

18

*Final Topography*

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LEVEL BOOK

370

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W115

# KEUFFEL & ESSER CO.

## DRAWING MATERIALS

### SURVEYING INSTRUMENTS.

NEW YORK.

CHICAGO. ST. LOUIS. SAN FRANCISCO. MONTREAL.

### Tables for Excavations and Embankments.

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.  
ROADWAY 14 FEET WIDE. SIDE SLOPES 1 TO 1.

FOR SINGLE TRACK EXCAVATION.

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	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	0
1	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	1
2	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	2
3	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	3
4	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	4
5	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	5
6	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	6
7	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	7
8	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	8
9	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	9
10	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	10
11	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	11
12	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	12
13	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	13
14	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	14
15	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	15
16	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	16
17	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	17
18	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	18
19	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	19
20	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	20
21	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	21
22	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	22
23	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	23
24	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	24
25	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	25
26	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	26
27	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	27
28	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	28
29	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	29
30	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	30
31	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	31
32	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	32
33	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	33
34	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	34
35	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	35
36	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	36

Calculated by Julien A. Hall, M. Am. Soc. C. E.

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April 1919

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4/11/19  
 meter. Bub. Askew.

At E5 - Sight E4 for

Zero turn 117° 8' left for dist

49.96' Point on Con Block  
 18.50

68.46 to Auxil Pt.

At Auxil Pt. Sight face sight

for 117° 8' lt.

HI = 41.45

87M

R = 5.45

436.0

234	41.45	439.11
145	281-30	486.0
23.3	116-30	
85	290-45	272
124		
70	315-45	303
125		
82	340-15	306
125		
55	26-45	334
128-45		
98	75	355
139-30		
163	93	365
129		
18.8	96	386
130-30		
20.4	111	317
123		
21.1	114-30	

HI = 41.45 2' Top. Rt Abot. - Fwd. 1

R = 3.45

438.

300	125	438	116	25°
295	123-30		15.2	6-30
27.7	124.0		13.6	353
248	117		14.0	349
21.6	114-45		15.6	339-45
20.6	111-30		15.2	330-45
19.7	99-45		17.0	311
19.3	94		12.9	295-15
15.7	87-30	Con. Block	14.6	289
15.9	78-30	R = 14.5	440	14.7
293-15				
20.0	79-45		18.2	312-30
20.9	73-30		18.3	320-30
18.9	66-30		18.8	339-15
20.2	59-30		17.6	341-30
18.2	49-45		16.9	349-30
19.3	47.0		14.3	352-30
15.2	50		16.9	7°
14.5	37-30		14.4	13°

4/11/19

Final 2' Topog Rt Abut.

HI = 41.45

R = 1.45

440

18.2

18-45

cor.

Con

42.5

17.5-30.

Dist

4996

117°-8'

Bm

1293

45204

43911

Rod = 10.04

Con. Cor.

442

58.0

121-45

442

36.2

74-45

49.5

115-15

34.4

66-30

48.2

116-30

29.8

63-45

46.9

114

31.5

53

45.7

117

29.7

53

42.5

114-15

25.4

47

39.1

114

19.0

45-30

35.8

104°

15.8

47-30

35.4

93-30

14.5

33-45

36.4

88-30

10.4

31-15

35.7

84-30

8.2

32-30

35.8

81-30

4.4

37-15

36.4

79°

3.0

45

33.9

80-15

3.0

101-45

22.7

77

35.4

74-45

To adjust Rod on to this setup

HI. 45204 At Auxil Pt from E 5

R=804

444	✓	28	114-45	444	378	71°	✓
"	✓	32	57		361	77	✓
✓		25	44		363	81	✓
✓		35	38-15		358	85	✓
✓		82	32-30		365	89	✓
✓		14.0	32.0		35.7	93-30	✓
✓		19.9	29-45		361	102	✓
✓		22.0	28-15		380	114	✓
✓		23.7	29-15		415	114	✓
✓		27.4	39-30		446	113-45	✓
✓		28.5	36-30		472	111-45	✓
✓		32.8	43-45		479	114	✓
✓		32.6	48-30	Cor.	490	114-45	✓
✓		35.7	50°	R=604			
✓		40.0	53-45	446	494	114-45	✓
✓		43.3	56-30		470	111	✓
✓		35.6	65-30		455	109-45	✓

Add. 5 to dist.

R=604

Cor. face

HI=45204 At Auxil Pt from E 5

446	✓	44.6	113-45	446	309	390
"	✓	41.6	114-15		290	320
Point	"	38.5	113-45		29.9	250
"	✓	31.3	98-30		259	34-15
✓		36.5	90-30		23.5	24-30
✓		37.0?	84-30		16.0	25-30
✓		36.5?	78-30		14.4	31.0°
✓		37.8	71-30		7.8	33.0
✓		40.5	68-30		2.8	31°
✓		39.3	66		1.8	84-30
✓		43-6	60°	Correct dist to Cm cor	3.2	
✓		45.0	56-45	Correct dist to line of Block	34	116-45
✓		44.7	54-45			
✓		40.5	54-30	Rod	904	
✓		36.7	51°		34	116-45
✓		33.4	49	448	18	63-30
✓		32.7	44-15	"	28	27-15
✓		33.4	40-15	"	85	31-30

Add. 5 to dist.

3

HI = 45204

At Auxil Pt from E5

4

4/11/19

448 128 31-45 448 42.7 49

" 164 25° " 45.6 53

" 190 24-15 " 45.5 56-45

" 220 21-30 " 44.2 58-45

25.3 23° " 44.0 61

28.0 19-45 " 43.6 64-30

29.2 24° Pt 6' higher " 40.8 68°

32.0 24-45 " 36.5 78

33.0 27-30 " 36.4 81

33.1 32-15 " 37.7 84-45

34.2 35.0 " 35.8 92

35.0 36-30 " 38.0 98

34.5 38-45 " 36.5 101-45

33.4 44 Point " 38.0 111

33.6 45 " 41.7 112-45

34.0 48 " 43.2 113

36.7 49-30 " 44.9 111

45.1 106

46.0 106-30

46.8 109-30

48.1 110-30

Cm. Face 52.8 112-30

" " 56.8 116-30

Set on E4 Sight H4 for 270°

Az Lt. Set Auxil Point 53.3' dist

102°39' Az

G4 11.90 58.61 46.71

Auxil Pt 122 57.39

H.I. 62.51 Set on Auxil Pt from E4

Sight E4 for ~~270~~<sup>102°39'</sup> Lt.

E4 92.5 62.51 53.26

Rod 12.51 450. 244 182. 176 177.30

450. 21.5 183 14.6 178°



At Auxil Point from E4				At Auxil Point from E4				5				
451	12.5	172°30'	451	23.7	107°	451	43.9	126°	452	29.1	96°15'	
	10.3	170°		22.6	102°30'		44.9	137°15'		29.0	91°15'	
	9.1	153°15'		23.2	101°30'		47.2	<sup>142</sup> <del>143</del> 15'		27.6	83°30'	
	9.2	150°		24.8	99°45'		49.6	<sup>145</sup> <del>147</del> 15'		23.4	87°15'	
	7.0	148°15'		25.7	86°15'	Rod 10.5'	452	53.8	135°45'		23.2	96°
	7.7	131°15'		25.6	93°30'		51.5	134°15'		20.9	99°45'	
	8.7	134°45'		25.0	104°15'		52.8	140°		21.8	102°15'	
	10.3	123°		28.2	103°15'		45.4	128°30'		18.3	108°15'	
	10.1	121°15'		<sup>297</sup> <del>24.7</del>	100°45'		39.0	125°30'		15.5	107°30'	
	11.5	124°		30.7	101°30'		36.3	123°45'		13.5	100°30'	
	13.4	122°30'		31.6	99°45'		35.6	118°15'		8.2	126°	
	13.3	116°15'		31.0	107°		38.5	116°		5.6	129°30'	
	11.5	118°30'		32.7	108°30'		33.5	109°		12.3	172°	
	15.4	119°00'		34.7	111°		33.7	100°15'		17.8	178°15'	
	16.6	117°45'		33.7	<sup>113</sup> <del>103</del> 30'		32.9	97°45'		21.8	181°30'	
	16.2	124°		35.3	118°		33.7	94°		24.6	181°45'	
	23.9	116°15'		35.6	119°15'		31.1	96°		26.5	194°15'	
	22.2	109°30'		36.1	125°30'		30.4	92°30'	A54	25.3	190°	

Rod 8.51		At Auxil Point from E 4		Elev. 54.91		Rod R		6251		At Auxil Point from E 4		6
454		186°30'	22.6	70°	454	44.1	124°	456	28.4	85°		
	18.4	179°15'	17.8	77°30'		45.0	127°30'		27.3	81°		
	16.3	177°45'	19.6	82°30'		47.5	128°30'		24.9	81°		
	14.9	190°30'	23.5	79°30'		48.7	132°30'		23.9	74°		
	12.9	189°45'	24.7	84°		54.0	135°30'		24.9	69°		
	12.9	174°	26.8	81°45'	Rod 6.51 456	53.0	132°30'		24.2	63°		
	10.6	176°15'	28.8	90°15'		44.6	125°15'		21.3	61°		
	9.6	187°30'	32.8	88°15'		43.8	121°45'		17.4	63°30'		
	7.7	188°	31.3	92°45'		39.7	123°		13.9	59°		
	7.9	163°	33.2	92°30'		40.8	116°30'		11.4	63°30'		
	4.0	118°15'	34.1	94°		34.9	107°15'		8.4	71°55'		
	8.2	103°15'	33.2	99°		35.0	99°30'		4.0	111°		
	9.4	96°30'	34.4	100°		37.2	92°45'		6.1	158°30'		
	13.6	72°30'	33.6	107°45'		36.0	89°		5.0	194°		
	16.8	71°	38.9	116°15'		33.3	90°	Rod 4.51 458	2.6	295°		
	16.2	63°30'	37.1	116°30'		34.1	87°		2.6	41°		
	19.2	63°	37.2	123°		30.9	84°45'		7.1	49°		
	20.0	71°15'	37.6	124°45'		29.4	82°30'		9.1	45°		

## At Autil Point at E4

45.5	11.9	60°	43.1	119°15'
16.1	55°15'	44.4	124°30'	
16.7	60°45'	50.8	130°	
21.7	58°30'	53.7	122°45'	
22.3	61°30'	51.3	107°45'	
23.6	56°45'	45.1	117°45'	
27.5	67°	40.9	116°	
32.1	68°45'	35.7	109°45'	
24.6	73°30'	36.6	102°30'	
25.3	80°	38.4	101°45'	
27.4	79°30'	38.0	96°15'	
28.7	82°30'	38.4	88°30'	
32.2	80°	35.6	84°	
36.3	88°15'	33.7	78°45'	
37.4	87°45'	31.4	78°45'	
37.3	91°45'	29.9	75°15'	
34.6	101°30'	33.0	67°45'	
34.6	108°	32.1	65°	

Rod 2.51  
460  
concrete wall.

## At Autil Point out E4

7

46.0	28.7	65°45'	16.2	26.4	55°45'
28.4	63°30'	26.9	63°15'		
26.9	63°30'	28.7	62°30'		
23.9	51°45'	32.2	63°30'		
17.4	60°	34.0	63°30'		
16.8	51°	35.0	72°45'		
18.5	48°30'	36.5	75°30'		
17.4	40°45'	36.9	78°15'		
11.0	35°	38.2	78°		
2.2	27°	39.2	81°30'		
7.5	23°	36.0	83°45'		
14.7	37°30'	39.4	85°		
18.4	37°15'	38.7	86°		
19.9	42°30'	38.6	97°		
23.0	41°30'	38.7	104°		
21.1	48°45'	38.9	111°30'		
24.8	51°15'	41.7	112°30'		
25.6	56°	44.7	116°15'		

Rod 0.51  
462

concrete wall.  
 Abw 51.1 117°55'  
 Middle Groat Hole.

vertical  
 G-H. 39.0 36°47' ✓  
 139°51'

North Groat Hole.

ELEV. 35.  
 15.3 from 1769 on curve on 3-3 R ✓  
 12.3 " 1749 on curve on 3-3 R

4/19/19.  
 Well #1 filled to  
 El. 428 -

(19)

4/14/19  
 Rock Surface Lt Abot. 8  
 + HI - etc  
 M 23 4.54 84.37 79.83

Set up on M 22 -  
 set point dist 15.4 West with

HI. Az. 270°  
 84.37 Set on M 22 - 16.4  
 15.4 West.  
 site Q 22 with 90° Azth. L

Top Point	14.1	1°30'	11.10	90.27
R = 637	9.3	261°30'	476	8.2 64°
478	5.7	284°30'	476	8.7 66°30'
	6.2	324°	116	11.3 57°30'
	14.5	354°30'		11.9 34°
	16.	2°30'		18.5 24°30'
	17	10°30'		19.1 8°
	15	19°15'		17. 8°45'
	9.4	38°30'		16.7 8°15'

Surface Rock Lt Abut

17.4	7°30		11.5	62°15
15.9	6°45	Rod 1238 472	13.	70°45
18.2	349°		13.9	65°
9.8	335°45		15.3	50°30
7.7	292°		16.9	46°30
10.7	282°		22.1	36°30
Rod 10.37 474	10.8	285°35	23.7	27°45
9.3	307°15		20.9	0°
13.2	338°		20.2 22.	334°15
14.8	342°15		18.6	327°15
18.7	339°45		17.4	335°45
19.7	359°		13.	315°30
17.6	3°15		12.6	296°30
19.3	8°15			
19.4	32°30			
12.9	38°45			
15.2	51°			
14.1	63			

Surface Rock

9

				Set on M22.		
				Set Point Dist 17.7 South		347°35
				Set up on auxiliary point site M22		
				Azth. 167°35		
				H.I		
			M 22.	7.2	75.97	68.57
			Rod 11.77 464	16.5	100°	
				13.6	77°30	
				7.8	54°	
				7.7	9°45	
				12.5	333°9	
				15.8	314°	
				21.6	298°15	
				23.2	285°15	
			Steel Rod 9.77 466	21.1	282°	12. 315°15
				21.3	284°30	9.6 318°
				18.8	296°	6.9 30°
				15.7	300°15	5.8 42°45

Add 10 cu Cubes of  
for Slab during May

Surface Rock Lt Abut

	10.4	82°45'	4.7	197°45'
Rod 777 468	7.	117°30'	9.8	157°45'
	6.7	84°15'		
	6.1	23°30'		
	5.5	0°		
	9.9	314°30'		
	14.2	295°		
	18.	286°15'		
	19.1	275°45'		
Point of Rock	20.8	278°45'		
Rod 577 470	20.7	278°45'		
	18.6	276°30'		
	13.0	285°		
	11.8	290°30'		
	5.9	216°15'		
Rock	5.3	26°		
	4.3	47°30'		

4/19/19 2' Final Topog Lt Abut 10  
Set on A19 Sight 019 for  
Zero Azimuth left

019	998	45.91	43593
Rod 596 440	9.1	89°30'	21.9 203°45'
	7.0	104°45'	24.3 211°45'
	8.3	130°	23.0 216°45'
	8.7	143°15'	24.6 219°15'
	16.4	144°45'	22.1 224°
	22.4	140°15'	23.1 230°30'
	22.0	145°30'	22.7 233°45'
	22.1	155°45'	22.5 240°30'
	16.8	168°30'	25.2 244°
	17.0	177°15'	21.4 236°45'
	19.0	183°15'	21.8 229°30'
Steel	21.3	186°	20.5 221°30'
	22.3	189°30'	21.8 212°15'
	21.8	197°30'	21.8 207°45'

