FIELD BOOK

740

B. K. ELLIOTT COMPANY

PLEASE RETURN TO
GEAUGA COUNTY ENGINEER
COURT HOUSE
CHARDON - O.
PHONE 250-X

TABLE FOR REDUCING PERCHES TO FEET AND INCHES.

PERCH	FEET.	PERCH.	FEET.	PERCH.	FEET.	PERCH.	FEET.	PERCH.	FEET.
1	16.6 in.	21	3.46 6 in.	41	6.76.6 in.	61	10.06.6 in.	81	13.36.6 in.
2	33.0	22	3 63.0	42	6.93.0	62	10.23.0	82	[illegible]
3	49.6	23	3.79.6	43	7.09 6	63	10.39.6	83	[illegible]
4	66.0	24	3.96.0	44	7 26.0	64	10.56.0	84	[illegible]
5	82.6	25	4 12.6	45	7 42.6	65	10.72.6	85	[illegible]
6	99.0	26	4.29.0	46	7.59.0	66	10.89.0	86	[illegible]
7	1.15.6	27	4.45 6	47	7.75.6	67	11.05.6	87	[illegible]
8	1.32.0	28	4.62.0	48	7.92.0	68	11.22.0	88	[illegible]
9	1.48.6	29	4.78.6	49	8.08.6	69	11.38.6	89	[illegible]
10	1.65.0	30	4.95.0	50	8.25.0	70	11.55.0	90	[illegible]
11	1.81.6	31	5 11.6	51	8.41.6	71	11.71.6	91	[illegible]
12	1.98 0	32	5.28 0	52	8.58.0	72	11.88.0	92	[illegible]
13	2.14.6	33	5.44.6	53	8.74.6	73	12.04 6	93	15 34.0
14	2.31.0	34	5.61 0	54	8.91.0	74	12.21.0	94	[illegible]
15	2.47.6	35	5.77 6	55	9.07 6	75	12.37.6	95	[illegible]
16	2.64.0	36	5.94.0	56	9.24.0	76	12.54.0	96	15.84.0
17	2.80.6	37	6.10.6	57	9.40.6	77	12.70.6	97	16.00.6
18	2.97.0	38	6.27 0	58	9.57.0	78	12.87.0	98	16.17.0
19	3.13.6	39	6.43.6	59	9.73.6	79	13.03.6	99	16.33.6
20	3.30.0	40	6.60.0	60	9.90.0	80	13.20.0	100	16.50 0

B. K. ELLIOTT COMPANY, PITTSBURG, PA.
DRAWING MATERIALS AND SURVEYING INSTRUMENTS

V-61

Cares Road Chester Twp.
Section ~~B~~ Nth. part C Page 1:17

SHERMAN RD.
T.H. 97 CHESTER Tp. Page 26

Chester Twp Hall Survey Page 78

Sherman Road (Storm Sewer) Page 22

Whiting Drive T.H. 225 Pg 76
WOODSIDE & MAPLE DR'S. " 574-75
Ward Dr. Chester T.H. 231 " 53
Cedar Rd Profile & X section Pg 60
~~Align~~
Profile side Rds. 18-21479 Pg
Valley View Pg 70-73

Sherman Road Improvement - 1987
Monument boxes installed - see
references - pg - 26

State B.M.'s

X - in S.W. Corner Door Step Brick School Nee

Sta. 79 ± Elev 1173.88

T.H. 157

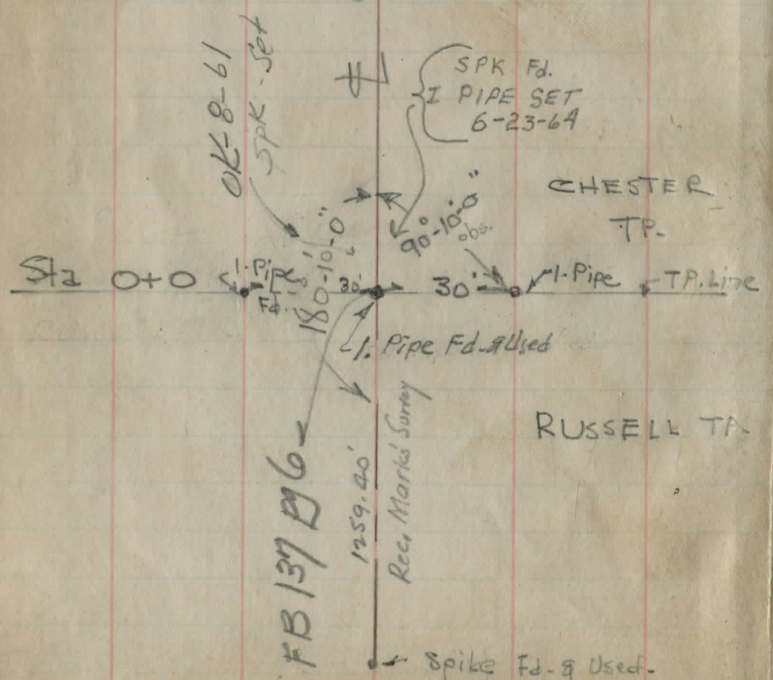
Cares Road — Chester Twp.

N-5°-10-E

℄ Chester Cares Rd.

NOTE: Stakes Set on 25'-offset on East Side of Rd. Unless otherwise INDICATED in FIELD Book -

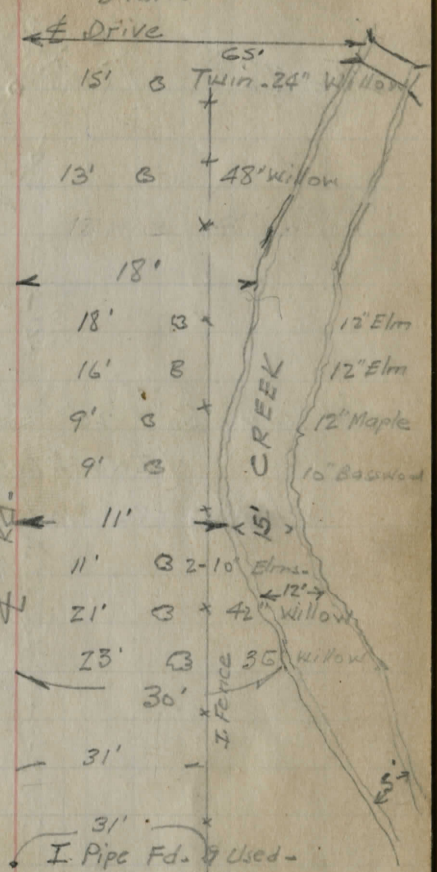
Sta 2+12 to Sta 2+47 Loose Rocks on E. Bank of Creek



June 26. 1935, Fair & Warm

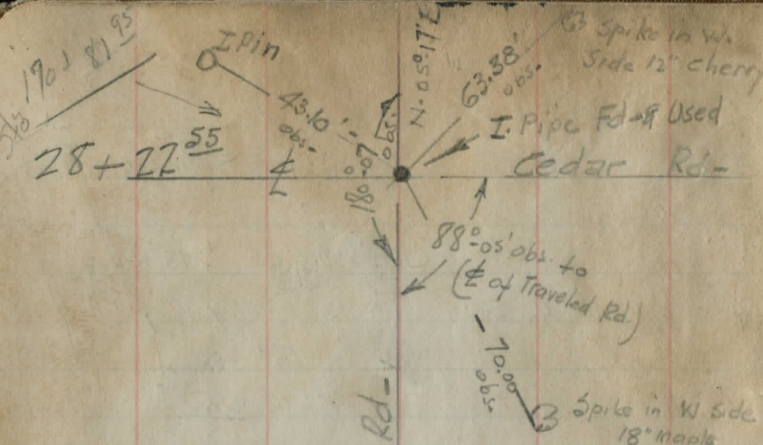
S. Gould Jr. - M. Parks D. Parks

(1)



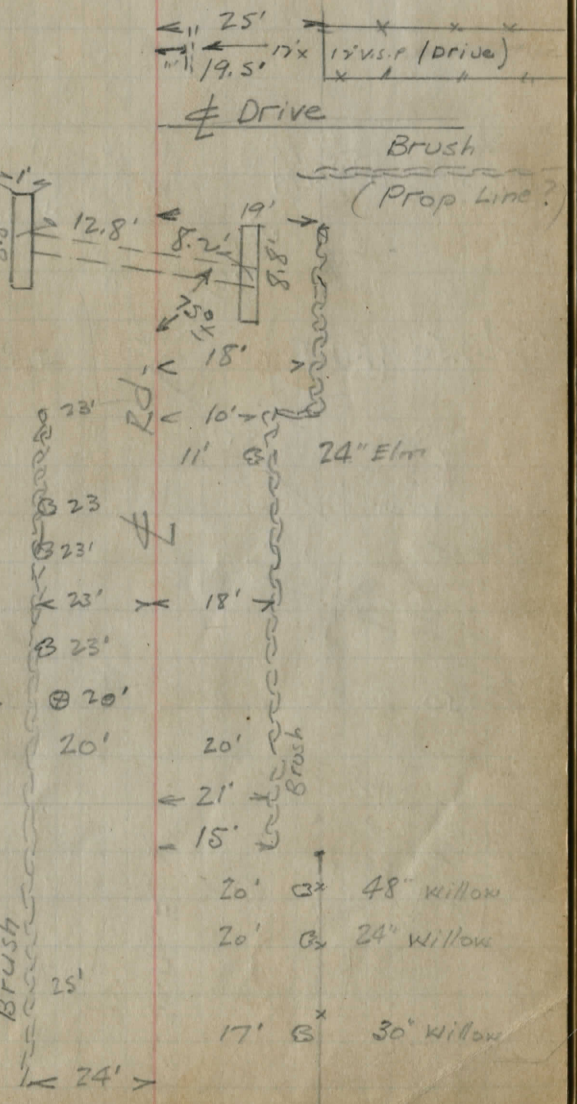
+87			
+75			
+67	10" Elm	B	24'
+60			
+41	12" Elm	B	24'
+20			
+18			
+17			
+10			
+09			
2+0			
+90			
+73			
+46			
+40	10" Ash	B	25'
1+0			
0+0	Township Line		

