SIGNAL BUTTE F.R.S. Design Report Data

(Book 2)

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SIGNAL BUTTE F.R.S.
DESIGN REPORT
BOOK II

DATA

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HYDRAULICS

AZ
SMC

Signal Butte FRS

5-24-83

Covered riser hydraulics.

crest Elev.	weir Q	pipe Q	
1701	0	0	
1704	310.5	121.3	governs.
1708		138.4	
1710		145.9	
1712		153.2	
1716		166.9	
1720		179.5	
1724		191.5	

balanced full-pipe flow w/ tailwater

AZ Buckhorn-Mesa WPP – Signal Butte FRS

SML 11-7-80

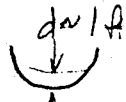
Principal spillway, est. stage/Q.

assume 36-inch R/C pipe, $n = 0.013$

$K_p = 0.00723$ outlet elev. 1687

$Q_{fp} = A\sqrt{\frac{2gH}{1+K_m+K_pL}} \sim 7.07\sqrt{\frac{64.4H}{1.5+0.00723(180)}} = 33.998\sqrt{H}$

H varies w/ tailwater, balance w/ curve



K=2.09
use S=.0003
$Q=\frac{K}{n}D^{8/3}S^{1/2}$

$33.998\sqrt{H}$

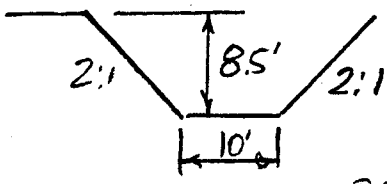
Riser cr. Elev.	h	t_w (+tc)	H	Q	Actual 5/83 Q
1604	0	—		0	
1688	+	—		2.78	not full pipe flow
1692	~~5~~	2.7	2.3	51.4	? OK est. full pipe
1696	~~9~~	3.35	5.65	80.6	
1699	~~12~~	~ 3.7	~ 8.3	~ 97.7	
1700	~~13~~	Q_1 3.8	9.2	102.8	
1701					0
1704	17	4.1	12.9	121.8	121.3 OK. use
1708	21	4.32	16.68	138.4	
1710	23	4.47	18.53	145.9	
1712	25	4.58	20.42	153.2	
1716	29	4.75	24.25	166.9	
1720	33	4.95	28.05	179.5	
1724	37	5.10	31.9	191.5	

AZ
Sam

Buckhorn Mesa WPP - Signal Butte FKS

11-4-80

calculate max. tailwater for Q's from princ. spwy.



$S = 0.0003 \quad n \sim 0.03$

Sto 01

$$Q = \frac{K D^{8/3} S^{1/2}}{n} = \frac{K D^{8/3} (.0003)^{1/2}}{.03} = K D^{8/3} (.5774)$$

assume D	D/b	K	Q
0.5	0.05	30.5	2.77
1.0	0.1	15.7	9.06
1.5	0.15	10.9	18.55
2.0	0.2	8.5	31.16
2.5	0.25	7.08	47.06
3.0	0.3	6.15	66.47
3.5	0.35	5.49	89.51
4.0	0.4	4.99	116.15
4.5	0.45	4.61	146.91
5.0	0.5	4.31	181.90
5.5	0.55	4.07	221.48
6.0	0.6	3.86	264.91
6.5	0.65	3.69	313.50
7.0	0.7	3.55	367.50
7.5	0.75	3.42	425.56
8.0	0.8	3.31	489.22
8.5	0.85	3.22	559.43

Note: sill velocy $\sim \frac{160 \text{ cfs}}{(4.68)(14.25)} = 2.4$ fps.

chan. velocity, w/o other runoff

$$\frac{160}{4.68(2 \cdot 4.68 + 10)} = 1.77 \text{ fps}$$

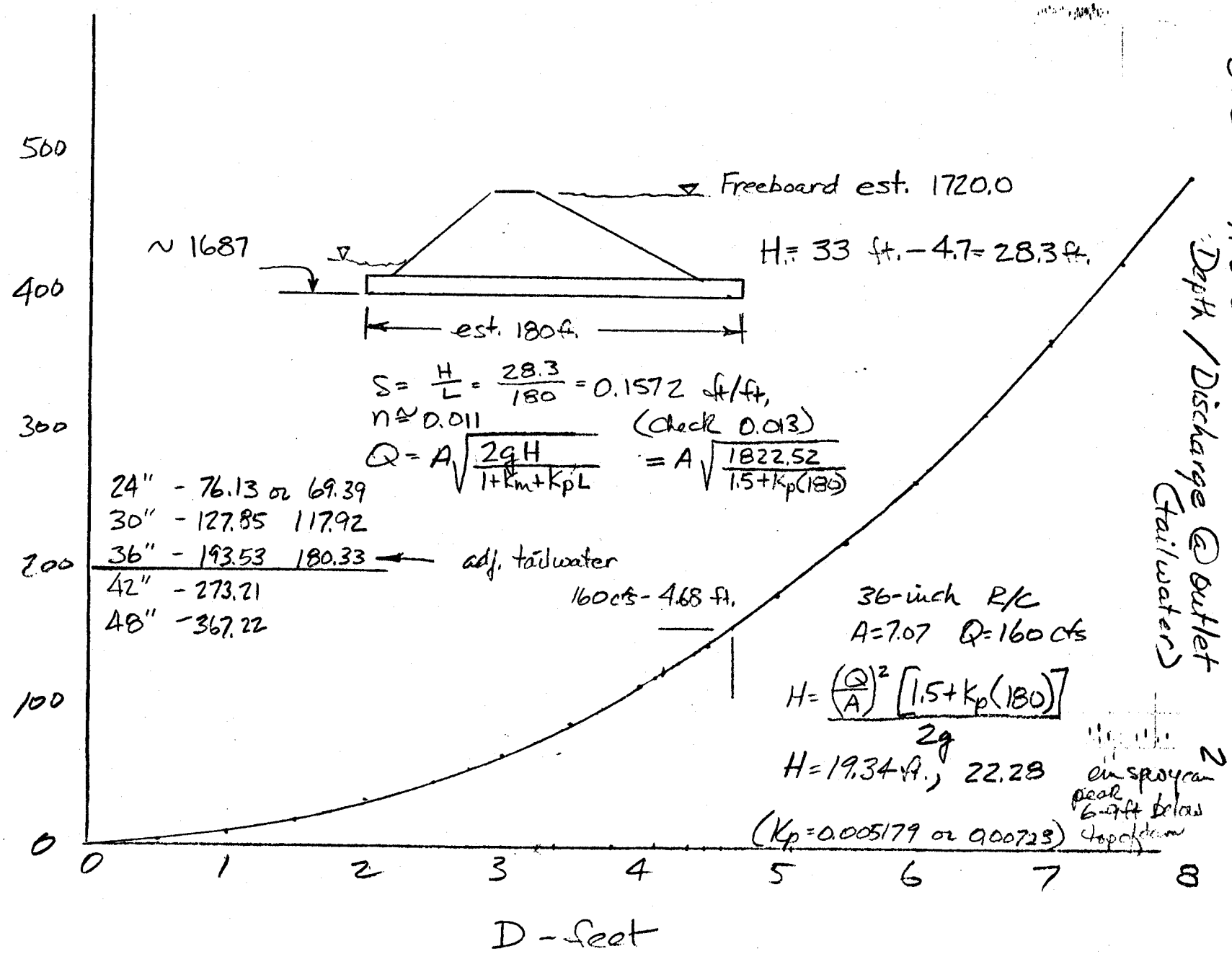
non-erosive velocities

AZ
Smc

11-6-80

Buckhorn-Mesa WPP - Signal Butte FRS

Depth / Discharge @ Outlet
(Tailwater)



$S = \frac{H}{L} = \frac{28.3}{180} = 0.1572$ ft/ft,

$n \cong 0.011$ (check 0.013)

$Q = A\sqrt{\frac{2gH}{1+K_m+K_pL}} = A\sqrt{\frac{1822.52}{1.5+K_p(180)}}$

$H = \frac{\left(\frac{Q}{A}\right)^2\left[1.5+K_p(180)\right]}{2g}$

$H = 19.34$ ft., 22.28

($K_p = 0.005179$ or 0.00723)

AZ
SMC

Buckhorn-Mesa WPP, Signal Butte FRS

11/23/81 R.A.P. 11/23/81

Width baffled outlet, Prin. Spwy / /

Small Canal Structures, Bulec. Pg. 308-322.

1717.3
-1691.7
25.6

87.0
+ 4.7
91.7

1711.5
-1690 ±
21.5

$Q = 160$ cfs
$h = 25.6$ ft. (max.) crestem. spwy, $h = 21.5$
$D = 36$ inches
$A \approx 7.07$ ft^2

$V = \sqrt{2gh} = \sqrt{(2)(32.2)(25.6)} = 40.6$ fps. (<50)

$A = \frac{Q}{V} = \frac{160}{40.6} = 3.94$ ft^2 (theoretical, □ flow)

$d = \sqrt{A} = \sqrt{3.94} = 1.985$ ft

$F = \frac{V}{\sqrt{gd}} = \frac{40.6}{\sqrt{32.2 \times 1.985}} = 5.08$

$\frac{W}{d}$ ratio ~ 7.2 (Fig. 6-10, pg. 310)

width basin $W = d \times \frac{W}{d} = 1.985(7.2) = 14.3$ ft.

Freeboard storm

check crest cm. spwy.

$V = \sqrt{(64.4)(21.5)} = 37.2$ fps $\quad A = \frac{160}{37.2} = 4.3$ ft^2

$d = \sqrt{A} = 2.07$ ft. $\quad F = \frac{37.2}{\sqrt{gd}} = 4.556$

$\frac{W}{d}$ ratio ~ 6.8 $\quad W = 2.07(6.8) = 14.08$ ft.

use 14 ft. basin width

Select pg. 320, 14'-3" wide basin, no footing & straight walls SMC

AZ Buckhorn-Mesa WPP — Signal Butte FRS

SML 6-21-83

Drawdown time, Principal Spillway. 1

$\frac{\Delta \text{storage}}{\bar{Q}(0.0826)} = \text{hr}$ (Ac ft/hr.)

TR-60 req. 80% stor. drain < 10 days.

Elev	Q	$\bar{Q}$	Stor.	Δ Stor.	hr.	Σhr
1712.4	154.5		1365			
		153.85		60	4.72	
1712.0	153.2		1305			
		149.55		259	20.97	25.69
1710.0	145.9		1046			
		142.15		229.5	19.55	45.23
1708	138.4		816.5			
		130.10		365.5	34.01	79.25
1704	121.8		451			
		60.90		191	37.97	117.22
1701.0	0		260			
						= 4.88 days

no problem

AZ
SMC

Buckhorn-Mesa WPP, Signal Butte FRS

1-26-82

Gated Outlet - ds. hydraulics

gated inlet el. 1685 (8+90)
outlet el. 1680 (10+82)

12-in. dia. steel liner, L = 192 ft.

Freeboard elev. (u/s) 1717.3 − 1680.5 = H_1 = 36.8 ft.
em. spwy. elev. 1713.73 − 1680.5 = H_2 = 33.23 ft.

$n \sim 0.012$ (prob. not this smooth, but conserv.)

5'83
use L=200
K_p OK.

$$Q = A\sqrt{\frac{2gH}{1+K_m+K_pL}} \qquad K_p = .0267 \qquad A = .785\ ft^2$$

$$Q_1 = (.785)\sqrt{\frac{(64.4)(36.8)}{2+(.0267)(192)}} = \underline{\underline{14.3\ cfs}}.$$

$$V = \frac{14.3}{.785} = 18.2\ fps$$

for Structure Table Dam 2 Sme

$.785\left[8.77(H)\right]^{1/2}$

$$Q_2 = .785\sqrt{\frac{(64.4)(33.23)}{2+(.0267)(192)}} = \underline{\underline{13.6\ cfs}}$$

$$V = 17.3\ fps.$$

Use 14 cfs for d.s. channel.
(check tailwater elevation)

natural channel approx. 10 ft. wide,
side slopes vary, but approx. 2:1
Sta 1670 el. 1676
Sta 1080 el. 1680 590 ft drops 4.0 ft.
$S \simeq 0.0068$ ft/ft.

.00708
.00910
.01033

$$K' = \frac{Qn}{b^{8/3}S^{1/2}} = \frac{(14)(.025)}{(10)^{8/3}(.0068)^{1/2}} = 0.0091 \qquad D = 0.462'$$

A = 5.05
P = 12.04

$$V = \frac{Q}{A} = \frac{14}{5.05} = 2.77\ fps \quad OK.$$

1680.46 ≃ 1680.5 assumed - OK.

ARIZONA SIGNAL BUTTE F.R.S.

R.A.P. 3/26/84

Emergency Spillway Backwater Curve 1 4

GIVEN:

Q_{FB} = 11,126 c.f.s

$n = 0.011$

bottom width = 140.0'

$z = 0.0$

$d_c = 5.81$

Assume starting station of 10+00

End of flat section = 9+91.5

End of calculation @ 9+89.5

Note:
See attached sheets for manual calculations per NEH, Section 5, pp 5.4-5)

SCS-MGT-7
REV. 1-71

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Tabular Computations

SIGNAL BUTTE F.R.S.

$d_c = 5.81$

Emergency Spillway Backwater Curve

Given: $Q_{FR} = 11,126$ c.f.s., $n = 0.011$, $2g = 64.4$

STA.	Bottom width (b)	Depth (d)	Area (a)	Velocity $V = \frac{Q}{a}$	$\frac{V^2}{2g}$	$H_e = \frac{V^2}{2g} + d$	$r = a/p$	V_m	r_m	$\frac{1}{2.2082\, r_m^{4/3}}$	$(nV_m)^2$	S_f	S_{fl}	S_{ol}	$\frac{V_2^2}{2g} + d_2 - S_{ol}$	$\frac{V_1^2}{2g} + d_1 - S_{fl}$	Remarks
10+00	140'	5.81	813.40	13.6784	2.9053	8.7153	5.3647										
								13.6550	5.3733	0.0481	0.0226	0.0011	0.0001	0.0000	8.7153	8.7153	
9+99.9	140'	5.83	816.20	13.6315	2.8854	8.7154	5.3818										
								13.6198	5.3861	0.0480	0.0224	0.0011	0.0001	0.0000	8.7154	8.7154	
9+99.8	140'	5.84	817.60	13.6081	2.8755	8.7155	5.3903										
								13.6023	5.3925	0.0479	0.0224	0.0011	0.0001	0.0000	8.7155	8.7155	
9+99.7	140'	5.845	818.30	13.5965	2.8706	8.7156	5.3946										
								13.5907	5.3967	0.0478	0.0223	0.0011	0.0001	0.0000	8.7156	8.7156	
9+99.6	140'	5.85	819.00	13.5849	2.8657	8.7157	5.3988										
								13.5791	5.4010	0.0478	0.0223	0.0011	0.0001	0.0000	8.7157	8.7157	
9+99.5	140'	5.855	819.70	13.5733	2.8608	8.7158	5.4031										
								13.5675	5.4052	0.0477	0.0223	0.0011	0.0001	0.0000	8.7158	8.7158	
9+99.4	140'	5.86	820.40	13.5617	2.8559	8.7159	5.4073										
								13.5559	5.4095	0.0477	0.0222	0.0011	0.0001	0.0000	8.7159	8.7159	
9+99.3	140'	5.865	821.10	13.5501	2.8510	8.7160	5.4116										
								13.5444	5.4137	0.0476	0.0222	0.0011	0.0002	0.0000	8.7160	8.7160	
9+99.1	140'	5.87	821.80	13.5386	2.8462	8.7162	5.4158										
								13.5271	5.4201	0.0476	0.0221	0.0011	0.0003	0.0000	8.7162	8.7162	
9+98.8	140'	5.88	823.20	13.5155	2.8365	8.7165	5.4244										
								13.5041	5.4287	0.0475	0.0221	0.0010	0.0004	0.0000	8.7165	8.7165	
9+98.4	140'	5.89	824.60	13.4926	2.8269	8.7169	5.4329										
								13.4812	5.4372	0.0474	0.0220	0.0010	0.0004	0.0000	8.7169	8.7169	
9+98.0	140'	5.90	826.00	13.4697	2.8173	8.7173	5.4414										
								13.4583	5.4457	0.0473	0.0219	0.0010	0.0005	0.0000	8.7173	8.7173	
9+97.5	140'	5.91	827.40	13.4469	2.8078	8.7178	5.4499										
								13.4356	5.4542	0.0472	0.0218	0.0010	0.0005	0.0000	8.7178	8.7178	
9+97.0	140'	5.92	828.80	13.4242	2.7983	8.7183	5.4584										
								13.4039	5.4661	0.0470	0.0217	0.0010	0.0010	0.0000	8.7183	8.7183	
9+96.0	140'	5.938	831.32	13.3835	2.7813	8.7193	5.4737										
								13.3667	5.4801	0.0469	0.0216	0.0010	0.0010	0.0000	8.7193	8.7193	
9+95.0	140'	5.953	833.42	13.3498	2.7673	8.7203	5.4864										

Sheet 2 of 4

SCS-MGT
REV. 1-7

U. S. [redacted]MENT OF AGRICULTURE
[redacted]NSERVATION SERVICE

Tabular Computatio

SIGNAL BUTTE F.R.S.

$d_c = 5.81$

Emergency Spillway Backwater Curve

Given: $Q_{EB} = 16,126$ c.f.s., $n = 0.011$, $2g = 64.4$

1 STA.	2 Bottom width (b)	3 Depth (d)	4 Area (a)	5 Velocity $V = \frac{Q}{a}$	6 $(\alpha)\frac{V^2}{2g}$	7 $H_e = \frac{V^2}{2g} + d$	8 $r = a/p$	9 V_m	10 r_m	11 $\frac{1}{2.2082\, r_m^{4/3}}$	12 $(nV_m)^2$	13 S_f (13)/(11)	14 $S_f l$	15 $S_o l$	16 $\frac{V_2^2}{2g} + d_2 - S_o l$ (7) - (15)	17 $\frac{V_1^2}{2g} + d - S_f l$ (7) - (14)	18 Remark
9+95.0	140'	5.953	833.42	13.3498	2.7673	8.7203	5.4864										
								13.3559	5.4920	0.0467	0.0216	0.0010	0.0010	0.0000	8.7203	8.7203	
9+94.0	140'	5.966	835.24	13.3207	2.7553	8.7213	5.4975										
								13.3074	5.5026	0.0466	0.0214	0.0010	0.0010	0.0000	8.7213	8.7213	
9+93.0	140'	5.978	836.92	13.2940	2.7443	8.7223	5.5076										end of
								13.2741	5.5204	0.0464	0.0213	0.0010	0.0015	0.0000	8.7223	8.7223	Flat Crest
9+91.5	140'	5.996	839.44	13.2511	2.7278	8.7238	5.5229										
								12.2617	5.9648	0.0419	0.0182	0.0008	0.0002	-0.3	9.0238	9.0238	
9+91.2	140'	7.052	987.28	11.2693	1.9720	9.0240	6.4066										
								10.8308	6.6504	0.0362	0.0142	0.0005	0.0002	-0.3	9.3240	9.3240	
9+90.9	140'	7.6472	1070.608	10.3922	1.6770	9.3242	6.8941										
								10.0737	7.0957	0.0332	0.0123	0.0004	0.0001	-0.3	9.6242	9.6242	
9+90.6	140'	8.1466	1140.524	9.7552	1.4777	9.6243	7.2973										
								9.4993	7.4773	0.0310	0.0109	0.0003	0.0001	-0.3	9.9243	9.9243	
9+90.3	140'	8.5977	1203.678	9.2433	1.3267	9.9244	7.6572										
								9.0276	7.8233	0.0292	0.0099	0.0003	0.0001	-0.3	10.2244	10.2245	
9+90.0	140'	9.0188	1262.632	8.8118	1.2057	10.2245	7.9894										
								8.5120	8.2457	0.0272	0.0088	0.0002	0.0001	-0.5	10.725	10.725	end conc
9+89.5	140'	9.6774	1354.836	8.2121	1.0472	10.7246	8.5020				Δn	n=0.020	S= -.014	144.			
				162				7.5404	8.4413	0.02635	0.02274	0.86310	0.17264	-0.002	10.556	10.552	17
9+89.3	140.4	9.82	1619.809	6.8287	0.7326	10.554	8.38053										17202
		section enlarges rapidly to full reservoir.										entrance		$\frac{V^2}{2g} =$	$\frac{(6.87)^2}{64.4}$		0.7
																	1720.9
														same elev. computer,			
															DAMS 2		
																	SL

Sheet 3 of 4

GPO : 1971 O - 418

energy dissipator at the end of a canal or wasteway that discharges into a reservoir. The length of the baffled apron does not affect the efficacy of the structure. It is effective in dissipating excess energy for drops of any magnitude (see fig. 6-1), but it becomes uneconomical for large flows with great drops, due to the wide section and numerous blocks required. Where an excess of trash, trees, or tumbleweeds accompanies the flow, they may become lodged in the baffle blocks, restricting the flow. Removal of this material is sometimes difficult.

(b) *Inlet Control Features.*—Various types of inlet control features are utilized to maintain an upstream water surface as required for turnouts; or to provide a velocity of approach consistent with the scouring tolerance of the upstream section; or to avoid the excessive splashing that would result from supercritical flow at the inlet. The more common types of inlet control features are as follows:

(1) *Sill control.*—A sill may be provided at the inlet, as shown in figure 6-2A, to reduce the velocity of approach, and minimize scour in the upstream section. The sill also provides a controlled water surface for upstream turnouts. To permit complete drainage of the upstream pool, a slot is provided through the crest, as shown in figure 6-5. The inlet should be kept free of sediment deposits, as the extensive accumulation of sediment would allow the flow to sweep over the sill at a velocity too fast for effective dissipation of energy.

(2) *Control notch.*—A control notch may be provided at the inlet, as shown in figures 6-2B and 6-3, to control the upstream water depth. While the control notch is designed to maintain normal depth and velocity in the upstream section, it produces a fast velocity in the inlet itself, causing splashing as the fast velocity flow strikes the first row of baffle blocks. Excessive splashing may require frequent maintenance of the erosion protection. The control notch should be kept free of trash.

(3) *Inlet without control.*—The simplest type of inlet (shown in fig. 6-2C) is used where there is not a requirement to control the upstream water surface for turnout deliveries, and where the upstream channel is sufficiently stable to withstand (without erosion) the higher velocities associated with water surface drawdown. To minimize splashing as the flow strikes the first row of baffle blocks, an invert curve may be provided to allow the flow to strike the blocks in a direction normal to their upstream face. Where flows are infrequent, and some splashing is permissible, the curve is sometimes omitted, as shown in figure 6-2B.

(c) *Miscellaneous Features.*—

(1) *Bridge deck.*—Where a crossing is required, a bridge deck may be incorporated in the inlet design.

(2) *Cutoff walls and wingwalls.*—In addition to the inlet cutoff walls, wingwalls are provided at, or near the downstream end of the structure, to decrease percolation and to retain the backfill along the slope. Where the downstream channel is subject to degradation, a cutoff wall is extended down

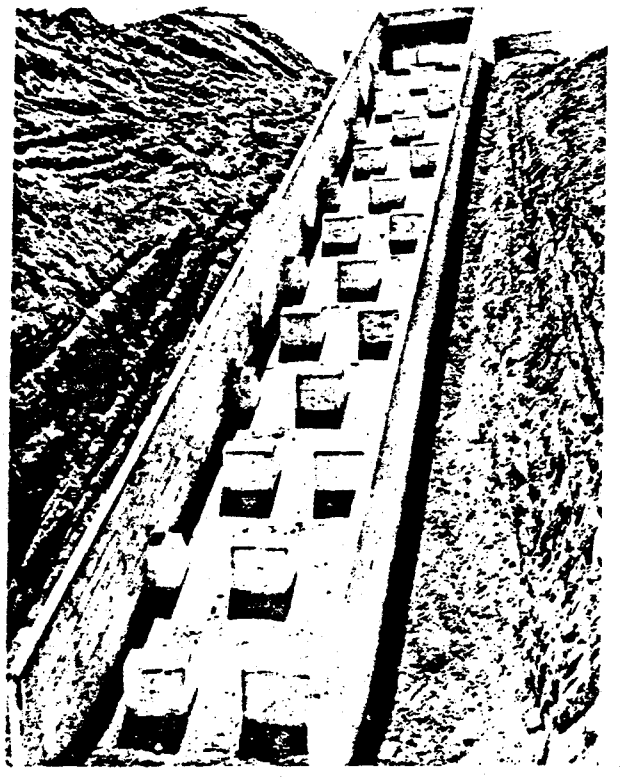


Figure 6-1. **Baffled apron drop before backfilling.**
P-328-701-9501

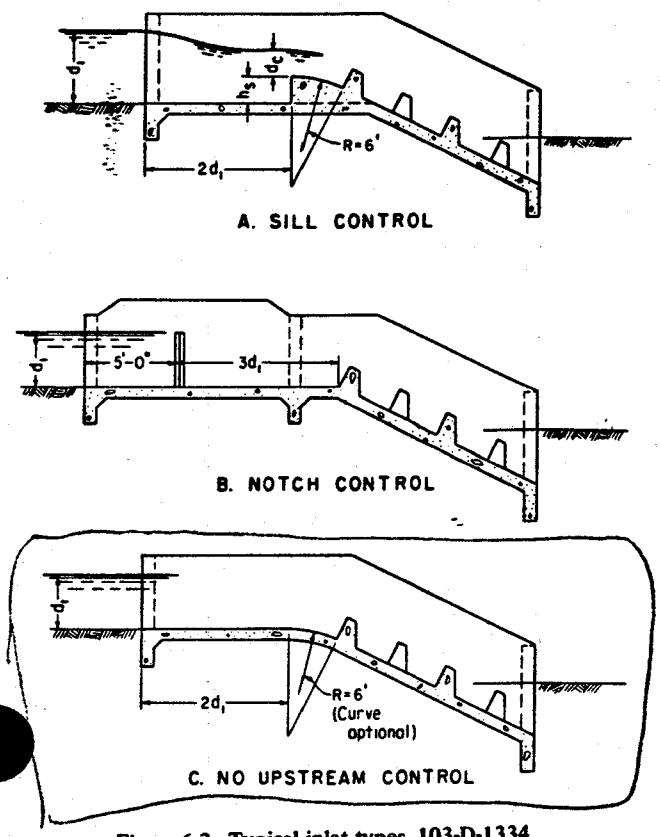


Figure 6-2. Typical inlet types. 103-D-1334

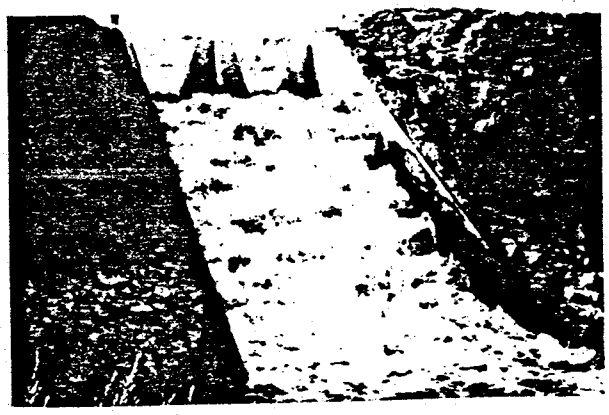


Figure 6-3. Baffled apron drop with inlet control notches. PX-D-72607

from the invert, as shown in figure 6-5. The wingwalls may be located at the end of the structure to coincide with the cutoff, but they are often located a few feet upstream from the end as shown in figure 6-4. This provides a better stilling action at the outlet, and raises the top elevation of the wingwall,

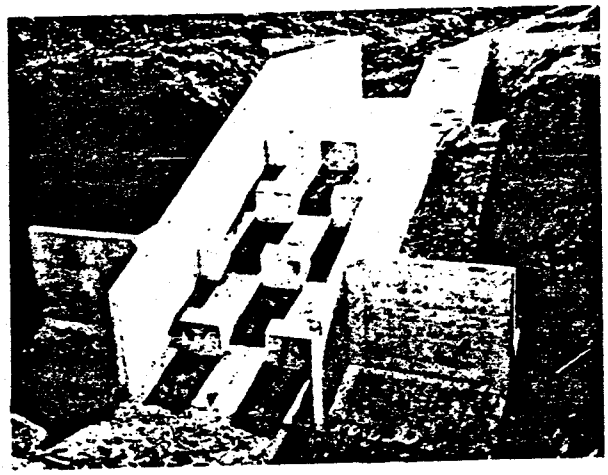


Figure 6-4. Baffled apron drop with wingwalls located upstream from the outlet end. P-492-701-1102A

which should be located above the tailwater elevation to minimize erosion.

(3) *Protective drains.*—Protective drains are sometimes provided under the invert of the baffled apron drop to relieve the uplift pressure following the termination of flow.

6-3. ***Design Considerations.***—(a) *General.*—For consideration of the baffled apron drop to provide dissipation of the excess energy at a wasteway turnout, see subsection 4-2(b) Wasteway Outlets. For the application of baffled apron drops to cross-drainage structures, see subchapter IV C.

(b) *Capacity.*—The capacity of the baffled apron drop is a function of the allowable discharge, q, per foot of width, as shown in table 6-1. They have been operated for short periods at about twice the design capacity without excessive erosion.

Table 6-1.—*Recommended discharge*

Q capacity, cfs	q *Discharge per foot of chute width, cfs
0 to 39	5 to 10
40 to 99	10 to 15
100 to 189	15 to 20
190 to 460	20 to 30

*Discharge per foot of width, q should be interpolated within the range indicated.

(c) *Inlet.*—The inlet should be the same width as the baffled apron, and should provide

AZ Signal Butte FRS - Buckhorn-Mesa

SL 3-16-84

D.S. Emr. Spwy - hydraulics - block location

$(1698-1695.5) \div 455 = 0.0055$ ft/ft. S

455' long channel to + natural chan.

1695.5' outlet invert @ natural channel

d.s. channel slope - approx.
S = .0085 (quad.)

$V = \frac{1.486}{n} r^{2/3} s^{1/2}$ assume depth of 6 ft, width of 40 ft, SS 2:1, n ~ 0.05, Cr = .778 Kings H.

$V = \frac{1.486}{.05}(.778 \cdot 6)^{2/3}(.0085)^{1/2}$

$V_1 = 7.65$ fps.

if n = .03, $V_2 = 12.76$ fps.

@ V_1 $Q = 312\ ft^2 (7.65\ fps) = 2,386.8$ cfs

@ V_2 $Q = (312)(12.76) = 3,981.12$ cfs.
close to max. prob. within channel flow

depth 10', width 40 ft 2:1 SS A = 600 ft² Cr = .708

$V = \left(\frac{1.486}{.03}\right)(.708 \cdot 10)^{2/3}(.0085)^{1/2} = 16.84$ fps.

$Q = (600)(16.84) = 10,104$ cfs. ball park

assume 10 depth flow natural chan.

Check D uniform flow in 140' chan, 2:1 SS 10' dep
n = 0.02 @ S = .0055 ft/ft Cr = .868

$V = \frac{1.486}{0.02}(.868 \cdot 10)^{2/3}(.0055)^{1/2} = 23.3$ fps

$Q = (1600)(23.3) = 37,280$ cfs. > 11,000 !

Check - check not std. location OK.

AZ Signal Butte FRS Buckhorn-Mesa
SL 3-16-84

D.S. Em. Spwy. hydraulics vs. block location: 2

$Q = 11,126.5$ $A \sim 1600\ ft^2$

$V = Q \div A = 6.95$ fps

caliche very competent @ this velocity.

0183 + 5
0231

$$\text{eff. } S = \left(\frac{Qn}{K' b^{8/3}}\right)^2$$

01033
01410

$$= \left(\frac{(11,126.5)(0.02)}{(.0188)(140)^{8/3}}\right)^2 = 0.0005 \text{ ft/ft.}$$

effective slope

$.0005(455') + 1695.5 = 1695.7$ ft.

no scour

check @ 8' depth $A = 1248\ ft^2$

$V = \frac{11,126.5}{1248} = 8.915$ fps. OK, < 10 ± (freeboard storm)

$$\text{eff } S = \left(\frac{(11,126.5)(.02)}{(140)^{8/3}(.01297)}\right)^2$$

eff $S = 0.00105$

$(0.00105)(455) + 1695.5 = 1695.98$

Only get Q d.s. in 100-yr + storm.

$q = 79.47$ cfs/ft. $T = 1$ $d_c = a_c$ $g = 32.2$

$$d_c^3 = \frac{q^2}{g} = \frac{(79.47)^2}{32.2} = 196.158$$

$d_c = 5.81$ ft. $V_c = \frac{q}{d_c} = \frac{79.47}{5.81} = 13.68$ fps.

aver. velocity in emergency spillway (apron) 13-15 fps.

HYDROLOGY

```
DAMS2 XEQ 5/31/83          STRUCTURE SITE ANALYSIS COMPUTER PROGRAM
      RE 03/82  SCS TECHNICAL RELEASE 48, DATED OCT.1982 (US ANUAL)

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

DAMS2      12/03/82  SIGNAL BUTTE FRS W/PM DIVERSION                          1
COMMENT    THIS IS THE FINAL DESIGN HYDROLOGY FOR SIGNAL BUTTE FRS
COMMENT    WHICH INCLUDES APACHE JUNCTION FRS, BULLDOG DIVERSION, AND        3
COMMENT    PASS MOUNTAIN DIVERSION WITH OUTLET CHANNEL.                      4
COMMENT    THE HYDROGRAPHS FROM THE DIVERSIONS INCLUDE FREEBOARD             5
COMMENT    DISCHARGE QUANTITIES.  SEDIMENT FROM PASS MOUNTAIN WILL           6
COMMENT    INCLUDE MOST FINE-GRAINED SEDIMENT, BUT NO COARSE-GRAINED         7
COMMENT    SEDIMENT.  THIS IS IN ADDITION TO THE WORK PLAN SEDIMENT          8
COMMENT    STORAGE REQUIREMENT.                                              9
COMMENT    THE 100-YR STORM SET THE EMERGENCY SPILLWAY CREST AT 1712.4.     10
CLPROFILE                     OLD CL DAM TO MERIDIAN RD THEN NORTH          12
           19076     1722.36   19108     1721.01   19208     1711.3         13
           19308     1717.6    19408     1719.08   19540     1717.9         14
           19570     1717.6    19650     1717.5    19700     1715.06        15
           19725     1716.7    19800     1715.94   20600     1704.05        16
           20650     1703.6    20700     1704.97   20750     1703.8         17
           20800     1704.09   20850     1702.4    21000     1701.25        18
           21070     1700.2    21070     1694.2    21100     1691.88        19
           21146.79  1693.95   21250     1694.1    21270     1691.1         20
           21300     1692.59   21320     1693.8    21350     1699.1         21
           21400     1698.72   21700     1694.85   21750     1695.8         22
           21875     1695.0    21925     1688.8    22000     1693.14        23
           22650     1693.8    22700     1692.42   22750     1691.4         24
           22760     1690.5    22772     1682.8    22795     1682.9         25
           22900     1686.7    22930     1691.0    22950     1691.2         26
           23000     1692.06   23050     1690.8    23070     1692.2         27
           23100     1691.3    23135     1688.6    23150     1689.5         28
           23170     1691.7    23190     1692.2    23200     1690.21        29
           23210     1687.9    23240     1687.9    23250     1686.3         30
           23255     1685.9    23400     1692.99   23550     1690.5         31
           23600     1691.7    23700     1690.4    23750     1691.7         32
           23800     1692.22   23900     1687.76   23910     1687.5         33
           23925     1684.1    23940     1686.3    23950     1686.5         34
           23980     1687.7    23995     1685.0    24000     1686.23        35
           24025     1689.3    24150     1687.5    24165     1685.8         36
           24175     1687.2    24200     1688.53   24232.27  1688.99        37
           24267     1686.79   24300     1689.44   24350     1688.9         38
           24390     1687.7    24400     1686.3    24700     1694.01        39
           24800     1693.69   25000     1698.36   25050     1695.8         40
           25100     1697.1    25150     1695.9    25200     1695.04        41
           25350     1700.6    25400     1703.16   26500     1720.00        43
           26550     1719.8    26600     1720.5    26650     1721.7         44
           26700     1722.4    26750     1723.3    26800     1723.5         45
ENDTABLE                                                                     46
STRUCTURE SBFRS      SIGNAL BUTTE FRS BUCKHORN-MESA WPP                      47
                     1684      0.09      0.0       0.0       0.022          48
                     1688      1.36      6.4       0.0       2.94           49
                     1692      5.58      7.9       0.0       16.82          50
                     1696      20.96     9.2       0.0       69.9           51
```

EM. SPWY. WIDTHS
140-160-170-180-185
& run for
130-133-135-148-145
& run for
90-110-120-125-150

(1)

```
********************** 80-CO LIST OF INPUT DATA ******************
                     1701      54.5      10.5      0.0       265.        52
                     1704      75.2      121.3     0.0       450.86      53
                     1708      107.6     138.4     0.0       816.46      54
                     1710      122.1     145.9     0.0       1046.16     55
                     1712      136.7     153.2     0.0       1304.94     56
                     1716      165.4     166.7     0.0       1909.1      57
                     1720      192.5     179.5     0.0       2624.9      58
                     1724      223.6     191.5     0.0       3457.1      59
ENDTABLE                                                                 59
POOLDATA  ELEV       1684.     1684.     1700.75                         61
ESCREST   ELEV       1712.4                                              61
BTMWIDTH  FEET       140.      160.      170.      180.      185.        70
ESDATA    45         10        0.011     0         0.011     0.5         63
ESRATING  45         1.0       FUJIMOTO ENTRANCE BAFFLED APRON DROP      X
ESRATING  2.34       6.62      14.11     22.24     34.44     45.21       X
ESRATING  57.04      71.96     85.86     100.56    116.02    132.19      X
HYD       EMSPY                TR20 HYDROGRAPH, EM. SPY. STORM (24 HR)   X
                     0.2
                     .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .25
                     4.54      18.64     45.98     88.62     144.69
                     212.22    304.06    435.98    587.09    769.08
                     960.55    1193.74   1478.19   1774.43   2150.09
                     2534.55   2972.28   3458.60   3919.47   4437.61
                     4915.95   5227.07   5377.27   5460.15   5476.27
                     5484.01   5395.20   5219.64   5062.48   4905.15
                     4788.57   4613.63   4383.13   4168.01   3873.13
                     3613.69   3350.73   3089.10   2882.43   2681.68
                     2524.54   2359.31   2185.07   2045.34   1920.52
                     1828.18   1730.76   1626.62   1539.77   1448.10
                     1374.23   1312.47   1260.31   1216.40   1152.37
                     1093.71   1027.24   955.71    909.02    917.42
                     944.03    941.57    908.55    879.18    878.11
                     888.22    846.35    757.69    686.04    676.69
                     694.24    712.52    723.97    722.41    683.17
                     638.73    618.71    623.05    636.94    665.98
                     693.18    686.41    649.93    618.61    616.71
                     626.46    610.09    568.52    541.98    581.11
                     636.84    640.76    595.28    558.87    590.80
                     640.85    589.76    446.57    315.50    228.10
                     178.84    151.93    136.66    127.74    122.47
                     119.38    117.57    116.50    115.87    115.50
                     115.09    114.35    113.91    113.74    113.62
                     113.52    113.42    113.32    113.22    113.12
                     113.02    112.92    112.82    112.72    112.62
                     112.52    112.42    112.32    112.22    112.12
```

2

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

```
                    112.02    111.93    111.83    111.73    111.63
                    111.53    111.43    111.33    111.24    111.14
                    111.04    110.94    110.84    110.75    110.65
                    110.55    110.45    110.35    110.26    110.16
                    110.06    109.96    109.87    109.77    109.67
                    109.58    109.48    109.38    109.29    109.19
                    109.09    109.00    108.90    108.80    108.71
                    108.61    108.52    108.42    108.33    108.23
                    108.13    108.04    107.94    107.85    107.75
                    107.66    107.56    107.47    107.37    107.28
                    107.18    107.09    106.99    106.90    106.80
                    106.71    106.62    106.52    106.43    106.33
                    106.24    106.15    106.05    105.96    105.86
                    105.77    105.68    105.58    105.49    105.40
                    105.31    105.21    105.12    105.03    104.93
                    104.84    104.75    104.66    104.56    104.47
                    104.38    104.29    104.19    104.10    104.01
                    103.92    103.83    103.73    103.64    103.55
                    103.46    103.37    103.28    103.19    103.10
                    103.00    102.91    102.82    102.73    102.64
                    102.55    102.45    102.34    102.21    102.08
                    101.95    101.82    101.69    101.56    101.43
                    101.30    101.17    101.04    100.92    100.79
                    100.66    100.53    100.40    100.27    100.14
                    100.02    99.89     99.76     99.63     99.50
                    99.38     99.25     99.12     99.00     98.87
                    98.74     98.62     98.49     98.37     98.24
                    98.11     97.99     97.86     97.74     97.61
                    97.49     97.36     97.24     97.11     96.99
ENDTABLE                                                                F1
GOHYD     L                                                              X
HYD       FRBD              TR20 HYDROGRAPH,FREEBOARD STORM 24 HR
                    0.2
                    .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00
                    .09       1.86      11.03     31.51     73.21
                    141.36    229.17    329.87    440.68    600.22
                    789.45    1002.89   1243.36   1480.79   1731.18
                    1975.91   2351.73   2891.09   3439.44   4052.10
                    4618.41   5299.06   6113.99   6897.81   7892.59
                    8836.20   9874.15   11001.97  12010.96  13169.29
                    14099.83  14351.65  14310.78  14258.98  14112.70
                    13988.39  13623.95  13047.53  12581.06  12138.84
                    11795.39  11299.99  10654.56  10061.87  9288.61
                    8606.31   7937.99   7278.82   6762.57   6273.06
                    5888.56   5486.15   5055.91   4712.62   4416.67
                    4198.41   3965.84   3711.38   3499.87   3281.07
                    3103.51   2958.36   2836.33   2732.83   2577.73
```

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**[illegible]********************** 80-90 LIST OF INPUT DATA ****[illegible]*****************
```

2433.02	2272.50	2098.71	1987.63	2019.96
2097.83	2092.93	2003.73	1926.58	1928.60
1959.59	1854.82	1625.67	1443.97	1433.45
1491.85	1541.58	1568.13	1561.96	1461.23
1346.39	1299.44	1317.78	1357.26	1430.13
1497.95	1477.86	1380.03	1298.66	1298.52
1328.91	1289.01	1181.26	1113.68	1218.58
1366.79	1374.26	1249.27	1151.67	1238.37
1373.39	1243.78	871.29	538.50	339.16
235.93	182.14	152.44	135.92	126.72
121.62	118.78	117.17	116.24	115.69
115.37	115.17	115.07	115.00	115.00
115.00	115.00	115.00	115.00	114.77
114.09	113.77	113.65	113.55	113.45
113.35	113.25	113.15	113.05	112.95
112.85	112.75	112.65	112.55	112.45
112.35	112.25	112.15	112.05	111.95
111.86	111.76	111.66	111.56	111.46
111.36	111.26	111.17	111.07	110.97
110.87	110.77	110.68	110.58	110.48
110.38	110.29	110.19	110.09	109.99
109.90	109.80	109.70	109.61	109.51
109.41	109.32	109.22	109.12	109.03
108.93	108.83	108.74	108.64	108.55
108.45	108.35	108.26	108.16	108.07
107.97	107.88	107.78	107.69	107.59
107.50	107.40	107.31	107.21	107.12
107.02	106.93	106.83	106.74	106.64
106.55	106.46	106.36	106.27	106.17
106.08	105.99	105.89	105.80	105.71
105.61	105.52	105.43	105.33	105.24
105.15	105.05	104.96	104.87	104.78
104.68	104.59	104.50	104.41	104.31
104.22	104.13	104.04	103.95	103.85
103.76	103.67	103.58	103.49	103.40
103.30	103.21	103.12	103.03	102.94
102.85	102.76	102.67	102.58	102.48
102.38	102.25	102.12	101.99	101.86
101.73	101.60	101.47	101.34	101.21
101.08	100.95	100.82	100.70	100.57
100.44	100.31	100.18	100.05	99.93
99.80	99.67	99.54	99.42	99.29
99.16	99.03	98.91	98.78	98.65
98.53	98.40	98.28	98.15	98.03

```
ENDTABLE
GO,HYD    L
ENDJOB

*****************************************************************************
```

(4)

SIGNAL BUTTE FRS W/PM DIVERSION

(5)

THIS IS THE FINAL DESIGN HYDROLOGY FOR SIGNAL BUTTE FRS
WHICH INCLUDES APACHE JUNCTION FRS, BULLDOG DIVERSION, AND
PASS MOUNTAIN DIVERSION WITH OUTLET CHANNEL.
THE HYDROGRAPHS FROM THE DIVERSIONS INCLUDE FREEBOARD
DISCHARGE QUANTITIES. SEDIMENT FROM PASS MOUNTAIN WILL
INCLUDE MOST FINE-GRAINED SEDIMENT, BUT NO COARSE-GRAINED
SEDIMENT. THIS IS IN ADDITION TO THE WORK PLAN SEDIMENT
STORAGE REQUIREMENT.
THE 100-YR STORM SET THE EMERGENCY SPILLWAY CREST AT 1712.4.

*****CONTROL WORD INVALID - FOLLOWING DATA CARD IGNORED*****

GOHYD L

(6)

********** BASIC DATA **********

****NOT DEFINED CLIMATE AREA DESIGN CLASS ****NOT DEFINED

STORM DISTRIBUTION.....T320 HYDROGRAPH,FREEBOARD STORM 24 HR

Q-PS1 DAY	Q-PS10 DAY	Q-ES	Q-FB	CN	DA-SM	TC/L	-/H
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONDUITS	COND L	D/W	-/H	PS N	KI	WEIR L	TW EL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PERM POOL	CREST PS	FP SED	QRF	2ND STG	QRF H	QRF L	START ES
1684.00	1684.00	1700.75	0.0	0.0	0.0	0.0	0.0
BASEFLOW	INITIAL EL	EXTRA VOL.					
0.0	0.0	0.0					
ES1	ES2	ES3	ES4	ES5	Z ES	EXIT N	EXIT S
1712.40	0.0	0.0	0.0	0.0	0.0	0.011	0.500
ES TYPE	ES L	ES N	BW1	BW2	BW3	BW4	BW5
45	10	0.011	140.00	160.00	170.00	180.00	185.00

****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.

ES CODE	INCREMENT			Q1	Q2	Q3	Q4
45	1.000			2.340	6.620	14.110	22.240
Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
34.440	45.210	57.040	71.960	85.860	100.560	116.020	132.190

7

PERM POOL	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
SED ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	14.2 CFS
ES CREST	1712.40 FT	1365.3 ACFT	139.57 AC	154.5 CFS
PS STORAGE	1110.1 ACFT	BETWEEN ES CREST AND SED ACCUM ELEVATIONS		
STARTING E	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS

****

RATING TABLE DEVELOPED
WITH PS GIVEN AND ESRATING FOR EMG

RATING TABLE NUMBER 2

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1686.37	3.79	3.79	1.75	0.84
3	1688.73	6.67	6.67	5.48	2.13
4	1691.10	7.56	7.56	13.69	4.63
5	1693.47	8.38	8.38	36.27	11.22
6	1695.83	9.15	9.15	67.67	20.32
7	1698.20	9.77	9.77	155.69	35.71
8	1700.57	10.39	10.39	248.03	51.58
9	1702.93	81.84	81.84	384.67	67.83
10	1705.30	126.85	126.85	569.51	85.71
11	1707.66	136.97	136.97	785.80	104.88
12	1710.03	146.01	146.01	1050.17	122.33
13	1712.40	154.54	154.54	1364.97	139.55
14	1712.98	345.73	156.50	1452.59	143.71
15	1713.56	580.56	158.46	1540.20	147.88
16	1714.60	1300.50	161.98	1697.92	155.37
17	1715.88	2686.06	166.29	1890.70	164.53
18	1718.20	6199.80	173.74	2302.56	180.30
19	1721.10	11618.35	182.80	2853.62	201.05
20	1724.00	17792.80	191.50	3457.10	223.60

TYPE	BW	EMAX	VOL-MAX	AMAX	HP	VOL-ES	Q-PS	Q-ES	Q-TOT	D/C	V/C	S/C	S/C.25	D-ES	OE/B
FLOOD HYD	140.0	1720.95	2822.1	199.9	8.55	1457.2	182.3	11126.5	11308.8	5.81	13.67	0.001	0.001	31.4	44.2

PERM POOL	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
SED ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	14.2 CFS
ES CREST	1712.40 FT	1365.3 ACFT	139.57 AC	154.5 CFS
PS STORAGE	1110.1 ACFT	BETWEEN ES CREST AND SED ACCUM ELEVATIONS		
STARTING E	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS

R/C # 210,700
442,000 (18)
456,200 (14) 1123,100

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RATING TABLE DEVELOPED
WITH PS GIVEN AND ESRATING FOR EMG

RATING TABLE NUMBER 3

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1686.37	3.79	3.79	1.75	0.84
3	1688.73	6.67	6.67	5.48	2.13
4	1691.10	7.56	7.56	13.69	4.63
5	1693.47	8.38	8.38	36.27	11.22
6	1695.83	9.15	9.15	67.67	20.32
7	1698.20	9.77	9.77	155.69	35.71
8	1700.57	10.39	10.39	248.03	51.58
9	1702.93	81.84	81.84	384.67	67.83
10	1705.30	126.85	126.85	569.51	85.71
11	1707.66	136.97	136.97	785.80	104.88
12	1710.03	146.01	146.01	1050.17	122.33
13	1712.40	154.54	154.54	1364.97	139.55
14	1712.98	372.77	156.50	1452.59	143.71
15	1713.56	640.86	158.46	1540.20	147.88
16	1714.60	1463.14	161.98	1697.92	155.37
17	1715.88	3046.02	166.29	1890.70	164.53
18	1718.20	7060.67	173.74	2302.56	180.30
19	1721.10	13252.00	182.80	2853.62	201.05
20	1724.00	20307.27	191.50	3457.10	223.60

TYPE	BW	EMAX	VOL-MAX	AMAX	HP	VOL-ES	Q-PS	Q-ES	Q-TOT	D/C	V/C	S/C	S/C.25	D-ES	OE/B
FLOOD HYD	160.0	1720.42	2712.7	195.8	8.02	1347.8	180.8	11488.4	11669.2	5.43	13.22	0.001	0.001	30.0	38.8

PERM POOL	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS	$240800 R/C
CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS	425,700 (18) 879,350
SED ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	14.2 CFS	439,000 (14) (2) 1118800 899,300
ES CREST	1712.40 FT	1365.3 ACFT	139.57 AC	154.5 CFS	
PS STORAGE	1110.1 ACFT	BETWEEN ES CREST AND SED ACCUM ELEVATIONS			
STARTING E	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS	

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RATING TABLE DEVELOPED
WITH PS GIVEN AND ESRATING FOR EMG

RATING TABLE NUMBER 4

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1686.37	3.79	3.79	1.75	0.84
3	1688.73	6.67	6.67	5.48	2.13
4	1691.10	7.56	7.56	13.69	4.63
5	1693.47	8.38	8.38	36.27	11.22
6	1695.83	9.15	9.15	67.67	20.32

7	1698.20	9.77	9.77	155.69	35.71
8	1700.57	10.39	10.39	248.03	51.58
9	1702.93	81.84	81.84	384.67	67.83
10	1705.30	126.85	126.85	569.51	85.71
11	1707.66	136.97	136.97	785.80	104.88
12	1710.03	146.01	146.01	1050.17	122.33
13	1712.40	154.54	154.54	1364.97	139.55
14	1712.98	386.29	156.50	1452.59	143.71
15	1713.56	671.01	158.46	1540.20	147.88
16	1714.60	1544.47	161.98	1697.92	155.37
17	1715.88	3226.01	166.29	1890.70	164.53
18	1718.20	7491.11	173.74	2302.56	180.30
19	1721.10	14068.82	182.80	2853.62	201.05
20	1724.00	21564.50	191.50	3457.10	223.60

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TYPE	BW	EMAX	VOL-MAX	AMAX	HP	VOL-ES	Q-PS	Q-ES	Q-TOT	D/C	V/C	S/C	S/C.25	D-ES	OE/B
FLOOD HYD	170.0	1720.20	2665.8	194.0	7.80	1300.8	180.1	11646.5	11826.6	5.26	13.01	0.001	0.001	29.4	36.5

PERM POOL	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS	
CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS	
SED ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	14.2 CFS	
ES CREST	1712.40 FT	1365.3 ACFT	139.57 AC	154.5 CFS	
PS STORAGE	1110.1 ACFT	BETWEEN ES CREST AND SED ACCUM ELEVATIONS			
STARTING E	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS	

A 255,850 R/C
419,300 (13) 2 T 1094450 1.5 884,800
432,400 (14) 1120650

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RATING TABLE DEVELOPED
WITH PS GIVEN AND ESRATING FOR EMG

RATING TABLE NUMBER 5

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1686.37	3.79	3.79	1.75	0.84
3	1688.73	6.67	6.67	5.48	2.13
4	1691.10	7.56	7.56	13.69	4.63
5	1693.47	8.38	8.38	36.27	11.22
6	1695.83	9.15	9.15	67.67	20.32
7	1698.20	9.77	9.77	155.69	35.71
8	1700.57	10.39	10.39	248.03	51.58
9	1702.93	81.84	81.84	384.67	67.83
10	1705.30	126.85	126.85	569.51	85.71
11	1707.66	136.97	136.97	785.80	104.88
12	1710.03	146.01	146.01	1050.17	122.33
13	1712.40	154.54	154.54	1364.97	139.55
14	1712.98	399.80	156.50	1452.59	143.71
15	1713.56	701.16	158.46	1540.20	147.88
16	1714.60	1625.79	161.98	1697.92	155.37
17	1715.88	3405.99	166.29	1890.70	164.53
18	1718.20	7921.54	173.74	2302.56	180.30
19	1721.10	14885.65	182.80	2853.62	201.05
20	1724.00	22821.74	191.50	3457.10	223.60

TYPE	BW	EMAX	VOL-MAX	AMAX	HP	VOL-ES	Q-PS	Q-ES	Q-TOT	D/C	V/C	S/C	S/C.25	D-ES	OE/B
FLOOD HYD	180.0	1719.98	2622.1	192.4	7.59	1257.2	179.5	11780.9	11960.4	5.11	12.82	0.001	0.001	28.8	34.5

PERM POOL	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS	

CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
D ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	14.2 CFS
ES CREST	1712.40 FT	1365.3 ACFT	139.57 AC	154.5 CFS
PS STORAGE	1110.1 ACFT	BETWEEN ES CREST AND SED ACCUM ELEVATIONS		
STARTING E	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS

#270,900 R/C
412,800 cy (18) 2 825,600 1.5
425,500 cy (14) 2 1.5

(10)

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RATING TABLE DEVELOPED
WITH PS GIVEN AND ESRATING FOR EMG

RATING TABLE NUMBER 6

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1686.37	3.79	3.79	1.75	0.84
3	1688.73	6.67	6.67	5.48	2.13
4	1691.10	7.56	7.56	13.69	4.63
5	1693.47	8.38	8.38	36.27	11.22
6	1695.83	9.15	9.15	67.67	20.32
7	1698.20	9.77	9.77	155.69	35.71
8	1700.57	10.39	10.39	248.03	51.58
9	1702.93	81.84	81.84	384.67	67.83
10	1705.30	126.85	126.85	569.51	85.71
11	1707.66	136.97	136.97	785.80	104.88
12	1710.03	146.01	146.01	1050.17	122.33
13	1712.40	154.54	154.54	1364.97	139.55
14	1712.98	406.56	156.50	1452.59	143.71
15	1713.56	716.24	158.46	1540.20	147.88
16	1714.60	1666.45	161.98	1697.92	155.37
17	1715.88	3495.98	166.29	1890.70	164.53
18	1718.20	8136.75	173.74	2302.56	180.30
19	1721.10	15294.06	182.80	2853.62	201.05
20	1724.00	23450.36	191.50	3457.10	223.60

TYPE	BW	EMAX	VOL-MAX	AMAX	HP	VOL-ES	Q-PS	Q-ES	Q-TOT	D/C	V/C	S/C	S/C.25	D-ES	OE/B
FLOOD HYD	185.0	1719.87	2602.5	191.6	7.48	1237.5	179.1	11852.8	12031.9	5.03	12.73	0.001	0.001	28.4	33.6

#278425 R/C total 1093,425 @150
410,000 cy (18) ~~x2~~ 1093425
422,100 cy (14) x2 ~~1093425~~ 1122,625

PERM POOL	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
SED ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	14.2 CFS
ES CREST	1712.40 FT	1365.3 ACFT	139.57 AC	154.5 CFS
PS STORAGE	1110.1 ACFT	BETWEEN ES CREST AND SED ACCUM ELEVATIONS		
STARTING E	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS

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RATING TABLE DEVELOPED
WITH PS GIVEN AND ESRATING FOR EMG

RATING TABLE NUMBER 2

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1686.37	3.79	3.79	1.75	0.84
3	1688.73	6.67	6.67	5.48	2.13
4	1691.10	7.56	7.56	13.69	4.63
5	1693.47	8.38	8.38	36.27	11.22
6	1695.83	9.15	9.15	67.67	20.32
7	1698.20	9.77	9.77	155.69	35.71
8	1700.57	10.39	10.39	248.03	51.58
9	1702.93	81.84	81.84	384.67	67.83
10	1705.30	126.85	126.85	569.51	85.71
11	1707.66	136.97	136.97	785.80	104.88
12	1710.03	146.01	146.01	1050.17	122.33
13	1712.40	154.54	154.54	1364.97	139.55
14	1712.98	332.22	156.50	1452.59	143.71
15	1713.56	550.41	158.46	1540.20	147.88
16	1714.60	1219.17	161.98	1697.92	155.37
17	1715.88	2506.07	166.29	1890.70	164.53
18	1718.20	5769.37	173.74	2302.56	180.30
19	1721.10	10801.52	182.80	2853.62	201.05
20	1724.00	16535.56	191.50	3457.10	223.60

TYPE	BW	EMAX	VOL-MAX	AMAX	HP	VOL-ES	Q-PS	Q-ES	Q-TOT	D/C	V/C	S/C	S/C.25	D-ES	OE/B
FLOOD HYD	130.0	1721.25	2884.8	202.2	8.85	1519.8	183.2	10914.3	11097.6	6.03	13.93	0.001	0.001	32.2	47.6

PERM POOL	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
SED ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	14.2 CFS
ES CREST	1712.40 FT	1365.3 ACFT	139.57 AC	154.5 CFS
PS STORAGE	1110.1 ACFT	BETWEEN ES CREST AND SED ACCUM ELEVATIONS		
STARTING E	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS

195,650 R/C
451,250 cy. (18)
466,000 cy (14)

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RATING TABLE DEVELOPED
WITH PS GIVEN AND ESRATING FOR EMG

RATING TABLE NUMBER 3

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1686.37	3.79	3.79	1.75	0.84
3	1688.73	6.67	6.67	5.48	2.13
4	1691.10	7.56	7.56	13.69	4.63
5	1693.47	8.38	8.38	36.27	11.22
6	1695.83	9.15	9.15	67.67	20.32
7	1698.20	9.77	9.77	155.69	35.71
8	1700.57	10.39	10.39	248.03	51.58
9	1702.93	81.84	81.84	384.67	67.83
10	1705.30	126.85	126.85	569.51	85.71
11	1707.66	136.97	136.97	785.80	104.88
12	1710.03	146.01	146.01	1050.17	122.33
13	1712.40	154.54	154.54	1364.97	139.55
14	1712.98	336.27	156.50	1452.59	143.71
15	1713.56	559.45	158.46	1540.20	147.88
16	1714.60	1243.57	161.98	1697.92	155.37
17	1715.88	2560.07	166.29	1890.70	164.53
18	1718.20	5898.50	173.74	2302.56	180.30
19	1721.10	11046.57	182.80	2853.62	201.05
20	1724.00	16912.73	191.50	3457.10	223.60

TYPE	BW	EMAX	VOL-MAX	AMAX	HP	VOL-ES	Q-PS	Q-ES	Q-TOT	D/C	V/C	S/C	S/C.25	D-ES	DE/B
FLOOD HYD	133.0	1721.16	2865.5	201.5	8.76	1500.6	183.0	10979.4	11162.4	5.96	13.85	0.001	0.001	32.0	46.5

PERM POOL	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS	300,165.
CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS	448,400
SED ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	14.2 CFS	463,000
ES CREST	1712.40 FT	1365.3 ACFT	139.57 AC	154.5 CFS	
PS STORAGE	1110.1 ACFT	BETWEEN ES CREST AND SED ACCUM ELEVATIONS			
STARTING E	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS	

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RATING TABLE DEVELOPED
WITH PS GIVEN AND ESRATING FOR EMG

RATING TABLE NUMBER 4

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1686.37	3.79	3.79	1.75	0.84
3	1688.73	6.67	6.67	5.48	2.13
4	1691.10	7.56	7.56	13.69	4.63
5	1693.47	8.38	8.38	36.27	11.22
6	1695.83	9.15	9.15	67.67	20.32

(12)

7	1698.20	9.77	9.77	155.69	35.71
8	1700.57	10.39	10.39	248.03	51.58
9	1702.93	81.84	81.84	384.6[illegible]	67.83
10	1705.30	126.85	126.85	569.51	85.71
11	1707.66	136.97	136.97	785.80	104.88
12	1710.03	146.01	146.01	1050.17	122.33
13	1712.40	154.54	154.54	1364.97	139.55
14	1712.98	338.97	156.50	1452.59	143.71
15	1713.56	565.48	158.46	1540.20	147.88
16	1714.60	1259.84	161.98	1697.92	155.37
17	1715.88	2596.06	166.29	1890.70	164.53
18	1718.20	5984.59	173.74	2302.56	180.30
19	1721.10	11209.93	182.80	2853.62	201.05
20	1724.00	17164.18	191.50	3457.10	223.60

(13)

TYPE	BW	EMAX	VOL-MAX	AMAX	HP	VOL-ES	Q-PS	Q-ES	Q-TOT	D/C	V/C	S/C	S/C.25	D-ES	OE/B
FLOOD HYD	135.0	1721.10	2852.9	201.0	8.70	1488.0	182.8	11020.5	11203.3	5.92	13.80	0.001	0.001	31.8	45.9

PERM POOL	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS	$203175 R/C
CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS	446,500 (13)
SED ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	14.2 CFS	461,100 (14)
ES CREST	1712.40 FT	1365.3 ACFT	139.57 AC	154.5 CFS	
PS STORAGE	1110.1 ACFT	BETWEEN ES CREST AND SED ACCUM ELEVATIONS			
STARTING E	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS	

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RATING TABLE DEVELOPED
WITH PS GIVEN AND ESRATING FOR EMG

RATING TABLE NUMBER 5

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1686.37	3.79	3.79	1.75	0.84
3	1688.73	6.67	6.67	5.48	2.13
4	1691.10	7.56	7.56	13.69	4.63
5	1693.47	8.38	8.38	36.27	11.22
6	1695.83	9.15	9.15	67.67	20.32
7	1698.20	9.77	9.77	155.69	35.71
8	1700.57	10.39	10.39	248.03	51.58
9	1702.93	81.84	81.84	384.67	67.83
10	1705.30	126.85	126.85	569.51	85.71
11	1707.66	136.97	136.97	785.80	104.88
12	1710.03	146.01	146.01	1050.17	122.33
13	1712.40	154.54	154.54	1364.97	139.55
14	1712.98	352.49	156.50	1452.59	143.71
15	1713.56	595.63	158.46	1540.20	147.88
16	1714.60	1341.16	161.98	1697.92	155.37
17	1715.88	2776.05	166.29	1890.70	164.53
18	1718.20	6415.02	173.74	2302.56	180.30
19	1721.10	12026.76	182.80	2853.62	201.05
20	1724.00	18421.41	191.50	3457.10	223.60

$218,225 R/C
432,700
451,600

TYPE	BW	EMAX	VOL-MAX	AMAX	HP	VOL-ES	Q-PS	Q-ES	Q-TOT	D/C	V/C	S/C	S/C.25	D-ES	OE/B
FLOOD HYD	145.0	1726.81	2792.6	198.8	8.41	1427.6	181.9	11223.5	11405.4	5.71	13.55	0.001	0.001	31.0	42.7

PERM POOL	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS

CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
SED ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	14.2 CFS
ES CREST	1712.40 FT	1365.3 ACFT	139.57 AC	154.5 CFS

PS STORAGE 1110.1 ACFT BETWEEN ES CREST AND SED ACCUM ELEVATIONS

STARTING E	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS

(14)

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RATING TABLE DEVELOPED
WITH PS GIVEN AND ESRATING FOR EMG

RATING TABLE NUMBER 6

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1686.37	3.79	3.79	1.75	0.84
3	1688.73	6.67	6.67	5.48	2.13
4	1691.10	7.56	7.56	13.69	4.63
5	1693.47	8.38	8.38	36.27	11.22
6	1695.83	9.15	9.15	67.67	20.32
7	1698.20	9.77	9.77	155.69	35.71
8	1700.57	10.39	10.39	248.03	51.58
9	1702.93	81.84	81.84	384.67	67.83
10	1705.30	126.85	126.85	569.51	85.71
11	1707.66	136.97	136.97	785.80	104.88
12	1710.03	146.01	146.01	1050.17	122.33
13	1712.40	154.54	154.54	1364.97	139.55
14	1712.98	356.55	156.50	1452.59	143.71
15	1713.56	604.68	158.46	1540.20	147.88
16	1714.60	1365.56	161.98	1697.92	155.37
17	1715.88	2830.04	166.29	1890.70	164.53
18	1719.20	6544.15	173.74	2302.56	180.30
19	1721.10	12271.80	182.80	2853.62	201.05
20	1724.00	18798.59	191.50	3457.10	223.60

TYPE	BW	EMAX	VOL-MAX	AMAX	HP	VOL-ES	Q-PS	Q-ES	Q-TOT	D/C	V/C	S/C	S/C.25	D-ES	OE/B
FLOOD HYD	148.0	1720.72	2775.5	198.1	8.33	1410.5	181.7	11277.7	11459.4	5.65	13.48	0.001	0.001	30.8	41.9

15

********** BASIC DATA **********

****NOT DEFINED CLIMATE AREA DESIGN CLASS ****NOT DEFINED

STORM DISTRIBUTION.....TR20 HYDROGRAPH,FREEBOARD STORM 24 HR

Q-PS1 DAY	Q-PS10 DAY	Q-ES	Q-FP	CN	DA-SM	TC/L	-/H
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONDUITS	COND L	D/W	-/H	PS N	KI	WEIR L	TW EL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PERM POOL	CREST PS	FP SED	QRF	2ND STG	QRF H	QRF L	START ES
1684.00	1684.00	1700.75	0.0	0.0	0.0	0.0	0.0
BASEFLOW	INITIAL EL	EXTRA VOL.					
0.0	0.0	0.0					
ES1	ES2	ES3	ES4	ES5	Z ES	EXIT N	EXIT S
1712.40	0.0	0.0	0.0	0.0	0.0	0.011	0.500
ES TYPE	ES L	ES N	BW1	BW2	BW3	BW4	BW5
45	10	0.011	90.00	110.00	120.00	125.00	150.00

****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.

ES CODE	INCREMENT			Q1	Q2	Q3	Q4
45	1.000			2.340	6.620	14.110	22.240
Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
34.440	45.210	57.040	71.960	85.860	100.560	116.020	132.190

(16)

PERM POOL	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
SED ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	14.2 CFS
ES CREST	1712.40 FT	1365.3 ACFT	139.57 AC	154.5 CFS
PS STORAGE	1110.1 ACFT	BETWEEN ES CREST AND SED ACCUM ELEVATIONS		
STARTING E	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS

****

RATING TABLE DEVELOPED
WITH PS GIVEN AND ESRATING FOR EMG

RATING TABLE NUMBER 2

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1686.37	3.79	3.79	1.75	0.84
3	1688.73	6.67	6.67	5.48	2.13
4	1691.10	7.56	7.56	13.69	4.63
5	1693.47	8.38	8.38	36.27	11.22
6	1695.83	9.15	9.15	67.67	20.32
7	1698.20	9.77	9.77	155.69	35.71
8	1700.57	10.39	10.39	248.03	51.58
9	1702.93	81.84	81.84	384.67	67.83
10	1705.30	126.85	126.85	569.51	85.71
11	1707.66	136.97	136.97	785.80	104.88
12	1710.03	146.01	146.01	1050.17	122.33
13	1712.40	154.54	154.54	1364.97	139.55
14	1712.98	278.15	156.50	1452.59	143.71
15	1713.56	429.81	158.46	1540.20	147.88
16	1714.60	893.88	161.98	1697.92	155.37
17	1715.88	1786.14	166.29	1890.70	164.53
18	1718.20	4047.64	173.74	2302.56	180.30
19	1721.10	7534.22	182.80	2853.62	201.05
20	1724.00	11506.62	191.50	3457.10	223.60

1505 x

TYPE	BW	EMAX	VOL-MAX	AMAX	HP	VOL-FS	Q-PS	Q-ES	Q-TOT	D/C	V/C	S/C	S/C.25	D-ES	OE/B
FLOOD HYD	90.0	1722.86	3220.1	214.7	10.46	1855.2	188.1	9758.7	9946.7	7.15	15.16	0.001	0.001	37.2	68.5

135450

PERM POOL	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
SED ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	14.2 CFS
ES CREST	1712.40 FT	1365.3 ACFT	139.57 AC	154.5 CFS
PS STORAGE	1110.1 ACFT	BETWEEN ES CREST AND SED ACCUM ELEVATIONS		
STARTING E	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS

****

90 = 387.52 cy.
x 4.306 cy/ft.
186.26 ft² floor & blocks

$\frac{2}{3} Q_F = 6505.8$ q = 72.29
$d_c = 5.45'$
block ht. = $.8 d_c = 4.36'$
2 ht. = S = 8.73'
Sd wall ht = 3 bl. ht + d_c = 18.53 w/o
Int wall H = 1.5 d_c = 8.18', 10.5 w/ blocks

RATING TABLE NUMBER 3

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1686.37	3.79	3.79	1.75	0.84
3	1688.73	6.67	6.67	5.48	2.13
4	1691.10	7.56	7.56	13.69	4.63
5	1693.47	8.38	8.38	36.27	11.22
6	1695.83	9.15	9.15	67.67	20.32
7	1698.20	9.77	9.77	155.69	35.71
8	1700.57	10.39	10.39	248.03	51.58
9	1702.93	81.84	81.84	384.67	67.83
10	1705.30	126.85	126.85	569.51	85.71
11	1707.66	136.97	136.97	785.80	104.88
12	1710.03	146.01	146.01	1050.17	122.33
13	1712.40	154.54	154.54	1364.97	139.55
14	1712.98	305.18	156.50	1452.59	143.71
15	1713.56	490.11	158.46	1540.20	147.88
16	1714.60	1056.53	161.98	1697.92	155.37
17	1715.88	2146.11	166.29	1890.70	164.53
18	1718.20	4908.50	173.74	2302.56	180.30
19	1721.10	9167.87	182.80	2853.62	201.05
20	1724.00	14021.09	191.50	3457.10	223.60

(17)

TYPE	BW	EMAX	VOL-MAX	AMAX	HP	VOL-ES	Q-PS	Q-ES	Q-TOT	D/C	V/C	S/C	S/C.25	D-ES	OE/B
FLOOD HYD	110.0	1721.96	3032.4	207.7	9.56	1667.5	185.4	10420.6	10606.0	6.53	14.50	0.001	0.001	34.4	56.2

165,550 473,600 [illegible]

PERM POOL	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS	
CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS	
SED ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	14.2 CFS	
ES CREST	1712.40 FT	1365.3 ACFT	139.57 AC	154.5 CFS	
PS STORAGE	1110.1 ACFT	BETWEEN ES CREST AND SED ACCUM ELEVATIONS			
STARTING E	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS	

114.5 ft²
4.24 cy/ft.
466.5 cy.

$\frac{2/3 Q}{W} = 63.16$
$d_c = 4.98 \sim 5'$
Wtbl. $= 3.99 \sim 4'$
$S = 7.98 \sim 8'$
Sd wall 12', ext. wall ~ 7.5', 9.5'
6 blocks.

****

RATING TABLE DEVELOPED
WITH PS GIVEN AND ESRATING FOR EMG

RATING TABLE NUMBER 4

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1686.37	3.79	3.79	1.75	0.84
3	1688.73	6.67	6.67	5.48	2.13
4	1691.10	7.56	7.56	13.69	4.63
5	1693.47	8.38	8.38	36.27	11.22
6	1695.83	9.15	9.15	67.67	20.32

7	1698.20	9.77	9.77	155.69	35.71
8	1700.57	10.39	10.39	248.03	51.58
9	1702.93	81.84	81.84	384.67	67.83
10	1705.30	126.85	126.85	569.51	85.71
11	1707.66	136.97	136.97	785.80	104.88
12	1710.03	146.01	146.01	1050.17	122.33
13	1712.40	154.54	154.54	1364.97	139.55
14	1712.98	318.70	156.50	1452.59	143.71
15	1713.56	520.26	158.46	1540.20	147.88
16	1714.60	1137.85	161.98	1697.92	155.37
17	1715.88	2326.09	166.29	1890.70	164.53
18	1719.20	5338.94	173.74	2302.56	180.30
19	1721.10	9984.70	182.80	2853.62	201.05
20	1724.00	15278.32	191.50	3457.10	223.60

461,500 (18) 477,000 (14)

(18)

TYPE	BW	EMAX	VOL-MAX	AMAX	HP	VOL-ES	Q-PS	Q-ES	Q-TOT	D/C	V/C	S/C	S/C.25	D-ES	OE/B
FLOOD HYD	120.0	1721.58	2954.3	204.8	9.19	1589.3	184.2	10683.5	10867.7	6.27	14.20	0.001	0.001	33.2	51.5

180,600 R/C

PERM POOL	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
SED ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	14.2 CFS
ES CREST	1712.40 FT	1365.3 ACFT	139.57 AC	154.5 CFS
PS STORAGE	1110.1 ACFT	BETWEEN ES CREST AND SED ACCUM ELEVATIONS		
STARTING E	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS

$\frac{2/3 Q}{w} = 59.35$
$d_c = 4.78'$
$bl = 3.83'$
$s = 7.65'$
$wall = 16.27'$
$ent = 7.17 < 9.19$
7 blocks

116.78
4.325 cy/ft.
519.036 cy

****

RATING TABLE DEVELOPED
WITH PS GIVEN AND ESRATING FOR EMG

RATING TABLE NUMBER 5

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1686.37	3.79	3.79	1.75	0.84
3	1688.73	6.67	6.67	5.48	2.13
4	1691.10	7.56	7.56	13.69	4.63
5	1693.47	8.38	8.38	36.27	11.22
6	1695.83	9.15	9.15	67.67	20.32
7	1698.20	9.77	9.77	155.69	35.71
8	1700.57	10.39	10.39	248.03	51.58
9	1702.93	81.84	81.84	384.67	67.83
10	1705.30	126.85	126.85	569.51	85.71
11	1707.66	136.97	136.97	785.80	104.88
12	1710.03	146.01	146.01	1050.17	122.33
13	1712.40	154.54	154.54	1364.97	139.55
14	1712.98	325.46	156.50	1452.59	143.71
15	1713.56	535.33	158.46	1540.20	147.88
16	1714.60	1178.51	161.98	1697.92	155.37
17	1715.88	2416.08	166.29	1890.70	164.53
18	1719.20	5554.15	173.74	2302.56	180.30
19	1721.10	10393.11	182.80	2853.62	201.05
20	1724.00	15906.94	191.50	3457.10	223.60

188,125 R/C (18) 456000 (14) 471000

TYPE	BW	EMAX	VOL-MAX	AMAX	HP	VOL-ES	Q-PS	Q-ES	Q-TOT	D/C	V/C	S/C	S/C.25	D-ES	OE/B
FLOOD HYD	125.0	1721.41	2917.9	203.4	9.01	1552.9	183.7	10796.4	10980.1	6.14	14.06	0.001	0.001	32.8	49.5

$\frac{2/3 Q}{w} = 57.58$
$d_c = 4.69'$
$bl = 3.75'$
$s = 7.5'$
$s/wall = 15.94$
$ent = 7.03 < 9.01$
7 blocks.

116.328
4.308 cy/ft.
538.556 cy

CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
SED ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	14.2 CFS
ES CREST	1712.40 FT	1365.3 ACFT	139.57 AC	154.5 CFS

PS STORAGE 1110.1 ACFT BETWEEN ES CREST AND SED ACCUM ELEVATIONS

STARTING E	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS

(19)

****

RATING TABLE DEVELOPED
WITH PS GIVEN AND ESRATING FOR EMG

RATING TABLE NUMBER 6

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1686.37	3.79	3.79	1.75	0.84
3	1688.73	6.67	6.67	5.48	2.13
4	1691.10	7.56	7.56	13.69	4.63
5	1693.47	8.38	8.38	36.27	11.22
6	1695.83	9.15	9.15	67.67	20.32
7	1698.20	9.77	9.77	155.69	35.71
8	1700.57	10.39	10.39	248.03	51.58
9	1702.93	81.84	81.84	384.67	67.83
10	1705.30	126.85	126.85	569.51	85.71
11	1707.66	136.97	136.97	785.80	104.88
12	1710.03	146.01	146.01	1050.17	122.33
13	1712.40	154.54	154.54	1364.97	139.55
14	1712.98	359.25	156.50	1452.59	143.71
15	1713.56	610.71	158.46	1540.20	147.88
16	1714.60	1381.82	161.98	1697.92	155.37
17	1715.88	2866.04	166.29	1890.70	164.53
18	1718.20	6630.24	173.74	2302.56	180.30
19	1721.10	12435.17	182.80	2853.62	201.05
20	1724.00	19050.03	191.50	3457.10	223.60

TYPE	BW	EMAX	VOL-MAX	AMAX	HP	VOL-FS	Q-PS	Q-ES	Q-TOT	D/C	V/C	S/C	S/C.25	D-ES	OE/B
FLOOD HYD	150.0	1720.67	2764.3	197.7	8.27	1399.3	181.5	11312.4	11493.9	5.61	13.44	0.001	0.001	30.6	41.3

@ 225,750 R/C

439,500 (18)

447,000 (14)

$\frac{2/3 Q}{w} = 50.28$

dc = 4.28'

bl = 3.43'

S = 6.85

Sd = 14.57'

out = 6.42 < 8.27

say 7 blocks.

114,508 ft²

4,241 cy/ft.

150

636,156 cy.

DAMS2.. R NO. 1 COMPLETE

SIGNAL BUTTE FRS W/PM DIVERSION

1 STRUCTURE(S) ANALYZED

5 HYDROGRAPHS ROUTED

0 TRIAL ROUTINGS

(20)

****

1712.4
1690
H = 22.4 x 2 =
44.8

50.09

ave width . 1.625'

114,508

Slope 50 ft long @ 18" = 75 ft²
assume inlet length 16' + 4' c/o
@ 12"
20 x 1 = 20 ft²
95 ft² floor.

(1.625) ht (H/2) = block area/section.

ignore walls.

Use 4.3 cy / ft width.
~~$350/cy~~
$1505 / ft width.

34

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DAMS2 XEQ 06/01/83          STRUCTURE SITE ANALYSIS COMPUTER PROGRAM
      R[illegible]/03/82  SCS TECHNICAL RELEASE 49, DATED OCT.1982 (US[illegible]ANUAL)

      *[illegible]********************** 80-80 LIST OF INPUT DATA ****[illegible]*****************

      DAMS2      12/03/82  SIGNAL BUTTE FRS W/PM DIVERSION                          1
      COMMENT    THIS IS THE FINAL DESIGN HYDROLOGY FOR SIGNAL BUTTE FRS
      COMMENT    WHICH INCLUDES APACHE JUNCTION FRS, BULLDOG DIVERSION, AND        3
      COMMENT    PASS MOUNTAIN DIVERSION WITH OUTLET CHANNEL.                      4
      COMMENT    THE HYDROGRAPHS FROM THE DIVERSIONS INCLUDE FREEBOARD             5
      COMMENT    DISCHARGE QUANTITIES.  SEDIMENT FROM PASS MOUNTAIN WILL           6
      COMMENT    INCLUDE MOST FINE-GRAINED SEDIMENT, BUT NO COARSE-GRAINED         7
      COMMENT    SEDIMENT.  THIS IS IN ADDITION TO THE WORK PLAN SEDIMENT          8
      COMMEMT    STORAGE REQUIREMENT.                                              9
      COMMENT    THE 100-YR STORM SET THE EMERGENCY SPILLWAY CREST AT 1712.4.     10
      CLPROFILE                        OLD CL DAM TO MERIDIAN RD THEN NORTH       12
                 19076      1722.36    19108      1721.01    19208      1711.3     13
                 19308      1717.6     19408      1719.08    19540      1717.9     14
                 19570      1717.6     19650      1717.5     19700      1715.06    15
                 19725      1716.7     19800      1715.94    20600      1704.05    16
                 20650      1703.6     20700      1704.97    20750      1703.8     17
                 20800      1704.09    20850      1702.4     21000      1701.25    18
                 21070      1700.2     21070      1694.2     21100      1691.88    19
                 21146.79   1693.95    21250      1694.1     21270      1691.1     20
                 21300      1692.59    21320      1693.8     21350      1699.1     21
                 21400      1698.72    21700      1694.85    21750      1695.8     22
                 21875      1695.0     21925      1688.8     22000      1693.14    23
                 22650      1693.8     22700      1692.42    22750      1691.4     24
                 22760      1690.5     22772      1682.8     22795      1682.9     25
                 22900      1686.7     22930      1691.0     22950      1691.2     26
                 23000      1692.06    23050      1690.8     23070      1692.2     27
                 23100      1691.3     23135      1688.6     23150      1689.5     28
                 23170      1691.7     23190      1692.2     23200      1690.21    29
                 23210      1687.9     23240      1687.9     23250      1686.3     30
                 23255      1685.9     23400      1692.99    23550      1690.5     31
                 23600      1691.7     23700      1690.4     23750      1691.7     32
                 23800      1692.22    23900      1687.76    23910      1687.5     33
                 23925      1684.1     23940      1686.3     23950      1686.5     34
                 23980      1687.7     23995      1685.0     24000      1686.23    35
                 24025      1689.3     24150      1687.5     24165      1685.8     36
                 24175      1687.2     24200      1688.53    24232.27   1688.99    37
                 24267      1686.79    24300      1689.44    24350      1688.9     38
                 24390      1687.7     24400      1686.3     24700      1694.01    39
                 24800      1693.69    25000      1698.36    25050      1695.8     40
                 25100      1697.1     25150      1695.9     25200      1695.04    41
                 25350      1700.6     25400      1703.16    26500      1720.00    43
                 26550      1719.8     26600      1720.5     26650      1721.7     44
                 26700      1722.4     26750      1723.3     26800      1723.5     45
      ENDTABLE                                                                     46
      STRUCTURE SBFRS       SIGNAL BUTTE FRS BUCKHORN-MESA WPP                     47
                            1684       0.09       0.0        0.0        0.022      48
                            1688       1.36       6.4        0.0        2.94       49
                            1692       5.58       7.9        0.0        16.82      50
                            1696       20.96      9.2        0.0        69.9       51
```

2

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

```
                    1701      54.5      10.5      0.0       265.          52
                    1704      75.2      121.3     0.0       450.86        53
                    1708      107.6     138.4     0.0       816.46        54
                    1710      122.1     145.9     0.0       1046.16       55
                    1712      136.7     153.2     0.0       1304.94       56
                    1716      165.4     166.7     0.0       1909.1        57
                    1720      192.5     179.5     0.0       2624.9        58
                    1724      223.6     191.5     0.0       3457.1        59
ENDTABLE                                                                  59
POOLDATA  ELEV      1684.     1684.     1700.75                           61
ESCREST   ELEV      1712.4                                                61
BTMWIDTH  FEET      140.                                                  70
ESDATA    45        10        0.011     0         0.011     0.5           63
ESRATING  45        1.0       FUJIMOTO ENTRANCE BAFFLED APRON DROP        X
ESRATING  2.34      6.62      14.11     22.24     34.44     45.21         X
ESRATING  57.04     71.96     85.86     100.56    116.02    132.19        X
HYD       EMSPY               TR20 HYDROGRAPH, EM. SPY. STORM (24 HR)     X
                    0.2
                    .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .25
                    4.54      18.64     45.98     88.62     144.69
                    212.22    304.06    435.98    587.09    769.08
                    960.55    1193.74   1478.19   1774.43   2150.09
                    2534.55   2972.28   3458.60   3919.47   4437.61
                    4915.95   5227.07   5377.27   5460.15   5476.27
                    5484.01   5395.20   5219.64   5062.48   4905.15
                    4788.57   4613.63   4383.13   4168.01   3873.13
                    3613.69   3350.73   3089.10   2882.43   2681.68
                    2524.54   2359.31   2185.07   2045.34   1920.52
                    1828.18   1730.76   1626.62   1539.77   1448.10
                    1374.23   1312.47   1260.31   1216.40   1152.37
                    1093.71   1027.24   955.71    909.02    917.42
                    944.03    941.57    908.55    879.18    878.11
                    888.22    846.35    757.69    686.04    676.69
                    694.24    712.52    723.97    722.41    683.17
                    638.73    618.71    623.05    636.94    665.98
                    693.18    686.41    649.93    618.61    616.71
                    626.46    610.09    568.52    541.98    581.11
                    636.84    640.76    595.28    558.87    590.80
                    640.85    589.76    446.57    315.50    228.10
                    178.84    151.93    136.66    127.74    122.47
                    119.38    117.57    116.50    115.87    115.50
                    115.09    114.35    113.91    113.74    113.62
                    113.52    113.42    113.32    113.22    113.12
                    113.02    112.92    112.82    112.72    112.62
                    112.52    112.42    112.32    112.22    112.12
```

2

3

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

112.02	111.93	111.83	111.73	111.63
111.53	111.43	111.33	111.24	111.14
111.04	110.94	110.84	110.75	110.65
110.55	110.45	110.35	110.26	110.16
110.06	109.96	109.87	109.77	109.67
109.58	109.48	109.38	109.29	109.19
109.09	109.00	108.90	108.80	108.71
108.61	108.52	108.42	108.33	108.23
108.13	108.04	107.94	107.85	107.75
107.66	107.56	107.47	107.37	107.28
107.18	107.09	106.99	106.90	106.80
106.71	106.62	106.52	106.43	106.33
106.24	106.15	106.05	105.96	105.86
105.77	105.68	105.58	105.49	105.40
105.31	105.21	105.12	105.03	104.93
104.84	104.75	104.66	104.56	104.47
104.38	104.29	104.19	104.10	104.01
103.92	103.83	103.73	103.64	103.55
103.46	103.37	103.28	103.19	103.10
103.00	102.91	102.82	102.73	102.64
102.55	102.45	102.34	102.21	102.08
101.95	101.82	101.69	101.56	101.43
101.30	101.17	101.04	100.92	100.79
100.66	100.53	100.40	100.27	100.14
100.02	99.89	99.76	99.63	99.50
99.38	99.25	99.12	99.00	98.87
98.74	98.62	98.49	98.37	98.24
98.11	97.99	97.86	97.74	97.61
97.49	97.36	97.24	97.11	96.99

```
ENDTABLE                                                                F1
GO,HYD     LP                                                            X
HYD        FRBD            TR20 HYDROGRAPH,FREEBOARD STORM 24 HR
```

0.2				
.00	.00	.00	.00	.00
.00	.00	.00	.00	.00
.00	.00	.00	.00	.00
.09	1.86	11.03	31.51	73.21
141.36	229.17	329.87	440.68	600.22
789.45	1002.89	1243.36	1480.79	1731.18
1975.91	2351.73	2891.09	3439.44	4052.10
4618.41	5299.06	6113.99	6897.81	7892.59
8836.20	9874.15	11001.97	12010.96	13169.29
14099.83	14351.65	14310.78	14258.98	14112.70
13988.39	13623.95	13047.53	12581.06	12138.84
11795.39	11299.99	10654.56	10061.87	9288.61
8606.31	7937.99	7278.82	6762.57	6273.06
5888.56	5486.15	5055.91	4712.62	4416.67
4198.41	3965.84	3711.38	3499.87	3281.07
3103.51	2958.36	2836.33	2732.83	2577.73

3

④

**********[illegible]********** 80-80 LIST OF INPUT DATA ******[illegible]**********

2433.02	2272.50	2098.71	1997.63	2019.96
2097.83	2092.93	2003.73	1926.58	1928.60
1959.59	1854.82	1625.67	1443.97	1433.45
1491.85	1541.58	1568.13	1561.96	1461.23
1346.39	1299.44	1317.78	1357.26	1430.13
1497.95	1477.86	1380.03	1298.66	1298.52
1328.91	1289.01	1181.26	1113.68	1218.58
1366.79	1374.26	1249.27	1151.67	1238.37
1373.39	1243.78	871.29	538.50	339.16
235.93	182.14	152.44	135.92	126.72
121.62	118.78	117.17	116.24	115.69
115.37	115.17	115.07	115.00	115.00
115.00	115.00	115.00	115.00	114.77
114.09	113.77	113.65	113.55	113.45
113.35	113.25	113.15	113.05	112.95
112.85	112.75	112.65	112.55	112.45
112.35	112.25	112.15	112.05	111.95
111.86	111.76	111.66	111.56	111.46
111.36	111.26	111.17	111.07	110.97
110.87	110.77	110.68	110.58	110.48
110.38	110.29	110.19	110.09	109.99
109.90	109.80	109.70	109.61	109.51
109.41	109.32	109.22	109.12	109.03
108.93	108.83	108.74	108.64	108.55
108.45	108.35	108.26	108.16	108.07
107.97	107.88	107.78	107.69	107.59
107.50	107.40	107.31	107.21	107.12
107.02	106.93	106.83	106.74	106.64
106.55	106.46	106.36	106.27	106.17
106.08	105.99	105.89	105.80	105.71
105.61	105.52	105.43	105.33	105.24
105.15	105.05	104.96	104.87	104.78
104.68	104.59	104.50	104.41	104.31
104.22	104.13	104.04	103.95	103.85
103.76	103.67	103.58	103.49	103.40
103.30	103.21	103.12	103.03	102.94
102.85	102.76	102.67	102.58	102.48
102.38	102.25	102.12	101.99	101.86
101.73	101.60	101.47	101.34	101.21
101.08	100.95	100.82	100.70	100.57
100.44	100.31	100.18	100.05	99.93
99.80	99.67	99.54	99.42	99.29
99.16	99.03	98.91	98.78	98.65
98.53	98.40	98.28	98.15	98.03

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ENDTABLE
GO,HYD    LP
ENDJOB
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SIGNAL BUTTE FRS W/PM DIVERSION

5

THIS IS THE FINAL DESIGN HYDROLOGY FOR SIGNAL BUTTE FRS WHICH INCLUDES APACHE JUNCTION FRS, BULLDOG DIVERSION, AND PASS MOUNTAIN DIVERSION WITH OUTLET CHANNEL.

THE HYDROGRAPHS FROM THE DIVERSIONS INCLUDE FREEBOARD DISCHARGE QUANTITIES. SEDIMENT FROM PASS MOUNTAIN WILL INCLUDE MOST FINE-GRAINED SEDIMENT, BUT NO COARSE-GRAINED SEDIMENT. THIS IS IN ADDITION TO THE WORK PLAN SEDIMENT STORAGE REQUIREMENT.

THE 100-YR STORM SET THE EMERGENCY SPILLWAY CREST AT 1712.4.

5

6

********** BASIC DATA **********

****NOT DEFINED CLIMATE AREA DESIGN CLASS ****NOT DEFINED

6

STORM DISTRIBUTION.....TR20 HYDROGRAPH, EM. SPY. STORM (24 HR)

Q-PS1 DAY	Q-PS10 DAY	Q-ES	Q-FP	CN	DA-SM	TC/L	-/H
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONDUITS	COND L	D/W	-/H	PS N	KI	WEIR L	TW EL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PERM POOL	CREST PS	FP SED	ORF	2ND STG	ORF H	ORF L	START ES
1684.00	1684.00	1700.75	0.0	0.0	0.0	0.0	0.0
BASEFLOW	INITIAL EL	EXTRA VOL.					
0.0	0.0	0.0					
ES1	ES2	ES3	ES4	ES5	Z ES	EXIT N	EXIT S
1712.40	0.0	0.0	0.0	0.0	0.0	0.011	0.500
ES TYPE	ES L	ES N	BW1	BW2	BW3	BW4	BW5
45	10	0.011	140.00	0.0	0.0	0.0	0.0

****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.

ES CODE	INCREMENT			Q1	Q2	Q3	Q4
45	1.000			2.340	6.620	14.110	22.240
Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
34.440	45.210	57.040	71.960	85.860	100.560	116.020	132.190

(2)

ERM POOL	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
SED ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	14.2 CFS
ES CREST	1712.40 FT	1365.3 ACFT	139.57 AC	154.5 CFS
PS STORAGE	1110.1 ACFT	BETWEEN ES CREST AND SED ACCUM ELEVATIONS		
STARTING E	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS

(7)

****

RATING TABLE DEVELOPED
WITH PS GIVEN AND ESRATING FOR EMG

RATING TABLE NUMBER 2

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1686.37	3.79	3.79	1.75	0.84
3	1688.73	6.67	6.67	5.48	2.13
4	1691.10	7.56	7.56	13.69	4.63
5	1693.47	8.38	8.38	36.27	11.22
6	1695.83	9.15	9.15	67.67	20.32
7	1698.20	9.77	9.77	155.69	35.71
8	1700.57	10.39	10.39	248.03	51.58
9	1702.93	81.84	81.84	384.67	67.83
10	1705.30	126.85	126.85	569.51	85.71
11	1707.66	136.97	136.97	785.80	104.88
12	1710.03	146.01	146.01	1050.17	122.33
13	1712.40	154.54	154.54	1364.97	139.55
14	1712.98	345.73	156.50	1452.59	143.71
15	1713.56	580.56	158.46	1540.20	147.88
16	1714.60	1300.50	161.98	1697.92	155.37
17	1715.88	2686.06	166.29	1890.70	164.53
18	1718.20	6199.80	173.74	2302.56	180.30
19	1721.10	11618.35	182.80	2853.62	201.05
20	1724.00	17792.80	191.50	3457.10	223.60

TYPE	BW	EMAX	VOL-MAX	AMAX	HP	VOL-ES	Q-PS	Q-ES	Q-TOT	D/C	V/C	S/C	S/C.25	D-ES	OE/B
FLOOD HYD	140.0	1715.66	1857.8	163.0	3.26	492.8	165.6	2284.0	2449.6	2.02	8.07	0.001	0.002	27.2	10.7

PLOT 1 IN = 1000. CFS EXIT SLOPE = 0.500

T	I	O	E	VOL	A	0. I	1000. I	2000. I	3000. I	4000. I	5000. I	6000. I	7000. I	EXIT VEL
0.0	0.0	0.0	1684.0	0.0	0.1	.								0.0
0.20	0.0	0.0	1684.0	0.0	0.1	.								0.0
0.40	0.0	0.0	1684.0	0.0	0.1	.								0.0
0.60	0.0	0.0	1684.0	0.0	0.1	.								0.0
0.80	0.0	0.0	1684.0	0.0	0.1	.								0.0
1.00	0.0	0.0	1684.0	0.0	0.1	.								0.0
1.20	0.0	0.0	1684.0	0.0	0.1	.								0.0
1.40	0.0	0.0	1684.0	0.0	0.1	.								0.0
1.60	0.0	0.0	1684.0	0.0	0.1	.								0.0
1.80	0.0	0.0	1684.0	0.0	0.1	.								0.0
2.00	0.0	0.0	1684.0	0.0	0.1	.								0.0
2.20	0.0	0.0	1684.0	0.0	0.1	.								0.0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.								0.0

← 2300 cfs Qew. spwy

2.80	0.0	0.0	1684.0	0.0	0.1	.	0.0
3.00	0.0	0.0	1684.0	0.0	0.1	.	0.0
3.20		0.0	1684.0	0.0	0.1	.	0.0
3.40		0.0	1684.0	0.0	0.1	.	0.0
3.60		0.0	1684.0	0.0	0.1	.	0.0
3.80	0.0	0.0	1684.0	0.0	0.1	.	0.0
4.00	0.0	0.0	1684.0	0.0	0.1	.	0.0
4.20	0.0	0.0	1684.0	0.0	0.1	.	0.0
4.40	0.0	0.0	1684.0	0.0	0.1	.	0.0
4.60	0.0	0.0	1684.0	0.0	0.1	.	0.0
4.80	0.3	0.3	1684.2	0.1	0.1	.	0.0
5.00	4.5	4.5	1687.7	2.7	1.3	.	0.0
5.20	18.6	14.2	1700.8	255.3	52.8	.	0.0
5.40	46.0	14.3	1700.8	255.6	52.9	.	0.0
5.60	88.6	14.8	1700.8	256.5	53.0	.I	0.0
5.80	144.7	15.7	1700.8	258.1	53.3	.I	0.0
6.00	212.2	17.1	1700.9	260.8	53.8	. I	0.0
6.20	304.1	19.1	1701.0	264.8	54.5	. I	0.0
6.40	436.0	22.2	1701.1	270.5	55.1	. I	0.0
6.60	587.1	26.4	1701.2	278.6	56.0	. I	0.0
6.80	769.1	32.0	1701.4	289.3	57.2	. I	0.0
7.00	960.5	39.1	1701.6	303.0	58.7	. I	0.0
7.20	1193.7	48.1	1701.9	320.1	60.6	. I	0.0
7.40	1478.2	59.2	1702.2	341.3	63.0	.P I	0.0
7.60	1774.4	72.7	1702.6	367.1	65.9	.P I	0.0
7.80	2150.1	85.1	1703.2	398.2	69.3	.P I	0.0
8.00	2534.5	94.2	1703.8	435.5	73.5	.P I	0.0
8.20	2972.3	104.9	1704.3	479.3	77.7	.P I	0.0
8.40	3458.6	117.4	1704.9	530.6	82.3	.P I	0.0
8.60	3919.5	127.8	1705.5	589.6	87.5	.P I	0.0
8.80	4437.6	130.9	1706.2	656.5	93.4	.P I	0.0
9.00	4915.9	134.4	1707.1	731.6	100.1	.P I	0.0
9.20	5227.1	137.9	1708.0	813.2	107.3	.P I	0.0
9.40	5377.3	140.8	1708.7	898.5	112.8	.P I	0.0
9.60	5460.1	143.8	1709.5	985.8	118.3	.P I	0.0
9.80	5476.3	146.7	1710.2	1073.7	123.7	.P I	0.0
10.00	5484.0	149.0	1710.9	1161.9	128.6	.P X	0.0
10.20	5395.2	151.4	1711.6	1249.3	133.6	. P I	0.0
10.40	5219.6	153.7	1712.2	1334.5	138.1	. P I	0.0
10.60	5062.5	265.9	1712.7	1416.0	142.0	. E I	14.02
10.80	4905.1	452.6	1713.2	1492.5	145.6	. E I	20.78
11.00	4788.6	685.4	1713.7	1563.2	149.0	. E I	26.20
11.20	4613.6	977.3	1714.1	1627.1	152.0	. E I	31.23
11.40	4383.1	1233.3	1714.5	1683.2	154.7	. E I	34.82
11.60	4168.0	1538.1	1714.8	1731.0	156.9	. E I	38.47
11.80	3873.1	1816.5	1715.1	1769.7	158.8	. E I	41.40
12.00	3613.7	2032.5	1715.3	1799.8	160.2	. E I	43.48
12.20	3350.7	2195.1	1715.4	1822.4	161.3	. E I	44.94
12.40	3089.1	2310.0	1715.5	1838.4	162.0	. E I	45.96
12.60	2882.4	2385.8	1715.6	1848.9	162.5	. E I	46.58
12.80	2681.7	2430.2	1715.6	1855.1	162.8	. E I	46.96
13.00	2524.5	2449.6	1715.7	1857.8	163.0	. XI	47.13
13.20	2359.3	2448.7	1715.7	1857.7	163.0	. E	47.11
13.40	2185.1	2428.9	1715.6	1854.9	162.8	. I E	46.95
13.60	2045.3	2393.8	1715.6	1850.0	162.6	. I E	46.67

(9)

13.80	1920.5	2347.7	1715.6	1843.6	162.3	.	46.27
14.00	18[illegible]	2294.6	1715.5	1836.2	161.9	.	45.82
14.20	17[illegible]	236.8	1715.5	1828.2	161.6	.	45.32
14.40	16[illegible]	174.3	1715.4	1819.5	161.1	.	44.76
14.60	1539.8	2108.0	1715.3	1810.3	160.7	.	44.17
14.80	1448.1	2039.1	1715.3	1800.7	160.2	.	43.54
15.00	1374.2	1968.7	1715.2	1790.9	159.8	.	42.90
15.20	1312.5	1898.6	1715.2	1781.1	159.3	.	42.23
15.40	1260.3	1829.9	1715.1	1771.6	158.9	.	41.53
15.60	1216.4	1763.6	1715.0	1762.3	158.4	.	40.88
15.80	1152.4	1698.6	1715.0	1753.3	158.0	.	40.20
16.00	1093.7	1634.1	1714.9	1744.3	157.6	.	39.52
16.20	1027.2	1569.8	1714.8	1735.4	157.1	.	38.82
16.40	955.7	1504.9	1714.8	1726.4	156.7	.	38.09
16.60	909.0	1440.7	1714.7	1717.4	156.3	.	37.37
16.80	917.4	1381.6	1714.7	1709.2	155.9	.	36.65
17.00	944.0	1331.0	1714.6	1702.2	155.6	.	36.04
17.20	941.6	1292.1	1714.6	1696.1	155.3	.	35.57
17.40	908.5	1265.4	1714.6	1690.2	155.0	.	35.23
17.60	879.2	1238.4	1714.5	1684.3	154.7	.	34.88
17.80	878.1	1212.2	1714.5	1678.6	154.4	.	34.54
18.00	888.2	1188.3	1714.4	1673.3	154.2	.	34.22
18.20	846.3	1164.9	1714.4	1668.2	154.0	.	33.91
18.40	757.7	1138.5	1714.4	1662.4	153.7	.	33.57
18.60	686.0	1108.2	1714.3	1655.8	153.4	.	33.16
18.80	676.7	1077.2	1714.3	1649.0	153.0	.	32.70
19.00	694.2	1048.7	1714.2	1642.8	152.7	.	32.30
19.20	712.5	1023.6	1714.2	1637.3	152.5	.	31.92
19.40	724.0	1001.4	1714.2	1632.4	152.3	.	31.59
19.60	722.4	981.2	1714.1	1628.0	152.0	.	31.30
19.80	683.2	960.9	1714.1	1623.5	151.8	.	31.00
20.00	638.7	939.1	1714.1	1618.8	151.6	.	30.65
20.20	618.7	916.6	1714.0	1613.8	151.4	.	30.29
20.40	623.0	895.1	1714.0	1609.1	151.1	.	29.97
20.60	636.9	875.8	1714.0	1604.9	150.9	.	29.63
20.80	666.0	859.5	1714.0	1601.3	150.8	.	29.35
21.00	693.2	846.4	1713.9	1598.4	150.6	.	29.16
21.20	686.4	835.0	1713.9	1595.9	150.5	.	28.96
21.40	649.9	822.9	1713.9	1593.3	150.4	.	28.77
21.60	618.6	809.2	1713.9	1590.3	150.3	.	28.52
21.80	616.7	795.2	1713.9	1587.2	150.1	.	28.26
22.00	626.5	782.6	1713.9	1584.5	150.0	.	28.05
22.20	610.1	770.7	1713.8	1581.8	149.9	.	27.81
22.40	568.5	757.5	1713.8	1579.0	149.7	.	27.60
22.60	542.0	742.8	1713.8	1575.7	149.6	.	27.31
22.80	581.1	729.6	1713.8	1572.9	149.4	.	27.05
23.00	636.8	720.8	1713.8	1570.9	149.3	.	26.92
23.20	640.8	714.9	1713.8	1569.6	149.3	.	26.78
23.40	595.3	707.8	1713.7	1568.1	149.2	.	26.66
23.60	558.9	698.3	1713.7	1566.0	149.1	.	26.47
23.80	590.8	689.3	1713.7	1564.0	149.0	.	26.27
24.00	640.8	684.0	1713.7	1562.9	149.0	.	26.16
24.20	589.8	679.0	1713.7	1561.8	148.9	.	26.07
24.40	446.6	667.3	1713.7	1559.2	148.8	.	25.87
24.60	315.5	646.5	1713.7	1554.6	148.6	.	25.43
24.80	228.1	619.2	1713.6	1548.7	148.3	.	24.85
25.00	178.8	589.0	1713.6	1542.1	148.0	.	24.21
25.20	151.9	567.2	1713.5	1535.2	147.6	.	23.70
25.40	136.7	548.9	1713.5	1528.4	147.3	.	23.26
25.60	127.7	530.8	1713.4	1521.7	147.0	.	22.82
25.80	122.5	513.3	1713.4	1515.1	146.7	.	22.39
26.00	119.4	496.3	1713.3	1508.7	146.4	.	21.97
26.20	117.6	479.9	1713.3	1502.6	146.1	.	21.53
26.40	116.5	464.2	1713.3	1496.9	145.8	.	21.12

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26.80	115.5	434.6	1713.2	1485.9	145.3	.I	F	20.27
27.00	115.[illegible]	420.8	1713.2	1480.6	145.0	.I	F	19.89
27.20	11[illegible]	407.5	1713.1	1475.6	144.9	.I	F	19.48
27.40	11[illegible]	394.8	1713.1	1470.5	144.6	.I	F	19.10
27.60	11[illegible]	382.6	1713.1	1466.4	144.4	.I	F	18.69
27.80	113.6	371.0	1713.0	1462.0	144.2	.I	F	18.31
28.00	113.5	359.8	1713.0	1457.8	144.0	.I	F	17.90
28.20	113.4	349.1	1713.0	1453.9	143.8	.I	E	17.57
28.40	113.3	340.2	1713.0	1450.0	143.6	.I	E	17.24
28.60	113.2	332.1	1712.9	1446.3	143.4	.I	E	16.94
28.80	113.1	324.4	1712.9	1442.9	143.2	.I	E	16.60
29.00	113.0	316.9	1712.9	1439.4	143.1	.I	E	16.33
29.20	112.9	309.6	1712.9	1436.1	142.9	.I	E	16.02
29.40	112.8	302.7	1712.8	1432.9	142.8	.I	E	15.72
29.60	112.7	295.9	1712.8	1429.8	142.6	.I	E	15.44
29.80	112.6	289.5	1712.8	1426.8	142.5	.I	E	15.17
30.00	112.5	283.2	1712.8	1423.9	142.4	.I	E	14.86
30.20	112.4	277.1	1712.8	1421.2	142.2	.I	E	14.61
30.40	112.3	271.3	1712.8	1418.5	142.1	.I	E	14.32
30.60	112.2	265.7	1712.7	1415.9	142.0	.I	E	14.05
30.80	112.1	260.2	1712.7	1413.4	141.9	.I	E	13.78
31.00	112.0	255.0	1712.7	1411.0	141.7	.I	E	13.46
31.20	111.9	249.9	1712.7	1408.7	141.6	.IE		13.22
31.40	111.8	245.0	1712.7	1406.4	141.5	.IE		12.93
31.60	111.7	240.3	1712.7	1404.3	141.4	.IE		12.64
31.80	111.6	235.7	1712.6	1402.2	141.3	.IE		12.36
32.00	111.5	231.3	1712.6	1400.2	141.2	.IE		12.10
32.20	111.4	227.1	1712.6	1398.2	141.1	.IE		11.84
32.40	111.3	223.0	1712.6	1396.3	141.0	.IE		11.59
32.60	111.2	219.0	1712.6	1394.5	141.0	.IE		11.28
32.80	111.1	215.2	1712.6	1392.8	140.9	.IE		11.05
33.00	111.0	211.5	1712.6	1391.1	140.8	.IE		10.76
33.20	110.9	208.0	1712.6	1389.5	140.7	.IE		10.47
33.40	110.8	204.5	1712.5	1387.9	140.6	.IE		10.18
33.60	110.8	201.2	1712.5	1386.4	140.6	.IE		9.90
33.80	110.6	198.0	1712.5	1384.9	140.5	.IE		9.63
34.00	110.5	194.9	1712.5	1383.5	140.4	.IE		9.36
34.20	110.4	191.9	1712.5	1382.1	140.4	.IE		9.09
34.40	110.3	189.0	1712.5	1380.8	140.3	.IE		8.83
34.60	110.3	186.2	1712.5	1379.5	140.2	.IE		8.56
34.80	110.2	183.5	1712.5	1378.3	140.2	.IE		8.21
35.00	110.1	180.9	1712.5	1377.1	140.1	.IE		7.94
35.20	110.0	178.4	1712.5	1375.9	140.1	.IE		7.57
35.40	109.9	176.0	1712.5	1374.8	140.0	.IE		7.29
35.60	109.8	173.6	1712.5	1373.7	140.0	.IE		7.00
35.80	109.7	171.4	1712.4	1372.7	139.9	.IE		6.59
36.00	109.6	169.2	1712.4	1371.7	139.9	.IE		6.26
36.20	109.5	167.1	1712.4	1370.7	139.8	.IE		5.91
36.40	109.4	165.0	1712.4	1369.8	139.8	.IE		5.51
36.60	109.3	163.1	1712.4	1368.9	139.7	.IE		5.05
36.80	109.2	161.2	1712.4	1368.0	139.7	.IE		4.64
37.00	109.1	159.3	1712.4	1367.2	139.7	.IE		4.10
37.20	109.0	157.5	1712.4	1366.3	139.6	.IE		3.30
37.40	108.9	155.8	1712.4	1365.6	139.6	.IE		2.46
37.60	108.8	154.5	1712.4	1364.8	139.5	.IP		0.0

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********** BASIC DATA **********

****NOT DEFINED CLIMATE AREA

DESIGN CLASS ****NOT DEFINED

STORM DISTRIBUTION.....TR20 HYDROGRAPH,FREEBOARD STORM 24 HR

Q-PS1 DAY	Q-PS10 DAY	Q-ES	Q-FB	CN	DA-SM	TC/L	-/H
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONDUITS	COND L	D/W	-/H	PS N	KI	WEIR L	TW EL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PERM POOL	CREST PS	FP SED	QRF	2ND STG	QRF H	QRF L	START ES
1684.00	1684.00	1700.75	0.0	0.0	0.0	0.0	0.0
BASEFLOW	INITIAL EL	EXTRA VOL.					
0.0	0.0	0.0					
ES1	ES2	ES3	ES4	ES5	Z ES	EXIT N	EXIT S
1712.40	0.0	0.0	0.0	0.0	0.0	0.011	0.500
ES TYPE	ES L	ES N	BW1	BW2	BW3	BW4	BW5
45	10	0.011	140.00	0.0	0.0	0.0	0.0

****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.

ES CODE	INCREMENT			Q1	Q2	Q3	Q4
45	1.000			2.340	6.620	14.110	22.240
Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
34.440	45.210	57.040	71.960	85.860	100.560	116.020	132.190

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PERM POOL	1684.00 FT	0.0 ACFT	0.09	0.0 CFS
CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
SED ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	14.2 CFS
ES CREST	1712.40 FT	1365.3 ACFT	139.57 AC	154.5 CFS
PS STORAGE	1110.1 ACFT	BETWEEN ES CREST AND SED ACCUM ELEVATIONS		
STARTING E	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS

****

RATING TABLE DEVELOPED
WITH PS GIVEN AND ESRATING FOR EMG

RATING TABLE NUMBER 2

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1686.37	3.79	3.79	1.75	0.84
3	1688.73	6.67	6.67	5.48	2.13
4	1691.10	7.56	7.56	13.69	4.63
5	1693.47	8.38	8.38	36.27	11.22
6	1695.83	9.15	9.15	67.67	20.32
7	1698.20	9.77	9.77	155.69	35.71
8	1700.57	10.39	10.39	248.03	51.58
9	1702.93	81.84	81.84	384.67	67.83
10	1705.30	126.85	126.85	569.51	85.71
11	1707.66	136.97	136.97	785.80	104.88
12	1710.03	146.01	146.01	1050.17	122.33
13	1712.40	154.54	154.54	1364.97	139.55
14	1712.98	345.73	156.50	1452.59	143.71
15	1713.56	580.56	158.46	1540.20	147.88
16	1714.60	1300.50	161.98	1697.92	155.37
17	1715.88	2686.06	166.29	1890.70	164.53
18	1718.20	6199.80	173.74	2302.56	180.30
19	1721.10	11618.35	182.80	2853.62	201.05
20	1724.00	17792.80	191.50	3457.10	223.60

TYPE	BW	EMAX	VOL-MAX	AMAX	HP	VOL-ES	Q-PS	Q-ES	Q-TOT	D/C	V/C	S/C	S/C.25	D-ES	OE/B
FLOOD HYD	140.0	1720.95	2822.1	199.9	8.55	1457.2	182.3	11126.5	11308.8	5.81	13.67	0.001	0.001	31.4	44.2

PLOT 1 IN = 5000. CFS EXIT SLOPE = 0.500

T	I	O	E	VOL	A	0. I	5000. I	10000. I	15000. I	20000. I	25000. I	30000. I	35000. I	EXIT VEL
0.0	0.0	0.0	1684.0	0.0	0.1	.								0.0
0.20	0.0	0.0	1684.0	0.0	0.1	.								0.0
0.40	0.0	0.0	1684.0	0.0	0.1	.								0.0
0.60	0.0	0.0	1684.0	0.0	0.1	.								0.0
0.80	0.0	0.0	1684.0	0.0	0.1	.								0.0
1.00	0.0	0.0	1684.0	0.0	0.1	.								0.0
1.20	0.0	0.0	1684.0	0.0	0.1	.								0.0
1.40	0.0	0.0	1684.0	0.0	0.1	.								0.0
1.60	0.0	0.0	1684.0	0.0	0.1	.								0.0
1.80	0.0	0.0	1684.0	0.0	0.1	.								0.0
2.00	0.0	0.0	1684.0	0.0	0.1	.								0.0
2.20	0.0	0.0	1684.0	0.0	0.1	.								0.0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.								[illegible]

2.80	0.0	0.0	1684.0	0.0	0.1	.	0.0
3.00	0.1	0.1	1684.1	0.1	0.1	.	0.0
3.20		1.9	1685.2	0.9	0.5	.	0.0
3.40		11.0	1700.6	249.3	51.8	.	0.0
3.60		14.2	1700.8	255.4	52.8	.	0.0
3.80	73.2	14.6	1700.8	256.0	53.0	.	0.0
4.00	141.4	15.4	1700.8	257.5	53.2	.	0.0
4.20	229.2	16.8	1700.9	260.3	53.7	.	0.0
4.40	329.9	19.1	1701.0	264.7	54.4	.I	0.0
4.60	440.7	22.2	1701.1	270.7	55.1	.I	0.0
4.80	600.2	26.5	1701.2	278.9	56.0	.I	0.0
5.00	789.4	32.3	1701.4	289.9	57.3	. I	0.0
5.20	1002.9	39.7	1701.6	304.1	58.9	. I	0.0
5.40	1243.4	49.0	1701.9	321.9	60.8	. I	0.0
5.60	1480.8	60.3	1702.3	343.5	63.2	. I	0.0
5.80	1731.2	73.6	1702.7	369.0	66.1	. I	0.0
6.00	1975.9	85.2	1703.2	398.3	69.3	. I	0.0
6.20	2351.7	93.5	1703.7	432.6	73.2	. I	0.0
6.40	2891.1	103.7	1704.3	474.3	77.3	. I	0.0
6.60	3439.4	116.0	1704.8	524.8	81.8	. I	0.0
6.80	4052.1	127.6	1705.5	584.7	87.1	. I	0.0
7.00	4618.4	130.8	1706.2	654.2	93.2	. I	0.0
7.20	5299.1	134.5	1707.1	734.0	100.3	. I	0.0
7.40	6114.0	138.3	1708.1	826.1	108.2	. I	0.0
7.60	6897.8	141.9	1709.0	931.3	114.8	. I	0.0
7.80	7892.6	146.0	1710.0	1051.1	122.4	. I	0.0
8.00	8836.2	149.7	1711.1	1186.9	130.0	. I	0.0
8.20	9874.1	153.8	1712.2	1339.1	138.3	. I	0.0
8.40	******	489.6	1713.3	1506.3	146.3	.E I	21.78
8.60	******	1229.0	1714.5	1682.3	154.6	. E I	34.75
8.80	******	2464.2	1715.7	1859.8	163.1	. E I	47.24
9.00	******	3896.9	1716.7	2032.6	170.1	. E I	57.31
9.20	******	5257.5	1717.6	2192.1	176.1	. E X	64.89
9.40	******	6488.4	1718.4	2331.9	181.4	. E I	70.76
9.60	******	7660.3	1719.0	2451.1	185.9	. E I	75.74
9.80	******	8641.2	1719.6	2550.9	189.7	. E I	79.56
10.00	******	9454.3	1720.0	2633.5	192.8	. E I	82.52
10.20	**********		1720.4	2700.1	195.3	. E I	84.80
10.40	**********		1720.6	2749.4	197.2	. E I	86.43
10.60	**********		1720.8	2783.3	198.4	. E I	87.53
10.80	**********		1720.9	2805.2	199.2	. E I	88.23
11.00	**********		1720.9	2817.8	199.7	. EI	88.61
11.20	**********		1720.9	2822.1	199.9	. X	88.76
11.40	**********		1720.9	2817.1	199.7	. I E	88.60
11.60	**********		1720.9	2803.3	199.2	. I E	88.16
11.80	9288.6	******	1720.8	2781.2	198.3	. I E	87.46
12.00	8606.3	******	1720.6	2751.2	197.2	. I E	86.49
12.20	7938.0	******	1720.4	2715.5	195.9	. I E	85.32
12.40	7278.8	9861.3	1720.2	2674.9	194.4	. I E	83.96
12.60	6762.6	9434.3	1720.0	2631.5	192.7	. I E	82.45
12.80	6273.1	8995.9	1719.8	2586.9	191.1	. I E	80.88
13.00	5888.6	8557.7	1719.5	2542.4	189.4	. I E	79.25
13.20	5486.1	8126.3	1719.3	2498.5	187.7	. I E	77.59
13.40	5055.9	7697.1	1719.0	2454.8	186.1	. I E	75.90
13.60	4712.6	7274.3	1718.8	2411.8	184.4	. I E	74.16

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13.804416	76867.0	1718.6	2370.4	182.9	. I F	72.43
14.0041[illegible]	[illegible]482.3	1718.4	2331.3	181.4	. I E	70.74
14.203[illegible]	[illegible]131.2	1718.2	2294.5	180.0	. I E	69.15
14.4037[illegible]	[illegible]5829.2	1718.0	2259.1	178.7	. I E	67.72
14.603499	.95536.3	1717.8	2224.8	177.4	. I E	66.30
14.803281	.15253.6	1717.6	2191.7	176.1	. I E	64.88
15.003103	.54982.1	1717.4	2159.8	174.9	. I E	63.48
15.202958	.44725.1	1717.2	2129.7	173.8	. I E	62.10
15.402836	.34484.3	1717.1	2101.5	172.7	. I E	60.77
15.602732	.84260.4	1716.9	2075.2	171.7	. I E	59.48
15.802577	.74049.0	1716.8	2050.5	170.8	. I E	58.25
16.002433	.03845.6	1716.7	2026.6	169.8	. I E	57.00
16.202272	.53649.0	1716.5	2003.6	169.0	. I E	55.77
16.402098	.73456.2	1716.4	1981.0	168.1	. I E	54.50
16.601987	.63270.1	1716.3	1959.2	167.3	. I E	53.27
16.802020	.03103.3	1716.2	1939.6	166.6	. I E	52.10
17.002097	.82965.7	1716.1	1923.5	165.9	. I E	51.10
17.202092	.92851.1	1716.0	1910.0	165.4	. I E	50.27
17.402003	.72745.3	1715.9	1897.6	164.9	. IE	49.46
17.601926	.62649.0	1715.8	1885.5	164.3	. IE	48.72
17.801928	.62568.1	1715.8	1874.3	163.7	. IE	48.09
18.001959	.62498.1	1715.7	1864.6	163.3	. IE	47.51
18.201854	.82431.9	1715.6	1855.3	162.8	. IE	46.97
18.401625	.72354.3	1715.6	1844.5	162.3	. I E	46.32
18.601444	.02262.4	1715.5	1831.8	161.7	. I E	45.53
18.801433	.42170.1	1715.4	1818.9	161.1	. IE	44.74
19.001491	.82090.7	1715.3	1807.9	160.6	. IE	44.02
19.201541	.62026.4	1715.3	1798.9	160.2	. IE	43.42
19.401568	.11973.5	1715.2	1791.6	159.8	. IE	42.94
19.601562	.01927.7	1715.2	1785.2	159.5	. IE	42.50
19.801461	.21881.0	1715.1	1778.7	159.2	. IE	42.04
20.001346	.41827.5	1715.1	1771.2	158.9	. IE	41.52
20.201299	.41770.9	1715.0	1763.4	158.5	. IE	40.95
20.401317	.81719.1	1715.0	1756.2	158.1	. E	40.43
20.601357	.31676.3	1714.9	1750.2	157.9	. E	39.96
20.801430	.11644.6	1714.9	1745.8	157.6	. E	39.64
21.001497	.91624.4	1714.9	1743.0	157.5	. E	39.43
21.201477	.91609.1	1714.9	1740.8	157.4	. E	39.25
21.401380	.01588.9	1714.9	1738.0	157.3	. E	39.04
21.601298	.71560.9	1714.8	1734.1	157.1	. E	38.72
21.801298	.51531.5	1714.8	1730.1	156.9	. E	38.41
22.001328	.91507.0	1714.8	1726.7	156.7	. E	38.13
22.201289	.01484.8	1714.8	1723.6	156.6	. E	37.86
22.401181	.31456.8	1714.7	1719.7	156.4	. IE	37.54
22.601113	.71422.1	1714.7	1714.8	156.2	. IE	37.14
22.801218	.61393.4	1714.7	1710.8	156.0	. IE	36.82
23.001366	.81382.1	1714.7	1709.3	155.9	. E	36.67
23.201374	.31380.8	1714.7	1709.1	155.9	. E	36.66
23.401249	.31373.1	1714.7	1708.0	155.8	. IE	36.58
23.601151	.71353.7	1714.7	1705.3	155.7	. IE	36.34
23.801238	.41335.9	1714.6	1702.8	155.6	. IE	36.12
24.001373	.41332.6	1714.6	1702.4	155.6	. E	36.07
24.201243	.81329.9	1714.6	1702.0	155.6	. IE	36.03
24.40 871	.31299.7	1714.6	1697.8	155.4	. IE	35.65
24.60 538	.51256.5	1714.5	1688.3	154.9	.I E	35.13
24.80 339	.21197.0	1714.5	1675.3	154.3	.IE	34.36
25.00 235	.91130.9	1714.4	1660.8	153.6	. E	33.46
25.20 182	.11063.9	1714.3	1646.1	152.9	. E	32.52
25.40 152	.4 998.7	1714.2	1631.8	152.2	. E	31.58
25.60 135	.9 936.6	1714.1	1618.2	151.6	. E	30.60
25.80 126	.7 878.0	1714.0	1605.4	151.0	. E	29.66
26.00 121	.6 823.2	1713.9	1593.4	150.4	. E	28.74
26.20 118	.8 772.1	1713.8	1582.2	149.9	. E	27.84
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	26.97

(14)

48

26.80	115.7	639.3	1713.6	1553.1	148.5	.F	25.28
27.00	115.4	601.2	1713.6	1544.7	148.1	.E	24.45
27.20	[illegible]	571.8	1713.5	1536.9	147.7	.E	23.79
27.40	[illegible]	552.0	1713.5	1529.6	147.4	.E	23.35
27.60	[illegible]	533.1	1713.4	1522.5	147.0	.E	22.89
27.80	115.0	515.0	1713.4	1515.7	146.7	.E	22.47
28.00	115.0	497.6	1713.4	1509.3	146.4	.E	22.03
28.20	115.0	481.0	1713.3	1503.1	146.1	.F	21.58
28.40	115.0	465.2	1713.3	1497.1	145.8	.E	21.15
28.60	115.0	450.0	1713.2	1491.5	145.6	.E	20.71
28.80	114.8	435.5	1713.2	1486.1	145.3	.E	20.30
29.00	114.1	421.6	1713.2	1480.9	145.1	.E	19.91
29.20	113.8	408.2	1713.1	1475.9	144.8	.E	19.50
29.40	113.6	395.5	1713.1	1471.1	144.6	.E	19.11
29.60	113.5	383.2	1713.1	1466.6	144.4	.E	18.70
29.80	113.4	371.5	1713.0	1462.2	144.2	.E	18.32
30.00	113.3	360.4	1713.0	1458.0	144.0	.E	17.96
30.20	113.2	349.7	1713.0	1454.0	143.8	.E	17.57
30.40	113.1	340.6	1713.0	1450.2	143.6	.E	17.23
30.60	113.0	332.5	1712.9	1446.5	143.4	.E	16.93
30.80	112.9	324.7	1712.9	1443.0	143.3	.E	16.64
31.00	112.8	317.2	1712.9	1439.5	143.1	.E	16.32
31.20	112.7	310.0	1712.9	1436.2	142.9	.E	16.06
31.40	112.6	303.0	1712.8	1433.0	142.8	.E	15.76
31.60	112.5	296.2	1712.8	1429.9	142.6	.E	15.48
31.80	112.4	289.7	1712.8	1426.9	142.5	.E	15.15
32.00	112.3	283.4	1712.8	1424.0	142.4	.F	14.89
32.20	112.2	277.4	1712.8	1421.3	142.2	.E	14.59
32.40	112.1	271.5	1712.8	1418.6	142.1	.E	14.30
32.60	112.0	265.9	1712.7	1416.0	142.0	.F	14.02
32.80	111.9	260.4	1712.7	1413.5	141.9	.E	13.75
33.00	111.9	255.2	1712.7	1411.1	141.7	.E	13.49
33.20	111.8	250.1	1712.7	1408.8	141.6	.E	13.18
33.40	111.7	245.2	1712.7	1406.5	141.5	.	12.95
33.60	111.6	240.4	1712.7	1404.3	141.4	.	12.67
33.80	111.5	235.9	1712.6	1402.2	141.3	.	12.39
34.00	111.4	231.5	1712.6	1400.2	141.2	.	12.12
34.20	111.3	227.2	1712.6	1398.3	141.1	.	11.86
34.40	111.2	223.1	1712.6	1396.4	141.0	.	11.54
34.60	111.1	219.1	1712.6	1394.6	141.0	.	11.30
34.80	111.0	215.3	1712.6	1392.8	140.9	.	11.00
35.00	110.9	211.6	1712.6	1391.1	140.8	.	10.78
35.20	110.8	208.0	1712.6	1389.5	140.7	.	10.48
35.40	110.7	204.6	1712.5	1387.9	140.6	.	10.20
35.60	110.6	201.3	1712.5	1386.4	140.6	.	9.92
35.80	110.5	198.0	1712.5	1384.9	140.5	.	9.64
36.00	110.4	194.9	1712.5	1383.5	140.4	.	9.37
36.20	110.3	191.9	1712.5	1382.1	140.4	.	9.10
36.40	110.2	189.0	1712.5	1380.8	140.3	.	8.83
36.60	110.1	186.2	1712.5	1379.5	140.2	.	8.48
36.80	110.0	183.5	1712.5	1378.3	140.2	.	8.21
37.00	109.9	180.9	1712.5	1377.1	140.1	.	7.94
37.20	109.8	178.4	1712.5	1375.9	140.1	.	7.57
37.40	109.7	176.0	1712.5	1374.8	140.0	.	7.29
37.60	109.6	173.6	1712.5	1373.7	140.0	.	7.00

15

5

T	I	O	E	VOL	A	I	VEL EXIT
37.80	109.5	171.4	1712.4	1372.7	139.9	.	6.58
38.00	[illegible]	169.2	1712.4	1371.7	139.9	.	6.25
38.20	[illegible]	167.1	1712.4	1370.7	139.8	.	5.89
38.40	[illegible]	165.0	1712.4	1369.8	139.8	.	5.49
38.60	109.1	163.0	1712.4	1368.9	139.7	.	5.03
38.80	109.0	161.1	1712.4	1368.0	139.7	.	4.60
39.00	108.9	159.3	1712.4	1367.1	139.7	.	4.05
39.20	108.8	157.5	1712.4	1366.3	139.6	.	3.41
39.40	108.7	155.8	1712.4	1365.5	139.6	.	2.34
39.60	108.6	154.5	1712.4	1364.8	139.5	.	0.0

0. 5000. 10000. 15000. 20000. 25000. 30000. 35000.

16

16

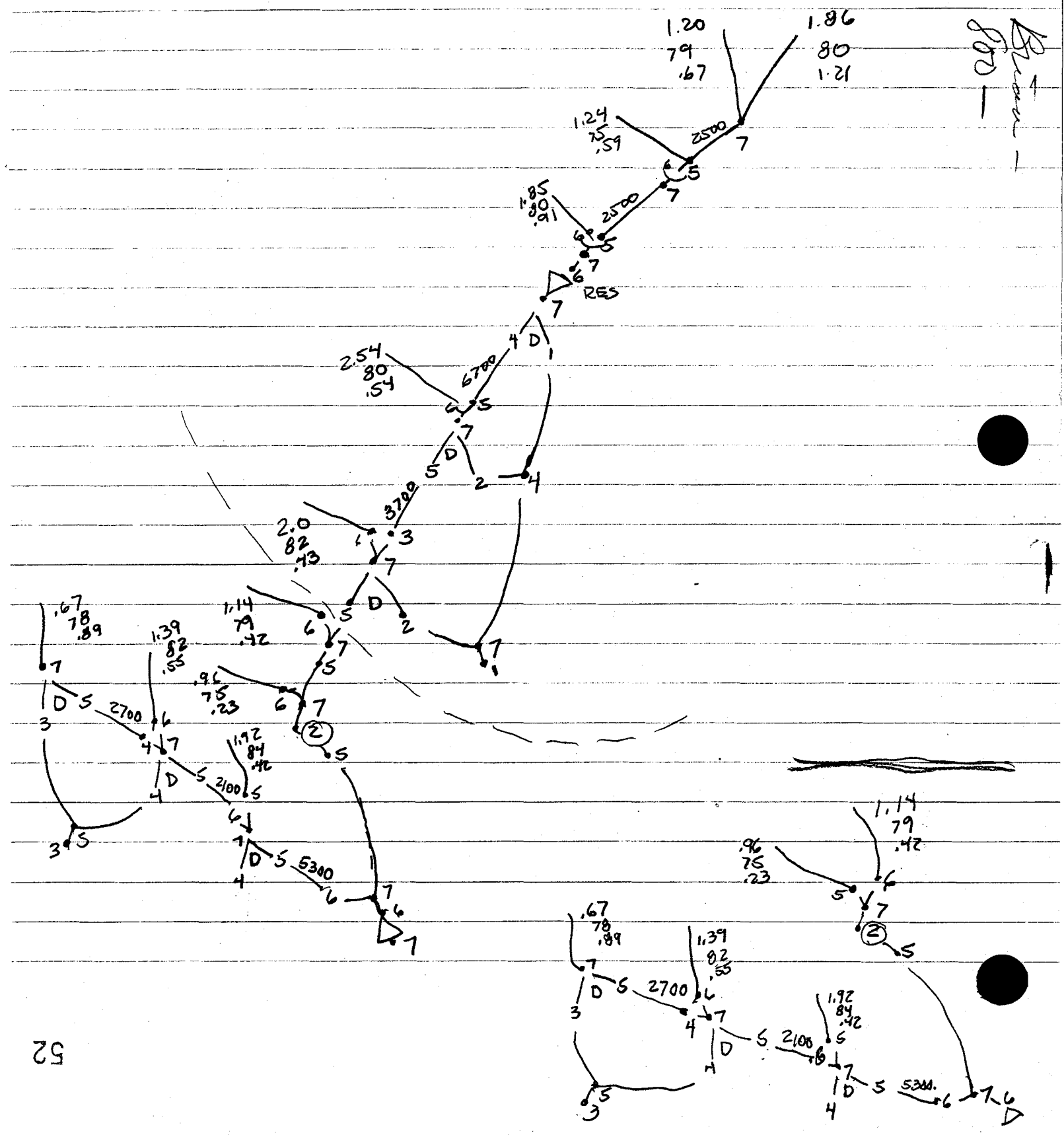
PROGRAM DATE - FEB. 14. 1974 S/360

*********TABLE TYPE 3 HAS BEEN REPLACED FOR THIS RUN.

(1)

File Name: (DES/TR20.BK2)

7-1-83 Check end of dam elevation required without flow from Bulldog Wash Diversion. Complete Signal Butte FRS with construction of culvert under Meridian Road @ outlet for Bulldog Wash Diversion. Confirms end-of-dam elevation required (freeboard storm) 1717.58 ft.


1.20
79
.67
1.86
80
1.21
1.24
75
.59
2500
1.85
80
.91
2500
RES
2.54
80
.54
6700
2.0
82
.73
3700
.67
78
.89
1.39
82
.55
1.14
79
.42
.96
75
.23
2700
1.92
84
.42
2100
5300
.67
78
.89
1.39
82
.55
2700
1.92
84
.42
2100
5300
1.14
79
.42
.96
75
.23

EXECUTIVE CONTROL CARD 122 OPERATION LIST

LISTING OF DATA IN CORE

(2)

0 BUCKHORN-MESA SIGNAL BUTTE FRS W/PASS MTN DIVER

VELOCITY INCREMENT

1 CTABLE .2000

8	.0000	.0800	.1800	.2500	.3200
8	.3700	.4100	.4500	.4900	.5100
8	.5400	.5700	.5900	.6100	.6300
8	.6500	.6600	.6700	.6900	.7000
8	.7100	.7200	.7300	.7400	.7500
8	.7600	.7700	.7700	.7800	.7900
8	.7900	.8000	.8100	.8100	.8200
8	.8200	.8300	.8300	.8400	.8400
8	.8400	.8500	.8500	.8600	.8600
8	.8600	.8600	.8700	.8700	.8700
8	.8800	.8800	.8800	.8900	.8900
8	.8900	.8900	.8900	.8900	.9000
8	.9000	.9000	.9000	.9000	.9100
8	.9100	.9100	.9100	.9100	.9100
8	.9200	.9200	.9200	.9200	.9200
8	.9200	.9200	.9200	.9300	.9300

9 ENDTBL

XSECTN NO. DRAINAGE AREA

2 XSECTN 104 1.0000

	ELEVATION	DISCHARGE	END AREA
8	.0000	.0000	.0000
8	2.0000	450.0000	40.0000
8	3.0000	838.0000	60.0000
8	4.0000	1288.0000	80.0000
8	5.0000	1782.0000	120.0000
8	6.0000	2314.0000	120.0000
8	7.0000	2875.0000	140.0000
8	8.0000	3454.0000	160.0000

9 ENDTBL

XSECTN NO. DRAINAGE AREA

2 XSECTN 106 1.0000

	ELEVATION	DISCHARGE	END AREA
8	.0000	.0000	.0000
8	1.5000	441.0000	45.0000
8	2.5000	975.0000	75.0000

8	3.5000	1682.0000	105.0000
8	4.5000	2468.0000	135.0000
8	5.5000	3332.0000	165.0000
8	6.5000	4272.0000	195.0000
8	7.5000	5258.0000	225.0000
8	8.5000	6296.0000	255.0000

9 ENDTBL

XSECTN NO. DRAINAGE AREA

2 XSECTN 107 1.0000

	ELEVATION	DISCHARGE	END AREA
8	1749.0000	.0000	.0000
8	1750.0000	38.5300	23.0000
8	1751.0000	130.5200	52.0000
8	1752.0000	273.1800	87.0000
8	1753.0000	470.9600	128.0000
8	1754.0000	706.8600	187.0000
8	1755.0000	1005.6200	240.0000
8	1756.0000	1369.4200	299.0000
8	1757.0000	1801.8000	364.0000
8	1758.0000	2305.5000	435.0000
8	1759.0000	2892.8000	512.0000
8	1760.0000	3558.1000	595.0000
8	1761.0000	4316.0400	684.0000
8	1762.0000	5156.9800	779.0000

9 ENDTBL

XSECTN NO. DRAINAGE AREA

2 XSECTN 108 1.0000

	ELEVATION	DISCHARGE	END AREA
8	1753.7000	.0000	.0000
8	1754.7000	61.9300	23.0000
8	1755.7000	209.3500	52.0000
8	1756.7000	438.9100	87.0000
8	1757.7000	757.0100	128.0000
8	1758.7000	1167.4100	175.0000
8	1759.7000	1678.5600	228.0000
8	1760.7000	2302.3900	287.0000
8	1761.7000	3038.9100	352.0000
8	1762.7000	3894.7400	435.0000
8	1763.7000	4647.7600	512.0000

9 ENDTBL

XSECTN NO. DRAINAGE AREA

2 XSECTN 109 1.0000

	ELEVATION	DISCHARGE	END AREA
8	1763.6000	.0000	.0000
8	1764.6000	27.4700	23.0000
8	1765.6000	92.8700	52.0000
8	1766.6000	194.7000	87.0000
8	1767.6000	335.8000	128.0000

3

8	1768.6000	503.2000	187.0000
8	1769.6000	715.7300	240.0000
8	1770.6000	974.8100	299.0000

9 ENDTBL

STRUCT NO.
3 STRUCT 1

	ELEVATION	DISCHARGE	STORAGE
8	1794.1000	.0000	.0000
8	1794.5000	26.3000	35.3700
8	1795.0000	74.4000	70.7500
8	1795.1400	91.2000	81.1100
8	1796.0000	96.1600	141.5000
8	1797.1400	102.4200	222.3500
8	1799.4200	113.9100	437.2700
8	1801.7200	1650.0000	684.1200
8	1804.0000	7700.0000	1020.4600
8	1806.2800	15200.0000	1382.5800
8	1808.5700	26200.0000	1835.7000

9 ENDTBL

STRUCT NO.
3 STRUCT 2

	ELEVATION	DISCHARGE	STORAGE
8	1684.0000	.0000	.0000
8	1688.0000	6.4000	.0000
8	1692.0000	7.9000	.0000
8	1696.0000	8.2000	.0000
8	1700.0000	10.2000	.0000
8	1701.0000	10.5000	15.0000
8	1704.0000	121.3000	200.0000
8	1708.0000	138.4000	566.0000
8	1710.0000	145.9000	796.0000
8	1710.5000	147.7000	839.0000
8	1711.5000	151.4000	925.0000
8	1712.2000	154.0000	1085.0000
8	1712.4000	155.0000	1120.0000
8	1713.4000	483.0000	1270.0000
8	1714.5000	1150.0000	1433.0000
8	1716.0000	2900.0000	1659.0000
8	1720.0000	9300.0000	2374.0000
8	1722.0000	13400.0000	2790.0000
8	1724.0000	17850.0000	3206.9999

9 ENDTBL

STRUCT NO.
3 STRUCT 3

	ELEVATION	DISCHARGE	STORAGE
8	1765.1000	.0000	100.0000
8	1765.7600	31.1500	114.6000
8	1766.4200	52.3000	130.6900

(4)

```
8                    1767.0700     68.7400    149.6000
8                    1767.7300     87.7900    171.5100
8                    1768.3900    101.7900    200.5900
8                    1769.0500    104.8800    227.4500
8                    1769.7100    108.2100    256.3600
8                    1770.3600    110.3800    278.5100
8                    1771.0200    113.3600    310.6100
8                    1771.6800    116.4500    343.9100
8                    1772.3400    117.9600    366.5200
8                    1773.0000    120.1100    402.6300
8                    1773.6500    501.9900    439.9000
8                    1774.3000   1043.4300    492.8600
8                    1775.4700   2512.2600    570.9300
8                    1776.9000   4839.3600    696.3000
8                    1779.5000  10327.5699    921.5600
8                    1782.7500  18894.0100   1300.2400
8                    1786.0000  28877.7000   1781.8500
9 ENDTBL

                TIME INCREMENT
4 DIMHYD

8              .0000       .0300       .1000       .1900       .3100
8              .4700       .6600       .8200       .9300       .9900
8             1.0000       .9900       .9300       .8600       .7800
8              .6800       .5600       .4600       .3900       .3300
8              .2800       .2410       .2070       .1740       .1470
8              .1260       .1070       .0910       .0770       .0660
8              .0550       .0470       .0400       .0340       .0290
8              .0250       .0210       .0180       .0150       .0130
8              .0110       .0090       .0080       .0070       .0060
8              .0050       .0040       .0030       .0020       .0010
8              .0000       .0000       .0000       .0000       .0000
9 ENDTBL

  COMPUTED PEAK K FACTOR =  484.00

                TIME INCREMENT
5 RAINFL 1                  .5000

8              .0000       .0080       .0170       .0260       .0350
8              .0450       .0550       .0650       .0760       .0870
8              .0990       .1120       .1250       .1400       .1560
8              .1740       .1940       .2190       .2540       .3030
8              .5150       .5830       .6240       .6540       .6820
8              .7050       .7270       .7480       .7670       .7840
8              .8000       .8160       .8300       .8440       .8570
8              .8700       .8820       .8930       .9050       .9160
8              .9260       .9360       .9460       .9550       .9650
8              .9740       .9830       .9920      1.0000      1.0000
9 ENDTBL

                TIME INCREMENT
```

(5)

```
5 RAINFL 2                    .5000

8                .0000        .0050        .0110        .0160        .0220
8                .0280        .0350        .0410        .0480        .0560
8                .0630        .0710        .0800        .0890        .0980
8                .1090        .1200        .1330        .1470        .1630
8                .1810        .2040        .2350        .2830        .6630
8                .7350        .7720        .7990        .8200        .8380
8                .8540        .8680        .8800        .8910        .9020
8                .9120        .9210        .9290        .9370        .9450
8                .9520        .9590        .9650        .9720        .9780
8                .9840        .9890        .9950       1.0000       1.0000
9 ENDTBL

                TIME INCREMENT
5 RAINFL 3                   2.4000

8                .0000        .0020        .0040        .0060        .0080
8                .0100        .0120        .0140        .0160        .0180
8                .0200        .0220        .0250        .0270        .0300
8                .0320        .0350        .0380        .0400        .0430
8                .0460        .0490        .0520        .0550        .0580
8                .0610        .0640        .0690        .0720        .0760
8                .0800        .0840        .0890        .0930        .0980
8                .1020        .1080        .1140        .1210        .1270
8                .1330        .1430        .1530        .1640        .1740
8                .1840        .1980        .2150        .2390        .2750
8                .7070        .7650        .7930        .8130        .8290
8                .8410        .8490        .8560        .8630        .8710
8                .8790        .8840        .8890        .8950        .9000
8                .9050        .9090        .9130        .9180        .9220
8                .9260        .9290        .9320        .9360        .9390
8                .9420        .9450        .9480        .9510        .9540
8                .9570        .9590        .9620        .9640        .9670
8                .9690        .9710        .9730        .9760        .9780
8                .9800        .9820        .9840        .9870        .9890
8                .9910        .9930        .9960        .9980       1.0000
9 ENDTBL

                TIME INCREMENT
5 RAINFL 4                    .2500

8                .0000        .0060        .0110        .0170        .0280
8                .0410        .0570        .0750        .0900        .5620
8                .6970        .7630        .8070        .8390        .8730
8                .9070        .9370        .9480        .9580        .9680
8                .9790        .9840        .9880        .9950       1.0000
9 ENDTBL

                TIME INCREMENT
5 RAINFL 5                    .5000

8                .0000        .0040        .0080        .0110        .0160
8                .0210        .0270        .0340        .0440        .0550
```

6

```
8          .0700     .0880     .1080     .1370     .1720
8          .2170     .2730     .3410     .4200     .4920
8          .5600     .6180     .6720     .7170     .7530
8          .7820     .8070     .8270     .8450     .8600
8          .8730     .8850     .8950     .9030     .9130
8          .9210     .9300     .9350     .9420     .9490
8          .9540     .9600     .9670     .9720     .9780
8          .9820     .9890     .9930    1.0000    1.0000
9' ENDTBL
```

7

STANDARD CONTROL INSTRUCTIONS

```
6 RUNOFF 1   6       6      1.1400     79.0000     .42001 0 0 1 0 1
6 RUNOFF 1   7       5       .9600     75.0000     .23001 0 0 1 0 1
6 ADDHYD 4   7   5 6 7                              1 1 0 1 0 1
6 SAVMOV 5   7   7   2
6 RUNOFF 1  10       7       .6700     78.0000     .89001 0 0 1 0 1
6 DIVERT 6 110   7 5 3    820.0000      1.0000     .00000 0 0 0 0 0
6 REACH  3 109   5   4   2700.0000       .0000     .00001 0 0 1 0 1
6 RUNOFF 1   9       6      1.3900     82.0000     .55001 0 0 1 0 1
6 ADDHYD 4 109   4 6 7                              1 0 0 1 0 1
6 DIVERT 6 109   7 5 4   2546.0000      1.0000     .00000 0 0 0 0 0
6 REACH  3 108   5   6   2100.0000       .0000     .00001 0 0 1 0 1
6 RUNOFF 1   8       5      1.9200     84.0000     .42001 0 0 1 0 1
6 ADDHYD 4 108   5 6 7                              1 1 0 1 0 1
6 ADDHYD 4 109   3 4 5                              1 1 0 1 0 1
6 SAVMOV 5 109   5   3
6 DIVERT 6 108   7 5 4   5253.0000      1.0000     .00000 0 0 0 0 0
6 REACH  3 107   5   6   5300.0000       .0000     .00001 1 0 1 0 1
6 SAVMOV 5 107   2   5
6 ADDHYD 4 107   5 6 7                              1 1 0 1 0 1
6 SAVMOV 5     2 7   6
6 RESVOR 2     2 6   7   1701.0000                  1 1 0 1 0 1
  ENDATA
```

END OF LISTING

PASS= 1

EXECUTIVE CONTROL CARD 123 OPERATION INCREM, MAIN TIME INCREMENT= .20
EXECUTIVE CONTROL CARD 124 OPERATION COMPUT, FROM XSECTN/STRUCT 6/ 0 TO XSECTN/STRUCT 0/ 2
STARTING TIME= .00 RAIN DEPTH= 3.24 RAIN DURATION= 1.00 RAIN TABLE NO.= 2 SOIL CONDITION= 2
ALTERNATE NO.= 5 STORM NO.= 1

(9)

SUBROUTINE RUNOFF CROSS SECTION 6
AREA= 1.14 INPUT RUNOFF CURVE= 79.0 TIME OF CONCENTRATION= .42

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.11	1039.291	(RUNOFF)
19.32	36.665	(RUNOFF)
21.55	31.768	(RUNOFF)
23.55	27.320	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 1.9171 CFS-HRS= 1410.49 ACRE-FT= 116.56

SUBROUTINE RUNOFF CROSS SECTION 7
AREA= .96 INPUT RUNOFF CURVE= 75.0 TIME OF CONCENTRATION= .23

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
11.99	910.165	(RUNOFF)
16.91	38.358	(RUNOFF)
19.31	28.387	(RUNOFF)
20.31	25.019	(RUNOFF)
21.43	24.953	(RUNOFF)
22.31	21.703	(RUNOFF)
23.43	21.584	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 1.6086 CFS-HRS= 996.60 ACRE-FT= 82.36

SUBROUTINE ADDHYD CROSS SECTION 7
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.03	1904.302	(NULL)
16.90	88.092	(NULL)
19.31	65.052	(NULL)
21.50	56.547	(NULL)
23.50	48.745	(NULL)

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 2.10

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8.00	DISCHG	.00	.00	.00	.00	.17	.90	2.15	3.74	5.42	7.61
10.00	DISCHG	10.76	15.71	22.11	29.00	41.23	52.31	76.15	105.45	262.79	1123.96
12.00	DISCHG	1889.08	1498.56	836.91	581.69	386.51	307.51	254.20	218.72	202.85	176.33
14.00	DISCHG	165.14	152.84	143.25	138.54	129.81	126.10	118.93	112.68	108.83	100.11
16.00	DISCHG	96.31	92.09	88.73	87.83	87.67	87.72	84.55	81.52	79.61	75.14
18.00	DISCHG	73.19	69.41	66.10	65.08	64.84	64.83	64.88	64.96	64.02	59.75
20.00	DISCHG	57.86	57.36	57.25	56.23	51.90	50.03	52.87	56.00	56.07	52.02
22.00	DISCHG	50.19	49.68	49.56	48.51	44.13	42.23	45.07	48.23	48.24	44.16

60

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 24.00    DISCHG      42.05     24.46      7.79      2.32       .70       .20       .04       .00

          TOTAL WATER, IN INCHES ON DRAINAGE AREA=   1.7761        CFS-HRS=     2407.07        ACRE-FT=     198.92

SUBROUTINE SAVMOV    CROSS SECTION   7
          INPUT HYDROGRAPH= 7     OUTPUT HYDROGRAPH= 2

SUBROUTINE RUNOFF    CROSS SECTION  10
          AREA=    .67     INPUT RUNOFF CURVE=  78.0     TIME OF CONCENTRATION=   .89

          PEAK TIMES                  PEAK DISCHARGES                PEAK ELEVATIONS
             12.41                        402.489                      (RUNOFF)
             21.77                         17.695                      (RUNOFF)
             23.76                         15.181                      (RUNOFF)

          TOTAL WATER, IN INCHES ON DRAINAGE AREA=   1.8374        CFS-HRS=      794.50        ACRE-FT=      65.66

SUBROUTINE DIVERT    CROSS SECTION 110
          INPUT HYDROGRAPH= 7     OUTPUT HYDROGRAPHS= 5,3

SUBROUTINE REACH     CROSS SECTION 109
          LENGTH=   2700.00     INPUT COEFFICIENT=   .0000     INPUT ROUTINGS=   .00

          AVERAGE WATER VELOCITY=   2.514       AVERAGE ROUTING COEFF=  .5966       NUMBER OF ROUTINGS=   .89

          PEAK TIMES                  PEAK DISCHARGES                PEAK ELEVATIONS
             12.69                        365.063                     1767.77
             21.98                         17.604                     1764.24
             23.95                         15.080                     1764.15

          TOTAL WATER, IN INCHES ON DRAINAGE AREA=   1.8367        CFS-HRS=      794.18        ACRE-FT=      65.63

SUBROUTINE RUNOFF    CROSS SECTION   9
          AREA=   1.38     INPUT RUNOFF CURVE=  82.0     TIME OF CONCENTRATION=   .55

          PEAK TIMES                  PEAK DISCHARGES                PEAK ELEVATIONS
             12.18                       1307.435                      (RUNOFF)
             21.61                         40.407                      (RUNOFF)
             23.61                         34.605                      (RUNOFF)

          TOTAL WATER, IN INCHES ON DRAINAGE AREA=   2.1476        CFS-HRS=     1926.50        ACRE-FT=     159.21

SUBROUTINE ADDHYD    CROSS SECTION 109
          INPUT HYDROGRAPHS= 4,6     OUTPUT HYDROGRAPH= 7

          PEAK TIMES                  PEAK DISCHARGES                PEAK ELEVATIONS
             12.22                      1484.534                     1772.57
             21.61                         57.824                    1765.06
             23.61                         49.482                    1764.94

          TOTAL WATER, IN INCHES ON DRAINAGE AREA=   2.0455        CFS-HRS=     2720.68        ACRE-FT=     224.84
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(10)

SUBROUTINE DIVERT CROSS SECTION 109
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,4

(11)

SUBROUTINE REACH CROSS SECTION 108
LENGTH= 2100.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 6.616 AVERAGE ROUTING COEFF= .7956 NUMBER OF ROUTINGS= .35

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.29	1408.327	1759.17
21.67	57.485	1754.63
23.67	49.160	1754.49

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 2.0454 CFS-HRS= 2719.25 ACRE-FT= 224.72

SUBROUTINE RUNOFF CROSS SECTION 8
AREA= 1.92 INPUT RUNOFF CURVE= 84.0 TIME OF CONCENTRATION= .42

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.09	2152.812	(RUNOFF)
19.31	67.635	(RUNOFF)
21.55	58.380	(RUNOFF)
23.55	50.071	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 2.3216 CFS-HRS= 2876.76 ACRE-FT= 237.74

SUBROUTINE ADDHYD CROSS SECTION 108
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.16	3387.930	1762.11
21.58	115.684	1755.06
23.58	99.041	1754.95

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 3.98

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	DISCHG	.00	.00	.00	.00	.00	.01	.34	1.53	3.17	4.97
8.00	DISCHG	7.00	9.89	13.85	17.92	22.54	27.20	32.63	39.33	45.81	54.03
10.00	DISCHG	62.46	74.01	90.43	106.65	133.51	161.58	203.87	269.55	455.84	1577.54
12.00	DISCHG	2999.94	3362.39	2500.77	1836.27	1366.36	1044.29	832.78	672.27	570.05	486.00
14.00	DISCHG	425.67	383.86	348.33	325.08	303.45	286.68	272.28	256.25	244.69	229.92
16.00	DISCHG	217.25	207.60	198.21	192.33	189.08	187.27	183.73	177.69	173.06	166.22
18.00	DISCHG	160.19	154.28	146.83	142.02	139.39	137.94	137.11	136.65	135.74	130.86
20.00	DISCHG	125.90	123.15	121.68	120.12	114.83	109.71	109.36	113.38	115.66	112.37
22.00	DISCHG	108.26	106.00	104.84	103.44	98.25	93.10	92.72	96.83	99.02	95.76
24.00	DISCHG	91.26	75.72	46.32	26.51	15.58	9.42	5.63	3.31	1.94	1.13
26.00	DISCHG	.65	.38	.22	.12	.06	.03	.00			

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 2.1786 CFS-HRS= 5596.01 ACRE-FT= 462.45

SUBROUTINE ADDHYD CROSS SECTION 109
INPUT HYDROGRAPHS= 3,4 OUTPUT HYDROGRAPH= 5

(12)

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= .00

TIME		
.00	DISCHG	.00

TOTAL WATER, CANNOT BE COMPUTED WITH D.A.= 0.0 CFS-HRS= .00 ACRE-FT= .00

SUBROUTINE SAVMOV CROSS SECTION 109
INPUT HYDROGRAPH= 5 OUTPUT HYDROGRAPH= 3

SUBROUTINE DIVERT CROSS SECTION 108
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,4

SUBROUTINE REACH CROSS SECTION 107
LENGTH= 5300.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 5.495 AVERAGE ROUTING COEFF= .7637 NUMBER OF ROUTINGS= 1.02

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.41	3170.661	1759.42
21.81	114.879	1750.83
23.81	98.251	1750.65

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 3.98

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	DISCHG	.00	.00	.00	.00	.00	.00	.01	.26	1.21	2.68
8.00	DISCHG	4.40	6.35	9.00	12.64	16.61	21.06	25.67	30.90	37.23	43.67
10.00	DISCHG	51.45	59.72	70.44	85.43	101.37	125.47	152.59	191.05	249.91	404.10
12.00	DISCHG	1281.69	2570.44	3169.36	2673.09	2044.97	1534.44	1165.40	914.85	732.23	610.05
14.00	DISCHG	516.70	448.17	399.74	361.06	333.97	311.02	292.71	277.34	261.50	248.85
16.00	DISCHG	234.64	221.56	211.06	201.40	194.57	190.43	188.05	184.81	179.47	174.65
18.00	DISCHG	168.33	162.21	156.25	149.18	143.79	140.47	138.56	137.46	136.85	136.02
20.00	DISCHG	132.16	127.46	124.21	122.30	120.66	116.30	111.35	109.83	112.48	114.87
22.00	DISCHG	113.01	109.45	106.85	105.33	103.91	99.67	94.74	93.20	95.90	98.24
24.00	DISCHG	96.40	92.55	80.10	54.79	33.52	20.00	12.02	7.20	4.26	2.51
26.00	DISCHG	1.47	.85	.49	.28	.16	.09	.04	.01	.00	

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 2.1711 CFS-HRS= 5576.68 ACRE-FT= 460.86

SUBROUTINE SAVMOV CROSS SECTION 107
INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 5

SUBROUTINE ADDHYD CROSS SECTION 107
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.29	4159.934	1760.79
21.62	168.573	1751.27

23.62 44.169 1751.10

(13)

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 6.08

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	DISCHG	.00	.00	.00	.00	.00	.00	.01	.26	1.21	2.68
8.00	DISCHG	4.40	6.35	9.00	12.64	16.78	21.96	27.82	34.64	42.65	51.28
10.00	DISCHG	62.21	75.43	92.56	114.44	142.60	177.78	228.73	296.50	512.70	1528.06
12.00	DISCHG	3170.76	4069.00	4006.27	3254.77	2431.48	1841.95	1419.60	1133.57	935.08	786.39
14.00	DISCHG	681.84	601.02	543.00	499.60	463.78	437.12	411.64	390.02	370.33	348.96
16.00	DISCHG	330.95	313.66	299.85	289.24	282.23	278.14	272.60	266.33	259.08	249.79
18.00	DISCHG	241.52	231.62	222.35	214.26	208.63	205.30	203.45	202.42	200.87	195.76
20.00	DISCHG	190.02	184.82	181.46	178.53	172.56	166.33	164.22	165.83	168.54	166.89
22.00	DISCHG	163.20	159.13	156.42	153.84	148.04	141.90	139.81	141.43	144.14	142.41
24.00	DISCHG	138.45	117.01	87.89	57.11	34.22	20.20	12.06	7.20	4.26	2.51
26.00	DISCHG	1.47	.85	.49	.28	.16	.09	.04	.01	.00	

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 2.0347 CFS-HRS= 7983.75 ACRE-FT= 659.78

SUBROUTINE SAVMOV STRUCTURE 2
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 6

SUBROUTINE RESVOR STRUCTURE 2
SURFACE ELEVATION= 1701.00

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
23.96	136.730	1707.61

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 6.08

TIME											
.00	DISCHG	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50
2.00	DISCHG	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50
4.00	DISCHG	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50
6.00	DISCHG	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.49	10.49	10.49
8.00	DISCHG	10.48	10.48	10.48	10.48	10.48	10.49	10.49	10.50	10.72	11.08
10.00	DISCHG	11.53	12.10	12.80	13.70	14.83	16.26	18.10	20.51	24.29	34.11
12.00	DISCHG	56.91	92.01	122.05	124.76	126.86	128.41	129.57	130.45	131.15	131.72
14.00	DISCHG	132.18	132.57	132.91	133.21	133.48	133.73	133.95	134.16	134.35	134.52
16.00	DISCHG	134.68	134.82	134.96	135.08	135.20	135.31	135.42	135.52	135.62	135.71
18.00	DISCHG	135.79	135.87	135.94	136.01	136.06	136.12	136.17	136.22	136.27	136.32
20.00	DISCHG	136.37	136.40	136.44	136.47	136.50	136.53	136.55	136.57	136.60	136.62
22.00	DISCHG	136.64	136.66	136.68	136.69	136.70	136.71	136.71	136.72	136.72	136.73
24.00	DISCHG	136.73	136.72	136.70	136.65	136.58	136.49	136.40	136.30	136.20	136.10
26.00	DISCHG	135.99	135.89	135.79	135.68	135.58	135.47	135.37	135.26	135.16	135.05
28.00	DISCHG	134.95	134.85	134.74	134.64	134.53	134.43	134.33	134.22	134.12	134.02
30.00	DISCHG	133.91	133.81	133.71	133.60	133.50	133.40	133.29	133.19	133.09	132.98
32.00	DISCHG	132.88	132.78	132.68	132.57	132.47	132.37	132.27	132.17	132.06	131.96
34.00	DISCHG	131.86	131.76	131.66	131.55	131.45	131.35	131.25	131.15	131.05	130.95
36.00	DISCHG	130.85	130.74	130.64	130.54	130.44	130.34	130.24	130.14	130.04	129.94
38.00	DISCHG	129.84	129.74	129.64	129.54	129.44	129.34	129.24	129.14	129.04	128.94
40.00	DISCHG	128.84	128.74	128.64	128.54	128.44	128.34	128.24	128.15	128.05	127.95
42.00	DISCHG	127.85	127.75	127.65	127.55	127.45	127.36	127.26	127.16	127.06	126.96
44.00	DISCHG	126.87	126.77	126.67	126.57	126.47	126.38	126.28	126.18	126.08	125.99
46.00	DISCHG	125.89	125.79	125.69	125.60	125.50	125.40	125.31	125.21	125.11	125.02
48.00	DISCHG	124.92	124.82	124.73	124.63	124.54	124.44	124.34	124.25	124.15	124.06

50.00	DISCHG	123.96	123.86	123.77	123.67	123.58	123.48	123.39	123.29	123.20	123.10
52.00	DISCHG	123.01	122.91	122.82	122.72	122.63	122.53	122.44	122.34	122.25	122.15
54.00	DISCHG	122.06	121.97	121.87	121.78	121.68	121.59	121.50	121.40	121.31	120.21
56.00	DISCHG	118.02	117.85	116.59	115.54	114.40	113.28	112.16	111.05	109.96	108.88
58.00	DISCHG	107.81	106.74	105.69	104.65	103.62	102.60	101.59	100.59	99.60	98.62

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 1.6008 CFS-HRS= 6281.15 ACRE-FT= 519.07

ENDCMP

(14)

PASS= 2

EXECUTIVE CONTROL CARD 126 OPERATION COMPUT. FROM XSECTN/STRUCT 6/ 0 TO XSECTN/STRUCT 0/ 2

STARTING TIME= .00 RAIN DEPTH= 7.06 RAIN DURATION= 1.00 RAIN TABLE NO.= 5 SOIL CONDITION= 2

ALTERNATE NO.= 5 STORM NO.= 4

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SUBROUTINE RUNOFF CROSS SECTION 6

AREA= 1.14 INPUT RUNOFF CURVE= 79.0 TIME OF CONCENTRATION= .42

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.27	564.993	(RUNOFF)
9.60	564.418	(RUNOFF)
17.04	90.827	(RUNOFF)
17.95	83.463	(RUNOFF)
19.38	65.639	(RUNOFF)
21.00	64.365	(RUNOFF)
21.99	55.256	(RUNOFF)
23.04	61.849	(RUNOFF)
23.98	61.636	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.6300 CFS-HRS= 3406.37 ACRE-FT= 281.50

SUBROUTINE RUNOFF CROSS SECTION 7

AREA= .96 INPUT RUNOFF CURVE= 75.0 TIME OF CONCENTRATION= .23

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.07	430.219	(RUNOFF)
9.61	433.092	(RUNOFF)
9.93	436.831	(RUNOFF)
10.91	376.922	(RUNOFF)
16.93	75.946	(RUNOFF)
17.91	70.090	(RUNOFF)
19.30	53.705	(RUNOFF)
20.92	54.270	(RUNOFF)
22.93	54.343	(RUNOFF)
23.91	56.700	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.1904 CFS-HRS= 2596.15 ACRE-FT= 214.55

SUBROUTINE ADDHYD CROSS SECTION 7

INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.30	988.491	(NULL)
9.61	997.499	(NULL)
9.92	998.332	(NULL)
16.98	166.037	(NULL)
17.92	153.373	(NULL)
19.33	119.264	(NULL)
20.95	118.281	(NULL)
21.94	101.833	(NULL)
22.98	115.036	(NULL)
23.94	117.544	(NULL)

TIME HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 2.10

.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.03	1.13	5.40	12.64
6.00	DISCHG	24.38	45.24	73.60	101.88	140.69	175.11	229.61	289.54	344.70	433.72
8.00	DISCHG	499.57	598.09	695.18	773.70	894.29	973.87	986.88	986.78	997.45	988.44
10.00	DISCHG	994.21	946.64	900.30	884.45	855.95	848.05	791.48	740.35	708.24	629.50
12.00	DISCHG	595.89	540.36	494.91	472.55	434.24	418.01	379.86	346.60	331.94	311.57
14.00	DISCHG	303.04	280.00	259.87	249.33	229.82	221.41	212.20	205.02	198.50	180.03
16.00	DISCHG	171.78	155.49	141.53	141.36	158.22	165.93	154.10	141.45	139.53	147.53
18.00	DISCHG	151.12	123.98	97.24	92.96	108.74	116.16	118.28	118.97	114.92	96.72
20.00	DISCHG	88.74	93.54	99.61	103.83	113.63	117.71	104.82	91.73	89.56	97.55
22.00	DISCHG	101.13	87.82	74.71	76.98	103.29	114.87	97.04	77.65	78.02	103.79
24.00	DISCHG	114.80	68.28	21.57	6.43	1.97	.58	.12	.00		

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.4290 CFS-HRS= 6002.48 ACRE-FT= 496.05

SUBROUTINE SAVMOV CROSS SECTION 7
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 2

SUBROUTINE RUNOFF CROSS SECTION 10
AREA= .67 INPUT RUNOFF CURVE= 78.0 TIME OF CONCENTRATION= .89

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.11	318.256	(RUNOFF)
17.24	50.653	(RUNOFF)
19.56	37.286	(RUNOFF)
21.22	35.187	(RUNOFF)
23.28	31.852	(RUNOFF)
24.13	30.856	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.5208 CFS-HRS= 1954.77 ACRE-FT= 161.54

SUBROUTINE DIVERT CROSS SECTION 110
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,3

SUBROUTINE REACH CROSS SECTION 109
LENGTH= 2700.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 2.427 AVERAGE ROUTING COEFF= .5881 NUMBER OF ROUTINGS= .91

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.39	316.123	1767.46
17.37	50.528	1764.95
19.90	36.973	1764.75
21.48	34.610	1764.71
23.55	31.055	1764.65
24.33	30.178	1764.64

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.5209 CFS-HRS= 1954.81 ACRE-FT= 161.55

SUBROUTINE RUNOFF CROSS SECTION 8
AREA= 1.39 INPUT RUNOFF CURVE= 82.0 TIME OF CONCENTRATION= .55

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PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.51	734.724	(RUNOFF)
17.12	111.635	(RUNOFF)
17.98	102.615	(RUNOFF)
19.47	81.479	(RUNOFF)
21.07	78.600	(RUNOFF)
22.03	67.815	(RUNOFF)
23.13	74.431	(RUNOFF)
24.03	72.005	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.9630 CFS-HRS= 4452.10 ACRE-FT= 367.92

SUBROUTINE ADDHYD CROSS SECTION 109
INPUT HYDROGRAPHS= 4,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.96	1034.762	1770.83
17.09	162.067	1766.28
17.96	150.931	1766.17
19.51	118.354	1765.85
21.11	111.814	1765.79
21.99	99.869	1765.67
23.14	103.222	1765.70
24.03	101.022	1765.68

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.8192 CFS-HRS= 6406.91 ACRE-FT= 529.47

SUBROUTINE DIVERT CROSS SECTION 109
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,4

SUBROUTINE REACH CROSS SECTION 108
LENGTH= 2100.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 6.077 AVERAGE ROUTING COEFF= .7814 NUMBER OF ROUTINGS= .38

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.03	1033.058	1758.37
17.16	161.520	1755.38
17.96	149.990	1755.30
19.54	117.803	1755.08
21.17	110.932	1755.03
22.01	99.177	1754.95
23.21	101.597	1754.97
24.11	99.661	1754.96

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.8193 CFS-HRS= 6407.05 ACRE-FT= 529.48

SUBROUTINE RUNOFF CROSS SECTION 8
AREA= 1.92 INPUT RUNOFF CURVE= 84.0 TIME OF CONCENTRATION= .42

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.21	1079.212	(RUNOFF)
17.04	159.640	(RUNOFF)

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17.95	146.539	(RUNOFF)
19.38	115.100	(RUNOFF)
21.00	112.728	(RUNOFF)
21.99	96.709	(RUNOFF)
23.04	108.177	(RUNOFF)
23.98	107.742	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 5.1865 CFS-HRS= 6426.70 ACRE-FT= 531.10

SUBROUTINE ADDHYD CROSS SECTION 108
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.71	2070.169	1760.33
17.06	319.934	1756.18
17.95	296.528	1756.08
19.45	232.052	1755.80
21.05	221.771	1755.75
21.99	195.877	1755.61
23.09	206.319	1755.68
24.00	204.582	1755.67

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 3.98

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.31	4.14	12.77	26.44	46.00	67.74	93.35
6.00	DISCHG	120.24	160.56	222.06	281.45	355.59	430.35	520.44	639.59	749.15	897.19
8.00	DISCHG	1041.81	1196.06	1384.95	1545.15	1740.36	1919.26	2017.28	2046.01	2069.72	2069.86
10.00	DISCHG	2067.48	2031.20	1944.78	1885.88	1827.73	1782.96	1718.16	1615.64	1537.31	1421.62
12.00	DISCHG	1318.23	1225.68	1120.08	1045.95	971.09	911.07	852.19	779.03	728.16	683.05
14.00	DISCHG	648.36	613.38	569.58	538.28	503.85	475.33	453.80	433.54	417.74	391.99
16.00	DISCHG	369.34	344.89	315.51	298.78	306.17	319.12	316.31	298.39	287.36	289.97
18.00	DISCHG	295.89	279.23	236.89	210.61	213.37	223.73	229.18	231.95	230.97	213.51
20.00	DISCHG	194.98	189.33	194.35	199.72	210.94	221.37	217.68	199.51	187.87	190.33
22.00	DISCHG	195.86	188.96	168.75	158.97	179.11	203.51	202.85	177.43	163.72	181.90
24.00	DISCHG	204.58	182.91	113.47	65.59	39.10	24.08	14.64	8.73	5.18	3.02
26.00	DISCHG	1.76	1.03	.60	.34	.18	.09	.04	.00		

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.9965 CFS-HRS= 12833.74 ACRE-FT= 1060.58

SUBROUTINE ADDHYD CROSS SECTION 109
INPUT HYDROGRAPHS= 3,4 OUTPUT HYDROGRAPH= 5

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= .00

TIME		
.00	DISCHG	.00

TOTAL WATER, CANNOT BE COMPUTED WITH D.A.= 0.0 CFS-HRS= .00 ACRE-FT= .00

SUBROUTINE SAVMOV CROSS SECTION 109
INPUT HYDROGRAPH= 5 OUTPUT HYDROGRAPH= 3

SUBROUTINE DIVERT CROSS SECTION 108
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,4

SUBROUTINE REACH CROSS SECTION 107
LENGTH= 5300.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 4.820 AVERAGE ROUTING COEFF= .7393 NUMBER OF ROUTINGS= 1.13

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.11	2069.743	1757.53
17.33	316.996	1752.22
18.15	294.244	1752.11
19.71	232.045	1751.71
21.32	218.758	1751.62
22.20	194.050	1751.45
23.37	200.720	1751.49
24.24	195.845	1751.46

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 3.98

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.20	2.74	9.31	20.64	37.48	57.73
6.00	DISCHG	81.56	107.53	142.80	195.39	253.21	321.66	394.71	478.86	586.05	695.92
8.00	DISCHG	830.26	972.52	1122.71	1298.13	1465.08	1649.52	1831.45	1959.23	2020.55	2054.57
10.00	DISCHG	2065.85	2067.28	2044.14	1979.11	1915.95	1856.41	1806.49	1747.52	1660.03	1576.96
12.00	DISCHG	1473.42	1368.80	1272.04	1170.01	1085.55	1008.25	942.28	881.43	812.87	755.22
14.00	DISCHG	706.28	666.85	630.74	589.80	554.77	520.49	489.90	465.32	443.81	426.08
16.00	DISCHG	403.39	379.79	356.28	329.01	308.30	306.01	314.44	316.09	304.75	292.97
18.00	DISCHG	290.50	293.91	284.68	253.48	224.36	215.98	220.70	226.44	230.24	230.87
20.00	DISCHG	219.74	203.24	193.51	193.65	197.61	206.37	216.44	217.71	206.02	193.74
22.00	DISCHG	190.99	194.05	190.96	176.51	164.50	173.34	193.26	200.41	185.90	170.85
24.00	DISCHG	177.25	195.24	188.23	139.73	89.60	54.86	33.58	20.50	12.38	7.40
26.00	DISCHG	4.38	2.57	1.50	.87	.50	.28	.15	.07	.02	.00

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.9970 CFS-HRS= 12835.14 ACRE-FT= 1060.70

SUBROUTINE SAVMOV CROSS SECTION 107
INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 5

SUBROUTINE ADDHYD CROSS SECTION 107
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.95	3061.826	1759.25
17.02	472.000	1753.00
17.91	444.192	1752.86
19.49	346.121	1752.37
21.06	324.884	1752.26
21.91	293.120	1752.10
23.13	291.199	1752.09
23.98	292.335	1752.10

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 6.08

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.20	2.74	9.34	21.77	42.88	70.37

6.00	DISCHG	105.94	152.77	216.40	297.28	393.90	496.77	624.32	768.40	930.75	1129.63
8.00	DISCHG	1329.83	1570.61	1817.89	2071.83	2359.37	2623.40	2818.33	2946.00	3018.01	3043.01
10.00	DISCHG	3060.06	3013.93	2944.44	2863.56	2771.89	2704.46	2597.97	2487.87	2368.27	2206.47
12.00	DISCHG	2069.31	1909.76	1766.94	1642.56	1519.79	1426.26	1322.14	1228.03	1144.82	1066.80
14.00	DISCHG	1009.31	946.86	890.61	839.13	784.59	741.90	702.10	670.34	642.31	606.11
16.00	DISCHG	575.18	535.28	497.81	470.37	466.52	471.94	468.55	457.54	444.28	440.50
18.00	DISCHG	441.62	417.89	381.92	346.44	333.09	332.14	338.98	345.41	345.16	327.59
20.00	DISCHG	308.48	296.79	293.13	297.47	311.24	324.08	321.26	309.44	295.59	291.29
22.00	DISCHG	292.12	281.87	265.67	253.49	267.79	288.21	290.30	278.06	263.92	274.63
24.00	DISCHG	292.06	263.52	209.80	146.16	91.57	55.44	33.70	20.51	12.38	7.40
26.00	DISCHG	4.38	2.57	1.50	.87	.50	.28	.15	.07	.02	.00

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.8008 CFS-HRS= 18837.61 ACRE-FT= 1556.74

(20)

SUBROUTINE SAVMOV STRUCTURE 2
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 6

SUBROUTINE RESVOR STRUCTURE 2
SURFACE ELEVATION= 1701.00

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
18.40	381.990	1713.09

Small flow through.
Spillway 13.1
12.4
OTHR.