See page 14 for final

edge of  
flat  
Steel  
Rod 791  
438

ATA 19		end of concrete Rod 9.91 436	2' Final Topog		At A 19		11	
steel	21.2	199°45'	9.1	2°	20.0	198°	32.9	258°45'
	20.7	187°	10.3	354°15'	20.3	209°	27.0	261°
	16.9	186°	15.7	356°45'	19.6	214°30'	25.4	254°45'
	17.1	164°15'	17.8	352°31'	19.9	218°15'	24.5	250°
	18.3	157°45'	16.2	351°36'	19.6	219°45'	23.4	248°15'
	14.4	162°15'	14.2	345°45°	19.4	230°	23.7	246°45'
	11.3	169°45'	11.5	342°	19.7	236°30'	20.7	246°45'
	9.4	165°15'	9.0	289°30'	19.7	239°30'	19.5	240°45'
	6.2	156°	7.1	273°	20.9	244°45'	18.8	235°15'
	5.9	220°	6.8	237°	24.8	246°15'	17.6	229°30'
	5.3	270°45'	7.4	208°45'	24.0	248°	17.5	223°30'
	7.3	283°45'	8.2	198°	25.1	249°15'	16.7	218°45'
	9.0	304°30'	7.2	184°15'	25.4	254°30'	17.1	214°15'
	11.5	341°45'	9.8	179°	31.8	256°	13.4	209°30'
steel	12.6	350°45'	11.7	171°15'	33.8	257°	10.7	206°30'
	12.1	355°	14.7	181°	38.7	257°15'	7.7	212°45'
	10.3	356°15'	15.3	186°31'	38.7	259°	9.0	280°15'
end of concrete	6.9	29°30'	16.4	193°	35.8	259°	10.3	294°15'

See New Setup  
A-19

Edge of flat steel

Rod 11.91  
434

At A19 - 2' Final

13.1	314°
18.2	349°15'
20.1	353°
Steel 20.2	353°45'
19.4	357°
Rod 5.91	
440. RC 2.9	109°
2.6	88°15'
3.3	122°30'
3.5	135°15'
4.8	149°30'
4.9	150°
0.1	20.9°
3.6	227°45'
Steel 2.7	254°45'

Auxil Point	11.85	319°03'
# 40.78	At Auxil Point from A-19	9.87 36.04
Rod 8.78	4.74	40.78 36.04
432 Steel	17.7	17°45'
	16.6	14°
		9.9 25°45'
		2.5 279°

Rod 8.78 At Auxil Point from A 19

432	3.8	239°15'	430	19.8	246°
	4.8	204°15'		21.3	233°30'
	8.2	190°15'		20.7	220°
	8.8	180°		20.8	213°
	11.2	179°		18.0	205°46'
	13.0	171°30'		17.0	199°30'
	18.0	173°		12.9	181°15'
	15.1	198°		8.8	185°45'
	20.6	204°30'		9.0	198°15'
	19.5	207°30'		5.5	215°30'
	21.2	214°15'		5.0	250°15'
	22.2	222°		5.2	279°45'
	22.4	235°15'		6.9	314°
	21.1	241°45'		19.4	9°30'
	27.0	251°30'	Steel	20.0	16°
	31.2	243°			
	37.3	243°			
		246°			
		236°			
Rod 10.78	24.7	246°			
430					



4/19/19 B-P-M

Fillets Rt Abutment 13

Set on A.7-8055 <sup>th</sup> Set Point Auxil		Set up on C 4 Site C 3	
Dist.	34.34	Az	323° 24'
B.M.	13.26	52/37	39.11
	24.75	326° 26'	2.96 49.31
	24.50	305° 38'	5.08 47.29
	29.57	282° 35'	5.35 47.02
Set up on Auxil pt. Site A.P. 8053			
166.95 North of ad			
T.P.	1.4	50.21	59.07
	9.3	187° 26'	10.78 49.43
top of fillet	9.4	85°	5.42 54.79
	8.1	181° 38'	5.14 55.07
	22.9	211° 23'	5.70 54.51
Bottom of fillet	7.9	227° 08'	5.41 54.81
	11.2	10° 54'	5.10 55.11
Bottom of fillet against rock	13.6	411° 33'	5.07 55.14
			18.5 104° 29'
			18.4 103° 23'
			11.7 92° 17'
			11.7 92° 17'
			16.3 105° 17'
			15.4 130° 45'
			16.4 159° 46'
			19.8 173° 14'
			24.7 174° 38'
			24.7 174° 03'
			30.6 177° 53'
			30.6 177° 26'
			45.0 183° 45'
			45.0 189° 11'
			7.30 68.37 59.07
			7.16 61.21
			11.13 57.24
			7.39 60.78
			7.89 60.48
			12.15 56.21
			12.38 55.99
			12.43 55.94
			12.67 55.70
			12.68 55.69
			13.20 55.17
			12.84 55.53
			13.20 55.17
			12.99 55.38

(INDEX) (continued from Page-1)

2' Final Topog - El 480-482 65  
 Fillet Lt Abut 65  
 2' Final Topog Lt Abut El 82-84 66  
 2' Final Topog Lt Abut El 82-84 67  
 2' Final Topog Spillway <sup>El</sup> 4.52 to 4.7 68-73  
 2' Final Topog Rt Abut 74  
 2' Topog Surface Rock Rt Abut. 75-76  
 2' Final Topog Spillway 77  
 2' Final Topog Rt Abut 78-79

4/22/19 2'-Final Topog

14

75° West of 019 =

At A19

0.19	18.42	44.35	3.5.73
Rod 4.35			
14.40	18.0	77.30	4.38
	12.8	82.30	20.3
	8.5	92.30	16.8
	6.9	108°	15.9
	8.1	138°45'	14.4
	9.2	144°30'	19.9
	13.3	140°30'	20.1
	14.2	147°15'	14.8
	22.3	139°30'	11.9
	23.9	163°30'	9.3
	20.8	164°45'	6.2
	19.9	174°45'	5.8
	18.	178°45'	5.5
	19.2	184°30'	5.6
	21.6	185°	7.3

3.5.73

4.38

186.30

4.38

178°30'

172°45'

168°

159°45'

162°15'

160

164

149°30'

221°30'

247°15'

273°15'

283

	A 19		2 <sup>i</sup> - Final		A 19		15
	3.8	302° ✓	80.9	34°30' ✓	21.0	200°15' ✓	61.95 ✓
corner of conc.	11.0	341°45' ✓	10.4	22°15' ✓	16.3	210°15' ✓	77.45 ✓
steel corner of conc.	11.5	348° ✓	9.2	16° ✓	16.6	203°45' ✓	79° ✓
	10.3	354° ✓	7.4	19° ✓	12.6	178°30' ✓	19.7 ✓
	6.7	29°45' ✓	10.2	354° ✓	8.0	199°30' ✓	
	8.7	34°15' ✓	15.4	356°30' ✓	7.0	228° ✓	
	9.1	415°30' ✓	15.1	353° ✓	7.0	260° ✓	
	8.8	417°30' ✓	15.8	348°15' ✓	7.1	282°45' ✓	
	8.9	53° ✓	11.7	342°30' ✓	13.9	312° ✓	
	6.8	93°30' ✓	8.9	289° ✓	17.8	349°15' ✓	
	13.0	82°15' ✓	7.1	278°30' ✓	17.3	351°15' ✓	
	18.1	78° ✓	7.3	196°45' ✓	19.5	353°30' ✓	
Rod 834 436	18.4	78° ✓	7.5	176° ✓	18.9	356° ✓	
	12.9	82°15' ✓	8.9	175° ✓	17.5	354°15' ✓	
	10.6	84°15' ✓	9.6	169°45' ✓	12.1	33°30' ✓	
	11.0	64°30' ✓	14.5	150°30' ✓	10.0	46° ✓	
	9.1	51°45' ✓	16.4	191°30' ✓	11.1	53°45' ✓	
	9.2	41°15' ✓	20.0	193°30' ✓	11.1	64°30' ✓	

4/22/19 At A. 19 - 2' Final  
 Sta Grade + HI - ELE  
 Bottom of Lift up stream  
 HI 44.35 19.7 265 11.85 Bottom Form 32.50  
 Rod Keen  
 Bottom F. 22.9 249°30' 11.90 32.40

4/23/19

0 19. 8.32 44.25 35.93  
 top of Face down  
 Fillet 19.74 265.45 4.45 39.80  
 " Rock Contact 26.45 242°30' 4.61 37.44  
 Bottom Rock Contact  
 of Fillet 23.7 250° 11.74 32.51  
 top of Face down  
 Fillet 26.8 281°15' 11.59 32.66  
 top of Rock  
 Fillet 27.5 263° 11.79 32.46  
 Rod Keen

4/23/19  
 0 19. 8.32 44.25 35.93  
 Bottom of Fillet against  
 Rock 27.1 271°45' 16.0 28.25  
 Bottom of Fillet against  
 Dam 26.9 283° 16.23 28.02

4/23/19 At A. 19 Rod .25 16  
 Rod 4.25 22.3 208° 4.44 23.4 186°30'  
 4.40 ✓ 24.6 211°45' 23.6 194°30'  
 ✓ 23.6 216° 26.4 201°  
 ✓ 24.6 219° 29.4 201°30'  
 ✓ 22.4 224° 31.9 204°  
 ✓ 23.1 230° 30.9 205°45'  
 ✓ 22.9 234°45' edge flat steel 32.2 205°  
 ✓ 24.7 238°45' 4.46 29.2 205°  
 Edge flat steel ✓ 25.5 240°30' 31.4 207°  
 Rod 2.25 ✓ 26.7 225° 33.6 201°30'  
 4.42 ✓ 28.5 216° 31.9 199°15'  
 ✓ 29.4 211° 27.6 199°15'  
 ✓ 27.4 204°45' 24.8 186°  
 ✓ 25.7 202°  
 ✓ 23.2 199°  
 ✓ 23.2 191°45'  
 steel ✓ 22.6 185°30'

TOP OF CLASS A. CONTOUR 4.46

Topog	At A 19	Z'	Final Topog	17
Rod 4.25 440	18.3 89° ✓		436 19.9 94° ✓	24.6 76°45' ✓
	18.7 96°30' ✓		23.7 94°30' ✓	24.0 82° ✓
	23.0 97°30' ✓		24.5 98°15' ✓	24.6 87° ✓
	24.4 101°45' ✓		25.4 98°30' ✓	25.7 96°45' ✓
	25.4 102° ✓		27.5 103° ✓	<del>25.7 95°30'</del> ✓
	27.0 103° ✓		29.0 105° ✓	27.6 98°15' ✓
	28.9 105° ✓	Rod 10.25 434	29.2 105° ✓	28.0 102° ✓
Rod 6.25 438	29.1 104°45' ✓		26.8 102°30' ✓	
	26.5 101°45' ✓		26.4 99°45' ✓	
	24.8 102° ✓		24.8 98°30' ✓	
	23.0 95°15' ✓		23.2 93°30' ✓	
	21.7 93°45' ✓		22.6 83°15' ✓	
	20.6 92° ✓		21.7 84° ✓	
	19.0 89°15' ✓		21.0 80°30' ✓	
	18.4 78°15' ✓		20.1 77°15' ✓	
Rod 8.25 436	18.7 78°45' ✓	Rod 12.25 432	19.5 76°30' ✓	
	17.2 86°30' ✓		22.1 78°45' ✓	
	22.3 86°45' ✓		22.4 76°30' ✓	

At A 19

Set Auxil Point

Az 54°42' Dist 27.22

4/25/19

At A 19

18

Set Auxil Pt. Az 187°21' Dist 32.98

0.19	↓	8.57	144.50	35.73
Intersection Exp. to face of feller	↓	Az. 260°	27.7	4.51
20	↓		27.7	39.99
top of feller Bottom	↓	260'	27.7	5.83
top of feller	↓		27.7	38.67
Rock Contact	↓	242°17'	26.5	5.76
				38.44

A 7 A7 8.04 South.

top of fillet

19

Set Auxil. PY AZ. 313.44" Dist 2827  
 Auxil Point 2827 313.44

Rock contact. 21.3 21°30' + 0.2 60.39

Fillets D S F G Section

Rt Abutment.

set up on Auxil Point

from A7- 8.04 South.

P Rock	112	60.19	59.07
top of fillet	11.1	80°30'	54.69
Rock contact	5.8	123°30'	54.89
	10.5	194°45'	54.89
top of fillet	22.8	211°25'	54.49
Downstream face	11.1	11°	55.19
Bottom of fillet	13.6	41°	55.19
downstream face	14.7	40°15'	58.99
Bottom of fillet	11.7	2°30'	58.89
downstream face	21.7	15°00'	59.49
Bottom of fillet	21.8	13°45' + 0.2	60.39
downstream face	21.3	21°30'	59.19
Rock contact			

4/28/19

At. Auxil. Pl. trim A19

A Prel Estimate.

019-1574

Rod 229

454

face of  
concrete

6.90	56.29	49.39	
5.6	132°15'	430	41.8 85°15'
7.6	111°31'		39.1 83°15'
8.4	128°30'		38.3 75°15'
12.5	123°30'		35.4 74°45'
14.4	125°		30.6 84°45'
18.8	113°30'		33.9 92°30'
24.2	113°30'		28.0 102°30'
30.5	107°		19.6 107°15'
35.0	99°15'		19.5 107°45'
41.2	97°30'	concrete	17.5 119°30'
48.9	87°45'	concrete	7.2 95°
54.0	82°30'	concrete	6.7 32°
55.0	79°	steel	5.5 23°15'
51.0	84°	Rod 1229 H46	7.5 70°
45.1	86°15'	steel cone	7.4 23°30'

4/28/20

446

7.5	41°30'
9.2	76°30'
9.2	82°
17.5	87°30'
21.1	82°
26.3	81°15'
30.4	71°15'
39.6	74°
40.3	79°30'
50.0	77°
58.0	73°30'
41.3	73°
42.2	66°30'
42.7	61°30'
37.7	152°
36.2	62°

Rout  
concrete

20



4/28/19 Av. O. 19

sign 0.21  
with 180°

0.19		
Rod 9.33		
432	18.0	287°30'
	19.5	283°
edge of cut.	28.3	276°
	31.0	267°45'
Rod 8.33		
436	19.4	265°15'
edge of cut	27.0	267°30'
	31.4	261°50'
Rod 1.33		
440	20.6	258°30'
	22.0	252°30'
	22.2	256°
edge of cut.	25.8	256°15'
	31.5	257°
	41.2	255°30'
	42.4	260°
	47.2	261°45'

APPR. ESTIMATE

4/28/19 class 4.

April Estimate

21

18 X 1 X 50	=	900	=	✓
18 X 3 1/2 X 23	=	1419	=	✓
18 X 2 1/2 X 16	=	720	=	✓
18 X 3 X 10	=	540	=	✓
18 X 1 X 25	=	450	=	✓
27) 4059 (150.3 @ 7 ft.)				
27				
135				
135				
90				

Estimated class of  
left abutment  
above 2' contours.

4/27/19

Final. 2'

topog  
H234.97

LT. Abut.

24

Set on Axial pt from

A19 (Dist 27.22 Angle 54°42' from A19)

O 19 8.66 44.59 35.93

L.P. on Rock 12.58 32.01

H2 3A 97  
Rod 497  
4.30

296 34.97

14.2 277°30' 4.30 15.2 143°

13.3 271°30' 13.9 153°30'

11.5 270° 15.2 152°

10.3 268° 16.2 151°45'

7.7 244° 18.7 142°30'

9.3 232°15' 20.8 132°

7.3 241°15' 21.9 134°30'

6.3 240°30' 25.1 125°30'

10.8 215°30' 25.4 122°30'

9.5 216°15' 26.3 120°

11.2 194°30' 23.5 113°45'

9.7 174°45' 27.7 110°

13.3 137° 51.8 106°15'

Rod 2.97  
4.32

33.9 109°15'

30.1 116°

27.7 123°30'

27.0 131°30'

23.9 139°15'

22.9 163°

20.1 163°45'

18.0 169°15'

10.8 172°30'

11.7 190°

18.7 207°

14.0 219°

13.7 222°30'

15.1 234°

15.3 241°

14.4 246°

15.1 258°

A 32. 13.4 257°30'

ofd cone 16.9 257°

exp joint 18.5 264°35'

check shot

O 19. 106°30'

4/30/19. ~~Right~~ <sup>Left</sup> Abut. A.T. Auxil Pt. A.19  
 (A.Z. 18721 Dist. 32.98)

HT 32.18			
C-21	10.46	56.18	45.72
Rid. 10.18		46.10.18	
4.46		✓	
lip 1/8"	10.7	294	✓
steel edge			✓
flat steel	8.0	276.45	✓
	6.5	291.15	✓
	8.3	322.30	✓
	7.6	352	✓
steel			✓
	8.5	10°15'	✓
11	7.4	16°45'	✓

4/30/19. At. Auxil A.19  
 (A.W. A.19)  
 Estimate

C-21	10.46	56.18	45.72
Top Block #2		50.53	50.53
AT Auxil SE A.19			
contraction joint + down stream face of dam.			
tp.	27.5	434.25	432
"	10.73	351.21	50.2 429.23

4/30/19 Concrete Estimate April 1919

Block # 12

Left Abutment.

