EUGENE DIETZGEN CO.

DRAWING MATERIALS, MATHEMATICAL and
SURVEYING INSTRUMENTS

Chicago New York San Francisco New Orleans Pittsburg Toronto

Distances from Center of Roadway for Cross-Sectioning
Roadway 16 feet wide. Side Slopes 1 on 1.
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.

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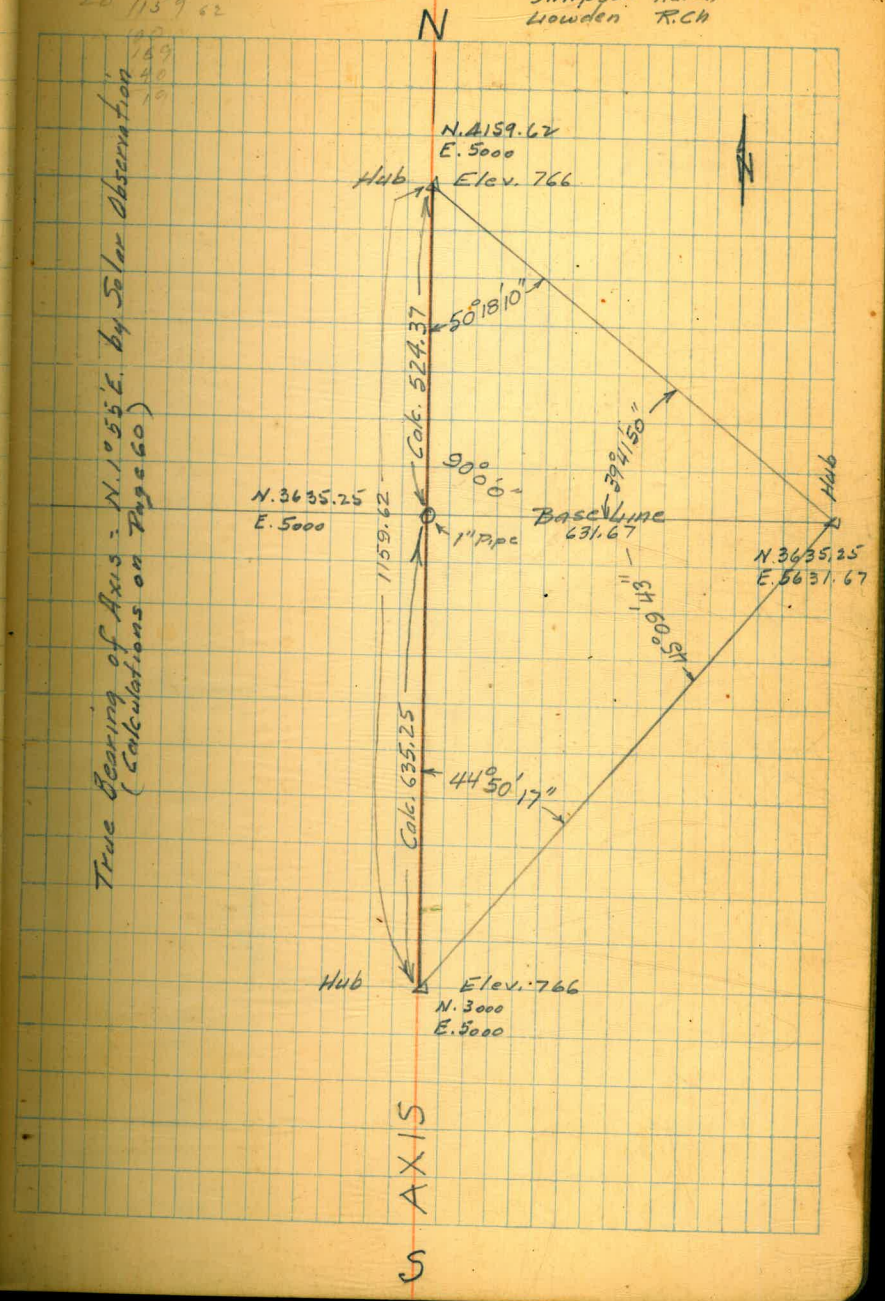
"C" Axis

Jan 11, 1932
Converse Chief
Elliott Notes
Simpson Hd. Ch
Howden R. Ch

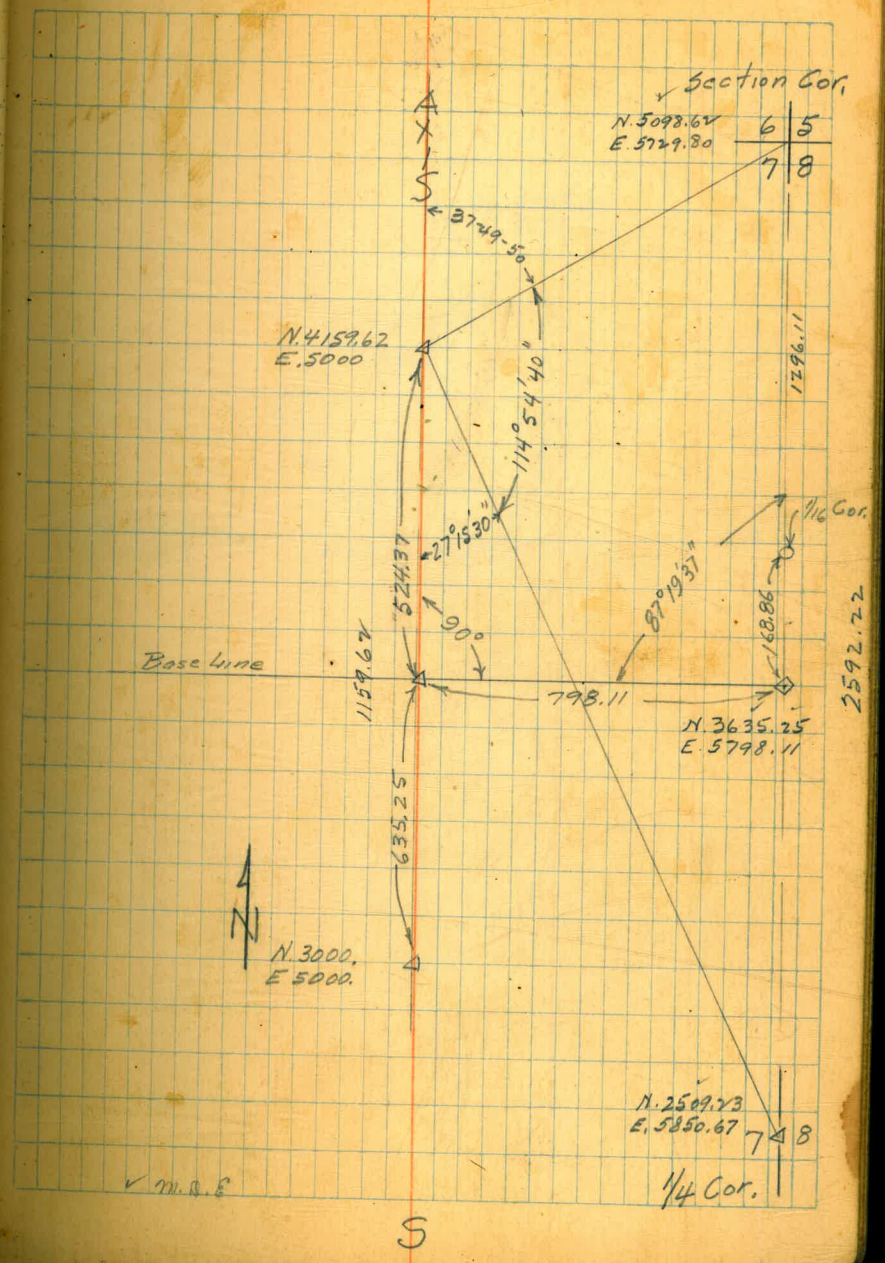
5 5



True Bearing of Axis = N. 10° 55' E. by Solar Observation
(Calculations on Page 60)

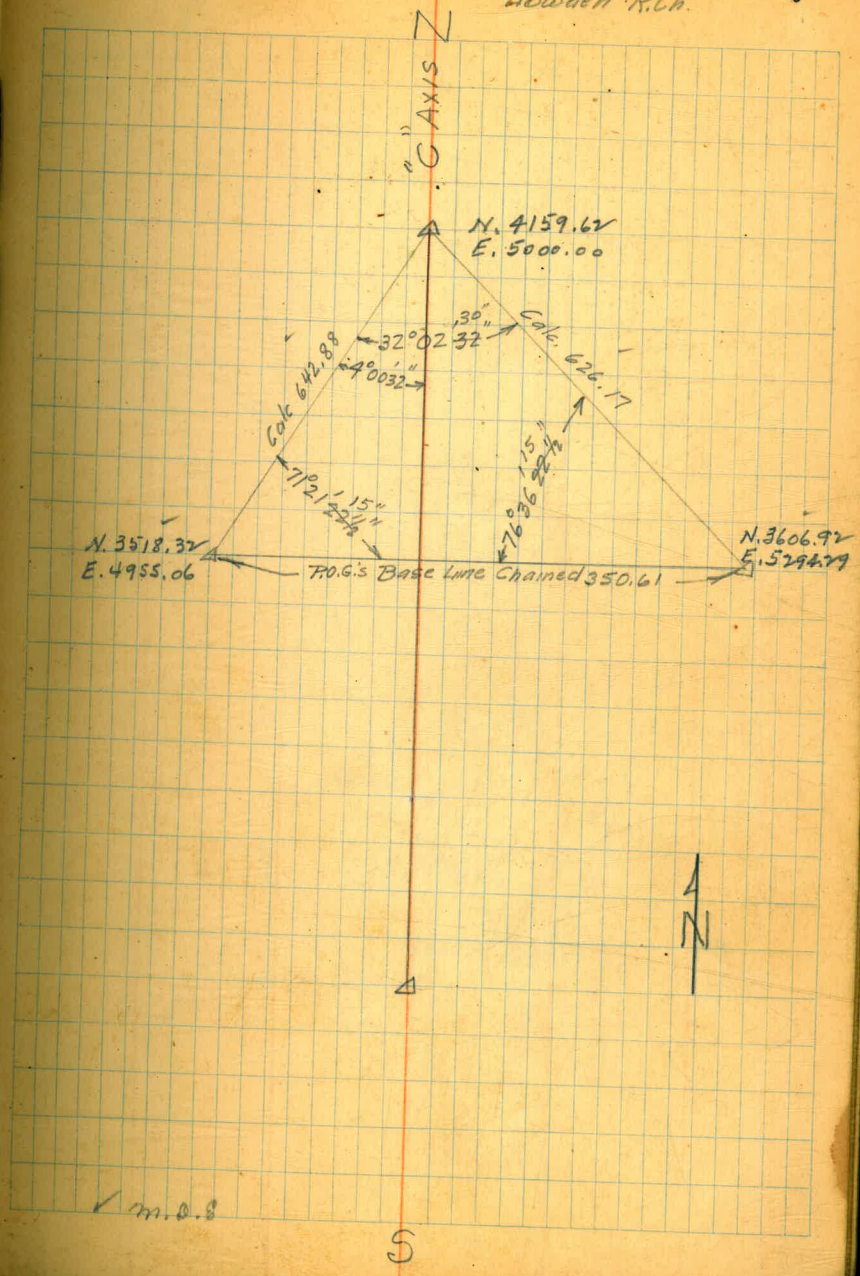
"C" Axis

Converse Chief
Elliott π notes
Simpson Hd. Ch.
Lowdon R. Ch



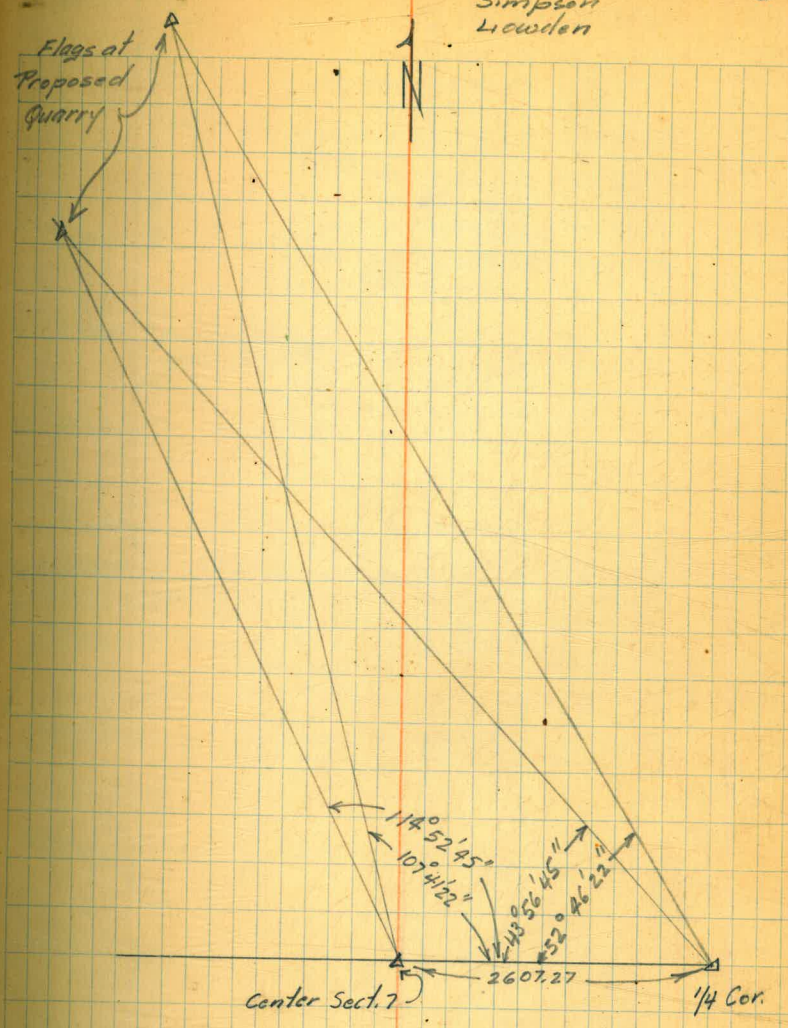
Converse Chief
Elliott notes
Simpson Hd. Ch.
Howden R. Ch.

