W
515

ENGINEERS' LEVEL BOOK

No. 412-F

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

Roadway 16 feet wide. Side Slopes 1 on 1.

MICROFILMED

For Single Track Embankment.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	H
0	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	0
1	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	1
2	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	2
3	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	3
4	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	4
5	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	5
6	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	6
7	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	7
8	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	8
9	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	9
10	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	10
11	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	11
12	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	12
13	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	13
14	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	14
15	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	15
16	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	16
17	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	17
18	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	18
19	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	19
20	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	20
21	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	21
22	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	22
23	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	23
24	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	24
25	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	25
26	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	26
27	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	27
28	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	28
29	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	29
30	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	30
31	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	31
32	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	32
33	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	33
34	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	34
35	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	35
36	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	36
37	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	37
38	46.0	46.1	46.2	46.3	46.4	46.5	46.6	46.7	46.8	46.9	38
39	47.0	47.1	47.2	47.3	47.4	47.5	47.6	47.7	47.8	47.9	39
40	48.0	48.1	48.2	48.3	48.4	48.5	48.6	48.7	48.8	48.9	40

Example—If point is 22.6 ft. above grade, how far should it be from center line to be a slope stake point? Ans. from Table 30.6. For same slopes but other widths of roadbed, correct above figures by one-half difference in width of roadbed; thus in example above, for 20 ft. roadbed distance will be 30.6+(20—16)÷2 or 2 ft. added to 30.6 =32.6. For slopes of 1 on 1½ see inside of back cover.

515

El Capitan Pipeline Construction

INDEX.

PIERS IN TUNNEL

0+00	Flange face of East 36" pipe (North line)				
0+00.12	" " " West " " (South line)				
B.M.				550.30	
	7.49	557.79			
T.P.			0.92	556.87	
	8.82	565.69			
Pier # 1			+1.58 ~~0.25~~	567.27 ~~565.44~~	
Pier # 2			0.63	565.06	

April 16-1936
Soper
Isbell
Remmen

1

Lead & tack at ℄ point 6+88.80 (8' offset)

Set lead and tack on each side of tunnel, on ℄ of each pier, 1.00 above top of pier. Elevations shown are 1.00 above top of pier.

x-section

Lt	℄	Rt	
561.85		561.92	566.27
3.84	561.21	3.77	+0.58
4.0	4.48	4.0	9.2
561.44		561.44	
4.25	560.69	4.25	
4.0	5.00	4.0	

+0.58 / 9.4

Recorded into 534/24

					HI 565.69		
	565.69				Lt	℄	Rt
Pier #3		1.00 ✓	564.69		4.62 / 4.0	5.30	4.45 / 4.0
#4		1.38 ✓	64.31		5.28 / 4.0	5.90	5.26 / 4.0
#5		1.76 ✓	63.93		5.76 / 4.0	6.41	5.75 / 4.0
#6		2.13 ✓	63.56		6.38 / 4.0	7.00	6.41 / 4.0
#7		2.51 ✓	63.18		6.90 / 4.0	7.51	6.75 / 4.0
#8		2.88 ✓	62.81		7.31 / 4.0	8.00	7.26 / 4.0
#9		3.26 ✓	62.43		8.05 / 4.0	8.63	7.98 / 4.0
#10		1.80 ✓	63.89	2.80 / 9.8	8.35 / 4.0	9.05	8.57 / 4.0

Top of concrete is -1.00 on South side;
-2.83 on North side

copied onto 534 ... ch

April 17 - 1936
Soper Remmen
Isbell

x-section
Same H.I

Note: these points set up from H.I. with ruler and spirit level.

				Lt	℄	Rt
B.M			550.30			
	9.77	560.07		H.I 560.07		
Pier # 11		+1.61 ✓	561.68	3.89 / 4.0	4.00	3.45 / 4.0
# 12		+1.23 ✓	561.30	3.70 / 4.0	4.34	3.77 / 4.0
# 13		+0.86 ✓	560.93	4.30 / 4.0	4.90	4.21 / 4.0
# 14		+0.48 ✓	560.55	4.84 / 4.0	5.52	4.87 / 4.0
# 15		+0.11 ✓	560.18	5.23 / 4.0	5.92	5.28 / 4.0
# 16		-0.27 ✓	559.80	5.75 / 4.0	6.55	5.79 / 4.0

560.07

Pier #17	0.65	559.42	
#18	1.02	559.05	
#19	1.40	558.67	
	9.77	550.30	von B.M

x-section same H.I 560.07

Lt	℄	Rt
6.20 / 4.0	6.85	6.17 / 4.0
6.70 / 4.0	7.36	6.68 / 4.0
7.30 / 4.0	7.89	7.22 / 4.0

534 ok

April 18 1936
Soper Isbell
Remmen

B.M.				550.30
	7.04	557.34		
check on #19			+1.33	558.67
Pier #20			+0.96	558.30
#21			+0.58	557.92
#22			+0.20	557.54

April 21 1936. Elev. of offset plugs for Pier between tunnel Plug and Pier #1

Elev. Plug on Pier #1				567.27
	0.34	567.61		
check - top of flange South pipe			+2.25	569.86
Pier "A"			+2.39	570.00

x-section May 2 1936
Soper
Isbell
Remmen

	HI	
5.22	555.52	550.30
Lt	¢	Rt
4.88 / 4.0	5.19	4.79 / 4.0
5.30 / 4.0	5.60	5.34 / 4.0
5.73 / 4.0	6.08	5.72 / 4.0

Set Ldatk. at Elev. 570.00 on ¢ of Pier.
x-section Pier "A" Book 502 - 80

copied
53d

				April 21 1936 Soper Remmen Isbell
B.M.				550.30
	7.36	557.66		
Pier # 23			+1.34	559.00
	Note: top conc.		-1.00 on South side.	
			-2.83 on North side	
Check on # 22			0.12	557.54
	May 1 1936			
B.M				550.30
	4.67	554.97		
check on Pier #			+4.03	559.00
Pier # 24			+1.82	556.79

x-section May 2 1936
Soper ✱
Isbell
Remmen

	H.I	
5.22	555.52	550.30

Lt ℄ Rt

~~2.48/11.9~~ 4.64/9.3 5.99/4.0 6.55 6.62/1.5 6.51/4.0

~~Note: x-sect. taken 90° to back tangent. ℄ is 11.74 from tead plug on South side.~~

ok for split of angle ℄ is 12.04 from plug on South side

May 2 1936

5.22	555.52	550.30

Lt ℄ Rt

6.90/4.0 7.22 6.92/4.0

copied ✓ ck with 5 31/28

May 2 1936
Soper
Isbell
Rammen

B.M	4.53	554.83		550.30
Pier #25			+1.59	556.42
#26			+1.21	556.04
#27			+0.83	555.66
check on Pier #23			+4.17	559.00

May 2 1936

x-section -

H.1
554.83

Lt	℄	Rt
6.79 / 4.0	7.18	6.85 / 4.0
7.26 / 4.0	7.68	7.36 / 4.0
7.74 / 4.0	8.24	7.82 / 4.0

copied
536

May 4 1936
Soper
Remmen
Isbell

B.M	2.21	552.51		550.30
check on Pier # 27			+3.15	555.66
# 28			+2.78	555.29
# 29			+2.40	554.91
# 30			+2.03	554.54
# 31			+1.65	554.16
# 32			+1.28	553.79
# 33			+0.90	553.41
# 34			+0.52	553.03

K-Section
May 4 1936
Soper
Bell
Remmen

HI

2.21 552.51 550.30

	Lt	℄	Rt
	5.97 / 4.0	6.29	6.01 / 4.0
	6.29 / 4.0	6.64	6.27 / 4.0
	6.90 / 4.0	7.20	6.94 / 4.0
	7.42 / 4.0	7.71	7.49 / 4.0
	7.92 / 4.0	8.16	7.95 / 4.0
	8.45 / 4.0	8.73	8.46 / 4.0
	8.86 / 4.0	9.16	8.95 / 4.0

ch

May 6 1936
Soper
Isbell
Remmen

B.M	1.91	552.21		550.30
T.P.	2.51	548.37	6.35	545.86
check on Pier # 34			+4.66	553.03
Pier # 35 Sta. 10+31.38			~~+6.19~~	~~554.56~~

May 9 1936 changed to elev. 553.73 (1" above top of concrete)