P.T. on 323 R. = 5+42<sup>60</sup>

Upstream Face 1<sup>st</sup> Contr Joint = 4+93<sup>88</sup> on 323 R.

for D.S. Face set on Auxil Point

South East of A-19 dist 2722

Az Lt 54° 42'

From Auxil Point to Inter section

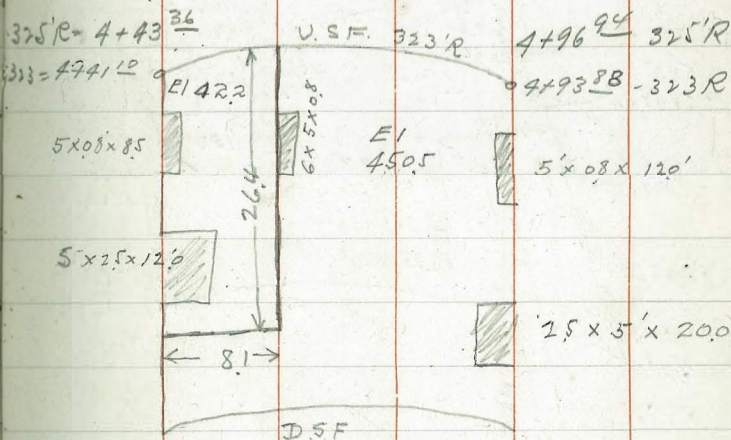
1<sup>st</sup> Contr Joint + D.S. Face dist = 1075

Az 351-21'

EI for 1<sup>st</sup> Block North of 1<sup>st</sup> Joint

East of Steel = Ele 430<sup>00</sup>

West of Steel = Ele 438<sup>20</sup>



Block (# 11) = { # 17 24  
# 18

Station North = 4+93.88 on 323'

Station South = 4+41<sup>10</sup> on 323'

Average EI = 450.5

END Inspection Gallery EI 450.5

5x0.8x12.0 = 48.0  
2.5x5x20 = 250.0  
2.5x5x12 = 150.0  
5x0.8x8.5 = 36.0  
6x5x0.8 = 24.0  
26.4x8.1x8.5 = 1714.7

22829.84.5 say Deductions  
212  
122  
188  
149

Compute from EI 438

to 450.5

4/30/19 April Concrete

Block (# 10) = { #15  
#16

$325R = 348886$

$3+86 \frac{71}{00323}$

U.S.F 325R

$325 - 4 + 43 \frac{36}{00323}$

$4 + 41 \frac{10}{00323}$

Bench # 8

$\frac{1}{2} \cdot 43344$

5'x08'x

5'x08'x88'

51.7

15.8'

13.4

15.6

8#9

2.5'x2.5' x 8'

438.5

15.2

15.0

5'x5'

2.5'x2.5'x4'

484.3

3'x3'x4'

5.3'

430.80

3'x3'x3.5'

3'x3'x20'

3'x3'x10'

8'x10'x350'

8'x12.5'x210'

8'x10'x150'

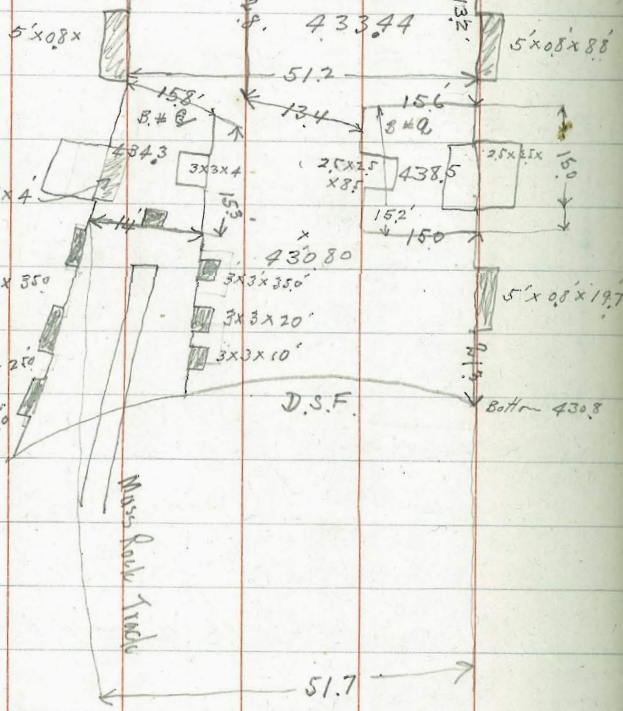
5'x08'x19.7'

D.S.F.

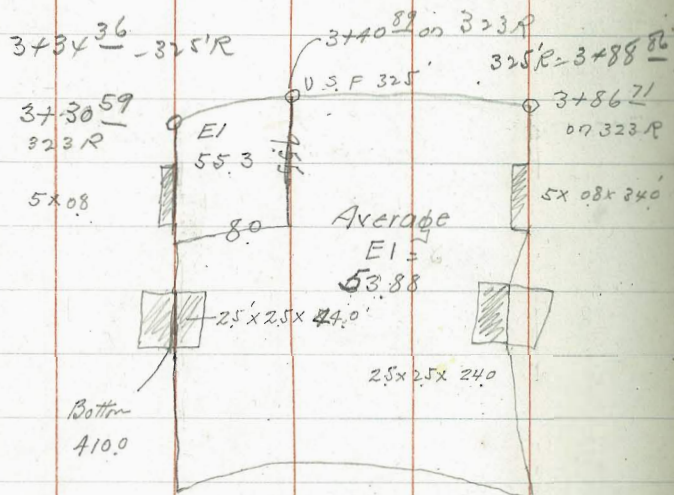
Batter 430.8

North-South Trade

51.7

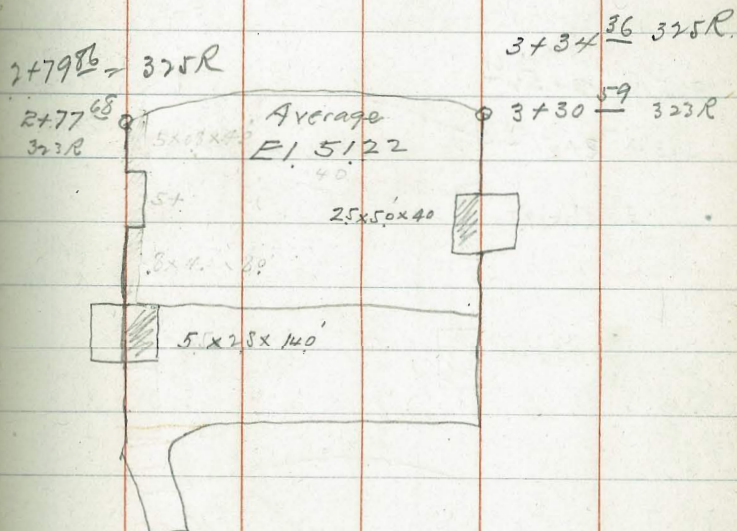


4/30/19. Block (#9) =  $\begin{cases} \#13 \\ \#14 \end{cases}$



3+40 <sup>89</sup>  
 13 <sup>00</sup>  
 3+27 <sup>89</sup>

Block (#8) =  $\begin{cases} \#11 \\ \#12 \end{cases}$



Block (# 7) = #10

$$345'R = 2 + 52.61$$

$$323'R = 2 + 51.09$$

5' x 0.8 x 19.7

5' x 2.5 x 19.5

Average EI

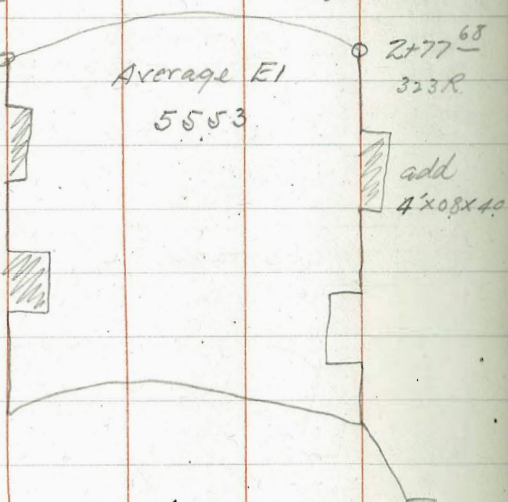
55.53

$$325'R = 2 + 79.86$$

$$277.65$$

323R

add  
4' x 0.8 x 40



Block (# 6) = #9

27

$$325'R = 2 + 75.36$$

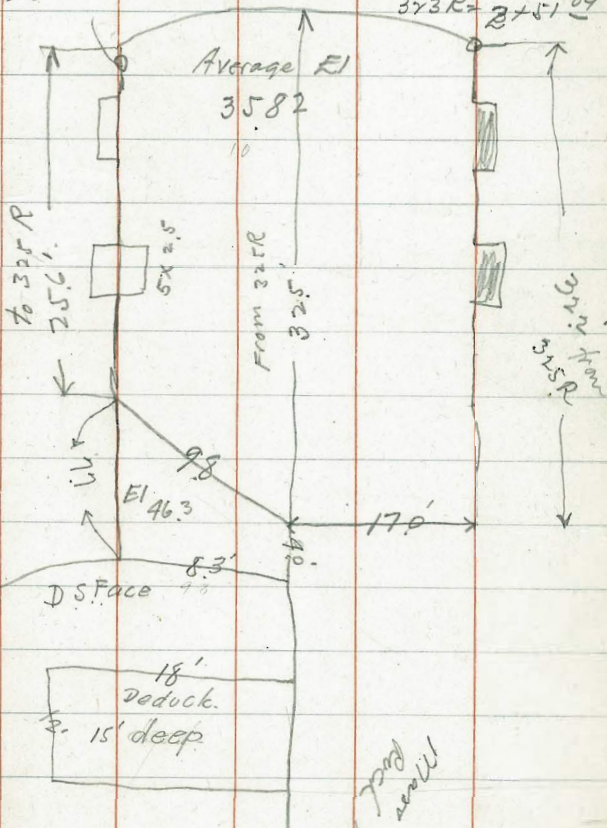
$$323'R = 2 + 23.19$$

No deductions 325R = 2 + 52.61

$$323'R = 2 + 51.09$$

Average EI

35.82



Block (# 5) = # 8

1498<sup>11</sup> - 325'R

1496<sup>43</sup>  
323R



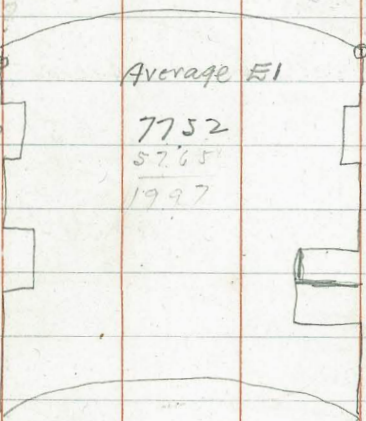
Block (# 4) = # 7

325'R = 1470<sup>86</sup>

323R 1470<sup>88</sup>

5x08x210

3x3x210



1442<sup>79</sup>  
2725  
1470<sup>04</sup> 545 28

R 325 = 1498<sup>11</sup>

Average FI

1496<sup>43</sup>  
323R

7752

5765

1997

5x08x200

3x3x110

25x5x90



325R = 1443<sup>61</sup>

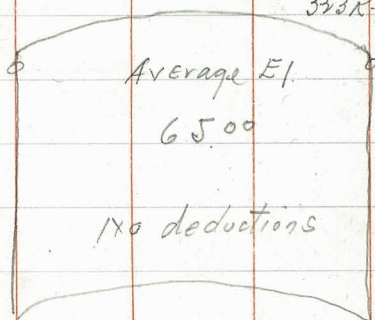
323R = 1442<sup>79</sup>

77.35  
12.45  
64.9

Block (# 3) = # 6

325R = 1470<sup>86</sup>

323R = 1470<sup>18</sup>

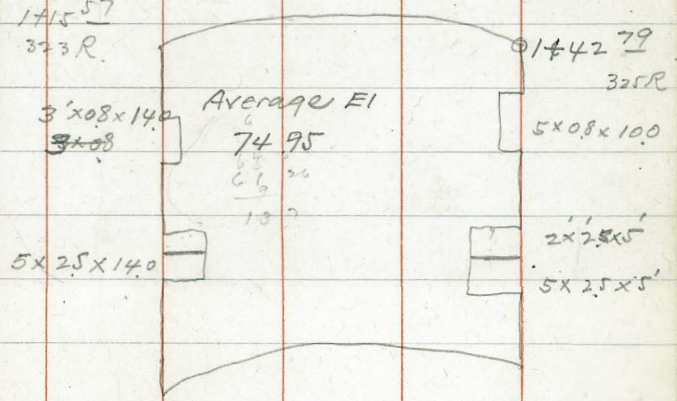


Block (# 2) = # 5

1416<sup>36</sup> 325R

325R = 1443<sup>61</sup>

1415<sup>57</sup>  
323R



4/30/19

Block # 1 = # 4

Average Ele. 6126

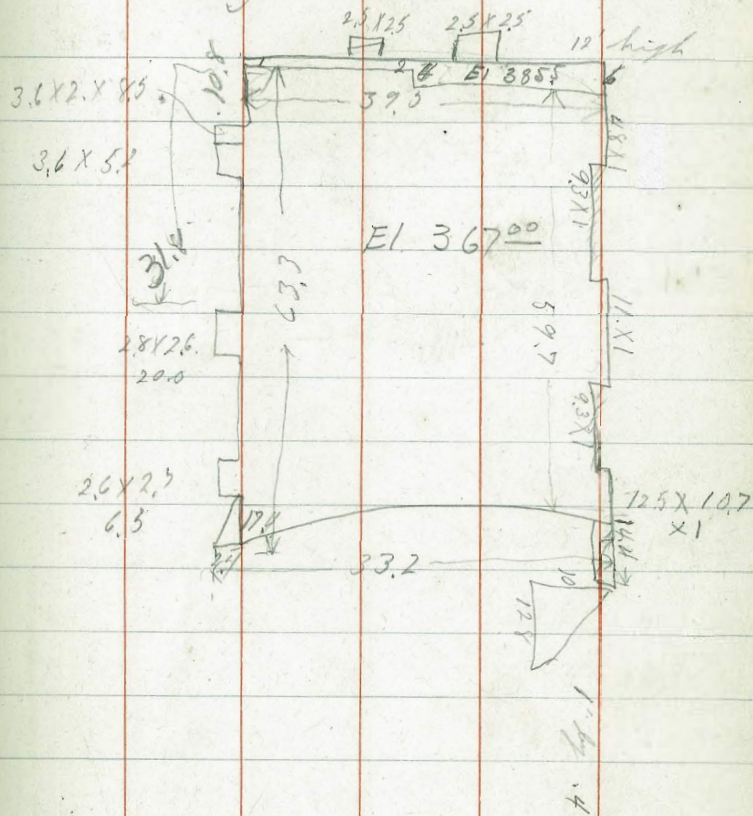
Sta 0+89<sup>63</sup> to (1+15<sup>51</sup> 323R)  
(1+16<sup>36</sup> 325R)

4/30/19

30

Mass Rock Recess

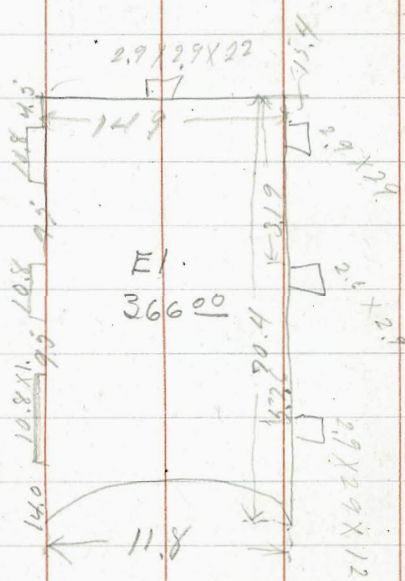
Right Abutment



4/20/19

Moss Rock Recess

Lt. Abutment



5/1  
19.  
#141.43  
0 19.  
Rod 943  
432.

