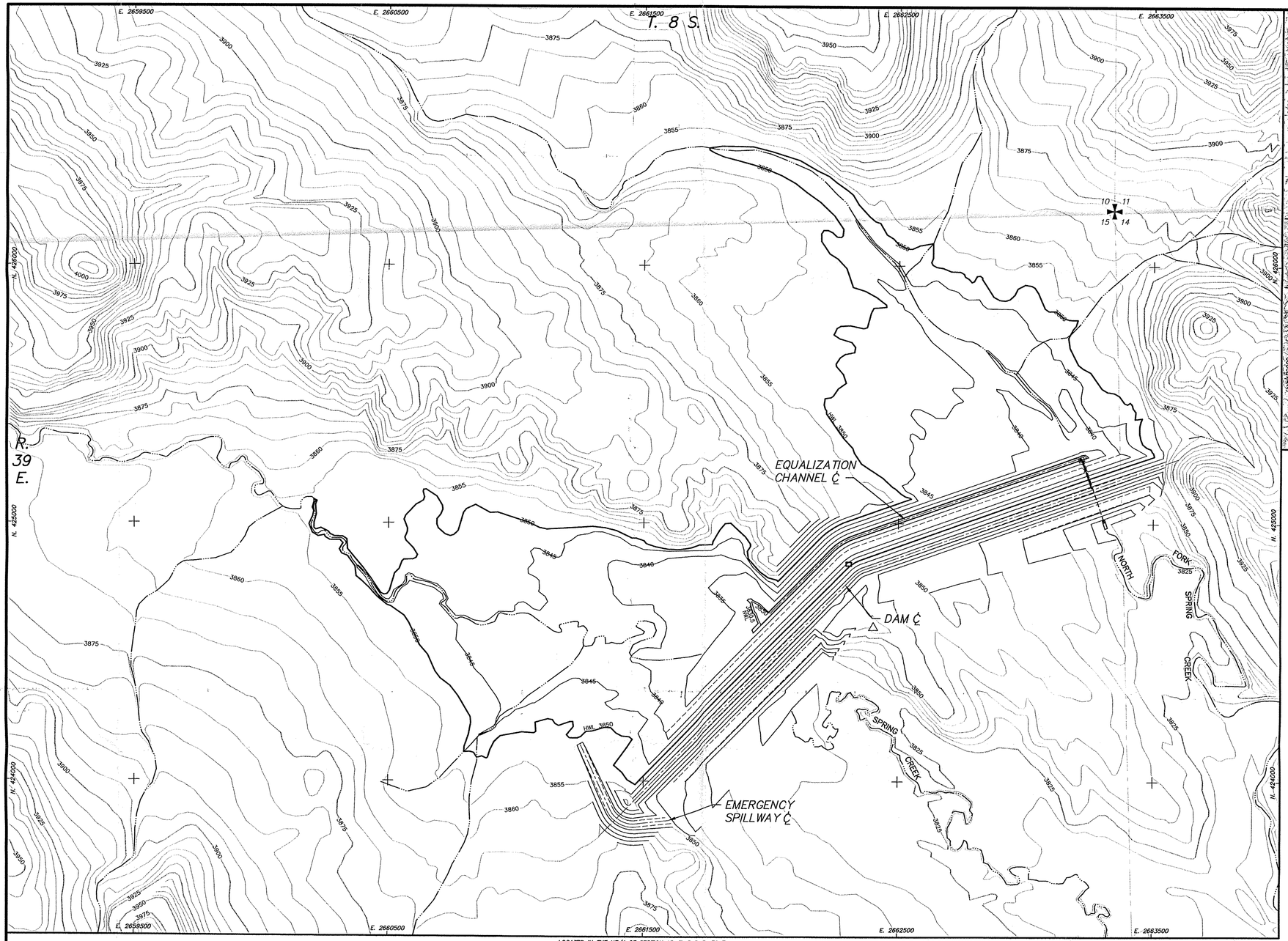
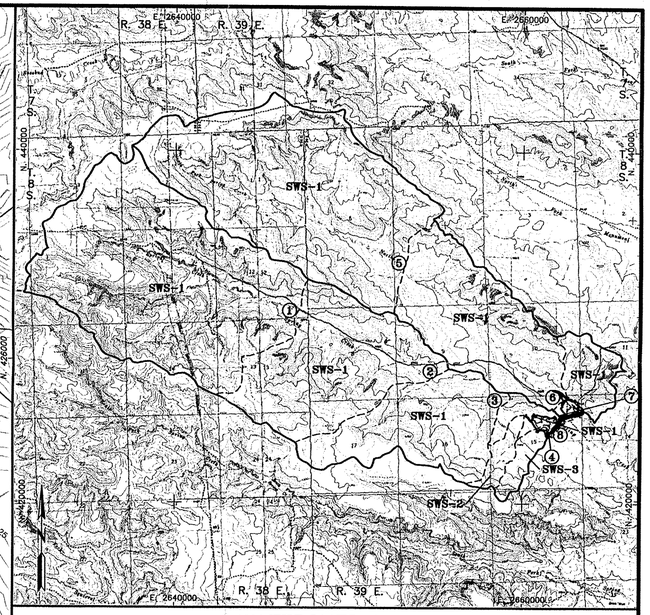