Pier # 36			+4.36	552.73

Pier # 37 See book 529 page 15

Pier # 38 see book 529 page 15

x-section May 6 1936
Soper
Remmen
Isbell

		H.I	
T.P.	2.42	548.28	545.86

Lt ℄ Rt

+2.45/12.1 ; 3.14/10.0 ; 4.97/4.0 ; 5.24 ; 5.00/4.0 ; 3.28/10.3 ; +2.45/12.0

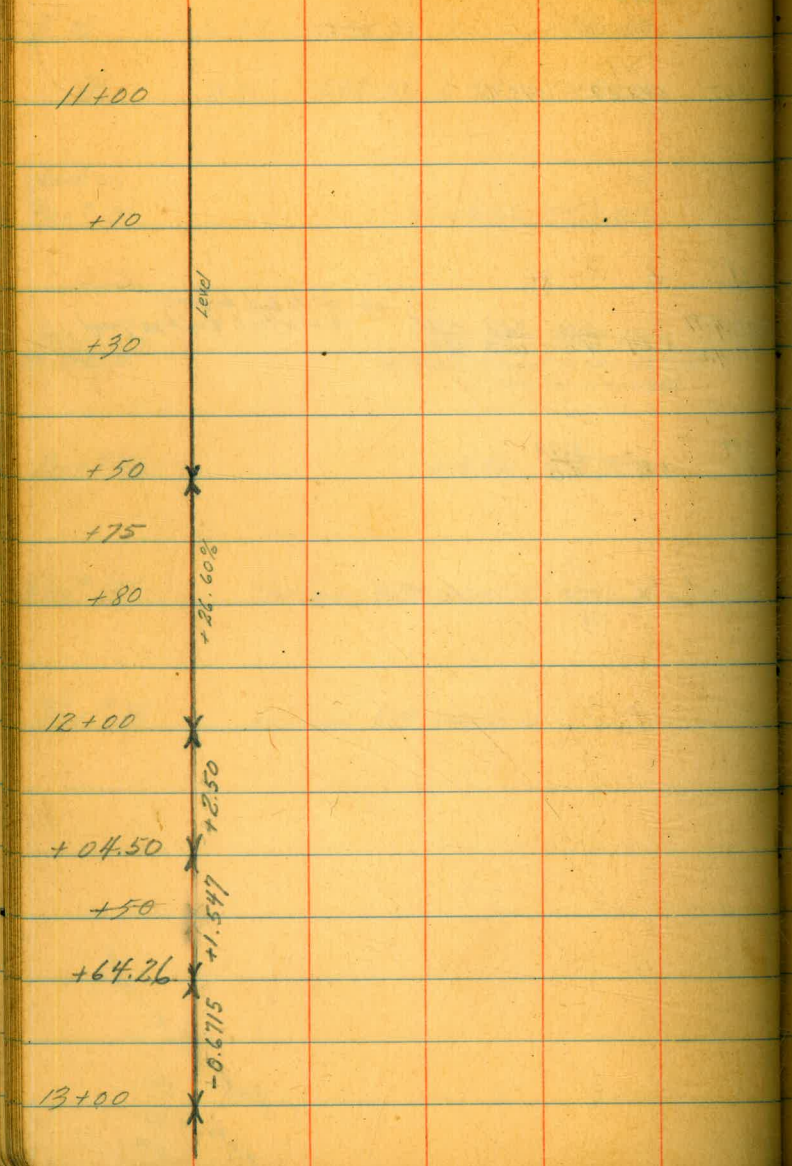
Note: 90° to back tangent. ℄ is actual ℄ of pipe special

5.84/4.0 ; 5.88 ; 5.93/4.0

x-section book 529/15

" " " "

Copied & ch into 536/30 10.



Grade	Off Cut	& cut
50.70		
50.70		
50.70		
550.70		
57.35		
57.68		
564.00		
64.11		
64.81		
~~565.25~~		
565.04		
64.80		

Profile over 13' offset

BM #2	6.49	577.06		570.57
13+50			5.8	71.3
14+00			6.5	70.6
+50			5.4	71.7
15+00			7.6	69.5
+50			8.4	68.7
15+77.40 BC			8.2	68.9
16+00			8.0	69.1
+25			8.5	68.6

-0.90%

Grade	13' Off Cut	± cut
64.35	7.0	
63.90	6.7	
63.45	8.3	
63.00	6.5	
62.55	6.2	
62.30	6.6	
62.10	7.0	
61.87	6.7	

					Grade	13' off cut	9 cut
		577.06					
16+50			9.0	68.1 ✓	61.65	6.5 ✓	
16+76.12 EC.	-0.90%		9.2	67.9 ✓	61.42	6.5 ✓	
17+00			9.3	67.8 ✓	561.20	6.6 ✓	
+25					61.~~15~~ 14		
+50			9.6	67.5 ✓	61.~~40~~ 09	~~6.4~~ ✓	
PT	6.07	57434	8.79	568.27			
18+00			6.1	68.2 ✓	60.97 ~~61.00~~	~~7.2~~ ✓	
18+09.38 BC.	-0.20% -0.22636		5.9	68.4 ✓	60.95 ~~60.98~~	~~7.4~~ ✓	
+25			5.7	68.6 ✓	~~60.95~~ 91	~~7.7~~ ✓	
+50			5.4	68.9 ✓	~~60.90~~ 86	~~8.0~~ ✓	
+75			5.0	69.3 ✓	~~60.85~~ 80	~~8.5~~ ✓	
19+00			5.2	69.1 ✓	~~60.80~~ 75	~~8.3~~ ✓	
19+18.15 EC.			4.6	69.7 ✓	~~60.76~~ 71	~~8.9~~ ✓	

							Grade	13' Off cut	℄ cut
		574.34							
19+38									
+50			4.6	69.7 ✓			~~60.70~~ 60.64	~~9.0~~ ✓	
19+66.20 B.C.			5.1	69.2 ✓			60.~~67~~ 60	~~8.5~~ ✓	
+75	-0.20% -0.2263%		5.5	68.8 ✓			60.~~65~~ 58	~~8.2~~ ✓	
20+00			6.5	67.8 ✓			60.~~60~~ 52	~~7.2~~ ✓	
+25			6.8	67.5 ✓			60.~~55~~ 46	~~7.0~~ ✓	
+50			7.2	67.1 ✓			60.~~50~~ 41	~~6.6~~ ✓	
Pt.	3.99	570.30	8.03	566.31					

Station		570.30			Grade	13' Off cut	℄ cut
20+60							
+65	~~-0.20%~~ -0.22%						
+75					60.~~45~~ [35]		
+97							
21+00			4.3	66.0	560.~~40~~ [29]	~~5.6~~ ✓	
+06.53					560.28		
+25			4.6	65.7 ✓	59.~~85~~ [91]	~~5.9~~ ✓	
+50			4.5	65.8 ✓	59.~~30~~ [.41]	~~6.5~~ ✓	
	~~-2.20%~~ -2.00%						
21+72.66 E.C.			4.3	66.0 ✓	58.~~80~~ [95]	~~7.2~~ ✓	

		570.30				
22+00			4.5	65.8		
+50			5.9	64.4		
+85	-2.20% -2.00%					
23+00			6.9	63.4		
+15.42						
+50	×O.#393%		7.1	63.2		
24+00			6.7	63.6		

Grade	13' Off cut	℄ cut
58.20 (41)	~~4.6~~	
~~57.40~~ (41)	~~4.3~~	
~~556.00~~ (41)	~~4.4~~	
556.10		
56.25		
~~56.20~~	~~4.0~~	
56.47		
~~56.40~~	~~4.2~~	

						13' Off cut	℄ cut
			570.30			Grade	
						56.69	
24+50				6.8	63.5	56.60	6.9
	+0.439%						
PI		962	573.46	6.46	563.84		
						56.91	
25+00				9.3	64.2	56.80	7.4
						57.13	
+50				10.0	63.5	557.00	6.5
54.42						557.15	
						58.53	
25+93.99 BC				7.0	66.5	58.45	8.1
	+3.499%						
						58.74	
26+00						58.65	
						59.61	
+25				5.8	67.7	59.47	8.2
+43.87						560 28	8.1
+50						60.30	

Station							Grade	Off cut	℄ cut
			573.46						
26+75				5.1	68.4		60.38 ~~60.42~~	~~8.0~~	
ren B.M.# 4				0.74	572.72	(Rec. Elev. 572.71)			
B.M.# 4		1.19	573.90		572.71				
27+00	+0.3424%			6.0	67.9		60.47 ~~60.53~~	~~7.4~~	
27+13.23 E.C.				6.1	67.8		60.51 ~~60.59~~	~~7.2~~	
+50				5.7	68.2		60.64 ~~60.77~~	~~7.4~~	
27+76.66 B.C.				5.7	68.2		60.74 ~~60.90~~	~~7.3~~	
+92.81	X						560.79		
28+00				5.5	68.4		61.00 ~~561.00~~	~~7.4~~	
+25	+2.895%			5.1	68.8		61.72 ~~61.75~~	~~7.1~~	
+50				4.5	69.4		62.45 ~~62.50~~	~~6.9~~	
+75				3.9	70.0		63.17 ~~63.25~~	~~6.8~~	
+96.46	X						563.79		
29+00	+4.496%			2.7	71.2		63.95 ~~564.00~~	7.2	
+25				1.7	72.2		65.07 ~~65.12~~	7.1	
T.P.		10.53	584.23	0.20	573.70				