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 6.08

TIME											
.00	DISCHG	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50
2.00	DISCHG	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50
4.00	DISCHG	10.50	10.50	10.50	10.50	10.50	10.49	10.49	10.49	10.53	10.98
6.00	DISCHG	11.74	12.90	14.59	16.98	20.22	24.40	29.69	36.25	44.27	53.98
8.00	DISCHG	65.56	79.20	95.11	113.33	122.30	124.13	126.13	128.26	130.46	132.70
10.00	DISCHG	134.95	137.19	139.09	140.58	142.02	143.42	144.77	146.11	147.69	149.21
12.00	DISCHG	150.62	151.60	152.05	152.47	152.85	153.21	153.54	153.84	154.20	154.65
14.00	DISCHG	160.21	189.24	215.14	238.21	258.57	276.49	292.31	306.29	318.72	329.56
16.00	DISCHG	338.83	346.51	352.55	357.22	361.17	365.01	368.74	372.09	374.89	377.28
18.00	DISCHG	379.55	381.33	381.99	381.36	379.88	378.20	376.69	375.46	374.39	373.04
20.00	DISCHG	371.09	368.66	366.04	363.53	361.43	359.88	358.56	357.02	355.09	352.90
22.00	DISCHG	350.73	348.46	345.81	342.75	339.84	337.64	335.92	334.09	331.85	329.62
24.00	DISCHG	327.98	326.20	323.02	317.87	310.81	302.38	293.23	283.78	274.29	264.90
26.00	DISCHG	255.71	246.75	238.07	229.66	221.53	213.68	206.10	198.79	191.73	184.92
28.00	DISCHG	178.36	172.03	165.92	160.03	154.99	154.92	154.84	154.77	154.70	154.63
30.00	DISCHG	154.55	154.48	154.41	154.33	154.26	154.19	154.12	154.04	153.98	153.94
32.00	DISCHG	153.90	153.86	153.82	153.78	153.73	153.69	153.65	153.61	153.57	153.53
34.00	DISCHG	153.49	153.45	153.40	153.36	153.32	153.28	153.24	153.20	153.16	153.12
36.00	DISCHG	153.08	153.03	152.99	152.95	152.91	152.87	152.83	152.79	152.75	152.71
38.00	DISCHG	152.67	152.62	152.58	152.54	152.50	152.46	152.42	152.38	152.34	152.30
40.00	DISCHG	152.26	152.21	152.17	152.13	152.09	152.05	152.01	151.97	151.93	151.89
42.00	DISCHG	151.85	151.81	151.77	151.72	151.68	151.64	151.60	151.56	151.52	151.48
44.00	DISCHG	151.44	151.40	151.29	151.18	151.08	150.97	150.86	150.75	150.65	150.54
46.00	DISCHG	150.43	150.33	150.22	150.11	150.00	149.90	149.79	149.69	149.58	149.47
48.00	DISCHG	149.37	149.26	149.15	149.05	148.94	148.84	148.73	148.62	148.52	148.41
50.00	DISCHG	148.31	148.20	148.10	147.99	147.89	147.78	147.68	147.57	147.47	147.37
52.00	DISCHG	147.27	147.17	147.07	146.96	146.86	146.76	146.66	146.56	146.46	146.35
54.00	DISCHG	146.25	146.15	146.05	145.95	145.86	145.78	145.70	145.62	145.55	145.47
56.00	DISCHG	145.39	145.31	145.23	145.15	145.08	145.00	144.92	144.84	144.76	144.69
58.00	DISCHG	144.61	144.53	144.45	144.37	144.30	144.22	144.14	144.06	143.99	143.91

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 2.5936 CFS-HRS= 10177.04 ACRE-FT= 841.03

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ENDCMP

PASS= 3

EXECUTIVE CONTROL CARD 127 OPERATION COMPUT, FROM XSECTN/STRUCT 6/ 0 TO XSECTN/STRUCT 0/ 2

STARTING TIME= .00 RAIN DEPTH= 15.80 RAIN DURATION= 1.00 RAIN TABLE NO.= 5 SOIL CONDITION= 2

ALTERNATE NO.= 5 STORM NO.= 5

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SUBROUTINE RUNOFF CROSS SECTION 6

AREA= 1.14 INPUT RUNOFF CURVE= 79.0 TIME OF CONCENTRATION= .42

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.15	1602.612	(RUNOFF)
17.04	219.249	(RUNOFF)
17.95	201.074	(RUNOFF)
19.38	157.770	(RUNOFF)
21.00	154.362	(RUNOFF)
21.99	132.351	(RUNOFF)
23.04	147.967	(RUNOFF)
23.98	147.300	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 12.9782 CFS-HRS= 9548.35 ACRE-FT= 789.08

SUBROUTINE RUNOFF CROSS SECTION 7

AREA= .96 INPUT RUNOFF CURVE= 75.0 TIME OF CONCENTRATION= .23

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.00	1320.594	(RUNOFF)
9.90	1222.027	(RUNOFF)
16.93	188.912	(RUNOFF)
17.91	173.853	(RUNOFF)
19.30	132.824	(RUNOFF)
20.91	133.824	(RUNOFF)
21.92	115.258	(RUNOFF)
22.93	133.573	(RUNOFF)
23.91	139.156	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 12.3692 CFS-HRS= 7663.38 ACRE-FT= 633.30

SUBROUTINE ADDHYD CROSS SECTION 7

INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.06	2917.049	(NULL)
16.98	406.366	(NULL)
17.92	374.491	(NULL)
19.33	290.407	(NULL)
20.95	287.330	(NULL)
21.94	247.024	(NULL)
22.98	278.743	(NULL)
23.94	284.547	(NULL)

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 2.10

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.19	3.38
4.00	DISCHG	11.07	25.51	44.49	66.39	103.62	138.15	182.25	228.91	269.64	320.32
6.00	DISCHG	361.85	471.00	531.25	682.11	818.34	910.72	1089.31	1265.32	1406.06	1663.39

8.00	DISCHG	1814.23	2070.76	2303.11	2466.89	2754.52	2908.18	2870.53	2808.52	2786.23	2716.93
10.00	DISCHG	2694.99	2534.38	2386.39	2323.74	2231.00	2195.15	2034.92	1893.61	1802.77	1595.15
12.00	DISCHG	1505.14	1361.38	1242.35	1183.40	1094.81	1042.44	945.03	861.08	823.57	771.89
14.00	DISCHG	749.93	691.78	641.48	614.88	566.14	545.09	521.93	503.94	487.51	441.71
16.00	DISCHG	421.34	380.97	346.67	346.27	387.53	406.06	376.64	345.58	340.87	360.33
18.00	DISCHG	369.85	302.02	236.86	226.61	265.19	283.08	288.08	289.63	279.59	235.09
20.00	DISCHG	215.75	227.53	242.20	252.36	276.13	285.88	254.25	222.47	217.30	236.70
22.00	DISCHG	245.27	212.68	180.94	186.61	250.52	278.30	234.66	187.77	188.85	251.39
24.00	DISCHG	277.78	164.39	51.70	15.39	4.69	1.39	.30	.01		

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 12.6997 CFS-HRS= 17211.63 ACRE-FT= 1422.37

SUBROUTINE SAVMOV CROSS SECTION 7
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 2

SUBROUTINE RUNOFF CROSS SECTION 10
AREA= .67 INPUT RUNOFF CURVE= 78.0 TIME OF CONCENTRATION= .89

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.68	893.015	(RUNOFF)
17.23	123.202	(RUNOFF)
19.56	90.255	(RUNOFF)
21.22	84.961	(RUNOFF)
23.28	76.701	(RUNOFF)
24.13	74.225	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 12.8319 CFS-HRS= 5548.48 ACRE-FT= 458.53

SUBROUTINE DIVERT CROSS SECTION 110
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,3

SUBROUTINE REACH CROSS SECTION 109
LENGTH= 2700.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 2.939 AVERAGE ROUTING COEFF= .6336 NUMBER OF ROUTINGS= .81

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.32	820.053	1770.00
17.38	122.727	1765.89
19.77	89.570	1765.55
21.44	83.792	1765.46
23.51	74.942	1765.33
24.31	72.573	1765.29

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 12.6614 CFS-HRS= 5474.74 ACRE-FT= 452.43

SUBROUTINE RUNOFF CROSS SECTION 9
AREA= 1.39 INPUT RUNOFF CURVE= 82.0 TIME OF CONCENTRATION= .55

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.25	1285.813	(RUNOFF)
17.12	264.318	(RUNOFF)

23

17.98	242.609	(RUNOFF)
18.47	192.276	(RUNOFF)
21.07	185.166	(RUNOFF)
22.03	159.609	(RUNOFF)
23.13	175.012	(RUNOFF)
24.03	169.176	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 13.4148 CFS-HRS= 12033.91 ACRE-FT= 994.48

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SUBROUTINE ADDHYD CROSS SECTION 109
INPUT HYDROGRAPHS= 4,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.39	2768.486	1777.52
17.10	386.746	1767.90
17.95	359.170	1767.74
19.51	281.635	1767.22
21.11	265.969	1767.11
21.99	236.365	1766.90
23.15	244.850	1766.96
24.03	238.904	1766.91

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 13.1697 CFS-HRS= 17508.64 ACRE-FT= 1446.91

SUBROUTINE DIVERT CROSS SECTION 109
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,4

SUBROUTINE REACH CROSS SECTION 108
LENGTH= 2100.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 7.832 AVERAGE ROUTING COEFF= .8216 NUMBER OF ROUTINGS= .31

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.10	2547.574	1761.03
17.15	385.202	1756.47
17.95	357.627	1756.35
19.53	280.518	1756.01
21.16	264.247	1755.94
22.00	235.092	1755.81
23.20	241.691	1755.84
24.09	233.400	1755.80

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 13.0021 CFS-HRS= 17285.77 ACRE-FT= 1428.50

SUBROUTINE RUNOFF CROSS SECTION 8
AREA= 1.92 INPUT RUNOFF CURVE= 84.0 TIME OF CONCENTRATION= .42

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.12	2825.522	(RUNOFF)
17.04	373.679	(RUNOFF)
17.95	342.582	(RUNOFF)
19.38	268.625	(RUNOFF)
21.00	262.789	(RUNOFF)

21.99	225.268	(RUNOFF)
23.04	251.796	(RUNOFF)
23.98	250.614	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 13.6962 CFS-HRS= 16971.09 ACRE-FT= 1402.49

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SUBROUTINE ADDHYD CROSS SECTION 108
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.17	5364.581	1764.65
17.06	756.159	1757.70
17.95	700.208	1757.52
19.45	547.012	1757.04
21.05	523.018	1756.96
21.99	460.350	1756.77
23.09	486.204	1756.85
24.00	481.576	1756.83

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 3.98

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.02	1.36	7.34	18.25	33.78	61.77
4.00	DISCHG	95.48	131.22	170.57	212.86	283.51	360.05	441.09	537.53	623.19	717.14
6.00	DISCHG	807.00	950.70	1176.11	1365.70	1592.57	1803.12	2049.63	2380.10	2656.77	3037.86
8.00	DISCHG	3391.00	3752.96	4203.16	4554.58	4991.53	5315.81	5363.15	5279.12	5238.42	5171.59
10.00	DISCHG	5124.89	5023.88	4839.54	4695.75	4537.87	4408.34	4227.47	3954.71	3746.68	3449.68
12.00	DISCHG	3185.74	2953.06	2689.62	2505.77	2321.96	2174.66	2031.42	1853.12	1730.39	1622.03
14.00	DISCHG	1538.52	1454.65	1349.21	1274.39	1192.04	1123.75	1072.72	1024.50	987.05	925.52
16.00	DISCHG	869.97	813.16	742.78	703.26	722.31	754.13	747.32	704.13	677.89	684.47
18.00	DISCHG	698.63	658.17	555.76	493.29	501.05	526.46	539.73	546.70	544.53	502.35
20.00	DISCHG	457.70	444.56	456.94	469.91	496.98	522.10	512.87	468.76	440.89	447.08
22.00	DISCHG	460.30	443.53	395.01	372.03	421.02	479.68	477.40	415.82	383.32	427.45
24.00	DISCHG	481.57	428.76	261.80	148.16	86.27	51.20	29.80	17.08	9.81	5.57
26.00	DISCHG	3.18	1.83	1.05	.58	.30	.13	.05	.00		

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 13.3369 CFS-HRS= 34256.84 ACRE-FT= 2830.99

SUBROUTINE ADDHYD CROSS SECTION 109
INPUT HYDROGRAPHS= 3,4 OUTPUT HYDROGRAPH= 5

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.47	286.510	1767.25

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= .00

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8.00	DISCHG	.00	.00	.00	.00	.00	86.81	236.22	282.98	275.36	242.35
10.00	DISCHG	199.73	134.45	24.77	.00						

TOTAL WATER, CANNOT BE COMPUTED WITH D.A.= 0.0 CFS-HRS= 298.06 ACRE-FT= 24.63

SUBROUTINE SAVMOV CROSS SECTION 109

INPUT HYDROGRAPH= 5 OUTPUT HYDROGRAPH= 3

SUBROUTINE DIVERT CROSS SECTION 108
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,4

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SUBROUTINE REACH CROSS SECTION 107
LENGTH= 5300.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 6.243 AVERAGE ROUTING COEFF= .7860 NUMBER OF ROUTINGS= .93

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.59	5249.696	1762.11
17.28	749.753	1754.14
18.14	695.635	1753.95
19.65	544.951	1753.31
21.26	517.242	1753.20
22.18	457.019	1752.93
23.32	476.064	1753.02
24.20	467.127	1752.98

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 3.98

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.09	1.47	6.82	16.91	32.10
4.00	DISCHG	57.89	90.16	125.44	164.15	207.41	272.99	347.63	428.32	521.02	608.55
6.00	DISCHG	701.00	794.53	933.14	1139.32	1334.37	1554.01	1768.47	2013.59	2324.05	2613.53
8.00	DISCHG	2974.90	3330.18	3696.01	4123.75	4495.27	4908.98	5185.12	5239.61	5249.50	5236.67
10.00	DISCHG	5191.68	5130.15	5034.01	4869.46	4720.74	4566.34	4428.88	4251.17	4000.97	3779.39
12.00	DISCHG	3499.22	3233.91	2992.98	2738.67	2540.92	2356.50	2202.12	2054.62	1885.66	1754.66
14.00	DISCHG	1643.29	1554.26	1468.11	1368.27	1288.07	1206.97	1137.17	1082.60	1033.76	992.65
16.00	DISCHG	935.44	878.80	821.98	756.08	714.80	722.70	747.53	744.82	710.61	684.74
18.00	DISCHG	685.35	693.63	659.14	572.48	509.37	504.19	522.84	536.81	544.62	542.07
20.00	DISCHG	507.56	466.76	449.67	456.27	468.81	492.90	515.79	510.86	475.43	448.07
22.00	DISCHG	448.05	456.89	443.31	403.19	381.06	416.59	467.10	471.75	424.95	394.13
24.00	DISCHG	424.06	467.12	426.51	287.62	172.04	101.13	59.79	34.97	20.18	11.61
26.00	DISCHG	6.62	3.78	2.17	1.24	.69	.37	.17	.07	.00	

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 13.3231 CFS-HRS= 34221.32 ACRE-FT= 2828.05

SUBROUTINE SAVMOV CROSS SECTION 107
INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 5

SUBROUTINE ADDHYD CROSS SECTION 107
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.29	8082.971	1765.48
17.07	1130.676	1755.34
17.93	1058.713	1755.15
19.47	827.680	1754.40
21.06	780.634	1754.25
21.95	694.213	1753.95
23.13	704.942	1753.99
23.99	702.030	1753.98

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 6.08

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.09	1.47	6.82	17.10	35.48
4.00	DISCHG	68.96	115.67	169.92	230.55	311.03	411.15	529.88	657.23	790.66	928.87
6.00	DISCHG	1062.85	1266.34	1524.39	1821.43	2152.72	2464.73	2857.77	3278.91	3730.11	4276.93
8.00	DISCHG	4789.13	5400.94	5999.12	6590.64	7249.79	7817.16	8055.65	8048.12	8035.72	7953.50
10.00	DISCHG	7876.67	7664.53	7420.39	7193.20	6951.74	6761.49	6463.80	6144.78	5803.74	5374.54
12.00	DISCHG	5004.36	4595.29	4235.33	3922.07	3625.73	3398.94	3147.15	2915.70	2709.23	2526.54
14.00	DISCHG	2393.22	2246.04	2109.59	1983.15	1854.22	1752.06	1659.10	1586.55	1521.27	1434.35
16.00	DISCHG	1356.78	1259.77	1168.65	1102.35	1102.33	1128.75	1124.17	1090.40	1051.48	1045.06
18.00	DISCHG	1054.20	995.65	896.00	799.09	774.56	787.27	810.92	826.44	824.21	777.15
20.00	DISCHG	723.32	694.29	691.86	708.63	744.94	778.78	770.05	733.33	692.73	684.77
22.00	DISCHG	693.32	669.57	624.25	589.79	631.59	694.89	701.76	659.52	613.80	645.52
24.00	DISCHG	701.84	631.51	478.21	303.01	176.73	102.52	60.09	34.97	20.18	11.61
26.00	DISCHG	6.62	3.78	2.17	1.24	.69	.37	.17	.07	.00	

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 13.1078 CFS-HRS= 51432.95 ACRE-FT= 4250.42

SUBROUTINE SAVMOV STRUCTURE 2
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 6

SUBROUTINE RESVOR STRUCTURE 2
SURFACE ELEVATION= 1701.00

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
11.79	5425.194	1717.58

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 6.08

TIME											
.00	DISCHG	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50
2.00	DISCHG	10.50	10.50	10.50	10.50	10.50	10.50	10.49	10.49	10.49	10.50
4.00	DISCHG	10.82	11.62	12.91	14.76	17.28	20.67	25.10	30.70	37.53	45.63
6.00	DISCHG	54.99	65.92	79.02	94.72	113.36	122.37	124.33	126.60	129.21	132.20
8.00	DISCHG	135.60	139.12	142.11	145.43	150.05	152.87	206.94	487.51	981.75	1684.24
10.00	DISCHG	2433.76	3101.25	3713.08	4208.15	4602.74	4913.23	5147.34	5306.73	5398.68	5424.92
12.00	DISCHG	5392.48	5310.84	5187.47	5034.73	4861.03	4675.24	4482.07	4282.23	4079.75	3878.37
14.00	DISCHG	3682.95	3495.14	3313.67	3139.08	2970.96	2821.48	2687.25	2559.21	2438.28	2322.74
16.00	DISCHG	2211.21	2102.60	1995.73	1892.25	1797.23	1715.23	1644.41	1579.80	1518.58	1462.01
18.00	DISCHG	1412.40	1365.79	1315.28	1259.01	1202.21	1151.53	1127.78	1107.55	1089.09	1070.22
20.00	DISCHG	1049.29	1027.01	1005.16	985.21	968.31	954.80	943.00	930.48	916.25	901.37
22.00	DISCHG	887.48	874.00	859.14	842.65	827.47	816.73	808.98	800.58	789.86	779.38
24.00	DISCHG	772.46	765.54	751.76	728.13	696.19	659.77	621.93	584.35	547.92	513.11
26.00	DISCHG	481.45	464.54	448.15	432.30	416.99	402.21	387.94	374.17	360.89	348.07
28.00	DISCHG	335.72	323.80	312.30	301.22	290.52	280.21	270.26	260.67	251.41	242.49
30.00	DISCHG	233.88	225.57	217.57	209.84	202.39	195.21	188.28	181.59	175.15	168.93
32.00	DISCHG	162.93	157.15	154.95	154.88	154.81	154.73	154.66	154.59	154.52	154.44
34.00	DISCHG	154.37	154.30	154.22	154.15	154.08	154.01	153.96	153.92	153.88	153.84
36.00	DISCHG	153.80	153.76	153.71	153.67	153.63	153.59	153.55	153.51	153.47	153.43
38.00	DISCHG	153.38	153.34	153.30	153.26	153.22	153.18	153.14	153.10	153.05	153.01
40.00	DISCHG	152.97	152.93	152.89	152.85	152.81	152.77	152.73	152.69	152.64	152.60
42.00	DISCHG	152.56	152.52	152.48	152.44	152.40	152.36	152.32	152.28	152.23	152.19
44.00	DISCHG	152.15	152.11	152.07	152.03	151.99	151.95	151.91	151.87	151.83	151.79
46.00	DISCHG	151.75	151.70	151.66	151.62	151.58	151.54	151.50	151.46	151.42	151.34
48.00	DISCHG	151.24	151.13	151.02	150.91	150.81	150.70	150.59	150.49	150.38	150.27
50.00	DISCHG	150.16	150.06	149.95	149.84	149.74	149.63	149.52	149.42	149.31	149.21
52.00	DISCHG	149.10	148.99	148.89	148.78	148.68	148.57	148.47	148.36	148.25	148.15

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54.00	DISCHG	148.04	147.94	147.83	147.73	147.63	147.52	147.42	147.32	147.22	147.12
56.00	DISCHG	147.01	146.91	146.81	146.71	146.61	146.51	146.40	146.30	146.20	146.10
58.00	DISCHG	146.00	145.90	145.82	145.74	145.66	145.59	145.51	145.43	145.35	145.27

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 10.7674 CFS-HRS= 42249.49 ACRE-FT= 3491.50

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' ENDCMP

SUMMARY TABLE 1

ALT	STORM	ID	DA SQ-MI.	RAIN TBLE	AMC	DELTA-T HRS.	TZERO HRS.	PRECIP IN.	PRECIP DURATION	PEAK-Q CFS	PEAK-TIME	PEAK-ELEV	RUNOFF IN.	CSM
5	1	6	1.14	2	2	.20	.00	3.94	24.00	1039.29	12.11	.00	1.92	911.66
5	1	7	.96	2	2	.20	.00	3.94	24.00	910.17	11.99	.00	1.61	948.09
5	1	7	2.10	2	2	.20	.00	3.94	24.00	1904.30	12.03	.00	1.78	906.81
5	1	10	.67	2	2	.20	.00	3.94	24.00	402.49	12.41	.00	1.84	600.73
5	1	109	.67	2	2	.20	.00	3.94	24.00	365.06	12.69	1767.77	1.84	544.87
5	1	9	1.39	2	2	.20	.00	3.94	24.00	1307.43	12.18	.00	2.15	940.60
5	1	109	2.06	2	2	.20	.00	3.94	24.00	1484.53	12.22	1772.57	2.05	720.65
5	1	108	2.06	2	2	.20	.00	3.94	24.00	1408.33	12.29	1759.17	2.05	683.65
5	1	8	1.92	2	2	.20	.00	3.94	24.00	2152.81	12.09	.00	2.32	1121.26
5	1	108	3.98	2	2	.20	.00	3.94	24.00	3387.93	12.16	1762.11	2.18	851.24
5	1	109	.00	2	2	.20	.00	3.94	24.00	.00	.00	.00	2.18	.00
5	1	107	3.98	2	2	.20	.00	3.94	24.00	3170.66	12.41	1759.42	2.17	796.65
5	1	107	6.08	2	2	.20	.00	3.94	24.00	4159.93	12.29	1760.79	2.03	684.20
5	1	-2	6.08	2	2	.20	.00	3.94	24.00	136.73	23.96	1707.61	1.60	22.49
5	4	6	1.14	5	2	.20	.00	7.06	24.00	564.99	9.27	.00	4.63	495.61
5	4	7	.96	5	2	.20	.00	7.06	24.00	436.83	9.93	.00	4.19	455.03
5	4	7	2.10	5	2	.20	.00	7.06	24.00	998.33	9.92	.00	4.43	475.40
5	4	10	.67	5	2	.20	.00	7.06	24.00	318.26	10.11	.00	4.52	475.01
5	4	109	.67	5	2	.20	.00	7.06	24.00	316.12	10.39	1767.46	4.52	471.83
5	4	9	1.39	5	2	.20	.00	7.06	24.00	734.72	9.51	.00	4.96	528.58
5	4	109	2.06	5	2	.20	.00	7.06	24.00	1034.76	9.96	1770.83	4.82	502.31
5	4	108	2.06	5	2	.20	.00	7.06	24.00	1033.06	10.03	1758.37	4.82	501.48
5	4	8	1.92	5	2	.20	.00	7.06	24.00	1079.21	9.21	.00	5.19	562.09
5	4	108	3.98	5	2	.20	.00	7.06	24.00	2070.17	9.71	1760.33	5.00	520.14
5	4	109	.00	5	2	.20	.00	7.06	24.00	.00	.00	.00	5.00	.00
5	4	107	3.98	5	2	.20	.00	7.06	24.00	2069.74	10.11	1757.53	5.00	520.04
5	4	107	6.08	5	2	.20	.00	7.06	24.00	3061.83	9.95	1759.25	4.80	503.59
5	4	-2	6.08	5	2	.20	.00	7.06	24.00	381.99	18.40	1713.09	2.59	62.83
5	5	6	1.14	5	2	.20	.00	15.80	24.00	1602.61	9.15	.00	12.98	1405.80
5	5	7	.96	5	2	.20	.00	15.80	24.00	1320.59	9.00	.00	12.37	1375.62
5	5	7	2.10	5	2	.20	.00	15.80	24.00	2917.05	9.06	.00	12.70	1389.07
5	5	10	.67	5	2	.20	.00	15.80	24.00	893.01	9.68	.00	12.83	1332.86
5	5	109	.67	5	2	.20	.00	15.80	24.00	820.05	10.32	1770.00	12.66	1223.96
5	5	9	1.39	5	2	.20	.00	15.80	24.00	1986.81	9.25	.00	13.41	1429.36
5	5	109	2.06	5	2	.20	.00	15.80	24.00	2768.49	9.39	1777.52	13.17	1343.93
5	5	108	2.06	5	2	.20	.00	15.80	24.00	2547.57	10.10	1761.03	13.00	1236.69
5	5	8	1.92	5	2	.20	.00	15.80	24.00	2825.52	9.12	.00	13.70	1471.63
5	5	108	3.98	5	2	.20	.00	15.80	24.00	5364.58	9.17	1764.65	13.34	1347.88
5	5	109	.00	5	2	.20	.00	15.80	24.00	286.51	9.47	1767.25	13.34	.00
5	5	107	3.98	5	2	.20	.00	15.80	24.00	5249.70	9.59	1762.11	13.32	1319.02
5	5	107	6.08	5	2	.20	.00	15.80	24.00	8082.97	9.29	1765.48	13.11	1329.44
5	5	-2	6.08	5	2	.20	.00	15.80	24.00	5425.19	11.79	1717.58	10.77	892.30

SUMMARY TABLE 3

	DISCHARGE,CFS									
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
XSEC/STRUC NO. -2 ALTERNATE 5	136.73	381.99	5425.19	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO. 6 ALTERNATE 5	1039.29	564.99	1602.61	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO. 7 ALTERNATE 5	1904.30	998.33	2917.05	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO. 8 ALTERNATE 5	2152.81	1079.21	2825.52	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO. 9 ALTERNATE 5	1307.43	734.72	1986.81	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO. 10 ALTERNATE 5	402.49	318.26	893.01	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO.107 ALTERNATE 5	4159.93	3061.83	8082.97	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO.108 ALTERNATE 5	3387.93	2070.17	5364.58	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO.109 ALTERNATE 5	.00	.00	286.51	.00	.00	.00	.00	.00	.00	.00

ENDJOB CARD ENCOUNTERED. END OF JOB.

COMPUTATION SHEET
SCS–ENG–523 Rev. 8–69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE	PROJECT			
Arizona	Signal Butte F.R.S.			
BY R.A.P.	DATE 11-3-80	CHECKED BY [illegible]	DATE 12-80	JOB NO. 82

SUBJECT Stage Storage for Alternative ~~#~~ FINAL SL 5-84 SHEET 1 OF

	Elev.	Area (Ac)	Avr. Area	Depth	Vol. (Ac/ft)	Total Volume
	1683.5	0.0				
			0.045	0.5'	0.022	
	1684	0.09				0.022
			0.73	4'	2.92	
	1688	1.36				2.94
			3.47	4'	13.88	
	1692	5.58				16.82
			13.27	4'	53.08	
	1696	20.96				69.90
			34.06	4'	136.24	
	1700	47.16				206.14
			61.18	4'	244.72	
	1704	75.2				450.86
			91.40	4'	365.60	
	1708	107.6				816.46
			114.85	2'	229.70	
Crest of Emergency Spillway	1710	122.1				1046.16
			129.39	2'	258.78	
	1712	136.67				1304.94
			151.04	4'	604.16	
	1716	165.4				1909.10
			178.95	4'	715.8	
	1720	192.5				2624.90
			208.05	4'	832.20	
	1724	223.6				3457.10

********** 80-80 LI T OF INPUT DATA **********

```
DAMS2      12/03/82  SIGNAL BUTTE FRS W/PM DIVERSION                          1
COMMENT    THIS IS THE FINAL DESIGN H DROLOGY FOR SIGNAL BUTTE FRS
COMMENT    WHICH INCLUDES APACHE JUNCTION FRS, BULLDOG DIVERSION, AND         3
COMMENT    PASS MOUNTAIN DIVERSION WITH OUTLET CHANNEL.                       4
COMMENT    THE HYDROGRAPHS FROM THE DIVERSIONS INCLUDE FREEBOARD              5
COMMENT    DISCHARGE QUANTITIES.  SEDIMENT FROM PASS MOUNTAIN WILL            6
COMMENT    INCLUDE MOST FINE-GRAINED SEDIMENT, BUT NO COARSE-GRAINED          7
COMMENT    SEDIMENT.  THIS IS IN ADDITION TO THE WORK PLAN SEDIMENT           8
COMMENT    STORAGE REQUIREMENT.                                               9
COMMENT    PRELIMINARY DESIGN SHOWED THAT THE 100-YR STORM SET THE           10
COMMENT    EMERGENCY SPILLWAY CREST.  THIS WILL BE VARIFIED.   Yes .         11
CLPROFILE                      OLD CL DAM TO MERIDIAN RD THEN NORTH          12
           19076     1722.36   19108     1721.01   19208     1711.3          13
           19308     1717.6    19408     1719.08   19540     1717.9          14
           19570     1717.6    19650     1717.5    19700     1715.06         15
           19725     1716.7    19800     1715.94   20600     1704.05         16
           20650     1703.6    20700     1704.97   20750     1703.8          17
           20800     1704.09   20850     1702.4    21000     1701.25         18
           21070     1700.2    21070     1694.2    21100     1691.88         19
           21146.79  1693.95   21250     1694.1    21270     1691.1          20
           21300     1692.59   21320     1693.8    21350     1699.1          21
           21400     1698.72   21700     1694.85   21750     1695.8          22
           21875     1695.0    21925     1688.8    22000     1693.14         23
           22650     1693.8    22700     1692.42   22750     1691.4          24
           22760     1690.5    22772     1682.8    22795     1682.9          25
           22900     1686.7    22930     1691.0    22950     1691.2          26
           23000     1692.06   23050     1690.8    23070     1692.2          27
           23100     1691.3    23135     1688.6    23150     1689.5          28
           23170     1691.7    23190     1692.2    23200     1690.21         29
           23210     1687.9    23240     1687.9    23250     1686.3          30
           23255     1685.9    23400     1692.99   23550     1690.5          31
           23600     1691.7    23700     1690.4    23750     1691.7          32
           23800     1692.22   23900     1687.76   23910     1687.5          33
           23925     1684.1    23940     1686.3    23950     1686.5          34
           23980     1687.7    23995     1685.0    24000     1686.23         35
           24025     1689.3    24150     1687.5    24165     1685.8          36
           24175     1687.2    24200     1688.53   24232.27  1688.99         37
           24267     1686.79   24300     1689.44   24350     1688.9          38
           24390     1687.7    24400     1686.3    24700     1694.01         39
           24800     1693.69   25000     1698.36   25050     1695.8          40
           25100     1697.1    25150     1695.9    25200     1695.04         41
           25350     1700.6    25400     1703.16   26500     1720.00         43
           26550     1719.8    26600     1720.5    26650     1721.7          44
           26700     1722.4    26750     1723.3    26800     1723.5          45
ENDTABLE                                                                     46
STRUCTURE SBFRS    SIGNAL BUTTE FRS BUCKHORN-MESA WPP                        47
                   1684      0.09      0.0       0.0       0.022             48
                   1688      1.36      6.4       0.0       2.94              49
                   1692      5.58      7.9       0.0       16.82             50
```

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

```
                    1696      20.96     9.2       0.0       69.9                51
                    1701      54.5      10.5      0.0       265.                52
                    1704      75.2      121.3     0.0       450.86              53
                    1708      107.6     138.4     0.0       816.46              54
                    1710      122.1     145.9     0.0       1046.16             55
                    1712      136.7     153.2     0.0       1304.94             56
                    1716      165.4     166.7     0.0       1909.1              57
                    1720      192.5     179.5     0.0       2624.9              58
                    1724      223.6     191.5     0.0       3457.1              59
ENDTABLE                                                                        59
POOLDATA  ELEV      1684.     1684.     1700.75                                 61
HYD       PS                PRINCIPAL SPILLWAY HYDROGRAPH                      X
                    1.0
                    .00       12.41     14.30     14.84     15.28
                    15.68     16.06     16.42     16.75     17.07
                    17.37     17.65     17.91     18.16     18.39
                    18.61     18.81     19.01     19.19     19.36
                    19.52     19.67     19.81     19.95     20.07
                    20.19     20.30     25.82     27.47     26.43
                    21.83     21.34     27.32     28.48     24.80
                    22.34     22.07     28.24     29.18     29.46
                    29.68     28.37     23.65     23.05     28.93
                    29.99     30.24     30.42     30.58     30.73
                    30.87     31.00     31.12     31.24     31.35
                    31.45     31.55     31.64     31.73     31.81
                    31.88     31.96     32.02     42.91     46.07
                    43.90     34.54     33.45     39.34     40.43
                    40.72     40.93     41.12     41.30     41.46
                    47.03     48.73     47.73     43.18     42.74
                    48.76     49.95     46.31     43.88     43.70
                    56.04     57.96     58.53     58.99     60.93
                    66.24     67.40     62.04     61.48     61.69
                    61.95     62.31     87.26     91.25     92.55
                    93.62     96.10     101.97    104.11    99.89
                    100.30    101.31    102.27    103.21    128.91
                    133.87    152.47    159.36    171.82    204.24
                    212.05    300.73    321.88    1923.57   2966.63
                    3097.10   829.15    542.33    358.83    314.50
                    297.16    257.94    253.01    228.86    224.80
                    208.18    197.46    195.73    170.87    167.43
                    161.46    159.67    159.13    158.75    158.39
                    163.95    164.57    164.33    164.00    163.58
                    144.91    142.20    141.64    141.24    142.38
                    146.83    147.06    140.83    139.51    139.04
                    138.66    138.25    131.78    130.63    130.09
                    129.55    130.50    134.81    134.89    128.50
                    127.02    126.40    125.87    125.32    118.68
                    117.37    116.75    116.18    117.12    121.41
                    121.47    115.08    113.58    112.93    112.39
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********** 80-80 LIST OF INPUT DATA **********

106.05	97.37	90.26	84.16	78.72
73.87	69.53	65.65	62.19	59.09
56.32	53.85	51.61	43.41	40.64
44.74	45.25	43.16	37.56	36.13
41.23	41.56	37.10	33.91	32.93
32.26	31.65	31.08	30.54	31.55
35.98	36.31	30.18	28.88	28.41
28.02	27.67	27.33	27.02	26.72
26.44	27.69	32.36	32.91	26.98
25.87	25.57	25.36	25.16	24.98
24.80	30.05	31.45	30.18	25.35
24.65	24.47	24.32	22.38	22.49
11.78	9.50	9.05	8.54	8.03
7.55	7.10	6.68	6.28	5.91
5.55	5.22	4.91	4.62	4.34
4.08	3.84	3.61	3.40	3.19
3.00	2.82	2.66	2.50	2.35
2.21	2.08	1.95	1.84	1.73
1.62	1.53	1.44	1.35	1.27
1.19	1.12	1.06	.99	.93
.88	.83	.78	.73	.69
.65	.61	.57	.54	.51
.48	.45	.42	.40	.37
.35	.33	.31	.29	.27

ENDTABLE
GO,HYD SLP
HYD 100Y TR20 HYDROGRAPH 100YR STORM

Checked w/ routing begun 8 Dec. 1700.75, same output results. [illegible]

0.2				
0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.00
0.0	0.01	0.26	1.21	2.8
5.31	8.83	13.68	20.07	28.2
38.32	50.21	64.4	79.97	97.74
118.3	144.	178.75	218.95	275.76
342.8	439.83	581.44	1013.27	3287.48
6690.89	8158.16	7034.78	5319.26	3867.81
2896.3	2267.67	1845.33	1570.44	1359.16
1208.42	1097.09	1010.92	949.52	895.95
854.86	816.75	779.14	747.66	710.97
679.28	652.68	629.45	613.07	603.66
598.72	590.05	576.96	564.22	547.2
531.73	515.17	497.55	484.06	476.05
471.88	469.78	468.76	466.44	455.71
443.63	435.06	430.36	426.08	414.19

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

401.55	399.03	406.39	412.83	407.52
398.27	391.09	387.1	383.24	371.49
358.79	356.36	363.68	370.10	364.67
354.56	314.41	248.29	191.9	157.0
138.21	128.19	122.59	119.17	116.67
115.27	114.55	114.09	113.79	113.56
113.39	113.25	113.12	113.01	112.91
112.81	112.71	112.61	112.51	112.41
112.31	112.21	112.11	112.01	111.91
111.82	111.72	111.62	111.52	111.42
111.32	111.22	111.13	111.03	110.93
110.83	110.73	110.64	110.54	110.44
110.34	110.25	110.15	110.05	109.95
109.86	109.76	109.66	109.57	109.47
109.37	109.28	109.18	109.08	108.99
108.89	108.79	108.7	108.6	108.51
108.41	108.31	108.22	108.12	108.03
107.93	107.84	107.74	107.65	107.55
107.46	107.36	107.27	107.17	107.08
106.98	106.89	106.79	106.7	106.6
106.51	106.42	106.32	106.23	106.13
106.04	105.95	105.85	105.76	105.67
105.57	105.48	105.39	105.29	105.20
105.11	105.02	104.92	104.83	104.74
104.64	104.55	104.46	104.37	104.28
104.18	104.09	104.00	103.91	103.82
103.72	103.63	103.54	103.45	103.36
103.27	103.18	103.08	102.99	102.9
102.81	102.72	102.63	102.54	102.44
102.33	102.2	102.07	101.94	101.81
101.68	101.55	101.42	101.29	101.16
101.03	100.9	100.77	100.64	100.51
100.39	100.26	100.13	100.00	99.87
99.74	99.62	99.49	99.36	99.24
99.11	98.98	98.86	98.73	98.6
98.48	98.35	98.22	98.1	97.97
97.85	97.72	97.6	97.47	97.35
97.22	97.1	96.98	96.85	96.73
96.6	96.48	96.36	96.23	96.11

ENDTABLE X
GO,HYD SLP
ENDJOB X

checked w/ routing started elev. 1200.75, same output results.

****

SIGNAL BUTTE FRS W/PM DIVERSIO

THIS IS THE FINAL DESIGN HYDROLOGY FOR SIGNAL BUTTE FRS WHICH INCLUDES APACHE JUNCTION FRS, BULLDOG DIVERSION, AND PASS MOUNTAIN DIVERSION WITH OUTLET CHANNEL.

THE HYDROGRAPHS FROM THE DIVERSIONS INCLUDE FREEBOARD DISCHARGE QUANTITIES. SEDIMENT FROM PASS MOUNTAIN WILL INCLUDE MOST FINE-GRAINED SEDIMENT, BUT NO COARSE-GRAINED SEDIMENT. THIS IS IN ADDITION TO THE WORK PLAN SEDIMENT STORAGE REQUIREMENT.

PRELIMINARY DESIGN SHOWED THAT THE 100-YR STORM SET THE EMERGENCY SPILLWAY CREST. THIS WILL BE VARIFIED. yes.

(6)

********** BASIC DATA **********

****NOT DEFINED CLIMATE AREA

DESIGN CLASS ****NOT DEFINED

STORM DISTRIBUTION.....PRINCIPAL SPILLWAY HYDROGRAPH

Q-PS1 DAY	Q-PS10 DAY	Q-ES	Q-FB	CN	DA-SM	TC/L	-/H
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONDUITS	COND L	D/W	-/H	PS N	KI	WEIR L	TW EL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PERM POOL	CREST PS	FP SED	QRF	2ND STG	ORF H	ORF L	START ES
1684.00	1684.00	1700.75	0.0	0.0	0.0	0.0	0.0
BASEFLOW	INITIAL EL	EXTRA VOL.					
0.0	0.0	0.0					
ES1	ES2	ES3	ES4	ES5	Z ES	EXIT N	EXIT S
0.0	0.0	0.0	0.0	0.0	0.0	0.040	0.0
ES TYPE	ES L	ES N	BW1	BW2	BW3	BW4	BW5
0	0	0.0	0.0	0.0	0.0	0.0	0.0

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PERM POOL	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
SED ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	10.4 CFS

****

RATING TABLE DEVELOPED
WITH PS GIVEN AND NO EMG DATA GIVEN

RATING TABLE NUMBER 2

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1688.00	6.40	6.40	2.94	1.36
3	1692.00	7.90	7.90	16.82	5.58
4	1696.00	9.20	9.20	69.90	20.96
5	1701.00	10.50	10.50	265.00	54.50
6	1704.00	121.30	121.30	450.86	75.20
7	1708.00	138.40	138.40	816.46	107.60
8	1710.00	145.90	145.90	1046.16	122.10
9	1712.00	153.20	153.20	1304.94	136.70
10	1716.00	166.70	166.70	1909.10	165.40
11	1720.00	179.50	179.50	2624.90	192.50
12	1724.00	191.50	191.50	3457.10	223.60

FLOOD HYD D= 0.0 HR P= 0.0 IN Q= 0.0 IN
TC= 0.0 HR CN= 0.0 VOL= 0.0 ACFT
PEAK 3097.1 CFS AT 120.00 HRS

ROUTED RESULTS - HYD TYPE	EMAX	VOL-MAX	AMAX	QMAX
FLOOD HYD	1711.65 FT	1259.4 ACFT	134.13 AC	151.9 CFS

lower than 100-yr. storm routing, so not used. SMC

PS STORAGE 1004.2 ACFT BETWEEN ES CREST AND SED ACCUM ELEVATIONS

PLOT 1 IN = 500. CFS EXIT SLOPE = 0.0

T	I	O	E	VOL	A	0. I	500. I	1000. I	1500. I	2000. I	2500. I	3000. I	3500. I	EXIT VEL
0.0	0.0	0.0	1684.0	0.0	0.1	.								0.0
1.00	12.4	12.4	1701.1	268.2	54.9	.								0.0
2.00	14.3	10.4	1700.8	255.4	52.8	.								0.0
3.00	14.8	10.4	1700.8	255.7	52.9	.								0.0
4.00	15.3	10.4	1700.8	256.1	53.0	.								0.0
5.00	15.7	10.4	1700.8	256.5	53.0	.								0.0
6.00	16.1	10.4	1700.8	257.0	53.1	.								0.0
7.00	16.4	10.4	1700.8	257.5	53.2	.								0.0
8.00	16.8	10.5	1700.8	258.0	53.3	.								0.0
9.00	17.1	10.5	1700.8	258.5	53.4	.								0.0
10.00	17.4	10.5	1700.8	259.1	53.5	.								0.0
11.00	17.6	10.5	1700.9	259.7	53.6	.								0.0
12.00	17.9	10.5	1700.9	260.3	53.7	.								0.0
13.00	18.2	10.5	1700.9	260.9	53.8	.								0.0
14.00	18.4	10.5	1700.9	261.5	53.9	.								0.0
15.00	18.6	10.5	1700.9	262.2	54.0	.								0.0
16.00	18.8	10.5	1700.9	262.9	54.1	.								0.0
17.00	19.0	10.5	1701.0	263.6	54.3	.								0.0
18.00	19.2	10.5	1701.0	264.3	54.4	.								0.0

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20.00	19.5	10.9	1701.0	265.7	54.6	.	0.0
21.00	[illegible]	11.3	1701.0	266.4	54.7	.	0.0
22.00	[illegible]	11.7	1701.0	267.1	54.7	.	0.0
23.00	[illegible]	12.1	1701.0	267.8	54.8	.	0.0
24.00	[illegible]	12.5	1701.1	268.4	54.9	.	0.0
25.00	20.2	12.9	1701.1	269.0	54.9	.	0.0
26.00	20.3	13.2	1701.1	269.6	55.0	.	0.0
27.00	25.8	13.7	1701.1	270.4	55.1	.I	0.0
28.00	27.5	14.3	1701.1	271.4	55.2	.I	0.0
29.00	26.4	14.9	1701.1	272.4	55.3	.I	0.0
30.00	21.8	15.4	1701.1	273.2	55.4	.	0.0
31.00	21.3	15.7	1701.1	273.7	55.5	.	0.0
32.00	27.3	16.1	1701.2	274.4	55.5	.I	0.0
33.00	28.5	16.7	1701.2	275.3	55.7	.I	0.0
34.00	24.8	17.1	1701.2	276.1	55.7	.	0.0
35.00	22.3	17.5	1701.2	276.7	55.8	.	0.0
36.00	22.1	17.7	1701.2	277.0	55.8	.	0.0
37.00	28.2	18.0	1701.2	277.6	55.9	.I	0.0
38.00	29.2	18.6	1701.2	278.5	56.0	.I	0.0
39.00	29.5	19.1	1701.2	279.4	56.1	.I	0.0
40.00	29.7	19.6	1701.2	280.2	56.2	.I	0.0
41.00	28.4	20.0	1701.3	281.0	56.3	.I	0.0
42.00	23.6	20.3	1701.3	281.5	56.3	.	0.0
43.00	23.0	20.5	1701.3	281.7	56.4	.	0.0
44.00	28.9	20.7	1701.3	282.2	56.4	.I	0.0
45.00	30.0	21.1	1701.3	282.9	56.5	.I	0.0
46.00	30.2	21.6	1701.3	283.6	56.6	.I	0.0
47.00	30.4	22.0	1701.3	284.3	56.6	.I	0.0
48.00	30.6	22.4	1701.3	285.0	56.7	.I	0.0
49.00	30.7	22.8	1701.3	285.6	56.8	.I	0.0
50.00	30.9	23.2	1701.3	286.3	56.9	.I	0.0
51.00	31.0	23.6	1701.4	286.9	56.9	.I	0.0
52.00	31.1	23.9	1701.4	287.5	57.0	.I	0.0
53.00	31.2	24.3	1701.4	288.1	57.1	.I	0.0
54.00	31.3	24.6	1701.4	288.7	57.1	.I	0.0
55.00	31.4	24.9	1701.4	289.2	57.2	.I	0.0
56.00	31.5	25.2	1701.4	289.7	57.3	.P	0.0
57.00	31.6	25.6	1701.4	290.3	57.3	.P	0.0
58.00	31.7	25.8	1701.4	290.7	57.4	.P	0.0
59.00	31.8	26.1	1701.4	291.2	57.4	.P	0.0
60.00	31.9	26.4	1701.4	291.7	57.5	.P	0.0
61.00	32.0	26.7	1701.4	292.1	57.5	.P	0.0
62.00	32.0	26.9	1701.4	292.6	57.6	.P	0.0
63.00	42.9	27.4	1701.5	293.4	57.7	.P	0.0
64.00	46.1	28.3	1701.5	294.8	57.8	.P	0.0
65.00	43.9	29.1	1701.5	296.1	58.0	.P	0.0
66.00	34.5	29.5	1701.5	297.0	58.1	.P	0.0
67.00	33.4	29.8	1701.5	297.3	58.1	.P	0.0
68.00	39.3	30.1	1701.5	297.8	58.2	.P	0.0
69.00	40.4	30.6	1701.5	298.6	58.2	.P	0.0
70.00	40.7	31.0	1701.6	299.4	58.3	.P	0.0
71.00	40.9	31.5	1701.6	300.2	58.4	.P	0.0
72.00	41.1	32.0	1701.6	301.0	58.5	.P	0.0
73.00	41.3	32.4	1701.6	301.7	58.6	.P	0.0
74.00	41.5	32.8	1701.6	302.5	58.7	.P	0.0
75.00	47.0	33.4	1701.6	303.4	58.8	.P	0.0

76.00	[illegible]	34.1	1701.6	304.6	58.9	.P	0.0
77.00	[illegible]	34.8	1701.7	305.7	59.0	.P	0.0
78.00	[illegible].2	35.3	1701.7	306.6	59.1	.P	0.0
79.00	42.7	35.6	1701.7	307.2	59.2	.P	0.0
80.00	48.8	36.1	1701.7	308.0	59.3	.P	0.0
81.00	49.9	36.8	1701.7	309.1	59.4	.P	0.0
82.00	46.3	37.3	1701.7	310.0	59.5	.P	0.0
83.00	43.9	37.7	1701.7	310.6	59.6	.P	0.0
84.00	43.7	38.0	1701.7	311.1	59.6	.P	0.0
85.00	56.0	38.6	1701.8	312.1	59.7	.P	0.0
86.00	58.0	39.4	1701.8	313.5	59.9	.P	0.0
87.00	58.5	40.3	1701.8	315.1	60.1	.P	0.0
88.00	59.0	41.2	1701.8	316.5	60.2	.P	0.0
89.00	60.9	42.1	1701.9	318.1	60.4	.P	0.0
90.00	66.2	43.2	1701.9	319.8	60.6	.P	0.0
91.00	67.4	44.3	1701.9	321.7	60.8	.P	0.0
92.00	62.0	45.3	1701.9	323.3	61.0	.P	0.0
93.00	61.5	46.1	1702.0	324.7	61.1	.P	0.0
94.00	61.7	46.8	1702.0	325.9	61.3	.P	0.0
95.00	61.9	47.5	1702.0	327.1	61.4	.P	0.0
96.00	62.3	48.2	1702.0	328.3	61.5	.P	0.0
97.00	87.3	49.5	1702.1	330.4	61.8	.PI	0.0
98.00	91.3	51.4	1702.1	333.7	62.1	.PI	0.0
99.00	92.5	53.4	1702.2	336.9	62.5	.PI	0.0
100.00	93.6	55.3	1702.2	340.1	62.9	.PI	0.0
101.00	96.1	57.2	1702.3	343.3	63.2	.PI	0.0
102.00	102.0	59.2	1702.3	346.7	63.6	.PI	0.0
103.00	104.1	61.3	1702.4	350.2	64.0	.PI	0.0
104.00	99.9	63.3	1702.4	353.5	64.4	.PI	0.0
105.00	100.3	65.0	1702.5	356.5	64.7	.PI	0.0
106.00	101.3	66.8	1702.5	359.4	65.0	.PI	0.0
107.00	102.3	68.4	1702.6	362.2	65.3	.PI	0.0
108.00	103.2	70.1	1702.6	365.0	65.6	.PI	0.0
109.00	128.9	72.3	1702.7	368.7	66.0	.P I	0.0
110.00	133.9	75.1	1702.7	373.4	66.6	. PI	0.0
111.00	152.5	78.4	1702.8	378.9	67.2	. PI	0.0
112.00	159.4	82.1	1702.9	385.2	67.9	. PI	0.0
113.00	171.8	86.1	1703.0	391.9	68.6	. PI	0.0
114.00	204.2	91.0	1703.2	400.1	69.5	. P I	0.0
115.00	212.0	96.7	1703.3	409.6	70.6	. P I	0.0
116.00	300.7	104.4	1703.5	422.4	72.0	. P I	0.0
117.00	321.9	114.3	1703.8	439.1	73.9	. P I	0.0
118.00	1923.6	124.6	1704.8	522.0	81.5	. P	0.0
119.00	2966.6	133.6	1706.9	713.5	98.5	. P	0.0
120.00	3097.1	142.8	1709.2	952.6	116.2	. P	0.0
121.00	829.1	147.5	1710.4	1102.8	125.3	. P	0.0
122.00	542.3	148.8	1710.8	1147.3	127.8	. P	0.0
123.00	358.8	149.5	1711.0	1172.2	129.2	. P I	0.0
124.00	314.5	149.9	1711.1	1187.6	130.1	. P I	0.0
125.00	297.2	150.3	1711.2	1200.5	130.8	. P I	0.0
126.00	257.9	150.6	1711.3	1211.0	131.4	. P I	0.0
127.00	253.0	150.8	1711.3	1219.7	131.9	. P I	0.0
128.00	228.9	151.0	1711.4	1227.1	132.3	. P I	0.0
129.00	224.8	151.2	1711.4	1233.4	132.7	. PI	0.0
130.00	208.2	151.3	1711.5	1238.8	133.0	. PI	0.0
131.00	197.5	151.5	1711.5	1243.0	133.2	. PI	0.0
132.00	195.7	151.6	1711.6	1246.7	133.4	. PI	0.0
133.00	170.9	151.6	1711.6	1249.4	133.6	. P	0.0
134.00	167.4	151.7	1711.6	1250.8	133.6	. P	0.0
135.00	161.5	151.7	1711.6	1251.9	133.7	. P	0.0
136.00	159.7	151.7	1711.6	1252.6	133.7	. P	0.0
137.00	159.1	151.7	1711.6	1253.2	133.8	. P	0.0
138.00	158.7	151.8	1711.6	1253.8	133.8	. P	0.0

140.00	163.9	151.8	1711.6	1255.2	133.9	.	P	0.0
141.00	[illegible]	151.8	1711.6	1256.2	133.9	.	P	0.0
142.00	[illegible]	151.9	1711.6	1257.2	134.0	.	P	0.0
143.00	[illegible]	151.9	1711.6	1258.2	134.1	.	P	0.0
144.00	[illegible]	151.9	1711.6	1259.2	134.1	.	P	0.0
145.00	144.9	151.9	1711.6	1259.4	134.1	.	X	0.0
146.00	142.2	151.9	1711.6	1258.7	134.1	.	P	0.0
147.00	141.6	151.9	1711.6	1257.9	134.0	.	P	0.0
148.00	141.2	151.8	1711.6	1257.0	134.0	.	P	0.0
149.00	142.4	151.8	1711.6	1256.2	134.0	.	P	0.0
150.00	146.8	151.8	1711.6	1255.6	133.9	.	P	0.0
151.00	147.1	151.8	1711.6	1255.2	133.9	.	P	0.0
152.00	140.8	151.8	1711.6	1254.6	133.9	.	P	0.0
153.00	139.5	151.8	1711.6	1253.6	133.8	.	P	0.0
154.00	139.0	151.7	1711.6	1252.6	133.7	.	P	0.0
155.00	138.7	151.7	1711.6	1251.5	133.7	.	P	0.0
156.00	138.2	151.7	1711.6	1250.4	133.6	.	P	0.0
157.00	131.8	151.6	1711.6	1249.1	133.5	.	P	0.0
158.00	130.6	151.6	1711.6	1247.4	133.5	.	P	0.0
159.00	130.1	151.5	1711.5	1245.6	133.4	.	P	0.0
160.00	129.5	151.5	1711.5	1243.8	133.3	.	P	0.0
161.00	130.5	151.4	1711.5	1242.1	133.2	.	P	0.0
162.00	134.8	151.4	1711.5	1240.5	133.1	.	P	0.0
163.00	134.9	151.3	1711.5	1239.1	133.0	.	P	0.0
164.00	128.5	151.3	1711.5	1237.5	132.9	.	P	0.0
165.00	127.0	151.2	1711.5	1235.6	132.8	.	P	0.0
166.00	126.4	151.2	1711.4	1233.5	132.7	.	P	0.0
167.00	125.9	151.1	1711.4	1231.5	132.6	.	P	0.0
168.00	125.3	151.1	1711.4	1229.4	132.4	.	P	0.0
169.00	118.7	151.0	1711.4	1227.0	132.3	.	IP	0.0
170.00	117.4	150.9	1711.4	1224.3	132.1	.	IP	0.0
171.00	116.7	150.8	1711.4	1221.5	132.0	.	IP	0.0
172.00	116.2	150.8	1711.3	1218.6	131.8	.	IP	0.0
173.00	117.1	150.7	1711.3	1215.8	131.7	.	IP	0.0
174.00	121.4	150.6	1711.3	1213.2	131.5	.	IP	0.0
175.00	121.5	150.5	1711.3	1210.8	131.4	.	IP	0.0
176.00	115.1	150.5	1711.3	1208.1	131.2	.	IP	0.0
177.00	113.6	150.4	1711.2	1205.2	131.1	.	IP	0.0
178.00	112.9	150.3	1711.2	1202.1	130.9	.	IP	0.0
179.00	112.4	150.2	1711.2	1199.0	130.7	.	IP	0.0
180.00	106.0	150.1	1711.2	1195.6	130.5	.	IP	0.0
181.00	97.4	150.0	1711.1	1191.6	130.3	.	IP	0.0
182.00	90.3	149.9	1711.1	1187.0	130.0	.	IP	0.0
183.00	84.2	149.7	1711.0	1181.8	129.8	.	IP	0.0
184.00	78.7	149.6	1711.0	1176.2	129.4	.	IP	0.0
185.00	73.9	149.4	1711.0	1170.1	129.1	.I	P	0.0
186.00	69.5	149.2	1710.9	1163.7	128.7	.I	P	0.0
187.00	65.6	149.0	1710.9	1157.0	128.4	.I	P	0.0
188.00	62.2	148.8	1710.8	1149.9	128.0	.I	P	0.0
189.00	59.1	148.6	1710.7	1142.6	127.5	.I	P	0.0
190.00	56.3	148.4	1710.7	1135.1	127.1	.I	P	0.0
191.00	53.8	148.2	1710.6	1127.4	126.7	.I	P	0.0
192.00	51.6	148.0	1710.6	1119.6	126.2	.I	P	0.0
193.00	43.4	147.7	1710.5	1111.3	125.8	.I	P	0.0
194.00	40.6	147.5	1710.4	1102.5	125.3	.I	P	0.0
195.00	44.7	147.2	1710.4	1093.9	124.8	.I	P	0.0

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196.00	[illegible]	147.0	1710.3	1085.4	124.3	.I	P	0.0
197.00	[illegible]	146.8	1710.2	1077.0	123.8	.I	P	0.0
198.00	[illegible]	146.5	1710.2	1068.2	123.3	.I	P	0.0
199.00	36.1	146.3	1710.1	1059.1	122.8	.I	P	0.0
200.00	41.2	146.0	1710.0	1050.2	122.3	.I	P	0.0
201.00	41.6	145.8	1710.0	1041.6	121.8	.I	P	0.0
202.00	37.1	145.5	1709.9	1032.8	121.3	.I	P	0.0
203.00	33.9	145.2	1709.8	1023.7	120.7	.I	P	0.0
204.00	32.9	144.9	1709.7	1014.5	120.1	.I	P	0.0
205.00	32.3	144.6	1709.6	1005.3	119.5	.I	P	0.0
206.00	31.6	144.3	1709.6	996.0	118.9	.I	P	0.0
207.00	31.1	144.0	1709.5	986.6	118.3	.I	P	0.0
208.00	30.5	143.7	1709.4	977.3	117.8	.I	P	0.0
209.00	31.5	143.3	1709.3	968.0	117.2	.I	P	0.0
210.00	36.0	143.1	1709.2	959.0	116.6	.I	P	0.0
211.00	36.3	142.8	1709.2	950.1	116.0	.I	P	0.0
212.00	30.2	142.5	1709.1	941.1	115.5	.I	P	0.0
213.00	28.9	142.2	1709.0	931.8	114.9	.I	P	0.0
214.00	28.4	141.9	1708.9	922.4	114.3	.I	P	0.0
215.00	28.0	141.6	1708.8	913.0	113.7	.I	P	0.0
216.00	27.7	141.2	1708.8	903.6	113.1	.I	P	0.0
217.00	27.3	140.9	1708.7	894.3	112.5	.I	P	0.0
218.00	27.0	140.6	1708.6	884.9	111.9	.I	P	0.0
219.00	26.7	140.3	1708.5	875.5	111.3	.I	P	0.0
220.00	26.4	140.0	1708.4	866.1	110.7	.I	P	0.0
221.00	27.7	139.7	1708.4	856.8	110.1	.I	P	0.0
222.00	32.4	139.4	1708.3	847.7	109.6	.I	P	0.0
223.00	32.9	139.1	1708.2	838.9	109.0	.I	P	0.0
224.00	27.0	138.8	1708.1	829.9	108.4	.I	P	0.0
225.00	25.9	138.5	1708.0	820.6	107.9	.I	P	0.0
226.00	25.6	138.2	1707.9	811.3	107.1	.I	P	0.0
227.00	25.4	137.7	1707.8	802.0	106.3	.I	P	0.0
228.00	25.2	137.3	1707.7	792.7	105.5	.I	P	0.0
229.00	25.0	136.9	1707.6	783.5	104.7	.	P	0.0
230.00	24.8	136.4	1707.5	774.2	103.9	.	P	0.0
231.00	30.0	136.0	1707.4	765.2	103.1	.I	P	0.0
232.00	31.4	135.6	1707.3	756.6	102.3	.I	P	0.0
233.00	30.2	135.2	1707.2	747.9	101.5	.I	P	0.0
234.00	25.3	134.8	1707.2	739.1	100.7	.I	P	0.0
235.00	24.6	134.4	1707.1	730.0	99.9	.	P	0.0
236.00	24.5	133.9	1707.0	720.9	99.1	.	P	0.0
237.00	24.3	133.5	1706.9	711.9	98.3	.	P	0.0
238.00	22.4	133.1	1706.8	702.8	97.5	.	P	0.0
239.00	22.5	132.7	1706.7	693.7	96.7	.	P	0.0
240.00	11.8	132.2	1706.6	684.2	95.9	.	P	0.0
241.00	9.5	131.7	1706.4	674.1	95.0	.	P	0.0
242.00	9.0	131.3	1706.3	664.0	94.1	.	P	0.0
243.00	8.5	130.8	1706.2	653.9	93.2	.	P	0.0
244.00	8.0	130.3	1706.1	643.8	92.3	.	P	0.0
245.00	7.5	129.9	1706.0	633.7	91.4	.	P	0.0
246.00	7.1	129.4	1705.9	623.6	90.5	.	P	0.0
247.00	6.7	128.9	1705.8	613.5	89.6	.	P	0.0
248.00	6.3	128.4	1705.7	603.4	88.7	.	P	0.0
249.00	5.9	128.0	1705.6	593.3	87.8	.	P	0.0
250.00	5.5	127.5	1705.4	583.2	86.9	.	P	0.0
251.00	5.2	127.0	1705.3	573.2	86.0	.	P	0.0
252.00	4.9	126.6	1705.2	563.1	85.1	.	P	0.0
253.00	4.6	126.1	1705.1	553.1	84.3	.	P	0.0
254.00	4.3	125.6	1705.0	543.0	83.4	.	P	0.0
255.00	4.1	125.1	1704.9	533.0	82.5	.	P	0.0
256.00	3.8	124.7	1704.8	523.0	81.6	.	P	0.0
257.00	3.6	124.2	1704.7	513.0	80.7	.	P	0.0
258.00	3.4	123.7	1704.6	503.1	79.8	.	P	0.0

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259.00	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
260.00	3.0	122.8	1704.4	483.2	78.1	. P	0.0
261.00	[illegible]	122.4	1704.2	473.3	77.2	. P	0.0
262.00	[illegible]	121.9	1704.1	463.5	76.3	. P	0.0
263.00	[illegible]	121.4	1704.0	453.6	75.4	. P	0.0
264.00	[illegible]	117.2	1703.9	444.0	74.4	. P	0.0
265.00	2.2	111.7	1703.7	434.7	73.4	. P	0.0
266.00	2.1	106.4	1703.6	425.9	72.4	. P	0.0
267.00	1.9	101.4	1703.5	417.5	71.5	. P	0.0
268.00	1.8	96.6	1703.3	409.4	70.6	. P	0.0
269.00	1.7	92.0	1703.2	401.8	69.7	. P	0.0
270.00	1.6	87.7	1703.1	394.5	68.9	. P	0.0
271.00	1.5	83.6	1703.0	387.5	68.1	. P	0.0
272.00	1.4	79.6	1702.9	380.9	67.4	. P	0.0
273.00	1.3	75.8	1702.8	374.6	66.7	. P	0.0
274.00	1.3	72.3	1702.7	368.6	66.0	.P	0.0
275.00	1.2	68.8	1702.6	362.9	65.4	.P	0.0
276.00	1.1	65.6	1702.5	357.4	64.8	.P	0.0
277.00	1.1	62.5	1702.4	352.2	64.2	.P	0.0
278.00	1.0	59.5	1702.3	347.3	63.7	.P	0.0
279.00	0.9	56.7	1702.3	342.5	63.1	.P	0.0
280.00	0.9	54.0	1702.2	338.0	62.6	.P	0.0
281.00	0.8	51.5	1702.1	333.7	62.2	.P	0.0
282.00	0.8	49.0	1702.0	329.7	61.7	.P	0.0
283.00	0.7	46.7	1702.0	325.8	61.3	.P	0.0
284.00	0.7	44.5	1701.9	322.0	60.9	.P	0.0
285.00	0.7	42.4	1701.9	318.5	60.5	.P	0.0
286.00	0.6	40.4	1701.8	315.1	60.1	.P	0.0
287.00	0.6	38.5	1701.8	311.9	59.7	.P	0.0
288.00	0.5	36.7	1701.7	308.9	59.4	.P	0.0
289.00	0.5	34.9	1701.7	306.0	59.1	.P	0.0
290.00	0.5	33.3	1701.6	303.2	58.8	.P	0.0
291.00	0.5	31.7	1701.6	300.5	58.5	.P	0.0
292.00	0.4	30.2	1701.5	298.0	58.2	.P	0.0
293.00	0.4	28.7	1701.5	295.6	57.9	.P	0.0
294.00	0.4	27.4	1701.5	293.3	57.7	.P	0.0
295.00	0.4	26.1	1701.4	291.1	57.4	.P	0.0
296.00	0.3	24.8	1701.4	289.1	57.2	.	0.0
297.00	0.3	23.7	1701.4	287.1	57.0	.	0.0
298.00	0.3	22.5	1701.3	285.2	56.7	.	0.0
299.00	0.3	21.5	1701.3	283.4	56.6	.	0.0
300.00	0.0	20.4	1701.3	281.7	56.4	.	0.0
T	I	O	E	VOL	A	I	VEL

I 0. I 500. I 1000. I 1500. I 2000. I 2500. I 3000. I 3500. EXIT

********** NO INPUT DATA GIVEN FOR EMG. SPILLWAY CREST AND/OR EMG. BOTTOM WIDTH. NO ROUTINGS PERFORMED.

(12)

(13)

********** BASIC DATA **********

****NOT DEFINED CLIMATE AREA

DESIGN CLASS ****NOT DEFINED

STORM DISTRIBUTION.....TR20 HYDROGRAPH 100YR STORM

Q-PS1 DAY	Q-PS10 DAY	Q-ES	Q-FB	CN	DA-SM	TC/L	-/H
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONDUITS	COND L	D/W	-/H	PS N	KI	WEIR L	TW EL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PERM POOL	CREST PS	FP SED	QRF	2ND STG	ORF H	ORF L	START ES
1684.00	1684.00	1700.75	0.0	0.0	0.0	0.0	0.0
BASEFLOW	INITIAL EL	EXTRA VOL.					
0.0	0.0	0.0					
ES1	ES2	ES3	ES4	ES5	Z ES	EXIT N	EXIT S
0.0	0.0	0.0	0.0	0.0	0.0	0.040	0.0
ES TYPE	ES L	ES N	BW1	BW2	BW3	BW4	BW5
0	0	0.0	0.0	0.0	0.0	0.0	0.0

(14)

PERM POOL	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
CREST PS	1684.00 FT	0.0 ACFT	0.09 AC	0.0 CFS
SED ACCUM	1700.75 FT	255.2 ACFT	52.82 AC	10.4 CFS

****

RATING TABLE DEVELOPED
WITH PS GIVEN AND NO EMG DATA GIVEN

RATING TABLE NUMBER 2

	ELEV FEET	Q-TOTAL CFS	Q-PS CFS	VOLUME AC-FT	AREA ACRE
1	1684.00	0.0	0.0	0.02	0.09
2	1688.00	6.40	6.40	2.94	1.36
3	1692.00	7.90	7.90	16.82	5.58
4	1696.00	9.20	9.20	69.90	20.96
5	1701.00	10.50	10.50	265.00	54.50
6	1704.00	121.30	121.30	450.86	75.20
7	1708.00	138.40	138.40	816.46	107.60
8	1710.00	145.90	145.90	1046.16	122.10
9	1712.00	153.20	153.20	1304.94	136.70
10	1716.00	166.70	166.70	1909.10	165.40
11	1720.00	179.50	179.50	2624.90	192.50
12	1724.00	191.50	191.50	3457.10	223.60

FLOOD HYD D= 0.0 HR P= 0.0 IN Q= 0.0 IN
TC= 0.0 HR CN= 0.0 VOL= 0.0 ACFT
PEAK 8158.2 CFS AT 12.20 HRS

ROUTED RESULTS - HYD TYPE	EMAX	VOL-MAX	AMAX	QMAX
FLOOD HYD	1712.40 FT	1365.6 ACFT	139.58 AC	154.6 CFS

Sets em. spwy. crest

PS STORAGE 1110.3 ACFT BETWEEN ES CREST AND SED ACCUM ELEVATIONS

PLOT 1 IN = 2000. CFS EXIT SLOPE = 0.0

T	I	O	E	VOL	A	0. I	2000. I	4000. I	6000. I	8000. I	10000. I	12000. I	14000. I	EXIT VEL
0.0	0.0	0.0	1684.0	0.0	0.1	.								0.0
0.20	0.0	0.0	1684.0	0.0	0.1	.								0.0
0.40	0.0	0.0	1684.0	0.0	0.1	.								0.0
0.60	0.0	0.0	1684.0	0.0	0.1	.								0.0
0.80	0.0	0.0	1684.0	0.0	0.1	.								0.0
1.00	0.0	0.0	1684.0	0.0	0.1	.								0.0
1.20	0.0	0.0	1684.0	0.0	0.1	.								0.0
1.40	0.0	0.0	1684.0	0.0	0.1	.								0.0
1.60	0.0	0.0	1684.0	0.0	0.1	.								0.0
1.80	0.0	0.0	1684.0	0.0	0.1	.								0.0
2.00	0.0	0.0	1684.0	0.0	0.1	.								0.0
2.20	0.0	0.0	1684.0	0.0	0.1	.								0.0
2.40	0.0	0.0	1684.0	0.0	0.1	.								0.0
2.60	0.0	0.0	1684.0	0.0	0.1	.								0.0
2.80	0.0	0.0	1684.0	0.0	0.1	.								0.0
3.00	0.0	0.0	1684.0	0.0	0.1	.								0.0
3.20	0.0	0.0	1684.0	0.0	0.1	.								0.0
3.40	0.0	0.0	1684.0	0.0	0.1	.								0.0
3.60	0.0	0.0	1684.0	0.0	0.1	.								0.0

4.00	0.0	0.0	1684.0	0.0	0.1	.	0.0
4.20	0.0	0.0	1684.0	0.0	0.1	.	0.0
4.40	0.0	0.0	1684.0	0.0	0.1	.	0.0
4.60	0.0	0.0	1684.0	0.0	0.1	.	0.0
4.80	0.0	0.0	1684.0	0.0	0.1	.	0.0
5.00	0.0	0.0	1684.0	0.0	0.1	.	0.0
5.20	0.0	0.0	1684.0	0.0	0.1	.	0.0
5.40	0.0	0.0	1684.0	0.0	0.1	.	0.0
5.60	0.0	0.0	1684.0	0.0	0.1	.	0.0
5.80	0.0	0.0	1684.0	0.0	0.1	.	0.0
6.00	0.0	0.0	1684.0	0.0	0.1	.	0.0
6.20	0.0	0.0	1684.0	0.0	0.1	.	0.0
6.40	0.0	0.0	1684.0	0.0	0.1	.	0.0
6.60	0.0	0.0	1684.0	0.0	0.1	.	0.0
6.80	0.0	0.0	1684.0	0.0	0.1	.	0.0
7.00	0.0	0.0	1684.0	0.0	0.1	.	0.0
7.20	0.0	0.0	1684.0	0.0	0.1	.	0.0
7.40	0.3	0.3	1684.2	0.1	0.1	.	0.0
7.60	1.2	1.2	1684.8	0.6	0.3	.	0.0
7.80	2.8	2.8	1685.7	1.3	0.6	.	0.0
8.00	5.3	5.3	1687.3	2.4	1.1	.	0.0
8.20	8.8	8.8	1694.9	54.8	16.6	.	0.0
8.40	13.7	10.4	1700.8	255.3	52.8	.	0.0
8.60	20.1	10.4	1700.8	255.4	52.8	.	0.0
8.80	28.2	10.4	1700.8	255.6	52.9	.	0.0
9.00	38.3	10.4	1700.8	256.0	52.9	.	0.0
9.20	50.2	10.4	1700.8	256.5	53.0	.	0.0
9.40	64.4	10.4	1700.8	257.3	53.2	.	0.0
9.60	80.0	10.5	1700.8	258.3	53.4	.	0.0
9.80	97.7	10.5	1700.9	259.6	53.6	.	0.0
10.00	118.3	10.5	1700.9	261.2	53.9	.I	0.0
10.20	144.0	10.5	1701.0	263.2	54.2	.I	0.0
10.40	178.7	10.9	1701.0	265.7	54.6	.I	0.0
10.60	218.9	12.8	1701.1	268.8	54.9	.I	0.0
10.80	275.8	15.1	1701.1	272.7	55.4	.I	0.0
11.00	342.8	18.0	1701.2	277.5	55.9	. I	0.0
11.20	439.8	21.6	1701.3	283.7	56.6	. I	0.0
11.40	581.4	26.4	1701.4	291.7	57.5	. I	0.0
11.60	1013.3	34.0	1701.6	304.4	58.9	. I	0.0
11.80	3287.5	54.7	1702.2	339.2	62.8	. I	0.0
12.00	6690.9	103.1	1703.5	420.3	71.8	.P I	0.0
12.20	8158.2	125.5	1705.0	541.2	83.2	.P X	0.0
12.40	7034.8	131.3	1706.3	664.6	94.1	.P I	0.0
12.60	5319.3	136.0	1707.4	764.5	103.0	.P I	0.0
12.80	3867.8	139.1	1708.2	838.2	109.0	.P I	0.0
13.00	2896.3	140.9	1708.7	891.7	112.4	.P I	0.0
13.20	2267.7	142.2	1709.0	932.1	114.9	.P I	0.0
13.40	1845.3	143.2	1709.3	963.7	116.9	.P I	0.0
13.60	1570.4	144.1	1709.5	989.6	118.5	.P I	0.0
13.80	1359.2	144.8	1709.7	1011.4	119.9	.P I	0.0
14.00	1208.4	145.4	1709.9	1030.2	121.1	.P I	0.0
14.20	1097.1	145.9	1710.0	1046.9	122.1	.P I	0.0
14.40	1010.9	146.3	1710.1	1061.9	123.0	.P I	0.0
14.60	949.5	146.7	1710.2	1075.7	123.8	.P I	0.0
14.80	895.9	147.1	1710.3	1088.5	124.5	.P I	0.0
15.00	854.9	147.4	1710.4	1100.5	125.2	.P I	0.0

15.20	[illegible]	147.8	1710.5	1111.9	125.8	.P	I		0.0
15.40	[illegible]	148.1	1710.6	1122.6	126.4	.P	I		0.0
15.60	747.7	148.3	1710.7	1132.8	127.0	.P	I		0.0
15.80	711.0	148.6	1710.7	1142.4	127.5	.P	I		0.0
16.00	679.3	148.9	1710.8	1151.4	128.0	.P	I		0.0
16.20	652.7	149.1	1710.9	1160.0	128.5	.P	I		0.0
16.40	629.4	149.3	1710.9	1168.1	129.0	.P	I		0.0
16.60	613.1	149.6	1711.0	1175.9	129.4	.P	I		0.0
16.80	603.7	149.8	1711.1	1183.5	129.8	.P	I		0.0
17.00	598.7	150.0	1711.1	1190.9	130.3	.P	I		0.0
17.20	590.0	150.2	1711.2	1198.3	130.7	.P	I		0.0
17.40	577.0	150.4	1711.2	1205.4	131.1	.P	I		0.0
17.60	564.2	150.6	1711.3	1212.4	131.5	.P	I		0.0
17.80	547.2	150.8	1711.3	1219.1	131.9	.P	I		0.0
18.00	531.7	151.0	1711.4	1225.5	132.2	.P	I		0.0
18.20	515.2	151.1	1711.4	1231.7	132.6	.P	I		0.0
18.40	497.5	151.3	1711.5	1237.5	132.9	.PI			0.0
18.60	484.1	151.5	1711.5	1243.1	133.2	.PI			0.0
18.80	476.0	151.6	1711.6	1248.6	133.5	.PI			0.0
19.00	471.9	151.8	1711.6	1253.9	133.8	.PI			0.0
19.20	469.8	151.9	1711.6	1259.2	134.1	.PI			0.0
19.40	468.8	152.1	1711.7	1264.4	134.4	.PI			0.0
19.60	466.4	152.2	1711.7	1269.6	134.7	.PI			0.0
19.80	455.7	152.3	1711.8	1274.7	135.0	.PI			0.0
20.00	443.6	152.5	1711.8	1279.6	135.3	.PI			0.0
20.20	435.1	152.6	1711.8	1284.4	135.5	.PI			0.0
20.40	430.4	152.8	1711.9	1289.0	135.8	.PI			0.0
20.60	426.1	152.9	1711.9	1293.6	136.1	.PI			0.0
20.80	414.2	153.0	1711.9	1298.0	136.3	.PI			0.0
21.00	401.5	153.1	1712.0	1302.2	136.5	.PI			0.0
21.20	399.0	153.2	1712.0	1306.3	136.8	.PI			0.0
21.40	406.4	153.3	1712.0	1310.4	137.0	.PI			0.0
21.60	412.8	153.4	1712.1	1314.6	137.2	.PI			0.0
21.80	407.5	153.5	1712.1	1318.9	137.4	.PI			0.0
22.00	398.3	153.6	1712.1	1323.0	137.6	.PI			0.0
22.20	391.1	153.7	1712.1	1327.0	137.7	.PI			0.0
22.40	387.1	153.8	1712.2	1330.9	137.9	.PI			0.0
22.60	383.2	153.9	1712.2	1334.7	138.1	.PI			0.0
22.80	371.5	153.9	1712.2	1338.4	138.3	.PI			0.0
23.00	358.8	154.0	1712.2	1341.9	138.5	.PI			0.0
23.20	356.4	154.1	1712.3	1345.2	138.6	.PI			0.0
23.40	363.7	154.2	1712.3	1348.6	138.8	.PI			0.0
23.60	370.1	154.3	1712.3	1352.2	138.9	.PI			0.0
23.80	364.7	154.3	1712.3	1355.7	139.1	.PI			0.0
24.00	354.6	154.4	1712.4	1359.1	139.3	.PI			0.0
24.20	314.4	154.5	1712.4	1362.1	139.4	.PI			0.0
24.40	248.3	154.5	1712.4	1364.2	139.5	.P			0.0
24.60	191.9	154.5	1712.4	1365.2	139.6	.P			0.0
24.80	157.0	154.6	1712.4	1365.6	139.6	.X			0.0
25.00	138.2	154.6	1712.4	1365.4	139.6	.P			0.0
25.20	128.2	154.5	1712.4	1365.1	139.6	.P			0.0
25.40	122.6	154.5	1712.4	1364.6	139.5	.P			0.0
25.60	119.2	154.5	1712.4	1364.1	139.5	.P			0.0
25.80	116.7	154.5	1712.4	1363.5	139.5	.P			0.0
26.00	115.3	154.5	1712.4	1362.8	139.4	.P			0.0
26.20	114.5	154.5	1712.4	1362.2	139.4	.P			0.0
26.40	114.1	154.5	1712.4	1361.5	139.4	.P			0.0
26.60	113.8	154.4	1712.4	1360.8	139.4	.P			0.0
26.80	113.6	154.4	1712.4	1360.2	139.3	.P			0.0
27.00	113.4	154.4	1712.4	1359.5	139.3	.P			0.0
27.20	113.2	154.4	1712.4	1358.8	139.3	.P			0.0
27.40	113.1	154.4	1712.4	1358.1	139.2	.P			0.0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			0.0

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27.80	112.9	154.4	1712.3	1356.7	139.2	.P	
28.00	112.8	154.3	1712.3	1356.1	139.1	.P	0.0
28.20	[illegible]	154.3	1712.3	1355.4	139.1	.P	0.0
28.40	[illegible]	154.3	1712.3	1354.7	139.1	.P	0.0
28.60	[illegible]	154.3	1712.3	1354.0	139.0	.P	0.0
28.80	112.4	154.3	1712.3	1353.3	139.0	.P	0.0
29.00	112.3	154.3	1712.3	1352.6	139.0	.P	0.0
29.20	112.2	154.2	1712.3	1351.9	138.9	.P	0.0
29.40	112.1	154.2	1712.3	1351.2	138.9	.P	0.0
29.60	112.0	154.2	1712.3	1350.5	138.9	.P	0.0
29.80	111.9	154.2	1712.3	1349.8	138.8	.P	0.0
30.00	111.8	154.2	1712.3	1349.1	138.8	.P	0.0
30.20	111.7	154.2	1712.3	1348.4	138.8	.P	0.0
30.40	111.6	154.2	1712.3	1347.7	138.7	.P	0.0
30.60	111.5	154.1	1712.3	1347.0	138.7	.P	0.0
30.80	111.4	154.1	1712.3	1346.3	138.7	.P	0.0
31.00	111.3	154.1	1712.3	1345.6	138.6	.P	0.0
31.20	111.2	154.1	1712.3	1344.9	138.6	.P	0.0
31.40	111.1	154.1	1712.3	1344.2	138.6	.P	0.0
31.60	111.0	154.1	1712.3	1343.5	138.5	.P	0.0
31.80	110.9	154.0	1712.3	1342.8	138.5	.P	0.0
32.00	110.8	154.0	1712.2	1342.1	138.5	.P	0.0
32.20	110.7	154.0	1712.2	1341.3	138.4	.P	0.0
32.40	110.6	154.0	1712.2	1340.6	138.4	.P	0.0
32.60	110.5	154.0	1712.2	1339.9	138.4	.P	0.0
32.80	110.4	154.0	1712.2	1339.2	138.3	.P	0.0
33.00	110.3	153.9	1712.2	1338.5	138.3	.P	0.0
33.20	110.3	153.9	1712.2	1337.7	138.3	.P	0.0
33.40	110.1	153.9	1712.2	1337.0	138.2	.P	0.0
33.60	110.0	153.9	1712.2	1336.3	138.2	.P	0.0
33.80	109.9	153.9	1712.2	1335.6	138.2	.P	0.0
34.00	109.9	153.9	1712.2	1334.8	138.1	.P	0.0
34.20	109.8	153.9	1712.2	1334.1	138.1	.P	0.0
34.40	109.7	153.8	1712.2	1333.4	138.1	.P	0.0
34.60	109.6	153.8	1712.2	1332.7	138.0	.P	0.0
34.80	109.5	153.8	1712.2	1331.9	138.0	.P	0.0
35.00	109.4	153.8	1712.2	1331.2	137.9	.P	0.0
35.20	109.3	153.8	1712.2	1330.5	137.9	.P	0.0
35.40	109.2	153.8	1712.2	1329.7	137.9	.P	0.0
35.60	109.1	153.7	1712.2	1329.0	137.8	.P	0.0
35.80	109.0	153.7	1712.2	1328.2	137.8	.P	0.0
36.00	108.9	153.7	1712.1	1327.5	137.8	.P	0.0
36.20	108.8	153.7	1712.1	1326.8	137.7	.P	0.0
36.40	108.7	153.7	1712.1	1326.0	137.7	.P	0.0
36.60	108.6	153.7	1712.1	1325.3	137.7	.P	0.0
36.80	108.5	153.6	1712.1	1324.5	137.6	.P	0.0
37.00	108.4	153.6	1712.1	1323.8	137.6	.P	0.0
37.20	108.3	153.6	1712.1	1323.0	137.6	.P	0.0
37.40	108.2	153.6	1712.1	1322.3	137.5	.P	0.0
37.60	108.1	153.6	1712.1	1321.5	137.5	.P	0.0
37.80	108.0	153.6	1712.1	1320.8	137.5	.P	0.0
38.00	107.9	153.5	1712.1	1320.0	137.4	.P	0.0
38.20	107.8	153.5	1712.1	1319.3	137.4	.P	0.0
38.40	107.7	153.5	1712.1	1318.5	137.3	.P	0.0
38.60	107.6	153.5	1712.1	1317.8	137.3	.P	0.0
38.80	107.5	153.5	1712.1	1317.0	137.3	.P	0.0
39.00	107.5	153.5	1712.1	1316.2	137.2	.P	0.0

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39.20	[illegible]	153.4	1712.1	1315.5	137.2	.P	0.0
39.40	[illegible]	153.4	1712.1	1314.7	137.2	.P	0.0
39.60	10[illegible]	153.4	1712.1	1313.9	137.1	.P	0.0
39.80	107.1	153.4	1712.1	1313.2	137.1	.P	0.0
40.00	107.0	153.4	1712.0	1312.4	137.1	.P	0.0
40.20	106.9	153.3	1712.0	1311.7	137.0	.P	0.0
40.40	106.8	153.3	1712.0	1310.9	137.0	.P	0.0
40.60	106.7	153.3	1712.0	1310.1	136.9	.P	0.0
40.80	106.6	153.3	1712.0	1309.3	136.9	.P	0.0
41.00	106.5	153.3	1712.0	1308.6	136.9	.P	0.0
41.20	106.4	153.3	1712.0	1307.8	136.8	.P	0.0
41.40	106.3	153.2	1712.0	1307.0	136.8	.P	0.0
41.60	106.2	153.2	1712.0	1306.2	136.8	.P	0.0
41.80	106.1	153.2	1712.0	1305.5	136.7	.P	0.0
42.00	106.0	153.2	1712.0	1304.7	136.7	.P	0.0
42.20	105.9	153.2	1712.0	1303.9	136.6	.P	0.0
42.40	105.8	153.1	1712.0	1303.1	136.6	.P	0.0
42.60	105.8	153.1	1712.0	1302.3	136.6	.P	0.0
42.80	105.7	153.1	1712.0	1301.6	136.5	.P	0.0
43.00	105.6	153.1	1712.0	1300.8	136.5	.P	0.0
43.20	105.5	153.1	1712.0	1300.0	136.4	.P	0.0
43.40	105.4	153.0	1712.0	1299.2	136.4	.P	0.0
43.60	105.3	153.0	1711.9	1298.4	136.3	.P	0.0
43.80	105.2	153.0	1711.9	1297.6	136.3	.P	0.0
44.00	105.1	153.0	1711.9	1296.8	136.2	.P	0.0
44.20	105.0	152.9	1711.9	1296.0	136.2	.P	0.0
44.40	104.9	152.9	1711.9	1295.2	136.2	.P	0.0
44.60	104.8	152.9	1711.9	1294.5	136.1	.P	0.0
44.80	104.7	152.9	1711.9	1293.7	136.1	.P	0.0
45.00	104.6	152.9	1711.9	1292.9	136.0	.P	0.0
45.20	104.5	152.8	1711.9	1292.1	136.0	.P	0.0
45.40	104.5	152.8	1711.9	1291.3	135.9	.P	0.0
45.60	104.4	152.8	1711.9	1290.5	135.9	.P	0.0
45.80	104.3	152.8	1711.9	1289.7	135.8	.P	0.0
46.00	104.2	152.7	1711.9	1288.9	135.8	.P	0.0
46.20	104.1	152.7	1711.9	1288.1	135.7	.P	0.0
46.40	104.0	152.7	1711.9	1287.3	135.7	.P	0.0
46.60	103.9	152.7	1711.9	1286.4	135.7	.P	0.0
46.80	103.8	152.7	1711.9	1285.6	135.6	.P	0.0
47.00	103.7	152.6	1711.8	1284.8	135.6	.P	0.0
47.20	103.6	152.6	1711.8	1284.0	135.5	.P	0.0
47.40	103.5	152.6	1711.8	1283.2	135.5	.P	0.0
47.60	103.4	152.6	1711.8	1282.4	135.4	.P	0.0
47.80	103.4	152.5	1711.8	1281.6	135.4	.P	0.0
48.00	103.3	152.5	1711.8	1280.8	135.3	.P	0.0
48.20	103.2	152.5	1711.8	1280.0	135.3	.P	0.0
48.40	103.1	152.5	1711.8	1279.1	135.2	.P	0.0
48.60	103.0	152.4	1711.8	1278.3	135.2	.P	0.0
48.80	102.9	152.4	1711.8	1277.5	135.2	.P	0.0
49.00	102.8	152.4	1711.8	1276.7	135.1	.P	0.0
49.20	102.7	152.4	1711.8	1275.9	135.1	.P	0.0
49.40	102.6	152.4	1711.8	1275.0	135.0	.P	0.0
49.60	102.5	152.3	1711.8	1274.2	135.0	.P	0.0
49.80	102.4	152.3	1711.8	1273.4	134.9	.P	0.0
50.00	102.3	152.3	1711.7	1272.6	134.9	.P	0.0
50.20	102.2	152.3	1711.7	1271.7	134.8	.P	0.0
50.40	102.1	152.2	1711.7	1270.9	134.8	.P	0.0
50.60	101.9	152.2	1711.7	1270.1	134.7	.P	0.0
50.80	101.8	152.2	1711.7	1269.3	134.7	.P	0.0
51.00	101.7	152.2	1711.7	1268.4	134.6	.P	0.0
51.20	101.5	152.1	1711.7	1267.6	134.6	.P	0.0
51.40	101.4	152.1	1711.7	1266.7	134.5	.P	0.0
51.60	101.3	152.1	1711.7	1265.9	134.5	.P	0.0

(18)

52.00	[illegible]	152.1	1711.7	1264.2	134.4	.P								0.0
52.20	[illegible]	152.0	1711.7	1263.4	134.4	.P								0.0
52.40	[illegible]	152.0	1711.7	1262.5	134.3	.P								0.0
52.60	[illegible]	152.0	1711.7	1261.7	134.3	.P								0.0
52.80	100.5	152.0	1711.7	1260.8	134.2	.P								0.0
53.00	100.4	151.9	1711.7	1260.0	134.2	.P								0.0
53.20	100.3	151.9	1711.6	1259.1	134.1	.P								0.0
53.40	100.1	151.9	1711.6	1258.3	134.1	.P								0.0
53.60	100.0	151.9	1711.6	1257.4	134.0	.P								0.0
53.80	99.9	151.8	1711.6	1256.6	134.0	.P								0.0
54.00	99.7	151.8	1711.6	1255.7	133.9	.P								0.0
54.20	99.6	151.8	1711.6	1254.8	133.9	.P								0.0
54.40	99.5	151.8	1711.6	1254.0	133.8	.P								0.0
54.60	99.4	151.7	1711.6	1253.1	133.8	.P								0.0
54.80	99.2	151.7	1711.6	1252.2	133.7	.P								0.0
55.00	99.1	151.7	1711.6	1251.4	133.7	.P								0.0
55.20	99.0	151.7	1711.6	1250.5	133.6	.P								0.0
55.40	98.9	151.6	1711.6	1249.6	133.6	.P								0.0
55.60	98.7	151.6	1711.6	1248.8	133.5	.P								0.0
55.80	98.6	151.6	1711.6	1247.9	133.5	.P								0.0
56.00	98.5	151.6	1711.6	1247.0	133.4	.P								0.0
56.20	98.3	151.5	1711.5	1246.1	133.4	.P								0.0
56.40	98.2	151.5	1711.5	1245.3	133.3	.P								0.0
56.60	98.1	151.5	1711.5	1244.4	133.3	.P								0.0
56.80	98.0	151.5	1711.5	1243.5	133.2	.P								0.0
57.00	97.8	151.4	1711.5	1242.6	133.2	.P								0.0
57.20	97.7	151.4	1711.5	1241.7	133.1	.P								0.0
57.40	97.6	151.4	1711.5	1240.8	133.1	.P								0.0
57.60	97.5	151.4	1711.5	1239.9	133.0	.P								0.0
57.80	97.3	151.3	1711.5	1239.0	133.0	.P								0.0
58.00	97.2	151.3	1711.5	1238.2	132.9	.P								0.0
58.20	97.1	151.3	1711.5	1237.3	132.9	.P								0.0
58.40	97.0	151.3	1711.5	1236.4	132.8	.P								0.0
58.60	96.8	151.2	1711.5	1235.5	132.8	.P								0.0
58.80	96.7	151.2	1711.5	1234.6	132.7	.P								0.0
59.00	96.6	151.2	1711.4	1233.7	132.7	.P								0.0
59.20	96.5	151.2	1711.4	1232.8	132.6	.P								0.0
59.40	96.4	151.1	1711.4	1231.9	132.6	.P								0.0
59.60	96.2	151.1	1711.4	1230.9	132.5	.P								0.0
59.80	96.1	151.1	1711.4	1230.0	132.5	.P								0.0
60.00	0.0	151.0	1711.4	1228.3	132.4	.P								0.0
T	I	O	E	VOL	A	I	I	I	I	I	I	I	I	VEL
						0.	2000.	4000.	6000.	8000.	10000.	12000.	14000.	EXIT

********** NO INPUT DATA GIVEN FOR EMG. SPILLWAY CREST AND/OR EMG. BOTTOM WIDTH. NO ROUTINGS PERFORMED.

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101

Signal Butte FRS w/
Pass Mtn Diversion
w/99 Ac ft. Additional
Sediment —
w/ Channel FB.

EXECUTIVE CONTROL CARD 122 OPERATION LIST

LISTING OF DATA IN CORE

0 BUCKHORN-MESA SIGNAL BUTTE FRS W/PASS MTN DIVER

VELOCITY INCREMENT
1 CTABLE .2000

8	.0000	.0800	.1800	.2500	.3200
8	.3700	.4100	.4500	.4900	.5100
8	.5400	.5700	.5900	.6100	.6300
8	.6500	.6600	.6700	.6900	.7000
8	.7100	.7200	.7300	.7400	.7500
8	.7600	.7700	.7700	.7800	.7900
8	.7900	.8000	.8100	.8100	.8200
8	.8200	.8300	.8300	.8400	.8400
8	.8400	.8500	.8500	.8600	.8600
8	.8600	.8600	.8700	.8700	.8700
8	.8800	.8800	.8800	.8900	.8900
8	.8900	.8900	.8900	.8900	.9000
8	.9000	.9000	.9000	.9000	.9100
8	.9100	.9100	.9100	.9100	.9100
8	.9200	.9200	.9200	.9200	.9200
8	.9200	.9200	.9200	.9300	.9300

9 ENDTBL

XSECTN NO. DRAINAGE AREA
2 XSECTN 104 1.0000

	ELEVATION	DISCHARGE	END AREA
8	.0000	.0000	.0000
8	2.0000	450.0000	40.0000
8	3.0000	838.0000	60.0000
8	4.0000	1288.0000	80.0000
8	5.0000	1782.0000	120.0000
8	6.0000	2314.0000	120.0000
8	7.0000	2875.0000	140.0000
8	8.0000	3454.0000	160.0000

9 ENDTBL

XSECTN NO. DRAINAGE AREA
2 XSECTN 106 1.0000

	ELEVATION	DISCHARGE	END AREA
8	.0000	.0000	.0000
8	1.5000	441.0000	45.0000
8	2.5000	995.0000	75.0000

102

8	3.5000	1682.0000	105.0000
8	4.5000	2468.0000	135.0000
8	5.5000	3339.0000	165.0000
8	6.5000	4272.0000	195.0000
8	7.5000	5258.0000	225.0000
8	8.5000	6296.0000	255.0000

9 ENDTBL

XSECTN NO.	DRAINAGE AREA
2 XSECTN 107	1.0000

	ELEVATION	DISCHARGE	END AREA
8	1749.0000	.0000	.0000
8	1750.0000	38.5300	23.0000
8	1751.0000	130.5200	52.0000
8	1752.0000	273.1800	87.0000
8	1753.0000	470.9800	128.0000
8	1754.0000	706.8600	187.0000
8	1755.0000	1005.6200	240.0000
8	1756.0000	1369.4200	299.0000
8	1757.0000	1801.8000	364.0000
8	1758.0000	2305.5000	435.0000
8	1759.0000	2892.8000	512.0000
8	1760.0000	3558.1000	595.0000
8	1761.0000	4316.0400	684.0000
8	1762.0000	5156.9800	779.0000

9 ENDTBL

XSECTN NO.	DRAINAGE AREA
2 XSECTN 108	1.0000

	ELEVATION	DISCHARGE	END AREA
8	1753.7000	.0000	.0000
8	1754.7000	61.9300	23.0000
8	1755.7000	209.3500	52.0000
8	1756.7000	438.9100	87.0000
8	1757.7000	757.0100	128.0000
8	1758.7000	1167.4100	175.0000
8	1759.7000	1678.5600	228.0000
8	1760.7000	2302.3900	287.0000
8	1761.7000	3038.9100	352.0000
8	1762.7000	3894.7400	435.0000
8	1763.7000	4647.7600	512.0000

9 ENDTBL

q=3623
V=5.4

XSECTN NO.	DRAINAGE AREA
2 XSECTN 109	1.0000

	ELEVATION	DISCHARGE	END AREA
8	1763.6000	.0000	.0000
8	1764.6000	27.4700	23.0000
8	1765.6000	92.8700	52.0000
8	1766.6000	194.7000	87.0000
8	1767.6000	335.8000	128.0000

422=q
413=K
V=5.2

1120 (7)

8	1768.6000	503.2200	187.0000
8	1769.6000	715.7800	240.0000
8	1770.6000	974.8100	299.0000

9 ENDTBL

3 STRUCT STRUCT NO. 1 Apache Junction

	ELEVATION	DISCHARGE	STORAGE
8	1794.1000	.0000	.0000
8	1794.5000	26.3000	35.3700
8	1795.0000	74.4000	70.7500
8	1795.1400	91.2000	81.1100
8	1796.0000	96.1600	141.5000
8	1797.1400	102.4200	222.3500
8	1798.4200	113.9100	437.2700
8	1801.7200	1650.0000	684.1200
8	1804.0000	7700.0000	1020.4600
8	1806.2800	15200.0000	1382.5800
8	1808.5700	26200.0000	1835.7000

9 ENDTBL

3 STRUCT STRUCT NO. 2 S.B. FRS 1

	ELEVATION	DISCHARGE	STORAGE
8	1684.0000	.0000	.0220
8	1688.0000	.0000	2.9400
8	1692.0000	.0000	16.8200
8	1696.0000	.0000	69.9000
8	1700.0000	.0000	206.1400
8	1701.4000	.0000	281.0000
8	1704.0000	121.8000	450.8600
8	1708.0000	138.4000	816.4600
8	1710.0000	145.9000	1046.1600
8	1710.5000	147.7000	1089.3000
8	1711.5000	151.4000	1175.5000
8	1712.2000	154.0000	1335.1500
8	1712.5000	155.0000	1380.4600
8	1712.6000	156.0000	1390.0000
8	1713.5000	390.0000	1531.5000
8	1714.5000	820.0000	1682.5400
8	1716.0000	1950.0000	1909.1000
8	1720.0000	6600.0000	2624.1000
8	1722.0000	9500.0000	3040.5900
8	1724.0000	12400.0000	3457.1000

9 ENDTBL

3 STRUCT STRUCT NO. 3 Pass Mtn.

	ELEVATION	DISCHARGE	STORAGE
8	1765.1000	.0000	100.0000
8	1765.7600	31.1500	114.6000

8	1766.4200	52.3000	130.6900
8	1767.0700	68.7400	149.6000
8	1767.7300	87.7800	171.5100
8	1768.3900	101.7900	200.5900
8	1769.0500	104.8800	227.4500
8	1769.7100	108.2100	256.3600
8	1770.3600	110.3800	278.5100
8	1771.0200	113.3600	310.6100
8	1771.6800	116.4500	343.9100
8	1772.3400	117.9600	366.5200
8	1773.0000	120.1100	402.6300
8	1773.6500	501.9900	439.9000
8	1774.3000	1043.4300	492.8600
8	1775.4700	2512.2600	570.9300
8	1776.9000	4839.3600	696.3000
8	1779.5000	10327.5699	921.6600
8	1782.7500	18894.0100	1300.2400
8	1786.0000	28877.7000	1781.8500

9 ENDTBL

TIME INCREMENT

4 DIMHYD

8	.0000	.0300	.1000	.1900	.3100
8	.4700	.6600	.8200	.9300	.9900
8	1.0000	.9900	.9300	.8600	.7800
8	.6800	.5600	.4600	.3900	.3300
8	.2800	.2410	.2070	.1740	.1470
8	.1260	.1070	.0910	.0770	.0660
8	.0550	.0470	.0400	.0340	.0290
8	.0250	.0210	.0180	.0150	.0130
8	.0110	.0090	.0080	.0070	.0060
8	.0050	.0040	.0030	.0020	.0010
8	.0000	.0000	.0000	.0000	.0000

9 ENDTBL

COMPUTED PEAK K FACTOR = 484.00

TIME INCREMENT

5 RAINFL 1 .5000

8	.0000	.0080	.0170	.0260	.0350
8	.0450	.0550	.0650	.0760	.0870
8	.0990	.1120	.1250	.1400	.1560
8	.1740	.1940	.2190	.2540	.3030
8	.5150	.5830	.6240	.6540	.6820
8	.7050	.7270	.7480	.7670	.7840
8	.8000	.8160	.8300	.8440	.8570
8	.8700	.8820	.8930	.9050	.9160
8	.9260	.9360	.9460	.9550	.9650
8	.9740	.9830	.9920	1.0000	1.0000

9 ENDTBL

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                    TIME INCREMENT
5 RAINFL 2                .5000

8                 .0000     .0050     .0110     .0160     .0220
8                 .0280     .0350     .0410     .0480     .0560
8                 .0630     .0710     .0800     .0890     .0980
8                 .1090     .1200     .1330     .1470     .1630
8                 .1810     .2040     .2350     .2830     .6630
8                 .7350     .7720     .7990     .8200     .8380
8                 .8540     .8680     .8800     .8910     .9020
8                 .9120     .9210     .9290     .9370     .9450
8                 .9520     .9590     .9650     .9720     .9780
8                 .9840     .9890     .9950    1.0000    1.0000
9 ENDTBL

                    TIME INCREMENT
5 RAINFL 3               2.4000

8                 .0000     .0020     .0040     .0060     .0080
8                 .0100     .0120     .0140     .0160     .0180
8                 .0200     .0220     .0250     .0270     .0300
8                 .0320     .0350     .0380     .0400     .0430
8                 .0460     .0490     .0520     .0550     .0580
8                 .0610     .0640     .0690     .0720     .0760
8                 .0800     .0840     .0890     .0930     .0980
8                 .1020     .1080     .1140     .1210     .1270
8                 .1330     .1430     .1530     .1640     .1740
8                 .1840     .1980     .2150     .2380     .2750
8                 .7070     .7650     .7930     .8130     .8290
8                 .8410     .8490     .8560     .8630     .8710
8                 .8790     .8840     .8890     .8950     .9000
8                 .9050     .9090     .9130     .9180     .9220
8                 .9260     .9290     .9320     .9360     .9390
8                 .9420     .9450     .9480     .9510     .9540
8                 .9570     .9590     .9620     .9640     .9670
8                 .9690     .9710     .9730     .9760     .9780
8                 .9800     .9820     .9840     .9870     .9890
8                 .9910     .9930     .9960     .9980    1.0000
9 ENDTBL

                    TIME INCREMENT
5 RAINFL 4                .2500

8                 .0000     .0060     .0110     .0170     .0280
8                 .0410     .0570     .0750     .0900     .5620
8                 .6970     .7630     .8070     .8390     .8730
8                 .9070     .9370     .9480     .9580     .9680
8                 .9790     .9840     .9890     .9950    1.0000
9 ENDTBL

                    TIME INCREMENT
5 RAINFL 5                .5000

8                 .0000     .0040     .0080     .0110     .0160
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8          .0210     .0270     .0340     .0440     .0550
8          .0700     .0880     .1080     .1370     .1720
8          .2170     .2730     .3410     .4200     .4920
8          .5600     .6180     .6720     .7170     .7530
8          .7820     .8070     .8270     .8450     .8600
8          .8730     .8850     .8950     .9030     .9130
8          .9210     .9300     .9350     .9420     .9490
8          .9540     .9600     .9670     .9720     .9780
8          .9820     .9890     .9930    1.0000    1.0000
9 ENDTBL
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STANDARD CONTROL INSTRUCTIONS

```
6 RUNOFF 1 101        5      1.8600     80.0000     1.21001 0 0 1 0 1
6 RUNOFF 1   1        6      1.2000     79.0000      .67001 0 0 1 0 1
6 ADDHYD 4   1   5 6 7                                    1 0 0 1 0 1
6 REACH  3 102   7    5   2500.0000       .6500      .00000 0 0 0 0 0
6 RUNOFF 1   2        6      1.2400     75.0000      .59001 0 0 1 0 1
6 ADDHYD 4   2   5 6 7                                    1 0 0 1 0 1
6 REACH  3 103   7    5   2500.0000       .6500      .00000 0 0 0 0 0
6 RUNOFF 1   3        6      1.8500     80.0000      .91001 0 0 1 0 1
6 ADDHYD 4   3   5 6 7                                    1 1 0 1 0 1
6 SAVMOV 5     1 7    6
6 RESVOR-2     1 6    7   1794.1000                      1 1 0 1 0 1
6 DIVERT 6     1 7 4  1    115.0000       .0000      .00000 0 0 0 0 0
6 REACH  3 104   4    5   6700.0000       .0000      .00001 0 0 1 0 1
6 RUNOFF 1   4        6      2.5400     80.0000      .54001 0 0 1 0 1
6 ADDHYD 4   4   5 6 7                                    1 0 0 1 0 1
6 DIVERT 6 104   7 5 2   3454.0000      1.0000      .00000 0 0 0 0 0
6 ADDHYD 4 104   1 2 4                                    0 0 0 0 0 0
6 REACH  3 106   5    3   3700.0000       .0000      .00001 0 0 1 0 1
6 RUNOFF 1   5        6      2.0000     82.0000      .43001 0 0 1 0 1
6 ADDHYD 4   5   3 6 7                                    1 0 0 1 0 1
6 DIVERT 6 106   7 5 2   6296.0000      1.0000      .00000 0 0 0 0 0
6 RUNOFF 1   6        6      1.1400     79.0000      .42001 0 0 1 0 1
6 ADDHYD 4   6   5 6 7                                    1 0 0 1 0 1
6 SAVMOV 5   6   7    5
6 ADDHYD 4 106   4 2 7                                    1 1 0 1 0 1
6 SAVMOV 5 106   7    1
6 RUNOFF 1   7        6       .9600     75.0000      .23001 0 0 1 0 1
6 ADDHYD 4   7   5 6 7                                    1 1 0 1 0 1
6 SAVMOV 5   7   7    2
6 RUNOFF 1  10        7       .6700     78.0000      .89001 0 0 1 0 1
6 DIVERT 6 110   7 5 3    820.0000      1.0000      .00000 0 0 0 0 0
6 REACH  3 109   5    4   2700.0000       .0000      .00001 0 0 1 0 1
6 RUNOFF 1   9        6      1.3900     82.0000      .55001 0 0 1 0 1
6 ADDHYD 4 109   4 6 7                                    1 0 0 1 0 1
6 DIVERT 6 109   7 5 4   2546.0000      1.0000      .00000 0 0 0 0 0
6 REACH  3 108   5    6   2100.0000       .0000      .00001 0 0 1 0 1
6 RUNOFF 1   8        5      1.9200     84.0000      .42001 0 0 1 0 1
6 ADDHYD 4 108   5 6 7                                    1 1 0 1 0 1
6 ADDHYD 4 109   3 4 5                                    1 1 0 1 0 1
6 SAVMOV 5 109   5    3
6 DIVERT 6 108   7 5 4   5253.0000      1.0000      .00000 0 0 0 0 0
6 REACH  3 107   5    6   5300.0000       .0000      .00001 1 0 1 0 1
6 SAVMOV 5 107   2    5
6 ADDHYD 4 107   5 6 7                                    1 1 0 1 0 1
6 SAVMOV 5     2 7    6
6 RESVOR 2     2 6    7   1701.4000                      1 1 0 1 0 1
  ENDATA
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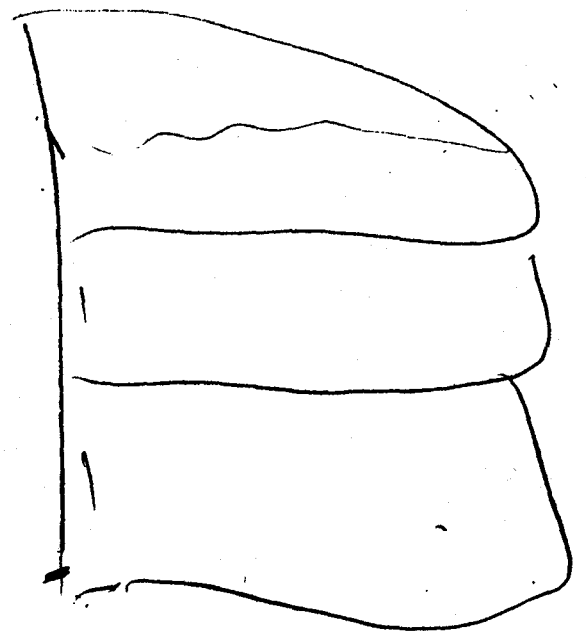
END OF LISTING



PASS= 1

EXECUTIVE CONTROL CARD 123 OPERATION INCREM, MAIN TIME INCREMENT= .20
EXECUTIVE CONTROL CARD 124 OPERATION COMPUT, FROM XSECTN/STRUCT 101/ 0 TO XSECTN/STRUCT 0/ 2
STARTING TIME= .00 RAIN DEPTH= 3.94 RAIN DURATION= 1.00 RAIN TABLE NO.= 2 SOIL CONDITION= 2
ALTERNATE NO.= 5 STORM NO.= 1

SUBROUTINE RUNOFF CROSS SECTION 101
AREA= 1.86 INPUT RUNOFF CURVE= 80.0 TIME OF CONCENTRATION= 1.21

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.61	996.753	(RUNOFF)
21.71	50.851	(RUNOFF)
23.71	43.489	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 1.9869 CFS-HRS= 2385.03 ACRE-FT= 197.10

SUBROUTINE RUNOFF CROSS SECTION 1
AREA= 1.20 INPUT RUNOFF CURVE= 79.0 TIME OF CONCENTRATION= .67

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.25	900.999	(RUNOFF)
21.67	32.652	(RUNOFF)
23.67	27.939	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 1.9122 CFS-HRS= 1480.91 ACRE-FT= 122.38

SUBROUTINE ADDHYD CROSS SECTION 1
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.40	1735.754	(NULL)
21.66	83.447	(NULL)
23.67	71.339	(NULL)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 1.9576 CFS-HRS= 3865.94 ACRE-FT= 319.48

SUBROUTINE REACH CROSS SECTION 102
LENGTH= 2500.00 INPUT COEFFICIENT= .6500 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 3.157 AVERAGE ROUTING COEFF= .6500 NUMBER OF ROUTINGS= .71

SUBROUTINE RUNOFF CROSS SECTION 2
AREA= 1.24 INPUT RUNOFF CURVE= 75.0 TIME OF CONCENTRATION= .59

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.22	825.204	(RUNOFF)
21.63	31.185	(RUNOFF)
23.63	26.835	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 1.6196 CFS-HRS= 1296.13 ACRE-FT= 107.11

SUBROUTINE ADDHYD CROSS SECTION 2
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.47	2180.794	(NULL)
21.64	114.203	(NULL)
23.65	97.714	(NULL)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 1.8598 CFS-HRS= 5161.17 ACRE-FT= 426.52

SUBROUTINE REACH CROSS SECTION 103
LENGTH= 2500.00 INPUT COEFFICIENT= .6500 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 3.157 AVERAGE ROUTING COEFF= .6500 NUMBER OF ROUTINGS= .71

SUBROUTINE RUNOFF CROSS SECTION 3
AREA= 1.85 INPUT RUNOFF CURVE= 80.0 TIME OF CONCENTRATION= .91

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.41	1200.942	(RUNOFF)
21.77	50.706	(RUNOFF)
23.76	43.324	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 1.9878 CFS-HRS= 2373.33 ACRE-FT= 196.13

SUBROUTINE ADDHYD CROSS SECTION 3
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.59	3115.792	(NULL)
21.75	164.866	(NULL)
23.75	140.952	(NULL)

HYDROGRAPH, T7ERO= .00 DELTA T= .20 DRAINAGE AREA= 6.15

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8.00	DISCHG	.00	.00	.02	.19	.78	1.99	4.01	7.12	11.34	16.70
10.00	DISCHG	23.25	31.42	41.93	55.29	72.51	94.62	123.25	163.08	251.94	533.62
12.00	DISCHG	1216.74	2186.05	2925.70	3115.36	2892.95	2507.37	2101.20	1719.99	1401.16	1150.99
14.00	DISCHG	959.13	813.36	703.72	619.75	555.40	505.94	467.53	435.77	408.46	384.20
16.00	DISCHG	361.63	340.93	322.72	307.27	294.83	285.51	278.56	272.23	265.47	258.26
18.00	DISCHG	250.36	242.07	233.41	224.64	216.77	210.52	205.99	202.85	200.56	198.08
20.00	DISCHG	194.16	189.40	184.92	181.19	177.35	172.53	167.59	164.71	164.45	164.82
22.00	DISCHG	163.68	161.03	158.17	155.59	152.53	148.14	143.47	140.63	140.49	140.90
24.00	DISCHG	139.61	134.15	120.52	98.47	73.96	52.95	36.81	24.88	16.45	10.76
26.00	DISCHG	7.00	4.55	2.96	1.92	1.24	.80	.52	.33	.21	.12
28.00	DISCHG	.06	.03	.00							

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 1.8992 CFS-HRS= 7533.80 ACRE-FT= 622.59

SUBROUTINE SAVMOV STRUCTURE 1

INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 6

SUBROUTINE RESVOR STRUCTURE 1
SURFACE ELEVATION= 1794.10

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
18.48	229.868	1799.59

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 6.15

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8.00	DISCHG	.00	.00	.00	.00	.01	.02	.06	.13	.24	.41
10.00	DISCHG	.65	.97	1.41	1.98	2.74	3.73	5.01	6.70	9.15	13.84
12.00	DISCHG	24.36	60.04	92.85	96.78	100.50	103.39	105.33	106.93	108.21	109.24
14.00	DISCHG	110.08	110.77	111.34	111.82	112.24	112.61	112.94	113.24	113.52	113.77
16.00	DISCHG	123.28	145.58	163.80	178.59	190.57	200.32	208.31	214.87	220.15	224.23
18.00	DISCHG	227.18	229.04	229.89	229.81	228.91	227.42	225.55	223.48	221.35	219.19
20.00	DISCHG	216.94	214.48	211.80	208.99	206.08	203.04	199.81	196.52	193.39	190.58
22.00	DISCHG	188.01	185.50	182.96	180.41	177.83	175.14	172.27	169.32	166.50	163.98
24.00	DISCHG	161.66	159.23	156.11	151.55	145.16	137.17	128.14	118.62	113.87	113.78
26.00	DISCHG	113.68	113.59	113.49	113.39	113.30	113.20	113.10	113.00	112.90	112.80
28.00	DISCHG	112.70	112.60	112.50	112.40	112.30	112.20	112.10	112.00	111.91	111.81
30.00	DISCHG	111.71	111.61	111.51	111.41	111.31	111.21	111.12	111.02	110.92	110.82
32.00	DISCHG	110.72	110.63	110.53	110.43	110.33	110.24	110.14	110.04	109.94	109.85
34.00	DISCHG	109.75	109.65	109.56	109.46	109.36	109.27	109.17	109.07	108.98	108.88
36.00	DISCHG	108.78	108.69	108.59	108.50	108.40	108.31	108.21	108.11	108.02	107.92
38.00	DISCHG	107.83	107.73	107.64	107.54	107.45	107.35	107.26	107.16	107.07	106.97
40.00	DISCHG	106.88	106.78	106.69	106.60	106.50	106.41	106.31	106.22	106.13	106.03
42.00	DISCHG	105.94	105.85	105.75	105.66	105.57	105.47	105.38	105.29	105.19	105.10
44.00	DISCHG	105.01	104.91	104.82	104.73	104.64	104.54	104.45	104.36	104.27	104.18
46.00	DISCHG	104.08	103.99	103.90	103.81	103.72	103.62	103.53	103.44	103.35	103.26
48.00	DISCHG	103.17	103.08	102.99	102.89	102.80	102.71	102.62	102.53	102.44	102.32
50.00	DISCHG	102.19	102.06	101.93	101.80	101.67	101.54	101.41	101.28	101.15	101.02
52.00	DISCHG	100.89	100.76	100.63	100.50	100.37	100.25	100.12	99.99	99.86	99.73
54.00	DISCHG	99.61	99.48	99.35	99.22	99.10	98.97	98.84	98.72	98.59	98.46
56.00	DISCHG	98.34	98.21	98.09	97.96	97.84	97.71	97.59	97.46	97.34	97.21
58.00	DISCHG	97.09	96.96	96.84	96.72	96.59	96.47	96.35	96.22	96.10	95.97

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 1.4741 CFS-HRS= 5850.61 ACRE-FT= 483.49

SUBROUTINE DIVERT STRUCTURE 1
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 4,1

SUBROUTINE REACH CROSS SECTION 104
LENGTH= 6700.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 11.250 AVERAGE ROUTING COEFF= .8687 NUMBER OF ROUTINGS= .72

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
25.30	115.037	.51

TOTAL WATER, CANNOT BE COMPUTED WITH D.A.= 0.0 CFS-HRS= 5120.67 ACRE-FT= 423.17

```
SUBROUTINE RUNOFF     CROSS SECTION    4
           AREA=    2.54      INPUT RUNOFF CURVE=  80.0      TIME OF CONCENTRATION=    .54

           PEAK TIMES                    PEAK DISCHARGES                PEAK ELEVATIONS
              12.18                          2223.462                      (RUNOFF)
              21.61                            71.210                      (RUNOFF)
              23.61                            61.203                      (RUNOFF)

           TOTAL WATER, IN INCHES ON DRAINAGE AREA=    1.9909        CFS-HRS=      3263.62        ACRE-FT=      269.71

SUBROUTINE ADDHYD     CROSS SECTION    4
           INPUT HYDROGRAPHS= 5,6      OUTPUT HYDROGRAPH= 7

           PEAK TIMES                    PEAK DISCHARGES                PEAK ELEVATIONS
              12.19                          2254.454                       (NULL)
              21.61                           186.210                       (NULL)
              23.61                           176.203                       (NULL)

           TOTAL WATER, IN INCHES ON DRAINAGE AREA=    5.1147        CFS-HRS=      8384.29        ACRE-FT=      692.88

SUBROUTINE DIVERT     CROSS SECTION 104
           INPUT HYDROGRAPH= 7      OUTPUT HYDROGRAPHS= 5,2

SUBROUTINE ADDHYD     CROSS SECTION 104
           INPUT HYDROGRAPHS= 1,2      OUTPUT HYDROGRAPH= 4

SUBROUTINE REACH      CROSS SECTION 106
           LENGTH=    3700.00      INPUT COEFFICIENT=    .0000      INPUT ROUTINGS=    .00

           AVERAGE WATER VELOCITY=  16.167        AVERAGE ROUTING COEFF=  .9049        NUMBER OF ROUTINGS=    .29

           PEAK TIMES                    PEAK DISCHARGES                PEAK ELEVATIONS
              12.24                          2149.407                        4.09
              21.66                           185.702                         .63
              23.66                           175.668                         .60

           TOTAL WATER, IN INCHES ON DRAINAGE AREA=    5.1100        CFS-HRS=      8376.51        ACRE-FT=      692.23

SUBROUTINE RUNOFF     CROSS SECTION    5
           AREA=    2.00      INPUT RUNOFF CURVE=  82.0      TIME OF CONCENTRATION=    .43

           PEAK TIMES                    PEAK DISCHARGES                PEAK ELEVATIONS
              12.10                          2052.389                      (RUNOFF)
              19.32                            68.094                      (RUNOFF)
              21.56                            58.806                      (RUNOFF)
              23.56                            50.519                      (RUNOFF)

           TOTAL WATER, IN INCHES ON DRAINAGE AREA=    2.1556        CFS-HRS=      2782.28        ACRE-FT=      229.93
```

SUBROUTINE ADDHYD CROSS SECTION 5
INPUT HYDROGRAPHS= 3,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.17	4107.912	(NULL)
21.60	244.285	(NULL)
23.60	225.959	(NULL)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 3.8085 CFS-HRS= 11158.79 ACRE-FT= 922.16

SUBROUTINE DIVERT CROSS SECTION 106
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,2

SUBROUTINE RUNOFF CROSS SECTION 6
AREA= 1.14 INPUT RUNOFF CURVE= 79.0 TIME OF CONCENTRATION= .42

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.11	1039.291	(RUNOFF)
19.32	36.665	(RUNOFF)
21.55	31.768	(RUNOFF)
23.55	27.320	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 1.9171 CFS-HRS= 1410.49 ACRE-FT= 116.56

SUBROUTINE ADDHYD CROSS SECTION 6
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.16	5129.794	(NULL)
19.31	303.093	(NULL)
21.59	276.005	(NULL)
23.59	253.227	(NULL)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 3.4289 CFS-HRS= 12569.27 ACRE-FT= 1038.72

SUBROUTINE SAVMOV CROSS SECTION 6
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5

SUBROUTINE ADDHYD CROSS SECTION 106
INPUT HYDROGRAPHS= 4,2 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
18.48	114.968	.39

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 6.15

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

14.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16.00	DISCHG	8.28	30.58	48.80	63.59	75.57	85.32	93.31	99.87	105.15	109.23
18.00	DISCHG	112.18	114.04	114.89	114.81	113.91	112.42	110.55	108.48	106.35	104.19
20.00	DISCHG	101.94	99.48	96.80	93.99	91.08	88.04	84.81	81.52	78.39	75.58
22.00	DISCHG	73.01	70.50	67.96	65.41	62.83	60.14	57.27	54.32	51.50	48.98
24.00	DISCHG	46.66	44.23	41.11	36.55	30.16	22.17	13.14	3.62	.00	

TOTAL WATER, IN INCHES ON DRAINAGE AREA= .1801 CFS-HRS= 714.64 ACRE-FT= 59.06

SUBROUTINE SAVMOV CROSS SECTION 106
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 1

SUBROUTINE RUNOFF CROSS SECTION 7
AREA= .96 INPUT RUNOFF CURVE= 75.0 TIME OF CONCENTRATION= .23

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
11.99	910.165	(RUNOFF)
16.91	38.358	(RUNOFF)
19.31	28.387	(RUNOFF)
20.31	25.019	(RUNOFF)
21.43	24.953	(RUNOFF)
22.31	21.703	(RUNOFF)
23.43	21.584	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 1.6086 CFS-HRS= 996.60 ACRE-FT= 82.36

SUBROUTINE ADDHYD CROSS SECTION 7
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.12	5744.614	(NULL)
19.31	331.479	(NULL)
21.57	300.516	(NULL)
23.56	274.377	(NULL)

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 6.64

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.12
8.00	DISCHG	.91	2.48	4.68	7.43	11.59	17.26	24.54	33.50	42.75	54.07
10.00	DISCHG	66.85	84.28	108.31	133.52	174.39	217.34	287.24	390.39	763.35	2883.38
12.00	DISCHG	5409.21	5587.72	3865.42	2646.17	1822.84	1361.86	1102.27	930.48	838.21	749.11
14.00	DISCHG	691.73	648.92	611.18	588.45	561.99	543.84	524.05	501.80	486.16	462.11
16.00	DISCHG	444.64	431.12	418.39	411.66	409.09	408.29	402.00	392.15	384.75	372.55
18.00	DISCHG	363.40	352.96	341.29	334.88	332.25	331.41	331.22	331.29	329.59	319.69
20.00	DISCHG	311.47	307.60	306.14	303.78	293.53	285.25	287.68	296.56	300.35	292.65
22.00	DISCHG	285.26	281.64	280.25	277.91	267.58	259.12	261.63	270.48	274.20	266.42
24.00	DISCHG	258.15	221.86	168.19	137.11	123.48	118.21	116.17	115.39	114.91	114.16
26.00	DISCHG	113.81	113.69	113.60	113.50	113.40	113.30	113.21	113.11	113.01	112.91
28.00	DISCHG	112.81	112.71	112.61	112.51	112.41	112.31	112.21	112.11	112.01	111.91
30.00	DISCHG	111.82	111.72	111.62	111.52	111.42	111.32	111.22	111.13	111.03	110.93
32.00	DISCHG	110.83	110.73	110.64	110.54	110.44	110.34	110.25	110.15	110.05	109.95
34.00	DISCHG	109.86	109.76	109.66	109.57	109.47	109.37	109.28	109.18	109.08	108.99

36.00	DISCHG	108.89	108.79	108.70	108.60	108.51	108.41	108.31	108.22	108.12	108.03
38.00	DISCHG	107.93	107.84	107.74	107.65	107.55	107.46	107.36	107.27	107.17	107.08
40.00	DISCHG	106.98	106.89	106.79	106.70	106.60	106.51	106.42	106.32	106.23	106.13
42.00	DISCHG	106.04	105.95	105.85	105.76	105.67	105.57	105.48	105.39	105.29	105.20
44.00	DISCHG	105.11	105.02	104.92	104.83	104.74	104.64	104.55	104.46	104.37	104.28
46.00	DISCHG	104.18	104.09	104.00	103.91	103.82	103.72	103.63	103.54	103.45	103.36
48.00	DISCHG	103.27	103.18	103.08	102.99	102.90	102.81	102.72	102.63	102.54	102.44
50.00	DISCHG	102.33	102.20	102.07	101.94	101.81	101.68	101.55	101.42	101.29	101.16
52.00	DISCHG	101.03	100.90	100.77	100.64	100.51	100.39	100.26	100.13	100.00	99.87
54.00	DISCHG	99.74	99.62	99.49	99.36	99.24	99.11	98.98	98.86	98.73	98.60
56.00	DISCHG	98.48	98.35	98.22	98.10	97.97	97.85	97.72	97.60	97.47	97.35
58.00	DISCHG	97.22	97.10	96.98	96.85	96.73	96.60	96.48	96.36	96.23	96.11

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 3.1657 CFS-HRS= 13565.86 ACRE-FT= 1121.08

SUBROUTINE SAVMOV CROSS SECTION 7
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 2

SUBROUTINE RUNOFF CROSS SECTION 10
AREA= .67 INPUT RUNOFF CURVE= 78.0 TIME OF CONCENTRATION= .89

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.41	402.489	(RUNOFF)
21.77	17.695	(RUNOFF)
23.76	15.181	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 1.8374 CFS-HRS= 794.50 ACRE-FT= 65.66

SUBROUTINE DIVERT CROSS SECTION 110
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,3

SUBROUTINE REACH CROSS SECTION 109
LENGTH= 2700.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 2.514 AVERAGE ROUTING COEFF= .5966 NUMBER OF ROUTINGS= .89

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.69	365.063	1767.77
21.98	17.604	1764.24
23.95	15.080	1764.15

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 1.8367 CFS-HRS= 794.18 ACRE-FT= 65.63

SUBROUTINE RUNOFF CROSS SECTION 8
AREA= 1.39 INPUT RUNOFF CURVE= 82.0 TIME OF CONCENTRATION= .55

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.18	1307.435	(RUNOFF)
21.61	40.407	(RUNOFF)
23.61	34.605	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 2.1476 CFS-HRS= 1926.50 ACRE-FT= 159.21

SUBROUTINE ADDHYD CROSS SECTION 109
INPUT HYDROGRAPHS= 4,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.22	1484.534	1772.57
21.61	57.824	1765.06
23.61	49.482	1764.94

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 2.0465 CFS-HRS= 2720.68 ACRE-FT= 224.84

SUBROUTINE DIVERT CROSS SECTION 109
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,4

SUBROUTINE REACH CROSS SECTION 108
LENGTH= 2100.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 6.616 AVERAGE ROUTING COEFF= .7956 NUMBER OF ROUTINGS= .35

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.29	1408.327	1759.17
21.67	57.485	1754.63
23.67	49.160	1754.49

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 2.0454 CFS-HRS= 2719.25 ACRE-FT= 224.72

SUBROUTINE RUNOFF CROSS SECTION 8
AREA= 1.92 INPUT RUNOFF CURVE= 84.0 TIME OF CONCENTRATION= .42

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.09	2152.812	(RUNOFF)
19.31	67.635	(RUNOFF)
21.55	58.380	(RUNOFF)
23.55	50.071	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 2.3216 CFS-HRS= 2876.76 ACRE-FT= 237.74

SUBROUTINE ADDHYD CROSS SECTION 108
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.16	3387.930	1762.11
21.58	115.684	1755.06
23.58	99.041	1754.95

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 3.98

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	DISCHG	.00	.00	.00	.00	.00	.01	.34	1.53	3.17	4.97
8.00	DISCHG	7.00	9.89	13.85	17.92	22.54	27.20	32.63	39.33	45.81	54.03
10.00	DISCHG	62.46	74.01	90.43	106.65	133.51	161.58	203.87	269.55	455.84	1577.54

12.00	DISCHG →	2999.94	3362.39	2500.77	1836.27	1366.36	1044.29	832.78	672.27	570.05	486.00
14.00	DISCHG	425.67	383.86	348.33	325.00	303.45	286.68	272.28	256.25	244.69	229.92
16.00	DISCHG	217.25	207.60	198.21	192.33	189.08	187.27	183.73	177.69	173.06	166.22
18.00	DISCHG	160.19	154.28	146.83	142.02	139.39	137.94	137.11	136.65	135.74	130.86
20.00	DISCHG	125.90	123.15	121.68	120.12	114.83	109.71	109.36	113.38	115.66	112.37
22.00	DISCHG	108.26	106.00	104.84	103.44	98.25	93.10	92.72	96.83	99.02	95.76
24.00	DISCHG	91.26	75.92	46.32	26.51	15.58	9.42	5.63	3.31	1.94	1.13
26.00	DISCHG	.65	.38	.22	.12	.06	.03	.00			

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 2.1786 CFS-HRS= 5596.01 ACRE-FT= 462.45

SUBROUTINE ADDHYD CROSS SECTION 109
INPUT HYDROGRAPHS= 3,4 OUTPUT HYDROGRAPH= 5

TIME HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= .00

.00	DISCHG	.00

TOTAL WATER, CANNOT BE COMPUTED WITH D.A.= 0.0 CFS-HRS= .00 ACRE-FT= .00

SUBROUTINE SAVMOV CROSS SECTION 109
INPUT HYDROGRAPH= 5 OUTPUT HYDROGRAPH= 3

SUBROUTINE DIVERT CROSS SECTION 108
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,4

SUBROUTINE REACH CROSS SECTION 107
LENGTH= 5300.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 5.495 AVERAGE ROUTING COEFF= .7637 NUMBER OF ROUTINGS= 1.02

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.41	3170.661	1759.42
21.81	114.879	1750.83
23.81	98.251	1750.65

TIME HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 3.98

.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	DISCHG	.00	.00	.00	.00	.00	.00	.01	.26	1.21	2.68
8.00	DISCHG	4.40	6.35	9.00	12.64	16.61	21.06	25.67	30.90	37.23	43.67
10.00	DISCHG	51.45	59.72	70.44	85.43	101.37	125.47	152.59	191.05	249.91	404.10
12.00	DISCHG	1281.69	2570.44	3169.36	2673.09	2044.97	1534.44	1165.40	914.85	732.23	610.05
14.00	DISCHG	516.70	448.17	399.74	361.06	333.97	311.02	292.71	277.34	261.50	248.85
16.00	DISCHG	234.64	221.56	211.06	201.40	194.57	190.43	188.05	184.81	179.47	174.65
18.00	DISCHG	168.33	162.21	156.25	149.18	143.79	140.47	138.56	137.46	136.85	136.02
20.00	DISCHG	132.16	127.46	124.21	122.30	120.66	116.30	111.35	109.83	112.48	114.87
22.00	DISCHG	113.01	109.45	106.85	105.33	103.91	99.67	94.74	93.20	95.90	98.24
24.00	DISCHG	96.40	92.55	80.10	54.79	33.52	20.00	12.02	7.20	4.26	2.51
26.00	DISCHG	1.47	.85	.49	.28	.16	.09	.04	.01	.00	

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 2.1711 CFS-HRS= 5576.68 ACRE-FT= 460.86

SUBROUTINE SAVMOV CROSS SECTION 107
INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 5

SUBROUTINE ADDHYD CROSS SECTION 107
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

100-YR 24-HR HYD @ signal Bulk PRO

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.21	8164.111	1765.58
21.61	412.839	1752.71
23.61	370.111	1752.49

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 10.62

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	DISCHG	.00	.00	.00	.00	.00	.00	.01	.26	1.21	2.80
8.00	DISCHG	5.31	8.83	13.68	20.07	28.20	38.32	50.21	64.40	79.97	97.74
10.00	DISCHG	118.30	144.00	178.75	218.95	275.76	342.80	439.83	581.44	1013.27	3287.48
12.00	DISCHG	6690.89	8158.16	7034.78	5319.26	3867.81	2896.30	2267.67	1845.33	1570.44	1359.16
14.00	DISCHG	1208.42	1097.09	1010.92	949.52	895.95	854.86	816.75	779.14	747.66	710.97
16.00	DISCHG	679.28	652.68	629.45	613.07	603.66	598.72	590.05	576.96	564.22	547.20
18.00	DISCHG	531.73	515.17	497.55	484.06	476.05	471.88	469.78	468.76	466.44	455.71
20.00	DISCHG	443.63	435.06	430.36	426.08	414.19	401.55	399.03	406.39	412.83	407.52
22.00	DISCHG	398.27	391.09	387.10	383.24	371.49	358.79	356.36	363.68	370.10	364.67
24.00	DISCHG	354.56	314.41	248.29	191.90	157.00	138.21	128.19	122.59	119.17	116.67
26.00	DISCHG	115.27	114.55	114.09	113.79	113.56	113.39	113.25	113.12	113.01	112.91
28.00	DISCHG	112.81	112.71	112.61	112.51	112.41	112.31	112.21	112.11	112.01	111.91
30.00	DISCHG	111.82	111.72	111.62	111.52	111.42	111.32	111.22	111.13	111.03	110.93
32.00	DISCHG	110.83	110.73	110.64	110.54	110.44	110.34	110.25	110.15	110.05	109.95
34.00	DISCHG	109.86	109.76	109.66	109.57	109.47	109.37	109.28	109.18	109.08	108.99
36.00	DISCHG	108.89	108.79	108.70	108.60	108.51	108.41	108.31	108.22	108.12	108.03
38.00	DISCHG	107.93	107.84	107.74	107.65	107.55	107.46	107.36	107.27	107.17	107.08
40.00	DISCHG	106.98	106.89	106.79	106.70	106.60	106.51	106.42	106.32	106.23	106.13
42.00	DISCHG	106.04	105.95	105.85	105.76	105.67	105.57	105.48	105.39	105.29	105.20
44.00	DISCHG	105.11	105.02	104.92	104.83	104.74	104.64	104.55	104.46	104.37	104.28
46.00	DISCHG	104.18	104.09	104.00	103.91	103.82	103.72	103.63	103.54	103.45	103.36
48.00	DISCHG	103.27	103.18	103.08	102.99	102.90	102.81	102.72	102.63	102.54	102.44
50.00	DISCHG	102.33	102.20	102.07	101.94	101.81	101.68	101.55	101.42	101.29	101.16
52.00	DISCHG	101.03	100.90	100.77	100.64	100.51	100.39	100.26	100.13	100.00	99.87
54.00	DISCHG	99.74	99.62	99.49	99.36	99.24	99.11	98.98	98.86	98.73	98.60
56.00	DISCHG	98.48	98.35	98.22	98.10	97.97	97.85	97.72	97.60	97.47	97.35
58.00	DISCHG	97.22	97.10	96.98	96.85	96.73	96.60	96.48	96.36	96.23	96.11

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 2.7930 CFS-HRS= 19142.53 ACRE-FT= 1581.94

SUBROUTINE SAVMOV STRUCTURE 2
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 6

SUBROUTINE RESVOR STRUCTURE 2
SURFACE ELEVATION= 1701.40

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
24.82	157.946	1712.61

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HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 10.62

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.01	.03
8.00	DISCHG	.08	.16	.29	.49	.77	1.15	1.66	2.31	3.14	4.15
10.00	DISCHG	5.37	6.85	8.67	10.82	13.70	17.18	21.59	27.35	36.43	61.33
12.00	DISCHG	119.40	127.13	132.73	137.27	139.99	141.74	143.05	144.09	144.93	145.64
14.00	DISCHG	146.36	147.05	147.67	148.26	148.81	149.33	149.82	150.28	150.71	151.12
16.00	DISCHG	151.44	151.58	151.71	151.84	151.96	152.08	152.20	152.32	152.43	152.54
18.00	DISCHG	152.64	152.74	152.84	152.93	153.02	153.10	153.19	153.27	153.36	153.44
20.00	DISCHG	153.52	153.60	153.67	153.75	153.82	153.89	153.95	154.03	154.12	154.21
22.00	DISCHG	154.30	154.39	154.48	154.56	154.64	154.72	154.79	154.87	154.94	155.10
24.00	DISCHG	155.46	155.77	155.98	157.48	157.94	157.66	157.00	156.15	155.95	155.88
26.00	DISCHG	155.81	155.74	155.67	155.60	155.53	155.45	155.38	155.31	155.23	155.16
28.00	DISCHG	155.09	155.01	154.99	154.97	154.96	154.94	154.93	154.91	154.89	154.88
30.00	DISCHG	154.86	154.85	154.83	154.82	154.80	154.78	154.77	154.75	154.74	154.72
32.00	DISCHG	154.70	154.69	154.67	154.66	154.64	154.62	154.61	154.59	154.58	154.56
34.00	DISCHG	154.54	154.53	154.51	154.49	154.48	154.46	154.44	154.43	154.41	154.40
36.00	DISCHG	154.38	154.36	154.35	154.33	154.31	154.30	154.28	154.26	154.24	154.23
38.00	DISCHG	154.21	154.19	154.18	154.16	154.14	154.13	154.11	154.09	154.08	154.06
40.00	DISCHG	154.04	154.02	154.01	153.99	153.98	153.97	153.95	153.94	153.93	153.92
42.00	DISCHG	153.90	153.89	153.88	153.86	153.85	153.84	153.82	153.81	153.80	153.79
44.00	DISCHG	153.77	153.76	153.75	153.73	153.72	153.71	153.69	153.68	153.67	153.65
46.00	DISCHG	153.64	153.63	153.61	153.60	153.59	153.57	153.56	153.55	153.53	153.52
48.00	DISCHG	153.51	153.49	153.48	153.47	153.45	153.44	153.42	153.41	153.40	153.38
50.00	DISCHG	153.37	153.36	153.34	153.33	153.31	153.30	153.29	153.27	153.26	153.24
52.00	DISCHG	153.23	153.22	153.20	153.19	153.17	153.16	153.15	153.13	153.12	153.10
54.00	DISCHG	153.09	153.07	153.06	153.05	153.03	153.02	153.00	152.99	152.97	152.96
56.00	DISCHG	152.94	152.93	152.91	152.90	152.88	152.87	152.86	152.84	152.83	152.81
58.00	DISCHG	152.80	152.78	152.77	152.75	152.74	152.72	152.71	152.69	152.68	152.66

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 1.0760 CFS-HRS= 7374.54 ACRE-FT= 609.43

ENDCMP

old 10 3

hrs 2 1

3

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PASS= 2

EXECUTIVE CONTROL CARD 126 OPERATION COMPUT. FROM XSECTN/STRUCT 101/ 0 TO XSECTN/STRUCT 0/ 2
STARTING TIME= .00 RAIN DEPTH= 7.06 RAIN DURATION= 1.00 RAIN TABLE NO.= 5 SOIL CONDITION= 2
ALTERNATE NO.= 5 STORM NO.= 4

SUBROUTINE RUNOFF CROSS SECTION 101
AREA= 1.86 INPUT RUNOFF CURVE= 80.0 TIME OF CONCENTRATION= 1.21

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.27	905.926	(RUNOFF)
19.61	105.033	(RUNOFF)
21.35	96.911	(RUNOFF)
23.42	86.488	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.7414 CFS-HRS= 5691.51 ACRE-FT= 470.35

SUBROUTINE RUNOFF CROSS SECTION 1
AREA= 1.20 INPUT RUNOFF CURVE= 79.0 TIME OF CONCENTRATION= .67

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.90	589.739	(RUNOFF)
17.17	92.968	(RUNOFF)
17.98	85.347	(RUNOFF)
19.51	68.342	(RUNOFF)
21.13	65.259	(RUNOFF)
22.07	56.467	(RUNOFF)
23.19	60.928	(RUNOFF)
24.09	58.396	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.6306 CFS-HRS= 3586.16 ACRE-FT= 296.36

SUBROUTINE ADDHYD CROSS SECTION 1
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.13	1490.069	(NULL)
17.11	238.877	(NULL)
19.54	173.258	(NULL)
21.19	161.220	(NULL)
23.23	145.887	(NULL)
24.08	142.216	(NULL)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.6980 CFS-HRS= 9277.67 ACRE-FT= 766.71

SUBROUTINE REACH CROSS SECTION 102
LENGTH= 2500.00 INPUT COEFFICIENT= .6500 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 3.157 AVERAGE ROUTING COEFF= .6500 NUMBER OF ROUTINGS= .71

SUBROUTINE RUNOFF CROSS SECTION 2
AREA= 1.24 INPUT RUNOFF CURVE= 75.0 TIME OF CONCENTRATION= .59

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.98	554.258	(RUNOFF)
17.14	92.769	(RUNOFF)
17.99	85.252	(RUNOFF)
19.49	67.868	(RUNOFF)
21.09	65.268	(RUNOFF)
22.04	56.464	(RUNOFF)
23.15	61.278	(RUNOFF)
24.05	59.449	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.1947 CFS-HRS= 3356.86 ACRE-FT= 277.41

SUBROUTINE ADDHYD CROSS SECTION 2
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.20	2028.761	(NULL)
19.53	240.054	(NULL)
21.21	222.269	(NULL)
23.25	200.318	(NULL)
24.11	199.188	(NULL)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.5529 CFS-HRS= 12634.70 ACRE-FT= 1044.13

SUBROUTINE REACH CROSS SECTION 103
LENGTH= 2500.00 INPUT COEFFICIENT= .6500 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 3.157 AVERAGE ROUTING COEFF= .6500 NUMBER OF ROUTINGS= .71

SUBROUTINE RUNOFF CROSS SECTION 3
AREA= 1.85 INPUT RUNOFF CURVE= 80.0 TIME OF CONCENTRATION= .91

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.04	919.904	(RUNOFF)
17.23	142.715	(RUNOFF)
19.58	104.977	(RUNOFF)
21.23	98.616	(RUNOFF)
23.31	89.089	(RUNOFF)
24.13	86.923	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.7411 CFS-HRS= 5660.56 ACRE-FT= 467.79

SUBROUTINE ADDHYD CROSS SECTION 3
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.31	2923.003	(NULL)
19.57	344.148	(NULL)
21.33	317.833	(NULL)
23.39	285.875	(NULL)
24.16	280.962	(NULL)

TIME HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 6.15

.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.26	1.65	5.60	14.00
6.00	DISCHG	28.27	50.76	85.15	134.29	197.53	274.32	365.01	473.23	600.72	747.63
8.00	DISCHG	918.18	1108.43	1319.98	1552.06	1798.90	2058.41	2312.95	2526.91	2686.77	2800.05
10.00	DISCHG	2875.65	2917.12	2919.03	2882.58	2825.85	2762.16	2694.30	2612.95	2512.56	2397.61
12.00	DISCHG	2267.59	2129.47	1988.54	1848.94	1718.48	1599.47	1491.55	1389.54	1291.59	1201.98
14.00	DISCHG	1123.29	1054.77	991.71	931.21	874.41	821.46	773.87	732.07	695.70	662.32
16.00	DISCHG	628.54	593.91	558.13	522.68	494.67	480.78	477.15	472.47	461.75	450.42
18.00	DISCHG	444.34	439.22	423.96	394.82	365.49	347.94	342.56	342.88	344.10	341.77
20.00	DISCHG	331.27	316.51	304.63	299.78	301.53	308.28	316.00	317.32	310.09	300.58
22.00	DISCHG	295.19	292.54	285.54	272.83	264.05	268.43	280.35	285.85	278.64	270.94
24.00	DISCHG	274.18	280.62	266.69	224.86	171.47	124.01	87.00	59.13	39.17	25.61
26.00	DISCHG	16.67	10.84	7.06	4.58	2.96	1.91	1.25	.80	.51	.31
28.00	DISCHG	.17	.08	.03	.00						

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.6095 CFS-HRS= 18295.29 ACRE-FT= 1511.92

SUBROUTINE SAVMOV STRUCTURE 1
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 6