LOCATED IN THE NE/4 OF SECTION 15, T. 8 S. R. 39 E.

PLAN VIEW

SCALE: 1" = 200'
C.I. = 5'



WATERSHED MAP

SCALE: 1" = 4000'

SEDCAD 4 HYDROLOGY INPUT PARAMETERS

STRU	SWS	DA	CN	Tc	K	X	UHS
1	1	2903.58	64	2.44	0.00	0.00	M
2	1	1428.83	64	2.01	0.00	0.00	M
3	1	986.56	64	2.78	0.00	0.00	M
4	1	155.19	72	1.68	0.00	0.00	M
4	2	105.79	69	0.61	1.20	0.20	M
4	3	117.70	69	0.47	0.48	0.20	M
5	1	2651.06	64	2.34	0.00	0.00	M
6	1	1249.77	64	2.16	0.00	0.00	M
7	1	321.40	67	0.89	0.00	0.00	M
8	1	0.00	0	0.00	0.00	0.00	M

ABBREVIATION KEY

STRU = STRUCTURE
DA = DRAINAGE AREA (acres)
CN = SCS CURVE NUMBER FOR SUBWATERSHED
Tc = SUBWATERSHED TIME OF CONCENTRATION (hr)
SWS = SUBWATERSHED
K = MUSKINGUM'S K (to structure)
X = MUSKINGUM'S X (to structure)
UHS = UNIT HYDROGRAPH SHAPE

AREA CAPACITY TABLE

ELEVATION (ft)	AREA (ac)	AVG. AREA (ac)	CAPACITY (ac-ft) INCR.	CAPACITY (ac-ft) ACCUM.
3830.0	0.45			0.00
		0.52	0.26	
3830.5	0.59			0.26
		1.55	6.98	
3835.0	2.51			7.24
		6.61	33.05	
3840.0	10.70			40.29
		19.22	96.10	
3845.0	27.74			136.39
		38.11	190.55	
3850.0	48.48			326.94

RESERVOIR DESIGN INFORMATION

COMBINED DRAINAGE AREA = 15.5 mi^2
SURFACE AREA AT HWL = 48.48 ac
MAXIMUM CAPACITY = 326.94 ac-ft

CERTIFICATE OF ENGINEER

I, Thomas E. Crump, hereby certify that this drawing was prepared by me or persons under my direct supervision for whose work I stand responsible, and that it is correct to the best of my knowledge.