					Grade	Off cut	℄ cut
		584.23					
29+33.62 EC.	24" W.M.		11.7	72.5 ✓	65.46	✓	
					~~65.51~~	7.0	
29+50			10.9	73.3 ✓	66.20	✓	
					~~66.25~~	7.1	
+75					67.33		
30+00.55					568.47		
30+04.88 B.C.			7.5	76.7 ✓	68.77	✓	
					~~68.77~~	7.9	
+25	8" C.I.P.		5.5	78.7 ✓	69.97	✓	
					~~69.87~~	8.8	
+50			4.2	80.0 ✓	71.51	✓	
					~~71.25~~	8.8	
30+59.05 EC.			3.6	80.6 ✓	72.07	✓	
					~~71.75~~	8.9	
+89.88					573.97		
31+00			2.7	81.5 ✓	73.90	✓	
					~~574.00~~	7.5	
+50	6" STORM		4.7	79.5 ✓	73.55	✓	
					~~73.70~~	5.8	
32+00			3.7	80.5 ✓	73.20	✓	
					~~573.40~~	7.1	
+09.38					573.14		

						Grade	℄ cut	℄ cut
		584.23						
32+50			5.0	79.2 ✓		88 71.97	7.2 ✓	
PI	0.61	580.32	4.52	579.71	(Revised 579.73)			
33+00			2.2	78.1 ✓		33 70.54	7.6 ✓	
33+32.81 BC	-3.10%		2.5	77.8 ✓	offset now 13' south of ℄	69.31 69.66	8.5 ✓ 8.2	
+50			3.2	77.1 ✓		68.77 69.11	8.3 8.0	
+75			4.1	76.2 ✓		68.00 568.40	8.2 ✓ 4.8	
+88.43						567.58		
34+00			4.8	75.5 ✓		66.89 66.91	✓ 8.6	
+25	200.9'		6.3	74.0 ✓		65.39 65.42	✓ 8.6	
+50			7.8	72.5 ✓		63.89 63.93	✓ 8.6	
+75			9.8	70.5 ✓		62.39 62.44	✓ 8.1	
34+87.34 EC			10.9	69.4 ✓		61.71	7.7 ✓	

			580.32			Grade	Off cut	℄ cut
		-6.00%				60.89		
35+00						60.96		
PI		0.91	568.57	12.66	567.66			
35+30.02								
=	Equation							
35+30.18	BC			2.1	66.5	1		
						59.18	7.3	
+50				3.1	65.5	57.89	7.6	
						57.98	7.5	
+75				4.7	63.9	56.39	7.5	
						56.49	7.4	
+97.02		X				535.09		
						55.00		
36+00				6.0	62.6	555.00	7.6	
						54.43		
+25				7.2	61.4	54.43	7.0	
		-2.280%						
						53.86		
+50				8.0	60.6	53.87	6.7	
						53.29		
+75				2.4	60.2	53.30	6.9	

							Grade	Off cut	℄ cut
			568.57						
37+00				8.8	59.8 ✓		52.72 ~~52.73~~	~~7.1~~ ✓	
check on B.M.#6	-2.28057%			+0.29	568.86	(Rec. elev 568.88)			
B.M.#6		2.26	571.14		568.88				
		2.83	564.03	9.94	561.20		Set new B.M.#5A. Nail in oak tree 35' Lt 37+90		
37+32.52 E.C.				5.5	58.5 ✓		51.96 ~~52.00~~	~~6.5~~ ✓	
+46.11							551.67		
+50							51.60 ~~551.60~~		
37+67.45 B.C.				6.7	57.3 ✓		~~51.28~~	~~6.0~~ ✓	
38+00				5.3	58.7 ✓		50.66 ~~50.67~~	~~8.0~~ ✓	
	-1.8815%								
+50				2.8	61.2 ✓		49.72 49.73	~~11.5~~ ✓	
39+00				4.2	59.8 ✓		48.77 48.80	~~11.0~~ ✓	

				Grade	Off cut	℄ cut
	564.03			47.83	9.2 ✓	
39+50		7.0	57.0 ✓	47.87	9.1	
	-1.8%			.30	✓	
39+78.25 EC.		8.4	55.6 ✓	47.34	8.3	
				46.89		
40+00			54.8	46.93	7.9	
+44.80 X				546.05		
+50 X		10.7	53.3 ✓	46.01	✓	
				546.00	7.3	
	-0.4%					
41+00		11.6	52.4 ✓	.61	✓	
				45.60	6.8	
+50		12.1	51.9 ✓	21	✓	
				45.20	6.7	
41+89.03 B.C.		12.6	51.4 ✓	44.90		
				44.89	6.5 ✓	

					Grade	Off cut	¢ cut
		564.03					
42+00			12.6	51.4	~~44.80~~ 44.82	6.6	
T.P.	2.24	553.55	12.72	551.31			
+50			3.0	50.5	~~44.40~~ 44.42	6.1	
+75	-0.7944%				~~44.20~~ 44.22		
43+00			3.8	49.7	~~44.00~~ 44.02	5.7	
+50			3.4	50.1	~~43.60~~ 43.63	6.5	
43+94.49 E.C.			4.2	49.3	~~43.25~~ 43.28	6.1	
44+00					~~43.20~~ 43.23		

					Grade	Off cut	℄ cut
		553.55					
44+50	-0.7994%		5.0	48.5 ✓	42.~~80~~ 83	5.7 ✓	
+92.92					542.49		
45+00			4.7	48.8 ✓	542.~~40~~ .39	6.4 ✓	
45+22.80 B.C.			4.6	48.9 ✓	~~42.09~~ 42.21	6.8 ✓	
+50			4.5	49.0 ✓	~~41.71~~ 41.73	7.3 ✓	
+75			4.6	48.9 ✓	41.~~37~~ .39	7.5 ✓	
46+00	-1.3382%		4.8	48.7 ✓	41.~~03~~ .06	7.7 ✓	
+25			5.4	48.1 ✓	40.~~69~~ .72	7.4 ✓	
46+59.24 E.C.			6.4	47.1 ✓	40.~~21~~ .26	~~6.9~~ 6.8 ✓	
47+00			7.2	46.3 ✓	39.~~66~~ .72	6.6 ✓	

						Grade	Off cut	℄ cut
			553.55			39.05	✓	
47+50				8.2	45.3 ✓	~~38.97~~	6.3	
	-1.338%							
48+00				9.4	44.1 ✓	.38 ~~38.29~~	5.7 ~~5.8~~	
48+49.60 BC				10.3	43.2 ✓	37.72 ~~37.61~~	5.5 ~~5.6~~	
+75				10.1	43.4 ✓	.38 ~~37.86~~	6.0 ~~6.1~~	
49+00				10.1	43.4 ✓	37.04 ~~536.92~~	6.4 ~~6.5~~	
+10.63						536.90		
+25				10.4	43.1 ✓	.87 ~~36.89~~	✓ 6.2	
+50				10.7	42.8 ✓	.82 ~~36.82~~	✓ 6.0	
PI		5.67	548.65	10.57	542.98			
+75	-0.214%			5.9	42.7 ✓	.76 ~~36.77~~	✓ 5.9	
50+00				6.0	42.6 ✓	.71 ~~36.72~~	✓ 5.9	
+25				6.0	42.6 ✓	.65 ~~36.67~~	✓ 5.9	

				Grade	Off cut	& cut
	548.65					
50+50		5.9	42.7 ✓	36.62	6.1 ✓	
+75		5.8	42.8 ✓	36.57	6.2 ✓	
51+00		5.8	42.8 ✓	36.52	6.3 ✓	
51+28.39 E.C.		5.7	42.9 ✓	36.46	6.4 ✓	
+50		5.6	43.0 ✓	36.42	6.6 ✓	
52+00		5.6	43.0 ✓	36.38	6.7 ✓	
+50		4.5	44.1 ✓	36.22	7.9 ✓	
53+00		5.1	43.5 ✓	36.12	7.4 ✓	