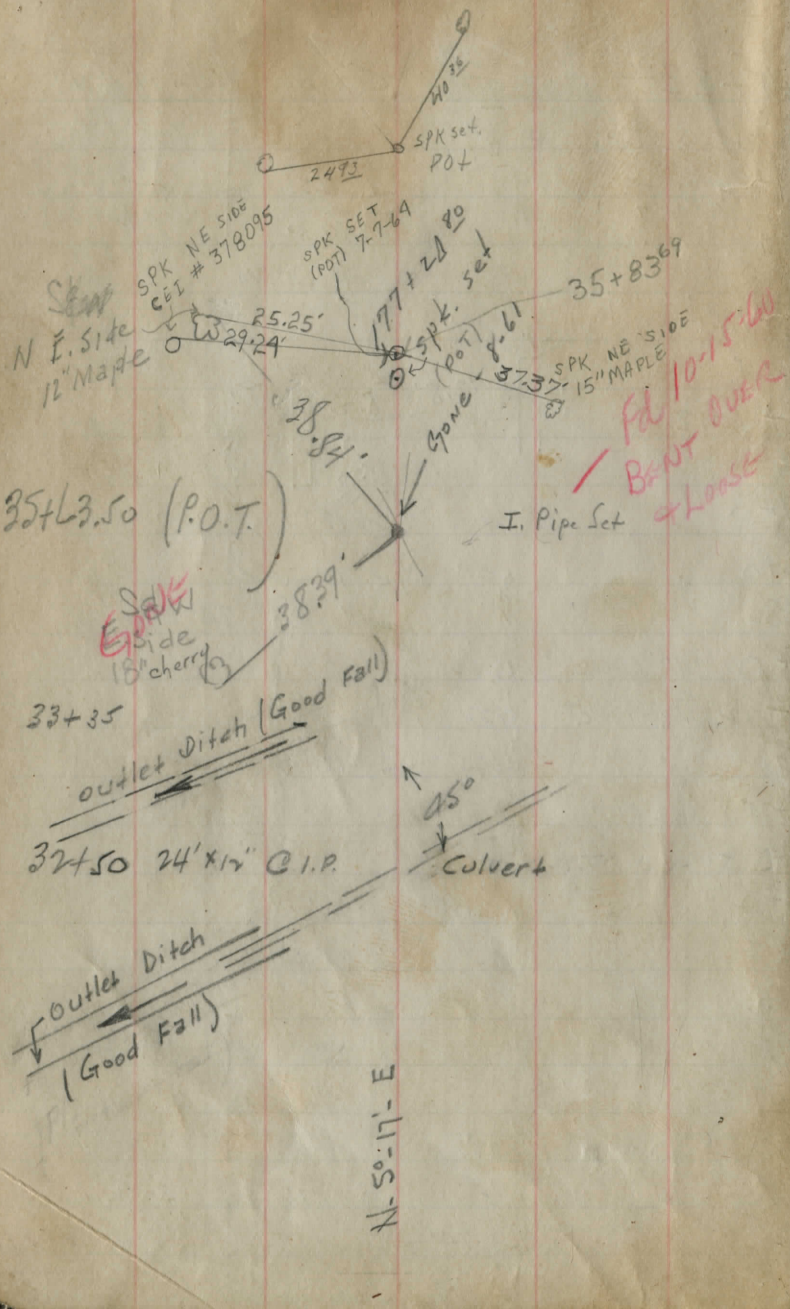
I. Pipe Fd. & Used -

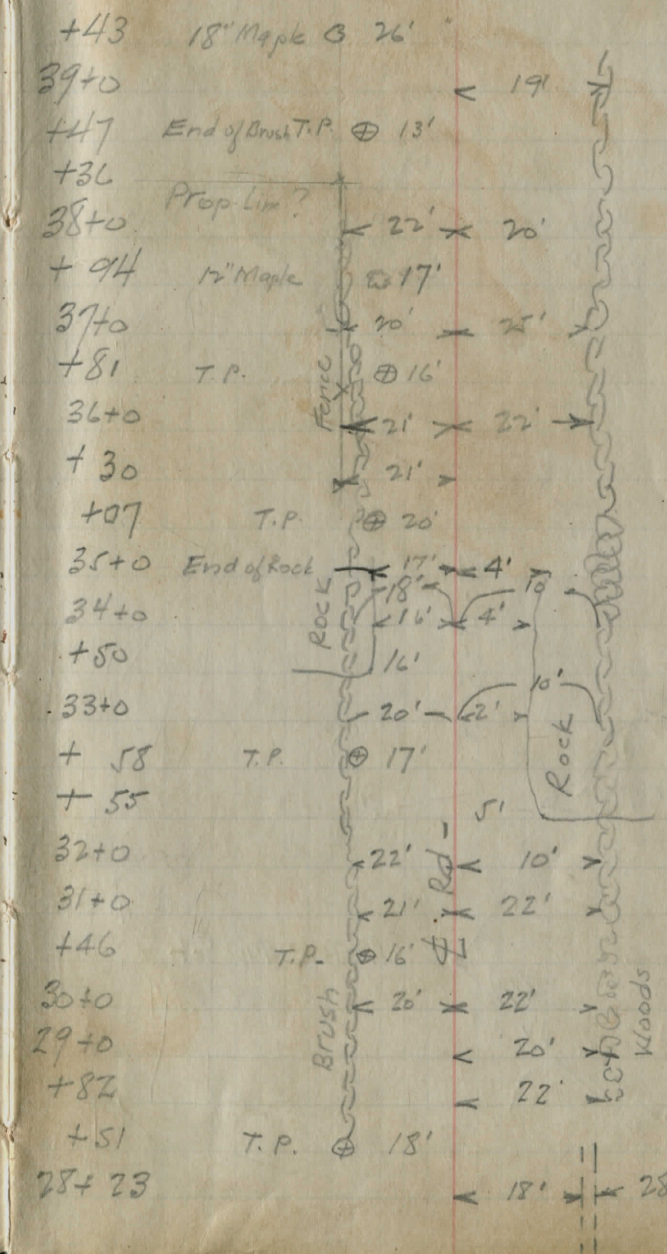


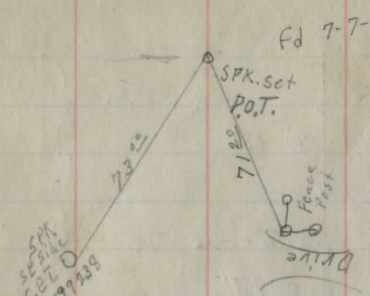
28+22.55 ℄ Cedar Rd- T.H. 98

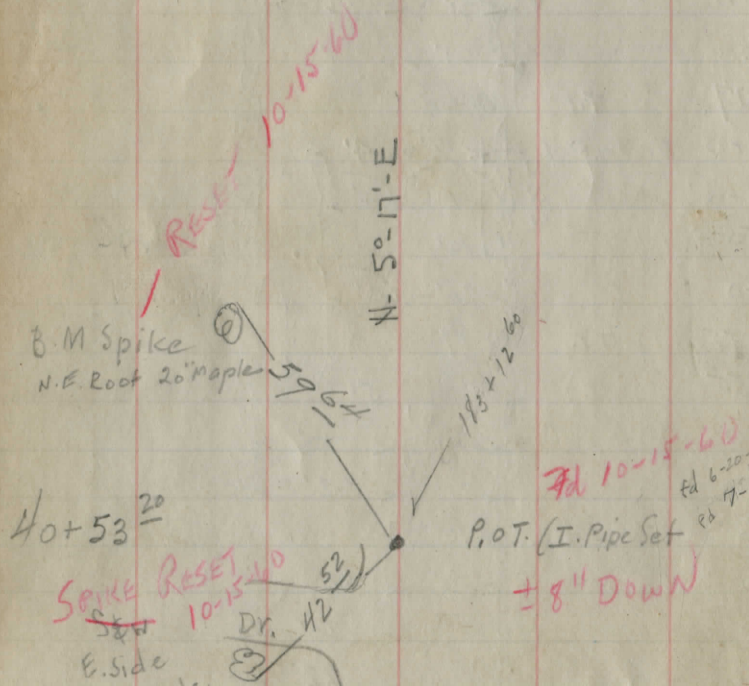
28+0 T.P. ⊕ 39'
27+93
+66
23+54
8+18
+65
+10.2
7+0
6+0
+80
+53 15" Maple ⊠ 23'
+22 12" Maple ⊠ 23'
5+0
+75 12" Elm ⊠ 23'
+25 T.P. ⊕ 20'
4+0
+65
+55
+18
+07
3+0
+98
2+90

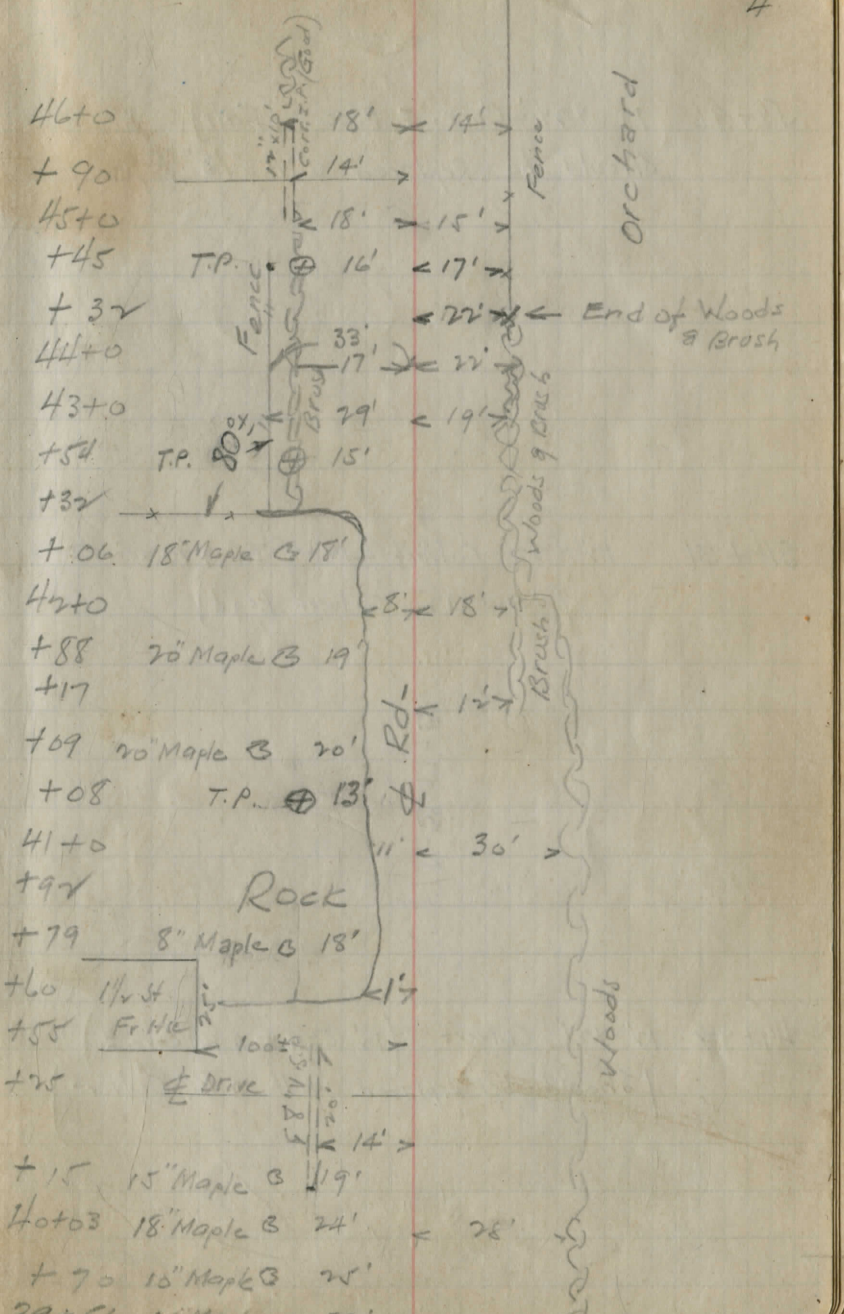



SPK set. POT
24.73
SPK NE SIDE CEI # 378095
SPK SET (POT) 7-7-69
177+24.80
Spk. set
35+83.69
N E. Side 12" Maple
25.25'
29.24'
Spk.
POT
8.61
37.37'
SPK NE SIDE 15" MAPLE
Fd 10-15-60 BENT OVER + LOOSE
38.82'
Stone
I. Pipe Set
35+43.50 (P.O.T.)
38.39'
S. Side 18" cherry
33+35
outlet Ditch (Good Fall)
45°
32+50 24"x12" C.I.P.
Culvert
Outlet Ditch
(Good Fall)
N. 5°-17'-E