SUBROUTINE RESVOR STRUCTURE 1
SURFACE ELEVATION= 1794.10

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.69	1794.120	1801.77

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 6.15

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.01	.06	.18
6.00	DISCHG	.43	.91	1.73	3.05	5.04	7.86	11.67	16.64	23.00	34.77
8.00	DISCHG	52.50	73.85	91.85	93.68	95.82	98.18	100.85	103.39	105.60	107.93
10.00	DISCHG	110.34	112.80	265.48	523.28	751.30	951.13	1124.97	1274.51	1400.54	1503.70
12.00	DISCHG	1584.78	1644.82	1743.51	1788.87	1787.53	1754.26	1700.22	1643.58	1613.94	1578.02
14.00	DISCHG	1537.38	1493.52	1447.52	1399.97	1351.34	1302.09	1252.75	1203.86	1155.92	1109.27
16.00	DISCHG	1063.90	1019.61	976.22	933.59	892.02	852.47	815.93	782.56	751.70	722.78
18.00	DISCHG	695.84	670.99	647.57	624.27	600.39	576.55	553.92	533.26	514.70	497.90
20.00	DISCHG	482.11	466.63	451.37	436.77	423.46	411.86	402.11	393.75	385.92	378.03
22.00	DISCHG	370.19	362.73	355.52	348.05	340.26	333.02	327.29	322.96	318.98	314.66
24.00	DISCHG	310.54	307.30	304.01	298.31	288.51	274.74	258.19	240.08	221.40	202.91
26.00	DISCHG	185.13	168.36	152.77	138.39	125.22	113.90	113.80	113.70	113.61	113.51
28.00	DISCHG	113.40	113.30	113.20	113.10	113.01	112.91	112.81	112.71	112.61	112.51
30.00	DISCHG	112.41	112.31	112.21	112.11	112.01	111.91	111.81	111.71	111.62	111.52
32.00	DISCHG	111.42	111.32	111.22	111.12	111.03	110.93	110.83	110.73	110.63	110.54
34.00	DISCHG	110.44	110.34	110.24	110.15	110.05	109.95	109.85	109.76	109.66	109.56
36.00	DISCHG	109.47	109.37	109.27	109.18	109.08	108.98	108.89	108.79	108.70	108.60
38.00	DISCHG	108.50	108.41	108.31	108.22	108.12	108.03	107.93	107.83	107.74	107.64
40.00	DISCHG	107.55	107.45	107.36	107.26	107.17	107.07	106.98	106.89	106.79	106.70
42.00	DISCHG	106.60	106.51	106.41	106.32	106.23	106.13	106.04	105.95	105.85	105.76
44.00	DISCHG	105.66	105.57	105.48	105.39	105.29	105.20	105.11	105.01	104.92	104.83
46.00	DISCHG	104.74	104.64	104.55	104.46	104.37	104.27	104.18	104.09	104.00	103.91
48.00	DISCHG	103.81	103.72	103.63	103.54	103.45	103.36	103.26	103.17	103.08	102.99
50.00	DISCHG	102.90	102.81	102.72	102.63	102.54	102.45	102.33	102.20	102.07	101.94
52.00	DISCHG	101.81	101.68	101.55	101.42	101.29	101.16	101.03	100.90	100.77	100.64

54.00	DISCHG	100.51	100.38	100.25	100.13	100.00	99.87	99.74	99.61	99.49	99.36
56.00	DISCHG	99.23	99.11	98.98	98.85	98.73	98.60	98.47	98.35	98.22	98.10
58.00	DISCHG	97.97	97.85	97.72	97.60	97.47	97.35	97.22	97.10	96.97	96.85

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.1504 CFS-HRS= 16472.99 ACRE-FT= 1361.33

SUBROUTINE DIVERT STRUCTURE 1
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 4,1

SUBROUTINE REACH CROSS SECTION 104
LENGTH= 6700.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 11.250 AVERAGE ROUTING COEFF= .8687 NUMBER OF ROUTINGS= .72

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
26.70	115.036	.51

TOTAL WATER, CANNOT BE COMPUTED WITH D.A.= 0.0 CFS-HRS= 5625.90 ACRE-FT= 464.92

SUBROUTINE RUNOFF CROSS SECTION 4
AREA= 2.54 INPUT RUNOFF CURVE= 80.0 TIME OF CONCENTRATION= .54

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.64	1281.816	(RUNOFF)
17.11	200.622	(RUNOFF)
17.97	184.240	(RUNOFF)
19.45	146.487	(RUNOFF)
21.07	141.759	(RUNOFF)
22.03	122.054	(RUNOFF)
23.12	133.356	(RUNOFF)
24.03	130.610	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.7408 CFS-HRS= 7771.30 ACRE-FT= 642.22

SUBROUTINE ADDHYD CROSS SECTION 4
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.71	1386.022	(NULL)
17.11	315.622	(NULL)
17.97	299.240	(NULL)
19.45	261.487	(NULL)
21.07	256.759	(NULL)
22.03	237.054	(NULL)
23.12	248.356	(NULL)
24.03	245.610	(NULL)
26.70	115.036	(NULL)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 8.1728 CFS-HRS= 13397.19 ACRE-FT= 1107.14

SUBROUTINE DIVERT CROSS SECTION 104
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,2

SUBROUTINE ADDHYD CROSS SECTION 104
INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 4

SUBROUTINE REACH CROSS SECTION 104
LENGTH= 3700.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 13.848 AVERAGE ROUTING COEFF= .8907 NUMBER OF ROUTINGS= .33

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.81	1385.612	3.07
17.17	314.133	1.07
18.00	297.338	1.01
19.51	261.697	.89
21.13	255.879	.87
22.09	235.615	.80
23.18	246.075	.84
24.09	240.549	.82
26.70	115.024	.39

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 8.1689 CFS-HRS= 13390.71 ACRE-FT= 1106.61

SUBROUTINE RUNOFF CROSS SECTION 5
AREA= 2.00 INPUT RUNOFF CURVE= 82.0 TIME OF CONCENTRATION= .43

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.24	1070.716	(RUNOFF)
9.51	1060.524	(RUNOFF)
17.05	163.265	(RUNOFF)
17.95	149.788	(RUNOFF)
19.39	118.066	(RUNOFF)
21.00	115.701	(RUNOFF)
21.99	99.172	(RUNOFF)
23.05	111.256	(RUNOFF)
23.98	110.110	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.9625 CFS-HRS= 6405.34 ACRE-FT= 529.34

SUBROUTINE ADDHYD CROSS SECTION 5
INPUT HYDROGRAPHS= 3,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.61	2442.243	(NULL)
17.11	475.443	(NULL)
17.97	446.990	(NULL)
19.46	378.837	(NULL)
21.06	369.836	(NULL)
22.02	334.405	(NULL)
23.11	353.975	(NULL)
24.02	349.026	(NULL)
26.70	115.024	(NULL)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 6.7564 CFS-HRS= 19796.04 ACRE-FT= 1635.94

SUBROUTINE DIVERT CROSS SECTION 106
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,2

SUBROUTINE RUNOFF CROSS SECTION 6
AREA= 1.14 INPUT RUNOFF CURVE= 79.0 TIME OF CONCENTRATION= .42

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.27	564.993	(RUNOFF)
9.60	564.418	(RUNOFF)
17.04	90.827	(RUNOFF)
17.95	83.463	(RUNOFF)
19.38	65.639	(RUNOFF)
21.00	64.365	(RUNOFF)
21.99	55.256	(RUNOFF)
23.04	61.849	(RUNOFF)
23.98	61.636	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.6300 CFS-HRS= 3406.37 ACRE-FT= 281.50

SUBROUTINE ADDHYD CROSS SECTION 6
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.61	3006.654	(NULL)
17.09	565.594	(NULL)
17.96	530.434	(NULL)
19.44	444.377	(NULL)
21.04	433.994	(NULL)
22.01	389.603	(NULL)
23.09	415.093	(NULL)
24.01	410.395	(NULL)
26.70	115.024	(NULL)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 6.3296 CFS-HRS= 23202.40 ACRE-FT= 1917.45

SUBROUTINE SAVMOV CROSS SECTION 6
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5

SUBROUTINE ADDHYD CROSS SECTION 106
INPUT HYDROGRAPHS= 4,2 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.69	1679.116	3.50

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 6.15

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10.00	DISCHG	.00	.00	150.48	408.28	636.30	836.13	1009.97	1159.51	1285.54	1388.70

12.00	DISCHG	1469.78	1529.82	1628.51	1673.87	1672.53	1639.26	1585.22	1528.58	1498.94	1463.02
14.00	DISCHG	1422.38	1378.52	1332.52	1284.97	1236.34	1187.09	1137.75	1088.86	1040.92	994.27
16.00	DISCHG	948.90	904.61	861.22	818.59	777.02	737.47	700.93	667.56	636.70	607.78
18.00	DISCHG	580.84	555.99	532.57	509.27	485.39	461.55	438.92	418.26	399.70	382.90
20.00	DISCHG	367.11	351.63	336.37	321.77	308.46	296.86	287.11	278.75	270.92	263.03
22.00	DISCHG	255.19	247.73	240.52	233.05	225.26	218.02	212.29	207.96	203.98	199.66
24.00	DISCHG	195.54	192.30	189.01	183.31	173.51	159.74	143.19	125.08	106.40	87.91
26.00	DISCHG	70.13	53.36	37.77	23.39	10.22	.00				

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 2.7292 CFS-HRS= 10832.22 ACRE-FT= 895.18

SUBROUTINE SAVMOV CROSS SECTION 106
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 1

SUBROUTINE RUNOFF CROSS SECTION 7
AREA= .96 INPUT RUNOFF CURVE= 75.0 TIME OF CONCENTRATION= .23

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.07	430.219	(RUNOFF)
9.61	433.092	(RUNOFF)
9.93	436.831	(RUNOFF)
10.91	376.922	(RUNOFF)
16.93	75.946	(RUNOFF)
17.91	70.090	(RUNOFF)
19.30	53.705	(RUNOFF)
20.92	54.270	(RUNOFF)
22.93	54.343	(RUNOFF)
23.91	56.700	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.1904 CFS-HRS= 2596.15 ACRE-FT= 214.55

SUBROUTINE ADDHYD CROSS SECTION 7
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.61	3439.741	(NULL)
17.05	639.039	(NULL)
17.94	600.032	(NULL)
19.40	497.532	(NULL)
21.00	486.814	(NULL)
21.98	435.660	(NULL)
23.05	465.396	(NULL)
23.98	464.317	(NULL)
26.70	115.024	(NULL)

TIME HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 6.64

.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.05	1.81	9.32	25.34	51.14	86.96
6.00	DISCHG	130.66	196.53	293.18	391.69	515.87	638.90	799.03	999.33	1188.38	1454.18
8.00	DISCHG	1704.29	1999.76	2335.89	2621.33	2972.53	3266.43	3395.62	3418.04	3439.60	3421.70
10.00	DISCHG	3418.16	3327.92	3175.50	3083.37	2989.20	2932.16	2807.14	2635.62	2507.99	2296.16
12.00	DISCHG	2140.27	1981.93	1817.06	1712.42	1596.13	1516.29	1417.04	1303.64	1232.47	1165.30
14.00	DISCHG	1121.90	1063.91	995.88	949.97	893.33	853.74	822.57	794.99	772.59	726.29

16.00	DISCHG	670.31	647.45	599.43	580.02	609.12	638.02	627.13	592.46	574.43	585.14
18.00	DISCHG	597.72	552.44	473.02	432.56	452.33	478.27	491.82	497.53	492.18	452.30
20.00	DISCHG	419.00	415.46	429.54	443.29	468.37	486.81	469.97	432.22	412.59	422.97
22.00	DISCHG	435.47	416.04	377.56	365.46	416.61	463.50	447.50	394.87	372.97	419.96
24.00	DISCHG	463.60	394.52	258.34	175.77	138.50	123.97	118.35	116.15	115.36	115.06
26.00	DISCHG	115.00	115.00	115.00	115.00	115.00	114.81	114.20	113.84	113.72	113.62
28.00	DISCHG	113.52	113.42	113.32	113.22	113.12	113.02	112.92	112.82	112.72	112.62
30.00	DISCHG	112.52	112.42	112.32	112.22	112.12	112.02	111.93	111.83	111.73	111.63
32.00	DISCHG	111.53	111.43	111.33	111.24	111.14	111.04	110.94	110.84	110.75	110.65
34.00	DISCHG	110.55	110.45	110.35	110.26	110.16	110.06	109.96	109.87	109.77	109.67
36.00	DISCHG	109.58	109.48	109.38	109.29	109.19	109.09	109.00	108.90	108.80	108.71
38.00	DISCHG	108.61	108.52	108.42	108.33	108.23	108.13	108.04	107.94	107.85	107.75
40.00	DISCHG	107.66	107.56	107.47	107.37	107.28	107.18	107.09	106.99	106.90	106.80
42.00	DISCHG	106.71	106.62	106.52	106.43	106.33	106.24	106.15	106.05	105.96	105.86
44.00	DISCHG	105.77	105.68	105.58	105.49	105.40	105.31	105.21	105.12	105.03	104.93
46.00	DISCHG	104.84	104.75	104.66	104.56	104.47	104.38	104.29	104.19	104.10	104.01
48.00	DISCHG	103.92	103.83	103.73	103.64	103.55	103.46	103.37	103.28	103.19	103.10
50.00	DISCHG	103.00	102.91	102.82	102.73	102.64	102.55	102.45	102.34	102.21	102.08
52.00	DISCHG	101.95	101.82	101.69	101.56	101.43	101.30	101.17	101.04	100.92	100.79
54.00	DISCHG	100.66	100.53	100.40	100.27	100.14	100.02	99.89	99.76	99.63	99.50
56.00	DISCHG	99.38	99.25	99.12	99.00	98.87	98.74	98.62	98.49	98.37	98.24
58.00	DISCHG	98.11	97.99	97.86	97.74	97.61	97.49	97.36	97.24	97.11	96.99

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 6.0203 CFS-HRS= 25798.51 ACRE-FT= 2131.99

SUBROUTINE SAVMOV CROSS SECTION 7
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 2

SUBROUTINE RUNOFF CROSS SECTION 10
AREA= .67 INPUT RUNOFF CURVE= 78.0 TIME OF CONCENTRATION= .89

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.11	318.256	(RUNOFF)
17.24	50.653	(RUNOFF)
19.56	37.286	(RUNOFF)
21.22	35.187	(RUNOFF)
23.28	31.852	(RUNOFF)
24.13	30.856	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.5208 CFS-HRS= 1954.77 ACRE-FT= 161.54

SUBROUTINE DIVERT CROSS SECTION 110
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,3

SUBROUTINE REACH CROSS SECTION 109
LENGTH= 2700.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 2.427 AVERAGE ROUTING COEFF= .5881 NUMBER OF ROUTINGS= .91

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.39	316.123	1767.46
17.37	50.528	1764.95
19.80	36.973	1764.75

21.48	34.610	1764.71
23.55	31.055	1764.65
24.33	30.178	1764.64

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.5209 CFS-HRS= 1954.81 ACRE-FT= 161.55

SUBROUTINE RUNOFF CROSS SECTION 9
AREA= 1.39 INPUT RUNOFF CURVE= 82.0 TIME OF CONCENTRATION= .55

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.51	734.724	(RUNOFF)
17.12	111.635	(RUNOFF)
17.98	102.615	(RUNOFF)
19.47	81.479	(RUNOFF)
21.07	78.600	(RUNOFF)
22.03	67.815	(RUNOFF)
23.13	74.431	(RUNOFF)
24.03	72.005	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.9630 CFS-HRS= 4452.10 ACRE-FT= 367.92

SUBROUTINE ADDHYD CROSS SECTION 109
INPUT HYDROGRAPHS= 4,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.96	1034.762	1770.83
17.09	162.067	1766.28
17.96	150.831	1766.17
19.51	118.354	1765.85
21.11	111.814	1765.79
21.99	99.869	1765.67
23.14	103.222	1765.70
24.03	101.022	1765.68

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.8192 CFS-HRS= 6406.91 ACRE-FT= 529.47

SUBROUTINE DIVERT CROSS SECTION 109
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,4

SUBROUTINE REACH CROSS SECTION 108
LENGTH= 2100.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 6.077 AVERAGE ROUTING COEFF= .7814 NUMBER OF ROUTINGS= .38

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.03	1033.058	1758.37
17.16	161.520	1755.38
17.96	149.990	1755.30
19.54	117.803	1755.08
21.17	110.932	1755.03
22.01	99.177	1754.95
23.21	101.597	1754.97
24.11	99.661	1754.96

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.8193 CFS-HRS= 6407.05 ACRE-FT= 529.48

SUBROUTINE RUNOFF CROSS SECTION 8
AREA= 1.92 INPUT RUNOFF CURVE= 84.0 TIME OF CONCENTRATION= .42

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.21	1079.212	(RUNOFF)
17.04	159.640	(RUNOFF)
17.95	146.539	(RUNOFF)
19.38	115.100	(RUNOFF)
21.00	112.728	(RUNOFF)
21.99	96.709	(RUNOFF)
23.04	108.177	(RUNOFF)
23.98	107.742	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 5.1865 CFS-HRS= 6426.70 ACRE-FT= 531.10

SUBROUTINE ADDHYD CROSS SECTION 108
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.71	2070.169	1760.33
17.06	319.934	1756.18
17.95	296.528	1756.08
19.45	232.052	1755.80
21.05	221.771	1755.75
21.99	195.877	1755.61
23.09	206.319	1755.68
24.00	204.582	1755.67

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 3.98

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.31	4.14	12.77	26.44	46.00	67.74	93.35
6.00	DISCHG	120.24	160.56	222.06	281.45	355.59	430.35	520.44	639.59	749.15	897.19
8.00	DISCHG	1041.81	1196.06	1384.95	1545.15	1740.36	1919.26	2017.28	2046.01	2069.72	2069.86
10.00	DISCHG	2067.48	2031.20	1944.78	1885.88	1827.73	1782.96	1718.16	1615.64	1537.31	1421.62
12.00	DISCHG	1318.23	1225.68	1120.08	1045.95	971.09	911.07	852.19	779.03	728.16	683.05
14.00	DISCHG	648.36	613.38	569.58	538.28	503.85	475.33	453.80	433.54	417.74	391.99
16.00	DISCHG	368.34	344.89	315.51	298.78	306.17	319.12	316.31	298.39	287.36	289.97
18.00	DISCHG	295.89	279.23	236.89	210.61	213.37	223.73	229.18	231.95	230.97	213.51
20.00	DISCHG	194.98	189.33	194.35	199.72	210.94	221.37	217.68	199.51	187.87	190.33
22.00	DISCHG	195.86	188.96	168.75	158.97	179.11	203.51	202.85	177.43	163.72	181.90
24.00	DISCHG	204.58	182.91	113.47	65.59	39.10	24.08	14.64	8.73	5.18	3.02
26.00	DISCHG	1.76	1.03	.60	.34	.18	.09	.04	.00		

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.9965 CFS-HRS= 12833.74 ACRE-FT= 1060.58

SUBROUTINE ADDHYD CROSS SECTION 109
INPUT HYDROGRAPHS= 3,4 OUTPUT HYDROGRAPH= 5

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= .00

TIME		
.00	DISCHG	.00

TOTAL WATER, CANNOT BE COMPUTED WITH D.A.= 0.0 CFS-HRS= .00 ACRE-FT= .00

SUBROUTINE SAVMOV CROSS SECTION 109
INPUT HYDROGRAPH= 5 OUTPUT HYDROGRAPH= 3

SUBROUTINE DIVERT CROSS SECTION 108
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,4

SUBROUTINE REACH CROSS SECTION 107
LENGTH= 5300.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 4.820 AVERAGE ROUTING COEFF= .7393 NUMBER OF ROUTINGS= 1.13

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.11	2069.743	1757.53
17.33	316.996	1752.22
18.15	294.244	1752.11
19.71	232.045	1751.71
21.32	218.758	1751.62
22.20	194.050	1751.45
23.37	200.720	1751.49
24.24	195.845	1751.46

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 3.98

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.20	2.74	9.31	20.64	37.48	57.73
6.00	DISCHG	81.56	107.53	142.80	195.39	253.21	321.66	394.71	478.86	586.05	695.92
8.00	DISCHG	830.26	972.52	1122.71	1298.13	1465.08	1649.52	1831.45	1959.23	2020.55	2054.57
10.00	DISCHG	2065.85	2067.28	2044.14	1979.11	1915.95	1856.41	1806.49	1747.52	1660.03	1576.96
12.00	DISCHG	1473.42	1368.80	1272.04	1170.01	1085.55	1008.25	942.28	881.43	812.87	755.22
14.00	DISCHG	706.28	666.85	630.74	589.80	554.77	520.49	489.90	465.32	443.81	426.08
16.00	DISCHG	403.39	379.79	356.28	329.01	308.30	306.01	314.44	316.09	304.75	292.97
18.00	DISCHG	290.50	293.91	284.68	253.48	224.36	215.98	220.70	226.44	230.24	230.87
20.00	DISCHG	219.74	203.24	193.51	193.65	197.61	206.37	216.44	217.71	206.02	193.74
22.00	DISCHG	190.99	194.05	190.96	176.51	164.50	173.34	193.26	200.41	185.90	170.85
24.00	DISCHG	177.25	195.24	188.23	139.73	89.60	54.86	33.58	20.50	12.38	7.40
26.00	DISCHG	4.38	2.57	1.50	.87	.50	.28	.15	.07	.02	.00

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 4.9970 CFS-HRS= 12835.14 ACRE-FT= 1060.70

SUBROUTINE SAVMOV CROSS SECTION 107
INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 5

SUBROUTINE ADDHYD CROSS SECTION 107
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.92	5492.679	1762.40
17.08	946.540	1754.80
17.94	890.651	1754.62
19.48	724.911	1754.06

24-Hrs
ESW C
Bottle F

34

21.06	694.714	1753.95
21.97	626.667	1753.66
23.12	645.129	1753.74
24.00	640.856	1753.72

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 10.62

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.25	4.54	18.64	45.98	88.62	144.69
6.00	DISCHG	212.22	304.06	435.98	587.09	769.08	960.55	1193.74	1478.19	1774.43	2150.09
8.00	DISCHG	2534.55	2972.28	3458.60	3919.47	4437.61	4915.95	5227.07	5377.27	5460.15	5476.27
10.00	DISCHG	5484.01	5395.20	5219.64	5062.48	4905.15	4788.57	4613.63	4383.13	4168.01	3873.13
12.00	DISCHG	3613.69	3350.73	3089.10	2882.43	2681.68	2524.54	2359.31	2185.07	2045.34	1920.52
14.00	DISCHG	1828.18	1730.76	1626.62	1539.77	1448.10	1374.23	1312.47	1260.31	1216.40	1152.37
16.00	DISCHG	1093.71	1027.24	955.71	909.02	917.42	944.03	941.57	908.55	879.18	878.11
18.00	DISCHG	888.22	846.35	757.69	686.04	676.69	694.24	712.52	723.97	722.41	683.17
20.00	DISCHG	638.73	618.71	623.05	636.94	665.98	693.18	686.41	649.93	618.61	616.71
22.00	DISCHG	626.46	610.09	568.52	541.98	581.11	636.84	640.76	595.28	558.87	590.80
24.00	DISCHG	640.85	589.76	446.57	315.50	228.10	178.84	151.93	136.66	127.74	122.47
26.00	DISCHG	119.38	117.57	116.50	115.87	115.50	115.09	114.35	113.91	113.74	113.62
28.00	DISCHG	113.52	113.42	113.32	113.22	113.12	113.02	112.92	112.82	112.72	112.62
30.00	DISCHG	112.52	112.42	112.32	112.22	112.12	112.02	111.93	111.83	111.73	111.63
32.00	DISCHG	111.53	111.43	111.33	111.24	111.14	111.04	110.94	110.84	110.75	110.65
34.00	DISCHG	110.55	110.45	110.35	110.26	110.16	110.06	109.96	109.87	109.77	109.67
36.00	DISCHG	109.58	109.48	109.39	109.29	109.19	109.09	109.00	108.90	108.80	108.71
38.00	DISCHG	108.61	108.52	108.42	108.33	108.23	108.13	108.04	107.94	107.85	107.75
40.00	DISCHG	107.66	107.56	107.47	107.37	107.28	107.18	107.09	106.99	106.90	106.80
42.00	DISCHG	106.71	106.62	106.52	106.43	106.33	106.24	106.15	106.05	105.96	105.86
44.00	DISCHG	105.77	105.68	105.58	105.49	105.40	105.31	105.21	105.12	105.03	104.93
46.00	DISCHG	104.84	104.75	104.66	104.56	104.47	104.38	104.29	104.19	104.10	104.01
48.00	DISCHG	103.92	103.83	103.73	103.64	103.55	103.46	103.37	103.28	103.19	103.10
50.00	DISCHG	103.00	102.91	102.82	102.73	102.64	102.55	102.45	102.34	102.21	102.08
52.00	DISCHG	101.95	101.82	101.69	101.56	101.43	101.30	101.17	101.04	100.92	100.79
54.00	DISCHG	100.66	100.53	100.40	100.27	100.14	100.02	99.89	99.76	99.63	99.50
56.00	DISCHG	99.38	99.25	99.12	99.00	98.87	98.74	98.62	98.49	98.37	98.24
58.00	DISCHG	98.11	97.99	97.86	97.74	97.61	97.49	97.36	97.24	97.11	96.99

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 5.6368 CFS-HRS= 38633.64 ACRE-FT= 3192.68

SUBROUTINE SAVMOV STRUCTURE 2
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 6

SUBROUTINE RESVOR STRUCTURE 2
SURFACE ELEVATION= 1701.40

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
13.42	2184.158	1716.20

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 10.62

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.03	.17	.54	1.33	2.69
6.00	DISCHG	4.76	7.75	12.01	17.90	25.68	35.57	47.84	63.02	81.43	103.60
8.00	DISCHG	122.32	124.29	126.61	129.29	132.32	135.73	139.14	141.93	144.78	148.15
10.00	DISCHG	151.60	153.02	154.56	242.21	370.07	561.83	752.13	999.74	1259.11	1477.75

12.00	DISCHG	1657.14	1801.64	1913.94	2012.87	2091.34	2143.55	2173.99	2184.00	2176.99	2157.19
14.00	DISCHG	2128.34	2092.75	2050.51	2002.84	1950.92	1907.98	1863.27	1817.60	1771.74	1725.23
16.00	DISCHG	1677.55	1628.69	1578.24	1527.10	1478.50	1435.13	1396.15	1358.85	1322.03	1286.93
18.00	DISCHG	1254.96	1224.26	1190.83	1153.70	1116.30	1082.19	1052.20	1025.76	1001.80	978.12
20.00	DISCHG	953.01	927.34	903.07	881.45	863.24	848.70	836.12	822.82	812.97	803.99
22.00	DISCHG	795.60	787.45	778.34	768.08	758.59	751.71	746.52	740.61	733.09	725.82
24.00	DISCHG	720.76	715.91	706.82	691.84	672.53	650.97	628.64	606.37	584.57	563.45
26.00	DISCHG	543.10	523.58	504.89	487.02	469.95	453.64	438.06	423.17	408.95	395.37
28.00	DISCHG	385.55	378.21	371.07	364.12	357.35	350.77	344.35	338.11	332.04	326.12
30.00	DISCHG	320.36	314.76	309.30	303.95	298.81	293.78	288.88	284.10	279.46	274.93
32.00	DISCHG	270.53	266.24	262.06	258.00	254.04	250.18	246.43	242.77	239.22	235.75
34.00	DISCHG	232.38	229.09	225.89	222.77	219.74	216.78	213.90	211.10	208.37	205.71
36.00	DISCHG	203.12	200.59	198.13	195.74	193.41	191.13	188.92	186.76	184.66	182.62
38.00	DISCHG	180.62	178.68	176.79	174.94	173.14	171.39	169.68	168.02	166.40	164.82
40.00	DISCHG	163.28	161.78	160.31	158.89	157.50	156.14	155.92	155.84	155.76	155.67
42.00	DISCHG	155.59	155.50	155.42	155.33	155.25	155.16	155.08	155.00	154.98	154.96
44.00	DISCHG	154.94	154.93	154.91	154.89	154.87	154.85	154.84	154.82	154.80	154.78
46.00	DISCHG	154.76	154.75	154.73	154.71	154.69	154.67	154.65	154.64	154.62	154.60
48.00	DISCHG	154.58	154.56	154.54	154.52	154.51	154.49	154.47	154.45	154.43	154.41
50.00	DISCHG	154.39	154.38	154.36	154.34	154.32	154.30	154.28	154.26	154.24	154.22
52.00	DISCHG	154.21	154.19	154.17	154.15	154.13	154.11	154.09	154.07	154.05	154.03
54.00	DISCHG	154.01	154.00	153.98	153.97	153.95	153.94	153.92	153.91	153.89	153.88
56.00	DISCHG	153.86	153.85	153.83	153.82	153.81	153.79	153.78	153.76	153.75	153.73
58.00	DISCHG	153.72	153.70	153.69	153.67	153.66	153.64	153.63	153.61	153.60	153.58

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 3.8220 CFS-HRS= 26195.05 ACRE-FT= 2164.76

ENDCMP

PASS= 3

EXECUTIVE CONTROL CARD 127 OPERATION COMPUT, FROM XSECTN/STRUCT 101/ 0 TO XSECTN/STRUCT 0/ 2
STARTING TIME= .00 RAIN DEPTH= 15.90 RAIN DURATION= 1.00 RAIN TABLE NO.= 5 SOIL CONDITION= 2
ALTERNATE NO.= 5 STORM NO.= 5

SUBROUTINE RUNOFF CROSS SECTION 101
AREA= 1.86 INPUT RUNOFF CURVE= 80.0 TIME OF CONCENTRATION= 1.21

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.99	2468.850	(RUNOFF)
19.60	250.999	(RUNOFF)
21.35	231.050	(RUNOFF)
23.42	205.719	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 13.1271 CFS-HRS= 15757.61 ACRE-FT= 1302.21

SUBROUTINE RUNOFF CROSS SECTION 1
AREA= 1.20 INPUT RUNOFF CURVE= 79.0 TIME OF CONCENTRATION= .67

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.41	1643.640	(RUNOFF)
17.17	224.454	(RUNOFF)
17.98	205.690	(RUNOFF)
19.51	164.285	(RUNOFF)
21.13	156.519	(RUNOFF)
22.07	135.273	(RUNOFF)
23.19	145.771	(RUNOFF)
24.09	139.574	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 12.9799 CFS-HRS= 10052.18 ACRE-FT= 830.71

SUBROUTINE ADDHYD CROSS SECTION 1
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.84	4069.525	(NULL)
17.11	574.831	(NULL)
19.53	415.024	(NULL)
21.19	385.333	(NULL)
23.23	347.886	(NULL)
24.08	338.813	(NULL)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 13.0694 CFS-HRS= 25809.78 ACRE-FT= 2132.92

SUBROUTINE REACH CROSS SECTION 102
LENGTH= 2500.00 INPUT COEFFICIENT= .6500 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 3.157 AVERAGE ROUTING COEFF= .6500 NUMBER OF ROUTINGS= .71

SUBROUTINE RUNOFF CROSS SECTION 2
AREA= 1.24 INPUT RUNOFF CURVE= 75.0 TIME OF CONCENTRATION= .59

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.31	1634.492	(RUNOFF)
17.14	230.814	(RUNOFF)
17.99	211.588	(RUNOFF)
19.49	167.890	(RUNOFF)
21.09	160.979	(RUNOFF)
22.04	139.039	(RUNOFF)
23.15	150.637	(RUNOFF)
24.05	145.944	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 12.3793 CFS-HRS= 9906.65 ACRE-FT= 818.69

SUBROUTINE ADDHYD CROSS SECTION 2
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.94	5635.433	(NULL)
19.53	580.492	(NULL)
21.21	536.242	(NULL)
23.24	482.150	(NULL)
24.10	478.908	(NULL)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 12.8706 CFS-HRS= 35716.92 ACRE-FT= 2951.65

SUBROUTINE REACH CROSS SECTION 103
LENGTH= 2500.00 INPUT COEFFICIENT= .6500 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 3.157 AVERAGE ROUTING COEFF= .6500 NUMBER OF ROUTINGS= .71

SUBROUTINE RUNOFF CROSS SECTION 3
AREA= 1.85 INPUT RUNOFF CURVE= 80.0 TIME OF CONCENTRATION= .91

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.68	2510.235	(RUNOFF)
17.23	342.345	(RUNOFF)
19.58	250.777	(RUNOFF)
21.23	235.078	(RUNOFF)
23.31	211.875	(RUNOFF)
24.13	206.546	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 13.1268 CFS-HRS= 15672.59 ACRE-FT= 1295.18

SUBROUTINE ADDHYD CROSS SECTION 3
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.04	8079.303	(NULL)
19.56	829.235	(NULL)
21.33	764.015	(NULL)
23.39	685.506	(NULL)
24.16	673.026	(NULL)

TIME HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 6.15

.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.03	.59	3.49
4.00	DISCHG	10.83	24.85	48.27	82.61	129.90	192.63	271.28	364.82	471.41	587.85
6.00	DISCHG	712.79	851.94	1023.93	1241.24	1493.48	1773.61	2079.32	2424.15	2814.04	3243.08
8.00	DISCHG	3721.59	4234.21	4783.62	5366.96	5964.81	6573.66	7146.39	7586.93	7867.25	8019.76
10.00	DISCHG	8077.20	8054.35	7939.45	7737.26	7497.03	7252.53	7009.55	6743.12	6438.04	6105.06
12.00	DISCHG	5742.10	5366.05	4989.36	4621.25	4280.46	3971.94	3693.89	3432.90	3183.87	2957.11
14.00	DISCHG	2758.64	2586.25	2428.15	2276.96	2135.48	2003.93	1885.90	1782.39	1692.42	1609.96
16.00	DISCHG	1526.69	1441.51	1353.72	1266.87	1198.28	1164.20	1155.11	1143.33	1116.76	1088.73
18.00	DISCHG	1073.58	1060.87	1023.54	952.50	881.16	838.62	825.62	826.32	829.10	823.22
20.00	DISCHG	797.56	761.63	732.79	720.99	725.13	741.30	759.76	762.69	744.94	721.75
22.00	DISCHG	708.64	702.18	685.21	654.44	633.15	643.65	672.36	685.42	667.79	648.99
24.00	DISCHG	656.71	672.19	638.63	537.86	409.54	295.79	207.28	140.77	93.18	60.90
26.00	DISCHG	39.62	25.76	16.78	10.89	7.02	4.53	2.96	1.91	1.21	.73
28.00	DISCHG	.40	.18	.07	.02	.00					

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 12.9477 CFS-HRS= 51389.67 ACRE-FT= 4246.84

SUBROUTINE SAVMOV STRUCTURE 1
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 6

SUBROUTINE RESVOR STRUCTURE 1
SURFACE ELEVATION= 1794.10

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.88	7419.614	1803.89

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 6.15

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03
4.00	DISCHG	.12	.33	.78	1.56	2.84	4.78	7.55	11.35	16.32	22.59
6.00	DISCHG	33.49	50.13	69.86	91.50	93.23	95.32	97.71	100.47	103.30	105.88
8.00	DISCHG	108.86	112.28	363.53	824.45	1298.06	2005.53	3262.06	4324.49	5205.22	5913.99
10.00	DISCHG	6466.48	6880.44	7169.42	7342.57	7413.64	7403.58	7333.04	7214.82	7053.24	6850.91
12.00	DISCHG	6610.88	6337.34	6037.18	5718.32	5390.25	5063.06	4744.65	4438.90	4146.28	3867.82
14.00	DISCHG	3606.41	3364.66	3142.72	2938.19	2748.73	2572.97	2410.41	2261.25	2125.66	2002.84
16.00	DISCHG	1890.37	1785.21	1684.89	1626.54	1588.00	1548.21	1510.20	1474.89	1441.15	1408.05
18.00	DISCHG	1376.07	1345.86	1316.15	1284.05	1248.13	1210.15	1173.17	1139.20	1108.73	1081.09
20.00	DISCHG	1054.61	1027.71	1000.27	973.52	949.02	927.91	910.56	895.95	882.05	867.50
22.00	DISCHG	852.60	838.20	824.06	808.98	792.82	777.71	766.00	757.48	749.57	740.65
24.00	DISCHG	732.06	725.45	718.59	705.84	683.13	650.81	611.75	568.93	524.72	480.92
26.00	DISCHG	438.79	399.07	362.11	328.04	296.82	268.35	242.47	218.99	197.72	178.47
28.00	DISCHG	161.07	145.34	131.13	118.31	113.85	113.74	113.64	113.54	113.44	113.34
30.00	DISCHG	113.24	113.14	113.04	112.94	112.84	112.74	112.64	112.54	112.45	112.35
32.00	DISCHG	112.25	112.15	112.05	111.95	111.85	111.75	111.65	111.55	111.46	111.36
34.00	DISCHG	111.26	111.16	111.06	110.96	110.87	110.77	110.67	110.57	110.48	110.38
36.00	DISCHG	110.28	110.18	110.09	109.99	109.89	109.79	109.70	109.60	109.50	109.41
38.00	DISCHG	109.31	109.21	109.12	109.02	108.92	108.83	108.73	108.64	108.54	108.44
40.00	DISCHG	108.35	108.25	108.16	108.06	107.97	107.87	107.78	107.68	107.59	107.49
42.00	DISCHG	107.40	107.30	107.21	107.11	107.02	106.92	106.83	106.73	106.64	106.54
44.00	DISCHG	106.45	106.36	106.26	106.17	106.08	105.98	105.89	105.79	105.70	105.61
46.00	DISCHG	105.51	105.42	105.33	105.23	105.14	105.05	104.96	104.86	104.77	104.68
48.00	DISCHG	104.59	104.49	104.40	104.31	104.22	104.12	104.03	103.94	103.85	103.76
50.00	DISCHG	103.67	103.57	103.48	103.39	103.30	103.21	103.12	103.03	102.94	102.84
52.00	DISCHG	102.75	102.66	102.57	102.48	102.38	102.25	102.12	101.99	101.86	101.73

54.00	DISCHG	101.60	101.47	101.34	101.21	101.08	100.95	100.82	100.69	100.56	100.43
56.00	DISCHG	100.30	100.17	100.05	99.92	99.79	99.66	99.54	99.41	99.28	99.15
58.00	DISCHG	99.03	98.90	98.77	98.65	98.52	98.40	98.27	98.14	98.02	97.89

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 12.4463 CFS-HRS= 49399.50 ACRE-FT= 4082.37

SUBROUTINE DIVERT STRUCTURE 1
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 4,1

SUBROUTINE REACH CROSS SECTION 104
LENGTH= 6700.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 11.250 AVERAGE ROUTING COEFF= .8687 NUMBER OF ROUTINGS= .72

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
28.50	115.037	.51

TOTAL WATER, CANNOT BE COMPUTED WITH D.A.= 0.0 CFS-HRS= 5860.83 ACRE-FT= 484.34

SUBROUTINE RUNOFF CROSS SECTION 4
AREA= 2.54 INPUT RUNOFF CURVE= 80.0 TIME OF CONCENTRATION= .54

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.25	3567.668	(RUNOFF)
17.11	481.041	(RUNOFF)
17.97	441.002	(RUNOFF)
19.45	349.853	(RUNOFF)
21.07	337.863	(RUNOFF)
22.03	290.575	(RUNOFF)
23.12	317.117	(RUNOFF)
24.03	310.297	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 13.1260 CFS-HRS= 21516.65 ACRE-FT= 1778.14

SUBROUTINE ADDHYD CROSS SECTION 4
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.25	3682.671	(NULL)
17.11	596.041	(NULL)
17.97	556.002	(NULL)
19.45	464.053	(NULL)
21.07	452.863	(NULL)
22.03	405.575	(NULL)
23.12	432.117	(NULL)
24.03	425.297	(NULL)
28.50	115.037	(NULL)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 16.7013 CFS-HRS= 27377.46 ACRE-FT= 2262.47

SUBROUTINE DIVERT CROSS SECTION 104
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,2

SUBROUTINE ADDHYD CROSS SECTION 104
INPUT HYDROGRAPHS= 1,2 OUTPUT HYDROGRAPH= 4

SUBROUTINE REACH CROSS SECTION 106
LENGTH= 3700.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 18.962 AVERAGE ROUTING COEFF= .9177 NUMBER OF ROUTINGS= .25

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.90	3460.842	5.63
17.16	593.145	1.77
17.99	552.605	1.70
19.50	464.123	1.54
21.11	451.336	1.52
22.07	402.890	1.37
23.16	427.669	1.45
24.07	415.823	1.41
28.50	115.028	.39

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 16.6047 CFS-HRS= 27218.99 ACRE-FT= 2249.38

SUBROUTINE RUNOFF CROSS SECTION 5
AREA= 2.00 INPUT RUNOFF CURVE= 82.0 TIME OF CONCENTRATION= .43

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.14	2890.470	(RUNOFF)
17.05	386.545	(RUNOFF)
17.95	354.098	(RUNOFF)
19.38	278.612	(RUNOFF)
21.00	272.562	(RUNOFF)
21.99	233.398	(RUNOFF)
23.05	261.600	(RUNOFF)
23.98	258.692	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 13.4136 CFS-HRS= 17313.43 ACRE-FT= 1430.78

SUBROUTINE ADDHYD CROSS SECTION 5
INPUT HYDROGRAPHS= 3,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.19	6340.939	(NULL)
17.10	975.392	(NULL)
17.96	906.478	(NULL)
19.45	742.112	(NULL)
21.05	720.574	(NULL)
22.01	635.699	(NULL)
23.10	682.623	(NULL)
24.01	671.892	(NULL)
28.50	115.028	(NULL)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 15.1989 CFS-HRS= 44532.40 ACRE-FT= 3680.16

SUBROUTINE DIVERT CROSS SECTION 106
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,2

SUBROUTINE RUNOFF CROSS SECTION 6
AREA= 1.14 INPUT RUNOFF CURVE= 79.0 TIME OF CONCENTRATION= .42

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.15	1602.612	(RUNOFF)
17.04	219.249	(RUNOFF)
17.95	201.074	(RUNOFF)
19.38	157.770	(RUNOFF)
21.00	154.362	(RUNOFF)
21.99	132.351	(RUNOFF)
23.04	147.967	(RUNOFF)
23.98	147.300	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 12.9782 CFS-HRS= 9548.35 ACRE-FT= 789.08

SUBROUTINE ADDHYD CROSS SECTION 6
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.15	7899.830	(NULL)
17.08	1194.016	(NULL)
17.96	1107.514	(NULL)
19.43	899.696	(NULL)
21.04	874.542	(NULL)
22.01	767.937	(NULL)
23.09	829.741	(NULL)
24.01	818.682	(NULL)
28.50	115.028	(NULL)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 14.7516 CFS-HRS= 54074.81 ACRE-FT= 4468.74

SUBROUTINE SAVMOV CROSS SECTION 6
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 5

SUBROUTINE ADDHYD CROSS SECTION 106
INPUT HYDROGRAPHS= 4,2 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.88	7304.610	9.47

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 6.15

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8.00	DISCHG	.00	.00	248.53	709.45	1183.06	2008.04	3415.71	4397.35	5229.09	5879.36
10.00	DISCHG	6371.62	6765.44	7054.42	7227.57	7298.64	7288.58	7218.04	7099.82	6938.24	6735.91
12.00	DISCHG	6495.88	6222.34	5922.18	5603.32	5275.25	4948.06	4623.65	4323.90	4031.28	3752.92
14.00	DISCHG	3491.41	3249.66	3027.72	2823.19	2633.73	2457.97	2295.41	2146.25	2010.66	1887.84

16.00	DISCHG	1775.37	1670.21	1569.89	1511.54	1473.00	1433.21	1395.20	1359.89	1326.15	1293.05
18.00	DISCHG	1261.07	1230.86	1201.15	1169.05	1133.13	1095.15	1058.17	1024.20	993.73	966.09
20.00	DISCHG	939.61	912.71	885.27	858.52	834.02	812.91	795.56	780.95	767.05	752.50
22.00	DISCHG	737.60	723.20	709.06	693.98	677.82	662.71	651.00	642.48	634.57	625.65
24.00	DISCHG	617.06	610.45	603.59	590.84	568.13	535.81	496.75	453.93	409.72	365.92
26.00	DISCHG	323.79	284.07	247.11	213.04	181.82	153.35	127.47	103.99	82.72	63.47
28.00	DISCHG	46.07	30.34	16.13	3.31	.00					

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 11.0058 CFS-HRS= 43682.37 ACRE-FT= 3609.91

SUBROUTINE SAVMOV CROSS SECTION 106
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 1

SUBROUTINE RUNOFF CROSS SECTION 7
AREA= .96 INPUT RUNOFF CURVE= 75.0 TIME OF CONCENTRATION= .23

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.00	1320.594	(RUNOFF)
9.90	1222.027	(RUNOFF)
16.93	188.912	(RUNOFF)
17.91	173.853	(RUNOFF)
19.30	132.824	(RUNOFF)
20.91	133.824	(RUNOFF)
21.92	115.258	(RUNOFF)
22.93	133.573	(RUNOFF)
23.91	139.156	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 12.3692 CFS-HRS= 7663.38 ACRE-FT= 633.30

SUBROUTINE ADDHYD CROSS SECTION 7
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.09	9247.118	(NULL)
17.04	1377.163	(NULL)
17.94	1280.197	(NULL)
19.39	1031.332	(NULL)
21.00	1005.049	(NULL)
21.98	881.395	(NULL)
23.04	954.098	(NULL)
23.98	951.385	(NULL)
28.50	115.028	(NULL)

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 6.64

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.40	4.21	14.60	41.11
4.00	DISCHG	83.46	139.01	204.43	276.53	392.81	516.45	655.25	815.04	959.77	1122.62
6.00	DISCHG	1274.91	1557.20	1957.95	2300.12	2717.73	3064.40	3530.59	4100.40	4573.76	5279.06
8.00	DISCHG	5861.31	6543.97	7305.96	7887.20	8674.02	9190.85	9166.53	9071.18	9009.48	8876.03
10.00	DISCHG	8806.71	8493.79	8013.53	7711.61	7418.09	7229.05	6871.11	6403.39	6060.90	5509.22
12.00	DISCHG	5107.10	4704.08	4285.84	4023.90	3732.15	3532.06	3284.03	3001.29	2826.96	2662.02
14.00	DISCHG	2555.12	2411.58	2243.27	2131.60	1993.00	1896.54	1821.19	1753.73	1699.06	1585.08
16.00	DISCHG	1497.58	1393.70	1276.73	1231.55	1305.16	1375.13	1345.40	1258.91	1215.97	1243.87
18.00	DISCHG	1274.24	1161.19	966.53	871.49	924.09	987.66	1018.74	1031.32	1017.34	919.16

20.00	DISCHG	838.83	832.68	868.11	901.00	961.33	1005.05	962.06	869.17	823.23	850.46
22.00	DISCHG	880.86	832.11	737.95	710.50	837.52	950.21	907.16	777.52	726.73	844.24
24.00	DISCHG	949.33	776.66	444.79	250.88	167.12	134.80	122.35	117.48	115.74	115.12
26.00	DISCHG	115.00	115.00	115.00	115.00	115.00	115.00	115.00	115.00	115.00	115.00
28.00	DISCHG	115.00	115.00	115.00	115.00	114.77	114.09	113.77	113.65	113.55	113.45
30.00	DISCHG	113.35	113.25	113.15	113.05	112.95	112.85	112.75	112.65	112.55	112.45
32.00	DISCHG	112.35	112.25	112.15	112.05	111.95	111.86	111.76	111.66	111.56	111.46
34.00	DISCHG	111.36	111.26	111.17	111.07	110.97	110.87	110.77	110.68	110.58	110.48
36.00	DISCHG	110.38	110.29	110.19	110.09	109.99	109.90	109.80	109.70	109.61	109.51
38.00	DISCHG	109.41	109.32	109.22	109.12	109.03	108.93	108.83	108.74	108.64	108.55
40.00	DISCHG	108.45	108.35	108.26	108.16	108.07	107.97	107.88	107.78	107.69	107.59
42.00	DISCHG	107.50	107.40	107.31	107.21	107.12	107.02	106.93	106.83	106.74	106.64
44.00	DISCHG	106.55	106.46	106.36	106.27	106.17	106.08	105.99	105.89	105.80	105.71
46.00	DISCHG	105.61	105.52	105.43	105.33	105.24	105.15	105.05	104.96	104.87	104.78
48.00	DISCHG	104.68	104.59	104.50	104.41	104.31	104.22	104.13	104.04	103.95	103.85
50.00	DISCHG	103.76	103.67	103.58	103.49	103.40	103.30	103.21	103.12	103.03	102.94
52.00	DISCHG	102.85	102.76	102.67	102.58	102.48	102.38	102.25	102.12	101.99	101.86
54.00	DISCHG	101.73	101.60	101.47	101.34	101.21	101.08	100.95	100.82	100.70	100.57
56.00	DISCHG	100.44	100.31	100.18	100.05	99.93	99.80	99.67	99.54	99.42	99.29
58.00	DISCHG	99.16	99.03	98.91	98.78	98.65	98.53	98.40	98.28	98.15	98.03

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 14.4071 CFS-HRS= 61738.09 ACRE-FT= 5102.04

SUBROUTINE SAVMOV CROSS SECTION 7
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 2

SUBROUTINE RUNOFF CROSS SECTION 10
AREA= .67 INPUT RUNOFF CURVE= 78.0 TIME OF CONCENTRATION= .89

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.68	893.015	(RUNOFF)
17.23	123.202	(RUNOFF)
19.56	90.255	(RUNOFF)
21.22	84.961	(RUNOFF)
23.28	76.701	(RUNOFF)
24.13	74.225	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 12.8319 CFS-HRS= 5548.48 ACRE-FT= 458.53

SUBROUTINE DIVERT CROSS SECTION 110
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,3

SUBROUTINE REACH CROSS SECTION 109
LENGTH= 2700.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 2.939 AVERAGE ROUTING COEFF= .6336 NUMBER OF ROUTINGS= .81

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.32	820.053	1770.00
17.38	122.727	1765.89
19.77	89.570	1765.55
21.44	83.792	1765.46
23.51	74.942	1765.33

24.31	72.573	1765.29

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 12.6614 CFS-HRS= 5474.74 ACRE-FT= 452.43

SUBROUTINE RUNOFF CROSS SECTION 9
AREA= 1.39 INPUT RUNOFF CURVE= 82.0 TIME OF CONCENTRATION= .55

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.25	1986.913	(RUNOFF)
17.12	264.318	(RUNOFF)
17.98	242.609	(RUNOFF)
19.47	192.276	(RUNOFF)
21.07	185.166	(RUNOFF)
22.03	159.609	(RUNOFF)
23.13	175.012	(RUNOFF)
24.03	169.176	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 13.4148 CFS-HRS= 12033.91 ACRE-FT= 994.48

SUBROUTINE ADDHYD CROSS SECTION 109
INPUT HYDROGRAPHS= 4,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.39	2768.486	1777.52
17.10	386.746	1767.90
17.95	359.170	1767.74
19.51	281.635	1767.22
21.11	265.969	1767.11
21.99	236.365	1766.90
23.15	244.850	1766.96
24.03	238.904	1766.91

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 13.1697 CFS-HRS= 17508.64 ACRE-FT= 1446.91

SUBROUTINE DIVERT CROSS SECTION 109
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,4

SUBROUTINE REACH CROSS SECTION 108
LENGTH= 2100.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 7.832 AVERAGE ROUTING COEFF= .8216 NUMBER OF ROUTINGS= .31

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
10.10	2547.574	1761.03
17.15	385.202	1756.47
17.95	357.627	1756.35
19.53	280.518	1756.01
21.16	264.247	1755.94
22.00	235.092	1755.81
23.20	241.691	1755.84
24.09	233.400	1755.80

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 13.0021 CFS-HRS= 17285.77 ACRE-FT= 1428.50

SUBROUTINE RUNOFF CROSS SECTION 8
AREA= 1.92 INPUT RUNOFF CURVE= 84.0 TIME OF CONCENTRATION= .42

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.12	2825.522	(RUNOFF)
17.04	373.679	(RUNOFF)
17.95	342.582	(RUNOFF)
19.38	268.695	(RUNOFF)
21.00	262.789	(RUNOFF)
21.99	225.268	(RUNOFF)
23.04	251.796	(RUNOFF)
23.98	250.614	(RUNOFF)

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 13.6962 CFS-HRS= 16971.09 ACRE-FT= 1402.49

SUBROUTINE ADDHYD CROSS SECTION 108
INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.17	5364.581	1764.65
17.06	756.159	1757.70
17.95	700.209	1757.52
19.45	547.012	1757.04
21.05	523.018	1756.96
21.99	460.350	1756.77
23.09	486.204	1756.85
24.00	481.576	1756.83

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 3.98

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.02	1.36	7.34	18.25	33.78	61.77
4.00	DISCHG	95.48	131.22	170.57	212.86	283.51	360.05	441.09	537.53	623.19	717.14
6.00	DISCHG	807.00	950.70	1176.11	1365.70	1592.57	1803.12	2049.63	2380.10	2656.77	3037.86
8.00	DISCHG	3391.00	3752.96	4203.16	4554.58	4991.53	5315.81	5363.15	5279.12	5238.42	5171.59
10.00	DISCHG	5124.89	5023.88	4839.54	4695.75	4537.87	4408.34	4227.47	3954.71	3746.68	3449.68
12.00	DISCHG	3185.74	2953.06	2689.62	2505.77	2321.96	2174.66	2031.42	1853.12	1730.39	1622.03
14.00	DISCHG	1538.52	1454.65	1349.21	1274.39	1192.04	1123.75	1072.72	1024.50	987.05	925.52
16.00	DISCHG	868.97	813.16	742.78	703.26	722.31	754.13	747.32	704.13	677.89	684.47
18.00	DISCHG	698.63	658.17	555.76	493.29	501.05	526.46	539.73	546.70	544.53	502.35
20.00	DISCHG	457.70	444.56	456.94	469.91	496.98	522.10	512.87	468.76	440.89	447.08
22.00	DISCHG	460.30	443.53	395.01	372.03	421.02	479.68	477.40	415.82	383.32	427.45
24.00	DISCHG	481.57	428.76	261.80	148.16	86.27	51.20	29.80	17.08	9.81	5.57
26.00	DISCHG	3.18	1.83	1.05	.58	.30	.13	.05	.00		

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 13.3369 CFS-HRS= 34256.84 ACRE-FT= 2830.99

SUBROUTINE ADDHYD CROSS SECTION 109
INPUT HYDROGRAPHS= 3,4 OUTPUT HYDROGRAPH= 5

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.47	286.510	1767.25

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= .00

TIME

.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8.00	DISCHG	.00	.00	.00	.00	.00	86.81	236.22	282.98	275.36	242.35
10.00	DISCHG	199.73	134.45	24.77	.00						

TOTAL WATER, CANNOT BE COMPUTED WITH D.A.= 0.0 CFS-HRS= 298.06 ACRE-FT= 24.63

SUBROUTINE SAVMOV CROSS SECTION 109
INPUT HYDROGRAPH= 5 OUTPUT HYDROGRAPH= 3

SUBROUTINE DIVERT CROSS SECTION 108
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPHS= 5,4

SUBROUTINE REACH CROSS SECTION 107
LENGTH= 5300.00 INPUT COEFFICIENT= .0000 INPUT ROUTINGS= .00

AVERAGE WATER VELOCITY= 6.243 AVERAGE ROUTING COEFF= .7860 NUMBER OF ROUTINGS= .93

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.59	5249.696	1762.11
17.28	749.753	1754.14
18.14	695.635	1753.95
19.65	544.951	1753.31
21.26	517.242	1753.20
22.18	457.019	1752.93
23.32	476.064	1753.02
24.20	467.127	1752.98

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 3.98

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.09	1.47	6.82	16.91	32.10
4.00	DISCHG	57.89	90.16	125.44	164.15	207.41	272.99	347.63	428.32	521.02	608.55
6.00	DISCHG	701.00	794.53	933.14	1139.32	1334.37	1554.01	1768.47	2013.59	2324.05	2613.53
8.00	DISCHG	2974.90	3330.18	3696.01	4123.75	4495.27	4908.98	5185.12	5239.61	5249.50	5236.67
10.00	DISCHG	5181.68	5130.15	5034.01	4869.46	4720.74	4566.34	4428.88	4251.17	4000.97	3779.39
12.00	DISCHG	3499.22	3233.91	2992.98	2738.67	2540.92	2356.50	2202.12	2054.62	1885.66	1754.66
14.00	DISCHG	1643.29	1554.26	1468.11	1368.27	1288.07	1206.97	1137.17	1082.60	1033.76	992.65
16.00	DISCHG	935.44	878.80	821.98	756.08	714.80	722.70	747.53	744.82	710.61	684.74
18.00	DISCHG	685.35	693.63	659.14	572.48	509.37	504.19	522.84	536.81	544.62	542.07
20.00	DISCHG	507.56	466.76	449.67	456.27	468.81	492.90	515.79	510.86	475.43	448.07
22.00	DISCHG	448.05	456.89	443.31	403.19	381.06	416.59	467.10	471.75	424.95	394.13
24.00	DISCHG	424.06	467.12	426.51	287.62	172.04	101.13	59.79	34.97	20.18	11.61
26.00	DISCHG	6.62	3.78	2.17	1.24	.69	.37	.17	.07	.00	

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 13.3231 CFS-HRS= 34221.32 ACRE-FT= 2828.05

SUBROUTINE SAVMOV CROSS SECTION 107
INPUT HYDROGRAPH= 2 OUTPUT HYDROGRAPH= 5

SUBROUTINE ADDHYD CROSS SECTION 107

24-Hour F8H @ SIGNK BUTTE FCS

INPUT HYDROGRAPHS= 5,6 OUTPUT HYDROGRAPH= 7

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
9.27	14371.046	1772.96
17.09	2105.872	1757.60
17.95	1964.604	1757.32
19.46	1569.715	1756.46
21.05	1501.185	1756.30
21.99	1329.074	1755.89
23.11	1387.293	1756.04
24.00	1373.400	1756.01
28.50	115.028	1750.83

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 10.62

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.09	1.86	11.03	31.51	73.21
4.00	DISCHG	141.36	229.17	329.87	440.68	600.22	789.45	1002.89	1243.36	1480.79	1731.18
6.00	DISCHG	1975.91	2351.73	2891.09	3439.44	4052.10	4618.41	5299.06	6113.99	6897.81	7892.59
8.00	DISCHG	8836.20	9874.15	11001.97	12010.96	13169.29	14099.83	14351.65	14310.78	14258.98	14112.70
10.00	DISCHG	13988.39	13623.95	13047.53	12581.06	12138.84	11795.39	11299.99	10654.56	10061.87	9288.61
12.00	DISCHG	8606.31	7937.99	7278.82	6762.57	6273.06	5888.56	5486.15	5055.91	4712.62	4416.67
14.00	DISCHG	4198.41	3965.84	3711.38	3499.87	3281.07	3103.51	2958.36	2836.33	2732.83	2577.73
16.00	DISCHG	2433.02	2272.50	2098.71	1987.63	2019.96	2097.83	2092.93	2003.73	1926.58	1928.60
18.00	DISCHG	1959.59	1854.82	1625.67	1443.97	1433.45	1491.85	1541.58	1568.13	1561.96	1461.23
20.00	DISCHG	1346.39	1299.44	1317.78	1357.26	1430.13	1497.95	1477.86	1380.03	1298.66	1298.52
22.00	DISCHG	1328.91	1289.01	1181.26	1113.68	1218.58	1366.79	1374.26	1249.27	1151.67	1238.37
24.00	DISCHG	1373.39	1243.78	871.29	538.50	339.16	235.93	182.14	152.44	135.92	126.72
26.00	DISCHG	121.62	118.78	117.17	116.24	115.69	115.37	115.17	115.07	115.00	115.00
28.00	DISCHG	115.00	115.00	115.00	115.00	114.77	114.09	113.77	113.65	113.55	113.45
30.00	DISCHG	113.35	113.25	113.15	113.05	112.95	112.85	112.75	112.65	112.55	112.45
32.00	DISCHG	112.35	112.25	112.15	112.05	111.95	111.86	111.76	111.66	111.56	111.46
34.00	DISCHG	111.36	111.26	111.17	111.07	110.97	110.87	110.77	110.68	110.58	110.48
36.00	DISCHG	110.38	110.29	110.19	110.09	109.99	109.90	109.80	109.70	109.61	109.51
38.00	DISCHG	109.41	109.32	109.22	109.12	109.03	108.93	108.83	108.74	108.64	108.55
40.00	DISCHG	108.45	108.35	108.26	108.16	108.07	107.97	107.88	107.78	107.69	107.59
42.00	DISCHG	107.50	107.40	107.31	107.21	107.12	107.02	106.93	106.83	106.74	106.64
44.00	DISCHG	106.55	106.46	106.36	106.27	106.17	106.08	105.99	105.89	105.80	105.71
46.00	DISCHG	105.61	105.52	105.43	105.33	105.24	105.15	105.05	104.96	104.87	104.78
48.00	DISCHG	104.68	104.59	104.50	104.41	104.31	104.22	104.13	104.04	103.95	103.85
50.00	DISCHG	103.76	103.67	103.58	103.49	103.40	103.30	103.21	103.12	103.03	102.94
52.00	DISCHG	102.85	102.76	102.67	102.58	102.48	102.38	102.25	102.12	101.99	101.86
54.00	DISCHG	101.73	101.60	101.47	101.34	101.21	101.08	100.95	100.82	100.70	100.57
56.00	DISCHG	100.44	100.31	100.18	100.05	99.93	99.80	99.67	99.54	99.42	99.29
58.00	DISCHG	99.16	99.03	98.91	98.78	98.65	98.53	98.40	98.28	98.15	98.03

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 14.0009 CFS-HRS= 95959.41 ACRE-FT= 7930.09

SUBROUTINE SAVMOV STRUCTURE ?
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 6

SUBROUTINE RESVOP STRUCTURE ?
SURFACE ELEVATION= 1701.40

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
11.54	10237.179	1722.51

HYDROGRAPH, TZERO= .00 DELTA T= .20 DRAINAGE AREA= 10.62

TIME											
.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	DISCHG	.00	.00	.00	.00	.00	.00	.01	.09	.34	.95
4.00	DISCHG	2.20	4.36	7.60	12.05	18.04	26.02	36.27	49.07	64.55	82.71
6.00	DISCHG	103.57	122.18	124.06	126.34	129.06	132.21	135.83	139.56	142.99	147.19
8.00	DISCHG	152.01	154.66	393.95	966.12	1886.47	3066.61	4204.98	5237.99	6160.89	7004.89
10.00	DISCHG	7771.65	8428.37	8962.43	9381.62	9705.73	9951.82	10125.49	10218.18	10233.42	10172.68
12.00	DISCHG	10039.35	9847.04	9603.42	9322.36	9017.14	8697.59	8369.99	8032.74	7690.10	7349.96
14.00	DISCHG	7018.86	6699.26	6401.22	6116.04	5837.99	5568.10	5309.28	5063.23	4830.78	4608.85
16.00	DISCHG	4394.27	4186.01	3981.94	3784.16	3602.54	3445.07	3307.38	3178.94	3055.12	2940.10
18.00	DISCHG	2838.49	2743.49	2641.15	2528.29	2417.14	2319.77	2237.84	2168.17	2106.64	2045.94
20.00	DISCHG	1980.44	1921.56	1873.03	1830.63	1796.04	1769.75	1747.43	1722.22	1691.90	1660.76
22.00	DISCHG	1633.28	1607.60	1578.11	1544.02	1514.10	1496.57	1486.59	1472.75	1451.19	1430.91
24.00	DISCHG	1421.01	1412.10	1384.03	1330.26	1259.68	1182.71	1105.62	1031.32	961.08	895.38
26.00	DISCHG	834.32	795.48	764.34	734.56	706.12	678.97	653.05	628.32	604.72	582.21
28.00	DISCHG	560.73	540.24	520.69	502.03	484.23	467.23	450.99	435.48	420.69	406.56
30.00	DISCHG	393.08	384.26	376.95	369.84	362.91	356.17	349.61	343.22	337.00	330.95
32.00	DISCHG	325.05	319.32	313.73	308.30	303.00	297.85	292.83	287.95	283.19	278.56
34.00	DISCHG	274.06	269.67	265.40	261.24	257.18	253.24	249.40	245.66	242.02	238.47
36.00	DISCHG	235.02	231.66	228.38	225.20	222.09	219.07	216.12	213.25	210.46	207.74
38.00	DISCHG	205.09	202.51	199.99	197.54	195.16	192.83	190.57	188.37	186.22	184.12
40.00	DISCHG	182.08	180.10	178.16	176.28	174.44	172.65	170.90	169.20	167.54	165.93
42.00	DISCHG	164.35	162.82	161.32	159.86	158.44	157.06	155.98	155.90	155.81	155.73
44.00	DISCHG	155.64	155.56	155.47	155.39	155.30	155.22	155.13	155.05	154.99	154.97
46.00	DISCHG	154.96	154.94	154.92	154.90	154.88	154.87	154.85	154.83	154.81	154.79
48.00	DISCHG	154.77	154.76	154.74	154.72	154.70	154.68	154.66	154.65	154.63	154.61
50.00	DISCHG	154.59	154.57	154.55	154.53	154.52	154.50	154.48	154.46	154.44	154.42
52.00	DISCHG	154.40	154.38	154.37	154.35	154.33	154.31	154.29	154.27	154.25	154.23
54.00	DISCHG	154.21	154.19	154.18	154.16	154.14	154.12	154.10	154.08	154.06	154.04
56.00	DISCHG	154.02	154.00	153.99	153.97	153.96	153.94	153.93	153.91	153.90	153.88
58.00	DISCHG	153.87	153.85	153.84	153.82	153.81	153.80	153.78	153.77	153.75	153.74

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 12.1690 CFS-HRS= 83404.47 ACRE-FT= 6892.55

ENDCMP

SUMMARY TABLE 1

ALT	STORM	ID	DA SQ-MI.	RAIN TBLE	AMC	DELTA-T HRS.	TZERO HRS.	PRECIP IN.	PRECIP DURATION	PEAK-Q CFS	PEAK-TIME	PEAK-ELEV	RUNOFF IN.	CSM
5	1	101	1.86	2	2	.20	.00	3.94	24.00	996.75	12.61	.00	1.99	535.89
5	1	1	1.20	2	2	.20	.00	3.94	24.00	901.00	12.25	.00	1.91	750.83
5	1	1	3.06	2	2	.20	.00	3.94	24.00	1735.75	12.40	.00	1.96	567.24
5	1	2	1.24	2	2	.20	.00	3.94	24.00	825.90	12.22	.00	1.62	666.05
5	1	2	4.30	2	2	.20	.00	3.94	24.00	2180.79	12.47	.00	1.86	507.16
5	1	3	1.85	2	2	.20	.00	3.94	24.00	1200.94	12.41	.00	1.99	649.16
5	1	3	6.15	2	2	.20	.00	3.94	24.00	3115.79	12.59	.00	1.90	506.63
5	1	-1	6.15	2	2	.20	.00	3.94	24.00	229.97	18.48	1799.59	1.47	37.39
5	1	104	.00	2	2	.20	.00	3.94	24.00	115.04	25.30	.51	.00	.00
5	1	4	2.54	2	2	.20	.00	3.94	24.00	2223.46	12.18	.00	1.99	875.38
5	1	4	2.54	2	2	.20	.00	3.94	24.00	2254.45	12.19	.00	5.11	887.58
5	1	106	2.54	2	2	.20	.00	3.94	24.00	2149.41	12.24	4.09	5.11	846.22
5	1	5	2.00	2	2	.20	.00	3.94	24.00	2052.39	12.10	.00	2.16	1026.19
5	1	5	4.54	2	2	.20	.00	3.94	24.00	4107.81	12.17	.00	3.81	904.80
5	1	6	1.14	2	2	.20	.00	3.94	24.00	1039.29	12.11	.00	1.92	911.66
5	1	6	5.68	2	2	.20	.00	3.94	24.00	5129.79	12.16	.00	3.43	903.13
5	1	106	6.15	2	2	.20	.00	3.94	24.00	114.97	18.48	.39	.18	18.69
5	1	7	.96	2	2	.20	.00	3.94	24.00	910.17	11.99	.00	1.61	948.09
5	1	7	6.64	2	2	.20	.00	3.94	24.00	5744.61	12.12	.00	3.17	865.15
5	1	10	.67	2	2	.20	.00	3.94	24.00	402.49	12.41	.00	1.84	600.73
5	1	109	.67	2	2	.20	.00	3.94	24.00	365.06	12.69	1767.77	1.84	544.87
5	1	9	1.39	2	2	.20	.00	3.94	24.00	1307.43	12.18	.00	2.15	940.60
5	1	109	2.06	2	2	.20	.00	3.94	24.00	1484.53	12.22	1772.57	2.05	720.65
5	1	108	2.06	2	2	.20	.00	3.94	24.00	1408.33	12.29	1759.17	2.05	683.65
5	1	8	1.92	2	2	.20	.00	3.94	24.00	2152.81	12.09	.00	2.32	1121.26
5	1	108	3.98	2	2	.20	.00	3.94	24.00	3387.93	12.16	1762.11	2.18	851.24
5	1	109	.00	2	2	.20	.00	3.94	24.00	.00	.00	.00	.00	.00
5	1	107	3.98	2	2	.20	.00	3.94	24.00	3170.66	12.41	1759.42	2.17	796.65
5	1	107	10.62	2	2	.20	.00	3.94	24.00	8164.11	12.21	1765.58	2.79	768.75
5	1	-2	10.62	2	2	.20	.00	3.94	24.00	157.95	24.82	1712.61	1.08	14.87 — crest En. Spwy.
5	4	101	1.86	5	2	.20	.00	7.06	24.00	905.93	10.27	.00	4.74	487.06
5	4	1	1.20	5	2	.20	.00	7.06	24.00	589.74	9.90	.00	4.63	491.45
5	4	1	3.06	5	2	.20	.00	7.06	24.00	1490.07	10.13	.00	4.70	486.95
5	4	2	1.24	5	2	.20	.00	7.06	24.00	554.26	9.98	.00	4.19	446.98
5	4	2	4.30	5	2	.20	.00	7.06	24.00	2028.76	10.20	.00	4.55	471.80
5	4	3	1.85	5	2	.20	.00	7.06	24.00	919.90	10.04	.00	4.74	497.25
5	4	3	6.15	5	2	.20	.00	7.06	24.00	2923.00	10.31	.00	4.61	475.29
5	4	-1	6.15	5	2	.20	.00	7.06	24.00	1794.12	12.69	1801.77	4.15	291.73
5	4	104	.00	5	2	.20	.00	7.06	24.00	115.04	26.70	.51	.00	.00
5	4	4	2.54	5	2	.20	.00	7.06	24.00	1281.82	9.64	.00	4.74	504.65
5	4	4	2.54	5	2	.20	.00	7.06	24.00	1386.02	9.71	.00	8.17	545.68
5	4	106	2.54	5	2	.20	.00	7.06	24.00	1385.61	9.81	3.07	8.17	545.52
5	4	5	2.00	5	2	.20	.00	7.06	24.00	1070.72	9.24	.00	4.96	535.36
5	4	5	4.54	5	2	.20	.00	7.06	24.00	2442.24	9.61	.00	6.76	537.94
5	4	6	1.14	5	2	.20	.00	7.06	24.00	564.99	9.27	.00	4.63	495.61
5	4	6	5.68	5	2	.20	.00	7.06	24.00	3006.65	9.61	.00	6.33	529.34
5	4	106	6.15	5	2	.20	.00	7.06	24.00	1679.12	12.69	3.50	2.73	273.03
5	4	7	.96	5	2	.20	.00	7.06	24.00	436.83	9.93	.00	4.19	455.03
5	4	7	6.64	5	2	.20	.00	7.06	24.00	3439.74	9.61	.00	6.02	518.03
5	4	10	.67	5	2	.20	.00	7.06	24.00	318.26	10.11	.00	4.52	475.01
5	4	109	.67	5	2	.20	.00	7.06	24.00	316.12	10.39	1767.46	4.52	471.83
5	4	9	1.39	5	2	.20	.00	7.06	24.00	734.72	9.51	.00	4.96	528.58
5	4	109	2.06	5	2	.20	.00	7.06	24.00	1034.76	9.96	1770.83	4.82	502.31

of Diversion Hyd

5	4	108	2.06	5	2	.20	.00	7.06	24.00	1033.06	10.03	1758.37	4.82	501.48
5	4	8	1.92	5	2	.20	.00	7.06	24.00	1079.21	9.21	.00	5.19	562.09
5	4	108	3.98	5	2	.20	.00	7.06	24.00	2070.17	9.71	1760.33	5.00	520.14
5	4	109	.00	5	2	.20	.00	7.06	24.00	.00	.00	.00	.00	.00
5	4	107	3.98	5	2	.20	.00	7.06	24.00	2069.74	10.11	1757.53	5.00	520.04
5	4	107	10.62	5	2	.20	.00	7.06	24.00	5492.68	9.92	1762.40	5.64	517.20
5	4	-2	10.62	5	2	.20	.00	7.06	24.00	2184.16	13.42	1716.20	3.82	205.66
5	5	101	1.86	5	2	.20	.00	15.80	24.00	2468.85	9.99	.00	13.13	1327.34
5	5	1	1.20	5	2	.20	.00	15.80	24.00	1643.64	9.41	.00	12.98	1369.70
5	5	1	3.06	5	2	.20	.00	15.80	24.00	4069.52	9.84	.00	13.07	1329.91
5	5	2	1.24	5	2	.20	.00	15.80	24.00	1634.49	9.31	.00	12.38	1318.14
5	5	2	4.30	5	2	.20	.00	15.80	24.00	5635.43	9.94	.00	12.87	1310.57
5	5	3	1.85	5	2	.20	.00	15.80	24.00	2510.23	9.68	.00	13.13	1356.88
5	5	3	6.15	5	2	.20	.00	15.80	24.00	8079.30	10.04	.00	12.95	1313.71
5	5	-1	6.15	5	2	.20	.00	15.80	24.00	7419.61	10.88	1803.89	12.45	1206.44
5	5	104	.00	5	2	.20	.00	15.80	24.00	115.04	28.50	.51	.00	.00
5	5	4	2.54	5	2	.20	.00	15.80	24.00	3567.67	9.25	.00	13.13	1404.59
5	5	4	2.54	5	2	.20	.00	15.80	24.00	3682.67	9.25	.00	16.70	1449.87
5	5	106	2.54	5	2	.20	.00	15.80	24.00	3460.84	9.90	5.63	16.60	1362.54
5	5	5	2.00	5	2	.20	.00	15.80	24.00	2890.47	9.14	.00	13.41	1445.23
5	5	5	4.54	5	2	.20	.00	15.80	24.00	6340.94	9.19	.00	15.20	1396.68
5	5	6	1.14	5	2	.20	.00	15.80	24.00	1602.61	9.15	.00	12.98	1405.80
5	5	6	5.68	5	2	.20	.00	15.80	24.00	7899.83	9.15	.00	14.75	1390.82
5	5	106	6.15	5	2	.20	.00	15.80	24.00	7304.61	10.88	9.47	11.01	1187.74
5	5	7	.96	5	2	.20	.00	15.80	24.00	1320.59	9.00	.00	12.37	1375.62
5	5	7	6.64	5	2	.20	.00	15.80	24.00	9247.12	9.09	.00	14.41	1392.64
5	5	10	.67	5	2	.20	.00	15.80	24.00	893.01	9.68	.00	12.83	1332.86
5	5	109	.67	5	2	.20	.00	15.80	24.00	820.05	10.32	1770.00	12.66	1223.96
5	5	9	1.39	5	2	.20	.00	15.80	24.00	1986.81	9.25	.00	13.41	1429.36
5	5	109	2.06	5	2	.20	.00	15.80	24.00	2768.49	9.39	1777.52	13.17	1343.93
5	5	108	2.06	5	2	.20	.00	15.80	24.00	2547.57	10.10	1761.03	13.00	1236.69
5	5	8	1.92	5	2	.20	.00	15.80	24.00	2825.52	9.12	.00	13.70	1471.63
5	5	108	3.98	5	2	.20	.00	15.80	24.00	5364.58	9.17	1764.65	13.34	1347.88
5	5	109	.00	5	2	.20	.00	15.80	24.00	286.51	9.47	1767.25	.00	.00
5	5	107	3.98	5	2	.20	.00	15.80	24.00	5249.70	9.59	1762.11	13.32	1319.02
5	5	107	10.62	5	2	.20	.00	15.80	24.00	14371.05	9.27	1772.96	14.00	1353.21
5	5	-2	10.62	5	2	.20	.00	15.80	24.00	10237.18	11.54	1722.51	12.17	963.95 — top dam. (gf)

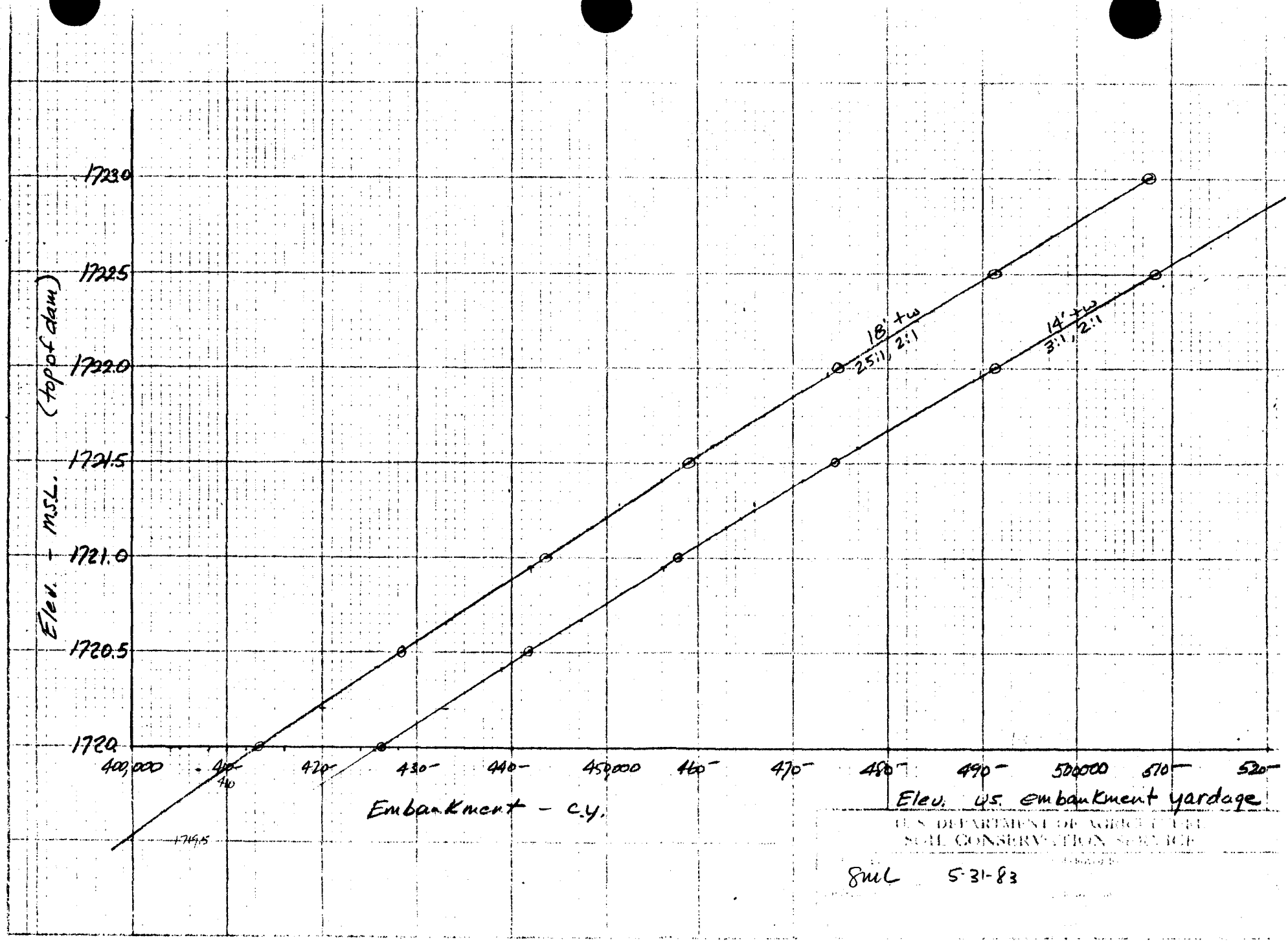
— 157 AK

10080.00 cfs. use 10,000 cfs. ← discharge to chan. from emergency spillway.

SUMMARY TABLE 3

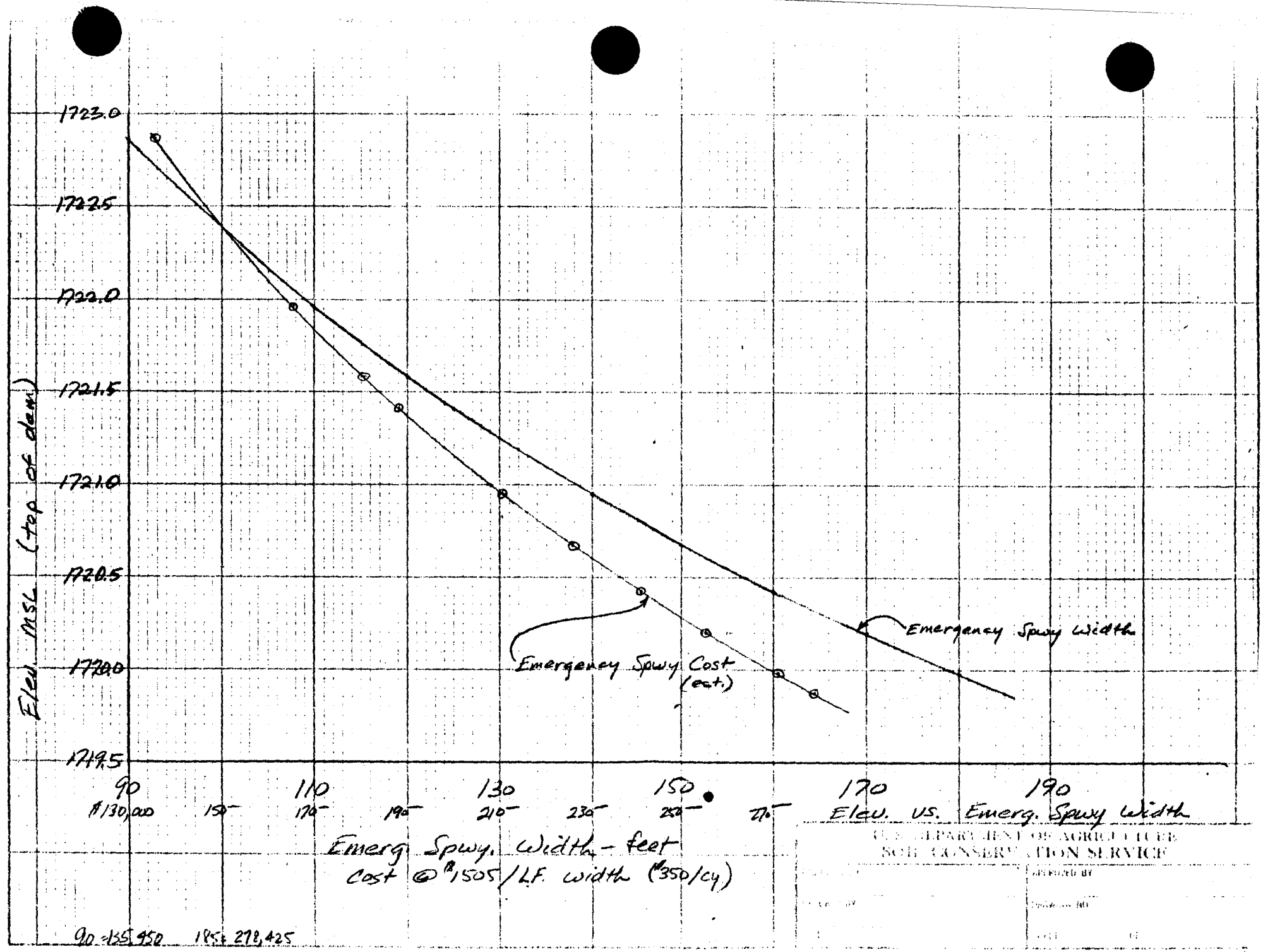
100 yr (24 hr) ESTB (24 hr) FEB (24 hr)

	DISCHARGE, CFS									
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
XSEC/STRUC NO. -2 ALTERNATE 5	157.95	2184.16	10237.18	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO. -1 ALTERNATE 5	229.97	1794.12	7419.61	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO. 1 ALTERNATE 5	1735.75	1490.07	4069.52	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO. 2 ALTERNATE 5	2180.79	2028.76	5635.43	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO. 3 ALTERNATE 5	3115.79	2923.00	8079.30	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO. 4 ALTERNATE 5	2254.45	1386.02	3682.67	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO. 5 ALTERNATE 5	4107.81	2442.24	6340.94	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO. 6 ALTERNATE 5	5129.79	3006.65	7899.83	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO. 7 ALTERNATE 5	5744.61	3439.74	9247.12	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO. 8 ALTERNATE 5	2152.81	1079.21	2825.52	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO. 9 ALTERNATE 5	1307.45	734.72	1986.81	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO. 10 ALTERNATE 5	402.49	318.26	893.01	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO.101 ALTERNATE 5	996.75	905.93	2468.85	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO.104 ALTERNATE 5	115.04	115.04	115.04	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO.106 ALTERNATE 5	114.97	1679.12	7304.61	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO.107 ALTERNATE 5	8164.11	5492.68	14371.05	.00	.00	.00	.00	.00	.00	.00
XSEC/STRUC NO.108 ALTERNATE 5	3387.93	2070.17	5364.58	.00	.00	.00	.00	.00	.00	.00

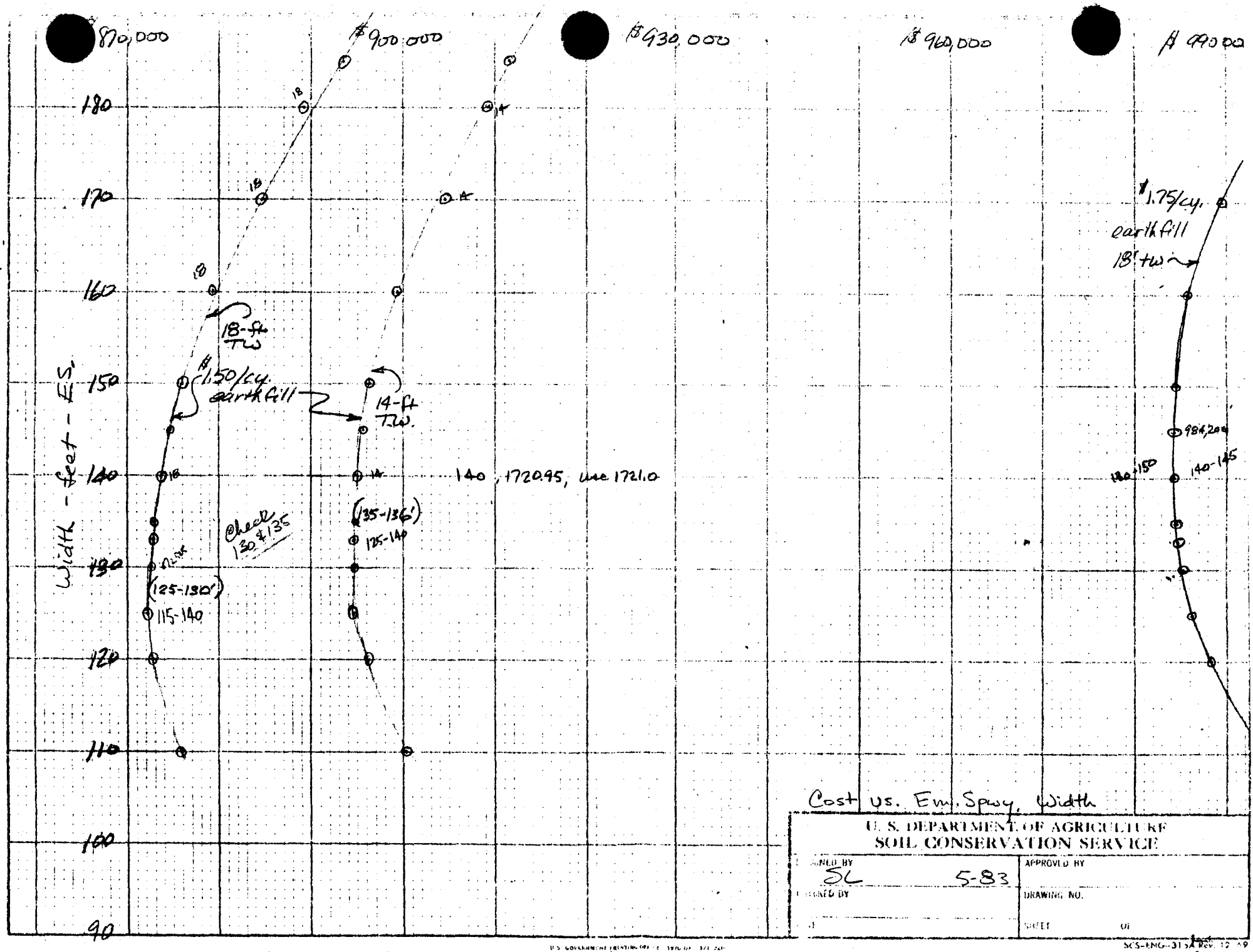


U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SML 5-31-83



U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE



Cost vs. Emb. Spwy. Width

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DRAWN BY SL 5-83	APPROVED BY
CHECKED BY	DRAWING NO.
	SHEET OF

SCS-ENG-31 SA Rev. 12-69

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
3335 West Durango Street
PHOENIX, ARIZONA 85009

(602) 262-1501

LETTER OF TRANSMITTAL

1/12/83

DATE JAN 11 1983	JOB NO.
ATTENTION	
RE:	

152

TO Susanne Lecband, Civil Engineer
Engineering Design Section
Soil Conservation Service
230 North First Ave.
Phoenix, Arizona 85025

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☒ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
X	1/10/83	2	Plan of Arizona Water Co. Distribution System at Meridian Road

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☒ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS The cover over the water pipes at this section is about 2 ft. to 3 ft. deep. If you need additional information, please call this office at 262-1501.

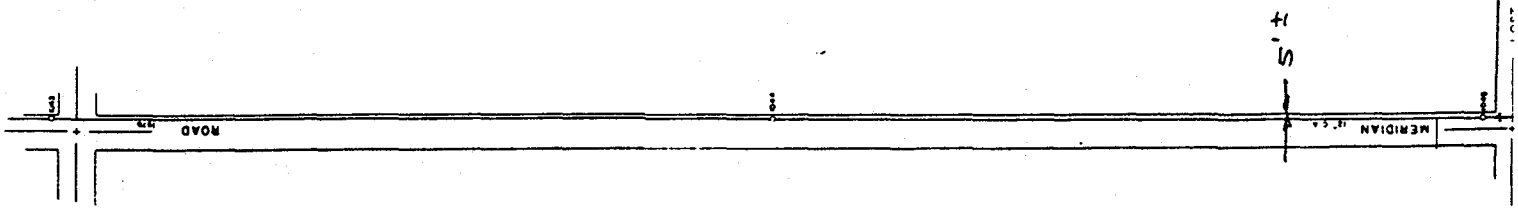
Please furnish us with plans for Signal Butte FRS so we can start working with the water company on the relocation work.

COPY TO _____

SIGNED: Corazon G. Fernandez
CORAZON G. FERNANDEZ

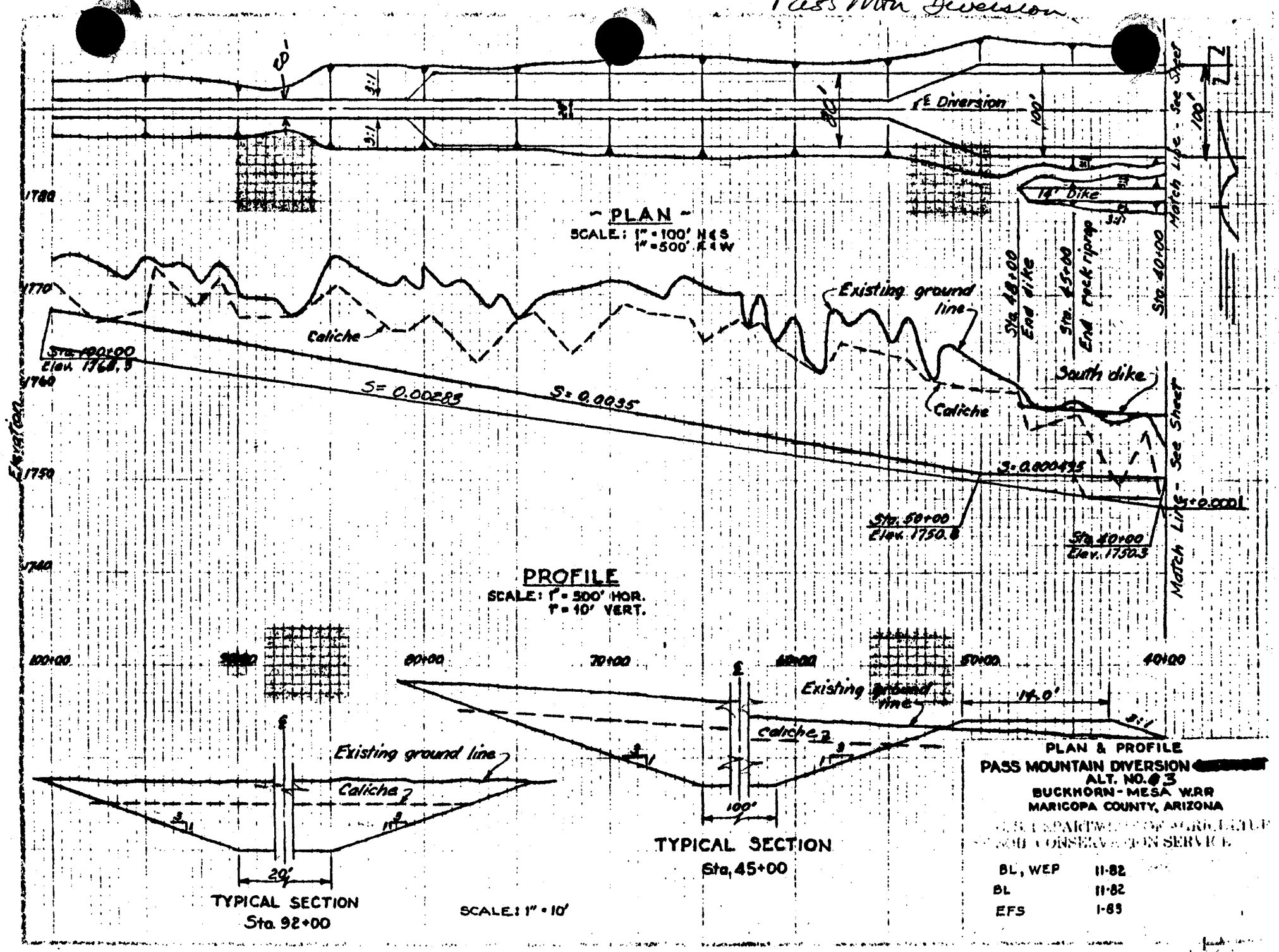
PRODUCT 240-3 NEBS Inc., Groton, Mass. 01471.

If enclosures are not as noted, kindly notify us at once.


MERIDIAN
ROAD

SEDIMENT

Pass Mtn Diversion



COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: AZ | PROJECT: BUCKHORN-MESA
BY: | DATE: 2-16-83 | CHECKED BY: | DATE: | JOB NO.: PASS MT.
SUBJECT: Alt #3 W.S.P. Diversion | SHEET 1 OF 7

* * PWSP *

SUB
STA.=33+59.82
Q=3,623.00 CFS
BW=100.00 FT
Z=3.00:1
N=0.030
Scb=0.0000000 F/F
a=1.150
k=0.000
CB-EL.=1,753.00 FT
WS-EL.=1,756.48 FT
EGL-EL.=1,758.07 FT
D=3.478 FT
V=9.433 F/S
DC=3.478 FT
VC=9.433 F/S
FR=1.000

SUB
STA.=33+60.82
CB-EL.=1,753.00 FT
WS-EL.=1,756.62 FT
EGL-EL.=1,758.07 FT
EGL-S=0.0073723 F/F
D=3.616 FT
V=9.039 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.941

SUB
STA.=33+61.82
CB-EL.=1,753.00 FT
WS-EL.=1,756.67 FT
EGL-EL.=1,758.08 FT
EGL-S=0.0067270 F/F
D=3.666 FT
V=8.904 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.921

SUB
STA.=33+62.82
CB-EL.=1,753.00 FT
WS-EL.=1,756.70 FT
EGL-EL.=1,758.09 FT
EGL-S=0.0064526 F/F
D=3.705 FT
V=8.801 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.906

SUB
STA.=33+63.82
CB-EL.=1,753.00 FT
WS-EL.=1,756.74 FT
EGL-EL.=1,758.09 FT
EGL-S=0.0062401 F/F
D=3.738 FT
V=8.714 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.894

SUB
STA.=33+64.82
CB-EL.=1,753.00 FT
WS-EL.=1,756.77 FT
EGL-EL.=1,758.10 FT
EGL-S=0.0060678 F/F
D=3.766 FT
V=8.644 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.883

SUB
STA.=33+65.82
CB-EL.=1,753.00 FT
WS-EL.=1,756.79 FT
EGL-EL.=1,758.11 FT
EGL-S=0.0059269 F/F
D=3.790 FT
V=8.583 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.875

SUB
STA.=33+66.82
CB-EL.=1,753.00 FT
WS-EL.=1,756.81 FT
EGL-EL.=1,758.11 FT
EGL-S=0.0058052 F/F
D=3.812 FT
V=8.529 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.867

SUB
STA.=33+67.82
CB-EL.=1,753.00 FT
WS-EL.=1,756.82 FT
EGL-EL.=1,758.12 FT
EGL-S=0.0056973 F/F
D=3.832 FT
V=8.480 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.860

SUB
STA.=33+68.82
CB-EL.=1,753.00 FT
WS-EL.=1,756.85 FT
EGL-EL.=1,758.12 FT
EGL-S=0.0055998 F/F
D=3.851 FT
V=8.434 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.853

SUB
STA.=33+69.82
CB-EL.=1,753.00 FT
WS-EL.=1,756.87 FT
EGL-EL.=1,758.13 FT
EGL-S=0.0055105 F/F
D=3.869 FT
V=8.392 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.847

SUB
STA.=33+70.00
Q=3,623.00 CFS
BW=100.00 FT
Z=3.00:1
N=0.030
Scb=-0.5000000 F/F
a=1.150
k=0.500
CB-EL.=1,752.91 FT
WS-EL.=1,757.40 FT
EGL-EL.=1,758.30 FT
EGL-S=0.0042715 F/F
D=4.493 FT
V=7.106 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.676

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-68

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: AZ | PROJECT: BUCKHORN-MESA
DATE: 2-16-83 | CHECKED BY: | DATE: | JOB NO.: PASSMT.
SUBJECT: ALT. #3 W.S.P. Diversion | SHEET 2 OF 7

SUB
STA.=33+70.25
CB-EL.=1,752.79 FT
WS-EL.=1,757.60 FT
EGL-EL.=1,758.37 FT
EGL-S=0.0029311 F/F
D=4.811 FT
V=6.581 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.602

SUB
STA.=33+70.50
CB-EL.=1,752.66 FT
WS-EL.=1,757.72 FT
EGL-EL.=1,758.41 FT
EGL-S=0.0023796 F/F
D=5.062 FT
V=6.213 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.555

SUB
STA.=33+70.75
CB-EL.=1,752.54 FT
WS-EL.=1,757.82 FT
EGL-EL.=1,758.44 FT
EGL-S=0.0020224 F/F
D=5.283 FT
V=5.919 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.519

SUB
STA.=33+70.82
CB-EL.=1,752.50 FT
WS-EL.=1,757.84 FT
EGL-EL.=1,758.45 FT
EGL-S=0.0016387 F/F
D=5.342 FT
V=5.846 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.510

SUB
STA.=33+71.00
CB-EL.=1,752.41 FT
WS-EL.=1,757.90 FT
EGL-EL.=1,758.47 FT
EGL-S=0.0017245 F/F
D=5.486 FT
V=5.671 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.489

SUB
STA.=33+72.00
CB-EL.=1,751.91 FT
WS-EL.=1,758.11 FT
EGL-EL.=1,758.54 FT
EGL-S=0.0013612 F/F
D=6.198 FT
V=4.929 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.402

SUB
STA.=33+73.00
CB-EL.=1,751.41 FT
WS-EL.=1,758.24 FT
EGL-EL.=1,758.59 FT
EGL-S=0.0009223 F/F
D=6.830 FT
V=4.402 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.344

SUB
STA.=33+74.00
CB-EL.=1,750.91 FT
WS-EL.=1,758.33 FT
EGL-EL.=1,758.62 FT
EGL-S=0.0006702 F/F
D=7.423 FT
V=3.992 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.301

SUB
STA.=33+75.00
CB-EL.=1,750.41 FT
WS-EL.=1,758.40 FT
EGL-EL.=1,758.64 FT
EGL-S=0.0005074 F/F
D=7.993 FT
V=3.656 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.267

SUB
STA.=33+76.92
CB-EL.=1,749.50 FT
WS-EL.=1,758.49 FT
EGL-EL.=1,758.67 FT
EGL-S=0.0003664 F/F
D=8.992 FT
V=3.173 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.220

SUB
STA.=33+77.82
CB-EL.=1,749.00 FT
WS-EL.=1,758.53 FT
EGL-EL.=1,758.68 FT
EGL-S=0.0002639 F/F
D=9.527 FT
V=2.957 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.200

SUB
STA.=33+78.82
CB-EL.=1,748.50 FT
WS-EL.=1,758.56 FT
EGL-EL.=1,758.69 FT
EGL-S=0.0002159 F/F
D=10.057 FT
V=2.768 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.183

SUB
STA.=33+79.82
CB-EL.=1,748.00 FT
WS-EL.=1,758.58 FT
EGL-EL.=1,758.70 FT
EGL-S=0.0001786 F/F
D=10.581 FT
V=2.599 F/S

COMPUTATION SHEET
SCS-ENG-123 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE AZ | PROJECT BUCKHORN-MESA
DATE 2-16-83 | CHECKED BY | DATE | JOB NO. PASSMT.
SUBJECT ALT. #3 W.S.P. Diversion | SHEET 3 OF 7

DC=3.478 FT
VC=9.433 F/S
FR=0.168

SUB
STA.=33+80.82
CB-EL.=1,747.50 FT
WS-EL.=1,758.60 FT
EGL-EL.=1,758.71 FT
EGL-S=0.0001496 F/F
D=11.102 FT
V=2.448 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.155

SUB
STA.=33+81.82
CB-EL.=1,747.00 FT
WS-EL.=1,758.62 FT
EGL-EL.=1,758.71 FT
EGL-S=0.0001263 F/F
D=11.619 FT
V=2.312 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.144

SUB
STA.=35+00.00
Q=3,623.00 CFS
BW=100.00 FT
Z=3.00:1
N=0.025
Scb=0.0001000 F/F
a=1.150
k=0.000
CB-EL.=1,747.01 FT
WS-EL.=1,758.63 FT
EGL-EL.=1,758.73 FT
EGL-S=0.0000982 F/F
D=11.619 FT
V=2.312 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.144

SUB
STA.=38+00.00
CB-EL.=1,747.04 FT
WS-EL.=1,758.65 FT
EGL-EL.=1,758.75 FT
EGL-S=0.0000805 F/F
D=11.613 FT
V=2.314 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.144

SUB
STA.=40+00.00
CB-EL.=1,747.06 FT
WS-EL.=1,758.67 FT
EGL-EL.=1,758.77 FT
EGL-S=0.0000807 F/F
D=11.609 FT
V=2.315 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.144

* * PWSP *

SUB
STA.=38+00.00
Q=3,623.00 CFS
BW=100.00 FT
Z=3.00:1
N=0.025
Scb=0.0001000 F/F
a=1.150
k=0.000
CB-EL.=1,747.04 FT
WS-EL.=1,758.65 FT
EGL-EL.=1,758.75 FT
D=11.613 FT
V=2.314 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.144

SUB
STA.=39+00.00
CB-EL.=1,747.05 FT
WS-EL.=1,758.66 FT
EGL-EL.=1,758.76 FT
EGL-S=0.0000806 F/F
D=11.611 FT
V=2.314 F/S
DC=3.478 FT
VC=9.433 F/S
FR=0.1

SUB
STA.=39+25.00
Q=3,623.00 CFS
BW=95.00 FT
Z=3.00:1
N=0.025
Scb=0.0001000 F/F
a=1.150
k=0.200
CB-EL.=1,747.05 FT
WS-EL.=1,758.66 FT
EGL-EL.=1,758.76 FT
EGL-S=0.0000644 F/F
D=11.604 FT
V=2.405 F/S
DC=3.588 FT
VC=9.548 F/S
FR=0.150

SUB
STA.=39+50.00
Q=3,623.00 CFS
BW=90.00 FT
Z=3.00:1
N=0.025
Scb=0.0001000 F/F
a=1.150
k=0.200
CB-EL.=1,747.06 FT
WS-EL.=1,758.65 FT
EGL-EL.=1,758.76 FT
EGL-S=0.0000925 F/F
D=11.596 FT
V=2.504 F/S
DC=3.706 FT
VC=9.669 F/S
FR=0.157

SUB
STA.=39+75.00
Q=3,623.00 CFS
BW=85.00 FT
Z=3.00:1
N=0.025
Scb=0.0001000 F/F
a=1.150
k=0.200
CB-EL.=1,747.06 FT
WS-EL.=1,758.65 FT
EGL-EL.=1,758.77 FT
EGL-S=0.0001018 F/F

COMPUTATION SHEET
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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE	PROJECT	
AZ	BUCKHORN MESA	
BY / DATE 2-16-83	CHECKED BY / DATE	JOB NO. PASS MT.
SUBJECT Alt. #3 W.S.P. Diversion		SHEET 4 OF 7

D=11.588 FT
V=2.611 F/S
DC=3.834 FT
VC=9.793 F/S
FR=0.165

SUB
STA.=40+00.00
Q=3,623.00 CFS
BW=80.00 FT
Z=3.00:1
N=0.025
Scb=0.0001000 F/F
a=1.150
k=0.200
CB-EL.=1,747.06 FT
WS-EL.=1,758.64 FT
EGL-EL.=1,758.77 FT
EGL-S=0.0001124 F/F
D=11.579 FT
V=2.727 F/S
DC=3.972 FT
VC=9.923 F/S
FR=0.173

SUB
STA.=42+00.00
Q=3,623.00 CFS
BW=80.00 FT
Z=3.00:1
N=0.025
Scb=0.0028300 F/F
a=1.150
k=0.000
CB-EL.=1,747.63 FT
WS-EL.=1,758.65 FT
EGL-EL.=1,758.80 FT
EGL-S=0.0001300 F/F
D=11.021 FT
V=2.907 F/S
DC=3.972 FT
VC=9.923 F/S
FR=0.188

SUB
STA.=44+00.00
CB-EL.=1,748.19 FT
WS-EL.=1,758.66 FT
EGL-EL.=1,758.83 FT
EGL-S=0.0001567 F/F
D=10.465 FT
V=3.109 F/S
DC=3.972 FT
VC=9.923 F/S
FR=0.206

SUB
STA.=46+00.00
CB-EL.=1,748.76 FT
WS-EL.=1,758.67 FT
EGL-EL.=1,758.87 FT
EGL-S=0.0001965 F/F
D=9.911 FT
V=3.331 F/S
DC=3.972 FT
VC=9.923 F/S
FR=0.225

SUB
STA.=48+00.00
CB-EL.=1,749.32 FT
WS-EL.=1,758.69 FT
EGL-EL.=1,758.91 FT
EGL-S=0.0002336 F/F
D=9.361 FT
V=3.581 F/S
DC=3.972 FT
VC=9.923 F/S
FR=0.248

SUB
STA.=50+00.00
CB-EL.=1,749.89 FT
WS-EL.=1,758.71 FT
EGL-EL.=1,758.97 FT
EGL-S=0.0002891 F/F
D=8.816 FT
V=3.861 F/S
DC=3.972 FT
VC=9.923 F/S
FR=0.275

SUB
STA.=52+00.00
CB-EL.=1,750.46 FT
WS-EL.=1,758.73 FT
EGL-EL.=1,759.04 FT
EGL-S=0.0003613 F/F
D=8.277 FT
V=4.175 F/S
DC=3.972 FT
VC=9.923 F/S
FR=0.305

SUB
STA.=54+00.00
CB-EL.=1,751.02 FT
WS-EL.=1,758.77 FT
EGL-EL.=1,759.14 FT
EGL-S=0.0004561 F/F
D=7.747 FT
V=4.530 F/S
DC=3.972 FT
VC=9.923 F/S
FR=0.340

SUB
STA.=56+00.00
CB-EL.=1,751.59 FT
WS-EL.=1,758.82 FT
EGL-EL.=1,759.25 FT
EGL-S=0.0005812 F/F
D=7.230 FT
V=4.928 F/S
DC=3.972 FT
VC=9.923 F/S
FR=0.381

SUB
STA.=58+00.00
CB-EL.=1,752.15 FT
WS-EL.=1,758.89 FT
EGL-EL.=1,759.40 FT
EGL-S=0.0007465 F/F
D=6.732 FT
V=5.371 F/S
DC=3.972 FT
VC=9.923 F/S
FR=0.429

SUB
STA.=60+00.00
CB-EL.=1,752.72 FT
WS-EL.=1,758.98 FT
EGL-EL.=1,759.59 FT
EGL-S=0.0009635 F/F
D=6.261 FT
V=5.858 F/S
DC=3.972 FT
VC=9.923 F/S
FR=0.483

SUB
STA.=62+00.00
CB-EL.=1,753.29 FT
WS-EL.=1,759.12 FT

COMPUTATION SHEET
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SOIL CONSERVATION SERVICE

STATE AZ | PROJECT BUCKHORN-MESA | JOB NO. PASS MT.
BY | DATE 2-17-83 | CHECKED BY | DATE
SUBJECT Alt #3 W.S.P. Diversion | SHEET 3 OF 7

EGL-EL.=1,759.84 FT
EGL-S=0.0012410 F/F
D=5.830 FT
V=6.374 F/S
DC=3.972 FT
VC=9.923 F/S
FR=0.542

SUB
STA.=65+00.00
CB-EL.=1,754.14 FT
WS-EL.=1,759.44 FT
EGL-EL.=1,760.34 FT
EGL-S=0.0016715 F/F
D=5.301 FT
V=7.126 F/S
DC=3.972 FT
VC=9.923 F/S
FR=0.632

SUB
STA.=66+50.00
CB-EL.=1,754.56 FT
WS-EL.=1,759.67 FT
EGL-EL.=1,760.66 FT
EGL-S=0.0020831 F/F
D=5.106 FT
V=7.443 F/S
DC=3.972 FT
VC=9.923 F/S
FR=0.671

SUB
STA.=67+00.00
Q=1,663.52 CFS
BW=80.00 FT
Z=3.00:1
N=0.025
Scb=0.0028300 F/F
a=1.150
k=0.000
CB-EL.=1,754.70 FT
WS-EL.=1,760.57 FT
EGL-EL.=1,760.72 FT
EGL-S=0.0012536 F/F
D=5.866 FT
V=2.906 F/S
DC=2.414 FT
VC=7.900 F/S
FR=0.246

SUB
STA.=69+00.00
CB-EL.=1,755.27 FT
WS-EL.=1,760.60 FT
EGL-EL.=1,760.79 FT
EGL-S=0.0003453 F/F
D=5.331 FT
V=3.250 F/S
DC=2.414 FT
VC=7.900 F/S
FR=0.287

SUB
STA.=71+00.00
CB-EL.=1,755.83 FT
WS-EL.=1,760.65 FT
EGL-EL.=1,760.88 FT
EGL-S=0.0004888 F/F
D=4.813 FT
V=3.660 F/S
DC=2.414 FT
VC=7.900 F/S
FR=0.339

SUB
STA.=73+00.00
CB-EL.=1,756.40 FT
WS-EL.=1,760.72 FT
EGL-EL.=1,761.03 FT
EGL-S=0.0007054 F/F
D=4.321 FT
V=4.142 F/S
DC=2.414 FT
VC=7.900 F/S
FR=0.402

SUB
STA.=75+00.00
CB-EL.=1,756.97 FT
WS-EL.=1,760.84 FT
EGL-EL.=1,761.23 FT
EGL-S=0.0010268 F/F
D=3.874 FT
V=4.687 F/S
DC=2.414 FT
VC=7.900 F/S
FR=0.478

SUB
STA.=77+00.00
CB-EL.=1,757.53 FT
WS-EL.=1,761.03 FT
EGL-EL.=1,761.53 FT
EGL-S=0.0014700 F/F
D=3.502 FT
V=5.248 F/S
DC=2.414 FT
VC=7.900 F/S
FR=0.560

SUB
STA.=79+50.00
CB-EL.=1,758.24 FT
WS-EL.=1,761.43 FT
EGL-EL.=1,762.04 FT
EGL-S=0.0020426 F/F
D=3.194 FT
V=5.815 F/S
DC=2.414 FT
VC=7.900 F/S
FR=0.647

SUB
STA.=79+75.00
Q=422.64 CFS
BW=70.00 FT
Z=3.00:1
N=0.025
Scb=0.0028300 F/F
a=1.150
k=0.200
CB-EL.=1,758.31 FT
WS-EL.=1,762.15 FT
EGL-EL.=1,762.18 FT
EGL-S=0.0012336 F/F
D=3.839 FT
V=1.351 F/S
DC=1.075 FT
VC=5.369 F/S
FR=0.139

SUB
STA.=80+00.00
Q=422.64 CFS
BW=60.00 FT
Z=3.00:1
N=0.025
Scb=0.0028300 F/F
a=1.150
k=0.200
CB-EL.=1,758.38 FT
WS-EL.=1,762.14 FT
EGL-EL.=1,762.19 FT
EGL-S=0.0001267 F/F

COMPUTATION SHEET
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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE AZ | PROJECT BUCKHORN-MESA
BY | DATE 2-17-83 | CHECKED BY | DATE | JOB NO. PASS-MT.
SUBJECT ALT #3 W.S.P. Diversion | SHEET 6 OF 7

D=3.761 FT
V=1.576 F/S
DC=1.186 FT
VC=5.607 F/S
FR=0.165

SUB
STA.=80+25.00
Q=422.64 CFS
BW=50.00 FT
Z=3.00:1
N=0.025
Scb=0.0028300 F/F
a=1.150
k=0.200
CB-EL.=1,758.45 FT
WS-EL.=1,762.13 FT
EGL-EL.=1,762.20 FT
EGL-S=0.0001869 F/F
D=3.681 FT
V=1.881 F/S
DC=1.330 FT
VC=5.988 F/S
FR=0.281

SUB
STA.=80+50.00
Q=422.64 CFS
BW=40.00 FT
Z=3.00:1
N=0.025
Scb=0.0028300 F/F
a=1.150
k=0.200
CB-EL.=1,758.52 FT
WS-EL.=1,762.11 FT
EGL-EL.=1,762.21 FT
EGL-S=0.0002955 F/F
D=3.592 FT
V=2.317 F/S
DC=1.524 FT
VC=6.221 F/S
FR=0.254

SUB
STA.=80+75.00
Q=422.64 CFS
BW=30.00 FT
Z=3.00:1
N=0.025
Scb=0.0028300 F/F
a=1.150
k=0.200
CB-EL.=1,758.59 FT
WS-EL.=1,762.07 FT
EGL-EL.=1,762.24 FT
EGL-S=0.0005209 F/F
D=3.482 FT
V=3.001 F/S
DC=1.803 FT
VC=6.618 F/S
FR=0.341

SUB
STA.=81+00.00
Q=422.64 CFS
BW=20.00 FT
Z=3.00:1
N=0.025
Scb=0.0028300 F/F
a=1.150
k=0.200
CB-EL.=1,758.66 FT
WS-EL.=1,761.97 FT
EGL-EL.=1,762.30 FT
EGL-S=0.0011325 F/F
D=3.306 FT
V=4.270 F/S
DC=2.237 FT
VC=7.075 F/S
FR=0.512

SUB
STA.=83+00.00
Q=422.64 CFS
BW=20.00 FT
Z=3.00:1
N=0.025
Scb=0.0028300 F/F
a=1.150
k=0.000
CB-EL.=1,759.23 FT
WS-EL.=1,762.27 FT
EGL-EL.=1,762.67 FT
EGL-S=0.0018886 F/F
D=3.037 FT
V=4.780 F/S
DC=2.237 FT
VC=7.075 F/S
FR=0.594

SUB
STA.=85+00.00
CB-EL.=1,759.80 FT
WS-EL.=1,762.69 FT
EGL-EL.=1,763.15 FT
EGL-S=0.0023976 F/F
D=2.897 FT
V=5.085 F/S
DC=2.237 FT
VC=7.075 F/S
FR=0.644

SUB
STA.=87+00.00
CB-EL.=1,760.36 FT
WS-EL.=1,763.21 FT
EGL-EL.=1,763.69 FT
EGL-S=0.0026914 F/F
D=2.848 FT
V=5.198 F/S
DC=2.237 FT
VC=7.075 F/S
FR=0.663

SUB
STA.=90+00.00
CB-EL.=1,761.21 FT
WS-EL.=1,764.04 FT
EGL-EL.=1,764.53 FT
EGL-S=0.0028024 F/F
D=2.834 FT
V=5.233 F/S
DC=2.237 FT
VC=7.075 F/S
FR=0.669

SUB
STA.=94+00.00
CB-EL.=1,762.34 FT
WS-EL.=1,765.18 FT
EGL-EL.=1,765.66 FT
EGL-S=0.0028297 F/F
D=2.834 FT
V=5.234 F/S
DC=2.237 FT
VC=7.075 F/S
FR=0.669

SUB
STA.=98+00.00
CB-EL.=1,763.47 FT
WS-EL.=1,766.31 FT
EGL-EL.=1,766.80 FT
EGL-S=0.0028298 F/F
D=2.834 FT
V=5.234 F/S
DC=2.237 FT
VC=7.075 F/S

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

STATE AZ		PROJECT BUCKHORN-MESA	JOB NO PASS MT
BY	DATE 2-17-83	CHECKED BY	DATE
SUBJECT ALT #3 W.S.P. Diversion			SHEET 7 OF 7

Full Q Reach W/S 10

79+50 +Q
66+50 +Q

FR=0.669

SUB
STA.=100+00.00
CB-EL.=1,764.04 FT
WS-EL.=1,766.87 FT
EGL-EL.=1,767.36 FT
EGL-S=0.0028298 F/F
D=2.833 FT
V=5.234 F/S
DC=2.237 FT
VC=7.075 F/S
FR=0.669

1/26/83

Pass Mountain Diversion - relationship of 2y event to 100y event rel to Sediment

$$\text{Sed. Yield} = 95(Q \times q_p)^{0.56} \times K \times LS \times C \times P$$

Problem: Establish relationship of $95(Q \times q_p)^{.56}$ for average annual sediment yield (2 year event) and 100 year event.

DA #10	DA #9	DA #8
$95(Q \times q_p)^{0.56}_{100y}$	$95(Q \times q_p)^{0.56}_{100y}$	$95(Q \times q_p)^{0.56}_{100y}$
$95(\underset{q_p}{422.64} \times \underset{Q}{68.78})^{0.56}$	$95(\underset{q_p}{1365.31} \times \underset{Q}{166.16})^{0.56}$	$95(\underset{q_p}{2243.53} \times \underset{Q}{247.68})^{0.56}$
$95(24{,}842.8)^{0.56}$	$95(226860.0)^{0.56}$	$95(555677.5)^{0.56}$
$95(289.3)$	$95(999.2)$	$95(1648.5)$
27481.2	94830.5	156611.8

DA #10	DA #9	DA #8
$95(Q \times q_p)^{0.56}_{2y}$	$95(Q \times q_p)^{0.56}_{2y}$	$95(Q \times q_p)^{0.56}_{2y}$
$(\underset{Q}{7.65} \times \underset{q_p}{31.44})$	$(\underset{Q}{23.58} \times \underset{q_p}{160.87})^{0.56}$	$(\underset{Q}{39.35} \times \underset{q_p}{321.38})^{0.56}$
$95(237.37)^{0.56}$	$95(3793.31)^{0.56}$	$95(12646.30)^{0.56}$
$95(21.39)$	$95(100.98)$	$95(198.2)$
2032.05	9593.1	18829.0

[Sediment Yield (ref: 7/19/74 Don Clarke, p. 1 of 2)]

factor	13.5	9.9	8.3
Sediment Yield to Pass Mountain Diversion			
13.5 x av. ann.* =	9.9 x av. ann.* =	8.3 x av. ann.* =	

* as determined by Don Clarke via Bill Mildness stock pond surveys

D.A. #10 D.A. = 0.67 sq. mi

Unit	Texture	Sed. Yield Rate (ac.ft/sq.mi)	% Fine in D.A.	% Coarse in DA
1	gravelly stoney loam	0.4	50	50
3	Sandy loam	0.1	30	70
5	Sandy loam	0.2	30	70

av. ann. yield = 0.33 X 0.67 sq. mi. = 0.22 ac.ft./av. ann.

Determine % Fines (silt. & clay) and % Coarse to Pass Mountain Diversion

Max. Fines would be total yield or 0.22 ac.ft. But this assumes ~~equal Delivery Ratio for Fines & Coarse which is~~ all of Fines removed which is probably not true.

Min. Fines would be when Delivery Ratio for Fines and Coarse is ~~not t~~ the same and this would indicate Fines at 35% and Coarse at 65% composition or Fines = .35 X 0.22 ac.ft.

Based on judgement Aubrey estimates sediment yield at 60% ~~Coarse~~ Fines and 80% ~~Fines~~ Coarse and Neville at 70% ~~Coarse~~ Fines and 30% Coarse

∴ use 65% Fines and 35% coarse

Fines = .65 X .22 ac.ft. = 0.14 ac.ft./av. ann.

Coarse .35 X .22 ac.ft. = 0.08 " av. ann.

For 100y event; ?

Fines : 13.5 ‡ X 0.14 = 1.89 ac.ft.

Coarse : 13.5 ‡ X 0.08 = 1.08 ac.ft.

14.87

‡ factor to convert av. ann. to 100y. event

D.A. 8 DA = 1.92 sq. mi.

85% in Unit 1 @ 0.4 ac.ft./sq.mi./yr
15% in Unit 5 @ 0.2 " " "

or.

.85 x 0.4 x 1.92 = 0.653 ac.ft.
.15 x 0.2 x 1.92 = 0.058 ac.ft
0.711 ac.ft/yr. av. ann.

use same concept shown in DA #10 to estimate that sediment yield is 65% Fines and 35% Coarse

∴ Fines = .65 x 0.711 = 0.46215 ac.ft/yr. av. ann
Coarse = .35 x 0.711 = 0.24885 " " " "

Using a factor of 9.9 to go from av. ann. value to sediment yield for 100 year event have

To Pass Hi. Diversion
Fines = 0.46215 x 8.3 = ~~4.58~~ 3.836 ac.ft/100 yr. event
Coarse = 0.24885 x 8.3 = ~~2.46~~ 2.065 ac.ft/100 yr. event

‖ 8.3 is factor to convert from av. ann. to 100 year event

D.A. #9 D.A. = 1.39 mi^2

Unit	Texture	sed. yield rate (ac. ft. mi^2)	% Fine in D.A.	% Coarse in D.A.
75% 1	gravelly stony loam	0.4	50	50
3	Sandy loam	0.1	30	70
25% 5	Sandy loam	0.2	30	70

Determine % fines (silt & clay) & % coarse mat'l

~~avg. annual sed yield = .33 × 1.39 sq. mi. = .46 ac. ft. (Avg. Ann.~~

~~Max. fines would be total yield or .46 ac ft.~~

Avg. Annual Sed yield = (.75)(1.39)(0.4) = .42
+ (.25)(1.39)(0.2) = +.07
.49 ac ft

Determine % fines (silt & clay) & % coarse (s&g) to Poss mtn. Div.

MAX. fines = total yield or .49 Ac ft.

Min. fines would be when delivery ratio for fines & coarse is same. Probably not true and this would indicate ratio of 65% fines & 35% coarse

∴ Fines = (.65)(.49) = 0.32 ac. ft

coarse = (.35)(.49) = 0.17 ac ft.

Using a factor of 9.9 to go from Avg. Ann. to 100 yr. freq.

Fines = 0.32 × 9.9 = 3.16 ac. ft

Coarse = 0.17 × 9.9 = 1.68 ac ft.

Summary of sediment yield to Pass Mountain Diversion from the 100 year storm or 1% event

	Unit 10	Unit 9	Unit 8	Total
Coarse (sand) =	1.08	1.68	2.065	4.825 ac.ft.
Fines (Silt & Clay) =	1.89	3.16	3.836	8.886 ac.ft

Fines (clay & silt fraction)

Fines vary from 2-11% Suggest using 6% as fines deposited along w/ bed material ∴ 94% fines will pass through the Pass Mt. Diversion leaving 0.5 acft of Fines in the diversion and 94% or 8.53 acft. of Fines transported down to Signal Butte FRS

Course (sands +) 9.076 × .94 = 8.53 Ac-ft.

Av. ann. Sediment Yield to ~~Sigrist Butte from~~ Pass Mt. ~~drainage~~ Diversion

Av. ann. to Pass Mt. Diversion

	DA #10	DA #8	DA #9	Total
Coarse	0.08 AF	0.25 AF	0.17 AF	0.5 AF/yr.
Fine	0.14 "	0.46 AF	0.32 AF	0.92 AF/Y

Sediment transport shows none of coarse material reached SB. FRS in 100-yr. storm
.92 Acft/yr × 100 yr × 0.70 trap efficiency
= 64.4 acre ft. 100-yr. storage added to Sigrist Butte FRS. say 65

FILE CODE ENG-22

LABORATORY NO

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	SOIL CLASSIFICATION

PROJECT and STATE: Buckhorn-Mesa WPP

SAMPLE LOCATION: Pass Mtn.

FIELD SAMPLE NO.

DEPTH: Surface

~~GEOLOGIC SERIES~~: for sediment transport analysis

TYPE OF SAMPLE

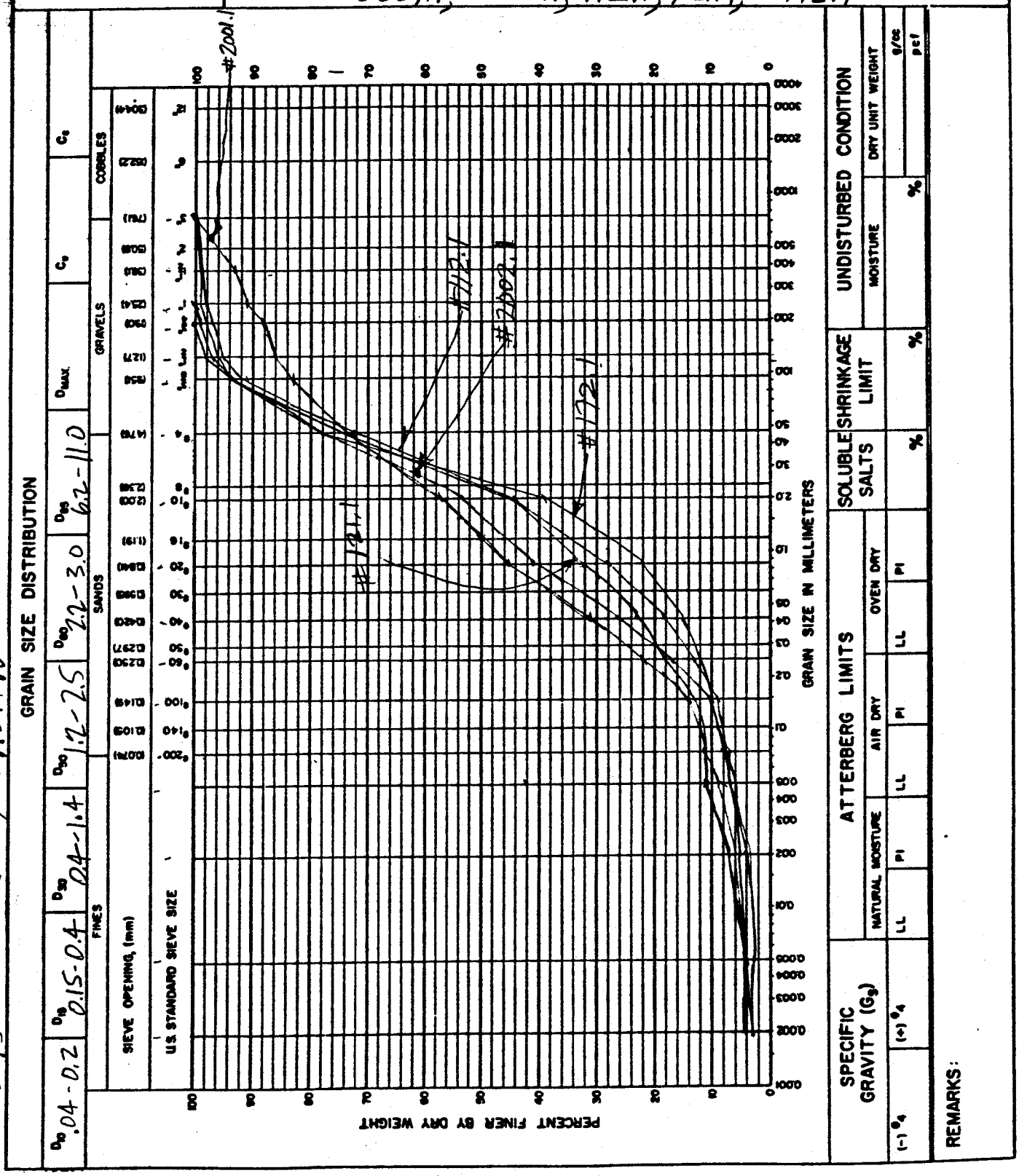
TESTED AT

APPROVED BY: [illegible]

DATE: 2-15-83

SYMBOL

DESCRIPTION: 2001.1, 2002.1, 112.1, 121.1, & 172.1



$D_{75} \cong 5$ mm. (4.5.1) or 1.5 to 2.0"

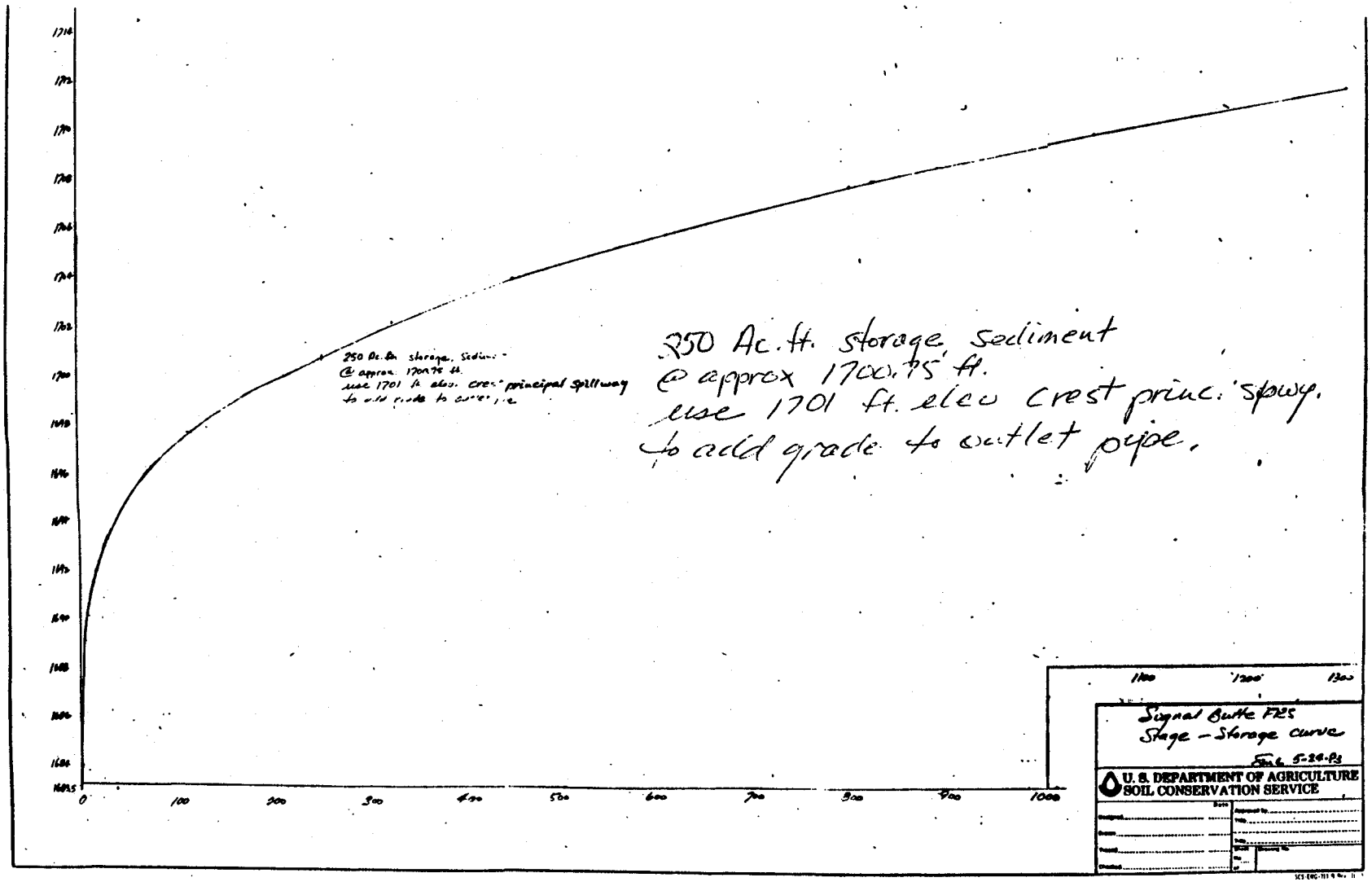
5-2-21

2/14/83

Pass Mtn. Diversion.

For sediment transport analysis determine bedload grain size distribution by using mean values from Pass Mtn. grain size distribution curves for sample No's

2001.1
2002.1
112.1
121.1
172.1


250 Ac.ft. storage, sediment
@ approx 1700.75 ft.
use 1701 ft. elev. crest principal spillway
to add grade to outlet pipe.
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
Signal Butte F25
Stage – Storage curve
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

COMPUTATION SHEET
SOIL CONSERVATION SERVICE
No. 5-61

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SUBJECT
PROJECT Buckhorn-Mesa WPP, Sugar Butte & Pass Wash
BY Eric L DATE 2-23-83 CHECKED BY DATE
SUBJECT Summary for Sed. transport SHEET 1

	DA #10	9	8	
		79+50	66+50	33+42
Ave. Ann.				
fines	0.14 Acft.	0.32	0.46215	to chan
coarse	0.08	0.17	0.24885	" "
Q100	423	1664	3624 cfs.	in chan.
S100F	1.89 Acft	3.16	3.836	to chan
S100C	1.03 Acft.	1.68	2.065	" "
Q100	423	1241	2383 cfs	to Chan

AZ Buckhorn Mesa WPP - Signal Butte Sed. from Pi
SWL 2-24-83

Sed. Transport - Pass Mtn Div. - Data 1

Begin w/ 100-yr storm
check to see how much sediment will get to dam
adjust assumptions accordingly.

Assume $n = 0.018$ mature caliche channel (Div.)
$n = 0.030$ sand outlet channel
$T = 60°$ (check $T = 80°$)

inlets - 39+80 ← Q=3623 @ 33+42
45+00 (small)
52+50
59+40 ← Q=1664 @ 66+50
69+60
75+10 ← Q=423 @ 79+50
87+00 (small)
98+00 (small)

$b = 20'$ Sta. 81+00 - 100+00
$b = 80'$ Sta. 40+00 - 79+50 (trans.)
$b = 100'$ Sta. 33+76 - 39+00 (trans.)

$S = 0.00283$ Sta 40+00 - 100+00
$S = 0.0001$ Sta. 33+76 - 40+00

$z = 3$, both sides, throughout

Geologist recommended tests from
2001.1, 2002.1, 112.1, 121.1, & 172.1

D_{50} ranges from 1.2 to 2.5 mm

Use 0.8 mm curves Fig 36
& check K_3 modifier for significance

A2
Sum

Buckhorn Mesa WPP – Signal Butte Sed. from PM.

2-24-83

Sed. Transport – Pass Mtn. Div. 2

Sediment – 100-yr. storm

		Fine	COARSE
w/s 10	Sta 100+00 – 79+50	1.89 Ac ft.	1.08 Ac ft.
w/s 9	Sta 79+50 – 66+50	3.16	1.68
w/s 8	Sta 66+50 – 33+42	3.84	2.07

Use Colby – Stable Earth Channels IV-80
Fig. 36 & 37

Reach A, 87+00–98+00, (assum 50% Q & sed. w/s 10)

assume
d=3'
148.6 ≠
d=2'
70.93 ≠
d=1'
21.02 ≠
d=1.5'
42.56
1.65
50.36

1 cfs × 1 hr = 1 Ac inch

$Q = 211$ cfs $b = 20'$ $S = 0.00283$ $n = 0.018$

$$\frac{a^{5/3}}{p^{2/3}} = \frac{Qn}{1.486 S^{1/2}} = \frac{(211)(.018)}{(1.486)(0.00283)^{1/2}} = 48.044$$

$a = (d3 + 20)d$ $p = 20 + 6.32d$

$d = \underline{\underline{1.6}}$ $A = 39.68$ $V = \frac{Q}{A} = \underline{\underline{5.32}}$ fps. ✓

C_f if sed. disch. 2 hours

0.945 Ac ft $= 41{,}164.2$ ft^3

assume $\gamma_d = 108$ #/ft^3

dry weight of sediment $= 4{,}445{,}733.6$ #

$$2\text{hr} \times \frac{3600\text{ sec}}{\text{hr}} \times \frac{211\text{ c.f.}}{\text{sec}} \times \frac{62.4\#}{\text{cf}} = H_2O = 94{,}798{,}080\#$$

(IV-4)

$$C_f \sim \frac{10^6 \times \text{dry wt.}}{\text{wet wt. total}} = \frac{4.45 \times 10^6 \times 10^6}{99.24 \times 10^6}$$

$C_f \sim 0.0448 \times 10^6 = 44{,}800$ ppm.

AZ
Smu

Buckhorn-Mesa WPP - Signal Butte Sed. from ffm

2-24-83

Sed. transport - Pass Mtn. Div. 3

$K_1 = 1$, $K_2 = 2$, $K_3 \cong 0.03$ to < 0.01

$g_{n\,1.0} \cong 40.0$ $g_{n\,100} \cong 75$ T/day/ft.

$g_n \cong 45$ T/day/ft. (1.6')

$g_T = [1 + (K_1 K_2 - 1) K_3]\, g_n$

$g_T = [1 + (1.2 - 1)\, 0.03]\, 45 = 46.35$ T/day/ft.

$G_T = T g_T$

because of caliche & 3:1 ss, use b

$G_T = 20\,(46.35) = 927$ T/day.

2 hours — $\frac{2}{24}(927) = 77.25$ T/Q100

$43{,}560 \frac{ft^3}{Ac\,ft.} \times 108\#/ft^3 \times 0.54$ Ac ft. $\times \frac{T}{2000\#}$ coarse $= 1270$ T

$77 / 2352.24$ T/Ac ft. $= 0.033$ Ac ft.

$(.507$ Ac ft. $\times 43560$ ft^3/Ac ft$) \div (20' \times 1100') = 1.0$ ft.

or 12" deep.

Note: 818 cy. to be removed.

9:30 AM
Feb 25, 83

Discussed 2 hour peak w/ Harry Milsaps, hydrologist, and reviewed TR-20 runs. TR-20 does not have printed hydrographs for separate watersheds, only composite for Pass Mtn. Diversion. The time from 90% peak through peak to 90% peak takes < 0.4 hour. The three sub-watersheds would probably have shorter or equal peak times.

AZ Buckhorn - Mesa WPP, Signal Butte Sed. from P.M.
SMC 2-25-83
Sed. transport - Pass Mtn. Div. 4

Recalculate Colby equ. w/ ½-hour peak,
$Q_p = 0.9(211) = 189.9$ cfs use 190 cfs.
$d_m = 1.51$ ft. $V_m = 5.13$ fps.

C_f, sed. ½-hour, 90% sed. ~ 4.0×10^6 #

$0.5 \times 3600 \times 190 \times 62.4 = 21,340,800$ # H_2O

$C_f \sim \frac{10^6 (4.0 \times 10^6)}{21.34 \times 10^6} = 0.187 \times 10^6$
or 187,000 ppm

$K_2 \sim 15$, $K_1 = 1$, K_3 use 0.03

gn can't read closer, 45 T/ft/day.

$g_T = [1 + (15-1)0.03]\,45 = 63.9$ T/ft/day

$G_T \approx 20(63.9) = 1278$ T/day

d=2.38 $\frac{0.5}{24}(1278) = 26.6$ T/Q_{100} Reach A

$\frac{26.6}{2352.24} = 0.011$ Ac ft, passes through,
853 cy. stays in Reach A
~ 12.6" deep sediment if dist.

arbitrary — use 0.02 Ac. ft. coarse sed. transport to Reach B

Reach B, 81+00 – 87+00
$Q = 423$ cfs sed., coarse = 0.965 Ac ft
$b = 20'$ $S = 0.00283^{1/2}$ $n = 0.018$

$$\frac{Qn}{1.486(S)^{1/2}} = \frac{a^{5/3}}{p^{2/3}} = \frac{(423)(0.018)}{(1.486)(.00283)^{1/2}} = 96.32$$

$d = 2.38$ $A = 64.59$ ft² $V = 6.55$ fps.

AZ Buckhorn-Mesa WPP - Signal Butte Sed. from PMI.
SMC 2-25-83
Sed. Transport - Pass Mtn. Div. 5

Assume peak Q for ½-hour & all sediment. very little sediment was transported in reach one, even with peak Q & V. Assume this is max. sed. possible to transport.

C_f, discharge ½ hr.

$1.89 \text{ Ac ft} \times 43560 \times 108 = 8.89 \times 10^6$ # dry sed.

$0.5 \text{ hr.} \times 3600 \times 423 \text{ cfs} \times 62.4 = 47.51 \times 10^6 \text{ H}_2\text{O}$

$$C_f \sim \frac{10^6 \times 8.89 \times 10^6}{56.4 \times 10^6} = 0.158 \times 10^6 \text{ ppm}$$

or 158,000 ppm

$K_2 = 20 \qquad K_1 = 1 \qquad K_3 \sim 0.03$

$g_n = 109$ T/day/ft. (90 to 150, graph)

$g_T = [1 + (K_1 K_2 - 1) K_3]\, g_n$

$= [1 + (20-1)\,0.03]\,109 = 171.13$ T/ft/day

$G_T \sim 20(171.13)(0.5/24) = 71.3$ T/Q100 Reach B → C

or $71.3/2352.24 = \underline{0.03 \text{ Ac ft.}}$

$.54 + 0.02 - 0.03 = .53$ Ac ft. or 855 c.y. dep. in channel

600' chan. 20' wide ~ 23" deep.

AZ
Gme

Buckhorn-Mesa WPP, Signal Butte Sed from Pin.

2-25-83
Sed. Transport - Pass Mtn. Div 6

Reach C, 75+00 - 81+00 (approx ½ W/S #9)

1.5
159.9
2.0
259.8
1.9
238.2

$Q = (1664 - 423).5 + 423 = 1043.5$ cfs.

$b = 80'$, $S = 0.00283$, $n = 0.018$

$$\frac{Qn}{1.486\, S^{1/2}} = \frac{(1043.5)(.018)}{1.486(.00283)^{1/2}} = 237.6 = \frac{a^{5/3}}{p^{2/3}}$$

$d = 1.9$ ft. $A = 162.8$ ft^2 $V = 6.41$ fps.

½ hr. f.sed. = 3.16 ÷ 2 = 1.58 Acft.

$$\left(1.89 + \frac{3.16}{2}\right)(43560)(108) = 16.32 \times 10^6 \text{\# dry sed.}$$

$$0.5 \text{ hr.} \times 3600 \times 1043.5 \text{ cfs} \times 62.4 = 117.21 \times 10^6 \text{\# } H_2O$$

$$C_f \sim \frac{10^6 \times 16.32 \times 10^6}{133.53 \times 10^6} = 122{,}220 \text{ ppm}$$

$K_2 \approx 7.5$, $K_1 = 1$, $K_3 \approx 0.03$

$g_n = 103$ T/ft/day

$$g_T = [1 + (7.5 - 1)0.03]\,103 = 123.08 \text{ T/ft/day}$$

$$G_T = 80(123.08)\left(\frac{0.5}{24}\right) = 205.13 \text{ T/}Q_{100}$$

Reach C ⟶ D

or $\frac{205.13}{2352.24} = 0.087$ Ac. ft.

$\frac{1.68}{2} - 0.087 + 0.03 = 0.783$ Acft. or 1263.24 cy.

evenly spread, 8.5" deep.

Buckhorn-Mesa WPP, Signal Butte Sed. from P.M.

Sml 2-25-83

Sed. Transport - Pass Mtn. Div. 7

Reach D, 66+50 - 75+00 (next W/S #9)

218.75

2.5
379.32

$Q = 1664$, $b = 80'$, $S = 0.00283$, $n = 0.018$

$$\frac{Qn}{1.486 S^{1/2}} = \frac{(1664)(0.018)}{(1.486)(.00283)^{1/2}} = 378.89$$

$d = 2.5$ ft. $A = 218.75$ ft^2 $V = 7.61$ fps.

$g_n = 133$ T/ft/day.

$(3.16 + 1.89)(43560)(108) = 23.76 \times 10^6$ # dry sed.

$(0.5)(3600)(1664)(62.4) = 186.90 \times 10^6$ # H_2O

$$C_f \sim \frac{10^6 (23.76)\, 10^6}{210.66 \times 10^6} = 112{,}790 \text{ ppm}$$

$K_2 = 7.5$ $K_1 = 1$ $K_3 \sim 0.03$

$g_T = [1 + (7.5 - 1)0.03]\, 133 = 158.94$ T/ft/day

$G_T = 80(158.94)\frac{0.5}{24} = 264.89$ T/Q_{100}

or 0.113 Ac ft

$\frac{1.68}{2} + 0.087 - 0.113 = 0.814$ Acft or 1313 cy.
evenly spread, 6.25" deep.

AZ
Smk

Buckhorn - Mesa WPP, Signal Butte Sed. for Pin.

2-25-83.

Sed. Transport - Pass Mtn. Div. 8

266.02

3.05
532.25

2.95
502.52

2.99
514.5

Reach E, 5800 - 66+50 (W/S #8, 30%)

$b = 80;\ S = 0.00283,\ n = 0.018$

$Q = .3(3623 - 1664) + 1664 = 2251.7$ cfs.

$$\frac{(2251.7)(0.018)}{(1.486)(.00283)^{1/2}} = 512.71$$

$d = 2.99$ ft. $A = 266.02$ ft^2 $V = 8.5$ fps.

$g_n = 174$

$[3.16 + 1.89 + (.3)(3.84)](43560)(108) = 29.18 \times 10^6$ # dry sed.

$(0.5)(3600)(2251.7)(62.4) = 252.91 \times 10^6$ # H_2O

$$C_f \sim \frac{10^6(29.18)\,10^6}{(282.09)10^6} = 103{,}440 \text{ ppm}$$

$K_1 = 1,\ K_2 = 7.0,\ K_3 \cong 0.03$

$g_T = [1 + (7.0 - 1)0.03]\,174 = 205.32$ T/ft/day

$G_T = 80(205.32)\left(\frac{.5}{24}\right) = 342.2$ T/Q_{100}

or $0.145\,T \xrightarrow{E \to F}$

$.3(2.07) + 0.113 - 0.145 = 0.59$ Ac ft. or 949.5 cy.

$\sim 4.5''$ deep (uniform)

AZ
Smc

Buckhorn-Mesa WPP, Signal Butte Sed. from PM.

2-25-83
Sed Transport - Pass Mtn. Div. 9

Reach F, 5700 - 5800 (w/s #8, 30%)

$Q = .3(3623-1664) + 2251.7 = 2839.4$ cfs

309.7
3.5
673.7
3.3
609.05
3.43

$b = 80, \quad S = 0.00283, \quad n = 0.018$

$$\frac{(2839.4)(.018)}{(1486)(.00283)^{1/2}} = 646.53$$

$d = 3.43 \quad A = 309.7\ ft^2 \quad V = 9.2$ fps.

$g_n \approx 194$

$[3.16 + 1.89 + 0.6(3.84)](43560)(108) = 34.60 \times 10^6$ dry sol

$(2839.4)(1800)(62.4) = 318.92 \times 10^6\ H_2O$

$$C_f \sim \frac{10^6(34.60)10^6}{353.52 \times 10^6} = 97{,}870 \text{ ppm}$$

$K_2 = 6.5 \quad K_1 = 1 \quad K_3 \approx 0.03$

$g_T = [1 + (6.5-1)0.03]\,194 = 226.01$ T/ft/day

$G_T = 80(226.01)\left(\frac{.5}{24}\right) = 376.7$ T/Q_{100}
or 0.160 Ac.ft.

E ⟶ F

$0.3(2.07) + 0.145 - 0.160 = 0.606$ Ac ft.
or 977.7 c.y. depos.
~5.7" deep throughout

A2 Buckhorn-Mesa WPP, Signal Butte Sed from P.M.

Sme 2-25-83

Sed. Transport - Pass Mtn Div. 10

Reach G, 44+00 - 51+00 (W/S #8, 10%)

321.81

$Q = .1(3623-1664) + 2839.4 = 3035.3$ cfs

3.55

$b = 80$, $S = 0.00283$, $n = 0.018$

$$\frac{(3035.3)(0.018)}{(1.486)(.00283)^{1/2}} = 691.13$$

No backwater.

$d = 3.55$ $A = 321.81\ ft^2$ $V = 9.43$ fps.

$q_n \sim 195$

$[3.16 + 1.89 + 0.7(3.84)](43560)(108) = 36.40 \times 10^6$ # dry sed.

$(3035.3)(62.4)(1850) = 340.92 \times 10^6$ # H_2O

$$C_f \sim \frac{10^6(36.4)\,10^6}{(377.32)\,10^6} = 96{,}470 \text{ ppm}$$

$K_2 \sim 6.5$ $K_1 = 1$ $K_3 \sim 0.03$

essentially same as Rch. F, 227.2 T/ft/day

$G_T = (227.2)(80)(\frac{.5}{24}) = 378.62\ T/Q_{100}$

or 0.161 Ac ft.

G ⟶ H

$0.1(2.07) + 0.16 - 0.161 = 0.206$ Ac ft.

or 332.3 cy deposited

~ 2" throughout

AZ
SMC

Buckhorn-Mesa WPP, Signal Butte Sed. from PM.

2-25-83

Sed. Transport - Pass Mtn. Div. 11

Reach H, 39+00 - 44+00 (W/S #8, 2.02)

$Q = 0.2(3623-1664) + 3035.3 = 3427.1$ cfs.

$b_{most} = 80$ $S_{most} = 0.00283$, $n = 0.018$

?48.3

3.75
758.4
3.77
765.4
3.79
772.4
3.81
779.4

no backwater curve assumed -

$$\frac{(3427.1)(.018)}{(1.486)(.00283)^{1/2}} = 780.35$$

$d = 3.81$ ft $A = 348.3$ ft^2 $V \sim 9.8$ fps.

$g_n \sim 200$

$[3.16 + 1.89 + 0.9(3.84)](43560)(108) = 40.02 \times 10^6$ # dry sed.

$(3427.1)(62.4)(1800) = 384.93 \times 10^6$ # H_2O

$$C_f \sim \frac{(40.02)\,10^6 \times 10^6}{(424.95)\,10^6} = 94{,}180 \text{ ppm}$$

$K_2 \cong 6$ $K_1 = 1$ $K_3 \cong 0.03$

$g_T = [1 + (6-1)0.03]\,200 = 230.0$ T/ft/day

$G_T = 80(230)(\frac{.5}{24}) = 383.3$ T/Q100

or 0.163 Ac ft.

H $\longrightarrow$ J

$0.2(2.07) + 0.161 - 0.163 = 0.412$ Ac ft.

or 664.7 cy.

$\sim$ 5.4" uniform.

AZ
Sue

Buckhorn-Mesa WPP, Signal Butte Sed. from P.M.

2-25-83

Sed. Transport - Pass Mtn. Div. 12

no Reach I
Confuses w/ 1

5
15368

847 7
27359
10
51551
9.2
11739 4467.1
11848 9.1

Reach J, 33+76 - 39+00 (w/ #8, 10%)

$Q = 3623$ cfs., $b = 100'$, $s = 0.0001$ $n = 0.018$

no backwater curve assumed

$$\frac{(3623)(.018)}{(1.486)(.0001)^{1/2}} = 4388.6 \sim 4381.$$

$d = 9.1$ ft. $A = 1158.4$ ft^2 $V = 3.13$ fps.

$$[3.16 + 1.89 + 3.84](43560)(108) = 41.82 \times 10^6 \text{ dry sed.}$$

$$(3623)(624)(1800) = 406.94 \times 10^6 \text{ \# } H_2O$$

$$C_f \sim \frac{106(41.82)10^6}{448.76 \times 10^6} = 93{,}190 \text{ ppm}$$

$K_1 = 1$, $K_3 \sim 0.03$, $K_2 = 8$

$g_n = 7.2$

$$g_T = [1 + (8.0 - 1)0.03]7.2 = 8.71 \text{ T/ft/day}$$

$$G_T = (8.71)(100)\left(\tfrac{15}{24}\right) = 18.15 \text{ T/Q}_{100}$$

or 0.008 Acft. (12.9 cy.)

J → K

$$0.1(2.07) + 0.163 - 0.008 = 0.362 \text{ Acft.}$$

or 584. cy.

(3.6" if uniform)

AZ
SMC

Buckhorn Mesa WPP, Signal Butte Sed. from F.N.

2-25-83

Sed. Transport - Pass Mtn. Div.

13

Reach K, ds. from weir & culverts, no new H_2O or Sed.
assume $L = 350'$ $s = 0.0001$, $b = 200'$ $Q = 3623$

$$\frac{(3623)(.018)}{(1.486)(.0001)^{1/2}} = 4388.6$$

$d = 6.27$ ft $A = 1371.9$ ft^2 $V = 2.64$ fps

C_f same Reach J, 93,190 ppm

$K_1 = 1$, $K_2 = 8$, $K_3 = 0.03$?

$g_n = 2.1$

$g_T = [1 + (8-1).03]\,2.1 = 2.54$ T/ft/day

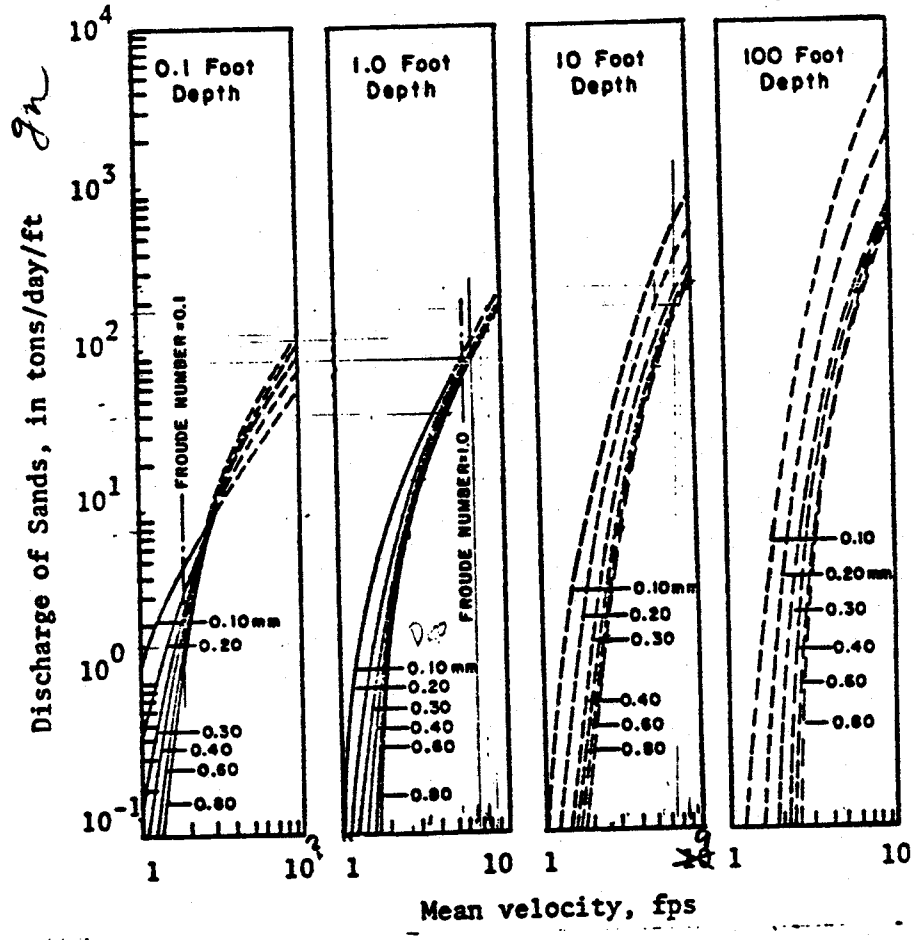
$G_T = 200(2.52)(\frac{.5}{24}) = 10.5$ T/Q_{100} or 0.004 Ac.ft. (7.2 c.y.)

$+0.008 - 0.004 = 0.004$ Ac.ft. deposited,

This is first of series of similar reaches with no additional source sediment added, therefore, one more reach would collect the last of the sediment (coarse).

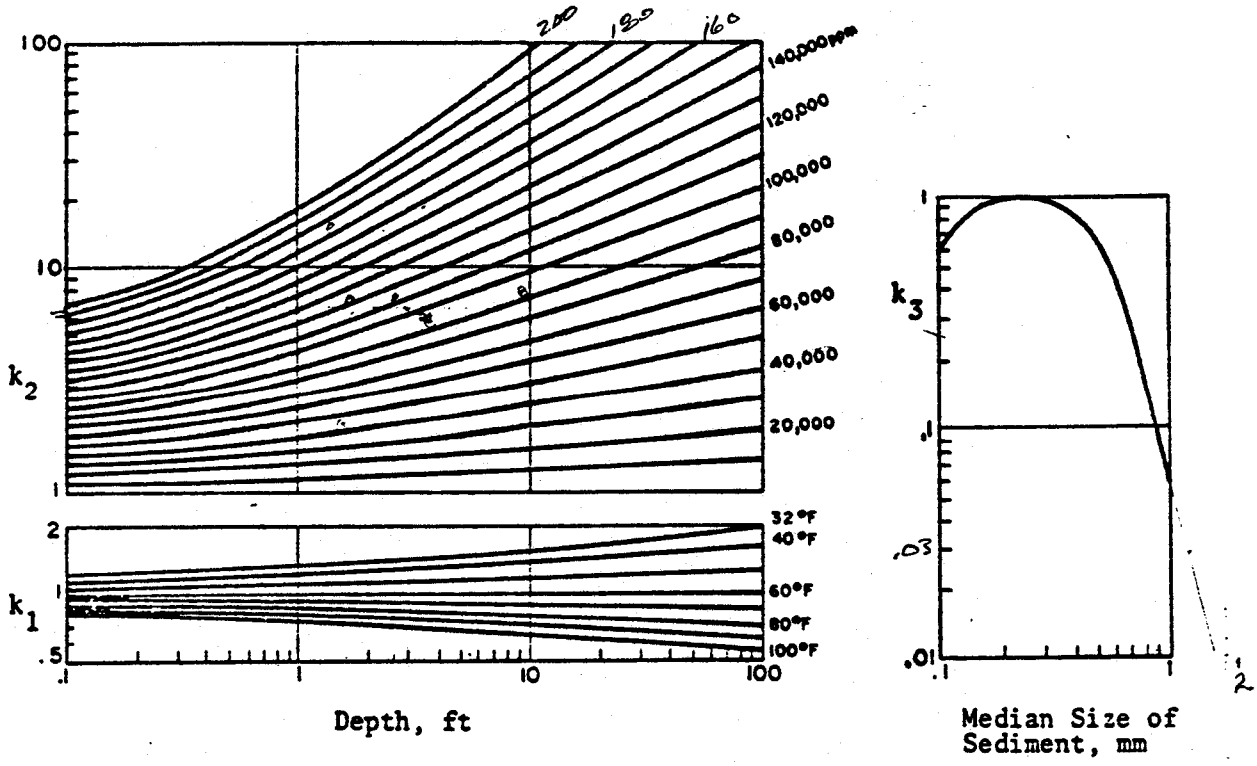
In fact, the sudden increase in width just below the weir would probably cause complete settlement of coarse fines.