-0.2145%

			548.65				
53+50				5.6	43.0 ✓		
54+00							
54+06.21 B.C.				6.2	42.4 ✓		
+25		-0.2145		6.1	42.5 ✓		
+50				5.6	43.0 ✓		
+75				5.0	43.6 ✓		
P.I.	3.80		547.50	4.95	543.70		
55+00				3.5	44.0 ✓		
+07.44		-0.1374					
+25				2.4	45.1 ✓		
+50							
55+54.94 E.C.	Equasion			2.8	44.7 ✓		
55+04.94 E.C.							
+50				5.6	41.9 ✓		

Grade	Offset cut	℄ cut
35.96 36.02	✓ ~~7.0~~	
.85 35.93		
.84 35.94	6.6 ✓ ~~6.5~~	
.80 35.87	6.7 ✓ ~~6.6~~	
.74 35.82	.73 ✓ ~~7.2~~	
.69 35.77	7.1 ✓ ~~7.8~~	
.64 535.72	4.4 ✓ ~~8.3~~	
535.62		
.38 35.38	✓ ~~9.7~~	
.03 35.04		
.96 34.97	✓ ~~9.7~~	
.34 34.36	✓ ~~7.5~~	

						Grade	Off cut	℄ cut
		547.50						
56+00			3.2	44.3 ✓		.65 33.68	+0.6 ✓	
+25						.31 33.34		
+50			4.4	43.1 ✓		32.96 ~~33.00~~	+0.1 ✓	
57+00 (-1.3098%)			4.4	43.1 ✓		.27 32.32	+0.8 ✓	
check on ℄ sta 56+00			6.9	40.6 ✓	elev 40.7	Book 508, page 31		
+50						31.58 31.64		
+56.03						531.50		
				June 1 1936 Soper Ishell Remmen				
B.M.# 8	7.95	543.59		535.64				
			4.27	539.32	set new B.M.# 8A. Nail in oak 45' Lt sta 58+68.			

		543.59				
58+00			4.8	38.8		
					31.41	
					~~30.96~~	7.4
58+50			4.3	39.3		
					31.30	
					~~30.28~~	8.0
58+61.86 BC			4.4	39.2		
					31.28	
					~~30.18~~	7.9
	-0.20%					
59+00			4.7	38.9		
					31.20	
					~~529.60~~	7.7
+50			4.8	38.8		
					31.09	
					~~29.50~~	7.7
+95.03	X					
					531.00	
60+00	X		4.7	38.9		
					530.99	
					~~529.40~~	7.9
PI			4.67	538.92		
	-0.23%	548	544.90			
+50			6.0	38.9		
					30.87	
					~~29.68~~	8.0

				Grade	Off cut	Lt. cut
	544.90					
61+00		5.7	39.2	30.76 ~~28.75~~	8.4	1
61+13.47 P.C.C.		5.6	39.3	30.73 ~~28.67~~	8.6	
+50		5.6	39.3	30.64 ~~28.43~~	8.7	
62+00		5.6	39.3	30.53 ~~28.11~~	8.8	
	−0.83%					
+50		5.6	39.3	30.41 ~~27.78~~	8.9	
63+00		5.4	39.5	30.30 ~~27.46~~	9.2	
+50		5.8	39.1	30.18 ~~27.20~~	8.9	

					Grade	Off cut	℄ cut
		544.90					
64+00			6.5	38.4	30.07 ~~26.94~~	8.3	
64+31.15 EC			6.8	38.1	30.00	8.1	
+50			6.9	38.0	29.95 ~~26.68~~	8.1	
65+00	-10.39°		7.3	37.6	29.84 ~~26.42~~	7.8	
+50			7.6	37.3	29.72 ~~26.16~~	7.6	
TP			7.74	537.16			
	476	541.92					
66+00			5.0	36.9	29.61 ~~25.90~~	7.3	
+50			5.5	36.4	29.49 ~~25.64~~	6.9	

				Grade	Off cut	Q cut
	541.92					
67+00		5.6	36.3	29.38		
				25.38	6.9	
+50	- 0.23%	6.0	35.9	29.26		
				25.12	6.6	
68+00		6.1	35.8	29.15		
				24.86	6.7	
+50		6.5	35.4	29.03		
68+60.78				524.60	6.4	
				529.00		
69+00		5.4	36.5	29.50		
	+1.20%			24.82	7.0	
69+50.68 B.C.		4.3	37.6	30.16		
				25.04	7.4	
+75		4.0	37.9	30.47		
				25.15	7.4	

					Grade	Off cut	℄ cut
		541.92					
70+00			3.6	38.3	30.89 / ~~25.26~~	7.5	
+25			3.3	38.6	31.12 / ~~25.37~~	7.5	
+50			2.8	39.1	31.44 / ~~25.48~~	7.7	
+75			2.5	39.4	31.76 / ~~25.59~~	7.6	
71+00	+1.28948%		2.4	39.5	32.09 / ~~25.70~~	7.4	
+25			2.3	39.6	32.41 / ~~25.81~~	7.2	
+50			2.1	39.8	32.73 / ~~25.92~~	7.1	
+75			1.7	40.2	33.05 / ~~26.03~~	7.2	
72+00			1.6	40.3	33.38 / ~~26.44~~	6.9	
PI			0.78	541.14			
		5.10	546.24				
+25			5.9	40.3	33.70 / ~~26.55~~	6.6	
72+48.54					534.00		
+50			5.7	40.5	33.99 / ~~26.36~~	6.5	

						Grade	Off cut	℄ cut
		546.24						
72+75			5.6	40.6		33.90 ~~26.47~~	6.7	
73+00			5.8	40.4		33.80 ~~26.58~~	6.6	
+25			5.8	40.4		33.70 ~~26.69~~	6.7	
+50			6.1	40.1		33.61 ~~26.80~~	6.5	
73+68.96 E.C.			6.4	39.8		33.56 ~~26.88~~	6.2	
ch. on B.M. 10			7.17	539.07	(Rec Elev 539.09)			
				June 12 1936	Sager Plemmon Rod.			
B.M. 10	5.34	544.43		539.09				
74+00			4.6	39.8		33.42 ~~529.02~~	6.4	
+50			4.7	39.7		33.22 ~~28.44~~	6.5	
75+00			4.7	39.7		33.03 ~~29.86~~	6.7	
+50			5.0	39.4		32.84 ~~31.28~~	6.6	

-0.385534%

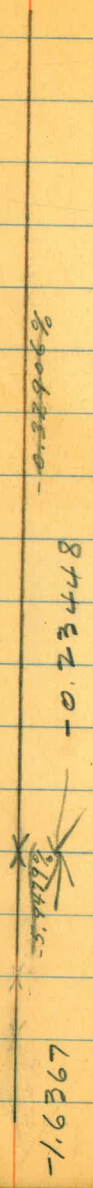
					Grade	Off cut	℄ cut
		54443					
76+00			5.4	39.0	32.64 ~~532.70~~	6.4	
76+06.66					532.62		
+50			6.2	38.2	32.10 ~~32.10~~	6.1	
	-1.20%						
77+00			6.5	37.9	31.49 ~~31.50~~	6.4	
PI	1.72	539.97	6.18	538.85			
+25					31.19 ~~531.20~~		
77+26.15					531.18		
+50			2.5	37.5	30.75 ~~30.75~~	6.8	
78+00	-1.78%		3.4	36.6	29.86 ~~29.85~~	6.7	
+50			4.4	35.6	28.97 ~~28.95~~	6.6	

					Grade	off cut	℄ cut
-		539.97					
79+00			5.2	34.8	28.07 ~~28.05~~	6.7	
+50			5.9	34.1	27.18 ~~27.15~~	6.9	
79+96.10 B.C.			6.2	33.8	26.36 ~~26.32~~	7.4	
80+00	-1.786 2%		6.3	33.7	26.29 ~~26.25~~	7.4	
+25					25.83		
+50			6.8	33.2	25.39 ~~25.35~~	7.8	
+75					24.94		
81+00			7.5	32.5	24.50 ~~24.45~~	8.0	
+25					24.05		
+50			8.2	31.8	23.61 ~~23.55~~	8.2	
					23.16		

		539.97			Grade	Off cut	℄ cut
82+00			8.8	31.2	22.72 ~~522.65~~	8.5
		(June 16 - 1936)				
B.M.# 12				525.10		
		9.07	534.17			
82+03.70					522.65	
82+19.47 E.C.			3.3	30.9	22.61 ~~22.61~~	8.3
+50			3.4	30.8	22.55 ~~22.55~~	8.3
83+00			3.8	30.4	22.48 22.45	8.0
	- ~~0.32406~~ 0.23448					
+50			4.1	30.1	22.30 ~~22.32~~	7.8
84+00			4.4	29.8	22.19 ~~22.25~~	7.6
+50			4.3	29.9	22.07 ~~22.15~~	7.8
+98.62 B.C.			4.4	29.8	21.96	7.8

