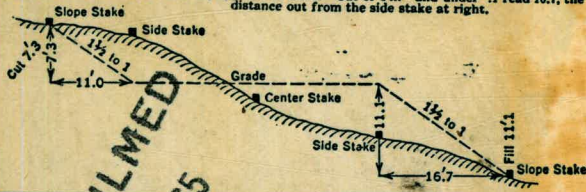


W
1911

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width. Side Slopes 1 1/2 to 1.

In the figure below: opposite 7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



Cut or Fill	Distance out from Side or Shoulder Stake										Cut or Fill
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0	
1	0.5	1.0	1.8	2.0	2.1	2.3	2.4	2.6	2.7	1	
2	1.0	1.7	3.3	3.5	3.6	3.8	3.9	4.1	4.2	2	
3	1.5	2.2	4.8	5.0	5.1	5.3	5.4	5.6	5.7	3	
4	2.0	2.9	6.3	6.5	6.6	6.8	6.9	7.1	7.2	4	
5	2.5	3.5	7.8	8.0	8.1	8.3	8.4	8.6	8.7	5	
6	3.0	4.1	9.3	9.5	9.6	9.8	9.9	10.1	10.2	6	
7	3.5	4.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	7	
8	4.0	5.3	12.3	12.5	12.6	12.8	12.9	13.1	13.2	8	
9	4.5	5.9	13.8	14.0	14.1	14.3	14.4	14.6	14.7	9	
10	5.0	6.5	15.3	15.5	15.6	15.8	15.9	16.1	16.2	10	
11	5.5	7.1	16.8	17.0	17.1	17.3	17.4	17.6	17.7	11	
12	6.0	7.7	18.3	18.5	18.6	18.8	18.9	19.1	19.2	12	
13	6.5	8.3	19.8	20.0	20.1	20.3	20.4	20.6	20.7	13	
14	7.0	8.9	21.3	21.5	21.6	21.8	21.9	22.1	22.2	14	
15	7.5	9.5	22.8	23.0	23.1	23.3	23.4	23.6	23.7	15	
16	8.0	10.1	24.3	24.5	24.6	24.8	24.9	25.1	25.2	16	
17	8.5	10.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	17	
18	9.0	11.3	27.3	27.5	27.6	27.8	27.9	28.1	28.2	18	
19	9.5	11.9	28.8	29.0	29.1	29.3	29.4	29.6	29.7	19	
20	10.0	12.5	30.3	30.5	30.6	30.8	30.9	31.1	31.2	20	
21	10.5	13.1	31.8	32.0	32.1	32.3	32.4	32.6	32.7	21	
22	11.0	13.7	33.3	33.5	33.6	33.8	33.9	34.1	34.2	22	
23	11.5	14.3	34.8	35.0	35.1	35.3	35.4	35.6	35.7	23	
24	12.0	14.9	36.3	36.5	36.6	36.8	36.9	37.1	37.2	24	
25	12.5	15.5	37.8	38.0	38.1	38.3	38.4	38.6	38.7	25	
26	13.0	16.1	39.3	39.5	39.6	39.8	39.9	40.1	40.2	26	
27	13.5	16.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	27	
28	14.0	17.3	42.3	42.5	42.6	42.8	42.9	43.1	43.2	28	
29	14.5	17.9	43.8	44.0	44.1	44.3	44.4	44.6	44.7	29	
30	15.0	18.5	45.3	45.5	45.6	45.8	45.9	46.1	46.2	30	
31	15.5	19.1	46.8	47.0	47.1	47.3	47.4	47.6	47.7	31	
32	16.0	19.7	48.3	48.5	48.6	48.8	48.9	49.1	49.2	32	
33	16.5	20.3	49.8	50.0	50.1	50.3	50.4	50.6	50.7	33	
34	17.0	20.9	51.3	51.5	51.6	51.8	51.9	52.1	52.2	34	
35	17.5	21.5	52.8	53.0	53.1	53.3	53.4	53.6	53.7	35	
36	18.0	22.1	54.3	54.5	54.6	54.8	54.9	55.1	55.2	36	
37	18.5	22.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	37	
38	19.0	23.3	57.3	57.5	57.6	57.8	57.9	58.1	58.2	38	
39	19.5	23.9	58.8	59.0	59.1	59.3	59.4	59.6	59.7	39	
40	20.0	24.5	60.3	60.5	60.6	60.8	60.9	61.1	61.2	40	

654

The paper in this book No. 370A
is made of 50% high grade rag stock
with a WATER RESISTING surface sizing.

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FINAL X-SECTION of EXC. for

CR 1357M

LOWER VALVE SHAFT Aug 26-02 1

Rogers

STA. H.I.

Lt.

±

Rt.

500.65

1+34

486.2 ⁹	486.3 ⁹	493.3
13.8	13.8	7.3
8.0	8.0	16

498.19
2.46
500.65

1+25

488.2	490.0	493.9
12.4	10.6	6.7
14	21	

1+12

478.7	488.7	489.0	491.1	486.8
21.7	11.7	11.6	9.5	13.8
24	8.0		10	15

1+00

478.1	489.5	489.1	489.3	491.3	488.9
22.5	11.1	11.5	11.3	6.3	11.7
28	11		3	10	18

0+75

477.5	489.8	489.7	492.4	498.5
23.1	10.8	10.7	8.2	2.1
26	8.0		5	9

FINAL X-SECTION LOWER VALVE SHAFT

2

CK 1224

£

STA H1
50065

0+07
478.4 482.7 489.6 490.5 497.4
222 129 11° 10° 3°
17 7 30 80

0+35
475.4 480.8 486.7 498.4
252 198 139 22
15 2 11

0+23
475.2 479.9 481.1 499.8
254 207 195 0.8
4 5 14

1+34
4789 482.5 482.7
86 50 4.8
22 14 50
14

1+25
4789
86
22

483.57
3.92
Sept. 15-92 487.49

FINAL X-SECTION FOR OUTLET PIPES

CK 138711

August 27-40 3

Sta	H.I.			±					
	483.4								477.97
									5.42
									483.39
0+00 (= 94145 on Axis)		4810 [✓]	477.7 [✓]	479.5 [✓]	477.7 [✓]	476.3 [✓]	477.3 [✓]	475.7 [✓]	
		2.4	5.7	3.9	5.7	7.1	6.1	7.7	
		15	8	5		6	8	14.5	
0+07		4818 [✓]	478.5 [✓]		477.1 [✓]	477.2 [✓]	474.7 [✓]		
		1.6	4.9		6.3	6.2	8.7		
		15	7			6	14		
0+12		4840 [✓]	480.5 [✓]		477.2 [✓]	475.2 [✓]	474.5 [✓]		
		7.0	2.9		6.2	8.2	8.9		
		15	11			8	14		
0+20		4834 [✓]	480.6 [✓]		477.8 [✓]	475.8 [✓]	474.9 [✓]		
		0.0	2.8		5.6	7.6	8.5		
		15	11			7	14		
0+32		4850 [✓]	479.0 [✓]		477.9 [✓]	475.5 [✓]	474.6 [✓]		
		7.6	4.0		5.5	7.9	8.8		
		15	10			5	14		

STA H1

0+40 183.4

4843 ^v	4789 ^v	4769 ^v	476.0 ^v	4748 ^v	476.6 ^v	476.1 ^v
10.9	4.5	6.5	7.4	8.6	6.8	7.3
15	9	5		8	11	14

0+50

481.6 ^v	480.0 ^v	476.0 ^v	473.8 ^v	475.5 ^v
1.8	3.4	7.0	9.6	7.9
15	13		7	14

0+60

481.2 ^v	477.2 ^v	478.6 ^v	476.0 ^v	473.4 ^v	474.1 ^v
2.2	4.2	4.8	7.4	10.0	9.3
15	12	7		7	14