At 0 19.

31

29.7	0 21	with	180°
3.50	41.43		35.93
21.8	278°45'	43A	49.4 262°
27.8	274°45'		44.9 261°45'
29.3	271°		44.4 260°45'
30.7	266°		40.1 259°30'
32.0	264°45'		38.7 259°45'
34.1	261°		35.7 258
34.7	258°		33.6 258°15'
43.4	261°		34.7 257°45'
45.0	264°		34.1 259°45'
45.2	263°30'		29.6 261°15'
47.5	262°45'		29.4 263°15'
47.1	265°30'		24.0 268°45'
49.8	267°45'		19.9 269°30'
Rod 943 434	51.5	266°20'	Rod 543 436 19.8 265°
	48.7	265°30'	24.8 263°45'
	48.2	263°	23.6 263°15'

5/5/19 At. O 19.

436	27.8	260°45'	438	30.8	255°45'
	29.8	260°15'		30.5	259°
	30.7	237°30'		27.6	257°
	34.6	258°		27.0	260°15'
	36.2	257°45'		22.2	258°15'
	46.3	261°		19.9	256°
	47.1	261°30'			
	48.8	263°30'			
	49.6	264°15'			
	49.9	265°30'			
Rod 343 438	54.4	267°			
	50.8	266°			
	50.9	264°30'			
	49.4	264°			
	47.0	260°45'			
	<del>38.0</del>	261°			
	37.1	257°			
	34.3	237°30'			

5/5/19 At. O 19 - 15' N. 32

O 19-15N. 4.80 54.19 49.39

At O 19-15N. Set 967 021 with

180°

Set Auxil. Pt. Az. 270° Dist. 49.2

At. Auxil Pt. from O 19-15N.

O 19-15N. 0.66 50.04 49.39  
HT. 50.04  
Rod. 10.4

440	29.3	73°	440	7.6	50°
	28.9	70°15'		10.4	41.2
	25.3	71°15'		8.4	29°15'
	21.8	70°45'		7.2	19°
	19.0	73°30'			
	19.5	77°45'			
	17.6	72°30'			
	13.4	66°			
	12.3	63°			

5/6/19

At. A. 19

Sight pt. on N line with 180°

Bottom of filter	1207	444.07		432.
Top of dam	17.45	211°13'	5.19	438.88
Bottom of filter				
Rock contact	22.73	209°45'	4.93	439.14

Note Forms tore out  
May 8-19.

5/11/19

At. A. 19 82942 0.19 33

Grout Hole Lt. A but. with 90°

0-19	835	44.28		35.93
Grout Hole			5.48	38.80
Dist. Az.	187.5	147.55		

	A t.	Auxil.	pc from		
		0-19	-15'N		
Dist	49.2	5.4	0-19'15"N		
with	95°				
019-15'N	.26	49.65	49.39		
HT					
49.65					
Rod 9.65					
442	32.7	88°45'	442	6.5	25°
	25.2	82°15'		7.0	9°45'
	20.7	81°45'		8.3	343°30'
	19.6	93°45'		10.3	337°45'
	14.5	87°		12.1	342°
	12.5	87°15'		13.5	326°15'
	10.6	88°15'		15.8	325°30'
	9.3	84°		16.0	332°30'
	8.8	77°		20.2	334°30'
	10.5	77°30'		20.8	321°30'
	11.7	75°		21.0	310°
	11.5	67°30'		10.7	313°30'
	7.9	58°30'		14.6	288°
	8.2	40°45'		2.1	273°30'

offset  
 5/2/19  
 0

	A t.	Auxil.	from		
		0-19	-15'N	34	
HT 49.65	442	6.9	211'	444	11.2
					203.30
		11.4	230°30'		106
					216°
		14.2	221°30'		7.4
					193°30'
		13.6	212°		7.5
					150
		18.4	231°		2.12
					199
		21.6	237°30'		8.5
					316°30'
		21.0	255°		7.2
					348°
		24.4	254°45'		6.1
					18°30'
		26.5	248°		5.3
					52°
		28.8	255°		6.7
					58°45'
		29.5	251°		7.9
					74°15'
		27.7	245°		11.4
					95°30'
		25.3	234°30'		15.1
					106°
		26.0	231°		20.7
					97°30'
		22.1	225°		22.3
					87°
		18.6	223°30'		33.3
					87°
		13.0	202°30'		

steel  
 565 Rod  
 444

offset  
 5/11/19  
 0

At. Auxil. from 019-151

019-151  
Rod 360  
446

448 14.6 175°45'

.23 49.62 47.39 15.6 159°30'

30.0 93° 26.5 235°30' 14.5 151°

26.5 92° 29.1 246°45' 20.4 136°15'

23.8 93° 29.9 249.15 21.0 129°45'

23.4 98°45' 448 Rod 162 23.1 123°

19.6 102° 30.3 247°45' 22.3 117°

21.0 115°30' 29.3 247° cone 23.7 112°

19.6 123°30' 29.0 231° cone 23.1 110°15'

19.6 124°30' 30.3 223° cone 23.5 106°30'

11.4 160 27.5 218°30' 22.3 104°

8.6 164 28.4 113°30' 25.4 109°15'

8.0 189°30' 26.1 206°30' 25.4 97°

11.2 200 18.1 207°30' 27.9 95°45'

14.4 196°15' 17.0 197°

19.9 217° 18.8 195°15'

26.8 218° 18.5 177°

29.7 227 17.3 182°30'

P  
10/11  
10/12  
10/19

P  
10/11  
10/12  
10/19

5/13/19		A.L. A. v. L. P. from E-3		Surface Rock						36
HT 83.60	11.97	83.60	71.63	15.2	255°	478	3.4	107.45		
E-3				16.4	230°15'		3.9	159.30		
Rod 11.6	2.55	2.28°	50.5	12.3	226°		6.9	201°45'		
472			151.15							
Surface	17.9	219°30'	41.8	6.9	191°30'		10.1	235°30'		
Rock	17.6	217°	30.7	4.0	152°15'					
	11.2	217°30'	21.8	4.7	125°15'	Rod 36 480	33.2	76°30'		
	8.4	198°45'	15.8	7.9	72°15'		20.4	88°		
	6.2	178°45'	7.4	14.7	55°		28.5	114°		
	6.2	126°	5.0	22.0	83°15'		29.7	122°15'		
	8.7	75°30'	5.2	31.2	135°30'		34.8	137°		
	16.1	62°	7.1	38.9	140°30'		39.1	142°30'		
Gap	17.8	88°30'	10.1				48.2	142°30'		
	17.1	103°	12.5	38.9	140°30'		50.0	149°30'		
	22.0	120°	18.1	31.2	134°45'		55	150°15'		
ofd cone.	23.8	124°15'	18.8	33.9	69°30'					
	30.8	135°30'	19.7	15.5	53°15'	Rod 482	36.6	127°30'		
corner of cone.	41.3	148°30'	194	7.3	70°30'		34.3	136°15'		
Face of wall.	50.5	151.15		4.6	99°		27.1	119°15'		

E-3  
 Gap  
 Plotted  
 5/13/19

Plotted  
 5/13/19

Rod 56  
 478

Gap

Surface

corner of cone  
Face of wall



At Auxil Point from C.3  
Surface Rock.

29.1 99.15

32.9 77.45

Plotted  
3/3/19

At Auxil Point from 0-19-1517.

37

Sight 019-1517 90° Lt.

0-19 R-225		1232	48.25 ✓	3593 ✓
RC 446	10'	108-	✓	
RC "	7.0	111-15	✓	
RC "	4.8	82-45	✓	
" "	2.8	56-30	✓	
" "	5.1	52-45	✓	
" "	5.1	4-30	✓	
" "	2.0	30-15	✓	
" "	5.7	116-30	✓	
" "	10.2	121-30	✓	
" "	10.5	109-30	✓	
Top Rock	8.9	108-30	✓	116 4709
Top Rock	4.3	49-15	✓	116 4709
RC 448	9.4	179-15	✓	
" "	10.1	167-15	✓	
" "	8.9	171-15	✓	
Top Rock	9.3	171	✓	+0.3 48.55

7/14/19 AT 0-19 Pinal topog. 9/14/19 AT Auxil from A 19 38 N.W.

Sight 021 180°

0.19	5.48	41.39	3590
R 00 739 434	16.4	273°19	436 19.5 263°
	18.7	268°30	16.8 260°30
	25.1	256°45	438 17.7 251°45
	27.3	256°	21.1 237°15
F.W.	29.2	266°45	22.6 253°
F.W.	26.2	263°	24.3 253°30
	24.7	261°	26.2 251°30
	24.3	264°	29.9 253°
F.W.	25.0	265°	F.W. 32.6 254°30
	20.9	265°30	
5.39 Red. 436		R 00 739 A 40	37.8 252°
F.W.	31.3	256°	38.6 251°
	30.9	254°	31.9 250°
	25.0	253°45	28.0 248°30
	25.1	256°	26.2 249°30
	21.0	258°30	23.6 252°30
			17.7 240°45

Sight B 21 0 AZ. Letz

B 21 133 56.43 55.10

10.68 45.75

Top of form 12.63 127°30 ✓

Bottom of forms 12.62 127°30 ✓

Top form Rock cont. 7.2 121° ✓

9.66 46.77

17.60 38.77

9.49 46.94

5/15/19.

A.L. O 19-15 N

A. Auxil. from A. 19. NW. 39

9/16/19. sight B 21 O AZ LOT

Grout  
Hole.

36.7 233°30'

O. 19-15 N	46	53.99		49.39
top of tiller				
against top D.W.	27.1	291°45'	14.94	39.05
top of tiller rock				
contact.	24.5	289°	14.94	39.05
Rock contact				
bottom of slope	28.9	279°	14.94	39.05
of D.W.				
Bottom of				
tiller.	29.9	278°	13.02	40.97
top of				
tiller.	30.3	279°30'	10.45	43.54
top of tiller	30.1	273°30'	10.24	43.75
top of tiller				
Rock cont.	27.5	272°15'	10.24	43.75
top of tiller				
against D.W.	30.9	275°45'	7.03	46.96
Bottom of				
tiller against D.W.	30.3	275°15'	10.45	43.54
Bottom of tiller				
Rock cont.	29.6	265°45'	10.60	43.39
Bottom of				
tiller rock	28.5	260°	6.70	47.29

9/16/19

A.T. 0 19-15 N

9/16/19 A.T. B 21

40

	8 09 58	0 21	with	180°		8 09 58	0 21	with	270°
0.19-15N	4.75	54.14		49.39	✓	B 21	4.28	59.38	53.10
top of filler against Rock	28.6	259°	7.34	46.80	✓	bottom of filler			
top of filler against DW	31.7	276°	7.34	46.80	✓	face of dam	36.2	37°	12.42
beginning of GS.	35.8	265°	7.34	46.80	✓	bottom of filler			
bottom of filler faced	31.2	256°	7.11	47.03	✓	rock cont.	31.6	44°	11.95
bottom of filler Rock cont.	28.6	253°	7.11	47.03	✓	top of filler			
top of filler						face of dam	36.1	37°	8.49
face of Dam	34.4	252°	7.30	53.84	✓	top of filler			
top of filler						rock cont.	21.1	45°	8.65
Rock cont.	29.8	246°	1.30	53.84	✓				

Plotted 9/16/19

Plotted

5/21/19

	A.C. M. 22, sight										
M 23.	with 150°										
set	Aux	35° 39'	D. 57.27.9	452	4.1	315°	454	14.6	35.5°		
M-23.	254	74.09	71.55		16.1	293° 15'		17.1	5° 30'		
			1244	61.45		19.0	295° 30'	18.9	4° 45'		
Aux	375	<del>63.23</del> 64.20				22.5	293°	22.9	14°		
4.57	34.3	294°	4.50	28.0	141°	24.2	292°	24.9	18°		
	29.9	293° 30'		21.3	14°	28.5	291° 15'	27.0	22°		
	27.3	294° 30'				32.7	292° 30'	27.0	24°		
	24.3	299	<del>Rod. 12.2</del> 4.56	30.3	19° 30'	<del>Rod. 12.2</del> 4.54	32.7	291° 30'	<del>Rod. 8.2</del> 4.56	27.0	24° 30'
	24.4	305° 15'		28.4	15° 30'	29.1	290° 30'	25.2	22° 30'		
	22.5	307° 15'		25.3	15°	26.2	290	23.7	17° 45'		
	21.0	308° 30'		21.5	6° 15'	22.5	291° 45'	21.5	17° 45'		
	18.4	330°		21.2	0° 45'	20.0	290° 30'	19.5	16° 45'		
	23.1	340° 30'		22.7	8° 30'	17.0	282° 30'	18.0	16°		
	23.0	248°		21.4	34° 5'	12.8	284° 45'	13.7	11° 30'		
	22.0	2° 45'		16.6	337°	11.8	310° 45'	13.5	8°		
	25.5	7° 30'		16.0	329°	12.2	322° 30'	11.0	339° 30'		
	25.1	12° 30'		14.6	328° 45'	13.2	41°	9.5	314° 30'		

5/19/19.

7409

~~438 10.3 285°~~  
~~13.8 284°~~  
~~17.2 283°15'~~  
~~17.9 284°15'~~  
~~18.5 289°~~  
~~22.6 286°45'~~  
~~25.8 289°15'~~  
~~29.7 289°30'~~

65.24

Top of fill at  
 Face of Dam. 28.9 294°30' 10.45 53.89  
 Bottom of  
 fill at face of 28.7 294°30' 14.42 50.82  
 top of fill at  
 Rock cont. 27.2 290° 10.55 54.69

5/17/19

87 AVX room M22, W

R. 1124	65.24	R. d 1124		
452	33.5	292°30'	454	32.4 21°30'
	30.5	292°		29.3 22°30'
	28.9	292°30'		26.5 15°30'
	22.0	293°30'		23.1 13°
	17.9	291°		20.2 7°15'
	17.2	298°		18.9 1°30'
	20.0	297°		21.7 34.9
	19.1	318°30'		17.5 34.8°
	17.7	332°		15.9 34.4°
	22.7	341°		13.0 35.4°30'
	22.8	341.8°		13.2 32.8
	21.7	2°		12.0 311.4°
	24.8	9°15'		13.3 289°30'
	25.0	15°30'		17.6 28.8
	28.8	15°15'		21.4 292°15'
	30.7	14°30'	Top filled Rock	26.9 291°
	31.4	15°30'	F. of fill 12.32 Rock cont.	52.92

Plot road

5/22/19

5/17/19		AT Auxil from M 22	
Face down			
Bottom Flt	28.7	290°30'	27.1 241°
	32.1	272°	
9.24	33.3	291°30'	
456	31.0	291°30'	
	29.0	290°	
	26.4	290°	
	23.1	291°30'	
	19.2	290°	
	17.2	284°	
	12.0	285°45'	
	11.5	325°45'	
	12.2	3°30'	
	14.1	11°	
	14.6	4°	
	17.7	13°30'	
	19.2	12°15'	
	21.5	16°30'	
	24.2	17°	

Plotted

5/21/19

5/21/19		AT Auxil from C.3		L3	
C.3	12.13	83.76		71.63	
Rod. 1.76					
482.	17.3	184°5'	480.	38.9	140°
	13.6	36°		35.1	136°45'
	20.7	35°45'		33.1	128°30'
	29.0	37°30'		32.4	121°
	35.3	38°30'		32.6	102°30'
gap →	45.0	68°15'	Blue.	34.7	93°15'
Blue.	40.2	76°30'		36.4	84°30'
	36.7	84°45'		40.2	79°
	34.0	97°		44.9	68°15'
	32.7	107°30'	gap →	35.3	39°30'
	33.0	122°30'		30.3	39°
	35.8	135°		23.5	38°30'
	37.8	134°		19.1	38°30'
	36.9	130°45'		13.0	42°30'
	34.7	117°30'		8.8	33°15'
				13.9	12°

Plotted 5/21/19

5/24/19.