MONTANA
THOMAS E. CRUMP
No. 11974PE
REGISTERED
PROFESSIONAL ENGINEER-CIVIL
COPY

Spring Creek Coal Company
P.O. BOX 67
Decker, Montana 59025
Ph. (406) 757-2581

N

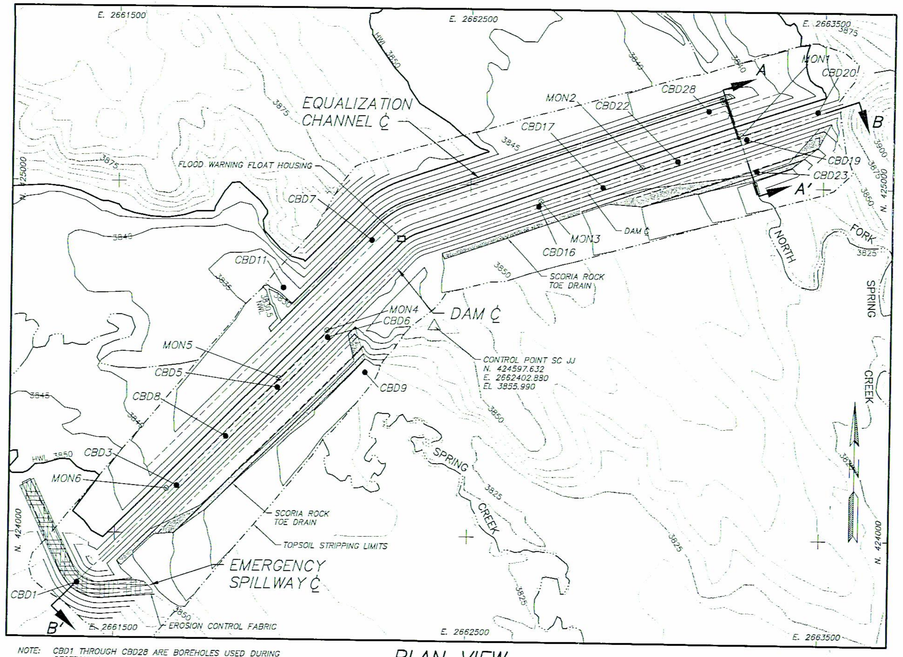
SHEET 1

DATE BY	REVISIONS

SPRING CREEK COAL COMPANY

CARBONE FLOOD CONTROL RESERVOIR
AS-BUILT DRAWINGS

DESIGN: TEC DRAWN: MBM DATE: 7-11-02
SCALE: AS SHOWN FILE NUMBER: SC_CBR01_AB

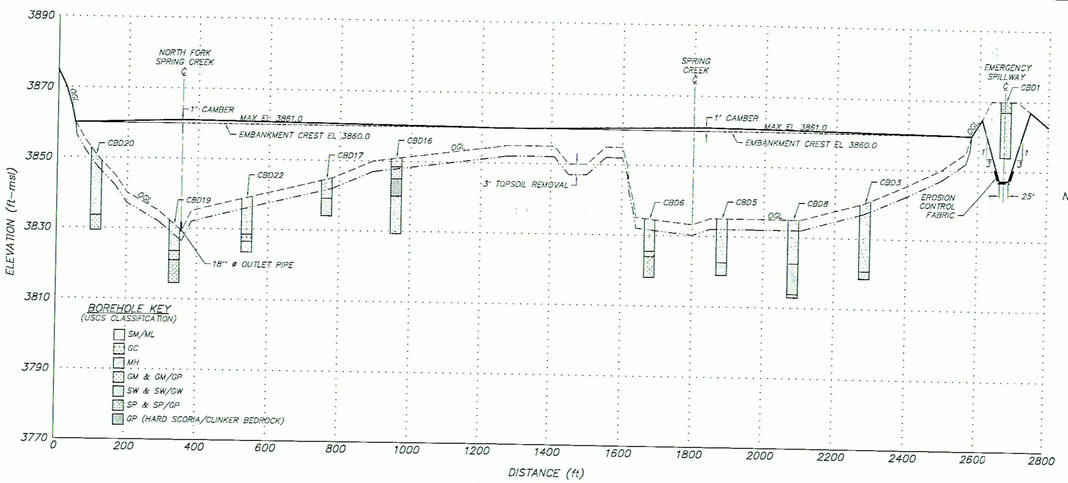


NOTE: CBD1 THROUGH CBD28 ARE BOREHOLES USED DURING GEOTECHNICAL AND BORROW INVESTIGATIONS.

NOTE: MON1 THROUGH MON6 ARE SETTLEMENT MONUMENTS.