7



m.d.s

Converse Chief
Elliott notes
Simpson
Lowden

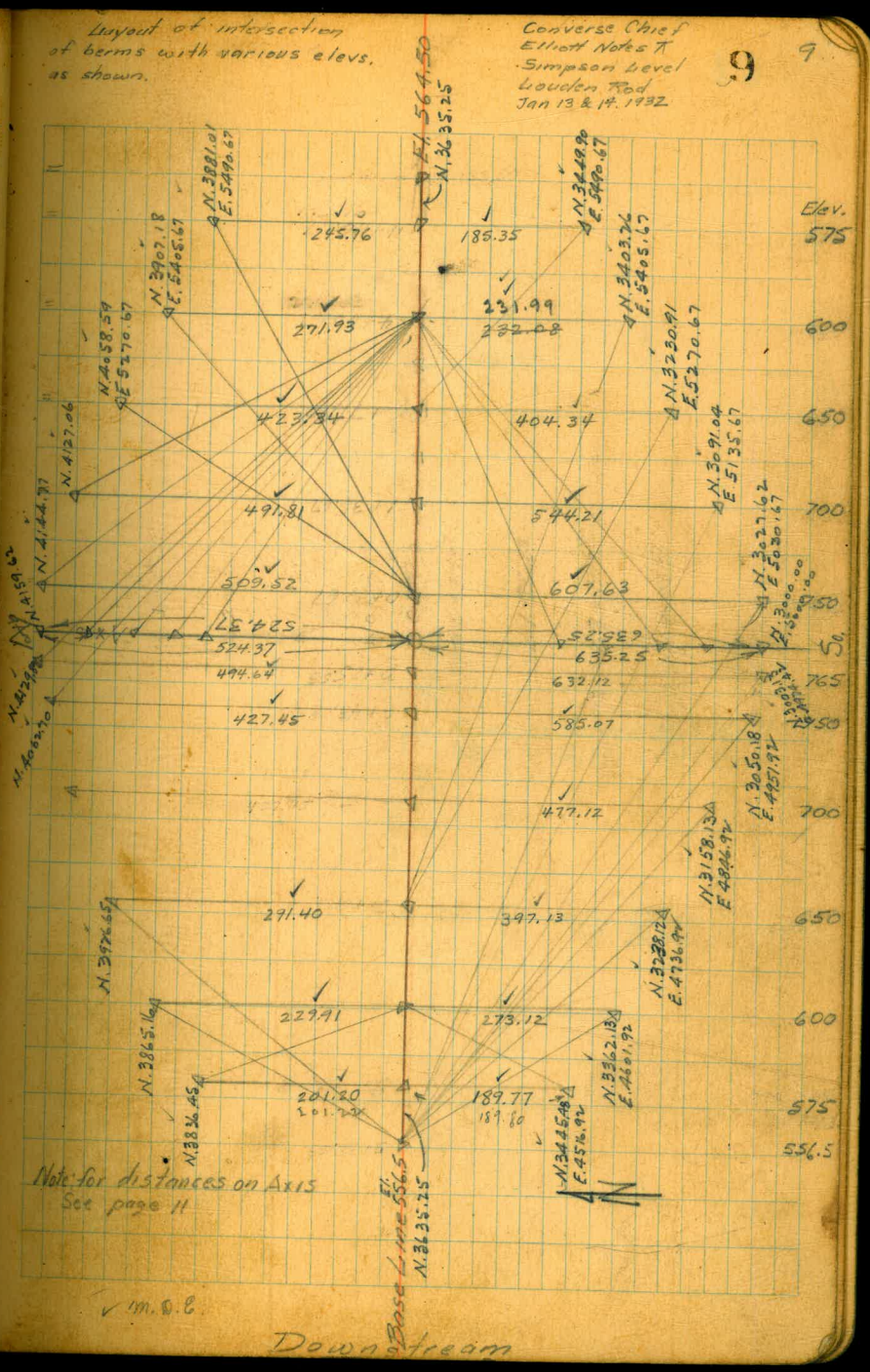


Sta.	Angle		
5+38 58	62°46'40"	to 600 El. on South (Downstream)	
5+38 58	55°15'	to 650 El. on South "	
5+38 58	51°03'45"	to 700 El. on South "	
5+38 58	50°01'30"	to 750 El. on South "	
5+38 58	50°56'20"	to 765 El. on South "	5+22.50
5+38 58	46°52'05"	to 750 El. on South (upstream)	
5+38 58	38°54'30"	to 700 El. on South "	4+90 67
5+38 58	37°55'45"	to 650 El. on Axis	
5+38 58	58°34'15"	to 600 El. on North (Downstream)	
5+38 58	46°36'25"	to 650 El. on North "	
3+98 08	67°05'50"	to 575 El. on North "	4+05 67
3+98 08	65°52'20"	to 575 El. on South "	
2+63 08	37°08'45"	to 650 El. on South (upstream)	2+70 67
2+63 08	19°07'55"	to 600 El. on South (upstream)	
0+30 67	28°06'50"	to 575 El. on North "	
0+30 67	35°56'50"	to 600 El. on North "	
0+30 67	60°27'0"	to 650 El. on North "	1+35 67
2+70 67	40°06'50"	to 575 El. on South "	
4+05 67	56°00'25"	to 750 El. on South Axis	0+30 67
4+05 67	52°00'10"	to 700 El. on South Axis	
4+05 67	37°42'50"	to 600 El. on South Axis	0+00
4+05 67	61°14'	to 700 El. on North (upstream)	
4+05 67	53°38'50"	to 750 El. on North "	0+25 58
4+05 67	48°55'	to 765 El. on North (downstream)	0+48 08
4+05 67	50°09'50"	to 750 El. on North Axis	
4+05 67	43°17'25"	to 750 El. on North (downstream)	
4+05 67	42°46'20"	to 703 El. on North Axis	
4+05 67	34°43'10"	to 650 El. on North Axis	1+53 08
4+05 67	27°48'05"	to 600 El. on North Axis	
			2+63 08
			3+98 08
			4+83 08
			5+38 58

Layout of intersection of berms with various elevs. as shown.

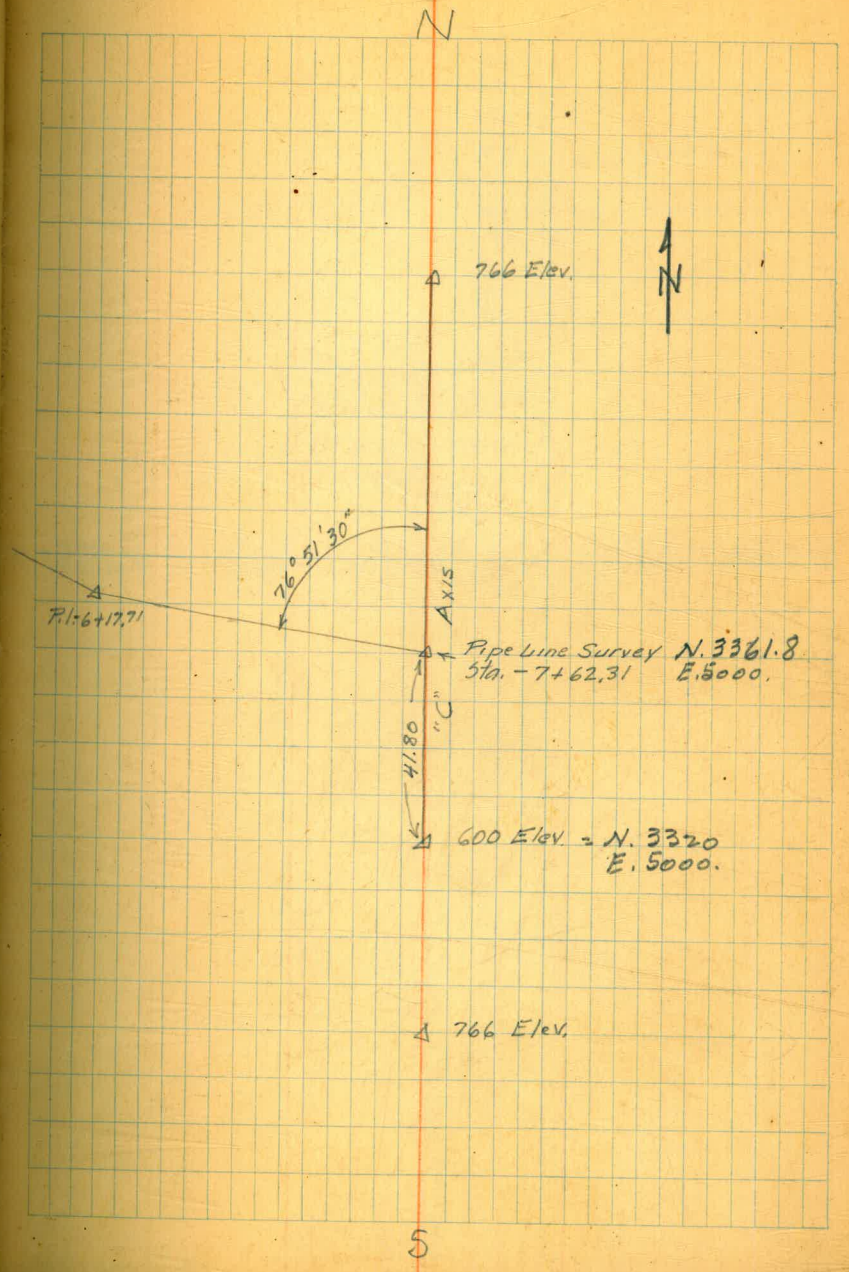
Converse Chief Elliott Notes II
Simpson Level
Louden Rod
Jan 13 & 14, 1932

9 9



Note for distances on Axis
See page 11

v m.d.e

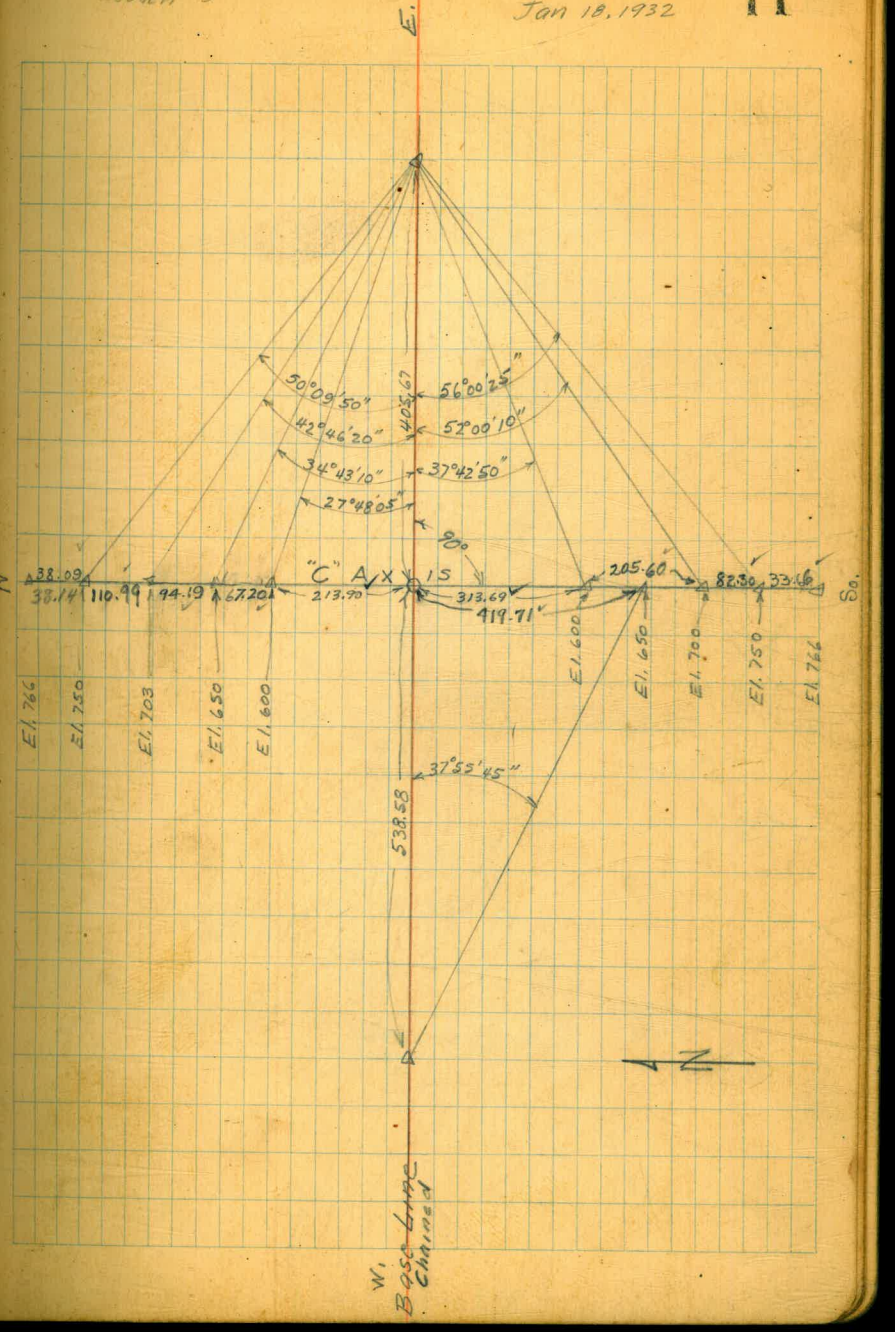

N
766 Elev.
N
76° 51' 30"
P.I. 6+17.71
Axis
Pipe Line Survey N. 3361.8
Sta. - 7+62.31 E. 5000.
"C"
41.80
600 Elev. = N. 3320
E. 5000.
766 Elev.
S

5	4159.62	4060 N. out	
	38.09		
Chained 4121.47	4121.52	El. 750	
	110.99		
" 4110.48	4010.54	700	
	94.19		
Changed Corrected 3916.27	3916.35	650	
	67.20		
Changed Corrected 3849.08	3849.15	600	
	213.90		
Chained 3635.27	3635.25		

Simpson & Howden & Calculations

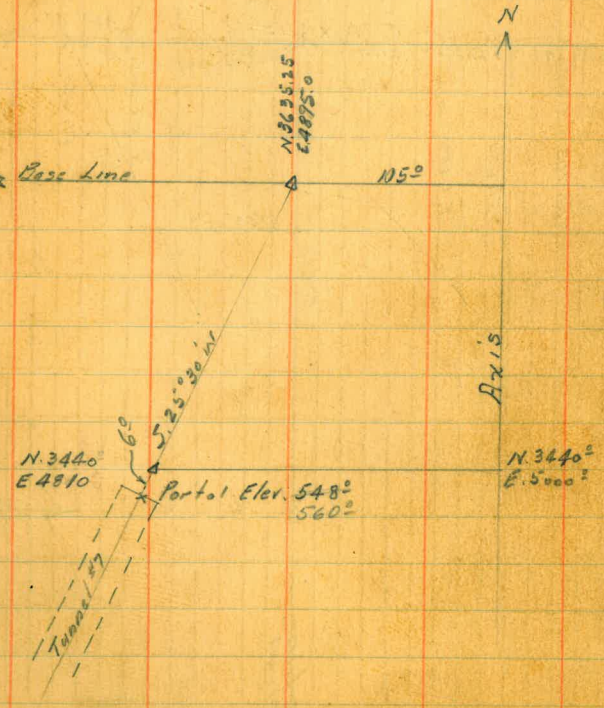
Converse Chief Elliott N notes Jan 18, 1932

11 11



Levels at Tunnel #3

B.M.	0.19	757.27		757.075
T.P.			13.02	744.25
	0.41	744.66		
T.P.			12.20	732.46
	4.57	737.03		
Top of hub portal of Tunnel #3	28-47 185 / 41.15 03-46 / 5.01 / 28-46-26	730.76	11.28	725.75 B.M.
Floor at face of Tunnel			2.8	728.0



Converse Chief Elliott Notes
Simpson H.A.C.h.
Loudon T.C.h.