Note: the 62 fine sediment that probably would be deposited throughout has been ignored



Relation of discharge of sands to mean velocity for six median sizes of bed sands, four depths of flow, and a water temperature of 60°F (Colby, 1964)

Figure 36



Colby's Correction Curves for Temperature and Fine Sediment
(Colby, 1964)

Figure 37

AZ Buckhorn-Mesa, Signal Butte FRS

SMC 5-83

Sediment storage in S.B. FRS | |

Original sediment storage requirt. determined by Don Clark 7-19-74

Sediment discharged through Pass Mtn. Diversion determined by Neville Curtis, 2-83)

direct sed. from Signal Butte W/S	177 Ac.ft
sed discharged from Apache Junc. FRS	40 Ac.ft.
sed. discharged through Pass Mtn. Div.	92 Ac.ft.
Sum	309 Ac.ft.

Principal spillway outlet is a low riser (just above orig. grade) and there is a gated outlet at the lowest part of the reservoir to permit total drainage, therefore, trap efficiency is estimated at 80% (Dubroy Sanders, 5-83) × 0.80

Required sediment storage = 247.2

GEOLOGY

GEOLOGIC INVESTIGATION

SIGNAL BUTTE FRS
BUCKHORN-MESA WATERSHED

Maricopa and Pinal County, Arizona

by

Aubrey C. Sanders, Jr.
Geologist - SCS
Phoenix, Arizona

and

Ronnie A. Rappmund
Geologist - SCS
Phoenix, Arizona

3 December 1980

GEOLOGIC INVESTIGATION

BUCKHORN-MESA WATERSHED
SIGNAL BUTTE DAMSITE
ARIZONA

This site is located in Sections 11 and 12, T1N, R7E and Section 7, T1N, R8E. It lies approximately 14 miles east of Mesa in eastern Maricopa County with a small portion extending into Pinal County. The dam is designed as a single-purpose floodwater retarding structure having an embankment length of 7,600 feet, a maximum height of 37.4 feet, 540,000 cubic yards of embankment fill, and a drainage area of about 6.8 square miles. The structure is designed to have a dry sediment pool with a surface area of about 61 acres. The structure classification is C, and the site group is I.

During the investigation on Signal Butte FRS a total of 70 boreholes were drilled with a CME-75 rotary drill rig and about 200 test pits were excavated using a Case 580B Extenda backhoe.

Geologic Setting

The site is located within the Sonoran Desert section of the Basin and Range physiographic province. More specifically, the site is located within the Phoenix Basin. This basin is subdivided into a series of lesser structural and topographic basins by a number of fault block mountains.

Mid-Tertiary time was a period of volcanic and tectonic activity throughout the Basin and Range province. Block faulting created a number of small "mountains" within the basin. These mountains consist mainly of Precambrian schists, granites, quartzites, gneiss, and slates. Volcanic rocks, including dacite, andesite, and rhyolite are prevalent in the mountains around the periphery of the basin. These rocks are primarily of Tertiary age. Quaternary-Tertiary basalt is also present in and adjacent to the basin.

During the period of volcanic activity, and continuing to the present, great quantities of sedimentary materials were deposited in the basin. Sediment sources include the local mountains and through-flowing streams such as the Salt, Verde, and Gila Rivers. These Tertiary and Quaternary sediments have accumulated to depths of several thousands of feet. These sedimentary rocks provide the groundwater reservoir for the basin.

General Site Geology

The site is located on the lower end of a pediment of primarily unconsolidated and semi-consolidated alluvial fan deposits of Quaternary-Tertiary age. Many ephemeral desert washes extend or cross the centerline of the dam. Flow is southward from the Goldfield Mountains and associated igneous activity. Caliche is exposed in many of the washes. Exposed caliche is hard, dense, well-cemented, and usually contains gravel.

The overlying material is composed of unconsolidated to semi-consolidated sand with varying amount of silt, clay, and gravel.

Centerline of Dam (Foundation)

During the investigation of the centerline, 31 drill holes and 43 test pits were completed. Alternating drill holes and test pits were placed every hundred feet along the centerline. The drive sampling technique was generally used to advance exploration drill holes. Standard penetration tests were taken continuously in all drill holes until hard caliche or very dense material was encountered and then blow counts were taken at five-foot intervals to bottom of hole.

Estimated average depth to caliche is:

3.0 ft., Station 194+00 to 210+00
+15.0 ft., Station 210+00 to 213+00
8.0 ft., Station 213+00 to 238+00
2.0 ft., Station 238+00 to 240+00
25.0 ft., Station 240+00 to 242+00
6.0 ft., Station 242+00 to 264+00

Estimated weighted average depth is approximately 7.0 feet.

The majority of the caliche encountered along the centerline was tan to white-gray in color, weakly to well-cemented, moderately hard to hard, dense, usually contains gravel, and breaks down to silty sand with gravel.

The depth to caliche is irregular. This is the result of the many washes that cut across the centerline. Buried channels were found in the vicinity of Station 233+00, between Station 236+00 and Station 238+00 and at Station 241+00. Several existing channels were filled with unconsolidated alluvial material (ex. Station 213+00, 15 ft. deep; Station 219+00, 10.5 ft. to caliche; Station 228+25, 5 ft. to caliche; Station 252+60, sand with a 2-ft. thick layer of caliche, total depth 23 ft.)

Overlying the caliche are alluvial deposits consisting primarily of silty sand (SM); usually with gravel, loose, dry, with non-plastic fines (15-35%) and brown to light brown in color.

Other soils found in varying amounts included clayey sand (SC), silty clayey sand (SM-SC), silty sand with a small amount fines (SM-SP) and fairly clean, poorly-graded sand (SP).

Depth to ground water was estimated in the preliminary geologic investigation to be +300 feet.

Approximately 9 disturbed soil samples were collected along the centerline. Two attempts were made to get undisturbed samples of caliche (Station 227+20 and 211+54). Both the rock core and the Denison sample were unacceptable. A permeability test was attempted without success. Three in-place density tests were made.

In-place density determinations are:

Station	Depth	Material *	Dry Density (lbs./cu.ft.)	Moisture
218+00 ℄	2.0 ft.	SM	103.5	3.7%
222+00 ℄	1.0 ft.	SM	108.2	4.8%
230+00 ℄	9.0 ft.	Caliche	111.9	3.0%

* field classification

In October the alternate portion of the centerline of the dam was investigated. This proposed centerline extends from approximately Station 210+00 to Station 188+50. Six drill holes were bored and logged along this section of the centerline.

Caliche depth ranged from 1.5 feet (Station 202+00) to 10.0 feet (Station 194+00). Caliche and overlying soil was similar to that investigated along the main part of the centerline.

Principal Spillway

Investigation of principal spillway revealed that depth to caliche ranged from 2.5 to 7.5 feet. Caliche in the principal spillway has similar properties and description to that encountered along centerline of dam.

Overlying soil was field classified as clayey sand (SC) and silty clayey sand (SM-SC). Dry density of the clayey sand soil was 101.4 lbs./cu.ft.

Emergency Spillway

Alternative No. 1 is designed as a "U" shaped earth spillway located on the NW end of the dam. Thirty-three backhoe pits and four drill holes were completed at this site.

Depth to caliche along the centerline varied from 1.0 feet to 13.0 feet (Station 38+00, lower end of spillway). Average depth to caliche along the centerline of the emergency spillway is approximately 3.5 feet. Caliche was logged as dense, tan, dry, moderately hard to hard, and weakly to well cemented. Test pit at Station 29+00, 200' SE of ℄ , which is located in a wash, was excavated down to 16.5 feet and caliche was not encountered.

Soil over the caliche was primarily silty sand (SM) and clayey sand (SC).

Alternative No. 2 is designed as an earth emergency spillway and is located on the eastern end of the alternate dam alignment. Twenty drill holes were bored to investigate this spillway.

Caliche depth ranged from 2.0 to 7.0 feet, with the exception of drill hole 267, which was drilled to refusal (@ 19.5 ft.) in silty sand and cobbles; drill hole 268, which was drilled down to 25.0 feet in gravelly silty sand; and drill hole 270, which never hit caliche and was drilled 19.0 feet into gravelly silty sand.

Caliche was similar to other caliche in area: tan to gray in color, weakly to well-cemented, moderately hard to hard, density increasing with depth, gravel usually increasing with depth, occasional cobbles and breaks down to gravelly silty sand. Rock coring the caliche was attempted at drill hole 273. Coring indicated that caliche was hard, dense, and contained cobbles. No sample was recovered.

Overlying soil is predominantly silty sand (SM) and silty clayey sand (SM-SC), which are generally unconsolidated.

Alternative No. 3 is a concrete emergency spillway to be constructed through the dam in the vicinity of Station 206+00 to 204+00. Three drill holes were drilled upstream from the centerline and three drill holes were drilled downstream from the centerline of the dam.

Caliche was encountered fairly shallow, within 1.5 to 3.0 feet from the surface. Standard penetration tests, indicated that caliche is hard, dense, and well cemented. Most overlying soil was field classified as silty sand (SM).

Borrow Area

A total of 96 backhoe pits were excavated to investigate the borrow area. Test pits were excavated on a 200, 400, 600, 800, and 1000-foot grid-line upstream from the centerline of the dam. Other at random holes are located 1200 to 1900 feet upstream, but below the 1,720 foot contour line. The area investigated covers approximately 100 acres.

Material in the borrow area consisted primarily of silty sand (SM), silty clayey sand, (SM-SC), clayey sand (SC), and caliche.

The silty sand in the borrow area, for the most part, is fine to coarse-grained, brown in color, with non-plastic silty fines, loose, usually dry, contains gravel in varying amounts, and may contain cobbles.

The thickest deposits (6 ft. or greater) of silty sand were found in TP-104 (6 ft.), TP-111 (6 ft.), TP-112 (6 ft.), TP-125 (7 ft.), TP-142 (6 ft.), TP-146 (8 ft.) and TP-170 (8 ft.).

Several test pits contained silty sand with a low percentage of fines and were field classified SM-SP (ex. TP-128, 142, 186 and 192). This sand is medium to coarse-grained, dry and loose.

Silty clayey sand (SM-SC) was found in a large percentage of the test pits in the borrow area. This material is characterized by a fine to coarse-grained sand, silty, clayey, with slightly plastic fines, usually loose, dark brown to reddish-brown color, and may contain some gravel or only scattered gravel.

The thickest deposit of clayey sand (SC) was found in TP-168 (5 ft.). Other test pits indicated generally thin deposits of clayey sand (1 to 2 ft.). This sand is primarily fine to coarse-grained, loose to moderately firm, usually dense, with plastic fines, reddish-brown in color, and may contain some gravel.

Caliche investigated in borrow area was found to be moderately hard to hard, tan to gray in color, dry, moderately cemented to well cemented, breaks down to a silty sand (mostly coarse), contains gravel in varying amounts and may contain cobbles.

Weighted average depth to caliche in borrow area is estimated to be 4.0 feet.

Approximately 20 disturbed samples were collected, representing the different materials in the borrow area.

Seismicity

There is no record of recent seismic activity within a 100-mile radius of the Signal Butte FRS. Within a radius of 100 miles, several earthquake and Quaternary fault traces are shown on the following map. The nearest large recorded earthquake,

which was approximately 150 miles away occurred in 1958. It measured between 5 and 5.9 on the Richter scale. Signal Butte FRS is located in seismic zone 2, which has a minimum seismic coefficient of 0.10.

Conclusions and Interpretations

1. Depth to caliche, which will probably be the foundation material for the dam, was found to be rather irregular. This irregularity in the caliche along the centerline is the result of the many washes which cross it. The washes are filled with unconsolidated to loosely consolidated alluvial material, which may be as deep as 23.0 feet (Station 252+60). Several buried channels were discovered; there may be more (see centerline of dam profile).

   The majority of the caliche encountered along the centerline was tan to gray in color, weakly to well cemented, moderately hard to hard, dense, usually contains gravel and/or cobbles. It breaks down to silty sand (SM) with gravel.

   The caliche in general has properties similar to the caliche in the foundation at Spook Hill Dam and is considered to be non-yielding for the designed structure.

   The overlying soil consisted of unconsolidated and semi-consolidated sand with varying amounts of silt, clay, gravel and cobbles. The unconsolidated soils have a high consolidation potential, especially with applied loading and moisture.

2. Depth to caliche at the principal spillway location ranged from 2.5 to 7.5 feet. It is soft to moderately hard, moderately dense and is considered non-compressible.

   Overlying soil was field classified as SC and SM-SC.

   The principal spillway is designed to outlet into a reinforced concrete-lined floodway. Therefore, channel stability problems are alleviated.

3. Three alternatives were investigated for the emergency spillway. Average depth to caliche along Alternate No. 1 was approximately 3.5 feet; 4.3 along Alternate No. 2 (with the exception of the upper portion); and ranged from 1.5 to 3.0 feet in the vicinity of Alternate No. 3.

   The caliche encountered was logged as tan to gray in color, moderately hard to hard, weakly to well cemented, density increasing with depth, usually dry, with gravel and occasional cobbles (see discussion on emergency spillway for detailed description). Caliche is considered rippable and is fairly resistant to erosion. Only minor erosion is anticipated with the designed flow.

   Soil over the caliche was primarily silty sand (SM) and silty clayey sand (SM-SC), which are generally unconsolidated to semi-consolidated.

It was observed that the wash in the vicinity of the emergency spillway Alternate No. 1 is deeper than the depth of the proposed spillway.

There may be a problem with sedimentation from the washes that flow directly into the emergency spillway Alternate No. 1, and Alternate No. 2. Sediment deposition in the emergency spillway could affect proper functioning of this feature.

Recommendations

1. Remove all material to caliche for the foundation. The cutoff trench should extend a minimum of one foot into indurated caliche.

2. Use all materials excavated from emergency spillway for fill. Some caliche in borrow area may be used for embankment fill. The areal extent of the borrow area can be reduced if the use of caliche in the embankment fill is maximized.

3. It is proposed (as it was for Pass Mountain) that the borrow pits be excavated in such a way as to leave a green vegetated strip in existing washes. This strip would not only save the established vegetation, but would also decrease erosion and provide a habitat for wildlife.

4. A homogeneous embankment is recommended.

5. Selection of emergency spillway site and type should be based upon engineering criteria since geologic conditions are very similar for the alternates investigated.

6. Provisions to divert sediment-laden waters from the washes which impinge upon the emergency spillway are recommended. This could probably be accomplished by the construction of dikes to divert the flow.

Concrete tables on gates.

Aubrey C. Sanders Jr.

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Geologist, SCS

Ronnie A. Rappmund

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Geologist, SCS

December 3, 1980
Phoenix, Arizona

4. Borrow investigation extended over most of the pool area. The area available for borrow is approximately 100 acres. The weighted average depth to caliche in this area is estimated to be about 4.0 feet. Therefore, it is estimated that approximately 500,000 cubic yards of material is available for embankment fill. This estimate includes a 20% shrinkage factor and is based on that material above caliche. It is estimated that approximately 540,000 cubic yards of fill will be needed. It is assumed that the additional needs for embankment materials will be met by utilization of caliche.

The soil in the borrow area consists primarily of silty sand (SM), silty clayey sand (SM-SC), and clayey sand (SC). These soils are generally loose to moderately firm, contain gravel in varying amounts and may contain cobbles.

Some of the caliche may also be used as fill material. Most caliche breaks down to a silty sand (mostly coarse-grained), with gravel and occasional cobbles. Unlimited quantities of this material are available.

REV. 7

LOG OF HOLES

SOIL CONSERVATION SERVICE

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte FRS		OWNER: BLM	STATE
LOGGED BY: P. E. Pedone	DATE: 7/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Centerline FRS	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
1-94	194+50	0	1	Red Brn. clayey grav. SAND; cse; w/5% G; 15-20% sl. p.		SC								
	1720.4			fines; dry; lse. to mod. frm.										
		1		CALICHE; hard; v. frm.; well cmt.										
1-96	196+00	0	3	Brn. silty grav. SAND; fn to cse; w/5% G; 15-25% NP fines		SM								
	1718.51			lse; dry										
		3		CALICHE; v. hard; v. frm.; well cmt.										
1-98	198+00	0	2	Brn. silty grav. SAND; w/10-15% NP fines; 5% G; lse;		SM-SC								
	1715.94			w/few cbls.										
		2		CALICHE; v. hard; well cmt.										
2-00	200+00	0	.5	Red Brn. clayey grav. SAND; 15-20% sl.p. fines; cse. S;		SC								
	1713.03			5% G; few cbls.										
		.5	2	CALICHE hard; layered; well cmt.										
2-02	202+00	0	1	Brn. silty grav. SAND; poorly grad.; 5% G; 20% NP fines;		SM								
				lse; dry										
	1710.24	1	3	CALICHE; hard; firm; well cmt.										

1. DISTURBED-UNDISTURBED-ROCK CORE 2. COARSE MATERIAL REMOVED 3. PERCENT SAMPLE RECOVERY

SHEET ____ OF ____ SHEETS

SCS-ENG-533
REV. 7-72

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte FRS		OWNER: BLM	STATE
LOGGED BY: P. F. Pedone	DATE: 7/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Centerline FRS	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
2-04	204+00	0	1	Brn. silty grav. SAND; poorly grad.; 5% G; 20% NP fines;		SM								
				lse; dry										
	1707.08	1	3	Hard CALICHE; well cmt.										
2-06	206+00	0	3	Brn. silty grav. SAND; med. to fn.; w/5% G; 20% NP fines;		SM								
	1704.05			lse.; dry										
		3	5	CALICHE (silty grav. S) mod. well cmt. to well cmt. w/few										
				cbls.										
2-08	208+00	0	2	Red Brn. v. gravelly clayey SAND, med. to cse; w/15-25%		SC								
	1704.09			sl. plas. fines; 5% grav.; dry; mod. frm.										
		2	5	CALICHE (silty gravelly sand) becomes v. hard @4.5'										
2-10	210+00	0	1.5	Brn. silty SAND w/5% G. 20% NP fines; lse; w/few cbls;		SM								
	1701.25			dry										
		1.5		CALICHE, hard, gravelly, well cmt.										

1. DISTURBED/UNDISTURBED ROCK CORE 2. COARSE MATERIAL REMOVED 3. PERCENT SAMPLE RECOVERY

SCS-ENG-533
REV. 7-72

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte FRS		OWNER: BLM	STATE
LOGGED BY: P. F. Pedone	DATE: 7/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Centerline FRS	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
2-11	210+50	0	3	0-3' v. cbly. silty SAND brn. 3' CALICHE hard + cbly.		SM								
to	210+75			0-3' silty gravelly S., brn. w/cbls., 20-25% NP fines										
				lse; moist										
	trench	3	7	Brn. v. cbly. silty SAND, w/10% cbl. 10% G. max. 12";		SM								
	1693.95			lse. to mod. frm.; dry; 20% NP fines										
		7	16.5	Brn. v. silty SAND w/5% cbls. 10% G; mostly fine to med.		SM								
				S; dry; mod. frm; mod. well cmt. @15'15.5'.										

1. DISTURBED-UNDISTURBED-ROCK CORE 2. COARSE MATERIAL [illegible]

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REV. 7-72

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED		SUB-WATERSHED	SITE NO.
LOCATION: Buckhorn-Mesa		OWNER: BLM	STATE
LOGGED BY: Signal Butte FRS	DATE: 7/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Centerline FRS	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
2-12	212+00	0	4	Brn. silty v. gravelly SAND, fn. to cse; 10-15% NP fines;		SP-SM								
	1694.09			10% G; few cbls. max. 8", lse.; moist										
		4	8	Brn. v. cbly. grav. SAND; 10% cbl. max. 24"; 10-15% G.;		SP-SM								
				lse. to mod. frm.; 10-15% NP fines										
		8	10	Red Brn. gravelly clayey SAND; 15-25% sl. plas. C; 10% G,		SC								
				w/5% cbls. max. 15"; mod. frm.										
		10	12	Brn. gravelly cbly. SAND, w/10-15% NP fines; 10% G., 10%		SM								
				cbl. max. 15"; mod. frm.										
		12	14	Red Brn. grav. clayey SAND; 15-25% sl. p. C; 10% G.; 5%		SC								
				cbls. max. 15"; mod. frm.										

1. DIST[illegible]-UNDISTURBED-ROCK CORE 2. COARSE MATERIAL REMOVED [illegible]RCENT SAMPLE RECOVERY SHEET OF S[illegible]

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REV. 7-72

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte FRS		OWNER: BLM	STATE
LOGGED BY: P. F. Pedone	DATE: 7/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Centerline FRS	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
2-13	213+00			Brn. silty SAND, fine to cse; w/5% G. and few cbls. max.		SM								
	1692.99	0	4.5	12"; poorly strat.; lse; moist; 20-25% NP fines;										
		4.5	8	Red Brn. clayey silty SAND; fine to cse; 25-35% VSP		SC-SM								
				fines; 2-3% G; moist; mod. frm.										
		8	13	Red Brn. v. cobbly gravelly SAND, w/15-20% VSP fines; mod.		SC								
				frm; 5% cbl. max. size 24"; 10% G.; moist.										
		13	15	Red Brn. Clayey SAND; med. to cse; w/25% sl. p. C; 10% G.		SC								
				few cbls.; frm; moist.										
2-14	214+00	0	1.5	Red Brn. silty gravelly SAND w/5% cbls. max. 12"; 10% G.;		SM-SC								
	1698.72			20% VSP fines; fm. to cse. S; lse.										
		1.5	2.5	CALICHE v. frm; w/cbls. & grav.; hard to dig.										
2-16	216+00	0	2.5	Red Brn. silty fn. to cse. SAND 20% V. sl. plas. fines;		SM								
	1696.8			5-10% G. max. 3" few cbls.										
		2.5	3	CALICHE (prob. silica cemt.) v. hard; v. frm; hard to										
				excavate										

1. DIS[illegible]D-UNDISTURBED-ROCK CORE 2. COARSE MATERIAL REMOVED [illegible]ERCENT SAMPLE RECOVERY SHEET ____ OF ____

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REV. 7-72

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte FRS		OWNER: BLM	STATE
LOGGED BY: P. F. Pedone	DATE: 7/79	PROJECT: WP-07 1 WP-08 X FP-03 P.L.-46	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Centerline FRS	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
2-18	218+00	0	4	Brn. silty fine to med. SAND w/few gravel; v. lse.; 20%		SM			D	2				
	1695.5			v. sl. plas. fines. Density test @ 2' = 103.5 lbs/ft.^{3}										
				dry density; 3.7% moisture										
		4		white CALICHE; hard; v. frm.										
2-20	220+00	0	2.5	Brn. clayey grav. SAND, 10-15% G.; 5% sl. plas. fines;		SC-SP								
	1693.14			lse.; few cbls.										
		2.5	5	White hard well cmt. CALICHE w/G. & cbls.										
		5	9	Brn. cobbly gravelly SAND w/20-25% NP fines lse.; 10%		SM								
				cbl. max. 12"; 15% G.; lse										
				NOTE: Caliche is undercut here by old wash deposit; see										
				enlarged X-sect. of trench from sta. 220+00 to										
				219+70										

1. D[illegible]ED-UNDISTURBED-ROCK CORE 2. COARSE MATERIAL REMOVED [illegible] PERCENT SAMPLE RECOVERY SHEET OF [illegible]

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REV. 7-72

U. S. DEPARTMENT OF AGRICU[illegible]E
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte FRS		OWNER: BLM	STATE
LOGGED BY: P. F. Pedone	DATE: 7/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Centerline FRS	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
2-22	222+00	0	1.5	Brn. silty cse. SAND w/fn. G. 15-20% NP fines; 5% G.; lse;		SM								
	1692.37			dry										
		1.5	3.5	white well cmt. CALICHE w/GS and fines; v. hard to dig										
		3.5	4.5	wh. sandy cobbly GRAVEL. mod. well cmt.; 10% cbl.; v.		GP-GM								
				frm.; cement is variable										
2-23	223+60	0	2.5	Red Brn. clayey SAND 15-20% sl. plas. fines		SC								
	1692.5	2.5	3	Indurated CALICHE; gravelly; v. hard										
2-24	224+00	0	2	Red Brn. sandy CLAY w/G.; mod. plas.; med. frm; 40-45% S&G		CL			D	1				
	1693.05	2	3.5	Brn. silty SAND w/G; med. frm; wk. cmt.; med. to cse.;		SM-SP								
				10-15% fines										
		3.5	6.5	Brn. grav. SAND w/10% NP fines; 5-10% G.; fn to cse.; mod.		SM-SP								
				cmt.; frm. few cbls.; hard to excavate below 5 ft.										
				In-place density at 1 ft. = 108.2 lbs/ft^3 dry density;										
				4.8% moisture										

1. DIST[illegible]-UNDISTURBED-ROCK CORE 2. COARSE MATERIAL REMOVED [illegible]RCENT SAMPLE RECOVERY SHEET ____ OF ____

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SCS-ENG-533
REV. 7-72

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED:	SITE NO.:
LOCATION: Signal Butte FRS		OWNER: BLM	STATE:
LOGGED BY: P. F. Pedone	DATE: 7/79	PROJECT: WP-07 ___ WP-08 X FP-03 ___ P.L.-46 ___	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Centerline FRS	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
2-26	226+00	0	4.5	Brn. silty grav. SAND, w/20-25% NP fines dry; lse.		SM								
	1693.76	4.5	6	Brn. silty grav. SAND, w/15-20% NP fines; 5% grav.; wk		SM								
				cmt.; frm.										
		6	7	White hard CALICHE										
2-27	227+00	0	1.5	Brn. silty SAND w/5% G. 20% NP fines, lse., dry.		SM								
	1692.42													
		1.5	3.5	Brn. silty SAND w/10% G. w/occas. cbls. 10-15% NP fines;		SM								
				lse to mod. frm.; dry.										
		3.5	12	Lt. Brn. silty Gravelly CALICHE w/15-25% NP fines; frm.		SM								
				wk cmt.; breaks up easily below 5'										
2-28	228+25			In sand bed wash w/8' cutbank exposure of 3' Red Brn.										
	1683.48			clayey sand and 5' white caliche										
		0	5	Wash dep. sand and gravel w/lenses of clayey sand		SP-SC								
		5		White hard CALICHE										

1. DISTURBED UNDISTURBED ROCK CORE 2. COARSE MATERIAL REMOVED 3. PERCENT SAMPLE RECOVERY

SHEET OF TS

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SCS-ENG-533
REV. 7-72

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED:	SITE NO.:
LOCATION: Signal Butte FRS		OWNER: BLM	STATE:
LOGGED BY: P. F. Pedone	DATE: 7/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Centerline FRS	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
2-30	230+00	0	2.5	Brn. Silty SAND w/15-25% NP fines; lse to mod. frm.		SM								
	1692.06													
		2.5	9	Red Brn. gravelly SAND w/20% G. max. 3" and 10-15% NP		SM			D	4				
				fines; sl. cmt.; wk. stratified										
		9	10	CALICHE wk. to mod. cmt. - Red w/lime streaks										
				inplace density @4' = 111.9 lbs/ft^3 dry density and 3%										
				moisture										
2-31	231+00	0	4	Brn. grav. sil. SAND w/10-15% G.; few cbl.; 20-30% NP		SM								
	1691.3			fines; lse. to frm.										
		4	4.5	White v. hard CALICHE v. frm. and dse.										
2-32	232+00	0	1	Brn. silty SAND lse. (in floodplain of wash just below hub		SM								
	1690.21			of 232+00) 20-30% NP fines; gravelly 10-15%										

1. DISTURBED UNDISTURBED ROCK CORE 2. COARSE MATERIAL REMOVED 3. PERCENT SAMPLE RECOVERY SHEET OF

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SCS-ENG-533
REV. 7-72

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte FRS		OWNER: BLM	STATE
LOGGED BY: P. F. Pedone	DATE: 7/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Centerline FRS	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
2-34	234+00	0	3.5	Brn. silty SAND; lse. to mod. frm.; 25-30% NP fines;		SM								
	1692.99			5-10% G										
		3.5	6	Brn. v. gravelly silty SAND w/15-20% NP fines; 15-20% G;		SM								
				few cbls. max. 5"; mod. frm.										
		6	7.5	Red Brn. clayey grav. SAND w/5% G; 10-15% sl. p. clay;		SC								
				frm; wk. cmt.										
		7.5	9	Brn. grav. SAND; frm.; wk. cmt.; w/10-15% NP fines, 5-10%		SM								
				fine G.										
		9		CALICHE v. hard, v. dse.										

1. DISTURBED UNDISTURBED ROCK CORE 2. COARSE MATERIAL REMOVED 3. PERCENT SAMPLE RECOVERY SHEET OF SHEETS

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SCS-ENG-533
REV. 7-72

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED:	SITE NO.:
LOCATION: Signal Butte FRS		OWNER: BLM	STATE:
LOGGED BY: P. F. Pedone	DATE: 7/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Centerline FRS	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
2-36	236+20	0	1	Red Brn. clayey SAND w/5% G.; 25-30% sl. p. fines; sl.		SC								
	1691.7			moist; frm.										
		1	4.5	Brn. silty SAND w/15-25% NP fines; few cbls., 5-10% G.,		SM								
				sl. cmt.; dry										
		4.5	7.5	Red Brn., gravelly SAND w/0-5% sl. p. fines, lse. to frm.		SP								
				(wash deposit) 15% G. few cbls.										
		7.5	10	Red Brn. gravelly SAND, well cmt. to sl. cmt.; 15% G.;		SP								
				dse; hard to dig										
		10		CALICHE, v. hard, v. frm.										
2-38	238+00	0	7	Brn. silty SAND w/5-10% G.; lse to mod. frm.; cbls. and		SM								
	1692.22			boulders @5' max. size 24"										
		7	10	Red Brn. clayey gravelly SAND and sandy GRAVEL (wash		SP-SC and GC-GP								
				dep.) 5-15% clay w/few clbs.										
		10	10.5	CALICHE; hard; v. frm.; well. cmt.										

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SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED:	SITE NO.:
LOCATION: Signal Butte FRS		OWNER: BLM	STATE:
LOGGED BY: P. F. Pedone	DATE: 7/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Centerline FRS	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
2-40	240+00	0	.5	CALICHE @ surface										
	1686.23													
2-42	242+00	0	3.5	Brn. silty SAND, lse. to mod. frm., 20% NP fines		SM								
	1688.53	3 1/4	4	CALICHE										
2-44	244+00	0	.5	Brn. silty SAND, lse., 20-25% NP fines		SM								
	1686.3	.5		CALICHE										
2-46	246+00	0	7	Brn. silty SAND w/5% G.; 20-25% NP fines; few cbls.		SM								
				slightly cmt. @5'										
	1692.5	7		CALICHE										
2-48	248+00	0	2	Red Brn. c. SAND w/20-25% sl.p.clay; 5-10% G.; lse. to mod.		SC								
	1693.69			frm.										
		2	8	CALICHE; hard; v. frm; dry; well cmt. (gravelly sand)										
2-50	250+00	0	4.5	Brn. silty SAND; 25-30% NP fines, 5% G., lse. to sl. frm.		SM								
	1698.36													
		4.5	7	CALICHE, hard; well cmt. dry										

1 DISTURBED/UNDISTURBED ROCK CORE 2 COARSE MATERIAL REMOVED 3 PERCENT SAMPLE RECOVERED

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte FRS		OWNER: BLM	STATE
LOGGED BY: P. E. Pedone	DATE: 7/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Centerline FRS	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
2-52	252+00	0	.5	Clean gravelly S. wash deposit 10% G. max. 2"		SP-SW								
	1695.04	.5	5.5	Brn. clayey sandy SILT w/G., sl. p., 30-35% S, w/lime few		ML								
				cbls.; mod. frm., sl. moist										
		5.5	7.5	Red clayey SAND, 15-30% sl. p. fines, few cbls.; mod. frm.		SC								
				sl. moist, increasing lime										
		7.5	9.5	CALICHE w/streaks of clayey sand and few cbls.; sl. moist										
				- cmt. variable; represents old channel dep.										
2-54	254+00	0	3	Red Brn. C. SAND w/G.; 15-20% sl. p. clay; dry; lse to		SC			D	0	3			
	1703.2			frm.										
		3	5	CALICHE, hard, v. frm., well cmt. w/some cbls.					D	3				
2-56	256+25	0	5.5	Brn. silty SAND w/5% G.; tr. cbls; 20-30% NP fines; lse.		SM			D	0	5.5			
	1706.6													
		5.5	6	CALICHE, refusal; v. hard v. dense										

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte FRS		OWNER: BLM	STATE
LOGGED BY: P. F. Pedone	DATE: 7/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Centerline FRS	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
2-58	258+00	0	3	Red Brn. silty clayey SAND w/15-25% v. s. p. fines. w/5%		SC-SM			D	2.5				
	1708.8			G. max. 4" cbl. dry, lse. to frm.										
		3	5	CALICHE, hard, v. frm., dse., sl. moist										
2-60	260+00	0	7	Red Brn. silty SAND w/15-25% NP fines; lse., dry; w/few		SM			D	3				
	1712.3			cbls. and 5% G.										
		7	12	Same but sl. cmt., frm., and sl. moist		SM			D	7.5				
		12	15	Red clayey gravelly SAND, frm. (old channel dep.) 10-15%		SC			D	12				
				sl. p. clay; 10% G.										

1 DISTURBED/UNDISTURBED ROCK CORE

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REV. 7-72

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED:	SITE NO.:
LOCATION: Signal Butte FRS		OWNER: Maricopa Co. Parks	STATE: AZ
LOGGED BY: Paul F. Pedone	DATE: 8/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Centerline FRS	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
2-62	262+00	0	10	Brn. silty grav. SAND w/25-30% NP fines; mod. well		SM								
	1715.2			grad.; 10-15% G;lse. to mod. frm @ 8'										
2-63	263+00	0	6	Brn. silty grav. SAND w/10-15% G; 25-35% NP fines; mod.		SM								
	1716.2			well grad.; lse.										
		6	9	Brn. silty grav. SAND w/10-15% G; 25-35% NP fines; wk		SM								
				cmt.; mod. frm.										
		9	11.5	Brn. sandy cobbly GRAVEL; 10-15% NP fines; 30-40% poorly		GM								
				grad. sand; 10-20% cbls. max 10"										
		11.5		CALICHE (cmt. grav. and sand w/fines)										
2-64	264+00	0	6.5	Brn. silty gr. SAND w/25-30% NP fines; mod. well grad.;		SM								
	1717.4			10-15% G.; lse.										
		6.5	8	Brn. silty gr. SAND; 5% G.; 20-25% v. sl. plas. fines;		SM-SC								
				frm.; mod. well cmt.										
		8		CALICHE (cmt. gravelly sand w/fines)										

1 UNDISTURBED ROCK CORE 2 COARSE MATERIAL REMOVED 3 PERCENT SAMPLE RECOVERY

SHEET 1 OF 1 S

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SCS-ENG-533
REV. 7-72

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED	Buckhorn-Mesa	SUB-WATERSHED	SITE NO.
LOCATION	Signal Butte FRS	OWNER BLM	STATE
LOGGED BY P. F. Pedone	DATE 7/79	PROJECT: WP-07 ___ WP-08 X FP-03 ___ P.L.-46 ___	
DRILLING EQUIPMENT	Backhoe	LOCATION OF HOLES	Centerline Principal Spillway

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
300	℄ PS	0	2.5	Red Brn. C. SAND w/25-30% sl. p. C.; 5% G., lse. to mod.		SC			D	1.2				
	@ BM			frm. dry - dry density @ 14" = 101.4 lbs/ft^3										
	1696.5	2.5	4	CALICHE hard, v. frm., well cmt. dry, laminated and flaggy										
311	℄ PS	0	1	Red Brn. C. SAND same as TP 300		SC								
	@ sta 11+00	1	6	CALICHE same as TP 300										
	on SB Fldwy	6	7	CALICHE wk. cmt.										
312	℄ PS	0	7.5	Red Brn. C. SAND; 10-15% sl. p. fines		SC-SM								
	@ sta 12+00			10-15% G. max. 3"; few cbls; lse. to wk. cmt.; becomes										
				slightly more silty w/depth; wk. stratified										
		7.5	8	CALICHE hard v. frm.										
				NOTE: CALICHE drops off @ 55' from TP 311 between 311										
				and 312; it is @ 2.5 to 3' @ sta 11+55 on ℄ Signal										
				Butte Fldway.										

1 DIGGING INDICATORS BOOK CODE 2 COARSE MATERIAL REMOVED PERCENT SAMPLE RECOVERY SHEET OF

SCS-ENG-533
REV. 7-72

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte FRS		OWNER: BLM	STATE: AZ
LOGGED BY: Paul F. Pedone	DATE: 8/79	PROJECT: WP-07 ___ WP-08 X FP-03 ___ P.L.-46 ___	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Borrow Area	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
3100	In wash	0	3	Wash dep. of grav. SAND;5% NP fines;well grad.; 15-25% G.		SW-SP								
	near 196+00			few cbls.										
		3	14	Red Brn. cobbly gravelly SAND w/20-25% sl. plas. fines;		SC								
				well grad.; 20% G and cbls. max 12"										
		14	16	CALICHE well cmt.										
3101	197+00	0	5	Wash dep. of silty gravelly SAND		SP-SM								
	offset 50'	5	15	cbls. gravel and SAND w/red clay;frm. to v. frm.		SC-GC								
	in wash													
3102	In wash	0	4	Wash deposit of silty gravelly SAND w/15-25% NP fines;		SM								
				well grad.; lse.; 20% G. w/many cbls.										
		4	14	Red Brn. cobbly gravelly clayey SAND w/20-25% sl. plas.		SC								
				fines; 20-25% G.; 5-10% cbls and boulders, max. 24";										
				v. hard digging; v. frm.										

1 DIS[illegible] UNDISTURBED-ROCK CORE 2 COARSE MATERIAL REMOVED [illegible]RCENT SAMPLE RECOVERY

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REV. 7-72

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED	Buckhorn-Mesa	SUB-WATERSHED	SITE NO.
LOCATION	Signal Butte FRS	OWNER BLM	STATE AZ
LOGGED BY Paul F. Pedone	DATE 8/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT Backhoe		LOCATION OF HOLES Borrow Area	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
3103		0	6.5	Red Brn. clayey SAND w/10-15% Grav.; 20-25% sl. plas. fines. loose to mod. firm. 5-10% cbls. max. 12" more cbls., 15-20% at 3.5'		SC								
			6.5	CALICHE										
3104		0	2	Red Brn. clayey SAND w/5-10% G.; 20-25% sl. plas. fines; lse.; poorly grad.; few cbls.		SC								
3105		0	1.5	Red Brn. clayey SAND w/5-10% G.; 20-25% sl. plas. fines; lse.; poorly grad.; 3% cbls. max. 12"		SC								
3106	300' N of sta. 216+00	0	3	Brn. silty grav. SAND; lse.; w/20-25% NP fines; 5-10% G.; poorly grad.;med. to cse.;		SM								
		3	9	Brn. silty grav. SAND; lse.; w/20-25% NP fines; 5-10% G.; poorly grad.;med. to cse.; frm.;w/3% cbls.		SM								

1. DIS[illegible] UNDISTURBED ROCK CORE 2. COARSE MATERIAL REMOVED ERCENT SAMPLE RECOVERY

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte FRS		OWNER: BLM	STATE: AZ
LOGGED BY: Paul F. Pedone	DATE: 8/79	PROJECT: WP-07 ___ WP-08 X FP-03 ___ P.L.-46 ___	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Borrow Area	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
3107	200'	0	3	Brn. silty grav. SAND w/20-25% NP fines; lse.; 5-10% G.;		SM								
	N of 3106			poorly grad.;fn. to med.;										
		3	5.5	Red Brn. clayey gravelly SAND; frm.; few cbls.; 10% G.;		SC		3107	Lg.	dis				
				15-25% sl. plas. fines; poorly grad.										
3108		0	2.5	Brn. silty fine SAND w/5% G.; 25-30% NP fines; lse; poorly		SM								
				grad.										
		2.5	5	Brn. silty cobbly SAND w/15% cbls and G.; 20% NP fines;		SM								
				lse.										
		5	6.5	Brn. silty fine SAND w/20-30% NP fines;med. frm.		SM								
3109		0	2.5	Brn. silty SAND w/5% gravel; 20-25% cbls.;lse.		SM								
			2.5	CALICHE										
3110		0	2	Red Brn. clayey SAND, w/5-10% gravelly, 25-30% sl. plas.		SC								
				fines. becoming cemented at 1.5'										
			2	CALICHE										

1 USE STANDARD BORE SIZE 2 COARSE MATERIAL REMOVED 3 PERCENT SAMPLE RECOVERY

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REV. 7-72

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED:	SITE NO.:
LOCATION: Signal Butte FRS		OWNER: BLM	STATE: AZ
LOGGED BY: Paul F. Pedone	DATE: 8/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Borrow Area	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
3111		0	3.5	Red Brn. clayey SAND;firm;25-30% sl. pl. fines; 5% grav.;		SC								
				5% cbls.;becoming cem. at 1.5', med. moist. 10-15%										
				grav. at 2.5'										
			3.5	CALICHE										
3112		0	3	Red Brn. clayey grav. SAND; lse. to frm.; 25-30% sl. plas.		SC								
				fines; 5-10% grav.;5% cbls.										
			3	CALICHE										
3113		0	3	Red Brn. clayey grav. SAND; lse. to frm.; 25-30% sl. plas.		SC								
				fines; 5-10% grav.;5% cbls.										
		3	5	Brn. silty grav. SAND; poorly grad.; 5% NP fines; 5% G.;		SM-SP								
				lse.										
		5		CALICHE										
3114		0	3.5	Brn. silty G. SAND w/10-15% G.; 15-20% NP fines; lse.; mod.		SM		3114	small bag					
				well grad.										
		3.5		CALICHE										

1 - CIST 2 - UNDISTURBED ROCK CORE 2 - COARSE MATERIAL REMOVED 3 - PERCENT SAMPLE RECOVERY

SCS-ENG-533
REV. 7-72

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED:	SITE NO.:
LOCATION: Signal Butte FRS		OWNER: BLM	STATE: AZ
LOGGED BY: Paul F. Pedone	DATE: 8/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Borrow Area	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
3115		0	3	Brn. silty G. SAND; 20-25% NP fines; 10% G.; lse.; poorly grad.		SM								
		3	5	Brn. silty G. SAND; 20-25% NP fines; 10% G.; lse.; poorly grad.; 10% cbls		SM								
		5		CALICHE										
3116		0	4.5	Brn. silty grav. SAND w/20-25% NP fines; 5-10% G.; more gravel @ 2.5'; lse. to mod. frm.		SM								
		4.5		CALICHE										
3117		0	3	Brn. silty G. SAND; w/5% G.; 25-30% NP fines; lse.;poorly grad.		SM								
		3	5	Brn. silty, G. Sand w/10% G.; 20% NP fines; wk cmt.; w/5% cbls.		SM								
		5		CALICHE										

1. SIEVE NUMBER ROCK CODE 2. COARSE MATERIAL REMOVED 3. PERCENT SAMPLE RECOVERY

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED:	SITE NO.:
LOCATION: Signal Butte FRS		OWNER: BLM	STATE: AZ
LOGGED BY: Paul F. Pedone	DATE: 8/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Borrow Area	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
3118		0	3	Red Brn. clayey silty gravelly SAND w/20-25% v. sl. plas		SC-SM								
				fines; 5% G.; tr. cbls.; poorly grad.; frm										
		3		CALICHE										
3119		0	3	Br. silty sand; 5-10% gravel; very few cbls.;20-25% NP		SM								
				fines.; mod. well graded.;loose to mod. firm;becoming										
				cmt. at 2'										
			3	CALICHE										
3120		0	5	Br. silty sand; 5-10% gravel: very few cbls.;20-25% NP		SM								
				fines.; mod. well graded.;loose to mod.;firm becoming										
				cmt. at 4.5'										
			5	CALICHE										
3121		0	5.5	Br. silty sand; 5-10% gravel: very few cbls.;20-25% NP		SM-SC								
				fines.; mod. well graded.;loose to mod. firm;										
				w/10-15% gravel starting at 3'										
			5.5	CALICHE										

1. TYPE: UNDISTURBED ROCK CORE 2. COARSE MATERIAL REMOVED 3. PERCENT SAMPLE RECOVERY

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte FRS		OWNER: BLM	STATE: AZ
LOGGED BY: Paul F. Pedone	DATE: 8/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Borrow Area	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
3122		0	3	Red Brn. clayey SAND; 5% G.; 25-30% sl. plas. fines; poorly		SC								
				grad.; lse.										
		3		CALICHE										
3123		0	5	Brn. silty SAND w/5% G.; 25-30% NP fines; lse. to frm.;		SM								
				poorly grad.										
			5	CALICHE										
3124		0	5	Brn. silty SAND w/5% G.; 25-30% NP fines; lse. to frm.;		SM								
				poorly grad.										
			5	CALICHE										
3125		0	4	Brn. silty SAND w/5% G.; 25-35% v. sl. plas. fines; lse.		SM-SC								
				to 3.5' then wk. cmt.; poorly grad.										
			4	CALICHE										

1. DIST... UNDISTURBED ROCK CORE 2. COARSE MATERIAL REMOVED ...RCENT SAMPLE RECOVERY

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte FRS		OWNER: BLM	STATE: AZ
LOGGED BY: Paul F. Pedone	DATE: 8/79	PROJECT: WP-07 ___ WP-08 X FP-03 ___ P.L.-46 ___	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Emergency Spillway	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
208	8+00	0	1	Brn. silty grav. SAND; w/20% NP fines; 5-10% G.; poorly		SM								
				grad.; lse.										
	1710.8	2		CALICHE										
209	9+00	0	2	Brn. silty grav. SAND; w/20% NP fines; 5-10% G.; poorly		SM								
	1711.3			grad.; lse.										
		2		CALICHE										
210	10+00	0	1	Brn. silty grav. SAND; 20% NP fines; lse; 5% gravel;		SM								
	1711.77			poorly grad.										
		1		CALICHE										
211	11+00	0	1	Red Brn. cobbly clayey SAND w/15% G. and cbls. max. 6";		SC								
	1715.1	1		CALICHE										
212	12+00	0	2	Red Brn. cobbly clayey SAND w/15% G. and cbls. max. 6";		SC								
	1717.1			20-25% sl. plas. fines; poorly grad.; lse. to v. frm.										
		2		CALICHE; v. hard; dse.										

1 DISTURBED 2 COARSE MATERIAL REMOVED 3 NT SAMPLE RECOVERY

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED:	SITE NO.:
LOCATION: Signal Butte FRS		OWNER: BLM	STATE: AZ
LOGGED BY: Paul E. Pedone	DATE: 8/79	PROJECT: WP-07 ___ WP-08 X FP-03 ___ P.L.-46 ___	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Emergency Spillway	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
213	13+00	0	1.5	Red Brn. cobbly clayey SAND w/15% G. cbls. max. 6";		SC								
	1716.7			20-25% sl. plas. fines; poorly grad.; lse.										
		1.5		CALICHE										
214	14+00	0	1	Brn. silty grav. SAND w/15-25% NP fines; 5-10% G.;few		SM								
	1717.4			cbls.; lse.;poorly grad.										
		1		CALICHE										
218	18+00	0	1	Wash deposit of lse. grav. SAND;well grad.		SW								
	in wash													
	1714.	1	7.5	Red Brn. cobbly gravelly clayey SAND w/5-10% cbls. max.		SC								
				12"; 10% G.; 15-20% sl. plas. clay; mod. well grad.;										
				frm.;few boulders max. 24".										
		7.5	10	CALICHE;v. cobbly and hard										
219	19+00	0	2.5	Red Brn. clayey grav. SAND; cse.; 5% G; 15-20% sl. plas.		SC								
	1724.49			fines; lse.; dry										
		2.5		CALICHE, v. hard; v. frm.; well cmt.										

[1] FIELD BORE BOOK CODE [2] % COARSE MATERIAL REMOVED [3] % UNIT SAMPLE RECOVERY

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte FRS		OWNER: BLM	STATE: AZ
LOGGED BY: Paul F. Pedone	DATE: 8/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Emergency Spillway	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
219.1	N 32° E. of E. S.	0	3	Brn. sil. grav. SAND, fine to cse.; 5% G. 20-25% NP fines		SM	219	1	Lg.	0	3			
	19+00 Lt offset	3		CALICHE										
	135'													
220	20+00	0	2.5	Brn. sil. grav. SAND, fine to cse.; 5% G. 20-25% NP fines		SM								
	1724.5	2.5		CALICHE										
220.1	offset	0	5.5	Brn. silty grav. SAND; 15-20% G; 15-20% NP fines; V. cse.		SM								
	180' Lt E			to med.; lse.;wash deposit										
	of 20+00													
		5.5		CALICHE; v. hard; v. frm.; well cmt.										

1. SIZE OF UNDISTURBED ROCK CORE 2. COARSE MATERIAL REMOVED CENT SAMPLE RECOVERY

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte FRS		OWNER: BLM	STATE: AZ
LOGGED BY: Paul F. Pedone	DATE: 8/79	PROJECT: WP-07 ___ WP-08 X FP-03 ___ P.L.-46 ___	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Emergency Spillway	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
221	21+00	0	2	Red Brn. clayey grav. SAND; fine to cse.; 5% G.; 20-25%		SC		221	Lg.	0	2			
	1722.5			sl. plas. fines ; lse.										
		2		CALICHE										
221.1	21+00	0	2.0	Red Brn. clayey grav. SAND; fine to cse; 5% G.; 20-25%		SC								
	offset 140'			sl. plas. fines ; lse.										
	N 222°W	2		CALICHE										
221.2	21+00	0	2.0	Red Brn. clayey grav. SAND; 5% cbls. and 5% G., fine to		SC								
				cse.; 20-25% sl. plas. fines; lse.										
	offset	2		CALICHE										
	180' N 67° E													
222	22+30			In wash at junction of washes										
	1714.	0	6	Red Brn. clayey sandy GRAVEL w/15-20% sl. plas. fines; 30%		GC								
				fn. to cse. S; 10% cbls. max. 24";lse. to mod. frm.										
		6		CALICHE										

1. DISTU[illegible] INDISTURBED ROCK CORE 2. COARSE MATERIAL REMOVED [illegible]CENT SAMPLE RECOVERY

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte FRS		OWNER: BLM	STATE: AZ
LOGGED BY: Paul F. Pedone	DATE: 8/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Emergency Spillway	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
223	23+00	0	3.5	Brn. sil. grav. SAND w/20% NP fines; 5-10% grav.;few cbls.		SM								
	1719.6			lse. to mod. frm.										
		3.5	6	Red Brn. clayey grav. SAND w/25-30% sl. plas. fines; 10%		SC								
				grav.; frm. w/few cbls.										
		6		CALICHE (comes up to the E to 5')										
224	24+00	0	2	Red Brn. clay grav. SAND w/25-30% sl. plas. fines; 5-10%		SC								
	1717.7			G.; mod. frm. to lse.										
		2		CALICHE										
224.1	24+00	0	3	Brn. grav. SAND; well grad.; lse.; strat.; w/15-20% G.;		SW								
	offset 200'			0- 5% NP fines										
	SE in wash	3	4.5	Brn. silty SAND w/5% G.; 25-35% v. sl. plas. fines;		SC-SM								
				poorly grad.; frm										
		4.5	7.5	Red Brn. clayey Grav. SAND; mod. well grad.; w/5-10% grav.		SC								
				and cbls.; 20-25% sl. plas. fines; frm.										
		7.5		CALICHE										

1 DISTURBED 2 UNDISTURBED ROCK CORE 2 COARSE MATERIAL REMOVED 3 PERCENT SAMPLE RECOVERY

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte FRS		OWNER: BLM	STATE: AZ
LOGGED BY: Paul F. Pedone	DATE: 8/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Emergency Spillway	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
225	25+00	0	2.5	Red Brn., clayey grav. SAND w/25-30% sl. pl. fines		SC								
	1717.12			5-10% grav.;mod. firm to lse.										
		2.5		CALICHE										
226	26+00	0	1.5	Red Brn. clayey grav. SAND w/25-30% sl. pl. fines,		SC								
	1715.5			10-15% grav.;mod. firm to lse.										
		1.5		CALICHE										
227	27+00	0	1	Brn. silty SAND w/30% NP fines, 5% cbls.;		SM								
	1706.7			loose to mod. firm.										
		1	6	Red Brn. clayey grav. SAND w/25-30% sl. plas. fines;		SC								
				15-20% grav.;firm ; many cbls. and boulders; becoming										
				cem. w/caliche										
		6		CALICHE										
228	28+00	0	1	Brn. silty SAND, w/30% NP fines, few cbls.;loose to med.		SM								
	1709.4			firm										
			1	CALICHE (drops to 6.5' in bottom of was[illegible]										

1 DISTUR[illegible] UNDISTURBED ROCK CORE 2 COARSE MATERIAL REMOVED [illegible] ENT SAMPLE RECOVERY

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte ERS		OWNER: BLM	STATE: AZ
LOGGED BY: Paul F. Pedone	DATE: 8/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Emergency Spillway	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
229	29+00	0	1	Red Brn. clayey grav. SAND; 5-10% G.; 20-25% sl. plas.		SC								
	1710.4			fines; lse., dry										
			1	CALICHE										
229.1	29+00	0	3	Brn. silty grav. SAND w/10-20% NP fines; 15-20% G.; lse.;		SM								
	offset 200'			well graded										
	SE in wash	3	7.5	Red Brn. clayey grav. SAND and sandy CLAY;30-55% sl. plas.		SC & CL								
				fines; frm; mod. well grad.; few cbls.										
		7.5	11.5	Brn. silty SAND w/30-35% sl. plas. fines ;5-10% grav.;		SM								
				poorly grad.; frm.										
		11.5	16.5	Brn. grav. SAND w/5-10% NP fines; poorly grad.; v. frm.;		SP-SM								
				5% G.; few cbls.										
230	30+00	0	3	Red Brn. clayey grav. SAND; 5% G.;20-25% v. sl. plas.		SC-SM								
	1711.3			fines; lse.; few cbls.										
			3	CALICHE										

1. DISTU[illegible] INDISTURBED ROCK CORE 2. COARSE MATERIAL REMOVED [illegible]CENT SAMPLE RECOVERY

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED: Buckhorn-Mesa		SUB-WATERSHED	SITE NO.
LOCATION: Signal Butte FRS		OWNER: BLM	STATE: AZ
LOGGED BY: Paul F. Pedone	DATE: 8/79	PROJECT: WP-07 ___ WP-08 X FP-03 ___ P.L.-46 ___	
DRILLING EQUIPMENT: Backhoe		LOCATION OF HOLES: Emergency Spillways	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
231	31+00	0	2	Brn. silty clayey grav. SAND; w/25-30% v. sl. plas. fines;		SC-SM								
	1709.9			5-10% G.; lse.										
		2		CALICHE										
232	32+00 1704.6	0		CALICHE at surface										
233	33+00	0	5	Brn. silty gravelly SAND w/25-30% NP fines; 15% G. w/2-3%		SM								
	1703.3			cbls. max. 15"; lse. to mod frm.										
		5		CALICHE										
234	34+00	0	2	Brn. silty gravelly SAND w/20% NP fines; 5-10% G.; lse. to		SM								
	1702.9			wk. cmt.; dry										
		2		CALICHE; wk cmt.										
235	35+00	0	5	Brn. silty grav. SAND w/20-25% NP fines; lse to frm.;		SM								
	1700.0			10-20% G. few cbls. max. 12"; dry; wk. strat.										
		5	7	Red Brn. clayey grav. SAND w/15-25% sl. plas. fines; 10%		SC								
				G.; frm.										
		7		CALICHE										

1 DISTURBED UNDISTURBED ROCK CORE 2 COARSE MATERIAL REMOVED 3 PERCENT SAMPLE RECOVERY

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LOG OF TEST HOLES

WATERSHED	Buckhorn-Mesa	SUB-WATERSHED	SITE NO.
LOCATION	Signal Butte FRS	OWNER	STATE AZ
LOGGED BY	Paul F. Pedone	DATE 8/79	PROJECT: WP-07 ____ WP-08 X FP-03 ____ P.L.-46 ____
DRILLING EQUIPMENT	Backhoe	LOCATION OF HOLES	Emergency Spillway

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT.	HOLE DEPTH TO FT.	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO.	TYPE[1]	FROM FT.	TO FT.	CSE. %	REM.[2] MIN. DIAM.	REC.[3] %
236	36+00	0	9.5	Brn. v. silty grav. SAND w/ 25-35% NP fines;fine to		SM								
	1698.9			cse. S.; 5-10% G. max. 4"; few cbls.; lse to mod frm.										
		9.5		CALICHE										

1. DISTURBED-UNDISTURBED-ROCK CORE 2. COARSE MATERIAL REMOVED 3. PERCENT SAMPLE RECOVERY

SHEET 9 OF 9 S.

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SOIL MECHANICS

United States Department of Agriculture
Soil Conservation Service
Soil Mechanics Laboratory
800 "J" Street
Lincoln, NE 68508

SUBJECT: ENG-210, Arizona WF-08, Buckhorn-Mesa, Pass Mountain

DATE: January 27, 1981

TO: Ralph M. Arrington
State Conservation Engineer
SCS, Phoenix, AZ

ATTACHMENTS

1. Form SCS-ENG-354, Soil Mechanics Laboratory Data, 3 sheets
2. Form SCS-ENG-355A and -355B, Triaxial Shear Test Data, 3 tests, 6 sheets
3. Form SCS-ENG-366, Direct Shear Test Data, 3 sheets
4. Form SCS-ENG-352, Compaction and Penetration Resistance, 5 sheets
5. Form SCS-ENG-353, Soil Classification, 6 sheets

The soil mechanics tests requested on the samples from this site have been completed, and the test results are on the attached reporting forms.

Lorn P. Dunnigan

Lorn P. Dunnigan
Head, Soil Mechanics Laboratory

Attachments

cc: Ralph M. Arrington (original and 3 copies)
Stanley N. Hobson (letter only)
Robert E. Nelson

SCS-ENG-154
Rev. 1-70
Field Manual ENG-11-18

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL MECHANICS LABORATORY DATA
Sheet 1 of 3

11-14-80 ARIZONA

Laboratory Sample Number	Field Number	Location and Description	Depth	Field Classification	Mechanical Analysis: Grain Size Distribution Expressed as Percent Finer by Dry Weight — Fines	Sand	Gravel	Atterberg Limits LL	PI	Unified Soil Classification	Moisture Content % Dry Soil	Moisture-Density Relationships (Standard) Max. Dry Density	Optimum Moisture %	Undisturbed Sample Data		%	Special Tests	Relative Density Min PCF	Max PCF
BIW		Buckhorn-Mesa, Pass Mountain																	
310	2001.	Centerline Dam 40+25 ℄ Dam L. Bag	2'-14'		3 4 7 11 11	14 22 31 45 57 74	83 86 88 91 93 100	Not Plastic		SW-SM						2.66	Shear? Direct Torr. Tri. Gravel Fraction Apparent Bulk. Dry % Absorption 2.60 2.46 2.3	102.5	124.6
311A	2002.	Centerline Dam 83+53 Dam S. Bag	0-2'	"A"	3 3 4 7 8	10 17 26 41 53 78	93 97 99 100	Not Plastic		SP-SM									
311	2002.2	" " S. Bag	2'-3.5'		12 12 17 27 31	34 37 42 47 57 80	94 96 97 97 100	31	12	SC		✓							
312	49.1	Centerline Dam 49+21 ℄ Dam L. Bag	0'-1.5'		6 7 9 13 17	17 24 28 35 53 77	91 95 97 99 100	24	7	SC-SM									
313	49.2	" " S. Bag	6'-8.5'		6 6 7 11 13	14 19 25 37 57 87	97 98 99 100	26	9	SC		✓							
314	112.1	Borrow Area 400' US Sta 82+00 ℄ Dam L. Bag	1.4'-3'		4 4 5 6 8	9 13 18 28 44 72	92 95 97 98 99 100	23	5	SW-SM									
315	112.2	" " L. Bag	6'-12'		9 10 11 13 15	16 18 20 25 37 67	88 94 98 99 100	50	27	SC		✓		1/2	-#40				
316	115.1	Borrow Area 400' US Sta 72+00 ℄ Dam L. Bag	6'		6 7 10 14 18	20 25 29 37 55 78	90 92 94 95 96 100	Non Plastic		SM		Tr							

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SCS-ENG-154
Rev. 1-70
File Code ENG-13-10

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL MECHANICS LABORATORY DATA
Sheet 2 of 3

11-14-80 ARIZONA

Laboratory Sample Number	Field Number	Location and Description	Depth	Field Class Designation	Gravel 3" 2"	Gravel 1½" 1"	Gravel ¾" ½"	Gravel ⅜" #4	Sand #8	Sand #16	Sand #30	Sand #50	Sand #100	Sand #200	Fines 0.05 mm	Fines 0.02 mm	Fines 0.005 mm	Fines 0.002 mm	Fines 0.001 mm	Fines 0.005 mm	Atterberg Limits LL	Atterberg Limits PL	Unified Class Symbol	Moisture Sieve	Dry Density % Dry Soil	Moisture Density Relationships OK Standard LL Modified	Moisture Density Relationships Max. Dry Density pcf	Moisture Density Relationships Optimum %	Undisturbed Sample Data % Gross	Undisturbed Sample Data % Net	Gs	Specific Gravity	Relative Density Max. pcf	Relative Density Min. pcf
81W		Buckhorn-Mesa, Pass Mountain																																
317	116.1	Borrow Area 400' US Sta 68+00 ℄ Dam L. Bag	0-4'		14	15	18	22	28	29	32	34	39	54	76	89	92	94	94	96	100	38	16	SC		✓						2.67			
																						DRY DENSITY < NO. 4					①	118.0	12.0			GRAVEL FRACTION	MINUS NO. 4	CUD	10,200	3000
																																2.59			57%	515
																																2.42				
																																1.8	% ABSORPTION			
318	121.1	Borrow Area 600' US Sta 74+00 ℄ Dam L. Bag	0-6'		4	4	6	9	11	13	18	23	32	44	74	94	96	98	99	99	100	NON Plastic		SW-SM								2.69				
																						DRY DENSITY < NO. 4					②	122.5	9.5			GRAVEL FRACTION	MINUS NO. 4		102.3	126.7
																																2.61				
																																2.49				
																																1.7	% ABSORPTION			
319	124.1	Borrow Area 200' US Sta 72+00 ℄ Dam L. Bag	0-1'		7	8	14	22	29	33	43	49	59	76	89	96	98	99	100			NON Plastic		SM											
320	124.2	Borrow Area 200' US Sta 72+00 ℄ Dam L. Bag	3'		6	7	12	17	22	24	29	34	43	61	79	91	94	96	97	99	100	26	7	SC-SM								2.68				
																						DRY DENSITY < NO. 4					③	122.0	8.5					✓ CUD	10,200	3000
																																			57%	545
321	126.1	Borrow Area 200' US Sta 68+00 ℄ Dam L. Bag	1.5'		16	18	21	25	29	30	32	34	39	57	80	93	97	99	99	99	100	46	22	SC		✓									
322	169.1	Borrow Area 600' US Sta 55+00 ℄ Dam L. Bag	1-3'		9	12	16	20	22	23	27	31	37	50	76	94	97	99	99	99	100	33	6	SM		4									
323	170.1	Borrow Area 600' US Sta 58+00 ℄ Dam L. Bag	1-3'		12	14	18	21	24	26	30	34	40	55	76	90	94	97	98	98	100	33	11	SC		✓									

SCS-ENG-154
Rev. 1-70
Field Sheet (NG-11-18)

U.S. DEPARTMENT OF AGRICULTURE
Soil Conservation Service

Soil Mechanics Laboratory Data
Sheet 3 of 3

11-L4-80 ARIZONA

Laboratory Sample Number	Field Number	Location and Description	Depth	Field Class Designation	Mechanical Analysis: Grain Size Distribution Expressed as Percent Finer by Dry Weight — Fines	Sand	Gravel	Atterberg Limits: LL	PI	Unified Class Designation	Moisture Content %	Dry Density %	Moisture Density Relationships: Max. Dry Density	Optimum Moisture %	Undisturbed Sample Data: Dry Density	Moisture %	Gs	Special Tests				Relative Density Min PCF	Relative Density Max PCF
81W		Buckhorn-Mann, Pass Mountain																					
324	L70.2	Borrow Area 600' US Sta 58+00 ℄ Dam L. Bag	3.5'-6.5'		7 9 18 30 41	45 52 56 63 77 91	98 99 100	NON Plastic		SM													
325	L72.1	Borrow Area 200' US Sta 55+00 ℄ Dam L. Bag	1'-2.5'		4 4 7 7 9	10 12 13 22 39 68	94 98 100	NON Plastic		SP-SM								222	MINUS NO. 4 GRAVEL FRACTION			97.6	122.1
								DRY DENSITY < NO. 4					(4)	122.0	10.5			2.62	APPARENT				
																		2.48	BULK DRY				
																		2.2	% ABSORPTION				
326	L73.1	Borrow Area 600' US Sta 47+00 ℄ Dam L. Bag	1'-2.5'		8 9 10 13 16	17 21 24 34 58 80	93 98 100	32	14	SC													
				B	8 10 14 23 29	33 38 41 48 60 81	93 96 98 99 99 100	22	6	SC-SM								270	MINUS NO. 4 GRAVEL FRACTION				
								DRY DENSITY < NO. 4					(5)	128.5	8.6			3.57	APPARENT				
																		2.43	BULK DRY				
																		2.4	% ABSORPTION				
327	L73.2	" "S. Bag	2.5'-3'		5 5 8 11 12	14 19 24 37 53 80	93 97 99 100	23	4	SP-SM													

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SCS-ENG-355A (Rev. 3-70)
FILE CODE ENG-22

LABORATORY NO 81W317

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	TRIAXIAL SHEAR TEST

PROJECT and STATE: Buckhorn-Mesa, Pass Mountain, Arizona

SAMPLE LOCATION: Borrow Area 400' US Sta 68+00

233

FIELD SAMPLE NO.	DEPTH	GEOLOGIC ORIGIN
116.1	0 - 4'	

TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
Compacted	SML	Edgar F Steele	1/21/81

INDEX TEST DATA

USCS SC ; LL 38 ; PI 16

% FINER (mm): 0.002 14 ; 0.005 15 ; 0.074 (#200) 28

G_s (-#4) 2.69 ; G_s (+#4) _____

STANDARD: γ_d MAX. 118.0 pcf; w_o 12.0 %

MODIFIED: γ_d MAX. _____ pcf; w_o _____ %

SPECIMEN DATA

HEIGHT 3.0 "; DIAMETER 1.4 "

MATERIALS TESTED PASSED No. 4 SIEVE

METHOD OF PREPARATION Static compacted in 2 lifts

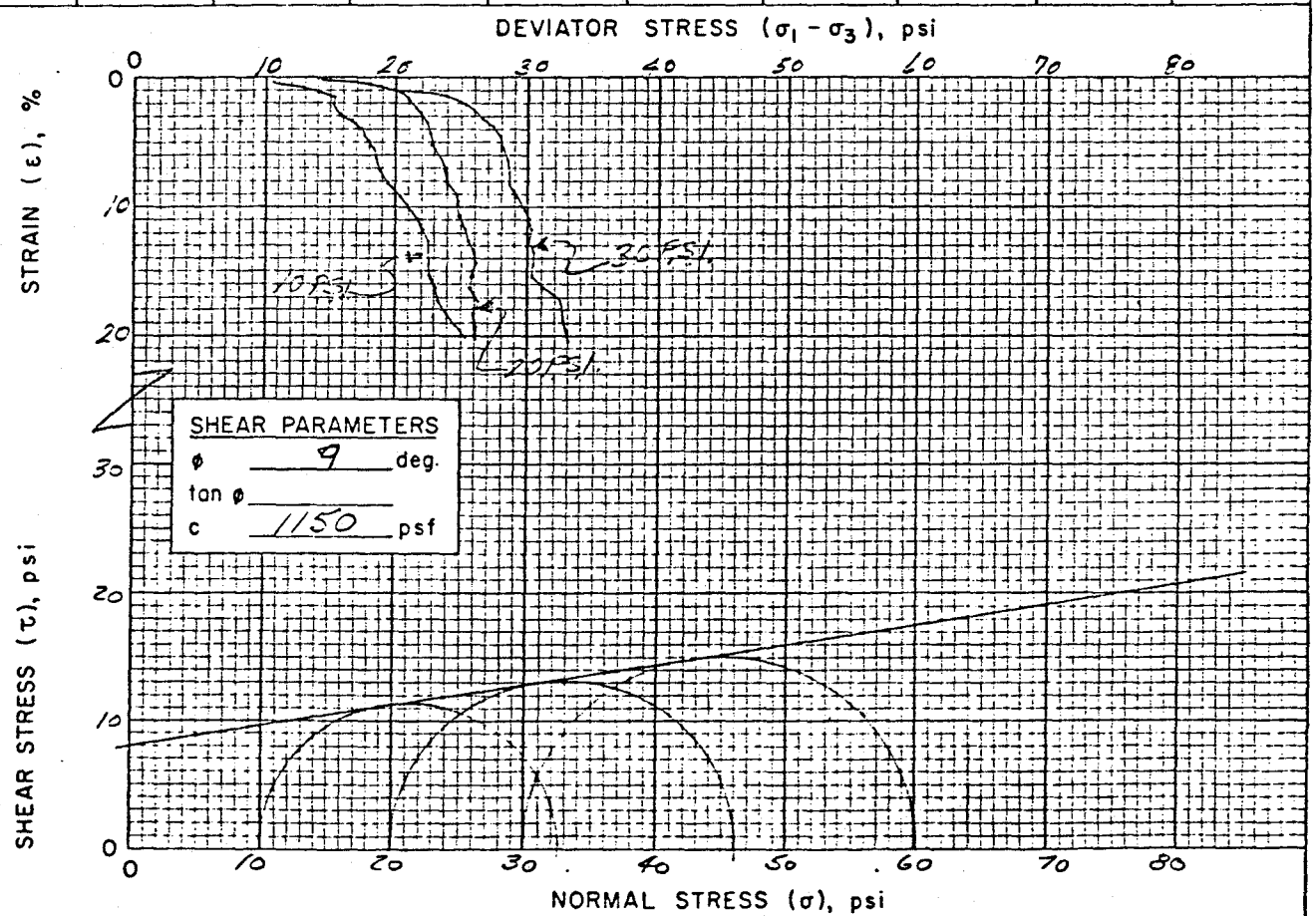
MOLDING MOISTURE 15.5 %

MOLDED AT 94.7 % OF γ_d MAXIMUM

TYPE OF TEST

UU ☐
CU ☐
$\overline{CU}$ ☒
CD ☐

DRY DENSITY INITIAL pcf ☒ g/cc ☐	DRY DENSITY CONSOLIDATED pcf ☐ g/cc ☐	B PARAMETER	MOISTURE CONTENT, % START OF TEST	MOISTURE CONTENT, % DEG. OF SAT. AT START OF TEST	MOISTURE CONTENT, % END OF TEST	TIME OF CONSOLIDATION (hrs.)	MINOR PRINCIPAL STRESS σ_3 (psi)	DEVIATOR STRESS $\sigma_1 - \sigma_3$ (psi)	AXIAL STRAIN AT FAILURE, ε (%)
112.0		0.97			15.1	17.03	10	22.6	12.7
112.0		1.00			14.8	17.13	20	26.0	13.6
111.4		1.00			14.6	16.95	30	30.1	10.9



REMARKS VOLUME CHANGE DURING CONSOLIDATION PHASE:
10psi - 1.6% ; 20psi - 3.1% ; 30psi - 4.2%

SCS-ENG-3558(6-71)
FILE CODE ENG-22

LABORATORY NO. 81W317

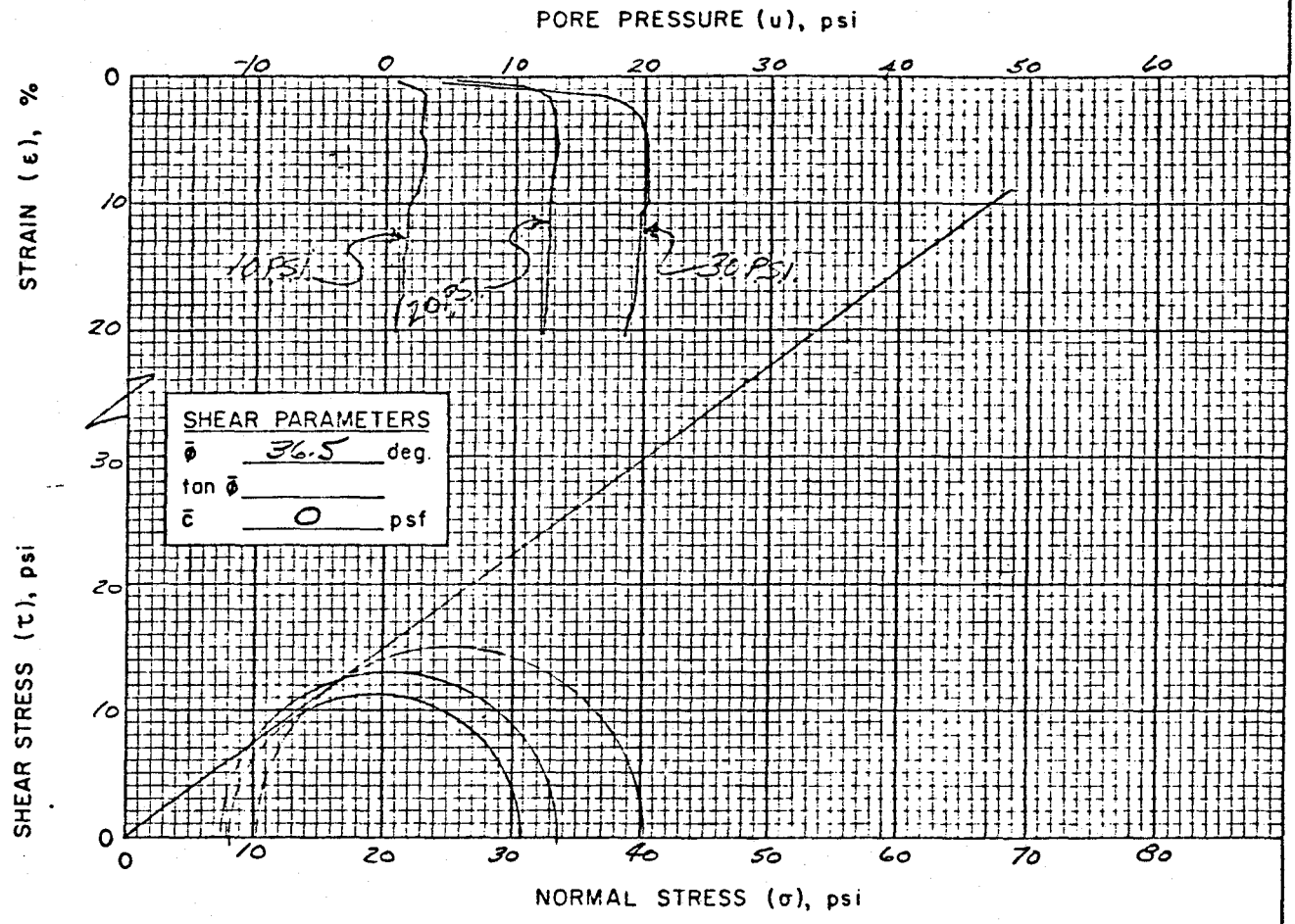
MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	TRIAXIAL SHEAR TEST with pore pressure measured

234

PROJECT and STATE		SAMPLE LOCATION
Buckhorn-Mesa, Pass Mountain, Arizona		Borrow Area 400' US Sta 68+00

TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
Compacted	SML	[illegible]	1/21/81

MINOR PRINCIPAL STRESS, σ_3 (psi)	PORE PRESSURE, u (psi)	EFFECTIVE MINOR PRINCIPAL STRESS, $\bar{\sigma}_3$ (psi)	DEVIATOR STRESS, $\sigma_1 - \sigma_3$ (psi)	FAILURE CRITERIA	AXIAL STRAIN AT FAILURE, ε (%)
10	1.8	8.2	22.6		12.7
20	12.5	7.5	26.0		13.6
30	19.8	10.2	30.1		10.9



REMARKS

SCS-ENG-355A (Rev. 3-70)
FILE CODE ENG-22

LABORATORY NO. 81W320

235

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	TRIAXIAL SHEAR TEST

PROJECT and STATE	SAMPLE LOCATION
Buckhorn-Mesa, Pass Mountain, Arizona	Borrow Area 200' US Sta 72+00

FIELD SAMPLE NO.	DEPTH	GEOLOGIC ORIGIN
124.2	3'	

TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
Compacted	SML	Edgar F. Steele	1/21/81

INDEX TEST DATA

USCS SC-SM ; LL 26 ; PI 7

% FINER (mm): 0.002 6 ; 0.005 7 ; 0.074 (# 200) 22

G_s (-#4) 2.68 ; G_s (+#4) _____

STANDARD: γ_d MAX. 127.0 pcf; w_o 8.5 %

MODIFIED: γ_d MAX. _____ pcf; w_o _____ %

SPECIMEN DATA

HEIGHT 3.0 "; DIAMETER 1.4 "

MATERIALS TESTED PASSED No. 4 SIEVE

METHOD OF PREPARATION Static compacted in 2 lifts

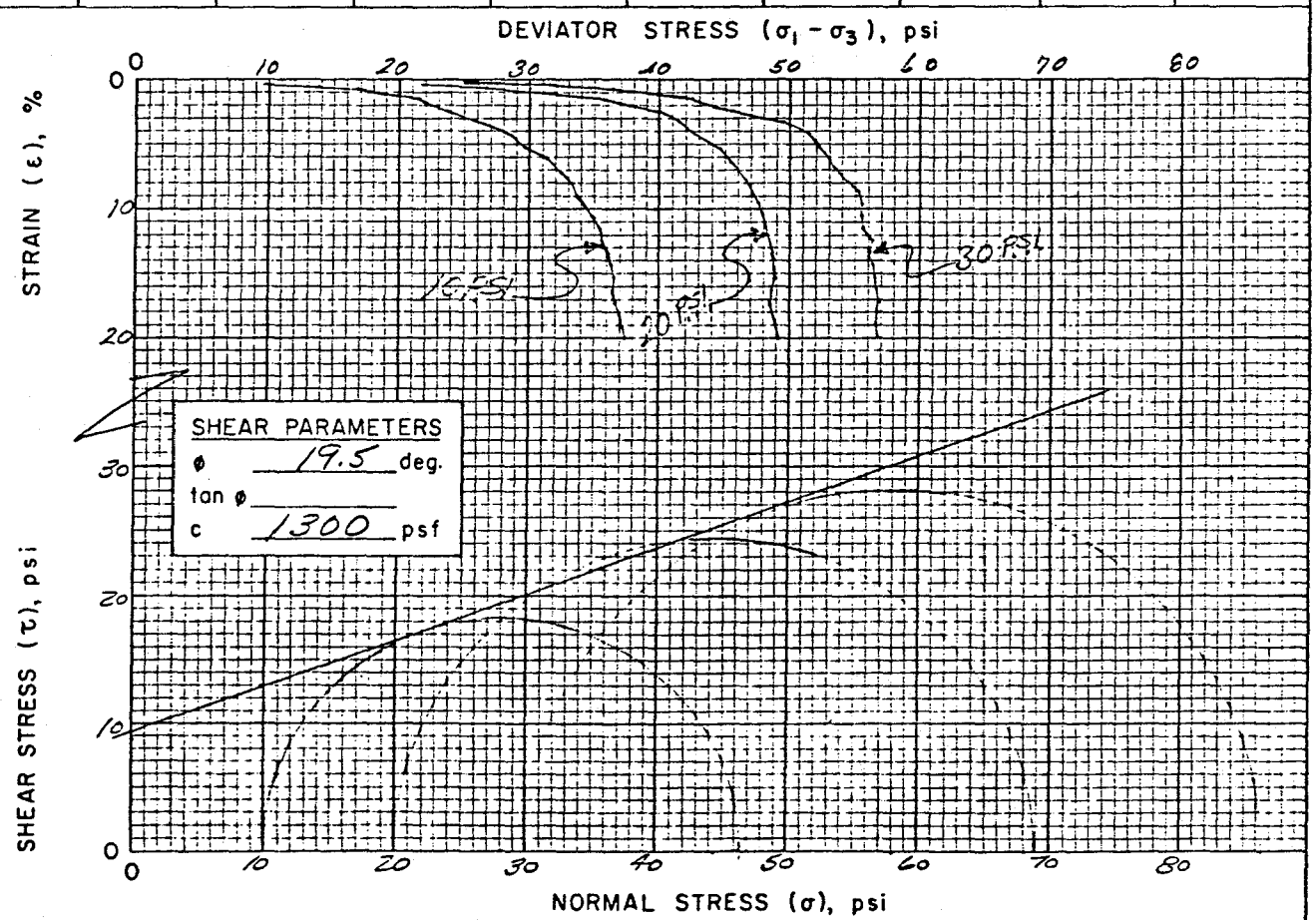
MOLDING MOISTURE 12.8 %

MOLDED AT 94.9% OF γ_d MAXIMUM

TYPE OF TEST

UU ☐
CU ☐
$\overline{CU}$ ☒
CD ☐

DRY DENSITY INITIAL pcf ☒ g/cc ☐	DRY DENSITY CONSOLIDATED pcf ☐ g/cc ☐	B PARAMETER	MOISTURE CONTENT, % START OF TEST	MOISTURE CONTENT, % DEG. OF SAT. AT START OF TEST	MOISTURE CONTENT, % END OF TEST	TIME OF CONSOLIDATION (hrs.)	MINOR PRINCIPAL STRESS σ_3 (psi)	DEVIATOR STRESS $\sigma_1 - \sigma_3$ (psi)	AXIAL STRAIN AT FAILURE, ε (%)
120.2		1.00			12.8	17.20	10	36.4	15.0
120.6		0.99			12.7	64.72	20	48.9	13.9
120.9		1.00			12.3	64.37	30	56.3	12.4



REMARKS VOLUME CHANGE DURING CONSOLIDATION PHASE:
10psi - 0.7% ; 20psi - 1.3% ; 30psi - 4.1%

SCS-ENG-355R (6-71)
FILE CODE ENG-22

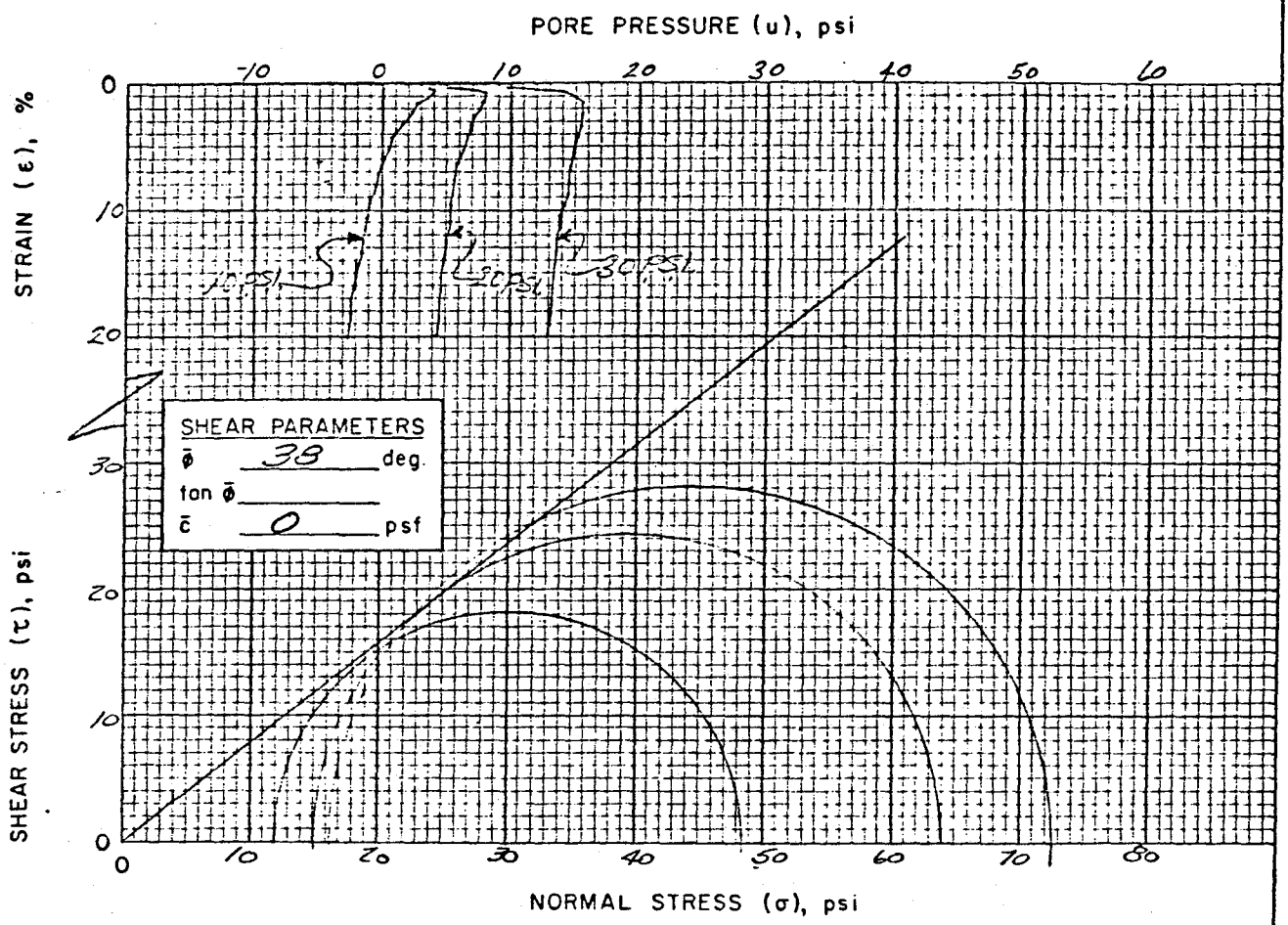
LABORATORY NO 81W320

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	TRIAXIAL SHEAR TEST with pore pressure measured

236

PROJECT and STATE			SAMPLE LOCATION
Buckhorn-Mesa, Pass Mountain, Arizona			Borrow Area 200' US Sta 72+00
TYPE OF SAMPLE: Comapcted	TESTED AT: SML	APPROVED BY: [illegible]	DATE: 1/21/81

MINOR PRINCIPAL STRESS, σ_3 (psi)	PORE PRESSURE, u (psi)	EFFECTIVE MINOR PRINCIPAL STRESS, $\bar{\sigma}_3$ (psi)	DEVIATOR STRESS, $\sigma_1 - \sigma_3$ (psi)	FAILURE CRITERIA	AXIAL STRAIN AT FAILURE, ε (%)
10	-2.0	12.0	36.4		15.0
20	4.9	15.1	48.9		13.9
30	13.7	16.3	56.3		12.4



REMARKS

[illegible] 9/78

SCS-ENG-355A (Rev. 3-70)
FILE CODE ENG-22

LABORATORY NO 81W326 8

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	TRIAXIAL SHEAR TEST

237

PROJECT and STATE	SAMPLE LOCATION
Buckhorn-Mesa, Pass Mountain, Arizona	Borrow Area 600' US Sta 47+00

FIELD SAMPLE NO.	DEPTH	GEOLOGIC ORIGIN
173.1	1' - 2.5'	

TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
Compacted	SML	Edgar F. Steele	1/21/81

INDEX TEST DATA

USCS SC-SM ; LL 22 ; PI 6
% FINER (mm): 0.002 8 ; 0.005 10 ;
0.074 (#200) 29
G_s (-#4) 2.70 ; G_s (+#4) _____
STANDARD: γ_d MAX. 128.5 pcf; w_o 8.5 %
MODIFIED: γ_d MAX. _____ pcf; w_o _____ %

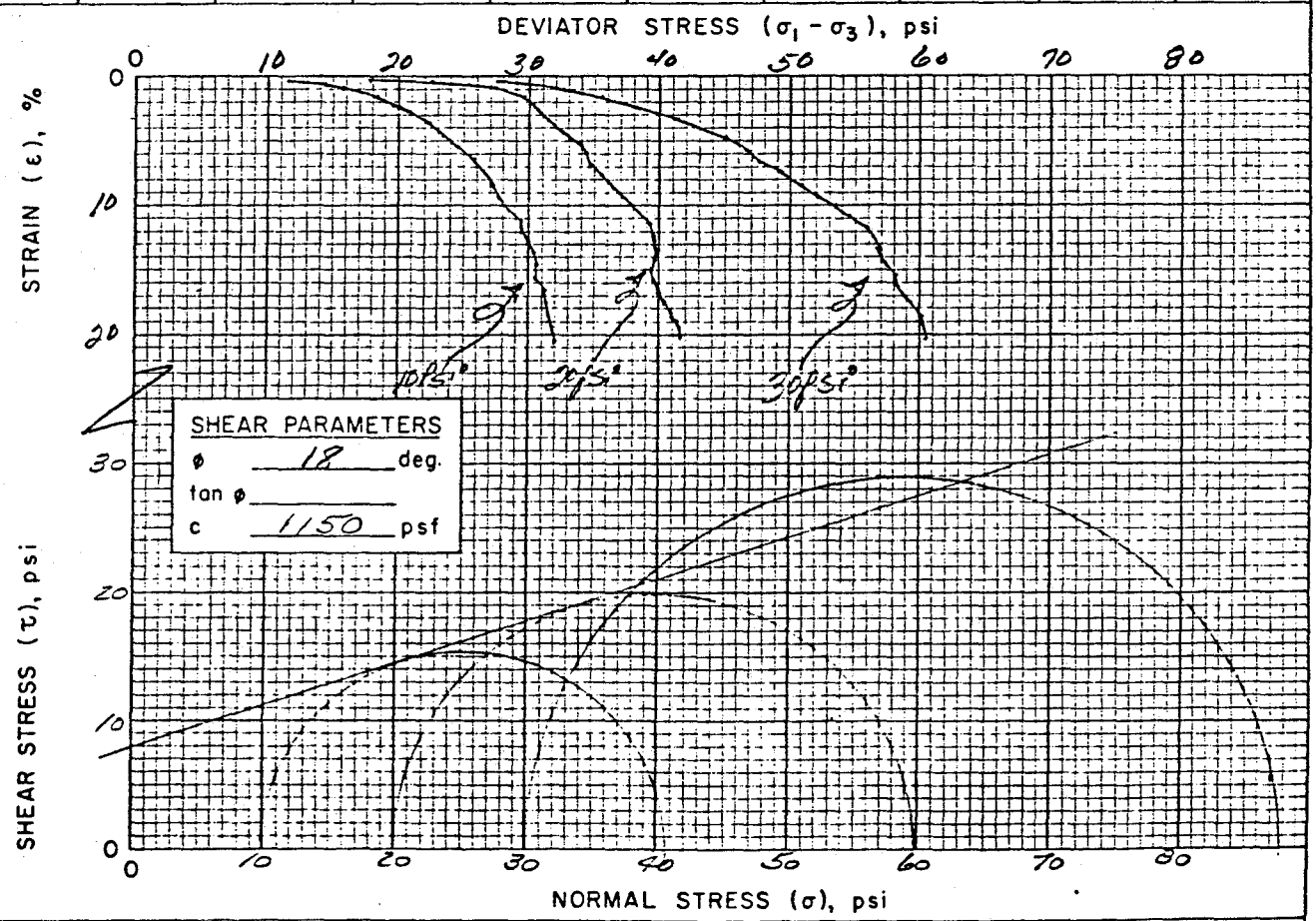
SPECIMEN DATA

HEIGHT 3.0 "; DIAMETER 1.4 "
MATERIALS TESTED PASSED No. 4 SIEVE
METHOD OF PREPARATION Static compacted in 2 lifts
MOLDING MOISTURE 11.2 %
MOLDED AT 95.0% OF γ_d MAXIMUM

TYPE OF TEST

UU ☐
CU ☐
$\overline{CU}$ ☒
CD ☐

DRY DENSITY INITIAL pcf ☒ g/cc ☐	DRY DENSITY CONSOLIDATED pcf ☐ g/cc ☐	B, Parameter	MOISTURE CONTENT, % START OF TEST	MOISTURE CONTENT, % DEG. OF SAT. AT START OF TEST	MOISTURE CONTENT, % END OF TEST	TIME OF CONSOLIDATION (hrs.)	MINOR PRINCIPAL STRESS σ_3 (psi)	DEVIATOR STRESS $\sigma_1 - \sigma_3$ (psi)	AXIAL STRAIN AT FAILURE, ε (%)
122.4		1.00			10.8	64.37	10	30.6	14.3
122.3		1.00			10.5	64.20	20	39.9	13.2
121.6		1.00			10.4	64.10	30	57.9	15.0



REMARKS VOLUME CHANGE DURING CONSOLIDATION PHASE:
10psi - 1.0% ; 20psi - 1.8% ; 30psi - 2.8%

SCS-ENG-355B (6-71)
FILE CODE ENG-22

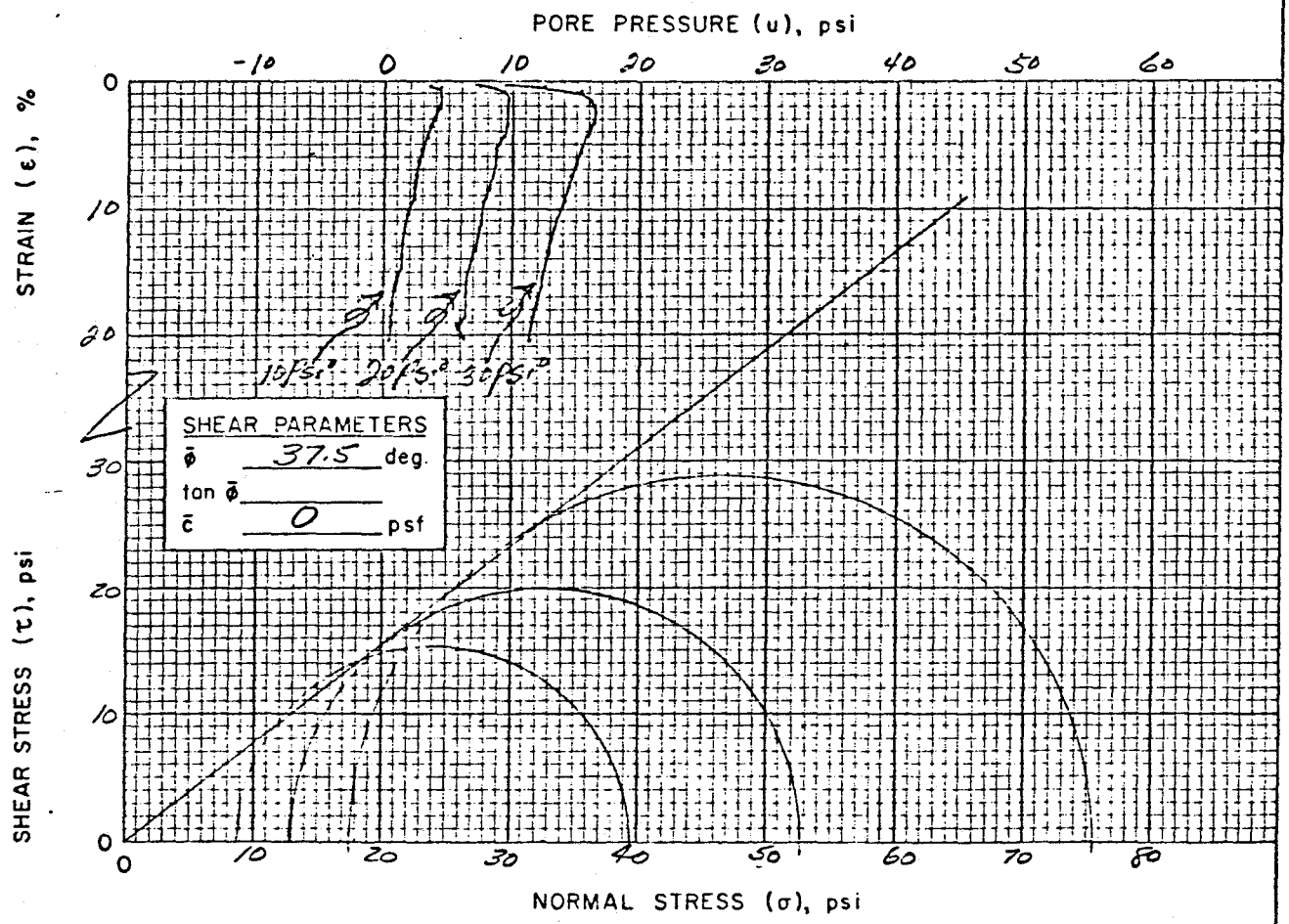
LABORATORY NO 81W326

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	TRIAXIAL SHEAR TEST with pore pressure measured

PROJECT and STATE	SAMPLE LOCATION
Buckhorn-Mesa, Pass Mountain, Arizona	Borrow Area 600' US Sta 47+00 238

TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
Compacted	SML		1/21/81

MINOR PRINCIPAL STRESS, σ_3 (psi)	PORE PRESSURE, u (psi)	EFFECTIVE MINOR PRINCIPAL STRESS, $\bar{\sigma}_3$ (psi)	DEVIATOR STRESS, $\sigma_1 - \sigma_3$ (psi)	FAILURE CRITERIA	AXIAL STRAIN AT FAILURE, ε (%)
10	1.2	8.8	30.6		14.8
20	7.1	12.9	39.9		13.2
30	12.4	17.6	57.9		15.0



REMARKS

Form SCS 366
9-64

LABORATORY NO. 81W310

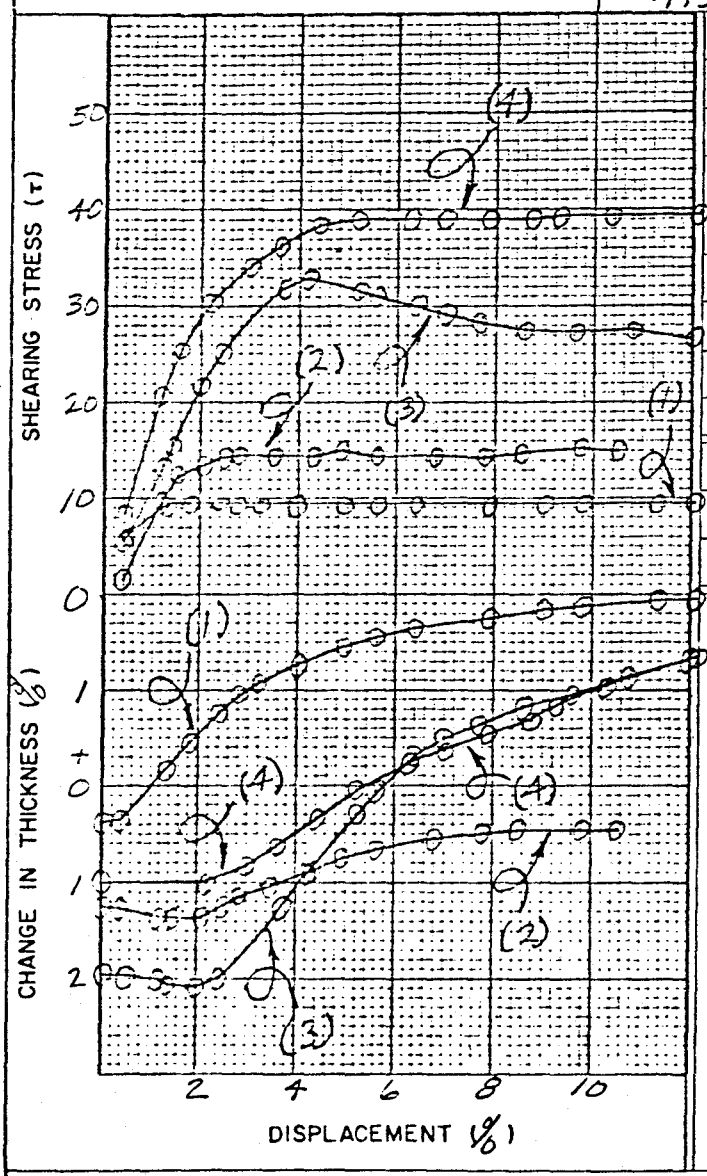
MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	DIRECT SHEAR TEST

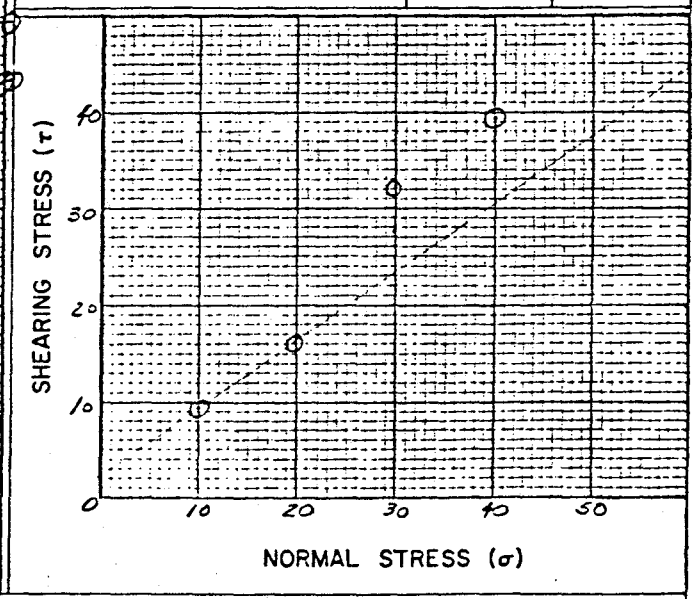
239

PROJECT and STATE: Buckhorn-Mesa, Pass Mountain, Arizona			SAMPLE LOCATION: Centerline Dam 40+25
FIELD SAMPLE NO.: 2001.1	DEPTH: 2' - 14'	GEOLOGIC ORIGIN:	
TYPE OF SAMPLE: Compacted	TESTED AT: SML	APPROVED BY: Edgar F Steele	DATE: 1/26/81
CLASSIFICATION: SW-SM		LL: Non-plastic	SPECIFIC GRAVITY
TYPE OF TEST:		CONTROL: STRAIN	$G_s(-)$ #4
RATE OF LOADING (in/min.): 0.00061		MOISTURE CONDITION: FLOODED	$G_s(+)$ #4
TYPE OF SPECIMEN:	AREA (sq.in.): 4.9	THICKNESS (in.): 1.0	G_m(bulk)(+) #4

TEST NO.	1	2	3	4
INIT. MOISTURE, %	6.9	6.9	6.9	6.9
DRY DENSITY, ☐ g/cc ☒ pcf	117.2	117.2	117.2	117.2
INIT. VOID RATIO				
TEST DURATION, (min.)	472	522	500	475
FINAL MOISTURE, %	15.2	15.6	14.6	14.1
NORMAL STRESS	10	20	30	40
MAX SHEAR STRESS	9.48	16.01	32.19	39.41

SHEAR VALUES	Ø	C
AT MAXIMUM STRESS	35	350





REMARKS

Form SCS 366
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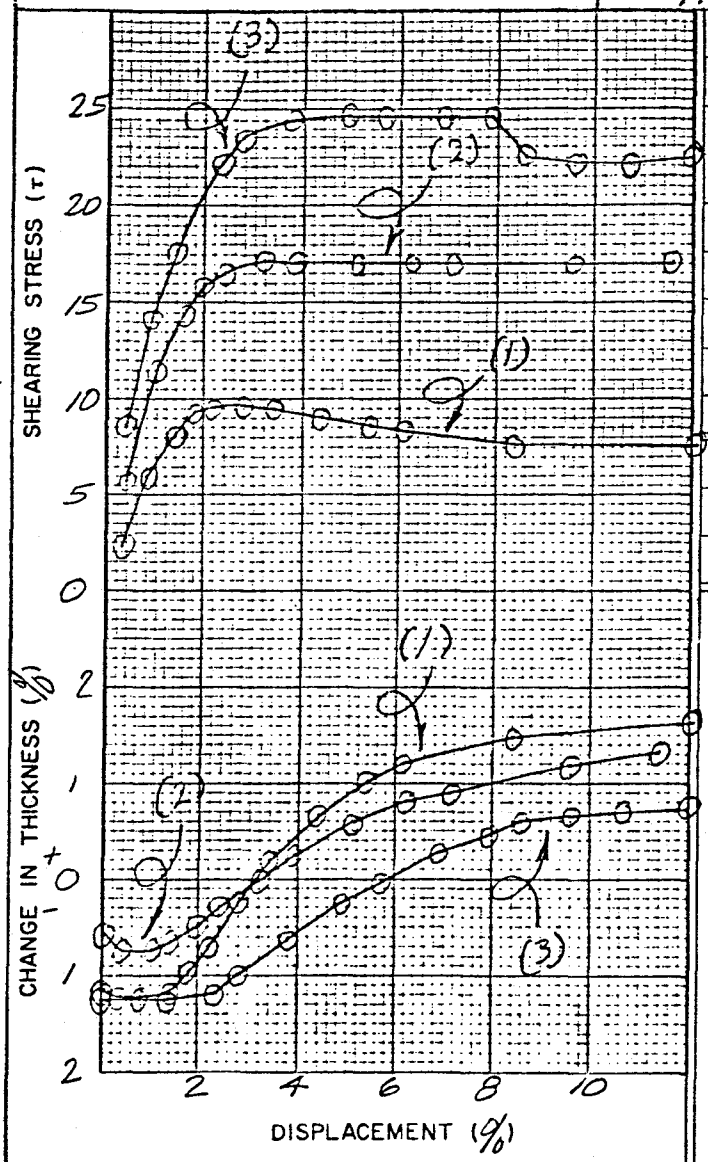
LABORATORY NO 81W318

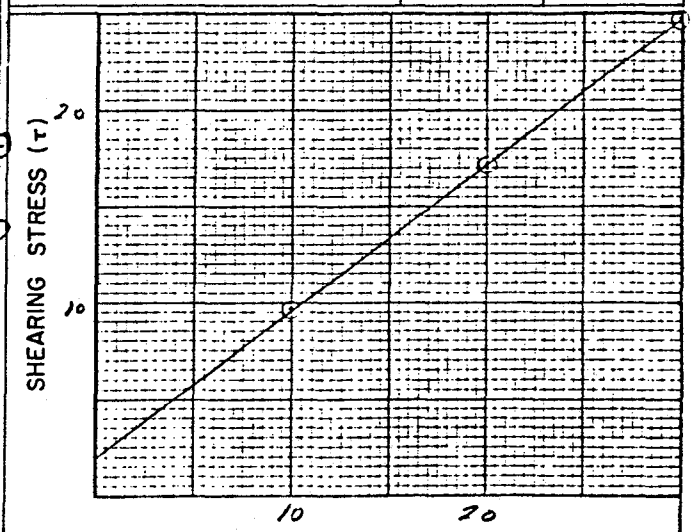
MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	DIRECT SHEAR TEST

PROJECT and STATE: Buckhorn-Mesa, Pass Mountain, Arizona			SAMPLE LOCATION: Borrow Area 600' US Sta 74+00
FIELD SAMPLE NO.: 121.1	DEPTH: 0 - 6'	GEOLOGIC ORIGIN: 240	
TYPE OF SAMPLE: Compacted	TESTED AT: SML	APPROVED BY: Edgar F. Steele	DATE: 1/26/81
CLASSIFICATION: SW-SM	LL	PI: Non-Plastic	SPECIFIC GRAVITY
TYPE OF TEST	CONTROL: STRAIN		$G_s(-)$ #4: 2.69
RATE OF LOADING (in/min.)	MOISTURE CONDITION: FLOODED		$G_s(+)$ #4
TYPE OF SPECIMEN	AREA (sq.in.): 4.9	THICKNESS (in.): 1.0	G_m(bulk)(+) #4

TEST NO.	1	2	3	4
INIT. MOISTURE, %	7.5	7.5	7.5	
DRY DENSITY, g/cc or pcf	118.3	118.3	118.3	
INIT. VOID RATIO	.4195	.4195	.4195	
TEST DURATION, (min.)	505	453	469	
FINAL MOISTURE, %	12.5	12.6	12.0	
NORMAL STRESS	10	20	30	
MAX. SHEAR STRESS	9.7	17.1	24.6	

SHEAR VALUES	Ø	C
AT MAXIMUM STRESS	37°	250





REMARKS

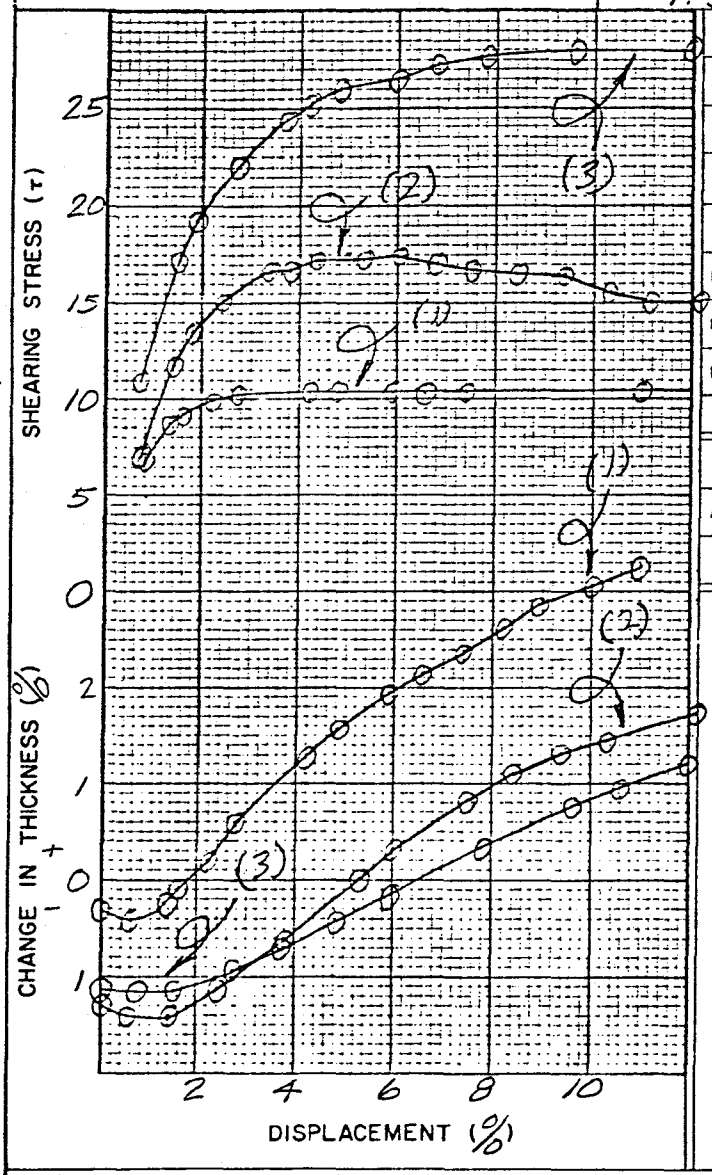
EFS

Form SCS 366
9-64

LABORATORY NO 81W325

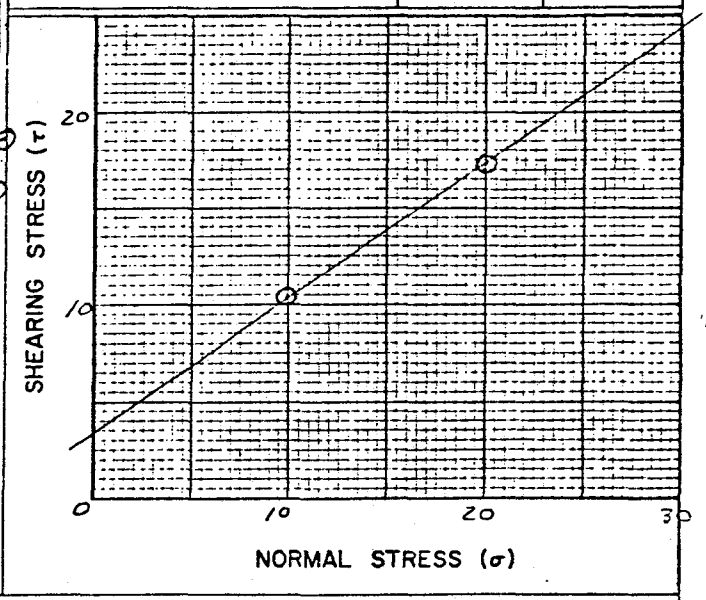
MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	DIRECT SHEAR TEST

PROJECT and STATE: Buckhorn-Mesa, Pass Mountain, Arizona			SAMPLE LOCATION: Borrow Area 200' US Sta 55+00
FIELD SAMPLE NO.: 172.1	DEPTH: 1' - 2.5'	GEOLOGIC ORIGIN:	2L1
TYPE OF SAMPLE: Compacted	TESTED AT: SML	APPROVED BY: Edgar F. Steele	DATE: 1/21/81
CLASSIFICATION: SP-SM	LL: Non-Plastic	PP:	SPECIFIC GRAVITY
TYPE OF TEST:	CONTROL: STRAIN		$G_s(-)$ #4
RATE OF LOADING (in/min.): 0.00063	MOISTURE CONDITION: FLOODED		$G_s(+)$ #4
TYPE OF SPECIMEN	AREA (sq.in.): 4.9	THICKNESS (in.): 1.0	G_m(bulk)(+) #4



TEST NO.	1	2	3	4
INIT MOISTURE, %	7.5	7.5	7.5	
DRY DENSITY, ☐ g/cc ☒ pcf	113.1	113.1	113.1	
INIT VOID RATIO				
TEST DURATION, (min.)	483	510	469	
FINAL MOISTURE, %	15.6	14.1	15.0	
NORMAL STRESS	10	20	30	
MAX. SHEAR STRESS	10.49	17.35	27.96	

SHEAR VALUES	ϕ	C
AT MAXIMUM STRESS	35	475



REMARKS

RHH/RJB

SCS-ENG-352 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO 81-W-317

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

242

PROJECT and STATE: Buckhorn-Mesa, Pass Mountain ARIZONA

FIELD SAMPLE NO.	LOCATION	DEPTH
116.1	Borrow Area 400' US Sta 68+00 ℄ DAM	0-4'

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
	SML	[illegible]	1/21/81.

CLASSIFICATION SC LL 38 PI 16

MAX. PARTICLE SIZE INCLUDED IN TEST < #4 "

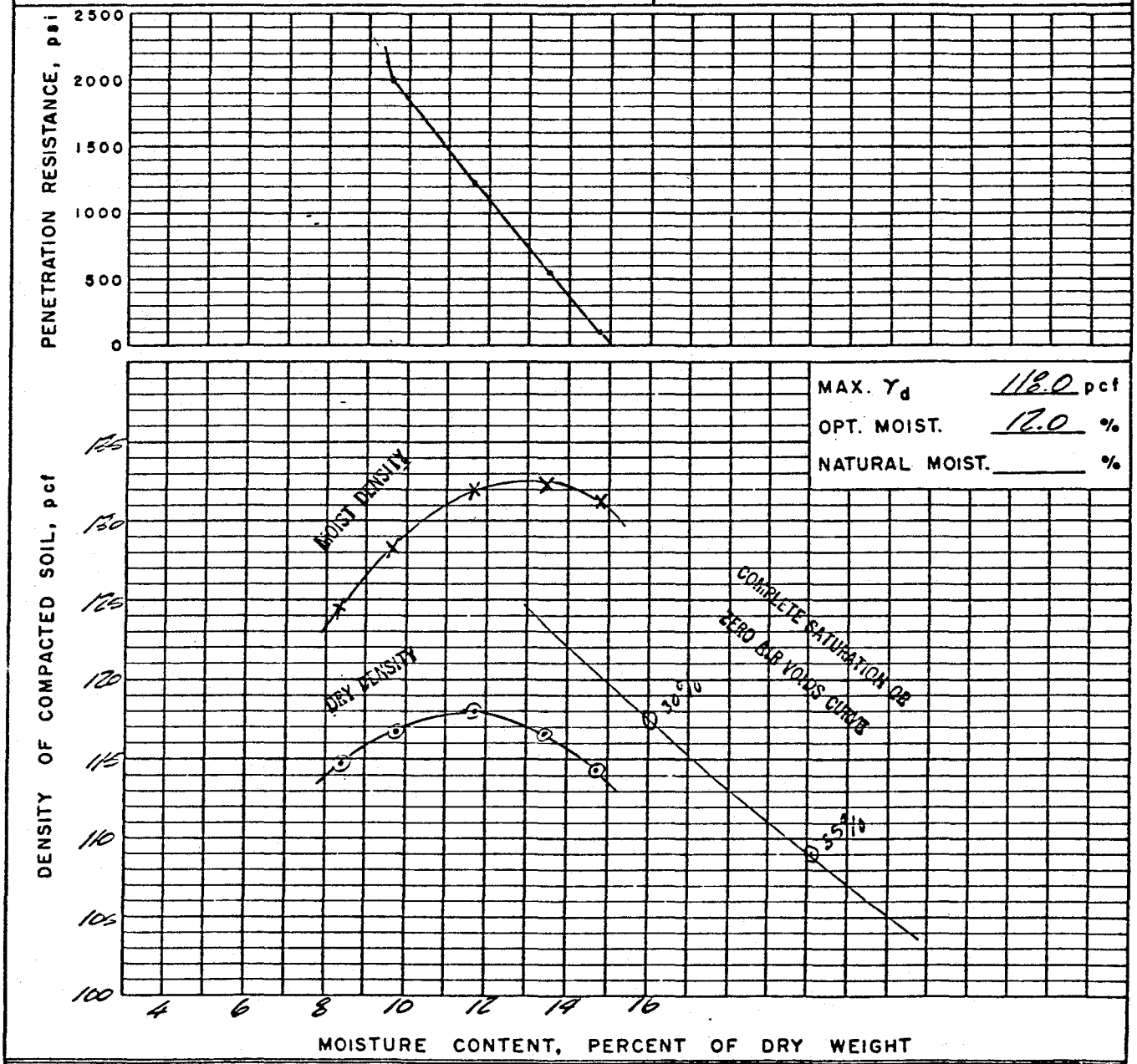
SPECIFIC GRAVITY (G_s) { MINUS NO 4 2.69; PLUS NO. 4 2.59

CURVE NO. 1 OF 5

STD. (ASTM D-698) ☑, METHOD A

MOD. (ASTM D-1557) ☐; METHOD

OTHER TEST ☐ (SEE REMARKS)



MAX. γ_d 118.0 pcf

OPT. MOIST. 12.0 %

NATURAL MOIST. ____ %

REMARKS

CURVE IS FOR THE MINUS NO. 4 FRACTION

GRADUATION OF TOTAL SAMPLE

< NO. 200 28 %; < NO. 4 76 %; < 3 IN. 100 %

USDA-SCS HYATTSVILLE MD. 1966

SCS-ENG-352 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO 81W 318

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

PROJECT and STATE: Buckhorn-Mesa, Pass Mountain ARIZONA

243

FIELD SAMPLE NO.	LOCATION	DEPTH
121.1	Borrow Area 600' us. Sta 74+00 ℄ Dam	0-6'

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
	SWL	278	1/21/81

CLASSIFICATION SW-SM1 LL NON Plastic PI

MAX. PARTICLE SIZE INCLUDED IN TEST < #4 "

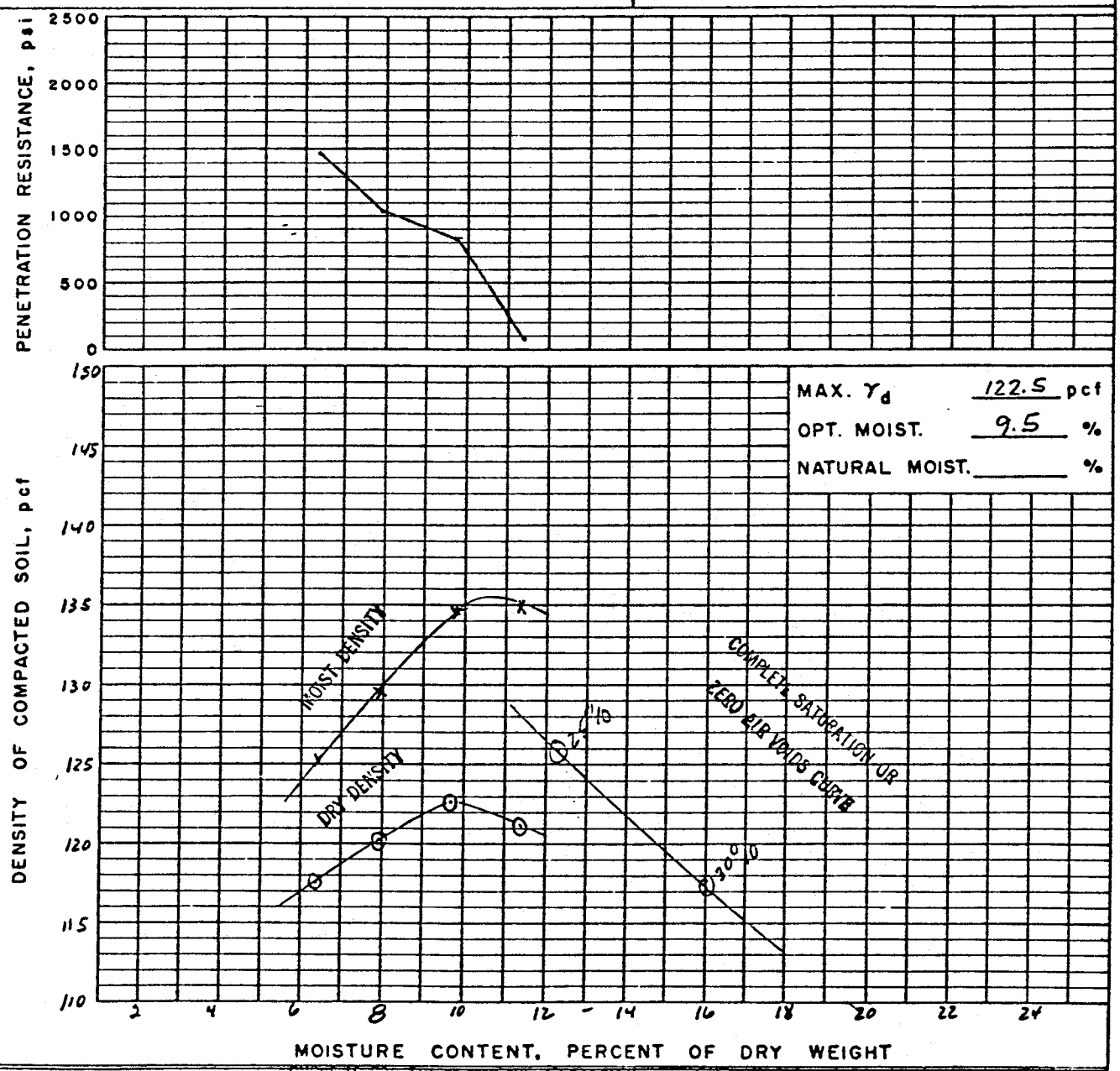
SPECIFIC GRAVITY (G_s) { MINUS NO 4 2.69 ; PLUS NO. 4 2.61

CURVE NO. 2 OF 5

STD. (ASTM D-698) ☒; METHOD A

MOD. (ASTM D-1557) ☐; METHOD

OTHER TEST ☐ (SEE REMARKS)



REMARKS

CURVE IS FOR THE MINUS NO. 4 FRACTION

GRADUATION OF TOTAL SAMPLE

< NO. 200 11 %; < NO. 4 74 %; < 3 IN. 100 %

USDA SCS HYATTSVILLE MD. 1966

SCS-ENG-352 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO 81W320

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

244

PROJECT and STATE: Buckhorn Mesa, Pass Mountain ARIZONA

FIELD SAMPLE NO.: 124.2

LOCATION: Borrow AREA 200' US. Sta 72+00 ℄ DAM

DEPTH: 3'

GEOLOGIC ORIGIN:

TESTED AT: SML

APPROVED BY: DJB

DATE: 1/21/81

CLASSIFICATION SC-SM LL 26 PI 7

CURVE NO. 3 OF 5

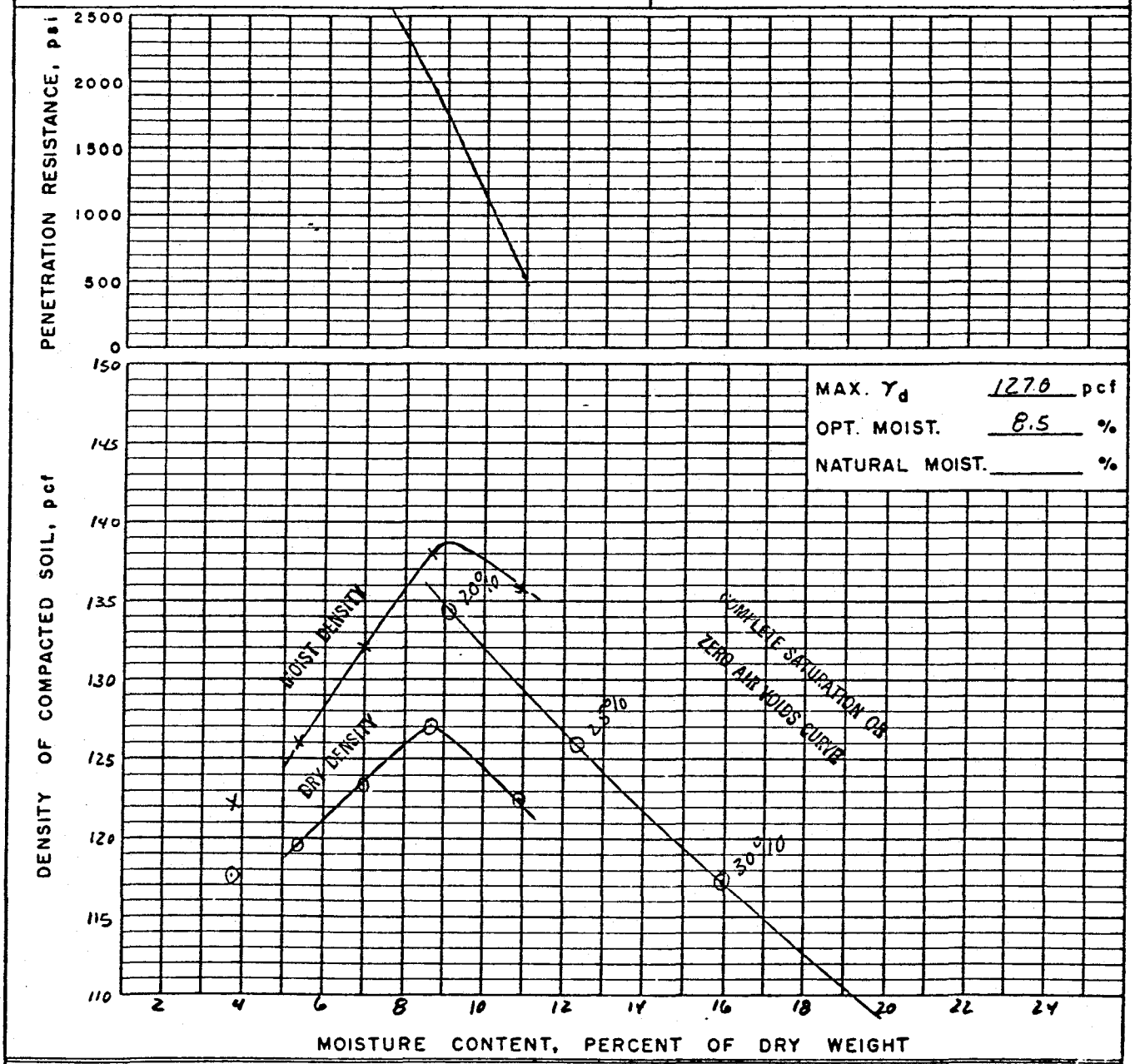
MAX. PARTICLE SIZE INCLUDED IN TEST < #4 "

SPECIFIC GRAVITY (G_s) { MINUS NO 4 2.68 / PLUS NO. 4 ____

STD. (ASTM D-698) ☒; METHOD A

MOD. (ASTM D-1557) ☐; METHOD ____

OTHER TEST ☐ (SEE REMARKS)



REMARKS

CURVE IS FOR THE MINUS NO. 4 FRACTION

GRADUATION OF TOTAL SAMPLE

< NO. 200 22 %; < NO. 4 79 %; < 3 IN. 100 %

USDA SCS HYATTSVILLE MD. 1966

SCS-ENG-352 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO 81W 325

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

245

PROJECT and STATE: Buckhorn-Mesa, Pass Mountain ARIZONA

FIELD SAMPLE NO.	LOCATION	DEPTH
172.1	Borrow Area 200' US. Sta 55+00 ℄ Dam	1'-2.5'

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
	SML	CJL	1/21/81

CLASSIFICATION SP-SM LL Non Plastic PI

MAX. PARTICLE SIZE INCLUDED IN TEST < #4 "

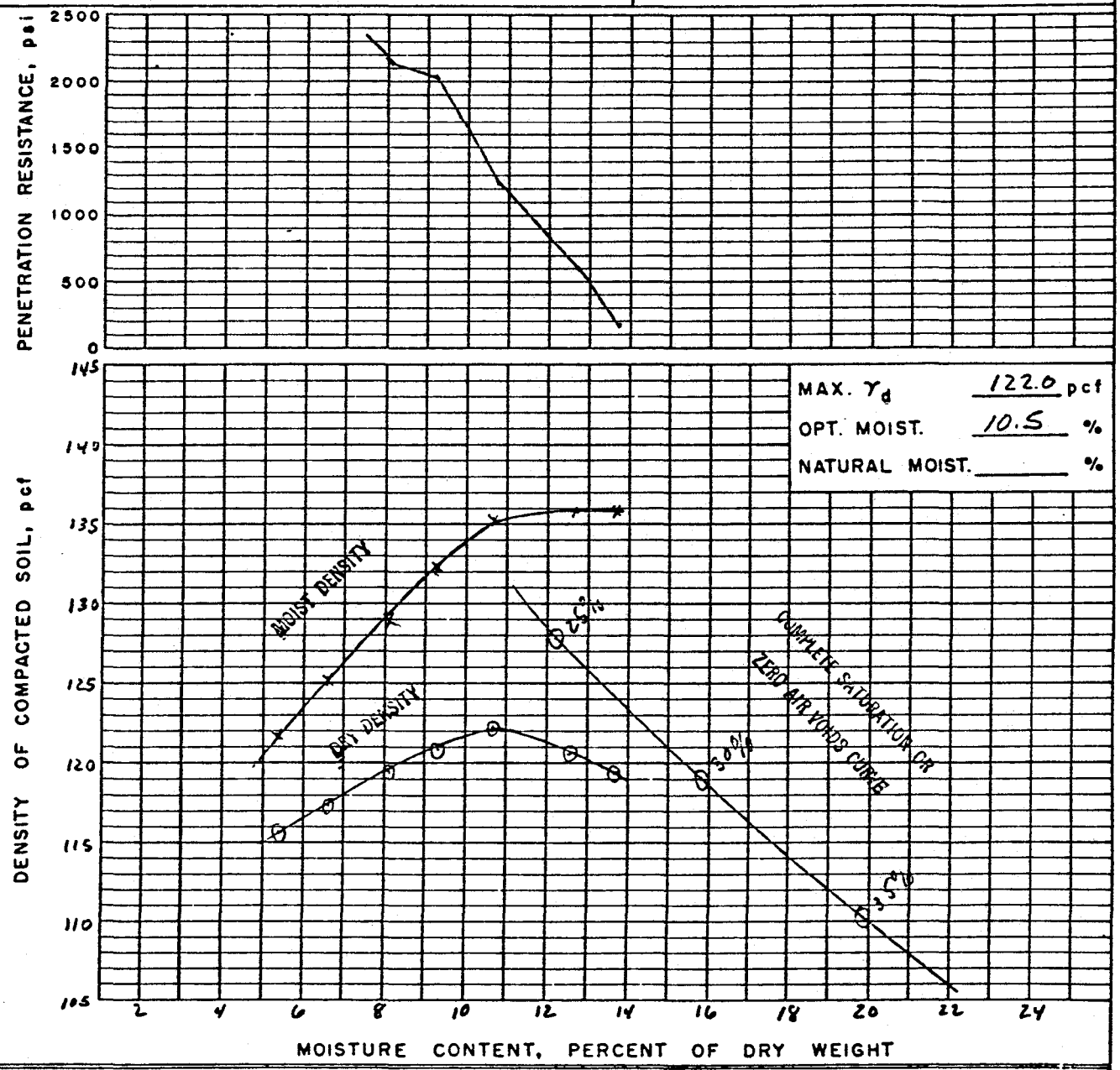
SPECIFIC GRAVITY (G_s) { MINUS NO 4 2.72 / PLUS NO. 4 2.62

CURVE NO. 4 OF 5

STD. (ASTM D-698) ☒; METHOD A

MOD. (ASTM D-1557) ☐; METHOD

OTHER TEST ☐ (SEE REMARKS)



REMARKS

CURVE IS FOR THE MINUS NO. 4 FRACTION
GRADUATION OF TOTAL SAMPLE

< NO. 200 9 %; < NO. 4 68 %; < 3/4 IN. 100 %

USDA SCS HYATTSVILLE MD. 1966

SCS-ENG-352 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO 81W 326 "B"

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

PROJECT and STATE: BUCKHORN-MESA, PASS MOUNTAIN, ARIZONA

246

FIELD SAMPLE NO.	LOCATION	DEPTH
173.1	BORROW AREA 600' US STA 47+00 ℄ DAM	1.6 - 2.5'

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
	SML	DDS	1/21/81

CLASSIFICATION SC-SM LL 22 PI 6

MAX. PARTICLE SIZE INCLUDED IN TEST < #4 "

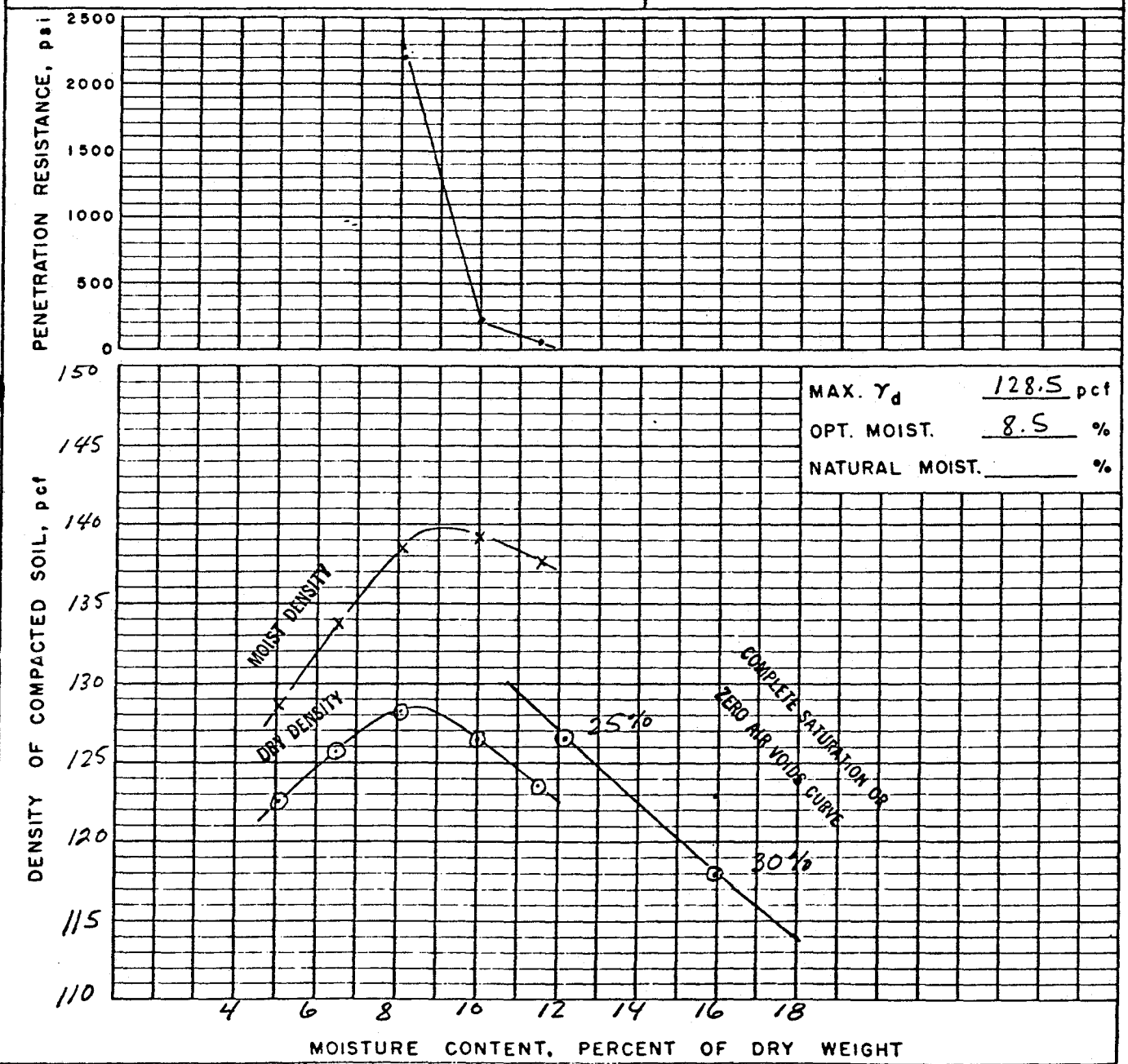
SPECIFIC GRAVITY (G_s) { MINUS NO. 4 2.70; PLUS NO. 4 2.57

CURVE NO. 5 OF 5

STD. (ASTM D-698) ☒; METHOD A

MOD. (ASTM D-1557) ☐; METHOD

OTHER TEST ☐ (SEE REMARKS)



MAX. γ_d 128.5 pcf

OPT. MOIST. 8.5 %

NATURAL MOIST. ____ %

REMARKS

CURVE IS FOR THE MINUS NO. 4 FRACTION

GRADUATION OF TOTAL SAMPLE

< NO. 200 29 %; < NO. 4 81 %; < 3 IN. 100 %

SCS-ENG-353 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO 81W310

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	SOIL CLASSIFICATION

PROJECT and STATE: Buckhorn - Mesa, Pass Mountain ARIZONA			SAMPLE LOCATION: Centerline Dam 40+25 ℄ Dam
FIELD SAMPLE NO.: 2001.1	DEPTH: 2'-14'	GEOLOGIC ORIGIN:	
TYPE OF SAMPLE:	TESTED AT: SML	APPROVED BY: EJS	DATE: 1/21/81
SYMBOL: SW-SM	DESCRIPTION:		

247

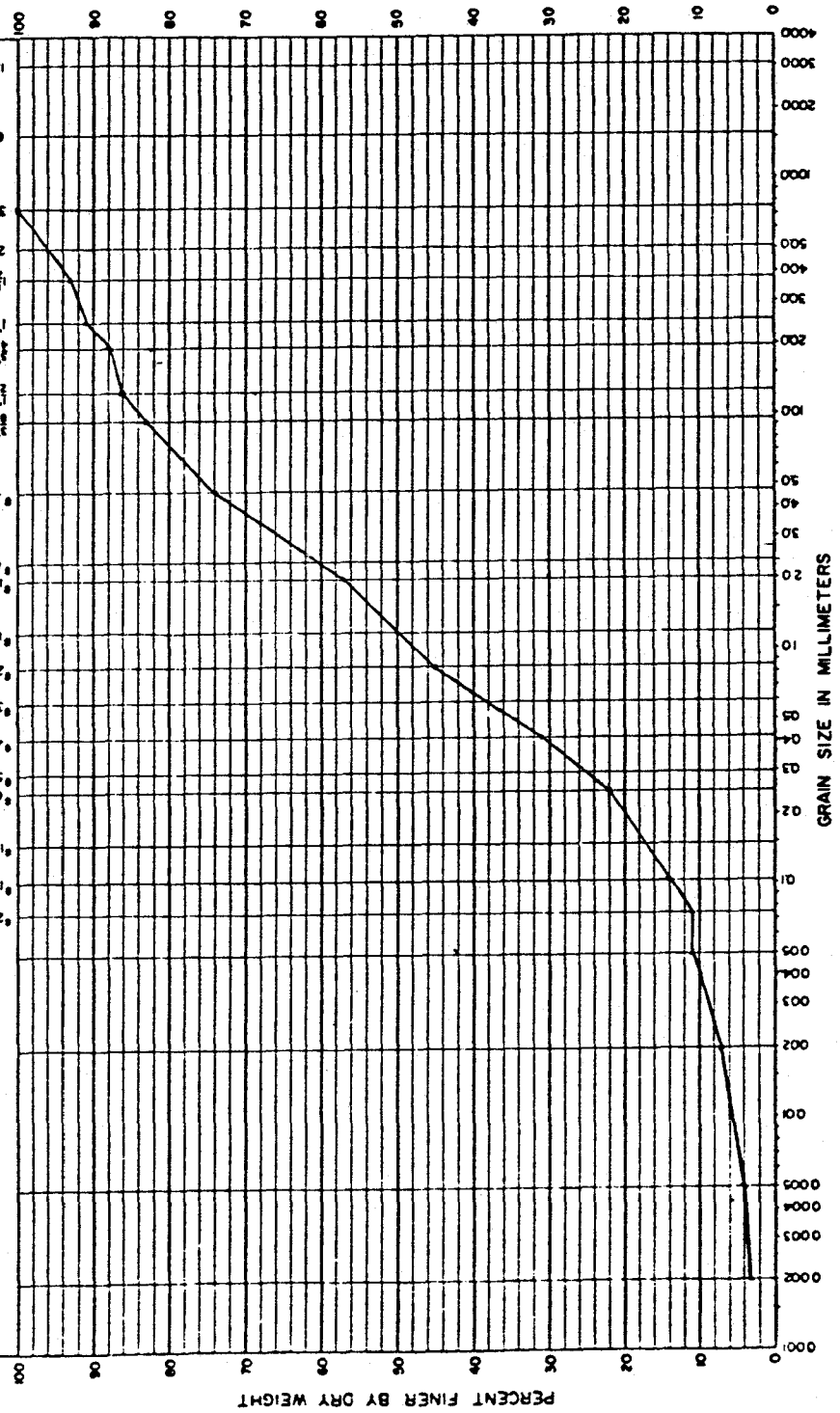
GRAIN SIZE DISTRIBUTION

D_{10} 0.41 | D_{15} | D_{30} 0.40 | D_{50} | D_{60} 2.40 | D_{85} | D_{MAX} | C_u 58.5 | C_c 1.63

COBBLES | GRAVELS | SANDS | FINES

SIEVE OPENING, (mm): (304.4), (152.2), (76.1), (50.8), (38.1), (25.4), (19.0), (12.7), (9.51), (4.76), (2.38), (2.00), (1.19), (0.84), (0.59), (0.42), (0.297), (0.250), (0.149), (0.105), (0.074)

U.S. STANDARD SIEVE SIZE: 12", 6", 3", 2", 1½", 1", ¾", ½", ⅜", #4, #8, #10, #16, #20, #30, #40, #50, #60, #100, #140, #200



UNDISTURBED CONDITION: DRY UNIT WEIGHT g/cc, pcf; MOISTURE %

SHRINKAGE LIMIT %

SOLUBLE SALTS %

ATTERBERG LIMITS: NATURAL MOISTURE LL, PI; AIR DRY LL, PI; OVEN DRY LL, PI

SPECIFIC GRAVITY (G_s): (+) #4; (−) #4

REMARKS:

SCS-ENG-353 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO 81W311 "A"

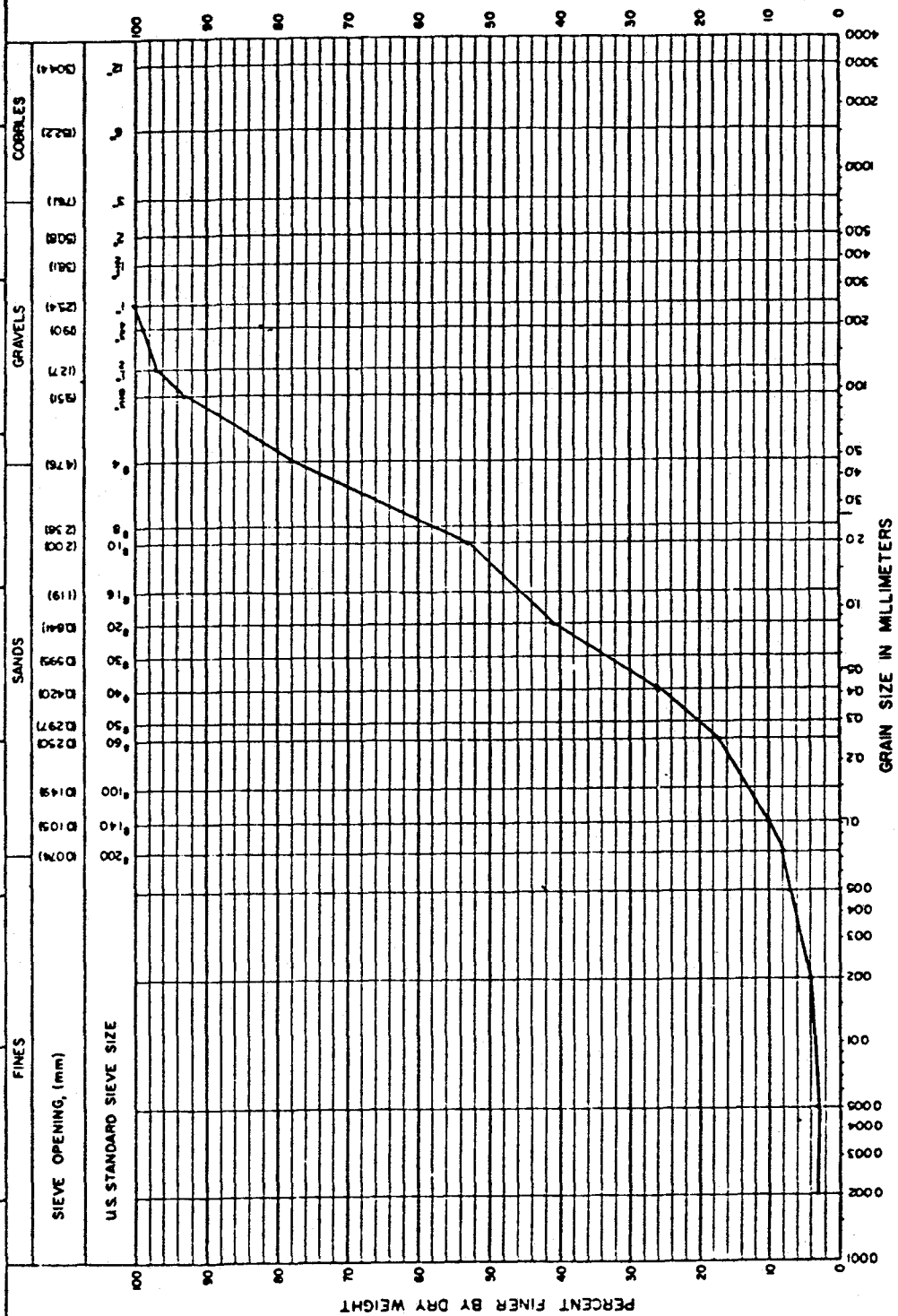
MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	SOIL CLASSIFICATION

PROJECT and STATE: Buckhorn-Mesa, Pass Mountain ARIZONA			SAMPLE LOCATION: Centerline Dam 83+53 Dam
FIELD SAMPLE NO.: 2002.1	DEPTH: 0'-2'	GEOLOGIC ORIGIN	
TYPE OF SAMPLE	TESTED AT: SML	APPROVED BY: EJS	DATE: 1/21/81
SYMBOL: SP-SM	DESCRIPTION		

248

GRAIN SIZE DISTRIBUTION

D_{10} 1.1' D_{15} D_{30} 5.1' D_{50} D_{60} 9.6' D_{85} D_{MAX} C_u 23.6 C_c .91



UNDISTURBED CONDITION: DRY UNIT WEIGHT g/cc pcf; MOISTURE %

SHRINKAGE LIMIT %

SOLUBLE SALTS %

ATTERBERG LIMITS: NATURAL MOISTURE LL PI; AIR DRY LL PI; OVEN DRY LL PI

SPECIFIC GRAVITY (G_s): (+) #4; (-) #4

REMARKS:

SCS-ENG-352 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO 81W314

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	SOIL CLASSIFICATION

PROJECT and STATE: Buckhorn-Mesa, Pass Mountian ARIZONA

SAMPLE LOCATION: Borrow Area 400'US STa 82+00 ℄ Dam

FIELD SAMPLE NO.: 112.1

DEPTH: 1.4' - 3'

GEOLOGIC ORIGIN:

TYPE OF SAMPLE:

TESTED AT: SML

APPROVED BY: [illegible]

DATE: 1/21/81

SYMBOL: SW-SM

DESCRIPTION:

249

GRAIN SIZE DISTRIBUTION

C_c 2.09

C_u 23.7

$D_{MAX.}$

D_{85}

D_{60} 3.20

D_{50}

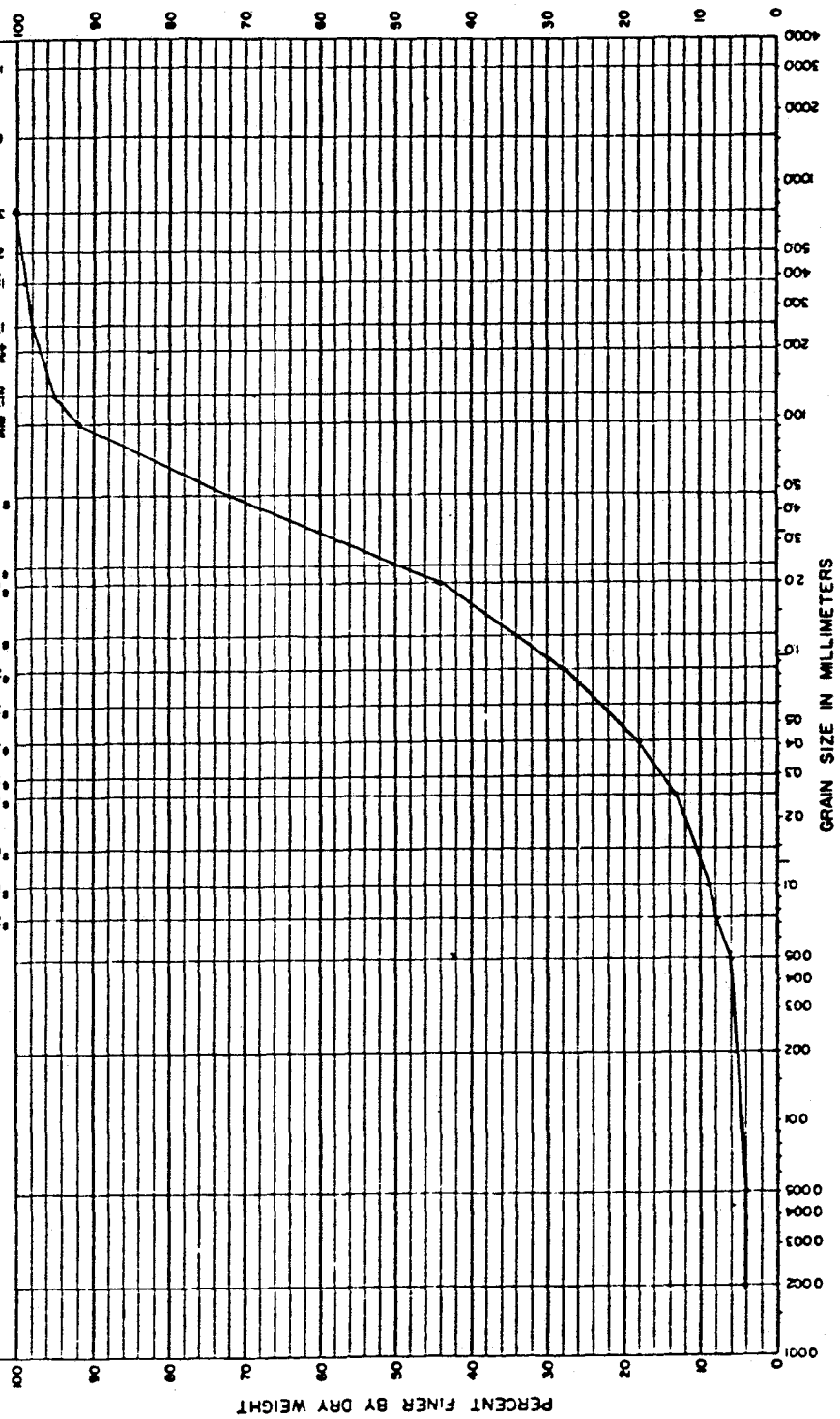
D_{30} .95

D_{15}

D_{10} .135

COBBLES | GRAVELS | SANDS | FINES

SIEVE OPENING, (mm) — U.S. STANDARD SIEVE SIZE



UNDISTURBED CONDITION: DRY UNIT WEIGHT g/cc pcf; MOISTURE %

SHRINKAGE LIMIT %

SOLUBLE SALTS %

ATTERBERG LIMITS: NATURAL MOISTURE LL PI; AIR DRY LL PI; OVEN DRY LL PI

SPECIFIC GRAVITY (G_s): (+) #4; (-) #4

REMARKS:

SCS-ENG-353 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO 81W318

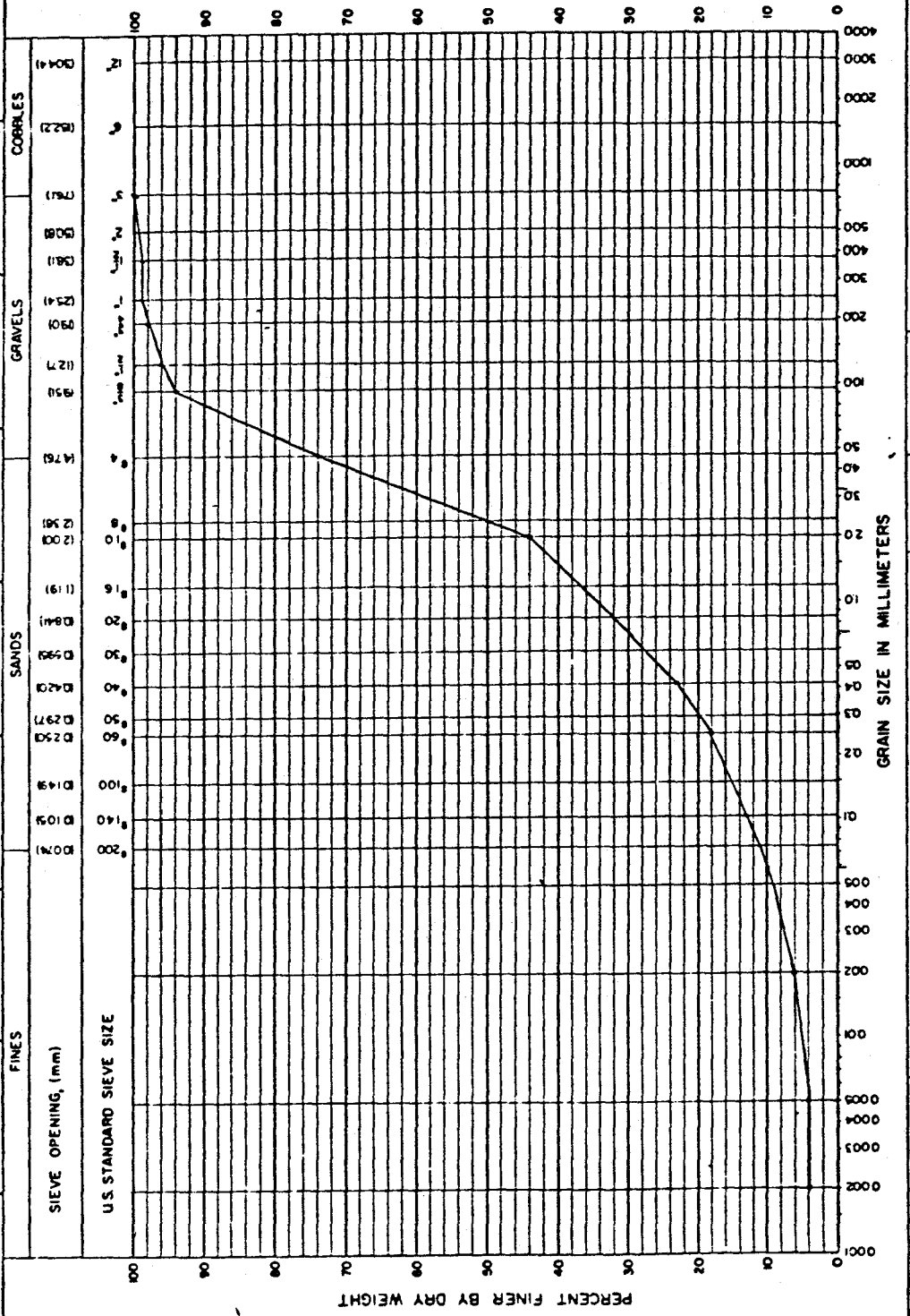
250

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	SOIL CLASSIFICATION

PROJECT and STATE: Buckhorn Mesa, Pass Mountain ARIZONA		SAMPLE LOCATION: Borrow Area 600' U.S. Sta 74+00 ℄ Dam	
FIELD SAMPLE NO.: 121.1	DEPTH: 0-6'	GEOLOGIC ORIGIN:	
TYPE OF SAMPLE:	TESTED AT: SML	APPROVED BY: EJS	DATE: 1/21/81
SYMBOL: SW-SM	DESCRIPTION:		

GRAIN SIZE DISTRIBUTION

D_{10}	D_{15}	D_{30}	D_{50}	D_{60}	D_{85}	D_{MAX}	C_u	C_c
.065		.71		3.20			54.2	2.67



UNDISTURBED CONDITION: MOISTURE %; DRY UNIT WEIGHT g/cc pcf

SHRINKAGE LIMIT %

SOLUBLE SALTS %

ATTERBERG LIMITS: NATURAL MOISTURE LL PI; AIR DRY LL PI; OVEN DRY LL PI

SPECIFIC GRAVITY (G_s): (-) #4 LL; (+) #4 PI

REMARKS:

SCS-ENG-353 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO BLW 325

251

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	SOIL CLASSIFICATION

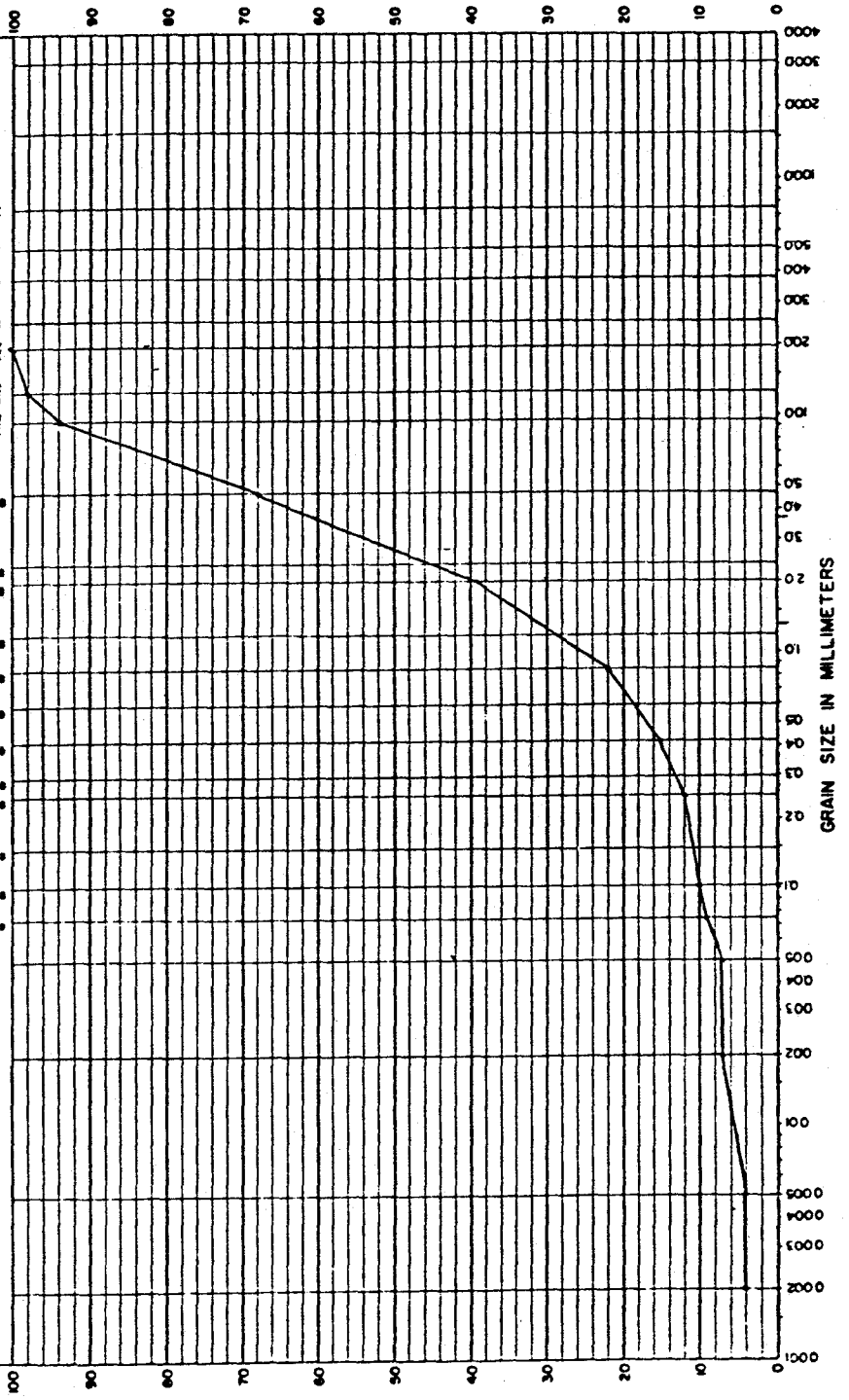
PROJECT and STATE: Buckhorn-Mesa, Pass Mountain ARIZONA		SAMPLE LOCATION: BORROW AREA 200' U.S. Sta 55+00 ℄ Dam	
FIELD SAMPLE NO.: 172.1	DEPTH: 1'-2.5'	GEOLOGIC ORIGIN:	
TYPE OF SAMPLE:	TESTED AT: S.M.L.	APPROVED BY: EJS	DATE: 1/21/81
SYMBOL: SP'-SM	DESCRIPTION:		

GRAIN SIZE DISTRIBUTION

D_{10} 1.1 | D_{15} | D_{30} 1.35 | D_{50} | D_{60} 3.75 | D_{85} | D_{MAX} | C_u 34.1 | C_c 3.79

COBBLES | GRAVELS | SANDS | FINES

SIEVE OPENING, (mm) — U.S. STANDARD SIEVE SIZE



UNDISTURBED CONDITION: DRY UNIT WEIGHT g/cc pcf; MOISTURE %

SHRINKAGE LIMIT %

SOLUBLE SALTS %

ATTERBERG LIMITS: NATURAL MOISTURE, AIR DRY, OVEN DRY — LL, PI

SPECIFIC GRAVITY (G_s): (+) #4, (-) #4

REMARKS:

SCS-ENG-353 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO 81W327

252

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	SOIL CLASSIFICATION

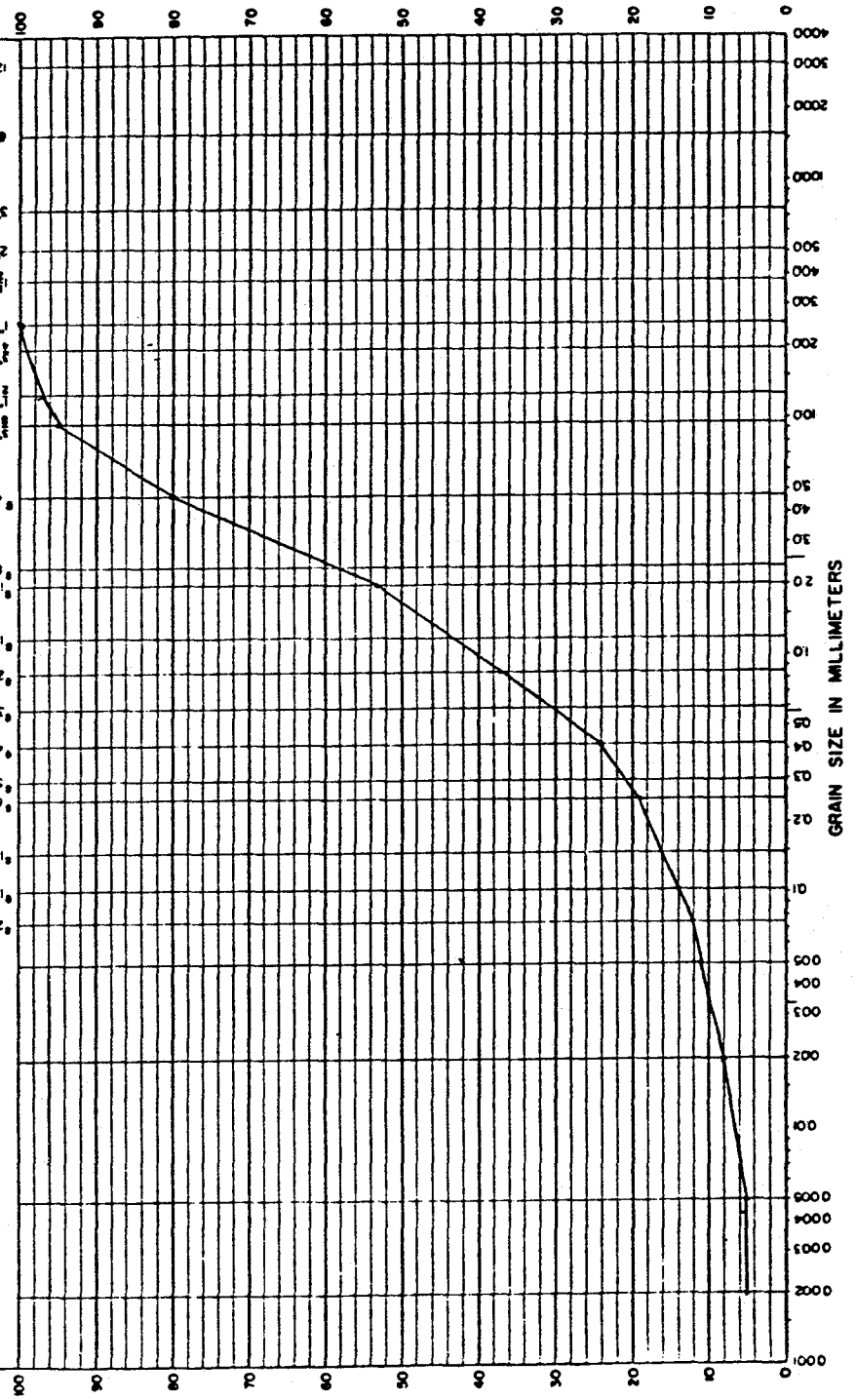
PROJECT and STATE: Buckhorn Mesa, Pass Mountain ARIZONA		SAMPLE LOCATION: BORROW AREA 600' U.S. STA. 47+00 ℄ Dam	
FIELD SAMPLE NO.: 173.2	DEPTH: 2.5'-5'	GEOLOGIC ORIGIN:	
TYPE OF SAMPLE:	TESTED AT: SML.	APPROVED BY: [illegible]	DATE: 1/21/81
SYMBOL: SP-SM	DESCRIPTION:		

GRAIN SIZE DISTRIBUTION

D_{10} 0.34' D_{15} D_{30} 1.58' D_{50} D_{60} 2.60' D_{85} D_{MAX} C_u 76.5' C_c 3.8

FINES | SANDS | GRAVELS | COBBLES

SIEVE OPENING, (mm) | U.S. STANDARD SIEVE SIZE



UNDISTURBED CONDITION: MOISTURE %; DRY UNIT WEIGHT g/cc pcf

SHRINKAGE LIMIT %

SOLUBLE SALTS %

ATTERBERG LIMITS: NATURAL MOISTURE LL PI; AIR DRY LL PI; OVEN DRY LL PI

SPECIFIC GRAVITY (G_s): (+) #4; (-) #4

REMARKS:

Send to Susanne Keep

United States Department of Agriculture

Soil Conservation Service

Midwest TSC
Soil Mechanics Laboratory
512 South 7th Street
Lincoln, NE 68508

Subject: ENG 210 - Arizona WF-08, Buckhorn-Mesa, Signal Butte

Date: June 8, 1981

To: Ralph M. Arrington
State Conservation Engineer
Soil Conservation Service
Phoenix, Arizona

Attention: Suzanne Leckband

Attached are the results of the "breakdown" test made at SML and the results of chemical tests performed at the National Soil Survey Laboratory.

