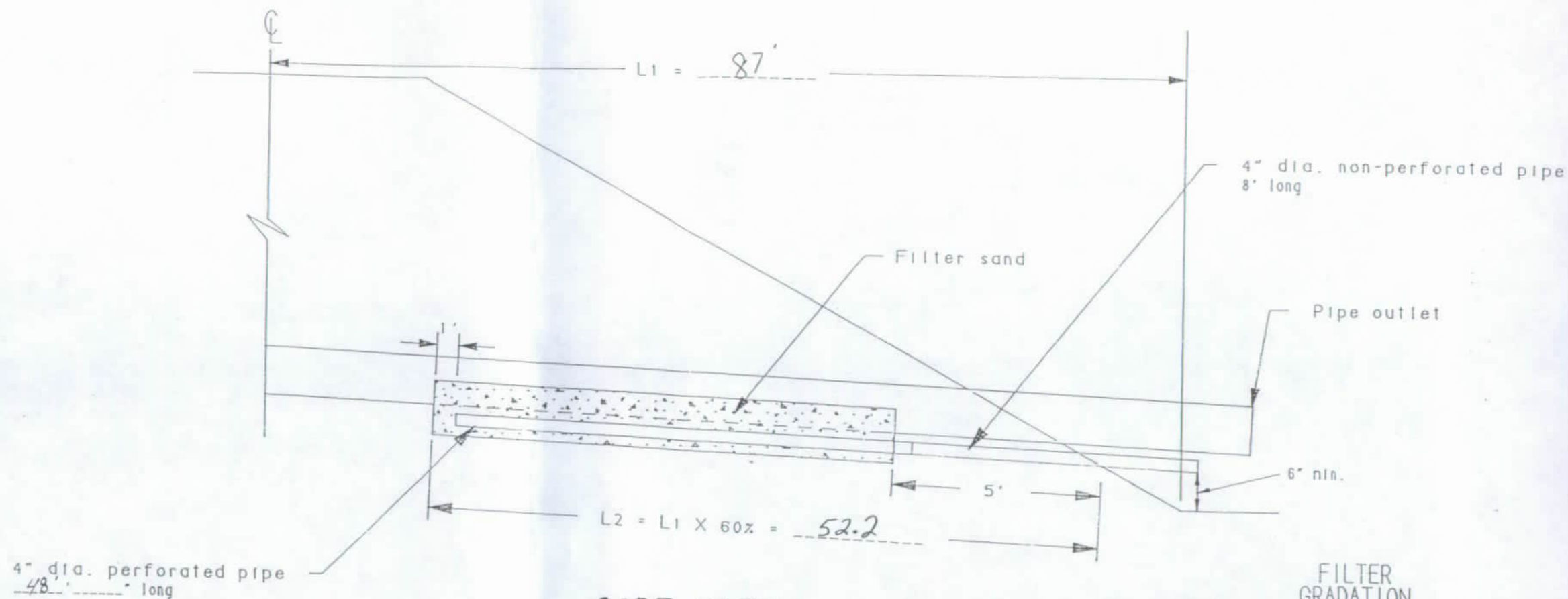


OUTLET DETAIL WITH
PIPE SUPPORT

Sec. SE 1/4 3D, T. 110 N., R. 74 W.
Hughes County

LOCATION
Concrete Riser / Plastic P.E. PIPE
DROP INLET PRINCIPAL SPILLWAY

OPERATOR <u>Kip Krull</u>	
CONSERVATION DISTRICT <u>Hughes Co.</u>	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Designed <u>K. Paulsen</u> Date <u>9-99</u>	Approved by _____
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	of _____