Jan 26, 1932

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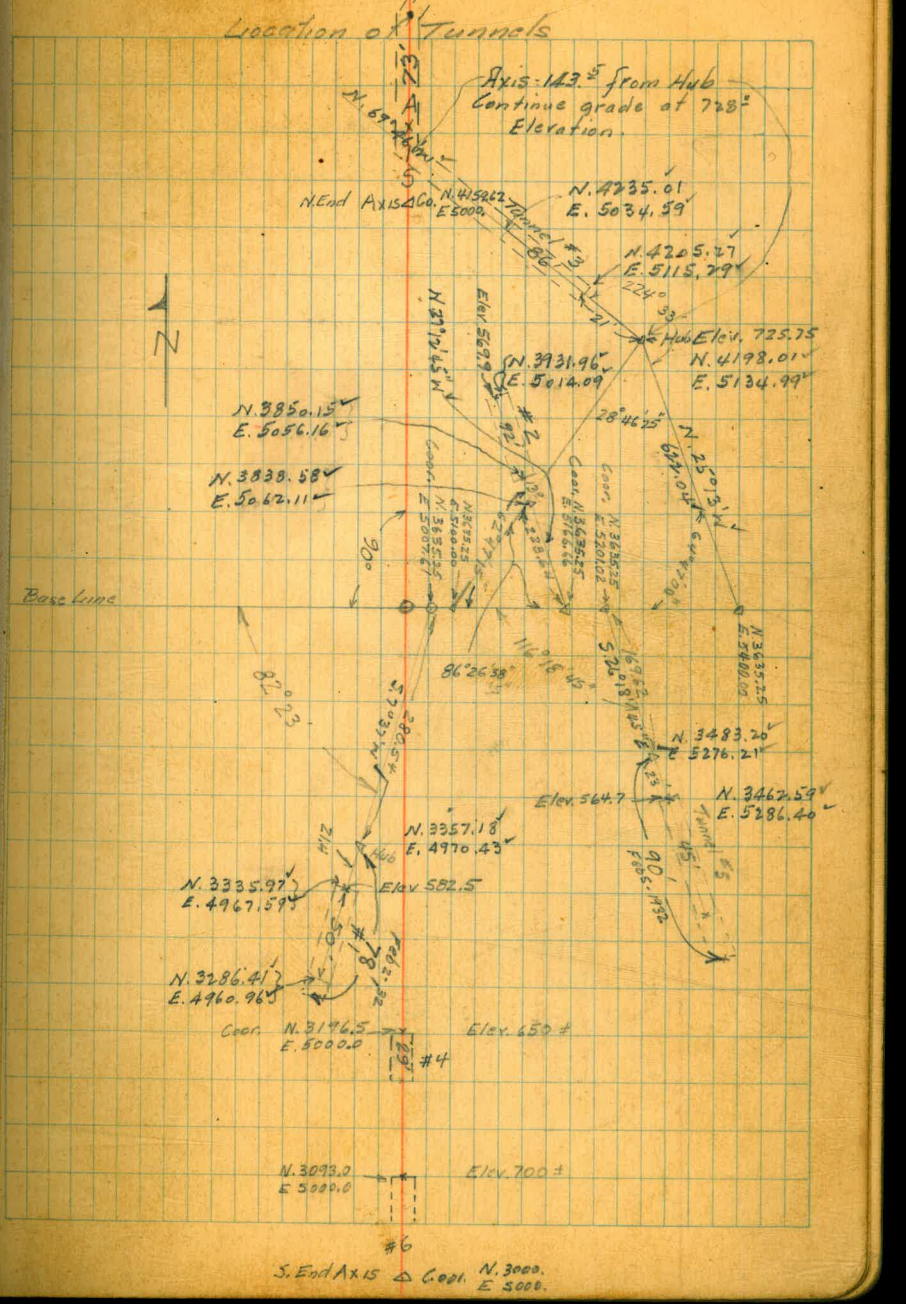
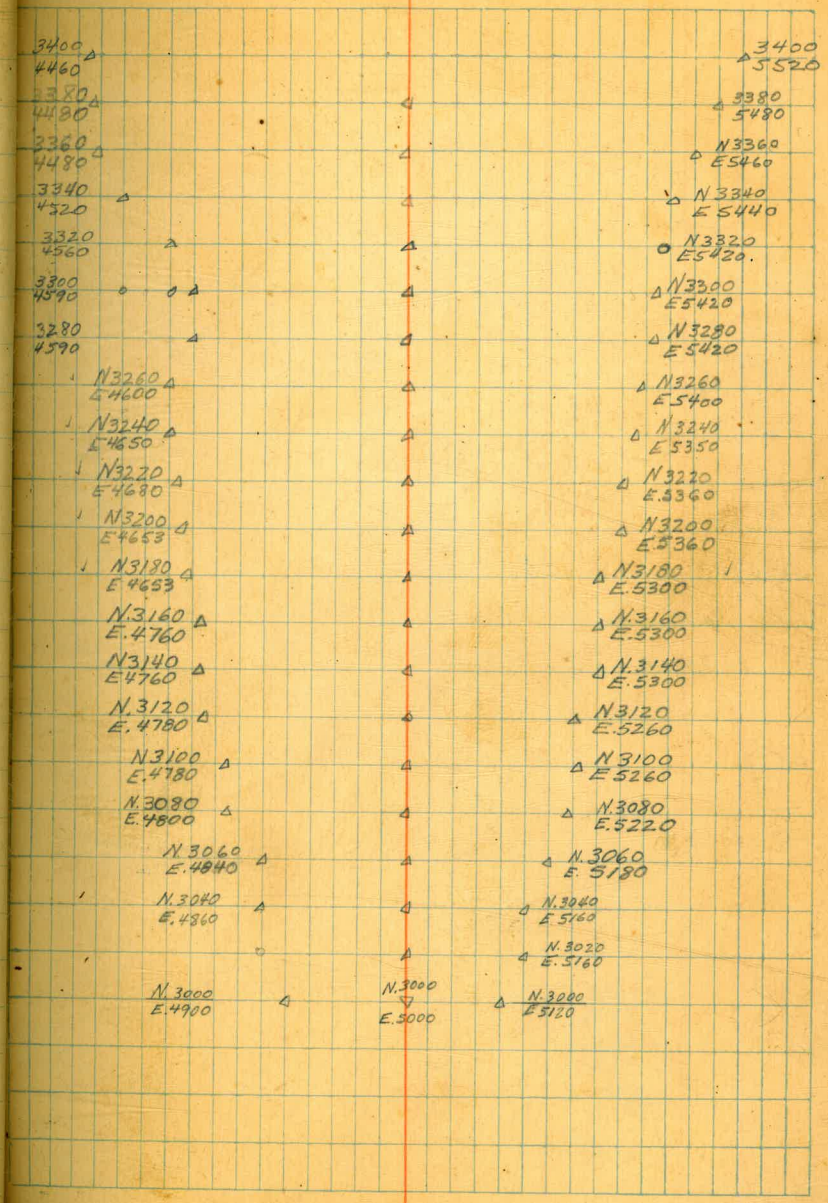
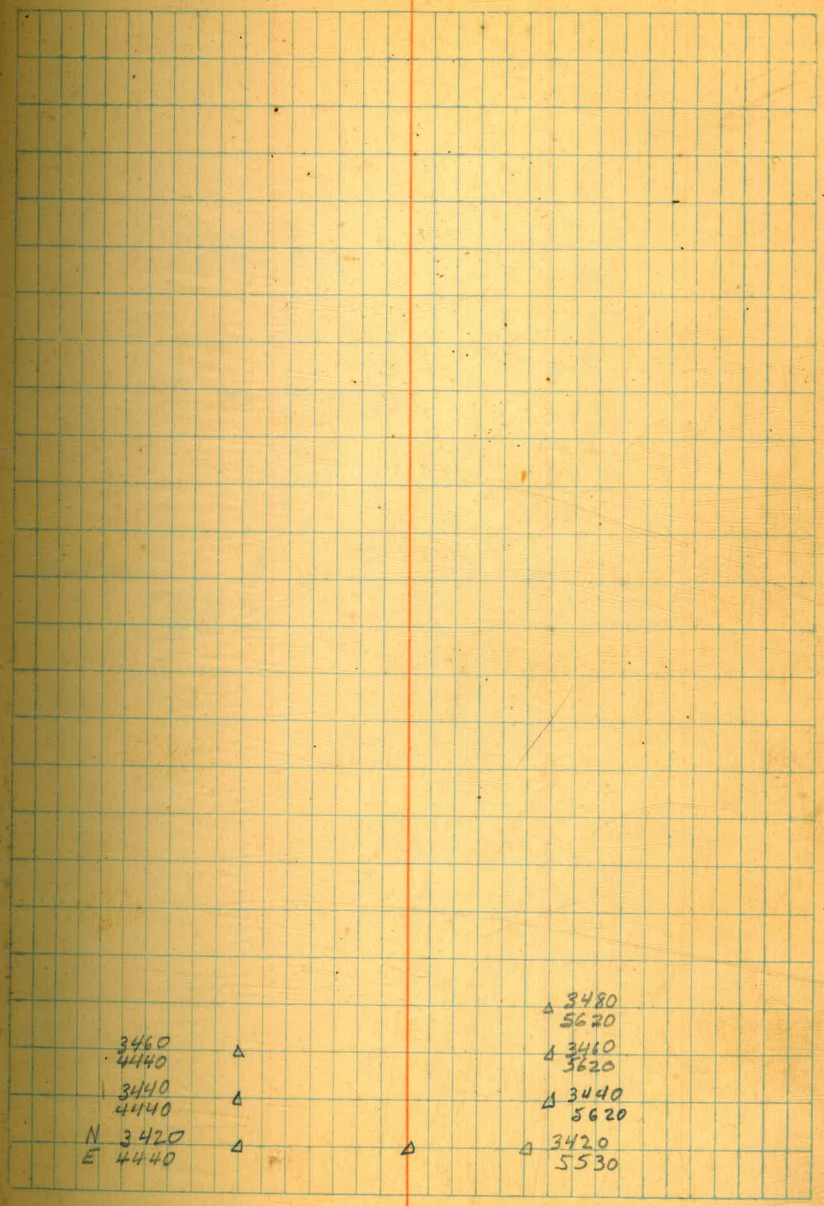
Location of Tunnels

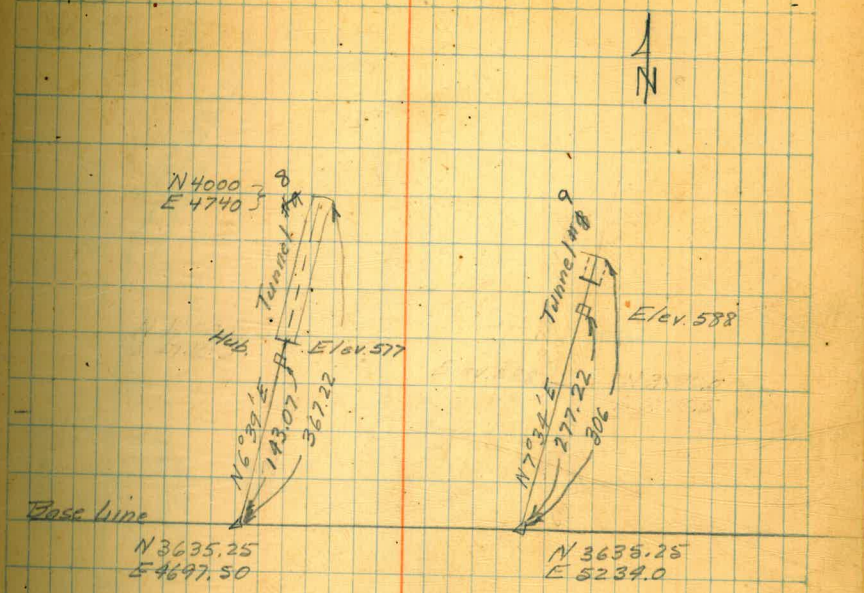


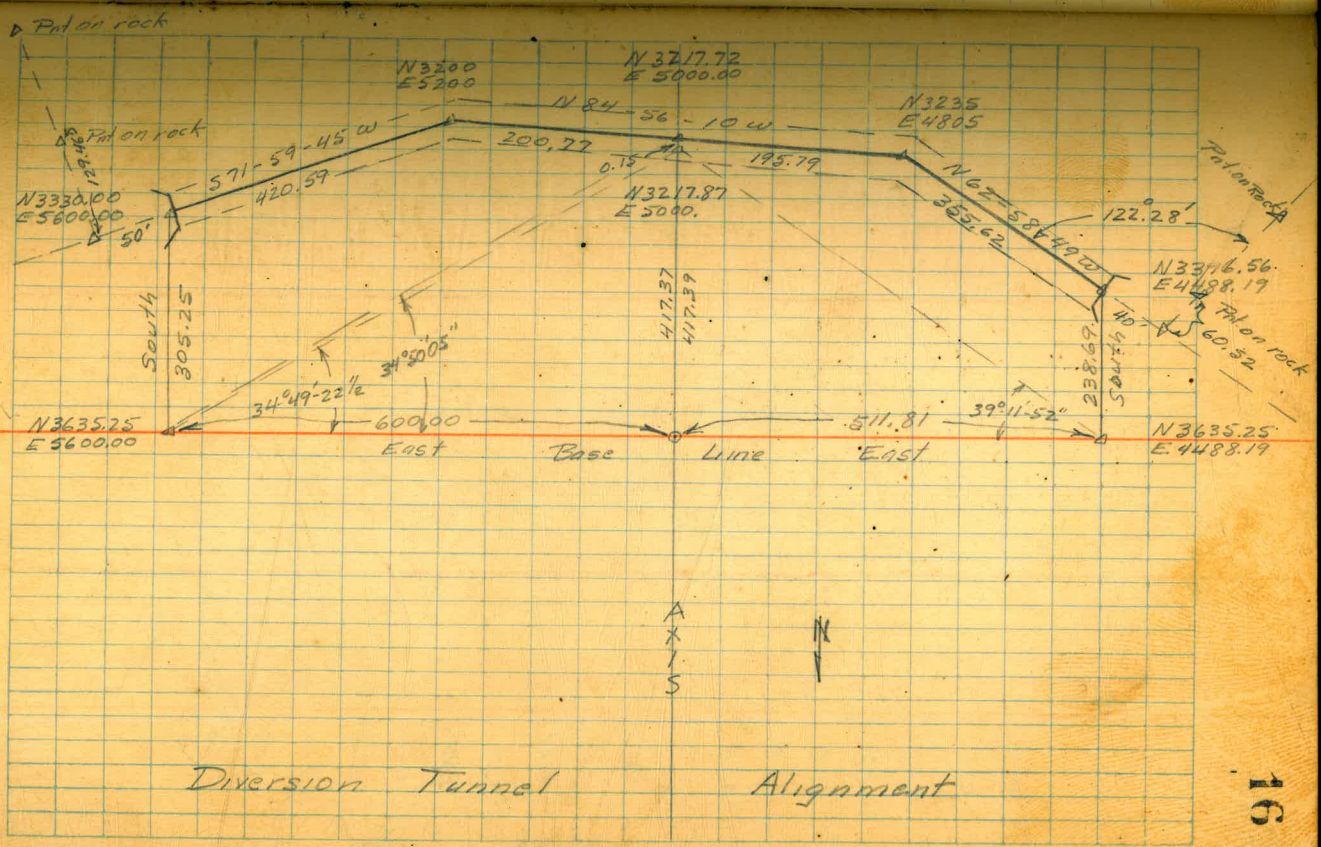

3400
4460
3380
4480
3360
4480
3340
4520
3320
4560
3300
4590
3280
4590
N3260
E4600
N3240
E4650
N3220
E4680
N3200
E4653
N3180
E4653
N.3160
E.4760
N3140
E4760
N.3120
E.4780
N.3100
E.4780
N.3080
E.4800
N.3060
E.4840
N.3040
E.4860
N.3000
E.4900
N.3000
E.5000
3400
5520
3380
5480
N3360
E5460
N3340
E5440
N3320
E5420.
N3300
E5420
N3280
E5420
N3260
E5400
N3240
E5350
N3220
E.5360
N3200
E.5360
N3180
E.5300
N.3160
E.5300
N.3140
E.5300
N.3120
E.5260
N.3100
E.5260
N.3080
E.5220
N.3060
E.5180
N.3040
E.5160
N.3020
E.5160
N.3000
E.5120