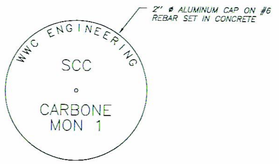
PLAN VIEW

SCALE: 1" = 200'
C.I. = 5'



PROFILE B–B'

SCALE: HORZ. 1" = 200', VERT. 1" = 20'



TYPICAL SETTLEMENT MONUMENT DETAIL PLAN VIEW

EMERGENCY SPILLWAY HYDRAULICS

CONTROL SECTION

$Q = CLH^{3/2}$

Q_{100-24} = 377.60 cfs
C = 3.22
L = 25 ft
H = 2.8 ft

TRANSPORT SECTION

$Q = \frac{1.49}{n} AR^{2/3} S^{1/2}$

Q = 377.60 cfs
n = 0.030
S = 0.0086 ft/ft
Z = 3H:1V
b = 25 ft

A = 59.92 ft
WP = 37.29 ft
R = 1.61 ft
V = 6.30 fps
Yn = 1.94 ft

NOTE: EMBANKMENT AND EMERGENCY SPILLWAY SLOPES ARE PROTECTED FROM EROSION BY PLANTING WITH GRASS MIXTURE. (SOME SEEDING MAY BE DELAYED UNTIL FALL 2002.) EROSION CONTROL FABRIC WAS INSTALLED IN THE SPILLWAY AS SHOWN.

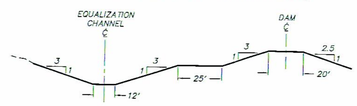
EMERGENCY SPILLWAY CROSS SECTION

NOT TO SCALE

EMERGENCY SPILLWAY PROFILE

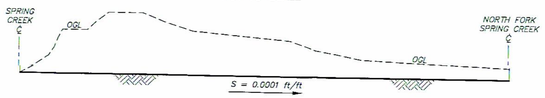
NOT TO SCALE

EQUALIZATION CHANNEL



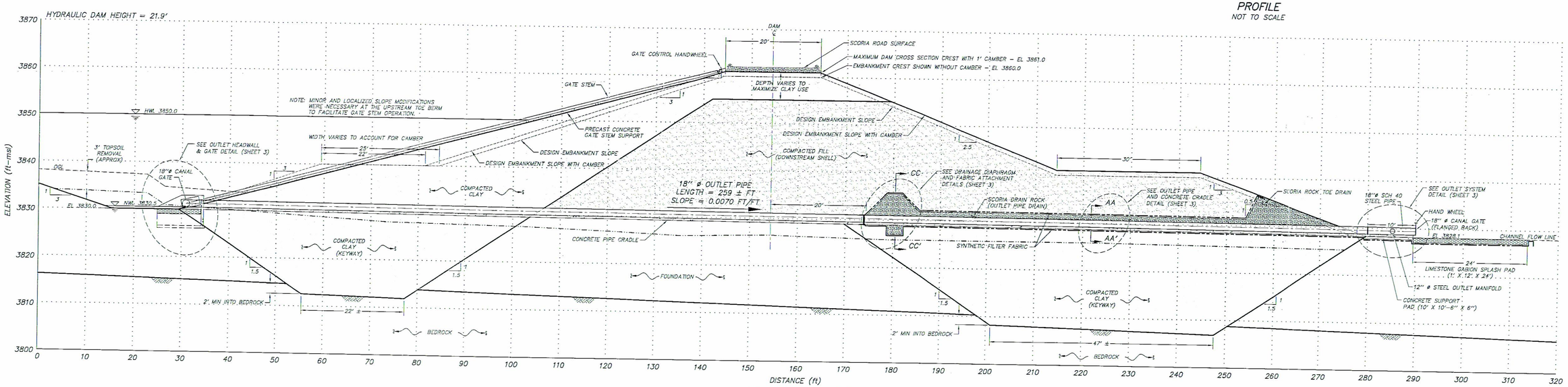
TYPICAL CROSS SECTION

NOT TO SCALE



PROFILE

NOT TO SCALE



SECTION A–A'

SCALE: 1" = 10'

CERTIFICATE OF ENGINEER

I, Thomas E. Crump, hereby certify that this drawing was prepared by me or persons under my direct supervision for whose work I stand responsible, and that it is correct to the best of my knowledge.