At. Aux. C-3

Rod. 5.76  
478

9.8 241.30

7.9 209°

6.1 192°

3.4 119°

4.9 96°30'

10.3 54°30'

19.3 41°45'

24.0 42°30'

28.9 41°30'

old cone.

34.8 40°30'

" "

35.6 45°15'

" "

37.0 45°45'

Gap. →

45.0 67°45'

40.9 75°15'

36.7 84°45'

34.5 93°45'

32.3 106°45'

old cone 32.2 132°

" " 33.1 135°

" " 33.0 132°

feco. cone. 34.5 137°30'

" " 38.7 140°15'

Rod 9.76  
4.92 feco. cone. 39.1 140°30'

34.1 136°30'

old cone. 32.3 129°45'

" " 31.6 124°15'

" " 32.2 121°

33.3 107°45'

33.5 99°30'

36.5 86°

40.0 77°

43.3 72°

37.6 47°

35.7 47°30'

35.4 47°15'

At. Aux. C-3.

44

old cone 34.7 433°

feco. tree. 33.3 412°

29.5 42°45'

22.8 44°

17.0 48°

9.0 62°45'

4.7 122°30'

4.3 154°

7.2 189°

9.0 210°30'

12.5 234°30'

16.5 277°45'

15.5 253°45'

Rod 9.76  
474. 20.1 250°30'

20.2 236°

19.8 232°15'

20.0 228°

18.7 224°45'

433° 174

18.1 221°

11.7 222°30'

8.5 202°30'

7.2 191°15'

5.4 173°30'

5.0 129°

5.8 81°

11.8 60°30'

19.6 37°30'

9.0 210°30' feco. cone.

23.6 43°15'

12.5 234°30' old cone.

31.3 49°45'

16.5 277°45' Gap. →  
42.6  
~~32.6~~ 82°

15.5 253°45'

37.9 99°30'

36.7 84°45'

20.2 236°

36.0 86°30'

19.8 232°15'

35.0 91°30'

20.0 228°

33.7 94°30'

18.7 224°45'

33.8 97°

5/24/19

Plotted

feco. cone.

Gap. →

Rock



5/21/19	At	At	472	6.7	159°15'
474	32.6	112°30'	472	6.7	159°15'
Rear face	31.4	119°30'		8.8	192°30'
Old cone	30.0	121°45'		10.2	199°30'
4.30 cone	31.4	135°30'		12.3	213°30'
Rod 11.08 face cone	472	31.4	135°	15.8	213°
Cone	30.4	129°45'		18.5	214°30'
	29.5	125°30'		21.1	220°
Rear face	30.9	117°30'		20.7	231°
	29.8	109°		21.7	237°
	31.5	118°45'		22.3	244°30'
	31.9	100°15'		23.5	247°30'
	33.5	95°30'		21.4	265°
	33.5	91°30'			
Gap face	294	47°30'			
	22.4	49°15'			
	196	54°			
	11.0	72°15'			
	7.1	136°45'			

At Auxil	from C-3.	65				
	83.76					
T.T.P.	12.85	70.91				
Auxil. point	from Auxil.					
point.	from C-3.					
A.Z. =	129.25	Dist 25.25				
A.T. Auxil. pt.	from Auxil. pt.	from C-3.				
T.T.P.	0.17	70.08	70.91			
Rod 11.08	460	38.0	251°	460	15.5	249°45'
	36.6	250°		18.8	254°30'	
	36.8	252°30'		8.6	240°30'	
	31.2	253°		9.8	219°	
	28.5	246°30'		10.7	201°15'	
	25.2	249°45'		11.9	200°30'	
	22.9	255°		12.7	223°30'	
	20.3	258°30'		16.6	225°45'	
	20.6	252°15'		19.2	220°30'	
	18.3	242°30'		16.0	206°45'	

Plotted  
 5/21/19

Plotted  
 5/21/19

At	500	From	Auxd.	From	23.
5/1/19	460.	11.5	189°	462	24.4 184°31'
		18.8	188°30'		20.4 184°15'
		19.3	186°		17.2 186°45'
		24.5	185°30'		15.9 188°
		32.8	192°		14.8 187°15'
		36.1	187°45'		12.7 194°15'
		38.4	185°		11.5 193°
		38.7	182°		9.5 193°15'
		43.8	181°15'		8.2 204°
Rod 9.08 # 62		40.4	181°15'		5.4 216°45'
		38.0	182°35'		8.0 258°30'
		37.1	182°30'		8.4 270°
		36.7	183°15'		11.2 312°
		34.6	187°15'		14.9 300°30'
		30.3	187°		15.9 298°
		29.4	185°		16.2 289°30'
		27.1	185°		16.0 283°30'
		25.7	184°		19.1 266°30'

Plotted

5/21/19

At	Auxd	From	Auxd.	From	e-3
5/1/19	462	20.0	263°	464	12.0 288°15'
		22.8	257°30'		13.1 182°
		24.6	255°		16.7 181°
		29.9	260°		18.7 180°15'
		35.0	253°		18.7 180°15'
		39.6	252°45'		18.6 174°30'
		41.4	255°		14.3 173°30'
		36.2	254°30'		12.3 184°30'
		32.8	257°30'		11.3 181°15'
		29.7	264°30'		11.3 174°30'
		19.8	272°30'		4.4 158°15'
		16.0	304°		1.0 217°
		12.4	325°30'		0.0
		8.8	344°30'		9.7 12°30'
		4.3	287°		10.7 349°
		4.4	253°		12.3 357°
		5.5	184°		10.2 339°30'
		9.9	184°45'		12.2 336°

Plotted

5/21/19

corner  
of  
con e.  
Rod 5.08

corner  
con e.

Rod 9.08  
# 64

At Auxl from Auxl			
466	156	337°	468
	18.7	326°	
	16.7	316°	
	16.9	29°30'	
	18.0	288°	
	28.8	269°	
	31.7	267°	
	36.1	257°30'	
Red 308	468	242°	
	31.4	268°	
	26.1	278°	
	21.1	288°30'	
	19.2	292°	
	17.7	314°30'	
top Rock	21.1	338°	
	22.8	353°	
	24.9	1°	
	21.9	354°	

at Auxl from Auxl from e 347			
471	7.5	493°	
	8.1	29°	
	12.0	21°	
	14.3	9°	
	18.7	23°	
	18.7	14°	
	21.5	15°	
	22.7	5°00'	
	33.0	358°30'	
	32.7	352°30'	
	29.7	352°30'	
	22.3	341°	
	18.2	314°	
	18.6	302°	
	22.3	292°	
	25.5	283°	
	32.3	280°	
	33.3	267°	

Plotted

Plotted

5/21/19

Add Trench 3 x 3 x 0 = 3 cy

Gap →

5/21/19

Face conc.

corner conc.

470

Face conc.

5/21/19 Mt. Dox. Ct. from road from C-3  
 71.58  
 top of tiller ✓ 82  
 Fore Dam ✓ 252° 5.27 62.81  
 Rock corner ✓  
 top of tiller ✓ 261° 8.37 62.75

Plotted 6/7/19

Set upon 93.96 52957 48  
 cross on wall with 180°  
 325' line (65.11)  
 Elev contraction joint? 88.39  
 T.P. ✓ 3.04 70.44 67.40  
 End cont joint. ✓ 24.0 77° 5.33 65.11  
 against old cone.  
 top form Down ✓ 20.4 87° 5' 300 67.44  
 stream face.  
 Top form corner ✓  
 at tiller old cone 22.8 84° 15' 300 67.44  
 top old cone. ✓  
 tiller. 0.13 70.31  
 " " ✓ 22.9 84° 0.82 69.52  
 corner in old  
 cone. ✓ 24.8 81° 30' 0.25 70.19

Grout Hole & Fillet  
Rt Abutment

5/26/1921 Final Topog Rt Abut. 49

C.3	1065	8228	7163	C.3	20.3	73.66	71.63
				TP. Rock	317	71.31	552 68.14

0+85 <sup>±8</sup>  
27 <sup>35</sup>  
057 <sup>93</sup>

Platted

At Auxil Point from C.3

Face Dam					
T. Fillet	99	108°40'	✓	1227	70.01
B. Fillet	99	108°40'	✓	17.07	65.21
T.F.R.C.	8.1	94°36'	✓	12.3	69.98
B.F.R.C.	8.8	102°	✓	1707	65.21

2735

Set on 323' line Sta 0+57 <sup>93</sup>

Sight 0+85 <sup>25</sup> for 180° Lt for A2  
Rod 5.31  
466

471.31

Grout Hole	17.3	85-30	✓		
				38.1	142-30 ✓ 466 00 00 ✓
				Face old Con	
				Contact Rock 312	141-45 ✓ " 45 354-45 ✓
				466	240 140-45 ✓ " 203 12° ✓
				466	2nd 143-30 ✓ " 189 7.30 ✓
				"	132 128° ✓ " 228 4.0 ✓
				"	96 123-15 ✓ " 230 00 ✓
				"	119 150-45 ✓ " 197 3-30 ✓
				"	11.1 162 ✓ " 176 358 ✓
				"	44 131-30 ✓ " 150 356-45 ✓
				"	46 171 30 ✓ " 7.3 338° ✓
					30 285-45 ✓

5/26/19		2' Final Topog Rt Abut				2' Final Topog Rt Abut.				50
B KI		At 0+	57.93	-	373-112	R <sub>2</sub> 131	At 0+	57.93		
			<sup>H.I.</sup> 471.31		21.9	8-15 ✓	A70	12.6	81-30 ✓	
Rod=7.31										
DC	464	DCnt. 7	342 ✓	468	22.5	6-30 ✓	"	12.7	62-15 ✓	
	DC 464	65	358 ✓	"	22.6	359-15 ✓	"	17.6	51-30 ✓	
	DC	120	354-30 ✓	"	20.4	0-30 ✓	"	18.5	49-30 ✓	
				"	15.5	354-30 ✓	"	19.7	41-30 ✓	
R = 3.31				"	8.8	335-45 ✓	"	22.0	39.0 ✓	
old con.	468	381	142-30 ✓	"	3.3	277-30 ✓	"	23.9	28.0 ✓	
R.C.	"	31.9	141-45 ✓	"			"	26.3	20-30 ✓	
	"	23.5	138-30 ✓				"	23.8	14-30 ✓	
	"	19.6	129-0 ✓	Rod 131 470	381	142-30 ✓	"	22.8	10-45 ✓	
	"	15.2	127-15 ✓	"	29.6	141-15 ✓	"	23.0	358° ✓	
	"	11.3	118-30 ✓	Cor. upper face old concrete	272	138-45 ✓	"	20.9	359-15 ✓	
	"	10.8	100-0 ✓	"	22.7	131-30 ✓	"	19.7	358 ✓	
	"	10.3	62-15 ✓	"	21.7	123-30 ✓	"	17.8	350-45 ✓	
	"	11.3	56-30 ✓	"	18.5	118-30 ✓	"	13.1	344-30 ✓	
	"	11.9	44-30 ✓	"	18.8	123-30 ✓	"	8.5	328-0 ✓	
	"	12.2	22° ✓	"	16.1	126-45 ✓	"	4.4	291° ✓	
	"	23.1	17-15 ✓	"	11.2	109-45 ✓	"			

5/28/19 2' Final Topog Lt Abut

51

W  
S. El. P 21 = 472.70

Set up on P 21 Sight Q 22 464 128° 5.3 ✓

Set points at O 21 - 6° 2' West 87° 2.0' ✓

Set up on O 21 - 6° 2' W Sight P 21 324° 4.5 ✓

Set Random point Az. 257° 53' 340° 12.4 ✓

14.22' - Nail in rock 339° 30' 16.5 ✓

B.S. H.I. F.S. 358° 30' 19.2 ✓

B.M. 4.71 477.41

B.A. 1.93 467.88

466.05  
~~472.70~~

Δ 11.36 466.05

Topog

Aux. Pt. 1.98 468.03

Red 2.0  
466

229° 20.3 466 139° 30' 19.2

Topog

200° 30' 22.7 135° 16.5

464 253° 24.0 464 168° 30' 20.2

196° 30' 22.3 130° 9.2

230° 19.8 168° 19.5

187° 30' 23.8 117° 6.2

198° 30' 22.3 156° 30' 20.9

183° 25.5 77° 5.1

197° 30' 19.7 146° 19.2

179° 30' 26.0 13° 30' 3.8

191° 23.2 157° 13.3

174° 30' 23.7 357° 7.3

184° 30' 23.3 148° 14.0

163° 30' 22.0 349° 11.4

171° 18.0 149° 30' 9.2

153° 30' 22.0

Plotted 6/3/19

Plotted 6/3/19

	2'	Final	Lt	Abut.	
6.0	462	351°30'	20.3	462	253° 22.7
		340°30'	17.5		268° 28.9
		335°	15.7		277° 40.0
		324°30'	14.8	8.0 460	280° 40.8
		307°	6.9		270° 29.4
		289	2.0		253° 22.6
		193°	3.2		239°30' 19.8
		154°	4.5		239° 17.0
		164°30'	11.7		203° 11.2
[463	Grout Hole	165	15.1		181° 7.8
		183°	12.5		189°30' 4.8
		194°	16.2		218° 5.4
		205°30'	15.1		270° 9.8
		218°	16.2		317° 16.8
		211°30'	20.8		327° 15.1
		219°	20.0		334° 16.5
		231°	19.7		339° 18.5

Platted 6/3/19

R10.0  
458

	2'	Final	Lt	Abut	
	460	346°30'	20.0	458	243°30' 12.6
		349°	21.6		247° 18.0
		353°30'	23.1		259° 20.0
		353	24.5		257° 23.3
		350°45'	23.9		274°30' 31.5
		347°30'	24.4		283° 40.5
		344°30'	21.9	456	284° 39.7
		345°30'	21.9		276° 31.1
		339°	20.8		267° 26.1
		337°	19.5		271° 22.6
		330'	17.9		278° 19.8
		316	16.6		254° 11.6
		313	15.2		262° 9.5
		296°30'	15.4		277° 16.3
		282°	12.9		289° 17.8
		270°	8.0		294° 20.9
		226°	9.0		

Platted 6/3/19



5/30/19 R' Final Lt. Abutment  
 F.B.M. Setup P 21 Sight Q 22  
 for 45° Rt Set Point on 21  
 line 3102 West = 0-21-602 West

P 21	498	477.68	477.70
468 Rod = 9.68	12.7	190-30	468 349 205-15
468	7.6	170-30	" 323 209
"	9.1	199-45	" 324 210-45
"	14.0	187-45	" 327 218-45
"	15.0	179-45	" 338 234
"	16.6	178-30	" 360 242-30
"	17.2	171-15	" 402 249-45
"	21.8	177-30	"
"	25.7	176	470 Rod = 7.68 36.1 238-30
"	28.5	179-45	" 33.0 226-45
"	38.6	186-15	" 332 216-30
"	27.0	190-15	" 342 210-30
"	33.6	198-15	" 350 207-15
"	33.6	202-15	" 364 202

Plotted 6/3/19

Rod = 7.68 2' Final Topog Lt ABUT. 53  
 R = 5.68

47.0	353	200-30	472	6.1	270-0
"	353	198-0	"	9.8	181-0
"	362	196-30	"	22.4	160-0
"	356	192-30	"	24.5	164-0
"	324	187	"	28.0	162-15
"	336	185-45	"	30.1	170-0
"	327	178-30	"	31.1	168-0
"	337	177-30	"	34.4	174-30
"	323	174-30	"	36.9	193-0
"	286	174	"	38.0	195-0
"	263	165-30	"	36.2	197-30
"	229	166-30	"	36.4	201-30
"	220	168-15	"	35.0	207-30
"	15.0	169-15	"	33.3	216-30
"	12.0	180-0	"	35.0	230-0
"	9.2	191-0	"		
"	6.2	252-15	"		
"	9.0	287-30	"		