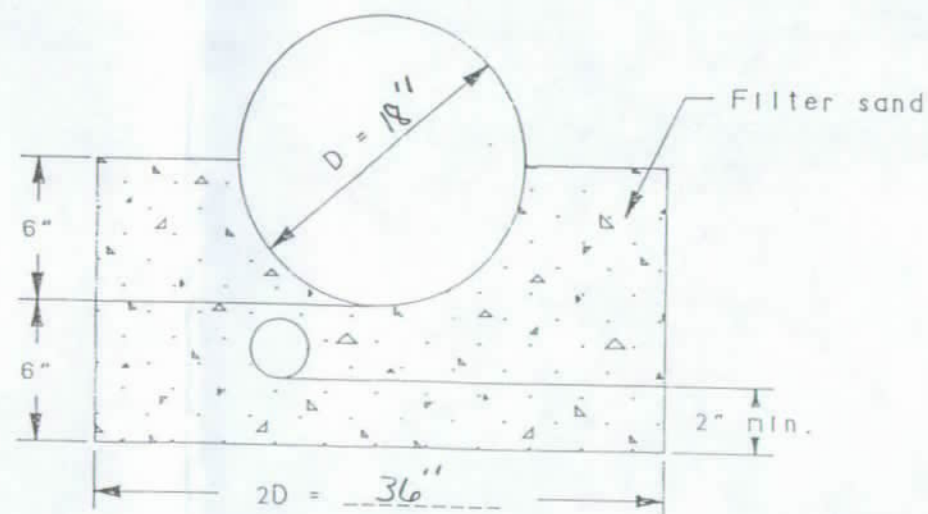


SIDE VIEW

$$\frac{47 \times 3 \times 1}{27} = 5.2 \text{ cu. yds}$$

FILTER GRADATION

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



UPSTREAM VIEW

NOTE:

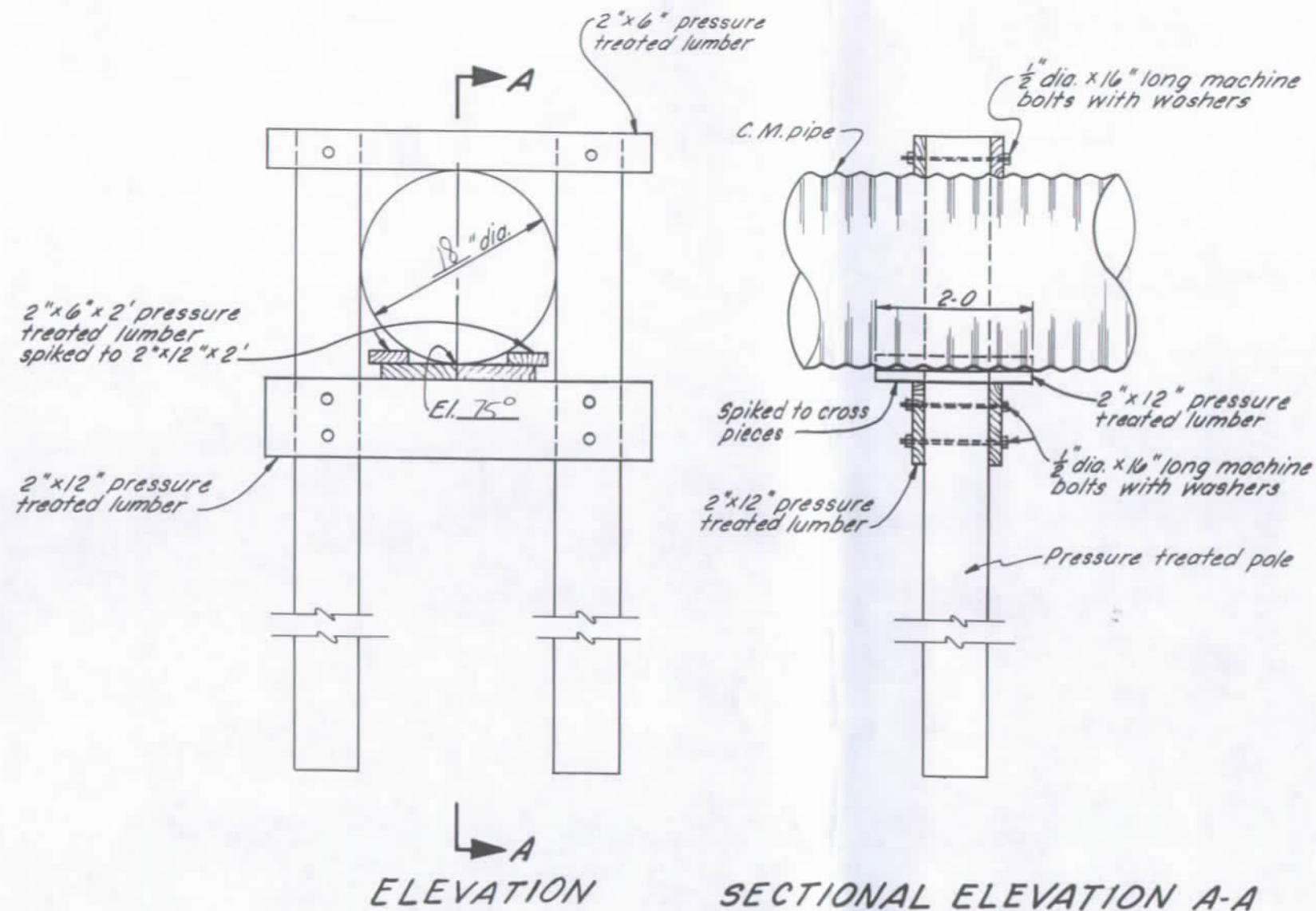
1. THE 4" DIA. PIPE SHALL BE SDR 35 PVC, OR STRONGER
2. PROVIDE AN ANIMAL GUARD ON DRAIN OUTLET PIPE. DRILL 2, 1/2" DIA. HOLES, ON ϕ 6" FROM END OF PIPE AND PLACE A 3/8" DIA., 5 1/2" LONG GALVANIZED STEEL BOLT THRU THEM AND SECURE WITH A NUT (PLACE BOLT HORIZONTAL).
3. FILTER SAND WILL BE CLEAN PEA AGGREGATE OR CONCRETE SAND.