0+70

482.5 ^v	478.2 ^v	478.7 ^v	475.6 ^v	472.9 ^v	472.9 ^v
0.9	5.2	4.7	7.8	10.5	10.5
15	12	9		10	14

0+80

480.5 ^v	477.0 ^v	478.1 ^v	476.0 ^v	475.1 ^v	474.9 ^v	472.7 ^v	472.7 ^v
2.9	6.4	5.3	7.4	8.3	8.5	10.7	10.7
15	13	9	3		5	9	14

0+90

477.5 ^v	478.3 ^v	475.7 ^v	474.0 ^v	474.7 ^v	473.5 ^v	474.6 ^v	475.6 ^v	472.4 ^v
5.9	5.1	7.7	9.4	8.7	9.9	8.8	11.0	
15	10	9		4	7	10	14	

STA H.I.
1+00 483.4

478.9 [✓]	^{478.4[✓]} 477.4 [✓]	475.5 [✓]	474.6 [✓]	472.0 [✓]	470.8 [✓]
4.5	5.0	7.9	8.8	11.2	12.6
15	8	5		12	14

1+08

477.7 [✓]	473.8 [✓]	475.7 [✓]	^{474.3[✓]} 472.3 [✓]	472.5 [✓]	^{470.9[✓]} 471.9 [✓]
5.7	9.6	7.7	9.0	10.9	12.5
15	12	2		4	14

1+20

476.5 [✓]	475.8 [✓]	477.8 [✓]	475.3 [✓]	474.6 [✓]	470.7 [✓]
6.9	7.6	5.6	8.1	8.8	12.7
15	13	10	6		14

1+30

477.8 [✓]	473.9 [✓]	470.9 [✓]
5.6	9.5	12.5
15		14

FINAL X-SECTION BIK # 13 CRABBIT

Rogers

8-27-42

6

4843

9+10

20N	4.1	480.2'
19N	6.9	477.4'
18N	8.2	476.3'
12N	4.9	479.4'
10N	5.0	479.3'
5N	7.2	477.3'
0	6.7	477.6'
6S	5.6	478.7'
10S	7.7	476.6'
20S	6.5	477.8'
30S	7.0	477.3'
40S	7.9	476.4'
50S	8.6	475.7'
60S	8.2	476.7'
70S	9.0	475.3'

Bik # 13

CK 1387M

7

4843

9+10

805 9.4 474.9'

905 9.3 475.0'

1005 9.5 474.8'

1105 10.6 473.7'

1205 9.8 474.5'

1305 10.0 473.9'

1405 9.0 475.3'

9+04

1105 11.9 472.4'

1005 10.8 473.5'

905 8.8 475.5'

855 11.0 473.3'

805 10.6 473.7'

705 10.6 473.7'

✓

BIL#13

CK 186M

8

4843

9+12

20N 3.5 480.8'

19N 5.8 478.5'

15N 8.1 476.2'

10N 7.1 477.2'

6N 5.6 478.7'

0 6.5 477.8'

B.M. 9.10 487.07' 477.99'

9+20

0 7.7 479.01'

10N 8.8 478.3'

14N 9.6 477.5'

18N 8.5 478.6'

6.5 9.4 477.7'

10.5 7.8 479.3'

20.5 7.7 479.0'

BIE #13

CK 1961

9

48707

9720

305	8.2	478.9 ^v
355	8.8	478.3 ^v
405	10.4	476.7 ^v
505	9.3	477.8 ^v
605	8.6	478.5 ^v
705	9.4	477.7 ^v
805	10.6	476.5 ^v
905	12.6	474.5 ^v
955	10.3	476.8 ^v
1005	11.9	475.2 ^v
1105	10.9	476.2 ^v
1205	11.9	475.7 ^v
1305	12.3	474.8 ^v
1405	12.2	474.9 ^v

Bik #13

CR. 18611

10

48207

9+26

1305 10.3 476.8'

1205 11.3 475.8'

1105 13.1 474.0'

1045 12.1 475.0'

1005 8.6 478.5'

905 7.3 479.8'

855 10.6 476.5'

805 9.2 477.9'

705 9.2 477.9'

605 8.1 479.0'

505 7.7 479.4'

9+25

405 6.9 480.2'

305 7.5 479.6'

205 6.1 481.0'

Bik #13

CR 18871

11

487.07

9+25

10S 6.3 480.8^v5S 8.2 478.9^v0 7.1 480.0^v10N 8.0 479.1^v18N 5.7 481.4^v

9+30

10N 3.3 483.8^v18N 2.0 485.1^v20N 40.3 487.4^v0 6.6 480.5^v10S 3.2 483.9^v20S 1.9 485.2^v30S 1.7 485.4^v40S 2.0 485.1^v50S 5.8 481.3^v

✓

FINAL X-SECTION Blk # 13

CR 1357

12

487.07

9+30

605 5.8 481.3[✓]

705 4.8 482.3[✓]

805 7.4 479.7[✓]

905 8.7 478.4[✓]

1005 8.2 478.9[✓]

1105 10.2 476.9[✓]

1205 10.8 476.3[✓]

1305 9.3 477.8[✓]

1405 10.7 476.4[✓]

✓

FINAL X-SECTION Blk #18 CK 13271

13

T.P. 490 574.90 570.0

11+55

10N 16.2 558.7

8N 17.5 557.4

0 154 559.5

10S 13.1 561.8

20S 8.0 566.9

30S 5.8 569.1

33S 2.8 572.1

40S 0.8 574.1

10N 11+60 13.3 561.6

5N 14.6 560.3

0 13.0 561.9

10S 9.8 565.1

20S 3.8 571.1

30S 4.2 570.7

34S 3.6 571.3

✓

Blk # 18

CK 1987A

14

570.90

11460

36.5

1.5 573.4'

40.5

0.6 574.3'

11465

0

9.6 565.3'

4.5

7.1 562.8'

10.5

5.4 569.5'

15.5

2.9 572.0'

20.5

1.8 573.1'

11470

10.5

11.0 563.9'

2.5

10.3 564.6'

0

8.2 566.7'

6.5

4.0 570.9'

10.5

3.0 571.9'

16.5

2.0 572.9'

↓

Blk # 18

CK 136711

15

574.90

11+80

7 N		9.7	565.2'	El on Conc Plug
0		9.2	565.7'	" " "
4 S		2.2	572.7'	
10 N		+0.6	575.5'	
	1045	584.17	0.88	574.02'
10 S		10.1	574.4'	
20 S		5.8	578.7'	
25 S		4.4	580.1'	
30 S		4.4	580.1'	
40 S		6.5	578.0'	
45 S		6.0	578.5'	
50 S		2.0	582.5'	
55 S		0.8	583.7'	

✓

Bik # 18

CK 13671

16

584.47

11+70

20S	8.6	575.9'
30S	9.2	575.3'
40S	9.9	574.6'
45S	9.7	574.8'
50S	5.8	578.7'
55S	2.7	581.8'

11+60

56S	4.7	579.8'
50S	7.0	577.5'

11+90

10N	4.3	583.2'
4N	4.8	579.7'
0	4.6	579.9'
10S	4.8	579.7'
20S	5.3	579.2'

✓

BIL # 18

CK 13574

17

58447

11+90

30S	3.0	581.5	El. on Conc Plug
35S	4.1	580.4	
40S	1.6	582.9	
50S	+1.7	586.2	

11+84

10N	6.3	578.2
5N	8.1	576.4
0	7.4	577.1
7S	7.8	576.9
10S	10.3	574.2
20S	4.9	579.6

58007
 427
 577.8

✓

Rogers

FINAL X-SECTION Bkt #13 CK 1967M

Sept 4-1942 18

BM 8.84 493.49 484.65

9+10

1505 20.0 473.5'

1605 18.5 475.0'

1705 16.5 477.0'

1805 16.2 477.3'

1905 16.1 477.0'

2005 15.5 478.0'

2105 14.0 479.5'

2205 11.0 482.5' 1.5'

9+20

1505 17.7 475.8'

1605 16.7 476.8'

1705 17.2 476.3'

1805 15.3 478.2'

1905 14.4 479.1'

2005 13.6 479.9'

Blk#13

CK BEM

19

493.49

9+20

2105

9.2

487.3

2145

5.7

487.8

2205

6.6

486.9

9+30

1505

15.8

477.7

1605

13.8

479.7

1705

14.5

479.0

1805

14.4

479.1

1905

14.0

479.1

2005

9.2

484.3

2105

2.0

491.5

2205

2.7

490.8

9+40

2105

+3.2

496.7

2055

+2.9

496.4

0.0

0.3

✓

L.H.H.