Plotted 6/3/19

Date	Topog Lt	Abut	Notes
5/30/19	2.1	Final Topog Lt Abut	
F-M-13		477.68	
Rod-368			
474	34.4	271-15	
"	36.1	204-30	
"	37.3	197-45	
"	39.0	194-0	
"	38.2	182-15	
"	39.7	176-0	
"	35.9	174-0	
"	35.8	170-15	
"	32.4	169	
"	30.7	160-30	
"	27.7	159-30	
"	26.7	154-45	
"	21.0	159-0	
"	17.2	167-30	
"	8.0	178-45	
G-H	47.5	160°45	3.3 474.38

Date	Topog Lt	Abut	Notes
5/31/19	47	0+29.4 00 323 ling Sight RPTA 00	
Fillet		RT Abutment	54
F.M.B.			
Tip Form	0.51	489.99	189.48 ✓
Face Dam	114	190°0	10.4 479.59 ✓
Bottom Fillet	114	190°0	15.7 474.3 ✓
Face Dam	9.7	194°45	15.4 474.6 ✓
Bottom Fillet	7.2	202-45	10.5 479.5 ✓
Rock Contact			
Top Fillet			
" old concrete wall			
Rock Cont.			
*Face Concr. Joint = 4.9' dist - Sta 0+33.30			
Dirt Face	Face Concr. Joint	Top Con. 13.9	476.1
Top Concrete	163'	109-30	Top Form 9.8 480.2 ✓
Top Form			
Rock Contact	33.9'	145°45'	9.3 480.7 ✓
Top Fillet			
D.S. Face	35.1	152-30	9.5 480.5 ✓
Bottom Fillet			
Rock Cont.	36.1	147-30	15.8 474.2 ✓
Bottom Fillet			
Rock Face dam	36.3	150°-30	? 15.8 474.2 ✓
Rod = 12.0			
478.0			
RF old concrete			
	4	217°15	7.5 ✓
Rear face old concrete			
		209.30	9.9 ✓
		203°36	8.0 ✓
		212.30	9.2 ✓
front face old concrete	478°00		
		220°30	9.7 ✓
front face old concrete	476°00		
		211°30	10.3 ✓

Platted 6/17

Platted 6/17

Platted 6/19

5/31/19 At 0+29.4 - 323 line  
 B-F-M  
 F Rad = 14°  
 R 476  
 " 205°-30'  
 " 284-30  
 R Face old concrete  
 " 203°-00'  
 Rear face old concrete  
 " 204°-15'

Plotted 6/7/19

6/2/19  
 At 18.65 East - 90° from  
 Sta 6+30<sup>93</sup>

Right R.P. East for 90° Az Left  
 P 21 R = 645  
 476 9.75 82.45 47270  
 " 13.5 16°-45' 476 142 206°  
 " 10.9 16-45 " 225 191-45  
 " 8.7 8-45 " 27° 195-25  
 " 6.6 22-0 " 262 207°  
 " 2.7 245-15 " 17.2 217-45  
 " 6.6 184° " 18.9 240

Plotted 6/3/19

6/2/19  
 R = 645 At 18.65 East 90° from 6+30<sup>93</sup>  
 476 15.0 260° 478 22.7 232-30  
 " 17.1 265-45 " 27.9 219-15  
 " 15.6 279-30 " 26.8 211-30  
 " 19.3 283-30 " 30.5 195-30  
 " 20.7 301-15 " 20.4 186-30  
 " 25.0 303-30 " 14.0 181-30  
 " 30.3 314-45 " 9.2 175  
 " 34.5 319-30 " 7.7 160-15

R = 445  
 478 33.4 312-30 " 4.3 30°  
 " 27.0 309 " 5.0 45-15  
 " 19.8 279-30 " 9.2 30°  
 " 19.7 269° Rod 2<sup>45</sup>  
 " 18.4 259 480 4.8 60-30  
 " 20.3 252-30 " 10.1 162-45  
 " 19.8 247-30 " 18.3 174°  
 " 20.5 237-15 " 21.2 181

Plotted 6/3/19

55  
 325 line

6/2/19

H.S.  
8245

325' line

56

R=2.45 At 1865 East 90° from Sta 6+30<sup>93</sup>

Fillet's Blocks - 2 and 3

480 274 183°

Top Fillet 11.2 El=71.25

Auxil Point

490.31

" 30.4 178-30

Face Dam 37.1 330°-0

2277 from C3 A40 482.89 1182 7849

" 31.8 188

Top Fillet 11.2 El=71.25

Rock Contact 37.2 326°-0

" 38.3 198-30

Fillet " El 68.80

Bottom " "

Set of Auxil Point 22.77 East of C3

" 33.3 204-

Sight G-3 for 270° Az H.

" 31.8 209-45

Top Fillet R. El

" 38.7 215-30

Face Dam 14.4 75-45 9.2 7369

" 27.3 223

Top Fillet 13.8 58-15 9.2 7369

" 25.5 226-

Rock Contact 14.0 64-15 12.65 70.24

" 25.5 229

Bottom Fillet 8.5 93° 12.65 70.24

" 20.6 237-15

Rock Contact 10.25 108-45 12.65 70.24

" 21.3 247-15

Bottom Fillet 9.1 102-30 17.40 65.49

" 20.0 265-45

Rock Contact

" 20.9 280°

Left Abutment

54+5.26 PT 196 16.4' 7.48' Top El=64.52

Bottom = 56.54

62.97

Top Fillet 24 60.57

Bottom Fillet Top Contact 64.3 56.54

Top Form 1.55 64.52

Anchor Joint at 5+47.92 on 325 line

G.H. 48.7 191°-0 ✓

Plotted  
6/12/19

Plotted  
6/17/19

6/4/19  
F-M-B  
Z. Final Topog Lt Abut.  
Corrections of 272-4 & 6 Contours  
Set on 6+30<sup>93</sup> 325 line  
Sight R.Ps North for 180° Az Lt

P 21	956	48226	✓	47270
Bottom Fillet				
Face Dam	20.65	00	✓	121 7016
Top Fillet				
Face Dam	20.65	00	✓	705 7521
Top Fillet				
Rock Contact	15.45	350°-30	✓	70 7526
Bottom Fillet				
Rock Cont	200	358-30	✓	121 7016
Rod 1026				474 <sup>0</sup> 125 63-30
472 <sup>0</sup> R6	8.9	144°	"	16.8 80-30
" "	15.4	146-45	"	15.7 93-30
" "	15.3	133-30	"	17.3 116-0
" "	10.7	125-30	"	19.8 114-0
" "	10.9	112-0	"	19.4 136-30
" "	5.5	118-15	"	190 144-45
Rod 826				127 152-45
A74	13.5	51°-15	"	93 155-30

At 6+30<sup>93</sup> 325 line. 57

474	5.5	104-30	A76	21.3	141-45
"	10.5	91-30	"	19.5	136-30
"	6.0	74-15	"	20.4	112-45
"	8.0	66-0	"	17.6	104°
"	7.8	18-15	"	16.6	94-15
Rod 626	11.6	10-45	"	17.8	83°
A76 <sup>0</sup>	10.6	3°-45	"	19.4	77°
"	9.5	354-45	"	24.4	65°
"	4.5	3°-0	"	27.0	59°
"	4.1	57-30			
"	1.5	76°			
"	4.7	159°			
"	10.2	165-45			
"	15.2	150-0			
"	19.7	158-30			
"	28.9	165-15			
"	28.4	154-45			
"	25.6	145-30			

Use old Notes  
and Add 10 cy Class 4.  
to Ex and Concrete

6/6/19 Rt Abutment

F-M-B. At N2 Sight P-2  
for 90° Az left.

Auxil Point 4889 23440

Set on Auxil Point from

N2 Sight N2

ON on Core Wall

TBM. 884 ✓ 8816 47932

Top fillet  
Rock Cont 3.5 265.75 ✓ 6.3 8186

Top fillet  
Face dam 9.0 256.0 ✓ 6.2 8196

Ex. Joint 0+3389  
East End 20.5 122°15' ✓ 5.2 8296

Bottom form  
20.5 12°15' ✓ 14.1 7406

Top of fillet 207-20 ✓

Rock Cont 33.9 206.75 ✓ 14.35 7381

Top of fillet 216-33 ✓

face of Dam 33 88 211.30 ✓ 14.35 7381

Face dam ✓ 11.6 below

Top Fill. 3865 213-25 ✓ Landing. Stirrer 699

Old Concrete  
Top fillet 3675 208.30 ✓ 699

6/6/19

58

Elevation Bottom Center Joint

Sta 0+33.89-373 line

T.P. from A00. 1.50 490.98 18948

20.97 470.01

20.95 470.13

20.30 470.68

19.88 470.10

17.37 473.61

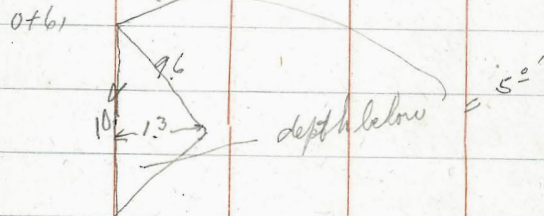
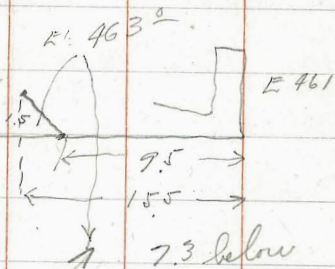
30' West  
east end  
cont joint

Tie from A00. Sight Q00 for Inv.

RP 323/12 29.80 1°33' ✓

PC 4593  
00-32.5 Lave 42°-17' ✓

Filet Rt Abutment



6/9/19

59

F.R.B. Fillets Lt Abutment.

P-21 13.10 48580 472-70

Set on 6+30.25 373 mg

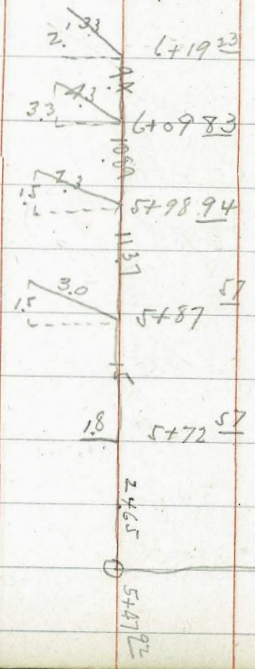
Sight RP North for 180° Az  $\frac{1}{2}$

T.F. R.C.	Dist.	R.C.	✓		
19.8	98.30	4.6	✓	481.2	
T.F. Facedam	17.9	57.45	✓	4.3	481.5
T.P. Facedam	18.6	59.15	✓	6.8	479.0
T.P. R.C.	20.9	74.15	✓	6.4	479.4
T.F. R.C.	19.6	98.45	✓	6.95	478.85
Bot F Dam	19.5	60.95	✓	10.95	474.85
Bot F R.C.	20.0	59.0	✓	9.4	476.40
T.F. F Dam	3.7	330°	✓	3.9	491.90
T.F. R.C.	5.1	303.15	✓	3.9	491.90
B.F. F Dam	3.7	330°	✓	7.6	478.26
T.F. F Dam	7.3	345.30	✓	7.35	478.45
T.F. R.C.	7.7	332.30	✓	7.5	478.30
Bot F.R.C.	7.7	332.30	✓	8.95	476.85

6/9/19 H.I. Fillets Lt Abut.  
 F.M.B. + 485.80

6/9/19 Fillets Lt Abut  
 F.M.B. Downstream Face

T.P. 9.89 475.91  
 B.S. 1:43 477.34  
 5+72.52  
 Top F. ✓ 12.75 64.59  
 Top F. ✓ 8.1 69.24  
 5+87.51  
 Top F.  
 5+98.94  
 Top F. 6.7 70.6  
 6+09.83  
 Top F. T.P. 9.28 485.19 2.04 75.30  
 6+19.23 8.0 77.19



Set on P-21 Sight Q22  
 for 135° AZ Lt Set Auxil  
 Point dist 32.32 AZ 270° =  
 0 21 - 7 32 West  
 Set on Auxil Point from P. 21  
 Sight P21 AZ 90° Lt.

P-21	477	77.47	472.70
Top Fillet			
Face Dam	14.1	283°	✓ 11.2 466.27
Top Fillet			
Rock Cont.	12.9	284°15'	✓ 11.12 466.26
Bottom Fillet	14.0	285°30'	✓ 12.4 465.07
T.F. Dam	8.0	233°15'	✓ 9.5 467.97
T.F. R.C.	6.2	232°45'	✓ 9.5 467.97
T.F. Dam	7.3	233°	✓ 10.7 466.77
T.F. Dam	11.4	181°45'	✓ 7.5 469.97
T.F. R.C.	10.5	175°15'	✓ 7.3 470.77
	10.9	181°45'	✓ 8.95 468.62
T.F. FD	18.7	163°	✓ 6.6 470.87



6/9/19 Fillets Lt Abut. Downstream face				6/9/19 Final Topog Lt Abutment. 61 FM-18. Setup on R26 Sight R28			
FM.B			477.47				
Top Fillet R.C.	18.4	160°15'	✓ 6.5	470.97	for 180° Az Lt.		
Bot Fillet Top Face D	24.6	158°45'	✓ 2.9	474.57	R-28	20.3	98.44
Top Fillet R.C.	25.2	153°15'	✓ 2.9	474.57	Rod 644 492	20.6	316.45
FM.B	Fillets Lt Abut.	6/11/19				190	7.9
	Set on Q 22	Sight R22 for 90° Az Lt			10.9	328° ✓	" 4.7
	Auxil pt.	2380' - 235° 40'			3.1	40° ✓	" 4.4
	Set on Auxil Point from Q 22	Sight Q 22 for 55° 43' Az Lt			6.5	51° 15' ✓	" 13.0
Q 22	10.97	- 90.88	77.89		9.6	41° 0' ✓	" 18.3
Top Face D	13.0	243° 0'	✓ 7.03	83.85	12.4	52° 30' ✓	" 25.6
" R.C.	8.0	216° 0'	✓ 7.30	83.57	"	14.0	52° 15' ✓
Bot Face D	12.5	244° 45'	✓ 9.10	81.77	"	17.7	36° 15' ✓
" R.C.	7.9	222° 15'	✓ 9.10	81.77	"	20.5	20° 0' ✓
Top Face D	29.2	231° 45'	✓ 7.5	83.38	R=800 490	37.6	345° 15' ✓
Top Face D	30.3	231° 45'	✓ 7.5	83.38		28.5	355° 30' ✓
Bot Face D	29.5	213° 45'	✓ 7.55	83.33		20.2	17° 30' ✓
Top Face D	30.3	213° 45'	✓ 6.2	84.67		17.8	32° 45' ✓
6+30.75			8.82	82.06		16.3	43° 15' ✓
Bot Cont. Joint						98	40° 45' ✓
							36.0

Copied from Book 20 Page 18

6/9/19 2' Final Lt Abotment.  
 F-M-13 At R-26  
 R-1044 498.44

✓	33.1	316-30	✓	
"	✓	21.1	319-15	✓
"	✓	18.7	322-45	✓
"	✓	17.5	331-0	✓
"	✓	4.7	18-0	✓
"	✓	17.3	36-45	✓
"	✓	11.1	38-30	✓
"	✓	10.8	36-15	✓
"	✓	13.7	39-0	✓
"	✓	17.2	33-45	✓
"	✓	20.8	11-0	✓
"	✓	13.3	329-45	✓
"	✓	16.9	334-15	✓
Attil Point	3536	315 <sup>00</sup>	= Q25	

Plotted 6/17/19

6/9/19 64  
 F-M-13 Set of Q25  
 Sight R 26 for 135° - A2 Lt.

R-26	160	495.11	493.51
Rd-91			
48600	✓	436	315-0
"	✓	22.2	315-15
"	✓	20.5	318-15
"	✓	16.7	323-0
"	✓	10.0	324-45
"	✓	3.1	335-0
"	✓	2.7	24-45

Plotted 6/17/19

6/13/19. 2'-Final Topog Lt About  
 set on R 26 Sight R 28  
 for 180° Az Lt.