534.17

			Grade	Off cut	℄ cut
85+00			21.94		
			~~22.05~~		
+25			21.90		
+50	4.6	29.6	21.84		
			~~21.95~~	7.8	
+75			21.78		
86+00	4.8	29.4	21.72		
			~~21.85~~	7.7	
+25			21.66		
+50	5.2	28.0	21.60		
			~~21.75~~	7.4	
+75			21.55		
87+00	5.5	28.7	21.49		
			~~21.65~~	7.2	
87+11.20			521.4587		
+25			21.23		
+50	6.2	28.0	20.82		
			~~21.00~~	7.2	



Station						Grade	Elt cut	℄ cut
			534.17					
88+00				6.7	27.5	20.01 ~~18.00~~	7.5	
+50	~~-2.19432%~~			7.1	27.1	19.19 ~~17.00~~	7.9	
89+00	-1.6367			7.1	27.1	18.37 ~~516.00~~	8.7	
+48.34 EC				10.1	24.1	17.58	6.5	
	~~+0.5964%~~		(June 17 1936 Soper Rummel Tooch)					
B.M.# 12		6.43	531.53		525.10			
+50						17.55 ~~16.25~~		
90+00				8.4	23.1	16.73 ~~516.50~~	6.4	
90+09.36						516.58 ✓ ~~516.58~~		
+50	+0.87255			8.3	23.2	16.93 ~~16.92~~	6.3	

		531.53				
91+00			8.1	23.4	Grade 17.37 ~~17.34~~	℄ cut 6.0
+50			7.4	24.1	17.81 ~~17.75~~	6.3
92+00			7.1	24.4	18.24 ~~18.17~~	6.2
+50	+0.87255		6.4	25.1	18.68 ~~18.59~~	6.4
93+00			5.7	25.8	19.12 ~~19.01~~	6.7
+50			5.3	26.2	19.55 ~~19.43~~	6.7

					Grade	off cut	$ cut
		531.53					
94+00			5.2	26.3	19.99		
					~~19.84~~	6.3	
+03.67 BC			5.2	26.3	20.02		
						6.3	
P.I.			3.43	528.10			
		June 18 1936 Soper Rammenkdell					
P.I.				528.10			
+25	10.61	538.71			20.20		
+50			11.8	26.9	20.42		
					~~528.26~~	6.5	
+57.47					520.49		
95+00			10.2	28.5	21.81		
					~~21.70~~	6.7	
+50			9.0	29.7	23.37		
					~~23.14~~	6.3	
+91.43			7.6	31.1	24.66	6.4	
96+00			7.1	31.6	24.93		
					~~24.58~~	6.7	
96+06.78					25.14		
+25					25.30		
					~~525.30~~		
+37.27			6.4	32.3	25.40	6.9	
					25.51		
+50			6.6	32.1	~~25.48~~	6.6	

Station	Note				Grade	Off cut	℄ cut
		538.71					
96+75			6.5	32.2	25.72	6.5	
97+00			5.4	33.3	25.94 ~~25.85~~	7.4	
+25	~~+0.85%~~ +0.8582		5.2	33.5	26.15	7.4	
+50			4.9	33.8	26.37 ~~26.23~~	7.4	
+75			5.2	33.5	26.59	6.9	
98+00			5.5	33.2	26.80 ~~26.61~~	6.4	
+16.524					26.94 ✓		
+25			6.1	32.6	26.80 ~~526.80~~	5.8	
+50			6.1	32.6	26.39 ~~26.39~~	6.2	
+57.82			6.2	32.5	26.26	6.2	
99+00	~~-1.65%~~ -1.65095		5.9	32.8	25.56 ~~25.56~~	7.2	
+34.02			6.3	32.4	25.00	7.4	
+50			6.4	32.3	24.74 ~~24.74~~	7.6	

						Grade	Off cut	¢ cut
		538.71						
100+00	-1.65% (struck) -1.65095		7.4	31.3		23.91 (23.91 struck)	7.4	
+25.49 (+25 struck)						523.49 (523.50 struck)		
+50			8.8	29.9		22.82	7.1	
101+00			9.3	29.4		21.47	7.9	
+50	-2.718		11.2	27.5		20.11	7.4	
T.P.			11.41	527.30				
	2.35	529.65						
102+00			3.6	26.0		18.75	7.3	
+44.05 P.C. +45.87	Equasion		5.0	24.6		17.56	7.0	
+50			5.1	24.5		17.44	7.1	

		529.65				
103+00			6.5	23.1		
	-2.715%					
+50			7.9	21.7		
ck on B.M 14			4.50	525.15	Rec'd on	525.11
B.M" 14	0.80	525.91		525.11		
			1.69	524.22		
+54	X					
104+00			4.3	21.6		
+39.82 EC.						
+46.49 BC	-2.702%		4.9	21.0		
+50						
+68						
+73.41	X					
+75						
	-1.521%					

Grade	Off cut	& cut	
16.09	7.0		
14.73	7.0		

(New B.M" 14.17. Nail in tree 20'Lt 103+65)

514.62			
13.38	8.2	13' offsets on N. side of line	
		13' offsets on S. side Book	529-60
12.31			
12.12	8.9		
12.03			
511.392			
11.37			

Profile, 13' offsets on North side of line 105+00 - 116+94.28
(Offsets on South side Book 529 - 60)

					Grade	off cut	& cut
		525.91					
105+00			8.0	17.9	10.99	6.9	
+50			8.9	17.0	10.23	6.8	
PI	4.15	520.53	9.53	516.38			
	-1.35'/%						
106+00			4.5	16.0	09.47	6.5	
+40.44 EC			6.2	15.3	08.85	6.5	
+50			5.5	15.0	08.71	6.3	

13' offsets on this side

					Grade	Off cut	℄ cut
		520.53					
107+00			6.2	14.3	07.94	6.4	
+50	−1.521%		6.3	14.2	07.18	7.0	
108+00			7.3	13.2	06.42	6.8	
+02.05					506.392		
+50	−0.2991%		7.4	13.1	06.25	6.9	
109+00			8.3	12.2	06.10	6.1	

13' offsets on N side

						Grade	off cut	℄ cut
		520.53						
109+50			8.9	511.6		05.95	5.7	
TP	2.92	515.51	7.94	512.59				
110+00			3.7	11.8		05.80	6.0	
+50	-0.2991%		4.5	11.0		05.65	5.4	13' offsets on N. side
111+00			5.2	10.3		05.50	4.8	
+50			5.5	10.0		05.35	4.7	
112+00			5.6	09.9		05.20	4.7	

					Grade	Off cut	Fill
		515.51					
112+50			6.6	09.5	05.05	4.5	
113+00			5.8	09.7	04.90	4.8	
+50	-0.2962		6.3	09.2	04.75	4.5	
114+00			6.4	09.1	04.60	4.5	
+50			7.2	08.3	04.45	3.9	
H_1	6.15	514.24	7.42	508.09			
115+00			6.1	08.3	04.30	4.0	

13' offset on N side

514.24

				Grade	Off cut	& cut
115+50		6.4	07.8	04.15	3.7	
	-0.29%					
116+00		6.1	08.1	04.00	4.1	
+08.675				503.98		
					13' offset on N. side	
+50		5.1	09.1	03.90	5.2	
+94.28		5.0	09.2	03.81	5.4	
Chan B.M.#16		2.89	511.35	Rec. Elev. 511.35		

Book 529-62 for off. profile cuts

117+00	-0.18558				03.80	
+25					03.75	
+50					03.70	

					Grade	Off cut	℄ cut
+ 75					03.65		
118 +00					03.60		
+25					03.55		
+50					03.50		
+75					03.45		
119 +00					03.40		
+25					03.35		
+50.93 EC					03.30		
Bm #17	0.66	515.09		514.43			
+96.425					503.21		
120 +00			5.0	10.1	03.20	6.9	
+25					03.13		

-0.1985%

					Grade	℄ cut	℄ cut
		515.09					
120+50			5.1	10.0	03.05	7.0	
+75					02.98		
121+00			5.1	10.0	02.90	7.1	
+25					02.83		
+50	-0.29H%		5.2	09.9	02.75	7.2	
+75					02.68		
122+00			5.4	09.7	02.60	7.1	
+25					02.53		
+50			5.6	09.5	02.45	7.1	
+75					02.38		
123+00			6.1	09.0	02.30	6.7	
TP	3.95	512.98	6.06	509.03			
+25					02.23		
447.04B.C.			4.3	08.7	02.16	6.5	