8/11/44

Please secure the following info within inspection gallery of San Vicente Dam (after Agate St job)

1. Top of casing, of ^{each} riser drain - referred to Res Log
2. Bottom of each riser drain.
3. Station of each riser drain.

Note that Block 1 is on West side

Drains should be numbered from west to east within each block and numbering the drain at west end of each block (in the contraction joint) as No 1. F.I.

Sta 321	Block 1	Drain 1
3+31		2
3+41		3
3+51		4
3+61		5
Sta 371	Block 2	Drain 1
		2
		3
		4
		5

etc.

4. Mark Station + Drain No. ^{and Res Ga of top of riser drain casing} on Wall behind each drain
5. Get depth of water from top of riser drain casing
6. Refer to WD 710 sheet 2, and WD 3035 sheets 1 & 2 attached.
7. Return Dwg's when finished.

R.B.

221

271

- 1 E Landung
- 2 Offset?
- 3 US6S?

19079
~~32~~
~~186~~

7/17/48 9905

62143
 =
 16148
 437
 16682
 2897
 19479

62680
 437
 62143

65477
 62580
 2897

Bk #13

ck. 18671

20

493.09

9+40

2005	2.4	491.1'
1905	3.5	490.0'
1805	8.1	485.4'
1705	7.9	485.6'
1605	8.1	485.4'
1505	11.5	482.0'

Also
See book 622, 188.66

1.17
8.5
32

✓

FINAL X-SECTION BK # 15

Rogers
9-15-42 21

BM 126 541.60 529.03
10+00

20N 12.6 529.0
30N 4.4 537.2
40N 0.6 541.0
50N +3.4 545.0

BM, 126 529.03 = 529.03
4.40 548.82 544.42

~~885 16.0 532.8~~

see pg. 38, this book

~~905 10.0 538.8~~

1005 8.6 540.2

1105 4.5 544.3

1205 2.9 545.9

1305 3.0 545.8

BM, 4.40 544.02 = 544.42



Sept. 1942

22

BACKFILL X-SECTION WASTEWAY

CR.BEM

Station	CR.BEM	Height
TP. 2.85	479.98	477.13
	479.98	
	151.95	
9+00	9.0	471.0'
8+93.5	9.4	470.6'
+83.5	10.8	469.2'
+73.5	11.2	468.8'
+63.5	12.4	467.6'
+53.5	15.3	464.7'
8+47	16.7	463.3'
+37	17.0	463.0'
+27	16.9	463.1'
+17	13.8	467.2'
+07	7.3	472.7'
8+00 ^E	2.7	477.3'
7+92	0.8	479.2'
	160.5	
7+92	0.9	479.1'

Note: This cross section taken for estimate of backfill necessary to level off area downstream from blocks #11 and #12

⑧

Roadway

Roadway

479.95
~~499.98~~

8+00.5 1.5 478.5

8+07 7.8 472.2

+17 14.2 465.8

+27 17.6 462.4

+37 18.2 461.8

+47 17.5 462.5

+53.5 15.5 464.5

+63.5 12.5 467.5

+73.5 11.9 468.1

+83.5 10.8 469.2

+93.5 5.9 474.1

9+00 5.5 474.5

170.5

9+00 3.7 476.3

8+93.5 4.2 475.8

8+90 8.5 471.5

479.98
~~479.98~~

170.5

8183.5	9.5	470.1
+93.5	7.1	472.9
+63.5	12.0	468.0
+53.5	17.2	462.8

180.5

9100	3.3	476.7
8+93.5	3.8	476.2
+83.5	5.4	474.6
+73.5	1.2	478.8
+63.5	7.9	472.1
+53.5	17.2	462.8

190.5

9100	2.9	477.1
8+93.5	3.2	476.8
8+83.5	3.7	476.3

479.98

1905

8+735 41 475.9

+635 47 475.3

+535 14.0 466.0

+17 16.1 463.9

2005

9+00 29 477.1

8+935 30 476.6

+835 38 476.7

+735 45 475.5

+635 22 472.8

+535 9.3 470.7

+47 13.3 466.7

+37 15.7 464.3

2105

9+00 26 477.0

BACKFILL X-SECTION WASTEWAY ^{CKBEM}

26

479.98
477.98

210.5

8+93.5	3.9	476.1
+83.5	4.3	475.9
+73.5	4.8	475.2
+63.5	4.6	475.0
+53.5	7.9	472.1
+47	7.9	472.1
+37	13.7	466.3
+27	14.2	465.8
+17	9.0	471.0
+07	2.0	478.0

8+00.5

2.6

472.0

Roadway

200.5

8+00.5

2.3

477.7

Roadway

+07

2.7

477.3

+17

9.9

470.1

479.98
~~499.98~~

C.K. B.E.M.

200.5

8+07 ^{p maybe}
27 B.E.M.

14.7 465.3'

190.5

8+00.5

1.8 ^{78.2'}
468.2'

+07

3.7 476.3'

+17

11.2 468.8'

180.5

8+00.5

1.2 478.6' Roadway

+07

5.0 475.0'

+17

11.5 468.5'

170.5

8+00.5

1.0 479.0' Roadway

+07

6.0 474.0'

+17

14.0 466.0'

220.5

8+83.5

4.1 475.9'

47998
~~47978~~

220.5

8473.5	4.7	475.3	
+63.5	5.1	474.9	
+53.5	5.0	475.0	
+47	2.0	473.0	
+37	2.6	472.4	
+27	9.0	471.0	
+17	6.3	473.7	
+07	3.0	477.0	
8400.5	3.1	476.9	Roadway

230.5

8400.5	3.3	476.7	Roadway
+07	3.5	476.5	
+17	4.5	475.5	
+27	2.9	472.1	
+37	6.4	473.6	

(Area Downstream from blocks 114) ^{SK} BEN

29

079.98

230.5

8447

5.5

474.5

+53.5

5.4

474.6

+63.5

5.0

475.0

+73.5

4.7

475.3

240.5

8407

3.7

476.3

+17

4.0

476.0

+27

5.3

474.7

+37

5.8

474.2

+47

5.6

474.4

+53.5

5.3

474.7

+63.5

4.9

475.1

+73.5

4.5

475.5

250.5

8407

4.0

476.0

AREA Downstream from Black 11412)

X-SECTION WASTEWAY CKBEM

30

479.98

2505

8417	4.6	475.4
+27	5.2	474.8
+37	5.0	475.0
+47	4.8	475.2
+53.5	4.8	475.2
+63.5	4.1	475.9
+73.5	3.0	472.0