MONTANA · THOMAS E. CRUMP · No. 11974PE · REGISTERED PROFESSIONAL ENGINEER-CIVIL

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DATE	BY	REVISIONS

SHEET 2

SPRING CREEK COAL COMPANY

CARBONE FLOOD CONTROL RESERVOIR
AS-BUILT DRAWINGS

DESIGN: TEC DRAWN: MBM DATE: 2-28-03
SCALE: AS SHOWN FILE NUMBER: SC_CBR02_AB

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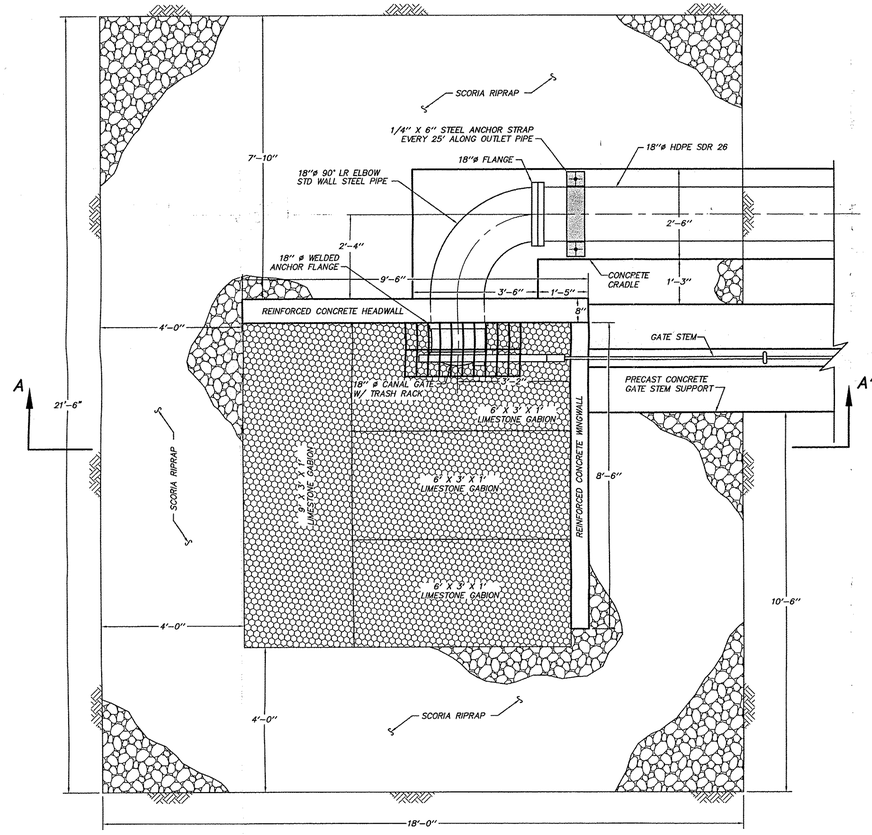
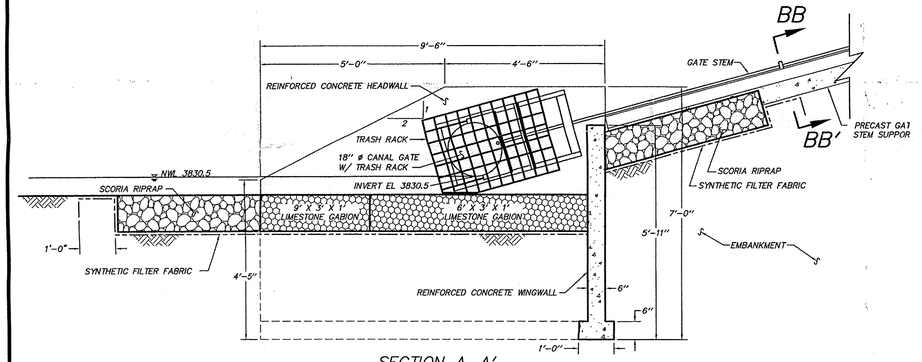


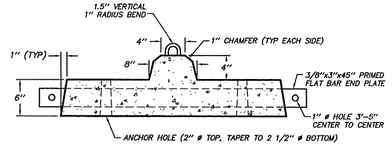
PLAN VIEW



SECTION A–A'