		512.98			Grade	off cut	℄ cut
123+50					02.15	
+75					02.08	
124+00			4.5	08.5	02.00	6.5
+25	-0.29948				01.93	
+50			4.4	08.6	01.85	6.8
+75					01.78	
125+00			4.8	08.2	01.70	6.5
+34.175					501.60	
+50			4.9	08.1	01.55	6.6
+75	-0.31680				01.47	
126+00			5.1	07.9	01.39	6.5
+25					01.31	

					Grade	Off cut	℄ cut
		512.98					
126+50			5.0	08.0	01.23	6.8	
+75	-0.316%				01.15		
127+00			5.6	07.4	01.07	6.3	
+13.475					501.032		
+25					00.97		
+50			5.9	07.1	00.85	6.3	
+75					00.72		
128+00			6.0	07.0	00.60	6.4	
+11.14 EC.			6.1	06.9	00.54	6.4	
	-0.500%	July 6 1936 Supervisor Robinson Isbell					
B.M. 18				507.45			
	3.47	510.92					
+50			4.4	06.5	00.35	6.2	
129+00			4.5	06.4	00.10	6.3	

				Grade	Off cut	& cut
	510.92					
129+50		4.7	06.2	499.85	6.4	
130+00		4.9	06.0	99.60	6.4	
+50	-0.500%	5.0	05.9	99.35	6.6	
131+00		5.2	05.7	99.10	6.6	
+50		5.5	05.4	98.85	6.6	
+74.40BC		5.7	05.2	98.73	6.5	
+91.3625				498.642		
132+00		5.8	05.1	98.64	6.5	
TP.		5.78	505.14			

	444	509.58		505.14	Grade	Off cut	Rt cut
132+25			4.4	05.2	98.62	6.6	
+50			4.4	05.2	98.60	6.6	
+75			4.4	05.2	98.58	6.6	
133+00			4.5	05.1	98.57	6.5	
+25			4.5	05.1	98.55	6.6	
+50			4.6	05.0	98.54	6.5	
+75	-0.06 42%		4.6	05.0	98.52	6.5	
134+00			4.6	05.0	98.51	6.5	
+25			4.7	04.9	98.49	6.4	
+50			4.9	04.7	98.48	6.2	
+75			5.1	04.5	98.46	6.0	
135+00			5.2	04.4	98.44	6.0	
+25			5.1	04.5	98.42	6.1	

		509.58					
135+50	-0.0642%		5.2	04.4	98.41	6.0	
+75			5.1	04.5	98.39	6.1	
136+00			5.0	04.6	98.38	6.2	
+08.7375					498.374		
+25			5.1	04.5	98.32	6.2	
+50			5.3	04.3	98.25	6.1	
+75			5.5	04.1	98.17	5.9	
137+00			5.5	041	98.10	6.0	
PI			5.55	504.03			
	-0.2964%	3.80	507.83				
+25			3.9	03.9	98.02	5.9	
+50			4.0	03.8	97.95	5.9	
+75			4.0	03.8	97.88	5.9	
138+00			4.0	03.8	97.81	6.0	
+09.47EC			4.1	03.7	97.78	5.9	

					Grade	℄ cut	℄ cut
		507.83					
138+50			4.3	03.5	97.66	5.8	
139+00			4.7	03.1	97.51	5.6	
+50	-0.29646		4.8	03.0	97.36	5.6	
140+00			5.2	02.6	97.21	5.4	
+50			5.6	02.2	97.07	5.1	
141+00			5.8	02.0	96.92	5.1	

					Grade	Off cut	℄ cut
		507.83					
141+50			6.1	01.7	96.77	4.9	
142+00			6.3	01.5	96.62	4.9	
℞	467	506.17	6.33	501.50			
+50			4.7	01.5	96.47	5.0	
143+00			46	01.6	96.32	5.3	
+50			4.7	01.5	96.18	5.3	
144+00			4.8	01.4	96.03	5.4	
+14.7375					495.9844		

0.2962.0

506.17

			Grade	off cut	℄ cut
144+50	5.1	01.1	95.95	5.2	
145+00	5.1	01.1	95.90	5.2	
+30.79 BC.	4.7	01.5	95.87	5.6	
+50	4.8	01.4	95.85	5.6	
+75			95.82		
146+00	8.1	498.1	95.80	2.3	
+25			95.77		
+50	3.8	02.4	95.75	6.7	
+75			95.72		

+0.09% 8%

							Grade	Off cut	℄ cut
			506.17						
146+94.68 E.C.				3.8	02.4	Rec. Elev.	95.71	6.7	
Ck on B.M. 20				2.67	503.50	503.52			
			July 23 1936 Soper-Bommelsbell.						
		4.70	508.22		503.52				
147+00				6.0	02.2		95.70	6.5	
+50	-0.0948%			6.7	01.5		95.65	5.9	
148				6.8	01.4		95.60	5.8	
+50				6.7	01.5		95.55	6.0	
149+00				6.8	01.4		95.50	5.9	

		508.22			Grade	off cut	℄ cut
149+50	-0.099+8%		6.7	01.5	95.45	6.1
150+00			6.8	01.4	95.40	6.0
+12.2375					495.39	
+50			7.0	01.2	95.34	5.9
151+00	-0.1207%		7.4	00.8	95.28	5.5
+50			7.6	00.6	95.22	5.4
152+00			7.5	00.7	95.16	5.5

						Grade	off cut	℄ cut
		508.22						
152+50			7.7	00.5		95.10	5.4	
153+00			7.6	00.6		95.04	5.6	
+50	−0.1207%		7.8	00.4		94.98	5.4	
154+00			7.6	00.6		94.92	5.7	
+50			7.6	00.6		94.86	5.7	
+90.2375						494.813		
155+00	+0.8467%		7.1	01.1		94.89	6.2	
+08.90 BC			7.0	01.2		94.97	6.2	

155+25						
TP.	3.6	509.1		505.5		10' offset Sta 157+00
+50			7.7	01.4		
+75						
156+00			8.5	00.6		
+25						
+50			6.1	03.0		
+75						
B.M.# 21	9.60	510.72		501.12		July 6 1932 Soper Remmers Ishell
157+00			5.2	05.5		
+25						
+50						

+0.84 67%

Grade	off cut	℄ cut
95.10		
95.32	6.1	
95.53		
95.74	4.9	
95.95		
96.16	6.8	
96.38		
96.59	8.9	
96.80		

		510.72			Grade	off cut	℄ cut
157+50			2.9	07.8	97.01	10.8	
+75					97.22		
158+00			3.8	06.9	97.43	9.5	
+25					97.65		
+50	+0.8467		3.9	06.8	97.86	8.9	
+75					98.07		
159+00			7.9	02.8	98.28	4.5	
+25					98.49		

							Grade	Off cut	℄ cut
			510.72						
159+54.35 = 159+62.76 E.C.				3.5	07.2	July 7 1936 Soper Remmen Isbell	98.74	8.5	
B.M. No 21	+0.8467%	9.16	510 28		501.12				
+75							98.85		
160+00				2.9	07.4		99.06	8.3	
+03.7792							499.09		
+25							99.00		
+50				3.1	07.2		98.90	8.3	
+75	-0.4112%						98.79		
161+00				3.6	06.7		98.69?	8.0	
+25							98.59		

				Grade	off cut	& cut
	510.28					
161+50		5.8	04.5	98.49	6.0	
+75				98.38		
162+00		4.8	05.5	98.38	7.2	
+25				98.18		
	-0.41½%					
+50		6.0	04.3	98.08	6.2	
+75				97.97		
163+00		6.0	04.3	97.87	6.4	
+25				97.77		
+50		6.8	03.5	97.67	5.8	
+75				97.57		

				Grade	off cut	℄ cut
	510.28					
164+00		6.9	03.4	97.46	5.9	
+25				97.35		
+50	-0.411 2%	7.1	03.2	97.25	6.0	
+75				97.15		
165+00		7.0	03.3	97.05	6.3	
+50		4.3	06.0	96.84	9.2	
166+00		6.4	03.9	96.64	7.3	
+08.0083				496.606		

July 9 1936
Soper
Romney
Isbell

					Grade	Off cut	℄ cut
B.M #22	4.44	507.04		502.60			
+25					96.40		
166+50			2.3	04.7	96.11	8.6	
+75					95.81		
167+00			3.1	03.9	95.52	8.4	
+24.00 BC			3.2	03.8	95.24	8.6	
+50			2.7	04.3	94.94	9.4	
+75					94.64		
168+00			5.9	01.1	94.35	6.8	
+25					94.06		
+50			7.6	99.4	93.76	5.6	
+75					93.47		

-1.17% ?