As agreed with Bob Nelson and Suzanne Leckband, a series of unconfined compression tests have been assigned to determine if there is any likelihood for the Caliche soils to "cement up" after placement. Samples 115.1 and 169.1 from the Pass Mountain Site have the most $CaCO_3$ and were used for this test series. The test series will consist of measuring the unconfined strength immediately after molding and at 7, 14, and 28 days.

Lorn P. Dunnigan

LORN P. DUNNIGAN
Head, Soil Mechanics Laboratory

Attachments:
Copy of letter dated May 27, 1981, from C. Steven Holzhey and data attached
Copy of Breakdown Test Data for Sample 81W353

cc: Ralph M. Arrington (original and 3 copies)
Stanley N. Hobson, WTSC, Portland, OR (letter only)
Robert E. Nelson, WTSC, Portland, OR

United States
Department of
Agriculture

Soil
Conservation
Service

Midwest Technical Service Center
Federal Building, Room 393
100 Centennial Mall North, Box 82503
Lincoln, Nebraska 68501

Subject: 430-SOILS - Lincoln SML: Samples from Arizona (RT81-SM181)

Date: May 27, 1981

To: Lorn P. Dunnigan
Head, Soil Mechanics Laboratory
Soil Conservation Service
512 South Seventh Street
Lincoln, NE 68508

Attached are two copies of the data requested for the Arizona samples referred to in your letter of April 21, 1981.

R. E. Nielsen, Acting
C. STEVEN HOLZHEY, Head
National Soil Survey Laboratory

Attachments

USDA-SCS
SOIL MECHANICS
LABORATORY
MAY 28 1981
LINCOLN, NEBR. 68508

Norma

USDA-SCS
SOIL MECHANICS
LABORATORY

255

MAY 28 1981

LINCOLN, NEBR. 68508

REFERENCE SAMPLES

SUBMITTED BY SML-LINCOLN FROM
BUCKHORN-MESA WATERSHED PROJECT, ARIZONA
- 0142-000 -000

81T 7523-7529

SAMPLE NOS. 81T7523 - 7529 DATE MAY 1981

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL MECHANICS-ARIZONA

GENERAL METHODS 1B1A, 2A1, 2B

-1- -2- -3- -4- -5- -6- -7- -8- -9- -10- -11- -12- -13- -14- -15- -16- -17- -18- -19- -20-

SAMPLE NO.	HZN NO.	DEPTH (CM)	FIELD NO.	TOTAL CLAY LT .002	TOTAL SILT .002-.05	TOTAL SAND .05-2	CLAY FINE LT .002	CLAY CCS LT .002	SILT FINE .002-.02	SILT COARSE .02-.05	SAND VF .05-.10	SAND F .10-.25	SAND M .25-.50	SAND C .5-1	SAND VC 1-2	COARSE FRAGMENTS (MM) WEIGHT 2-5	5-20	20-75	>2MM 75-381	>2MM WHOLE SOIL
				<- PCT OF <2MM (SAL) ->												<- PCT OF <75MM(381)->				
81T7523	1	0- 0	115.1													—	—	—		—
81T7524	2	30- 91	165.1													—	—	—		—
81T7525	3	167-198	170.2													—	—	—		—
81T7526	4	91-153	161.2													—	—	—		—
81T7527	5	61-122	144.1													—	—	—		—
81T7528	6	91-122	141.1													—	—	—		—
81T7529	7	122-274	276.1													—	—	—		—

SAMPLE NO.	HZN NO.	EXCH K 5A1C	TOTAL N 6G3A	EXTR P	TOTAL S 6K3A	DITH-CIT EXTRACTABLE FE 6L2B	AL 6G7A	MN 6D2A	RATIO/CLAY CEC 8D1	15 BAR 8D1	ATTERBERG LIMITS LL 4F1	PI 4F	BULK DENSITY FIELD MOIST 4A3A	1/3 BAR 4A1D	OVEN DRY 4A1H	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4E4	1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2A	WRD WHOLE SOIL 4C1
		<- PCT OF <2MM - ->									PCT <0.4MM		<- G/CC - ->			CM/CM	<- PCT OF <2MM ->				CM/CM
81T7523	1																				
81T7524	2																				
81T7525	3																				
81T7526	4																				
81T7527	5																				
81T7528	6																				
81T7529	7																				

SAMPLE NO.	HZN NO.	NH4OAC EXTRACTABLE BASES CA 5B5A 6N2E	MG 5B5A 6N2D	NA 5B5A 6P2B	K 5B5A 6N2B	SUM BASES	ACIDITY 6H5A	CEC SUM CATS 5A3A	NH4-OAC 5A8B	EXCH NA 5D2 PCT	SAR SE	BASE SATURATION SUM 5C3	NH4OAC 5C1	CO3 AS CACO3 <2MM 6E1G PCT	RES. OHMS /CM 8E1	CASO4 AS GYPSUM <2MM 6F1A	<20MM 6F4	PH SAT PASTE 8C1B	CACL2 .01M 8C1F 1:2	H2O 8C1F 1:1
		<- MEQ / 100 G - ->								<- PCT ->		<- PCT- >		<- PCT ->						
81T7523	1	1.4	0.1	0.3				7.6	1	TR		18						7.6	7.9	8.5
81T7524	2	1.4	0.6	0.3				10.4	5	2		33						7.8	7.9	8.5
81T7525	3	2.9	1.9	0.5				11.1	11	5		10						7.5	7.9	8.0
81T7526	4	2.2	0.8	0.4				8.3	8	4		12						7.8	7.9	8.5
81T7527	5	2.6	0.1	0.5				9.1	1	TR		13						7.8	7.9	8.4
81T7528	6	4.7	0.6	0.6				10.1	5	2		14			2500			8.0	8.0	8.4
81T7529	7	2.4	0.5	0.5				10.2	4	2		4						7.6	7.9	8.4

SAMPLE NO.	HZN NO.	WATER EXTRACTED FROM SATURATED PASTE CA 6N1B	MG 6N1B	NA 6P1A	K 6Q1A	CO3 6H1B	HCO3 6J1A	CL 6K1C	SO4 6L1C	NO3 6M1C	H2O 9A	TOTAL SALTS EST. 6D5	ELEC. COND. 8A3A MMHOS /CM	PINEFALOGY CLAY X-RAY 7A2I	7A2I	7A2I	7A2I	DTA 7A3	7A3	TOTAL RES 7B1A	COM WEATH 7B1A
		<- MEQ / LITER - ->									<- PCT ->			<- RELATIVE APPLNTS ->				<- PCT - ->			
81T7523	1	3.5	0.6	0.7	0.2	—	3.4	0.4	1.1	0.2	23.6	TR	0.49								
81T7524	2	2.4	0.3	2.2	0.1	—	2.9	0.4	1.6	—	31.7	TR	0.52								
81T7525	3	31.5	9.4	23.0	0.3	—	1.1	31.3	14.0	6.7	30.3	0.1	5.87								
81T7526	4	3.7	1.6	5.4	0.2	—	3.2	2.4	4.3	—	27.3	TR	1.05								
81T7527	5	2.4	0.7	0.4	0.2	—	2.6	0.4	1.0	0.2	30.2	TR	0.38								
81T7528	6	5.1	2.2	3.9	0.2	—	2.5	1.5	6.6	0.4	31.0	TR	1.12								
81T7529	7	6.5	1.5	4.5	0.2	—	2.2	8.7	2.4	0.4	23.3	TR	1.37								

WHERE: 3= ALL CA BIEVLD <2MM BASIS

FTS 541-5363
Bob Jordan

WORK ASSIGNMENT SHEET

NB-SML-9 (B-1 Fourche Maline Gradation) USDA-SCS

DATE 4-23-81 PROJECT AZ. 5-6-UNC Butte

OPERATION BREAKDOWN TEST FOR DEGRADABLE MATERIAL 256

Lab. Sample No. 81W 353 Harvey

1. Run one point at natural moisture in 6" dia. mold.
2. Use Modified effort, (10# hammer, 18" drop, 3 lifts, 93 blows per lift.)
3. Prepare 5000 gram sample as indicated below.
4. After compacting, dry entire sample molded for moisture determination.
5. Determine gradation after test (Gravel, sand, and fine fraction) and record belo

SPECIMEN GRADATION % PASSING

		1 1/2"	1"	3/4"	1/2"	3/8"	#4	#10	#20	#40	#60	#140	#200
Before Test	Grams	950	600	650	500	700	1600	--	--	--	--	--	--
	%	100	81	69	56	46	32	--	--	--	--	--	--
After Test	Grams	198	269	363	415	708	1998						
	%	100	95	88	79	68	51						

Bulk G_s _____ pcf.
% Absorption _____ %.

Standard Proctor test on material < #4 = _____ pcf @ _____ %.

Apparent G_s of fraction < #8 _____.
Apparent G_s of fraction > #4 _____.

Density obtained on breakdown test = 116.0 pcf. Natural moisture content = 1.7 %.

Description of material by field:

Remarks: this samples has Hard Rock and a sand stone of some kind. I would say about 10% of the Hard Rock Broke down and 40% of the softer sand stone.

WORK assigned by: P.C. Recorded by: P.K.

WORK completed by: _____ Date: 5-13-81

Date: _____

Form RTSC-LI-ENG-7
6/17/69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
SOIL MECHANICS LABORATORY

GRAVEL SIEVE WORK SHEET
(Record All Weights in Grams)

Line Number	Laboratory Sample Number	8/w 353								
	[illegible]	Weight Retained	Percent Coarser Than	Percent Finer Than	Weight Retained	Percent Coarser Than	Percent Finer Than	Weight Retained	Percent Coarser Than	Percent Finer Than
1	Total Sample									
2	Total Retained on # 4									
3	Retained on 3"									
4	Retained on 1½"			100						
5	Retained on 1"	199		99						
6	Retained on 3/4"	269		88						
7	Retained on ½"	363		79						
8	Retained on 3/8"	415		68						
9	Retained on # 4	708		51						
10	Sum of 3", 1½", 1", 3/4", ½", 3/8", # 4		49							
11	Wt. Passing # 4	1998								
12	Split Sample									
13	Split Sample Corrected									
14	Retained on # 10									
15	Finer Than # 10									
16	Sum of Lines 14 & 15 = Line 12									
17	Sum of Lines 10 & 14									

Completed by _____ Date _____ Checked by Harvey Date 4 [illegible]

Completed by _____ Date _____ Recorded by _____ Date _____

SCS-ENG-359
REV. 6-71

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

258

WORK SHEET FOR COMPACTION AND PENETRATION RESISTANCE DATA

Sample No.: Blw 353

COMPACTION DATA (Record Weights in Pounds)

1	Wt. of Cyl. + Soil	14.99					
2	Wt. of Cylinder	6.13					
3	Wt. of Soil = (1) - (2)						
4	Wt. per Cu. Ft. (Wet) = (3) ÷ Vol. of Cyl.	118.0					
5	Wt. per Cu. Ft. (Dry) = $\frac{(4) \times 100}{100 + (9)}$	116.0					
6	Proctor Needle Readings						
7	Size Needle (Sq. in.)						
8	Penetration Resistance = (6) ÷ (7) (Lbs./sq. in.)						

MOISTURE DETERMINATION DATA (Record Weights in Grams)

9	Percent Moisture = $\frac{(13)}{(15)} \times 100$	1.7					
10	Can Number	Pan	-				
11	Wet Wt. - Can + Soil	4187.0					
12	Dry Wt. - Can + Soil	4120.0					
13	Moisture Weight = (11) - (12)						
14	Weight of Can	170.0					
15	Dry Weight of Soil = (12) - (14)						

Vol. of Cyl. _____ cu. ft.	
	Standard Proctor
X	Modified AASHO
	Other _____

PROCEDURE DATA:

Wt. of Hammer 10 # Pounds

Drop 18 Inches

No. of Lifts 3

Blows 93

Completed by: Harvey Date: 4-27-81

Computed by: _____ Date: _____

Checked by: _____ Date: _____

Recorded by: _____ Date: _____

Project AZ- Sigo & Butte

Site _____

Density		% H_2O
Wet	Dry	

59M-81

Sus arrive

United States Department of Agriculture

Soil Conservation Service

Midwest Technical Service Center
Soil Mechanics Laboratory
512 South 7th Street
Lincoln, NE 68508

259

Subject: 210-ENG - Soil Mechanics - Arizona WF-08
Buckhorn Mesa Watershed, Pass Mountain
Maricopa County

Date: January 27, 1982

To: Ralph M. Arrington
State Conservation Engineer
Soil Conservation Service
Phoenix, Arizona

Index tests for the subject site are attached.

Permeability test results are summarized as follows:

Sample No.	Compacted Unit Weight and Moisture		Permeability Rate, k, fpd		
			Range		Average
	lb/ft³	(%)	Maximum	Minimum	
82W172	109.3	13.0	0.002	0.0002	0.0003
82W174	124.0	8.0	0.09	0.01	0.07
82W177	120.2	9.5	0.10	0.01	0.08
82W178	116.9	9.5	0.08	0.02	0.07

Permeability testing includes the following items:

1. Height of specimen, 4 inches
2. Diameter of sample, 4 inches, in Lucite cylinders
3. Height of water, 36 inches
4. Testing time, November 25, 1981 to December 9, 1981

Lorn P. Dunnigan

LORN P. DUNNIGAN
Head, Soil Mechanics Laboratory

cc: Ralph M. Arrington (Orig. + 3)
Jack C. Stevenson, WTSC (letter only
Robert E. Nelson, WTSC, Portland, OR

Attachments:
Form SCS-ENG-354, Soil Mechanics Laboratory Data, 2 sheets
Form SCS-ENG-352, Compaction and Penetration Resistance, 6 sheets

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DEPTH	FIELD CLASSIFICATION	MECHANICAL ANALYSIS — GRAIN SIZE DISTRIBUTION EXPRESSED AS PERCENT FINER BY DRY WEIGHT: FINES					SAND						GRAVEL						ATTERBERG LIMITS		UNIFIED CLASSIFICATION	SOLUBLE SALTS %	DISPERSION %	MOISTURE - DENSITY RELATIONSHIPS ☐ STANDARD ☐ MODIFIED			UNDISTURBED SAMPLE DATA		G_s
		0.002 mm	0.005	0.02	0.05	#200 0.074	#140 0.105	#60 0.250	#40 0.42	#20 0.84	#10 2.0	#4 4.76	3/8" 9.525	1/2" 12.7	3/4" 19.05	1" 25.4	1 1/2" 38.1	3" 76.2 mm	LL	PI				CURVE NO	MAX γ_d pcf	w_o %	γ_d g/cc	w_n %	

SCS-(NG-)54
Rev. 3-70
Field Code (NG-1)-18

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL MECHANICS LABORATORY DATA
Sheet 1 of 2

10/27/81 ARIZONA

Laboratory Sample Number	Field Sample Number	Location and Description			Depth	Field Classification	Fines 0.002 mm	0.005	0.02	0.05	#200 0.074	Sand #140 0.105	#60 0.250	#40 0.42	#20 0.84	#10 2.0	#4 4.76	Gravel 3/8" 9.525	1/2" 12.7	3/4" 19.05	1" 25.4	1 1/2" 38.1	3" 76.2 mm	LL	PI	Unified Classification	Soluble Salts %	Dispersion %	Curve No	Max γ_d pcf	w_o %	γ_d g/cc	w_n %	G_s	Special Tests
82W	DH-	Buckhorn Mesa - Pass Mountain			Site																														
166	69A	℄ dam	68+72	S. Bag	2-3'		14	15	17	22	22	23	27	30	36	56	83	97	98	100				39	17	SC									
	TP-																																		
167	81A	℄ dam	81+00	S. Bag	0-3'		11	14	20	28	32	35	41	47	56	75	94	98	99	100				21	1	SM									
168	81A	"	"	S. Bag	3.5-6'		9	10	12	15	16	17	19	22	28	46	74	94	98	100				39	18	SC									
169	79A	"	79+00	M. Bag	0-5'		7	8	11	13	14	16	21	27	37	53	79	96	99	100				22	3	SM									
	DH-																																		
170	84A	℄ dam	84+40	S. Bag	4-6'		6	9	12	14	16	18	23	28	38	60	88	98	99	100				NON PLASTIC		SM									
	TP-																																		
171	95A	℄ dam	95+00	M. Bag	0-7'		5	8	11	14	21	24	31	36	45	57	77	94	97	99	100			NON PLASTIC		SM									
172	131-A	Borrow	62+00 600' Rt.	M. Bag	0-8'		14	15	17	22	25	26	29	32	37	48	68	85	90	93	96	98	100	47	23	SC							2.69	154 pcf MINUS NO. 4 GRAVEL FRACTION 2.58 APPARENT 2.46 BULK DRY 1539 pcf. 2.1 % AT. OMITTED
																								DRY DENSITY < NO. 4						①	115.0	13.0			
173	132A	"	63+00 800' Rt.	M. Bag	.5-3'		7	10	12	23	31	35	44	49	56	65	78	87	90	93	93	97	100	NON PLASTIC		SM									
174	137A	"	68+00 600' Rt.	M. Bag	0-3'		7	8	12	20	29	33	39	44	52	68	83	93	95	97	98	100		NON PLASTIC		SM							2.70	154 pcf 95.9
																								DRY DENSITY < NO. 4						②	130.5	8.0			

260

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DEPTH	FIELD CLASSIFICATION	MECHANICAL ANALYSIS — GRAIN SIZE DISTRIBUTION EXPRESSED AS PERCENT FINER BY DRY WEIGHT: FINES					SAND					GRAVEL						ATTERBERG LIMITS		UNIFIED CLASSIFICATION	SOLUBLE SALTS %	DISPERSION %	MOISTURE-DENSITY RELATIONSHIPS ☐ STANDARD ☐ MODIFIED			UNDISTURBED SAMPLE DATA		G_s
		0.002 mm	0.005	0.02	0.05	#200 0.074	#140 0.105	#60 0.250	#40 0.42	#20 0.84	#10 2.0	#4 4.76	3/8" 9.525	1/2" 12.7	3/4" 19.05	1" 25.4	1 1/2" 38.1	3" 76.2 mm	LL	PI				CURVE NO	MAX γ_d pcf	w_o %	γ_d g/cc	w_o %	

SCS-ENG-354
Rev. 3-70
File Code ENG-13-18

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL MECHANICS LABORATORY DATA
Sheet 2 of 2

ARIZONA

LABORATORY SAMPLE NUMBER	FIELD NUMBER	LOCATION AND DESCRIPTION	DEPTH	FIELD CLASSIFICATION	0.002 mm	0.005	0.02	0.05	#200 0.074	#140 0.105	#60 0.250	#40 0.42	#20 0.84	#10 2.0	#4 4.76	3/8" 9.525	1/2" 12.7	3/4" 19.05	1" 25.4	1 1/2" 38.1	3" 76.2 mm	LL	PI	UNIFIED CLASSIFICATION	SOLUBLE SALTS %	DISPERSION %	CURVE NO	MAX γ_d pcf	w_o %	γ_d g/cc	w_o %	G_s	SPECIAL TESTS
82W	TP-	Buckhorn Mesa - Pass Mountain Site																															
175	139A	Borrow 70+00 S. Bag 600' Rt.	2.5-3'		9	11	15	21	27	30	38	44	52	63	79	88	90	91	92	97	100	NON PLASTIC		SM									
176	154A	Borrow 74+00 M. Bag 600' Rt.	2-3'		9	11	14	19	25	27	34	38	45	59	81	95	97	98	98	98	100	NON PLASTIC		SM									
177	153A	" 76+00 M. Bag 600' Rt.	0-2'		9	10	13	18	23	25	30	34	41	55	76	90	94	97	98	100		26	8	SC							2.70	
																						DRY DENSITY < NO. 4					3	126.5	9.5			
178	150A	" 79+00 M. Bag 800' Rt.	2-3'		6	8	12	17	24	26	32	37	43	54	72	87	91	93	94	96	100	NON PLASTIC		SM							2.67	
																						DRY DENSITY < NO. 4					4	123.0	9.5			
179	130A	" 82+00 600' M.Bag Rt.	0-6'		7	8	10	17	23	25	32	38	47	60	79	94	96	98	99	100		NON PLASTIC		SM							2.71	MINUS NO. 4
																						DRY DENSITY < NO. 4					5	123.0	8.5			GRAVEL FRACTION
																															2.62	APPARENT
																															2.51	BULK DRY 126.9 A.C.C.
																															1.7	% ABSORPTION
180	130A	" 82+00 M. Bag 600' Rt.	7-7.2'		8	11	15	20	27	30	36	41	49	61	84	96	99	100				29	3	SM									
181	142A	" 91+00 M. Bag 800' Rt.	0-1.5'		8	9	11	15	19	20	25	29	36	47	71	91	96	99	99	100		31	12	SC							2.70	
																						DRY DENSITY < NO. 4					6	124.5	10.0			

SCS-ENG-352 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO 82W172

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

262

PROJECT and STATE: BUCKHORN MESA - PASS MT.; ARIZONA

FIELD SAMPLE NO.	LOCATION	DEPTH
131-A	BORROW 62+00 600' Rt	0.0 - 8.0'

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
—	SML		

CLASSIFICATION SC LL 47 PI 23

MAX. PARTICLE SIZE INCLUDED IN TEST < #4 "

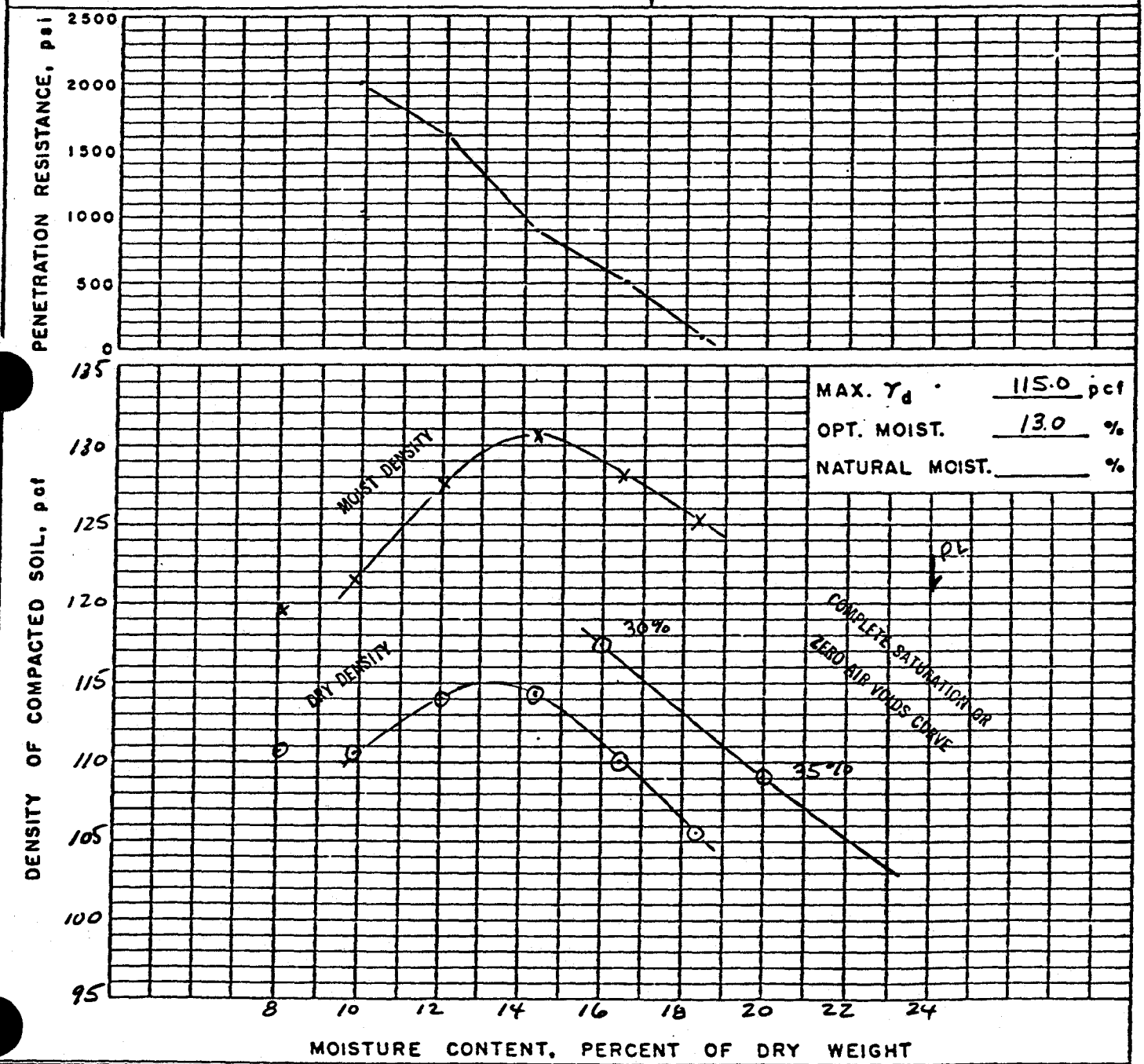
SPECIFIC GRAVITY (G_s) { MINUS NO 4 2.69; PLUS NO. 4 2.58

CURVE NO. 1 OF 6

STD. (ASTM D-698) ☒; METHOD A

MOD. (ASTM D-1557) ☐; METHOD

OTHER TEST ☐ (SEE REMARKS)



MAX. γ_d 115.0 pcf

OPT. MOIST. 13.0 %

NATURAL MOIST. ____ %

REMARKS

CURVE IS FOR THE MINUS NO. 4 FRACTION

GRADUATION OF TOTAL SAMPLE

< NO. 200 25 %; < NO. 4 68 %; < 3 IN. 100 %

USDA SCS HYATTSVILLE MD. 1966

SCS-ENG-352 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO 82W174

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

263

PROJECT and STATE: BUCKHORN MESA – PASS Mt.; ARIZONA

FIELD SAMPLE NO.	LOCATION	DEPTH
137A	BORROW 68+00 600' Rt	0.0 – 3.0

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
—	SML		

CLASSIFICATION SM LL NON-PLASTIC

MAX. PARTICLE SIZE INCLUDED IN TEST < #4

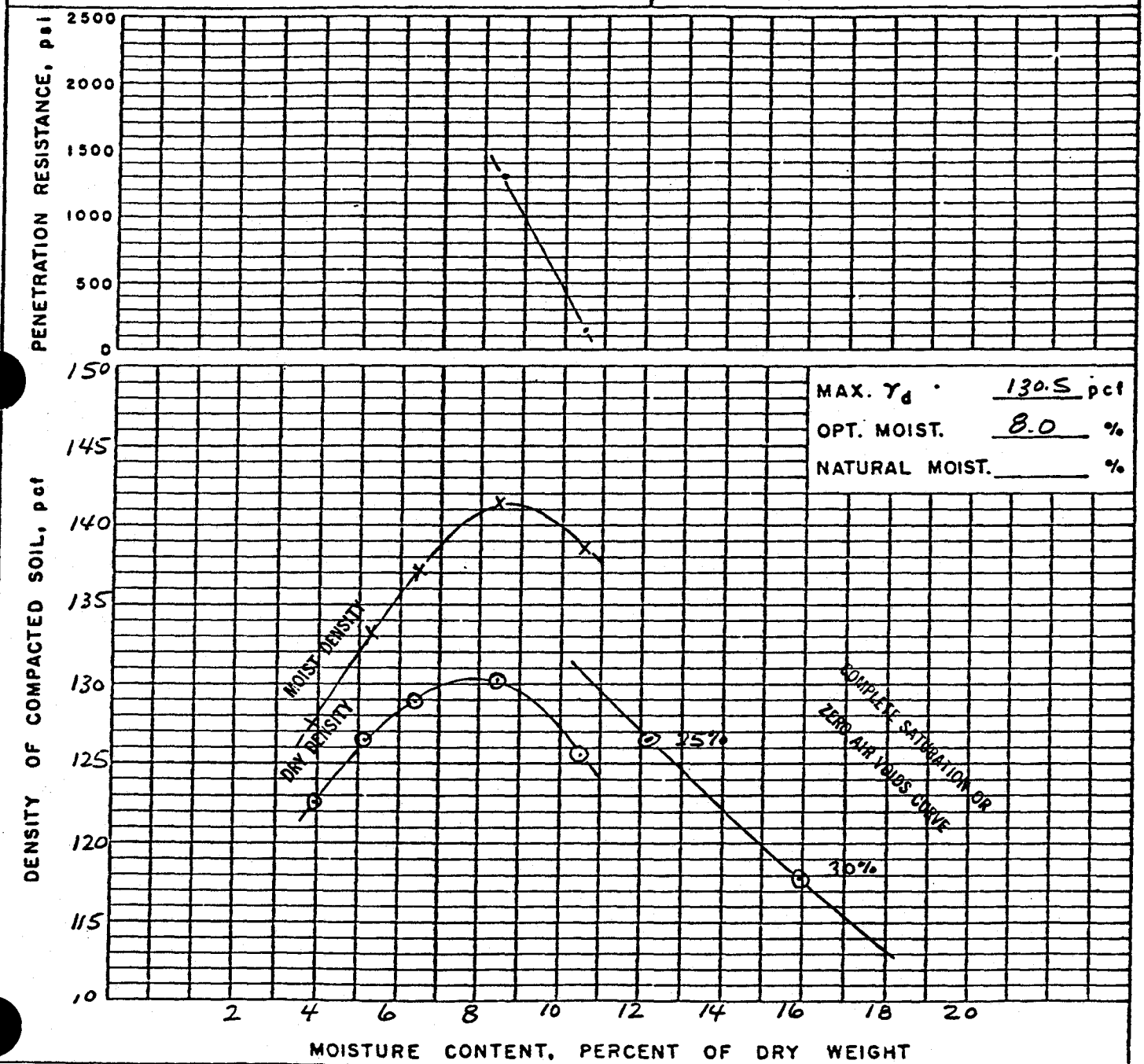
SPECIFIC GRAVITY (G_s) { MINUS NO 4 2.70 ; PLUS NO. 4 ____

CURVE NO. 2 OF 6

STD. (ASTM D-698) ☒; METHOD A

MOD. (ASTM D-1557) ☐; METHOD ____

OTHER TEST ☐ (SEE REMARKS)



REMARKS

CURVE IS FOR THE MINUS NO. 4 FRACTION

GRADUATION OF TOTAL SAMPLE

< NO. 200 29 %; < NO. 4 83 %; < 1½ IN. 100 %

USDA SCS HYATTSVILLE MD 1966

SCS-ENG-352 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO 82W177

MATERIALS TESTING REPORT	U.S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

264

PROJECT and STATE: BUCKHORN MESA – PASS Mt.; ARIZONA

FIELD SAMPLE NO.	LOCATION	DEPTH
153A	BORROW 76+00 600' Rt.	0.0 – 2.0'

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
—	SML		

CLASSIFICATION SC LL 26 PI 8

MAX. PARTICLE SIZE INCLUDED IN TEST < #4

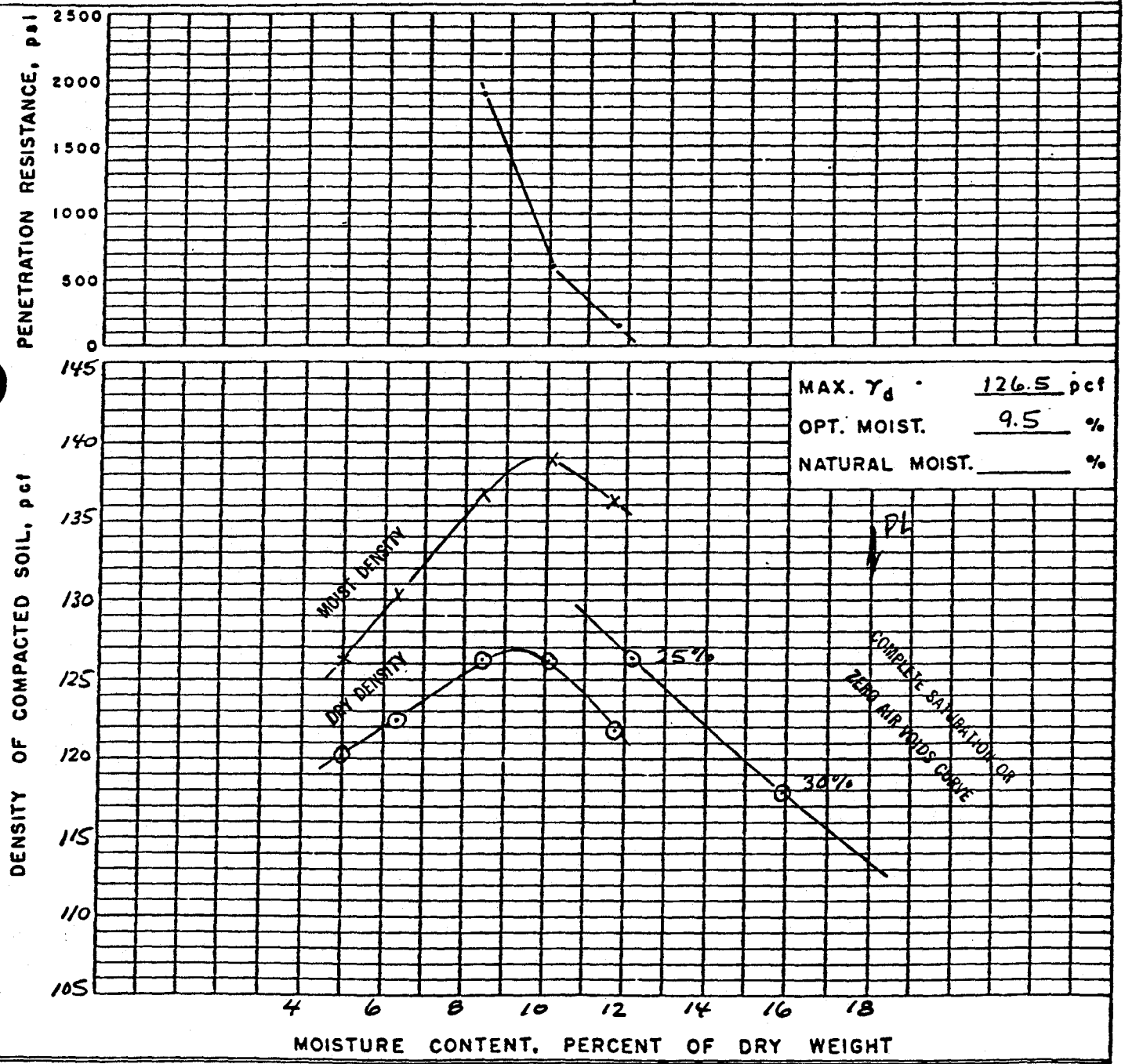
SPECIFIC GRAVITY (G_s) { MINUS NO 4 2.70 ; PLUS NO. 4 ____

CURVE NO. 3 OF 6

STD. (ASTM D-698) ☒; METHOD A

MOD. (ASTM D-1557) ☐; METHOD ____

OTHER TEST ☐ (SEE REMARKS)



REMARKS

CURVE IS FOR THE MINUS NO. 4 FRACTION

GRADUATION OF TOTAL SAMPLE

< NO. 200 23 %; < NO. 4 76 %; < 1½ IN. 100 %

USDA SCS HYATTSVILLE MD 1966

SCS-ENG-352 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO 82W178

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

265

PROJECT and STATE: BUCKHORN MESA - PASS MT.; ARIZONA

FIELD SAMPLE NO.	LOCATION	DEPTH
150 A	BORROW 79+00 800' Rt	2.0'-3.0'

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
—	SML		

CLASSIFICATION SM LL NON-PLASTIC

MAX. PARTICLE SIZE INCLUDED IN TEST <#4 "

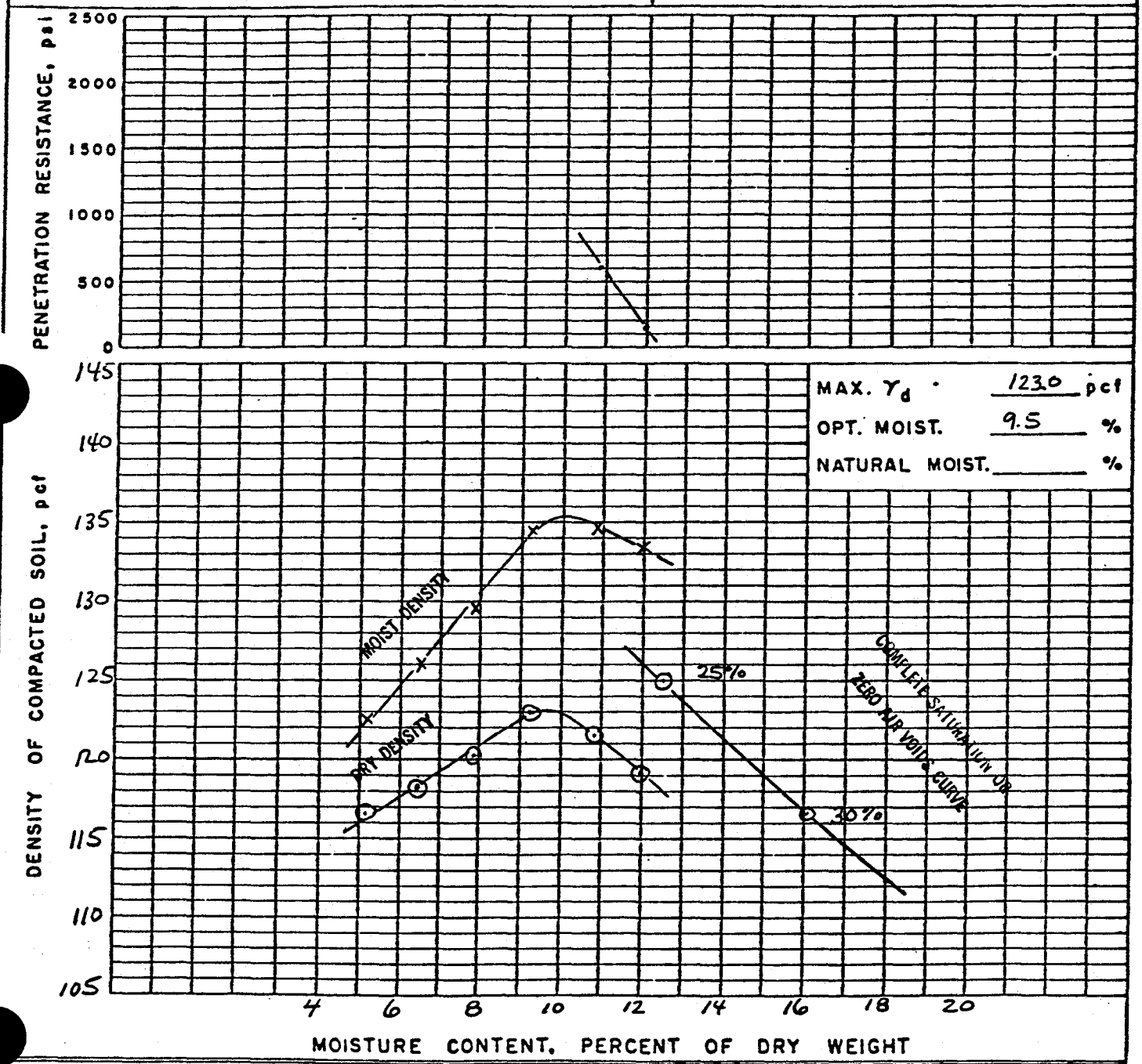
SPECIFIC GRAVITY (G_s) { MINUS NO 4 2.67 ; PLUS NO. 4 ____

CURVE NO. 4 OF 6

STD. (ASTM D-698) ☒; METHOD A

MOD. (ASTM D-1557) ☐; METHOD ____

OTHER TEST ☐ (SEE REMARKS)



REMARKS

CURVE IS FOR THE MINUS NO. 4 FRACTION
GRADUATION OF TOTAL SAMPLE

< NO. 200 24 %; < NO. 4 72 %; < 1½ IN. 100 %

USDA-SCS-HYATTSVILLE MD 1966

SCS-ENG-352 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO 82W179

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

266

PROJECT and STATE: BUCKHORN MESA - PASS Mt.; ARIZONA

FIELD SAMPLE NO.	LOCATION	DEPTH
130A	BORROW 82+00 600' Rt	0.0 - 6.0'

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
—	SML		

CLASSIFICATION SM LL NON-PLASTIC

MAX. PARTICLE SIZE INCLUDED IN TEST < #4

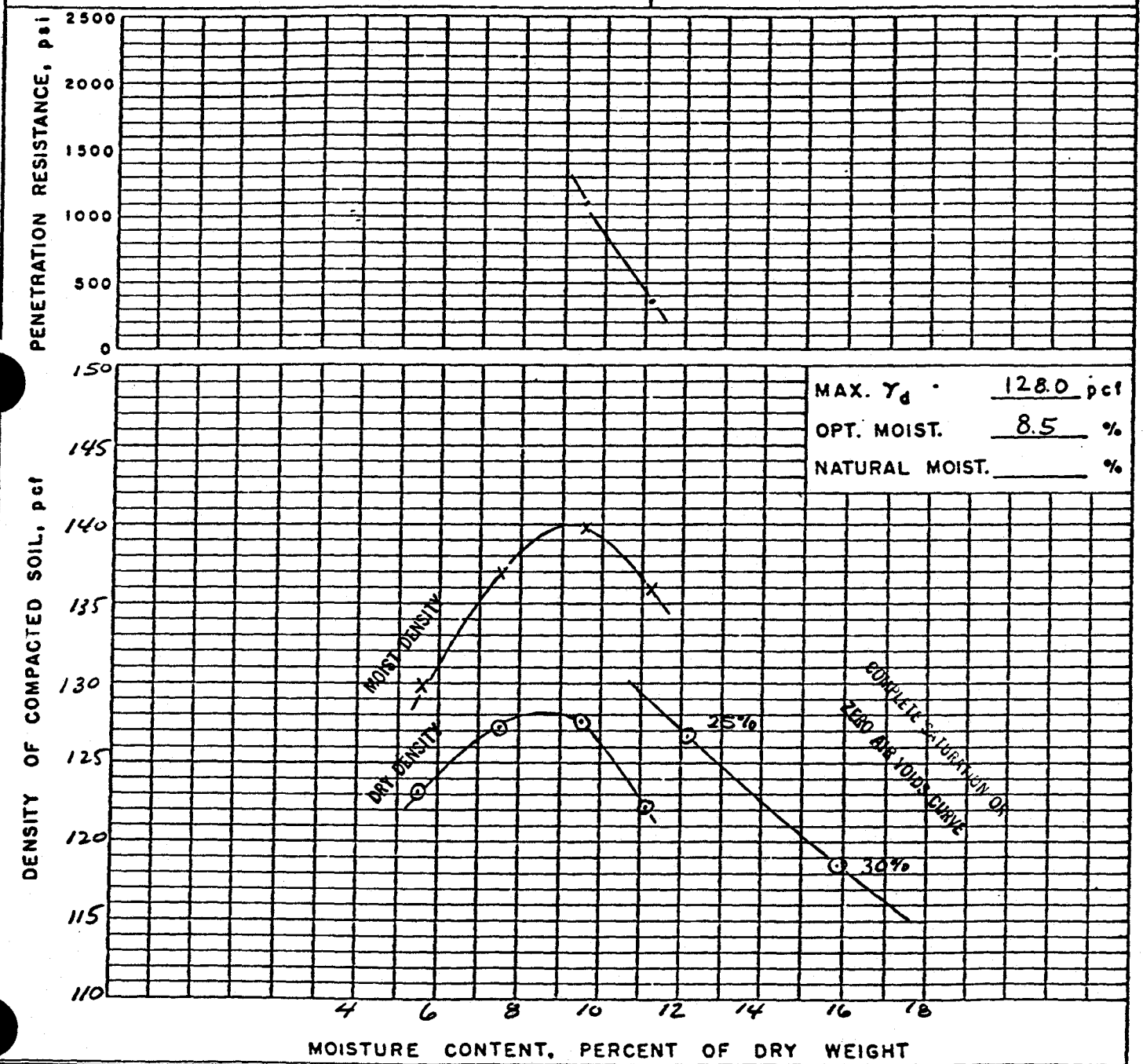
SPECIFIC GRAVITY (G_s) { MINUS NO 4 2.71; PLUS NO. 4 2.62

CURVE NO. 5 OF 6

STD. (ASTM D-698) ☒; METHOD A

MOD. (ASTM D-1557) ☐; METHOD

OTHER TEST ☐ (SEE REMARKS)



REMARKS

CURVE IS FOR THE MINUS NO. 4 FRACTION

GRADUATION OF TOTAL SAMPLE

< NO. 200 23 %; < NO. 4 79 %; < 1½ IN. 100 %

USDA SCS HYATTSVILLE MD 1966

SCS-ENG-352 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO 82W181

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

267

PROJECT and STATE: BUCKHORN MESA – PASS MT.; ARIZONA

FIELD SAMPLE NO.	LOCATION	DEPTH
142-A	BORROW 91+00 800' Rt	0.0–1.5

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
—	SML		

CLASSIFICATION SC LL 31 PI 12

MAX. PARTICLE SIZE INCLUDED IN TEST < #4

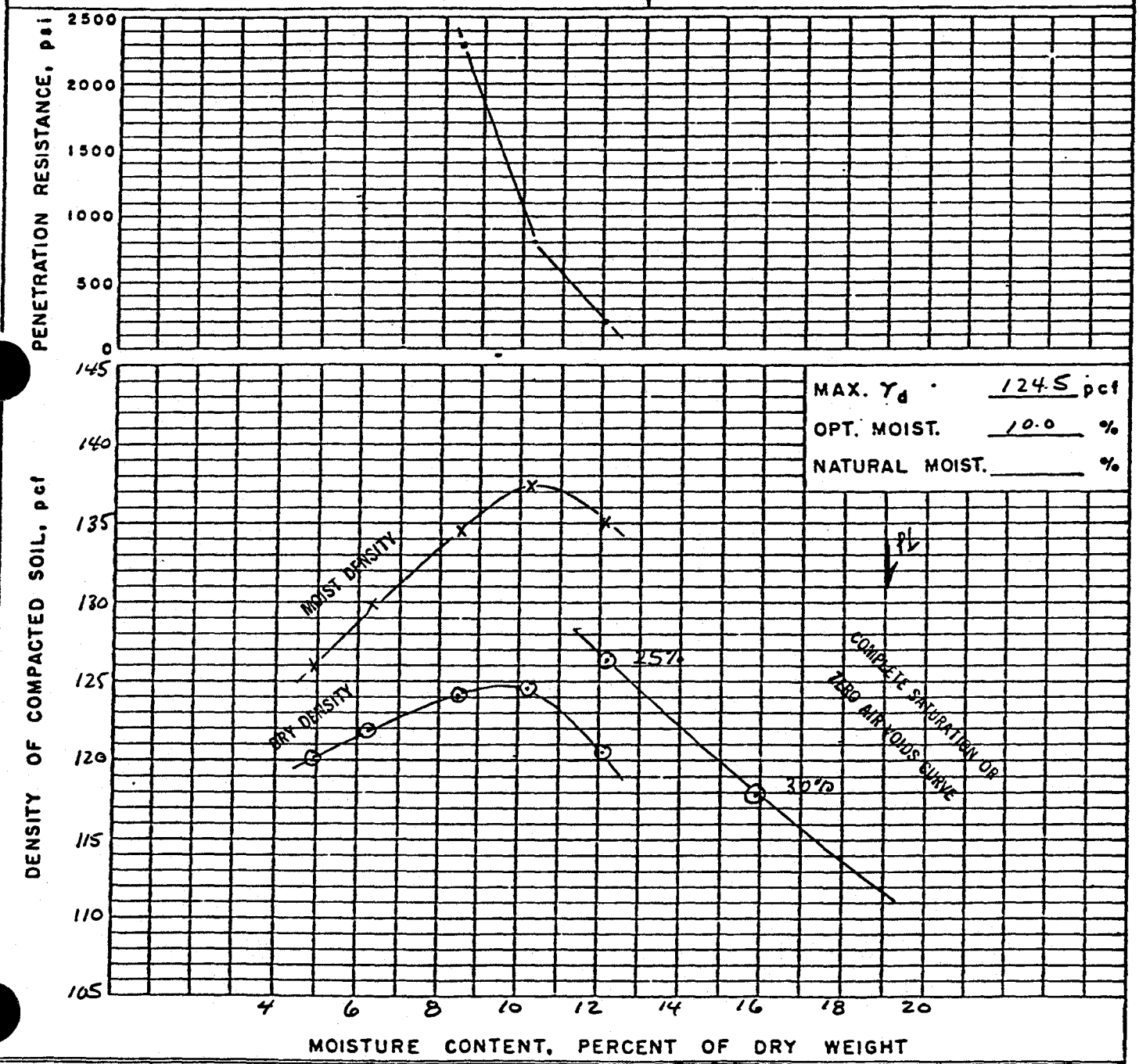
SPECIFIC GRAVITY (G_s) { MINUS NO 4 2.70 ; PLUS NO. 4 ____

CURVE NO. 6 OF 6

STD. (ASTM D-698) ☒; METHOD A

MOD. (ASTM D-1557) ☐; METHOD ____

OTHER TEST ☐ (SEE REMARKS)



REMARKS

CURVE IS FOR THE MINUS NO. 4 FRACTION

GRADUATION OF TOTAL SAMPLE

< NO. 200 19 %; < NO. 4 71 %; < 1½ IN. 100 %

USDA SCS HYATTSVILLE MD 1968

United States
Department of
Agriculture

Soil
Conservation
Service

Midwest National Technical Center
Soil Mechanics Laboratory
512 South 7th Street
Lincoln, NE 68508

268

Subject: ENG - Soil Mechanics - Arizona WF-08
Buckhorn-Mesa, Signal Butte

Date: July 2, 1982

To: Ralph M. Arrington
State Conservation Engineer
Soil Conservation Service
Phoenix, Arizona

File Code: 210-22

The additional soil mechanics tests requested in your letter of June 17, 1982, have been completed and the test results are attached.

Acting

LORN P. DUNNIGAN
Head, Soil Mechanics Laboratory

Attachments:
Form SCS 366, Direct Shear Test, 4 sheets
Form SCS-ENG-352, Compaction and Penetration Resistance, 1 sheet

cc:
Jack C. Stevenson, Acting Head, Eng. Staff, WNTC, SCS, Portland, OR
Donald E. Wallin, Acting Soil Mechanics Eng., SCS, Portland, OR

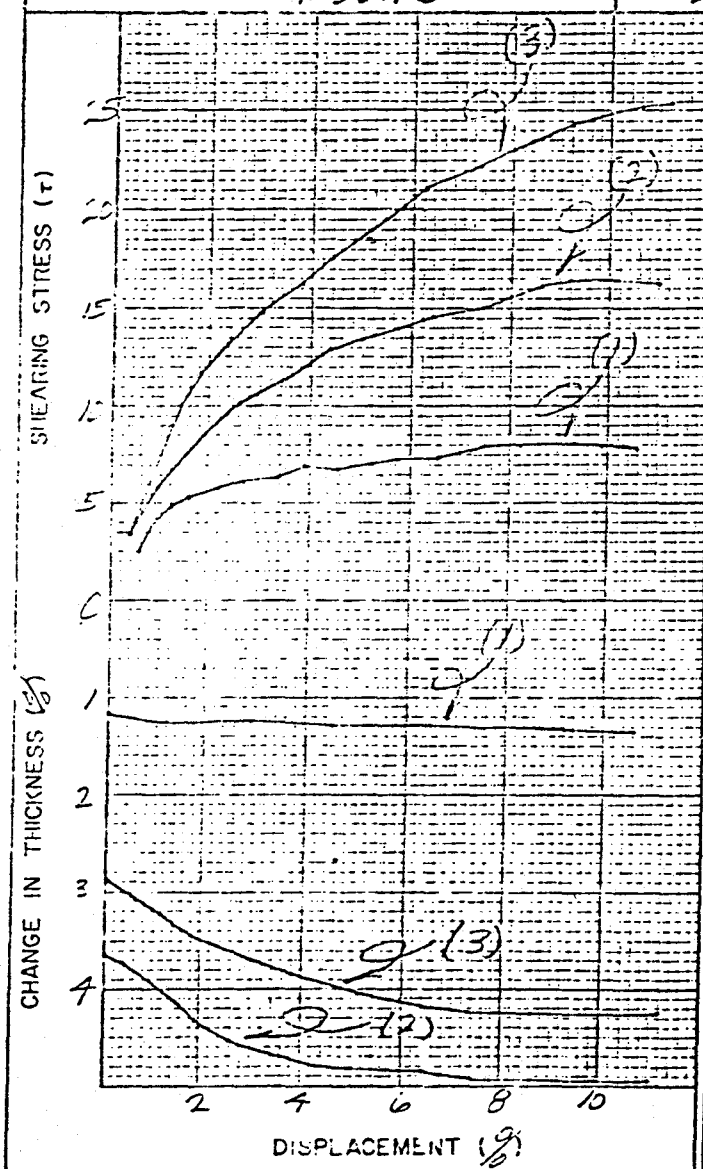
Form SCS 366
5-64

LABORATORY NO 81W337

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	DIRECT SHEAR TEST

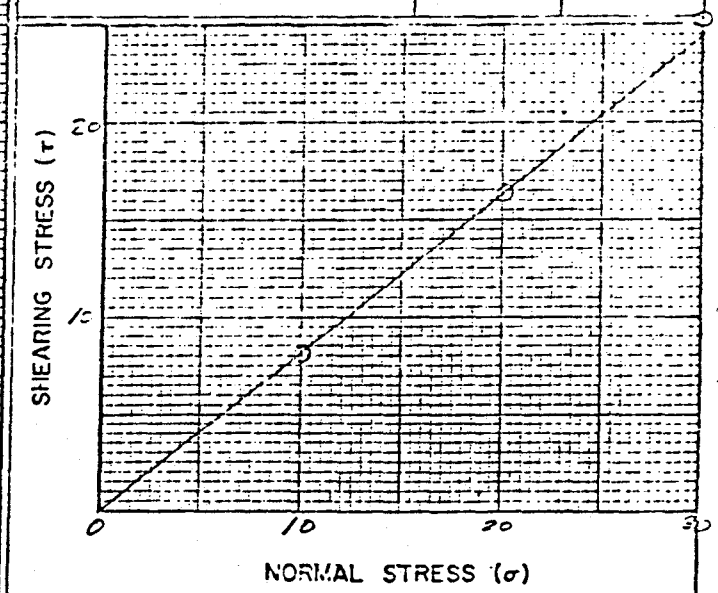
269

PROJECT and STATE: BUCKHORN-MESA, SIGNAL BUTTE		SAMPLE LOCATION: Section 400' NS, [illegible]	
FIELD SAMPLE NO: 101.1	DEPTH: 0-3'	GEOLOGIC ORIGIN	
TYPE OF SAMPLE: COMPACTED	TESTED AT: S.M.L.	APPROVED BY: Robert F. Steele	DATE: 7/2/82
CLASSIFICATION: SW-SM	LL: NON-PLASTIC	PI	SPECIFIC GRAVITY
TYPE OF TEST: COMPACTED	CONTROL: STEAM	$G_s(-)$ #4	2.64
RATE OF LOADING (in/min): 0.0006	MOISTURE CONDITION: FLOODED	$G_s(+)$ #4	
TYPE OF SPECIMEN: ROUND	AREA (sq in): 4.9	THICKNESS (in): 1.0	G_m(bulk)(+) #4



TEST NO.	1	2	3	4
INIT. MOISTURE, %	6.0	6.0	6.0	
DRY DENSITY, γ_d pcf	112.3	112.1	112.5	
INIT. VOID RATIO	.4675	.4703	.4645	
TEST DURATION, (min)	440	457	467	
FINAL MOISTURE, %	13.4	12.9	12.4	
NORMAL STRESS	10	20	30	
MAX. SHEAR STRESS	7.01	16.42	25.39	

SHEAR VALUES	Ø	C
AT MAXIMUM STRESS	39	0



REMARKS

RAH/RJS

SCS-ENG-352 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO 8141353

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

270

PROJECT OR STATE ARIZONA · BUCKHORN-MESA, #SIGNAL BUTTE

FIELD SAMPLE NO	LOCATION	DEPTH
1411	BORROW 600' US STA. 231+00 4' DAM	30'-40'

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
	SML	[illegible]	7/2/82

CLASSIFICATION SM LL NON-PLASTIC CURVE NO. 1m OF 1m

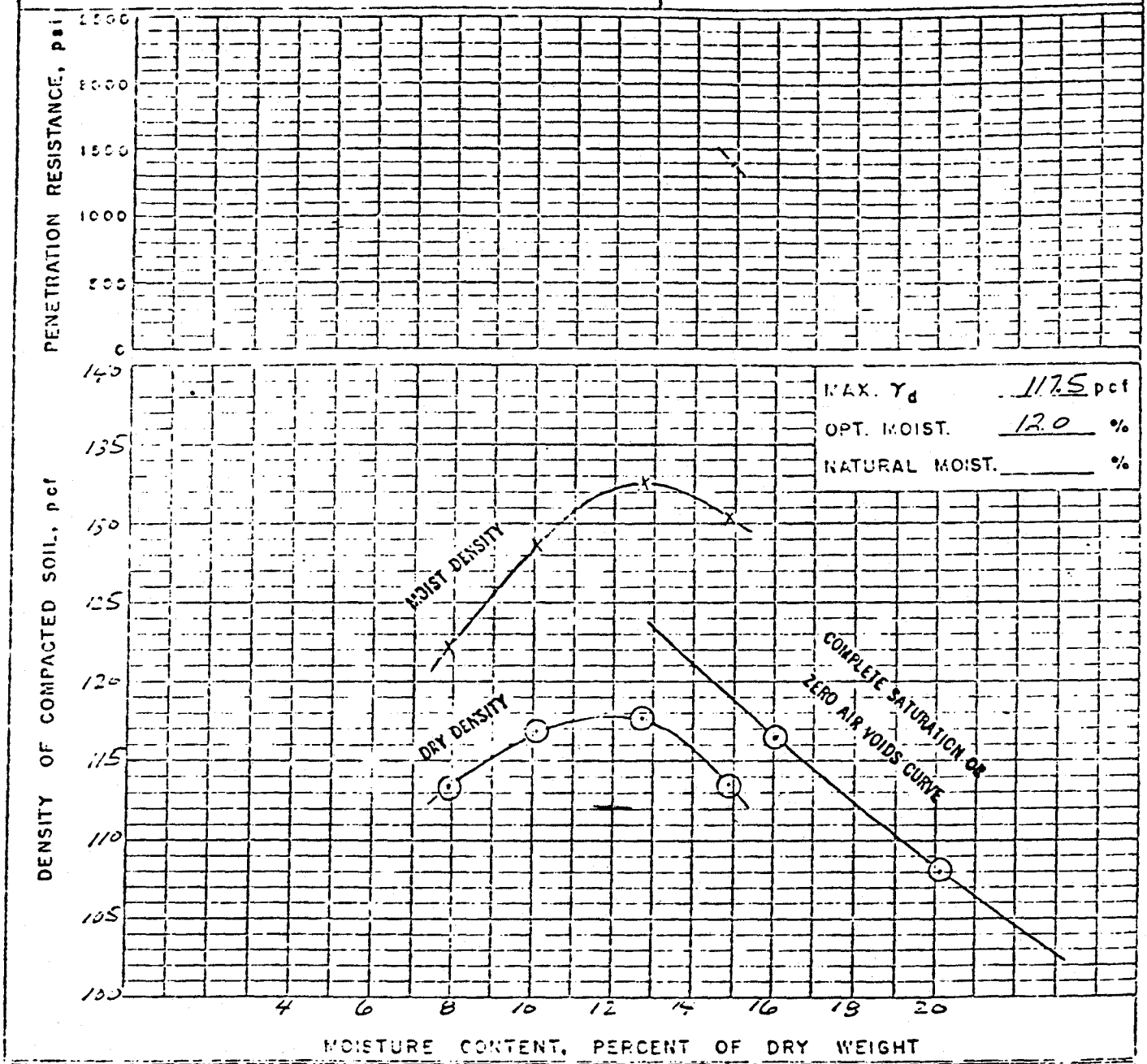
MAX. PARTICLE SIZE INCLUDED IN TEST <#4 "

SPECIFIC GRAVITY (G_s) { MINUS NO. 4 2.66 / PLUS NO. 4 ____

STD. (ASTM D-698) ☐; METHOD ____

MOD. (ASTM D-1557) ☒; METHOD A

OTHER TEST ☐ (SEE REMARKS)



REMARKS

CURVE IS FOR THE MINUS NO. 4 FRACTION
GRADUATION OF TOTAL SAMPLE

< NO 200 20 %; < NO. 4 69 %; < 3 IN. 100 %

USDA-SCS-HYATTSVILLE, MD. 1968

Form SCS 366
5-64

LABORATORY NO. 81W35C

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	DIRECT SHEAR TEST

PROJECT and STATE: PUEBLO-MESA, SIGNAL BUTTE, ARIZONA

SAMPLE LOCATION: 8.25 miles U.S. Hwy. 666 [illegible]

FIELD SAMPLE NO.	DEPTH	GEOLOGIC ORIGIN
140.1	0-3'	271

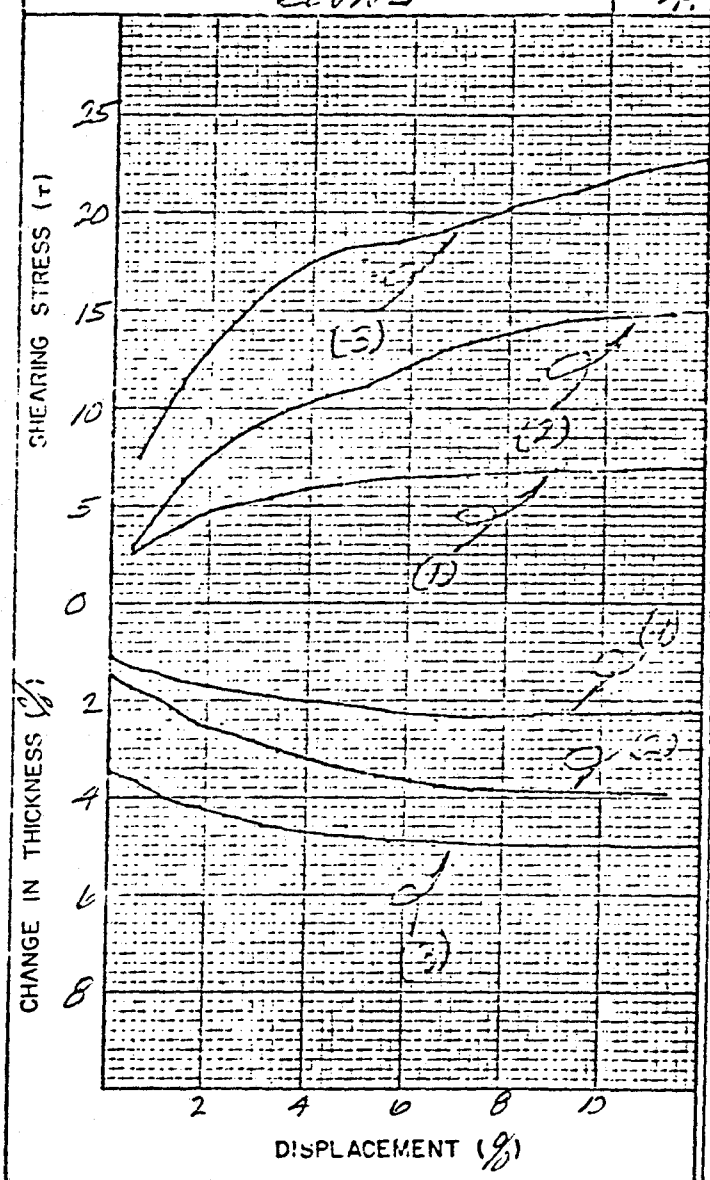
TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
COMPACTED	S. M. L.	Edgar F. Steele	7/2/82

CLASSIFICATION	LL	PI	SPECIFIC GRAVITY
SM	NON-PLASTIC		

TYPE OF TEST	CONTROL	$G_s(-)$ #4	
COMPACTED	STRAIN		2.66

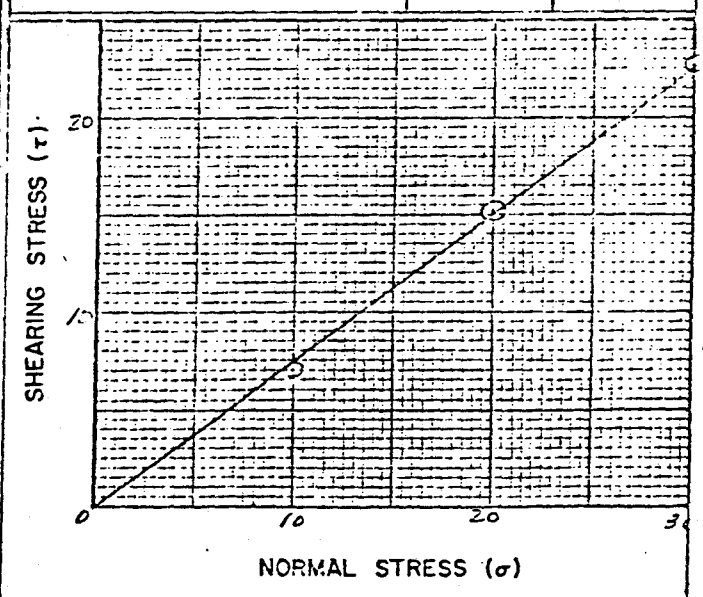
RATE OF LOADING (in/min)	MOISTURE CONDITION	$G_s(+)$ #4	
0.00064	FLOODED		

TYPE OF SPECIMEN	AREA (sq in)	THICKNESS (in)	G_m(bulk)(+) #4	
ROUND	4.3	1.0		



TEST NO.	1	2	3	4
INIT MOISTURE, %	9.5	9.5	9.5	
DRY DENSITY, D g/cc pcf	112.8	111.6	112.6	
INIT VOID RATIO	.4696	.4377	.4745	
TEST DURATION, (min)	469	480	469	
FINAL MOISTURE, %	12.9	12.9	11.7	
NORMAL STRESS	10	20	30	
MAX SHEAR STRESS	7.00	15.05	22.67	

SHEAR VALUES	Ø	C
AT MAXIMUM STRESS	37	0



REMARKS

RHY 8/28

Form SCS 366
9-64

LABORATORY NO. 81W340

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	DIRECT SHEAR TEST

PROJECT and STATE: BUCKHORN-MESA, SIGNAL BUTTE, ARIZONA

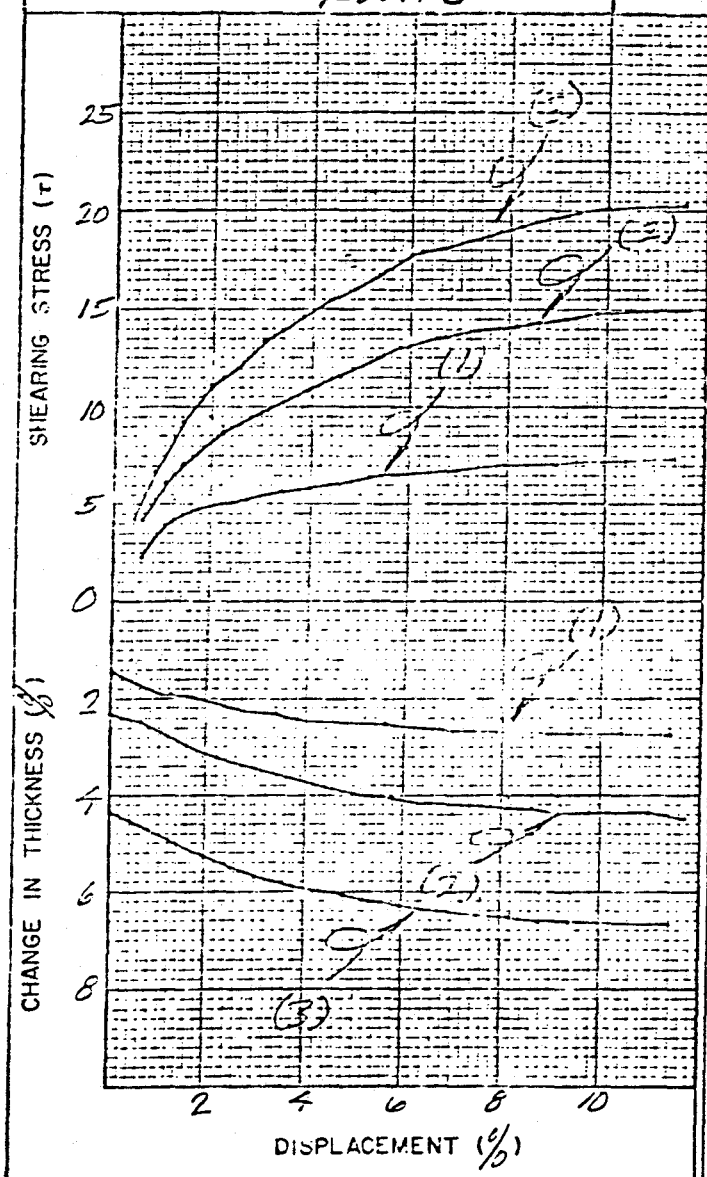
SAMPLE LOCATION: BELOW 200' U.S. STA. 254+00 ℄

FIELD SAMPLE NO.	DEPTH	GEOLOGIC ORIGIN
127.1	0-2'	272

TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
COMPACTED	S.M.L.	Edgar F. Steele	7/2/82

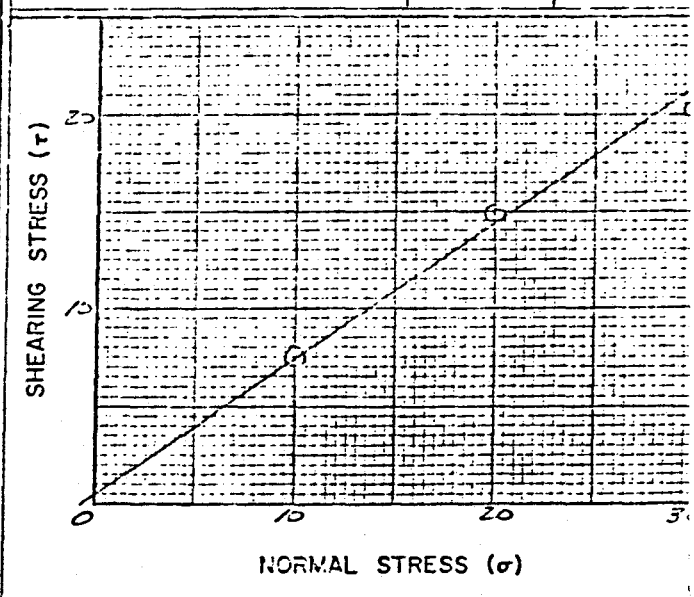
CLASSIFICATION: SM LL 21 PI 3

TYPE OF TEST	CONTROL	SPECIFIC GRAVITY	
COMPACTED	STRAIN	G_s (−) #4	2.66
RATE OF LOADING (in/min) 0.0006	MOISTURE CONDITION FLOODED	G_s (+) #4	
TYPE OF SPECIMEN ROUND	AREA (sq in) 4.9 / THICKNESS (in) 1.0	G_m(bulk)(+) #4	



TEST NO.	1	2	3	4
INIT MOISTURE, %	10.1	10.1	10.1	
DRY DENSITY, ☐ g/cc ☒ pcf	111.9	112.1	112.6	
INIT VOID RATIO	.4860	.4917	.4747	
TEST DURATION, (min)	477	487	475	
FINAL MOISTURE, %	13.6	12.6	12.3	
NORMAL STRESS	10	20	30	
MAX. SHEAR STRESS	7.44	14.96	20.30	

SHEAR VALUES	ϕ	C
AT MAXIMUM STRESS	35	75



REMARKS

BHH 7/21

Form SCS 366
9-64

LABORATORY NO. 81W341

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	DIRECT SHEAR TEST

PROJECT or STATE: Buckeye-Mesa, Signal Butte, Arizona

SAMPLE LOCATION: Borrow 400' U.S. Sta. 2600 Eon

FIELD SAMPLE NO.	DEPTH	GEOLOGIC ORIGIN
106.1	1.5-5.5'	273

TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
Compacted	S.M.L.	Edgar F. Steele	7/2/82

CLASSIFICATION: SM LL: 0 PI: NON-PLASTIC

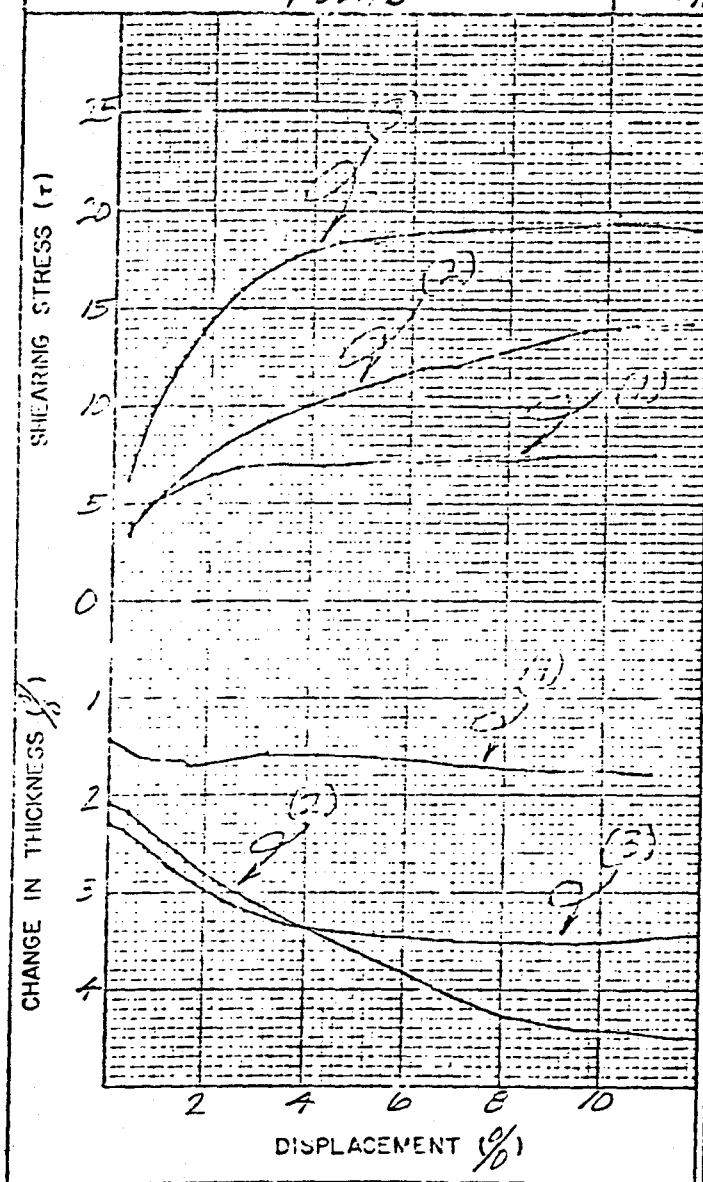
SPECIFIC GRAVITY

$G_s(-)$ #4	2.67
$G_s(+)$ #4	
G_m(bulk)(+) #4	

TYPE OF TEST: COMPACTED CONTROL: STRAIN

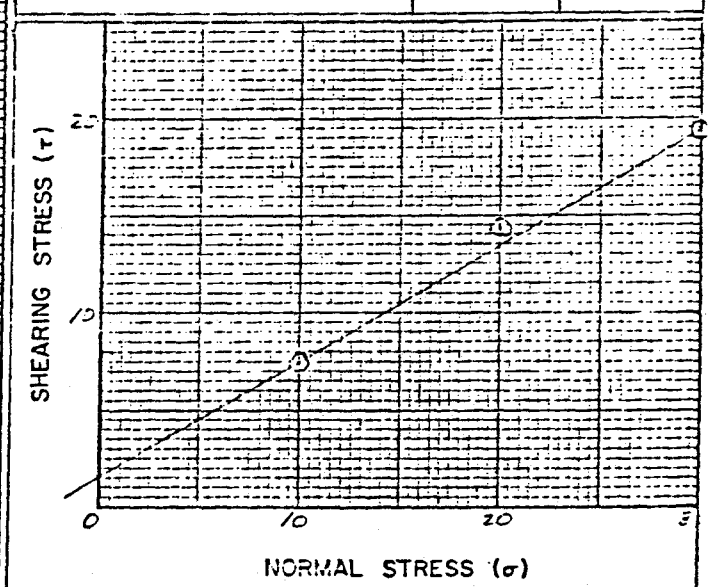
RATE OF LOADING (in/min): 0.00064 MOISTURE CONDITION: FLOODED

TYPE OF SPECIMEN: ROUND AREA (sq in): 4.9 THICKNESS (in): 1.0



TEST NO.	1	2	3	4
INIT MOISTURE, %	10.2	10.2	10.2	
DRY DENSITY, □ g/cc ✕ pcf	112.1	112.0	112.1	
INIT VOID RATIO	.4966	.4983	.4866	
TEST DURATION, (min)	430	456	469	
FINAL MOISTURE, %	14.9	14.2	13.6	
NORMAL STRESS	10	20	30	
MAX SHEAR STRESS	7.46	14.50	19.44	

SHEAR VALUES	Ø	C
AT MAXIMUM STRESS	31	225



REMARKS

RHH

Sample retained

FILE CODE ENG-22

MATERIALS TESTING REPORT

U.S. DEPARTMENT of AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION

LABORATORY NO. ____

PROJECT and STATE: Buckhorn-Mesa WPP - Signal Butte HRS

FIELD SAMPLE NO.

DEPTH

SAMPLE LOCATION

TYPE OF SAMPLE

GEOLOGIC ORIGIN

TESTED AT

APPROVED BY

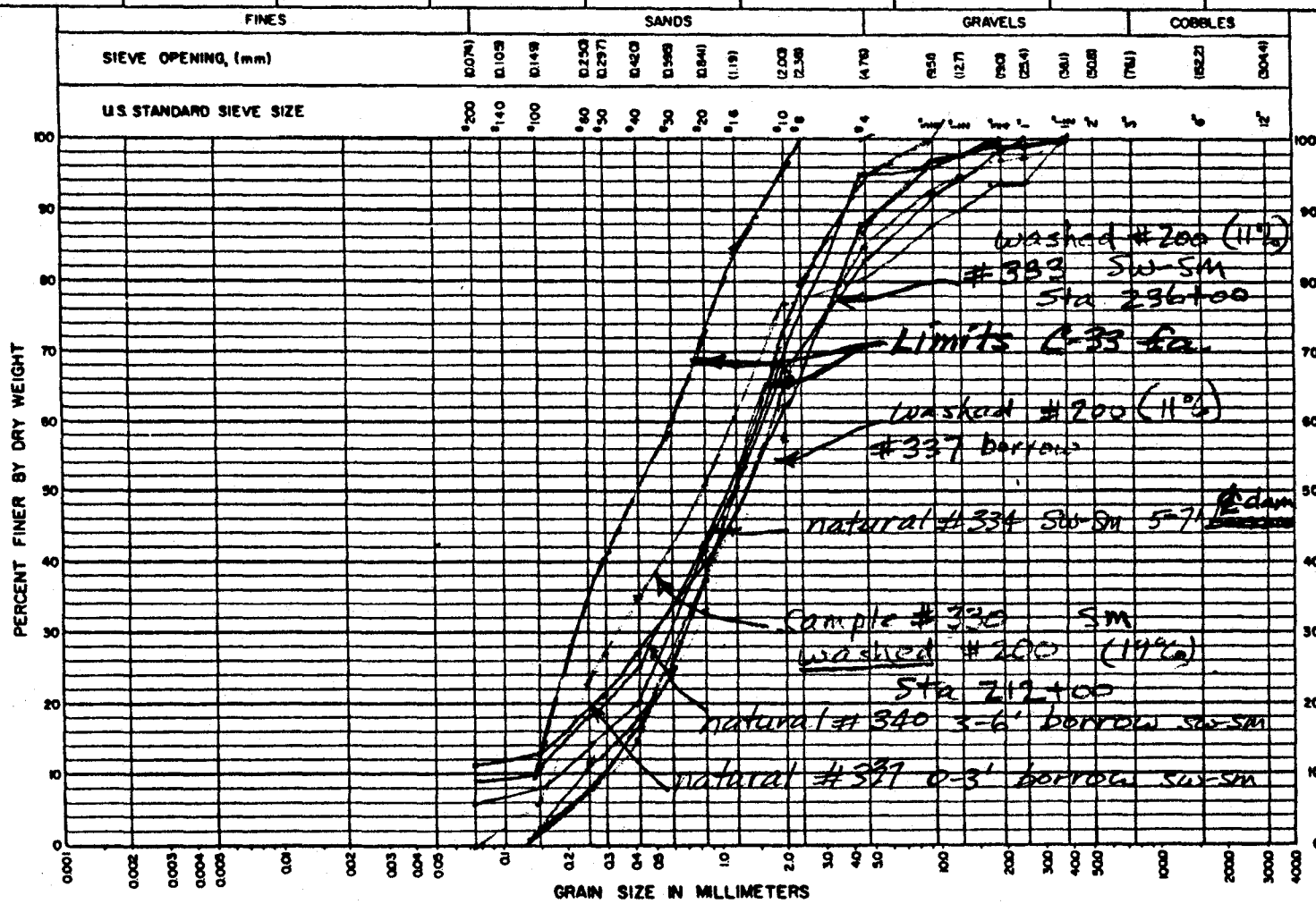
DATE

SYMBOL

DESCRIPTION

GRAIN SIZE DISTRIBUTION

D_{10}	D_{15}	D_{30}	D_{50}	D_{60}	D_{85}	D_{MAX}	C_u	C_c



SPECIFIC GRAVITY (G_s)		ATTERBERG LIMITS						SOLUBLE SALTS	SHRINKAGE LIMIT	UNDISTURBED CONDITION	
		NATURAL MOISTURE		AIR DRY		OVEN DRY				MOISTURE	DRY UNIT WEIGHT
(-) #4	(+) #4	LL	PI	LL	PI	LL	PI	%	%	%	g/cc pcf

REMARKS:

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Signal Butte FRS

FILE CODE ENG-22

MATERIALS TESTING REPORT

U. S. DEPARTMENT of AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION

LABORATORY NO. ____

PROJECT and STATE

FIELD SAMPLE NO.

TYPE OF SAMPLE

SYMBOL

DEPTH

TESTED AT

DESCRIPTION

GEOLOGIC ORIGIN

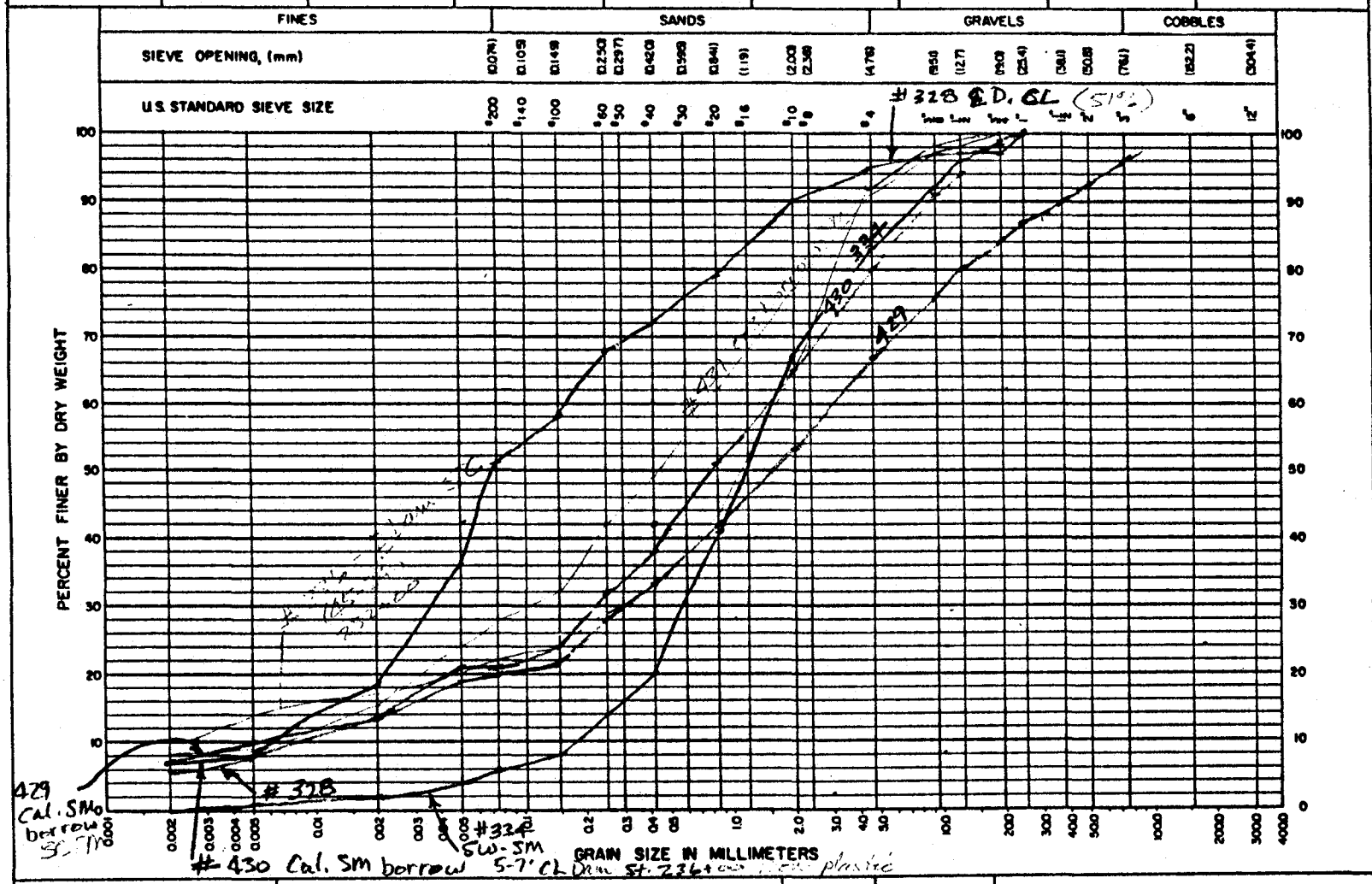
APPROVED BY

SAMPLE LOCATION

DATE

GRAIN SIZE DISTRIBUTION

D_{10}	D_{15}	D_{30}	D_{50}	D_{60}	D_{85}	$D_{MAX.}$	C_u	C_c



SPECIFIC GRAVITY (G_s)		ATTERBERG LIMITS						SOLUBLE SALTS	SHRINKAGE LIMIT	UNDISTURBED CONDITION	
		NATURAL MOISTURE		AIR DRY		OVEN DRY				MOISTURE	DRY UNIT WEIGHT
(-) #4	(+) #4	LL	PI	LL	PI	LL	PI	%	%	%	g/cc pcf

REMARKS:

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United States Department of Agriculture

Soil Conservation Service

Midwest National Technical Center
Soil Mechanics Laboratory
512 South 7th Street
Lincoln, NE 68508

KMy

File

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Subject: ENG - Soil Mechanics - Arizona, WF-08
Buckhorn Mesa, Pass Mountain

Date: April 18, 1983

To: Ralph M. Arrington
State Conservation Engineer
SCS, Phoenix, AZ

File Code: 210-22

INTRODUCTION

The soil mechanics tests requested on the samples from this site have been completed and the results are summarized on the attached data form SCS-ENG-354.

DISCUSSION

The percent of calcium carbonate varied from a trace for 83W872 (2403.1) to 36.8 percent for sample 83W882 (2407.2). The four samples tested for calcium carbonate contained only a trace of soluble salts.

Most of the samples were too sandy for pinhole testing and Atterberg Limits tests.

Edgar J. Steele, Acting

LORN P. DUNNIGAN
Head, Soil Mechanics Laboratory

Attachments:
Form SCS-ENG-354, Soil Mechanics Laboratory Data, 3 sheets
Form SCS-ENG-353, Soil Classification, 2 sheets

cc:
Ralph M. Arrington (Original + 3 copies)
Jack C. Stevenson, Head, Engineering Staff, WNTC, SCS, Portland, OR (ltr. only)
Clifton E. Deal, Soil Mechanics Engineer, Engineering Staff, WNTC, SCS, Portland, OR

SCS-ENG-354
Rev. 3-70
FILE CODE ENG-13-18

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

LABORATORY SAMPLE NUMBER	FIELD NUMBER	LOCATION AND DESCRIPTION	DEPTH	FIELD CLASSIFICATION	MECHANICAL ANALYSIS GRAIN SIZE DISTRIBUTION EXPRESSED AS PERCENT FINER BY DRY WEIGHT: FINES 0.007 mm	0.005	0.02	0.05	#200 0.074	SAND #140 0.105	#80 0.250	#40 0.42	#20 0.84	#10 2.0	#4 4.76	GRAVEL 3/8" 9.525	1/2" 12.7	3/4" 19.05	1" 25.4	1 1/2" 38.1	3" 76.2 mm
1/31/83		ARIZONA																			
83W		Buckhorn Mesa, Pass MTN																			
869	2401.1	℄ X45+00 L. Bag	4.0-6.0		8	10	15	22	26	28	34	38	45	58	77	90	93	95	97	99	100
		Caliche																			
		(in diversion)																			
870	2402.1	℄ on Curve 85' SW of 8+00	0.0-2.0		5	5	7	14	18	21	30	38	53	74	92	98	99	99	100		
		diversion to L. Bag																			
		outlet — Sand, SM																			
871	2402.2	℄ on Curve 85' SW of 8+00	9.0-11.0		6	7	8	10	12	13	19	31	37	53	76	90	93	95	97	100	
		Sand, SM L. Bag																			
872	2403.1	12+00 L. Bag	2.0		6	6	8	14	21	25	33	40	52	69	85	91	93	95	96	98	100
		Sand, SM																			
		(2.3' GM)																			
		1st drop str.																			
873	2403.1	12+00 L. Bag	15.0		5	6	8	15	21	24	30	35	43	56	73	85	88	91	93	97	100
		caliche																			
		1st drop str.																			
874	2404.1	Floodway 18+00, 100' Right	2.0		8	9	13	21	28	30	36	40	48	67	85	98	99	100			
		once proposed M. Bag																			
		drop.																			
		Sand, SM-SC																			

LABORATORY SAMPLE NUMBER	LIQUID LIMIT	PLASTICITY INDEX	UNIFIED CLASSIFICATION	AASHTO CLASSIFICATION	ORGANIC MATTER	PH	CACO3	SPECIAL NOTES
869	27	5	SC-SM			Tr		
870	NON PLASTIC		SM			Tr		
871	27	11	SW-SC			Tr		
872	NON PLASTIC		SM	<.5		Tr		TANK
873	NON PLASTIC		SM			Tr		
874	22	6	SC-SM			Tr		

Pit Test

SCS-ENG-354
REV. 3-70
FILE CODE ENG-13-18

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

1/31/83 ARIZONA

83W Buckhorn Mesa, Pass MTN

MECHANICAL ANALYSIS — GRAIN SIZE DISTRIBUTION EXPRESSED AS PERCENT FINER BY DRY WEIGHT

Laboratory Sample Number	Field Number	Location and Description	Depth	Field Classification	Fines .002 mm	.005	.02	.05	#200 .074	Sand #140 .105	#60 .250	#40 .42	#20 .84	#10 2.0	#4 4.76	Gravel 3/8" 9.525	1/2" 12.7	3/4" 19.05	1" 25.4	1 1/2" 38.1	3" 76.2 mm	LL	PI	Unified Class	Shrink	Disp.	Percent $CaCO_3$	Special Tests	
875	404.2	Floodway 18+00, 100' Right, L. Bag; Caliche; ~~xxx~~ proposed drop	15.0		6	8	11	16	31	44	50	55	62	75	80	95	97	99	99	100		Non Plastic		SM		Tc			
876	405.1	23+00 ℄, L. Bag; Sand - SM; proposed drop st	2.0		6	6	10	21	29	34	43	51	64	80	93	97	98	99	99	100		Non Plastic		SM		Tc			
877	405.2	23+00 ℄, L. Bag; Caliche	10.0		6	7	9	12	16	18	23	26	33	46	66	83	86	89	91	93	94	Non Plastic		SM	<.5	Tc	28%	NO-1	
878	405.3	23+00 ℄, L. Bag; Caliche (Softer)	16.0		5	6	10	21	31	35	43	48	57	71	88	97	90	99	100			Non Plastic		SM	<.5	Tc	12.7%	Too Tuff	Sandy Test
879	406.1	28+50, 100' Right, M. Bag; Sand, Silt; proposed drop	2.0-3.0		7	9	11	20	24	31	37	42	52	71	90	97	99	100				20	4	SC-SM		Tc			
880	406.2	28+50, 100' Right, L. Bag; Caliche	10.5		4	6	10	16	23	25	29	33	38	49	67	82	86	90	93	97	100	Non Plastic		SM		Tc			

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SCS-ENG-354
Rev. 3-70
FILE CODE ENG-13-18

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

MECHANICAL ANALYSIS
GRAIN SIZE DISTRIBUTION EXPRESSED AS PERCENT FINER BY DRY WEIGHT

LABORATORY SAMPLE NUMBER	FIELD NUMBER	LOCATION AND DESCRIPTION	DEPTH	FIELD CLASSIFICATION	FINES					SAND						GRAVEL					
					0.002 mm	0.005	0.02	0.05	#200 0.074	#140 0.105	#60 0.250	#40 0.42	#20 0.84	#10 2.0	#4 4.76	3/8" 9.525	1/2" 12.7	3/4" 19.05	1" 25.4	1 1/2" 38.1	3" 76.2 mm

SCS-ENG-354
Rev. 3-70
FILE CODE ENG-13-18

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL MECHANICS LABORATORY DATA
Sheet 3 of 3

1/31/83

Laboratory Sample Number	Field Number	Location and Description	Depth	Field Class. Weathering	Fines 0.002 mm	0.005	0.02	0.05	#200 0.074	#140 0.105	#60 0.250	#40 0.42	#20 0.84	#10 2.0	#4 4.76	3/8" 9.525	1/2" 12.7	3/4" 19.05	1" 25.4	1 1/2" 38.1	3" 76.2 mm	Atterberg Limits LL	PI	Unified Class. Symbol	Moisture Content %	Bulk Density g/cm³ Dry	Moisture Relationships CT Standard CE Modified Optimum	Max. γd g/cm³	Optimum %	Undisturbed Sample Data γd g/cm³	%	%	Percent CaCO3		Pinhole Test		
83W		Buckhorn Mesa, Pass MTN																																			
881	407.1	34+00 1 L. Bag	3.0-3.5		4	5	5	6	9	11	20	33	55	75	93	99	99	100				NON PLA	NON PLA	SW-SM		TR											
		Sandy SW-SP																																			
882	407.2	34+00 1 L. Bag	12.0		8	12	16	20	26	28	34	40	47	60	83	94	97	98	99	100		25	3	SM	4.5	TR							36.8%		Pinhole Test	SANDY SC	
		Caliche 14-16' Soften																																			
		near edge of SPARS borrow																																			

SCS-ENG-353 (REV. 3-70)
FILE CODE ENG-22

MATERIALS TESTING REPORT

U. S. DEPARTMENT of AGRICULTURE
SOIL CONSERVATION SERVICE

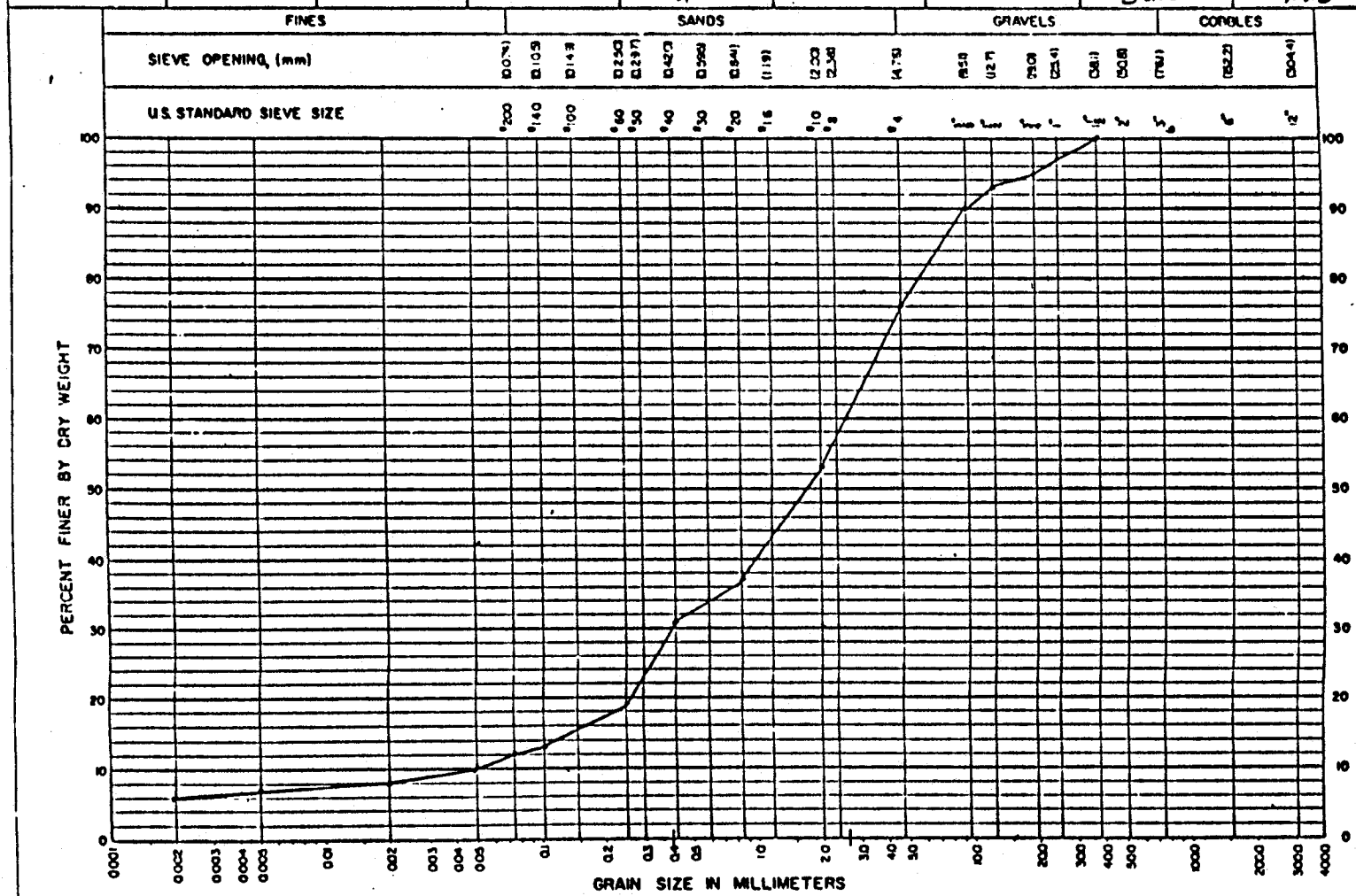
SOIL CLASSIFICATION

LABORATORY NO. 83W871

PROJECT and STATE: Buckhorn Mesa, Pass Mtn
FIELD SAMPLE NO.: 2L02.2
DEPTH: 9-11
TYPE OF SAMPLE:
GEOLOGIC ORIGIN:
SAMPLE LOCATION:
TESTED AT:
APPROVED BY:
DATE: 4/14/83
SYMBOL: SW-SC
DESCRIPTION:

GRAIN SIZE DISTRIBUTION

D_{10}	D_{15}	D_{30}	D_{50}	D_{60}	D_{85}	D_{MAX}	C_u	C_c
.05		.4		2.6			52.0	1.23



SPECIFIC GRAVITY (G_s)		ATTERBERG LIMITS						SOLUBLE SALTS	SHRINKAGE LIMIT	UNDISTURBED CONDITION	
		NATURAL MOISTURE		AIR DRY		OVEN DRY				MOISTURE	DRY UNIT WEIGHT
(-) #4	(+) #4	LL	PI	LL	PI	LL	PI	%	%	%	g/cc pcf

REMARKS: LL. 27-11 PI

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ES-ENG-353 (REV. 3-70)
FILE CODE ENG-22

MATERIALS TESTING REPORT

U. S. DEPARTMENT of AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION

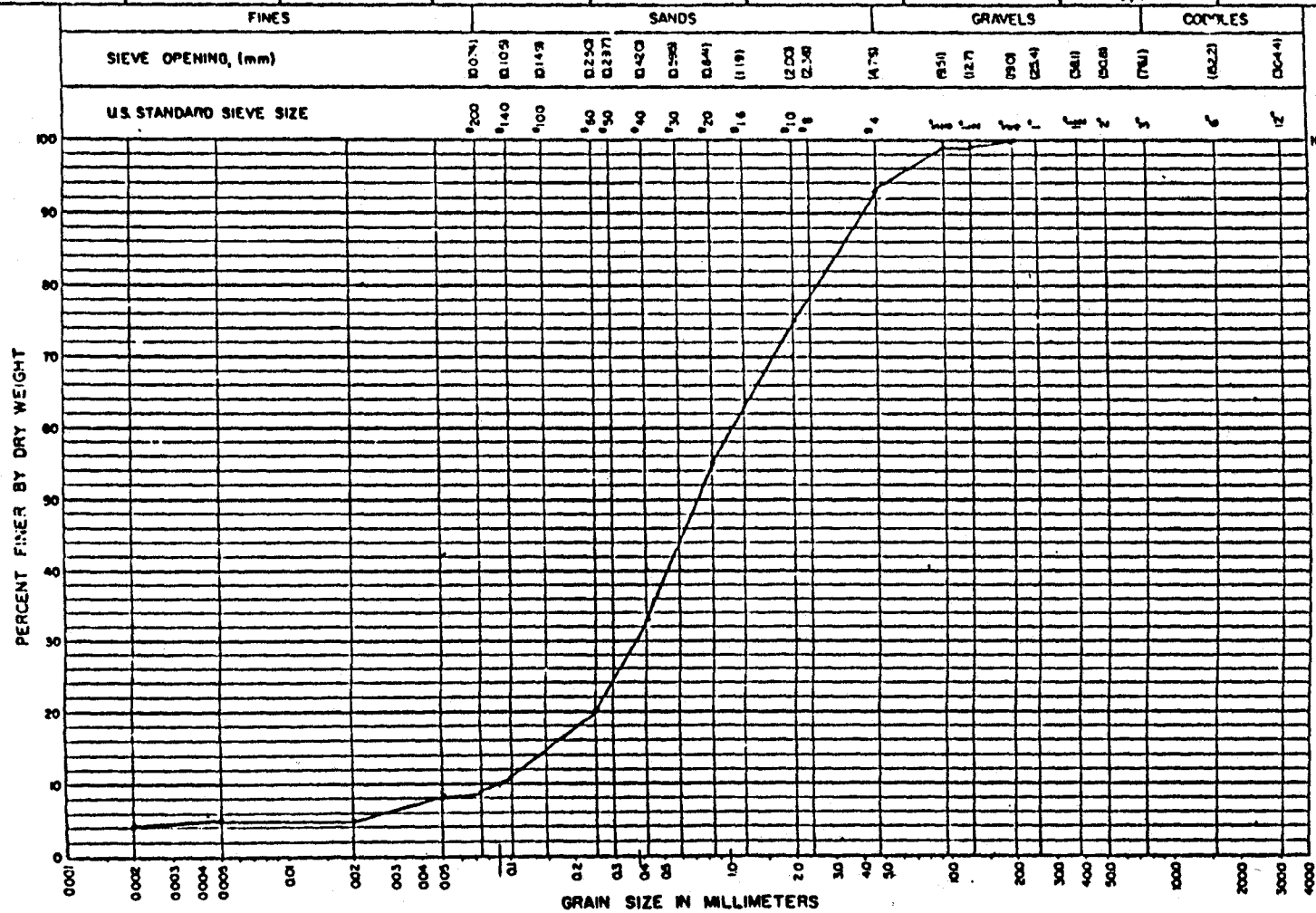
LABORATORY NO. 83W881

PROJECT and STATE: Luck Kiosk Mesa - Pass Mtn
FIELD SAMPLE NO.: 24071
DEPTH: 3 - 3.5
SAMPLE LOCATION: Arizona
TYPE OF SAMPLE: TESTED AT: SML
GEOLOGIC ORIGIN:
APPROVED BY:
DATE: 4/14/83

SYMBOL: SW-SM
DESCRIPTION:

GRAIN SIZE DISTRIBUTION

D_{10}	D_{15}	D_{30}	D_{50}	D_{60}	D_{85}	D_{MAX}	C_u	C_c
.09		.38		1.0			11.1	1.6



SPECIFIC GRAVITY (G_s)		ATTERBERG LIMITS						SOLUBLE SALTS	SHRINKAGE LIMIT	UNDISTURBED CONDITION	
		NATURAL MOISTURE		AIR DRY		OVEN DRY				MOISTURE	DRY UNIT WEIGHT
(-) #4	(+) #4	LL	PI	LL	PI	LL	PI	%	%	%	g/cc pcf

REMARKS: NP.

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AZ Buckhorn-Mesa WPP, Signal Butte FRS

SL 6-5-84

Borrow-Summary of Mat'ls
by Soil tests - LD,

Signal Butte FRS

	SM	SW-SM	SW-SC	SC-SM	SC	CL	GW-GC	
#Samples	16	9	—	4	1	2	1	/33
% "	48.5	27.3	—	12.1	3.0	6.1	3.0	
+ #4 (ave)	12.5	18.8	—	13.8	8.	4.0	46	/15
− #200	26.8	8.7	—	26.0	23.	53.0	11	/2
− 2μ	4.4	1.0	—	7.0	11.	8.5	4	/4
LL	14-NP, 2-3	NP	—	23.5	45	27	27	
PI	23		—	5.25	24	9.5	10	

Pass Mtn. Outlet

#Samples	9	1	1	3	—	—	—	/14
% "	64.3	7.1	7.1	21.4	—	—	—	
+ #4 s.	18.3	7	24	16.7	—	—	—	/18
− #200	24.9	9	12	27.3	—	—	—	/2
− 2μ	5.7	4	6	7.7	—	—	—	/6
LL	8-NP, 25	NP	27	23	—	—	—	
PI	3		11	5	—	—	—	
(47) % ST.	53%	21%	22	15%			27%	/9

Pass Mtn. Diversion

						SP-SM	
#samples	4	3	—	3	7	3	/20
% "	29.0	15	—	15	35	15	
+ #4s.	16.5	26.7	—	21.0	22.0	24.7	/22
− #200	27.5	10	—	22.7	22.3	9.7	/20
− 2μ	7.25	3.7	—	6.7	11.0	4.0	/7.5
LL	3-NP, 33	2NP-23	—	24.0	36.6	2-NP, 23	
PI	6	5	—	6.7	15.9	4	

67 %
Total - (SM, 43)(SW-SM, 19)(SW-SC, 1)(SC-SM, 15)(SC, 12)(CL, 3)(SP-SM, 4)(GW GC, 1

United States
Department of
Agriculture

Soil
Conservation
Service

Midwest National Technical Center
Soil Mechanics Laboratory
512 South 7th Street
Lincoln, NE 68508

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Subject: ENG - Soil Mechanics - Arizona, WF-08
Buckhorn Mesa, Signal Butte FRS

Date: August 19, 1983

To: Ralph M. Arrington
State Conservation Engineer
SCS, Phoenix, AZ

File Code: 210-22

The test data for soluble salt content requested June 3, 1983, on samples from the subject site are recorded on the attached Forms SCS-ENG-354.

I am sorry for the delay in getting this data to you. The tests were made promptly after we received your letter, but we did not follow through like we should have.

Lorn P. Dunnigan

LORN P. DUNNIGAN
Head, Soil Mechanics Laboratory

Attachments:
Form SCS-ENG-354, Soil Mechanics Laboratory Data, 5 sheets

cc:
Ralph M. Arrington (Original + 3 copies)
Jack C. Stevenson, Head, Engineering Staff, WNTC, SCS, Portland, OR (Ltr only)
Clifton E. Deal, Soil Mechanics Engineer, Engineering Staff, WNTC, SCS, Portland, OR

SCS-ENG-354
Rev. 3-70
File Code ENG-13-10

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL MECHANICS
LABORATORY DATA
Page 1 of 4

11-14-80 ARIZONA

Laboratory Sample Number	Field Number	Location and Description	Depth	Field Classification	Mechanical Analysis: Gravel	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Coarse Silt	Medium Silt	Fine Silt	Very Fine Silt	Clay	1/2"	3/8"	1/4"	1"	2"	3"	Atterberg Limits: LL	PI	Unified Classification	Moisture Content %	Moisture Density: Max. Dry Density	Optimum Moisture	Moisture Density: Dry Density	Moisture	Undisturbed Density: Dry Density	Moisture	Gs	Specific Gravity				
81W		Buckhorn-Mesa, Signal Butte																																		
328	208.1	℄ Dam 208+00 S. Bag	0-1'		6	8	18	36	51	58	68	72	79	90	95	97	97	97	100			29	10	CL	.053	Tr										1
329	208.2	" " S. Bag	2-3'		2	4	10	26	38	45	58	64	74	86	93	96	97	98	98	100		NON PLASTIC		SM	.213	Tr										1
330	212.1	℄ Dam 212+00 L. Bag	1-4'		3	4	6	14	19	24	38	48	60	73	84	90	92	95	95	100		NON PLASTIC		SM	.053											
331	212.2	" " S. Bag	8'-10'		11	13	17	30	40	46	64	74	86	94	96	97	98	100				24	5	SC-SM	.061	Tr.										1
332	212.3	" " S. Bag	10'-12'		3	4	5	6	7	8	14	22	41	64	82	92	94	99	100			NON PLASTIC		SW-SM	.059											
333	236.1	℄ Dam 236+00 S. Bag	1-4'		1	2	3	7	11	13	18	24	44	69	86	93	95	97	98	100		NON PLASTIC		SW-SM	.115											
334	236.2	" " S. Bag	5-7'		0	1	2	4	6	8	14	20	41	67	83	92	96	98	100			NON PLASTIC		SW-SM	.154											
335	246.1	℄ Dam 246+00 S. Bag	3-5'		1	2	4	10	16	19	27	35	50	68	83	92	95	99	100			NON PLASTIC		SM	.072											
336	252.1	℄ Dam 252+00 S. Bag	5'-5.6'		11	14	17	20	23	24	29	33	43	65	92	98	99	100				45	24	SC												

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Rev. 3-70
Text Code ENG-11-18

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL MECHANICS
LABORATORY DATA
Sheet 2 of 4

11-14-80 ARIZONA

Laboratory Sample Number	Field Number	Location and Description	Depth	Field Class Location	Gravel	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Liquid Limit	Plastic Limit	Unified Class Assigned	Moisture %	Dry Density %	Moisture-Density Determinations Method	Max. Dry Density	Optimum Moisture	Unconfounded Sample Data		Gs	Special Tests				
81W		Buckhorn-Mesa, Signal Butte														Dry Soil											
337	101.1	Borrow 400' US Sta 260+00 ℄ Dam L. Bag	0-3'		2	3	4	8	11	13	21	27	40	62	88	97	98	99	99	100	NON PLASTIC		SW-SM					2.64					
																					DRY DENSITY			< NO. 4	①	125.0	10.0						
																								.035										
338	101.2	" "L. Bag	3-6'		9	12	17	24	28	31	40	48	60	82	92	96	98	98	99	99	100	NON PLASTIC		SM		Tr							2.65					
																					DRY DENSITY			< NO. 4	②	113.0	13.0						
																								.085										
		GRADATION AFTER 3 MIN. ROLL									84	90	92	94	95	96	100																	
339	103.1	Borrow 400' US Sta 256+00 ℄ Dam S. Bag	0-2.5'		2	4	8	13	16	18	25	31	45	70	91	97	99	100				25	7	SW-SM					2.65					
																								.058										
340	104.1	Borrow 400' US Sta 254+00 ℄ Dam S. Bag	3-6'		1	2	3	6	9	11	18	25	42	68	95	96	98	100			NON PLASTIC		SW-SM					2.64					
																								.048										
341	106.1	Borrow 400' US Sta 250+00 ℄ Dam L. Bag	1.5'-5.5'		2	2	7	20	30	36	47	53	65	80	95	98	99	99	100		NON PLASTIC		SM					2.67					
																					DRY DENSITY			< NO. 4	③	124.5	10.5						
																								.050										
342	107.1	Borrow 400' US Sta 248+00 ℄ Dam S. Bag	6'-10'		1	2	7	19	28	33	44	50	63	84	96	99	99	100			NON PLASTIC		SM					2.67					
																								.075										
343	109.1	Borrow 400' US Sta 237+00 ℄ Dam S. Bag	0-3'		2	4	10	26	37	43	56	61	70	83	93	98	98	100			NON PLASTIC		SM										
																								.034										
344	114.1	Borrow 400' US Sta 224+00 ℄ Dam L. Bag	2-4'		8	10	14	21	27	31	37	42	52	70	81	88	90	93	94	97	100	NON PLASTIC		SM		Tr			1.87	1.4	2.68			
																					DRY DENSITY			< NO. 4	④	112.0	14.5	1.71	1.2				
		GRADATION AFTER 3 MIN. ROLL									63	70	72	76	79	84	93							.056				1.81	1.3					

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Field Code (NG-13-18

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SOIL CONSERVATION SERVICE

SOIL MECHANICS LABORATORY DATA
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11-14-80 ARIZONA

Laboratory Sample Number	Field Number	Location and Description	Depth	Field Class Identification	Percent Finer by Dry Weight: 3 in.	2 in.	1 in.	3/4 in.	3/8 in.	No. 4	No. 10	No. 16	No. 20	No. 30	No. 40	No. 50	No. 60	No. 80	No. 100	No. 140	No. 200	Atterberg Limits LL	PL	Unified Class Identification	Sample Split %	Dry Density & Dry Soil	Moisture Density Relationship % Moisture	Max. Dry Density	Optimum Moisture	Undisturbed Sample Data		Gs	Special Tests				
81W		Buckhorn-Mesa, Signal Butte																																			
345	122.1	Borrow 222' US Sta 254+00 ℄ Dam S. Bag	0-3'		4	6	14	26	40	45	55	61	73	88	98	100						Non Plastic		SM	.048												
346	127.1	Borrow 200' US Sta 231+00 ℄ Dam L. Bag	0-2'		5	6	14	29	37	41	49	53	62	78	90	95	96	98	98	100		21	3	SM	.053		DRY DENSITY < NO. 4	(5)	124.5	10.5			2.66	✓				
347	128.1	Borrow 200' US Sta 229+00 ℄ Dam S. Bag	2.5'-7.5'		1	2	4	7	10	12	19	25	39	58	73	83	86	90	94	100		Non Plastic		SW-SM	.056												
348	129.1	Borrow 400' US Sta 213+00 ℄ Dam L. Bag	4.5'-11'		4	5	7	10	11	13	18	23	31	43	54	61	64	68	71	76	92	27	10	SW-GC	.062		DRY DENSITY < NO. 4	(6)	124.5	10.0			2.65 2.66 2.52 2.1	✓ MINUS NO. 4 FRACTION AIR DRY MOIST. DRY % ABSORPTION		1572 PCF		
349	134.1	Borrow 600' US Sta 256+00 ℄ Dam S. Bag	1.5'-3'		0	1	2	5	7	9	16	22	35	52	69	88	94	97	98	100		Non Plastic		SW-SM	.077							2.64					
350	137.1	Borrow 600' US Sta 250+00 ℄ Dam L. Bag	2-3'		6	8	11	16	21	23	31	38	51	71	83	90	92	94	95	98	100	Non Plastic		SM	.058	Tr											
					Gradation After 3 min Roll										45	50	52	55	58	70	100																	
351	138.1	Borrow 600' US Sta 237+00 ℄ Dam S. Bag	1-5'		1	2	4	8	11	13	19	24	36	51	70	89	93	97	99	100		Non Plastic		SW-SM	.054												
352	140.1	Borrow 600' US Sta 233+00 ℄ Dam L. Bag	0-3'		3	5	12	23	32	38	51	57	67	82	93	97	98	99	99	100		Non Plastic		SM			DRY DENSITY < NO. 4	(7)	126.5	9.0			2.66	✓				
		DEGRADATION AND DENSITY AFTER ONE-POINT TEST AT NATURAL w. MODIFIED EFFORT													32	46	56	69	81	100					.032												
353	141.1	Borrow 600' US Sta 231+00 ℄ Dam L. Bag	3-4'		4	6	9	13	20	23	31	37	47	60	69	78	82	86	88	94	100	Non Plastic		SM		Tr			116.0	1.7	1.78	2.4	2.66	✓				
					Gradation After 3 min Roll										54	62	65	68	72	79	100						DRY DENSITY < NO. 4	(8)	109.5	15.0	1.80	2.3						
																									.091			(8)	112.5	12.0							

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Test Goal ENG-13-18

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL MECHANICS LABORATORY DATA
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11-14-80

Laboratory sample number	Field number	Location and description	Depth	Field classification	Mechanical analysis: Grain size distribution expressed as percent finer by dry weight — Fines					Sand						Gravel						Atterberg limits		Unified classification	Moisture content	Dry density	Moisture density relationships (T) standard (T) modified			Undisturbed sample data		G_s	Special tests				
					2000 mm	0.005	0.002	0.001	#200 0.075	#140 0.105	#80 0.177	#40 0.42	#20 0.84	#10 2.0	#4 4.76	3/8" 9.525	1/2" 12.7	3/4" 19.05	1" 25.4	1 1/2" 38.1	3" 76.2	LL	PI														
81W		Buckhorn-Mesa, Signal Butte																																			
354	180.1	Borrow, along fence L. Bag	1-5'		6	7	10	13	17	19	26	32	45	69	85	93	95	96	98	100		NON PLA	TIC	SM	.058	Tr											
					GRADATION AFTER 30 IN. ROW										73	84	86	89	92	95	100																
355	192.1	Borrow 1300' US Sta 265+00 ℄ Dam S. Bag	1-2'		11	15	24	43	55	61	71	76	84	92	97	99	100					25	9	CL	.050							2.69					
356	192.2	Borrow 1300' US Sta 265+00 ℄ Dam L. Bag	2'-4.5'		0	1	2	5	6	8	16	23	37	62	85	95	97	99	100			NON PLASTIC		SW-SM	.066							2.66					

NP ~~III~~ ~~IIII~~ IIII
21-3
25-3

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File Code ENG-13-18

U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL MECHANICS LABORATORY DATA
Page 1

12-4-80 ARIZONA

Laboratory Sample Number	Field Number	Location and Description	Depth	Field Classification	Mechanical Analysis: Grain Size Distribution Expressed as Percent Finer by Dry Weight — Fines					Sand						Gravels						Atterberg Limits		Unified Classification	Moisture Content %	Dry Density %	Moisture Density Relationships (Standard)			Undisturbed Sample Data		Gs	Special Tests				
					2000 mm	850	425	250	#200	#100	#60	#40	#20	#10	#4	3/8"	1/2"	3/4"	1"	1½"	2"	LL	PI														
81W		Buckhorn Mesa, Signal Butte																																			
428	276.1	℄ Emer Spwy 7+00 L. Bag	4-9'		7	8	12	18	18	20	26	31	39	50	78	94	98	99	100			25	3	SM								21.6	SIEVE				
																						DRY DENSITY < NO. 4					9	122.5	10.5			MINUS NO. 4				
																									.062							2.61	GRAVEL FRACTION				
																																2.61	APPARENT				
																																2.61	BULK, DRY				
																																3.3	% ABSORPTION				
429	177.1	Borrow 220+00, 1300 US L. Bag	6'		7	10	13	19	20	22	28	33	42	53	67	76	80	84	87	90	96	24	5	SC-SM													
																									.086												
430	194.1	Borrow 219+00 1500 US ~~S. Bag~~	3.5'-5'		7	8	13	21	21	24	32	38	51	65	80	91	94	99	100			NP	NP	SM													
																									.086												
431	195.1	Borrow 218+60, 1700 US S. Bag	0-3'		8	9	15	24	28	32	42	49	62	77	91	97	98	100				21	4	SC-SM													
																									.053												

AZ Signal Butte FRS

SL 4-23-84 DEP 4-23-84

Principal Spillway Conduit load. 1 2

TR-5 Given: 36-inch R/C pipe on bedding
assume 4.5" wall thickness (>load)
OD ~ 45" or 3.75 ft. $= b_c$

Case a, non-yielding foundation w/adjacent embankment
$\therefore \delta = 1$

positive projecting condition

$H_c = 29$ ft. max. use 30'

$\frac{H_c}{b_c} = \frac{30}{3.75} = 8$ See ES-117 sheet 1

$K\mu$ @ 30° ϕ = 0.193, $2K\mu = 0.386$

$\rho = \frac{\rho b_c}{b_c}$ ρb_c = OD+4" = 4.083 ft. $b_c = 3.75'$

$\rho = \frac{4.083}{3.75} = 1.089$ $\therefore \delta\rho = 1.089$

$\frac{H_c}{b_c} = 2.09$ chart $< \frac{H_c}{b_c}$ incomplete condition

C_p, ES-118 $2K\mu \frac{H_c}{b_c} = 3.09$, $2K\mu\delta\rho = 0.42$, $C_p = \frac{6.3}{.386} = 16.3$

X_p, ES-120, 0.65

T, ES-121 5.42

$s = 1$, R/C AWWA C-301 pipe $F_{SR} = C_p X_p - KT$

$\phi = 30$, $\gamma_m \sim 133$ #/ft³

$F_{SP} = (16.3)(0.65) - (0.33)(5.42) = F_{SP} = 8.806$

$Reb = \frac{s\gamma_m F_{SP} b_c^2}{1.431} = \frac{(1)(133)(8.806)(3.75)^2}{1.431} = 11{,}509.41$ #/ft.

AZ Signal Butte FRS
SL 4-23-84 DEP 4-23-84

Principal Spillway Conduit load 2 2

AWWA - C-300 pipe. $S = 1.33$ (TR-60)

$$R_{eb} = \frac{(1.33)(133)(8.806)(3.75)^2}{1.431} = 15,307.5$$

use C-301, 11,600 #/ft. (.01")

C-300, 15,400 #/ft. (.001")

AZ Signal Butte FRS, Buckhorn-Mesa
SMC 5-14-84
Gated Outlet - bedding. 1 2

Riprap @ outlet to Gated Outlet
by TR-46 $D_{50} \geq 4''$

12"	100%
9"	60-100
6"	40-90
4"	25-50
1½"	0-25
1"	0-15"

· caliche & SM materials are anticipated at outlet. Solid caliche cannot be assumed, though.

Design bedding to be safe against piping through Riprap.
Turbulence would be erosive force.
No flow from "base" is anticipated.

Therefore Bedding is "Base" for Riprap (filter)

PI <7 by design GP or SP

D_{15} Riprap $\leq$ 4 D_{85} bedding. $\frac{80mm}{4} = 20mm$

D_{50} Riprap $\leq$ 25 D_{50} bedding $\frac{200}{25} = 8mm$.

D_{100} " $\leq$ 3" does not apply.

C_u <20 OK.

Check C-33 for Std. gradation

AZ Signal Butte FRS - Buckhorn-Mesa-
SL

Gated Outlet - bedding 2 2

2"	100%
1"	65-100%
3/4"	55-85%
1/2"	40-70%
#4	10-35%
#10	0-10%
#16	0-5%

This is a relatively small volume of material.

No standard gradation available appears to be this broad at these larger sizes.

Select closest standard gradation for top of "curve" (larger sizes)

Specify #467 ASTM C-33 or
#57 ASTM C-33

2"	100	both std.
1½"	90-100	specs. fit this
1"	60-100	range.
3/4"	35-85	
1/2"	20-60	
3/8"	10-45	
#4	0-10	
#8	0-5	

O-5 #16

FILE CODE ENG-22

MATERIALS TESTING REPORT

U.S. DEPARTMENT of AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION

LABORATORY NO.

PROJECT and STATE

FIELD SAMPLE NO.

DEPTH

GEOLOGIC ORIGIN

SAMPLE LOCATION

TYPE OF SAMPLE

TESTED AT

APPROVED BY

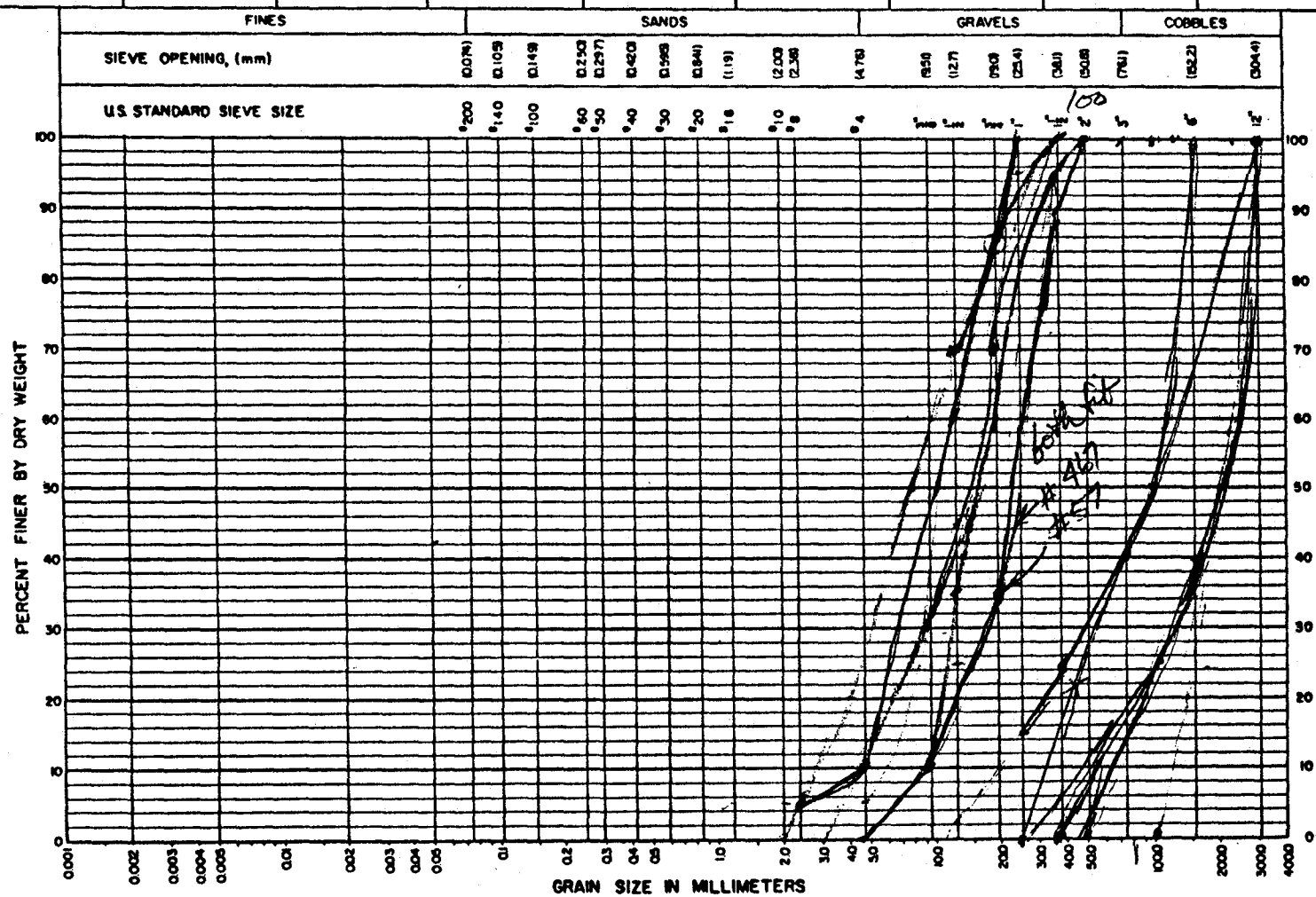
DATE 5-14-92

SYMBOL

DESCRIPTION

GRAIN SIZE DISTRIBUTION

D_{10}	D_{15}	D_{30}	D_{50}	D_{60}	D_{85}	D_{MAX}	C_u	C_c



SPECIFIC GRAVITY (G_s)		ATTERBERG LIMITS						SOLUBLE SALTS	SHRINKAGE LIMIT	UNDISTURBED CONDITION	
		NATURAL MOISTURE		AIR DRY		OVEN DRY				MOISTURE	DRY UNIT WEIGHT
(-) #4	(+) #4	LL	PI	LL	PI	LL	PI	%	%	%	g/cc pcf

REMARKS:

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SLOPE STABILITY

SIGNAL BUTTE FRS

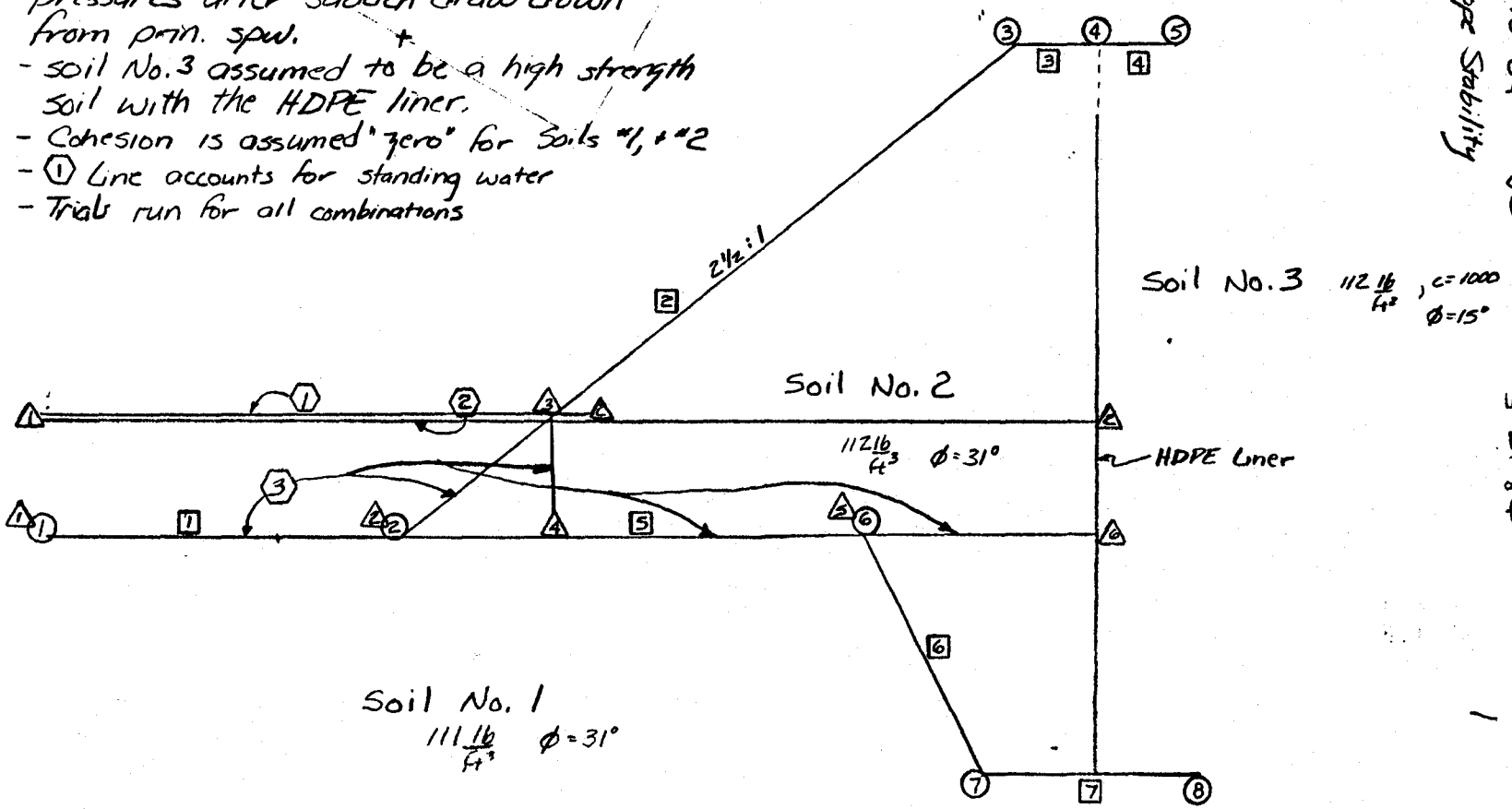
5-21-84

1 / 12

AE: DE PAULUS 4-10-84 SL

ICES LEASE-II, Slope Stability

- Extreme cutoff trench location.
- Piezometric lines ② + ③ accounts for pore pressures after sudden draw down from min. spw.
- soil No. 3 assumed to be a high strength soil with the HDPE liner.
- Cohesion is assumed "zero" for Soils #1, + #2
- ① Line accounts for standing water
- Trials run for all combinations



STA 212+00

Az. SIGNAL BUTTE FRS

DE PAULIS 4-10-84 82 5-21-84

Ices Lease II

2 12

GENERAL DATA

$ SIGNAL BUTTE FRS, STATION 212+00

POINT DATA

1	0.	1694.
2	40.	1694.
3	110.	1722.
4	119.	1722.
5	128.	1722.
6	92.5	1694.
7	106.	1680.5
8	128.	1680.5

LINE DATA

1	1	2	1
2	2	3	2
3	3	4	2
4	4	5	3
5	2	6	1
6	6	7	1
7	7	8	1

SOIL DATA

1	111.0	0	31
2	112.0	0	31
3	112.0	1000	15

SEISMIC CONSTANT 0.1

PIEZOMETRIC DATA

~ Varies ~ see p1

GRID 1 0 1734 2 60 1716 3 80 1734 6 4

SIGNAL BUTTE FRS
Slope Stability
ICES LEASE II
GRID PTS. @ F.S. < 1.0

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

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Drawn ..... Title .....
Traced ..... Title .....
Checked ..... Sheet No. 3 of 12 Drawing No.

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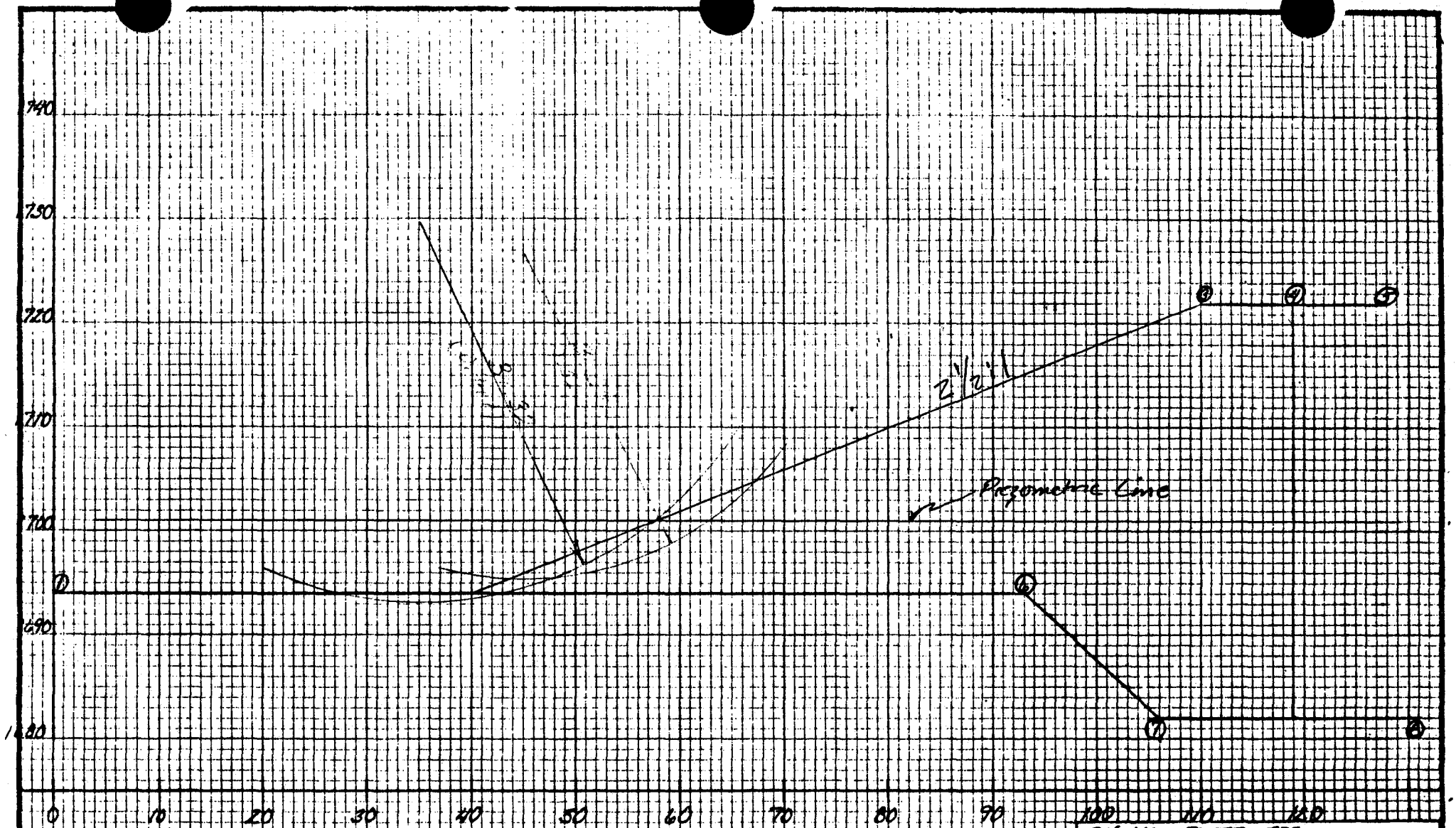

SIGNAL BUTTE FRS
Slope Stability
ICES LEASE II
GRID PTS. @ F.S. < 1.0

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SOIL CONSERVATION SERVICE

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Title
Sheet No. 4 of 12
Drawing No.

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SIGNAL BUTTE FRS
Slope Stability
ICES LEASE II
GRID POINTS @ F.S. < 1.0

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SOIL CONSERVATION SERVICE

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Sheet No. 5 of 12

SIGNAL BUTTE FRS
SLOPE STABILITY
ICES LEASE II
GRID POINTS @ F.S. < 1.0

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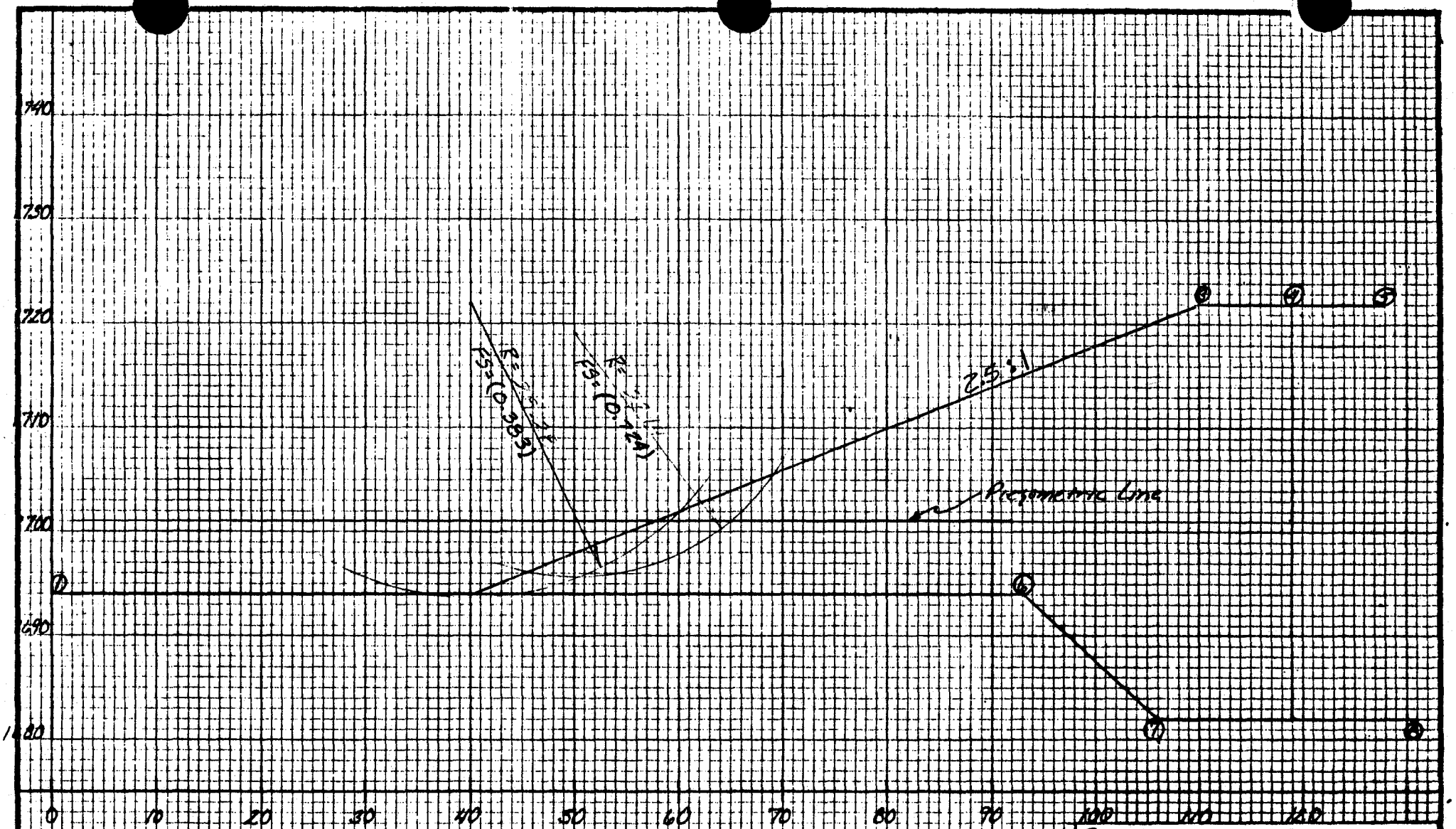
SOIL CONSERVATION SERVICE

Designed ..... Date
Drawn .....
Traced .....
Approved by .....
Title .....
Sheet No. 6/12



STA. 212+00

SIGNAL BUTTE FRS
SLOPE STABILITY
ICES LEASE II
GRID POINTS @ F.S. < 1.0

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Date
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Title
Sheet No. 7 of 12

300

Az. SIGNAL BUTTE FRS.

DE Paulus 4-17-84

Slope Stability 8 12

Conclusions of Ices Lease II computer runs.

For the actual functioning conditions of this dam we will have both: 1) a dry standing dam and 2) standing water up to the prin. spw. elev w/o seepage creating a phreatic line. These conditions yielded factors of safety of 1.522 and 1.519 respectively.

We also checked to see what would happen if a phreatic line was introduced into the dam. We tried several approaches. In each trial the factor of safety was less than 1.0. Drawing the failure circles for F.S. < 1.0 with the piezometric line through the dam at Elev. 1701 (prin. spw.) we saw that these occured at a shallow depth (0'-4') within the saturated zone. By inspection of the radius pts. & lengths of trials with the piezometric line 1.0' into the dam we saw that the same type of failure occures.

After conversations with Cliff Deal of WNTC we came to the conclusion that with this type of failure and using zero for cohesion that figurring slope stability using infinite slope analysis would be more applicable, and to use this analysis for the actual condition mentioned.

DE Paulus 4-18-84

Slope Stability - Infinite Slope Analysis 9 12

1.) Slopes in Dry Sand & Submerged Slopes $\bar{c}=0$

$$F.S. = \frac{\tan\phi}{\tan\beta} \qquad \phi = 31^\circ, \quad \beta = (2\tfrac{1}{2}:1 \text{ slope}) = 21.8^\circ$$

$$= \frac{\tan 31^\circ}{\tan 21.8^\circ} = \frac{0.6}{0.4} = 1.5 \quad \text{ok}$$

2.) Checking Seepage Parallel to slope (sample 106.1 w/cohesion)

$$F.S. = \frac{\bar{c} + \gamma_b h \cos^2\beta \tan\bar{\phi}}{\gamma_t h \cos\beta \sin\beta} \qquad \text{use } h = 2.0'$$

FOR F.S. = 1.0, limit thickness (for cohesive soil)

$$h = \frac{1}{\gamma_t[\tan\beta - (\gamma_b/\gamma_t)\tan\bar{\phi}]\cos^2\beta}\,\bar{c}$$

---

sample 106.1

$$\gamma_t = \frac{(G+e)}{(1+e)}\gamma_w = \left(\frac{2.67+0.34}{1.34}\right)62.4 = 140.1 \ \frac{lb}{ft^3}$$

$$\gamma_b = \gamma_t - \gamma_w = 140.1 - 62.4 = 77.7$$

$\beta = 21.8^\circ$

$\bar{\phi} = 31^\circ$ min.

$$\gamma_d = \left(\frac{G}{1+e}\right)\gamma_w, \qquad 124.5 = \left(\frac{2.67}{1+e}\right)62.4$$

$\bar{c} = 225$

$e = 0.34$

$$\text{Solve for } h = \frac{1}{140.1[\tan 21.8^\circ - (77.7/140.1)\tan 31^\circ]\cos^2 21.8^\circ}(225)$$

$$= 27.9 \text{ ft.}$$

F.S. for $h = 2.0'$

$$F.S. = \frac{225 + 77.7(2.0)(\cos^2 21.8^\circ)\tan 31.0^\circ}{140.1(2.0)(\cos 21.8)(\sin 21.8)} = 3.16$$

Az. Signal Butte FRS

DE Paulus 4-18-84

Slope Stability - Infinite Slope Analysis 10 12

Sample 140.1 w/o cohesion

S.G. = 2.66 $\phi = 37$

$\gamma_d = 126.5$ $c = 0$

$\gamma_d = \left(\frac{G}{1+e}\right)\gamma_w$, $126.5 = \left(\frac{2.66}{1+e}\right)62.4$, $e = 0.31$

$\gamma_t = \left(\frac{2.66 + 0.31}{1.31}\right)62.4 = 141.5$

$\gamma_b = 141.5 - 62.4 = 79.1$

F.S. $\doteq$ (reduces to) $\frac{\gamma_b}{\gamma_t}\frac{\tan\phi}{\tan\beta} = \frac{79.1}{141.5}\frac{\tan 37}{\tan 21.8} = 1.05$

This would be true for any depth.

Summary:

	Lease II	Infinite
Dry Dam	1.52	1.5
Submerged (No seepage)	1.52	1.5
Phreatic Line	Failed	—
Parallel Seepage	—	1.05

NOTE: Using the results of the infinite slope analysis a trial with the extreme "fill" condition will not have to be run.

Az. DE PAULUS 4-10-84

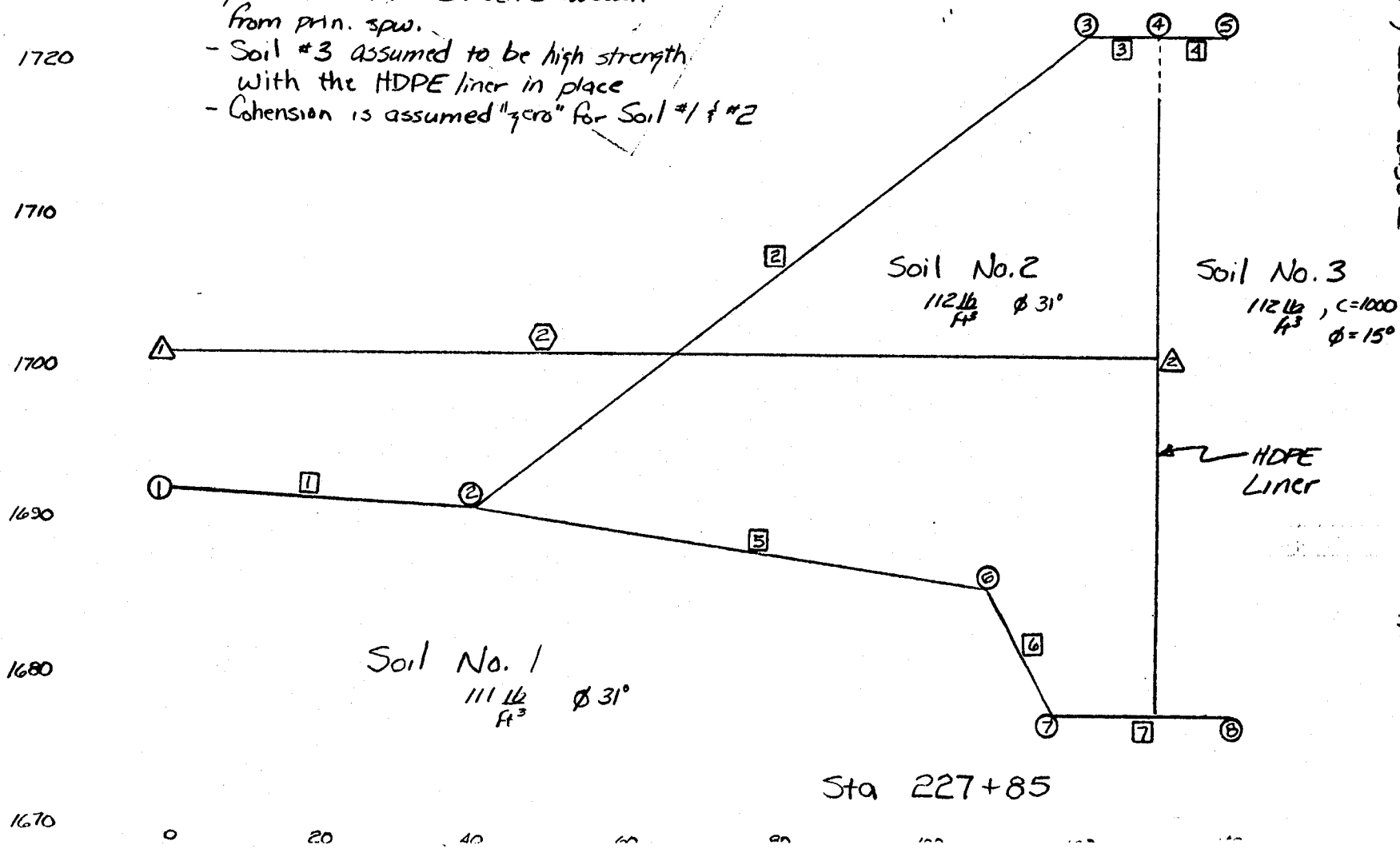
Slope Stability, Ices Lease II

SIGNAL BUTTE FRS

11 12

304

- extreme fill location
- Piezometric line (2) accounts for pore pressures after sudden drawdown from prin. spw.
- Soil #3 assumed to be high strength with the HDPE liner in place
- Cohension is assumed "zero" for Soil #1 & #2



AZ. SIGNAL BUTTE FRS

DE PAULUS 4-10-84

Slope Stability, Ices Lease II 12 12

SIGNAL BUTTE FRS, STATION 227+85

POINT DATA

1	0.	1692.0
2	40.	1691.0
3	120.	1722.0
4	129.	1722.0
5	138.	1722.0
6	107.	1686.0
7	116.	1677.5
8	138.	1677.5

LINE DATA

1	1	2	1
2	2	3	2
3	3	4	2
4	4	5	3
5	2	6	1
6	6	7	1
7	7	8	1

SOIL DATA

1	111.0	0	31	
2	112.0	0	31	2
3	112.0	1000	15	

SEISMIC CONSTANT 0.1

PIEZOMETRIC DATA

2	1	0	1701.
2	2	129	1701.