BIR # 13 FINAL X-SECTION

Rogers

9-23-42

31

B.M. 8.16 506.35 ✓
498.19

9+10

28 N 11.2 495.1 ✓

32 N 7.8 498.5 ✓

40 N 7.6 498.7 ✓

50 N 6.4 499.9 ✓

9+20

50 N 6.1 500.2 ✓

40 N 4.3 502.0 ✓

30 N 5.3 501.0 ✓

27 N 7.2 498.1 ✓
9.1

9+30

50 N 0.0 506.3 ✓

40 N 1.6 500.7 ✓

36 N 2.4 503.9 ✓

30 N 8.8 497.5 ✓

✓

STA 9+60 - 10+10 FINAL X-SEC

32

237 513.89 511.52

9+60

40N +3.2 517.1

B.M. 4.70 533.73 529.03

9+80

30N 6.2 527.5

20N 1.1 532.6

9.74 538.77 4.70 529.03

0 9+90 17.5 521.3

7N 17.6 521.2

10N 22.1 516.7

17N 21.5 517.3

20N 15.8 523.0

30N 2.2 531.6

40N 2.0 536.8

50N

10.6
15.6
6.5
2.1

✓

STA 9+60 - 10+10

538.77 ✓

9+90

12.5	19.6	519.2 ✓
10.5	17.8	521.0 ✓
20.5	15.0	523.8 ✓
30.5	16.6	522.2 ✓
40.5	15.9	522.9 ✓
50.5	15.8	523.0 ✓
60.5	11.9	526.9 ✓
70.5	11.0	527.8 ✓
80.5	10.3	528.5 ✓
85.5	13.3	525.5 ✓
90.5	12.8	526.0 ✓
100.5	10.2	528.6 ✓
105.5	8.1	530.4 ✓
110.5	2.3	536.5 ✓

See page 44 This book

" " " " "

✓

STA 9+60-10+10

2.93 547.39

10+00

544.46

Reams

9-25-12

34

16.1

23.6

523.8

~~12.1~~

~~24.2~~

~~523.2~~

See pg. 38, this book

10.1

22.1

525.3

0

18.2

529.1

10.5

15.2

532.2

20.5

11.6

535.8

30.5

13.7

533.7

40.5

13.7

533.7

50.5

11.8

535.6

60.5

12.6

534.8

70.5

14.8

532.6

~~80.5~~

~~15.5~~

~~532.2~~

See pg. 38, this book

~~12~~

(?)

~~15.5~~

~~552.9~~

?

STA 9+60-10+10

542.39 ✓

10+10

1205	+5.5	552.9 ✓
1105	+4.1	551.5 ✓
1005	+2.9	550.3 ✓
905	+1.0	548.4 ✓
805	4.2	543.2 ✓
705	8.5	538.9 ✓
605	1.7	545.7 ✓
505	1.9	545.5 ✓
455	5.8	541.6 ✓
405	5.8	541.6 ✓
305	4.0	543.4 ✓
205	4.1	543.3 ✓
105	7.7	539.7 ✓
0	14.3	533.1 ✓
105	17.3	530.1 ✓

Rogers
9-25-12

35

see pg 39, this book ✓

STA 9+60 - 10+10 FINAL X-SECTION

36

547.39 ✓

10+10

16 N 17.3 530.1 ✓

20 N 15.3 532.1 ✓

30 N 5.3 542.1 ✓

40 N 2.0 545.4 ✓

50 N 0.6 546.8 ✓

10+20

10 N 0.8 546.6 ✓

FINAL X-SECTION BIK# 15

10-16-42 37

10.25 539.28 ✓ 579.03

10+10

~~705 0.3 539.0 ✓~~

See pg 35, this book

715 1.7 537.6 ✓

775 0.4 538.9 ✓

~~805 13.8 543.1 ✓~~

See pg. 35 this book

10+05

705 4.4 534.9 ✓

805 4.9 534.4 ✓

855 3.4 535.9 ✓

10+04

875 4.0 535.3 ✓

855 7.0 532.3 ✓

805 21 532.2 ✓

755 21 532.2 ✓

705 4.4 534.9 ✓

Bik # 15

539.28 ✓

10+00

~~705~~

~~5.6~~

~~533.7~~ ✓

745

7.7

531.6 ✓

805

7.0

532.3 ✓

825

9.3

530.0 ✓

875

8.7

530.6 ✓

915

4.9

534.4 ✓

1150

540.53 ✓

529.03 ✓

10+00

0

11.3

529.2 ✓

5N

12.9

527.6 ✓

13N

17.6

522.9 ✓

~~10N~~

~~14.8~~

~~525.7~~ ✓

Sta. 10+05

0

10.6

529.9 ✓

6N

12.3

528.2 ✓

see pg. 34, this book

see pg. 34, this book

540.53 ✓

10+05

7N	14.6	525.9 ✓
13N	12.7	524.8 ✓
10N	15.0	525.5 ✓

10+10

0	7.9	532.6 ✓
4N	10.4	530.1 ✓
10N	8.9	531.6 ✓
13N	12.4	529.1 ✓

10+20

0	2.5	538.0 ✓
10N	6.2	534.3 ✓
13N		

10+30

0	0.1	540.4 ✓
10N	1.7	538.8 ✓

540.53 ✓

10730

13N

1.0

539.5 ✓

~~10740~~

0

~~+3.8~~

544.3 ✓

10N

~~+1.5~~

542.0 ✓

~~13N~~

~~+1.4~~

~~541.9 ✓~~

VOID

✓

FINAL X-SECTION B/L#16

10-22-42 41

BM, 9.04 553.46 ✓ 544.42

10+50

0	10.1	543.4 ✓
10 N	10.4	543.1 ✓
15 N	9.4	544.1 ✓
2 S	9.2	544.3 ✓
4 S	5.5	548.0 ✓
7 S	5.5	548.0 ✓

10+60

0	8.8	544.7 ✓
6 N	11.2	542.3 ✓
10 N	10.2	543.3 ✓
15 N	10.0	543.5 ✓

see book 622, pg. 62

10+70

0	7.0	546.5 ✓
10 N	8.9	544.6 ✓
13 N	8.8	544.7 ✓

BIL #16 FINAL X-SECTIONS

42

553.46

10770

25	6.4	547.1 ✓
65	3.0	550.5 ✓
105	0.7	552.8 ✓

10780

0	6.6	546.9 ✓
4N	6.2	547.3 ✓
5N	7.7	545.8 ✓
10N	6.9	546.6 ✓
12N	6.5	547.0 ✓
85	0.9	552.6 ✓
105	0.8	552.7 ✓

10790

0	4.1	549.4 ✓
10N	5.8	547.7 ✓
11N	6.4	547.1 ✓
105	+0.3	553.8 ✓

FINAL X-SECTION B/k# 14

11-5-42 43

4.53 534.91[✓]

530.38[✓]

9+70

120S

18.7 516.2[✓]

123S

12.0 522.9[✓]

130S

13.7 522.2[✓]

135S

11.0 523.9[✓]

140S

12.6 522.3[✓]

150S

12.0 522.9[✓]

160S

14.3 520.6[✓] Original/S.

9+80

150S

5.0 529.9[✓] N.S.

140S

5.7 529.5[✓]

130S

4.6 530.3[✓]

120S

4.3 530.6[✓]

114S

5.2 529.7[✓]

112S

11.1 523.8[✓]

110S

11.2 523.7[✓]



B/K #19

49

53091

1005	9+80	13.9	521.0
1105	9+90	+1.8	536.7
1205		+5.0	539.9
1155		+4.6	539.5
1305		+4.8	539.7
1405		+0.8	535.7
1505		+0.5	535.4
1605		2.6	532.3
1005		6.3	528.6
1055		5.8	529.1

N.S.

Approx.