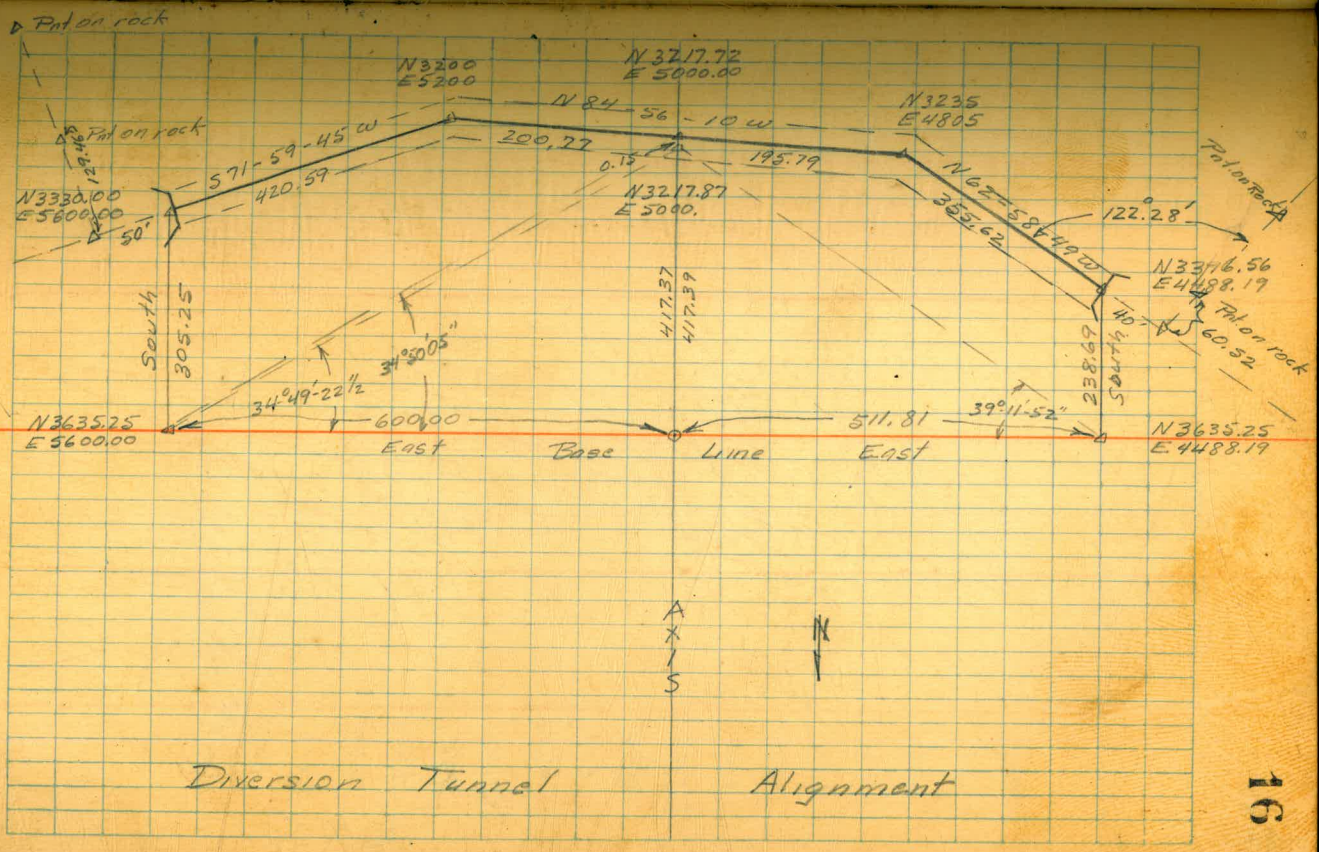
Coordinates of Reference Points



Feb 24, 1932
Converse Chief - Chain & Rod
Elliott - Transit, Notes
Simpson - Chain, Level




Pat on rock
N3300
E5200
N3217.72
E5000.00
N84-56-10 W
N3235
E4805
Pat on rock
S71-59-45 W
200.77
0.15
195.79
N62-58-49 W
N3330.00
E5600.00
420.59
N3217.87
E5000.
355.62
122.28'
Pat on rock
N3316.56
E4488.19
50'
South
305.25
417.37
417.39
34°50'05"
Pat on rock
60.32
40'
238.69
South
34°49'-22 1/2"
600.00
511.81
39°11'-52"
N3635.25
E5600.00
East
Base
Line
East
N3635.25
E4488.19
AXIS
N
Diversion Tunnel
Alignment


Pnt on rock
N3200
E5200
N3217.72
E5000.00
N84-56-10W
N3235
E4805
Pnt on rock
19.46
S71-59-45W
200.77
0.15
195.79
N62-58-49W
122.28
Pnt on Rock
N3330.100
E5600.00
50'
420.59
N3217.87
E5000.
355.62
N3346.56
E4488.19
Pnt on rock
60.52
40'
South
305.25
417.37
417.39
238.69
South
34°50'05"
34°49'-22½
N3635.25
E5600.00
600.00
East
Base
Line
511.81
East
39°11-52"
N3635.25
E4488.19
AXIS
N
Diversion Tunnel
Alignment

Curve Data, Upstream Toe Wall

0+00 B.C. North end Wall

+25

+50

+75

1+00

+25

+50

+75

2+00

+25

+50

+75

3+00

+25

+50

+75

4+00

+25

+55.22 E.C.

Sept 3-1932
Elliott - Notes
Simpson - Level
Soper - Rod
Remmen - Tape
Very Hot

Profile of So. Edge Spillway Crest

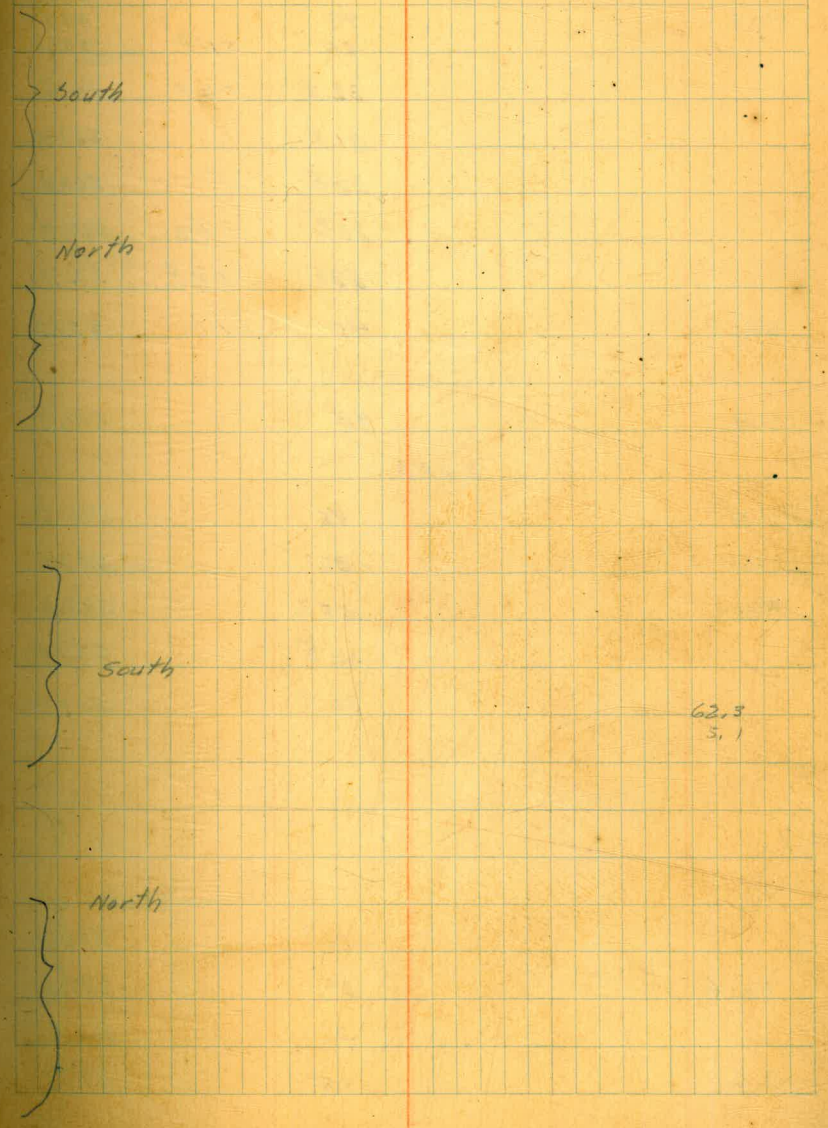
B.M.	2.68	793.43		790.75	
0+00 = S.W. Cor. Spillway Crest.			4.0	789.4	
0+32			10.1	783.3	
T.P.	0.46	781.16	12.73	780.70	
0+72			5.7	775.5	
T.P.	5.75	774.17	12.74	768.42	
1+05			8.2	766.0	
1+37			21.2	753.0	
1+58			14.5	759.7	
2+25			7.5	766.7	
2+82			4.1	770.1	
T.P.	6.22	773.14	7.28	766.92	
3+20			8.6	764.5	
3+48			15.6	757.5	
3+75			31.9	741.2	Bottom of Gully 12' of boulders
4+00			10.0	763.1	
T.P.	12.93	785.25	0.82	772.32	
T.P.	13.08	797.88	0.45	784.80	
4+36			13.0	784.9	
T.P.	12.67	809.88	0.67	797.21	
4+68			13.2	796.7	
5+00 = S.E. Cor. Spillway Crest			12.7	797.2	
T.P.	6.30	815.00	1.18	808.70	
B.M.			2.93	812.07	811.97

Nov. 2-1932 - Also Nov. 3
Elliott
Simpson
Soper
Remmen

Continued from page 49

Final x sections Tunnel Inlet

	Slope Dist	Vert. Angle	Hor. Dist	Rod or Diff. Elev.	Elev.
		0+20 H.I. 567.5			
O.G			49		591.8
Rock			39		576.7
			36	+1.3	568.8
			33 5		563.0
			33		563.0
			40	+7.7	575.2
Rock			41		576.7
O.G			47		586.8
		0+10 H.I. = 567.4			
O.G			48		593.8
Rock			40 5		580.7
			36 5	+7.3	574.7
			31 5	-1.9	565.5
			32		563.0
			31		563.0
			31	-2.8	564.6
			38	+7.4	574.8
			40	+8.7	576.1
Rock			41		579.7
O.G			45		588.3



		Hor. Dist.	Rod or Diff. in Elev.	Elev
	0+05	H.I. = 567.6		
O.G.		47.5		594.1
Rock		40		583.0
		35	+11.0	578.6
		32.5	+2.0	569.6
		31.8		563.0
		32.5		563.0
		33.0	-0.3	567.3
		35.5	+8.5	576.1
Rock		40		581.2
O.G		45		589.7
	0+00			
O.G		46		595.5
Rock		36		587.6
		35.5		585.6
		32.5		581.4
		32.5		563.0
		32.5		563.0
Rock		34		584.6
		26		586.6
O.G		45		591.7