GRID 1 0 1732 2 60 1714 3 92 1740 6 4

①

```
@*SYSTEM.ICES

*************************************************
*                                               *
*            UNIVAC 1100 SERIES ICES            *
*      APR 13, 1984              15:00:05       *
*                 VERSION  2.9.1                *
*                                               *
*************************************************
  1. LEASE

*************************
*  1100 ICES LEASE-II   *
*     LEVEL 2.0.0       *
*************************

  2. $ SIGNAL BUTTE FRS, STATION 212+00
  3. POINT DATA
  4. 1 0 1694
  5. 2 40 1694
  6. 3 110 1722
  7. 4 119 1722
  8. 5 128 1722
  9. 6 92.5 1694
 10. 7 106 1680.5
 11. 8 128 1680.5
 12. LINE DATA
 13. 1 1 2 1
 14. 2 2 3 2
 15. 3 3 4 2
 16. 4 4 5 3
 17. 5 2 6 1
 18. 6 6 7 1
 19. 7 7 8 1
 20.
 21. SOIL DATA
 22. 1 111 0 31
 23. 2 112 0 31
 24. 3 112 1000 15
 25.
 26. SEISMIC CONSTANT 0.1
 27.
 28. PIEZOMETRIC DATA
 29. 1 1 0 1701
 30. 1 2 120 1701
 31. BEGIN AT 30 1749 4 4

FSBSHP  FSNRML RADIUS NO.SLCS.X=   30.00  Y= 1749.00
6.985   6.248   62.65   16
7.110   6.363   62.18   15
7.262   6.548   61.71   15
7.458   6.753   61.23   14
7.665   6.972   60.76   14
7.916   7.233   60.29   14
8.215   7.537   59.82   13
8.634   7.958   59.34   12
```

STANDING WATER (to prin. spw invert 1701.0 w/no piezometric line built into the soil)

F.S. ≈ 1.519

UNIVAC 1100 SERIES ICES

9.112	8.444	58.87	12
9.739	9.072	58.40	12
10.569	9.891	57.93	11
11.841	11.141	57.46	10
13.660	12.924	56.98	10
16.734	15.916	56.51	10
23.136	22.105	56.04	8
12.459	11.253	55.57	4

TOO FEW SLICES AT RAD= 55.09

THE LOWEST FACTOR OF SAFETY FOUND WAS 6.985 AT R= 62.65

FSBSHP FSNRML RADIUS NO.SLCS.X= 34.00 Y= 1749.00

5.158	4.484	64.66	17
5.169	4.527	63.98	17
5.193	4.572	63.30	16
5.214	4.616	62.61	16
5.243	4.664	61.93	15
5.289	4.733	61.25	15
5.355	4.820	60.57	14
5.429	4.918	59.89	14
5.527	5.036	59.20	13
5.675	5.206	58.52	12
5.861	5.415	57.84	12
6.130	5.700	57.16	10
6.516	6.104	56.48	10
7.113	6.710	55.80	9
4.848	4.501	55.11	5
6.132	5.663	54.43	4
7.296	6.892	55.62	9
7.475	7.064	55.45	8
4.671	4.339	55.28	5
5.063	4.698	54.94	5
5.323	4.939	54.77	5
5.673	5.252	54.60	4

TOO FEW SLICES AT RAD= 53.75

THE LOWEST FACTOR OF SAFETY FOUND WAS 4.671 AT R= 55.28

FSBSHP FSNRML RADIUS NO.SLCS.X= 38.00 Y= 1749.00

4.351	3.709	66.85	19
4.313	3.698	65.95	19
4.281	3.688	65.05	17
4.243	3.681	64.14	17
4.207	3.674	63.24	17
4.177	3.672	62.34	16
4.143	3.666	61.44	15
4.114	3.668	60.53	15
4.090	3.676	59.63	14
4.064	3.679	58.73	13
4.048	3.698	57.83	12
4.033	3.717	56.92	11
3.986	3.704	56.02	10
3.712	3.476	55.12	8
3.269	3.062	54.22	6
3.552	3.333	53.31	5
3.173	2.968	54.89	7
3.201	2.997	54.67	7
3.226	3.020	54.44	6

UNIVAC 1100 SERIES ICES

3.322	3.116	53.99	5
3.382	3.174	53.76	5
3.457	3.245	53.54	5

TOO FEW SLICES AT RAD= 52.41
THE LOWEST FACTOR OF SAFETY FOUND WAS 3.173 AT R= 54.89

FSBSHP FSNRML RADIUS NO.SLCS.X= 42.00 Y= 1749.00

3.934	3.288	69.20	21
3.871	3.255	68.07	20
3.807	3.223	66.94	19
3.740	3.187	65.80	18
3.674	3.154	64.67	17
3.601	3.117	63.54	17
3.527	3.075	62.41	16
3.453	3.037	61.27	15
3.372	2.994	60.14	15
3.286	2.947	59.01	14
3.188	2.887	57.88	12
3.066	2.808	56.74	12
2.867	2.654	55.61	9
2.564	2.399	54.48	8
2.524	2.379	53.34	6
2.475	2.353	52.21	5
2.314	2.217	51.08	4

THE LOWEST FACTOR OF SAFETY FOUND WAS 2.314 AT R= 51.08

FSBSHP FSNRML RADIUS NO.SLCS.X= 46.00 Y= 1749.00

3.705	3.042	71.70	22
3.623	2.996	70.33	22
3.540	2.949	68.96	21
3.455	2.900	67.59	20
3.368	2.850	66.21	19
3.276	2.796	64.84	18
3.181	2.740	63.47	17
3.080	2.677	62.10	16
2.973	2.613	60.73	15
2.858	2.540	59.35	14
2.725	2.451	57.98	13
2.567	2.341	56.61	12
2.318	2.144	55.24	9
2.233	2.094	53.87	8
2.127	2.012	52.50	7
1.960	1.879	51.12	5
1.599	1.572	49.75	3

THE LOWEST FACTOR OF SAFETY FOUND WAS 1.599 AT R= 49.75

FSBSHP FSNRML RADIUS NO.SLCS.X= 50.00 Y= 1749.00

3.672	2.989	74.33	24
3.549	2.905	72.71	24
3.430	2.824	71.09	22
3.310	2.745	69.47	22
3.191	2.663	67.86	20
3.084	2.599	66.24	19
2.973	2.532	64.62	19
2.859	2.461	63.00	17
2.737	2.383	61.38	16
2.606	2.299	59.76	15

UNIVAC 1100 SERIES ICES

2.463	2.202	58.14	13
2.293	2.083	56.52	12
2.150	1.979	54.91	10
2.043	1.908	53.29	9
1.908	1.808	51.67	7
1.717	1.658	50.05	6

TOO FEW SLICES AT RAD= 48.43

THE LOWEST FACTOR OF SAFETY FOUND WAS 1.717 AT R= 50.05

FSBSHP FSNRML RADIUS NO.SLCS.X= 46.00 Y= 1753.00

3.569	2.969	74.81	23
3.477	2.910	73.48	23
3.389	2.854	72.14	21
3.306	2.805	70.81	21
3.223	2.755	69.47	19
3.133	2.702	68.13	19
3.042	2.645	66.80	17
2.943	2.585	65.46	17
2.838	2.516	64.13	15
2.723	2.442	62.79	14
2.591	2.351	61.46	13
2.420	2.223	60.12	11
2.221	2.068	58.78	10
2.132	2.005	57.45	8
2.017	1.920	56.11	8
1.844	1.781	54.78	6
1.544	1.529	53.44	4

THE LOWEST FACTOR OF SAFETY FOUND WAS 1.544 AT R= 53.44

FSBSHP FSNRML RADIUS NO.SLCS.X= 46.00 Y= 1757.00

3.450	2.902	78.01	23
3.356	2.840	76.70	23
3.266	2.780	75.40	22
3.176	2.720	74.09	21
3.093	2.670	72.79	20
3.007	2.617	71.48	19
2.917	2.561	70.18	18
2.822	2.499	68.88	16
2.717	2.431	67.57	16
2.601	2.350	66.27	14
2.466	2.254	64.96	13
2.274	2.104	63.66	11
2.131	1.995	62.35	10
2.037	1.924	61.05	8
1.921	1.838	59.74	7
1.741	1.691	58.44	6
1.519	1.508	57.14	4

THE LOWEST FACTOR OF SAFETY FOUND WAS 1.519 AT R= 57.14

FSBSHP FSNRML RADIUS NO.SLCS.X= 46.00 Y= 1761.00

3.350	2.850	81.27	24
3.256	2.783	79.99	23
3.163	2.719	78.72	22
3.071	2.656	77.44	22
2.979	2.593	76.16	20
2.895	2.540	74.88	20
2.806	2.483	73.61	18

UNIVAC 1100 SERIES ICES

```
 2.712   2.421   72.33    17
 2.608   2.350   71.05    16
 2.492   2.269   69.77    15
 2.350   2.162   68.50    13
 2.131   1.987   67.22    11
 2.053   1.930   65.94     9
 1.959   1.862   64.66     9
 1.836   1.765   63.39     7
 1.649   1.610   62.11     5
TOO FEW SLICES AT RAD=   60.83
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.649 AT R=   62.11

FSBSHP  FSNRML  RADIUS NO.SLCS.X=   50.00  Y= 1757.00
 3.562   3.014   80.43    25
 3.336   2.802   78.89    24
 3.217   2.718   77.35    23
 3.099   2.634   75.81    22
 2.981   2.550   74.27    21
 2.865   2.470   72.74    20
 2.745   2.385   71.20    19
 2.637   2.315   69.66    18
 2.524   2.240   68.12    16
 2.400   2.156   66.58    15
 2.257   2.054   65.04    13
 2.092   1.930   63.50    11
 2.004   1.870   61.96    10
 1.895   1.789   60.42     9
 1.769   1.696   58.88     8
 1.598   1.561   57.35     6
 1.531   1.517   55.81     4
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.531 AT R=   55.81

FSBSHP  FSNRML  RADIUS NO.SLCS.X=   42.00  Y= 1757.00
 3.599   3.068   75.72    22
 3.539   3.034   74.64    21
 3.478   3.001   73.56    20
 3.414   2.964   72.48    19
 3.349   2.928   71.40    18
 3.278   2.887   70.33    18
 3.207   2.844   69.25    16
 3.128   2.797   68.17    16
 3.045   2.745   67.09    15
 2.948   2.680   66.02    14
 2.834   2.602   64.94    13
 2.668   2.473   63.86    11
 2.342   2.197   62.78     9
 2.282   2.157   61.70     8
 2.195   2.091   60.63     7
 2.050   1.972   59.55     5
TOO FEW SLICES AT RAD=   58.47
THE LOWEST FACTOR OF SAFETY FOUND WAS 2.050 AT R=   59.55

FSBSHP  FSNRML  RADIUS NO.SLCS.X=   47.00  Y= 1757.00
 3.440   2.889   78.60    24
 3.340   2.819   77.24    23
 3.241   2.752   75.88    22
 3.144   2.687   74.51    22
```

UNIVAC 1100 SERIES ICES

```
 3.048  2.623   73.15   20
 2.959  2.568   71.79   20
 2.866  2.508   70.43   18
 2.767  2.445   69.06   17
 2.659  2.373   67.70   16
 2.541  2.293   66.34   15
 2.402  2.193   64.98   13
 2.208  2.044   63.61   11
 2.092  1.956   62.25   10
 1.998  1.889   60.89    9
 1.873  1.793   59.53    7
 1.684  1.638   58.16    5
TOO FEW SLICES AT RAD=   56.80
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.684 AT R=   58.16

FSBSHP  FSNRML RADIUS NO.SLCS.X=   45.00  Y= 1757.00
 3.468  2.925   77.42   23
 3.383  2.870   76.17   23
 3.300  2.816   74.93   21
 3.223  2.770   73.68   21
 3.145  2.723   72.43   19
 3.062  2.673   71.19   19
 2.976  2.618   69.94   17
 2.883  2.560   68.69   17
 2.783  2.492   67.44   15
 2.672  2.418   66.20   14
 2.540  2.324   64.95   13
 2.352  2.178   63.70   11
 2.175  2.038   62.46   10
 2.087  1.973   61.21    8
 1.976  1.889   59.96    7
 1.800  1.745   58.72    6
 1.526  1.515   57.47    4
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.526 AT R=   57.47

FSBSHP  FSNRML RADIUS NO.SLCS.X=   46.00  Y= 1758.00
 3.423  2.888   78.82   23
 3.329  2.824   77.52   23
 3.238  2.764   76.22   22
 3.145  2.700   74.92   21
 3.063  2.650   73.63   20
 2.978  2.597   72.33   20
 2.889  2.541   71.03   18
 2.794  2.478   69.73   16
 2.689  2.410   68.44   16
 2.573  2.328   67.14   14
 2.436  2.231   65.84   13
 2.237  2.073   64.55   11
 2.111  1.978   63.25   10
 2.020  1.913   61.95    9
 1.898  1.819   60.65    7
 1.718  1.671   59.36    6
TOO FEW SLICES AT RAD=   58.06
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.718 AT R=   59.36

FSBSHP  FSNRML RADIUS NO.SLCS.X=   46.00  Y= 1756.00
 3.477  2.918   77.20   23
```

UNIVAC 1100 SERIES ICES

3.384	2.856	75.89	23
3.288	2.789	74.58	21
3.207	2.740	73.27	21
3.124	2.691	71.95	20
3.038	2.638	70.64	19
2.947	2.581	69.33	18
2.852	2.520	68.02	16
2.746	2.452	66.71	16
2.631	2.372	65.39	14
2.496	2.278	64.08	13
2.311	2.134	62.77	11
2.153	2.013	61.46	10
2.059	1.944	60.15	8
1.944	1.858	58.84	7
1.765	1.712	57.52	6
1.521	1.510	56.21	4

THE LOWEST FACTOR OF SAFETY FOUND WAS 1.521 AT R= 56.21

THE MINIMUM FACTOR OF SAFETY IS 1.519 FOR X= 46.00 Y= 1757.00 R= 57.14

```
32. REMOVE PIEZ 1
33. PIEZOMETRIC DATA
34. 2 1 0 1694
35. 2 2 49.4 1694
36. 2 3 50.7 1696
37. 2 4 54 1698
38. 2 5 60 1701
39. 2 6 105.1 1720
40. 2 7 120 1720
41.
42. SOIL DATA
43. 1 111 0 31 2
44. 2 111 0 31 2
45. GRID 1 0 1734 2 60 1716 3 80 1734 6 4
```

?

Not Applicable !!

FSBSHP FSNRML RADIUS NO.SLCS.X= 60.00 Y= 1716.00

2.627	1.760	63.91	25
2.345	1.690	60.85	23
2.230	1.611	57.80	23
2.124	1.552	54.74	21
2.017	1.492	51.69	19
1.914	1.430	48.63	19
1.813	1.376	45.58	17
1.716	1.328	42.53	15
1.617	1.281	39.47	14
1.516	1.218	36.42	13
1.430	1.179	33.36	11
1.367	1.136	30.31	10
1.339	1.123	27.25	8
1.269	1.089	24.20	8
1.206	1.071	21.14	6
1.141	1.062	18.09	4

TOO FEW SLICES AT RAD= 15.03

THE LOWEST FACTOR OF SAFETY FOUND WAS 1.141 AT R= 18.09

FSBSHP FSNRML RADIUS NO.SLCS.X= 50.00 Y= 1719.00

2.192	1.630	55.90	21
2.128	1.604	53.72	20

```
@*SYSTEM.ICES

*********************************************
*                                           *
*          UNIVAC 1100 SERIES ICES          *
*     APR 11, 1984              14:24:44    *
*                VERSION  2.9.1             *
*                                           *
*********************************************
   1. LEASE

*************************
*  1100 ICES LEASE-II   *
*     LEVEL 2.0.0       *
*************************
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Dry Dam

```
   2. $ SIGNAL BUTTE FRS, STATION 212+00
   3. POINT DATA
   4. 1 0 1694
   5. 2 40 1694
   6. 3 110 1722
   7. 4 119 1722
   8. 5 128 1722
   9. 6 92.5 1694
  10. 7 106 1680.5
  11. 8 128 1680.5
  12. LINE DATA
  13. 1 1 2 1
  14. 2 2 3 2
  15. 3 3 4 2
  16. 4 4 5 3
  17. 5 2 6 1
  18. 6 6 7 1
  19. 7 7 8 1
  20. SOIL DATA
  21. 1 111 0 31
  22. 2 112 0 31
  23. 3 112 1000 15
  24. SEISMIC CONSTANT 0.1
  25.
  26. GRID 1 0 1734 2 60 1716 3 80 1734 6 4
```

F.S. ≈ 1.522

(No piezometric line established in Dam)

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FSBSHP   FSNRML RADIUS NO.SLCS.X=   60.00  Y= 1716.00
 5.052   3.700   63.91   25
 4.767   3.372   60.85   23
 4.527   3.210   57.80   23
 4.331   3.090   54.74   21
 4.133   2.970   51.69   19
 3.918   2.835   48.63   19
 3.719   2.721   45.58   17
 3.528   2.618   42.53   15
 3.330   2.515   39.47   14
 3.093   2.365   36.42   13
 2.917   2.273   33.36   11
 2.715   2.143   30.31   10
 2.597   2.080   27.25    8
```

UNIVAC 1100 SERIES ICES

2.403	1.972	24.20	8
2.233	1.881	21.14	6
2.035	1.776	18.09	4

TOO FEW SLICES AT RAD= 15.03
THE LOWEST FACTOR OF SAFETY FOUND WAS 2.035 AT R= 18.09

FSBSHP FSNRML RADIUS NO.SLCS.X= 50.00 Y= 1719.00

4.493	3.246	55.90	21
4.375	3.191	53.72	20
4.193	3.074	51.53	19
4.054	3.003	49.35	18
3.857	2.876	47.16	17
3.707	2.798	44.98	16
3.498	2.665	42.80	15
3.289	2.534	40.61	14
3.090	2.418	38.43	13
2.869	2.282	36.24	12
2.648	2.148	34.06	11
2.418	2.008	31.88	10
2.197	1.869	29.69	8
2.005	1.756	27.51	7
1.874	1.684	25.32	6
1.757	1.633	23.14	5

TOO FEW SLICES AT RAD= 20.95
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.757 AT R= 23.14

FSBSHP FSNRML RADIUS NO.SLCS.X= 40.00 Y= 1722.00

4.408	3.366	48.83	17
4.281	3.294	47.46	17
4.159	3.223	46.09	16
4.047	3.160	44.72	15
3.908	3.081	43.35	15
3.773	3.003	41.98	14
3.624	2.918	40.61	14
3.481	2.831	39.24	13
3.326	2.739	37.87	12
3.153	2.636	36.50	12
2.985	2.526	35.13	10
2.783	2.402	33.76	10
2.571	2.253	32.39	8
2.321	2.087	31.02	8
2.015	1.856	29.65	6
1.669	1.600	28.28	5

TOO FEW SLICES AT RAD= 26.91
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.669 AT R= 28.28

FSBSHP FSNRML RADIUS NO.SLCS.X= 30.00 Y= 1725.00

5.537	4.621	43.14	14
5.529	4.638	42.41	13
5.524	4.669	41.68	13
5.551	4.723	40.95	12
5.527	4.645	42.23	13
5.525	4.652	42.05	13
5.524	4.660	41.86	13
5.524	4.678	41.50	13
5.552	4.704	41.32	12
5.551	4.713	41.14	12

```
 5.558  4.768   40.23   12
 5.574  4.812   39.50   11
 5.622  4.900   38.77   11
 5.745  5.047   38.04   10
 5.847  5.192   37.31   10
 5.989  5.365   36.58    9
 6.272  5.688   35.86    9
 6.854  6.285   35.13    8
 7.683  7.137   34.40    7
 9.863  9.327   33.67    7
24.184 23.327   32.94    5
******807.650   32.21    4
TOO FEW SLICES AT RAD=   31.49
THE LOWEST FACTOR OF SAFETY FOUND WAS 5.524 AT R=   41.68

FSBSHP  FSNRML RADIUS NO.SLCS.X=   20.00  Y= 1728.00
**************   39.45    8
**************   39.12    8
**************   38.79    8
**************   38.47    8
******832.831   38.14    6
******962.878   37.81    6
******431.470   38.38    7
******463.948   38.30    7
******502.521   38.22    7
******860.493   38.06    6
******890.768   37.98    6
******924.156   37.89    6
**************   37.49    6
**************   37.16    6
**************   36.83    6
**************   36.51    6
******250.381   36.18    5
******492.066   35.85    4
******197.993   36.42    5
******211.906   36.34    5
******229.146   36.26    5
******443.548   36.10    4
******457.291   36.02    4
******473.010   35.93    4
******617.019   35.52    4
**************   35.20    4
TOO FEW SLICES AT RAD=   34.87
THE LOWEST FACTOR OF SAFETY FOUND WAS****** AT R=   36.42

FSBSHP  FSNRML RADIUS NO.SLCS.X=   10.00  Y= 1731.00
**************   38.33    4
**************   38.25    4
**************   38.17    4
**************   38.09    4
**************   38.01    4
**************   37.93    4
**************   37.85    4
TOO FEW SLICES AT RAD=   37.77
THE LOWEST FACTOR OF SAFETY FOUND WAS****** AT R=   36.42

FSBSHP  FSNRML RADIUS NO.SLCS.X=     .00  Y= 1734.00
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(4)

UNIVAC 1100 SERIES ICES

RMAX TOO SMALL. NO TRIAL CIRCLES ARE POSSIBLE.

FSBSHP FSNRML RADIUS NO.SLCS.X= 65.00 Y= 1720.50

4.455	3.438	63.02	24
4.270	3.270	60.16	23
4.042	3.068	57.29	22
3.748	2.768	54.43	21
3.572	2.659	51.57	19
3.370	2.522	48.71	18
3.203	2.425	45.85	17
3.050	2.338	42.98	15
2.882	2.233	40.12	14
2.763	2.169	37.26	12
2.666	2.120	34.40	11
2.537	2.043	31.54	10
2.429	1.985	28.68	8
2.262	1.896	25.81	8
2.102	1.808	22.95	6
1.918	1.706	20.09	4

TOO FEW SLICES AT RAD= 17.23
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.918 AT R= 20.09

FSBSHP FSNRML RADIUS NO.SLCS.X= 55.00 Y= 1723.50

4.163	3.045	62.41	24
4.011	2.950	59.98	22
3.848	2.851	57.54	21
3.677	2.743	55.11	20
3.514	2.649	52.67	19
3.332	2.536	50.23	18
3.165	2.440	47.80	17
2.993	2.339	45.36	15
2.798	2.219	42.93	14
2.615	2.110	40.49	13
2.423	1.994	38.06	12
2.248	1.887	35.62	10
2.107	1.809	33.19	9
2.006	1.753	30.75	7
1.879	1.694	28.31	7
1.752	1.626	25.88	5

TOO FEW SLICES AT RAD= 23.44
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.752 AT R= 25.88

FSBSHP FSNRML RADIUS NO.SLCS.X= 45.00 Y= 1726.50

3.899	2.981	55.51	19
3.768	2.903	53.88	19
3.638	2.825	52.25	18
3.520	2.756	50.61	17
3.381	2.672	48.98	16
3.232	2.584	47.35	16
3.095	2.498	45.72	14
2.934	2.401	44.09	14
2.770	2.301	42.46	14
2.605	2.193	40.83	12
2.430	2.083	39.19	11
2.238	1.960	37.56	11
2.044	1.827	35.93	9
1.847	1.697	34.30	8

UNIVAC 1100 SERIES ICES

```
 1.708  1.604   32.67    6
 1.636  1.564   31.04    4
TOO FEW SLICES AT RAD=   29.41
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.636 AT R=   31.04

FSBSHP  FSNRML RADIUS NO.SLCS.X=   35.00  Y= 1729.50
 4.094  3.355   49.85   16
 4.019  3.316   48.95   16
 3.952  3.281   48.05   15
 3.875  3.237   47.15   14
 3.792  3.194   46.24   14
 3.708  3.150   45.34   14
 3.631  3.107   44.44   13
 3.537  3.051   43.54   12
 3.441  2.998   42.64   12
 3.353  2.948   41.73   11
 3.234  2.870   40.83   10
 3.115  2.799   39.93   10
 2.994  2.722   39.03    9
 2.816  2.591   38.13    8
 2.621  2.448   37.22    7
 2.246  2.135   36.32    6
TOO FEW SLICES AT RAD=   35.42
THE LOWEST FACTOR OF SAFETY FOUND WAS 2.246 AT R=   36.32

FSBSHP  FSNRML RADIUS NO.SLCS.X=   25.00  Y= 1732.50
 8.284  7.482   45.90   12
 8.659  7.865   45.46   12
 9.123  8.329   45.02   11
 9.772  8.980   44.57   11
10.774  9.959   44.13   10
12.019 11.191   43.68   10
13.898 13.030   43.24    9
17.220 16.280   42.79    9
24.041 22.928   42.35    9
49.819 47.881   41.91    7
******379.552   41.46    7
**************  41.02    6
******253.335   40.57    5
******443.765   40.13    4
**************  40.91    6
**************  40.80    6
**************  40.68    6
******287.565   40.46    5
******397.414   40.35    4
******417.938   40.24    4
******631.283   39.68    4
TOO FEW SLICES AT RAD=   39.24
THE LOWEST FACTOR OF SAFETY FOUND WAS 8.284 AT R=   45.90

FSBSHP  FSNRML RADIUS NO.SLCS.X=   15.00  Y= 1735.50
**************  44.13    6
**************  43.97    6
**************  43.81    6
**************  43.65    6
******224.397   43.50    5
******267.857   43.34    5
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UNIVAC 1100 SERIES ICES

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**************   43.62    6
**************   43.58    6
******216.346    43.54    5
******233.233    43.46    5
******243.376    43.42    5
******254.810    43.38    5
******722.526    43.18    4
******787.056    43.02    4
******885.128    42.87    4
**************   42.71    4
**************   42.55    4
**************   42.39    4
TOO FEW SLICES AT RAD=   42.24
THE LOWEST FACTOR OF SAFETY FOUND WAS****** AT R=   43.54

FSBSHP  FSNRML RADIUS NO.SLCS.X=    5.00  Y= 1738.50
TOO FEW SLICES AT RAD=   44.78
THE LOWEST FACTOR OF SAFETY FOUND WAS****** AT R=   43.54

FSBSHP  FSNRML RADIUS NO.SLCS.X=   70.00  Y= 1725.00
 3.757  3.037   58.08   22
 3.600  2.887   55.65   20
 3.423  2.735   53.23   20
 3.146  2.425   50.80   18
 2.997  2.324   48.37   18
 2.887  2.253   45.95   16
 2.777  2.178   43.52   15
 2.700  2.133   41.09   14
 2.614  2.082   38.67   13
 2.528  2.036   36.24   12
 2.445  1.993   33.82   10
 2.331  1.932   31.39   10
 2.224  1.873   28.96    8
 2.104  1.802   26.54    6
 1.957  1.730   24.11    6
 1.798  1.639   21.68    4
TOO FEW SLICES AT RAD=   19.26
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.798 AT R=   21.68

FSBSHP  FSNRML RADIUS NO.SLCS.X=   60.00  Y= 1728.00
 4.186  3.302   68.26   26
 3.993  3.126   65.62   24
 3.777  2.944   62.97   24
 3.478  2.643   60.32   22
 3.287  2.516   57.67   21
 3.112  2.403   55.03   20
 2.941  2.293   52.38   18
 2.772  2.190   49.73   17
 2.608  2.095   47.08   16
 2.454  2.004   44.44   14
 2.304  1.917   41.79   13
 2.194  1.855   39.14   11
 2.101  1.803   36.50    9
 1.989  1.749   33.85    9
 1.871  1.685   31.20    7
 1.740  1.613   28.55    5
TOO FEW SLICES AT RAD=   25.91
```

UNIVAC 1100 SERIES ICES

THE LOWEST FACTOR OF SAFETY FOUND WAS 1.740 AT R= 28.55

FSBSHP FSNRML RADIUS NO.SLCS.X= 50.00 Y= 1731.00

FSBSHP	FSNRML	RADIUS	NO.SLCS.
3.593	2.751	62.20	22
3.465	2.675	60.31	22
3.343	2.603	58.41	20
3.207	2.522	56.52	20
3.079	2.444	54.63	18
2.935	2.358	52.73	18
2.797	2.272	50.84	16
2.648	2.181	48.95	15
2.497	2.084	47.05	14
2.340	1.987	45.16	13
2.178	1.887	43.26	13
2.022	1.785	41.37	11
1.882	1.699	39.48	10
1.793	1.647	37.58	8
1.717	1.604	35.69	6
1.659	1.585	33.80	5

TOO FEW SLICES AT RAD= 31.90

THE LOWEST FACTOR OF SAFETY FOUND WAS 1.659 AT R= 33.80

FSBSHP FSNRML RADIUS NO.SLCS.X= 40.00 Y= 1734.00

FSBSHP	FSNRML	RADIUS	NO.SLCS.
3.516	2.852	56.57	18
3.422	2.797	55.40	18
3.329	2.742	54.24	17
3.233	2.681	53.07	16
3.130	2.619	51.91	16
3.026	2.556	50.74	15
2.913	2.486	49.57	15
2.796	2.408	48.41	14
2.674	2.330	47.24	13
2.540	2.241	46.08	13
2.398	2.140	44.91	11
2.238	2.030	43.75	11
2.057	1.893	42.58	9
1.858	1.746	41.41	8
1.641	1.580	40.25	7
1.573	1.537	39.08	5

TOO FEW SLICES AT RAD= 37.92

THE LOWEST FACTOR OF SAFETY FOUND WAS 1.573 AT R= 39.08

FSBSHP FSNRML RADIUS NO.SLCS.X= 30.00 Y= 1737.00

FSBSHP	FSNRML	RADIUS	NO.SLCS.
4.314	3.762	52.43	14
4.291	3.763	51.87	14
4.270	3.765	51.30	14
4.263	3.777	50.73	13
4.243	3.782	50.17	13
4.222	3.780	49.60	12
4.214	3.797	49.04	12
4.215	3.822	48.47	12
4.219	3.783	49.46	12
4.217	3.788	49.32	12
4.216	3.792	49.18	12
4.214	3.803	48.89	12
4.213	3.809	48.75	12
4.214	3.815	48.61	12

UNIVAC 1100 SERIES ICES

```
 4.235  3.864   47.90   11
 4.249  3.904   47.34   11
 4.282  3.958   46.77   10
 4.390  4.086   46.21    9
 4.522  4.246   45.64    9
 4.792  4.536   45.07    8
 5.654  5.404   44.51    7
******870.115   43.94    4
TOO FEW SLICES AT RAD=   43.38
THE LOWEST FACTOR OF SAFETY FOUND WAS 4.213 AT R=   48.75

FSBSHP  FSNRML RADIUS NO.SLCS.X=   20.00  Y= 1740.00
**************  50.16    8
**************  49.91    8
**************  49.66    8
**************  49.41    8
**************  49.16    6
**************  48.91    6
******536.375  49.35    7
******574.989  49.29    7
******621.617  49.22    7
**************  49.10    6
**************  49.04    6
**************  48.97    6
**************  48.66    6
**************  48.41    6
**************  48.16    6
**************  47.91    6
******313.081  47.66    5
******634.787  47.41    4
******250.120  47.85    5
******266.837  47.79    5
******287.747  47.73    5
******573.201  47.60    4
******591.077  47.54    4
******611.489  47.48    4
******788.964  47.16    4
**************  46.92    4
TOO FEW SLICES AT RAD=   46.67
THE LOWEST FACTOR OF SAFETY FOUND WAS****** AT R=   47.85

FSBSHP  FSNRML RADIUS NO.SLCS.X=   10.00  Y= 1743.00
**************  50.01    4
**************  49.95    4
**************  49.89    4
**************  49.83    4
**************  49.77    4
**************  49.71    4
**************  49.65    4
TOO FEW SLICES AT RAD=   49.59
THE LOWEST FACTOR OF SAFETY FOUND WAS****** AT R=   47.85

FSBSHP  FSNRML RADIUS NO.SLCS.X=   75.00  Y= 1729.50
 3.304  2.791   53.53   19
 3.197  2.681   51.51   18
 3.096  2.584   49.50   17
 2.975  2.466   47.49   17
```

UNIVAC 1100 SERIES ICES

2.750	2.205	45.47	15
2.658	2.142	43.46	15
2.583	2.087	41.44	13
2.491	2.027	39.43	13
2.414	1.975	37.42	11
2.329	1.930	35.40	11
2.245	1.885	33.39	10
2.156	1.839	31.37	9
2.060	1.787	29.36	8
1.957	1.727	27.35	6
1.843	1.674	25.33	6
1.708	1.589	23.32	4

TOO FEW SLICES AT RAD= 21.30
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.708 AT R= 23.32

FSBSHP FSNRML RADIUS NO.SLCS.X= 65.00 Y= 1732.50

3.496	2.879	63.87	23
3.331	2.731	61.62	22
3.159	2.584	59.38	21
2.878	2.290	57.14	20
2.733	2.192	54.89	19
2.605	2.104	52.65	17
2.477	2.021	50.40	17
2.369	1.950	48.16	15
2.287	1.904	45.91	14
2.222	1.870	43.67	12
2.143	1.830	41.42	12
2.071	1.792	39.18	10
1.981	1.743	36.94	9
1.895	1.701	34.69	8
1.792	1.645	32.45	7
1.681	1.582	30.20	5

TOO FEW SLICES AT RAD= 27.96
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.681 AT R= 30.20

FSBSHP FSNRML RADIUS NO.SLCS.X= 55.00 Y= 1735.50

3.612	2.872	68.90	25
3.356	2.619	66.74	23
3.200	2.515	64.59	23
3.057	2.418	62.43	21
2.906	2.320	60.27	21
2.765	2.228	58.12	19
2.624	2.143	55.96	19
2.485	2.058	53.81	17
2.348	1.972	51.65	15
2.205	1.885	49.49	15
2.073	1.802	47.34	13
1.958	1.734	45.18	12
1.881	1.691	43.02	10
1.811	1.659	40.87	9
1.738	1.621	38.71	7
1.646	1.570	36.55	5

TOO FEW SLICES AT RAD= 34.40
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.646 AT R= 36.55

FSBSHP FSNRML RADIUS NO.SLCS.X= 45.00 Y= 1738.50

3.215	2.596	63.29	21

UNIVAC 1100 SERIES ICES

```
 3.121  2.538   61.86   20
 3.019  2.476   60.43   19
 2.913  2.411   59.00   19
 2.810  2.345   57.57   17
 2.696  2.274   56.14   17
 2.584  2.198   54.71   15
 2.461  2.121   53.28   15
 2.336  2.040   51.85   14
 2.201  1.947   50.42   13
 2.064  1.856   48.99   12
 1.922  1.758   47.56   11
 1.778  1.656   46.13   10
 1.681  1.592   44.70    8
 1.640  1.572   43.27    6
 1.577  1.533   41.84    5
TOO FEW SLICES AT RAD=   40.41
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.577 AT R=   41.84

FSBSHP  FSNRML RADIUS NO.SLCS.X=   35.00  Y= 1741.50
 3.376  2.893   59.00   17
 3.312  2.856   58.22   17
 3.252  2.819   57.44   16
 3.183  2.774   56.65   15
 3.111  2.731   55.87   15
 3.037  2.684   55.09   15
 2.962  2.636   54.31   14
 2.875  2.575   53.52   13
 2.785  2.515   52.74   13
 2.689  2.448   51.96   12
 2.571  2.359   51.18   11
 2.449  2.269   50.39   10
 2.291  2.147   49.61   10
 2.086  1.977   48.83    8
 1.801  1.740   48.05    8
 1.530  1.509   47.26    4
TOO FEW SLICES AT RAD=   46.48
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.530 AT R=   47.26

FSBSHP  FSNRML RADIUS NO.SLCS.X=   25.00  Y= 1744.50
 6.048  5.579   56.35   13
 6.204  5.742   56.00   12
 6.416  5.965   55.65   12
 6.688  6.245   55.30   12
 7.082  6.641   54.95   11
 7.556  7.121   54.59   11
 8.224  7.788   54.24   10
 9.283  8.844   53.89   10
11.113 10.658   53.54   10
15.455 14.918   53.19    8
29.022 28.282   52.84    8
**************  52.49    6
**************  52.14    6
******556.380   51.79    4
******846.988   51.44    4
******346.770   52.05    5
******401.972   51.96    5
******525.245   51.87    4
```

(11)

UNIVAC 1100 SERIES ICES

```
******596.882   51.70    4
******652.208   51.61    4
******729.486   51.52    4
TOO FEW SLICES AT RAD=   51.08
THE LOWEST FACTOR OF SAFETY FOUND WAS 6.048 AT R=   56.35

FSBSHP  FSNRML RADIUS NO.SLCS.X=   15.00  Y= 1747.50
**************  55.56    6
**************  55.44    6
**************  55.32    6
**************  55.19    6
******281.540  55.07    5
******335.632  54.94    5
**************  55.16    6
**************  55.13    6
**************  55.10    6
******292.558  55.04    5
******305.322  55.01    5
******319.387  54.98    5
******911.617  54.82    4
******994.163  54.70    4
**************  54.57    4
**************  54.45    4
**************  54.33    4
**************  54.20    4
TOO FEW SLICES AT RAD=   54.08
THE LOWEST FACTOR OF SAFETY FOUND WAS****** AT R=   55.07

FSBSHP  FSNRML RADIUS NO.SLCS.X=   80.00  Y= 1734.00
 3.166  2.764   49.48   17
 3.087  2.689   47.85   16
 2.986  2.584   46.21   15
 2.872  2.476   44.58   15
 2.585  2.145   42.95   13
 2.498  2.085   41.32   13
 2.412  2.025   39.69   13
 2.332  1.965   38.06   11
 2.244  1.906   36.42   11
 2.166  1.854   34.79   10
 2.079  1.798   33.16    9
 2.003  1.760   31.53    9
 1.933  1.723   29.90    7
 1.845  1.678   28.27    7
 1.773  1.642   26.63    5
 1.655  1.570   25.00    4
TOO FEW SLICES AT RAD=   23.37
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.655 AT R=   25.00

FSBSHP  FSNRML RADIUS NO.SLCS.X=   70.00  Y= 1737.00
 3.011  2.592   59.91   20
 2.892  2.490   58.04   20
 2.769  2.373   56.17   18
 2.640  2.255   54.31   18
 2.433  2.031   52.44   16
 2.359  1.980   50.57   16
 2.291  1.930   48.70   14
 2.217  1.882   46.84   14
```

UNIVAC 1100 SERIES ICES

2.146	1.831	44.97	12
2.082	1.799	43.10	12
2.022	1.768	41.23	11
1.951	1.731	39.37	10
1.888	1.697	37.50	8
1.807	1.657	35.63	8
1.736	1.620	33.76	6
1.635	1.559	31.90	5

TOO FEW SLICES AT RAD= 30.03
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.635 AT R= 31.90

FSBSHP FSNRML RADIUS NO.SLCS.X= 60.00 Y= 1740.00

3.366	2.811	70.34	25
3.206	2.671	68.24	23
3.036	2.528	66.13	23
2.767	2.256	64.03	21
2.627	2.160	61.93	20
2.492	2.066	59.82	19
2.362	1.979	57.72	18
2.240	1.899	55.62	17
2.132	1.830	53.51	16
2.043	1.778	51.41	14
1.977	1.743	49.31	13
1.919	1.713	47.20	11
1.851	1.676	45.10	10
1.784	1.644	43.00	9
1.716	1.608	40.89	7
1.643	1.570	38.79	5

TOO FEW SLICES AT RAD= 36.68
THE LOWEST FACTOR OF SAFETY FOUND WAS 1.643 AT R= 38.79

FSBSHP FSNRML RADIUS NO.SLCS.X= 50.00 Y= 1743.00

3.086	2.491	70.01	23
2.968	2.413	68.31	23
2.853	2.337	66.62	22
2.740	2.262	64.93	21
2.631	2.194	63.23	20
2.520	2.123	61.54	19
2.405	2.051	59.85	18
2.289	1.975	58.15	16
2.167	1.897	56.46	16
2.046	1.817	54.77	14
1.927	1.739	53.07	13
1.818	1.665	51.38	11
1.748	1.626	49.68	10
1.701	1.600	47.99	8
1.648	1.576	46.30	8
1.596	1.549	44.60	6
1.541	1.522	42.91	4

THE LOWEST FACTOR OF SAFETY FOUND WAS 1.541 AT R= 42.91

FSBSHP FSNRML RADIUS NO.SLCS.X= 40.00 Y= 1746.00

2.996	2.537	65.60	19
2.919	2.489	64.57	19
2.842	2.440	63.53	18
2.760	2.384	62.49	17
2.674	2.329	61.45	17

UNIVAC 1100 SERIES ICES

2.585	2.271	60.41	16
2.490	2.207	59.37	16
2.391	2.136	58.33	14
2.283	2.062	57.29	14
2.169	1.980	56.25	13
2.040	1.884	55.21	12
1.903	1.782	54.17	11
1.753	1.667	53.13	10
1.613	1.558	52.09	8
1.581	1.542	51.05	7
1.553	1.527	50.01	5
1.523	1.512	48.97	3

THE LOWEST FACTOR OF SAFETY FOUND WAS 1.523 AT R= 48.97

FSBSHP FSNRML RADIUS NO.SLCS.X= 30.00 Y= 1749.00

3.552	3.186	62.65	16
3.519	3.167	62.18	15
3.488	3.152	61.71	15
3.462	3.140	61.23	14
3.427	3.122	60.76	14
3.391	3.103	60.29	14
3.351	3.078	59.82	13
3.323	3.064	59.34	12
3.281	3.041	58.87	12
3.236	3.014	58.40	12
3.182	2.976	57.93	11
3.139	2.950	57.46	10
3.074	2.905	56.98	10
2.990	2.842	56.51	10
2.866	2.734	56.04	8
1.522	1.512	55.57	4

TOO FEW SLICES AT RAD= 55.09

THE LOWEST FACTOR OF SAFETY FOUND WAS 1.522 AT R= 55.57

FSBSHP FSNRML RADIUS NO.SLCS.X= 20.00 Y= 1752.00

**********		61.35	8
**********		61.15	8
**********		60.95	8
**********		60.75	8
**********		60.55	6
**********		60.35	6
******649.625		60.70	7
******695.520		60.65	7
******750.604		60.60	7
**********		60.50	6
**********		60.45	6
**********		60.40	6
**********		60.14	6
**********		59.94	6
**********		59.74	6
**********		59.54	6
******380.644		59.34	5
******782.356		59.14	4
******305.293		59.49	5
******325.669		59.44	5
******349.952		59.39	5
******707.519		59.29	4

UNIVAC 1100 SERIES ICES

(4)

```
******728.903    59.24     4
******754.857    59.19     4
******970.787    58.94     4
**************   58.74     4
TOO FEW SLICES AT RAD=   58.54
THE LOWEST FACTOR OF SAFETY FOUND WAS****** AT R=   59.49

THE MINIMUM FACTOR OF SAFETY IS [1.522] FOR X=   30.00  Y= 1749.00  R= [redacted]
 27. SOIL DATA                    END                                R=55.:
 28. 2 112 0 31 1                 (note: Run search routine
 29.                               from this point)
 30. PEIZOMETERIC DATA
**** INPUT  ERROR   7.6  - *PEIZOMETERIC*IS NOT A VALID COMMAND
**** SYSTEM WARNING 7.19 - INHIBIT MODE ENTERED
 31. 1 1 0 1701
**** INPUT  ERROR   7.6  - *1           *IS NOT A VALID COMMAND
 32. 1 2 60 1701
**** INPUT  ERROR   7.6  - *1           *IS NOT A VALID COMMAND
 33. GRID 1 0 1734 2 60 1716 3 80 1734 6 4
 34. FINISH
 35. $ SIGNAL BUTTE FRS, STATION 227+85
 36. POINT DATA
 37. 1 0 1692
 38. 2 40 1691
 39. 3 120 1722
 40. 4 129 1722
 41. 5 138 1722
 42. 6 107 1686
 43. 7 116 1677.5
 44. 8 138 1677.5
 45. LINE DATA
 46. 1 1 2 1
 47. 2 2 3 2
 48. 3 3 4 2
 49. 4 4 5 3
 50. 5 2 6 1
 51. 6 6 7 1
 52. 7 7 8 1
 53. SOIL DATA
 54. 1 111 0 31
 55. 2 112 0 31 2
 56. 3 112 1000 15
 57. SEIZMIC CONSTANT 0.1
**** INPUT  ERROR   7.6  - *SEIZMIC     *IS NOT A VALID COMMAND
 58. PIEZOMETRIC DATA
 59. 2 1 0 1701
 60. 2 2 129 1701
 61. GRID 1 0 1732 2 60 1714 3 92 1740 6 4
 62. FINISH
**** INPUT  WARNING 7.16 - EOF RETURN FROM CARD READ INHIBIT MODE ACTIVE
```

AZ Signal Butte F.R.S.

ICC 5/8/84 SL 5-10-84

Design of Trashrack for Principle Spillway 1 5

Ref: AISC, 1982

GIVEN:

$Q = 160$ cfs

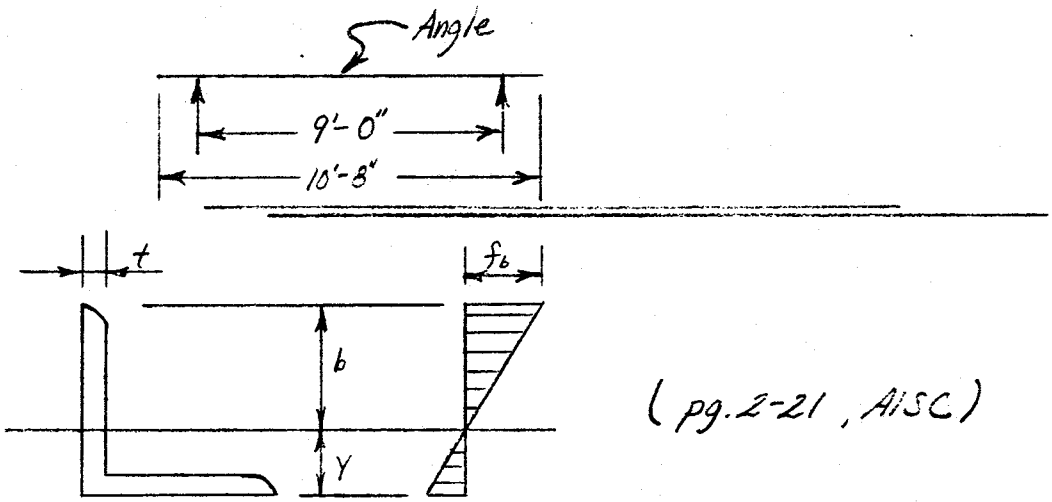
$V_{All.} = 2$ fps

$F_y = 36$ ksi

(80 cfs through each side of covered top riser.)

Note:

Will design angles only to resist moment due to its own weight. Any external loads applied will be resisted by the shear connectors. Will assume pinned connections.



(pg. 2-21, AISC)

$b/t \leq \frac{76}{\sqrt{F_y}}$ (pg. 5-30, AISC)

TRY $\angle$ 2 x 2 x 1/8 : (pg 1-46, AISC)

Properties:

$I = 0.190\ in^4$

$S = 0.131\ in^3$

$r = 0.626\ in$

$y = 0.546\ in$

$w = 1.65$ plf

$A_g = 0.484\ in^2$

$M = \frac{wl^2}{8} = \frac{1.65(9)^2}{8} = 16.71$ ft-Lbs.

$\sigma_{Act.} = \frac{Mc}{I} = \frac{16.71(12")1.454}{0.190 in^4} = \underline{1.535\ ksi}$

AZ Signal Butte FRS
ICC 5/9/84 SL 5-10-84
Trashrack for Principle Spillway 2 5

$L_c = \frac{76\, b_2}{\sqrt{F_y}} = \frac{76\,(2-.546)}{\sqrt{36}} = \underline{18.4'} > 9'\text{-}0''$ OK (Spec 1.5.1.4.1(5) AISC)

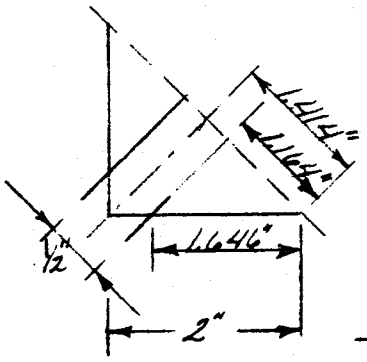
$\frac{b}{t} = \frac{1.454}{1/8''} = 11.6 \leq 12.7$ OK (Spec. 1.9.1.2, AISC)

∴ Compact Section, $F_b = 0.6F_y$ (Spec 1.5.1.4.5.1)

$F_b = 0.6(36) = 21.6\,ksi > \sigma_{Act.}$ OK

Allowable load on Angle: (Spec. 1.5.1.1 AISC)

$F_t = 0.45\, F_y A_g$
$= 0.45(36)\,0.484 = \underline{7.84^k}$



Note:
Assumed 1/2" bolt.

Check Tension in Member:

Assume member will not deflect more than 1/2" under max. loadings.

$\sigma = \epsilon E = \Delta/L\,(E_s)$
$\Delta = 1.93\times10^{-4}\,ft$
$E_s = 29{,}000\,ksi$
$L = 4.5\,ft$

$\sigma = \frac{1.93\times10^{-4}\,ft}{4.5\,ft}(29{,}000) = 1.243\,ksi$

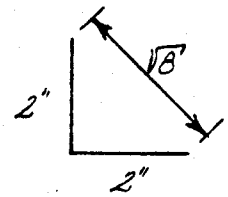
$T = 1{,}243\,\frac{lbs}{in^2}(0.484\,in^2) = 602\,lbs < 7.84^k$ OK

AZ Signal Butte FRS

ICC 5/9/84 SL 5-10-84

Trashrack Principle Spillway 3 5

Check Velocity (V_A) ≤ 2fps



Effective area = $\frac{\sqrt{8}}{12''}(9') = 2.12\,ft^2$

~ Will use 9 angles @ 12" O.C.

Total area = 9 (2.12) = 19.1 ft^2

Flow area = 8.49 (9') − 19.1 = 57.3 ft^2

$Vel. = \frac{Q}{A} = \frac{80}{57.3} = 1.40$ fps < 2fps OK

---

check Shear in angle

$F_v = 0.4F_y$ (Spec. 1.5.1.2.1)

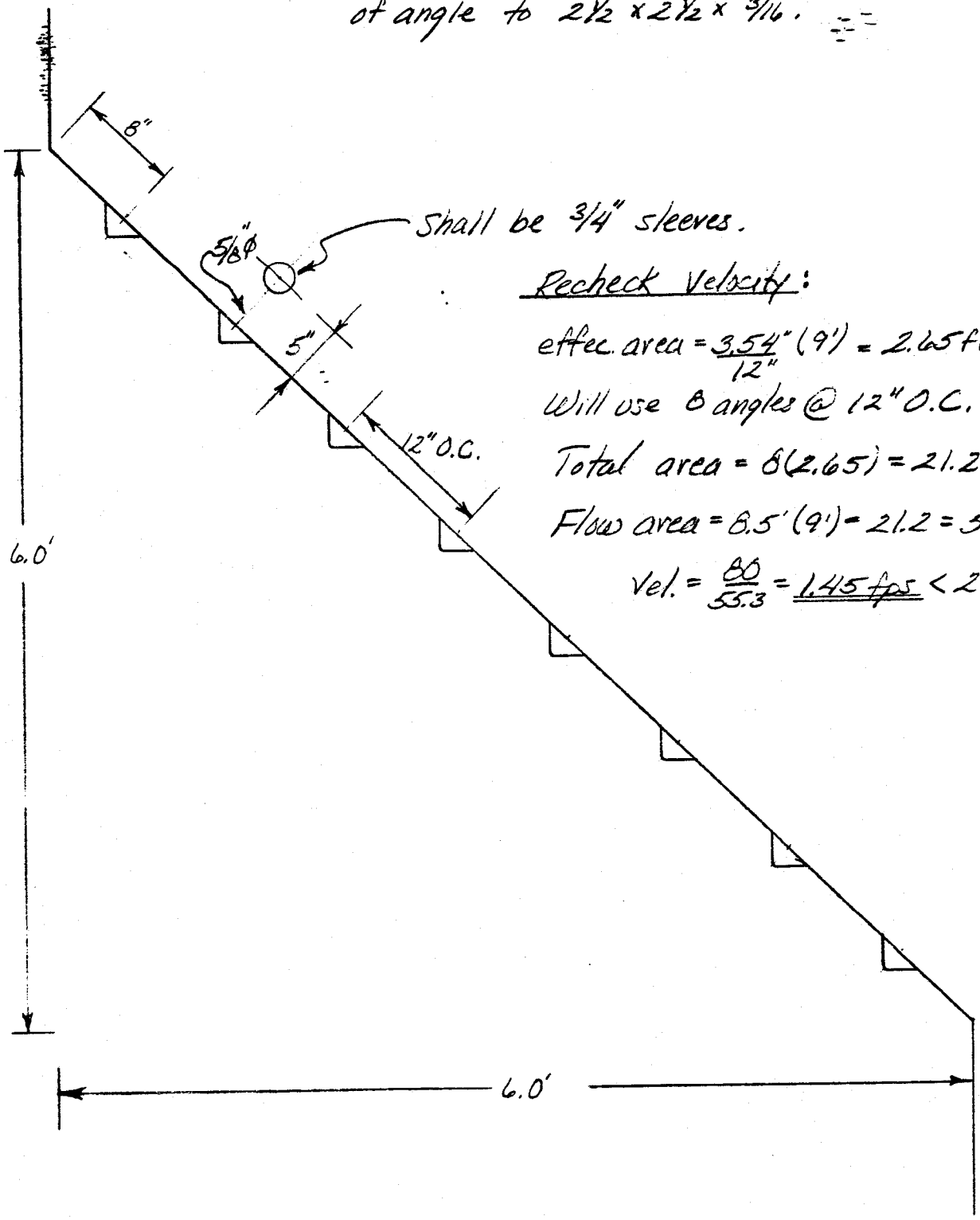
$= 0.4(36) = 14.4$ ksi > 1.24 ksi OK

AZ Signal Butte FRS

ICC 5/9/84

Trashrack for Principle Spillway 4 5

Note: Due to vandalism, will increase size of angle to 2½ x 2½ x 3/16.



Recheck Velocity:

effec. area = $\frac{3.54"}{12"}(9') = 2.65 ft^2$

Will use 8 angles @ 12" O.C.

Total area = $8(2.65) = 21.2 ft^2$

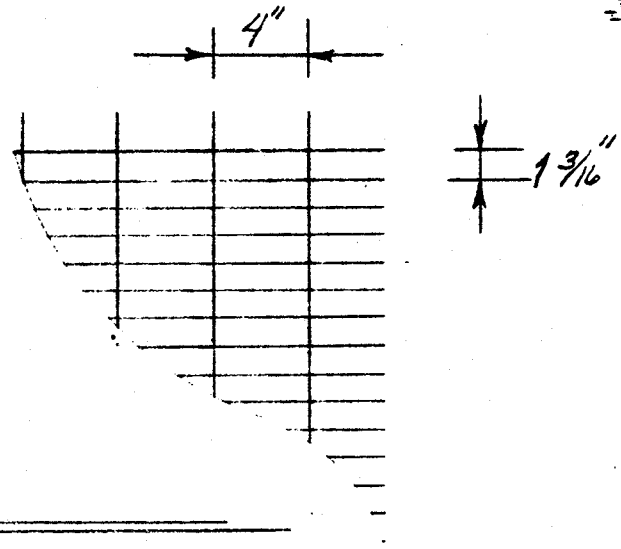
Flow area = $8.5'(9') - 21.2 = 55.3 ft^2$

Vel. = $\frac{80}{55.3} = 1.45$ fps < 2 fps OK

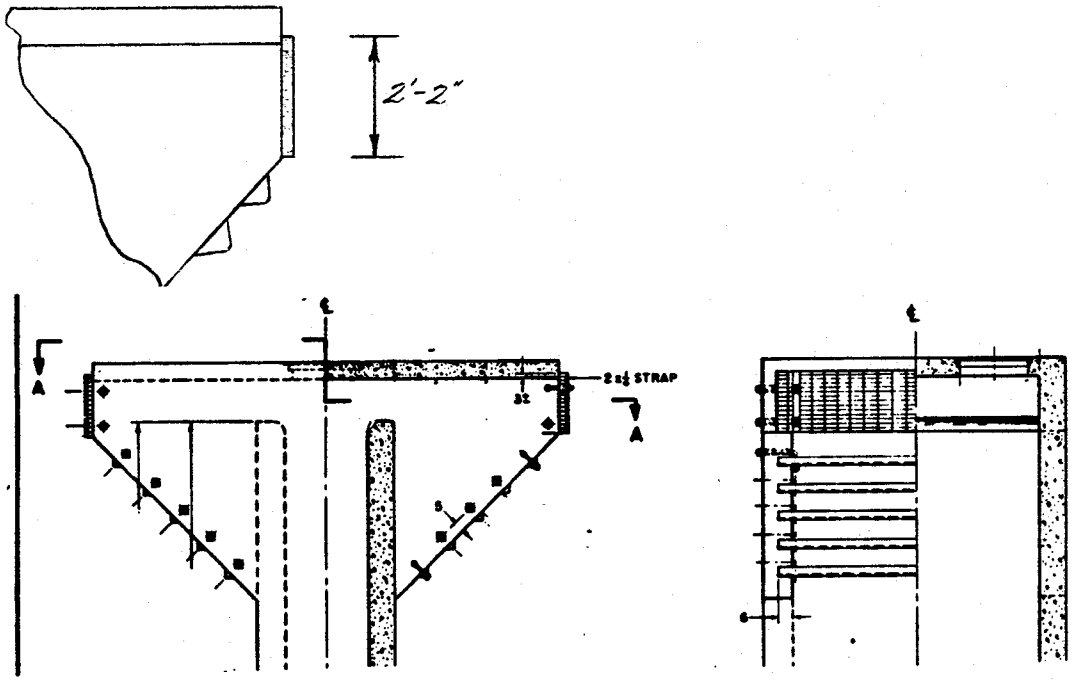
AZ Signal Butt FRS.

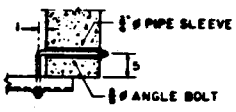
ICC 5/2/84 WEP 5/2/84

Grating Detail - Aluminum 5 5

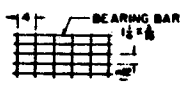


Dimensions: 2'-2" x 10'-8"





BOLT DETAIL



SPACING AND SIZE GIVEN ARE MINIMUMS

GRATING DETAIL - STEEL OR ALUMINUM

DC-676 (6-81)
Bureau of Reclamation

332

United States Department of the Interior

BUREAU OF RECLAMATION

ENGINEERING AND RESEARCH CENTER

P O BOX 25007
BUILDING 67, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

IN REPLY REFER TO D-235

June 3, 1983

Ms Susan Leckband
Soil Conservation Service, Room 3008
230 North First Avenue
Phoenix AZ 85025

Thank you for your inquiry to Mr. Walt Long on June 3, 1983.

☐ Enclosed is/are

- ☐ the document/s you request.
- ☐ "Publications for Sale" catalog (Procurement information is included on page i).
- ☐ "Publications for Distribution Without Charge" folder.

☐ We have no stock of the document/s you request.

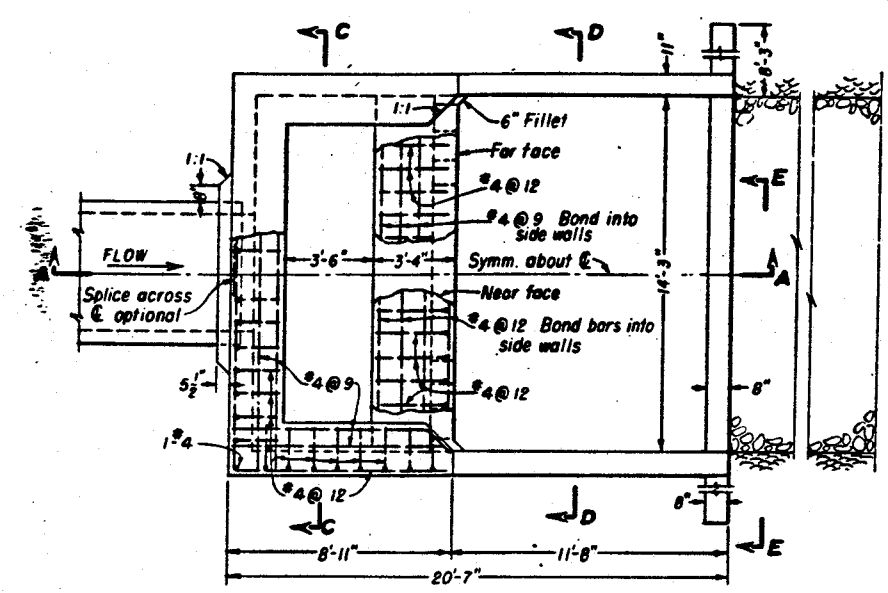
☐ The document/s requested was/were not issued by the Bureau of Reclamation.

☐ We suggest that you write to:

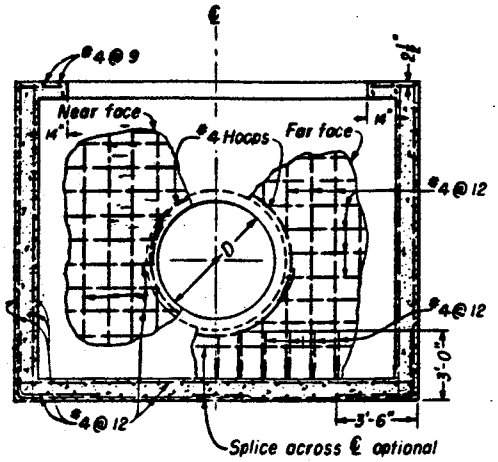
- ☐ National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.
- ☐ Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

☒ Enclosed is a half-size copy of drawing 103-D-1349. We will send you a full-size mylar copy later next week. As for our requirements for the use of our drawings and standards, basically we have none. We only advise that they not be substituted for or applied without the application of sound engineering judgment.

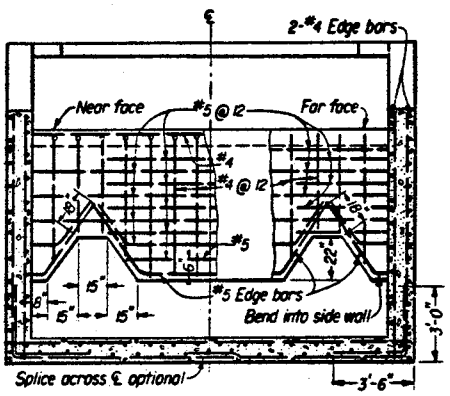
Lawrence Fedde



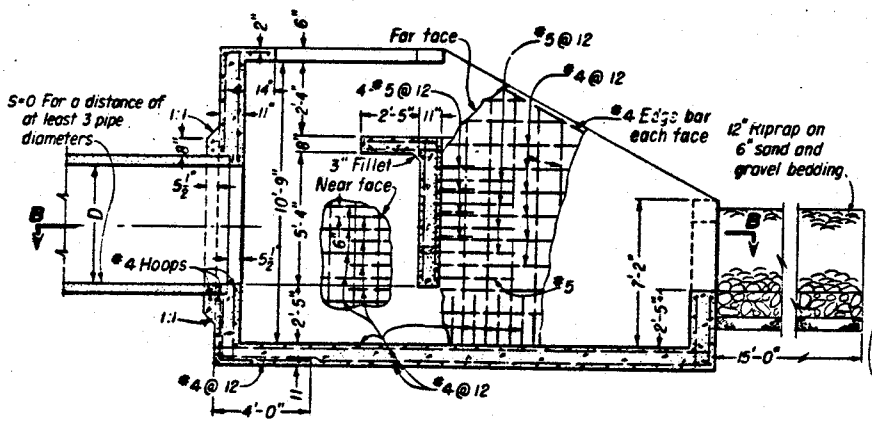
PLAN



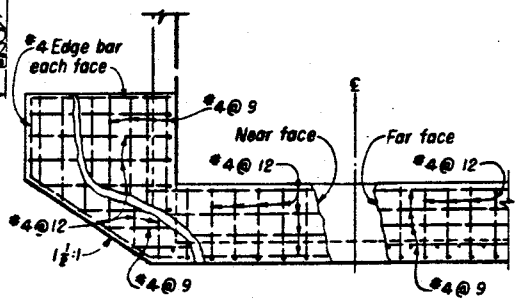
SECTION C-C



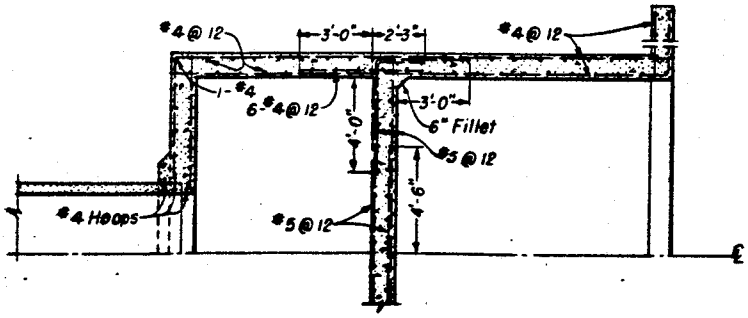
SECTION D-D



SECTION A-A



ELEVATION E-E



SECTION B-B

ESTIMATED QUANTITIES

Concrete	39 Cu. Yds.
Reinforcement Steel	3,460 Lbs.

Figure 6-20. Type 10 baffled outlet

AZ
Smu

Signal Butte FRS - Buckhorn-Mesa WPP

10-31-83

Dimensions Emergency Spillway

18' to - 25:1 u.s., 2:1 d.s. 140' em. spwy. width

4' x 5' blocks - check design & wall heights

Q_{FB} = 11,126.5 cfs spillway width - 140'

Q_{ES} = 2,284 cfs crest elev. 1712.4'

design follows "T or C Baffled Apron Spillway" April 1979 report No. GR-79-2 - a joint model study SCS & BuRec.

Discharge	Unit Discharge	Critical Depth
11,126.5 cfs	79.475 cfs	5.81 ft.
7,417.67	52.983	4.43 ft.
3,708.83	26.491	2.79 ft.
2,284.	16.31	2.02 ft.

1. Block ht = $H = 0.8D_c = 0.8(4.43) = 3.54$ ft. ($0.9D_c = 3.987$ ft.) use 4.0'
2. Block width = $1.5H = 1.5(3.54) = 5.31$ ft. use 5.0'
3. Block spacing = $2(3.54) = 7.08$ ft. use 8.0'
4. Sidewall Ht. = $3(3.54) + 2.79 = 13.41$ ft. use 14.0'
5. Sidewall Above Crest = $1.5(5.81) = 8.715$ ft.
   $1712.4 + 8.715 = 1721.115$
   use 1721.4, 9 ft. deep.

BuRec Monograph 25 pg. 175 states "... the baffle pier heights are not critical and the height may be varied by several inches to provide a convenient dimension."

AZ
SML

Signal Butte FRS - Buckhorn Mesa WPP

10-31-83

Dimensions. Emergency Spwy, 2

140' ÷ 5' = 28 block widths

recommended block width varies 1 to 1.5 H so 5' is good width for that parameter.

Blocks will be 4.0' high × 5' wide with 5' spacings and 8.0' apart c-c in flow direction.

Side walls will be 9 ft high at inlet and 14.0' high adjacent to apron.

Length of inlet = $2D_c$ = 2(5.81) = 11.62'
Use 12.0 ft w/ 10.0 ft. level & 2.0 ft slope.

COMPUTATION SHEET
SCS-ENG-522A
Rev. 5-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE AZ PROJECT Buckhorn-Mesa Signal Butte FRS
BY SMC DATE 2-8-84 CHECKED BY DATE JOB NO.
SUBJECT R/C design - Em. Spwy. SHEET 1 OF

TR-50 Type T3F has always been the most econ. shape for our AZ PL-566 structures. By inspection, still is.

Loading Conditions -

Structure is em. spwy. on top of dam. Backfill will never be submerged. It is unlikely that uplift pressures will ever be developed in any part of the structure. Therefore, Load Condition No 1 is relatively insignificant. Load Condition No 2 will be the normal condition in a 100-yr. + flood.

Since this structure has baffle blocks on the floor, the safety factor for floatation will be ample at 1.0.

(DES/TR50. SBES)
SB 2
3
4 etc.

ALPHANUMERIC INFORMATION — CHANNELS (TR-50)

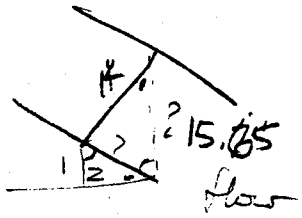
Signal Butte FRS Emergency Spillway
Inlet Channel

B	HT	HB	DESIGN	DEFAULT1	DEFAULT2	DEFAULT3	
140	9.0	9.5	2.	1.	1.	1.	—
HW1	HW2	HWP	GMOIST	GSAT	KO1	KO2	FLOATR
0.	0.	31 0.42	138 / 112	N.A. / 140	0.7	0.5	1.0
MAXFTG	JOINTS	MFOUND					
12 0.0 / 10.0 34	25 / 5 60	1,000,000	—	—	—	—	—
CFSC	CFSS	KPASS					
0.4	0.6	1.5	—	—	—	—	—

γ_m moist 138#/ft

γ_d (min. 112#/

Signal Butte FRS Emergency Spillway
Apron — Above Grade



B	HT	HB	DESIGN	DEFAULT1	DEFAULT2	DEFAULT3	
140	15.65 / 11.5	13.42	2.0	1.	1.	1.	—
HW1	HW2	HWP	GMOIST	GSAT	KO1	KO2	FLOATR
0	0	0	138 / 112.	140.	0.7	0.5	1.0
MAXFTG	JOINTS	MFOUND					
0 / 10	25 / 60	1,000,000	—	—	—	—	—
CFSC	CFSS	KPASS					
0.4	0.6	1.5	—	—	—	—	—

ALPHAMERIC INFORMATION CHANNELS (TR-50)

Signal Butte FRS Emergency Spillway
Apron - Actual water load

most of wall ht. for splash !
assume 2/3 height of wall

B	HT	HB	DESIGN	DEFAULT1	DEFAULT2	DEFAULT3	
140.	11.5	13.42	2.	1.	1.	1.	—
HW1	HW2	HWP	GMOIST	GSAT	KO1	KO2	FLOATR
0.	0.0	0.	138./112.	140	0.7.	0.5	1.0
MAXFTG	JOINTS	MFOUND					
0./0.	25./60.	1,000,000	—	—	—	—	—
CFSC	CFSS	KPASS					
0.4	0.6	1.5	—	—	—	—	—

B	HT	HB	DESIGN	DEFAULT1	DEFAULT2	DEFAULT3	
							—
HW1	HW2	HWP	GMOIST	GSAT	KO1	KO2	FLOATR
MAXFTG	JOINTS	MFOUND					
			—	—	—	—	—
CFSC	CFSS	KPASS					
			—	—	—	—	—

COMPUTATION SHEET
SCS-ENG-522A
Rev. 8-60

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE | PROJECT

BY | DATE | CHECKED BY | DATE | JOB NO.

SUBJECT | SHEET ___ OF ___

Des/TR50.	SBES	Inlet	1	138	0	25
	SB2		2	112	0	25
	SB3		3	138	10	25
	SB4		4	112	10	25
	SB5		5	138	0	60
	SB6		6	112	0	60
	SB7		7	138	10	60
	SB8		8	112	10	60
Des/TR50.	SBA	Apron	A	15.65	138	0	25
	SBB		B	11.5	138	0	25
	SBC		C	15.65	112	0	25
	SBD		D	11.5	112	0	25
	SBE		E	15.65	138	10	25
	SBF		F	11.5	138	10	25
	SBG		G	15.65	112	10	25
	SBH		H	11.5	112	10	25
	SBI		I	15.65	138	0	60
	SBJ		J	11.5	138	0	60
	SBK		K	15.65	112	0	60
	SBL		L	11.5	112	0	60

HQSL17ML don't really it.

wxc/JCL. TR50

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EXECUTION DATE:  02/09/84
REVISION DATE:   12/22/83
==================================================================================

                    RECTANGULAR STRUCTURAL CHANNEL
                         CROSS SECTION DESIGN
            ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

                    SPECIAL DESIGN PREPARED BY
          DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
                              FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY      SBES
INLET CHANNEL NO 1

                    DESIGN PARAMETERS
  B=140.00        HW1=  0.0        KO1= 0.70    FLOATR=  1.00   MFOUND=1000000.
 HT=  9.50        HW2=  0.0        KO2= 0.50    JOINTS= 25.00   GMOIST=     138.
 HB=  9.50        HWP=  0.0      KPASS= 1.50    MAXFTG=  5.00     GSAT=     140.
                                   CFSC= 0.40      CFSS=  0.60

                    DESIGN OF SPECIFIED TYPE FOLLOWS

                    TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES
  X= 17.00          TP= 11.00        XP=106.00
 TT= 10.00          TB= 11.00        TS= 12.00  FTG PROJ= 0.0   QUANT=  5.542

                    TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN
  X= 17.00          TP= 11.00        XP=106.00
 TT= 10.00          TB= 11.00        TS= 12.00  FTG PROJ= 0.0   QUANT=  5.542

                    STEEL REQUIREMENTS
          WALL
                    A( 1)=  0.24                S( 1)= 18.00
                    A( 2)=  0.24                S( 2)= 18.00
                    A( 3)=  0.25                S( 3)= 18.00
                    A( 4)=  0.12                S( 4)= 18.00
                    A( 5)=  0.25                S( 5)= 18.00
                    A( 6)=  0.13                S( 6)= 18.00
                    A( 7)=  0.26                S( 7)= 18.00
                    A( 8)=  0.43                S( 8)= 18.00
                    A( 9)=  0.26                S( 9)= 18.00
                    A(10)=  1.06                S(10)= 18.00
          BASE
                    A(11) - A(16) DO NOT EXIST SINCE FTG=0

                    A(17)=  0.29                S(17)= 18.00
                    A(18)=  1.30                S(18)= 18.00
                    A(19)=  0.29                S(19)= 18.00
                    A(20)=  0.39                S(20)= 18.00
                    A(21)=  0.29                S(21)= 18.00
                    A(22)=  0.14                S(22)= 18.00

          KEY WALL NOT REQUIRED

          PAVEMENT SLAB
                    A(23)=  0.26                S(23)= 18.00
                    A(24)=  0.13                S(24)= 18.00
                    A(25)=  0.26                S(25)= 18.00
                    A(26)=  0.13                S(26)= 18.00
                    A(27)=  0.26                S(27)= 18.00
                    A(28)=  0.13                S(28)= 18.00
```

```
============================== END T3F DESIGN ==============================

EXECUTION DATE:  02/09/84
REVISION DATE:   12/22/83
==============================================================================

                    RECTANGULAR STRUCTURAL CHANNEL
                         CROSS SECTION DESIGN
              ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

                       SPECIAL DESIGN PREPARED BY
          DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
                                FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY     SB2
INLET CHANNEL NO 1

                  DESIGN PARAMETERS
   B=140.00       HW1=  0.0       KO1= 0.70    FLOATR=  1.00   MFOUND=1000000.
  HT=  9.50       HW2=  0.0       KO2= 0.50    JOINTS= 25.00   GMOIST=    112.
  HB=  9.50       HWP=  0.0     KPASS= 1.50    MAXFTG=  0.0      GSAT=    140.
                                  CFSC= 0.40      CFSS=  0.60

                  DESIGN OF SPECIFIED TYPE FOLLOWS

                  TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES
   X= 40.00       TP= 11.00       XP= 60.00
  TT= 10.00       TB= 10.00       TS= 11.00  FTG PROJ= 0.0    QUANT=  5.396

                  TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN
   X= 40.00       TP= 11.00       XP= 60.00
  TT= 10.00       TB= 10.00       TS= 11.00  FTG PROJ= 0.0    QUANT=  5.396

                  STEEL REQUIREMENTS
          WALL
                  A( 1)=  0.24                S( 1)= 18.00
                  A( 2)=  0.24                S( 2)= 18.00
                  A( 3)=  0.24                S( 3)= 18.00
                  A( 4)=  0.12                S( 4)= 18.00
                  A( 5)=  0.24                S( 5)= 18.00
                  A( 6)=  0.12                S( 6)= 18.00
                  A( 7)=  0.24                S( 7)= 18.00
                  A( 8)=  0.38                S( 8)= 18.00
                  A( 9)=  0.24                S( 9)= 18.00
                  A(10)=  0.98                S(10)= 18.00
          BASE
                  A(11) - A(16) DO NOT EXIST SINCE FTG=0

                  A(17)=  0.26                S(17)= 18.00
                  A(18)=  1.17                S(18)= 18.00
                  A(19)=  0.29                S(19)= 18.00
                  A(20)=  0.13                S(20)= 18.00

                  A(21)=  0.26                S(21)= 18.00
                  A(22)=  0.13                S(22)= 18.00

          KEY WALL NOT REQUIRED

          PAVEMENT SLAB
                  A(23)=  0.26                S(23)= 18.00
                  A(24)=  0.13                S(24)= 18.00
                  A(25)=  0.26                S(25)= 18.00
                  A(26)=  0.13                S(26)= 18.00
                  A(27)=  0.26                S(27)= 18.00
                  A(28)=  0.13                S(28)= 18.00

============================== END T3F DESIGN ==============================
```

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EXECUTION DATE:  02/09/84
REVISION DATE:   12/22/83
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                    RECTANGULAR STRUCTURAL CHANNEL
                         CROSS SECTION DESIGN
            ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

                    SPECIAL DESIGN PREPARED BY
          DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
                              FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY        SB3
INLET CHANNEL NO 1

                  DESIGN PARAMETERS
  B=140.00      HW1=  0.0        KO1= 0.70     FLOATR=  1.00    MFOUND=1000000.
 HT=  9.50      HW2=  0.0        KO2= 0.50     JOINTS= 25.00    GMOIST=     138.
 HB=  9.50      HWP=  0.0      KPASS= 1.50     MAXFTG= 10.00.     GSAT=     140.
                                 CFSC= 0.40       CFSS=  0.60

                  DESIGN OF SPECIFIED TYPE FOLLOWS

                  TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES
  X= 17.00        TP= 11.00        XP=106.00
 TT= 10.00        TB= 11.00        TS= 12.00  FTG PROJ= 0.0     QUANT=  5.542

                  TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN
  X= 17.00        TP= 11.00        XP=106.00
 TT= 10.00        TB= 11.00        TS= 12.00  FTG PROJ= 0.0     QUANT=  5.542

                  STEEL REQUIREMENTS
          WALL
                  A( 1)=  0.24                 S( 1)= 18.00
                  A( 2)=  0.24                 S( 2)= 18.00
                  A( 3)=  0.25                 S( 3)= 18.00
                  A( 4)=  0.12                 S( 4)= 18.00
                  A( 5)=  0.25                 S( 5)= 18.00
                  A( 6)=  0.13                 S( 6)= 18.00
                  A( 7)=  0.26                 S( 7)= 18.00
                  A( 8)=  0.43                 S( 8)= 18.00
                  A( 9)=  0.26                 S( 9)= 18.00
                  A(10)=  1.06                 S(10)= 18.00
          BASE
                  A(11) - A(16) DO NOT EXIST SINCE FTG=0

                  A(17)=  0.29                 S(17)= 18.00
                  A(18)=  1.30                 S(18)= 18.00
                  A(19)=  0.29                 S(19)= 18.00
                  A(20)=  0.39                 S(20)= 18.00
                  A(21)=  0.29                 S(21)= 18.00
                  A(22)=  0.14                 S(22)= 18.00

          KEY WALL NOT REQUIRED

          PAVEMENT SLAB
                  A(23)=  0.24                 S(23)= 18.00
                  A(24)=  0.13                 S(24)= 18.00
                  A(25)=  0.26                 S(25)= 18.00
                  A(26)=  0.13                 S(26)= 18.00
                  A(27)=  0.26                 S(27)= 18.00
                  A(28)=  0.13                 S(28)= 18.00

================================ END T3F DESIGN ================================
```

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EXECUTION DATE:  02/09/84
REVISION DATE:   12/22/83
==================================================================================

                    RECTANGULAR STRUCTURAL CHANNEL
                       CROSS SECTION DESIGN
            ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

                    SPECIAL DESIGN PREPARED BY
          DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
                              FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY        S84
INLET CHANNEL NO 1

                    DESIGN PARAMETERS
  B=140.00     HW1=  0.0      KO1= 0.70    FLOATR=  1.00   MFOUND=1000000.
 HT=  9.50     HW2=  0.0      KO2= 0.50    JOINTS= 25.00   GMOIST=    112.
 HB=  9.50     HWP=  0.0    KPASS= 1.50    MAXFTG= 10.00     GSAT=    140.
                            CFSC= 0.40      CFSS=  0.50

                    DESIGN OF SPECIFIED TYPE FOLLOWS

                    TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES
  X= 40.00       TP= 11.00       XP= 60.00
 TT= 10.00       TB= 10.00       TS= 11.00  FTG PROJ= 0.0    QUANT=  5.396

                    TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN
  X= 40.00       TP= 11.00       XP= 60.00
 TT= 10.00       TB= 10.00       TS= 11.00  FTG PROJ= 0.0    QUANT=  5.396

                    STEEL REQUIREMENTS
          WALL
                    A( 1)=  0.24              S( 1)= 18.00
                    A( 2)=  0.24              S( 2)= 18.00
                    A( 3)=  0.24              S( 3)= 18.00

                    A( 4)=  0.12              S( 4)= 18.00
                    A( 5)=  0.24              S( 5)= 18.00
                    A( 6)=  0.12              S( 6)= 18.00
                    A( 7)=  0.24              S( 7)= 18.00
                    A( 8)=  0.38              S( 8)= 18.00
                    A( 9)=  0.24              S( 9)= 18.00
                    A(10)=  0.98              S(10)= 18.00
          BASE
                    A(11) - A(16) DO NOT EXIST SINCE FTG=0

                    A(17)=  0.26              S(17)= 18.00
                    A(18)=  1.17              S(18)= 18.00
                    A(19)=  0.29              S(19)= 18.00
                    A(20)=  0.13              S(20)= 18.00
                    A(21)=  0.26              S(21)= 18.00
                    A(22)=  0.13              S(22)= 18.00

          KEY WALL NOT REQUIRED

          PAVEMENT SLAB
                    A(23)=  0.26              S(23)= 18.00
                    A(24)=  0.13              S(24)= 18.00
                    A(25)=  0.26              S(25)= 18.00
                    A(26)=  0.13              S(26)= 18.00
                    A(27)=  0.26              S(27)= 18.00
                    A(28)=  0.13              S(28)= 18.00

=============================== END T3F DESIGN ==============================
```

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EXECUTION DATE:  02/09/84
REVISION DATE:   12/22/83
==================================================================================

                    RECTANGULAR STRUCTURAL CHANNEL
                         CROSS SECTION DESIGN
            ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

                      SPECIAL DESIGN PREPARED BY
          DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
                                FOR
SIGNAL BUTTE FRS EMERGENCY SPILLWAY  SBS
INLET AND APRON CONTINUED DESIGNS

                 DESIGN PARAMETERS
  B=140.00       HW1=  0.0      KO1= 0.70     FLOATR=  1.00    MFOUND=1000000.
  HT=  9.50      HW2=  0.0      KO2= 0.50     JOINTS= 60.00    GMOIST=     138.
  HB=  9.50      HWP=  0.0    KPASS= 1.50     MAXFTG=  0.0       GSAT=     140.
                                 CFSC= 0.40      CFSS=  0.50

                 DESIGN OF SPECIFIED TYPE FOLLOWS

                 TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES
  X= 17.00       TP= 11.00      XP=106.00
 TT= 10.00       TB= 11.00      TS= 12.00   FTG PROJ= 0.0     QUANT=  5.542

                 TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN
  X= 17.00       TP= 11.00      XP=106.00
 TT= 10.00       TB= 11.00      TS= 12.00   FTG PROJ= 0.0     QUANT=  5.542

                 STEEL REQUIREMENTS
        WALL
                 A( 1)=  0.24                S( 1)= 18.00
                 A( 2)=  0.24                S( 2)= 18.00
                 A( 3)=  0.25                S( 3)= 18.00
                 A( 4)=  0.12                S( 4)= 18.00
                 A( 5)=  0.25                S( 5)= 18.00
                 A( 6)=  0.13                S( 6)= 18.00
                 A( 7)=  0.26                S( 7)= 18.00
                 A( 8)=  0.43                S( 8)= 18.00
                 A( 9)=  0.26                S( 9)= 18.00
                 A(10)=  1.06                S(10)= 18.00
        BASE
                 A(11) - A(16) DO NOT EXIST SINCE FTG=0

                 A(17)=  0.29                S(17)= 18.00
                 A(18)=  1.30                S(18)= 18.00
                 A(19)=  0.29                S(19)= 18.00
                 A(20)=  0.39                S(20)= 18.00
                 A(21)=  0.29                S(21)= 18.00
                 A(22)=  0.14                S(22)= 18.00

        KEY WALL NOT REQUIRED

        PAVEMENT SLAB
                 A(23)=  0.26                S(23)= 18.00
                 A(24)=  0.13                S(24)= 18.00
                 A(25)=  0.26                S(25)= 18.00
                 A(26)=  0.13                S(26)= 18.00
                 A(27)=  0.26                S(27)= 18.00
                 A(28)=  0.13                S(28)= 18.00
```

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EXECUTION DATE:  02/09/84
REVISION DATE:   12/22/83
==========================================================================

                    RECTANGULAR STRUCTURAL CHANNEL
                         CROSS SECTION DESIGN
              ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

                      SPECIAL DESIGN PREPARED BY
          DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
                                FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY   SB6
INLET CHANNEL NO 1

                  DESIGN PARAMETERS
     B=140.00      HW1=  0.0      KO1= 0.70    FLOATR=  1.00   MFOUND=1000000.
    HT=  -9.50     HW2=  0.0      KO2= 0.50    JOINTS= 60.00   GMOIST=    112.
    HB=  -9.50     HWP=  0.0    KPASS= 1.50    MAXFTG=  0.0      GSAT=    140.
                                  CFSC= 0.40      CFSS=  0.50

                  DESIGN OF SPECIFIED TYPE FOLLOWS

                  TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES
     X= 40.00      TP= 11.00      XP= 60.00
    TT= 10.00      TB= 10.00      TS= 11.00  FTG PROJ= 0.0    QUANT=  5.396

                  TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN
     X= 40.00      TP= 11.00      XP= 60.00
    TT= 10.00      TB= 10.00      TS= 11.00  FTG PROJ= 0.0    QUANT=  5.396

                  STEEL REQUIREMENTS
            WALL
                    A( 1)=  0.24              S( 1)= 18.00
                    A( 2)=  0.24              S( 2)= 18.00
                    A( 3)=  0.24              S( 3)= 18.00
                    A( 4)=  0.12              S( 4)= 18.00
                    A( 5)=  0.24              S( 5)= 18.00
                    A( 6)=  0.12              S( 6)= 18.00
                    A( 7)=  0.24              S( 7)= 18.00
                    A( 8)=  0.38              S( 8)= 18.00
                    A( 9)=  0.24              S( 9)= 18.00
                    A(10)=  0.98              S(10)= 18.00
            BASE
                    A(11) - A(16) DO NOT EXIST SINCE FTG=0

                    A(17)=  0.26              S(17)= 18.00
                    A(18)=  1.17              S(18)= 18.00
                    A(19)=  0.29              S(19)= 18.00
                    A(20)=  0.13              S(20)= 18.00
                    A(21)=  0.26              S(21)= 18.00
                    A(22)=  0.13              S(22)= 18.00

            KEY WALL NOT REQUIRED

            PAVEMENT SLAB
                    A(23)=  0.26              S(23)= 18.00
                    A(24)=  0.13              S(24)= 18.00
                    A(25)=  0.26              S(25)= 18.00
                    A(26)=  0.13              S(26)= 18.00
                    A(27)=  0.26              S(27)= 18.00
                    A(28)=  0.13              S(28)= 18.00
```

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============================== END T3F DESIGN ==========

EXECUTION DATE:  02/09/84
REVISION DATE:   12/22/83
==================================================================================

                    RECTANGULAR STRUCTURAL CHANNEL
                         CROSS SECTION DESIGN
          ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

                    SPECIAL DESIGN PREPARED BY
        DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
                              FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY     SB7
INLET CHANNEL NO 1

                  DESIGN PARAMETERS
   B=140.00       HW1=  0.0       KD1= 0.70    FLOATR=  1.00   MFOUND=1000000.
  HT=  9.50       HW2=  0.0       KD2= 0.50    JOINTS= 60.00   GMOIST=     138.
  HB=  9.50       HWP=  0.0     KPASS= 1.50    MAXFTG= 10.00     GSAT=     140.
                                  CFSC= 0.40      CFSS=  0.50

                  DESIGN OF SPECIFIED TYPE FOLLOWS

                  TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES
   X= 17.00       TP= 11.00       XP=106.00
  TT= 10.00       TB= 11.00       TS= 12.00  FTG PROJ= 0.0    QUANT=  5.542

                  TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN
   X= 17.00       TP= 11.00       XP=106.00
  TT= 10.00       TB= 11.00       TS= 12.00  FTG PROJ= 0.0    QUANT=  5.542

                  STEEL REQUIREMENTS
          WALL
                  A( 1)=  0.24                S( 1)= 18.00
                  A( 2)=  0.24                S( 2)= 18.00
                  A( 3)=  0.25                S( 3)= 18.00
                  A( 4)=  0.12                S( 4)= 18.00
                  A( 5)=  0.25                S( 5)= 18.00
                  A( 6)=  0.13                S( 6)= 18.00
                  A( 7)=  0.26                S( 7)= 18.00
                  A( 8)=  0.43                S( 8)= 18.00
                  A( 9)=  0.26                S( 9)= 18.00
                  A(10)=  1.06                S(10)= 18.00
          BASE
                  A(11) - A(16) DO NOT EXIST SINCE FTG=0

                  A(17)=  0.29                S(17)= 18.00
                  A(18)=  1.30                S(18)= 18.00
                  A(19)=  0.29                S(19)= 18.00
                  A(20)=  0.39                S(20)= 18.00
                  A(21)=  0.29                S(21)= 18.00
                  A(22)=  0.14                S(22)= 18.00

          KEY WALL NOT REQUIRED

          PAVEMENT SLAB
                  A(23)=  0.26                S(23)= 18.00
                  A(24)=  0.13                S(24)= 18.00
                  A(25)=  0.26                S(25)= 18.00
                  A(26)=  0.13                S(26)= 18.00
                  A(27)=  0.26                S(27)= 18.00
                  A(28)=  0.13                S(28)= 18.00

============================== END T3F DESIGN ============================
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EXECUTION DATE:  02/09/84
REVISION DATE:   12/22/83
==================================================================================

                    RECTANGULAR STRUCTURAL CHANNEL
                         CROSS SECTION DESIGN
            ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

                     SPECIAL DESIGN PREPARED BY
          DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
                              FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY
INLET CHANNEL NO 1                                  SB8

                    DESIGN PARAMETERS
  B=140.00     HW1=  0.0      KO1= 0.70     FLOATR=  1.00    MFOUND=1000000.
 HT=  9.50     HW2=  0.0      KO2= 0.50     JOINTS= 60.00    GMOIST=     112.
 HB=  9.50     HWP=  0.0    KPASS= 1.50    MAXFTG= 10.00      GSAT=     140.
                            CFSC= 0.40      CFSS=  0.50

                    DESIGN OF SPECIFIED TYPE FOLLOWS

                    TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES
  X= 40.00       TP= 11.00       XP= 60.00
 TT= 10.00       TB= 10.00       TS= 11.00  FTG PROJ= 0.0     QUANT=  5.396

                    TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN
  X= 40.00       TP= 11.00       XP= 60.00
 TT= 10.00       TB= 10.00       TS= 11.00  FTG PROJ= 0.0     QUANT=  5.396

                    STEEL REQUIREMENTS
            WALL
                    A( 1)=  0.24              S( 1)= 18.00
                    A( 2)=  0.24              S( 2)= 18.00
                    A( 3)=  0.24              S( 3)= 18.00
                    A( 4)=  0.12              S( 4)= 18.00
                    A( 5)=  0.24              S( 5)= 18.00
                    A( 6)=  0.12              S( 6)= 18.00
                    A( 7)=  0.24              S( 7)= 18.00
                    A( 8)=  0.39              S( 8)= 18.00
                    A( 9)=  0.24              S( 9)= 18.00
                    A(10)=  0.98              S(10)= 18.00
            BASE
                    A(11) - A(16) DO NOT EXIST SINCE FTG=0

                    A(17)=  0.26              S(17)= 18.00
                    A(18)=  1.17              S(18)= 18.00

                    A(19)=  0.29              S(19)= 18.00
                    A(20)=  0.13              S(20)= 18.00
                    A(21)=  0.26              S(21)= 18.00
                    A(22)=  0.13              S(22)= 18.00

            KEY WALL NOT REQUIRED

            PAVEMENT SLAB
                    A(23)=  0.26              S(23)= 18.00
                    A(24)=  0.13              S(24)= 18.00
                    A(25)=  0.26              S(25)= 18.00
                    A(26)=  0.13              S(26)= 18.00
                    A(27)=  0.26              S(27)= 18.00
                    A(28)=  0.13              S(28)= 18.00

============================== END T3F DESIGN ==============================
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EXECUTION DATE:  02/09/84
REVISION DATE:   12/22/83
==================================================================================

                    RECTANGULAR STRUCTURAL CHANNEL
                         CROSS SECTION DESIGN
            ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

                    SPECIAL DESIGN PREPARED BY
          DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
                              FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY        SBA
INLET CHANNEL NO 1

                    DESIGN PARAMETERS
      B=140.00      HW1=  0.0      KO1= 0.70    FLOATR=  1.00   MFOUND=1000000.
     HT= 15.65      HW2=  0.0      KO2= 0.50    JOINTS= 25.00   GMOIST=    138.
     HB= 13.42      HWP=  0.0    KPASS= 1.50    MAXFTG=  0.0      GSAT=    140.
                                   CFSC= 0.40      CFSS=  0.60

                    DESIGN OF SPECIFIED TYPE FOLLOWS

                    TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES
      X= 24.00      TP= 11.00      XP= 92.00
     TT= 10.00      TB= 15.00      TS= 16.00  FTG PROJ= 0.0    QUANT=  6.825

                    TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN
      X= 24.00      TP= 11.00      XP= 92.00
     TT= 10.00      TB= 15.00      TS= 18.00  FTG PROJ= 0.0    QUANT=  7.137

                    STEEL REQUIREMENTS
            WALL
                    A( 1)=  0.24              S( 1)= 18.00
                    A( 2)=  0.24              S( 2)= 18.00
                    A( 3)=  0.27              S( 3)= 18.00
                    A( 4)=  0.13              S( 4)= 18.00
                    A( 5)=  0.30              S( 5)= 18.00
                    A( 6)=  0.15              S( 6)= 18.00
                    A( 7)=  0.35              S( 7)= 18.00
                    A( 8)=  0.76              S( 8)= 18.00
                    A( 9)=  0.56              S( 9)= 18.00
                    A(10)=  2.07              S(10)= 14.39
            BASE
                    A(11) - A(16) DO NOT EXIST SINCE FTG=0

                    A(17)=  0.60              S(17)= 18.00
                    A(18)=  2.19              S(18)= 18.00
                    A(19)=  0.43              S(19)= 18.00
                    A(20)=  0.68              S(20)= 18.00
                    A(21)=  0.43              S(21)= 18.00
                    A(22)=  0.22              S(22)= 18.00

            KEY WALL NOT REQUIRED

            PAVEMENT SLAB
                    A(23)=  0.26              S(23)= 18.00
                    A(24)=  0.13              S(24)= 18.00
                    A(25)=  0.26              S(25)= 18.00
                    A(26)=  0.13              S(26)= 18.00
                    A(27)=  0.26              S(27)= 18.00
                    A(28)=  0.13              S(28)= 18.00

================================ END T3F DESIGN ================================
```

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============================== END T3F DESIGN ==============================

EXECUTION DATE:  02/09/84
REVISION DATE:   12/22/83
==============================================================================

                    RECTANGULAR STRUCTURAL CHANNEL
                         CROSS SECTION DESIGN
              ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

                      SPECIAL DESIGN PREPARED BY
            DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
                                FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY
INLET AND APRON CONTINUED DESIGNS          SBB

                    DESIGN PARAMETERS
  B=140.00      HW1=  0.0      KO1= 0.70    FLOATR=  1.00   MFOUND=1000000.
 HT= 13.42      HW2=  0.0      KO2= 0.50    JOINTS= 25.00   GMOIST=    138.
 HB= 13.42      HWP=  0.0    KPASS= 1.50    MAXFTG=  0.0     GSAT=     140.
                            CFSC= 0.40      CFSS=  0.50

                    DESIGN OF SPECIFIED TYPE FOLLOWS

                    TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES
  X= 27.00        TP= 11.00       XP= 86.00
 TT= 10.00        TB= 15.00       TS= 16.00  FTG PROJ= 0.0    QUANT=  6.745

                    TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN
  X= 27.00        TP= 11.00       XP= 86.00
 TT= 10.00        TB= 15.00       TS= 18.00  FTG PROJ= 0.0    QUANT=  7.094

                    STEEL REQUIREMENTS
            WALL
                    A( 1)=  0.24              S( 1)= 18.00
                    A( 2)=  0.24              S( 2)= 18.00
                    A( 3)=  0.27              S( 3)= 18.00
                    A( 4)=  0.13              S( 4)= 18.00
                    A( 5)=  0.30              S( 5)= 18.00
                    A( 6)=  0.28              S( 6)= 18.00
                    A( 7)=  0.33              S( 7)= 18.00
                    A( 8)=  0.93              S( 8)= 18.00
                    A( 9)=  0.36              S( 9)= 18.00
                    A(10)=  2.08              S(10)= 14.39
            BASE
                    A(11) - A(16) DO NOT EXIST SINCE FTG=0

                    A(17)=  0.43              S(17)= 18.00
                    A(18)=  2.20              S(18)= 18.00
                    A(19)=  0.43              S(19)= 18.00
                    A(20)=  0.69              S(20)= 18.00

                    A(21)=  0.43              S(21)= 18.00
                    A(22)=  0.22              S(22)= 18.00

            KEY WALL NOT REQUIRED

            PAVEMENT SLAB
                    A(23)=  0.26              S(23)= 18.00
                    A(24)=  0.13              S(24)= 18.00
                    A(25)=  0.26              S(25)= 18.00
                    A(26)=  0.13              S(26)= 18.00
                    A(27)=  0.26              S(27)= 18.00
                    A(28)=  0.13              S(28)= 18.00

============================== END T3F DESIGN ==============================
```

SPECIAL DESIGN PREPARED BY
DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY SBC
INLET CHANNEL NO 1

DESIGN PARAMETERS

B=140.00	HW1= 0.0	KO1= 0.70	FLOATR= 1.00	MFOUND=1000000.
HT= 15.65	HW2= 0.0	KO2= 0.50	JOINTS= 25.00	GMOIST= 112.
HB= 13.42	HWP= 0.0	KPASS= 1.50	MAXFTG= 0.0	GSAT= 140.
		CFSC= 0.40	CFSS= 0.50	

DESIGN OF SPECIFIED TYPE FOLLOWS

TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES

X= 21.00	TP= 11.00	XP= 98.00		
TT= 10.00	TB= 14.00	TS= 15.00	FTG PROJ= 0.0	QUANT= 6.539

TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN

X= 21.00	TP= 11.00	XP= 98.00		
TT= 10.00	TB= 14.00	TS= 17.00	FTG PROJ= 0.0	QUANT= 6.813

STEEL REQUIREMENTS

WALL

A(1)= 0.24	S(1)= 18.00
A(2)= 0.24	S(2)= 18.00
A(3)= 0.26	S(3)= 18.00
A(4)= 0.13	S(4)= 18.00
A(5)= 0.29	S(5)= 18.00
A(6)= 0.14	S(6)= 18.00
A(7)= 0.50	S(7)= 18.00
A(8)= 0.65	S(8)= 18.00
A(9)= 0.93	S(9)= 18.00
A(10)= 1.82	S(10)= 16.31

BASE

A(11) - A(16) DO NOT EXIST SINCE FTG=0

A(17)= 1.00	S(17)= 18.00
A(18)= 1.87	S(18)= 18.00
A(19)= 0.57	S(19)= 18.00
A(20)= 0.57	S(20)= 18.00
A(21)= 0.41	S(21)= 18.00
A(22)= 0.20	S(22)= 18.00

KEY WALL NOT REQUIRED

PAVEMENT SLAB

A(23)= 0.26	S(23)= 18.00
A(24)= 0.13	S(24)= 18.00
A(25)= 0.26	S(25)= 18.00
A(26)= 0.13	S(26)= 18.00
A(27)= 0.26	S(27)= 18.00
A(28)= 0.13	S(28)= 18.00

========== END T3F DESIGN ==========

EXECUTION DATE: 02/09/84

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EXECUTION DATE:  02/09/84
REVISION DATE:   12/22/83
==================================================================================

                    RECTANGULAR STRUCTURAL CHANNEL
                         CROSS SECTION DESIGN
              ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

                       SPECIAL DESIGN PREPARED BY
          DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
                                FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY   SBD
INLET AND APRON CONTINUED DESIGNS

                    DESIGN PARAMETERS
  B=140.00     HW1=  0.0      KO1= 0.70    FLOATR=  1.00   MFOUND=1000000.
 HT= 13.42     HW2=  0.0      KO2= 0.50    JOINTS=  0.25   GMOIST=     112.
 HB= 13.42     HWP=  0.0    KPASS= 1.50    MAXFTG=  0.0      GSAT=     140.
                            CFSC= 0.40      CFSS=  0.50

                    DESIGN OF SPECIFIED TYPE FOLLOWS

                    TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES
  X= 23.00       TP= 11.00       XP= 94.00
 TT= 10.00       TB= 14.00       TS= 15.00  FTG PROJ= 0.0    QUANT=  6.423

                    TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN
  X= 23.00       TP= 11.00       XP= 94.00
 TT= 10.00       TB= 14.00       TS= 17.00  FTG PROJ= 0.0    QUANT=  6.721

                    STEEL REQUIREMENTS
          WALL
                    A( 1)=  0.24              S( 1)= 18.00
                    A( 2)=  0.24              S( 2)= 18.00
                    A( 3)=  0.26              S( 3)= 18.00
                    A( 4)=  0.13              S( 4)= 18.00
                    A( 5)=  0.29              S( 5)= 18.00
                    A( 6)=  0.24              S( 6)= 18.00
                    A( 7)=  0.31              S( 7)= 18.00
                    A( 8)=  0.80              S( 8)= 18.00
                    A( 9)=  0.34              S( 9)= 18.00
                    A(10)=  1.83              S(10)= 16.31
          BASE
                    A(11) - A(16) DO NOT EXIST SINCE FTG=0

                    A(17)=  0.41              S(17)= 18.00
                    A(18)=  1.88              S(18)= 18.00
                    A(19)=  0.41              S(19)= 18.00
                    A(20)=  0.59              S(20)= 18.00
                    A(21)=  0.41              S(21)= 18.00
                    A(22)=  0.20              S(22)= 18.00

          KEY WALL NOT REQUIRED

          PAVEMENT SLAB
                    A(23)=  0.26              S(23)= 18.00
                    A(24)=  0.13              S(24)= 18.00
                    A(25)=  0.26              S(25)= 18.00
                    A(26)=  0.13              S(26)= 18.00
                    A(27)=  0.26              S(27)= 18.00
                    A(28)=  0.13              S(28)= 18.00

============================== END T3F DESIGN ==============================
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EXECUTION DATE:  02/09/84
REVISION DATE:   12/22/83
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                    RECTANGULAR STRUCTURAL CHANNEL
                         CROSS SECTION DESIGN
            ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

                    SPECIAL DESIGN PREPARED BY
          DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
                              FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY   SBE
INLET AND APRON CONTINUED DESIGNS

                    DESIGN PARAMETERS
  B=140.00      HW1=  0.0      KO1= 0.70    FLOATR=  1.00   MFOUND=100000
 HT= 15.65      HW2=  0.0      KO2= 0.50    JOINTS= 25.00   GMOIST=    13
 HB= 13.42      HWP=  0.0    KPASS= 1.50    MAXFTG= 10.00     GSAT=    14
                             CFSC= 0.40      CFSS=  0.60

                    DESIGN OF SPECIFIED TYPE FOLLOWS

                    TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES
  X= 11.00      TP= 11.00      XP=118.00
 TT= 10.00      TB= 15.00      TS= 16.00  FTG PROJ= 2.00   QUANT=  6.621

                    TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN
  X= 11.00      TP= 11.00      XP=118.00
 TT= 10.00      TP= 15.00      TS= 17.00  FTG PROJ= 2.00   QUANT=  6.709

                    STEEL REQUIREMENTS
          WALL
                A( 1)=  0.24              S( 1)= 18.00
                A( 2)=  0.24              S( 2)= 18.00
                A( 3)=  0.27              S( 3)= 18.00

                A( 4)=  0.13              S( 4)= 18.00
                A( 5)=  0.30              S( 5)= 18.00
                A( 6)=  0.15              S( 6)= 18.00
                A( 7)=  0.35              S( 7)= 18.00
                A( 8)=  0.76              S( 8)= 18.00
                A( 9)=  0.56              S( 9)= 18.00
                A(10)=  2.07              S(10)= 14.39
          BASE
                A(11)=  0.20              S(11)= 18.00
                A(12)=  0.20              S(12)= 18.00
                A(13)=  0.20              S(13)= 18.00
                A(14)=  0.20              S(14)= 18.00
                A(15)=  0.20              S(15)= 18.00
                A(16)=  0.20              S(16)= 18.00

                A(17)=  0.60              S(17)= 18.00
                A(18)=  1.94              S(18)= 18.00
                A(19)=  0.41              S(19)= 18.00
                A(20)=  0.50              S(20)= 18.00
                A(21)=  0.41              S(21)= 18.00
                A(22)=  0.20              S(22)= 18.00

          KEY WALL NOT REQUIRED

          PAVEMENT SLAB
                A(23)=  0.26              S(23)= 18.00
                A(24)=  0.13              S(24)= 18.00
                A(25)=  0.26              S(25)= 18.00
                A(26)=  0.13              S(26)= 18.00
                A(27)=  0.26              S(27)= 18.00
                A(28)=  0.13              S(28)= 18.00

============================== END T3F DESIGN ==============================
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EXECUTION DATE:  02/09/84
REVISION DATE:   12/22/83
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                    RECTANGULAR STRUCTURAL CHANNEL
                         CROSS SECTION DESIGN
              ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

                    SPECIAL DESIGN PREPARED BY
          DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
                              FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY      SBF
INLET AND APRON CONTINUED DESIGNS

                    DESIGN PARAMETERS
                                                                  MFOUND=1000000.
     B=140.00     HW1=  0.0      KO1= 0.70    FLOATR=  1.00
    HT= 13.42     HW2=  0.0      KO2= 0.50    JOINTS= 25.00     GMOIST=    138.
    HB= 13.42     HWP=  0.0    KPASS= 1.50    MAXFTG= 10.00       GSAT=    140.
                                  CFSC= 0.40      CFSS=  0.60

                    DESIGN OF SPECIFIED TYPE FOLLOWS

                    TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES
     X=  9.00       TP= 11.00      XP=122.00
    TT= 10.00       TB= 15.00      TS= 16.00   FTG PROJ= 2.80    QUANT=  6.466

                    TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN
     X=  9.00       TP= 11.00      XP=122.00
    TT= 10.00       TB= 15.00      TS= 16.00   FTG PROJ= 2.80    QUANT=  6.466

                    STEEL REQUIREMENTS
          WALL
                    A( 1)=  0.24                S( 1)= 18.00
                    A( 2)=  0.24                S( 2)= 18.00
                    A( 3)=  0.27                S( 3)= 18.00
                    A( 4)=  0.13                S( 4)= 18.00
                    A( 5)=  0.30                S( 5)= 18.00
                    A( 6)=  0.28                S( 6)= 18.00
                    A( 7)=  0.33                S( 7)= 18.00
                    A( 8)=  0.93                S( 8)= 18.00
                    A( 9)=  0.36                S( 9)= 18.00
                    A(10)=  2.08                S(10)= 14.39
          BASE
                    A(11)=  0.19                S(11)= 18.00
                    A(12)=  0.19                S(12)= 18.00
                    A(13)=  0.19                S(13)= 18.00
                    A(14)=  0.19                S(14)= 18.00
                    A(15)=  0.36                S(15)= 18.00
                    A(16)=  0.19                S(16)= 18.00

                    A(17)=  0.38                S(17)= 18.00
                    A(18)=  1.83                S(18)= 18.00
                    A(19)=  0.38                S(19)= 18.00
                    A(20)=  0.45                S(20)= 18.00
                    A(21)=  0.38                S(21)= 18.00
                    A(22)=  0.19                S(22)= 18.00

          KEY WALL NOT REQUIRED

          PAVEMENT SLAB
                    A(23)=  0.26                S(23)= 18.00
                    A(24)=  0.13                S(24)= 18.00
                    A(25)=  0.26                S(25)= 18.00
                    A(26)=  0.13                S(26)= 18.00
                    A(27)=  0.26                S(27)= 18.00
                    A(28)=  0.13                S(28)= 18.00

================================ END T3F DESIGN ==============================
```

SIGNAL BUTTE FRS EMERGENCY SPILLWAY
INLET AND APRON CONTINUED DESIGNS SBG

DESIGN PARAMETERS

B=140.00	HW1= 0.0	KO1= 0.70	FLOATR= 1.00	MFOUND=1000000.	
HT= 15.65	HW2= 0.0	KO2= 0.50	JOINTS= 25.00	GMOIST= 112.	
HB= 13.42	HWP= 0.0	KPASS= 1.50	MAXFTG= 10.00	GSAT= 140.	
		CFSC= 0.40	CFSS= 0.60		

DESIGN OF SPECIFIED TYPE FOLLOWS

TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES

X= 15.00	TP= 11.00	XP=114.00		
TT= 10.00	TB= 14.00	TS= 15.00	FTG PROJ= 1.20	QUANT= 6.452

TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN

X= 13.00	TP= 11.00	XP=114.00		
TT= 10.00	TB= 14.00	TS= 16.00	FTG PROJ= 1.20	QUANT= 6.547

STEEL REQUIREMENTS

WALL

A(1)= 0.24	S(1)= 18.00
A(2)= 0.24	S(2)= 18.00
A(3)= 0.26	S(3)= 18.00
A(4)= 0.13	S(4)= 18.00
A(5)= 0.29	S(5)= 18.00
A(6)= 0.14	S(6)= 18.00
A(7)= 0.50	S(7)= 18.00
A(8)= 0.65	S(8)= 18.00
A(9)= 0.93	S(9)= 18.00
A(10)= 1.82	S(10)= 16.31

BASE

A(11)= 0.19	S(11)= 18.00
A(12)= 0.19	S(12)= 18.00
A(13)= 0.19	S(13)= 18.00
A(14)= 0.19	S(14)= 18.00
A(15)= 0.19	S(15)= 18.00
A(16)= 0.19	S(16)= 18.00
A(17)= 1.02	S(17)= 18.00
A(18)= 1.84	S(18)= 18.00
A(19)= 0.49	S(19)= 18.00
A(20)= 0.50	S(20)= 18.00
A(21)= 0.38	S(21)= 18.00
A(22)= 0.19	S(22)= 18.00

KEY WALL NOT REQUIRED

PAVEMENT SLAB

A(23)= 0.26	S(23)= 18.00
A(24)= 0.13	S(24)= 18.00
A(25)= 0.26	S(25)= 18.00
A(26)= 0.13	S(26)= 18.00
A(27)= 0.26	S(27)= 18.00
A(28)= 0.13	S(28)= 18.00

========== END T3F DESIGN ==========

CROSS SECTION DESIGN
ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

SPECIAL DESIGN PREPARED BY
DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY
INLET AND APRON CONTINUED DESIGNS SBH

DESIGN PARAMETERS

B=140.00	HW1= 0.0	KO1= 0.70	FLOATR= 1.00	MFOUND=1000000
HT= 13.42	HW2= 0.0	KO2= 0.50	JOINTS= 25.00	GMOIST= 112
HB= 13.42	HWP= 0.0	KPASS= 1.50	MAXFTG= 10.00	GSAT= 140
		CFSC= 0.40	CFSS= 0.60	

DESIGN OF SPECIFIED TYPE FOLLOWS

TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES

X= 13.00	TP= 11.00	XP=114.00		
TT= 10.00	TB= 14.00	TS= 15.00	FTG PROJ= 1.40	QUANT= 6.306

TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN

X= 13.00	TP= 11.00	XP=114.00		
TT= 10.00	TB= 14.00	TS= 16.00	FTG PROJ= 1.40	QUANT= 6.402

STEEL REQUIREMENTS

WALL

A(1)= 0.24	S(1)= 18.00
A(2)= 0.24	S(2)= 18.00
A(3)= 0.26	S(3)= 18.00
A(4)= 0.13	S(4)= 18.00
A(5)= 0.29	S(5)= 18.00
A(6)= 0.24	S(6)= 18.00
A(7)= 0.31	S(7)= 18.00
A(8)= 0.80	S(8)= 18.00
A(9)= 0.34	S(9)= 18.00
A(10)= 1.83	S(10)= 16.31

BASE

A(11)= 0.19	S(11)= 18.00
A(12)= 0.19	S(12)= 18.00
A(13)= 0.19	S(13)= 18.00
A(14)= 0.19	S(14)= 18.00
A(15)= 0.19	S(15)= 18.00
A(16)= 0.19	S(16)= 18.00
A(17)= 0.38	S(17)= 18.00
A(18)= 1.81	S(18)= 18.00
A(19)= 0.38	S(19)= 18.00
A(20)= 0.49	S(20)= 18.00
A(21)= 0.38	S(21)= 18.00
A(22)= 0.19	S(22)= 18.00

KEY WALL NOT REQUIRED

PAVEMENT SLAB

A(23)= 0.26	S(23)= 18.00
A(24)= 0.13	S(24)= 18.00
A(25)= 0.26	S(25)= 18.00
A(26)= 0.13	S(26)= 18.00
A(27)= 0.26	S(27)= 18.00
A(28)= 0.13	S(28)= 18.00

========== END T3F DESIGN ==========

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EXECUTION DATE:  02/09/84
REVISION DATE:   12/22/83
==================================================================================

                    RECTANGULAR STRUCTURAL CHANNEL
                         CROSS SECTION DESIGN
              ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

                    SPECIAL DESIGN PREPARED BY
          DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
                              FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY      SBI
INLET AND APRON CONTINUED DESIGNS

                    DESIGN PARAMETERS
        B=140.00      HW1=  0.0      KO1= 0.70    FLOATR=  1.00   MFOUND=1000000.
       HT= 15.65      HW2=  0.0      KO2= 0.50    JOINTS= 60.00   GMOIST=     138.
       HB= 13.42      HWP=  0.0    KPASS= 1.50    MAXFTG=  0.0      GSAT=     140.
                                     CFSC= 0.40      CFSS=  0.50

                    DESIGN OF SPECIFIED TYPE FOLLOWS

                    TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES
        X= 24.00      TP= 11.00      XP= 92.00
       TT= 10.00      TB= 15.00      TS= 16.00  FTG PROJ= 0.0    QUANT=  6.825

                    TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN
        X= 24.00      TP= 11.00      XP= 92.00
       TT= 10.00      TB= 15.00      TS= 18.00  FTG PROJ= 0.0    QUANT=  7.137

                    STEEL REQUIREMENTS
              WALL
                        A( 1)=  0.24              S( 1)= 18.00
                        A( 2)=  0.24              S( 2)= 18.00
                        A( 3)=  0.27              S( 3)= 18.00
                        A( 4)=  0.13              S( 4)= 18.00
                        A( 5)=  0.30              S( 5)= 18.00
                        A( 6)=  0.15              S( 6)= 18.00
                        A( 7)=  0.35              S( 7)= 18.00
                        A( 8)=  0.76              S( 8)= 18.00
                        A( 9)=  0.56              S( 9)= 18.00
                        A(10)=  2.07              S(10)= 14.39
              BASE
                        A(11) - A(16) DO NOT EXIST SINCE FTG=0

                        A(17)=  0.60              S(17)= 18.00
                        A(18)=  2.19              S(18)= 18.00
                        A(19)=  0.43              S(19)= 18.00
                        A(20)=  0.68              S(20)= 18.00
                        A(21)=  0.43              S(21)= 18.00
                        A(22)=  0.22              S(22)= 18.00

              KEY WALL NOT REQUIRED

              PAVEMENT SLAB
                        A(23)=  0.26              S(23)= 18.00
                        A(24)=  0.13              S(24)= 18.00
                        A(25)=  0.26              S(25)= 18.00
                        A(26)=  0.13              S(26)= 18.00
                        A(27)=  0.26              S(27)= 18.00
                        A(28)=  0.13              S(28)= 18.00

============================== END T3F DESIGN ==============================
```

```
EXECUTION DATE:  02/09/84
REVISION DATE:   12/22/83
==================================================================================

                    RECTANGULAR STRUCTURAL CHANNEL
                         CROSS SECTION DESIGN
            ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

                     SPECIAL DESIGN PREPARED BY
          DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
                              FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY
INLET AND APRON CONTINUED DESIGNS
```

SBJ

```
                    DESIGN PARAMETERS
  B=140.00     HW1=  0.0      KO1= 0.70     FLOATR=  1.00    MFOUND=1000000.
 HT= 13.42     HW2=  0.0      KO2= 0.50     JOINTS= 60.00    GMOIST=     138.
 HB= 13.42     HWP=  0.0    KPASS= 1.50     MAXFTG=  0.0     GSAT=       140.
                              CFSC= 0.40       CFSS=  0.50
```

10.0

SBJ2

check 12.5 for 1/2 way.

```
                    DESIGN OF SPECIFIED TYPE FOLLOWS

                    TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES
  X= 27.00     TP= 11.00      XP= 86.00
 TT= 10.00     TB= 15.00      TS= 16.00   FTG PROJ= 0.0     QUANT=  6.745

                    TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN
  X= 27.00     TP= 11.00      XP= 86.00
 TT= 10.00     TB= 15.00      TS= 18.00   FTG PROJ= 0.0     QUANT=  7.094

                    STEEL REQUIREMENTS
          WALL
                    A( 1)=  0.24                S( 1)= 18.00
                    A( 2)=  0.24                S( 2)= 18.00
                    A( 3)=  0.27                S( 3)= 18.00
                    A( 4)=  0.13                S( 4)= 18.00
                    A( 5)=  0.30                S( 5)= 18.00
                    A( 6)=  0.28                S( 6)= 18.00
                    A( 7)=  0.33                S( 7)= 18.00
                    A( 8)=  0.93                S( 8)= 18.00

                    A( 9)=  0.36                S( 9)= 18.00
                    A(10)=  2.08                S(10)= 14.39
          BASE
                    A(11) - A(16) DO NOT EXIST SINCE FTG=0

                    A(17)=  0.43                S(17)= 18.00
                    A(18)=  2.20                S(18)= 18.00
                    A(19)=  0.43                S(19)= 18.00
                    A(20)=  0.69                S(20)= 18.00
                    A(21)=  0.43                S(21)= 18.00
                    A(22)=  0.22                S(22)= 18.00
          KEY WALL NOT REQUIRED

          PAVEMENT SLAB
                    A(23)=  0.26                S(23)= 18.00
                    A(24)=  0.13                S(24)= 18.00
                    A(25)=  0.26                S(25)= 18.00
                    A(26)=  0.13                S(26)= 18.00
                    A(27)=  0.26                S(27)= 18.00
                    A(28)=  0.13                S(28)= 18.00
================================ END T3F DESIGN ==============================
```

```
EXECUTION DATE:  02/09/84
REVISION DATE:   12/22/83
==================================================================================

                    RECTANGULAR STRUCTURAL CHANNEL
                         CROSS SECTION DESIGN
            ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

                    SPECIAL DESIGN PREPARED BY
          DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
                              FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY  SBK
INLET AND APRON CONTINUED DESIGNS

                    DESIGN PARAMETERS
  B=140.00    HW1=  0.0      KO1= 0.70    FLOATR=  1.00    MFOUND=1000000.
 HT= 15.65    HW2=  0.0      KO2= 0.50    JOINTS= 60.00    GMOIST=     112.
 HB= 13.42    HWP=  0.0    KPASS= 1.50    MAXFTG=  0.0      GSAT=      140.
                            CFSC= 0.40      CFSS=  0.50

                    DESIGN OF SPECIFIED TYPE FOLLOWS

                    TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES
  X= 21.00     TP= 11.00      XP= 98.00
 TT= 10.00     TB= 14.00      TS= 15.00   FTG PROJ= 0.0     QUANT=  6.539

                    TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN
  X= 21.00     TP= 11.00      XP= 98.00
 TT= 10.00     TB= 14.00      TS= 17.00   FTG PROJ= 0.0     QUANT=  6.813

                    STEEL REQUIREMENTS
          WALL
                    A( 1)=  0.24              S( 1)= 18.00
                    A( 2)=  0.24              S( 2)= 18.00
                    A( 3)=  0.26              S( 3)= 18.00
                    A( 4)=  0.13              S( 4)= 18.00
                    A( 5)=  0.29              S( 5)= 18.00
                    A( 6)=  0.14              S( 6)= 18.00
                    A( 7)=  0.50              S( 7)= 18.00
                    A( 8)=  0.65              S( 8)= 18.00
                    A( 9)=  0.93              S( 9)= 18.00
                    A(10)=  1.82              S(10)= 16.31
          BASE
                    A(11) - A(16) DO NOT EXIST SINCE FTG=0

                    A(17)=  1.00              S(17)= 18.00
                    A(18)=  1.87              S(18)= 18.00
                    A(19)=  0.57              S(19)= 18.00
                    A(20)=  0.57              S(20)= 18.00
                    A(21)=  0.41              S(21)= 18.00
                    A(22)=  0.20              S(22)= 18.00
          KEY WALL NOT REQUIRED

          PAVEMENT SLAB
                    A(23)=  0.26              S(23)= 18.00
                    A(24)=  0.13              S(24)= 18.00
                    A(25)=  0.26              S(25)= 18.00
                    A(26)=  0.13              S(26)= 18.00
                    A(27)=  0.26              S(27)= 18.00
                    A(28)=  0.13              S(28)= 18.00

================================ END T3F DESIGN ================================
```

EXECUTION DATE: 02/09/84
REVISION DATE: 12/22/83

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RECTANGULAR STRUCTURAL CHANNEL
CROSS SECTION DESIGN
ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

SPECIAL DESIGN PREPARED BY
DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY SBL
INLET AND APRON CONTINUED DESIGNS

DESIGN PARAMETERS

B=140.00	HW1= 0.0	KO1= 0.70	FLOATR= 1.00	MFOUND=1000000.	
HT= 13.42	HW2= 0.0	KO2= 0.50	JOINTS= 60.00	GMOIST= 112.	
HB= 13.42	HWP= 0.0	KPASS= 1.50	MAXFTG= 0.0	GSAT= 140.	
		CFSC= 0.40	CFSS= 0.50		

DESIGN OF SPECIFIED TYPE FOLLOWS

TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES

X= 23.00	TP= 11.00	XP= 94.00		
TT= 10.00	TB= 14.00	TS= 15.00	FTG PROJ= 0.0	QUANT= 6.423

TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN

X= 23.00	TP= 11.00	XP= 94.00		
TT= 10.00	TB= 14.00	TS= 17.00	FTG PROJ= 0.0	QUANT= 6.721

STEEL REQUIREMENTS

WALL

A(1)= 0.24	S(1)= 18.00
A(2)= 0.24	S(2)= 18.00
A(3)= 0.26	S(3)= 18.00
A(4)= 0.13	S(4)= 18.00
A(5)= 0.29	S(5)= 18.00
A(6)= 0.24	S(6)= 18.00
A(7)= 0.31	S(7)= 18.00
A(8)= 0.80	S(8)= 18.00
A(9)= 0.34	S(9)= 18.00
A(10)= 1.83	S(10)= 16.31

BASE

A(11) - A(16) DO NOT EXIST SINCE FTG=0

A(17)= 0.41	S(17)= 18.00
A(18)= 1.88	S(18)= 18.00
A(19)= 0.41	S(19)= 18.00
A(20)= 0.59	S(20)= 18.00
A(21)= 0.41	S(21)= 18.00
A(22)= 0.20	S(22)= 18.00

KEY WALL NOT REQUIRED

PAVEMENT SLAB

A(23)= 0.26	S(23)= 18.00
A(24)= 0.13	S(24)= 18.00
A(25)= 0.26	S(25)= 18.00
A(26)= 0.13	S(26)= 18.00
A(27)= 0.26	S(27)= 18.00
A(28)= 0.13	S(28)= 18.00

```
EXECUTION DATE:  02/10/84
REVISION DATE:   12/22/83
==============================================================================

                    RECTANGULAR STRUCTURAL CHANNEL
                         CROSS SECTION DESIGN
              ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

                     SPECIAL DESIGN PREPARED BY
          DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
                              FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY
APRON SBJ WITH FOOTING

                    DESIGN PARAMETERS
        B=140.00      HW1=  0.0      KO1= 0.70    FLOATR=  1.00   MFOUND=1000000.
       HT= 13.42      HW2=  0.0      KO2= 0.50    JOINTS= 60.00   GMOIST=     138.
       HB= 13.42      HWP=  0.0    KPASS= 1.50    MAXFTG= 10.00     GSAT=     140.
                                     CFSC= 0.40      CFSS=  0.60

                    DESIGN OF SPECIFIED TYPE FOLLOWS

                    TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES
        X=  9.00      TP= 11.00      XP=122.00
       TT= 10.00      TB= 15.00      TS= 16.00  FTG PROJ= 2.80   QUANT=  6.466

                    TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN
        X=  9.00      TP= 11.00      XP=122.00
       TT= 10.00      TB= 15.00      TS= 16.00  FTG PROJ= 2.80   QUANT=  6.466

                    STEEL REQUIREMENTS
              WALL
                        A( 1)=  0.24              S( 1)= 18.00
                        A( 2)=  0.24              S( 2)= 18.00
                        A( 3)=  0.27              S( 3)= 18.00
                        A( 4)=  0.13              S( 4)= 18.00
                        A( 5)=  0.30              S( 5)= 18.00
                        A( 6)=  0.28              S( 6)= 18.00
                        A( 7)=  0.33              S( 7)= 18.00
                        A( 8)=  0.93              S( 8)= 18.00
                        A( 9)=  0.36              S( 9)= 18.00
                        A(10)=  2.08              S(10)= 14.39
              BASE
                        A(11)=  0.19              S(11)= 18.00
                        A(12)=  0.19              S(12)= 18.00
                        A(13)=  0.19              S(13)= 18.00
                        A(14)=  0.19              S(14)= 18.00
                        A(15)=  0.36              S(15)= 18.00
                        A(16)=  0.19              S(16)= 18.00

                        A(17)=  0.38              S(17)= 18.00
                        A(18)=  1.83              S(18)= 18.00
                        A(19)=  0.38              S(19)= 18.00
                        A(20)=  0.45              S(20)= 18.00
                        A(21)=  0.38              S(21)= 18.00
                        A(22)=  0.19              S(22)= 18.00

              KEY WALL NOT REQUIRED

              PAVEMENT SLAB
                        A(23)=  0.26              S(23)= 18.00
                        A(24)=  0.13              S(24)= 18.00
                        A(25)=  0.26              S(25)= 18.00
                        A(26)=  0.13              S(26)= 18.00
                        A(27)=  0.26              S(27)= 18.00
                        A(28)=  0.13              S(28)= 18.00

============================== END T3F DESIGN ==============================
```

EXECUTION DATE: 02/10/84
REVISION DATE: 12/22/83

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RECTANGULAR STRUCTURAL CHANNEL
CROSS SECTION DESIGN
ELASTIC ANALYSIS AND WORKING STRESS DESIGN ARE USED

SPECIAL DESIGN PREPARED BY
DESIGN UNIT, ENGINEERING DIVISION, SCS, WASHINGTON, D. C.
FOR

SIGNAL BUTTE FRS EMERGENCY SPILLWAY SBJ2, Mid pt. w/Inlet
APRON SBJ WITH FOOTING MIDPOINT WALL HT

DESIGN PARAMETERS

B=140.00	HW1= 0.0	KO1= 0.70	FLOATR= 1.00	MFOUND=1000000.
HT= 12.50	HW2= 0.0	KO2= 0.50	JOINTS= 60.00	GMOIST= 138.
HB= 12.50	HWP= 0.0	KPASS= 1.50	MAXFTG= 10.00	GSAT= 140.
		CFSC= 0.40	CFSS= 0.60	

DESIGN OF SPECIFIED TYPE FOLLOWS

TYPE T3F STRUCTURAL CHANNEL - TRIAL VALUES

X= 11.00	TP= 11.00	XP=118.00		
TT= 10.00	TB= 14.00	TS= 15.00	FTG PROJ= 1.80	QUANT= 6.225

TYPE T3F STRUCTURAL CHANNEL - DETAIL DESIGN

X= 11.00	TP= 11.00	XP=118.00		
TT= 10.00	TB= 14.00	TS= 16.00	FTG PROJ= 1.80	QUANT= 6.312

STEEL REQUIREMENTS

WALL

A(1)= 0.24	S(1)= 18.00
A(2)= 0.24	S(2)= 18.00
A(3)= 0.26	S(3)= 18.00
A(4)= 0.13	S(4)= 18.00
A(5)= 0.29	S(5)= 18.00
A(6)= 0.24	S(6)= 18.00
A(7)= 0.31	S(7)= 18.00
A(8)= 0.80	S(8)= 18.00
A(9)= 0.34	S(9)= 18.00
A(10)= 1.82	S(10)= 15.26

BASE

A(11)= 0.19	S(11)= 18.00
A(12)= 0.19	S(12)= 18.00
A(13)= 0.19	S(13)= 18.00
A(14)= 0.19	S(14)= 18.00
A(15)= 0.19	S(15)= 18.00
A(16)= 0.19	S(16)= 18.00
A(17)= 0.38	S(17)= 18.00
A(18)= 1.71	S(18)= 18.00
A(19)= 0.38	S(19)= 18.00
A(20)= 0.44	S(20)= 18.00
A(21)= 0.38	S(21)= 18.00
A(22)= 0.19	S(22)= 18.00

KEY WALL NOT REQUIRED

PAVEMENT SLAB

A(23)= 0.26	S(23)= 18.00
A(24)= 0.13	S(24)= 18.00
A(25)= 0.26	S(25)= 18.00
A(26)= 0.13	S(26)= 18.00
A(27)= 0.26	S(27)= 18.00
A(28)= 0.13	S(28)= 18.00

========== END T3F DESIGN ==========

AZ Signal Butte FRS — Buckhorn-Mesa

SL 3-13-84

pavement slab steel & blocks

all T & S.

11" slab

longer than 30 ft.

exposed — #6 @ 12

unexposed — #5 @ 12

shorter than 30 ft. or equal.

exposed — #5 @ 12

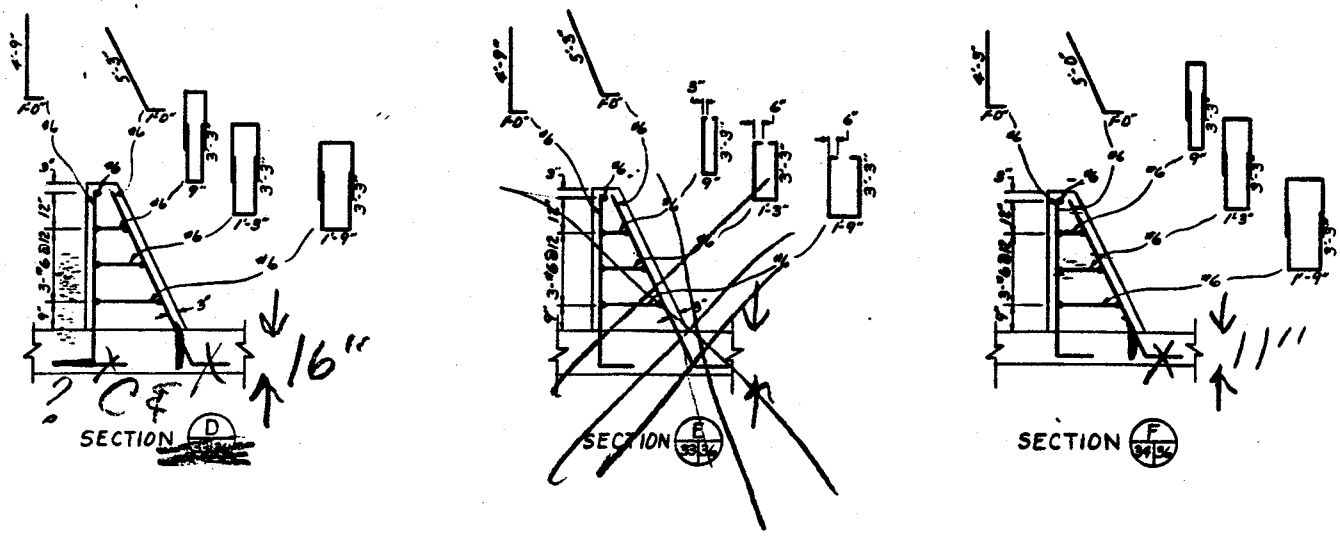
unexposed — #4 @ 12

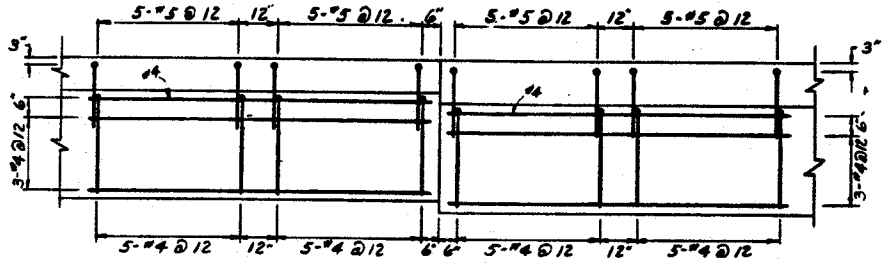
$(2'10'' + 10'') \div 2 = 1'10''$ ave thickness block.

Short, exposed #6 @ 12"

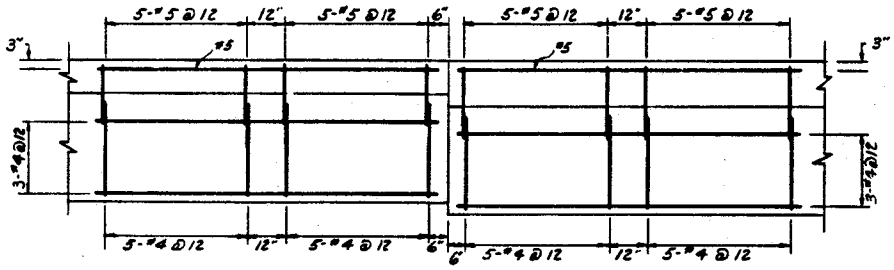
same as Harquahala FRS

Crest blocks — use #5 @ 12





UPSTREAM FACE



DOWNSTREAM FACE

CHUTE SECTION 1 CUTOFF WALL
ELEVATION

SCALE 0 IN 8 FEET

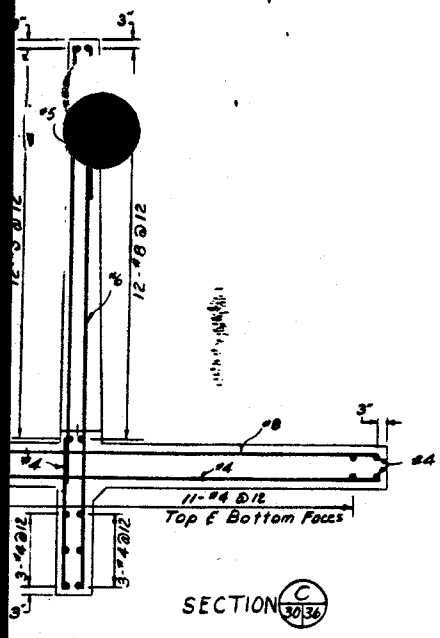
344-OA-D-43

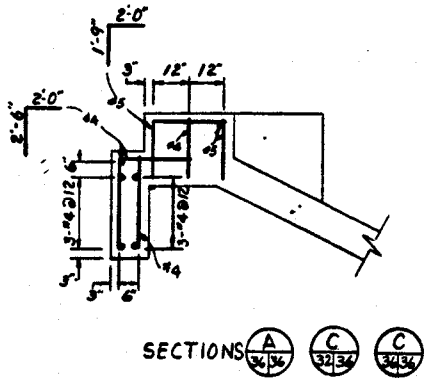
ALWAYS THINK SAFETY

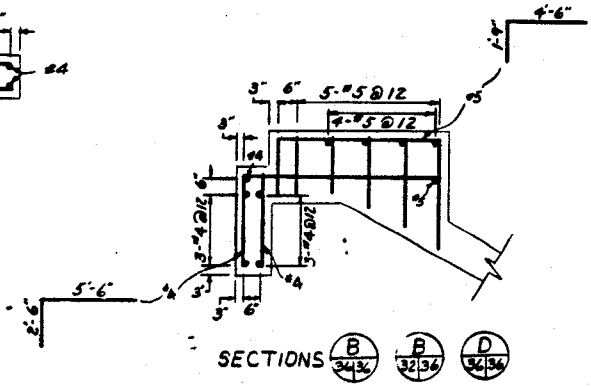
EMERGENCY SPILLWAY DETAILS
INLET, CHUTE SECTION 2 & 3
HARQUAHALA F.R.S.
HARQUAHALA VALLEY WATERSHED
MARICOPA & YUMA COUNTIES, ARIZONA

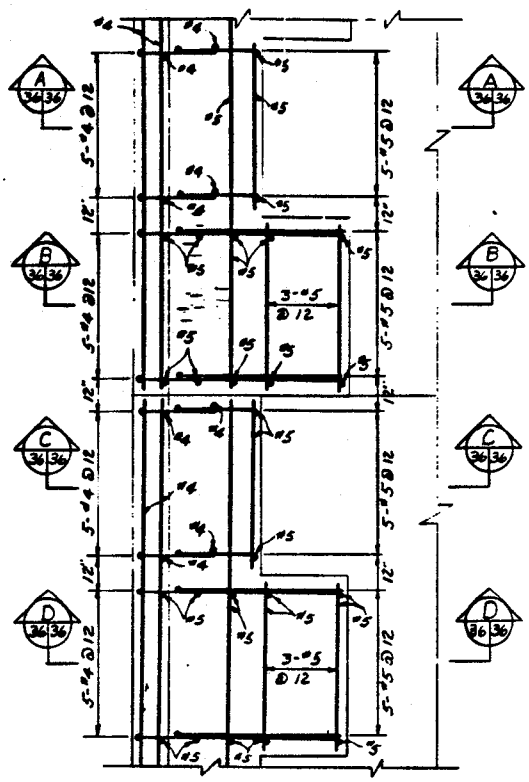
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed WEP	Date 6-80	Approved by	
Drawn JAM	6-80	Title	
Traced		Title	
Checked PJM	7-80	Sheet No 36 of 55	Drawing No 80003-AZ-B

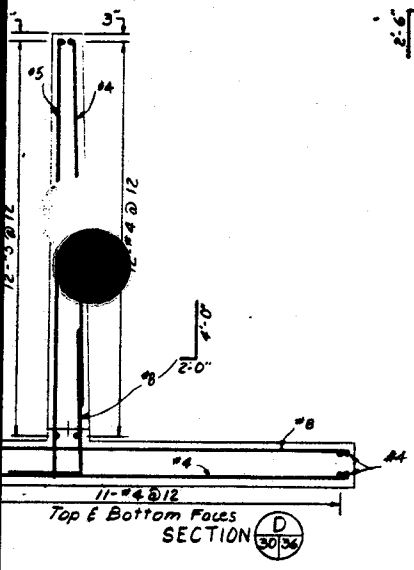


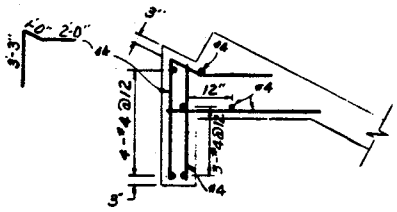


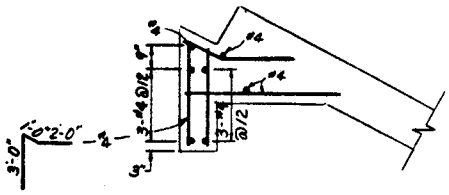


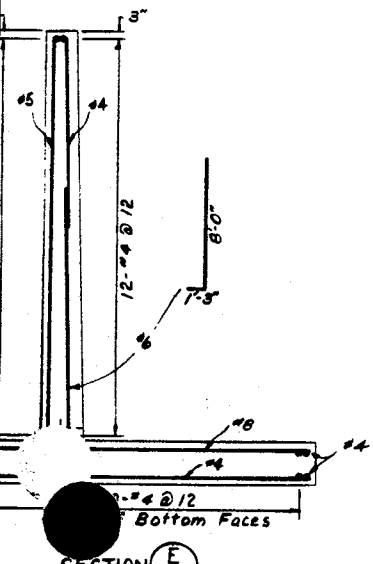


CHUTE SECTION 1 ENTRANCE
BLOCK DETAILS

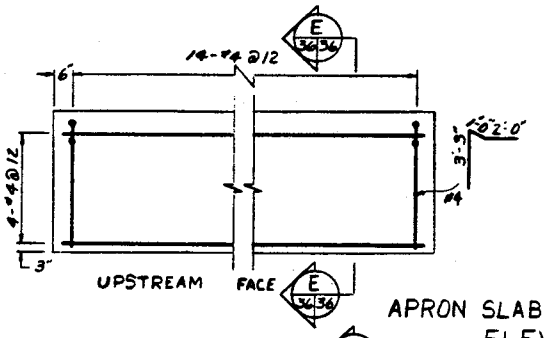


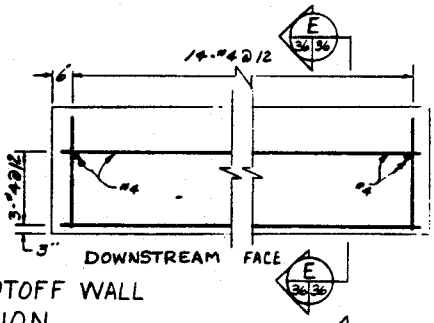




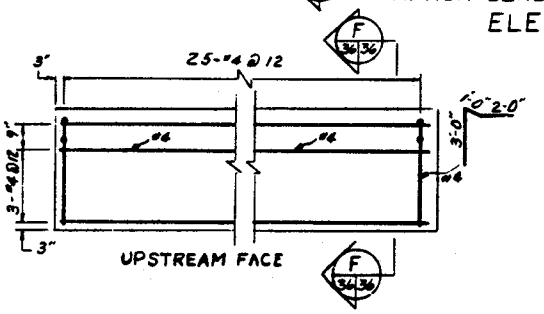


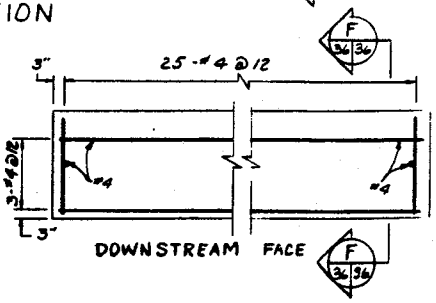
INLET SECTION





APRON SLAB CUTOFF WALL
ELEVATION

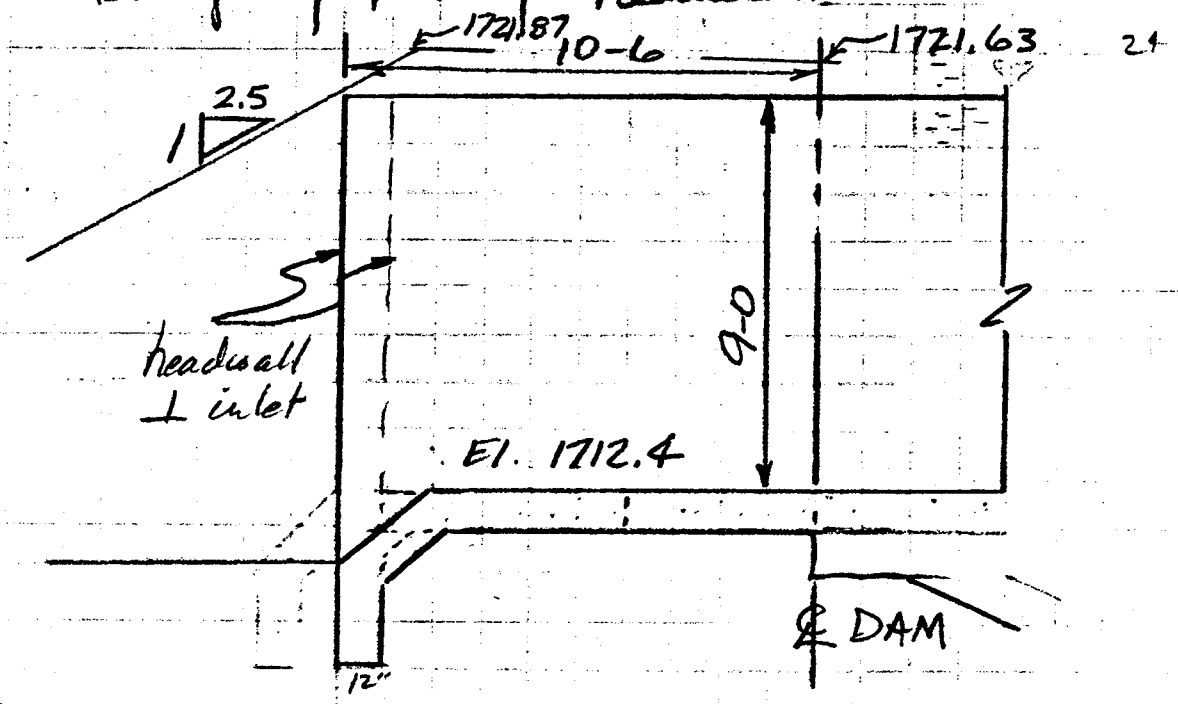


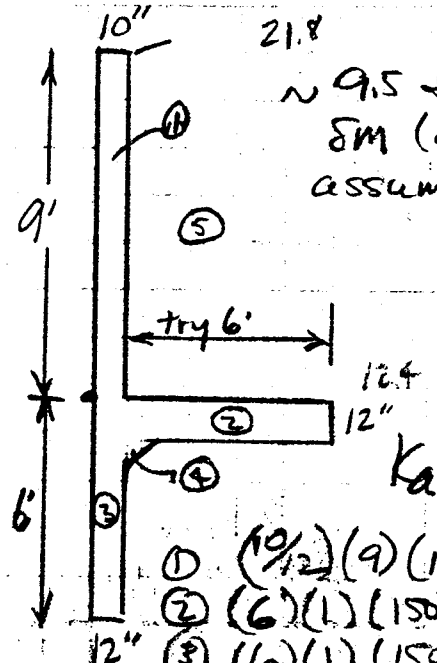


PAVING SLAB CUTOFF WALL
ELEVATION
CHUTE SECTION 2

AZ Signal Butte FRS - Buckhorn Mesa
SL 3-15-84 ICC 4/6/84

Emergency Spillway - headwall.





~ 9.5 ft backfill - no water
SM (caliche)
assume 115#/ft³ γd, 133#/ft³
φ ~ 35°
assume active condition
allow wall to move
independent of inlet str.

Ka ~ 0.3

				ft#
①	(10/12)(9)(150) =	1125#	(5/12)	468.75
②	(6)(1)(150) =	900#	(3.83)	3447.0
③	(6)(1)(150	900#	(5/12)	375.0
④	(.5)(.5)(.5)(150) =	18.75#	(.997)	18.69
⑤	(6)(9.5)(133) =	7581.0 #	(3.83)	29,035.23
		10,524.75#		33,344.67

W = 10,524.75
@ 3.168 ft.

AZ Signal Butte FRS - Buckhorn - Mesa

SL 3-15-84

Emergency Spwy. - headwall str. 2

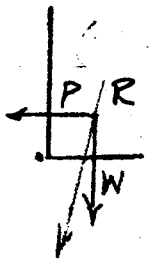
$P = K_a \gamma_m H^2 \div 2 = [(0.3)(133)(9.5)^2] \div 2 =$

$= 1800.49\ \#$ @ $\frac{9.5}{3} = 3.167$ ft. 5701.54 ft #

overturning $S.F. = \frac{33,344.67}{(3.167)(1800.49)} = 5.85$

Resultant applied @ 3.167 ft up ~~3.168'~~ over

$\frac{1800.49\#}{33,344.67\#} = \frac{x}{3.167}$ $x = 0.17$ ft.



$3.168 - 0.17 \sim 3.0$ ft. $> \frac{6.83}{3} = 2.27$ ft.

$R = 33,393.24$ ft # @ 3.0 ft.

$f_1 = \frac{P}{A}\left(1 + 6\frac{e}{d}\right)$ Parker et al

$e = 3.416 - 3.0 = 0.416$ ft.
$P = 10,524.75 = W$
A (unit) $= 6.833$ ft^2
$d = 6.833$ ft.

$f_1 = \frac{10,524.75}{6.833}\left(1 + \frac{6(.416)}{6.833}\right) = 2,102.93\#$

$f_2 = 977.64\#$

Allowable bearing, compacted SM (caliche) approx. 6 T/ft^2

AZ
SL

Signal Butte FRS - Buckhorn-Mesa

3-16-84

Emu Spwy. - headwall structure 3

Check at 5' footing

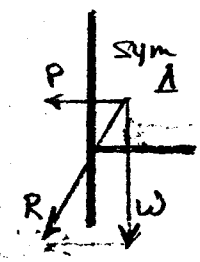
W_T	10,524.75	M.	468.75 NC
less		(2.9165)	2187.38
concrete	150		375.00 NC
soil (9.5)(133)	1263.5		18.69 NC
	9111.25#	(2.9165)	18,424.99
			21,474.81 ft#

$W = 9111.25\#$ @ 2.36 ft.

$P = 1800.49\#$ @ 3.167 ft (no change)

$R = \sqrt{W^2 + P^2} = 9,287.45\#$ right angle to W

$$\frac{9111.25\#}{1800.49\#} = \frac{3.167}{x} \qquad x = 0.626 \text{ ft.}$$



R acts @ 2.36 − 0.63 = 1.734 ft. (y)

5.833 ÷ 3 = 1.944 outside "middle 1/3"

Check load @ "toe"

$$f_1 = 2\frac{P}{3yb} = 2\frac{9111.25}{(3)(1.734)(1)} = 3,502.979\#$$

< 6T/ft² OK.

this load situation exists for a very short length of wall at corner of inlet.

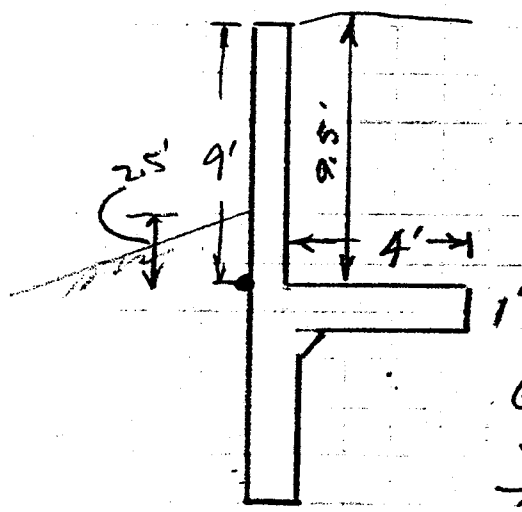
Check 4 ft. @ 7.5 ft. from inlet wall.
(footing length)

AZ
8C

Signal Butte FRS - Buckhorn-Mesa

3-16-84

Em. Spwy. - headwall structure 4



By inspection

Can't count on 2.5 ft of fill, possible erosion. Same load exists on dam side of wall.

Go back to 6 ft. width footing at inlet corner, taper to 5' @ 7.5' from inlet

Check @ 15 ft from inlet, erosion of u.s. fill unlikely

use same sketch, 5' fill u.s. side

$W_1 = (\frac{10}{12})(9)(150)$	1125#	5/12	468.75
$W_2 = (4)(1)(150)$	600	2.833	1699.8
$W_3 = (6)(1)(150)$	900	(5/12)	375.0
$W_4 = (.5)^3(150)$	18.75	(.997)	18.69
$W_5 = (4)(9.5)(133)$	5054.	2.833	14,317.98
	7697.75#		16,880.22 ft#

$W_T = 7697.75\#$ @ 2.193 ft.
(4.833 ÷ 3 = 1.611 ft, 1st 1/3rd)

$P_1 = 1800.49\#$ @ 3.167 ft (same)

$P_2 \sim K_p \gamma_d H^2 (.5)$ use $K_p \sim 1$ (Far West States shows 3.7 ±)

γ_d (worst) = 112#/ft³ (Specif.)

$P_2 \sim (1)(112)(5)^2(.5)$

$P_2 \sim 1400\#$ @ 1.6 ft.

ignore negative slope because of constant assumption.

AZ Signal Butte FRS - Buckhorn-Mesa

SL 3-16-84

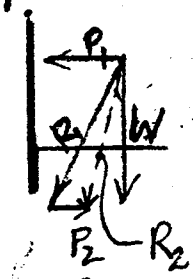
Em. Spwy. headwall str. 5

$\Sigma M_H = -P_1 x_1 - P_2 x_2 - R x_R = 0$

$(1800.49)(3.167) - (1400)(1.6) = R x_R$

$3{,}462.15 \text{ ft\#} = R x_R$ overturning moment,

$\frac{16{,}800}{3462} = 4.88$ SF, against OT



$R_1 = \sqrt{W^2 + P_1^2} = 7905.51$ #

$\frac{7697.75}{1800.49} = \frac{3.167}{x_1}$ $x_1 = 0.74$ ft.

$R_2 = \sqrt{R_1^2 + P_2^2} = 8028.52$ #

W acts @ 2.193 ft. rt. R_1 acts $2.193' - 0.74' = 1.45'$ rt.

$\frac{8028.52}{1400.} = \frac{\sqrt{3.167^2 + 0.74^2}}{x_2}$ $x_2 = 0.567'$ rt. of R_1

R_2 acts $1.45 + 0.57 = 2.02$ ft rt. @ top floor within middle 1/3rd (>1.61 ft)

$f_1 = \frac{7697.75\#}{4.833}\left(1 + \frac{6(.42)}{4.833}\right) = 2{,}423.23 \text{ \#} < 6T$ / ft²

$\left(e = \frac{4.833}{2} - 2.02 = 0.42'\right)$

Check 15' w/ no footing. (cantelever)

AZ Signal Butte FRS - Buckhorn-Mesa

SL 3-19-84

Emergency Spillway headwall steel 7

@ 15' no footing req. T&S steel sufficient use #4@12 unexposed & #5@12 exposed

Highest load @ end of wall adjacent to inlet structure.

NEH-6, ES-164

Wall steel $M = 5.7$ K-ft., $d = 7.5''$

A_s req'd $= 0.5$ in²/ft. use #7@12

Check shear & bond.

$$v = \frac{V}{bd} = \frac{1800\#}{(12)(7.5)} = 20 \text{ psi} < 70 \text{ psi}$$

$$u = \frac{V}{E_0 jd} = \frac{1800}{(2.749)(0.86)(7.5)} \quad 101.52 \text{ psi}$$

$$\frac{V}{d} = \frac{1800}{7.5} = 240 \#/\text{in} \quad \text{or } .24 \text{ k/in}$$

$$u_{allow} = 4.8\sqrt{f'_c}/D \leq 500 \text{ psi} \quad (347 \text{ psi})$$

#7@12 OK

15 ft. M 0.606 to 5.7

#4@12	M allow =	2.3 K-ft.	(.2)
#5@12	M " =	3.6 K-ft.	(.31)
#6@12	M " =	5.1 K-ft	(.44)

2-#7@12 from artic. jt.

8-#6@12

#4@12 to end of wall

2' 3.6 4' 12.3 5'

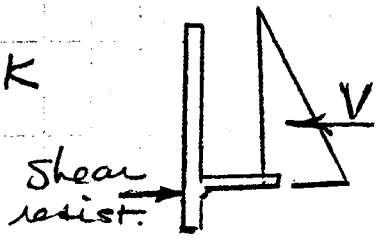
AZ Signal Butte FRS - Buckhorn-Mesa

SL 3-19-84

Emergency Spwy. headwall steel 8

Check shear in toe wall @ footing bottom
No significant moment expected.

$V \sim (10.5)^2 (.3)(133)(.5) = 2.2K$



$v = \frac{2.2}{(12)(8.5)} = 21.6 psi < 70$

$\mu = \frac{2200}{(1.571)(.86)(8.5)} = 191.6 psi < 500$

$d_{min} = 8.5''$

#4@12 OK (T&S)
(fillet not really necessary)

Force of water on exposed side of wall,
backfill dry

$F_w = (62.4)(\frac{9^2}{2}) = 2,527.2 \# @ 3'$

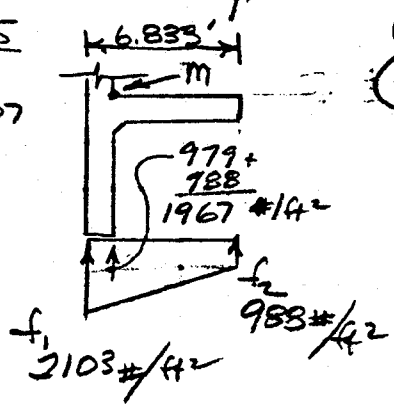
$F_p = (1)(112)(9.5)^2(.5) = 5,054 \# @ 3.17'$
obviously resisting moment greater
exposed steel, T&S, #4@12

Max. moment on footing
footing wt. (150)(1)(6)(3) = 2700 ft#
Soil wt. (7581#) (3) = 22,743 ft#
− bearing resist.

$\frac{6.883}{6} = \frac{1115}{x}$

x = 979.07

2103 − 988 = 1115 #/ft²



(988#/ft²)(6)(3) = 17,784 ft#
(1967#/ft²)(.5)(6)(2) = 11,802 ft#

29,586 ft# resistance > 25,443 ft# load.
moments will balance,
T&S steel OK.