							Grade	Off cut	℄ cut
			507.04						
169+00				7.2	99.8		93.17	6.6	
B.M.# 22	-1.1349%	2.71	505.31		502.60	July 10 1936 Soper Remmen Ickell			
+25							92.88		
+50				5.9	99.4		92.59	6. 8	
+75							92.29		
169+95.8208	X						492.0495		
170+00				6.0	99.3		92.04	7. 3	
+25	-0.133447%						92.01		
+50				5.9	99.4		91.98	7.4	
+75							91.94		
171+00				5.2	00.1		91.91	8.2	
+25							91.88		
+40.21 E.C.				3.6	01.7		91.86	9.8	
+50				3.4	01.9		91.84	10.1	

		505.31			Grade	↑ cut	↓ cut
172+00			5.2	00.1	91.78	8.3	
+50			10.9	94.4	91.71	2.7	
173+00	-0.133447%		9.3	96.0	91.64	4.4	
+50			8.7	96.6	91.58	5.0	
TP			9.21	496.10			
	7.94	504.04					
174+00			8.2	95.8	91.51	4.3	
+50			8.3	95.7	91.44	4.3	

		504.04			Grade	off cut	& cut
175+00			8.7	95.3	91.38	3.9	
+50			8.5	95.5	91.31	4.2	
	-0.13344%						
176+00			5.4	98.6	91.24	7.4	
+29.74 BC			3.3	00.7	91.20	9.5	
+50			3.5	00.5	91.18	9.3	
+75					91.14		

					Grade	off cut	& cut
		504.04					
177+00	-0.13344%		3.8	00.2	91.11	9.1	
+25					91.08		
+50			3.9	00.1	91.04	9.1	
+75					91.01		
178+00			4.5	99.5	90.97	8.5	
178+01.7583					490.974		
+25					90.65		
+50			5.7	98.3	90.31	8.0	
+75					89.97		
PI	-1.37392%		4.42	499.62			
		476 504.38					
179+00			4.8	99.6	89.62	10.0	
+25					89.28		

			504.38			Grade	off cut	& cut
179+50	-1.37392 %			5.6	98.8	88.94	9.9	
+75						88.59		
180+00				8.0	96.4	88.25	8.2	
T.P.		2.0 ft	498.42	8.00	496.38			
180+10.44584						488.1068		
+25						87.91		
+50				4.2	94.2	87.56	6.6	
+75						87.22		
181+00	-1.37436 %			5.4	93.0	86.88	6.1	
+25						86.53		
+50				6.7	91.7	86.19	5.5	
+75						85.84		
181+89.32084						485.6484		
182+00				7.2	91.2	85.55	5.7	
+26						85.32		

July 11 1926
Soper
Rimmer
Isbell

						Grade	off cut	& cut
		498.42						
182+50			7.5	90.9		85.09	5.8	
PI	1.91	494.08	6.25	492.17	Nail in tel pole			
+75						84.86		
183+00			2.4	91.7		84.63	7.1	
+27.32 EC			0.1	94.0	10' offsets end here	84.38	9.6	
+50			0.5	93.6	13' offsets begin here	84.18	9.4	
+25						84.00		
184+00			1.6	92.5		83.72	8.8	
+50			3.0	91.1		83.26	7.8	
+75								
184+87.7583						482.9094		
185+00			3.8	90.3		82.90	7.4	
+25						82.89		

87+16.0 —

							Grade	Lft cut	℄ cut
		494.08							
185+50			4.2	89.9			82.88	7.0	
+75			0.41	493.67	ck on B.M.º23 Rec. elev 493.67				
+75							82.86		
186+00			4.7	89.4			82.85	6.6	
+25							82.84		
B.M.º23	3.50	497.17		493.67	July 25 1936 Soper Remmio Isbell				
+50	-0.05168%		8.3	88.9			82.82	6.1	
+75							82.81		
187+00			8.5	88.7			82.80	5.9	
+25							82.79		
+50			8.7	88.5			82.77	5.7	
+75							82.76		
188+00			8.8	88.4			82.75	5.7	
+20.00 B.C.			8.8	88.4			82.74	5.7	

- 0.05168%

	49717			Grade	off cut	℄ cut
188+50		8.6	88.6	82.72	5.9	
+75				82.71		
189+00		8.1	89.1	82.70	6.4	
+25				82.68		
+50		7.7	89.5	82.67	6.8	
+75				82.66		
190+00				82.64		
+02.58 EC		7.4	89.8	82.64	7.2	
+25				82.63		
+50		7.0	90.2	82.62	7.6	
+75				82.60		
191+00		6.9	90.3	82.59	7.7	
+25				82.58		

				Grade	off cut	℄ cut
	497.17					
191+50		7.0	90.2	82.57	7.6	
+75				82.55		
192+00		6.9	90.3	82.54	7.8	
+25	-0.05168%			82.53		
+50		6.4	90.8	82.51	8.3	
+75				82.50		
193+00		5.4	91.8	82.49	9.3	
+25				82.48		
+50		4.5	92.7	82.46	10.2	
+75				82.45		
194+00		4.3	92.9	82.44	10.5	
+25				82.42		

					Grade	Off cut	℄ cut
	-0.05168%	497.17					
194+50			4.2	93.0	82.41	10.6	
+75					82.40		
195+00			4.4	92.8	82.39	10.4	
195+03.5083					482.3844		
+50			4.8	92.4	82.20	10.2	
196+00	-0.39742%		5.2	92.0	82.00	10.0	
+50			5.4	91.8	81.80	10.0	
197+00			5.9	91.3	81.60	9.7	

	497.17					
197+50			6.4	90.8	81.40	9.4
198+00			7.0	90.2	81.21	9.0
+50	-0.39742%		7.8	89.4	81.01	8.4
199+00			8.6	88.6	80.81	7.8
+50			9.2	88.0	80.61	7.4
200+00			9.8	87.4	80.41	7.0
211.3833					480.366	