At Auxil Point from R 26 63  
 487.48

Auxil  
 Point Nail in Rock 52.69 329°34'  
 R 28 215 498.56 496.41  
 R Rock in West Bank 1246 486.10

" 13.0 195-45 482 41.2 326-05 ✓  
 " 14.1 177-15 " 515 325-45 ✓  
 " 14.8 156-30 R=348  
 " 14.0 147-45 484 47.9 328-0 ✓  
 " 16.2 129-0 " 455 327-15 ✓  
 " 8.2 129-30 " 412 327-15 ✓

Set up on Auxil Point from R 26  
 Sight R 26 Az = 149.34

TIP Rock 138 87.48 486.10  
 Dep Con Rod-7.48 10.0 206-20 482 21.6 286-0 ✓  
 480 DC 11.7 190-15 21.2 281-30 ✓  
 " " 10.4 171-00 18.0 281-30 ✓  
 " " 7.8 209-15 14.8 269-15 ✓  
 Rod 5.48 15.0 258-45 ✓  
 482 30.4 291 ✓ 11.5 255-15 ✓  
 " 29.6 293 ✓ " 10.2 216-30 ✓  
 " 29.8 292.30 " 11.7 210-30 ✓  
 " 26.3 289 ✓ " 11.0 204-30 ✓

Plotted 6/17/19  
 " 1.7 166-0 " 332 327-45 ✓  
 " 1.0 12-0 " 227 333-45 ✓  
 " 4.2 305-15 " 20.2 332-45 ✓  
 " 6.0 336-30 " 16.3 333-15 ✓  
 " 10.3 315-0 ✓ " 16.0 338-20 ✓  
 " 15.5 330-30 ✓ " 13.8 336-6 ✓  
 " 21.5 323-45 ✓ " 13.4 344-0 ✓  
 " 24.2 333-15 ✓ " 9.6 334-0 ✓  
 " 28.8 328-15 ✓ " 6.4 1°-15 ✓  
 " 30.3 324-15 ✓ " 4.5 42-15 ✓  
 " 32.5 327-20 ✓ " 4.0 81° ✓

Plotted 6/17/19  
 S 66° 20' E

Plotted 6/17/19

6/13/19 At Auxil Point from R<sup>26</sup>  
 R= 348 48748

484	9.1	113-30	Red 140		
"	14.3	115-15	486	292	288-30 ✓
Gap		"	"	229	280-30 ✓
484	15.3	194-30 ✓	"	17.0	263-0 ✓
"	14.5	195-45 ✓	"	14.8	252-0 ✓
"	13.0	197-45 ✓	"	13.3	202-30 ✓
"	12.4	209-30 ✓	"	18.9	175-45 ✓
"	12.3	230-30 ✓	Gap	1	
"	13.0	247-45 ✓	486	14.5	114-0 ✓
"	14.9	252-30 ✓	"	5.4	67-30 ✓
"	15.7	261-45 ✓	"	7.4	0°-45 ✓
"	20.2	275-45 ✓	"	12.5	252-0 ✓
"	22.9	282-30 ✓	"	342.0	302-0 ✓
"	27.3	288-30 ✓	"	25.7	333-0 ✓
"	37.6	295-15 ✓	"		
" ✓	46.2	297-15 ✓	R+52 488	14.8	347-30 ✓
			"	12.5	355-0 ✓

R+52 At Auxil Point from R<sup>26</sup> 64  
 488 487.95

"	9.8	357-0 ✓			
"	5.5	65-30 ✓			
"	11.3	105-30 ✓			
"	14.4	113-30 ✓			
Gap					
"	17.8	180-45 ✓			
"	14.7	194-0 ✓			
"	13.7	203-0 ✓			
"	13.3	238-30 ✓			
"	19.0	269-15 ✓			
"	22.5	278-15 ✓			

Plotted 6/17/19

2' Final Left Abutment.

6/16/19

F-M-B

Set on 323 line Sta

6+80 <sup>58</sup> Sight 7+47 <sup>81</sup> for

180° Az Lt.

T.P. Rock

0.75 486.85

486.10

Rod = 685

480°

2.0 ✓ 16-30 482 ✓ 13.7 91-30 ✓

" 32 ✓ 152-15 " ✓ 17.3 103-45 ✓

" 54 ✓ 149-0 " ✓ 14.3 119-15 ✓

" 68 ✓ 177-0 " ✓ 17.3 140-15 ✓

" 10.1 ✓ 180-0 ✓ " 25.6 151-0 ✓

" 12.9 161-0 ✓ " 27.3 160-15 ✓

" 10.0 111-30 ✓ " 25.2 164-15 ✓

" 11.0 92-15 ✓ " 19.7 168-30 ✓

" 9.9 58-30 ✓ " 16.3 167-30 ✓

Plotted 6/17/19

" 12.5 181-45 ✓

Rod 485

12.1 62-45 ✓ " 27.1 183-30 ✓

482°

11.8 78-30 ✓ " 6.6 195-15 ✓

482-	5.2	188-15 ✓
"	2.7	212-30 ✓
"	0.0	0.0 ✓
"	2.3	354-45 ✓
"	5.4	332-0 ✓
"	7.4	356-30 ✓
"	9.4	1-0 ✓
"	12.2	358-15 ✓
"	13.2	355-15 ✓
"	15.2	357-30 ✓
"	20.0	356-15 ✓

6/17/19

F-M-B Fillet DS Face Lt Abut

Set of Auxil Point

from Q 22 = Sight Q 22

dist ~~23.80~~<sup>22</sup> Az 55° 40' It.

Q 22	1101	90.90	7989
Top Fillet			3.3 87.6
Face Dam 22°	169°30'		<del>4.08</del> 86.82
Top Fillet			3.3 87.6
Rock Contact 25.4	155°-45'		<del>7.08</del> 86.82
Bottom Fillet			7.30 836
Face Dam 21.4	168°-30'		7.30 836
Bottom Fillet			7.30 836
Rock Contact 23.4	159°-30'		7.30 836

6/18/19

66

Sta fillet left abutment

6+60<sup>54</sup>

$$K' = \frac{24.4}{EI} = 487\frac{66}{25}$$

Bottom Concr Joint at 6+85<sup>25</sup>.R<sub>16</sub> 285 99.26 7641

Bottom Concr Joint 1926 8000

6/18/19 2' Final Left Abut.  
 F-M-B Set on R-26 Sight  
 R-28 for 180° Az Lt  
 Set Auxil Point

Auxil Point 16.90 14° 45'

To Fo	R 26		-3.6	8991		93.51
To Ro	Rod = 7.91					
Bi Fo	482°	27.7	317°-15'	4892	6.5	232-15'
Bi Fo		20.2	316°-'		7.0	192-30'
		17.6	307°-15'		1.9	89-15'
		28.4	299°-30'		14.6	317-30'
		30.4	298°-30'		20.1	323°
		35.1	295°-45'		23.2	320-30'
5.91		<u>34.4</u>	<u>292°-45'</u>		<u>26.9</u>	<u>324°</u>
484		30.6	292°-15'	486	26.7	324°-15'
		29.4	289°-30'		15.7	328°-30'
		15.9	282°-15'		48	346.15
		12.7	265°-15'		3.5	23-

7/7/19 2' Final Topog Spillway  
 F-M-B set on T31 sight T34  
 turn 90° East dist 50' set V31  
 set on V31 sight T31 turn 90°  
 South dist 35' set V30  
 set on V30 sight V31 turn  
 90°<sup>east</sup> dist 50' set X30  
 set on X30 sight V30  
 turn 90° South dist 20' set  
 V30 - 20' South.  
 set on V30 - 20' South sight  
 V30 turn 90° East dist 50'  
 set Z29 - 5' North.  
 set on Z29 - 5' N sight  
 V30 - 20' South turn 90° South  
 check Z27 set point at  
 5' South = Z29

7/7/19 2' Final Topog Spillway 68  
 F-M-B  
 Z27 206 61.91 59.85  
 T.P. Rock below Z line 8.38 53.53  
 T.P. Rock on X line 2.88 59.03  
 Set on Z29 sight Z27 for 00  
 TP 599 59.54 53.53  
 Rod 2.52 452.2 58.8 89.15 ✓ (45.9) 48.3 19° 00  
 " ✓ 97.4 86.30 ✓ ✓ 40.3 172.30  
 41.0 90.30 ✓ ✓ 36.7 150 0  
 34.0 91.30 ✓ ✓ 33.7 3° 30  
 16.7 69.15 ✓ ✓ 29.8 354.45  
 9.7 356.30 ✓ ✓ 23.1 341.45  
 19.4 346.15 ✓ ✓ 17.0 300.15  
 27.3 0° 30 ✓ ✓ 8.9 251.15  
 33.8 18.15 ✓ ✓ 3.0 340-15.  
 44.9 20.30 ✓ ✓ 16.1 76 15  
 52.9 20° 20 ✓ ✓ 23.1 170 30



At 229

454	228	106.95	95.0	✓	✓	16.0	244.30
	37.6	100.45	✓	✓		25.0	263.30
	41.7	94.45	✓	✓		27.0	281.30
	41.4	92.30	✓	✓		22.0	299.45
	44.1	91.95	✓	✓		21.8	318.30
	48.4	88.15	✓	✓		21.2	323.15
	48.5	96.30	✓	✓		34.5	357.0
352							
456	51.4	88.15	✓	✓		38.4	52.45
	46.0	90.30	✓	✓		38.6	16.15
	37.8	102.45	✓	✓		44.0	17.30
	32.4	109.30	✓	✓		45.0	9.0
	28.5	118.45	✓	✓		43.4	4.30
	25.7	124.30	✓	✓		39.9	3.30
	23.2	129.0	✓	✓		35.5	354.0
	20.6	139.30	✓	✓		32.5	351.45
	17.0	152.0	✓	✓		29.2	341.30
	16.5	198.30	✓	✓		25.9	337.30

7  
F  
T  
R  
A  
E  
B

At 229

458	22.5	320.0	✓				
	24.0	312.30	✓				
	23.8	292.45	✓				
	33.1	278.30	✓				
	53.0	267.0	✓				
	66.0	262.15	✓				
	67.9	259.30	✓				

Plotted 7-22-19

9/11/19

2' Final Topog Spillway

F-M-B

486

Red

332 ✓

26.1

46-15

732 ✓

464

23.7

134-30

70

Set of 3+20 E Spillway

466 ✓

19.3

19.0

✓

19.5

147-15

Sight 2+50 for 170° Az 4

✓

16.7

357-15

✓

20.2

139-30

T 31

090

7137

7042

✓

10.9

357-15

✓

22.0

37-45

Rod 132

470

26.2

45-45

Rod 332

468 ✓

40.3

118-45

✓

10.0

30-30

✓

26.5

48-45

18.8

349 -

✓

✓

44.2

116-45

✓

7.7

157.0

64-66

68-70

✓

34.0

57-30

31.7

305-45

✓

✓

44.8

115-15

✓

12.9

176 -

93

162

✓

33.5

58-15

30.5

286-30

✓

✓

24.9

139-30

✓

16.0

166-45

✓

30.0

54-15

34.6

283.0

✓

✓

18.7

175-15

✓

19.6

156-15

✓

29.1

126-45

34.4

269.0

✓

✓

22.9

218.0

✓

24.1

137-15

✓

17.5

112.0

35.7

266-30

✓

✓

19.5

238-15

✓

32.4

129-30

R.C.

468

✓

31.3

238.0

35.3

262.0

✓

✓

18.7

242-30

✓

40.0

120-30

R.C.

✓

25.9

261-45

32.2

244-45

✓

✓

13.5

226.0

✓

40.1

117-45

R.C.

✓

26.6

267-30

34.1

236-45

✓

✓

11.9

307.0

✓

44.7

114-45

R.C.

✓

26.4

276-30

21.4

208-15

✓

✓

21.4

313-15

732

464 ✓

44.3

114-15

R.C.

✓

25.4

279-30

28.6

132-30

✓

✓

23.3

318.0

✓

39.3

117-45

✓

30.3

303-30

332

468

29.8

133-30

✓

✓

20.9

331-30

✓

38.8

119.0

✓

29.3

308-15

39.8

122-15

✓

✓

26.4

46.0

✓

29.9

128-45

R.C.

✓

32.8

273-45

3+20 & Spillway

Z-29

71

RC	4680	22.3	266.0	✓	755	47.7	226.45	35.0	108.45	✓	46.8	271.0	✓
RC		24.4	254.15	✓	✓	38.2	222.15	32.4	110.45	✓	25.7	294.2	✓
RC		29.7	234.45	✓	✓	31.0	217.15	28.5	120.45	✓	24.6	316.2	✓
Red (5.32)	4660	25.1	263.15	✓	✓	26.8	197.30	22.5	132.30	✓	23.8	317.15	✓
RC		26.1	267.2	✓	✓	18.9	194.15	21.5	143.30	✓	30.4	341.45	✓
RC		26.9	295.95	✓	✓	21.3	139.45	19.6	193.0	✓	37.4	355.15	✓
RC		26.1	297.0	✓	✓	22.7	131.45	22.9	196.45	✓	39.5	359.45	✓
RC		23.2	265.15	✓	✓	28.2	120.30	29.7	210.30	✓	Set Z-30 — 3' N.		
(7.32)	764	23.7	273.30	✓	✓	32.6	110.0	37.3	220.15	✓	4.41	77.78	73.37
RC		24.6	273.15	✓	✓	37.3	104.0	43.2	226.15	✓	137.8	45.3	69.15
RC		25.2	280.45	✓	✓	42.2	95.45	48.4	228.45	✓	30.7	64.30	✓
RC		23.8	280.45	✓	✓	45.7	95.15	54.3	231.45	✓	26.5	65.15	✓
		Set on Z 29		✓	✓	49.4	92.0	62.7	233.0	✓	24.4	60.30	✓
T. Pen Rock N	229	6.18	59.71			53.53		72.3	235.30	✓	18.7	55.0	✓
(1.21)	458	67.0	261.45	✓	✓	47.9	96.0	73.6	249.30	✓	9.0	29.0	✓
		66.9	259.0	✓	✓	46.7	99.30	75.0	261.45	✓	6.9	359.0	✓
		60.4	248.30	✓	✓	42.9	102.30	65.4	263.45	✓	7.3	333.15	✓
		62.0	233.45	✓	✓	40.1	105.45	50.5	269.0	✓	6.3	306.15	✓

Platted 7-23-19

Platted 7-23-19

Platted 7-23-19

21, 75

46.6	7.3	307.30 ✓	17.7	264.30 ✓
5.7	330.15 ✓	22.5	265.30 ✓	
6.7	4-15 ✓	778 470.00 ✓	21.3	265.15 ✓
11.2	42-15 ✓	20.7	263.45 ✓	
18.3	57.30 ✓	19.3	260.30 ✓	
18.6	63.45 ✓	17.3	263.45 ✓	
31.4	65.45 ✓	14.1	268.45 ✓	
41.2	72.0 ✓	12.7	274.45 ✓	
46.8	36.3	79.0 ✓	5.7	296.30 ✓
22.0	73.0 ✓	4.0	12.45 ✓	
14.4	66.15 ✓	10.7	73.45 ✓	
12.1	50.45 ✓	15.5	75.45 ✓	
5.4	8-30 ✓	472- 45.78 ✓	8.0	77.45 ✓
4.5	330-15 ✓	72.0 ✓	2.3	346.0 ✓
7.0	300.45 ✓	8.3	280.30 ✓	
9.8	280.45 ✓	13.2	268.45 ✓	
14.3	273.0 ✓	17.8	259.45 ✓	
16.0	265.45 ✓	20.8	257.0 ✓	

Platted 7-23-19

Re Platted 8/19/19

476

74

Concrete	20.4	262.30 ✓	64-66	14.3	279.15 ✓
	21.4	264.30 ✓	62-64-66	16.2	274.45 ✓
74	21.1	264.15 ✓	42-64	19.0	271.15 ✓
	20.4	262.0 ✓	66	17.2	267.0 ✓
	21.2	259.30 ✓			
	21.5	253.45 ✓			
	19.1	256.0 ✓			
	18.5	258.45 ✓			
	16.5	259.0 ✓			
	73.6	264.15 ✓			
	18.3	259.0 ✓			
	19.9	251.45 ✓			
	23.8	251.30 ✓			
	24.1	258.15 ✓			
	20.4	260.15 ✓			
Concrete	20.9	263.30 ✓			

Platted 7-23-19

Set on Y-27 sight Y 31

Turn 156° - Dist 19.2 for Auxil/point

Set Auxil/point sight Y-27 = 156

0.9 271 209.30 ✓

25.0 214.30 ✓

18.3 212.30 ✓

130.5 72.90 59.85

7/13/19 Y Final Spillway

R-10.90  
46.2

14.0 61.45 ✓ 8.4 65.15

At Z-29 sight 2.17 for 00

6.4 116.30 ✓ Red 6.90 3.6 ✓ ~~8.3~~

Red 267

347 59.67 456.20

7.6 156.0 ✓ 466-19 5.0 141-15 ✓

Red 267

27.5 288° ✓

7.8 162.0 ✓ 10.1 186.45 ✓

" 51.5 166-45 ✓

11.3 179.15 ✓ 13.3 199-45 ✓

" 41.0 249-15 ✓

21.7 200.45 ✓ 17.1 201-15 ✓

39.5 276-15 ✓

Vertical  
8.0

26.6 207.30 ✓ 21.7 207.30 ✓

27.8 215-15 ✓

Red 8.9  
6.0 Vertical  
46.2

32.0 214.2 ✓ Red 9.90 11.1 197.45 ✓

trench RE

78.2 195-45 ✓

31.5 214.2 ✓ 46.5 19.0 205.45 ✓

Red 267

26.0 216-45 ✓

26.8 207.45 ✓ 20.9 206.45 ✓

" 73.6 280-45 ✓

Vertical  
8.0

25.6 211.30 ✓ 29.4 13.6 206.45 ✓

" 27.3 282-30 ✓

21.2 207.45 ✓ 20.5 207.45 ✓

" 34.5 215-30 ✓

14.2 195.15 ✓ 25.5 212.15 ✓

11.4 188.30 ✓ 26.7 208.0 ✓

Plotted 7-23-19

Plotted 7-23-19

7/16/19

B-F-M

2' Final Right About

Set of PC 27' R Curve

Sight Tang East for Zero  
Az Lt.