AZ
SL 3-26-84 Signal Butte FRS, Buckhorn-Mesa WPP

Summary steel headwall 8

unexposed face, wall steel:
inlet sidewall to far end, vertical.
2-#7@12, 8-#6@12, balance #4@12

horizontal, #4@12

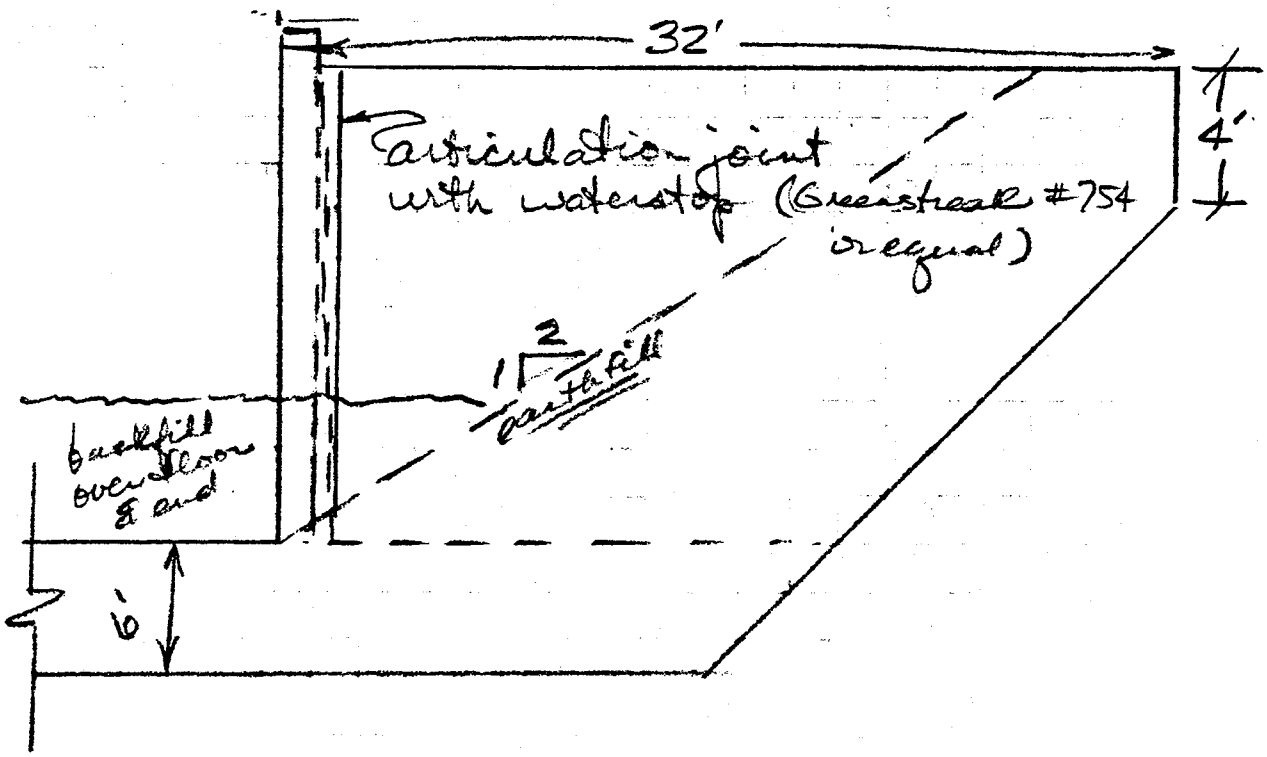
exposed face, wall steel #5@12, both ways

footing and toe wall
#4@12, both ways. (T&S)

AZ Buckhorn-Mesa WPP Signal Butte FRS
SL 4-2-84 ICC 5/18/84
Emergency Spwy Retaining Wall 1
Str.

assume 14' retained fill on 2:1 slope
(dam projection)
assume 133 #/ft³ γ_m & 112 #/ft² min (γ_d)
$K_a \sim 0.3$ $K_p \sim 1$

try 32' length ⊥ apron wall (outside)
4-0 c/o wall depth @ wall
2:1 slope ∥ cut slope, c/o wall



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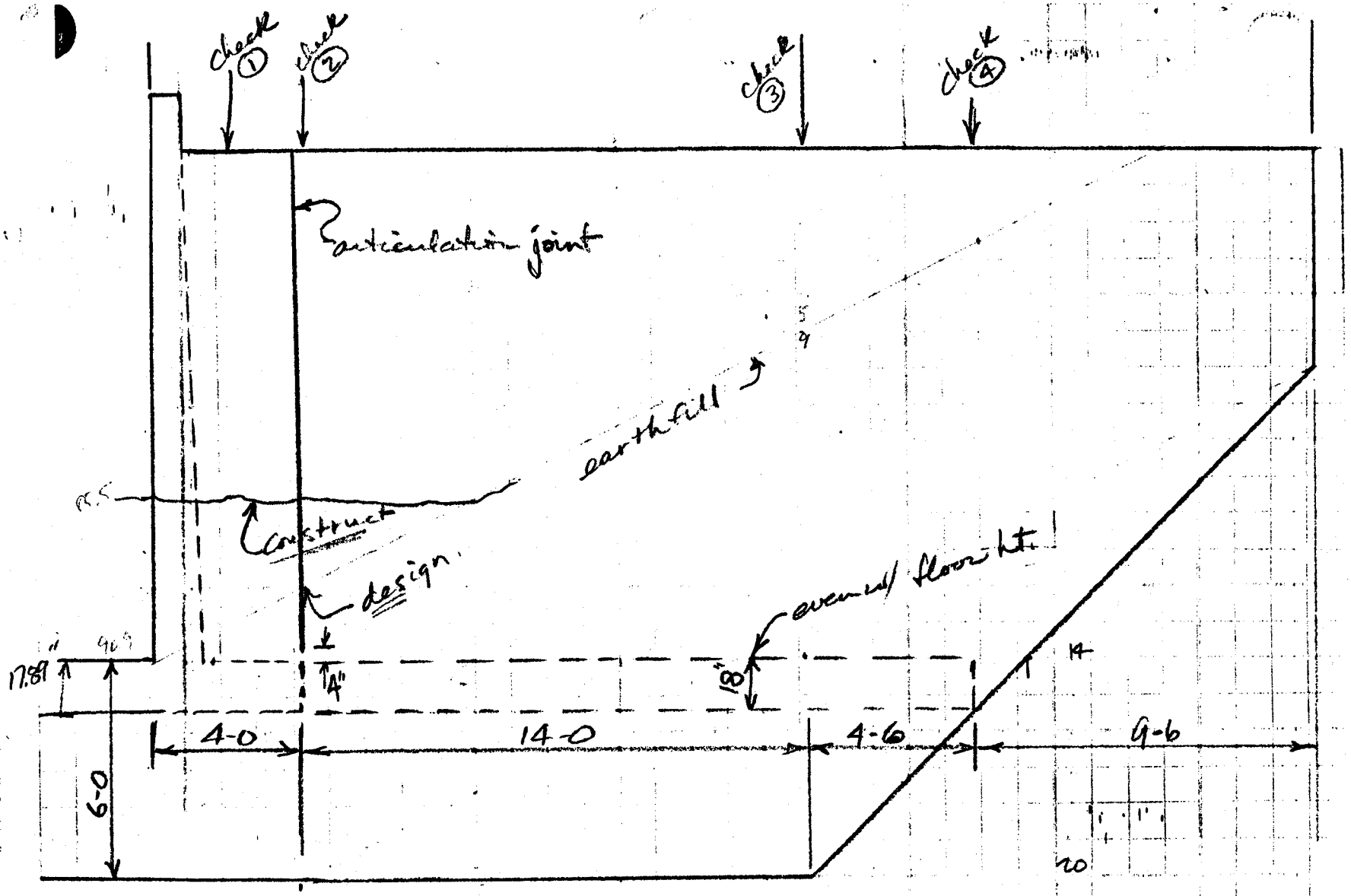
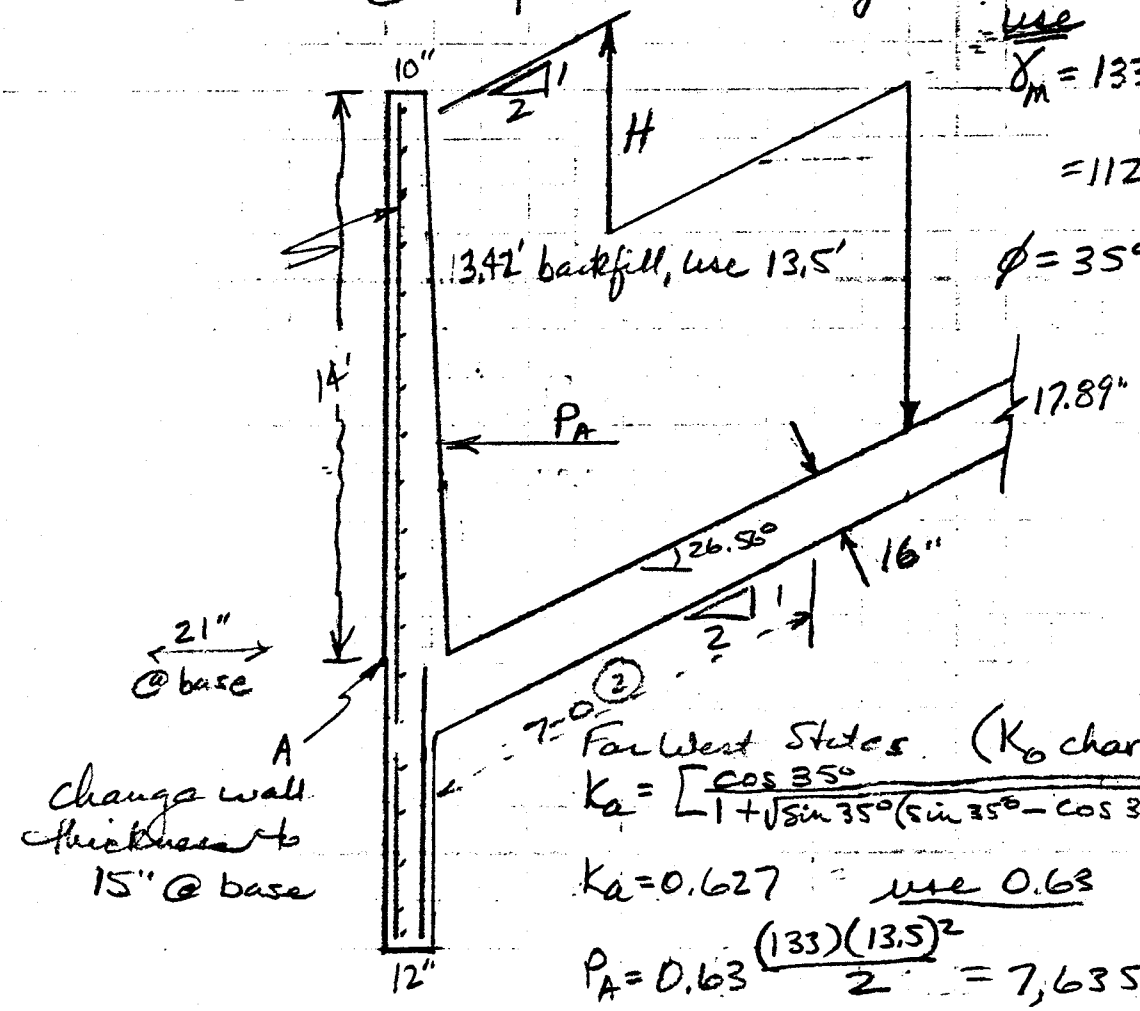

check 1
check 2
check 3
check 4
articulation joint
earthfill
construct
design
even w/ floor lt.
4"
4-0
14-0
4-6
9-6
6-0
17.81
20

AZ Buckhorn-Mesa WPP, Signal Butte FRS
SL 4-2-84 ICE 5/19/84
Retaining/Wing wall. E.S. 3

check ① adj. articulation joint



use
$\gamma_m = 133\#/ft^3$ active
$= 112\#/ft^3$ passive

$\phi = 35°$

For West States (K_o chart, 0.54)

$$K_a = \left[\frac{\cos 35°}{1+\sqrt{\sin 35°(\sin 35° - \cos 35° \tan 26.56°)}}\right]$$

$K_a = 0.627$ use 0.63 K_a or K_o

$$P_A = 0.63\frac{(133)(13.5)^2}{2} = 7{,}635.4$$

P_A acts $\frac{13.5}{3}$ or 4.5 ft. above slab

$M_A = 4.5(7{,}635.4) = 34{,}360$ ft#

use $d = 12"$, $t = 15"$, $A_s = 1.96\ in^2$

#9 @ 6" $A_s = 2.0\ in^2$

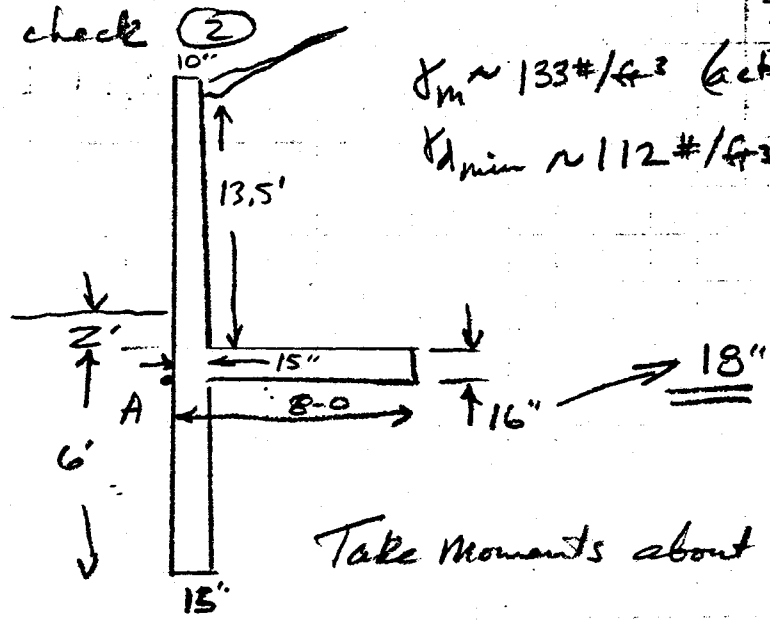
footing extends to next joint & part of channel ∴ overturning is not a factor
4' − 1.25 = 2.75' long wall section

AZ Buckhorn-Mesa Signal Butte FRS

SL 4-3-84 ICC 5/18/84

Emergency Spillway Retaining Wall 4

check (2)



$\gamma_m \sim 133\#/ft^3$ (active)

$\gamma_{d\,min} \sim 112\#/ft^3$ (passive)

Take moments about A

		#		ft#
W_1	$\left(\frac{15}{12}\right)(6)(150)$	1125	$\left(\frac{15}{24}\right)$	703.1
W_2	$\left(\frac{10}{12}\right)(14)(150)$	1750	$\left(\frac{5}{12}\right)$	729.2
W_3	$\left(\frac{5}{24}\right)(14)\ 150$	437.5	$\left(\frac{5}{36}+\frac{10}{12}\right)$	425.3
W_4 (6.75)	$\left(\frac{16}{12}\right)(6.75)(150)$	1350	(4.625)	6243.8
W_5	$(133)\left(\frac{13.5+17}{2}\right)\left(\frac{6.75+7.17}{2}\right)$	14,116.6	(approx. 3.48+1.04)	63,807.0
		18,779.1		71,908.4 ft#

~Approx. @ 3.829 ft.

Fig 2.12 F.W.S.

$P_a = 0.63(133)(14.83)^2(.5) = 9,213.9\ \#$ @ $\frac{14.83}{3} = 4.94$ ft

~Need to consider footing beneath slab.

$M_p = (4.94)(9213.9) = 45,516.7$ ft#

$\frac{M_w}{M_p} = SP$ (overturn) $= 1.58$ OK

AZ Buckhorn-Mesa WPP, Signal Butte FRS
SL 4-2-84 ICC 5/18/84

Emergency Spillway Retaining Wall 5

$M_{wall} = 0.63(133)(13.5)^2(.5)(\frac{13.5}{3}) = 34,359.1$ ft#.

$d = 15-3$, 12" ES-164 $1.97 = A_s$ req'd. (in^2)

use #9@6" (2.0 in^2)

V toe (cut off) $= 0.63(14.83)^2(133) = 18,428$ #

less ds. fill $(1)(3.33)^2(112) = 1,242$ #

17,186 # (119)

1977 ACI allows $2\sqrt{f'_c} = 126$.
(& SCS)

$\frac{17186}{12.5 \times 12} = 114.6$ psi. OK

$u = \frac{V}{\Sigma o j d} = \frac{17186}{(7.09)(.86)(12)} = 234.9$ psi. <270 OK.

$M_{footing}$ $(\overset{W_5}{14,116.6\#} + \overset{W_4}{1350\#})(\frac{6.75}{2}) \simeq 52,200$ ft#

$d = 13.5$ $A_s = 2.67\ in^2$ $A'_s = 0.5\ in^2$

#9 @4", top, #7@12 bottom.

adjust footing depth to 18", $M \sim 52770$ ft#.

$d = 15$ $A_s < 1.9\ in^2$ use #9 @6"

18" footing.

$V_{footing} \sim 15,635.4$ #

$v = \frac{V}{bd} = \frac{15635.4}{12 \cdot 15} \simeq 87$ psi, <126 OK.

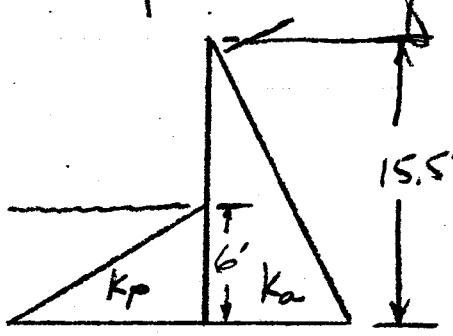
AZ Buckhorn-Mesa WPP, Signal Butte FRS
SL 4-4-84 ICC 5/10/84
Emergency Spillway Retaining Wall 6

T&S, 15" wall exposed #6@12
unexposed #4@12
18" footing unexposed #5@12

check ③

assume no footing - wall 15.5 ft high.

take moments about bottom of wall, ignor wt. of wall. 2:1 backfill, dam.



15.5' wall, 15' backfill @ 2:1

$K_a = 0.63$ prior calc. w/ 2:1 slope

$P_a = 0.63(133)(15)^2(.5) = 9,426.4$ #

$P_p \sim 1.0(112)(6)^2(.5) = 2,016.0$ #

check for equilibrium @ that wall ht.

$9,426.4 = (112)(1.0)(.5)x^2$

$x = \sqrt{\frac{9426.4}{56}} = 12.97$, 13 ft.

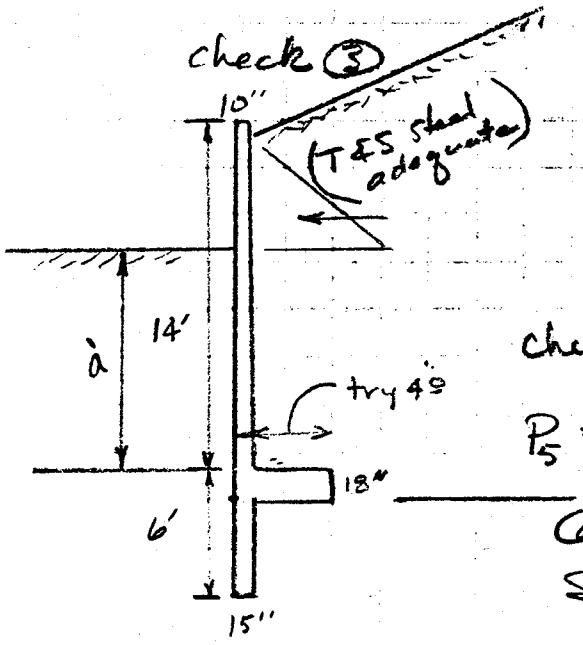
by this (stiff) criterion

NO, change to trapezoidal footing

AZ Buckhorn Mesa WPP, Signal Butte FRS

SL 4-4-84 ICC 5/10/84

Emergency Spillway Retaining Wall ?



$\gamma_m = 133\ \#/ft^3$ use active

$\gamma_d = 112\ \#/ft^3$ use passive

$\phi = 35°$

check moment for steel, top 5' wall

$P_5 = (0.63)(4.5)^2\left(\frac{133}{2}\right) = 848.4\ \#$

@(1.5 ft) $M = 1272.6$ ft#

Steel req'd, 0.11 in² T&S: #4 = 0.2 in²

$W_1 = \left(\frac{10}{12}\right)(14)(150)$	1750	$\left(\frac{5}{12}\right)$	729.2
$W_2 = \left(\frac{5}{24}\right)(14)(150)$	437.5	(.972)	425.2
$W_3 = (6)\left(\frac{15}{12}\right)(150)$	1125	(0.625)	703.1
$W_4 = (1.5)(4-1.25)(150)$	618.75	(2.625)	1624.2
$W_5 \sim \left(\frac{13.5+15.0}{2}\right)(2.75)(133)$	5211.94	(2.625)	13,681.3
	9143.19		17,163.0

acts @ 1.93'

P_A (from embankment) $= (15)^2(.63)\left(\frac{133}{2}\right) = 9,426.4\ \#$

P_p (from channel slope) $= (10.5)^2(1)\left(\frac{112}{2}\right) = 6,174.0\ \#$

$M_A = (5.0)(9426.4) = 47,132$ ft#

$M_p = 3.5\ (6174) = 21,609$ ft#

AZ Buckhorn-Mesa WPP, Signal Butte FRS,
SL 4-5-84 ICC 5/18/84
Emergency Spillway Retaining Wall. 8

$\Sigma M = 17,163.0 + 21,609 - 47,132 = -8,360.0$ ft#

add one foot to footing length.

$W_4 = (1.5)(5-1.25)(150)$ 843.75 (3.125) 2,636.7

$W_5 \simeq \left(\frac{13.5+15.5}{2}\right)(3.75)(133)$ 7,231.88 (3.125) approx. 22,599.6

$+ W_1 + W_2 + W_3$ (?) 1,857.5

27,093.8

$\Sigma M = 27,093.8 + 21,609 - 47,132 = 1570.8$ ft#
OK.

use footing length, 5 ft. from d.s. wall face,

Stem steel req'd.

$(0.63)(133)\frac{(13.5)^2}{2}(4.5) = 34,359.1$ ft#

$(1)(112)\frac{(9)^2}{2}(3) \doteq -13,608.$ ft#

20,751.1 ft#

$d = 12.5''$ $A_s = 1.1 in^2$

toe steel req'd. $M @ (W_4 + W_5)$ 1.88 = 15.2 Kft.

$d = 15.5 in^2$ $A_s \simeq 0.64 in^2$

AZ Buckhorn-Mesa WPP, Signal Butte FRS
SL 4-5-84 ICC 5/18/84
Emergency Spwy. Retaining Wall 9

check ④

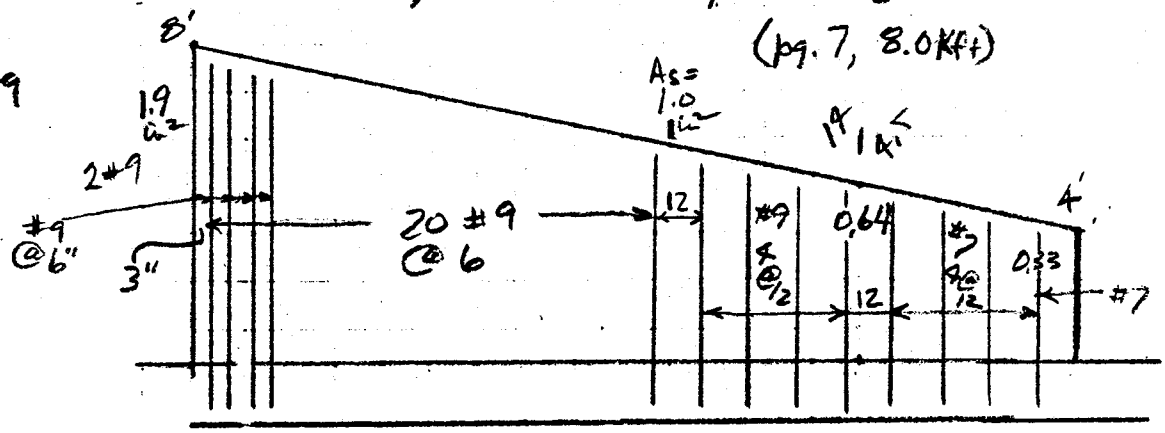
assume 15.5' wall, 2.5' ds. exposed.

$P_A = 9{,}426$ & $M_A = 47{,}132$ ft# as before

$M_p = (13.0)^2(1)\left(\frac{112}{2}\right)\left(\frac{13}{3}\right) = 41{,}010.7$

make footing trapezoidal — extend to "check 4", then stop. $A_s = 0.33\ in^2$ (pg. 7, 8.0 kft)

Footing

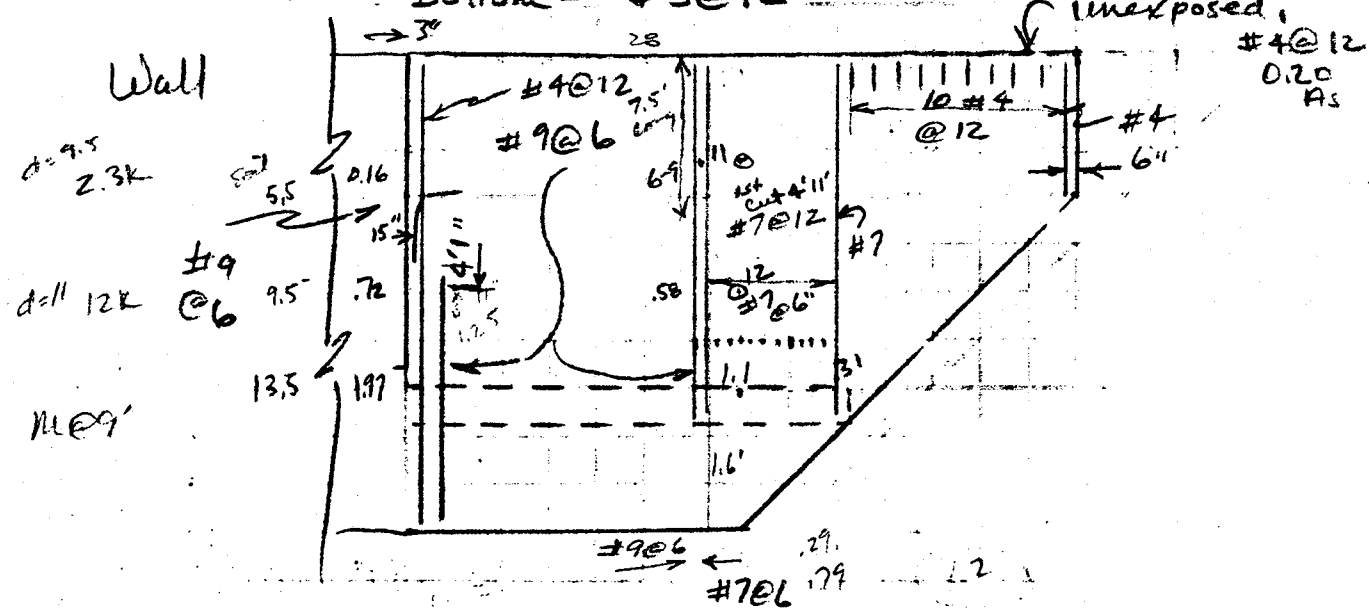


1.9, 1.0, 0.64 > 14

0.09 .085/ft. .069/ft.

T&S footing = #5@12 = 0.31 in²
bottom — #5@12

Wall

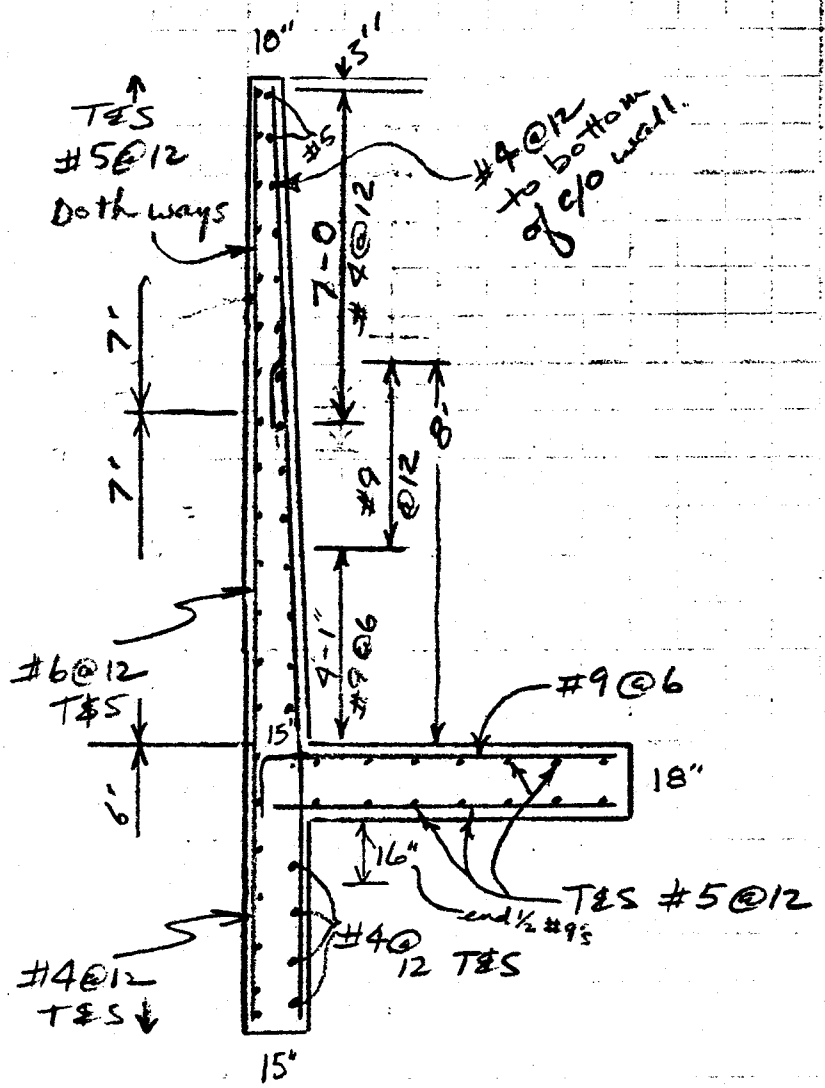


AZ
SL

Signal Butte FRS

4-5-84

E.S. Retaining Wall steel



Wall @ 2

10

3"
6
3"

x

x 12.5
14 15

#9-34"
18
12

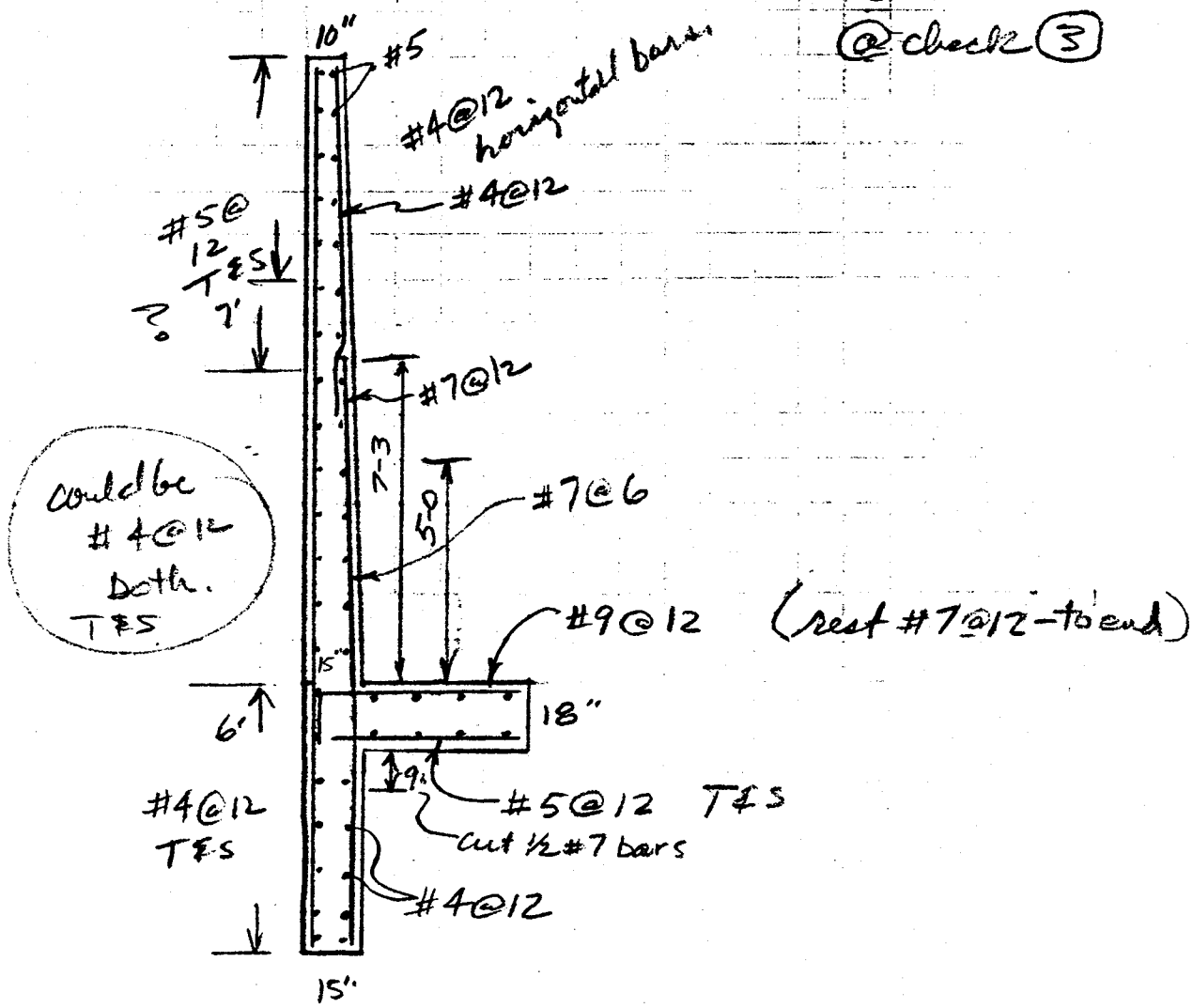
AZ
SL

Buckhorn-Mesa Signal Butte FRS

4-5-84

E.S, Retaining Wall, steel

@ check (3)



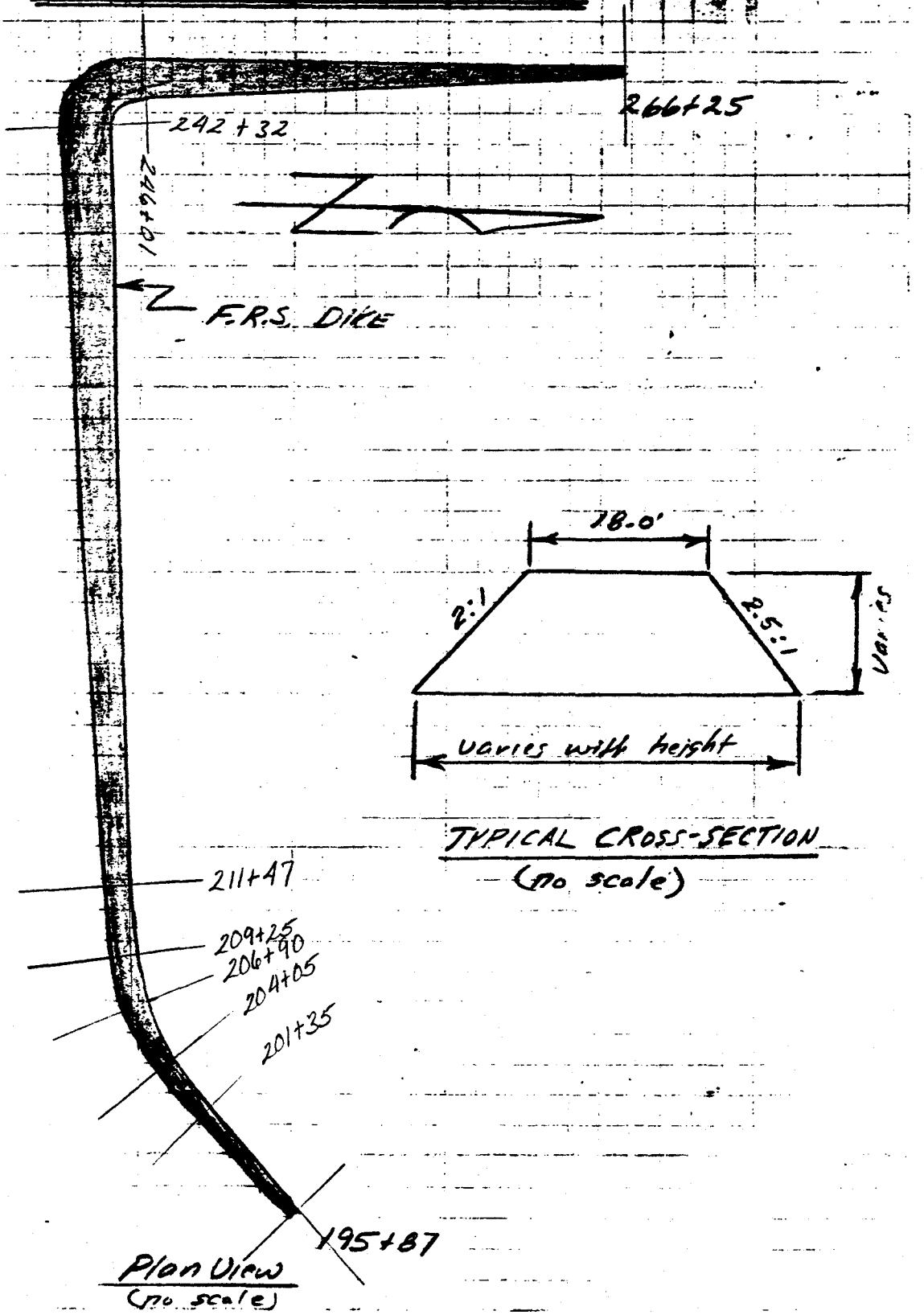
Subject	Calculations			Check		
	Quanity	Units	Initials	Quanity	Units	Initials
I. Clearing & Grubbing						
a.) Under F.R.S Embankment	19.19	Ac.	R.A.P.	19.22	Ac.	J.C
b.) Borrow Area	85.6	Ac.	R.A.P.	85.5963	Ac.	A.M.
c.) Emergency Spillway outlet channel	1.6	Ac.	R.A.P.	1.5486	Ac.	A.M.
d.) Principal Spillway outlet channel	0.348	Ac.	R.A.P.	0.348	Ac.	ADM
total =	106.73	Ac.				
Use	107 Ac					

COMPUTATION SHEET

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: ARIZONA PROJECT: SIGNAL BUTTE F.R.S.
R.A.P. DATE: 3/8/84 CHECKED BY: Ice DATE: 3/23/84 JOB NO.
SUBJECT: Clearing & Grubbing Acreage Calculations SHEET 1 OF 5

Under F.R.S. Embankment:



COMPUTATION SHEET
SCS-ENG-5204 Rev. 9-70

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: ARIZONA
PROJECT: SIGNAL BUTTE F.R.S.
BY: R.A.P. DATE: 3/8/84
CHECKED BY: DATE: JOB NO.:
SUBJECT: Clearing & Grubbing Acreage Calculations
SHEET 2 OF 5

Sta.	Top of F.R.S.	Top of ground	distance between Sta	Bottom width	Ac
195+87	1718.51	1718.51		18.0'	
			13'		342.22
196+00	1721.00	1717.3		34.65'	
			100'		3,773.25
197+00	1721.07	1716.0		40.81'	
			25'		~~1,004.5~~ .63
197+25	1721.09	1716.3		39.55	
			275'		~~13,036.37~~ 13,037.0
200+00	1721.28	1713.0		55.26'	
			100'		5,924.0 .25
201+00	1721.35	1711.3		63.22'	
			100'		6,563.0 .25
202+00	1721.42	1710.3		68.04'	
			175'		13,056.75
203+75	1721.54	1707.5		81.18'	
			25'		2,047.5
204+00	1721.56	1707.2		82.62'	
			200'		17,892.0
206+00	1721.70	1704.3		96.30'	
			100'		9,488.0 .25
207+00	1721.77	1705.0		93.46'	
			100'		9,587.0 .25
208+00	1721.84	1704.0		98.28'	
			125'		~~13,005.0~~ 13,013.4
209+25	1721.93	1701.5		109.80'	
			120'		~~13,605.0~~ 13,613.40
210+45	1721.99	1700.0		116.95	
			55'		7,423.62 .76
211+00	1722.00	1692.0		153.00'	
			45'		6,682.5
211+45		1694.0		144.00'	
			105'		15,120.0
212+50		1694.0		144.00'	
			25'		3,740.62 .63
212+75		1691.5		155.25'	
			75'		10,344.37 .38
213+50		1699.2		120.6'	
			150'		18,765.0
215+00		1697.2		129.6'	
			375'		50,287.5
218+75		1695.2		138.6'	
			50'		7,650.0

~~247,709.51~~
229,357.02 (229,337.95)

COMPUTATION SHEET
SCS-ENG-523A Rev. 9-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

387

STATE: ARIZONA | PROJECT: SIGNAL BUTTE F.R.S.
BY: R.A.P. | DATE: 3/8/84 | CHECKED BY: | DATE: | JOB NO:
SUBJECT: Clearing & Grubbing Acreage Calculations | SHEET 3 OF 5

Sta.	Top of F.R.S.	Top of ground	distance between Sta.	bottom width	Ft²	
219+25	1722.00	1688.8		167.4'		
			75'		11,778.75	
220+00		1693.4		146.7'		
			50'		7,323.75	
220+50		1693.5		146.25'		
			25'		~~2,445.62~~	3,695
220+75		1692.8		149.4'		
			15'		2,217.37	.38
220+90		1693.5		146.25'		
			60'		8,707.5	
221+50		1694.0		144.0'		
			50'		7,368.75	
222+00		1692.5		150.75'		
			50'		7,346.25	
222+50		1694.2		143.1'		
			100'		14,985.0	
223+50		1691.2		156.6'		
			65'		9,828.0	
224+15		1693.6		145.8'		
			85'		12,469.5	
225+00		1693.2		147.6'		
			150'		21,870.0	
226+50		1694.0		144.0'		
			100'		15,030.0	
227+50		1691.2		156.6'		
			35'		6,142.5	
227+85		1682.8		194.4'		
			60'		11,299.5	
228+45		1685.5		182.25'		
			65'		11,012.62	.63
229+10		1691.2		156.6'		
			90'		13,932.0	
230+00		1692.0		153.0'		
			50'		7,785.0	
230+50		1690.8		158.4'		
			25'		3,892.5	
230+75		1692.0		153.0'		
			65'		10,383.75	
231+40		1689.0		166.5'		
			50'		7,965.0	
231+90		1692.2		152.1'		
			60'		~~9,624.0~~	9,625.5

434,015.90 204,658.88 ~~(203,407.36)~~

COMPUTATION SHEET
SCS-ENG-523a Rev. 9-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE ARIZONA | PROJECT SIGNAL BUTTE F.R.S.
BY R.A.P. | DATE 8/8/84 | CHECKED BY | DATE | JOB NO.
SUBJECT Clearing & Grubbing Acreage Calculations | SHEET 4 OF 5

Sta.	Top of F.R.S.	Top of ground	distance between Sta.	bottom width	Ft²	
232+50	1722.0	1688.5		168.7'		
			50'		~~8,222.5~~	8,223.7
233+00		1690.4		160.2'		
			50'		7,717.5	✓
233+50		1693.0		148.5'		
			150'		22,882.5	✓
235+00		1691.2		156.6'		
			50'		7,920.0	✓
235+50		1690.4		160.2'		
			65'		10,179.0	✓
236+15		1692.0		153.0'		
			85'		13,330.12	.13
237+00		1690.3		160.65		
			100'		15,682.5	✓
238+00		1692.0		153.0'		
			115'		18,423.0	✓
239+15		1688.8		162.4'		
			10'		1,773.0	✓
239+25		1684.4		187.2'		
			15'		2,743.87	.88
239+40		1686.3		178.65'		
			35'		6,174.0	✓
239+75		1687.3		174.15'		
			25'		4,471.87	.88
240+00		1685.2		183.6'		
			32'		~~5,585.6~~	5587.20
240+32		1689.2		165.5'		
			118'		~~19,720.75~~	19,726.65
241+50		1688.5		168.75'		
			15'		2,615.62	.63
241+65		1686.0		180.0'		
			60'		10,422.0	✓
242+25		1688.8		167.4'		
			45'		7,735.5	✓
242+70		1686.8		176.4'		
			55'		~~9,402.25~~	9,405.00
243+25		1689.2		165.5'		
			75'		~~12,855.0~~	12,858.75
244+00		1686.6		177.3'		
			100'		16,785.0	✓
245+00		1690.8		158.4'		
			100'		15,525.0	✓
			220,181.85		~~(230,166.50)~~	

COMPUTATION SHEET
SCS-ENG-523A Rev. 7-69

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE ARIZONA PROJECT SIGNAL BUTTE F.R.S. 389

BY R.A.P. DATE 3/9/84 CHECKED BY DATE JOB NO.

SUBJECT Clearing & Grubbing Acreage Calculations SHEET 5 OF 5

Sta.	Top of F.R.S.	Top of ground	distance between Sta.	bottom width	Ft²
246+00	1722.0	1692.2		152.1'	
			100'		14,805.0 ✓
247+00		1694.0		144.0'	
			100'		~~14,465.0~~ ✓ 14,467.50
248+00		1693.7		145.3'	
			125'		~~17,150.0~~ ✓ 17153.44
249+25	1721.99	1697.3		129.1'	
			75'		9,490.12 ✓ .5
250+00	1721.95	1698.4		123.97'	
			50'		6,466.25 ✓ .5
250+50	1721.93	1696.0		134.68'	
			50'		6,595.75 ✓ .88
251+00	1721.90	1697.2		129.15'	
			65'		8,858.2 ✓ .36
251+65	1721.87	1694.0		143.41'	
			35'		4,923.21 ✓ .45
252+00	1721.85	1695.2		137.92'	
			65'		8,229.32 ✓ .49
252+65	1721.82	1700.2		115.29'	
			110'		12,469.05 ✓ ✓
253+75	1721.76	1701.0		111.42'	
			250'		24,637.5 ✓ ✓
256+25	1721.64	1706.6		85.68'	
			150'		12,352.5 ✓ ✓
257+75	1721.56	1708.0		79.02'	
			510'		~~31,974.45~~ ✓ 31,980.83
262+85	1721.31	1715.0		46.37'	
			90'		~~3,759.3~~ ✓ 3,760.43
263+75	1721.26	1717.0		37.17'	
			25'		-905.62 ✓ .63
264+00	1721.14	1717.3		35.28'	
			225'		5,994.0 ✓ ✓
266+25	1721.0	1721.0		18.0'	

183,090.04

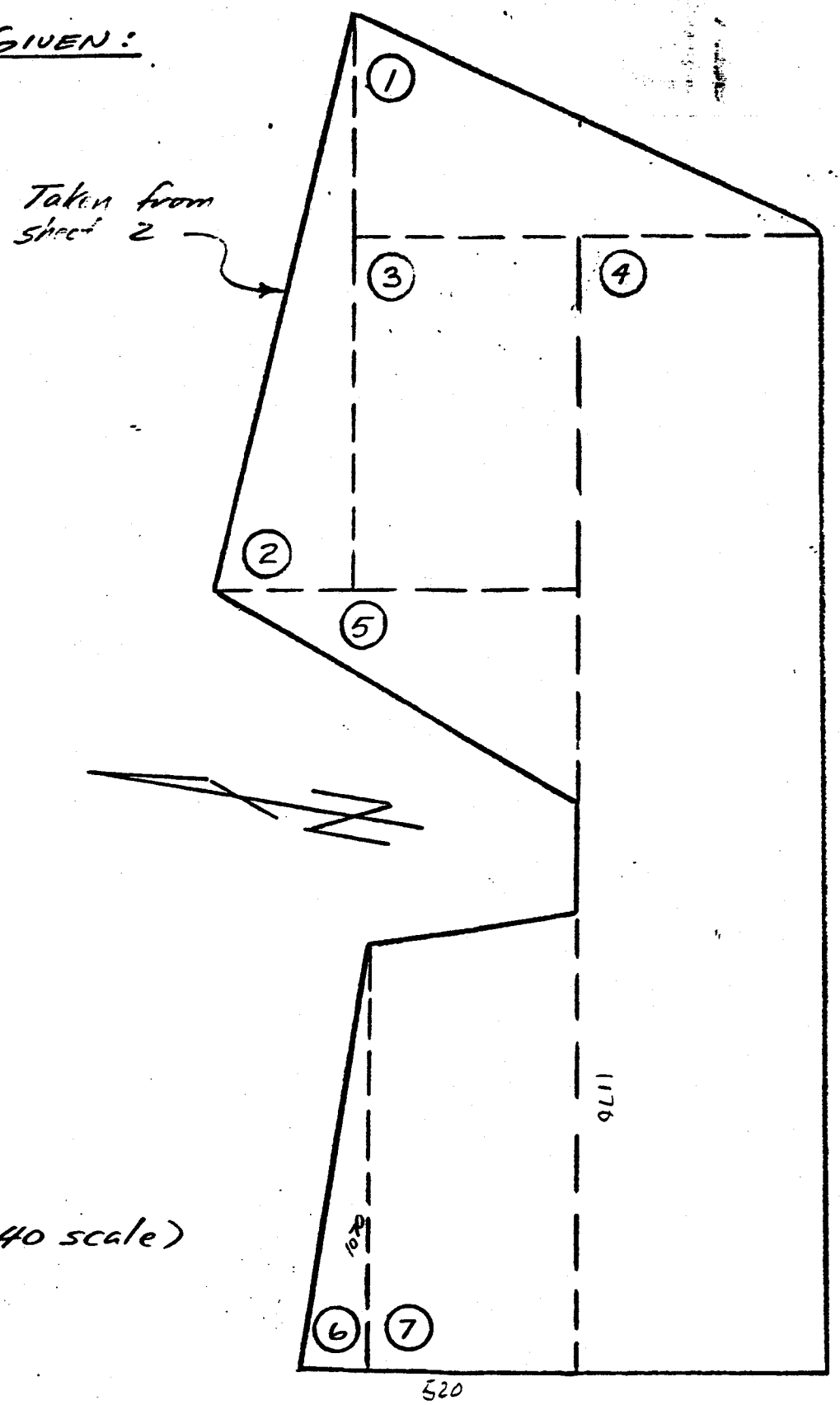
Total Ft² ~~835,987.22~~ 837,287.79

835,987.22 ÷ 43,560 = ~~19.19 Ac~~ 19.22

(183,075.33)

ARIZONA SIGNAL BUTTE F.R.S.
R.A.P. 3/28/84 QBM 4-12-84 BORROW AREA
CLEARING & GRUBBING ACRAGE CALCULATIONS 1 2

GIVEN:



(40 scale)

ARIZONA SIGNAL BUTTE F.R.S.
R.A.P. 3/28/84 DBM 4-12-84 BORROW AREA
CLEARING & GRUBBING ACRAGE CALCULATIONS 2 2

SOLUTION:

① RIGHT TRIANGLE

$\frac{500' \times 1165'}{2} = 291,250.00\ ft^2$

② RIGHT TRIANGLE

$\frac{350' \times 1435'}{2} = 251,125.00\ ft^2$

③ RECTANGLE

$565' \times 985' = 556,525.00\ ft^2$

④ RECTANGLE

$600' \times 2860' = 1,716,000.00\ ft^2$

⑤ RIGHT TRIANGLE

$\frac{540' \times 900'}{2} = 243,000.00\ ft^2$

⑥ RIGHT TRIANGLE

$\frac{165' \times 1070'}{2} = 88,275.00\ ft^2$

⑦ TRAPEZOID

$\frac{1070' + 1170'}{2} \times 520' = 582,400.00\ ft^2$

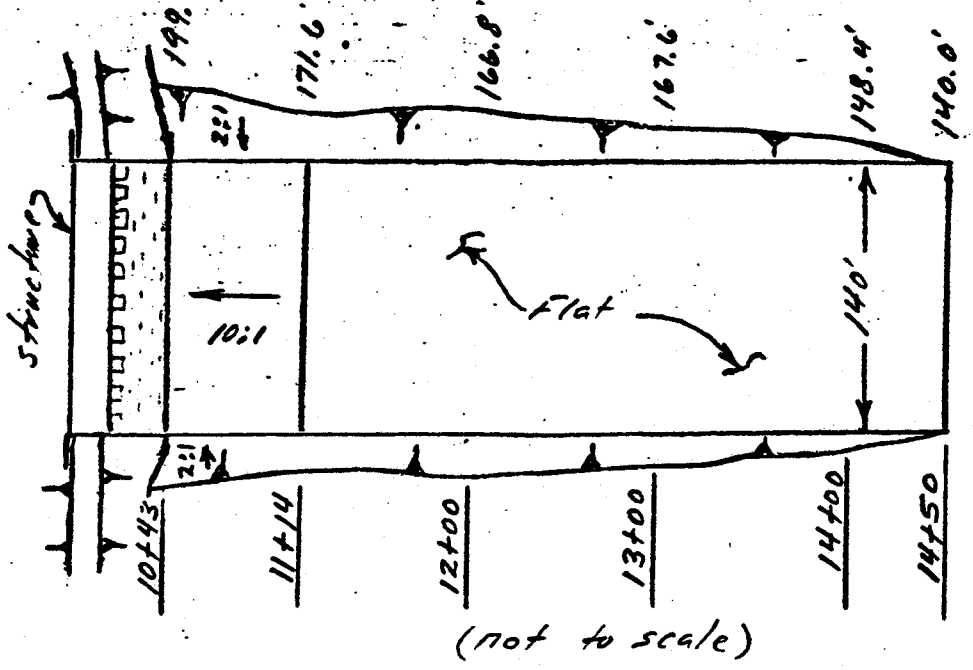
$3,728,575.00\ ft^2$

$3,728,575.00 \div 43,560 = 85.5963\ Ac.$

ARIZONA SIGNAL BUTTE F.R.S.
R.A.P. 3/29/84 ABM 4-12-84 EMERGENCY SPILLWAY
CLEARING & GRUBBING OUTLET CHANNEL / /

GIVEN:

(From excavation calculations)



SOLUTION:

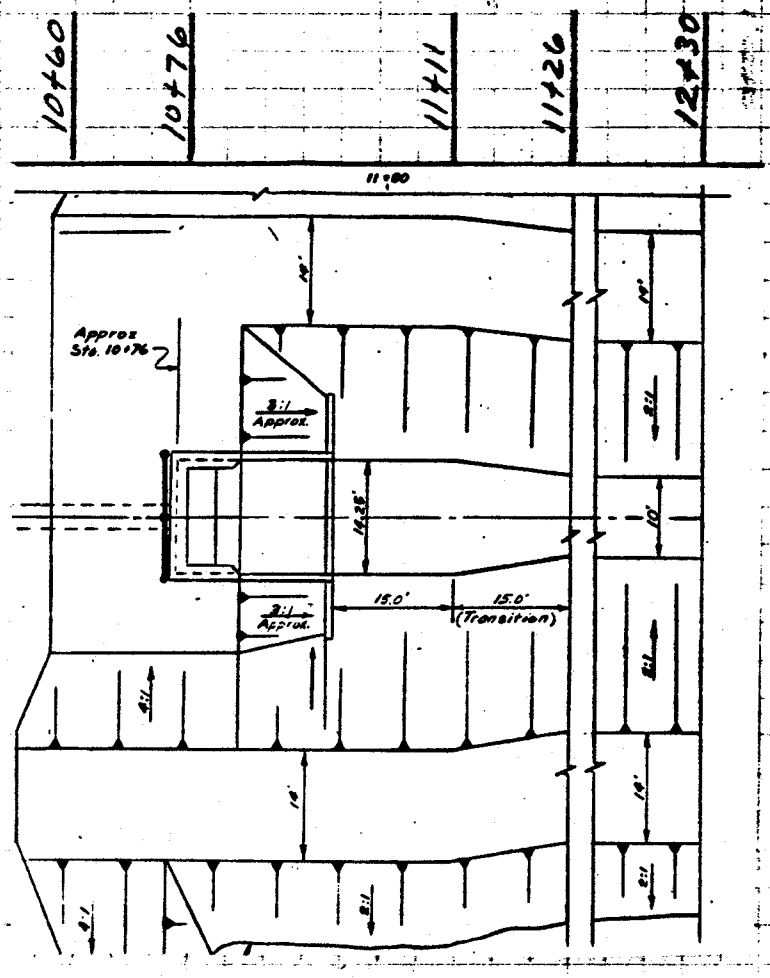
Sta	dist.	width	Ft²
10+43		199.6'	
	71'		13,177.60
11+14		171.6'	
	86'		14,551.20
12+00		166.8'	
	100'		16,720.00
13+00		167.6'	
	100'		15,800.00
14+00		148.4'	
	50'		7,210.00
14+50		140.0'	

Total Ft² = 67,458.80 CK

67,458.80 ÷ 43560' = 1.5486 Ac. CK

STATE ARIZONA PROJECT SIGNAL BUTTE F.R.S.
R.A.P. DATE 5/3/84 COMPUTED BY agm DATE 5-9-84 Principal Spillway
CLEARING & GRUBBING - OUTLET CHANNEL SHEET 1 OF 1

GIVEN:



SOLUTION:

Sta.	dist.	width	Ft 2
10+60		94'	
	16'		1,504
10+76		94'	
	35'		3,255
11+11		92'	
	15'		1,350
11+26		88'	
	104'		9,048
12+30		86'	

Total A^2 = 15,157

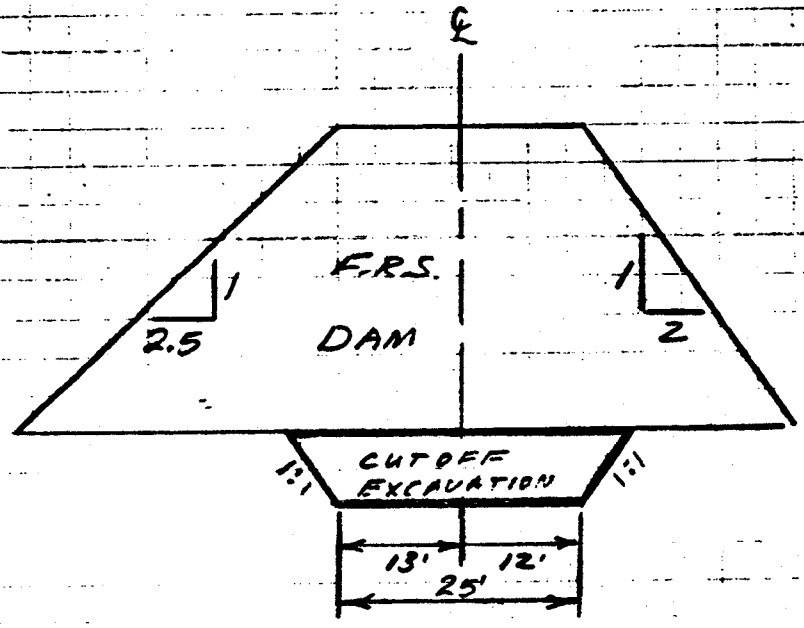
15,157 ÷ 43,560 = 0.348 Ac. ✓

SIGNAL BUTTE F.R.S. (1984)

Subject	Calculations			Check		
	Quanity	Units	Initials	Quanity	Units	Initials
II. Excavation						
a.) Cutoff Excavation	42,554	yd^3	R.A.P.	42,579.94	yd^3	I.C.
b.) Emergency Spillway outlet Excavation	21,106	yd^3	R.A.P.	21,105.6	yd^3	A.M.
c.) Gated Outlet Structure Excavation	1,515	yd^3	A.D.M.	1,515	yd^3	ICC
d.) Principal Spillway Structure Excavation	1,293.23	yd^3	A.D.M.	1,293	yd^3	BJL
e.) Emergency Spillway Structure Excavation	2,531.4	yd^3	A.D.M.	2,531	yd^3	BJL
f.) Channel Diversion	748.84	yd^3	B.J.L.	1,070.52	yd^3	A.D.M
g.) Principal Spillway outlet excavation	1410.3	yd^3	B.J.L.	1410.96	yd^3	A.D.M
h.) inlet & outlet trenchs for Gated Outlet	1044	yd^3	R.A.P.	1044	yd^3	JEB
		total =		72,550.02	yd^3	
		Use		72,550	yd^3	

STATE ARIZONA PROJECT SIGNAL BUTTE F.R.S.
BY R.A.P. DATE 3/7/84 CHECKED BY ICC DATE 3/23/84 JOB NO.
SUBJECT CUTOFF EXCAVATION CALCULATIONS SHEET 1 OF 11

GIVEN:



CROSS-SECTION

SOLUTION:

Depth's of stations where ~~gotten~~ taken from sheets 3 thru 6 of the Plan & Profile Sheets on SIGNAL BUTTE F.R.S. Design.

Using the formula

$$\left(\frac{d \times 2}{2} + 25'\right) d = A^2$$

where: d = depth
2 = Combined side slopes.
25 = bottom width

COMPUTATION SHEET
SCS-Eng-52a Rev. 9-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE ARIZONA PROJECT SIGNAL BUTTE F.R.S.
BY R.A.P. DATE 3/6/84 CHECKED BY DATE JOB NO.
SUBJECT CUTOFF EXCAVATION CALCULATIONS SHEET 2 OF 11

STA.	Top of Ground	Bottom of trench	Height	End Area in ft²	
195+87	1718.51	1718.51	0.0'	0.00	
196+00	1718.51	1715.51	3.0'	84.00	
197+00	1715.00	1712.00	3.0'	84.00	
200+00	1713.03	1711.53	1.5'	39.75	
201+00	1711.21	1705.01	6.2'	193.44	
202+00	1710.24	1708.54	1.7'	45.39	Sheet 3 of
203+00	1708.20	1704.20	4.0'	116.00	
203+75	1708.10	1704.50	3.6'	102.96	
204+00	1708.08	1700.08	8.0'	264.00	
206+00	1704.05	1700.00	4.05'	~~117.53~~ 117.65	
208+00	1704.09	1701.09	3.0'	84.00	
210+00	1701.25	1698.50	2.75'	76.31	
211+00	1692.00	1682.00	10.0'	350.00	
213+10	1693.50	1679.50	14.0'	546.00	
214+00	1698.72	1696.02	2.7'	74.79	
216+10	1696.80	1693.80	3.0'	84.00	
217+00	1695.25	1690.00	5.25'	~~151.81~~ 158.81	Sheet 4 of
218+00	1695.50	1691.00	4.5'	132.75	
219+25	1688.80	1679.00	9.8'	341.04	
223+00	1692.25	1691.10	1.15'	30.07	
224+00	1693.05	1686.00	7.05'	225.95	

COMPUTATION SHEET
SCS-ENG-523A Rev 9-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: ARIZONA PROJECT: SIGNAL BUTTE F.R.S.
BY: R.A.P. DATE: 3/6/84 CHECKED BY: DATE:
SUBJECT: CUTOFF EXCAVATION CALCULATIONS SHEET 3 OF 11

STA	Top of Ground	Bottom of Channel	Height	End Area in FT	
225+00	1693.20	1692.20	1.0'	26.00	Sheet 4 of
226+00	1693.76	1686.00	7.76'	254.22	
227+10	1692.25	1688.00	4.25'	124.31	
228+00	1683.00	1676.50	6.5'	204.75	
229+30	1691.50	1684.75	6.75'	214.31	
230+00	1692.00	1683.00	9.0'	306.00	
232+10	1689.50	1689.00	0.5'	12.75	Sheet 5 of
234+00	1692.99	1683.99	9.0'	306.00	
235+00	1691.00	1687.00	4.0'	116.00	
236+30	1692.00	1682.00	10.0'	350.00	
237+00	1691.25	1683.50	7.75'	253.81	
238+30	1691.00	1681.00	10.0'	350.00	
240+30	1689.75	1686.00	3.75'	107.81	
241+65	1686.00	1684.00	2.0'	54.00	
243+00	1688.75	1687.75	1.0'	26.00	
244+00	1686.30	1685.75	0.55'	14.05	
245+00	1690.75	1688.50	2.25'	61.31	
246+00	1692.50	1685.00	7.5'	243.75	
248+00	1693.75	1691.25	2.0'	54.00	
249+63	1697.75	1688.00	9.75'	338.81	
250+00	1698.36	1694.56	3.8'	109.44	

COMPUTATION SHEET

SCS-ENG-323A Rev. 9-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

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STATE ARIZONA SIGNAL BUTTE F.R.S.

BY R.A.P. DATE 3/6/84 CHECKED BY DATE SCS

SUBJECT CUTOFF EXCAVATION CALCULATIONS SHEET 4 11

STA	Top of Ground	Bottom of Channel	Height	End Area in Feet
251+75	1694.00	1687.00	7.0'	224.00
254+00	1703.20	1699.75	3.45'	98.15
256+25	1706.6	1700.00	6.6'	208.56
258+00	1708.8	1705.50	3.3'	93.39
262+00	1715.20	1707.00	8.2'	272.24
264+00	1717.40	1711.00	6.4'	200.96
266+25	1721.00	1721.00	0.0'	0.00

Sheet 6 of

Useing

$$\left(\frac{\text{depth} \times \text{combined slope}}{2} + \text{bottom width}\right) \text{depth} = ft^2$$

or

$$\left(\frac{d \times z}{2} + 25'\right) d = ft^2$$

195+87 — 0.0 ft²

196+00

$$\left(\frac{3.0' \times 2}{2} + 25'\right) 3.0' = 84.0 ft^2$$

197+00

$$\left(\frac{3.0' \times 2}{2} + 25'\right) 3.0' = 84.0 ft^2$$

200+00

$$\left(\frac{1.5' \times 2}{2} + 25'\right) 1.5' = 39.75 ft^2$$

COMPUTATION SHEET
U.S.-ENG-S&3A Rev. 9-60

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: ARIZONA PROJECT: SIGNAL BUTTE F.R.S.
BY: R.A.P. DATE: 2/6/84 CHECKED BY: DATE: JOB NO.
SUBJECT: CUTOFF EXCAVATION CALCULATIONS SHEET 5 OF 11

201+00

$\left(\frac{6.2' \times 2}{2} + 25.0'\right) 6.2' = 193.44\ ft^2$

202+00

$\left(\frac{1.7' \times 2}{2} + 25.0'\right) 1.7' = 45.39\ ft^2$

203+00

$\left(\frac{4.0' \times 2}{2} + 25.0'\right) 4.0' = 116.0\ ft^2$

203+75

$\left(\frac{3.6' \times 2}{2} + 25.0'\right) 3.6' = 102.96\ ft^2$

204+00

$\left(\frac{8.0' \times 2}{2} + 25.0'\right) 8.0' = 264.0\ ft^2$

206+00

$\left(\frac{4.05' \times 2}{2} + 25.0'\right) 4.05' = 117.53\ ft^2$

208+00

$\left(\frac{3.0' \times 2}{2} + 25.0'\right) 3.0' = 84.0\ ft^2$

210+00

$\left(\frac{2.75' \times 2}{2} + 25.0'\right) 2.75' = 76.31\ ft^2$

211+00

$\left(\frac{10' \times 2}{2} + 25.0'\right) 10.0' = 350.0\ ft^2$

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

ARIZONA SIGNAL BUTTE F.R.S.
R.A.P. 3/6/84

CUTOFF EXCAVATION CALCULATIONS SHEET 6 OF 11

213+10

$\left(\frac{14.0' \times 2}{2} + 25.0'\right) 14.0' = 546.0\ ft^2$

214+00

$\left(\frac{2.7' \times 2}{2} + 25.0'\right) 2.7' = 74.79\ ft^2$

216+10

$\left(\frac{3.0' \times 2}{2} + 25.0'\right) 3.0' = 84.0\ ft^2$

217+00

$\left(\frac{5.25' \times 2}{2} + 25.0'\right) 5.25' = \cancel{151.81\ ft^2}$

218+00

$\left(\frac{4.5' \times 2}{2} + 25.0'\right) 4.5' = 132.75\ ft^2$

219+25

$\left(\frac{9.8' \times 2}{2} + 25.0'\right) 9.8' = 341.04\ ft^2$

223+00

$\left(\frac{1.15' \times 2}{2} + 25.0'\right) 1.15' = 30.07\ ft^2$

224+00

$\left(\frac{7.05' \times 2}{2} + 25.0'\right) 7.05' = 225.95\ ft^2$

225+00

$\left(\frac{1.0' \times 2}{2} + 25.0'\right) 1.0' = 26.0\ ft^2$

STATE ARIZONA PROJECT SIGNAL BUTTE F.R.S.
BY R.A.P. DATE 3/6/84 JOB NO
SUBJECT CUTOFF EXCAVATION CALCULATIONS SHEET 7 OF 11

226+00

$\left(\frac{7.76' \times 2}{2} + 25.0'\right) 7.76' = 254.22\ ft^2$

227+10

$\left(\frac{4.25' \times 2}{2} + 25.0'\right) 4.25' = 124.31\ ft^2$

228+00

$\left(\frac{6.5' \times 2}{2} + 25.0'\right) 6.5' = 204.75\ ft^2$

229+30

$\left(\frac{6.75' \times 2}{2} + 25.0'\right) 6.75' = 214.31\ ft^2$

230+00

$\left(\frac{9.0' \times 2}{2} + 25.0'\right) 9.0' = 306.0\ ft^2$

232+10

$\left(\frac{0.5' \times 2}{2} + 25.0'\right) 0.5' = 12.75\ ft^2$

234+00

$\left(\frac{9.0' \times 2}{2} + 25.0'\right) 9.0' = 306.0\ ft^2$

235+00

$\left(\frac{4.0' \times 2}{2} + 25.0'\right) 4.0' = 116.0\ ft^2$

236+30

$\left(\frac{10.0' \times 2}{2} + 25.0'\right) 10.0' = 350.0\ ft^2$

COMPUTATION SHEET

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE ARIZONA PROJECT SIGNAL BUTTE FRS
RAP CHECKED BY DATE 3/6/84 JOB NO.

CUTOFF EXCAVATION CALCULATIONS SHEET 8 OF 11

237+00

$\left(\frac{7.75' \times 2}{2} + 25.0'\right) 7.75' = 253.81 \text{ ft}^2$

238+30

$\left(\frac{10.0' \times 2}{2} + 25.0'\right) 10.0' = 350.0 \text{ ft}^2$

240+30

$\left(\frac{3.75' \times 2}{2} + 25.0'\right) 3.75' = 107.81 \text{ ft}^2$

241+65

$\left(\frac{2.0' \times 2}{2} + 25.0'\right) 2.0' = 54.0 \text{ ft}^2$

243+00

$\left(\frac{1.0' \times 2}{2} + 25.0'\right) 1.0' = 26.0 \text{ ft}^2$

244+00

$\left(\frac{0.55' \times 2}{2} + 25.0'\right) 0.55' = 14.05 \text{ ft}^2$

245+00

$\left(\frac{2.25' \times 2}{2} + 25.0'\right) 2.25' = 61.31 \text{ ft}^2$

246+00

$\left(\frac{7.5' \times 2}{2} + 25.0'\right) 7.5' = 243.75 \text{ ft}^2$

248+00

$\left(\frac{2.0' \times 2}{2} + 25.0'\right) 2.0' = 54.0 \text{ ft}^2$

ARIZONA RAP. PROJECT SIGNAL BUTTE F.R.S.
DATE 3/7/84 CHECKED BY DATE JOB NO.
SUBJECT CUTOFF EXCAVATION CALCULATIONS SHEET 9 OF 11

249+63

$\left(\frac{9.75' \times 2}{2} + 25.0'\right) 9.75' = 338.81\ ft^2$

250+00

$\left(\frac{3.8' \times 2}{2} + 25.0'\right) 3.8' = 109.44\ ft^2$

251+75

$\left(\frac{7.0' \times 2}{2} + 25.0'\right) 7.0' = 224.0\ ft^2$

254+00

$\left(\frac{3.45' \times 2}{2} + 25.0'\right) 3.45' = 98.15\ ft^2$

256+25

$\left(\frac{6.6' \times 2}{2} + 25.0'\right) 6.6' = 208.56\ ft^2$

258+00

$\left(\frac{3.3' \times 2}{2} + 25.0'\right) 3.3' = 93.39\ ft^2$

262+00

$\left(\frac{8.2' \times 2}{2} + 25.0'\right) 8.2' = 272.24\ ft^2$

264+00

$\left(\frac{6.4' \times 2}{2} + 25.0'\right) 6.4' = 200.96\ ft^2$

266+25

$0.0\ ft^2$

SCS-529
REV 8-58

U. S. DEPARTMENT OF AGRICULTUR
SOIL CONSERVATION SERVICE

404

EARTHWORK COMPUTATION SHEET

LOCATION: 5½ 12 - T1N - R7E	OWNER: MARICOPA FLOOD CONTROL DISTRICT
WATERSHED: Buckhorn - Mesa	SUB-WATERSHED: SIGNAL BUTTE F.R.S. / SITE NO.
CONTRACTOR: —	COMPUTED BY: R.A.P. / DATE: 3/7/84
ITEM: CUTOFF EXCAVATION CALCULATIONS	CHECKED BY: / DATE:
CONTRACT NO.: —	ESTIMATE: ——— CU. YDS. / ACTUAL: ——— CU. YDS

STATION	END AREA SQ. IN.	END AREA SQ. FT.	SUM OF END AREAS SQ. FT.	DISTANCE IN FEET	SECTION PRODUCTS CU. FT.	VOLUME CU. YD.	REMARKS
195+87		0.00					
			84.0	13	1092		
196+00		84.00					1092.00+
			168.0	100	16800		16800.00+
197+00		84.00					37125.00+
			123.75	300	37125		23319.00+
200+00		39.75					23883.00+
			233.19	100	23319		16139.00+
201+00		193.44					16422.00+
			238.83	100	23883		9174.00+
202+00		45.39					76306.00+
			161.39	100	16139		40306.00+
203+00		116.00					32062.00+
			218.96	75	16422		42631.00+
203+75		102.96					188160.00+
			366.96	25	9174		55871.10+
204+00		264.00					33345.90+
			381.53	200	76306		21222.90+
206+00		~~117.53~~					28456.00+
			201.53	200	40306		59223.75+
208+00		84.00					139166.25+
			160.31	200	32062		25602.00+
210+00		76.31					25195.00+
			426.31	100	42631		28022.00+
211+00		350.00					41638.30+
			896.00	210	188160		29615.40+
213+10		546.00					54477.80+
			620.79	90	55871	10	36421.70+
214+00		74.79					66937.50+
			158.79	210	33345	90	60562.50+
216+10		84.00					(1329177.10T)
			235.81	90	21222	90	
217+00		~~151.81~~					
			284.56	100	28456		
218+00		132.75					
			473.79	125	59223	75	
219+25		341.04					
			371.11	375	139166	25	
223+00		30.07					
			256.02	100	25602		
224+00		225.95					
			251.95	100	25195		
225+00		26.00					
			280.22	100	28022		
226+00		254.22					
			378.53	110	41638	30	
227+10		124.31					
			329.06	90	29615	40	
228+00		204.75					
			419.06	130	54477	80	
229+30		214.31					
			520.31	70	36421	70	
230+00		306.00					
			318.75	210	66937	50	
232+10		12.75					
			318.75	190	60562	50	
234+00		306.00					

SHEET 10 OF 11 SHEETS

SCS-529
REV 8-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

EARTHWORK COMPUTATION SHEET

LOCATION S 1/2 12 - T1N - R7E		OWNER MARICOPA FLOOD CONTROL DISTRICT	
WATERSHED Buckhorn - Mesa		SUB-WATERSHED SIGNAL BUTTE F.R.S.	SITE NO.
CONTRACTOR —		COMPUTED BY R.A.P.	DATE 3/7/84
ITEM CUTOFF EXCAVATION CALCULATIONS		CHECKED BY	DATE
CONTRACT NO. —		ESTIMATE ——— CU. YDS.	ACTUAL ——— CU. YDS.

STATION	END AREA SQ. IN.	END AREA SQ. FT.	SUM OF END AREAS SQ. FT.	DISTANCE IN FEET	SECTION PRODUCTS CU. FT.	VOLUME CU. YD.	REMARKS
234+00		306.00					
			422.00	100	42200		42200.00+
235+00		116.00					
			466.00	130	60580		60580.00+
236+30		350.00					
			603.81	70	42266	70	42266.70+
237+00		253.81					
			603.81	130	78495	30	78495.30+
238+30		350.00					
			457.81	200	91562		91562.00+
240+30		107.81					
			[illegible]	135	21844	35	21844.35+
241+65		54.00					
			80.00	135	10800		10800.00+
243+00		26.00					
			40.05	100	4005		4005.00+
244+00		14.05					
			75.36	100	7536		7536.00+
245+00		61.31					
			305.06	100	30506		30506.00+
246+00		243.75					
			297.75	200	59550		59550.00+
248+00		54.00					
			392.81	163	64028	03	64028.03+
249+63		338.81					
			448.25	37	16585	25	16585.25+
250+00		109.44					
			333.44	175	58352		58352.00+
251+75		224.00					
			322.15	225	72483	75	72483.75+
254+00		98.15					
			306.71	225	69009	75	69009.75+
256+25		208.56					
			301.95	175	52841	25	52841.25+
258+00		93.39					
			365.63	400	146252		146252.00+
262+00		272.24					
			473.20	200	94640		94640.00+
264+00		200.96					
			200.96	225	45216		45216.00+
266+25		0.00					
				54)	2,297,930	48	= 42,554.26
					Use	~~42,554~~ yd³	
						~~42,580 yd³~~	

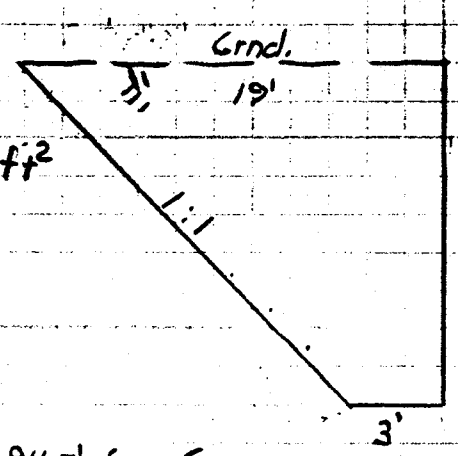
(1,068,753.38T)

SHEET 11 OF 11 SHEETS

STATE AZ PROJECT SIGNAL BUTTE F.R.S.
BY A.D.M. DATE 4-20-84 CHECKED BY BJL DATE 5-4-84 JOB NO.
SUBJ. Emergency Spillway structure Excavation SHEET 1 OF 2

PROFILE

104' from ℄

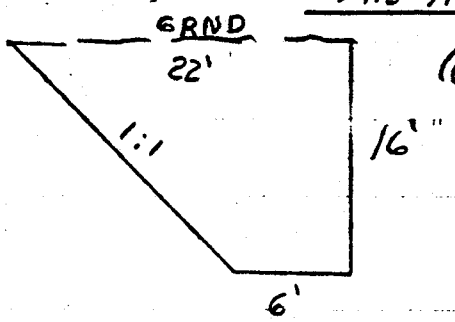


Area:

$(3')(16') + \frac{(16)(16)}{2} = 176\ ft^2$

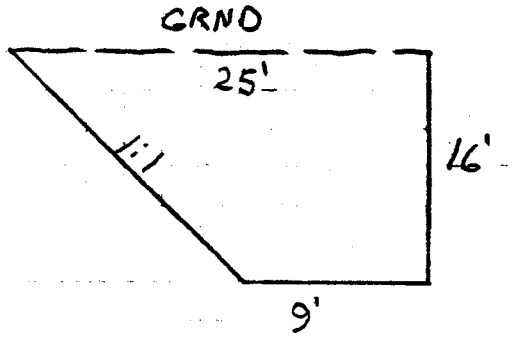
Channel common

94.5' from ℄



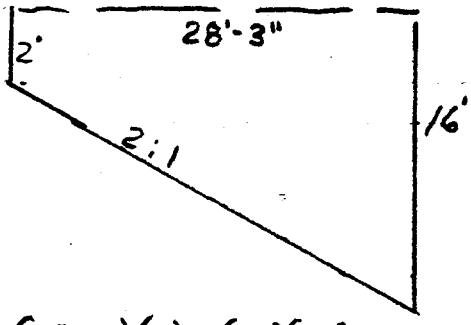
$(6)(16) + \frac{(16)(16)}{2} = 224\ ft^2$

76' from ℄



$(9)(16) + \frac{(16)(16)}{2} = 272\ ft$

76' from ℄ to ℄



$(28.25)(2) + \frac{(14)(28)}{2} = 252.5\ ft^2$

COMPUTATION SHEET

SCS-ENG-5/3a Rev 4-60

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE AZ PROJECT SIGNAL BUTTE F.R.S.

BY ADM DATE 4-20-84 CHECKED BY BJL DATE 5-4-84 JOB NO.

SUBJECT Emergency Spillway Structure Excavation SHEET 2 2

Sta. from ℄	Area ft²	ft² Average Area	ft. Distance	yds³
1+20	0.0			
		88	16	52.148
1+04	176			
		176	9.5	61.92
0+94.5	176			
0+94.5	224			
		248	48	440.88
0+76	272			
0+76	252.5			
		252.5	76	710.74
0+00	252.5			

1/2 total = 1,265.7 yds³

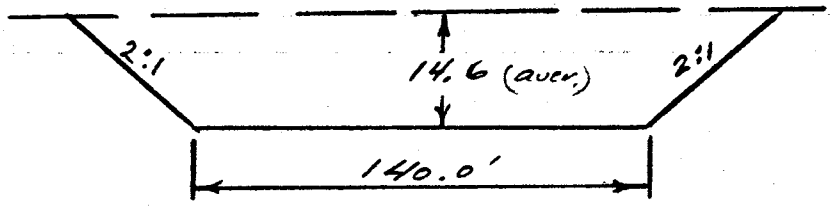
Total volume = 2,531.4 yds³

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

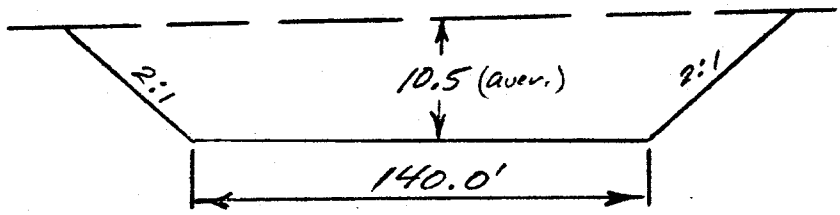
STATE	PROJECT			
ARIZONA	SIGNAL BUTTE FRS			
BY R.A.P.	DATE 4/5/84	CHECKED BY ABM	DATE 4-18-84	JOB NO. QUANTITIES
SUBJECT CROSS-SECTIONS OF EMERGENCY SPILLWAY OUTLET				SHEET 1 OF 3

10+43



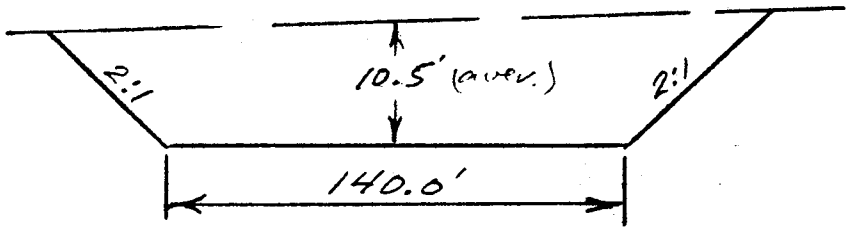
$$\frac{140' + 198.4}{2} \times 14.6' = 2{,}470.32\ ft^2$$

10+89



$$\frac{140' + 182'}{2} \times 10.5 = 1{,}690.50\ ft^2$$

11+00



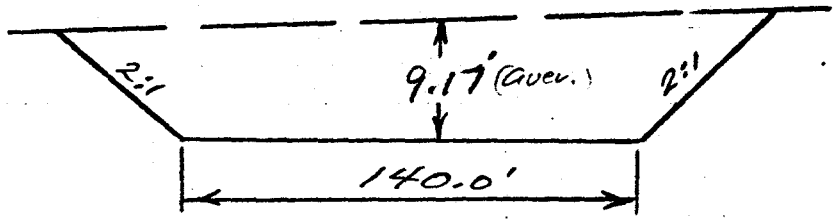
$$\frac{140' + 182'}{2} \times 10.5' = 1{,}690.50\ ft^2$$

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

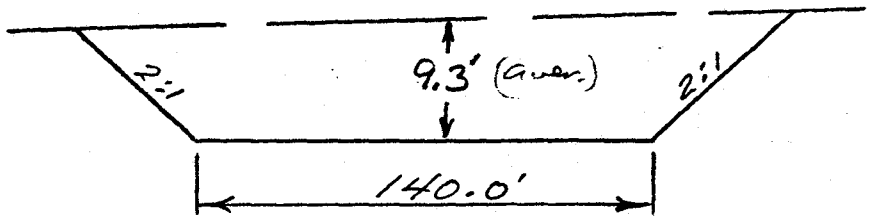
STATE ARIZONA		PROJECT SIGNAL BUTTE F.R.S.		
BY R.A.P.	DATE 4/5/84	CHECKED BY OBM	DATE 4-18-84	JOB NO. YARDAGE QUANTITIES
SUBJECT CROSS-SECTIONS OF EMERGENCY SPILLWAY OUTLET				SHEET 2 OF 3

12+00



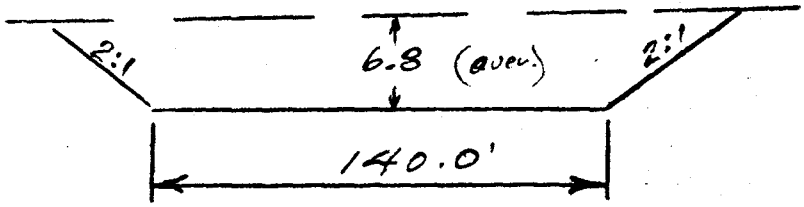
$$\frac{140' + 176.68'}{2} \times 9.17' = 1{,}451.98\ ft^2$$

13+00



$$\frac{140' + 177.2'}{2} \times 9.3' = 1{,}474.98\ ft^2$$

14+00



$$\frac{140' + 167.2}{2} \times 6.8' = 1{,}044.48\ ft^2$$

14+50 ± assume grade out to 0.0 ft²

SCS-529
REV 8-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

EARTHWORK COMPUTATION SHEET

LOCATION SE 1/4 12-T1N-R7E		OWNER MARICOPA FLOOD CONTROL DISTRICT	
WATERSHED BUCKHORN - MESA		SUB-WATERSHED SIGNAL BUTTE FRS	SITE NO. —
CONTRACTOR —		COMPUTED BY R.A.P.	DATE 4/5/84
ITEM Cross-Sections of Emergency Spillway Outlet		CHECKED BY ABM	DATE 4-18-84
CONTRACT NO. —		ESTIMATE 21,106 CU. YDS.	ACTUAL ——— CU. YDS.

STATION	END AREA SQ. IN.	END AREA SQ. FT.	SUM OF END AREAS SQ. FT.	DISTANCE IN FEET	SECTION PRODUCTS CU. FT.	VOLUME CU. YD.	REMARKS
10+43	\	2470.32					
			4160.82	46'	191,397	72	
10+89	\	1690.50					
			3381.00	11'	37,191		
11+00	\	1690.50					
			3142.48	100'	314,248		
12+00	\	1451.98					
			2926.96	100'	292,696		
13+00	\	1474.98					
			2519.46	100'	251,946		
14+00	\	1044.48					
			1044.48	50'	52,224		
14+50	\	0.00					
				54)	1,139,702.	72 =	21,105.6059
					Use	21,106	yd3
						=	21,105.6 yd3 Ck.

```
** ROB **
(vol. of trap.
 x-section)
==========:

BW=140.00
Z,1=2.00
Z,2=2.00

STA. 1= 10+43.00
     D,1= 14.60
  AREA 1= 2,470.32
STA. 2= 10+89.00
     D,2= 10.50
  AREA 2= 1,690.50
*AVG. AREA= 2,080.41
L= 46.00
VOL.= 95,698.86
ACC. VOL.=95,698.86

STA. 1= 10+89.00
     D,1= 10.50
  AREA 1= 1,690.50
STA. 2= 11+00.00
     D,2= 10.50
  AREA 2= 1,690.50
*AVG. AREA= 1,690.50
L= 11.00
VOL.= 18,595.50
ACC. VOL.=114,294.36

STA. 1= 11+00.00
     D,1= 10.50
  AREA 1= 1,690.50
STA. 2= 12+00.00
     D,2= 9.17
  AREA 2= 1,451.98
*AVG. AREA= 1,571.24
L= 100.00
VOL.= 157,123.89
ACC. VOL.=271,418.25

STA. 1= 12+00.00
     D,1= 9.17
  AREA 1= 1,451.98
STA. 2= 13+00.00
     D,2= 9.30
  AREA 2= 1,474.98
*AVG. AREA= 1,463.48
L= 100.00
VOL.= 146,347.89
ACC. VOL.=417,766.14

STA. 1= 13+00.00
     D,1= 9.30
  AREA 1= 1,474.98
STA. 2= 14+00.00
     D,2= 6.80
  AREA 2= 1,044.48
*AVG. AREA= 1,259.73
L= 100.00
VOL.= 125,973.00
ACC. VOL.=543,739.14

STA. 1= 14+00.00
     D,1= 6.80
  AREA 1= 1,044.48
STA. 2= 14+50.00
     D,2= 0.00
  AREA 2= 0.00
*AVG. AREA= 522.24
L= 50.00
VOL.= 26,112.00
ACC. VOL.=569,851.14 ft3
```

SHEET 3 OF 3 SHEETS

COMPUTATION SHEET
SCS-ENG-NVA Rev. 1-64

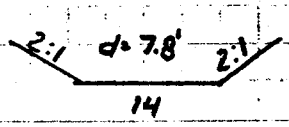
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE AZ PROJECT SIGNAL BUTTE F.R.S.

BY A.D.M. DATE 4-19-84 CHK'D ICC DATE 5/2/84

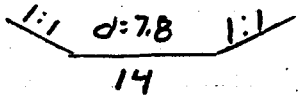
Gated Outlet Structure Excavation SHEET 1 OF 2

Sta. 8+81.45 — 0.0 ft²

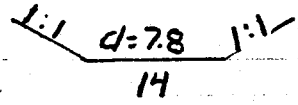
Sta. 8+89.25 — 

2(7.8)(7.8) + 14(7.8) = 230.88 ft

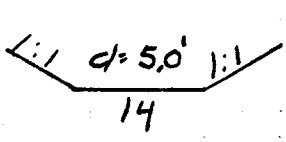
Sta. 8+92.5 — SAME — 230.88 ft²

Sta. 8+92.5 — 

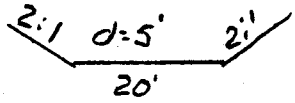
(7.8)(7.8)+(7.8)(14.0) = 170.04 ft

Sta. 10+00 — 

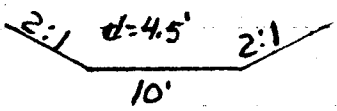
(7.8)(7.8)+(7.8)(14.0) = 170.04 ft

Sta. 10+82 — 

(5.0)(5.0)+(5.0)(14.0) = 95.0 ft²

Sta. 10+88.5 — 

2(5)(5)+(20)(5) = 150.0 ft²

Sta. 10+98.5 — 

2(4.5)(4.5)+(10)(4.5) = 85.5 ft²

Sta. 12+88.5 — 0.0 ft²

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SCS-ENG-529
2-80

EARTHWORK COMPUTATION SHEET

Location S½ 12-T1N-R7E
Owner Maricopa Flood Control District
Watershed BUCKHORN-MESA
Subwatershed
Site No.
Contractor
Computed by ADM
Date 4-19-84
Item Gated Outlet Structure Excavation
Checked by
Date
Contract No.
Estimate yd³
Actual yd³

Station	End area (in²)	End area (ft²)	Sum of end areas (ft²)	Distance (ft)	Section products (ft³)	Volume (yd³)	Remarks
8+81.45		0.0					
			230.88	7.8	1800.86		
8+87.25		230.88					
			461.76	3.25	1500.72		
8+92.5		230.88					
8+92.5		170.04					
			340.08	107.5	36,558.6		
10+00		170.04					
			265.04	82.0	21,733.28		
10+82		95.0					
			245.0	6.5	1592.5		
10+88.5		150.0					
			235.5	10.0	2355.0		
10+98.5		85.5					
			85.5	190.0	16,245.0		
12+88.5		0.0					
				54)	81,785.96 =		
				total		1515.0 yds³	

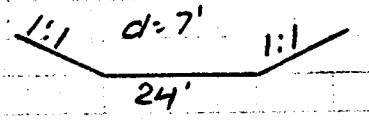
Sheet 2 of 2 sheets

AZ Signal Butte F.R.S.

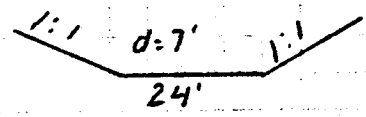
ADM 4-19-84 BJL 5-4-84

Principal Spillway Structure Excavation SHEET 1 2

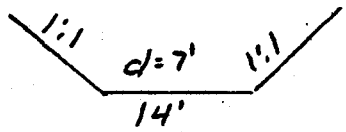
Sta. 9+00 — 0.0 ft²

Sta. 9+15 — 

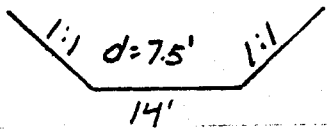
(7)(7)+(24)(7) = 217.0 ft²

Sta. 9+28 — 

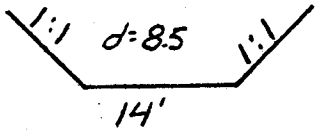
SAME 217.0 ft²

Sta. 9+28 — 

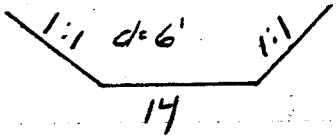
(7)(7)+(14)(7) = 147.0 ft²

Sta. 9+92 — 

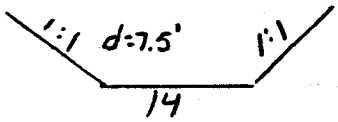
(7.5)(7.5)+(14)(7.5) = 161.25 ft²

Sta. 10+07.5 — 

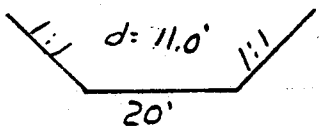
(8.5)²+(14)(8.5) = 191.25 ft²

Sta. 10+40 — 

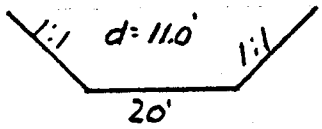
(6)²+(14)(6) = 120.0 ft²

Sta 10+70 — 

(7.5)²+(14)(7.5) = 161.25 ft²

Sta 10+73 — 

(11.0)²+(20)(11.0) = 341.0 ft²

Sta. 10+96 — 

SAME 341.0 ft²

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SCS-ENG-529
2-80

414

EARTHWORK COMPUTATION SHEET

Location S 1/2 - T1N - R7E
Owner Maricopa Flood Control District
Watershed BUCKHORN - MESA
Subwatershed
Site No.
Contractor
Computed by ADM
Date 4-19-84
Item Principal Spillway Structure
Checked by B.L.
Date 5-4-84
Contract No. Excavation
Estimate 1293 yd³
Actual yd³

Station	End area (in²)	End area (ft²)	Sum of end areas (ft²)	Distance (ft)	Section products (ft³)	Volume (yd³)	Remarks
9+00		0.0					
			217.0	15.0	3255.0		
9+15		217.0					
			434.0	13.0	5642.0		
9+28		217.0					
9+28		147.0					
			308.25	64.0	19,728.0		
9+92		161.25					
			352.50	15.5	5463.75		
10+07.5		191.25					
			311.25	32.5	10,115.63		
10+40		120.0					
			281.25	30.0	8,437.5		
10+70		161.25					
			502.25	3.0	1,506.75		
10+73		341.0					
			682.0	23.0	15,686.0		
10+96		341.0					
				54	69,834.63		
						1,293.23 yds³	

Sheet 2 of 2 sheets

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SCS-ENG-529
2-80

EARTHWORK COMPUTATION SHEET

Location: Buckhorn - Mesa
Owner:
Watershed: Signal Butte - Diversion
Subwatershed:
Site No.:
Contractor:
Computed by: BJL
Date: 4/24/84
Item: Quantities
Checked by: ABM
Date: 5-2-84
Contract No.:
Estimate: yd³
Actual: yd³

Station	End area (in²)	End area (ft²)	Sum of end areas (ft²)	Distance (ft)	Section products (ft³)	Volume (yd³)	Remarks
11+00		0.0					
			56.75	30	1,702.5	31.53	
11+30		56.75					
			143.50	55	7,892.5	146.16	
11+85		86.75					
			158.00	15	2370.0	43.89	
12+00		71.25					
			79.20	50	3,960.0	73.33	
12+50		7.95					
			7.95	50	397.5	7.36	
13+00		0.0					
						302.3	Cu yds Fill
11+30		0.0	46.75		2571.25		
			52.0	55'	2860.0	52.96	
11+85		46.75					
			129.0		1935.0		
		52.0	134.0	15	2010.0	37.22	
12+00		82.25					
			259.58	50	12529.0		
		168.33	249.33	55.	13713.15	253.95	
12+50		160.33					
			362.58		18129.0		
			361.58	50'	18079.0	334.80	
13+00		194.25					
			221.63		22163.0		
			220.63	100'	3309.95	61.29	
14+00		27.38					
			30.88		463.2		
		26.38	29.88	15	448.2	8.30	
14+15		3.50					
			3.50	5	17.5	0.32	
14+20		0.0					
						748.84	Cu yds Cut
				54	5780.95		
					=	1070.52	yds³ cut

Fill

Cut

Sheet ____ of ____ sheets

COMPUTATION SHEET

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

PROJECT Az.

BUL 4/24/84 CHECKED BY aum DATE 5-2-84 JOB NO.

X-sections of Diversion Dike @ Meridian D/S Rd. Culvert SHEET 1 OF 2

Looking D/S

11+00	Lt.				O.D			Rt.		
					℄					
11+30	1716	1714	1712	1710	1710	1712	1714	1716	1718	1718
	41	32	20	10	0	10	15	20	30	40
				1716						
				50						
11+85	1716	1714	1712	1710	1710	1712	1714	1716	1714	1718
	65	55	40	25	0	5	10	15	20	30
				1716						
				75						
12+00	1716	1714	1712	1710	1712	1714	1716	1718	1718	
	100	70	50	40	0	8	15	25	50	
				1716						
				110						
12+50	1718	1710	1712	1714	1716	1717	1718			
	80	70	50	20	0	50	100			
	1716	1714	1712	1710	1708					
	170	160	150	140	130					
				1718						
				200						
13+00	112	1714	1716	1716	1716	1716	1717	1718		
	125	120	110	50	0	40	100	170		

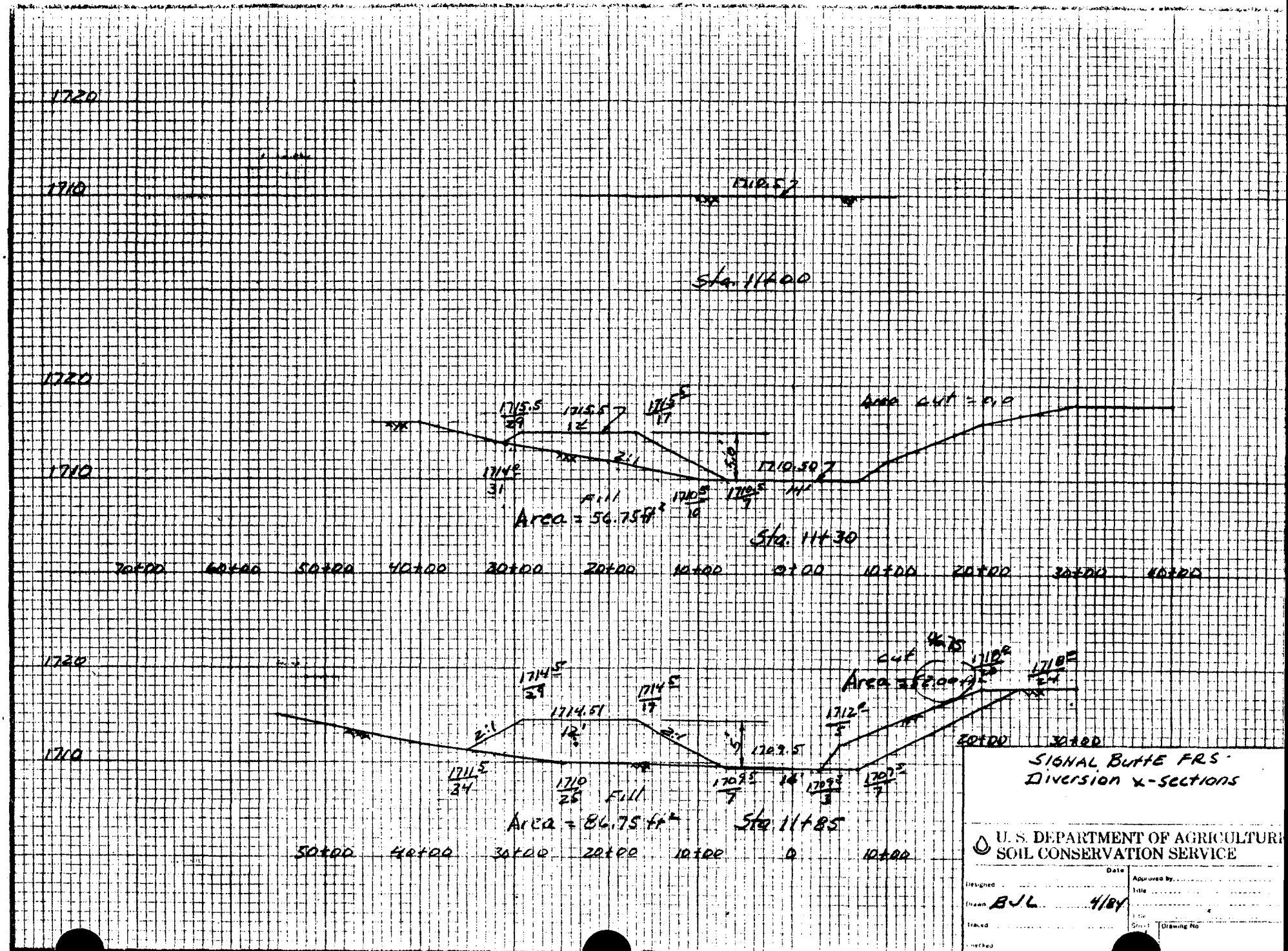
COMPUTATION SHEET
SCS-ENG-523A Rev. 9-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE Az. PROJECT Signal Butte FRS
BY BJL DATE 4/24/84 CHECKED BY OWM DATE 5-2-84 JOB NO.
SUBJECT X-Section of Diversion D/S Meridian Rd. Culvert SHEET 2 OF 2

	Lt.					Rt.				
14+00	1714	1714	1712	1710	1710	1710	1712	1714	1716	1716
	50	35	15	7	0	15	20	30	40	50
		1710	1710	1712						
		150	100	80						
14+15	1713	1712	1710	1708.5	1710	1712	1714	1716	1716	
	50	20	15	0	15	20	30	40	50	
		1708	1710	1712						
		90	75	65						
14+20		1708	1708	1708	1708	1710	1712			
		20	10	0	8	15	30			

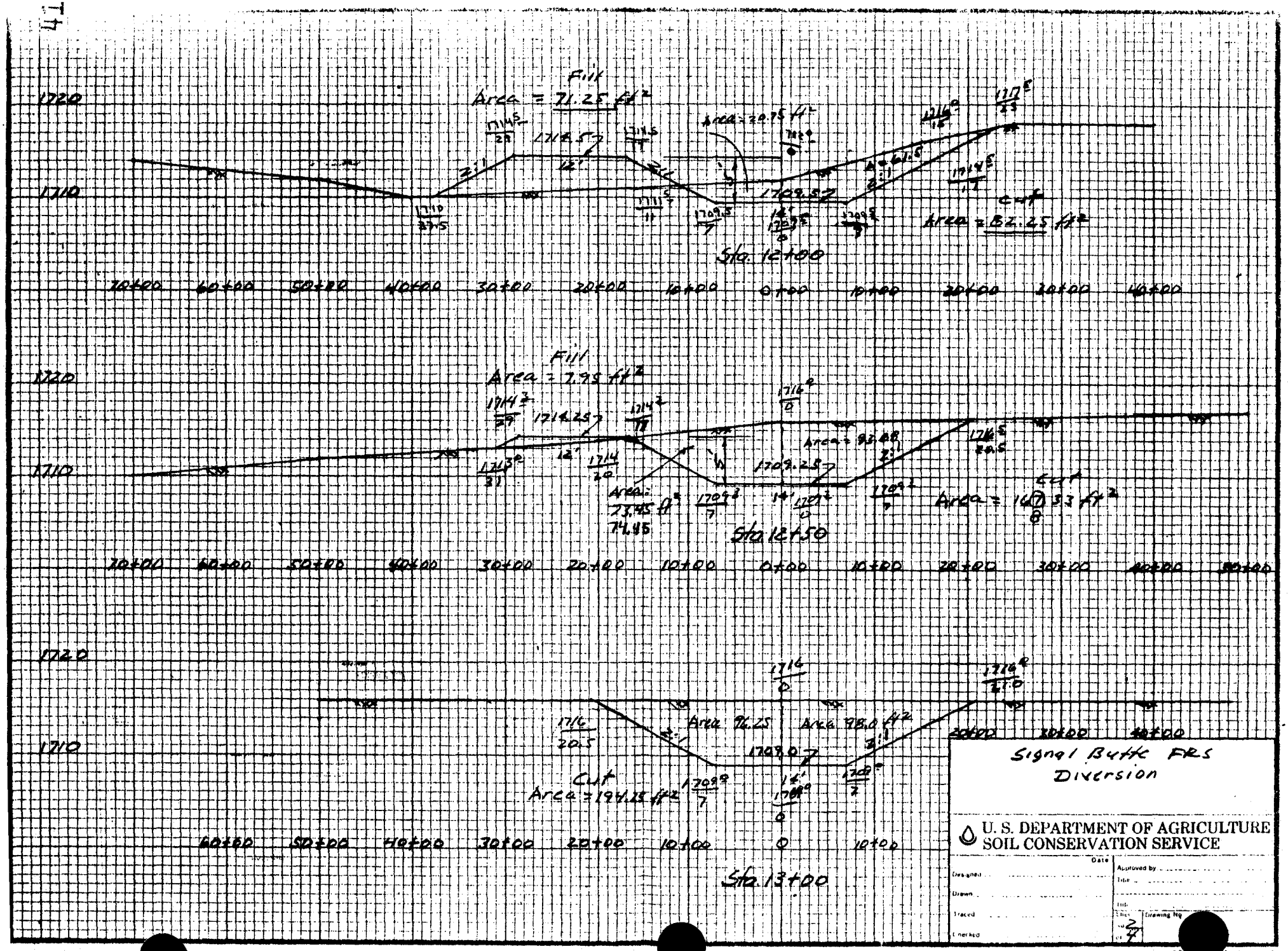
4418



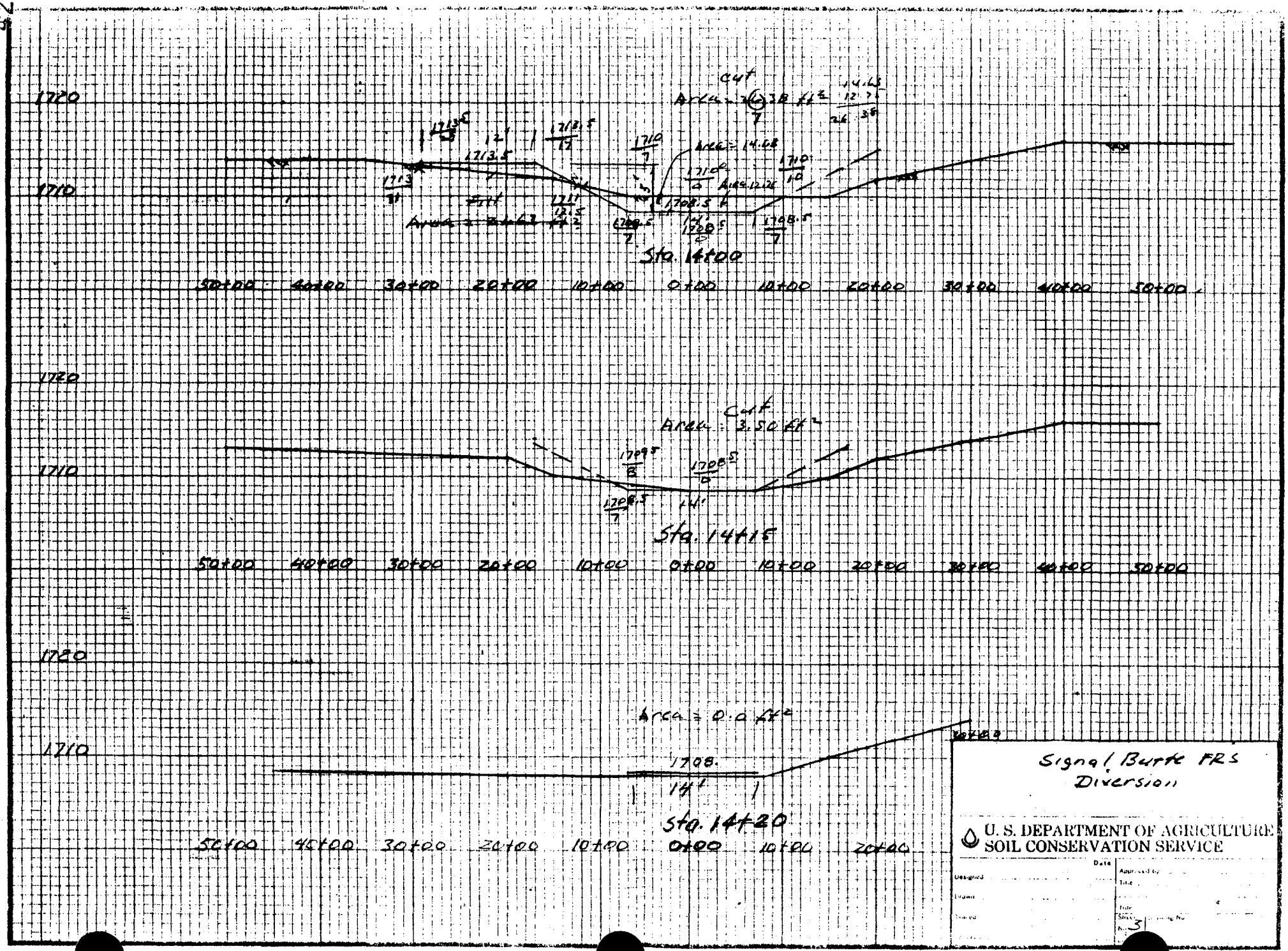
SIGNAL BUTTE FRS
Diversion x-sections

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed
Drawn BJL 4/84
Traced
Checked
Approved by
Title
Sheet
Drawing No


Fill
Area = 71.25 ft²
Area = 20.75 ft²
Cut
Area = 82.25 ft²
Sta. 12+00
Fill
Area = 7.95 ft²
Area = 93.48
Area = 73.45 ft²
74.45
Cut
Area = 167.53 ft²
Sta. 12+50
Area 96.25
Area 98.0 ft²
Cut
Area = 194.25 ft²
Sta. 13+00
Signal Butte FRS
Diversion
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Designed
Drawn
Traced
Checked
Approved by
Title
Drawing No
Sheet 2 of 7

420



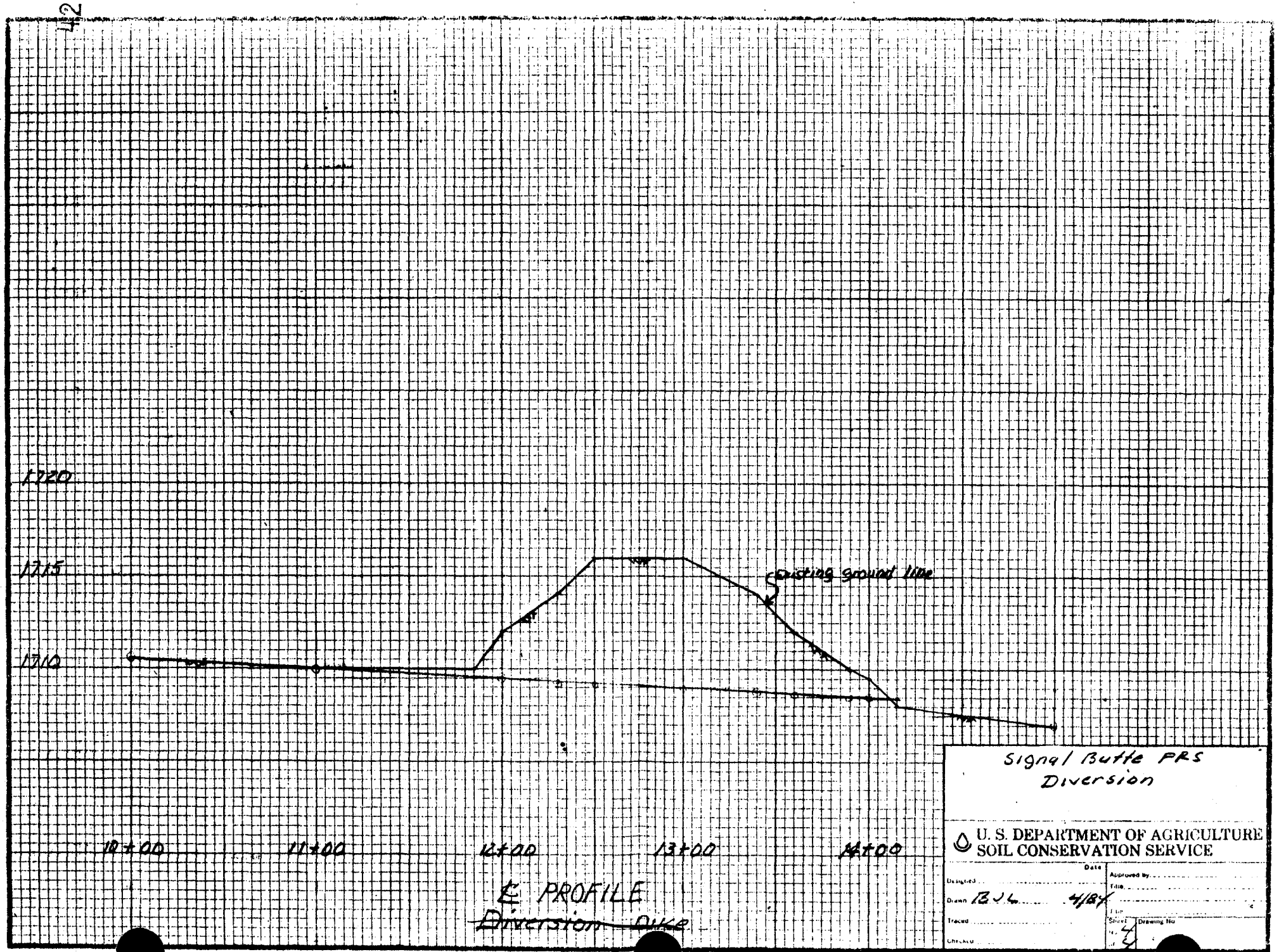
Signal Butte FRS
Diversion

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed
Drawn
Traced
Date
Approved by
Title
Date
Sheet No. 3
Drawing No.

SCS-ENG-15A (Rev.)

421



Signal Butte PRS
Diversion

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed		Approved by	
Drawn BJL	4/84	Title	
Traced		Sheet No. 4	Drawing No.
Checked			

G-315A (3-81)

SCS-629
REV 8-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

EARTHWORK COMPUTATION SHEET

422

LOCATION SE 1/4 12 - T1N - R7E		OWNER Maricopa Flood Control District	
WATERSHED Buckhorn - Mesa		SUB-WATERSHED SIGNAL BUTTE F.R.S	SITE NO.
CONTRACTOR —		COMPUTED BY R.A.P.	DATE 11/82
ITEM Yd3 from inlet & outlet trench @ gabed outlet		CHECKED BY JEB	DATE 2/26/82
CONTRACT NO. —		ESTIMATE 1044 CU. YDS.	ACTUAL ——— CU. YDS.

STATION	END AREA SQ. IN.	END AREA SQ. FT.	SUM OF END AREAS SQ. FT.	DISTANCE IN FEET	SECTION PRODUCTS CU. FT.	VOLUME CU. YD.	REMARKS
	Inlet						
0+00		120.0	360	80	28,800		
0+80		240.0		54)	28,800	= 533.33	
					Use	533 yd³	
	Outlet						
0+00		132.0	204	100	20,400		
1+00		72.0	72	100	7,200		
2+00		0.0		54)	27,600	= 511.11	
					Use	511 yd³	
				total =		1044 yd³	

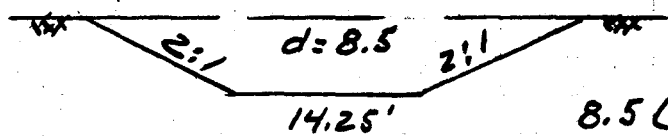
SHEET 1 OF 1 SHEETS

Az. SIGNAL BUTTE FRS

BJL 5-4-84 aem 5-10-84

Principal Spillway Outlet Cha. Excavation 1 2

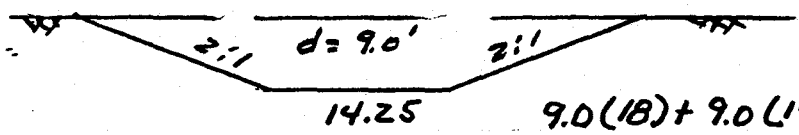
Sta. 10+96



+15'

8.5 (17) + 14.25 (8.5)
= 265.63 ft² ✓

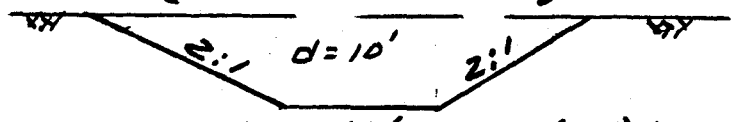
Sta. 11+11 (Begin Transition)



+15'

9.0 (18) + 9.0 (14.25)
= 290.25 ft² ✓

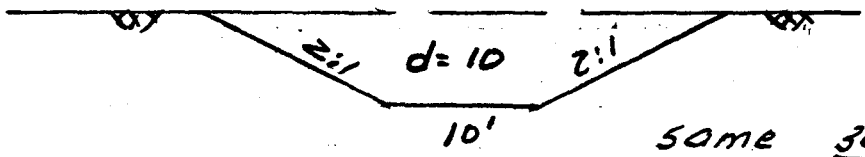
Sta. 11+26 (End Transition)



+24'

10 (20) + 10 (10)
= 300.0 ft² ✓

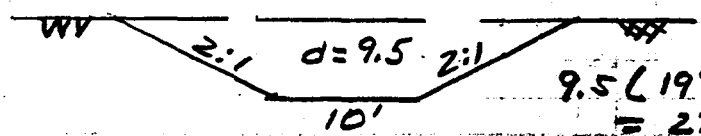
Sta. 11+50



+50

same 300.0 ft² ✓

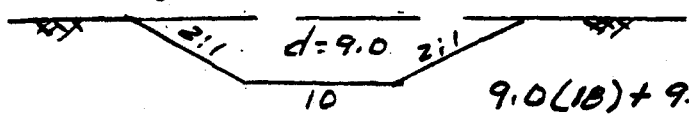
Sta. 12+00



+30

9.5 (19') + 9.5 (10)
= 275.5 ft² ✓

Sta. 12+30 (End)



9.0 (18) + 9.0 (10)
= 252.0 ft² ✓

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SCS-ENG-529
2-80

EARTHWORK COMPUTATION SHEET

Location: Signal Butte FRS — Owner: MCED
Watershed: Buckhorn-Meso — Subwatershed: — Site No.:
Contractor: — Computed by: BJL — Date: 5-4-84
Item: P.S. Outlet Cha. excavation — Checked by: akm — Date:
Contract No.: — Estimate: yd³ — Actual: yd³

	Station	~~End area (in²)~~	End area (ft²)	Sum of end areas (ft²)	Distance (ft)	Section products (ft³)	Volume (yd³)	Remarks
	10+96		265.63					
	11+11		290.25	555.88	15	8338.2		
	11+26		300.00	590.25	15	8857.75		
CUT	11+50		300.00	600.00	24	14400.0		
	12+00		275.00	575.00	50	28750.0		
	12+30		252.00	527.00	30	15810.0		
					54	76155.95	= 1,410.30 Cu.yds.	ok
						76191.95	= 1410.96	

Sheet 2 of 2 sheets

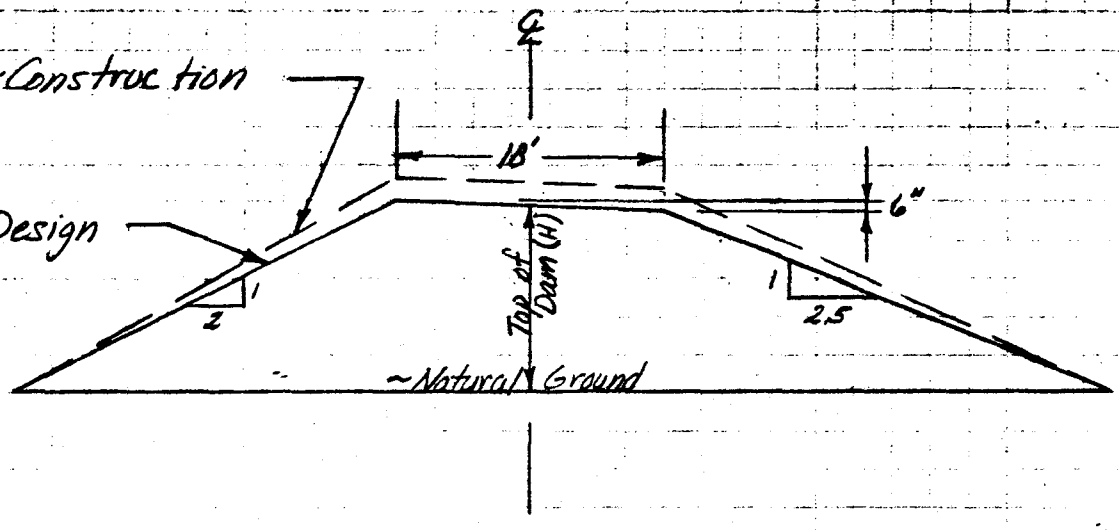
SIGNAL BUTTE F.R.S. (1984)

Subject	Calculations			Check		
	Quanity	Units	Initials	Quanity	Units	Initia
III. Earth Fill						
a.) F.R.S. Dike	492,746.57	yd^3	ICC	492,747	yd^3	A.M.
b.) E.S. Outlet Dike	1,142	yd^3	BJL.	1142.46	yd^3	A.M.
c.) P.S. Structure Backfill	1,069	yd^3	A.D.M.	1076	yd^3	ICC
d.) Gated Outlet Structure Backfill	1,057.5	yd^3	A.D.M.	1057.5	yd^3	ICC
e.) Emergency Spillway Structure Backfill	2,449.76	yd^3	A.D.M.	2,449.76	yd^3	ICC
f.) P.S. Road Ramp	4,471.47	yd^3	B.J.L.	4,471	yd^3	A.D.M
g.) E.S. Road Ramps	2,240	yd^3	B.J.L	2,275.55	yd^3	A.D.M
			total =	505,219.27	yd^3	
			Use	505,220	yd^3	

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE ARIZONA		PROJECT Signal Butte F.R.S.		
BY ICC	DATE 2/23/84	CHECKED BY ABM	DATE 4-12-84	JOB NO.
SUBJECT Fill yds.³ needed for F.R.S.				SHEET 1 OF 11



Cross - Section
(Not to Scale)

Solution:

Developed formula for area: $\left(\frac{4.5H_2}{2} + 18\right)H_2$

H_1 = Designed top of dam
H_2 = Construction top of dam

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE	PROJECT		
ARIZONA	SIGNAL BUTTE F.R.S.		
BY R.A.P.	DATE 10/4/83	CHECKED BY	DATE	JOB NO.
SUBJECT CAMBER DATA			SHEET 1 OF 1

Sta.	Elev.	Sta.	Elev.
196+00	1721.00	248+00	1722.05
197+00	1721.07	249+25	1721.99
197+25	1721.09	250+00	1721.95
200+00	1721.28	250+50	1721.93
201+00	1721.35	251+00	1721.90
202+00	1721.42	251+65	1721.87
203+75	1721.54	252+00	1721.85
204+00	1721.56	252+65	1721.82
206+00	1721.70	253+75	1721.76
207+00	1721.77	256+25	1721.64
208+00	1721.84	257+75	1721.56
209+25	1721.93	262+85	1721.31
210+45	1722.01	263+75	1721.26
211+00	1722.05	266+25±	1721.14

From Sta. 196+00 to Sta 211+00 S = 0.0007 (up)

From Sta 211+00 to Sta. 248+00 Flat (Elev 1722.0)

From Sta. 248+00 to Sta. 266+25± S = 0.0005 (down)

(Represents a 3% camber rounding off at top to Elev. 1722.00)

COMPUTATION SHEET
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$\left(\frac{4.5H_1 + 18}{2}\right) H_2 = A_2$

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: ARIZONA | PROJECT: SIGNAL BUTTE F.R.S.
BY: R.A.P. | DATE: 8/3/83 | CHECKED BY: AOM | DATE: 4-12-84 | JOB NO.: For New Design Top
SUBJECT: FILL Yd3 NEEDED FOR F.R.S. | SHEET 2 OF 11

STA	"CONSTRUCTION" TOP OF FRS (H_2)	"DESIGN" TOP OF FRS (H_1)	Ground Elev. @ ℄	H_1 HEIGHT	H_2 HEIGHT
195+87	1718.51	1721.0	1718.51	2.49	0.0
196+00	1721.00		1717.3	3.7'	3.70
197+00	1721.07		1716.0	5.0'	5.07
197+25	1721.09		1716.3	4.7'	4.79'
200+00	1721.28		1713.0	8.0'	8.28'
201+00	1721.35		1711.3	9.7'	10.05'
202+00	1721.42		1710.3	10.7'	11.12'
203+75	1721.54		1707.5	13.5'	14.04'
204+00	1721.56		1707.2	13.8'	14.36'
206+00	1721.70		1704.3	16.7'	17.4'
207+00	1721.77		1705.0	16.0'	16.77
208+00	1721.84		1704.0	17.0'	17.84'
209+25	1721.93		1701.5	19.5'	20.43'
210+45	1722.01		1700.0	21.0'	22.01'
211+00	1722.05		1692.0	29.0'	30.05
211+45			1694.0	27.0'	28.05
212+50			1694.0	27.0'	28.05
212+75			1691.5	29.5'	30.55
213+50			1699.2	21.8'	22.85
215+00			1697.2	23.8'	24.85
218+75			1695.2	25.8'	26.85

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: ARIZONA | PROJECT: SIGNAL BUTTE F.R.S.
BY: R.A.P. | DATE: 8/5/83 | CHECKED BY: CBM | DATE: 4-12-84 | JOB NO.:
SUBJECT: FILL Yd³ Needed FOR F.R.S. | SHEET 3 OF 11

STA	"Construction" Top of FRS (H_2)	"Design" Top of FRS (H_1)	Ground Elev. @ ℄	H_1 Height	H_2 Height
219+25	1722.05	1721.0	1688.8	32.2'	33.25'
220+00			1693.4	27.6'	28.65'
220+50			1693.5	27.5'	28.55'
220+75			1692.8	28.2'	29.25'
220+90			1693.5	27.5'	28.55'
221+50			1694.0	27.0'	28.05'
222+00			1692.5	28.5'	29.55'
222+50			1694.2	26.8'	27.85'
223+50			1691.2	29.8'	30.85'
224+15			1693.6	27.4'	28.45'
225+00			1693.2	27.8'	28.85'
226+50			1694.0	27.0'	28.05'
227+50			1691.2	29.8'	30.85'
227+85			1682.8	38.2'	39.25'
228+45			1685.5	35.5'	36.55'
229+10			1691.2	29.8'	30.85'
230+00			1692.0	29.0'	30.05'
230+50			1690.8	30.2'	31.25'
230+75			1692.0	29.0'	30.05'
231+40			1689.0	32.0'	33.05'
231+90			1692.2	28.8'	29.85'

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

430

STATE ARIZONA | PROJECT SIGNAL BUTTE F.R.S.
BY RAP | DATE 81 | CHECKED BY QBM | DATE 4-12-84 | JOB NO.
SUBJECT FILL YDS' NEEDED FOR F.R.S | SHEET 4 OF 11

STA.	"Construction" Top of FRS (H_2)	"Design" Top of FRS (H_1)	Ground Elev. @ ℄	[redacted]	H_2 Height
232+50	1722.05	1721.0	1688.5	32.5'	33.55'
233+00			1690.4	30.6'	31.65'
233+50			1693.0	28.0'	29.05'
235+00			1691.2	29.8'	30.85'
235+50			1690.4	30.6'	31.65'
236+15			1692.0	29.0'	30.05'
237+00			1690.3	30.7'	31.75'
238+00			1692.0	29.0'	30.05'
239+15			1688.8	32.2'	33.25'
239+25			1684.4	36.6'	37.65'
239+40			1686.3	34.7'	35.75'
239+75			1687.3	33.7'	34.75'
240+00			1685.2	35.8'	36.85
240+32			1689.2	31.8'	32.85'
241+50			1688.5	32.5'	33.55'
241+65			1686.0	35.0'	36.05'
242+25			1688.8	[redacted]	33.25'
242+70			1686.8	[redacted]	35.25'
243+25			1689.2	31.8'	32.85'
244+00			1686.6	34.4'	35.45'
245+00			1690.8	30.2'	31.25'

COMPUTATION SHEET
SCS-ENG-523 Rev. 3-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: ARIZONA | PROJECT: SIGNAL BUTTE F.R.S.
BY: R.A.P. | DATE: 8 | CHECKED BY: GDM | DATE: 4-12-84 | JOB NO.
SUBJECT: FILL Yd³ NEEDED FOR F.R.S. | SHEET 5 OF 11

STA.	"Construction" Top of FRS (H_2)	"Design" Top of FRS (H_1)	Ground Elev. @ ℄	H_1 Height	H_2 Height
246+00	1722.05	1721.0	1692.2	28.8'	29.85'
247+00	↓	↓	1694.0	27.0'	28.05
248+00			1693.7	27.3'	28.35'
249+25	1721.99		1692.3	23.7'	24.69'
250+00	1721.95		1698.4	22.6'	23.55'
250+50	1721.93		1696.0	25.0'	25.93'
251+00	1721.90		1697.2	23.8'	24.70'
251+65	1721.87		1694.0	27.0'	27.87'
252+00	1721.85		1695.2	25.8'	26.65'
252+65	1721.82		1700.2	20.8'	21.62'
253+75	1721.76		1701.0	20.0'	20.76'
256+25	1721.64		1706.6	14.4'	15.04'
257+75	1721.56		1708.2	12.8'	13.36'
262+85	1721.31		1715.0	6.0'	6.31'
263+75	1721.26		1717.0	4.0'	4.26'
264+00	1721.25		1717.3	3.7'	3.95'
266+25±	1721.14	↓	1721.0	0.0	0.14'

COMPUTATION SHEET
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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE	PROJECT		
AZ	SIGNAL BUTTE F.R.S.		432
BY ICC RAP / DATE 4/12/84	CHECKED BY ABM / DATE 4/12/84		JOB NO.
SUBJECT Fill needed for F.R.S.			SHEET 6 OF 11

** ROB **
(vol. of trap.
x-section)
==========

BW=18.00
Z,1=2.00
Z,2=2.50

STA. 1= 195+87.00
D,1= 0.00
AREA 1= 0.00
STA. 2= 196+00.00
D,2= 3.70
AREA 2= 97.40
*AVG. AREA= 48.70
L= 13.00
VOL.= 633.12
ACC. VOL.=633.12

STA. 1= 196+00.00
D,1= 3.70
AREA 1= 97.40
STA. 2= 197+00.00
D,2= 5.07
AREA 2= 149.10
*AVG. AREA= 123.25
L= 100.00
VOL.= 12,324.93
ACC. VOL.=12,958.04

STA. 1= 197+00.00
D,1= 5.07
AREA 1= 149.10
STA. 2= 197+25.00
D,2= 4.79
AREA 2= 137.84
*AVG. AREA= 143.47
L= 25.00
VOL.= 3,586.75
ACC. VOL.=16,544.80

STA. 1= 197+25.00
D,1= 4.79
AREA 1= 137.84
STA. 2= 200+00.00
D,2= 8.28
AREA 2= 303.30
*AVG. AREA= 220.57
L= 275.00
VOL.= 60,656.84
ACC. VOL.=77,201.63

STA. 1= 200+00.00
D,1= 8.28
AREA 1= 303.30
STA. 2= 201+00.00
D,2= 10.05
AREA 2= 408.16
*AVG. AREA= 355.73
L= 100.00
VOL.= 35,572.60
ACC. VOL.=112,774.23

STA. 1= 201+00.00
D,1= 10.05
AREA 1= 408.16
STA. 2= 202+00.00
D,2= 11.12
AREA 2= 478.38
*AVG. AREA= 443.27
L= 100.00
VOL.= 44,326.90
ACC. VOL.=157,101.13

STA. 1= 202+00.00
D,1= 11.12
AREA 1= 478.38
STA. 2= 203+75.00
D,2= 14.04
AREA 2= 696.24
*AVG. AREA= 587.31
L= 175.00
VOL.= 102,779.78
ACC. VOL.=259,880.9

STA. 1= 203+75.00
D,1= 14.04
AREA 1= 696.24
STA. 2= 204+00.00
D,2= 14.36
AREA 2= 722.45
*AVG. AREA= 709.35
L= 25.00
VOL.= 17,733.69
ACC. VOL.=277,614.60

STA. 1= 204+00.00
D,1= 14.36
AREA 1= 722.45
STA. 2= 206+00.00
D,2= 17.40
AREA 2= 994.41
*AVG. AREA= 858.43
L= 200.00
VOL.= 171,686.16
ACC. VOL.=449,300.76

STA. 1= 206+00.00
D,1= 17.40
AREA 1= 994.41
STA. 2= 207+00.00
D,2= 16.77
AREA 2= 934.63
*AVG. AREA= 964.52
L= 100.00
VOL.= 96,452.20
ACC. VOL.=545,752.96

STA. 1= 207+00.00
D,1= 16.77
AREA 1= 934.63
STA. 2= 208+00.00
D,2= 17.84
AREA 2= 1,037.22
*AVG. AREA= 985.93
L= 100.00
VOL.= 98,592.58
ACC. VOL.=644,345.54

STA. 1= 208+00.00
D,1= 17.84
AREA 1= 1,037.22
STA. 2= 209+25.00
D,2= 20.43
AREA 2= 1,306.86
*AVG. AREA= 1,172.0
L= 125.00
VOL.= 146,504.60
ACC. VOL.=790,850.14

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE	PROJECT		
AZ	SIGNAL BUTTE F.R.S.		
BY: I.C.C. RAP / DATE: 4-12-84	CHECKED BY: QBM / DATE: 4-12-84	JOB NO. 433	
SUBJECT: Fill needed for F.R.S.		SHEET 7 OF 11	

STA. 1= 209+25.00
D,1= 20.43
AREA 1= 1,306.86
STA. 2= 210+45.00
D,2= 22.01
AREA 2= 1,486.17
*AVG. AREA= 1,396.51
L= 120.00
VOL.= 167,581.58
ACC. VOL.=958,431.72

STA. 1= 210+45.00
D,1= 22.01
AREA 1= 1,486.17
STA. 2= 211+00.00
D,2= 30.05
AREA 2= 2,572.66
*AVG. AREA= 2,029.41
L= 55.00
VOL.= 111,617.71 OK
ACC. VOL.=1,070,049

STA. 1= 211+00.00
D,1= 30.05
AREA 1= 2,572.66
STA. 2= 211+45.00
D,2= 28.05
AREA 2= 2,275.21
*AVG. AREA= 2,423.93
L= 45.00
VOL.= 109,076.88 OK
ACC. VOL.=1,179,126.31

STA. 1= 211+45.00
D,1= 28.05
AREA 1= 2,275.21
STA. 2= 212+50.00
D,2= 28.05
AREA 2= 2,275.21
*AVG. AREA= 2,275.21
L= 105.00
VOL.= 238,896.59
ACC. VOL.=1,418,022.9

STA. 1= 212+50.00
D,1= 28.05
AREA 1= 2,275.21
STA. 2= 212+75.00
D,2= 30.55
AREA 2= 2,649.83
*AVG. AREA= 2,462.52
L= 25.00
VOL.= 61,562.95
ACC. VOL.=1,479,585.85

STA. 1= 212+75.00
D,1= 30.55
AREA 1= 2,649.83
STA. 2= 213+50.00
D,2= 22.85
AREA 2= 1,586.08
*AVG. AREA= 2,117.95
L= 75.00
VOL.= 158,846.48
ACC. VOL.=1,638,432.34

STA. 1= 213+50.00
D,1= 22.85
AREA 1= 1,586.08
STA. 2= 215+00.00
D,2= 24.85
AREA 2= 1,836.73
*AVG. AREA= 1,711.40
L= 150.00
VOL.= 256,710.09
ACC. VOL.=1,895,142.43

STA. 1= 215+00.00
D,1= 24.85
AREA 1= 1,836.73
STA. 2= 218+75.00
D,2= 26.85
AREA 2= 2,105.38
*AVG. AREA= 1,971.05
L= 375.00
VOL.= 739,143.98
ACC. VOL.=2,634,286.41

STA. 1= 218+75.00
D,1= 26.85
AREA 1= 2,105.38
STA. 2= 219+25.00
D,2= 33.25
AREA 2= 3,086.02
*AVG. AREA= 2,595.70
L= 50.00
VOL.= 129,784.78
ACC. VOL.=2,764,071.19

STA. 1= 219+25.00
D,1= 33.25
AREA 1= 3,086.02
STA. 2= 220+00.00
D,2= 28.65
AREA 2= 2,362.55
*AVG. AREA= 2,724.28
L= 75.00
VOL.= 204,321.23
ACC. VOL.=2,968,392.43

STA. 1= 220+00.00
D,1= 28.65
AREA 1= 2,362.55
STA. 2= 220+50.00
D,2= 28.55
AREA 2= 2,347.88
*AVG. AREA= 2,355.22
L= 50.00
VOL.= 117,760.78
ACC. VOL.=3,086,153.21

STA. 1= 220+50.00
D,1= 28.55
AREA 1= 2,347.88
STA. 2= 220+75.00
D,2= 29.25
AREA 2= 2,451.52
*AVG. AREA= 2,399.70
L= 25.00
VOL.= 59,992.45
ACC. VOL.=3,146,145.66

STA. 1= 220+75.00
D,1= 29.25
AREA 1= 2,451.52
STA. 2= 220+90.00
D,2= 28.55
AREA 2= 2,347.88
*AVG. AREA= 2,399.70
L= 15.00
VOL.= 35,995.47
ACC. VOL.=3,182,141.13

STA. 1= 220+90.00
D,1= 28.55
AREA 1= 2,347.88
STA. 2= 221+50.00
D,2= 28.05
AREA 2= 2,275.21
*AVG. AREA= 2,311.54
L= 60.00
VOL.= 138,692.59
ACC. VOL.=3,320,833.72

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE	PROJECT		
AZ	SIGNAL BUTTE F.R.S.		434
BY / DATE	CHECKED BY / DATE	JOB NO.	
I.C.C. / 4-12-84	ABM / 4-12-84		
SUBJECT		SHEET	
Fill needed for FRS.		8 OF 11	

STA. 1= 221+50.00
D,1= 28.05
AREA 1= 2,275.21
STA. 2= 222+00.00
D,2= 29.55
AREA 2= 2,496.61
*AVG. AREA= 2,385.91
L= 50.00
VOL.= 119,295.28
ACC. VOL.=3,440,129.00

STA. 1= 222+00.00
D,1= 29.55
AREA 1= 2,496.61
STA. 2= 222+50.00
D,2= 27.85
AREA 2= 2,246.45
*AVG. AREA= 2,371.53
L= 50.00
VOL.= 118,576.41
ACC. VOL.=3,558,705.41

STA. 1= 222+50.00
D,1= 27.85
AREA 1= 2,246.45
STA. 2= 223+50.00
D,2= 30.85
AREA 2= 2,696.68
*AVG. AREA= 2,471.56
L= 100.00
VOL.= 247,156.31
ACC. VOL.=3,805,861.72

STA. 1= 223+50.00
D,1= 30.85
AREA 1= 2,696.68
STA. 2= 224+15.00
D,2= 28.45
AREA 2= 2,333.26
*AVG. AREA= 2,514.97
L= 65.00
VOL.= 163,472.77
ACC. VOL.=3,969,334.49

STA. 1= 224+15.00
D,1= 28.45
AREA 1= 2,333.26
STA. 2= 225+00.00
D,2= 28.85
AREA 2= 2,392.03
*AVG. AREA= 2,362.64
L= 85.00
VOL.= 200,824.45
ACC. VOL.=4,170,158.

STA. 1= 225+00.00
D,1= 28.85
AREA 1= 2,392.03
STA. 2= 226+50.00
D,2= 28.05
AREA 2= 2,275.21
*AVG. AREA= 2,333.62
L= 150.00
VOL.= 350,042.34
ACC. VOL.=4,520,201.29

STA. 1= 226+50.00
D,1= 28.05
AREA 1= 2,275.21
STA. 2= 227+50.00
D,2= 30.85
AREA 2= 2,696.68
*AVG. AREA= 2,485.94
L= 100.00
VOL.= 248,594.06
ACC. VOL.=4,768,795.35

STA. 1= 227+50.00
D,1= 30.85
AREA 1= 2,696.68
STA. 2= 227+85.00
D,2= 39.25
AREA 2= 4,172.77
*AVG. AREA= 3,434.72
L= 35.00
VOL.= 120,215.22
ACC. VOL.=4,889,010.57

STA. 1= 227+85.00
D,1= 39.25
AREA 1= 4,172.77
STA. 2= 228+45.00
D,2= 36.55
AREA 2= 3,663.68
*AVG. AREA= 3,918.22
L= 60.00
VOL.= 235,093.39
ACC. VOL.=5,124,103.96

STA. 1= 228+45.00
D,1= 36.55
AREA 1= 3,663.68
STA. 2= 229+10.00
D,2= 30.85
AREA 2= 2,696.68
*AVG. AREA= 3,180.18
L= 65.00
VOL.= 206,711.58
ACC. VOL.=5,330,815.

STA. 1= 229+10.00
D,1= 30.85
AREA 1= 2,696.68
STA. 2= 230+00.00
D,2= 30.05
AREA 2= 2,572.66
*AVG. AREA= 2,634.67
L= 90.00
VOL.= 237,119.91
ACC. VOL.=5,567,935.44

STA. 1= 230+00.00
D,1= 30.05
AREA 1= 2,572.66
STA. 2= 230+50.00
D,2= 31.25
AREA 2= 2,759.77
*AVG. AREA= 2,666.21
L= 50.00
VOL.= 133,310.53
ACC. VOL.=5,701,245.97

STA. 1= 230+50.00
D,1= 31.25
AREA 1= 2,759.77
STA. 2= 230+75.00
D,2= 30.05
AREA 2= 2,572.66
*AVG. AREA= 2,666.21
L= 25.00
VOL.= 66,655.27
ACC. VOL.=5,767,901.24

STA. 1= 230+75.00
D,1= 30.05
AREA 1= 2,572.66
STA. 2= 231+40.00
D,2= 33.05
AREA 2= 3,052.58
*AVG. AREA= 2,812.62
L= 65.00
VOL.= 182,820.18
ACC. VOL.=5,950,721.

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE AZ	PROJECT SIGNAL BUTTE F.R.S.		435
BY J.C.C. R.A.P. DATE 4-12-84	CHECKED BY	DATE	JOB NO.
SUBJECT Fill needed for F.R.S.			SHEET 9 OF 11

STA. 1= 231+40.00
D,1= 33.05
AREA 1= 3,052.58
STA. 2= 231+90.00
D,2= 29.85
AREA 2= 2,542.10
*AVG. AREA= 2,797.34
L= 50.00
VOL.= 139,867.03
ACC. VOL.=6,090,58

STA. 1= 231+90.00
D,1= 29.85
AREA 1= 2,542.10
STA. 2= 232+50.00
D,2= 33.55
AREA 2= 3,136.51
*AVG. AREA= 2,839.30
L= 60.00
VOL.= 170,358.19
ACC. VOL.=6,260,946.64

STA. 1= 232+50.00
D,1= 33.55
AREA 1= 3,136.51
STA. 2= 233+00.00
D,2= 31.65
AREA 2= 2,823.58
*AVG. AREA= 2,980.04
L= 50.00
VOL.= 149,002.03
ACC. VOL.=6,409,948.67

STA. 1= 233+00.00
D,1= 31.65
AREA 1= 2,823.58
STA. 2= 233+50.00
D,2= 29.05
AREA 2= 2,421.68
*AVG. AREA= 2,622.63
L= 50.00
VOL.= 131,131.41
ACC. VOL.=6,541,080.08

STA. 1= 233+50.00
D,1= 29.05
AREA 1= 2,421.68
STA. 2= 235+00.00
D,2= 30.85
AREA 2= 2,696.68
*AVG. AREA= 2,559.18
L= 150.00
VOL.= 383,876.72
ACC. VOL.=6,924,956.79

STA. 1= 235+00.00
D,1= 30.85
AREA 1= 2,696.68
STA. 2= 235+50.00
D,2= 31.65
AREA 2= 2,823.58
*AVG. AREA= 2,760.13
L= 50.00
VOL.= 138,006.28
ACC. VOL.=7,062,963.08

STA. 1= 235+50.00
D,1= 31.65
AREA 1= 2,823.58
STA. 2= 236+15.00
D,2= 30.05
AREA 2= 2,572.66
*AVG. AREA= 2,698.12
L= 65.00
VOL.= 175,377.52
ACC. VOL.=7,238,340.59

STA. 1= 236+15.00
D,1= 30.05
AREA 1= 2,572.66
STA. 2= 237+00.00
D,2= 31.75
AREA 2= 2,839.64
*AVG. AREA= 2,706.15
L= 85.00
VOL.= 230,022.59
ACC. VOL.=7,468,363.18

STA. 1= 237+00.00
D,1= 31.75
AREA 1= 2,839.64
STA. 2= 238+00.00
D,2= 30.05
AREA 2= 2,572.66
*AVG. AREA= 2,706.15
L= 100.00
VOL.= 270,614.81
ACC. VOL.=7,738,978.00

STA. 1= 238+00.00
D,1= 30.05
AREA 1= 2,572.66
STA. 2= 239+15.00
D,2= 33.25
AREA 2= 3,086.02
*AVG. AREA= 2,829.34
L= 115.00
VOL.= 325,373.60
ACC. VOL.=8,064,351.59

STA. 1= 239+15.00
D,1= 33.25
AREA 1= 3,086.02
STA. 2= 239+25.00
D,2= 37.65
AREA 2= 3,867.13
*AVG. AREA= 3,476.57
L= 10.00
VOL.= 34,765.71
ACC. VOL.=8,099,117.30

STA. 1= 239+25.00
D,1= 37.65
AREA 1= 3,867.13
STA. 2= 239+40.00
D,2= 35.75
AREA 2= 3,519.14
*AVG. AREA= 3,693.13
L= 15.00
VOL.= 55,397.00
ACC. VOL.=8,154,514.30

STA. 1= 239+40.00
D,1= 35.75
AREA 1= 3,519.14
STA. 2= 239+75.00
D,2= 34.75
AREA 2= 3,342.52
*AVG. AREA= 3,430.83
L= 35.00
VOL.= 120,078.98
ACC. VOL.=8,274,593.28

STA. 1= 239+75.00
D,1= 34.75
AREA 1= 3,342.52
STA. 2= 240+00.00
D,2= 36.85
AREA 2= 3,718.63
*AVG. AREA= 3,530.57
L= 25.00
VOL.= 88,264.27
ACC. VOL.=8,362,857.55

STA. 1= 240+00.00
D,1= 36.85
AREA 1= 3,718.63
STA. 2= 240+32.00
D,2= 32.85

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE AZ		PROJECT SIGNAL BUTTE F.R.S.		436
BY ICC RAP	DATE 4-12-84	CHECKED BY ADM	DATE 4-12-84	JOB NO.
SUBJECT Fill needed for F.R.S.				SHEET 10 OF 11

AREA 2= 3,019.33
*AVG. AREA= 3,368.98
L= 32.00
VOL.= 107,807.22
ACC. VOL.=8,470,664.7

STA. 1= 240+32.00
D,1= 32.85
AREA 1= 3,019.33
STA. 2= 241+50.00
D,2= 33.55
AREA 2= 3,136.51
*AVG. AREA= 3,077.92
L= 118.00
VOL.= 363,194.04
ACC. VOL.=8,833,858.81

STA. 1= 241+50.00
D,1= 33.55
AREA 1= 3,136.51
STA. 2= 241+65.00
D,2= 36.05
AREA 2= 3,573.01
*AVG. AREA= 3,354.76
L= 15.00
VOL.= 50,321.33
ACC. VOL.=8,884,180.14

STA. 1= 241+65.00
D,1= 36.05
AREA 1= 3,573.01
STA. 2= 242+25.00
D,2= 33.25
AREA 2= 3,086.02
*AVG. AREA= 3,329.51
L= 60.00
VOL.= 199,770.64
ACC. VOL.=9,083,950.78

STA. 1= 242+25.00
D,1= 33.25
AREA 1= 3,086.02
STA. 2= 242+70.00
D,2= 35.25
AREA 2= 3,430.27
*AVG. AREA= 3,258.1
L= 45.00
VOL.= 146,616.33
ACC. VOL.=9,230,567.1

STA. 1= 242+70.00
D,1= 35.25
AREA 1= 3,430.27
STA. 2= 243+25.00
D,2= 32.85
AREA 2= 3,019.33
*AVG. AREA= 3,224.80
L= 55.00
VOL.= 177,363.76
ACC. VOL.=9,407,930.8

STA. 1= 243+25.00
D,1= 32.85
AREA 1= 3,019.33
STA. 2= 244+00.00
D,2= 35.45
AREA 2= 3,465.68
*AVG. AREA= 3,242.50
L= 75.00
VOL.= 243,187.73
ACC. VOL.=9,651,118.60

STA. 1= 244+00.00
D,1= 35.45
AREA 1= 3,465.68
STA. 2= 245+00.00
D,2= 31.25
AREA 2= 2,759.77
*AVG. AREA= 3,112.72
L= 100.00
VOL.= 311,272.31
ACC. VOL.=9,962,390.92

STA. 1= 245+00.00
D,1= 31.25
AREA 1= 2,759.77
STA. 2= 246+00.00
D,2= 29.85
AREA 2= 2,542.10
*AVG. AREA= 2,650.93
L= 100.00
VOL.= 265,093.31
ACC. VOL.=10,227,484.23

STA. 1= 246+00.00
D,1= 29.85
AREA 1= 2,542.10
STA. 2= 247+00.00
D,2= 28.05
AREA 2= 2,275.21
*AVG. AREA= 2,408.65
L= 100.00
VOL.= 240,865.31
ACC. VOL.=10,468,349.5

STA. 1= 247+00.00
D,1= 28.05
AREA 1= 2,275.21
STA. 2= 248+00.00
D,2= 28.35
AREA 2= 2,318.68
*AVG. AREA= 2,296.94
L= 100.00
VOL.= 229,694.06
ACC. VOL.=10,698,043.60

STA. 1= 248+00.00
D,1= 28.35
AREA 1= 2,318.68
STA. 2= 249+25.00
D,2= 24.69
AREA 2= 1,816.01
*AVG. AREA= 2,067.34
L= 125.00
VOL.= 258,417.93
ACC. VOL.=10,956,461.

STA. 1= 249+25.00
D,1= 24.69
AREA 1= 1,816.01
STA. 2= 250+00.00
D,2= 23.55
AREA 2= 1,671.76
*AVG. AREA= 1,743.86
L= 75.00
VOL.= 130,791.26
ACC. VOL.=11,087,252.79

STA. 1= 250+00.00
D,1= 23.55
AREA 1= 1,671.76
STA. 2= 250+50.00
D,2= 25.93
AREA 2= 1,979.56
*AVG. AREA= 1,825.66
L= 50.00
VOL.= 91,282.92
ACC. VOL.=11,178,535.71

STA. 1= 250+50.00
D,1= 25.93
AREA 1= 1,979.56
STA. 2= 251+00.00
D,2= 24.70
AREA 2= 1,817.30
*AVG. AREA= 1,898.43
L= 50.00
VOL.= 94,921.59
ACC. VOL.=11,273,457.30

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE AZ | PROJECT SIGNAL BUTTE F.R.S. | 437
BY ICC RAP | DATE 4-12-84 | CHECKED BY QDM | DATE 4-12-84 | JOB NO.
SUBJECT Fill needed for F.R.S. | SHEET 11 OF 11

STA. 1= 251+00.00
D,1= 24.70
AREA 1= 1,817.30
STA. 2= 251+65.00
D,2= 27.87
AREA 2= 2,249.32
*AVG. AREA= 2,033.31
L= 65.00
VOL.= 132,165.17
ACC. VOL.=11,405,622.47

STA. 1= 251+65.00
D,1= 27.87
AREA 1= 2,249.32
STA. 2= 252+00.00
D,2= 26.65
AREA 2= 2,077.70
*AVG. AREA= 2,163.51
L= 35.00
VOL.= 75,722.83
ACC. VOL.=11,481,345.30

STA. 1= 252+00.00
D,1= 26.65
AREA 1= 2,077.70
STA. 2= 252+65.00
D,2= 21.62
AREA 2= 1,440.86
*AVG. AREA= 1,759.28
L= 65.00
VOL.= 114,353.38
ACC. VOL.=11,595,698.68

STA. 1= 252+65.00
D,1= 21.62
AREA 1= 1,440.86
STA. 2= 253+75.00
D,2= 20.76
AREA 2= 1,343.38
*AVG. AREA= 1,392.12
L= 110.00
VOL.= 153,133.45
ACC. VOL.=11,748,832.17

STA. 1= 253+75.00
D,1= 20.76
AREA 1= 1,343.38
STA. 2= 256+25.00
D,2= 15.04
AREA 2= 779.67
*AVG. AREA= 1,061.53
L= 250.00
VOL.= 265,381.65
ACC. VOL.=12,014,213.7

STA. 1= 256+25.00
D,1= 15.04
AREA 1= 779.67
STA. 2= 257+75.00
D,2= 13.36
AREA 2= 642.08
*AVG. AREA= 710.88
L= 150.00
VOL.= 106,631.64
ACC. VOL.=12,120,845.42

STA. 1= 257+75.00
D,1= 13.36
AREA 1= 642.08
STA. 2= 262+85.00
D,2= 6.31
AREA 2= 203.17
*AVG. AREA= 422.62
L= 510.00
VOL.= 215,538.20
ACC. VOL.=12,336,383.62

STA. 1= 262+85.00
D,1= 6.31
AREA 1= 203.17
STA. 2= 263+75.00
D,2= 4.26
AREA 2= 117.51
*AVG. AREA= 160.34
L= 90.00
VOL.= 14,430.52
ACC. VOL.=12,350,814.14

STA. 1= 263+75.00
D,1= 4.26
AREA 1= 117.51
STA. 2= 264+00.00
D,2= 3.95
AREA 2= 106.21
*AVG. AREA= 111.86
L= 25.00
VOL.= 2,796.47
ACC. VOL.=12,353,610.61

STA. 1= 264+00.00
D,1= 3.95
AREA 1= 106.21
STA. 2= 266+25.00
D,2= 0.14
AREA 2= 2.56
*AVG. AREA= 54.38
L= 225.00
VOL.= 12,236.59
ACC. VOL.=12,365,847.20

* * * * *
TOT. CU. YDS
=457,994.34
* * * * *

USE

If we average H2 Heights
Total sum of hts = 2021.19
Divided by sum of hts taken = 80
= Avg. of 25.26'

$\left(\frac{(4.5)(25.26')}{2}+18\right)25.26'$

* Avg Area 1890.33 ft²

Dist. = 7038.0'

(7038.0')(1890.33 ft²) = 13,304,157.3 ft³

CK By QDM

492,746.57 yds³

COMPUTATION SHEET
SCS-ENG-523A Rev. 9-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: AZ
PROJECT: Signal Butte F.R.S.
BY: ADM
DATE: 4-20-84
CHECKED BY: ICC
DATE: 5/10/84
JOB NO.:
SUBJECT: Principal spillway Structure Backfill
SHEET 1 OF 1

Figure volume of pipe, part of inlet that's covered and outlet and 3 collars

Inlet:

$(6')(10.6667')(4.6667') = \underline{289.6\ ft^3}$

Pipe: 3.5 O.D. $\pi 1.75^2 = 9.62\ ft^2$

$(9.62\ ft^2)(148.34\ L.P.) = \underline{1427.0\ ft^3}$

outlet

$(20.5')(12.25)(16.25) = \underline{4084.0\ ft^3}$

collars $(5.0')(5.6667)(0.8333)$ minus $(\pi 1.75^2)(0.8333)$ 3 collars $= \underline{46.78\ ft^3}$

Total $5{,}853.4\ ft^3 =$

$\underline{\underline{217\ yds^3}}$

Structure Excavation is $1293\ yds^3$

minus $217\ yds^3$

Principal spillway Backfill $= \underline{\underline{1076.0\ yds^3}}$

COMPUTATION SHEET

SCS-ENG-523A Rev. 9-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE AZ PROJECT SIGNAL BUTTE F.R.S.

BY ADM DATE 4-20-84 CHECKED BY ICC DATE 5/10/84 JOB NO.