+43 18" Maple @ 26'
39+0
+47 End of Brush T.P.
+36
38+0 Prop. Line?
+94 12" Maple
37+0
+81 T.P.
36+0
+30
+07 T.P.
35+0 End of Rock
34+0
+50
33+0
+58 T.P.
+55
32+0
31+0
+46 T.P.
30+0
29+0
+82
+51 T.P.
28+23
Fence
Rock
Rock
Brush
Woods
Rd.
28'x18" Corr. I. Pipe (Good)


Fd 7-7-69
SPK. Set
P.O.T.
73.22
71.20
Fence Post
Drive
SPK
SE Side
CBL
+99.239


RESET 10-15-60
N. 5°-17'-E
B.M Spike
N.E. Root 20" Maple
59.16
113+12.60
40+53.20
SPIKE RESET 10-15-60
52
Dr. 42
S&H
E. Side
15" Maple
Fd 10-15-60
Fd 6-20-63
Fd 7-7-64
P.O.T. (I. Pipe Set
±8" Down

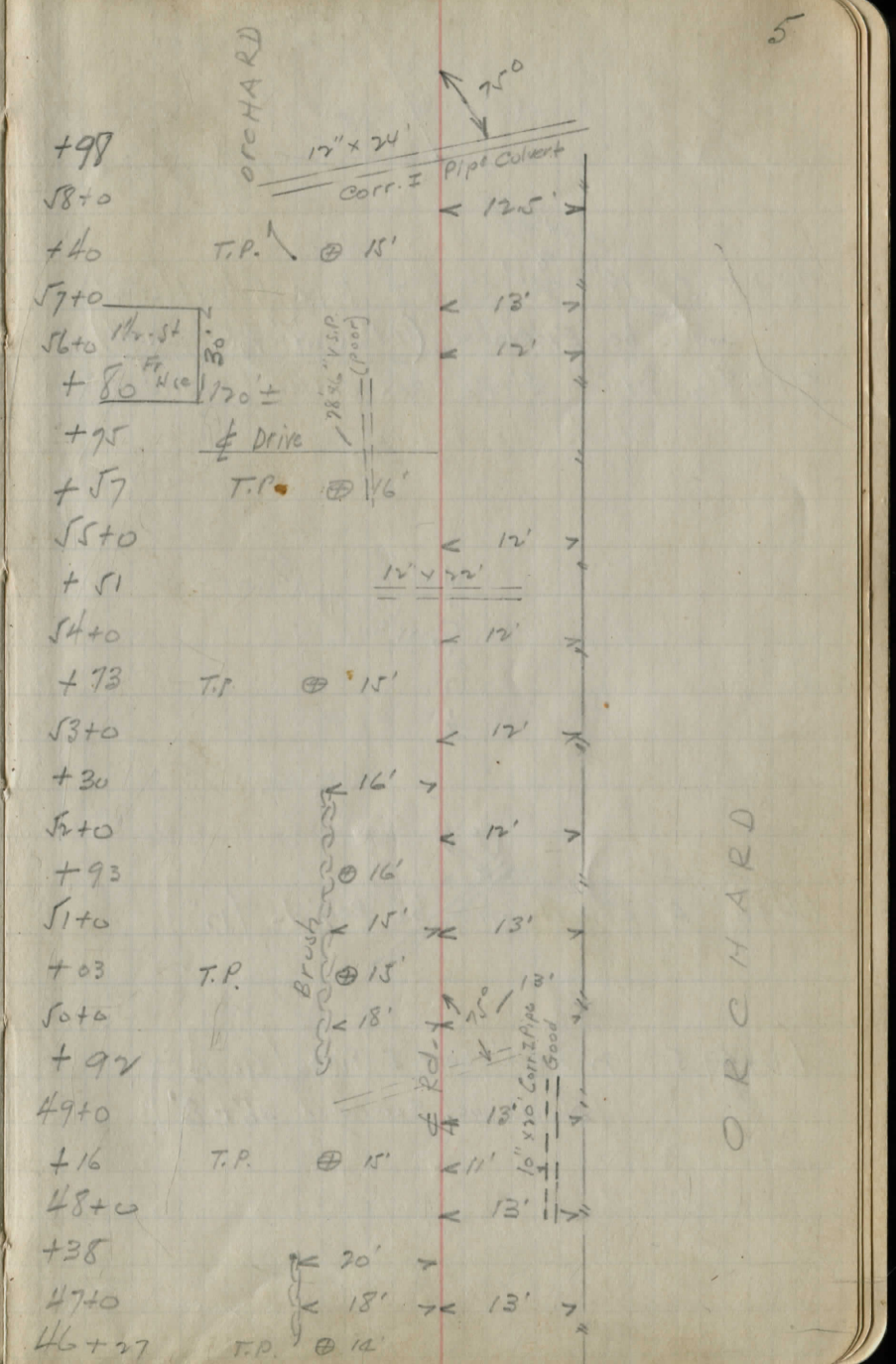

Orchard
Fence
End of Woods & Brush
Woods & Creek
Brush
Rd.
Woods
Fr Hdr
Drive
ROCK
T.P.
T.P.
T.P.
46+0
+90
45+0
+45
+37
44+0
43+0
+54
+37
+06
42+0
+88
+17
+09
+08
41+0
+97
+79
+60
+55
+25
+15
40+03
+70
39+56
18" Maple
20" Maple
8" Maple
15" Maple
18" Maple
10" Maple
15" Maple
18'
14'
15'
16'
17'
33'
17'
79'
80.04'
15'
18'
19'
8'
12'
20'
13'
11'
30'
18'
1'
100±
14'
19'
24'
25'
23'

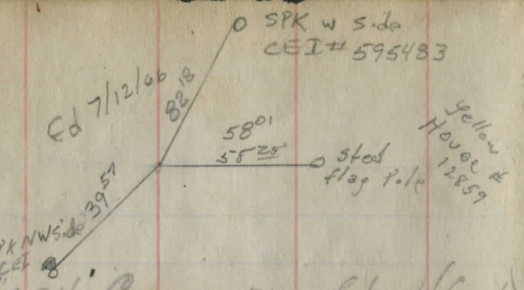
58+96 12" x 24' Corr. I Pipe (Fair)
Should be Replaced with a 15" Pipe

54+51 12" x 22' Culvert (14'-C.I.P. & 10' x Corr. I)
(New 12' Culvert Req'd)

N-5°-17'-E

49+92 12" x 24' Culvert (12' Cast II & 12' Corr. I.)
(Should be Replaced with a 15" Culvert)





75+17.5 18" x 24' Corr. I. Pipe Culvert (Good) — To be Extended (No Outlet Channel)

74+86 3'x6' Stone Box Culvert (Abandoned)

N-50°-17'-E

SPK 207+72.15

60°

64+0 A Culvert may be Req'd. (17")

62+49.5 17" x 24' Corr I. Pipe (Good) (Should be Extended 26'+8")

79+0 < 17' >

77+73 T.P. ⊕ 17'

75+86 T.P. ⊕ 16'

75+17.5 18" x 24' (Good) Corr. I. Pipe

75+0 < 16' >

74+86 3'x6' x 21'

73+97 ⊕ 16'

73+18 T.P. ⊕ 17'

71+0 15' < 15' >

+28 T.P. ⊕ 4'x5' (Poor)

70+70 < 15' >

+70 Drive

67+0 < 13' > 13'

+64 T.P. ⊕ 16'

66+0 < 12' >

65+0 < 13' >

64+0 < 13' >

63+0 < 18' >

+89 T.P. ⊕ 17'

+49.5 17" x 24' Corr I.P.

62+0 < 13' >

+05 T.P. ⊕ 16'

61+0 < 13' >

60+0 < 13' >

+15 T.P. ⊕ 16'

59+0 < 12' >

Fence Posts only - No Wire

End of Wooden Post. Beg. of Iron Posts

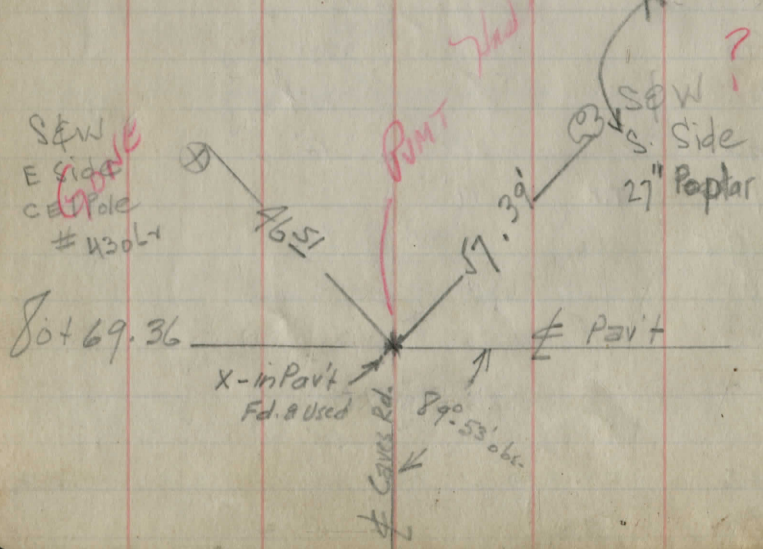
Fence

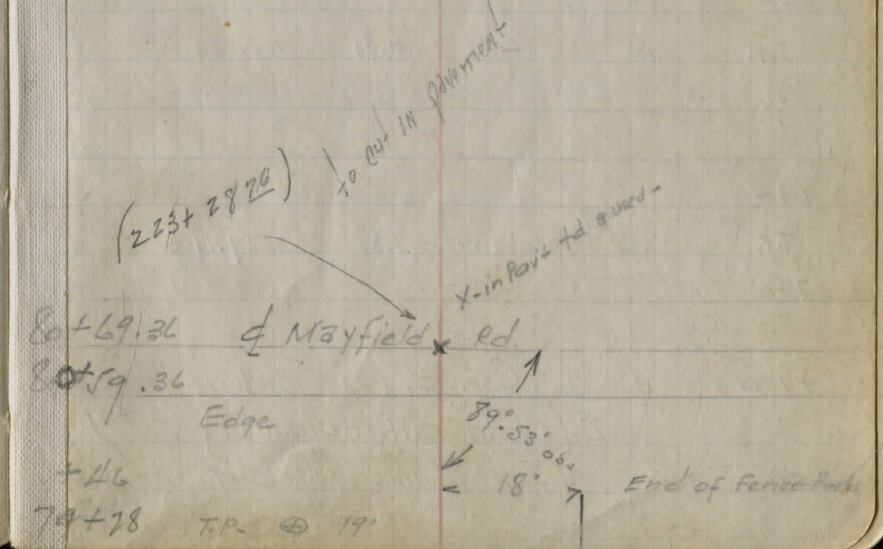
Rd.