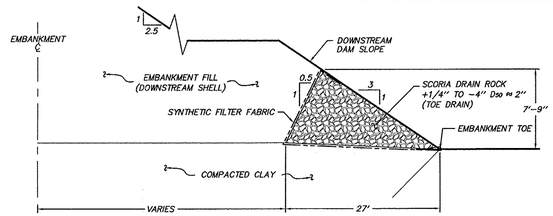
OUTLET HEADWALL AND GATE DETAILS

SCALE: 1" = 2'



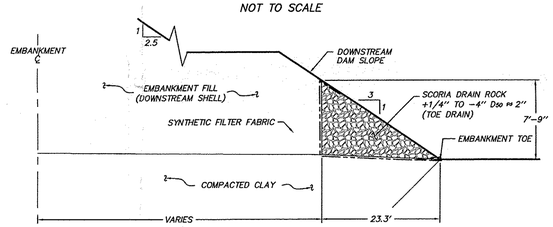
PRECAST CONCRETE GATE STEM SUPPORT TYPICAL CROSS SECTION BB–BB'

NOT TO SCALE



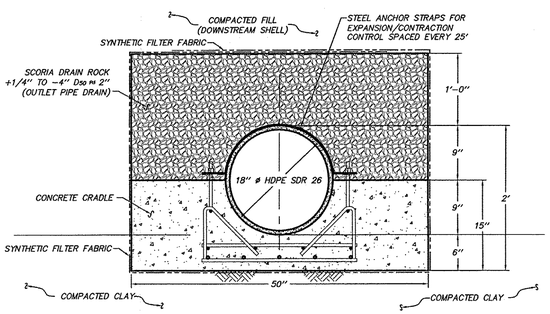
TYPICAL NORTH FORK SPRING CREEK TOE DRAIN SECTION

NOT TO SCALE



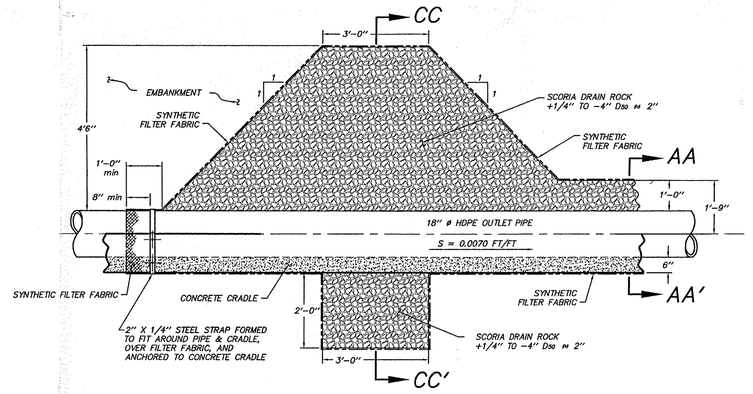
TYPICAL SPRING CREEK TOE DRAIN SECTION

NOT TO SCALE



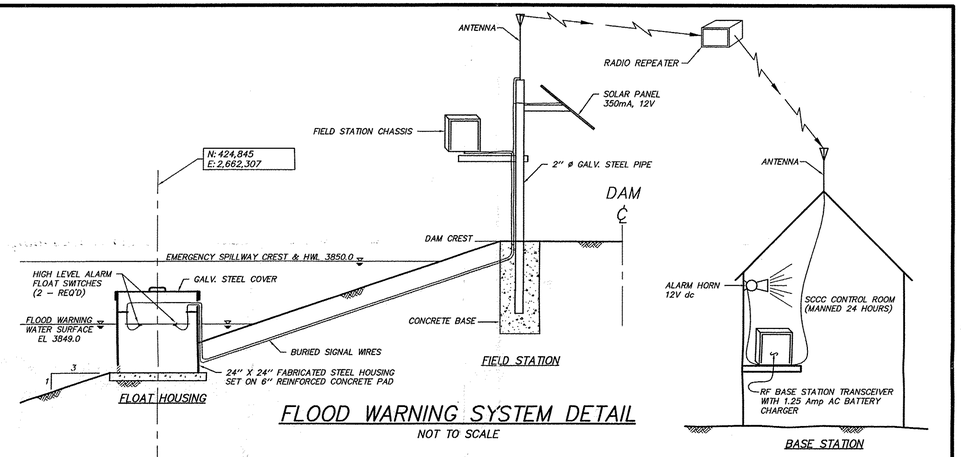
OUTLET PIPE AND CONCRETE CRADLE DETAIL TYPICAL CROSS SECTION AA–AA'