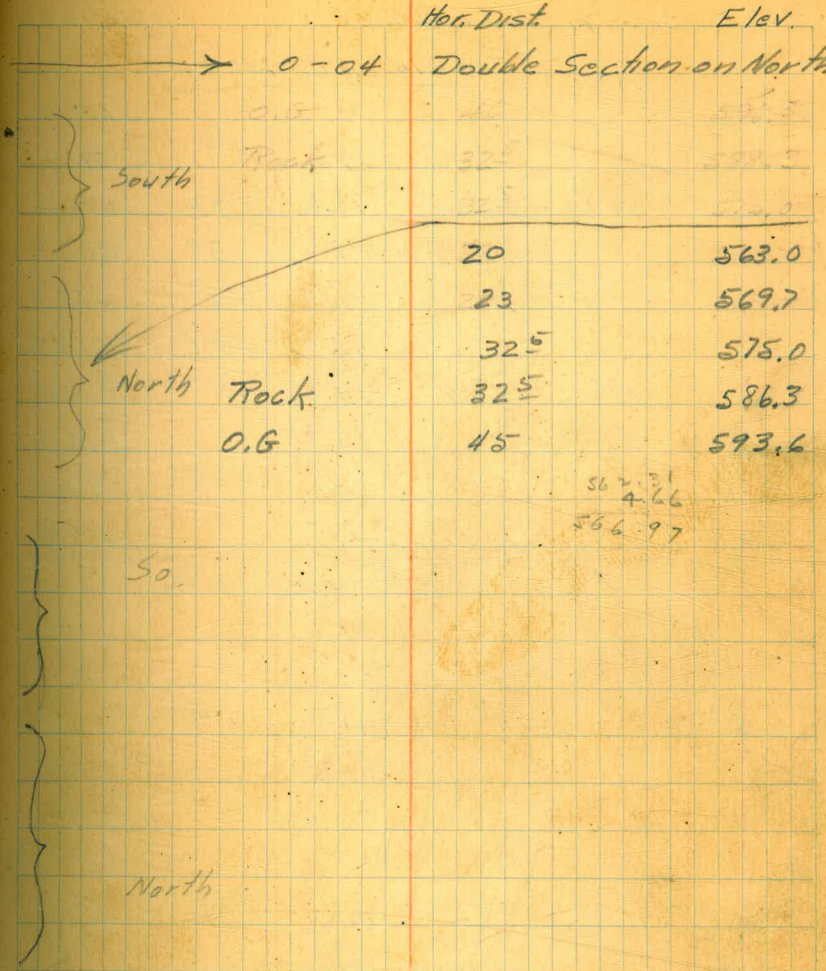
South

North

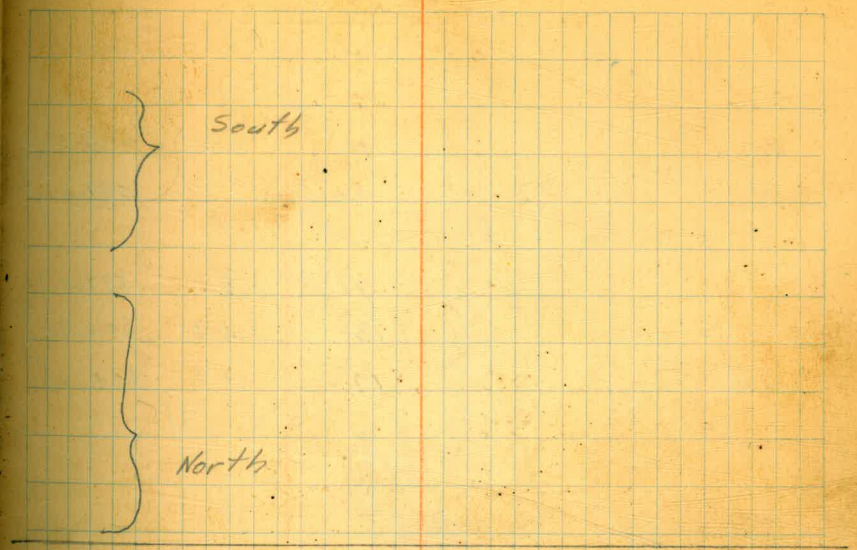
South

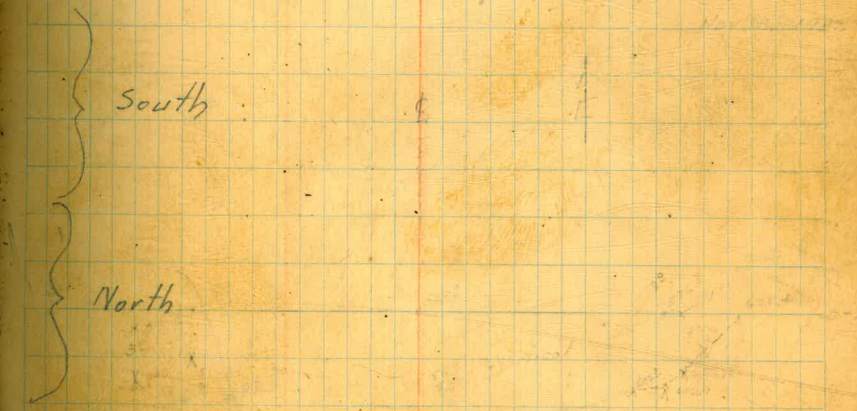
North

	Slope Dist.	Vert. Angle	Hor. Dist.	Rod	Elev.
		0-04 ←			
O.G.			46		596.3
Rock			32.5		588.3
			32.5		563.0
			32.5		563.0
Rock			32.5		586.3
			32.5		587.6
O.G			45		593.6
		0-10 →	HI. 567.0		
O.G			28		599.4
Rock			24.5		590.0
			19	+2.4	569.4
			18	4.°	563.0
			18	4.°	563.0
			18	+1.°	568.0
	24.8	+14° 40'			
	27.8	+34° 36'			
Rock			23		590.3
O.G			28		598.3



	Slope Dist	Vert. Angle	Dist		Elev.
		0-14 H.I. = 566.8			
O.G.			22		601.4
Rock			19		591.1
	19 5/	+30°31'	16.8	+ 9.9	576.7
			15 2/	-3 8/	563.0
			15 4/	-3 8/	563.0
			15 5/	+2.0	568.8
	19°	+14°07'	18 4/	1	571.4
	21°	+37°27'	16.7		579.6
Rock			16		592.4
O.G.			23		601.0
		0-15 8/ H.I. = 605.60			
O.G.			21°	3.7	601.9
			13 2/		577.7
			13 2/		577.7
Rock			13 2/	12.9	92.7
O.G.			25°	4.1	601.5



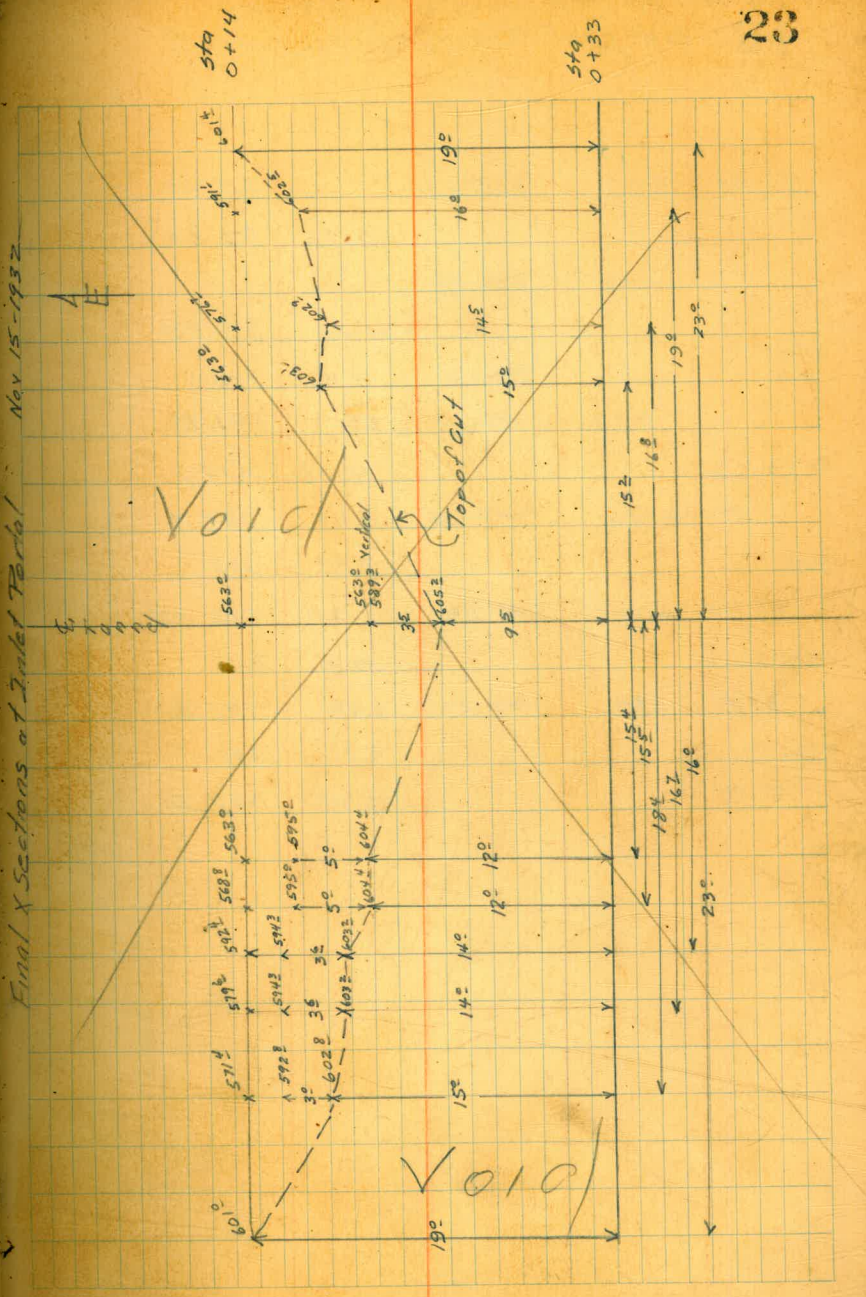


0 - 20 - H.I. = 605 60

	Dist.		Elev.	
O.G.	11°	2.3	603.3	South
℄	0.0		589.3	
	7°	8.1	597.5	North
	13°	5.3	600.3	
O.G.	17°	1.6	604.0	

0 - 23 5

O.G.	℄	605 2



Levels on 788 Contour thru
N.W. ¼ of N.W. ¼ of Section 8.

B.M.	3.71	815.68		811.97
			12.85	802.83
	1.00	803.83		
			12.43	791.40
Start #1	0.0	791.4	3.4	788.0
	7.29	798.69	0.0	791.40
#2,3,4,5,6			10.69	788.0
T.P.	2.64	797.35	3.98	794.71
#7			9.35	788
T.P.	6.15	798.30	5.20	792.15
#8,9,10,11,12			10.3	788.
T.P.	1.79	793.67	6.42	791.88
#13, 14			5.67	788
T.P.			6.48	787.19

788 Contour thru N.W.¼ - N.W.¼ Sect 8.

April 13-14, 1933

Elliott
Simpson
Safer
Rammen

Sta.	(deflection) Angle from back tang. produced	Dist.	Mag. Br.	Calc. Br.
1/16 Cor. on w. line of N.W.¼ of the N.W.¼ of Sect 8.				
	0-0	435.04	N 1-15 W	N 0-45-20 W
△ #1				
	Rt. 92°15′	49.20		S. 88-30-20 E
#2				
#1				
	Rt. 75°07	65.5		N. 74-21-40 E
#3				
#1				
	Rt. 102°-29′	101.2		S. 78-16-20
#4				
#1				
	Rt. 110°32	210.8		S. 70-13-20
#5				
#1				
	111-03-30 222-07-10 Rt. 111-03-35	348.8	S 70-15 E	S 69-41-45 E ✓
△ #6				
	6-20-10 12-40-10 Lt. 6-20-05	127.54	S 75-45 E	S 76-01-50 E ✓
△ #7				
	Lt. 51-36	45.3		N. 52-22-10 E
#8				

Distances from hub 50′ So. of 1/16 Corner to point #1

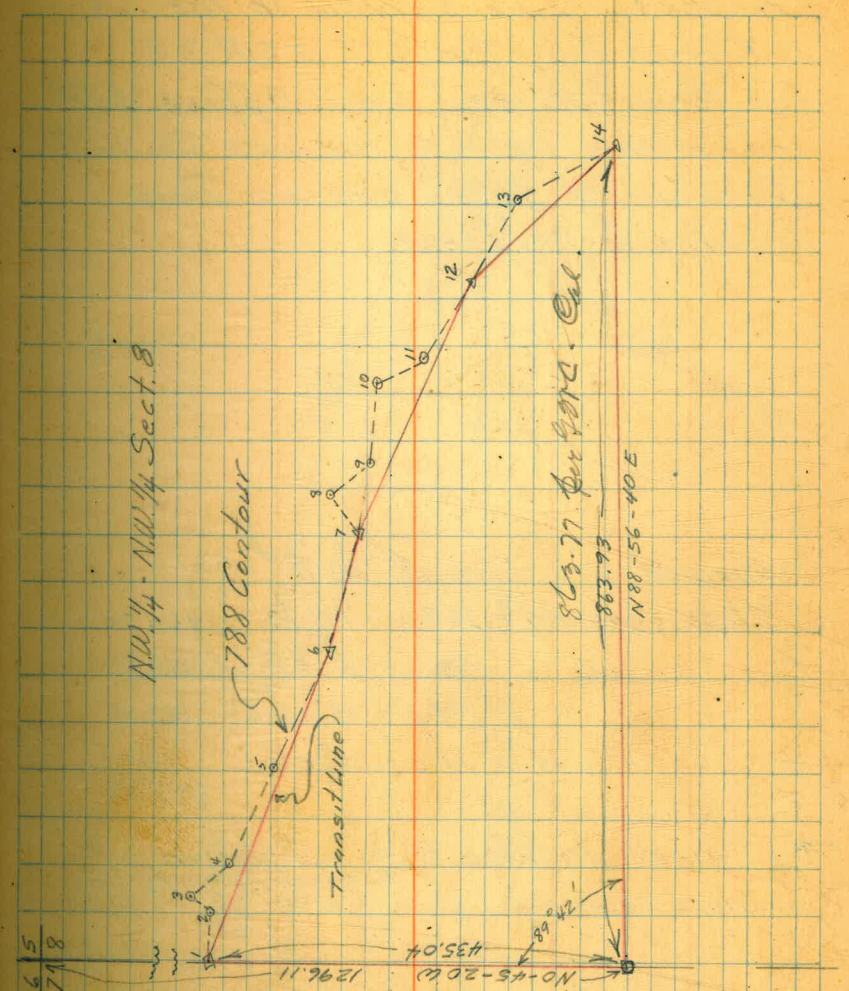
	.9394		
90.0	20°03′	=	84.55 ✓
	.9365		
61.22	20°32′	=	57.33 ✓
	.91787		
186.45	23°23′	=	171.14 ✓
	.89298		
162.17	26°45′	=	144.81 ✓
		Hor.	27.21
			485.04 ✓
			− 50.
			435.04 ✓

Sta.	Angle	Dist.	Mag Br.	Calc. Br.
#7				
	Lt 5-19	72.3		S.81-20-50 E
#9				
#7				
	Lt 5-29	154.7		S.81-30-50 E
#10				
#7				
	Rt 5-29	196.25		S.70-32-50 E
#11				
△ #7	9-52-30			✓
9-52-52	Rt 9-52-55	288.25	S65-0 E	S66-08-55 E
△ #12				
	Rt 3-38	101.0		S.62-30-55 E
#13				
#12				
	20-22 40-44-30			✓
20-22-15	Rt 20-22-15	216.05	S 45-15 E	S45-46-40 E
△ #14				
				✓
	Rt 134-42-48			N88-56-08-E

1/16 Cor
Point of beginning

Distances #14 to 1/16 Cor

Slope	Angle		
38.12	27°06	.94098	= 33.93
200.	19°47	.97623	= 188.20
196.69	12°31	.98957	= 192.01
200.	8°17	.97863	= 197.91
200.	11°52		= 195.73
	Horizontal		3.89
	Horizontal		52.26
			863.73



4/17/33
Elliott
Simpson
Soper

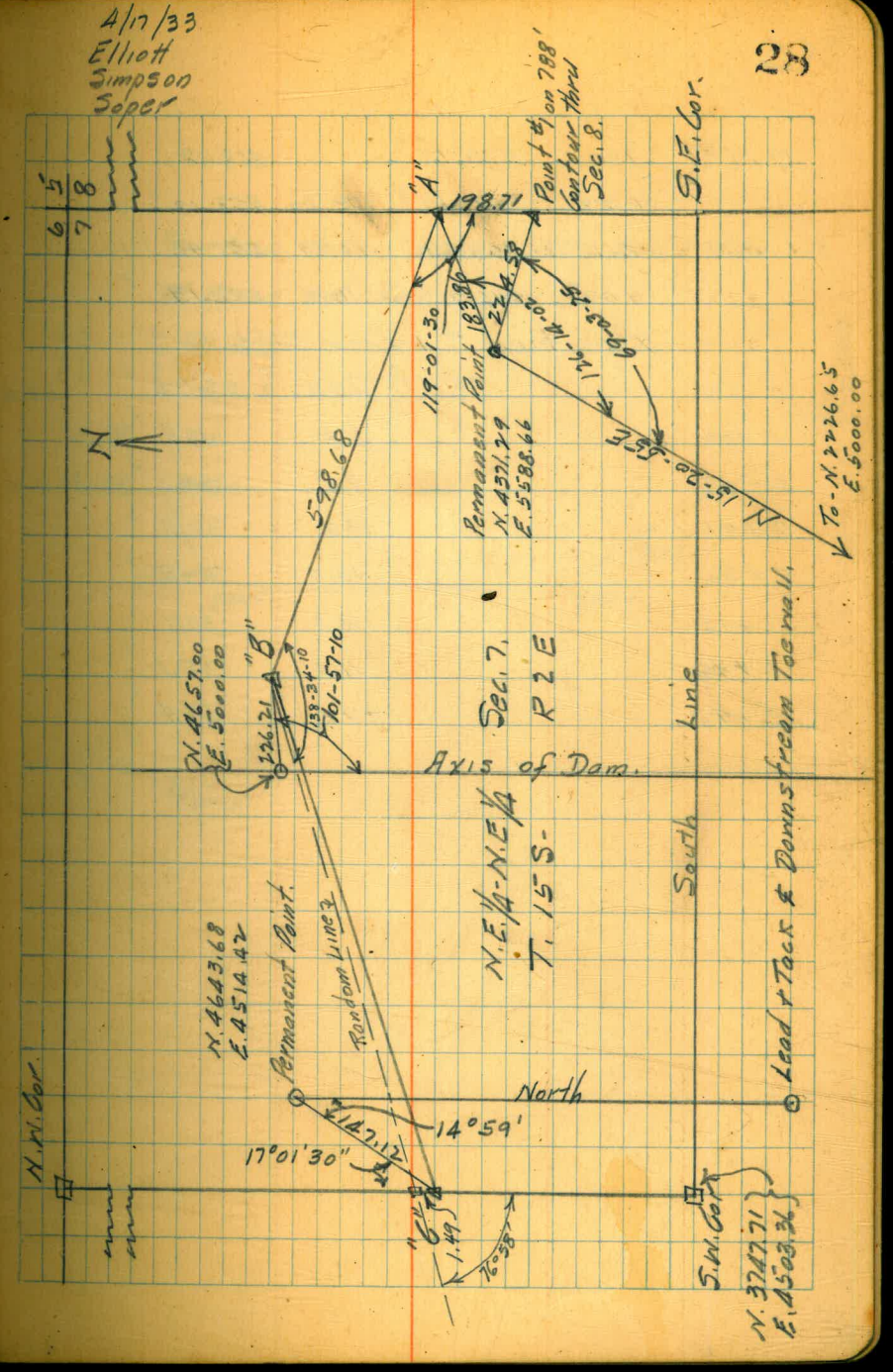
Property Line Survey in the N.E.1/4 - N.E.1/4 Sec. 7, T. 15 S. R. 2 E. for permit to Genl. Land Office for land in this tract to include Spillway Coordinates shown are on Dam Coordinate System.