SAND ANTISEEP DRAIN

OPERATOR <u>Kip Krull</u>	
CONSERVATION DISTRICT <u>Hughes Co</u>	
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	
Designed <u>K. Paulsen</u> Date <u>9-99</u>	Approved by _____
Drawn _____	Title _____
Traced _____	Title _____
Checked _____	Sheet No. _____ Dwg. No. _____
	of _____

Rev. 3/96

JOB PLAN NO. 3.8-P



NOTES:

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

Place pipe support 6 feet back from the end of pipe. A 3"x12"x16' plank shall be installed on the bottom side of pipe, extending from the end of the pipe 16' back into the fill.

TABLE OF QUANTITIES

ITEM	LENGTH FOR 18" DIA. C.M. PIPE	UNIT	QUANTITY
PRESSURE TREATED POLE 8" DIA.	8-0	EACH	2
2" X 12" PRESSURE TREATED LUMBER	4-0	EACH	6
2" X 6" PRESSURE TREATED LUMBER	4-0	EACH	2
2" X 12" PRESSURE TREATED LUMBER	2-0	EACH	3
2" X 6" PRESSURE TREATED LUMBER	2-0	EACH	2
1/2" DIA. MACHINE BOLTS WITH NUTS	16'	EACH	10
1/2" DIA. WASHERS		EACH	20