"

530.9
6.3
524.6
57.73
528.6

5.8
5.5

U.S.G.S.
Res. Ga. ~~City~~ ~~Station~~

	H.I.			
(29.95 @ +25° 17'	5.25	50.09	510.02	
69.60 @ +29° 44'	5.25	69.29	529.27	
+5.52	534.79	-5.20	69.61	529.59
(37.75 @ +27° 28'	5.20	92.22	552.20	
79.82 @ +30° 46'	5.20	115.64	575.62	
+6.56	582.18	-5.16	117.04	577.02
(39.33 @ +27° 33'	^{H.I.} 5.16	140.29	600.27	
76.57 @ +30° 32'	H.I. 5.16	161.10	621.08	
+5.03	626.11	-5.91		620.20

on step

Landing # 5 (W. END of landing)

" " (E. " " " ")

on step

Landing # 6 (W. END)

" " (E. ")

on step

Top Landing (E. END.)

B.M. 100' 30.0 of downstream face, sta. 11+70
E. 620.16

ELEVATIONS of DRAIN
RISERS SAN VICENTE DAM

8-22-44

BYIER
King
atten
Stephens

smaller
PIPE

Depth to
Bottom
Elev

Water
Elev.

Obstruc.
47

Res. Gauge

All - (MINUS) from TOP of drain casing. These meas. are

	202	163.01		160.99	BM TOP ^W Landing				
4+11			0.45	162.56	BLK 2 - #5	?	137.15		
							-25.91		
4+21			5.96	157.05	BLK 3 - #1		137.05	127.33	
							-20.00	-29.72	
	8.03	151.62		143.59	B.M. on step				
4+31			0.10	151.52	BLK 3 - #2		106.45	119.9	126.2
							-45.07	-31.6	Obstruc. -25.3
4+41			6.92	144.70	BLK 3 - #3		99.32	113.2	117.6
							-45.38	-31.5	Obstruc. -27.1
	0.00	143.59		143.59	B.M. on step				
4+51			5.98	138.11	BLK 3 - #4		85.47	103.71	
							-53.64	-34.4	
	6.60	124.94		118.34	B.M. on Landing #2				
TP	7.32	131.64	0.62	124.32					
4+61			0.00	131.64	BLK 3 - #5		82.04	106.4	
							-49.60	-25.2	

					Top S.M. PIPE	Bottom El.	Water El.	OBstruc. 48
	6.60	124.94		118.34	B.M. on landing #1			
4+91			0.30	124.64	BLK. 4-#1	98.49	no water	no pipe
			4.95	119.99	BLK. 4-#2	-26.15		
4+81						-29.05	no water	Grout ring -23.8
	0.00	118.34		118.34	B.M. on landing #2			
4+91			3.55	114.79	BLK 4-#3	-56.36	-36.8	
TP	2.05	112.39	8.00	110.34				
5+01			4.33	108.06	BLK 4-#4	-46.27	-35.85	Grout ring -24.8
	6.05	101.61		95.56	B.M. on step			
5+11			0.0	101.61	BLK 4-#5	-47.18	-29.3	Grout ring -25.2
	0.0	95.56		95.56	B.M. on step			
5+21			0.64	94.92 94.87	BLK 5-#1	-32.0	-26.3	
TP	1.23	88.14	8.65	86.91		-50.67	-19.95	
5+31			0.0	88.14	BLK 5-#2	-50.67	-19.95	
5+41			6.93	81.21	BLK 5-#3	-61.45	-16.25	

						Bottom El.	Water El.	49
	6.65	71.51		64.86	B.M. on Landing #3			
TP	4.60	74.79	1.32	70.19				
5757			0.0	74.79	BLK. 5-#4	-59.02	-9.95	
	6.65	71.51		64.86	B.M. on Landing #3			
5761			3.38	68.13	BLK. 5-#5	-58.91	-13.83	
	0.0	64.86		64.86	B.M. on Landing #3			
5771			0.30	64.56	BLK 6-#1	-57.11	-10.3	
TP	2.05	58.27	8.64	56.22				
5781			0.25	58.02	BLK 6-#2	-41.60	-2.35	
5791			6.95	51.32	BLK 6-#3	-54.41	+0.0	
	6.45	44.63		38.18	B.M. on step			
6401			0.0	44.63	BLK. 6-#4	-54.2	+0.0	
	0.0	38.18		38.18	B.M. on step			
6411			0.8	38.10	BLK 6-#5	-71.0	-8.1	
6421			6.95	31.23	BLK 7-#1	-63.20	-1.3	
TP	0.0	29.54	8.64	29.54				
6430			4.25	25.29	BLK 7-#2	-44.20	-6.0	

						Bottom El.	Water El.	50
	6.28	19.10		12.82	B.M. on 6 th step			
6+40			0.0	19.10	BLK 7-#3	-45.50	+0.0	
	4.06	12.93		8.87	B.M.			
6+49			0.15	12.78	BLK 7-#4	-50.40	-2.2	
6+58			2.60	10.33	BLK 7-#5	-53.06	-1.0 seepage	
6+67			2.54	10.39	BLK 8-#1	-49.73	-0.25	
6+77			2.76	10.17	BLK 8-#2	-51.46	+0.0 seepage	
6+86			2.91	10.02	BLK 8-#3	-49.75	-0.15	
6+94			2.91	10.02	BLK 8-#4	-51.85	+0.0 seepage	
7+05			3.10	9.83	BLK 9-#5	-52.31	-2.65	
7+14			3.14	9.79 ✓	BLK 9-#1	-44.05	-2.50	
7+23			3.28	9.65	BLK 9-#2	-53.73	-0.1	
7+33			3.39	9.54	BLK 9-#3	-46.32	+0.0 seepage	
7+43			3.31	9.62	BLK 9-#4	-53.91	+0.0 seepage	
7+51			3.26	9.67	BLK 9-#5	-52.70	-0.15	
7+60.5			3.26	9.67	BLK 10-#1	-52.15	+0.0 seepage	
7+70			3.11	9.82	BLK 10-#2	-48.83	-0.13	

						Bottom El.	Water El.	
	129.3							51
7779		3.0	9.93		BLK 10-#3	-50.65	+0.35	
7787		2.95	9.98		BLK 10-#4	-53.01	-0.2	
7797		2.81	10.12		BLK 10-#5	-47.42	+0.0	See page
8407		2.54	10.39		BLK 11-#1	-43.65	-0.3	
8416		2.39	10.54		BLK 11-#2	-40.57	+0.0	See page
8426		2.27	10.66		BLK 11-#3	-36.59	-0.2	
8435		1.62	11.31		BLK 11-#4	-39.35	+0.0	See page
	9.00	16.93	4.00	8.934	Bottom of E. flight	El. 8.94	(check)	
TP	4.69	21.62	0.0	16.93				
8444		4.22	17.40		BLK 11-#5	-46.46	-6.15	
	7.00	23.93	4.69	16.93				
8454		0.0	23.93		BLK 12-#1	-49.17	.515	
	6.0	31.66		31.66				
8463		1.75	29.91		BLK 12-#2	-46.96	-11.1	
	4.0	35.66		31.66				
8472		2.30	33.36		BLK 12-#3	-34.86	-9.1	
8481		2.05	33.61		BLK 12-#4	-24.60	-7.15	

	8.64	40.64		32.00
9491			5.30	35.34
	4.00	44.64	0.0	40.64
9400			3.11	41.53
	0.0	50.04		50.04
9407			3.20	46.84
	8.00	58.04		50.04
9419			3.79	54.25
TP	8.00	66.04	0.0	58.04
9430			4.32	61.72
	4.00	70.04	0.0	66.04
9440			1.52	68.41
	4.05	74.34	0.75	69.29
9450			2.45	71.89
	4.00	73.61		69.61
9460			2.50	71.11
9470			2.35	71.26