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Width	HEIGHT														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	.02	.04	.06	.07	.09	.11	.13	.15	.17	.18	.20	.22	.24	.26	.28
2	.04	.07	.11	.15	.18	.22	.26	.30	.33	.37	.41	.44	.48	.52	.56
3	.06	.11	.17	.22	.28	.33	.39	.44	.50	.56	.61	.67	.72	.78	.83
4	.07	.15	.22	.30	.37	.44	.52	.59	.67	.74	.81	.89	.96	1.04	1.11
5	.09	.19	.28	.37	.46	.56	.65	.74	.83	.93	1.02	1.11	1.20	1.30	1.39
6	.11	.22	.33	.44	.56	.67	.78	.89	1.00	1.11	1.22	1.33	1.44	1.55	1.67
7	.13	.26	.39	.52	.65	.78	.91	1.04	1.16	1.30	1.42	1.55	1.68	1.81	1.94
8	.15	.30	.44	.59	.74	.89	1.04	1.19	1.33	1.48	1.63	1.78	1.92	2.08	2.22
9	.17	.33	.50	.67	.83	1.00	1.17	1.33	1.50	1.67	1.83	2.00	2.17	2.33	2.50
10	.18	.37	.56	.74	.93	1.11	1.30	1.48	1.67	1.85	2.04	2.22	2.41	2.59	2.78
11	.20	.41	.61	.82	1.02	1.22	1.43	1.63	1.83	2.04	2.24	2.44	2.65	2.85	3.06
12	.22	.44	.67	.89	1.11	1.33	1.56	1.78	2.00	2.22	2.44	2.67	2.89	3.11	3.33
13	.24	.48	.72	.96	1.20	1.44	1.68	1.92	2.16	2.41	2.65	2.89	3.13	3.37	3.61
14	.26	.52	.78	1.04	1.30	1.55	1.81	2.08	2.33	2.59	2.85	3.11	3.37	3.63	3.89
15	.28	.56	.83	1.11	1.39	1.67	1.94	2.22	2.50	2.78	3.06	3.33	3.61	3.89	4.17
16	.30	.59	.89	1.18	1.48	1.78	2.07	2.37	2.67	2.96	3.26	3.56	3.85	4.15	4.44
17	.31	.63	.94	1.26	1.57	1.89	2.20	2.52	2.83	3.15	3.46	3.78	4.09	4.41	4.72
18	.33	.67	1.00	1.33	1.67	2.00	2.33	2.67	3.00	3.33	3.67	4.00	4.33	4.67	5.00
19	.35	.70	1.06	1.41	1.76	2.11	2.46	2.82	3.17	3.52	3.87	4.22	4.57	4.92	5.28
20	.37	.74	1.11	1.48	1.85	2.22	2.59	2.96	3.33	3.70	4.07	4.44	4.81	5.18	5.56
21	.39	.78	1.17	1.55	1.94	2.33	2.72	3.11	3.50	3.89	4.28	4.67	5.06	5.44	5.83
22	.41	.81	1.22	1.63	2.04	2.44	2.85	3.26	3.67	4.07	4.48	4.89	5.30	5.70	6.11
23	.43	.85	1.28	1.70	2.13	2.56	2.98	3.41	3.83	4.26	4.68	5.11	5.54	5.96	6.39
24	.44	.89	1.33	1.78	2.22	2.67	3.11	3.56	4.00	4.44	4.89	5.33	5.78	6.22	6.67
25	.46	.92	1.39	1.85	2.31	2.78	3.24	3.70	4.17	4.63	5.09	5.56	6.02	6.48	6.94
26	.48	.96	1.44	1.92	2.41	2.89	3.37	3.85	4.33	4.82	5.30	5.78	6.26	6.74	7.24
27	.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50
28	.52	1.04	1.55	2.07	2.59	3.11	3.63	4.15	4.67	5.18	5.70	6.22	6.74	7.26	7.78
29	.54	1.07	1.61	2.15	2.68	3.22	3.76	4.30	4.83	5.37	5.91	6.44	6.98	7.52	8.06
30	.56	1.11	1.67	2.22	2.78	3.33	3.89	4.44	5.00	5.55	6.11	6.67	7.22	7.78	8.33
31	.57	1.15	1.72	2.30	2.87	3.44	4.02	4.59	5.17	5.74	6.32	6.89	7.46	8.04	8.61
32	.59	1.18	1.78	2.37	2.96	3.56	4.15	4.74	5.33	5.92	6.52	7.11	7.70	8.30	8.89
33	.61	1.22	1.83	2.44	3.05	3.67	4.28	4.89	5.50	6.11	6.72	7.33	7.94	8.55	9.17
34	.63	1.26	1.89	2.52	3.15	3.78	4.40	5.04	5.67	6.29	6.93	7.56	8.18	8.81	9.44
35	.65	1.30	1.94	2.59	3.24	3.89	4.53	5.18	5.83	6.48	7.13	7.78	8.42	9.08	9.72
36	.67	1.33	2.00	2.67	3.33	4.00	4.66	5.33	6.00	6.67	7.33	8.00	8.67	9.33	10.00
37	.68	1.37	2.06	2.74	3.42	4.11	4.79	5.48	6.17	6.85	7.54	8.22	8.91	9.59	10.28
38	.70	1.41	2.11	2.82	3.52	4.22	4.92	5.63	6.33	7.03	7.74	8.44	9.15	9.85	10.56
39	.72	1.44	2.17	2.89	3.61	4.33	5.05	5.78	6.50	7.22	7.95	8.67	9.39	10.11	10.83
40	.74	1.48	2.22	2.96	3.70	4.44	5.18	5.92	6.67	7.41	8.15	8.89	9.63	10.37	11.11

Table gives cu. yds. in 1 ft. of a triangle of given width and height. Corrections for tenths of width are one tenth the values found under each height considering the widths from 1 to 9 as tenths and similarly the corrections for tenths of height are one tenth the figures opposite width considering the heights from 1 to 9 as tenths. Thus if w =16.2 and h =5.3, cu. yds. =1.48+.028+.089 =1.597 cu. yds. or practically 160 cu. yds. per 100 ft. If w exceeds 40 ft., use one half and multiply result by 2, if both w and h are large use one half of each and multiply result by 4. Any cross-section may be divided into triangles by the following rule. To the triangle of the sum of the outside cuts (or fills) =h, and ½ the roadbed =w, add the triangles formed by taking the distance out to each break in turn (=w's) by the difference between the cuts (or fills) on each side of it (=h's) always subtracting the outer from the inner.

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

Roadway 16 feet wide. Side Slopes 1 on 1½.

For Single Track Embankment.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	H
0	8.0	8.2	8.3	8.5	8.6	8.8	8.9	9.1	9.2	9.4	0
1	9.5	9.7	9.8	10.0	10.1	10.3	10.4	10.6	10.7	10.9	1
2	11.0	11.2	11.3	11.5	11.6	11.8	11.9	12.1	12.2	12.4	2
3	12.5	12.7	12.8	13.0	13.1	13.3	13.4	13.6	13.7	13.9	3
4	14.0	14.2	14.3	14.5	14.6	14.8	14.9	15.1	15.2	15.4	4
5	15.5	15.7	15.8	16.0	16.1	16.3	16.4	16.6	16.7	16.9	5
6	17.0	17.2	17.3	17.5	17.6	17.8	17.9	18.1	18.2	18.4	6
7	18.5	18.7	18.8	19.0	19.1	19.3	19.4	19.6	19.7	19.9	7
8	20.0	20.2	20.3	20.5	20.6	20.8	20.9	21.1	21.2	21.4	8
9	21.5	21.7	21.8	22.0	22.1	22.3	22.4	22.6	22.7	22.9	9
10	23.0	23.2	23.3	23.5	23.6	23.8	23.9	24.1	24.2	24.4	10
11	24.5	24.7	24.8	25.0	25.1	25.3	25.4	25.6	25.7	25.9	11
12	26.0	26.2	26.3	26.5	26.6	26.8	26.9	27.1	27.2	27.4	12
13	27.5	27.7	27.8	28.0	28.1	28.3	28.4	28.6	28.7	28.9	13
14	29.0	29.2	29.3	29.5	29.6	29.8	29.9	30.1	30.2	30.4	14
15	30.5	30.7	30.8	31.0	31.1	31.3	31.4	31.6	31.7	31.9	15
16	32.0	32.2	32.3	32.5	32.6	32.8	32.9	33.1	33.2	33.4	16
17	33.5	33.7	33.8	34.0	34.1	34.3	34.4	34.6	34.7	34.9	17
18	35.0	35.2	35.3	35.5	35.6	35.8	35.9	36.1	36.2	36.4	18
19	36.5	36.7	36.8	37.0	37.1	37.3	37.4	37.6	37.7	37.9	19
20	38.0	38.2	38.3	38.5	38.6	38.8	38.9	39.1	39.2	39.4	20
21	39.5	39.7	39.8	40.0	40.1	40.3	40.4	40.6	40.7	40.9	21
22	41.0	41.2	41.3	41.5	41.6	41.8	41.9	42.1	42.2	42.4	22
23	42.5	42.7	42.8	43.0	43.1	43.3	43.4	43.6	43.7	43.9	23
24	44.0	44.2	44.3	44.5	44.6	44.8	44.9	45.1	45.2	45.4	24
25	45.5	45.7	45.8	46.0	46.1	46.3	46.4	46.6	46.7	46.9	25
26	47.0	47.2	47.3	47.5	47.6	47.8	47.9	48.1	48.2	48.4	26
27	48.5	48.7	48.8	49.0	49.1	49.3	49.4	49.6	49.7	49.9	27
28	50.0	50.2	50.3	50.5	50.6	50.8	50.9	51.1	51.2	51.4	28
29	51.5	51.7	51.8	52.0	52.1	52.3	52.4	52.6	52.7	52.9	29
30	53.0	53.2	53.3	53.5	53.6	53.8	53.9	54.1	54.2	54.4	30
31	54.5	54.7	54.8	55.0	55.1	55.3	55.4	55.6	55.7	55.9	31
32	56.0	56.2	56.3	56.5	56.6	56.8	56.9	57.1	57.2	57.4	32
33	57.5	57.7	57.8	58.0	58.1	58.3	58.4	58.6	58.7	58.9	33
34	59.0	59.2	59.3	59.5	59.6	59.8	59.9	60.1	60.2	60.4	34
35	60.5	60.7	60.8	61.0	61.1	61.3	61.4	61.6	61.7	61.9	35
36	62.0	62.2	62.3	62.5	62.6	62.8	62.9	63.1	63.2	63.4	36
37	63.5	63.7	63.8	64.0	64.1	64.3	64.4	64.6	64.7	64.9	37
38	65.0	65.2	65.3	65.5	65.6	65.8	65.9	66.1	66.2	66.4	38
39	66.5	66.7	66.8	67.0	67.1	67.3	67.4	67.6	67.7	67.9	39
40	68.0	68.2	68.3	68.5	68.6	68.8	68.9	69.1	69.2	69.4	40

Example—If point is 22.6 ft. above grade, how far should it be from center line to be a slope stake point? Ans. from Table 41.9. For same slopes but other widths of roadbed correct above figures by one-half difference in width of roadbed; thus in example above for 20 ft. roadbed distance will be 41.9+(20—16)÷2 or 2 ft. added to 41.9 =43.9. For slopes of 1 on 1 see inside of front cover.

Made in Germany.