Aoo.

1.38 98.77

9709

Rod 644

(Rod 644)  
492.0

check 22.8 344.0 ✓

492.0 25.5 341.15 ✓

" 26.1 339.0 ✓

" 29.2 342.0 ✓

" 31.0 349.15 ✓

" 32.8 342.0 ✓

" 33.7 342.15 ✓

" 35.3 344.0 ✓

" 37.4 344.0 ✓

" 39.0 341.0 ✓

" 40.0 341.95 ✓

" 40.9 344.30 ✓

Platted 7-17-19

7/16/19

At PC 27' R Curve Sight Tang East  
for Zero Az. Lt.

Rod 833

124

9833

9709

490

13.6

356.30

Rod 1033

488

43.3

357.4 ✓

120.1

352.15 ✓

40.3

345.45 ✓

22.8

346.0 ✓

35.9

344.30 ✓

24.5

341.95 ✓

33.3

342.45 ✓

25.2

341.30 ✓

31.3

345.0 ✓

26.0

339.15 ✓

30.5

345.0 ✓

28.1

341.30 ✓

27.7

343.15 ✓

30.6

345.15 ✓

24.5

341.30 ✓

32.1

342.45 ✓

21.8

349.0 ✓

33.8

342.0 ✓

20.7

359.0 ✓

35.6

344.15 ✓

16.3

40.30 ✓

37.3

344.15 ✓

16.3

30.30 ✓

38.9

341.30 ✓

14.0

39.45 ✓

40.0

343.0 ✓

Rod  
12.33

20.7

45.30 ✓

40.6

346.15

486

18.4

31.0 ✓

42.3

347.45 ✓

22.4

8.0 ✓

74

Rod.  
12-33

486	21.4	5°45' ✓
	21.2	359.30 ✓
	22.7	348.75 ✓
	28.5	346.45 ✓
	30.1	345.45 ✓
	31.9	344.15 ✓
	33.7	342.15 ✓
	37.5	346.45 ✓
	40.6	347.0 ✓
	44.2	10.0

Platted 7-17-19

7/16/19

B.M.F.

Surface Rock

Set on A-1 - Sight on A-0-0

for Zero

Top Rock  
South of Road  
Rod 7.9

484.0

2.22	491.90	489.48
23.3	196.30 ✓	30.0 <del>111-30</del>
18.7	190.45 ✓	26.2 109-15
18.2	182.15 ✓	20.5 106.0
12.2	146.0 ✓	15.0 115.0
14.7	124.15 ✓	15.7 130.30
15.5	101.30 ✓	12.1 145.30
23.0	103.0 ✓	15.6 172.0
31.1	111.0 ✓	19.2 183-15
31.8	119.45 ✓	19.5 184.0
31.0	130.0	21.8 192.45
35.7	156.0	24.1 196.0
35.7	156.0	23.6 195.0
30.8	131.0	22.5 193-15
31.6	119.45	20.1 183-15

Platted 7-17-19

484

rod 9.9

482-

rod 11.9

480-

75

7/16/19

E1 491.90

480	✓ 17.1 17.8	178-0	478.0 R.F.C. WALL	20-0	180-30
-	✓ 15.6	170-45	⊙	22.3	181-45
✓	13.9	159-45	⊙	23.5	183.45
✓	18.1	139-30		22.0	187.13
✓	21.8	129-30	11.15	180.75	
✓	25.2	120-0			
✓	29.9	115-45			
✓	31.1	121-45			
✓	30.7	129-30			
(3.79)	35.7	156-0			
478.0	35.7	156-0			
"	31.2	133-45			
	30.8	122-30			
	26.6	119.30			
	24.0	123.15			
✓	21.3	134-45			
✓	17.5	146-0			
✓	14.6	166-30			

Platted 7-17-19  
B.M.

7/16/19

Surface Rock 76  
Set on Auxil point from

A1- 184°-0 Dist 22.75'

Sight A-1-

-742 84.78- 492.2

Rod 878	476	1.7	124-30	474	4.5	✓ 111-0
Concrete	2.1	46-30	concrete	1.4	✓ 102-0	
✓	6.3	50-45	concrete	1.8	✓ 121-30	
✓	10.7	80-15	12.78 472	5.0	117-30	
✓	16.1	81-45		7.7	119-30	
✓	21.0	77-15		11.4	106-45	
✓	23.0	85-30		13.7	104-30	
✓	19.2	120-30		15.6	112-45	
474	✓ 17.1	120-15		16.0	121-30	
	✓ 16.7	106-30				
	✓ 18.3	99-45				
	✓ 13.8	97-15				
	✓ 11.0	100-15				
	✓ 7.7	116-45				



7/16/19

2' Topog. Spillway

B-F-N

Set on 2 29 Sight

257 for Zero Pt Lt.

Top Conc.

4+00

Bot 6-16

454.0

59

Bot trench  
(4.52)

Bot trench

452

452

54-56-58

54-56-58

52-54-56

28.7

27.9

25.8

27.1

25.5

23.7

25.3

27.3

210-15 ✓

208-15 ✓

211-45 ✓

219-0 ✓

285-30 ✓

290-0 ✓

292-45 ✓

289-45 ✓

Plat Hed 7-23-19

396 460.16

456.20

7/17/19

Set on A 1

77

2' Final Topog Rt Abutment.

Top Rock

width of Road

7.82

48.4

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2.34

22.0

18.9

18.3

13.7

11.2

10.2

8.8

11.3

13.1

16.6

16.8

19.4

21.2

22.4

25.6

28.0

"

"

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"

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"

"

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"

"

91.82

195-30 ✓

190-30 ✓

183-0 ✓

170-30 ✓

137-30 ✓

118-0 ✓

85-30 ✓

79-0 ✓

73-0 ✓

70-45 ✓

77-45 ✓

79-45 ✓

78-30 ✓

86-0 ✓

89-0 ✓

89-15 ✓

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89.48

28.0

29.6

30.8

31-0

31-0

31.5

30.9

29.3

28.3

27.1

25.9

23.8

23.5

17.1

16.6

13.4

"

"

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89.48

89-45 ✓

88-0 ✓

90-30 ✓

100-15 ✓

107-45 ✓

115-45 ✓

121-0 ✓

123-0 ✓

90-30 ✓

89-30 ✓

90-45 ✓

91-0 ✓

89-45 ✓

86-45 ✓

83-45 ✓

79-15 ✓

72-30 ✓

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Plat Hed 7-23-19

(Red 982)

482	12.2	80.0	✓ 480°	12.0	83.0	482-	305	10345	✓		
	10.1	93.15	✓	13.4	80.45		30.9	129-30	✓		
	10.7	122.15	✓	14.9	82.0		1.20	90.68		89.98	
	11.3	138.45	✓	16.0	87.0					11.6	79.08
	15.0	159.0	✓	19.9	96.45		5.41	84.49			
	14.0	170.45	✓	22.1	94.0	6	At	Auxil point from A.1-			
	16.7	180.45	✓	24.8	95.45		Dist.	22.75	184.0		
	19.1	184.30	✓	27.0	91.30	<sup>6.49</sup> 478	1.0	124.30	✓ 478	28.1	46.95
	21.1	191.45	✓	30.0	96.15	concrete	1.5	75.0	✓	29.9	51.30
	23.3	194.15	(note)	30.6	100.0	concrete	4.9	18.30	✓	32.3	53.45
480	23.6	194.30	✓	29.7	105.30		6.1	31.30	✓	33.5	53.30
	20.2	183.45	✓	30.9	108.15		11.5	34.30	✓	36.3	56.30
	17.2	180.0	✓	31.3	117.45		15.5	36.45	✓	31.9	61.0
	14.6	170.45	✓	31.1	123.30		21.5	33.30	✓	31.1	70.45
	12.7	151.45	✓	30.5	128.30		25.6	31.45	✓	28.3	73.15
	11.4	135.15	✓ 482.	31.1	127.30		27.4	35.30	✓	25.2	81.30
	10.6	120.0	✓	31.7	119.15		29.7	36.0	✓ (149) 476	18.8	122.0
	9.8	97.45	✓	31.3	110.30		28.0	41.30	✓ JJ	19.2	112.0

Plotted 7-23-19

Plotted 7-23-19

(849)

476	19.7	101-0	✓	3.7	31-15	✓	
"	23.7	85-0	r	1.6	108-0	✓	
	24.6	79-30	✓	474	1.6	108-0	✓
	26.5	72-0	✓	B.H- 11A wall	3.7	36-30	✓
	30.5	69-30	✓	10.4	43-30	✓	
	28.5	61-0	✓	12.7	47-30	✓	
	34.2	55-15	r	15.7	46-0	✓	
	35.8	54-30	✓	18.3	40-0	✓	
	36.3	53-0	✓	25-0	42-45	✓	
	31.4	53-0	r	29.2	52-0	✓	
	28.6	50-15	✓	34.0	53-15	✓	
	27.5	44-0	✓	35.2	54-15	✓	
	27.6	40-0	✓	22.3	62-30	✓	
	22-9	35-30	✓	22.3	74-30	✓	
	19.4	38-30	✓	22.5	88-0	✓	
	17.1	40-0	✓	16.4	106-0	✓	
	15.7	43-0	✓	17.4	107-0	✓	
	7.7	45-0	✓	17.3	117-30	✓	
				16.7	120-30	✓	

Platted 7-23-19

79

(472)

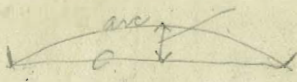
15.9	119-30	✓
16.0	114-30	✓
15.1	106-0	✓
13.9	101-30	✓
17.1	80-45	✓
16.9	68-0	✓
26.6	56-30	✓
27.2	53-15	✓
19.8	58-15	✓
19.2	45-45	✓
19.8	46-15	✓
14.6	50-0	✓
9.0	50-30	✓
5.4	58-0	✓

7.0  
~~7.0~~ 10.2, 0

Platted 7-23-19

(470)	3.0	70-30	✓
D.C.	11.1	60-45	✓
	15.9	59-0	✓
	16.0	63-0	✓
	13.9	65-30	✓
	13.7	71-45	✓

5952  
0



48

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 14 FEET WIDE. SIDE SLOPES 1½ TO 1.

FOR SINGLE TRACK EMBANKMENT.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	7.0	7.2	7.3	7.5	7.6	7.8	7.9	8.1	8.2	8.4	0
1	8.5	8.7	8.8	9.0	9.1	9.3	9.4	9.6	9.7	9.9	1
2	10.0	10.2	10.3	10.5	10.6	10.8	10.9	11.1	11.2	11.4	2
3	11.5	11.7	11.8	12.0	12.1	12.3	12.4	12.6	12.7	12.9	3
4	13.0	13.2	13.3	13.5	13.6	13.8	13.9	14.1	14.2	14.4	4
5	14.5	14.7	14.8	15.0	15.1	15.3	15.4	15.6	15.7	15.9	5
6	16.0	16.2	16.3	16.5	16.6	16.8	16.9	17.1	17.2	17.4	6
7	17.5	17.7	17.8	18.0	18.1	18.3	18.4	18.6	18.7	18.9	7
8	19.0	19.2	19.3	19.5	19.6	19.8	19.9	20.1	20.2	20.4	8
9	20.5	20.7	20.8	21.0	21.1	21.3	21.4	21.6	21.7	21.9	9
10	22.0	22.2	22.3	22.5	22.6	22.8	22.9	23.1	23.2	23.4	10
11	23.5	23.7	23.8	24.0	24.1	24.3	24.4	24.6	24.7	24.9	11
12	25.0	25.2	25.3	25.5	25.6	25.8	25.9	26.1	26.2	26.4	12
13	26.5	26.7	26.8	27.0	27.1	27.3	27.4	27.6	27.7	27.9	13
14	28.0	28.2	28.3	28.5	28.6	28.8	28.9	29.1	29.2	29.4	14
15	29.5	29.7	29.8	30.0	30.1	30.3	30.4	30.6	30.7	30.9	15
16	31.0	31.2	31.3	31.5	31.6	31.8	31.9	32.1	32.2	32.4	16
17	32.5	32.7	32.8	33.0	33.1	33.3	33.4	33.6	33.7	33.9	17
18	34.0	34.2	34.3	34.5	34.6	34.8	34.9	35.1	35.2	35.4	18
19	35.5	35.7	35.8	36.0	36.1	36.3	36.4	36.6	36.7	36.9	19
20	37.0	37.2	37.3	37.5	37.6	37.8	37.9	38.1	38.2	38.4	20
21	38.5	38.7	38.8	39.0	39.1	39.3	39.4	39.6	39.7	39.9	21
22	40.0	40.2	40.3	40.5	40.6	40.8	40.9	41.1	41.2	41.4	22
23	41.5	41.7	41.8	42.0	42.1	42.3	42.4	42.6	42.7	42.9	23
24	43.0	43.2	43.3	43.5	43.6	43.8	43.9	44.1	44.2	44.4	24
25	44.5	44.7	44.8	45.0	45.1	45.3	45.4	45.6	45.7	45.9	25
26	46.0	46.2	46.3	46.5	46.6	46.8	46.9	47.1	47.2	47.4	26
27	47.5	47.7	47.8	48.0	48.1	48.3	48.4	48.6	48.7	48.9	27
28	49.0	49.2	49.3	49.5	49.6	49.8	49.9	50.1	50.2	50.4	28
29	50.5	50.7	50.8	51.0	51.1	51.3	51.4	51.6	51.7	51.9	29
30	52.0	52.2	52.3	52.5	52.6	52.8	52.9	53.1	53.2	53.4	30
31	53.5	53.7	53.8	54.0	54.1	54.3	54.4	54.6	54.7	54.9	31
32	55.0	55.2	55.3	55.5	55.6	55.8	55.9	56.1	56.2	56.4	32
33	56.5	56.7	56.8	57.0	57.1	57.3	57.4	57.6	57.7	57.9	33
34	58.0	58.2	58.3	58.5	58.6	58.8	58.9	59.1	59.2	59.4	34
35	59.5	59.7	59.8	60.0	60.1	60.3	60.4	60.6	60.7	60.9	35
36	61.0	61.2	61.3	61.5	61.6	61.8	61.9	62.1	62.2	62.4	36

Calculated by Julien A. Hall, M. Am. Soc. C. E.