	Bottom El.	Water El.	52
B.M. on End Landing #4			
BLK 12 #5	-45.72	-9.1	
BLK 13 #1	-48.45	-14.65	
B.M. on step			
BLK 13 #2	-31.15	-16.4	
B.M. on step			
BLK 13 #3	-61.70	-15.25	
BLK 13 #4	-55.35	-22.55	
BLK 13 #5	-59.70	-22.35	
B.M. Wind Landing #5	El. 69.29	(check)	
BLK 14 #1	-40.0	-24.16	Grout ring -13.70
B.M. End Landing #5			
BLK 14 #2	-42.14	-25.15	Grout ring -21.80
BLK 14 #3	-20.26	-19.20	

		73.61		
TP	4.00	77.61	0.0	73.61
TP	4.00	81.61	0.0	77.61
9480			4.51	77.10
TP	4.00	85.61	0.0	81.61
9490			1.90	83.71
TP	6.65	92.26	0.0	85.61
10400			1.75	90.51
	8.00	100.22	6.69	92.22
10410			3.19	97.03
TP	4.00	104.22	0.00	100.22
10420			0.60	103.62
TP	8.00	112.22	0.0	104.22
10430			1.90	110.32
TP	4.00	116.22	0.0	112.22
			0.61	115.61
	4.11	119.75		115.64
10440			2.46	117.29

Bottom El.	Water El.	53
---------------	--------------	----

BLK. 14 - #4

-22.85 -22.7

Smaller
Pipe
-17.60

BLK 14 - #5

-46.51 -23.85

BLK 15 - #1

-38.8

Grout
ring
-19.5

BLK 15 - #2

-38.8

Grout
ring
-18.5

BLK. 15 - #3

-44.45 -25.30

Grout
ring
-20.50

BLK 15 - #4

-42.55 -37.4

Grout
ring
-22.10

AM. wind landing #6 El. 115.64 (check)

BLK. 15 - #5

-26.40

Smaller
vert. pipe
-16.50

					Bottom El.	Water El.	54
		119.75					2 Grout 1"ing -23.20 -26.20
10+50		2.00	117.75	BLK.16-#1	-41.40	-38.50	Grout 1"ing -26.60
10+60		1.55	118.20	BLK.16-#2	-36.20	—	
10+70		1.40	118.35	BLK.16-#3	-26.58	—	
TP	4.42	120.90	3.77	115.98			
10+80		1.90	118.50	BLK.16-#4	-28.26	—	
10+90		1.70	118.70	BLK.16-#5	-45.10	-40.60	Grout 1"ing -25.3
11+00		2.15	118.25	BLK.17-#1	-44.65	-39.5	Small vert. pipe -14.30 Grout 1"ing 16.80
11+10		2.01	118.39	BLK.17-#2	-27.95	-25.4	
TP	A.20	120.95	3.75	116.65			
11+20		2.35	118.5	BLK.17-#3	-49.45	-25.6	
11+30		2.05	118.8	BLK.17-#4	-26.90	-16.90	
11+40		1.42	118.43	BLK.17-#5	-26.79	-17.60	
TP	8.00	125.04	3.81	117.04			
11+50		0.15	124.89	BLK.18-#1	-39.8	-20.1	
	8.00	133.04	0.0	125.04			
11+60		1.55	131.49	BLK.18-#2	-52.82	-25.30	

B.M. on E. end of Landing #6 El. 117.04 (check)

		133.04		
TP	8.00	141.04	0.0	133.04
11470			2.75	138.29
TP	8.00	148.29		140.29
11480			3.70	144.59
TP	4.00	152.29	0.0	148.29
11490			0.75	151.54
TP	8.00	160.29	0.0	152.29
12400			1.25	159.04
TP	4.00	164.29	0.0	160.29
12410			1.60	162.99
			3.25	161.04

BLK. 18 - #3

B.M. on STEP E.I. 137.39

BLK. 18 - #4

BLK. 18 - #5

BLK 19 - #1

BLK 19 - #2

B.M. Top of K. Landing E.I. 161.10 check

Bottom Water
E.I. E.I.