OLD ROAD

1.528 miles
5280 | 8069.36

10-15-60
Steel head drag cuff





June 27 1935 Fair & Warm

Sta	+	H.I.	−	Elev.	
B.M.	5.66	1049.53		1043.87	Spike & Scar 15" Elm 30' Lt. (Sta 133+90) Marks Line
T.P.	6.84	1051.53	4.84	1044.69	
T.P.	6.03	1052.64	4.92	1046.61	
0+0					
1+0					
B.M. #1			3.41	1049.23	2 Spikes in E. Side 10" Ash 25 Ft.
1+50					
T.P.	4.37	1053.60	3.41	1049.23	Sta 1+40
2+0					
3+0					
4+0					
T.P.	6.80	1059.49	0.91	1052.69	
5+0					
6+0					
T.P.	4.61	1062.22	1.88	1057.61	
7+0					
+10.2					
8+0					

℄ 30" Corr. I. Pipe Culvert
Z (Clean outlet channel)
(Inlet Channel parallel to Rd-)

East ℄ West

5.3/25' 6.8/16' 5.4 5.7/12' 6.5/14' 5.7/17' 5.9/25'

6.5/25' 6.6/13' 5.0/5' 4.6 4.4/5' 5.3/11' 6.1/14' 5.5/17' 5.5/25'

4.5/25 4.2 4.1/5' 5.7/14' 4.7/16' 4.7/25'

33' (W. Edge of creek)

2.0/50' 3.8/38' 8.1/35 (W. Edge) 5.1/13' (E) 4.5/7' 5.2/5' 5.0 4.8/5' 5.4/11' 6.3/16' 5.1/16' 5.1/25'

5.1/25' 3.9 3.8/7' 4.1/11' 4.8/14' 3.6/16' 3.6/25'

0.5/25' 0.5/17' 2.3/15' 2.3/11' 2.9/10' 1.6 2.7/12' 3.6/15' 2.7/16' 1.5/25'

3.8/25' 3.8/20' 6.9/9' 5.8 6.2/12' 7.9/17' 5.7/23' 5.7/25'

6.0/25' 5.2/13' 5.3/7' 4.2 4.9/12' 5.2/14' 3.9/16' 5.6/25'

5.6/25' 5.6/7' 6.1/6' 5.9 6.0/11' 6.0/25'

10.6/30' 10.2/20' 9.5/F.L. 4.6/8.2' 4.6/7.2' 5.6/7.2' 5.6 5.6/12.8' 4.5/11.8' 4.5/12.8' 9.0/F.L. 8.8/19.0

2.7/25' 2.7/18' 5.4/12' 4.5/10' 4 4.6/8' 6.2/11' 6.1/13' 5.0/17' 5.0/25'

Sta	+	H.I.	-	Elev.	Rem's
T.P.	8.74	1062.22 1069.53	1.43	1060.79	
9+0					
10+0					
11+0					
T.P.	11.72	1078.44	2.81	1066.72	
12+0					
13+0					
B.M. #2			8.83	1069.61	Spike in S.E. Root 10" Elm 18' Lt. Sta 13+87
14+0					
+85	℄ Ditch (from N.W.)				
15+0					
16+0					
T.P.	13.07	1089.87	1.64	1076.80	
17+0	(Beg'g of Gravel)				
T.P.	10.95	1099.99	0.83	1089.04	
18+0					
19+0					
T.P.	11.79	1110.69	1.09	1098.90	

East	℄	West
2.9/30' 3.0/25' 10.2/12' 9.3/10'	8.6	9.2/5' 12.3/11' 12.2/13' 7.4/22' 8.0/25'
1.1/30' 7.2/25' 7.2/15 6.3/14 5.3/5'	5.3	6.3/8' 9.9/13' 10.0/18' 5.5/23 6.6/26'
3.8/25' 3.6/21' 5.3/17' 4.4/15' 3.7/7'	4.0	4.2/3' 4.8/4' 4.9/6' 4.0/8' 4.5/13' 7.1/17' 7.1/20' 3.7/21' 4.7/25'
11.5/25' 11.2/20' 12.6/17' 12.0/15'	11.8	11.5/8' 12.2/12' 14.0/14' 14.0/17' 11.3/23' 12.2/25'
10.2/25' 9.8/19' 11.3/16' 10.7/15' 10.1/7'	10.7	11.4/1 10.1/5' 10.4/10' 11.6/11' 11.7/14' 9.9/20' 11.1/25'
8.3/25 7.9/18' 9.7/15' 9.1/14' 8.5/7'	9.0	9.2/1 8.1/9' 10.7/13' 10.7/17' 8.3/20' 7.8/25'
	6.5	6.1/17' 8.7/19' 8.6/30' 6.0/32'
5.5/25' 5.6/17 7.4/13' 6.6/12'	6.0	5.4/13' 6.4/15' 5.3/25'
1.2/25' 2.0/17' 4.3/12' 3.1/9'	2.2	2.6/6' 3.2/8' 1.6/14' 1.4/25'
3.1/25' 9.7/8' 9.2/7'	8.8	10.0/9' 6.6/14' 6.8/25'
8.6/25' 86/16 11.8/10'	11.1	11.5/6' 12.0/9' 9.2/18 9.2/25'
3.6/25 3.8/17' 6.4/11 5.9/7'	5.8	6.4/4' 7.6/7' 4.2/14 4.0/25

Sta	+	H.I.	-	Elev.	Rem's
20+0		1110.69			
21+0					
22+0					
T.P.	11.77	1121.34	1.12	1109.57	Hub 20'Rt 22+10
23+0					
24+0					
25+0					
T.P.	12.42	1132.81	0.95	1120.39	
26+0					
27+0					
T.P.	13.08	1145.39	0.50	1132.31	
28+0				(1144.68	(cc-) (RP)
B.M.#3			0.96	1144.43	I Pin 43.10' NW of Intersec of Caves Rd & Cedar Rd.
+22.55	℄ Cedar Rd-				
T.P.	12.44	1156.71	1.12	1144.27	
+22.55	℄ Cedar Rd.				
29+0					
T.P.	9.88	1166.08	0.51	1156.20	
30+0					

East ℄ West

10.1 (25') 10.2 (19') 12.0 (18') 12.4 (8') 12.3 12.8 (4') 13.6 (6') 10.2 (13') 10.0 (25')

5.2 (25') 5.2 (16') 9.4 (11') 8.0 (8') 7.8 8.4 (4') 8.9 (6') 5.6 (12') 5.3 (25')

1.7 (25') 1.9 (15') 5.0 (11') 4.1 (8') 3.7 3.8 (5') 4.6 (7') 2.1 (13') 2.3 (25')

9.0 (25') 9.6 (15') 12.1 (11') 11.2 (8') 10.6 11.3 (5') 11.7 (7') 10.2 (12') 10.6 (25')

6.9 (25') 7.3 (14') 8.5 (12') 7.0 (8') 7.0 7.2 (4') 7.9 (7') 7.4 (9') 8.7 (25')

7.4 (25') 8.1 (14') 5.3 (10') 3.2 (6') 3.4 3.6 (5') 4.1 (7') 3.9 (10') 4.5 (11') 5.1 (25')

7.1 (25') 8.3 (20') 11.6 (11') 10.5 (8') 10.3 10.9 (5') 11.9 (8') 10.8 (11') 11.4 (25')

0.5 (25') 0.5 (23') 4.5 (12') 3.5 (9') 3.3 (6') 3.3 3.7 (4') 4.9 (8') 3.3 (10') 3.3 (25')

1.3 (25') 5.2 (16') 3.9 (12') 4.3 6.9 (25')

4.6 (150.) F.E. Side Rd. culvert 0.4 (15') 7.1 4.9 (25') 8.0 (50') 12.3 (100')

13.4 (N.F.L.) 8.1 (50')

0.3 (30') 1.1 (25') 7.9 (13') 6.9 (9') 6.7 7.2 (6') 9.0 (11') 5.9 (17') 5.8 (21') 6.1 (25')

1.4 (30') 3.2 (20') 9.3 (10') 8.3 (7') 8.2 8.4 (6') 9.3 (10') 6.7 (12') 7.7 (25')

Sta	+	H.I. 1166.08	−	Elev.	Remis
T.P.	6.37	1172.45	0.00	1166.08	
31+0					
T.P.	12.83	1183.69	1.59	1170.86	
32+0	Layer of Rock on E Side			(32+05)	
+55	Rock E. Side				
T.P.	9.84	1193.43	0.10	1183.59	
33+0					
+35	Outlet Ditch				
+55	Rock (W. Side)				
T.P.	11.55	1204.01	0.97	1192.46	
34+0					
35+0					
T.P.	9.18	1213.19	0.00	1204.01	
36+0					
B.M. #4			5.18	1208.01	2 Spikes in N W. Root in 15" N. Cherry 75' Lt. Sta 36+07 El. 1208.01
36+50	(Summit)				
37+0					
T.P.	3.11	1209.33	6.97	1206.22	
38+0					
39+0					

East	℄	West
+0.4 / 30' 0.5 / 25' 1.5 / 19' 8.2 / 7' 7.4 / 4'	7.2	7.5 / 7' 8.6 / 11' 5.7 / 15' 6.3 / 20' 6.8 / 25'
4.4 / 25' 4.4 (R) 20' 6.1 / 14' 11.7 / 4'	11.0	11.1 / 10' 12.4 / 14' 10.7 / 19' 11.1 / 25'
+4.0 / 35' +1.2 / 25' 1.3 / 12' 2.6 / 7' (R) 5.4 / 4' (R) 7.8 / 2'	6.8	7.1 / 12' 7.8 / 15' 6.7 / 18' 7.7 / 25' (9.2 F.L.)
0.3 / 35' 3.7 / 20' 7.2 / 8' (R) 10.2 / 4' (R)	12.2	12.1 / 1' 12.2 / 13' 12.9 / 15' 11.3 / 18' 11.2 / 25'
	8.1	9.7 / 25' 12.6 / 50'
	6.6	6.6 / 12' 7.5 / 4' 4.5 / 16' (R) 6.4 / 25'
0.2 / 3' (R) 2.2 / 25' (R) 7.0 / 10' (L) 13.3 / 0'	12.9	12.8 / 12' 13.8 / 15' (R) 11.1 / 17' (R) 12.1 / 28'
+7.0 / 25' +6.3 / 19' +5.1 / 10' 0.7 / 2'	0.0	+0.4 / 7' 0.1 / 13' 1.1 / 16' +1.0 / 18' +1.1 / 25'
1.8 / 25' 2.8 / 12' 7.0 / 6' 5.8 / 4'	5.3	5.0 / 5' 5.6 / 13' 6.8 / 15' 5.5 / 17' 5.3 / 25'
	4.8	
4.7 / 25' 4.8 / 8' 6.7 / 6' 5.7 / 4'	5.4	5.2 / 5' 5.4 / 10' 6.6 / 12' 5.3 / 16' 5.2 / 25'
2.3 / 25' 2.5 / 13' 4.7 / 8' 3.6 / 4'	3.3	3.6 / 8' 4.9 / 11' 3.7 / 13' 3.5 / 25'
4.7 / 25' 4.8 / 8' 6.0 / 6' 5.3 / 4'	4.9	5.0 / 8' 6.1 / 13' 3.8 / 22' 3.6 / 25'

Sta	+	H.I.	-	Elev.	Rem's
		1209.33			
40+00					
+60	(Change in Grade) & Rock West Side				
41+00					
T.P.	2.77	1201.77	10.33	1199.00	
42+00					
B.M. #5			1.48	1200.29	Spike in N E. Root 20" Maple 20' Lt.
T.P.	0.20	1189.70	12.27	1189.50	
43+00					
T.P.	0.13	1177.78	12.55	1177.15	41+09 El. 1200.29
44+00					
+60	(Change in Grade)				
T.P.	1.69	1166.71	12.76	1164.52	
45+00					
46+00					
T.P.	1.15	1154.68	12.68	1153.53	
47+00					
48+00					
T.P.	1.28	1144.32	11.64	1143.04	

East ℄ West

7.8 25' 7.5 19' 7.1 9' 6.6 5' 6.2 6.1 4' 6.4 12' 7.3 15' 4.9 22' 4.0 30'

9.7 25' 8.2 7' 8.7 6' 8.1 5' 7.8 (R) 7.6 2'(R) 7.7 12'(R) 8.2 15'(R) 6.6 30'

12.2 25' 10.9 9' 11.9 7' 11.6 5' 11.3 11.3 5' 12.0 9(R) 10.4 11'(R) 7.6 25'