REFERENCE: GUIDE PLAN NO. 4.0

JOB PLAN NO. 4.0

TIMBER PIPE SUPPORT

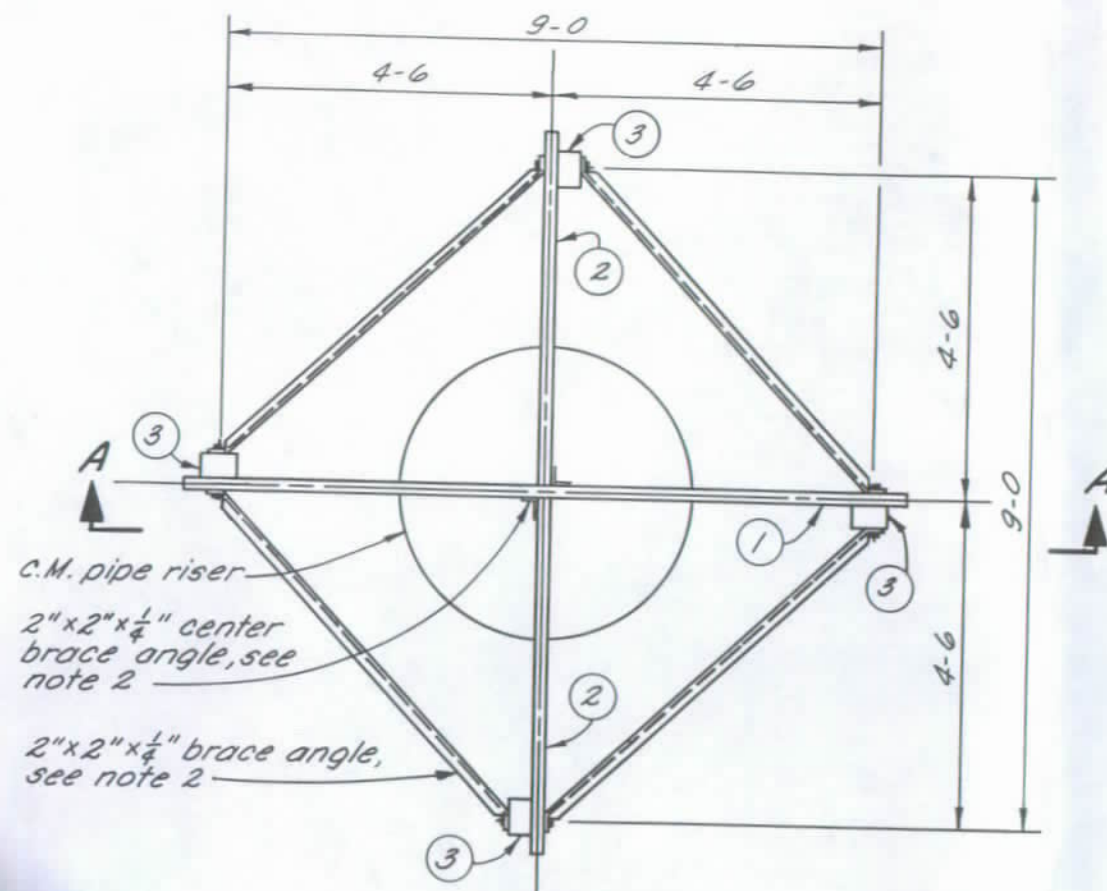
OPERATOR: Kip Krull

CONSERVATION DISTRICT: Hughes Co.

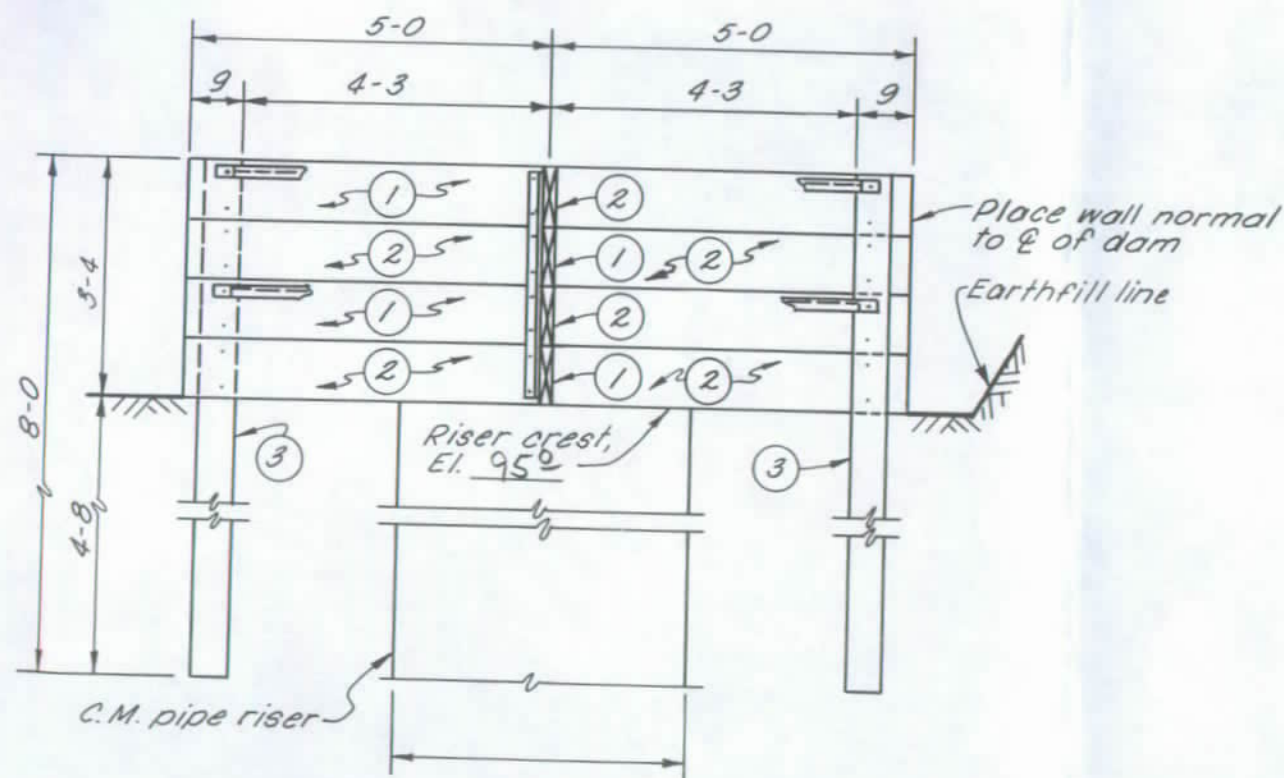
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed: K. Paulsen Date: 9-99 Approved by: _____
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of _____