55

- 44.5 - 30.25

- 50.90 - 35.00

- 45.62 - 32.90

- 59.22 - 36.5

- 13.50 - 38.60

Small
Vent. Pipe

- 25.50

Grout
ring

- 27.00

Grout
ring

- 31.00

Grout
ring

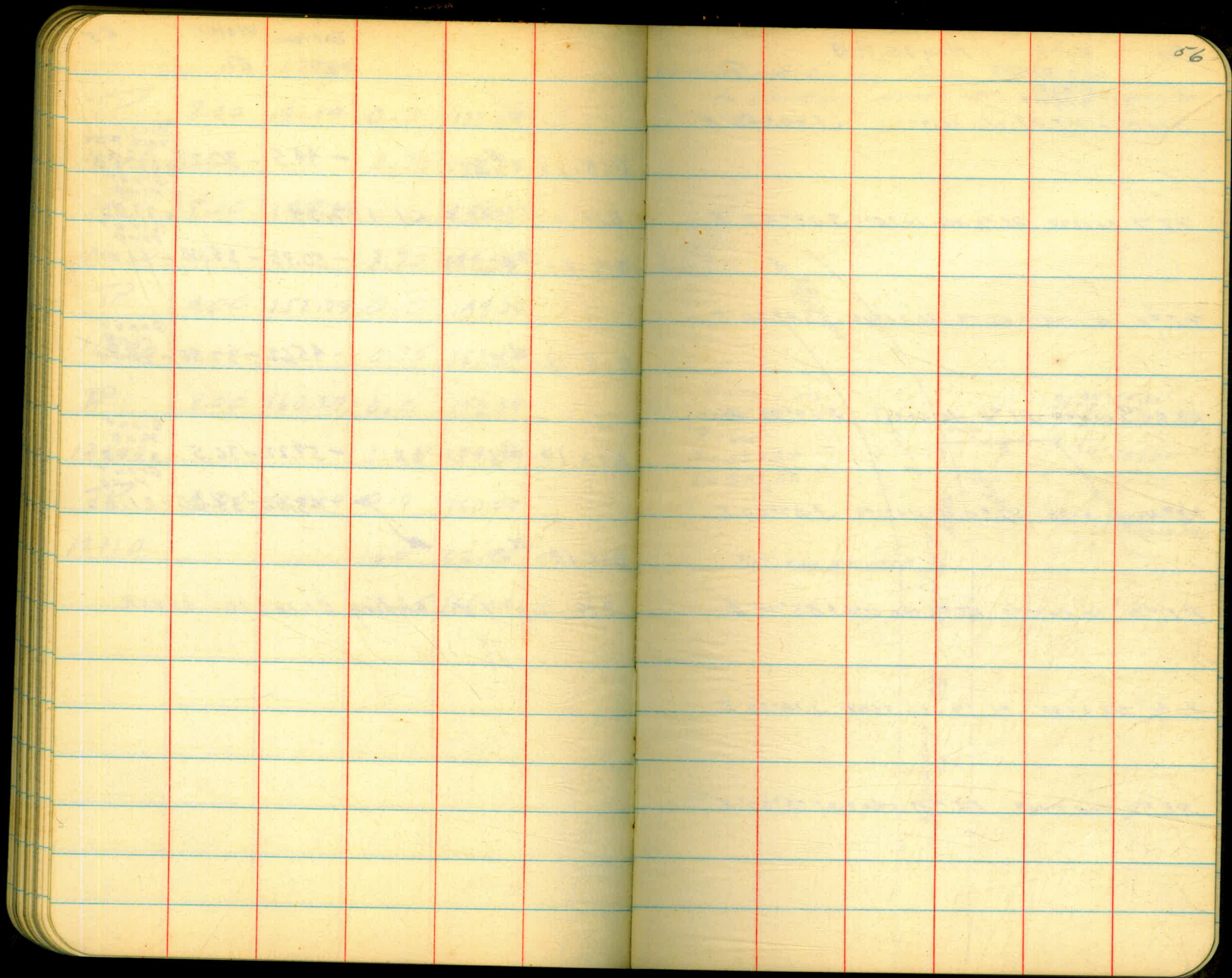
- 32.70

Grout
ring

- 32.90

Grout
ring

- 21.60



King
Shipman
West
Payne

May 25, 1949

Mag. Bearing

0+00 - P.I. #1 Sta. 141300 $\angle 139^{\circ}30'E$

P.I. #1 Sta. 141320 P.I. #2 Sta. 147500 $503^{\circ}45'E$

P.I. #2 Sta. 147500 P.I. #3 Sta. 212400 $528^{\circ}30'E$

P.I. #3 Sta. 213400 P.I. #4 Sta. 3+33 $319^{\circ}00'W$

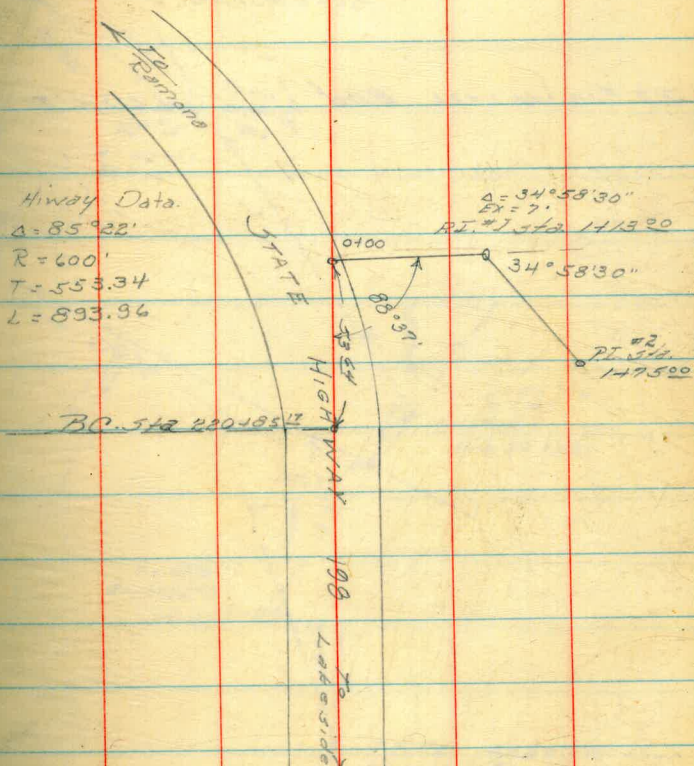
P.I. #4 Sta. 3+33 P.I. #5 Sta. 447200 $\angle 97^{\circ}00'E$

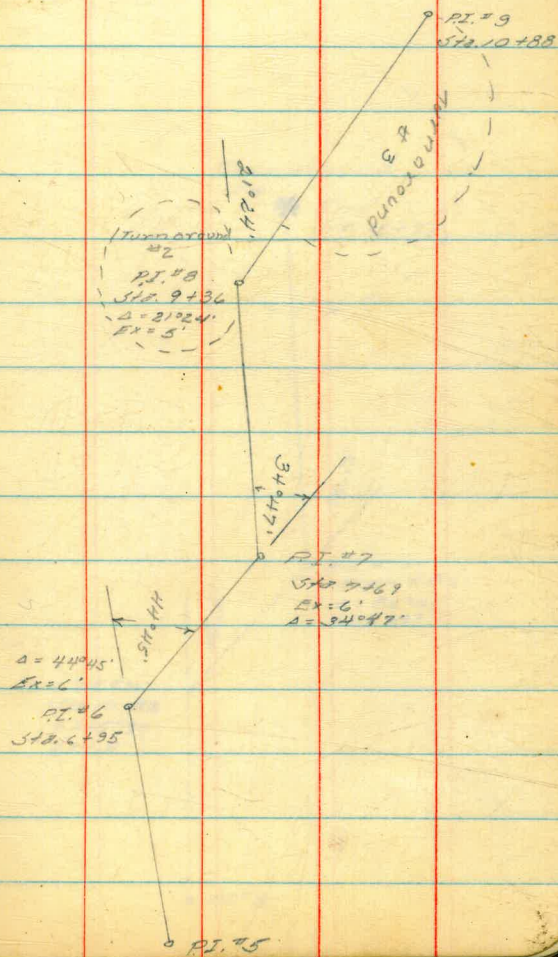
P.I. #5 Sta. 447200 P.I. #6 Sta. 6195 $83^{\circ}15'E$

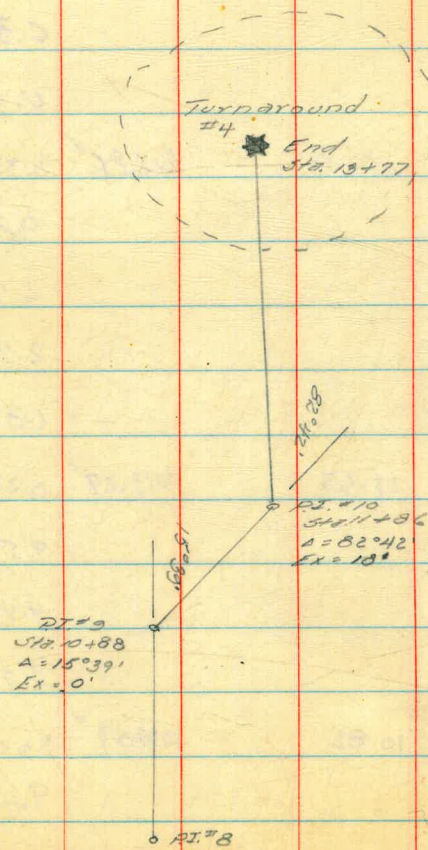
P.I. #6 Sta. 6195 P.I. #7 Sta. 7+69 $538^{\circ}30'E$

P.I. #7 Sta. 7+69 P.I. #8 Sta. 9+11 $73^{\circ}00'E$

57.
Road Survey from Highway 138
to Parking Areas at San Vicente
Dam







Profile over Access Rd.

San Vicente Lake - From Highway #198

61

B.M.	12.91	978.54		965.63
T.P.	12.47	990.25	0.76	977.78
0+00			6.3	983.9
0+50			4.4	985.8
T.P.	11.99	1001.86	0.38	989.87
1+00			9.3	992.6
PT 1+03			6.7	995.2
1+50			2.7	999.2
P.T. 1+75			1.3	1000.6
T.P.	11.63	1013.27	0.22	1001.64
2+00			9.5	1003.8
P.T. 2+34			4.4	1008.9
2+50			3.5	1009.8
T.P.	10.82	1024.09	0.00	1013.27
3+00			9.4	1014.7

state Highway B.M. ^{Sta} 220 - 120 Lts. Iron Pin

P.I.		1024.09 ✓		
3+33			4.5	1019.6
3+50			1.6	1022.5
T.P.	11.84	1035.69 ✓	0.24	1022.85 ✓
4+00			5.2	1030.5
4+50			0.6	1035.1
T.P.	5.71	1040.14 ✓	1.26	1034.43 ✓
II				
4+72 P.I.			2.9	1037.2 ✓
5+00			3.3	1036.8
5+50			6.9	1033.2
6+00			11.4	1028.7
T.P.	1.23	1028.53 ✓	12.84	1027.30 ✓
6+50			4.2	1024.3
P.I.				
6+95			7.1	1021.4
7+00			7.3	1021.2
7+50			9.6	1018.9
P.I.				
7+69			11.1	1017.4
T.P.	0.65	1016.27 ✓	12.92	1015.61 ✓