13.2 25' 11.4 14' 12.1 11' 11.0 8' 10.8 11.2 5' 11.7 7' 9.6 9'(R) 9.1 19' 6.8 25' 6.4 30'

8.3 25' 7.9 14' 10.0 10' 8.9 7' 8.9 9.2 6' 9.8 11' 7.3 14' 6.8 19' 4.9 23' 4.8 25'

5.6 25' 5.3 19' 8.6 13' 6.7 8' 6.3 6.7 6' 8.3 12' 5.6 16' 4.9 20' 2.5 25'

11.9

4.6 25' 4.1 18' 3.5 15' 6.8 11' 5.6 7' 5.3 5.4 8' 6.7 13' 0.8 27

13.6 25' 11.3 14' 13.6 11' 12.3 7' 12.0 12.2 7' 13.6 12' 12.1 25'

7.1 25' 6.1 13' 7.1 10' 6.0 6' 5.7 5.8 8' 6.9 12' 5.4 19' 3.6 25'

11.2 25 10.4 13' 11.5 11' 10.2 7' 10.0 10.3 6' 11.4 12' 10.7 13' 10.0 25'

Sta	+	H.I.	−	Elev.	Rem's
		1144.37			
49+00					
49+97	℄	12" Culvert			
50+00					
51+00					
52+00					
T.P.	2.52	1142.39	4.45	1139.87	
53+00					
54+00					
54+51	℄	12" Culvert (No Inlet Channel)			
55+00					
B.M. #6			1.46	1140.93	Spike in E Side 8" Sweet Cherry 40' Lt Sta 55+07 1' Ab. Ground El. 1140.93
56+00					
56+50		(Change in Grade)			
57+00					

East ℄ West

4.5 / 25' 3.5 / 12' 3.9 / 10' 2.9 / 6' 2.5 2.9 / 7' 4.1 / 11' 4.6 / 25'

8.4 / 50' 7.6 / 11' (F.L.) 4.2 7.1 / (F.L.) 13'

6.9 / 25' 6.1 / 12' 7.3 / 10' 4.7 / 6' 4.3 4.3 / 7' 6.3 / 14' 5.6 / 16' 4.0 / 25'

9.4 / 25' 8.8 / 12' 5.3 / 6' 4.9 4.9 / 7' 6.4 / 13' 3.9 / 18 3.7 / 25'

7.0 / 25' 6.8 / 12' 4.8 / 7' 4.6 4.8 / 7' 5.8 / 12' 4.9 / 14 3.4 / 25'

3.9 / 25' 3.5 / 12' 4.0 / 11' 2.7 / 7' 2.1 2.3 / 7' 3.3 / 11' 1.7 / 15' 1.7 / 20 0.8 / 25'

4.7 / 25' 5.0 / 12' 5.6 / 9' 4.9 / 6' 4.3 4.6 / 7' 5.9 / 13' 3.1 / 20' 2.6 / 25'

8.9 / 50' 7.5 / 9' (F.L.) 4.6 7.1 / 13' (F.L.) 4.6 / 50'

5.6 / 25' 5.6 / 12' 6.3 / 9' 4.9 / 6' 4.7 4.9 / 7' 6.1 / 13' 4.3 / 17' 3.9 / 25'

4.6 / 26' 4.4 / 13' 5.3 / 10' 4.1 / 7' 3.4 3.8 / 8' 4.5 / 12' 3.5 / 15' 2.8 / 25'

3.1

4.5 / 25' 4.7 / 12' 5.0 / 9' 4.4 / 6' 4.0 4.2 / 6' 5.4 / 13' 3.2 / 16' 4.4 / 25'

Sta	+	H.I.	-	Elev	Rem's
		1142.39			
58+00					
T.P.	2.55	1139.56	5.38	1137.01	
58+96	℄	12" Culvert			
59+00					
60+00					
61+00					
62+00					
62+49.5	℄	12" Culvert			NOTE: Outlet Channel To be Cleaned out
63+00					
T.P.	5.70	1139.71	5.55	1134.01	
64+00					
65+00					
66+00					
66+50		(change of Grade)			
T.P.	5.10	1140.70	4.61	1135.10	

East ℄ West

6.4 25' 6.4 13' 7.7 9' 6.9 7' 6.7 6.9 7' 7.8 11' 5.8 15' 5.3 25'

10.1 75' 8.2 25' 8.1 12'(F.L.) 4.8 7.4 12'(F.L.) 4.7 50'

7.7 25' 8.1 13' 5.2 6' 4.8 4.9 6' 6.7 12' 4.5 18' 4.7 25'

6.6 25' 6.4 13' 6.9 12' 5.2 6' 4.8 4.9 6' 6.0 12' 3.9 16' 3.7 25'

4.2 25' 4.5 13' 5.8 11' 4.5 6' 4.2 4.8 8' 6.0 13' 4.6 15' 4.5 25'

6.3 25' 6.4 13' 7.3 10' 5.7 5' 5.2 5.7 9' 7.0 14' 5.6 16' 5.5 25'

10.1 100' 8.6 25' 9.0 10'(F.L.) 5.4 8.1 14'(F.L.) 5.7 25'

6.4 25' 6.3 13' 7.7 10' 6.2 8' 5.9 5' 5.7 5.8 9' 7.2 15' 5.9 18' 5.9 25'

9.4 50' 7.4 25' 7.3 13' 7.9 11' 6.1 5' 5.8 5.9 9' 7.1 14' 6.1 18' 6.3 25'

6.0 25' 5.9 11' 6.8 8' 5.6 4' 5.3 5.5 9' 6.8 15' 5.6 18' 5.9 25'

4.1 25' 4.3 11' 5.6 9' 4.5 6' 4.0 4.1 7' 4.8 12' 6.1 14' 3.7 18' 4.7 25'

3.6

Sta	+	H.I.	-	Elev	Remrs
B.M. #7		1140.70	0.89	1139.81	Bent Spike in E. Root 18" Maple 100'± Lt. Sta 67+20 El. 1139.31
67+0					
68+0					
69+0					
T.P.	2.85	1133.27	9.83	1130.37	
70+0					
71+0					
72+0					
T.P.	3.45	1126.75	10.42	1122.80	
73+0					
74+0					
75+0					
75+12.5	℄	18" Culvert			
76+0					
T.P.	8.43	1129.51	6.17	1121.08	
77+0					

East ℄ West

5.3/25' 5.5/14' 6.7/10 5.3/6' 4.9 5.4/10' 6.6/12' 5.2/15' 4.4/25'

7.2/25' 7.5/14' 8.4/10' 7.4/8' 7.0 7.4/7' 8.8/11' 6.8/15' 5.5/25'

9.6/25' 9.8/13' 10.8/11' 9.3/8' 8.8 9.4/7' 10.8/10' 8.8/13' 9.0/25'

4.1/25' 4.1/14' 5.6/10' 4.5/7' 4.1 4.7/7' 5.9/10' 3.9/13' 3.3/25'

5.8/25' 6.2/14' 8.3/10' 7.3/7 7.0 7.7/7' 8.7/11' 6.0/13' 5.9/25'

9.0/25' 9.1/15' 10.9/11' 9.8/8' 9.6 10.1/7' 11.2/10' 9.9/12' 7.3/25'

5.7/25' 5.7/13' 4.8/7' 4.2 4.5/6' 5.8/11' 5.1/12' 5.9/15' 5.6/25'

7.0/25' 6.8/14' 7.1/11' 5.3/7' 5.0 5.6/8' 6.8/11' 6.5/13' 6.8/25'

7.3/25' 7.1/16' 7.9/13' 6.5/10' 5.8/6' 5.6 5.9/8' 8.1/13' 7.8/25'

7.7/50' 8.7/13 F.L. 5.6 8.9/F.L. 8.6/30' 9.9/100'

6.1/25' 5.9/14' 6.5/12' 5.6/9' 5.2 5.9/10' 7.5/12' 6.8/14' 7.5/25'

7.9/26' 8.5/14' 9.1/11' 8.5/6' 8.1 8.6/9' 9.9/12' 8.5/14' 8.6/25'

Sta	+	H.I.	−	Elev	Rem's
		1129.51			
78+00					
79+00					
79+50					
80+00					
T.P.	2.49	1128.67	3.38	1126.13	
80+27	So. Ditch Mayfield Rd.				
80+59.36	So. Edge of Pav't				
80+69.36	℄ Mayfield Rd. & Pav't				
B.M. #8			5.63	1122.99	X in S.W. Corner Door Step Br. School House Sta 79±

East ℄ West

5.7/25' 6.2/12' 7.9/11' 6.7/6' 6.4 6.8/9' 8.0/12' 5.8/14' 5.1/25'

3.2/25' 3.9/15' 5.5/13' 4.7/10' 3.9/7' 3.4 4.0/8' 5.3/12' 4.1/14' 3.6/25'

2.6

3.1/25' 4.0/14' 3.4/12' 3.7/9' 3.0 3.5/7' 4.2/11' 5.1/13' 3.8/15' 3.6/25'

0.2/100'(D) 1.9/50'(D.) 1.8 4.7/50'(D) 6.0/100'(D)

1.90

1.87

CHECK LEVELS

Caves Rd Sec "B"

Sta	+	H.I.	−	Elev.	REMARKS
B.M.#8	5.39	1128.38		1122.99	X-SW Cor. Step Brick School Hse Sta 79+30 (El. 1123.88)
T.P.	2.61	1129.42	1.57	1126.81	+ Roof
T.P.	6.60	1127.35	8.67	1120.75	
T.P.	12.37	1139.51	0.21	1127.14	
B.M.#7			0.20	1139.31	Bent Spike in E. Root 18" Maple 100'± Lt Sta 67+20 El. 1139.31
T.P.	5.26	1139.34	5.43	1134.08	
T.P.	9.14	1143.72	4.76	1134.58	
B.M.#6			2.80	1140.92	Spike in E. Side 8" Sweet Cherry 40' Lt Sta 55+07 El. 1140.
T.P.	5.23	1144.41	4.54	1139.18	
T.P.	12.12	1155.78	0.75	1143.66	
T.P.	11.71	1166.73	0.76	1155.02	
T.P.	12.18	1278.69	0.22	1166.51	
T.P.	12.68	1291.39	+0.02	1278.71	
T.P.	9.30	1200.66	0.03	1291.36	
B.M.#5			0.38	1200.28	Spike in N.E. Root 20" Maple 20' Lt Sta 41+09 El. 1200.29
T.P.	8.15	1208.59	0.22	1200.44	
T.P.	6.40	1212.75	2.24	1206.35	
B.M.#4			4.75	1208.00	2 Spikes in N.W. Root 15" W. Cherry 25' Lt Sta 36+07 El.
T.P.	0.06	1200.26	12.55	1200.20	
T.P.	0.13	1187.56	12.83	1187.43	
T.P.	0.36	1275.45	12.47	1275.09	
T.P.	0.38	1263.40	12.43	1263.02	
T.P.	1.42	1251.94	12.88	1250.52	
B.M.#3			7.50	1244.44	I. Pin-RP 43.10' N.W. of Int of Caves & Cedar Rds El. 1144.43

June 27, 1958 warm 80°

A. Patterson
P. Young
O. Rideout

Cedar Rd.