Chained distance "A" to "B"

Slope chaining - 169.0 - 12°57' = 164.70
170.0 - 4°07' = 169.56
199.0 - 18°04.5' = 189.18
78.3 - 16°04' = 75.24
598.68

Chained distance "B" to intersection of Random Line & 1/4 Line

Slope chaining 65.0 - 12°28' 63.47
200.0 - 22°28' 184.82
200.0 - 28°06.5' 176.41
Horizontal = 26.64
198.28 - 21°41' 184.25
142.5 - 17°15' 136.09
771.68



B.M. #4	1.30	570.18 ✓		568.88
	0.23	558.41 ✓	12.00	558.18 ✓
Set B.M.	2.17	553.59 ✓	6.99	551.42 ✓
	4.03	546.2 ✓	11.42	542.17 ✓

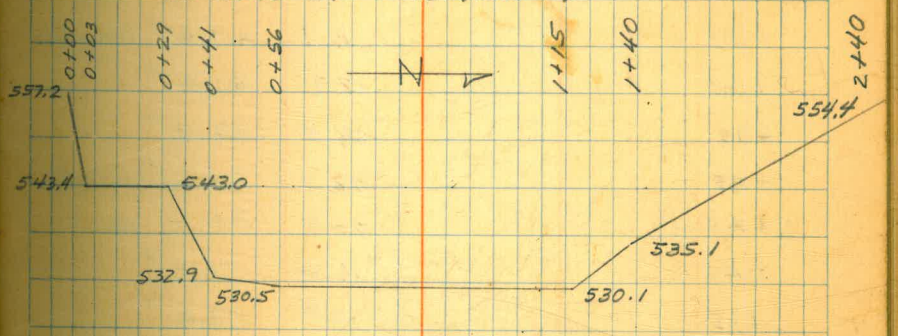
X section #1 from So. to No.

0+00	+11.0	557.2 ✓	
0+03	2.8	43.4 ✓	Road
0+29	3.2	43.0 ✓	Road
0+41	13.3	32.9 ✓	
0+56	15.7	30.5 ✓	
1+15	16.1	30.1 ✓	
1+40	11.1	35.1 ✓	
2+40	+8.2	54.4 ✓	

ch + plotted 4/21/[illegible] JV

Pipeline Sta 36+64 = Sta of Sec.

Section taken about 150' E. of the W. Line of Section 7



River X-Section #2 From So. to North.

B.M.	2.92	554.34 ✓	551.42 ✓	
0+00		+3.0	557.3 ✓	= Sta.
+10		4.8	49.5 ✓	So. Side
+35		4.7	49.6 ✓	No. Side
+50		12.7	41.6 ✓	
+78		16.5	37.8 ✓	
+95		20.7	33.6 ✓	So. Side
1+25		20.8	33.5 ✓	No. "
+45		18.2	36.1 ✓	
+65		10.9	43.4 ✓	
2+30		0.6	53.7 ✓	

Survey

April, 20, 1933
Simpson
Soper.

30+83 on Pipe Line Survey

Road.

Road

River channel

" "

Apr. 20, 1933

River Cross-Section #3

From South to North.

B.M.	5.49	578.20 ✓		572.71	
T.P.	8.78	585.73 ✓	1.25	576.95 ✓	
0 + 00			+9.0	94.7 ✓	= Top of cut bank for Rd.
+ 06			2.5	83.2 ✓	
+ 20			3.9	81.8 ✓	= Sta 18+10 on Pipe Line Survey
+ 40			4.0	81.7 ✓	= North edge of Road
+ 47			4.1	81.6 ✓	
T.P.	0.30	573.10 ✓	12.93	572.80 ✓	
T.P.	0.21	560.28 ✓	13.03	560.07 ✓	
1 + 00			18.3	42.0 ✓	= South side of River channel
+ 40			17.8	42.5 ✓	= North " " "
2 + 00			16.3	44.0 ✓	
+ 50			12.1	48.2 ✓	
+ 80			3.8	56.5 ✓	
3 + 70			+9.1	69.4	= South edge of Contractor's Road.

Survey

River Cross-Section #4

From South to North

Apr. 20, 1933

B.M.	2.33	575.04		572.71	
0+00			1.6	573.4	
+10			5.3	569.7	= Sta. 13+43 on pipe Line Survey
+18			7.5	567.5	= South edge of Road
+30			7.4	567.6	= North " " "
T.P.	0.23	562.41	12.86	562.18	
1+00			13.6	548.8	
T.P.	3.41	554.67	11.15	551.26	
1+40			5.0	549.7	
2+10			10.6	544.1	= South side of River channel
+40			9.7	545.0	= North " " " "
+55			5.6	549.1	
+75			+9.0	563.7	
3+35			+15.8	570.5	South side of contractors Road.

(2900 E, 3600 N)

Same no.

Cross-sections of South side of cut at tunnel outlet, for pipe line location purposes.

B.M.	12.35	576.00		563.65
T.P	7.51	581.95	1.56	574.44

E 4360

N 3400			0.8	
15			6.5	
B.M.	1.64	564.69		563.05
26			7.0	
32			11.6	
34			16.0	

E 4340

		581.95		
N 3410			1.7	
21			7.8	
25			11.8	
28			12.0	
B.M.	1.64	564.69		563.05
36			5.9	
43			11.6	
45			17.1	

April, 20, 1933
Simpson
Soper.

		581.95		
			E4320	
N 3410			2.6	
21			7.7	
25			10.9	
40			11.8	
B.M	1.64	564.69		563.05
46			6.8	
49			7.7	
54			16.0	
			E4280	
		581.95		
N 3410			1.4	
18			2.6	
23			5.1	
24			8.0	
44			10.4	
47			14.4	
60			17.3	

Note: Boulder 10'x6'x4' at N3460 E4280
Not shown in sections

581.95

E4260

3410			1.8	
20			2.2	
26			7.7	
36			8.3	
55			16.4	
68			18.3	
T.P.	1.56	576.00	7.51	574.44
	1.64	564.69	12.95	563.05

Spillway Sta. 12+00 Profile
to: South at Rt. Angle
May 5 - 1933 (High Sag)

B.M.	11.40	591.40		580.00
00 - ℄			12.9	78.5
0+60			12.3	79.1
0+73			7.2	84.2
0+78			+0.4	91.8
0+97			+0.8	92.2
1+02			0.8	90.6
1+30			1.8	89.6
1+38			3.8	87.6
+65			5.4	86.0
+74			9.8	81.6
2+32			11.5	79.9
T.P.	2.07	580.85	12.62	578.78
2+50			5.8	75.0
3+25			12.3	68.5
3+65			17.0	63.8
4+25			18.6	62.2
4+70			12.0	68.8
5+30			5.9	74.9

Toe Wall at N3623

Elliott Notes - Level
Simpson T
Saper Hd.Ch
Remmen Tr.Ch.

87

Spillway Sta 13+30 T-Profile
to South at Rt. Angles
May 5 - 1933 (Low Fog)

B.M.	3.58	583.58		580.00
0+00 ℄			1.2	82.4
0+40			1.8	81.8
1+14			3.1	80.5
+41			6.7	76.9
+80			14.3	69.3
T.P.	0.17	571.24	12.51	571.07
1+87			6.3	64.9
2+50			10.1	61.1
2+60			8.2	63.0
3+20			8.2	63.0
3+78			8.9	62.3
	2.39	561.37	12.26	558.98
3+92			10.3	51.1
4+45			8.3	53.1
4+95			8.4	53.0
			10.9	50.5 W.S
5+08			18.6	42.8
5+62			19.3	42.1
6+04			13.3	48.1
6+35			8.7	52.7
6+60			12.0	49.4
7+33			11.9	49.5

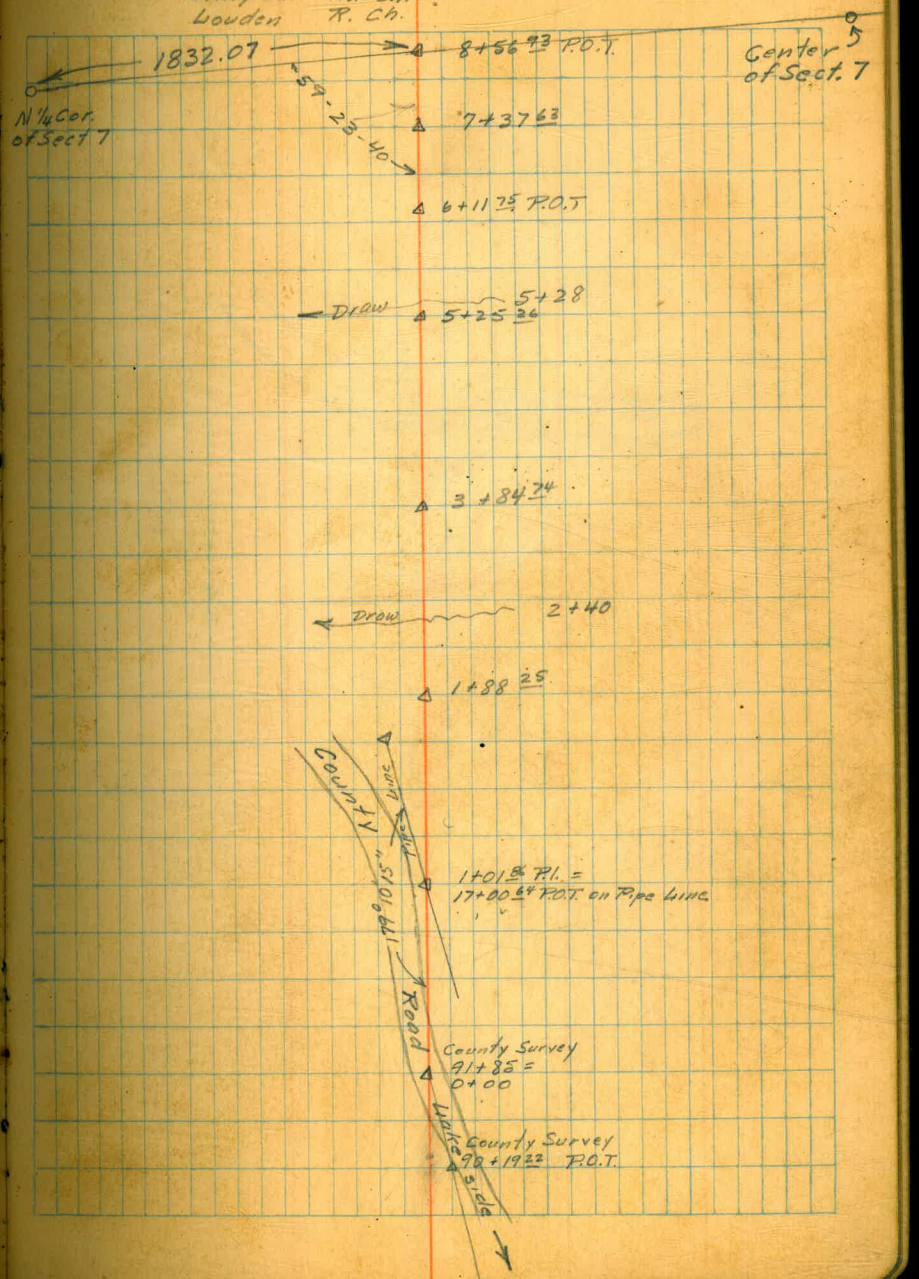
about center of So. wall of tunnel structure

Sta.	Defl. ∠	Mag. Br.	
	62-42 / 125-34	S 59-0 E	
P.I. 7+37 63 Ext. 20.0	62-42-0 Rt		
		N 58-15 E	217.37
	75-54-30		
P.I. 5+25 26 Ext 25.0	75-54-30 Lt		
	33-26-40 / 66-53-20	S 45-45 E	140.52
P.I. 3+84 74 External 12'	33-26-40 Rt.		
	32-23-50 / 64-47-20	S 78-45 E	196.49
P.I. 1+88 25 External 10'	32-23-40 Lt.		
		S 46-30 E	86.39
	25-47-40 / 51-34-40		
P.I. 1+01 86 External 10'	25-47-20 Rt.		
	15° C ✓ T = 87.49 Ext. = 9.89		101.86
		S 74-0 E	
	8-32-30 / 16-05-10		
0+00	8-02-35 Rt.		

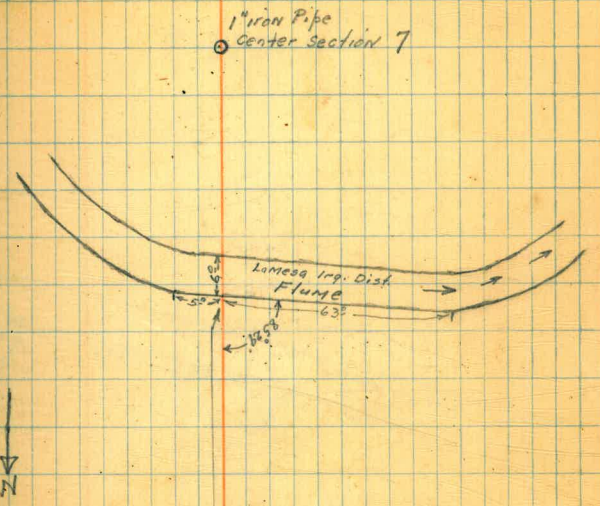
232.42
1599.65
1832.07

March 6-1932
Converse Chief
Elliott ↑ Notes
Simpson Hd Ch.
Louden R. Ch.