SCALE: 1" = 1'



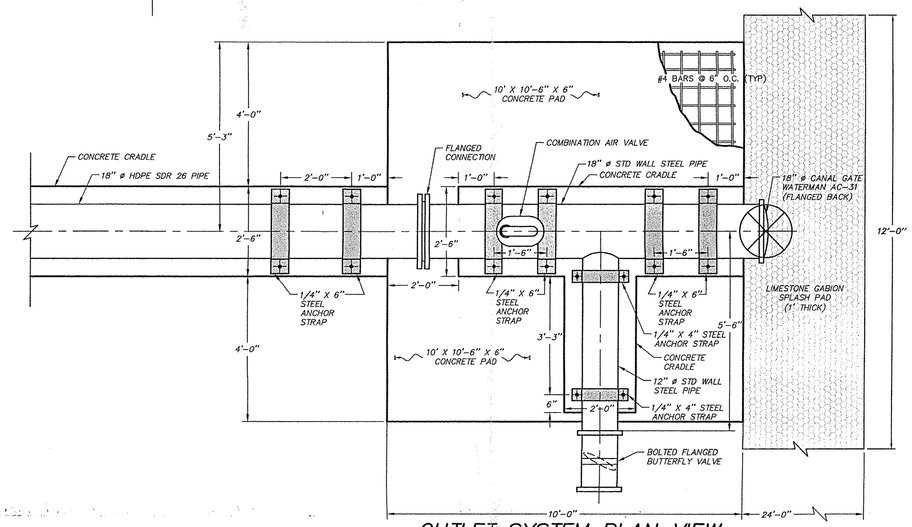
DRAINAGE DIAPHRAGM AND FABRIC ATTACHMENT DETAIL

SCALE: 1" = 2'



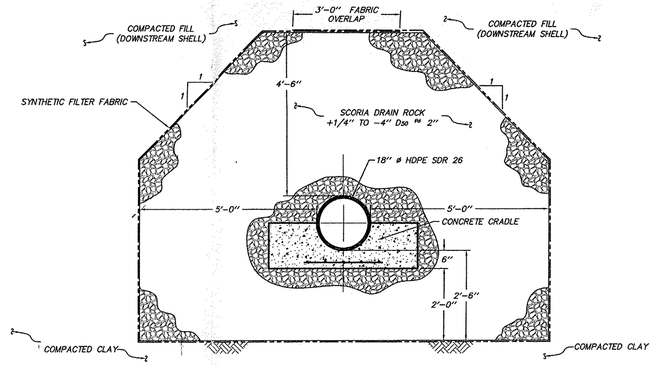
FLOOD WARNING SYSTEM DETAIL

NOT TO SCALE



OUTLET SYSTEM PLAN VIEW

SCALE: 1" = 2'



OUTLET PIPE AND DRAINAGE DIAPHRAGM DETAIL @ CROSS SECTION CC–CC'

SCALE: 1" = 2'

CERTIFICATE OF ENGINEER

I, Thomas E. Crump, hereby certify that this drawing was prepared by me or persons under my direct supervision for whose work I stand responsible, and that it is correct to the best of my knowledge.

MONTANA · THOMAS E. CRUMP No. 11974PE REGISTERED PROFESSIONAL ENGINEER

COPY

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N

DATE	BY	REVISIONS

SHEET 3

SPRING CREEK COAL COMPANY

CARBONE FLOOD CONTROL RESERVOIR
AS–BUILT DRAWINGS

DESIGN: TEC DRAWN: MBM DATE: 2–28–03

SCALE: AS SHOWN FILE NUMBER: SC_CBR03_AB

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