	+	HI	−	Elev
B.M. #11	1.61	249.19		247.58
T.P.	2.49	242.29	9.39	239.80
80+0				232.49
T.P.	9.68	251.66	0.31	241.98
81+0				242.76
82+0				246.56
T.P.	3.65	246.77	8.54	243.12
83+0				239.67
T.P.	0.29	236.82	10.24	241.42
84+0				229.22
T.P.	1.42	227.87	10.37	231.34
85+0				219.27
T.P.	0.78	216.91	11.74	221.02
86+0				210.91
T.P.	0.86	208.55	9.22	212.58
87+0				201.45
T.P.	0.63	199.04	10.14	203.30
B.M.	3.26	197.54	4.24	194.28
88+0				193.14
T.P.	1.30	189.30	9.54	192.89
89+0				184.80
T.P.	1.29	179.92	10.67	183.52
90+0				175.82

Top S.S. stake Sta. 88+0

	N						S				
80+0	1.9/30	2.4/28	10.3/14	10.9/12	10.4/11	9.8	10.1/9	10.5/14	10.4/16	7.0/23	7.7/10
81+0		1.3/30			9.5/13	8.9	9.7/13	6.8/20		7.5/30	
82+0	WP 4'/30		2.2/21		5.6/15	5.1	5.8/12			5.3/30	
83+0	0.2/30	3.2/23	8.0/17		7.7/12	7.1	7.8/11			7.4/30	
84+0	5.1/30		10.0/19	8.0/12		7.6	8.4/10	9.2/12	8.7/14	11.2/30	
85+0	7.3/30		9.7/21	8.8/16		8.6	9.0/11	11.9/14		12.9/30	
86+0						6.5					
87+0						7.1					
88+0						4.4					
89+0						4.5					
90+0						4.1					

	+	HI 179.92	-	Elev.	
T.P.	1.15	169.30	11.80	173.01	
91+00				167.30	2.0
92+00				160.40	8.9
T.P.	2.62	160.12	11.80	162.39	
B.M. 12			3.12	157.00	
94+00				155.52	4.6
96+00				157.02	3.1
T.P.	8.10	165.96	2.26	157.86	
98+00				162.16	3.8
T.P.	8.69	173.35	1.28	164.68	
100+00				168.35	5.0
102+00				172.75	0.6
T.P.	9.72	182.50	0.57	172.75	
104+00				177.20	5.3
106+00				181.30	1.2
T.P.	4.93	186.66	0.57	181.93	
B.M. 13	3.11	186.64	3.07	183.53	
108+00				182.34	4.3
110+00				182.54	4.1
112+00				183.34	3.3
T.P.	9.00	192.24	3.40	183.24	
114+18				187.34	4.9
116+00				190.74	1.5
T.P.	3.50	193.56	2.18	190.06	

		193.56		188.76	
117+85				Swamp & Creek	
118+00				188.66	
120+00				189.66	
TP 122+00	8.40	201.43	0.53	193.03	
125+00				197.53	
TP	4.13	209.13	1.43	200.00	
126+00				199.03	Inv. Marilyn
127+0				198.03	
TP	3.73	198.96	8.90	195.23	
128+0				193.46	
129+0				189.96	
T.P.	4.90	195.07	8.79	190.17	
130+0				190.17	
T.P.	6.03	199.81	1.29	193.78	
131+0				193.71	
TP	7.09	206.78	0.12	199.69	
132+0				199.48	
TP	5.88	210.09	2.57	204.21	
133+0				204.69	
T.P.	5.01	212.12	2.98	207.11	
134+0				207.32	
T.P.	4.62	211.06	5.68	206.49	

N

12" CIP flagged ½ FALL

6.7 Inlet

7.2 outlet

4.8 7.7/50 8.6/100

4.9

3.9

3.9

Dr. 5.2/50 5.1 5.4/50

2.3/30 6.7/13 6.1/9 6.1 6.7/13 7.1/15 6.5/17 3.7/21 4.2/30

1.0/30 4.7/17 6.7/13 5.8/10 5.5 6.1/13 6.6/15 5.2/19 4.6/30

out 10.7/21 10.6/17 9.3/12 9.0 9.3/15 10.1/18 10.8/30

8.9/30 8.3/18 5.6/13 4.9 5.2/10 8.2/13 11.5/30

2.0/30 7.0/15 6.1/10 6.1 6.4/13 7.4/15 6.2/18 5.4/30

4.6/30 3.9/25 7.7/16 5.3/14 7.8/13 7.3 7.7/12 8.4/14 3.6/26 3.1/30

2.1/30 2.4/22 5.5/15 6.5/14 5.9/12 5.4 5.7/12 6.0/14 2.4/25 2.6/30

3.4/30 3.7/22 5.3/14 5.7/13 4.8 5.2/12 5.7/14 4.5/19 4.2/30

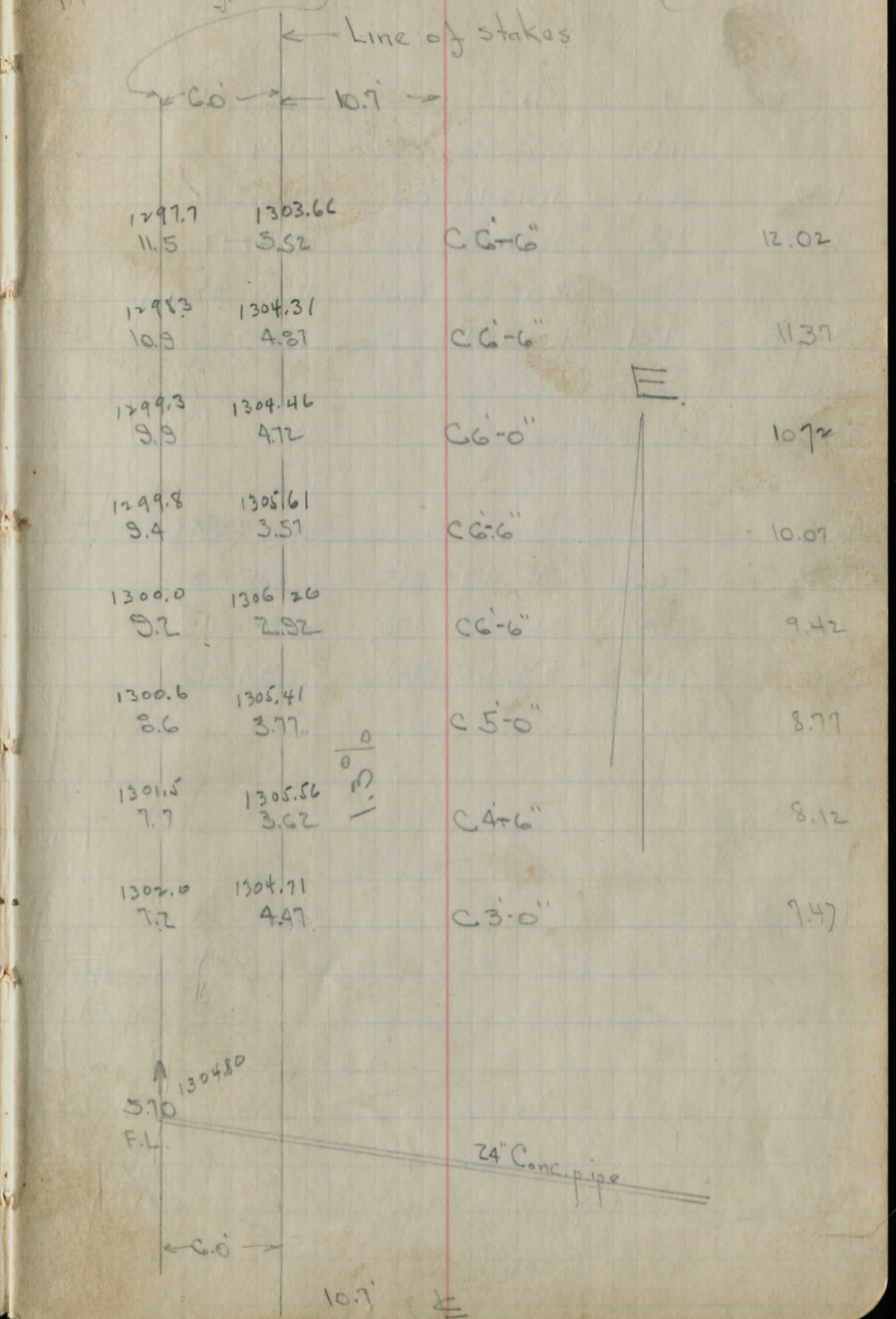
		211.06													
135+0				206.36		2.8 / 30	3.1 / 22	5.0 / 16	5.5 / 15	4.7	5.6 / 15	3.9 / 18	4.1 / 30		
137+0				204.56						6.5					
139+0				208.46						2.6					
T.P.	-6.38	216.74	0.68	210.38 ✓						215.56					
141+13				205.56	Int. Sk. *306 ± Cedar					1.2					
BM #3	5.93	154.53		148.60			E Inlet			℄		W Outlet			
-Culvt. West Geauga Trail Sta 21+80			Running	N. 15"X 49'			13.8			11.9		15.7			
1+0										6.9 Cont.					
TP	6.60	160.62	0.51	154.02											
2+0										5.7					
3+0										1.0					
BM #3			12.01	148.61											
BM # 5	3.11	182.27		179.16	R.P. Sp.	S Side 25" Beach									
T.P.	10.44	189.88	2.83	179.44			E Inlet			℄		W Outlet			
-Culvt. Springblossom Trail Sta. 35+90			Running	N. 18"X 56'			5.9			4.0		7.4			
1+0										0.7					
T.P.	7.67	196.44	1.11	188.77											
2+0										4.6					
3+0										6.4					

Cont. Pg 79

4/24/39 Pomeroy
Willman
Fair-Very Windy Clause

Stakes for Storm Sewer (Sherman Rd)

	+	H.I	-	Elev	Grade
				1297.16	
+50				9.2.36	
				1297.81	
3+0				93.01	
				1298.46	
+50				93.66	
				1299.11	
2+0				94.31	
T.X	L.D.	C.A.	A.C.	1299.76	
+50				94.96	
				1300.41	
1+0				95.61	
				1301.06	
+50				96.26	
				1301.71	
0+0 = 12[illegible]+71.30				96.91	
		1309.18		1306.22	
T.P.	2.96	104.38	4.28	101.42	
		1310.80		1304.80	
- 39[illegible].3	5.70	105.70		100.00	



	+	H.I	−	Elev.	G
T.P.	11.13	1258.38	0.82	1247.25	
T.P.	8.60	1248.17	0.45	1239.57	
T.P.	7.85	1240.02	1.45	1232.17	
T.P.	10.38	1233.62	0.85	1223.24	
U.S.G.B.	7.71	1224.09		1216.38	

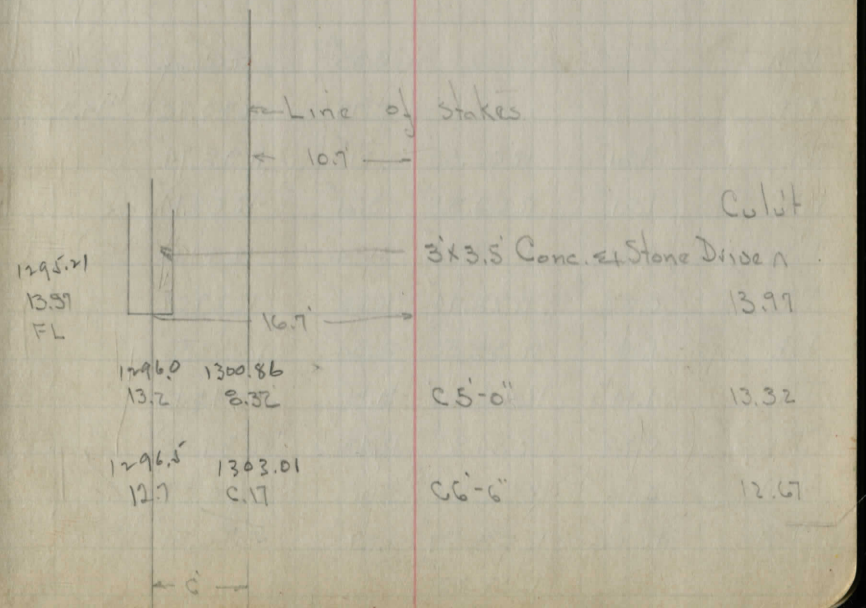
4/23/38 Fair - Warm
Pomeroy - Clause - Willman

B.M			6.15	92.54
T.P.	3.06	98.69	5.15	95.63
T.P.	6.03	100.78	4.70	94.75
T.P.	4.43	99.45	9.42	94.96

West foundation Cottrells Store (Burned)

Spk in W. Root 24" Elm ±400' N of Sherman - Chillicothe Road intersection 30' Rt Sta 131+20

Top W. Headwall Drive Culv.