SUBJECT Gated Outlet Structure Backfill SHEET 1 OF 1

Backfill will consist of structure excavation between stations 8+92.5 and 10+82 minus volume of pipe between these stations

Volume of pipe 2' O.D. $\frac{\pi(2.0)^2}{4} \times$ Length 189.5' = 595.33 ft^3
= 22.0 yds^3

Structure excavation between stations = 1079.5 yds^3

minus 22.0 yds^3

Backfill = 1057.5 yds^3

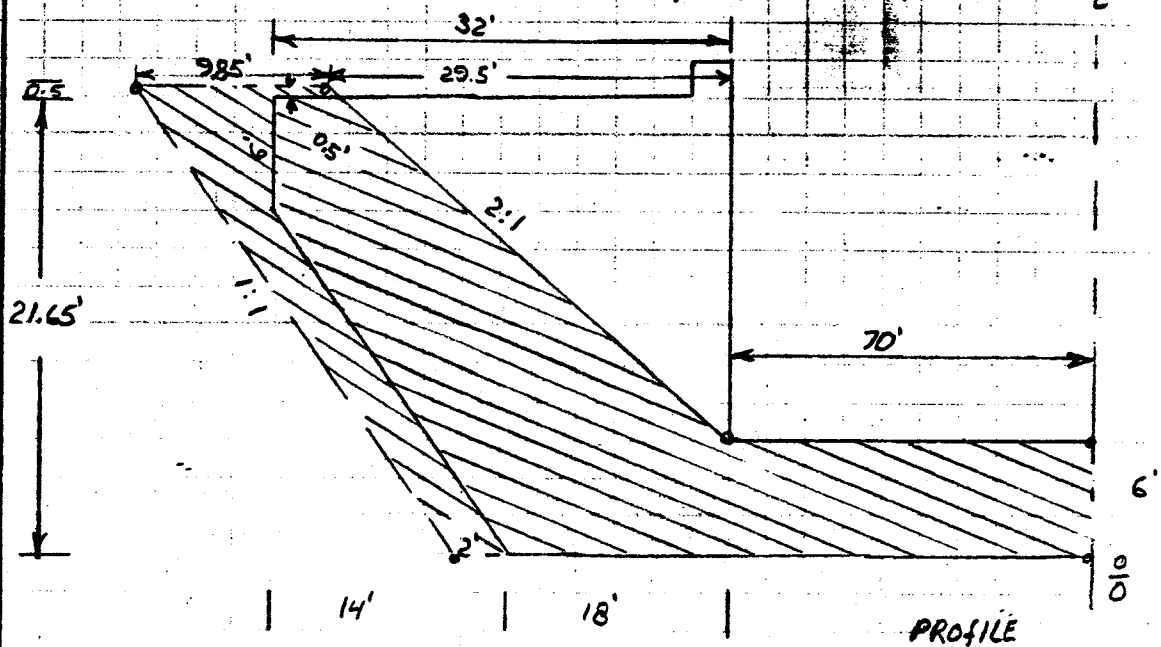
COMPUTATION SHEET
SCS-ENG-523A Rev. 9-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

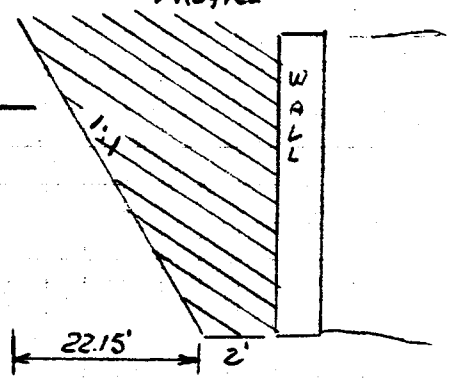
440

STATE AZ | PROJECT SIGNAL BUTTE F.R.S.
BY A.D.M. | DATE 4-24-84 | CHECKED BY ICC | DATE 5/10/84 | JOB NO.
SUBJECT Structure Backfill Emergency Spillway | SHEET 1 OF 5

ONSTRM RETAINING WALL Half Section ℄



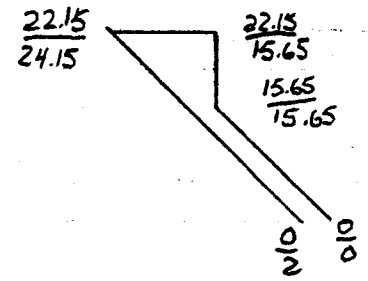
PROFILE



0	6	6	22.15	22.15	0	0
0	0	70	102.3	112.15	90	0

Area = 847.49 ft^2 = 41,080.93 ft^3

Plus Volume at end of wall



Area = (65.43 ft^2) (10" thick wall) = 54.52 ft^2

41,080.93 ft^3
54.52 ft^3
41,135.45 ft^3
2 sides

Total 824.85 yds^3

COMPUTATION SHEET

SCS-ENG-SELS Rev. 9-69

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

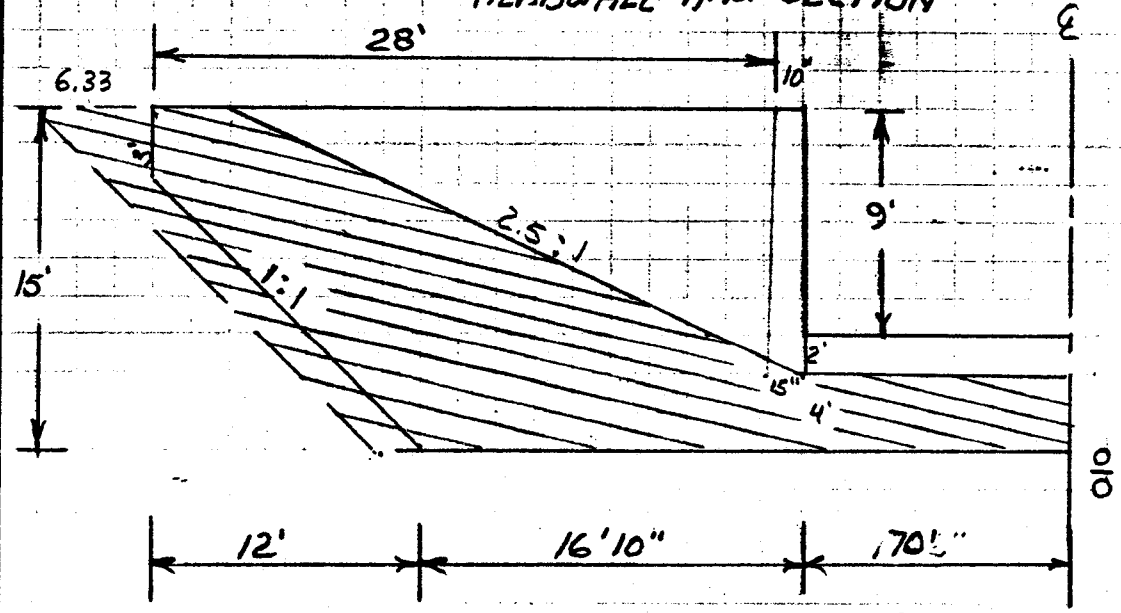
441

STATE AZ PROJECT SIGNAL BUTTE F.R.S.

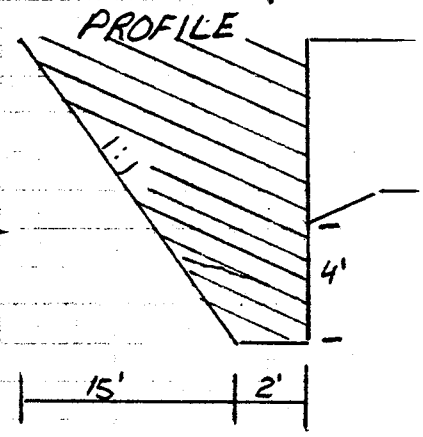
BY A.D.M. DATE 4-27-84 CHECKED BY ICC DATE 5/10/84

SUBJECT Structure Backfill Emergency Spillway SHEET 2 OF 5

HEADWALL HALF SECTION



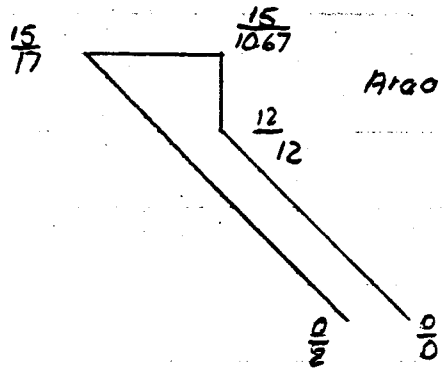
PROFILE



0/0	4/0	4/70	15/97.5	15/103.83	0/88.83	0/0

Area = 523.7 ft^2 = 4975.15 ft^3

Plus Volume at end of wall



Area = 36.5 (10" thick) = 30.42 ft^3

4975.15 ft^3
30.42 ft^3
5005.57 ft^3
2 sides

total 370.8 yds^3

AZ SIGNAL BUTTE F.R.S.

A.D.M. 5-1-84 ICC 5/10/84

STRUCTURE BACKFILL Emergency Spillway SHEET 3 5

Cross sections off of 15"x10½" computation sht.

Sta. 0+00

0	15.75	15.75	14.25	14.25	0
39.35	23.77	21.77	21.77	0	0

Area = 464.42 ft²

Sta. 0+03.17

0	18.75	18.75	17.25	17.25	0
39.35	23.77	21.77	21.77	0	0

Area = 559.1 ft²

Sta. 0+07.17

0	19.0	19	13.67	13.67	0
39.35	15.0	2.75	2.75	0	0

Area = 501.67 ft²

Sta. 0+10

0	13.75	16.75	17.5	18.25	14.92	14.92	13.67	13.67	0
39.35	25	20	15	10	5.17	3.17	3.17	0	0

Area = 503.19 ft²

Sta. 0+15

0	11.25	14.25	15	16	14.92	14.92	13.67	13.67	0
39.35	25	20	15	10	5.17	3.17	3.17	0	0

Area = 442.94 ft²

Sta. 0+20

0	8.75	11.75	12.5	13.5	14.92	14.92	13.67	13.67	0
39.35	25	20	15	10	5.17	3.17	3.17	0	0

Area = 381.46 ft²

Sta. 0+25

0	6.25	9.25	10	11	14.92	14.92	13.67	13.67	0
39.35	25	20	15	10	5.17	3.17	3.17	0	0

Area = 320.0 ft²

Sta. 0+30

0	6.25	6.75	7.5	9.17	14.92	14.92	13.67	13.67	0
39.35	25	20	15	10	4	2	2	0	0

Area = 274.42 ft²

COMPUTATION SHEET
SCS-ENG-503A Rev. 5-79

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE AZ PROJECT SIGNAL BUTTE F.R.S.

BY A.D.M. DATE 5-1-84 CHECKED BY ICC DATE 5/10/84 JOB NO.

SUBJECT Structure Backfill Emergency Spillway SHEET 4 5

Sta. 0+33.167

0	2.2	3.4	4	9.03	13.53	15.03	15.03	13.78	13.78	0
34	25	20	15	10	5	3.75	1.75	1.75	0	0

Area = 203.4 ft²

Sta 0+42.167 ℄ Dam

0	3.07	3.07	3.07	5.57	7.07	10.57	10.57	9.32	9.32	0
34	25	20	15	10	5	2.75	.75	.75	0	0

Area = 145.69 ft²

Sta. 0+45.83

0	6.5	6.5	6.5	8.54	10.57	10.57	0
34	25	20	15	10	5	0	0

Area = 232.48

Sta. 0+49.83

0	10.8	10.8	10.8	10.8	9.8	9.8	0
34	25	20	15	11.5	11.5	0	0

Area = 307.10 ft

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SCS-ENG-529
2-80

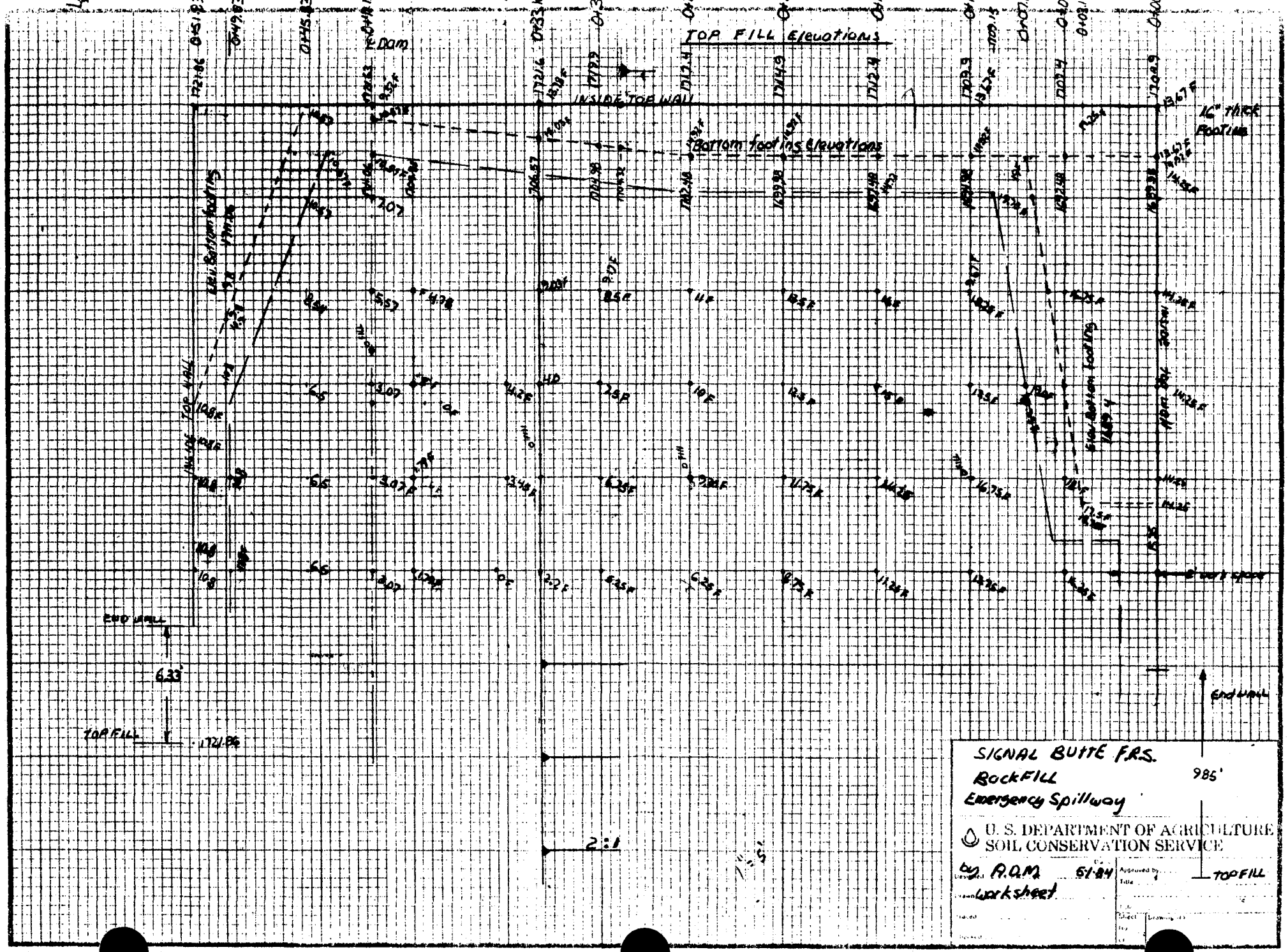
444

EARTHWORK COMPUTATION SHEET

Location SIGNAL BUTTE F.R.S. Owner
Watershed Subwatershed Site No.
Contractor Computed by A.D.M. Date 5-1-84
Item Checked by Date
Contract No. Estimate 2,449.76 yd³ Actual yd³

Station	End area (in2)	End area (ft²)	Sum of end areas (ft²)	Distance (ft)	Section products (ft³)	Volume (yd³)	Remarks
0+00		464.42					
			1023.52	3.17	3244.56	120.17	
0+03.17		559.1					
			1060.77	4.0	4243.08	157.15	
0+07.17		501.67					
			1,004.86	2.83	2843.75	105.32	
0+10		503.19					
			946.13	5.0	4730.65	175.21	
0+15		442.94					
			824.4	5.0	4122.0	152.67	
0+20		381.46					
			701.46	5.0	3507.3	129.9	
0+25		320.0					
			594.42	5.0	2972.1	110.08	
0+30		274.42					
			477.82	3.167	1513.26	56.05	
0+33.167		203.4					
			349.09	9.0	3141.81	116.36	
0+42.167		145.69					
			378.17	3.66	1384.1	51.26	
0+45.83		232.48					
			539.58	4.0	2158.32	79.94	
0+49.83		307.1					
					2	1,254.11	=
						627.06	
				two	sides	1254.11	
				sht	#1	824.85	
				sht	#2	370.8	
				total		2,449.76	yds³

Sheet 5 of 5 sheets


TOP FILL Elevations
Dam
INSIDE TOP WALL
16" THICK FOOTING
Bottom footings Elevations
End Bottom footings
Bottom footings
TOP WALL
END WALL
6.33'
TOP FILL
1721.86
2:1
1" = 5'
End WALL
TOP FILL
985'
SIGNAL BUTTE F.R.S.
BockFILL
Emergency Spillway
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
by R.O.M. 6-1-84
Worksheet

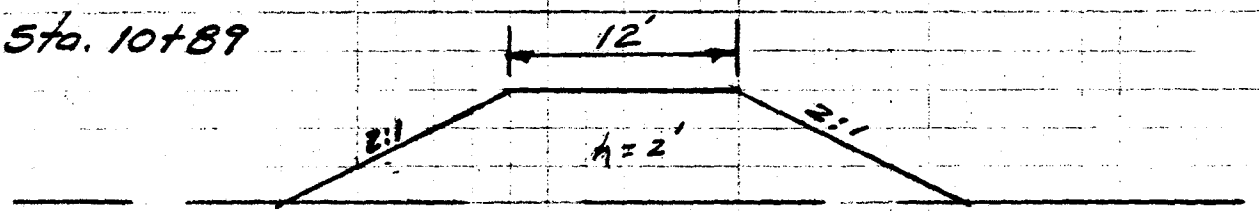
STATE Az. PROJECT Signal Butte FRS
BY BJL DATE 4-17-84 CHECKED BY OCM DATE 4-18-84 JOB NO.
SUBJECT Emergency Spillway outlet Dike SHEET 1 OF 3

Sta. 10+43

1705.5

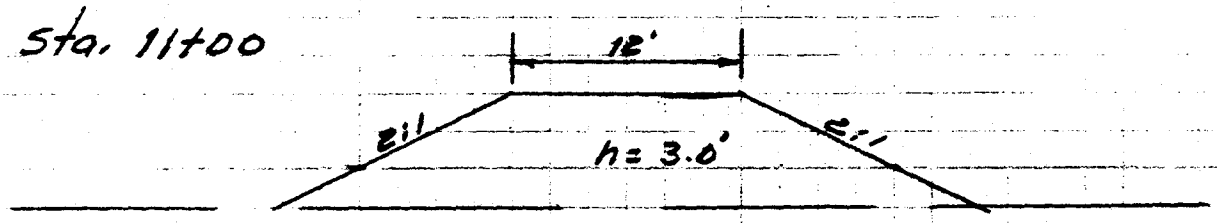
Area = 0.00 ft^2

Sta. 10+89



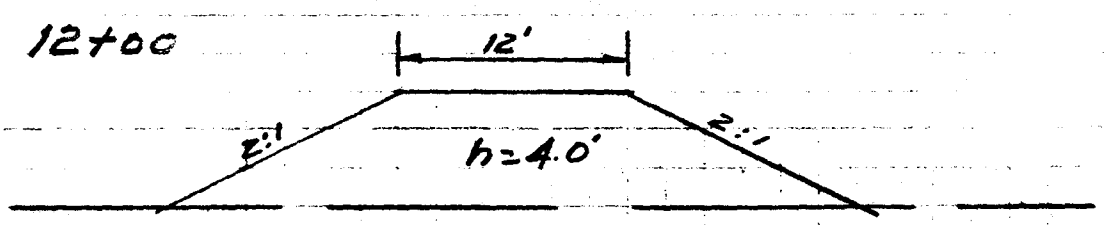
Area = $z(h^2) + h(TW) = 2(2)^2 + 2(12) = 32.0\ ft^2$

Sta. 11+00



Area = $zh^2 + h(TW) = 2(3.0)^2 + 3(12) = 54.0\ ft^2$

Sta. 12+00



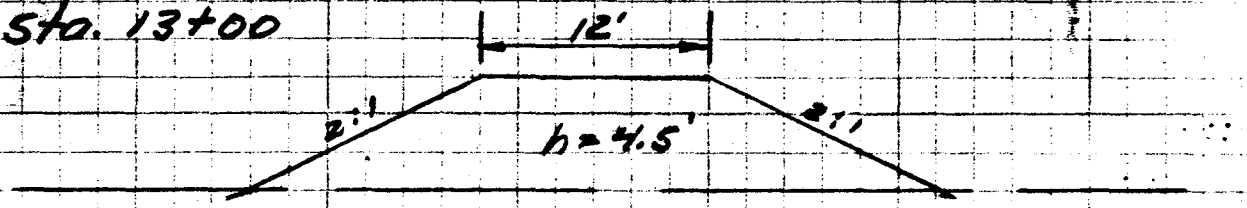
Area = $zh^2 + h(TW) = 2(4.0)^2 + 4.0(12) = 80.0\ ft^2$

COMPUTATION SHEET
SCS-ENG-523A Rev. 9-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

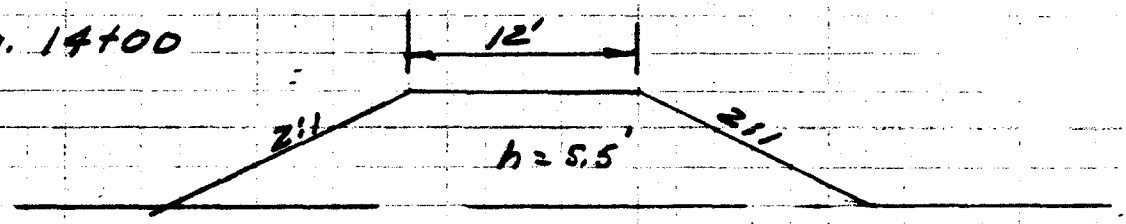
STATE Az. PROJECT Signal Butte FRS
BY BJL DATE 4-17-84 CHECKED BY DATE JOB NO.
SUBJECT Emergency Spillway Outlet Dike SHEET 2 OF 3

Sta. 13+00



$Area = 2h^2 + h(TW) = 2(4.5)^2 + 4.5(12) = 94.5\ ft^2$

Sta. 14+00



$Area = 2h^2 + h(TW) = 2(5.5)^2 + 5.5(12) = 126.5\ ft^2$

Sta. 14+50

$Area = 0.00\ ft^2$

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SCS-ENG-529
2-80

448

Fill

EARTHWORK COMPUTATION SHEET

Location Buckhorn-Mesa Owner
Watershed Signal Butte FRS Subwatershed Site No.
Contractor Computed by Date
Item Emergence Spwy. Outlet Dike Checked by Clem Date 4-18-84
Contract No. Estimate 1574.0 yd³ Actual yd³

Station	End area (in²)	End area (ft²)	Sum of end areas (ft²)	Distance (ft)	Section products (ft³)	Volume (yd³)/54	Remarks
10+43		0.0					
				46'			
10+89							
				11'			
11+00							
				100'			
12+00							
				100'			
13+00							
				100'			
14+00							
				50'			
14+50		0.0					

```
** ROB **
(vol. of trap.
 x-section)
===========

BW=12.00
Z,1=2.00
Z,2=2.00

STA. 1= 10+43.00
     D,1= 0.00
  AREA 1= 0.00
STA. 2= 10+89.00
     D,2= 2.00
  AREA 2= 32.00
*AVG. AREA= 16.00
L= 46.00
VOL.= 736.00
ACC. VOL.=736.00

STA. 1= 10+89.00
     D,1= 2.00
  AREA 1= 32.00
STA. 2= 11+00.00
     D,2= 3.00
  AREA 2= 54.00
*AVG. AREA= 43.00
L= 11.00
VOL.= 473.00
ACC. VOL.=1,209.00

STA. 1= 11+00.00
     D,1= 3.00
  AREA 1= 54.00
STA. 2= 12+00.00
     D,2= 4.00
  AREA 2= 80.00
*AVG. AREA= 67.00
L= 100.00
VOL.= 6,700.00
ACC. VOL.=7,909.00

STA. 1= 12+00.00
     D,1= 4.00
  AREA 1= 80.00
STA. 2= 13+00.00
     D,2= 4.50
  AREA 2= 94.50
*AVG. AREA= 87.25
L= 100.00
VOL.= 8,725.00
ACC. VOL.=16,634.00

STA. 1= 13+00.00
     D,1= 4.50
  AREA 1= 94.50
STA. 2= 14+00.00
     D,2= 5.50
  AREA 2= 126.50
*AVG. AREA= 110.50
L= 100.00
VOL.= 11,050.00
ACC. VOL.=27,684.00

STA. 1= 14+00.00
     D,1= 5.50
  AREA 1= 126.50
STA. 2= 14+50.00
     D,2= 0.00
  AREA 2= 0.00
*AVG. AREA= 63.25
L= 50.00
VOL.= 3,162.50

ACC. VOL.=30,846.50 ft³
```

1,142.46 yds³

Sheet 3 of 3 sheets

COMPUTATION SHEET
SCS-ENG-5234 Rev. 9-69

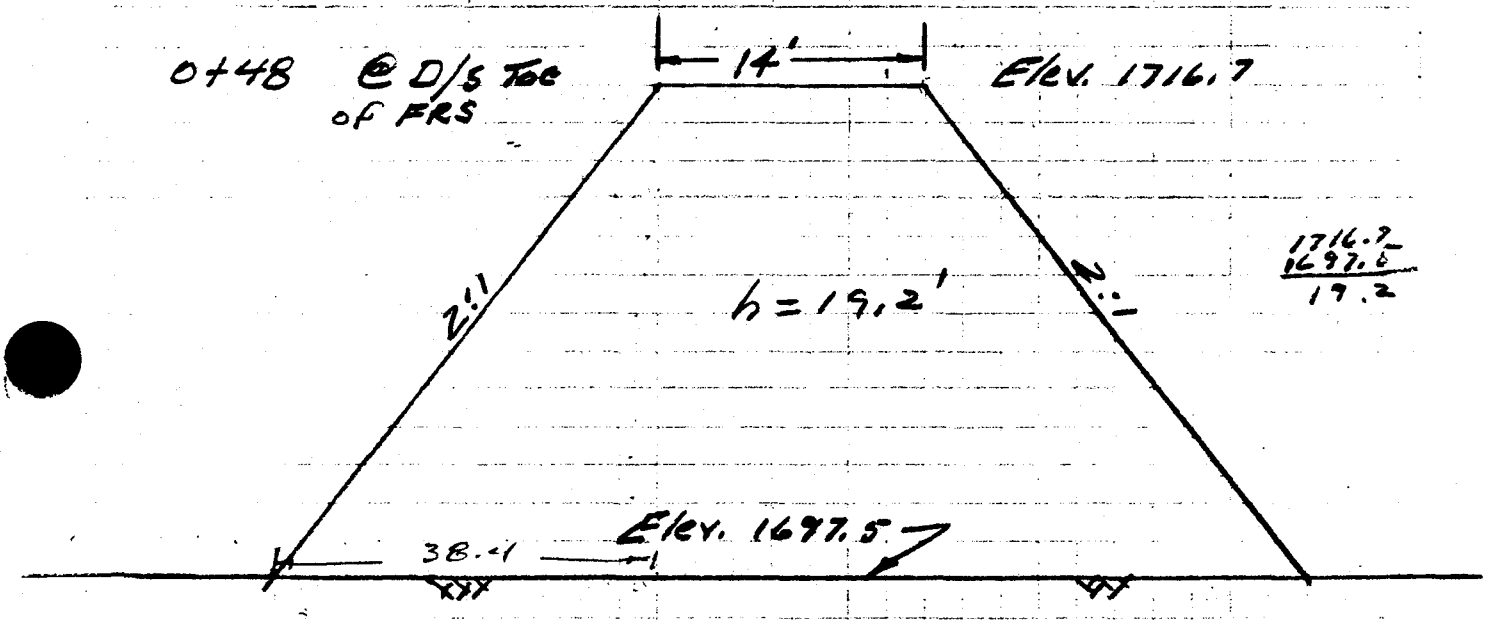
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE Az. PROJECT Signal Butte FRS
BY BJL DATE 4-16-84 CHECKED BY CBM DATE 4-18-84 JOB NO. Sta. 248+75
SUBJECT Road Ramp. Calculation SHEET 1 OF 2

Ramp @ Sta. 248+75

0+00 Top FRS Elev. 1721.5 End Area 0.0 ft²

0+48 @ D/S Toe of FRS



1716.7
1697.5
19.2

End Area = $2(d^2) + d(TW) = 2(19.2)^2 + 19.2(14') = 1006.0$

2d x d

2+40 End ramp _____ End Area 0.0 ft²

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

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2-80

EARTHWORK COMPUTATION SHEET

Location Buckhorn-Mesa Owner
Watershed Signal Butte FRS Subwatershed Site No.
Contractor Computed by Date
Item Road Ramps Checked by aem Date 4-18-84
Contract No. Estimate yd³ Actual yd³

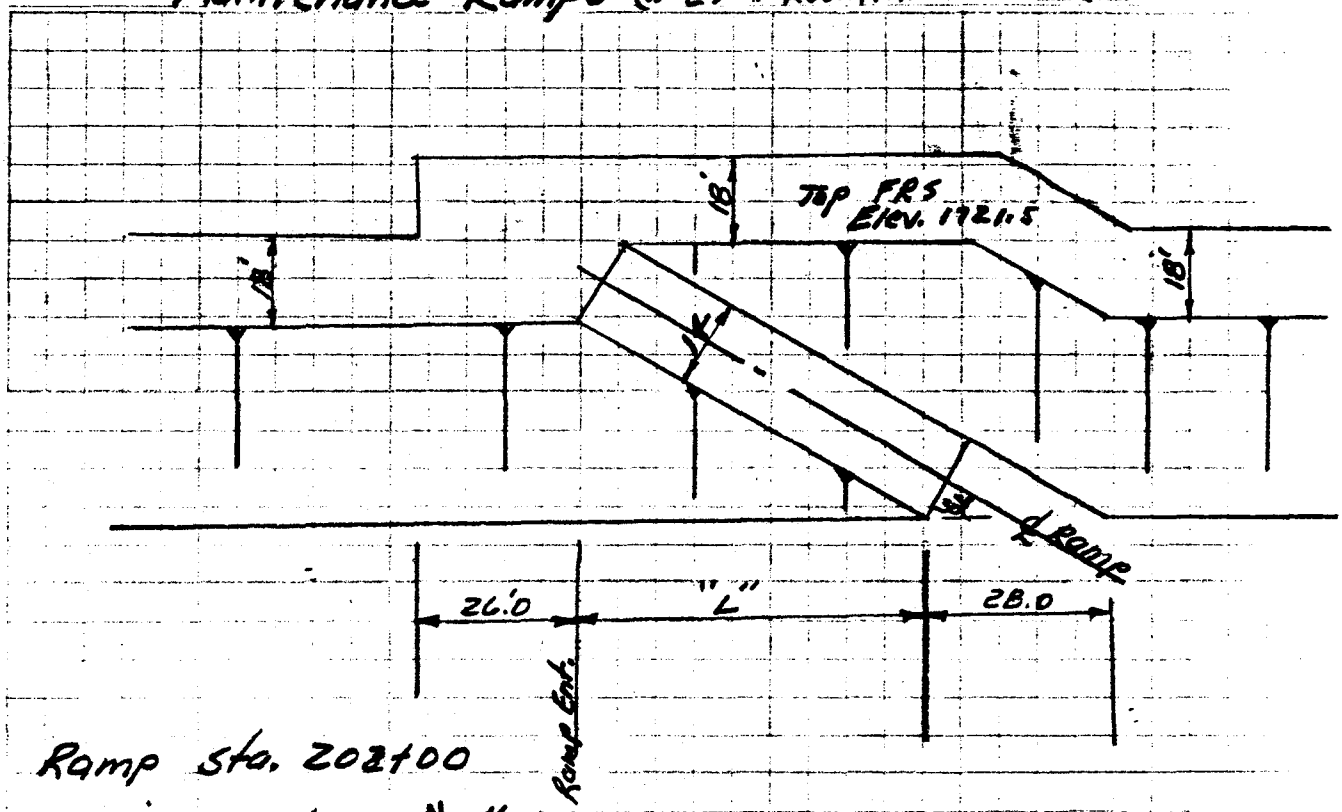
Ramp @ Sta. 248+75

Station	End area (in²)	End area (ft²)	Sum of end areas (ft²)	Distance (ft)	Section products (ft³)	Volume (yd³)	Remarks
0+00	0	0					
			1006.1	48	48291.8	894.3	
0+48	19.2	1006.1					
			1006.1	192	193171.2	3577.2	
2+40	0	0					
					TOTAL=	4471.54	yds³ Fill
						4,471.47	yds³

```
 ** ROB **
(vol. of trap.
 x-section)
============

BW=14.00
Z,1=2.00
Z,2=2.00

STA. 1= 0+00.00
     D,1= 0.00
  AREA 1= 0.00
STA. 2= 0+48.00
     D,2= 19.20
  AREA 2= 1,006.08
*AVG. AREA= 503.04
L= 48.00
VOL.= 24,145.92 ft³

ACC. VOL.=24,145.92 ft³

STA. 1= 0+48.00
     D,1= 19.20
  AREA 1= 1,006.08
STA. 2= 2+40.00
     D,2= 0.00
  AREA 2= 0.00
*AVG. AREA= 503.04
L= 192.00
VOL.= 96,583.68
ACC. VOL.=120,729.60 ft³
```

Sheet 2 of 2 sheets

STATE Az. PROJECT Buckhorn-Mesa WPP Signal Butte Pr
BY BJL DATE 4/13/84 CHECKED BY DATE JOB NO.
SUBJECT Maintenance Ramps @ E.S. Location SHEET 1 1



Ramp sta. 202+00

Find distance "L" Given angle 30°

Elev. diff. 1721.6
1708.2
13.4

Height X Z = Horz. dist.
(13.4) (2.5) = 33.75'

$\frac{33.75'}{\text{Tan. } 30°} = \underline{\underline{58.46'}}$ = "L" dist.

Ramp sta. 208+00

Find distance "L" Given angle 30°

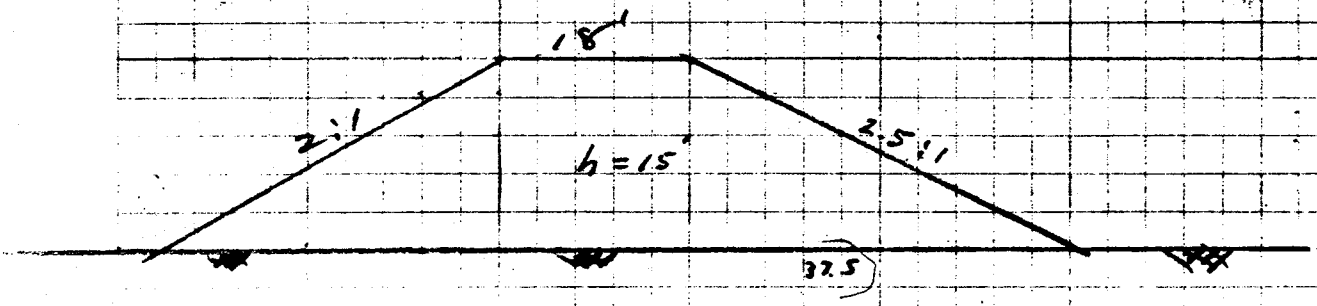
Elev. diff. 1721.6
1704.1
17.5

(17.5) (2.5) = 43.75'

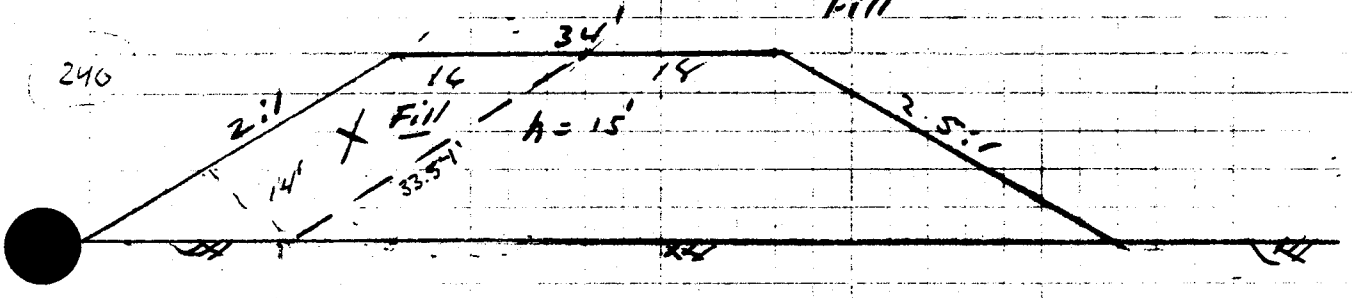
$\frac{45.75'}{\text{Tan. } 30°} = \underline{\underline{79.24'}}$ = "L" dist.

STATE Az. PROJECT Signal Butte PRS
BY BJL DATE 4-16-84 CHECKED BY CDM DATE 5-11-84 JOB NO.
SUBJECT Road Ramps @ Emg. Spillway (2) SHEET 1 OF 4

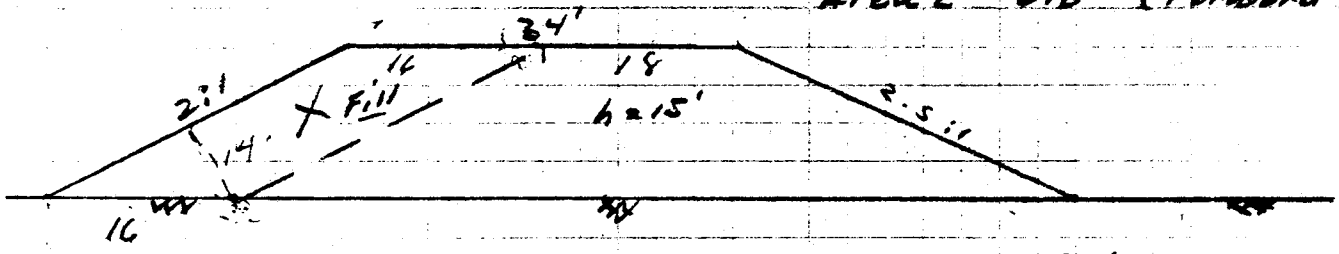
0+00 Area = 0.0 ft2



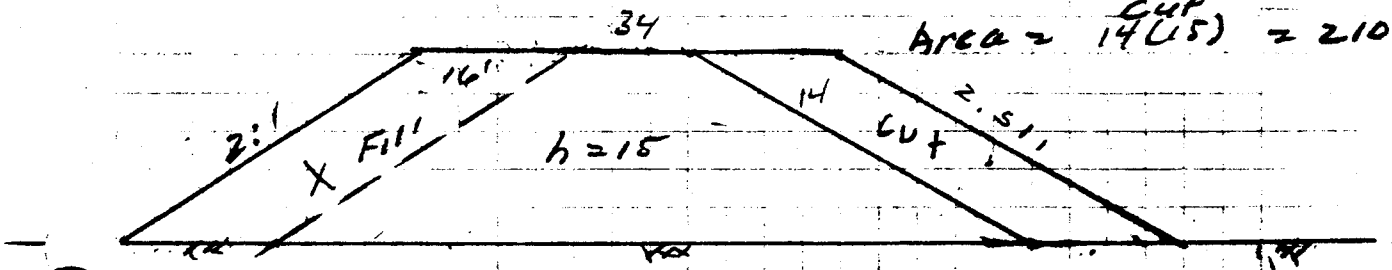
0+30 Area = 15(16) = 240.0 ft2
Fill



0+56 Area = 15(16) = 240.0 ft2
Area = 0.0 (Forward)



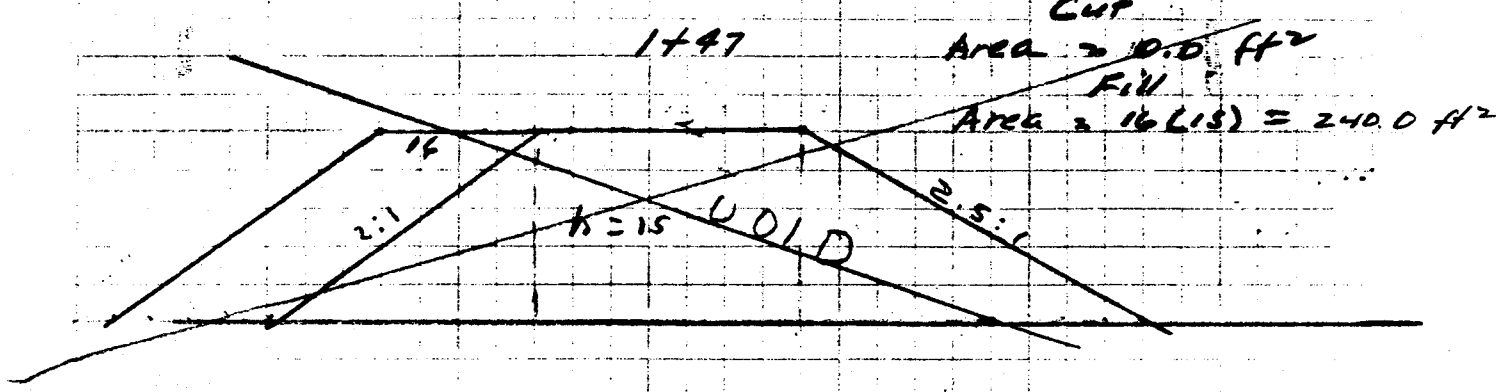
1+14 Area = Fill 15(16) = 240.0 ft2
Area = Cut 14(15) = 210

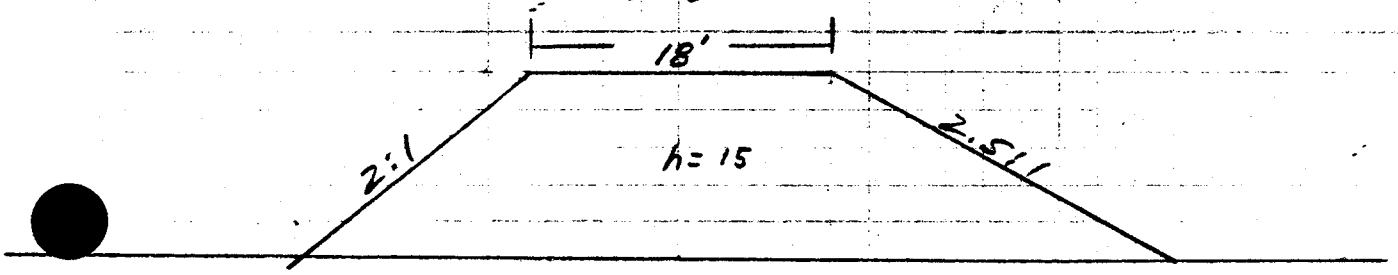


COMPUTATION SHEET

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE Az PROJECT Signal Butte FRS
BY BJL DATE 4-16-84 CHECKED BY ABM DATE 5-11-84 JOB NO
SUBJECT Road Ramps SHEET 2 OF 4





U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SCS-ENG-529
2-80

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EARTHWORK COMPUTATION SHEET

Location: BUCKHORN - MESA
Owner:
Watershed: SIGNAL BUTTE FRS
Subwatershed:
Site No.:
Contractor:
Computed by: BJL
Date: 4-19-84
Item: Road Ramps (2) Fill
Checked by: alm
Date: 5-11-84
Contract No.:
Estimate: 2377.3 yd³
Actual: yd³

Station	End area (in²)	End area (ft²)	Sum of end areas (ft²)	Distance (ft)	Section products (ft³)	Volume (yd³)	Remarks
Ramp FRS sta. 201+44							
0+00		0.0					
			240.0	30	7200.0	266.67	
0+30		240.0			8400.0	155.6	
			480.0	26	12480.0	462.22	
0+56		240.0				231.1	
			480.0	58	27840.0	1031.11	
1+14		240.0				515.6	
			240.0	46	11040.0	408.89	
1+60		0.0			6720.0	124.4	
						2)2168.89	=1084.44 yds³
				~~Sub Total~~	~~1026.70~~	~~Cu yds~~	
				Sub total =	1084.44	yds³	
Ramp sta. 208+56							
0+00		0.0					
			240.0	30 28	7200.0 6720.0	266.67 124.4	
0+28		240.0					
			480.0	~~79~~ 26	12480.0 37920.0	462.22 702.2	
0+56		240.0					
			480.0	79 26	37920.0 12480.0	1404.44 231.1	
1+33		240.0					
			240.0	~~28~~ 33	6720.0 8400.0	248.89 155.6	
1+66		0.0					
				~~Sub Total~~	~~1213.30~~	~~Cu yds~~	
				~~Total =~~	~~2240.0~~	~~Cu. yds~~	~~Fill~~
					~~2,239~~	~~yd³ Fill~~	
							R.L.D.
			Sub total = 54		64320.0	= 1191.11 yds³	Fill
					Total	2275.55 yds³	Fill

Sheet 3 of 4 sheets

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SCS-ENG-529
2-80

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EARTHWORK COMPUTATION SHEET

Location: BUCHORN-MESA
Owner:
Watershed: SIGNAL BUTTE FRS
Subwatershed:
Site No.:
Contractor:
Computed by: B.L.
Date: 4-19-84
Item: Road Ramps (2) Cut
Checked by: ABM
Date: 5-11-84
Contract No.:
Estimate: 748.0 yd³
Actual: yd³

Station	End area (in²)	End area (ft²)	Sum of end areas (ft²)	Distance (ft)	Section products (ft³)	Volume (yd³)	Remarks
Ramp C FRS Sta. 202+00.58							
0+00		0.0					
1+19		210.0	210.0	58.0	12180.0	225.0	
1+47		0.0	210.0	33 28.0	6930.0 5880.0	108.0	
				Sub Total =		333.0	Cu yds
						334.44	
				54	19110.0	353.89 yds³	
Ramp C FRS Sta. 208+00							
0+00		0.0					
0+28		210.0	210.0	28	5880.0	108.0	
1+05		0.0	210.0	79	16590.0	307.0	
				Sub Total =		~~415.0~~ (416.111)	Cu yds
				TOTAL =		748.0	Cu yds CUT
						750.55	
						R A.P.	
				total		770.0 yds³	NOM

Sheet 4 of 4 sheets

SIGNAL BUTTE F.R.S. (1984)

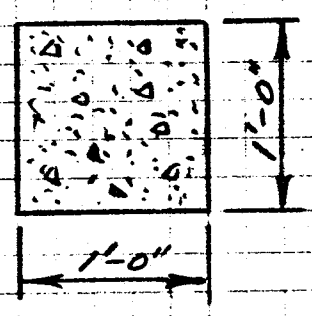
Subject	Calculations			Check		
	Quanity	Units	Initials	Quanity	Units	Initial
V. Concrete						
a.) HDPE Anchor Block	261	yd^3	R.A.P.	261	yd^3	BJL
b.) Gate Lift Pedestal	0.47	yd^3	R.A.P.	0.47	yd^3	JEB
c.) Gate Stem Pedestals	0.5170	yd^3	R.A.P.	0.5170	yd^3	BJL
d.) Outlet Structure of Principal Spillway	39	yd^3	ICC.	39	yd^3	RAP.
e.) P.W.D. for Gated outlet Structure	1.94	yd^3	Standard drawing	—	—	—
f.) Inlet Structure for Gated Outlet	1.57	yd^3	Standard drawing	—	—	—
g.) Inlet Structure for Principal Spillway	20.5	yd^3	Standard drawing	—	—	—
h.) Emergency Spillway	1645.0	yd^3	A.D.M.	645	yd^3	ICC
Total =	969.9970					
Use	970 yd^3					

COMPUTATION SHEET
SCS-ENG-523A Rev. 4-64

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE ARIZONA | PROJECT SIGNAL BUTTE F.R.S.
BY R.A.P. | DATE 3/7/84 | CHECKED BY | DATE 4-19-84 | JOB NO
SUBJECT CONCRETE CALCULATIONS FOR HDPE ANCHOR | SHEET 1 OF 1

GIVEN:



Concrete block 1.0' wide, 1.0' deep and length of F.R.S. or 7,038 ft

(Located @ ℄ in bottom of cutoff trench)

SOLUTION:

$1.0' \times 1.0' \times 7{,}038' = 7{,}038\ ft^3$

$7{,}038 \div 27 = 260.6667\ yd^3$

Use $261\ yd^3$

CO... ...TATION SHEET
SCS-ENG-523 Rev. 8-69

(6)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

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STATE ARIZONA		PROJECT SIGNAL BUTTE F.R.S.		
BY R.A.P.	DATE 11/2/81	CHECKED BY JEB	DATE 2/25/82	JOB GATED OUTLET
SUBJECT GATE LIFT PEDESTAL DESIGN DATA				SHEET 1 OF 3

GIVEN:

Gate size = 12" dia.

Head = 1711.5 (Maximum water surface)
1685.0 (℄ of inlet gate)
26.5' = design head in feet

SOLUTION:

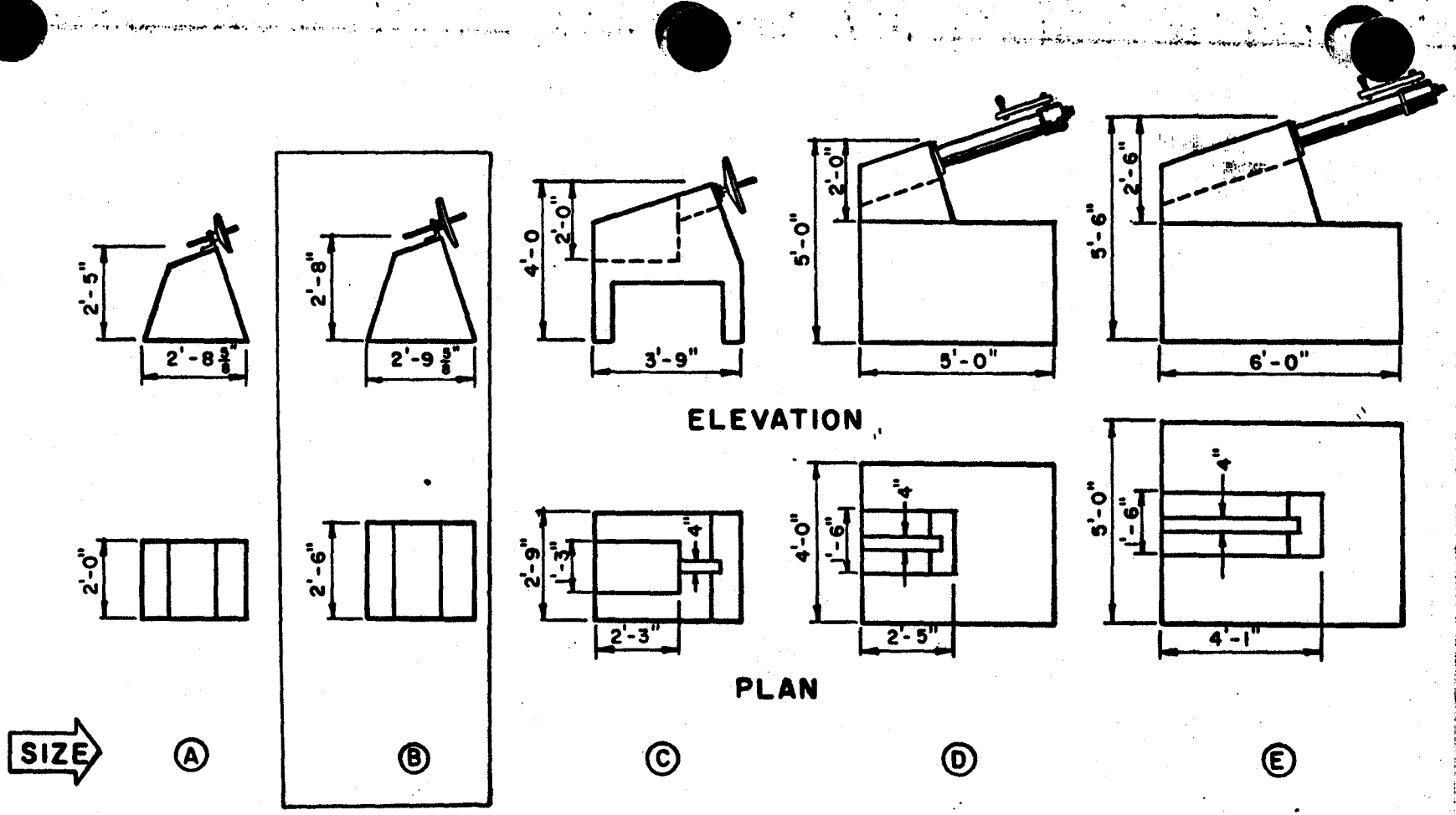
Go to Figure D-1 (pp D-33) of TR-46

Using Selection Chart, with a gate dia of 12" plus the required 3" added go to 15" line and progress up to intersect with head of 26.5' line coming across from the left.

Design data:
Lift Pedestal Size = B
Stem Dia. = 1 1/2" dia
Hand wheel size = 18" dia
Stem Spacing = 16' c.c. encased

Note
Fig D-9 and D-11 from TR-46 are attached as page 2 of 3 and 3 of 3.

SIGNAL BUTTE F.R.S.
Gated Outlet



SIZE	LIFT CAPACITY	VOLUME CONCRETE	REINF. STEEL	REFER TO DRG. NO. 7-L-20544 A THRU E	BASE PLATE DETAIL FIG.
A	200*	0.27 cu. yds.		Fig. No. D-10	D-17
B	800*	0.47 cu. yds.		Fig. No. D-11	D-17
C	2,200*	0.74 cu. yds.	44.25*	Fig. No. D-12	D-18
D	6,000*	2.41 cu. yds.	18.05*	Fig. No. D-13	D-19
E	10,000*	3.70 cu. yds.	24.05*	Fig. No. D-14	D-19

FIGURE D-9
GATE LIFT PEDESTALS
EWP Unit Portland, Oregon

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SIGNAL BUTTE F.R.S.

Gatted Outlet

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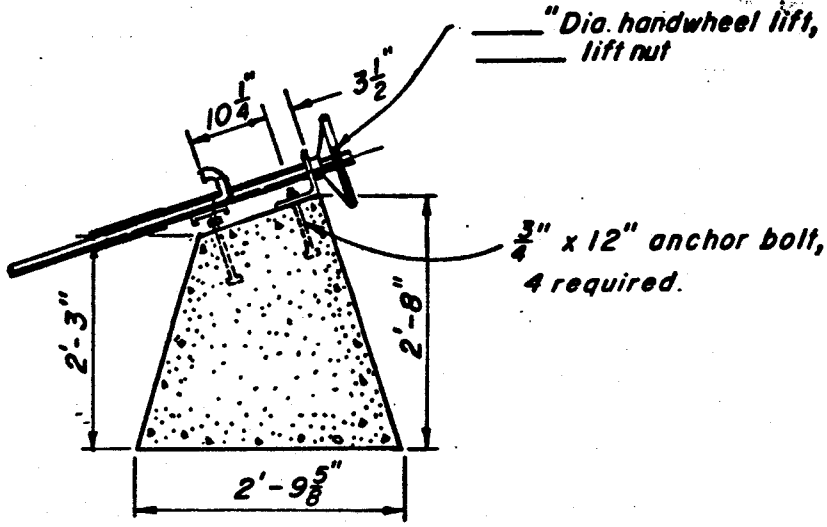
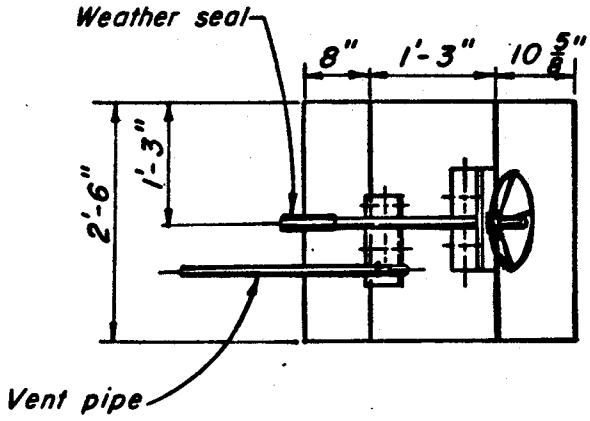


SECTIONAL ELEVATION



PLAN

GATE LIFT PEDESTAL

1 0 5
SCALE IN FEET

Note:

For lift selection and handwheel size refer to Figure D-1.

For handwheel bracket detail see Figure D-17

Specify bronze or cast iron lift nut

Inlet of vent pipe to consist of a screened (galv. 18 mesh) street ell and 90° ell securely fastened to lift pedestal

FIGURE D-11
GATE LIFT PEDESTAL
SIZE B
EWP Unit Portland, Oregon

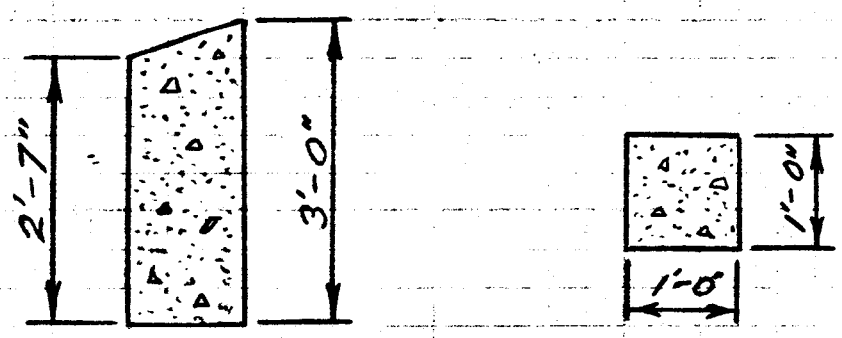
7-L-20544-B

3 of 3

STATE ARIZONA PROJECT SIGNAL BUTTE F.R.S.
BY R.A.P. DATE 3/28/84 CHECKED BY DATE 4-18-84 JOB NO. GATED OUTLET
SUBJECT GATE STEM PEDESTALS YARDAGE CALCULATIONS SHEET 1 OF 1

GIVEN:

Based on TR-46, Fig D-5, Page D-40 modified for a 2.5:1 slope.



(not to scale)

SOLUTION:

$$\frac{2.5833' + 3.0'}{2} \times 1.0' \times 1.0' = 2.7917\ ft^3$$

$$2.7917 \div 27 = 0.1034\ yd^3$$

$$0.1034\ yd^3 \times 5\ \text{pedestals} = \underline{\underline{0.5170\ yd^3}}$$

STATE AZ PROJECT Signal Butte FRS
BY ICC DATE 5/1/84 CHECKED BY R.A.P. DATE 5/4/84 JOB NO. Principal Spillway
SUBJECT Concrete Quantities of Outlet Structure SHEET 1 OF 2

Floor:

$14'-3'' \times 18'-9'' \times 11'' = 244.9\,ft^3 = \underline{9.08\,yds^3}$

Side Walls:

$8'-11'' \times 12'-2'' \times 11'' + 10'-9'' \times \frac{12'-2'' + 8'-1''}{2} \times 11'' =$

$= 199.22\,ft^3 = 7.38\,yds^3$

Total (2) = $\underline{14.76\,yds^3}$

Head Wall

$14'-3'' \times 12'-2'' \times 11'' - \pi/4\,(3')^2 \times 11'' + \pi\left(\frac{28.5}{12}\right)^2 \frac{5\frac{1}{2}''}{12}$

$- \pi\left(\frac{18}{12}\right)^2\left(\frac{5\frac{1}{2}''}{12}\right) = 157.33\,ft^3 = \underline{5.83\,yds^3}$

Impact Wall:

$\left[\frac{11''}{12} \times 6' + 2'-5'' \times \frac{8}{12}\right] 14'-3'' = 101.\bar{3}\,ft^3 = \underline{3.75\,yds^3}$

Lip: (around top)

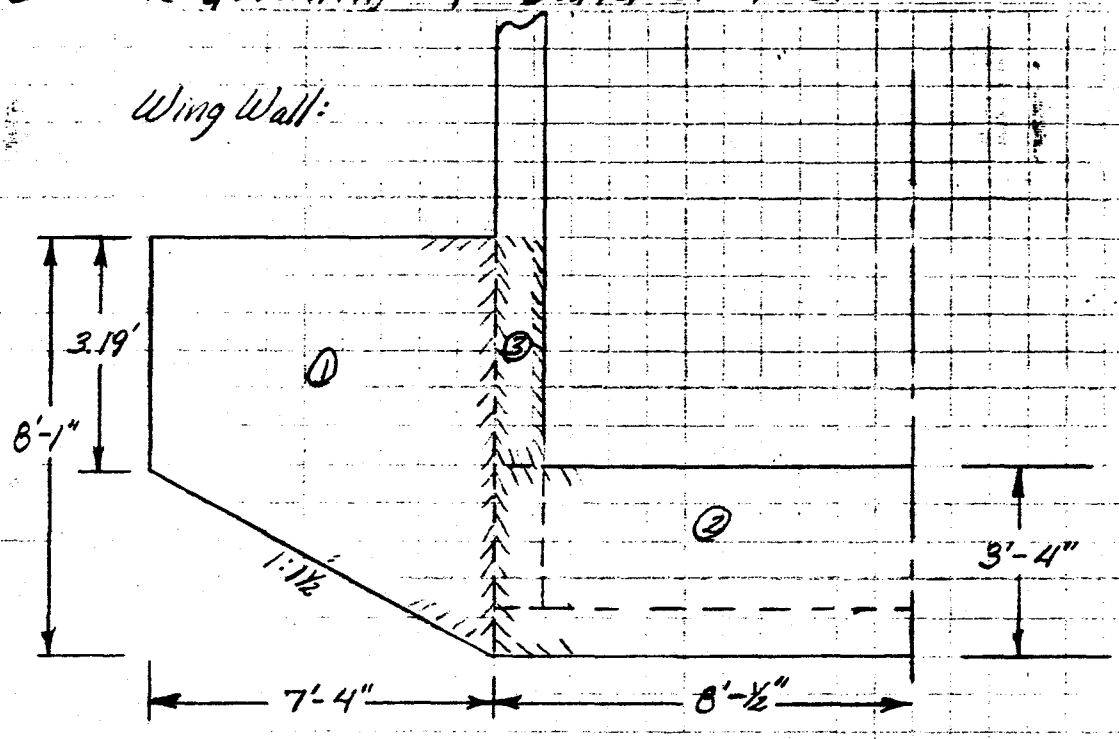
$6'-3'' \times \frac{14''}{12''} \times \frac{6''}{12} = 3.65\,ft^3 \times 2 = 0.27\,yds^3$

$+ \frac{6''}{12} \times \frac{14''}{12} \times 14'-3'' = 8.31\,ft^3 = 0.31\,yds^3$

Total = $\underline{0.58\,yds^3}$

Arizona — PROJECT: Signal Butte FRS
I.C.C. — DATE: 5/1/84 — CHECKED BY: R.A.P. — DATE: 5/4/84 — JOB NO.: Principal Spillway
Concrete Quantities of Outlet Structure. SHEET 2 OF 2

Wing Wall:



①:
$5.64'(7'\text{-}4'')\,11'' = 37.91\,ft^3$

②:
$3'\text{-}4''(8'\text{-}½'')\,11'' = 24.57\,ft^3$

③
$4'\text{-}9''\,(11'')^2 = 4.0\,ft^3$

Sub. Total vol. = $66.47\,ft^3$
= $2.46\,yds^3$/half of structure

Total vol. = $5.0\,yds^3$

~ Vol. of Concrete for entire structure = 38.9 ≈ $39\,yds^3$

AZ SIGNAL BUTTE F.R.S.

A.O.M. 5-8-84 ICC 5/11/84

Emergency Spillway Concrete Summation SHEET 1 8

UNIT	yds³	No. of UNITS	Volume yds³
APRON			
A	29.01	2	58.02
B	24.41	2	48.82
C	6.4	2	12.8
D	64.0	2	128.0
E	6.68	2	13.36
F	73.48	2	146.96
SIDEWALL			
A	11.82	2	23.64
B	15.75	2	31.5
H	12.24	2	24.48
R	22.0	2	44.0
BAFFLES			
at crest	0.85	14	11.9
blocks	1.36	56	76.16
Footings			
Headwall	1.85	2	3.7
Retaining	5.27	2	10.54
side	5.56	2	11.12

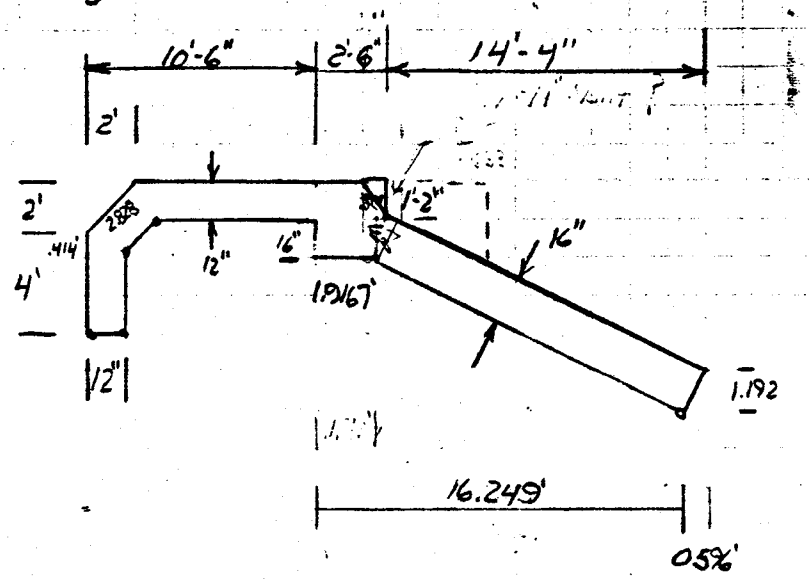
Total Volume 645.0 yds³

AZ SIGNAL BUTTE F.R.S.

A.D.M. 5-2-84 ICC 5/11/84

Emergency Spillway Apron (A) (B) (C) (D) (E) (F) 2 8

(A)



27'-4"

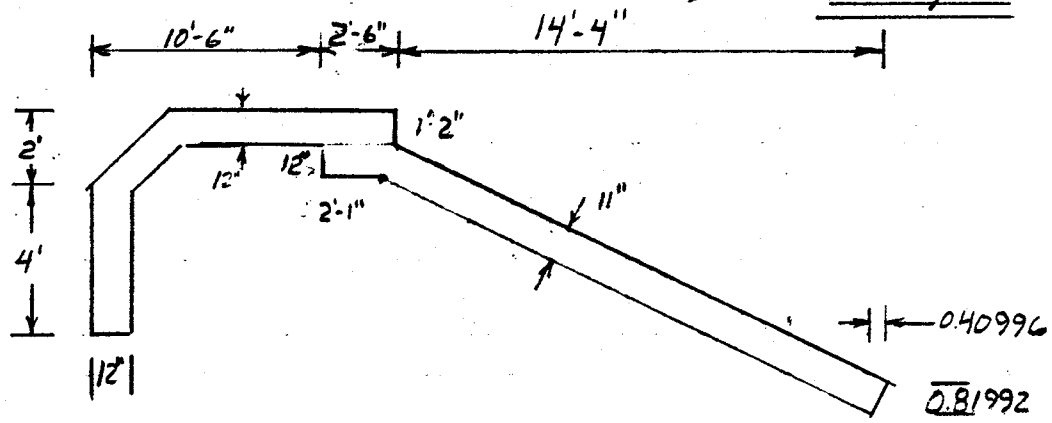
0	0	3.586	5.0	5.0	3.6667	3.6667	-3.4936	-2.3016	4.8333
0	1.0	1.0	3.0	10.5	10.5	12.4167	26.7373	27.333	13.0632

6.0	6.0	4.0	0
13.0	2.0	0	0

Area = 41.78 ft² width = 17.5 + 1.5" = 18.75'

(41.78 ft²)(18.75') = 29.01 yds³

(D) (C)



0	0	3.586	5.0	5.0	4.0	4.0	-3.1698	-2.349	4.8333
0	1.0	1.0	3.0	10.5	10.5	12.58335	26.923	27.333	13

6	6	4	0
13	2	0	0

Area = 34.56 ft²

width D = 50' (50')(34.56 ft²) = D = 64.0 yds³

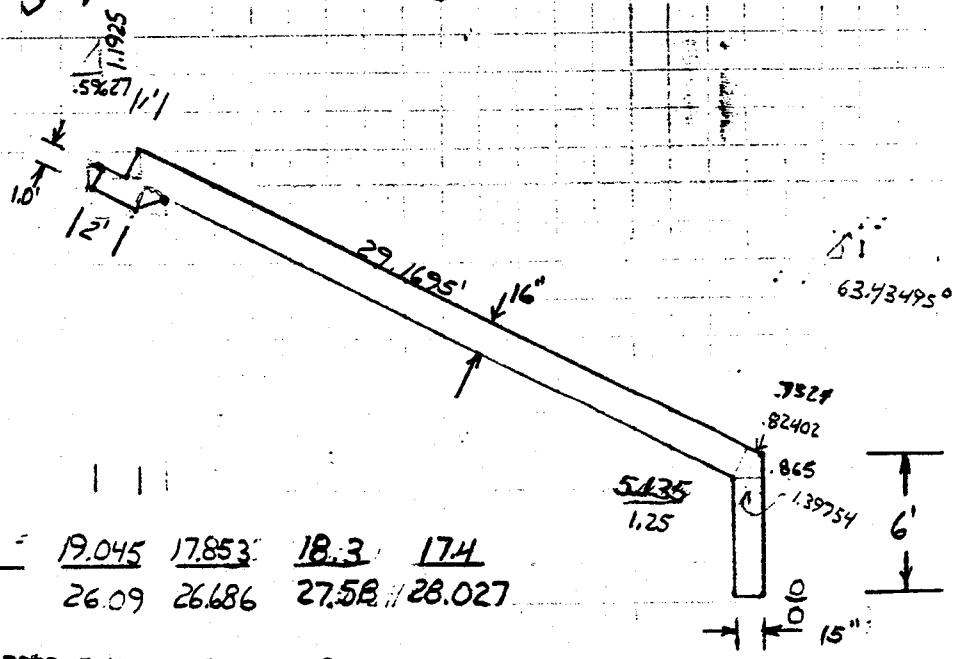
width C = 5' (5') 34.56 ft² = C = 6.4 yds³

AZ SIGNAL BUTTE F.R.S.

A.D.M. 5-3-84 TLC 5/11/84

Emergency Spillway Apron (A) (B) (C) (D) (E) (F) SHEET 3 OF 8

(B)



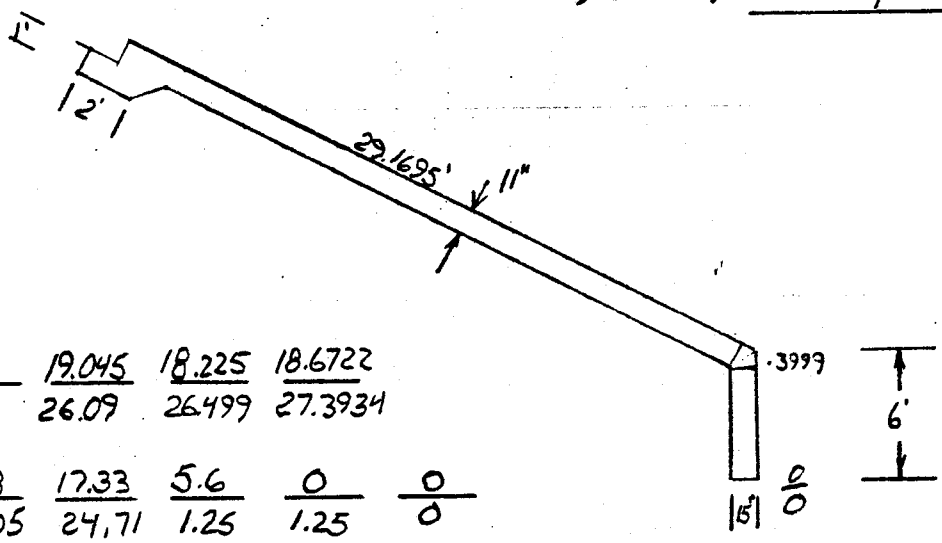
0/0	6/0	19.045 / 26.09	17.853 / 26.686	18.3 / 27.58	17.4 / 28.027

16.50557 / 26.23815	16.95279 / 24.8965	5.135 / 1.25	0 / 1.25	0 / 0

Area = 47.93 ft^2 width 13.75'

(47.93 ft^2)(13.75') = 24.41 yds^3

(E) (F)



0/0	6/0	19.045 / 26.09	18.225 / 26.499	18.6722 / 27.3934	

17.777 / 27.84	16.88 / 26.05	17.33 / 24.71	5.6 / 1.25	0 / 1.25	0 / 0

Area = 36.07 ft^2

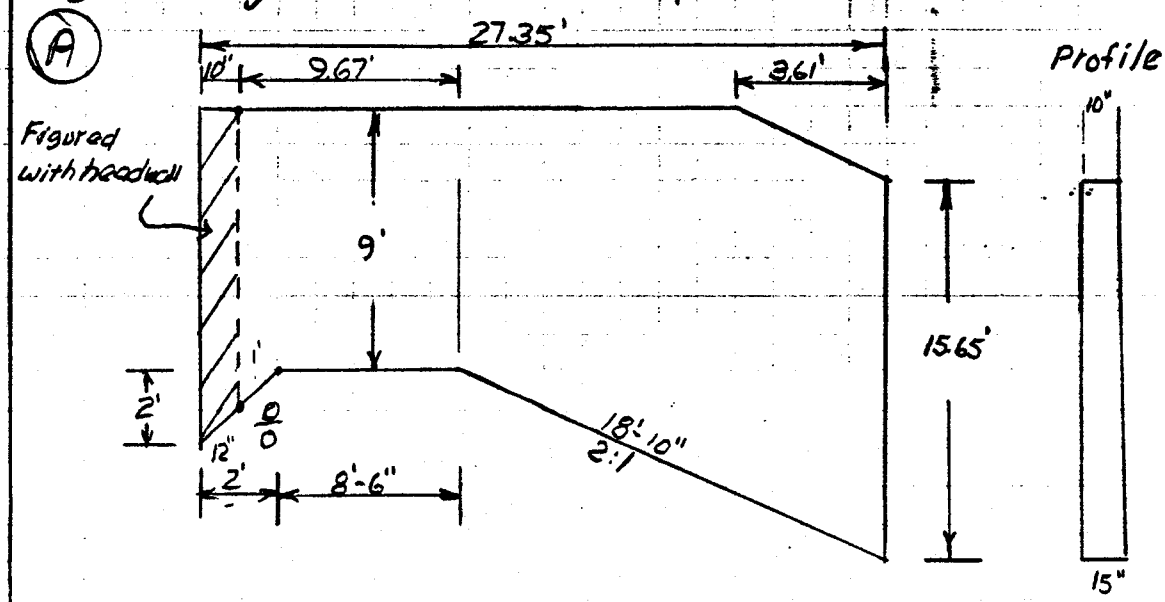
Width F = 55' (36.07 ft^2)(55') = 73.48 yds^3

Width E = 5' (36.07 ft^2)(5') 6.68 yds^3

STATE AZ PROJECT SIGNAL BUTTE F.R.S.

A.D.M. 5-4-84 ICC 5/11/84

Emergency Spillway Sidewall unit A SHEET 4 8



Avg. Width

$\frac{10" + 15"}{2} = 1.04167'$

~~0~~	~~1.0~~	~~1.0~~	~~7.4225~~	~~8.227~~	~~10.032~~	~~10.032~~	
~~0~~	~~1.0~~	~~9.5~~	~~26.345~~	~~26.345~~	~~22.735~~	~~-0.1717~~	

0	15.65	17.455	17.455	7.455	8.455	8.455	0
0	0	3.61	26.5167	26.35	25.35	16.85	0

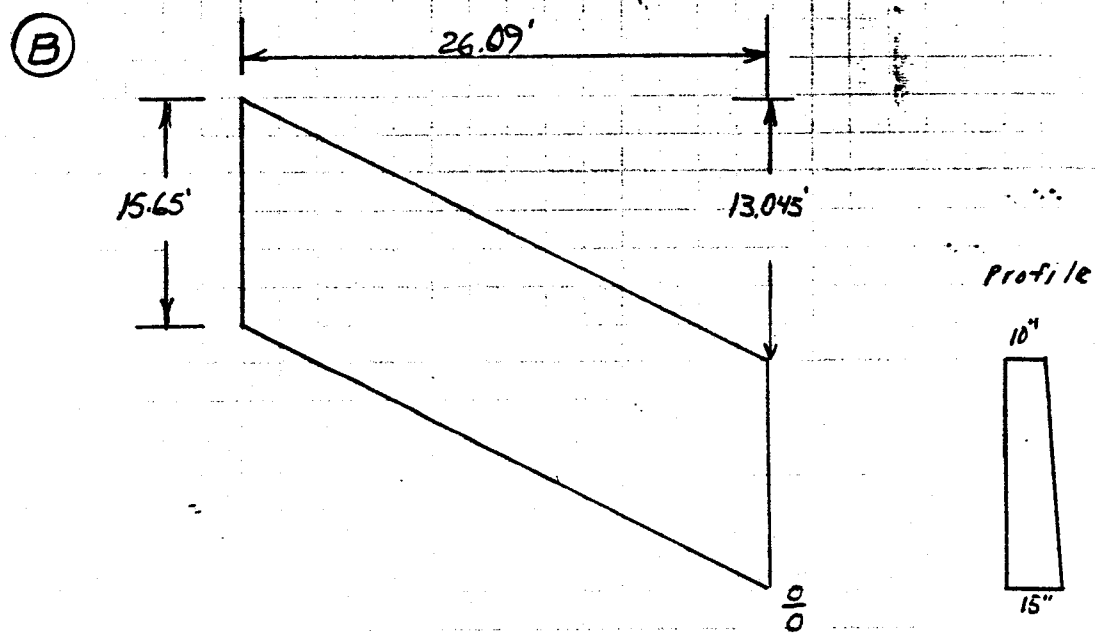
Area = 306.46 ft^2

$(306.46\ ft^2)(1.04167') = 319.23\ ft^3$ or 11.82 yds^3

AZ SIGNAL BUTTE F.R.S.

A.D.M. 5-4-84 ICC 5/11/84

Emergency Spillway sidewall unit B 5 8



0	15.65	28.695	13.045	0
0	0	26.09	26.09	0

Avg width = 1.04167'

Area = 408.31 ft^2

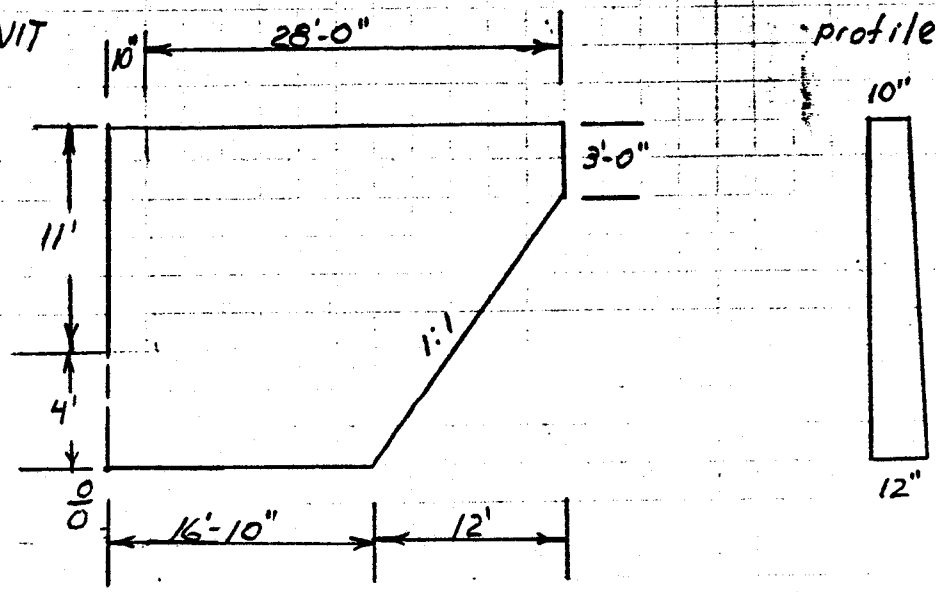
$(408.31\ ft^2)(1.04167') = 425.32\ ft^3$ or $\underline{15.75\ yds^3}$

AZ SIGNAL BUTTE F.R.S. 469

A.D.M. 5-2-84 ICC 5/11/84

Emergency Spillway Headwall Concrete 6 8

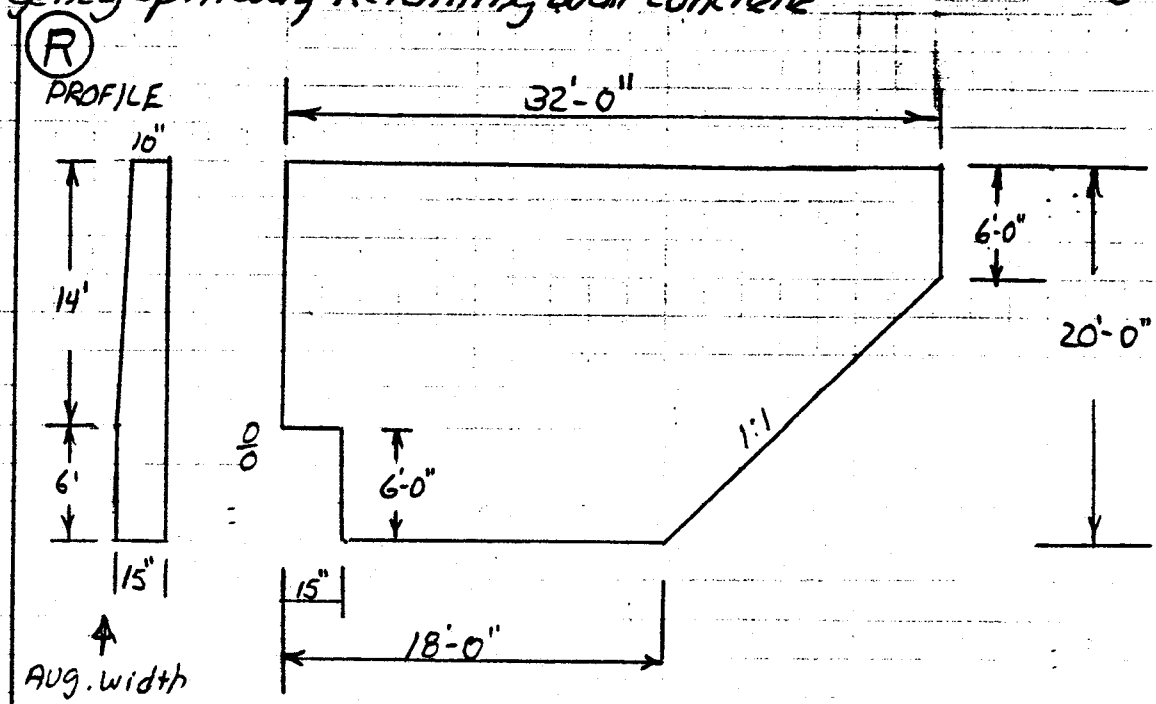
(H) UNIT



0/0 0/168333 12/288333 15/288333 15/0 0'/0 Area = 360.5 ft²

Volume (360.5 ft²)(11") / .9167 = 12.24 yds³

STATE AZ PROJECT SIGNAL BUTT F.R.S.
BY A.D.M. DATE 5-4-84 CHK. ICC DATE 5/11/84
SUBJECT Emergency Spillway Retaining wall concrete SHEET 7 OF 8



$$\frac{10'' + 15'' + 15''}{3} = \underline{13.33''} \text{ or } 1.1'$$

0	0	-6	-6	8	14	14	0
0	1.25	1.25	18	32	32	0	0

$\underline{\text{Area} = 534.5\ ft^2}$

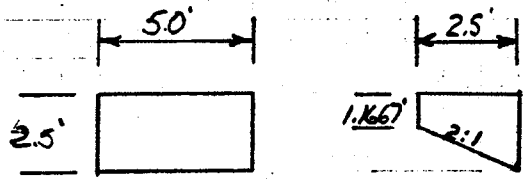
Avg width
$(1.1')(534.5\ ft^2) = 593.74\ ft^3$ or $\underline{22.0\ yds^3}$

STATE AZ (PROJECT) SIGNAL BUTTE F.R.S.

BY A.D.M. 5-8-84 CHK'D ICC 5/11/84

SUBJECT Emergency Spillway Baffle Block Concrete SHEET 8 OF 8

That part of block at the crest area. 14 blocks



0	2.5	2.5	1.33	0
0	0	2.5	2.5	0

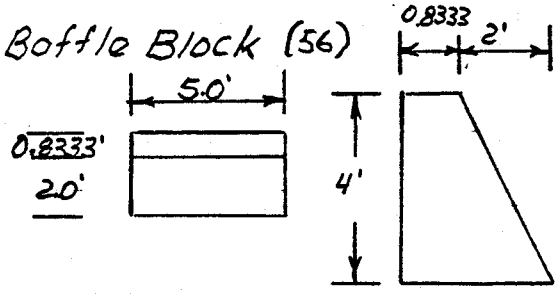
PLAN PROFILE

Area = 4.59 ft^2

$(4.59\ ft^2)(5.0') = \underline{22.94\ ft^3}$ 1 block

$\underline{0.85\ yds^3}$

Baffle Block (56)



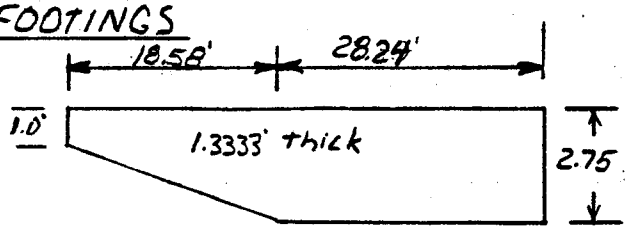
0	4	4	0	0
0	2	2.8333	2.8333	0

Area = 7.33 ft^2

$(7.33\ ft^2)(5.0) = \underline{36.67\ ft^3}$ 1 block

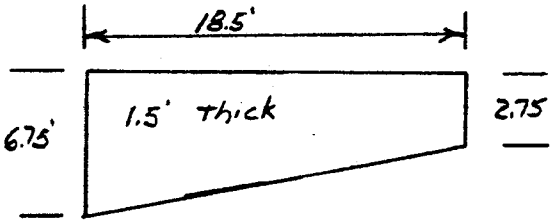
$\underline{1.36\ yds^3}$

FOOTINGS



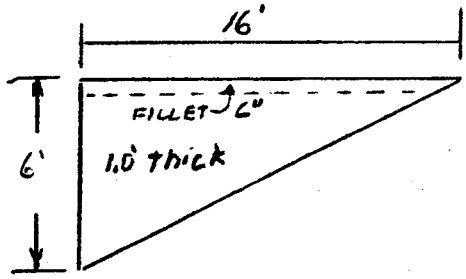
$(28.24)(2.75) + \left[(18.58)(2.75) - \frac{(18.58)(1.75)}{2}\right]$

$(1.333') = ft^3\ 149.99$ or $\underline{5.56\ yds^3}$



$(18.5)(2.75) + \frac{(4.75)(18.5)}{2}(1.5')$

$= ft^3\ 142.22$ or $\underline{5.27\ yds^3}$



FILLET

$\frac{(16')(6')}{2}(1.0') + \frac{(.5)(.5)}{2}(16') = ft^3\ 50.0$

$\underline{1.85\ yds^3}$

SIGNAL BUTTE F.R.S. (1984)

Subject	Calculations Quanity	Units	Initials	Check Quanity	Units	Initials
VI. Steel Reinforcement						
a.) Gatted Outlet P.W.D. Structure	146	lbs.	R.A.P.	146	lbs.	BJL
b.) Gatted Outlet Inlet Structure	122	lbs.	R.A.P.	122	lbs.	BJL
c.) Gate Stem pedestals	63	lbs	R.A.P.	63.46	lbs.	BJL
d.) Principal Spillway Inlet structure	3248	lbs	Standard drawing	—	—	—
e.) Principal Spillway Outlet Structure	4811	lbs	ICC	4,738.09	lbs	BJL
f.) Emergency Spillway	82,589.21	lbs	JEB			
	90,906.76					
Use	90,907 lbs					

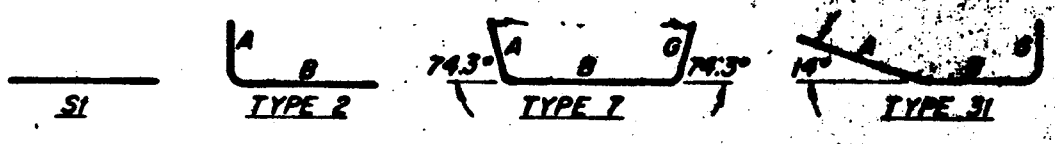
ARIZONA PROJECT SIGNAL BUTTE F.R.S.
R.A.P. 3/13/84 ℄ 4-18-84
Gatted Outlet - P.W.D. Steel Calculations SHEET 1 OF 1

Given:

From Standard Drawing 7-E-20463-C

STEEL SCHEDULE

Location	Mark	Size	Quan.	Length	Type	A	B	G	Total Length
Apron	A1	4	2	4'-0"	2	2'-3"	1'-9"		8'-0"
"	A2	4	2	4'-6"	2	2'-6"	2'-0"		9'-0"
"	A3	4	2	4'-9"	2	2'-6"	2'-3"		9'-6"
"	A4	4	2	5'-3"	2	2'-9"	2'-6"		10'-6"
"	A5	4	2	5'-3"	2	2'-6"	2'-9"		10'-6"
"	A6	4	2	5'-6"	2	2'-6"	3'-0"		11'-0"
"	A7	4	2	5'-6"	2	2'-3"	3'-3"		11'-0"
"	A8	4	3	7'-0"	31	3'-0"	3'-3"	9"	21'-0"
"	A9	4	2	4'-0"	2	3'-3"	9"		8'-0"
Headwall	H1	4	1	4'-6"	7	1'-3"	2'-0"	1'-3"	4'-6"
Sidewall	S1	4	6	9'-6"	7	3'-0"	6'-6"		57'-0"
Cutoff wall	C1	4	2	7'-3"	S1				14'-6"
"	C2	4	1	12'-0"	S1				12'-0"
"	C3	4	5	1'-6"	S1				7'-6"
Wing wall	W1	4	8	3'-0"	S1				24'-0"



BAR TYPES

Solution:

Total length from schedule above = 218'-0".

Bar #4 = 0.668

218.0 X 0.668 = 145.62

Use 146 lbs

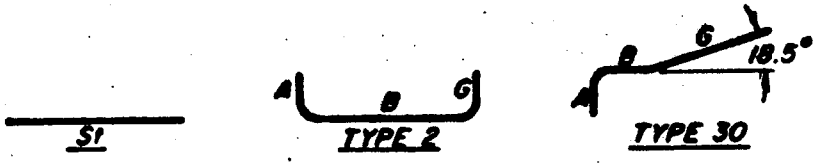
STATE ARIZONA PROJECT SIGNAL BUTTE F.R.S.
BY R.A.P. DATE 3/13/84 CHECKED BY DATE 4-18-84 JOB NO.
Gatted Outlet - Inlet Steel Calculations SHEET 1 OF 1

Given:

From Standard Drawing 7-E-20465, Size C

STEEL SCHEDULE

Location	Mark	Size	Quan.	Length	Type	A	B	G	Total Length
Apron	A1	4	2	5'-6"	2	1'-0"	4'-6"		11'-0"
"	A2	4	1	6'-0"	2	1'-0"	5'-0"		6'-0"
"	A3	4	2	6'-9"	30	1'-0"	9"	4'-0"	11'-6"
"	A4	4	1	1'-9"	2	1'-0"	9"		1'-9"
"	A5	4	1	2'-6"	S1				2'-6"
"	A6	4	3	2'-6"	S1				7'-6"
"	A7	4	4	9"	S1				3'-0"
Sidewall	S1	4	2	2'-9"	S1				5'-6"
"	S2	4	2	4'-9"	2	1'-8"	3'-1"		9'-6"
"	S3	4	2	5'-3"	2	1'-10"	3'-5"		10'-6"
"	S4	4	2	5'-6"	2	1'-9"	3'-9"		11'-0"
"	S5	4	2	5'-9"	2	1'-8"	4'-1"		11'-6"
"	S6	4	2	8'-0"	2	1'-9"	4'-6"	1'-9"	16'-0"
"	S7	4	2	6'-9"	2	1'-9"	4'-6"	6"	13'-0"
"	S8	4	2	6'-3"	2	1'-9"	4'-6"		12'-6"
"	S9	4	2	4'-9"	2	1'-0"	3'-9"		9'-6"
"	S10	4	1	4'-0"	2	1'-10"	2'-2"		4'-0"
"	S11	4	2	4'-9"	S1				9'-6"
Headwall	H1	4	2	2'-6"	S1				7'-6"
"	H2	4	2	6'-0"	S1				12'-0"
"	H3	4	1	2'-0"	S1				2'-0"
"	H4	4	2	2'-6"	S1				5'-0"



BAR TYPES

Solution:

Total length from schedule above = 182'-0", Bar #4 = 0.668

182.0 X 0.668 = 121.5760

Use 122 lbs.

COMPUTATION SHEET
SCS-ENG-523A Rev. 3-69

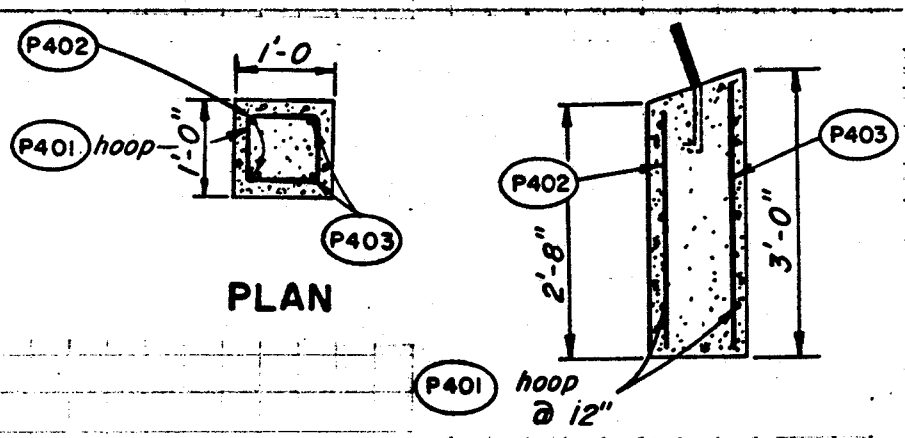
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: ARIZONA
PROJECT: SIGNAL BUTTE F.R.S.
R.A.P. DATE: 3/28/84 COMPUTED BY: [illegible] DATE: 4-18-84 JOB NO.: GATED OUTLET
SUBJECT: GATE STEM PEDESTAL STEEL
SHEET 1 OF 1

GIVEN:

From TR-46, Page D-40, Figure D-5

STEEL SCHEDULE									
Location	Mark	Size	Quan.	Length	Type	A	B	C	Total Length
GATE STEM PEDESTAL									
	P401	4	3	3'-0"	T1	0'-2"	0'-8"	0'-8"	9'-0"
	P402	4	2	2'-3"	Str				4'-6"
	P403	4	2	2'-9"	Str				5'-6"



Solution:

#4 bar = 0.668 lbs/ft

total feet = 19.0'

19.0' X 0.668 = 12.692 # per pedestal

12.692 X 5 pedestals = 63.46 lbs

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

1

476

STATE: Arizona
PROJECT: Buckhorn-Mesa-Signal Butte F.R.S.
BY: J.E.B. DATE: 24 Apr 84
CHECKED BY: DATE:
JOB NO.: Em. Spway Rebar
SUBJECT: UNITS B & R Toewall (1 each side of spway)
SHEET 1 OF 12

LOCATION	MARK	SIZE	QUAN.	LENGTH	TYPE	A	B	G	TOTAL LENGTH
Toe wall B-Exp. Vert.	T1	4	26	6-9	7	1-3	5-6	-	175.5'
R-Exp. Vert.	T2	4	36	7-6	str.				270.0'
R-Exp Vert.	T3	4	2	7-0	str.				14.0'
" " "	T4	4	2	6-0	str.				12.0'
" " "	T5	4	2	5-0	str.				10.0'
" " "	T6	4	2	4-0	str.				8.0'
" " "	T7	4	2	3-0	str.				6.0'
B-Exp. Horiz	T8	4	12	17-9	str.				213.0'
R-Exp. Horiz	T9	4	2	13-9	str.				27.5'
" " "	T10	4	2	14-9	str.				29.5'
" " "	T11	4	2	15-9	str.				31.5'
" " "	T12	4	2	16-9	str.				33.5'
" " "	T13	4	2	17-9	str.				35.5'
" " "	T14	4	2	18-9	str.				37.5'
Toe wall									
B-unexp. vert	T15	4	28	5-9	str.				161.0
R-unexp. vert	T16	9	26	13-9	7	8-0	5-9		357.5'
" "	T17	7	2	13-0	7	7-3	5-9		26.0
" "	T18	7	2	12-6	7	7-3	5-3		25.0
" " "	T19	7	2	11-6	7	7-3	4-3		23.0
" " "	T20	7	2	10-6	7	7-3	3-3		21.0
" " "	T21	7	2	9-6	7	7-3	2-3		19.0
" " "	T22	7	2	8-6	7	7-3	1-3		17.0
" " "	T23	9	30	7-0	7	4-1	2-11		210.0
R-unexp. vert	T24	7	12	7-3	7	5-0	2-3		87.0
B-unexp. Horiz	T26	4	10	16-0	str.				160.0
R-unexp. Horiz	T27	4	2	15-6	str.				31.0
" " "	T28	4	2	16-6	str.				33.0
" " "	T29	4	2	17-6	str.				35.0
" " "	T30	4	2	18-6	str.				37.0
" " "	T31	4	2	19-6	str.				39.0
" " "	T32	4	2	20-6	str.				41.0
R-Exp. Horiz	R1	5	2	20-0	str.				40.0
" " "	R2	5	2	21-0	str.				42.0
" " "	R3	5	2	22-0	str.				44.0
" " "	R4	5	2	23-0	str.				46.0
" "	R5	5	2	24-0	str.				48.0
" "	R6	5	2	25-0	str.				50.0
" "	R7	5	2	26-0	str.				52.0
" " "	R8	5	2	27-0	str.				54.0

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: Arizona
PROJECT: Buckhorn-Mesa, Signal Butte F.R.S.
BY: J.E.B. DATE: 24 Apr. 84
CHECKED BY: DATE:
JOB NO.: Em. Spway Rebar
SUBJECT: unit R (1 each side of spillway)
SHEET 2 OF 12

477

LOCATION	MARK	SIZE	QUAN.	LENGTH	TYPE	A	B	G	TOTAL LENGTH
R Exp. Horiz	R 9	5	12	27-6	str.				330.0
" " "	R 10	5	28	4-9	2	1-3	3-6		133.0
R Exp. vert	R 11	5	44	13-6	str.				594.0
" " "	R 12	5	2	13-3	str.				26.5
" " "	R 13	5	2	12-3	str.				24.5
" " "	R 14	5	2	11-3	str.				22.5
" " "	R 15	5	2	10-3	str.				20.5
" " "	R 16	5	2	9-3	str.				18.5
" " "	R 17	5	2	8-3	str.				16.5
" " "	R 18	5	2	7-3	str.				14.5
" " "	R 19	5	2	6-3	str.				12.5
R Unexp. Horiz	R 20	4	2	20-0	str.				40.0
" "	R 21	4	2	21-0	str.				42.0
" "	R 22	4	2	22-0	str.				44.0
" "	R 23	4	2	23-0	str.				46.0
" "	R 24	4	2	24-0	str.				48.0
" "	R 25	4	2	25-0	str.				50.0
" "	R 26	4	2	26-0	str.				52.0
" "	R 27	4	2	27-0	str.				54.0
" "	R 28	4	10	27-6	str.				275.0
" "	R 29	5	2	27-6	str.				55.0
" "	R 30	4	26	3-6	str.				91.0
" "	R 31	5	2	3-6	str.				7.0
R Unexp vert	R 33	4	2	11-0	str.				22.0
" "	R 34	4	32	7-0	str.				224.0
" "	R 35	4	12	7-9	str.				93.0
" "	R 36	4	4	13-3	str.				33.0
" "	R 37	4	2	12-9	str.				25.5
" "	R 38	4	2	11-9	str.				23.5
" "	R 39	4	2	10-9	str.				21.5
" "	R 40	4	2	9-9	str.				19.5
" "	R 41	4	2	8-9	str.				17.5
" "	R 42	4	2	7-9	str.				15.5
" "	R 43	4	2	6-9	str.				13.5
" "	R 44	4	2	5-9	str.				11.5
exp horiz	~~R 45~~				~~2~~				

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

(2)

478

STATE: Arizona
PROJECT: Buckhorn-Mesa, Signal Butte F.R.S.
BY: J.E.B. DATE: 24 Apr. 84 CHECKED BY: DATE: JOB NO. Em. Spway Rebar
SUBJECT: Unit R (1 each side of spillway)
SHEET 3 OF 12

LOCATION	MARK	SIZE	QUAN.	LENGTH	TYPE	A	B	G	TOTAL LENGTH
Footing	T34	5	4	7-6	str.				30.0
Bottom Face	T35	5	2	7-3	str.				14.5
	T36	5	2	7-0	str.				14.0
	T37	5	2	6-9	str.				13.5
	T38	5	2	6-6	str.				13.0
	T39	5	2	6-3	str.				12.5
	T40	5	2	6-0	str.				12.0
	T41	5	2	5-9	str.				11.5
	T42	5	4	5-6	str.				22.0
	T43	5	2	5-3	str.				10.5
	T44	5	2	5-0	str.				10.0
	T45	5	2	4-9	str.				9.5
	T46	5	2	4-6	str.				9.0
	T47	5	2	4-3	str.				8.5
	T48	5	2	4-0	str.				8.0
	T49	5	2	3-9	str.				7.5
	T50	5	2	3-6	str.				7.0
	T51	5	12	18-0	str.				216.0
	T52	5	4	14-3	str.				57.0
	T53	5	4	8-9	str.				35.0
	T54	5	4	5-0	str.				20.0
	T55	4	4	18-6	str.				74.0
Footing	T56	9	6	9-6	2	2-0	7-6		57.0
Top Face	T57	9	4	9-3	2	2-0	7-3		37.0
	T58	9	4	9-0	2	2-0	7-0		36.0
	T59	9	4	8-9	2	2-0	6-9		35.0
	T60	9	4	8-6	2	2-0	6-6		34.0
	T61	9	4	8-3	2	2-0	6-3		33.0
	T62	9	6	8-0	2	2-0	6-0		48.0
	T63	9	4	7-9	2	2-0	5-9		31.0
	T64	9	4	7-6	2	2-0	5-6		30.0
	T65	9	2	7-3	2	2-0	5-3		14.5
	T66	9	2	7-0	2	2-0	5-0		14.0
	T67	9	4	6-9	2	2-0	4-9		27.0
	T68	9	2	6-6	2	2-0	4-6		13.0
	T69	7	2	5-3	2	1-0	4-3		10.5
	T70	7	2	5-0	2	1-0	4-0		10.0
	T71	7	2	4-9	2	1-0	3-9		9.5
	T72	7	2	4-6	2	1-0	3-6		9.0

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: Arizona
PROJECT: Buckhorn - Mesa, Signal Butte F.R.S
BY: J.E.B. DATE: 27Apr. 84 CHECKED BY: DATE:
JOB NO.: Em. Spwy Rebar
SUBJECT: Units B, E & F bar schedule
SHEET 4 OF 12

LOCATION	MARK	SIZE	QUAN.	LENGTH	TYPE	A	B	G	TOTAL LENGTH
B Apron unex	B1	4	34	28-9	str.				977.5
B Apron "	B2	4	52	3-6	str.				152.0
" " "	B3	6	52	8-3	str.				429.0
" " "	B4	10	50	10-9	2	4-9	6-0		537.5
" " "	B5	9	52	16-0	2	7-0	9-0		832.0
Artic " " "	B6	5	4	16-0	str.				64.0
const " " "	B7	4	34	4-3	5	1-9	1-3	1-3	144.5
Joint " " "	B8	6	42	5-9	2	1-0	4-9		241.5
Baffle " " "	B9	6	42	5-9	14	0-6	1-3	4-0	241.5
Block B Apron Exp.	B-10	6	34	28-9	str.				977.5
" " "	B11	6	52	16-0	str.				832.0
const. jt. " " "	B12	4	34	3-3	5	1-3	0-9	1-3	110.5
B side wall unex	B13	4	22	28-9	str.				632.5
" " " "	B14	5	24	28-9	str.				690.0
" " " "	B15	5	52	8-9	str.				455.0
B side wall exp.	B16	6	10	28-9	str.				287.5
" " " "	B17	6	54	8-0	str.				432.0
" " " "	B18	5	54	10-3	str.				553.5
UNIT E									
E Toe wall exp	T1	4	60	6-9	7	1-3	5-6		405.0
" " " "	B-19	5	6	59-6	str.				357.0
" " " UNEXP.	T15	4	60	5-9	str.				345.0
" " " "	B-19	5	5	59-6	str.				297.5
E Apron UNEXP.	B19	5	29	59-6	str.				1725.5
" " "	B1	4	60	28-9	str.				1734.0
Artic. " " "	B7	4	60	4-3	5	1-9	1-3	1-3	255.0
const " " "	B19	5	2	59-6	str.				119.0
Joint " " "	B21	6	85	5-6	2	1-0	4-6		467.5
Baffle " " "	B22	6	85	5-6	14	0-6	0-9	4-3	467.5
Blocks E Apron Exp.	B10	6	60	28-9	str.				1725.0
" " "	B20	6	29	59-6	str.				1725.5
Artic " " "	B12	4	60	3-3	5	1-3	0-9	1-3	195.0
Const. " " "	B19	5	2	59-6	str.				119.0
Joint									
UNIT F									
F Toe wall exp.	T1	4	55	6-9	7	1-3	5-6		371.25
" " " "	B25	5	6	54-6	str				327.0
F Toe wall UNEXP	T15	4	55	5-9	str.				316.25
" " " "	B25	5	5	54-6	str.				272.50
Apron UNEXP.	B25	5	29	54-6	str.				1580.50
" "	B1	4	55	28-9	str.				1581.25
Artic " " "	B7	4	55	4-3	5	1-9	1-3	1-3	232.75
Joint " " "	B25	5	2	54-6	str.				109.0

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: Arizona
PROJECT: Buckhorn-Mesa, Signal Butte F.R.S.
BY: J.E.B. DATE: 27 Apr. 84
CHECKED BY: DATE:
JOB NO.: Em. Spwy Rebar
SUBJECT: Unit F cont. and units A & H cutoff & footing
SHEET 5 OF 12

480

LOCATION	MARK	SIZE	QUAN.	LENGTH	TYPE	A	B	G	TOTAL LENGTH
BAFFLE BLOCK F Apron UNEXP.	B21	6	85	5-6	2	1-0	4-6		467.5
" " "	B22	6	85	5-6	14	0-6	0-9	4-3	467.5
F Apron EXP.	B10	6	55	28-9	str.				1581.25
" " "	B24	6	29	54-6	str.				1580.50
ARTIC. " " "	B12	4	55	3-3	5	1-3	0-9	1-3	178.75
JOINT " " "	B25	5	2	54-6	str.				109.00
UNITS B E & F									
BAFFLE Blocks	B31	6	84	7-0	17	3-3	0-6	3-3	588.0
	B32	6	84	7-6	17	3-3	1-0	3-3	630.0
	B33	6	84	8-0	17	3-3	1-6	3-3	672.0
	B34	6	84	8-6	17	3-3	2-0	3-3	714.0

over

" " " "	H6	4	2	3-0	str.				10.00
" " " "	H7	4	2	4-0	str.				8.00
" " " "	H8	4	2	3-0	str.				6.00
A cutoff EXP. Hor.	H9	4	8	20-0	str.				160.00
H " " "	H10	4	2	15-6	str.				31.00
" " " "	H11	4	2	16-6	str.				33.00
" " " "	H12	4	2	17-6	str.				35.00
" " " "	H13	4	2	18-6	str.				37.00
" " " "	H14	4	2	19-6	str.				39.00
" " " "	H15	4	2	20-6	str.				41.00
A cutoff UNEX V.	H16	4	38	4-6	str.				171.00
A " " Hor.	H9	4	8	20-0	str.				160.00
H cutoff UNEX. V.	H18	7	6	8-9	str.				52.50
H " " "	H19	6	16	8-3	str.				132.00
" " " "	H20	4	12	7-6	str.				90.00
" " " "	H21	4	2	6-6	str.				13.00
" " " "	H22	4	2	5-6	str.				11.00
" " " "	H23	4	2	4-6	str.				9.00
" " " "	H24	4	2	3-6	str.				7.00
" " " "	H25	4	2	2-6	str.				5.00
H FOOTING UNEX	H26	4	2	6-9	str.				13.50
" " "	H27	4	2	6-3	str.				12.50
" " "	H28	4	2	6-0	str.				12.00
" " "	H29	4	2	5-6	str.				11.00
" " "	H30	4	2	5-3	str.				10.50
" " "	H31	4	2	4-9	str.				9.50
" " "	H32	4	2	4-6	str.				9.00
" " "	H33	4	2	4-0	str.				8.00
" " "	H34	4	2	3-9	str.				7.50

COMPUTATION SHEET

SCS-ENG-523 Rev. 8-69 SOIL CONSERVATION SERVICE

STATE	PROJECT			
Arizona	Buckhorn-Mesa, Signal Butte F.R.S.			
BY J.E.B.	DATE 27 Apr. 84	CHECKED BY	DATE	JOB NO. Em. Spwway Rebar
SUBJECT Unit F cont. and units A & H cutoff & footing				SHEET 5 OF 12

431

LOCATION	MARK	SIZE	QUAN	LENGTH	TYPE	A	B	C	TOTAL
1 EACH SIDE									
UNITS A & H									
A cutoff Exp. Vert	H 1	4	36	5-3	7	3-9	1-6		189.00
" " " Vert	H 2	7	2	9-0	str.				18.00
" " " Vert	H 3	5	36	8-0	str.				288.00
" " " Vert	H 4	4	2	7-0	str.				14.00
" " " "	H 5	4	2	6-0	str.				12.00
" " " "	H 6	4	2	5-0	str.				10.00
" " " "	H 7	4	2	4-0	str.				8.00
" " " "	H 8	4	2	3-0	str.				6.00
A cutoff Exp. Hor.	H 9	4	8	20-0	str.				160.00
H " " "	H 10	4	2	15-6	str.				31.00
" " " "	H 11	4	2	16-6	str.				33.00
" " " "	H 12	4	2	17-6	str.				35.00
" " " "	H 13	4	2	18-6	str.				37.00
" " " "	H 14	4	2	19-6	str.				39.00
" " " "	H 15	4	2	20-6	str				41.00
A cutoff UNEX V.	H 16	4	38	4-6	str.				171.00
A " " Hor.	H 9	4	8	20-0	str.				160.00
H cutoff UNEX. V.	H 18	7	6	8-9	str.				52.50
H " " "	H 19	6	16	8-3	str.				132.00
" " " "	H 20	4	12	7-6	str.				90.00
" " " "	H 21	4	2	6-6	str.				13.00
" " " "	H 22	4	2	5-6	str.				11.00
" " " "	H 23	4	2	4-6	str.				9.00
" " " "	H 24	4	2	3-6	str.				7.00
" " " "	H 25	4	2	2-6	str.				5.00
H Footing UNEX	H 26	4	2	6-9	str.				13.50
" " "	H 27	4	2	6-3	str.				12.50
" " "	H 28	4	2	6-0	str.				12.00
" " "	H 29	4	2	5-6	str.				11.00
" " "	H 30	4	2	5-3	str.				10.50
" " "	H 31	4	2	4-9	str.				9.50
" " "	H 32	4	2	4-6	str.				9.00
" " "	H 33	4	2	4-0	str.				8.00
" " "	H 34	4	2	3-9	str.				7.50

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: Arizona
PROJECT: Buckhorn-Mesa WPP, Signal Butte F.R.S.
BY: J.E.B.
DATE: 2 May 84
CHECKED BY:
DATE:
JOB NO.: Em. Spway Rebar
SUBJECT: Units A & H Footings & unit H Headwall
SHEET 6 OF 12

LOCATION	MARK	SIZE	QUAN.	LENGTH	TYPE	A	B	G	TOTAL LENGTH
UNIT H Footing UNEX.	H35	4	2	3-3	str.				6.50
" " "	H36	4	2	3-0	str.				6.00
" " "	H37	4	2	2-6	str.				5.00
" " "	H38	4	2	2-3	str.				4.50
" " "	H39	4	2	1-9	str				3.50
UNIT H Footing UNEX.	H40	4	2	14-0	str				28.00
" " "	H41	4	2	11-6	str				23.00
" " "	H42	4	2	9-0	str				18.00
" " "	H43	4	2	6-3	str				12.50
" " "	H44	4	2	3-9	str				7.50
" " "	H45	4	2	18-0	str				36.00
UNIT H Footing EXP.	H46	5	2	7-9	2	1-0	6-9		15.50
" " "	H47	5	2	7-3	2	1-0	6-3		14.50
" " "	H48	5	2	7-0	2	1-0	6-0		14.00
" " "	H49	5	2	6-6	2	1-0	5-6		13.00
" " "	H50	5	2	6-3	2	1-0	5-3		12.50
" " "	H51	5	2	5-9	2	1-0	4-9		11.50
" " "	H52	5	2	5-6	2	1-0	4-6		11.00
" " "	H53	5	2	5-0	2	1-0	4-0		10.00
" " "	H54	5	2	4-9	2	1-0	3-9		9.50
" " "	H55	5	2	4-3	2	1-0	3-3		8.50
" " "	H56	5	2	4-0	2	1-0	3-0		8.00
" " "	H57	5	2	3-6	2	1-0	2-6		7.00
" " "	H58	5	2	3-3	2	1-0	2-3		6.50
" " "	H59	5	2	2-9	2	1-0	1-9		5.50
UNIT H Footing EXP	H40	4	2	14-0	str.				28.00
" " "	H41	4	2	11-6	str.				23.00
" " "	H42	4	2	9-0	str.				18.00
" " "	H43	4	2	6-3	str.				12.50
" " "	H44	4	2	3-9	str.				7.50
" " "	H45	4	2	18-0	str				36.00
UNIT H Headwall UNEXP									
" " " vert	H61	7	6	8-6	str				51.00
" " V	H62	6	16	8-6	str				136.00
" " V	H63	4	24	8-6	str.				204.00
" " V	H64	4	2	7-9	str.				15.50
" " V	H65	4	2	6-9	str.				13.50
" " V	H66	4	2	5-9	str.				11.50
" " V	H67	4	2	4-9	str.				9.50
" " V	H68	4	2	3-9	str.				7.50
" " V	H69	4	2	3-0	str.				6.00
	H70								

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: Arizona
PROJECT: Buckhorn Mesa W.P.P. - Signal Butte F.R.S.
BY: JEB
DATE: 2 May 84
CHECKED BY:
DATE:
JOB NO.: Em. Spwy. Rebar
SUBJECT: Unit H CONT & UNIT A Apron
SHEET 7 OF 12

LOCATION	MARK	SIZE	QUAN.	LENGTH	TYPE	A	B	G	TOTAL LENGTH
UNIT H.									
HEADWALL UNEX H	H 71	4	2	21-6	str.				43.00
" " "	H 72	4	2	22-6	str.				45.00
" " "	H 73	4	2	23-6	str.				47.00
" " "	H 74	4	2	24-6	str.				49.00
" " "	H 75	4	2	25-6	str.				51.00
" " "	H 76	4	2	26-6	str.				53.00
" " "	H 77	4	2	27-0	str				54.00
HEADWALL EXP. V	H 78	5	46	8-6	str.				391.00
" " "	H 79	5	2	7-9	str				15.50
" " "	H 80	5	2	6-9	str.				13.50
" " "	H 81	5	2	5-9	str.				11.50
" " "	H 82	5	2	4-9	str.				9.50
" " "	H 83	5	2	3-9	str.				7.50
" " "	H 84	5	2	3-0	str.				6.00
HEADWALL EXP. Hor.	H 85	5	2	21-6	str.				43.00
" " "	H 86	5	2	22-6	str.				45.00
" " "	H 89	5	2	23-6	str.				47.00
" " "	H 88	5	2	24-6	str.				49.00
" " "	H 89	5	2	25-6	str.				51.00
" " "	H 90	5	2	26-6	str.				53.00
" " "	H 91	5	6	27-0	str.				54.00
UNIT A									
APRON UNEX. L	A 1	4	38	12-0	12	2-6	8-6	1-0	456.00
" " L	A 2	5	38	18-0	7	1-0	17-0		684.00
" " L	A 3	4	2	18-0	7	1-0	17-0		36.00
" " L	A 4	4	2	9-0	str				18.00
" " L	A 5	4	2	18-3	7	1-0	17-3		36.50
APRON UNEX T	A 6	8	2	13-3	2	5-0	8-3		26.50
	A 7	7	2	25-3	2	7-0	18-3		50.50
	A 8	8	2	12-3	2	4-0	8-3		24.50
	A 9	7	18	24-3	2	6-0	18-3		436.50
	A 10	8	16	11-9	2	3-6	8-3		188.00
	A 11	8	2	13-0	2	4-9	8-3		26.00
	A 12	9	4	14-3	2	7-6	6-9		57.50
	A 13	9	2	14-6	2	7-6	7-0		29.00
	A 14	9	2	14-9	2	7-6	7-3		29.50
	A 15	9	2	15-0	2	7-6	7-6		30.00
	A 16	9	2	15-3	2	7-6	7-9		30.50
	A 17	9	2	15-6	2	7-6	8-0		31.00
	A 18	9	2	15-9	2	7-6	8-3		31.50
	A 19	9	2	16-0	2	7-6	8-6		32.00
	A 20	9	2	16-3	2	7-6	8-9		32.50

COMPUTATION SHEET
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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE Arizona | PROJECT Buckhorn-Mesa WPP - Signal Butte F.R.S.

BY JEB | DATE 3 May 84 | CHECKED BY | DATE | JOB NO. Em. Spway Rebar

SUBJECT UNIT A Apron CONT. Begin sidewall | SHEET 8 OF 12

484

LOCATION	MARK	SIZE	QUAN.	LENGTH	TYPE	A	B	G	TOTAL LENGTH
Apron UNEX	A21	9	2	16-6	2	7-6	9-0		33.00
	A22	9	2	16-9	2	7-6	9-3		33.50
	A23	9	4	17-0	2	7-6	9-6		68.00
	A24	9	2	17-3	2	7-6	9-9		34.50
	A25	9	2	17-6	2	7-6	10-0		35.00
	A26	9	2	11-6	2	7-6	4-0		23.00
	A27	9	4	11-9	2	7-6	4-3		47.00
	A28	9	2	12-0	2	7-6	4-6		24.00
	A29	9	4	12-3	2	7-6	4-9		49.00
	A30	9	4	12-6	2	7-6	5-0		50.00
	A31	9	2	12-9	2	7-6	5-3		25.50
	A32	9	4	13-0	2	7-6	5-6		52.00
	A33	9	2	13-3	2	7-6	5-9		26.50
	A34	9	2	13-6	2	7-6	6-0		27.00
	A35	10	6	10-3	2	4-3	6-0		61.50
	A36	6	2	14-6	str.	14-6	—		29.00
	A37	4	32	12-3	str.				392.00
	A38	4	2	11-3	str.				22.50
	A39	7	2	12-0	str				24.00
Footing UNEX.	A40	4	4	1-9	str.				7.00
	A41	4	4	2-0	str				8.00
	A42	4	4	2-3	str.				9.00
	A43	4	4	2-6	str.				10.00
	A44	4	4	2-9	str.				11.00
	A45	4	4	3-0	str.				12.00
	A46	4	4	3-3	str.				13.00
	A47	4	4	3-6	str.				14.00
	A48	4	2	3-9	str.				7.50
Sidewall UNEX	A51	4	2	3-6	str.				7.00
Horiz	A52	4	2	5-9	str.				11.50
	A53	4	2	8-0	str.				16.00
	A54	4	2	10-3	str.				20.50
	A55	4	2	12-6	str.				25.00
	A56	4	2	14-3	str.				28.50
	A57	4	2	16-6	str.				33.00
	A58	4	2	27-0	str.				54.00
	A59	9	2	16-6	7	1-6	15-0		33.00
Sidewall EXP. Horz	A61	5	2	2-6	2	1-0	1-6		5.00
	A62	6	2	28-0	2	1-0	27-0		56.00
	A63	5	14	28-0	2	1-0	27-0		392.00

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: Arizona
PROJECT: Buckhorn-Mesa W.P.P. - Signal Butte F.R.S.
BY: J.E.B. DATE: 8 May 84
CHECKED BY: DATE:
JOB NO.: Em. Spring Rebar
SUBJECT: UNIT A SIDEWALL CONT. APRON EXP FOLD
SHEET 9 OF 12

LOCATION	MARK	SIZE	QUAN.	LENGTH	TYPE	A	B	G	TOTAL LENGTH
SIDEWALL EXP Vert	A64	5	2	3-9	str				7.50
Exp Vert	A65	5	18	2-9	str.				49.50
Exp "	A66	5	2	3-6	str.				7.00
" "	A67	5	2	4-0	str.				8.00
" "	A68	5	2	4-6	str.				9.00
" "	A69	5	2	5-0	str.				10.00
" "	A70	5	2	5-6	str.				11.00
" "	A71	6	2	5-0	str.				10.00
	A72	6	2	5-6	str				11.00
	A73	6	2	6-0	str				12.00
	A74	6	2	6-6	str				13.00
	A75	6	2	7-0	str.				14.00
	A76	6	2	7-6	str.				15.00
	A77	6	2	8-0	str.				16.00
	A78	6	2	8-6	str.				17.00
	A79	6	2	9-0	str.				18.00
	A80	6	2	9-6	str.				19.00
	A81	6	2	10-0	str.				20.00
	A82	6	2	10-3	7	1-3	9-0		20.50
SIDEWALL EXP H.	A83	6	2	4-3	str				8.50
Horiz	A84	6	2	6-3	str.				12.50
	A85	6	2	8-3	str.				16.50
	A86	6	2	10-3	str.				20.50
	A87	6	2	12-3	str.				24.50
	A88	6	4	13-0	str.				52.00
APRON EXP H long	A101	5	38	12-9	7	2-6	10-3		484.50
Footing long	A102	5	16	7-6	2	3-3	4-3		120.00
" "	A103	5	20	4-0	2	2-0	2-0		80.00
Apron "	A104	6	38	18-3	str.				693.50
Footing "	A105	4	4	18-3	str.				73.00
" "	A106	4	2	9-0	str.				18.00
Apron Trans Vert	A107	5	24	18-3	str.				438.00
" "	A108	7	4	18-3	Str				73.00
" "	A109	6	4	19-3	Str				77.00
" "	A110	6	4	19-6	str				78.00
" "	A111	6	4	19-9	str				79.00
" "	A112	6	4	20-0	str				80.00
" "	A113	6	4	20-3	str				81.00
" "	A114	6	4	20-6	str				82.00
" "	A115	6	4	20-9	str				83.00
" "	A116	6	4	21-0	str				84.00

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: Arizona
PROJECT: Buckhorn-Mesa W.P.P. - Signal Butte F.R.S.
BY: J.E.B.
DATE: 8 May 84
CHECKED BY:
DATE:
JOB NO.: Em. Spwy Rebar
SUBJECT: UNIT A Fujimoto Blocks & upper sidewalls
SHEET 10 OF 12

LOCATION	MARK	SIZE	QUAN.	LENGTH	TYPE	A	B	G	TOTAL LENGTH
Block Transv.	A117	5	6	5-3	2	2-3	3-0		31.50
	A118	5	6	5-9	2	2-9	3-0		34.50
	A119	5	2	3-0	str.				6.00
	C12	5	2	4-6	str.				9.00
End of Block	C13	5	6	6-0	2	3-0	3-0		36.00
End of Block									
Sidewall UNEXP.	A125	5	22	5-0	str.				110.00
Vert.	A126	5	2	5-6	str.				11.00
	A127	5	2	5-9	str.				11.50
	A128	5	2	6-0	str.				12.00
	A129	5	2	6-3	str				12.50
	A130	5	2	6-6	str.				13.00
	A131	5	2	6-9	str.				13.50
	A132	5	2	7-0	str.				14.00
	A133	5	2	7-3	str.				14.50
	A134	5	2	7-6	str.				15.00
	A135	5	2	7-9	str.				15.50
	A136	5	4	8-0	str.				32.00
	A137	5	4	8-3	str.				33.00
	A138	5	4	8-6	str.				34.00
	A139	5	2	4-3	str.				8.50
Sidewall UNEX Horz.	A140	4	14	27-0	str.				378.00
"	A141	4	2	25-6	str.				51.00
"	A142	5	2	23-6	str.				47.00
Sidewall Exp V.	A143	5	32	8-6	str.				272.00
" Vert	A144	5	16	9-6	str.				152.00
	A145	5	2	9-0	str.				18.00
	A146	5	2	8-6	str.				17.00
	A147	5	2	8-0	str				16.00
	A148	5	2	7-9	str				15.50
Horz	A 8[illegible]	Counted			2				
Horiz	A149	5	2	26-6	2	1-0	25-6		53.00
Horz.	A150	5	2	24-6	2	1-0	23-6		49.00
Slope	A139	5	2	4-3	str				8.50

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: Arizona
PROJECT: Buckhorn-Mesa – Signal Butte F.R.S.
BY: J.E.B. DATE: 21 May 84
CHECKED BY: DATE:
JOB NO.: Em. Spwy Rebar
SUBJECT: REBAR UNITS C & D (C=55'w & D=50'w)
SHEET 11 OF 12

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LOCATION	MARK	SIZE	QUAN.	LENGTH	TYPE	A	B	G	TOTAL LENGTH
Unit C	C1	4	55	12-0	12	2-6	8-6	–	660.00
Unexp face	C2	5	34	54-6	str.				1853.00
	C3	4	55	17-9	7	1-6	16-3		976.25
	C4	6	3	54-6	str.				163.50
	H16	4	55	4-3	str.				233.75
11 Blocks	B21	6	55	5-6	2	1-0	4-6		302.50
11 Blocks	B22	6	55	5-6	14	0-6	0-9	4-3	302.50
Exp. face	H1	4	55	5-3	7	3-9	1-6		288.75
	C5	5	55	12-9	7	2-6	10-3		701.25
	C6	6	13	54-6	str.				708.50
	C7	7	1	54-6	str.				54.50
	C8	5	30	7-3	2	3-0	4-3		217.50
	C9	5	25	3-9	2	1-9	2-0		93.75
	C10	5	12	5-0	2	2-0	3-0		60.00
	C11	5	12	5-6	2	2-6	3-0		66.00
	C12	5	6	4-6	str.				27.00
	C13	5	12	6-0	2	3-0	3-0		72.00
	C14	6	16	54-6	str.				872.00
	C15	5	55	17-3	str.				948.75
11 BAFFLE BLOCKS	B31	6	22	7-0	17	3-3	0-6	3-3	154.00
	B32	6	22	7-6	17	3-3	1-0	3-3	165.00
	B33	6	22	8-0	17	3-3	1-6	3-3	176.00
	B34	6	22	8-6	17	3-3	2-0	3-3	187.00
UNIT D									
UNEXP. FACE	C1	4	50	12-0	12	2-6	8-6	1-0	600.00
	D2	5	34	49-6	str.	-			1683.00
	C3	4	50	17-9	7	1-6	16-3		887.50
	D4	6	3	49-6	str.				148.50
	H16	4	50	4-3	str.				212.50
10 BAFFLE BLOCK	B21	6	50	5-6	2	1-0	4-6		275.00
" "	B22	6	50	5-6	14	0-6	0-9	4-3	275.00
Exp. face	H1	4	50	5-3	7	3-9	1-6		262.50
	C5	5	50	12-9	7	2-6	10-3		637.50
	D6	6	13	49-6	str.				643.50
	D7	7	1	49-6	str.				49.50
	C8	5	25	7-3	2	3-0	4-3		181.25
	C9	5	25	3-9	2	1-9	2-0		93.75
	C10	5	10	5-0	2	2-0	3-0		50.00
	C11	5	10	5-6	2	2-6	3-0		55.00
	C12	5	5	4-6	str.				22.50
	C13	5	10	6-0	2	3-0	3-0		60.00
	D14	6	16	49-6	str.				792.00
	C15	5	50	17-3	str.				862.50

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: Arizona
PROJECT: Buckhorn-Mesa - Signal Butte F.R.S.
BY: J.E.B.
DATE: 21 May 84
CHECKED BY:
DATE:
JOB NO.: Em. Spwy REBAR
SUBJECT: UNITS C&D
SHEET 12 OF 12

LOCATION	MARK	SIZE	QUAN.	LENGTH	TYPE	A	B	G	TOTAL LENGTH
10 BAFFLE	B31	6	20	7-0	17	3-3	0-6	3-3	140.00
BLOCKS	B32	6	20	7-6	17	3-3	1-0	3-3	150.00
UNIT	B33	6	20	8-0	17	3-3	1-6	3-3	160.00
D	B34	6	20	8-6	17	3-3	2-0	3-3	170.00

ARIZONA SIGNAL BUTTE F.R.S.

R.A.P. 5/24/84 Emergency Spillway 1 3

REBAR: Total lengths by page

 # 4 bars

pp 1	=	1,440.5'
pp 2	=	1,262.0'
pp 3	=	74.0'
pp 4	=	7,483.5'
pp 5	=	1,353.25'
pp 6	=	543.0'
pp 7	=	888.5'
pp 8	=	701.5'
pp 9	=	91.0'
pp 10	=	429.0'
pp 11	=	4,121.25'
		18,387.5'

 # 5 bars

pp 1	=	376.0'
pp 2	=	1,275.0'
pp 3	=	541.0'
pp 4	=	6,669.5'
pp 5	=	397.0'
pp 6	=	147.0'
pp 7	=	1,480.5'
pp 8	=	397.0'
pp 9	=	1,224.5'
pp 10	=	1,115.0'
pp 11	=	7,684.75'
		21,307.25'

 # 6 bars

pp 4	=	7,826.5'
pp 5	=	6,832.75'
pp 6	=	136.0'
pp 8	=	85.0'
pp 9	=	1,657.0'
pp 11	=	5,165.0'
pp 12	=	620.0'
		22,322.25'

 # 8 bars

pp 7	=	265.0'
		265.0'

ARIZONA SIGNAL BUTTE F.R.S.

R.A.P. 5/24/84

Emergency Spillway

REBAR: Total lengths by page 2 3

 # 7 bars

pp 1	=	218.0'
pp 3	=	39.0'
pp 5	=	70.5'
pp 6	=	51.0'
pp 7	=	487.0'
pp 8	=	24.0'
pp 9	=	73.0'
pp 11	=	104.0'
		1,066.5'

 # 9 bars

pp 1	=	567.5'
pp 3	=	409.5'
pp 4	=	832.0'
pp 7	=	303.5'
pp 8	=	561.0'
		2,673.5'

 # 10 bars

pp 4	=	537.5'
pp 8	=	61.5'
		599.0'

ARIZONA SIGNAL BUTTE F.R.S.

R.A.P. 5/24/84

REBAR: Total weight by bar — Emergency Spillway 3 3

#4	18,387.5'	X 0.668	=	12,282.85 lbs
#5	21,307.25'	X 1.043	=	22,223.46 lbs
#6	22,322.25'	X 1.502	=	33,528.02 lbs
#7	1,066.50'	X 2.044	=	2,179.93 lbs
#8	265.0'	X 2.670	=	707.55 lbs
#9	2,673.5'	X 3.400	=	9,089.90 lbs
#10	599.0'	X 4.303	=	2,577.50 lbs

Total = 82,589.21 lbs

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: ARIZONA | PROJECT: SIGNAL BUTTE F.R.S.
BY: ICC | DATE: 5/1/84 | CHECKED BY: B.J.L. | DATE: 5-17-84 | JOB NO.: Principal Spillway Outlet
SUBJECT: Steel Schedule | SHEET 1 OF 5

LOCATION	MARK	SIZE	QUAN.	LENGTH	TYPE	A	B	G	TOTAL LENGTH
Sec. A	B1	#4	16	26'-3"	2	3'-0"	20'-3"	3'-0"	420'-0"
	B2	#5	15	20'-3"	S1				303'-9"
	B3	#4	15	3'-0"	S1				45'-0"
	B4	#5	15	3'-0"	S1				45'-0"
	B5	#4	1	11'-6"	T3				11'-6"
	B6	#4	2	13'-0"	T3				26'-0"
Sec. C	B7	#5	10	11'-9"	S1				117'-6"
	B8	#4	38	6'-0"	2	2'-9"	3'-3"		228'-0"
	B9	#5	2	3'-9"	S1				7'-6"
	B10	#5	2	3'-3"	S1				6'-6"
	B11	#4	2	6'-6"	2	3'-9"	2'-9"		13'-0"
	B12	#4	2	6'-9"	2	3'-9"	3'-0"		13'-6"
	B13	#4	10	17'-3"	2	3'-9"	11'-9"	1'-9"	172'-6"
Sec. A	B14	#5	18	14'-0"	S1				252'-0"
Sec. C	B15	#5	2	6'-0"	S1				12'-0"
	B16	#5	2	5'-6"	S1				11'-0"
Sec. B	B18	#4	1	11'-9"	S1				11'-9"
Sec. C	B19	#4	2	17'-0"	2	8'-6"	8'-6"		34'-0"
	B20	#4	2	8'-6"	S1				17'-0"
	B21	#5	8	14'-0"	S1				112'-0"
	B23	#5	4	5'-0"	S1				20'-0"
	B24	#5	2	5'-3"	S1				10'-6"
	B25	#4	2	7'-9"	S1				15'-6"
Sec. A	B26	#5	3	14'-0"	S1				42'-0"
	B27	#4	3	14'-0"	S1				42'-0"
Sec. C	B28	#4	2	7'-6"	2	1'-9"	5'-9"		15'-0"
	B29	#4	2	8'-3"	2	1'-9"	6'-6"		16'-5"

(35

Total #4 bars this page = 1,081.25
Total #5 bars this page = 939.75

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: ARIZONA | PROJECT: SIGNAL BUTTE F.R.S.
BY: ICC | DATE: 4/26/84 | CHECKED BY: BJL | DATE: 5-17-84 | JOB NO.: Principal Spillway Outlet
SUBJECT: Steel Schedule | SHEET 2 OF 5

LOCATION	MARK	SIZE	QUAN.	LENGTH	TYPE	A	B	G	TOTAL LENGTH
Sec. B	B30	#5	18	11'-9"	S1				211'-6"
	B31	#5	2	11'-6"	S1				23'-0"
	B32	#5	2	11'-3"	S1				22'-6"
	B33	#5	2	10'-9"	S1				21'-6"
	B34	#5	2	10'-6"	S1				21'-0"
	B35	#5	2	10'-3"	S1				20'-6"
	B36	#5	2	9'-9"	S1				19'-6"
	B37	#5	2	9'-6"	S1				19'-0"
	B38	#5	2	9'-3"	S1				18'-6"
	B39	#5	2	8'-9"	S1				17'-6"
	B40	#5	2	8'-6"	S1				17'-0"
	B41	#5	2	8'-3"	S1				16'-6"
	B42	#4	16	22'-0"	2	1'-9"	11'-9"	8'-6"	352'-0"
	B43	#4	2	20'-3"	2		11'-9"	8'-6"	40'-6"
	B44	#4	2	20'-0"	2		11'-6"	8'-6"	40'-0"
	B45	#4	2	19'-9"	2		11'-3"	8'-6"	39'-6"
	B46	#4	4	19'-3"	2		10'-9"	8'-6"	77'-0"
	B48	#4	2	19'-0"	2		10'-6"	8'-6"	38'-0"
	B49	#4	2	18'-9"	2		10'-3"	8'-6"	37'-6"
	B50	#4	2	18'-3"	2		9'-9"	8'-6"	36'-6"
	B51	#4	2	18'-0"	2		9'-6"	8'-6"	36'-0"
	B52	#4	2	17'-9"	2		9'-3"	8'-6"	35'-6"
	B53	#4	2	17'-3"	2		8'-9"	8'-6"	34'-6"
	B54	#4	2	17'-0"	2		8'-6"	8'-6"	34'-0"
	B55	#4	2	16'-9"	2		8'-3"	8'-6"	33'-6"

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Total #4 bars this page = 834.5'
Total #5 bars this page = 428.0'

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: ARIZONA | PROJECT: SIGNAL BUTTE F.R.S.
BY: ICC | DATE: 4/26/84 | CHECKED BY: BL | DATE: 5-17-84 | JOB NO.: Principal Spillway Outlet
SUBJECT: Steel Schedule | SHEET 3 OF 5

LOCATION	MARK	SIZE	QUAN.	LENGTH	TYPE	A	B	G	TOTAL LENGTH
Sec. C	H1	#4	6	28'-9"	2	8'-6"	20'-3"		172'-6"
	H4	#4	2	27'-3"	2	7'-0"	20'-3"		54'-6"
	H5	#4	4	26'-3"	2	6'-0"	20'-3"		105'-0"
	H6	#4	2	26'-0"	2	5'-9"	20'-3"		52'-0"
	H8	#4	2	28'-9"	2	8'-6"	20'-3"		57'-6"
	H10	#4	2	26'-0"	2	8'-6"	17'-6"		52'-0"
	H11	#4	2	23'-0"	2	8'-6"	14'-6"		46'-0"
	H12	#4	2	20'-6"	2	8'-6"	11'-9"		41'-0"
	H13	#4	2	17'-3"	2	8'-6"	8'-9"		34'-6"
	H15	#5	2	8'-9"	S1				17'-6"
	H16	#5	2	11'-9"	S1				23'-6"
	H17	#5	2	14'-6"	S1				29'-0"
	H18	#5	2	17'-6"	S1				35'-0"
	H19	#5	8	28'-3"	2	8'-0"	20'-3"		226'-0"
Sec. B	H21	#5	8	5'-3"	S1				42'-0"
	H22	#5	8	7'-0"	2	2'-3"	4'-9"		56'-0"
Sec. C	H23	#5	2	26'-9"	2	6'-6"	20'-3"		53'-6"
	H24	#5	2	25'-3"	2	5'-0"	20'-3"		50'-6"
	H25	#5	2	23'-9"	2	3'-6"	20'-3"		47'-6"
Sec. D	H26	#5	4	9'-0"	S1				36'-0"
	H28	#5	8	8'-6"	2	3'-0"	5'-6"		68'-0"
	H29	#5	4	6'-6"	2	3'-0"	3'-6"		26'-0"
	H30	#5	2	7'-0"	2	3'-0"	4'-0"		14'-0"
	H31	#5	6	5'-9"	S1				34'-5"
	H32	#5	4	4'-0"	S1				16'-0"
	H33	#5	4	5'-6"	S1				22'-0"
	H34	#5	6	3'-6"	S1				21'-0"
	H35	#4	2	16'-0"	S1				32'-0"
	H36	#4	2	15'-3"	S1				30'-6"
	H37	#4	2	27'-9"	S1				55'-6"
	H38	#4	2	26'-3"	S1				52'-6"
	H39	#4	3	19'-0"	S1				57'-0"
	H40	#4	4	11'-9"	S1				47'-0"
	H41	#5	4	15'-9"	S1				63'-0"
	H42	#5	4	4'-6"	31	2'-0"	2'-6"	θ =	18'-0"
	H43	#5	4	6'-0"	31	4'-6"	1'-6"	65.4°	24'-0"
	H44	#5	4	7'-9"	31	4'-6"	3'-3"		31'-0"
	H45	#5	4	17'-9"	31	2'-0"	3'-6"		71'-0"
	H47	#5	4	23'-3"	31	3'-9"	15'-9"	3'-9"	93'-0"

(43)

Total #4 bars this page = 889.5'
Total #5 bars this page = 1,118.0'

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE: ARIZONA | PROJECT: SIGNAL BUTTE F.R.S.

BY: ICC | DATE: 4/26/84 | CHECKED BY: BL | DATE: 5-17-84 | JOB NO.: Principal Spillway Outlet

SUBJECT: Steel Schedule | SHEET 4 OF 5

LOCATION	MARK	SIZE	QUAN.	LENGTH	TYPE	A	B	G	TOTAL LENGTH
Sec. B	H49	#4	14	8'-0"	S1				112'-0"
	H50	#4	2	8'-0"	S1				16'-0"
	H51	#4	4	7'-6"	S1				30'-0"
	H52	#4	4	6'-9"	S1				27'-0"
	H53	#4	4	6'-3"	S1				25'-0"
	H54	#4	2	5'-9"	S1				11'-6"
	H55	#4	4	5'-3"	S1				21'-0"
	H56	#4	4	4'-6"	S1				18'-0"
Sec. E	H58	#4	4	8'-0"	S1				32'-0"
	H59	#4	4	10'-9"	2	7'-9"	3'-0"		43'-0"
	H60	#4	4	17'-9"	2	9'-0"	8'-9"		71'-0"

(13.

Total #4 bars this page = 406.5
Total #5 bars this page = 0.00'

ARIZONA SIGNAL BUTTE F.R.S.

ICC 4/26/84 B.L. 5-17-84 Principal Spillway Outlet

5 5

Steel Schedule Quantities

#4 bars

sheet #1 = 1,081.25'

sheet #2 = 834.5'

sheet #3 = 889.5'

sheet #4 = 406.5'

total length = 3,211.75'

total weight = 0.668 X 3211.75

= 2,145.45 lbs

#5 bars

sheet #1 = 939.75'

sheet #2 = 428.00'

sheet #3 = 1,118.00'

sheet #4 = 0.00'

total length = 2,485.75'

total weight = 1.043 X 2,485.75

= 2,592.64 lbs

Total length of both bars = 5,697.5'

Total weight of both bars = 4,738.09 lbs

Subject	Calculations			Check		
	Quanity	Units	Initials	Quanity	Units	Initials
VII. Fenceing						
a.) Boundry Fence	7,400	L.F.	R.A.P.	7,400 ±	L.F.	BJL
b.) Steel Retaining Rale for P. Spillway	16.0	L.F.	R.A.P.	—	—	—
c.) Chain Link Gate @ Meridian Access	28.0	L.F.	R.A.P.	—	—	—
d.) Chain Link Fence @ Emergency Spillway	112.0	L.F.	R.A.P.			

COMPUTATION SHEET
AWG-523 (Rev. 8-69)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

498

ARIZONA		PROJECT SIGNAL BUTTE F.R.S.		
R.A.P.	DATE 2/27/84	CHECKED BY [illegible]	DATE 4-19-84	JOB NO.
SUBJECT Boundry Fence Lengths				SHEET 1 OF 1

On the East side, south from existing Usery Mountain fence tie-in to gate @ F.R.S. 200'±

From F.R.S. south along Meridian Road 650'±

Then turn S.W. to Powerline R.W. 200'±

Proceed along north R.W. of Powerline 4,300'±

Then turn to the N.W. 580'±

Finally north to tie-in of existing Usery Mountain Fence. 1,470'±

7,400'±

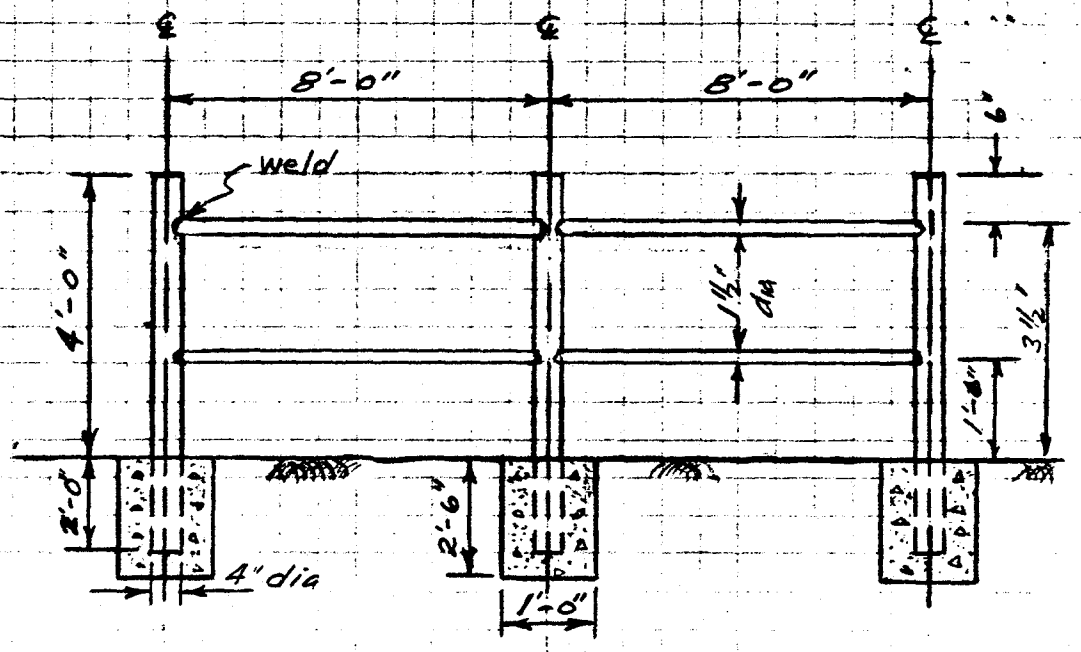
Approx. 7400'± of 4 barbed wire fence.

COMPUTATION SHEET
SCS-ENG-523 Rev. 3-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE	PROJECT		
ARIZONA	SIGNAL BUTTE F.R.S.		
BY R.A.P.	DATE 7/14/83	CHECKED BY	DATE	JOB NO.

SUBJECT STEEL POST DETAIL FOR PRINCIPAL SPILLWAY SHEET 1 OF 1



STEEL POST DETAIL
FOR
PRINCIPAL SPILLWAY

(no scale)

(16 feet long)

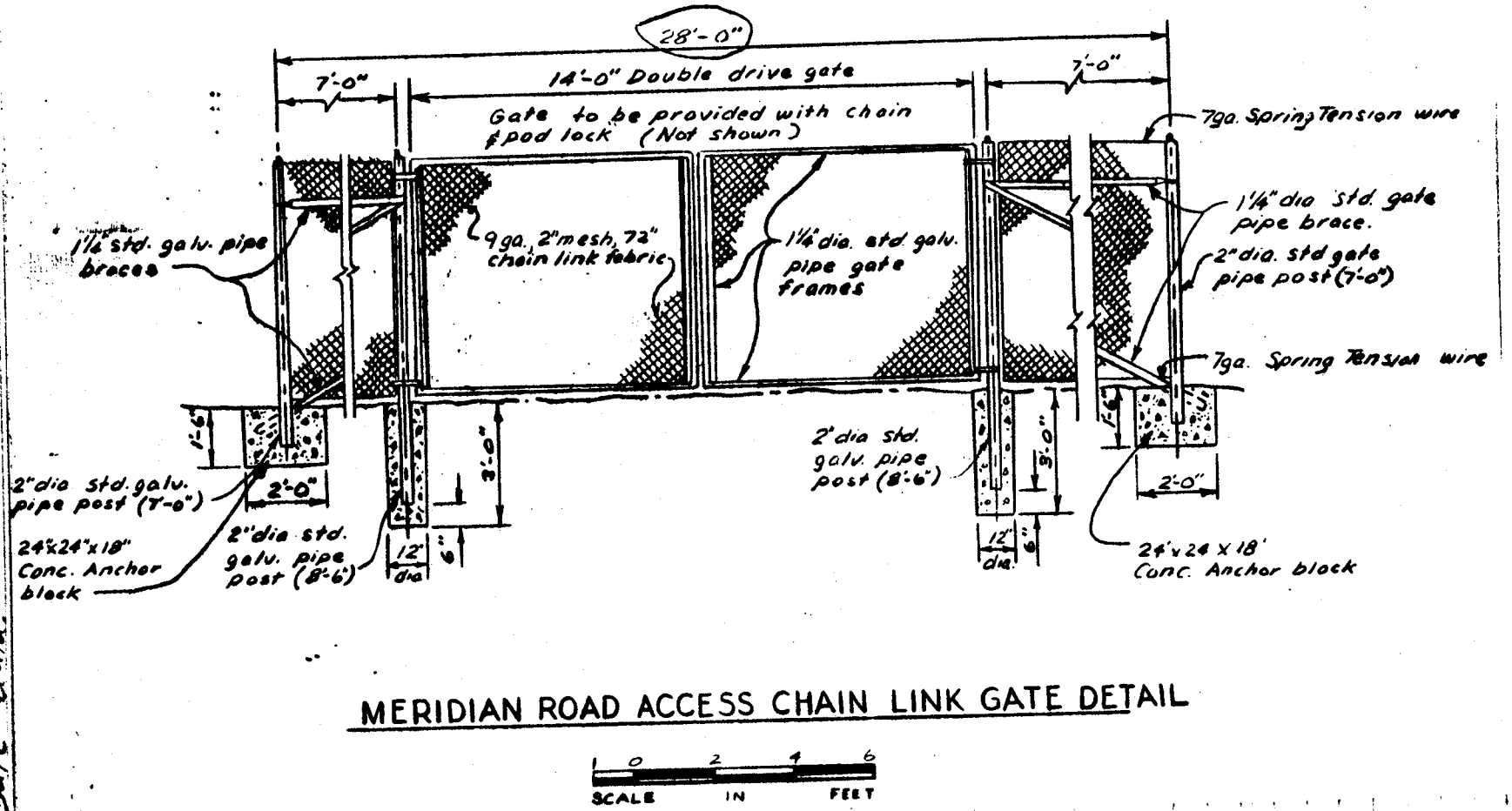
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

500

COMPUTATION SHEET

STATE ARIZONA
PROJECT SIGNAL BUTTE F.R.S.
JOB NO. @ Meridian Road Access
SHEET 1
BY R.A.P.
DATE 3/8/84
CHECKED BY
DATE

Chain Link Gate data.



MERIDIAN ROAD ACCESS CHAIN LINK GATE DETAIL

SCALE 0 2 4 6 IN FEET

STATE ARIZONA PROJECT SIGNAL BUTTE FRS
BY R.A.P. DATE 3/8/84 CHECKED BY DATE JOB NO. Emergency Spillway
SUBJECT Chain Link Fence data SHEET 1 OF 1

Emergency Spillway

Side top: 24.0' X 2 sides = 48.0'

Side chute 32.0' X 2 sides = 64.0'

total = 112.0'

112.0 feet

Note: see sheet 3 of 38
for fence details.

SIGNAL BUTTE F.R.S. (1984)

Subject	Calculations			Check		
	Quanity	Units	Initials	Quanity	Units	Initial
VIII. Pipe						
a.) Principal Spillway	148' (36")	L.F.	R.A.P.			
b.) Gated Outlet	184' (12")	L.F	RAP			

Subject	Calculations			Check		
	Quanity	Units	Initials	Quanity	Units	Initial
VIII. LINER						
a.) HDPE 100 Mil.	162,515.9	ft²	BJL	162,516	ft²	ADM

COMPUTATION SHEET
SCS-ENG-523A Rev. 9-61

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE Az. PROJECT Signal Butte FRS
BY BJL DATE 4-13-84 CHECKED BY aem DATE 4-18-84 JOB NO.
SUBJECT HDPE Liner 100 mil. SHEET 1 OF 3

Sta.	Elev. Top Liner	Bottom of Trench	h	Ave h	x (dist)	Ft²
195+87	1718.0	1718.0	0			
				1.3	13'	16.9
196+00	1718.0	1715.5	2.5			
				4.3	100'	430.0
197+00	1718.0	1712.0	6.0			
				6.3	100'	630.0
200+00	1718.0	1711.5	6.5			
				9.5	100'	950.0
201+00	1718.0	1705.0	13.0			
				11.3	100'	1130.0
202+00	1718.0	1708.5	9.5			
				11.7	100'	1170.0
203+00	1718.0	1704.2	13.8			
				13.7	75'	1027.5
203+75	1718.0	1704.5	13.5			
				15.7	25'	392.5
204+00	1718.0	1700.1	17.9			
				18.0	200'	3600.0
206+00	1718.0	1700.0	18.0			
				17.5	200	3500.0
208+00	1718.0	1701.1	16.9			
				18.2	200	3640.0
210+00	1718.0	1698.5	19.5			
				27.8	100'	2780.0
211+00	1718.0	1682.0	36.0			
				37.3	200	7460.0
213+00	1718.0	1679.5	38.5			
				30.3	100'	3030.0
214+00	1718.0	1696.0	22.0			
				23.1	200'	4620.0
216+00	1718.0	1693.8	24.2			
				26.10	100'	2610.0
217+00	1718.0	1690.0	28.0			
				27.50	100'	2750.0
218+00	1718.0	1691.0	27.0			
				33.0	125 ~~75~~	4125 ~~2475~~.0
219+25	1718.0	1679.0	39.0			
				33.0	375	12375.0
223+00	1718.0	1691.0	27.0			

ST 56,236.9

COMPUTATION SHEET

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE Az. PROJECT Signal Butte FRS

BJL DATE 4-13-84 CHECKED CWM DATE 4-18-84

HDPE Liner 100 mil. SHEET 2 OF 3

Sta.	Elev. Top Liner	Bottom of Trench	h	Ave. h	(dist)	Ft²
223+00	1718.00	1691.0	27.0			
				29.5	100'	2950.0
224+00	1718.00	1686.0	32.0			
				29.0	100'	2900.0
225+00	1718.00	1692.0	26.0			
				29.0	100	2900.0
226+00	1718.00	1686.0	32.0			
				31.0	100	3100.0
227+00	1718.00	1688.0	30.0			
				36.0	100	3600.0
228+00	1718.00	1676.5	41.5 42.0			4855.5
				37.35 6	130	4886.0
229+30	1718.00	1684.8	33.2			
				34.10	70	2387.0
230+00	1718.00	1683.0	35.0			
				32.0	200	6400.0
232+00	1718.00	1689.0	29.0			
				31.5	200	6300.0
234+00	1718.00	1684.0	34.0			
				32.5	100	3250.0
235+00	1718.00	1687.00	31.0			
				33.5	100	3350.0
236+00	1718.00	1682.00	36.0			
				35.3	100	3530.0
237+00	1718.00	1683.5	34.5			
				35.8	100	3580.0
238+00	1718.00	1681.0	37.0			
				34.5	230	7935.0
240+30	1718.00	1686.0	32.0			
				33.0	135	4455.0
241+65	1718.00	1684.0	34.0			
				32.1	135	4333.5
243+00	1718.00	1687.8	30.2			
				31.2	100	3120.0 3160.0
244+00	1718.00	1685.8	32.2 33.0			
				30.85 31.3	100	3085.0 3130.0
245+00	1718.00	1688.5	29.5			

ST 72,031.0

COMPUTATION SHEET
SCS-ENG-523A Rev. 9-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE Az. PROJECT Signal Butte FRS
BY BJL DATE 4-13-84 CHECKED aom DATE 4-18-84 JOB NO.
SUBJECT HDPE Liner 100 mil. SHEET 3 OF 3

Sta.	Elev. Top Liner	Bottom of Trench	h	Ave h	(dist.)	ft²
245+00	1718.0	1688.5	29.5			
				31.3	100'	3130.0
246+00	1718.0	1685.0	33.0			
				29.6	100	2960.0
248+00	1718.0	1691.8	26.0			
				28.0	163	4564.0
249+63	1718.0	1688.0	30.0			
				27.0	37	999.0
250+00	1718.0	1694.0	24.0			
				27.5	175	4812.5
251+75	1718.0	1687.0	31.0			
				24.6	225	5535.0
254+00	1718.0	1699.8	18.2			
				18.1	125	2262.5
256+25	1718.0	1700.0	18.0			
				15.3	175	2677.50
258+00	1718.0	1705.5	12.5			
				11.8	400'	4720.0
262+00	1718.0	1707.0	11.0			
				9.0	200'	1800.0
264+00	1718.0	1711.0	7.0			
				3.5	225'	787.5
266+25	1718.0	1718.0	0			

" St. 34,248.0 "

162,515.9 ft²

x 1.05

170,641.7

SIGNAL BUTTE F.R.S. page 9

Subject	Calculations			Check		
	Quanity	Units	Initials	Quanity	Units	Initials
WATER CONTROL GATES						
Gated Outlet (12")	one	ea.	R.A.P.			
Handwheel (18") Gated outlet	one	ea.	R.A.P.			

PROJECT SIGNAL BUTTE F.R.S.

AZ

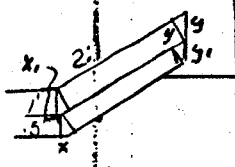
A.D.M. 5-9-84

Gated Outlet Riprap and Filter

SHEET 1 OF 2

$\cos 26.5651° = \frac{1'}{y} = y = 1.118'$

" $\frac{.5}{y_1} = .559'$

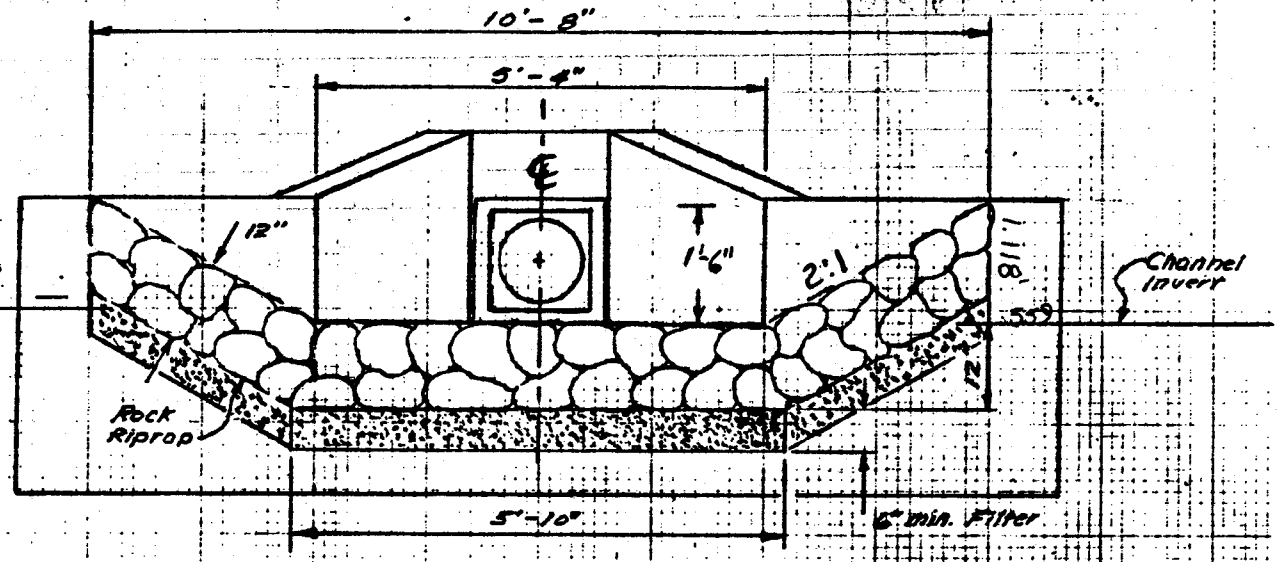


$\frac{1}{2}\tan 26.5651° = \frac{X}{.5}$

$X = 0.118$

$\frac{1}{2}\tan 26.5651 = \frac{X_1}{1'}$

$X_1 = 0.2361'$



GATED OUTLET RIPRAP AND FILTER
CROSS SECTION

DETAIL C

SCALE IN FEET

$\frac{1}{2}$Area at sta. 10+89.5

0	0	1.3819	2.5	1.0	1.0	0	whole Area = 11.3 ft²
0	2.9	5.333	5.333	2.666	0	0	

$\frac{1}{2}$Area at sta. 10+98.8

0	0	1.3819	2.5	1.0	1.0	0	whole Area = 15.98 ft²
0	5.236	7.67	7.67	5.0	0	0	

$\frac{1}{2}$Area at sta. 11+01.5 SAME whole Area = 15.98 ft²

Filter

sta. 10+89.5	0	0	1.323'	1.882	.5	.5	0	whole Area = 5.99 ft²
	0	3.0208	5.6668	5.6668	2.9028	0	0	
Sta. 10+98.8	0	0	1.323	1.882	.5	.5	0	whole Area = 8.32 ft²
	0	5.3541	8.0	8.0	5.2361	0	0	

Sta. 11+01.5 SAME whole Area = 8.32 ft²

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SCS-ENG-529
2-80

EARTHWORK COMPUTATION SHEET

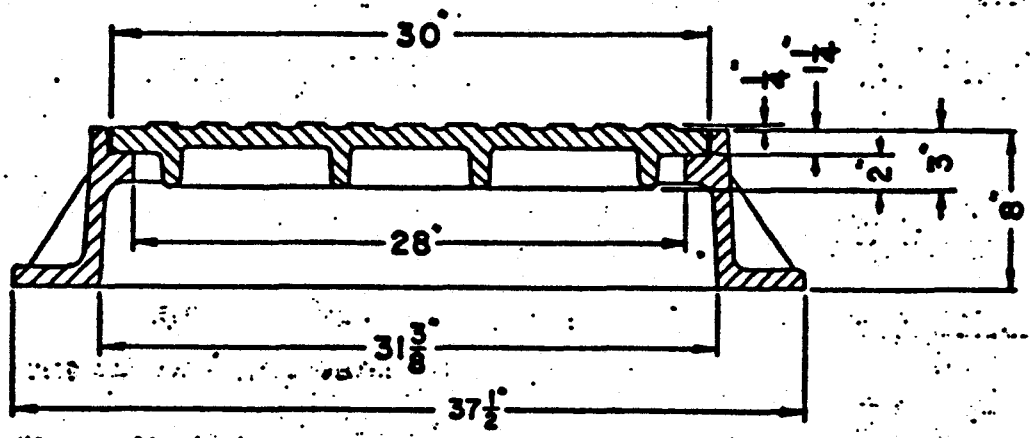
Location SIGNAL BUTTE F.R.S. Owner
Watershed Subwatershed Site No.
Contractor Computed by ADM Date 5-9-84
Item Checked by Date
Contract No. Estimate yd³ Actual yd³

	Station	End area (in²)	End area (ft²)	Sum of end areas (ft²)	Distance (ft)	Section products (ft³)	Volume (yd³)	Remarks
RIPRAP	10+89.5		11.3					
				27.28	9.3	253.7	9.4	
	10+98.8		15.98					
				31.96	2.7	86.29	3.2	
	11+01.5		15.98					
						2	12.6	
							6.3 yds³	RIPRAP
R.R	10+89.5		5.99					
				14.31	9.3	133.08	4.93	
	10+98.8		8.32					
				16.64	2.7	44.93	1.66	
	11+01.5		8.32					
						2	6.59	
							3.3 yds³	FILTER

Sheet 2 of 2 sheets

ARIZONA PROJECT SIGNAL BUTTE F.R.S.
R.A.P. DATE 5/3/84 CHECKED BY DATE JOB NO.
Principal Spillway Inlet Structure Manhole SHEET 1 OF 1

(#R-1798 on page 51 of Neenah Catalogue)



Manhole Frame, Solid Lid

(See Sheet 10 of 37 for location)