40



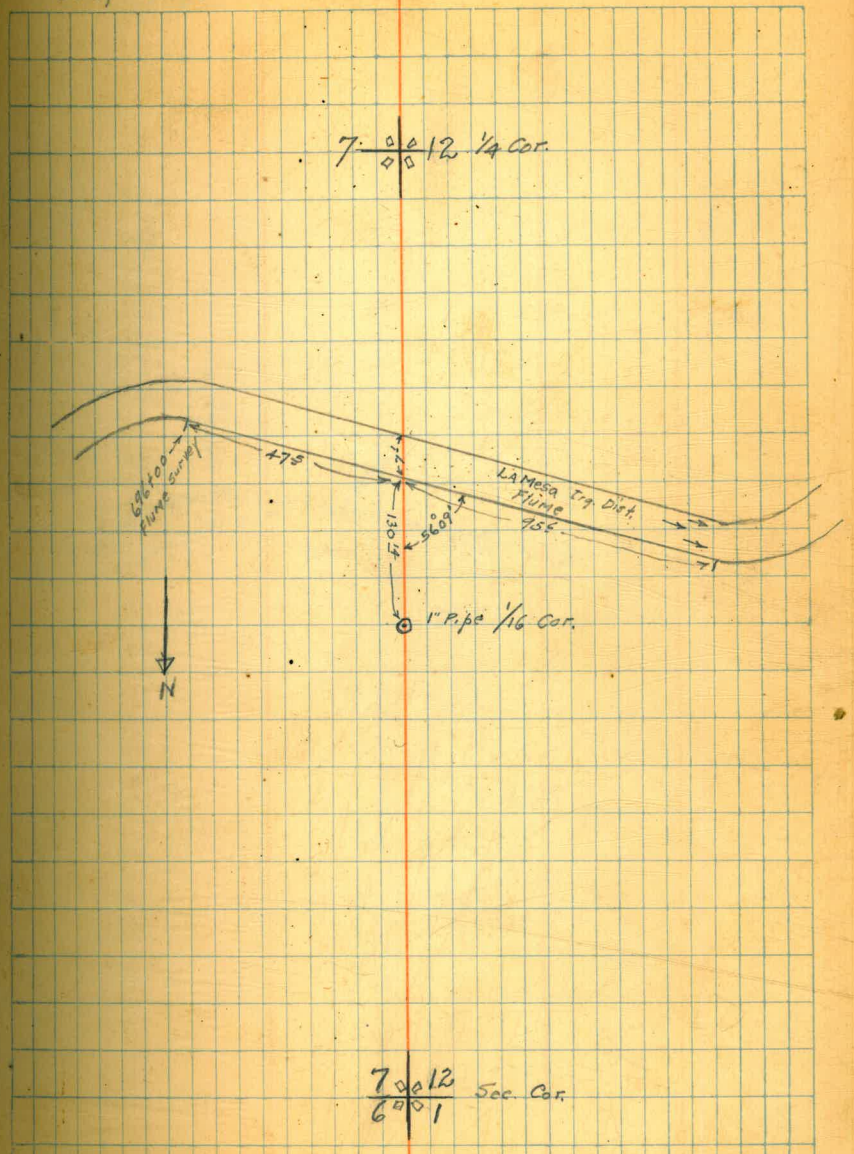
Mar. 31, 1932
Converse - chief
Simpson - T
Lowden - Hd. Ch.
Bailey - Rr. ch.



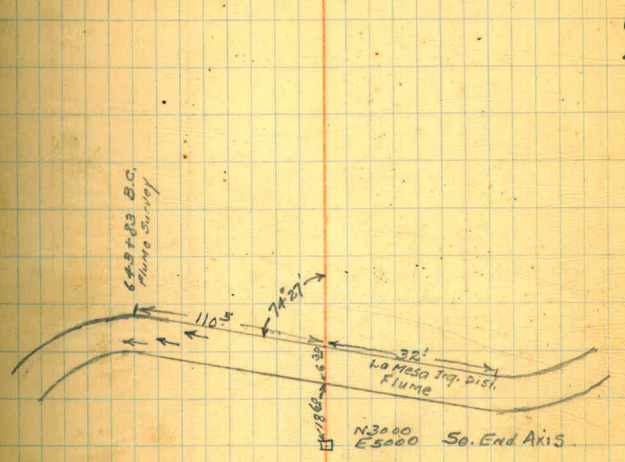
2165 ft

N 1/4 Cor. Sec. 7

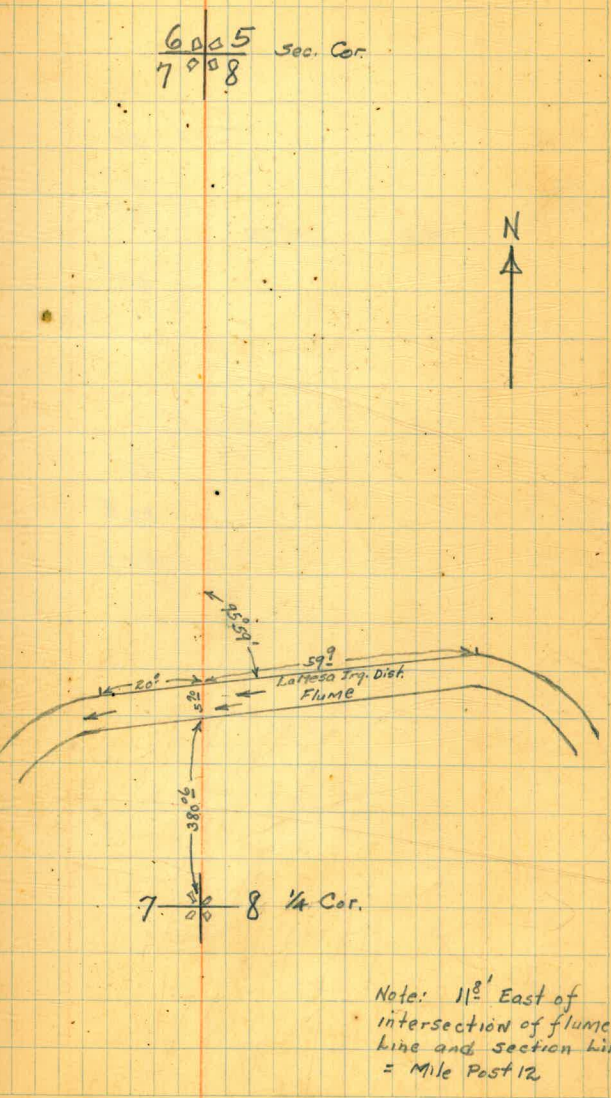
Mar. 31, 1932
Converse - chief.
Simpson - R
Louden - Rod. ch.
Bailey - Rr. ch.



Mar 31, 1932
Converse-chief
Simpson-T
Lodden-Hd. Ch.
Bailey-R. Ch.



Mar. 31, 1932.
Converse - chief
Simpson - T
Louden - Rd. ch
Bailey - Pr. ch.



Note: 11.8' East of intersection of flume line and section line = Mile Post 12

Entrance Tunnel Portal Cut
Final X Sections

	Slope Dist	Vert. Angle	Hor. Dist	Red or Diff. in Elev.	Elev.
			0+50 H.I. = 567.95		
			50		562.5
O.G.			50'		586.3
Rock			41'		568.5
Rock			30		566.4
	45	+5°50'			
			37'		563.0
			30'		563.0
Rock			32 5/5		567.5
O.G.			41 5/5		580.7

South

62.3'
5.64
67.95

North

	Slope Dist	Vert. Angle	Hor. Dist	Rod or Diff. in El.	Elev.
			0+50 H.I. = 567.95		
O.G			50'		
			50'	+0.5	568.5
Rock			41'	+0.5	568.5
			40		563.0
			40'		563.0
Rock			40'	+2.4	70.4
			50'	+2.4	70.4
O.G			50'		80.8

South

North

	Slope Dist	Vert. Angle	Hor. Dist.	Rodor Diff. in Elev.	
		0+48	H.I. 567.95		
O.G.			50		586.5
			50		568.5
Rock			41	+0.5	568.5
			40'		563.0
			40'		563.0
Rock			40'	+2.4	70.4
			50'	+2.4	70.4
O.G.			50'		581.3

South

North

	Slope Dis.	Vert Angle	Hor. Dist.	Rod or Diff. Elev	Elev.
		0+48	H.I. 568.0		
O.G			50		586.5
			48	+ 7.5	577.5
Rock			40	+ 0.5	568.5
			40		563.0
			40		563.0
Rock			40		570.4
			40		572.7
O.G			50		581.3

South

North

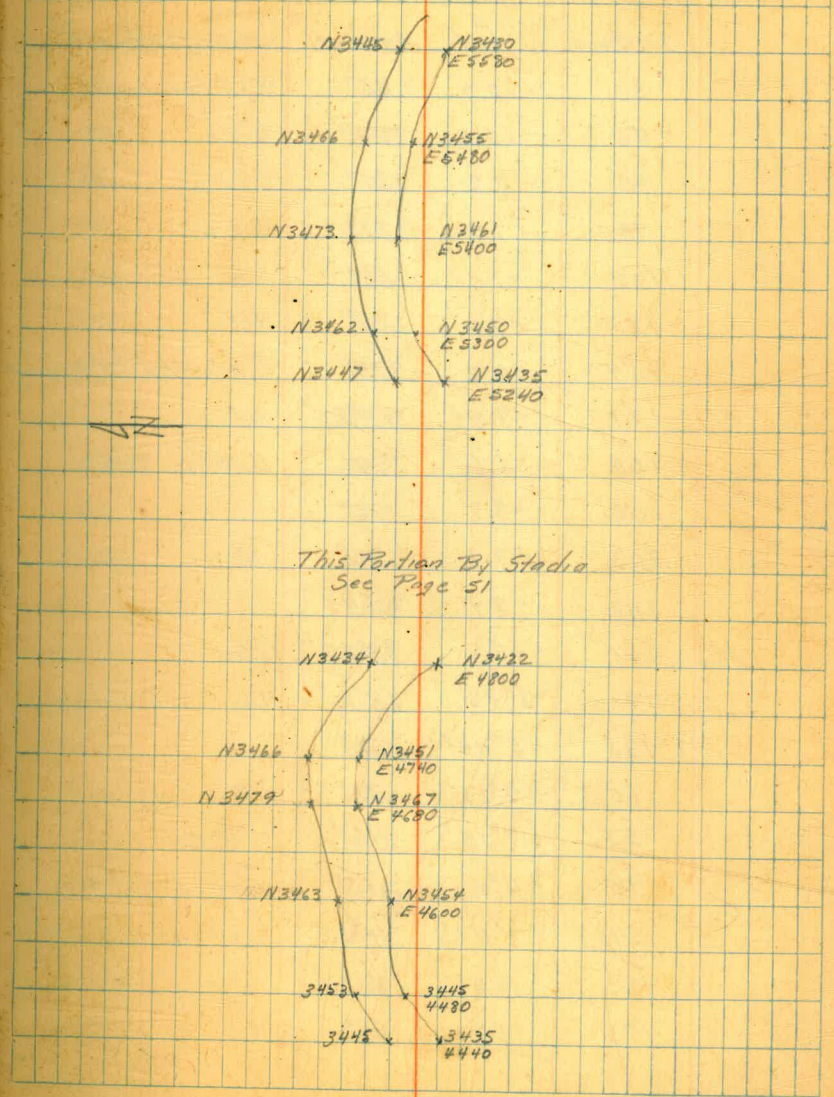
	Slope Dist.	Vert. Angle	Hor. Dist.	Rod or Diff. Elev.	Elev.	
		0+40	H.I. = 567.8			
O.G			51		587.9	
			48.5		580.3	
Rock			41		570.7	South
			40	+0.5	568.3	
			40		563.0	
			37		563.0	
			40	+2.1	569.9	North
Rock			41		572.1	
O.G.			50		583.2	
		0+30	H.I. = 567.6			
O.G			50		589.9	
			45		578.0	
			43	+9.8	577.4	South
Rock			41		574.0	
			37	-0.4	567.2	
			36.5		563.0	
			35		563.0	
			35.5	-2.8	564.8	North
			42	+8.7	576.3	
Rock			40.5		574.4	
O.G			48		584.6	

Continued on Page 19

6 2 - 3
5 - 5

Feb 17 - 1932
Elliott - Simpson

Road Location



3463

3454
4600

Topo. of Road at El Capitan Axis

Transit on Axis 41.8 N. of 600 El. on Axis.
Horizontal Angles Az. from No. end of Axis
Elev. of ground at Transit = 582.7 + 4.9 to H.I.

Distance	Vert. ∠ or. Rod	Azimuth	Object
32	-10.7	56°	S. edge road
42	-10.2	57°	N. " "
80	-7.8	74°	" " "
78	-7.7	81°	S. " "
125	-7.0	82°	" " "
125	-7.0	76°	N. " "
154	-6.2	75°	N. edge Rd. at Turnout
177	-7.5	73°20′	N. " " "
158	-6.6	79°	S. edge Rd.
206	-8.7	75°	"
203	-7.9	72°	N. " "
262	-8.9	70°45′	" "
261	-9.8	73°25′	S. " "
191	-3°32′	68°10′	Top cut Bank
133	-5°04′	50°	" " "
60	-9°25′	31°	" " "
53	-9°15′	45°	Toe
93	-4°0′	66°	"
134	-2°04′	71°30′	" at turnout
153	-8.0	72°30′	" "
173	-8.7	71°	

Jan 21, 1932
Converse Chief
Elliott Notes
Simpson T
Louden 9.