	+	HI	−	E
BM.			0.93	1205.62
T.P.			6.79	1199.76 = 94.96
T.P.	7.81	1206.55	11.21	1198.74
T.P.	1.81	1209.95	9.81	1208.14
T.P.	0.85	1217.95	11.34	1217.10
T.P.	0.82	1228.44	10.88	1227.62
T.P.	1.18	1238.50	8.94	1237.32
T.P.	1.14	1246.76	9.79	1245.12
T.P.	0.58	1254.91	12.49	1254.33
T.P.	2.15	1266.82	3.90	1264.67
T.P.	12.06	1268.57	1.87	1256.51
		1258.38		

add 120480 as differential ~~elev~~

Spike W. Side 8" Apple Sta 4+07 = 132+78 35' Rt.
Top W. Headwall Divide Co'l't.

75

75 00
35+37 24
39 63

S. Gould Jr
Sec. Dist.
E.C. Richards

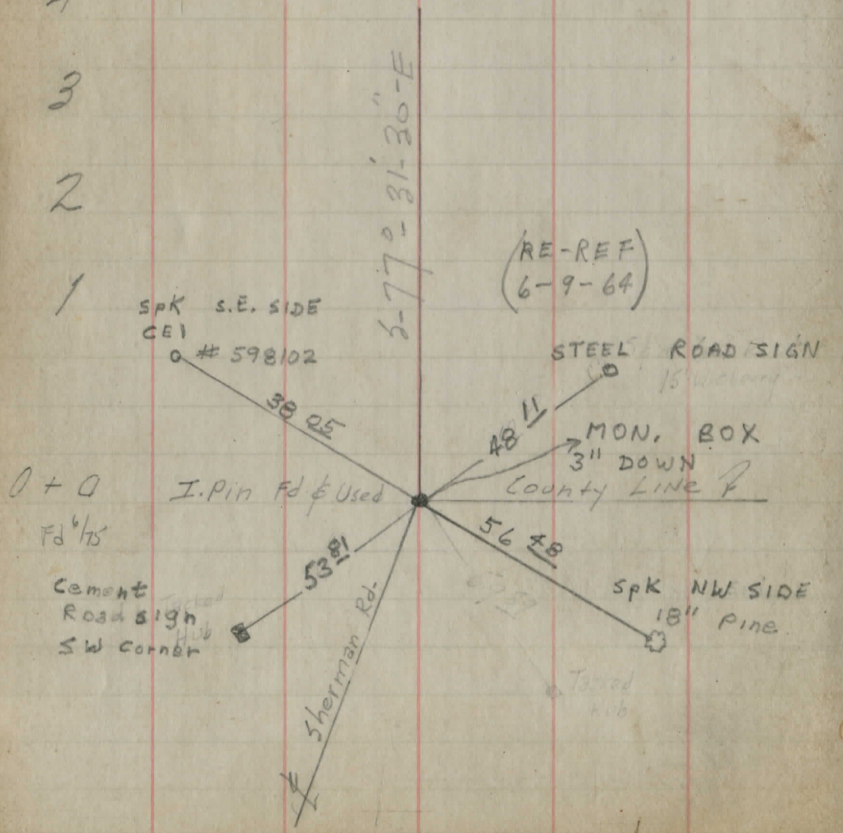
Nov 9, 1936
Cloudy & Cold

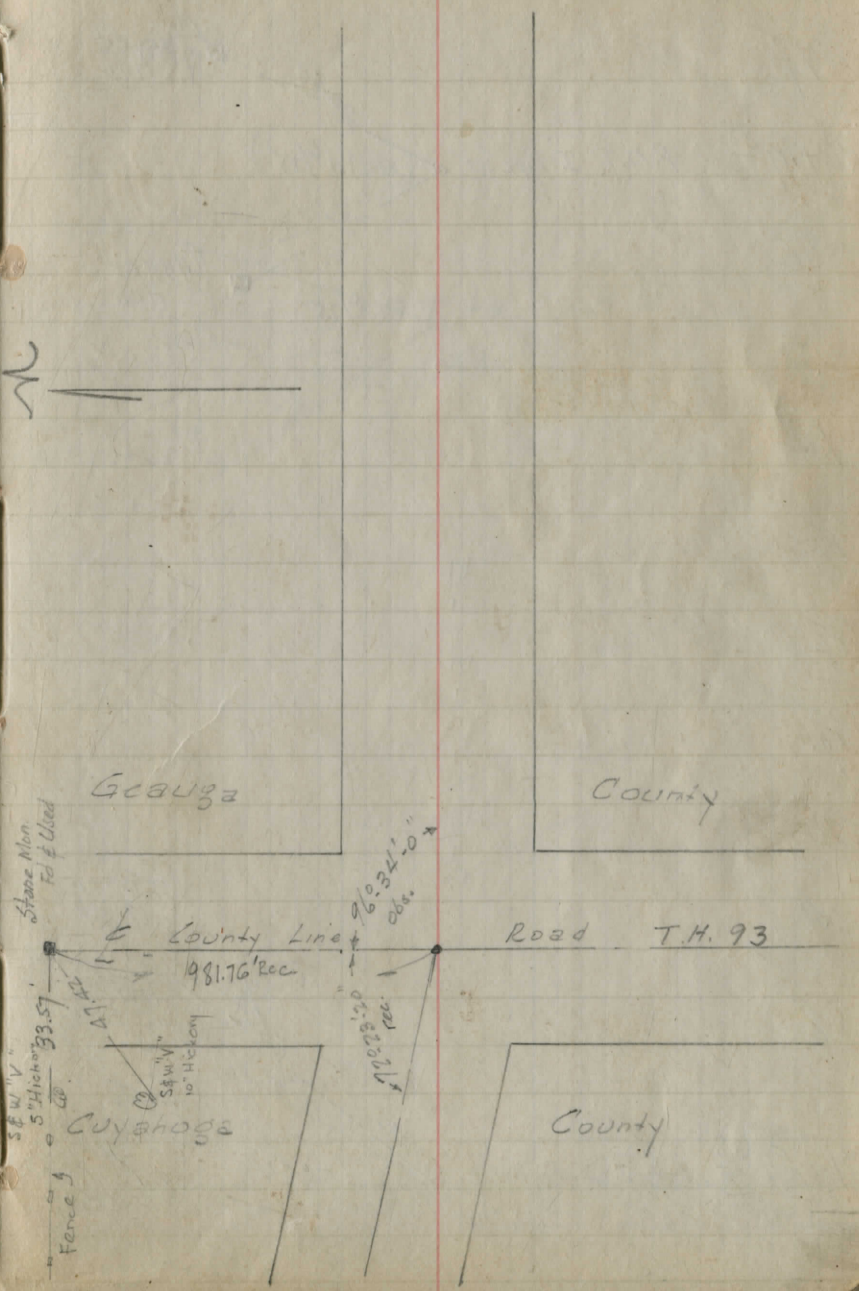
SHERMAN RD.
T.H. # 97

CHESTER TP.

26

NOTE: Stakes Set on 25' offset on So. Side of Rd., Unless Otherwise Indicated in Note Book.





17

16+19.88 P.O.T. I Pipe Set (No fd 4/75)

23.48

Cooked Hub

27.73

Cooked Hub

16

+60.94 POT set I.P. 4/25

15

14

13

12

11

10

9

8

S-77°-31-30-E

Z-54

Fr. H.SE

NW cor Fd-

89.14

7+54.38 P.O.T. I. Pipe Set Stone

78.81

Mill Stone

NW cor Fd

+44.67 POT I.P. Set 4/75

Hse

SW & Brick Fndn.

12.76

Drive

4" dn.

63.06

Spk S.W side

CEI # 823763

NOT LOCATED '87 Mill Impossible

DRIVE

℄ 200'± 11+15

120°±

flush Spk SE side CEI #823760

R.P.

49.47

42.10

49.43

Box Set 87'

I. pin+ "

19.13'

Hub w/ Tack

FOUND I pipe

6 cp 864 (Re-Ref)

12" down

7+0

7+44.67 POT

REF. PIN

℄ 30

63.28

74.19

73.13'

PK

4" dn.

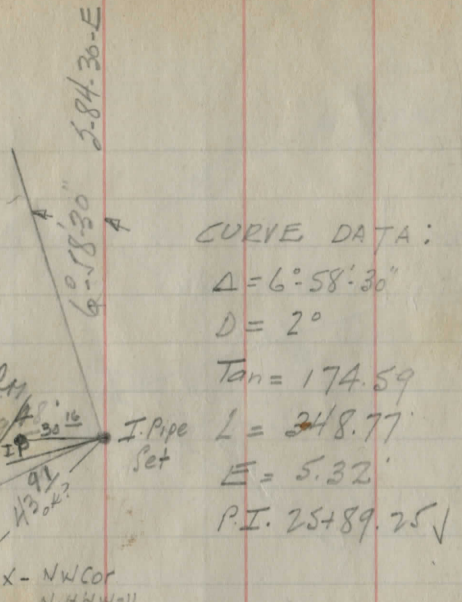
SEA face post. 18" UP

27+63.43 P.T.

27

(Re-Ref 6-10-64)

26



CURVE DATA:

$\Delta = 6° 58' 30"$

$D = 2°$

Tan = 174.59

$L = 348.77'$

$E = 5.32'$

P.I. 25+89.25 ✓

25

24+14.66 P.C.