1039.89

62

10627 ✓

8700			3.3	1013.0
8758			10.4	1005.9
T.P.	0.55	1003.86 ✓	12.96	1003.31 ✓
9400			1.8	1002.1
9436PI			5.9	998.0 ✓
9450			6.9	997.0
10400			9.7	994.2
10450			10.9	993.0
10488PI			10.5	993.4
11400			10.7	993.4
11450			13.1	990.8
T.P.	0.67	991.43 ✓	13.10	990.76 ✓
P.I 11486			1.8	989.6
12400			4.2	987.2
12450			11.5	989.9
T.P.	0.51	978.96 ✓	12.98	978.45 ✓
13400			5.6	973.4

	+	π	97896 ✓ -		
13450			2.2	970.8	
13477			8.4	971.6 ✓	End of Rd. Survey
T.B.M.			4.05	974.91 ✓	Top rock LY 13477 - 30'
T.P.	11.16	986.07 ✓			
			.37	985.70 ✓	
T.P.	12.53	998.23			
			.38	997.85 ✓	
T.P.	12.51	1010.36 ✓	.25	1010.11 ✓	
T.P.	11.30	1021.41 ✓			
			.28	1021.13 ✓	
T.P.	10.40	1031.53 ✓	.18	1031.35 ✓	
B.M.	10.54	⁸⁹ 1041.81	1.85	1040.04	1039.89 Navy bench

Parking Site #1

Elev

65

Ton 4472 - For site on #33-Turns clockwise 1037.2

	Dist.	Horiz	V.L	H1	Red	Reduced by W.H.
#1	165'	38°20'	-4°22'	4.9	4.9	1024.7
#2	169'	62°45'	-1°0'	"	"	1034.3
#3	184'	81°58'	+0°19'	"	"	1038.2
#4	192'	98°55'	-1°36'	"	"	1031.8
#5	236'	110°15'	-2°11'	"	"	1028.2
#6	288'	118°38'	-2°16'	"	"	1025.8
#7	224'	127°30'	-4°12'	"	"	1020.8
#8	228'	149°40'	-1°55'	"	12.0	1022.5
#9	245'	157°40'	-0°12'	"	10.9	1030.4
#10	219'	177°26'	+1°55'	"	10.9	1038.5
#11	129'	211°37'	+4°37'	"	4.9	1047.5
#11-1						

Parking Site #2 & #3

Elev

T-9+36	Forsite back on 7+69 - Turn R Clockwise				998.0	
#1	81'	12°32'	+3°56'	4.8	48	1003.4 Edge Rocks
#2	67'	39°49'	+4°51'	"	"	" "
#3	89'	68°50'	+4°50'	"	"	1005.5
#4	122'	94°20'	+4°12'	"	"	1006.9
#5	122'	124°16'	+2°32'	"	"	1003.4
#6	127'	161°30'	-1°20'	"	"	995.0
#7	123'	185°27'	-5°4'	"	"	987.2 Ditch could be filled easy
#8	184'	213°12'	-8°48'	"	"	995.4
#9	166'	230°59'	+1°55'	"	"	1003.5
#10	110'	258°13'	+4°24'	"	"	1006.4
#11	55'	250°13'	+3°39'	"	"	1001.5

11-1

Parking Lot site #3

Elev. 971.6

67

T13+77 Foresight on 11+86 Turn ¹³ clockwise

	Dis.	Hor L	V-L	H.T	Prod		
# 1	134'	2° 0'	+4° 20'	50	50	979.1	Edge boulders
# 2	100'	26° 31'	+4° 15'	"	"	979.0	" "
# 3	99'	46° 42'	+6° 01'	"	"	981.9	" "
# 4	137'	66° 09'	+7° 24'	"	"	989.1	" "
# 5	146'	72° 49'	+8° 04'	"	"	991.9	" "
# 6	163'	86° 01'	+6° 51'	"	"	983.8	" "
# 7	91'	128° 14'	+5° 53'	"	"	980.9	" "
# 8	125'	160° 25'	+4° 11'	"	"	980.7	" "
# 9	164'	174° 54'	+2° 56'	"	"	976.7	" "
# 10	85'	191° 29'	+1° 53'	"	80	971.4	" "
# 11	105'	210° 21'	-2° 30'	"	50	967.0	" " + bank
# 12	127'	235° 41'	-4° 40'	"	"	961.3	Trail starts down to lake
# 13	138'	259° 21'	-2° 39'	"	"	965.2	Edge big boulders
# 14	111'	264° 38'	-2° 8'	"	"	967.5	Bottom slope
# 15	81'	295° 22'	+1° 38'	"	"	973.9	" "

El.

#16	97'	372° ₃₄	74°32'	50	5.0	979.2 Bottom Slope
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16-1

971.4
 550

 421.4

 9.0
 1.7

 7.3
 6.4

 13.7
 1.2

 12.5
 95.56

 108.06

137.39
 2.1

 135.3

 7204
 64

 71.40
 69.29

 2.11

6929
 64

 69.93
 1.52

 71

 197.71
 10.32

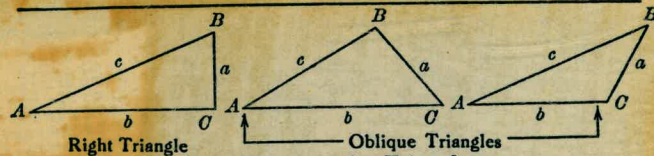
 137.39

69.83
 865

 61.18
 30

 61.48

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{a}$, $\text{cosec} = \frac{c}{b}$

Given	Required	Formula
a, b	A, B, c	$\tan A = \frac{a}{b} = \cot B$, $c = \sqrt{a^2 + b^2} = a \sqrt{1 + \frac{b^2}{a^2}}$
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B$, $b = \sqrt{(c+a)(c-a)} = c \sqrt{1 - \frac{a^2}{c^2}}$
A, a	B, b, c	$B = 90^\circ - A$, $b = a \cot A$, $c = \frac{a}{\sin A}$
A, b	B, a, c	$B = 90^\circ - A$, $a = b \tan A$, $c = \frac{b}{\cos A}$
A, c	B, a, b	$B = 90^\circ - A$, $a = c \sin A$, $b = c \cos A$

Solution of Oblique Triangles

Given	Required	Formula
A, B, a	b, c, C	$b = \frac{a \sin B}{\sin A}$, $C = 180^\circ - (A + B)$, $c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a}$, $C = 180^\circ - (A + B)$, $c = \frac{a \sin C}{\sin A}$
a, b, C	A, B, c	$A + B = 180^\circ - C$, $\tan \frac{1}{2}(A - B) = \frac{(a - b) \tan \frac{1}{2}(A + B)}{a + b}$ $c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$s = \frac{a + b + c}{2}$, $\sin \frac{1}{2}A = \sqrt{\frac{(s - b)(s - c)}{bc}}$ $\sin \frac{1}{2}B = \sqrt{\frac{(s - a)(s - c)}{ac}}$, $C = 180^\circ - (A + B)$
a, b, c	Area	$s = \frac{a + b + c}{2}$, $\text{area} = \sqrt{s(s - a)(s - b)(s - c)}$
A, b, c	Area	$\text{area} = \frac{bc \sin A}{2}$
A, B, C, a	Area	$\text{area} = \frac{a^2 \sin B \sin C}{2 \sin A}$

REDUCTION TO HORIZONTAL



Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle = $5^\circ 10'$. From Table, Page IX. $\cos 5^\circ 10' = .9959$. Horizontal distance = $319.4 \times .9959 = 318.09$ ft. Horizontal distance also = Slope distance minus slope distance times (1 - cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained. $\text{Cosine } 5^\circ 10' = .9959$. $1 - .9959 = .0041$. $319.4 \times .0041 = 1.31$. $319.4 - 1.31 = 318.09$ ft. When the rise is known, the horizontal distance is approximately: — the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft. slope distance = 302.6 ft. Horizontal distance = $302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$ ft.