Corr. Dist	Diff. in Ground Elevs.	Elev.
32	-5.8	576.9
42	-5.3	77.4
80	-2.9	79.8
78	-2.8	79.9
125	-2.1	80.6
125	-2.1	80.6
154	-1.3	81.4
177	-2.6	80.1
158	-1.7	81.0
206	-3.8	78.9
203	-3.0	79.7
262	-4.0	78.7
261	-4.9	77.8
190	-11.7	71.0
132	-11.6	71.1
58	-9.7	73.0
52	-8.4	74.3
93	-6.5	76.2
134	-4.8	77.9
153	-3.1	79.6
173	-3.8	78.9

Dist.	Vert. ∠ or rod	Azimuth	Object
213	-12.5	67°40'	
226	-2°54'	62°	Top cut bank
25	-13.3	349°20	S. edge road
46	-12°34	351°50	Top cut bank
54	-10°20	325°25	N. edge rd.
50	-11°09	310°15	S " "
96	-5°34	283°45	" " "
113	-6°27	298°20	Top ct. bank
202	-3°51	290°15	N. edge rd.
201	-3°47	286°0'	S " "
266	-2°05	291°26	N. " "

Corr. Dist.	Diff. Elev.	Elev.
213	-7.6	575.1
226	-11.4	71.3
25	-8.4	74.3
44	-9.8	72.9
52	-9.5	73.2
48	-9.5	73.2
95	-9.3	73.4
112	-12.6	70.1
201	-13.5	69.2
201	-13.2	69.5
266	-9.7	573.0

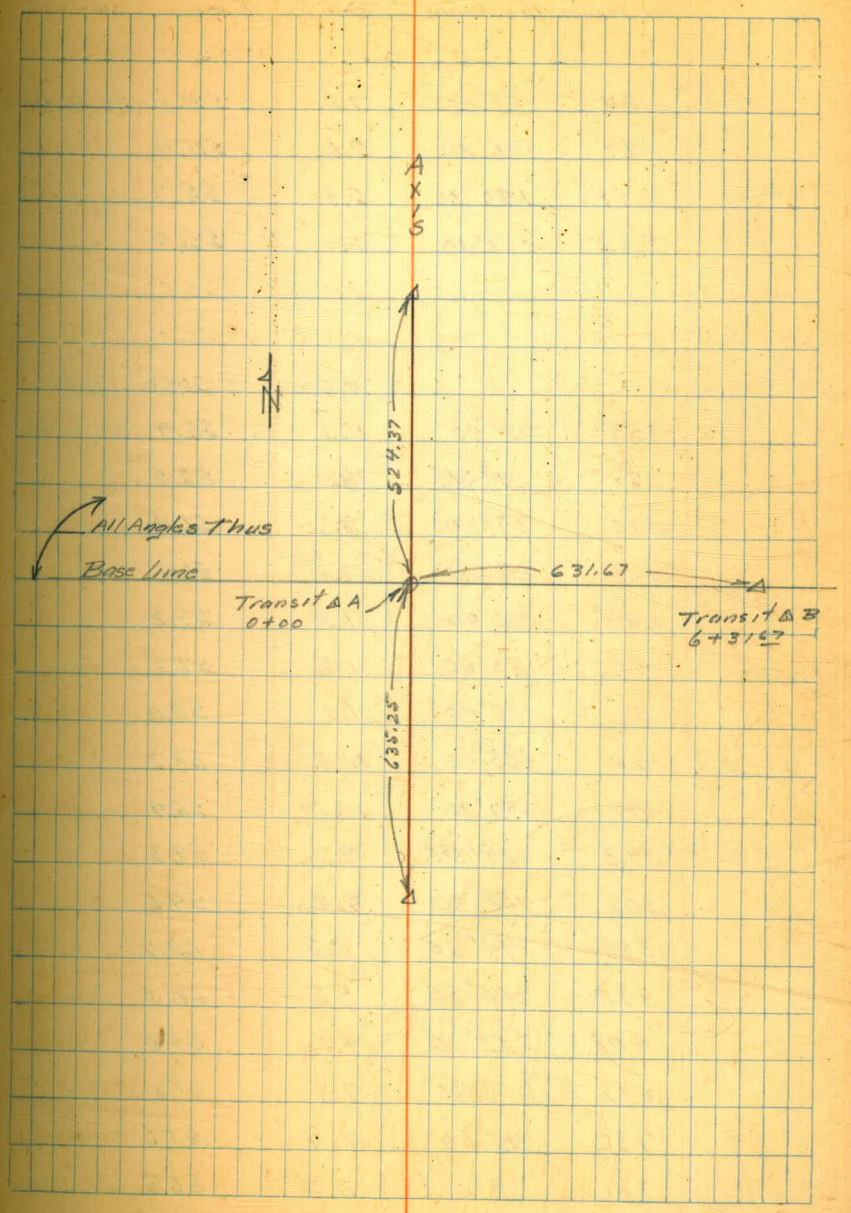
El Capitan Dam Project.

Stream outline on Jan 22, 1932

Transit	Distance	Hor. Angle	Rod	Elev.	What
△A 0+00 Baseline H.I. 562.0			+5.3	556.75	B.M.
	48	90°	-7.5	554.5	waters edge S. side stream
	50	6°20'	7.8	54.2	"
	118	342°30'	8.0	54.0	"
	206	340°45'	8.4	53.6	"
	301	340°55'	8.8	53.2	"
	378	343°50'	9.1	52.9	"
	410	347°10'	9.2	52.8	"
	490	348°20'	9.6	52.4	"
	580	350°40'	10.0	52.0	"
	665	351°30'	10.4	51.6	"
	90	92°10'	7.4	54.6	N. side str.
	162	124°50'	6.8	55.2	"
	241	140°20'	6.5	55.5	"
	332	148°20	6.0	56.0	"
	438	155°10	5.5	56.5	"
	90	46°40'	7.6	54.4	"
	93	12°50'	8.0	54.0	"
	150	354°20	8.2	53.8	"
	231	351°20	8.5	53.5	"
	357	354°0'	9.1	52.9	"
	486	358°10'	9.6	52.4	"
	610	358°50	10.2	51.8	"
	732	358°20'	10.7	51.3	"
	915	356°40'	11.3	50.7	"

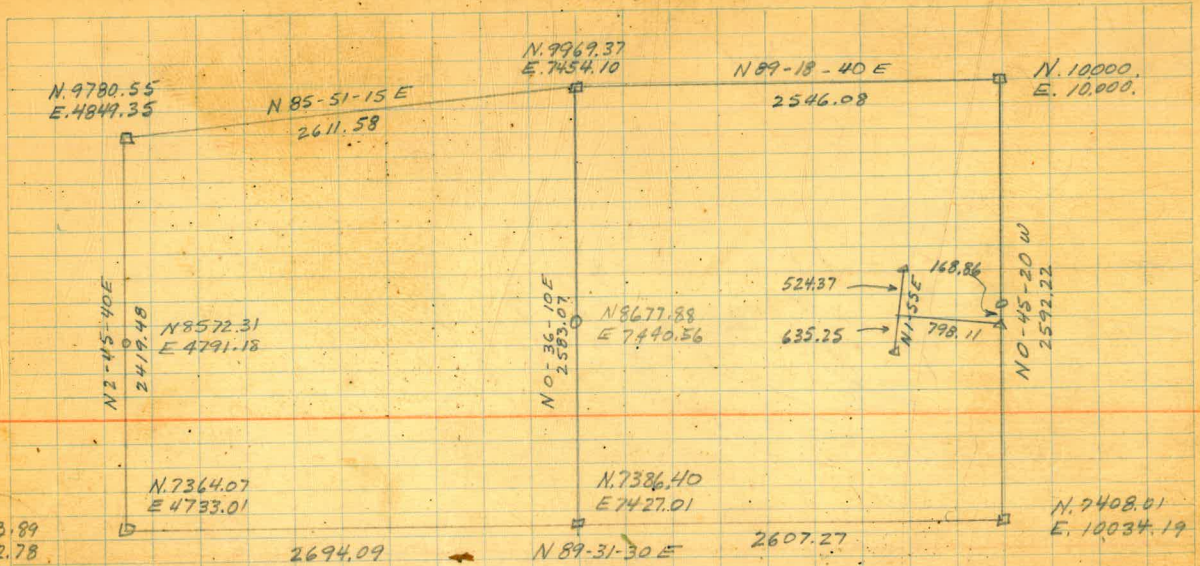
Note: All Horizontal Angles Az. From West End Base Line, See Sketch

Converse Chief
Elliott Notes
Simpson ↑
Lowden ♀



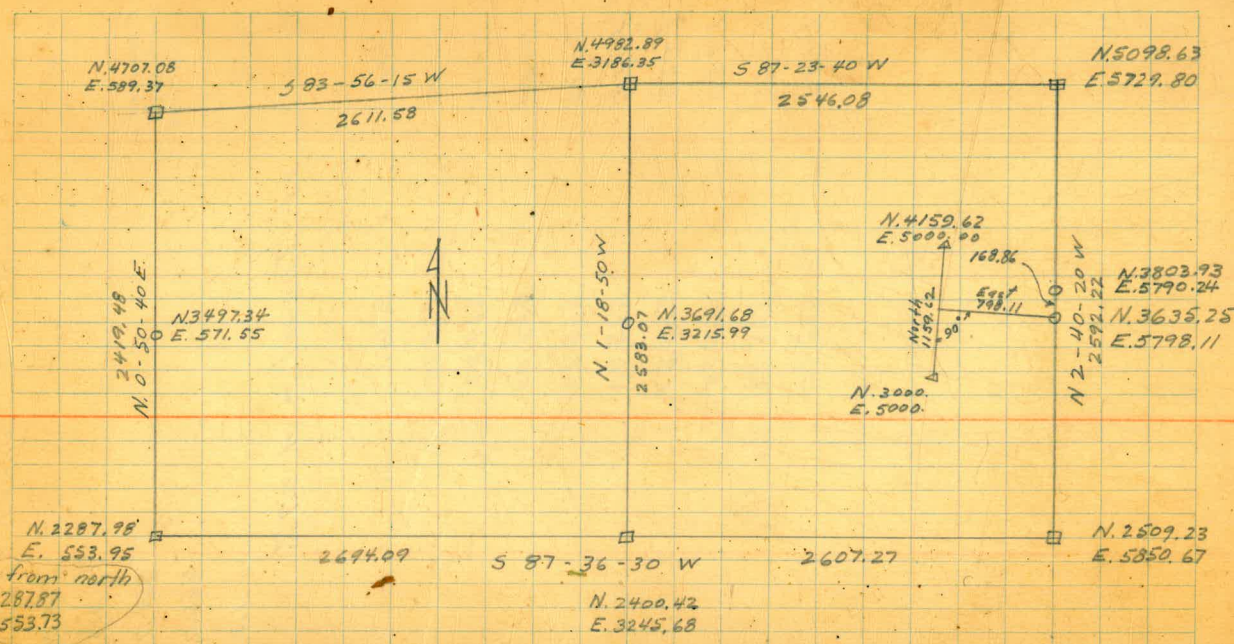
	Distance	Hor. Angle	Rod	Elev.	
	104	133°50′	7.0	555.0	So. side
	199	148°50′	6.6	55.4	"
	258	153°30	6.3	55.7	"
	268	156°40	6.1	55.9	
Transit △ B. 6+31.5 Base L. H.I = 569.0			+ 4.50	564.50	B.M.
	353	18°40′	13.1	55.9	So. side
	351	24°40′	13.0	56.0	"
	310	27°20′	12.6	56.4	"
	228	29°50′	12.1	56.9	"
	159	42°40′	11.8	57.2	"
	91	53°50	11.2	57.8	"
	83	115°40′	11.0	58.0	"
	126	138°40	10.8	58.2	"
	190	159°30′	10.1	58.9	"
	243	174°40	9.7	59.3	"
	306	188°40	9.4	59.6	"
	388	199°50′	8.8	60.2	"
	485	206°50′	8.5	60.5	"
	608	212°10	8.0	61.0	"
	612	213°30	7.8	61.2	"
	732	215°50	7.4	61.6	"
	301	38°0′	12.5	56.5	N. side

Distance	Hor. Angle	Rod	Elev.	
228	44°30	11.9	557.1	No. side
175	58°50	11.8	57.2	"
123	85°50	11.4	57.6	"
158	128°30	10.7	58.3	"
183	142°30	10.4	58.6	"
221	155°20	10.0	59.0	"
241	161°40	9.9	59.1	"
267	170°30	9.8	59.2	"
328	184°20	9.4	59.6	"
400	195°40	9.0	60.0	"
488	202°40	8.5	60.5	"
567	206°30	8.0	61.0	"
667	210°	7.6	61.4	"



Coordinates Using True Bearings

Section Corner Base N. 10,000 E. 10,000



Closing from north
N.2287.87
553.73

Coordinates of Section and Property Corners Etc.

With Dam Axis as Base North & South.

South End of Axis N.3000.
E.5000.

Grades On Tunnel #5

B.M.	568.00	Rg. by entrance
	- 3.3	
Floor at entrance Grade 185' in	564.7	Grade
	566.0	
Diff.	1.3	

Grade of Tunnel = + 0.7%

Sta.	Elev.
0+00	564.70
0+25	564.87
0+50	565.05
0+75	565.22
1+00	565.40
1+25	565.57
1+50	565.75
1+75	565.93
1+85	566.00

Solar Observation

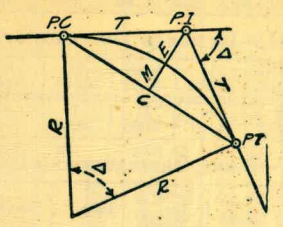
Jan 22, 1932 Latitude 32°53'W. } From Map.
Longitude 116°48'N. }

Time	Hor. Angle	Vert. Angle
3-38 P.M.	50°59'30" Rt.	+ 15°57'0"
3-40	51°12'	15°45'15"
3-41	51°28'30"	15°26'0"
3-43	51°59'	15°0'0"
	Average	
3-40½	51°24'45"	15°32'04"

Horizontal Angle Rt. from "C" Axis

Bearing of Axis N. 1°55' E

DIETZGEN'S RAILROAD CURVE AND REDUCTION TABLES



CURVE FORMULAS

Radius=R=$\frac{50}{\sin. D/2}$ (1) Degree of Curve=D and sin. $\frac{D}{2}=\frac{50}{R}$ (2)

Tangent=T=Rtan$\frac{\Delta}{2}$ (3) Length of Curve=L=$100\frac{\Delta}{D}$ (4)

Middle ordinate=M= R(1—cos. $\frac{\Delta}{2}$) (5) =Rvers $\frac{\Delta}{2}$ (6)

External=E=Ttan$\frac{\Delta}{4}$ (7) =R÷cos.$\frac{\Delta}{2}$—R (8)=Rexsec$\frac{\Delta}{2}$ (9)

Long Chord=C=2 R sin.$\frac{\Delta}{2}$ (10) Δ=Central Angle

EXPLANATION AND USE OF TABLES

Stations.—Given P. I.=Sta. 161 +60.35 to find Sta. of P. C. and P. T. Δ=62° 10′ D=8° 20′. From Table IV for 1° curve T=3454.1 and ÷8⅓=414.49 ft. From Table V correction=.36 or T=414.85 ft. P. C.=Sta. P.I.—T=157 +45.50. Also from (4) L=746.00 and P. T.=Sta. P. C. +L=164 +91.50.

Offsets.—Tangent offsets vary (approximately) directly with D and with square of the distance. Thus tangent offset for Sta. 158 on above curve is 2.16 ft. found as follows. From Table III tangent offset for 100 ft.=7.27 ft. Distance=158—Sta. P. C.=54.50, hence offset=7.27 (54.50÷100)²=2.16 ft. Also square of any distance divided by twice the radius equals (approximately) the distance from tangent to curve. Thus (54.50)²÷(2 x 688.26)=2.16 ft.

Deflections.—Deflection angle=½ D for 100 ft., ¼ D for 50 ft., etc. For c ft.=(in minutes) .3 x C x D° or=defl. for 1 ft. from Table III x C. For Sta. 158 of above curve=.3 x 54.5 x 8⅓=136.2′ or 2° 16.2′, or=2.50 x 54.5=136.2′ from Table III. For Sta. 159 deflection angle=2° 16.2′ +8° 20′ ÷2=6° 26.2′, etc.

Externals.—May be found in similar manner to tangents. Thus E for curve above is 91.37. For from Table IV for 1° curve E=960.6 for 8° 20′=960.6÷8⅓=91.27 and from Table V correction=.10 or E=91.37 ft. Or suppose Δ=32° and E is measured and found to be 42 ft. What is D? From Table IV E=230.9 and ÷42=5.5 or D=5° 30′.

Mar 18

Final Measurements

Tunnel #8 102' from hub

#2 110 " "

#9 29' " "

#3 143.5 from hub plus 50' on AXLS

11.5

205.59
82.30
33.67
36.00 321.56
24.73 313.69
635.25

311 25.7
43.0

30+82.7

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.

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