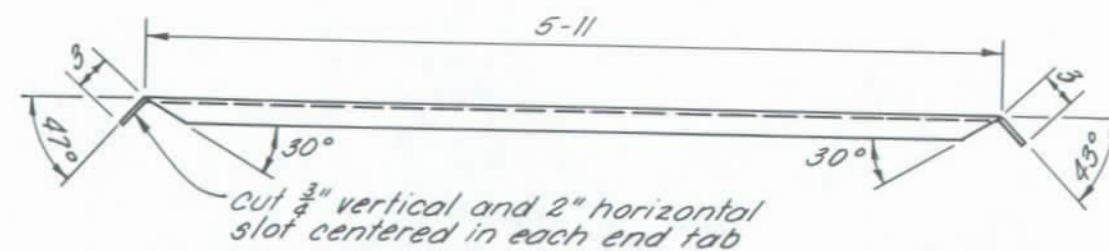
5 N-20 072 12



PLAN VIEW



SECTIONAL ELEVATION A-A



PLAN VIEW OF BRACE ANGLE

TABLE OF QUANTITIES

ITEM	MARK	NO. REQ'D.	QUANTITY
2" X 10" X 10' PRESSURE TREATED LUMBER	1	4	67 BD.FT.
2" X 10" X 4'-11" PRESSURE TREATED LUMBER	2	8	66 BD.FT.
4" X 6" X 8' PRESSURE TREATED POST	3	4	64 BD.FT.
2" X 2" X 1/4" X 6'-5" STEEL ANGLE		8	164 LB.
2" X 2" X 1/4" X 3'-2" STEEL ANGLE		2	20 LB.
5/8" X 8" STEEL BOLTS, NUTS, 2 WASHERS		32	32 SETS
1/2" X 3" STEEL BOLTS, NUTS, 2 WASHERS		32	32 SETS

NOTES:

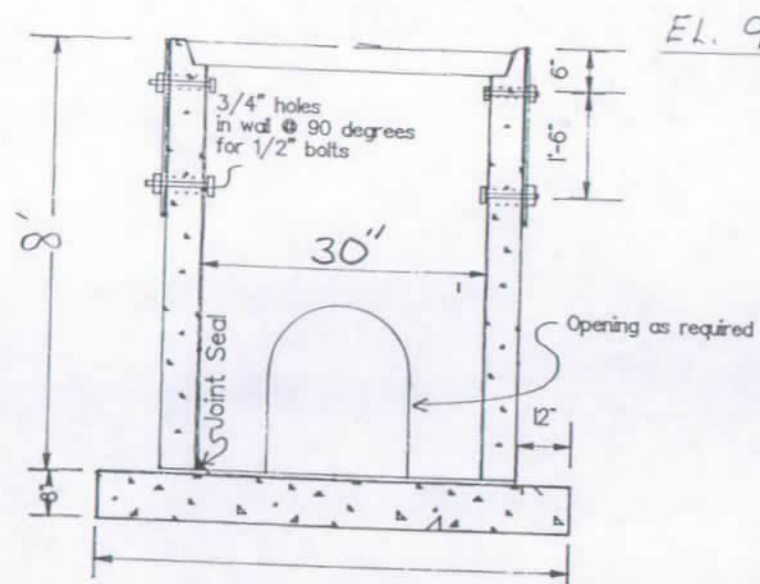
1. TO 4" X 6" POSTS (4 REQUIRED) BOLT 2" X 10" BOARDS USING TWO 5/8" X 8" BOLTS PER 2" X 10" BOARD. DO NOT PLACE BOLTS CLOSER THAN 1 1/2" FROM EDGE OF BOARD.
2. FOR CENTER BRACE ANGLES DRILL 8 - 9/16" HOLES 5/8" FROM OUTER EDGE OF EACH LEG OF EACH ANGLE AND CENTERED 5 1/4" APART ALONG THE LEG.
3. ATTACH BRACE ANGLES TO TOP BOLT ON TOP 2" X 10" BOARD AND TO TOP BOLT ON NEXT TO BOTTOM BOARD.

TRASH RACK AND BAFFLE
FOR RISER DIA. 36" THRU 60"

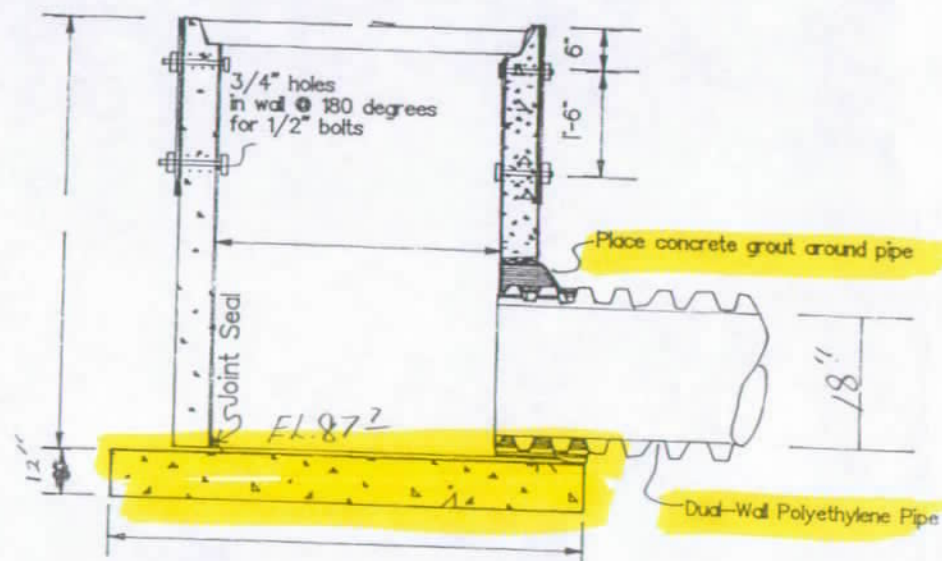
OPERATOR: Kip Krull
CONSERVATION DISTRICT: Hughes Co.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed: K. Paulsen Date: 9-99 Approved by: _____
Drawn: _____ Title: _____
Traced: _____ Title: _____
Checked: _____ Sheet No. _____ Drawing No. _____



FRONT VIEW



SIDE VIEW

CONSTRUCTION NOTES:

- 1- Reinforced concrete pipe shall meet ASTM C-478.
- 2- Polyethylene pipe shall be equal to ADS N-12 or equal.
- 3- Provide holes in concrete pipe for lifting lugs.
- 4- Alternative to concrete base is poured in place concrete base

STEEL SCHEDULE

RISER DIA. IN.	BAR SIZE	MARK	TYPE	NO. REQ'D.	LENGTH FT.-IN.	TOTAL LENGTH FT.-IN.	TOTAL WT. LB.	C IN.	L FT.-IN.
30	4	1	STR.	10	4-0	40-0	27	3	4-6

TABLE OF QUANTITIES

ITEM	UNIT	QUANTITY
CONCRETE	CU. YD.	1.2
REINFORCING STEEL	LB.	27

CONCRETE RISER