24

23

22

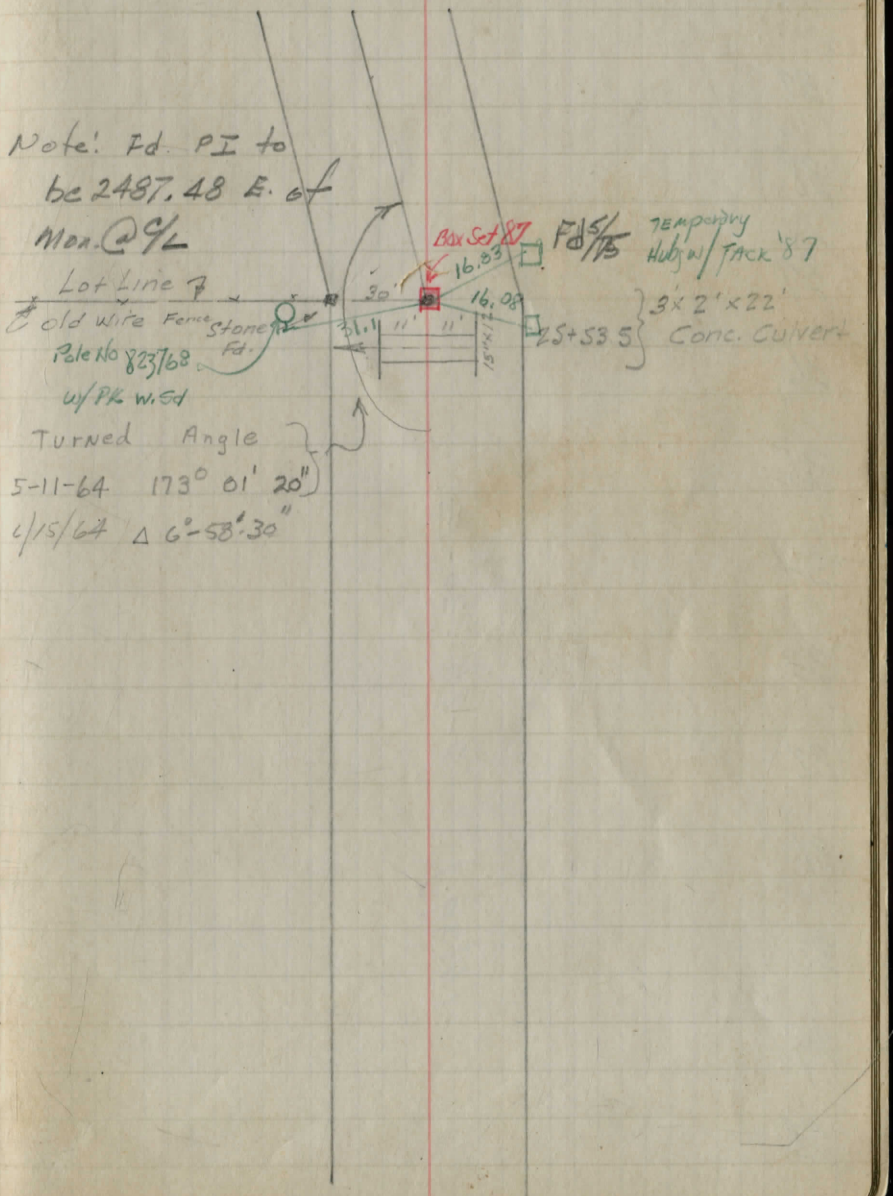
21

20

19

18

Note: Fd. PI to be 2487.48 E. of Mon. @ ℄



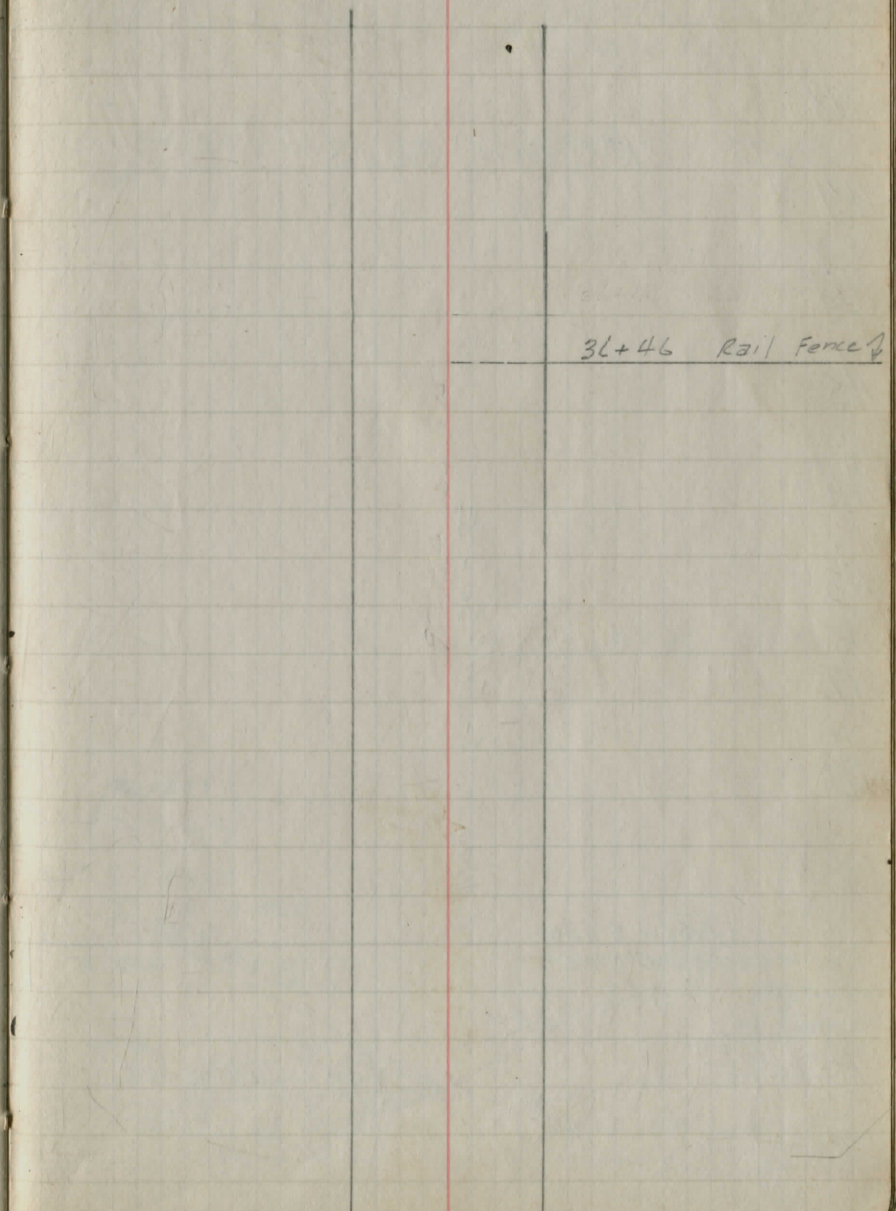
Turned Angle

5-11-64 173° 01' 20"

6/15/67 Δ 6° 58' 30"

40
39
38
37
36
35
34
33
32
31
30
29
28

(Mag.) S-84°30'-E



48

+75 15" Culvert Req'd -

47

46

45

44

43

42

41

(Mag.) S-84°-30'-E

S&W E. Side
12" Maple

4+3 24

40+42 20

S&W
W Side
12" Maple

46 86

P.O.T. I. Pipe Set

48+38

2'x4' Wood C.B.
6" Drain Tile

49+75 Ditch ℄

42+95 Fence ℄

(Re-Ref
5-9-64)

Spk E. SIDE
18" MAPLE
44.3 43 25

PK in
E. Root

Re-
*Referenced-87
Mikegraham
G. Folmer

Box Set 87

Spk E. SIDE
18" MAPLE 67 30 Hub w/ Tack 37.51

67.11

27.16

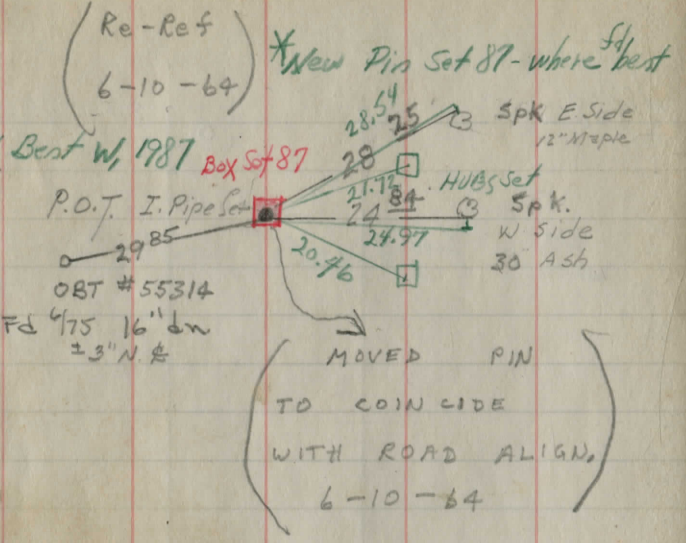
46 03

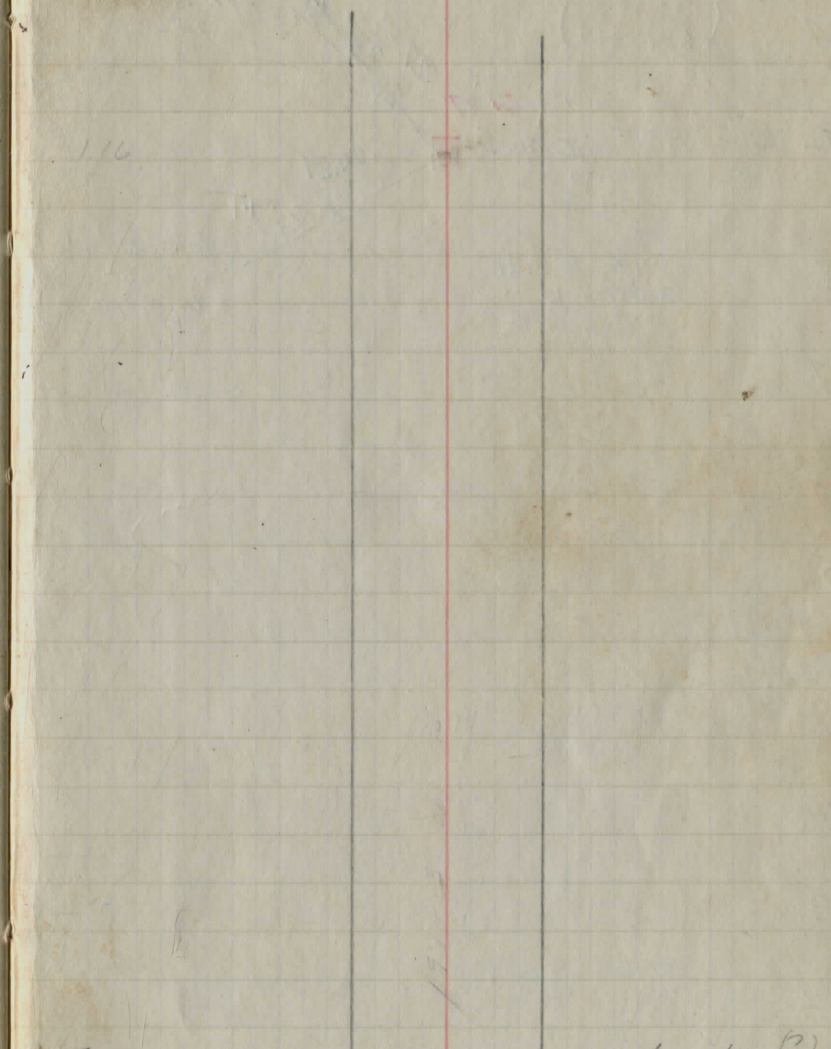
Spk.

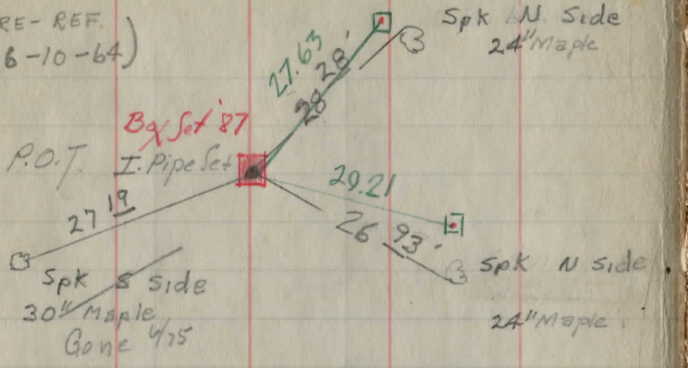
45.09'

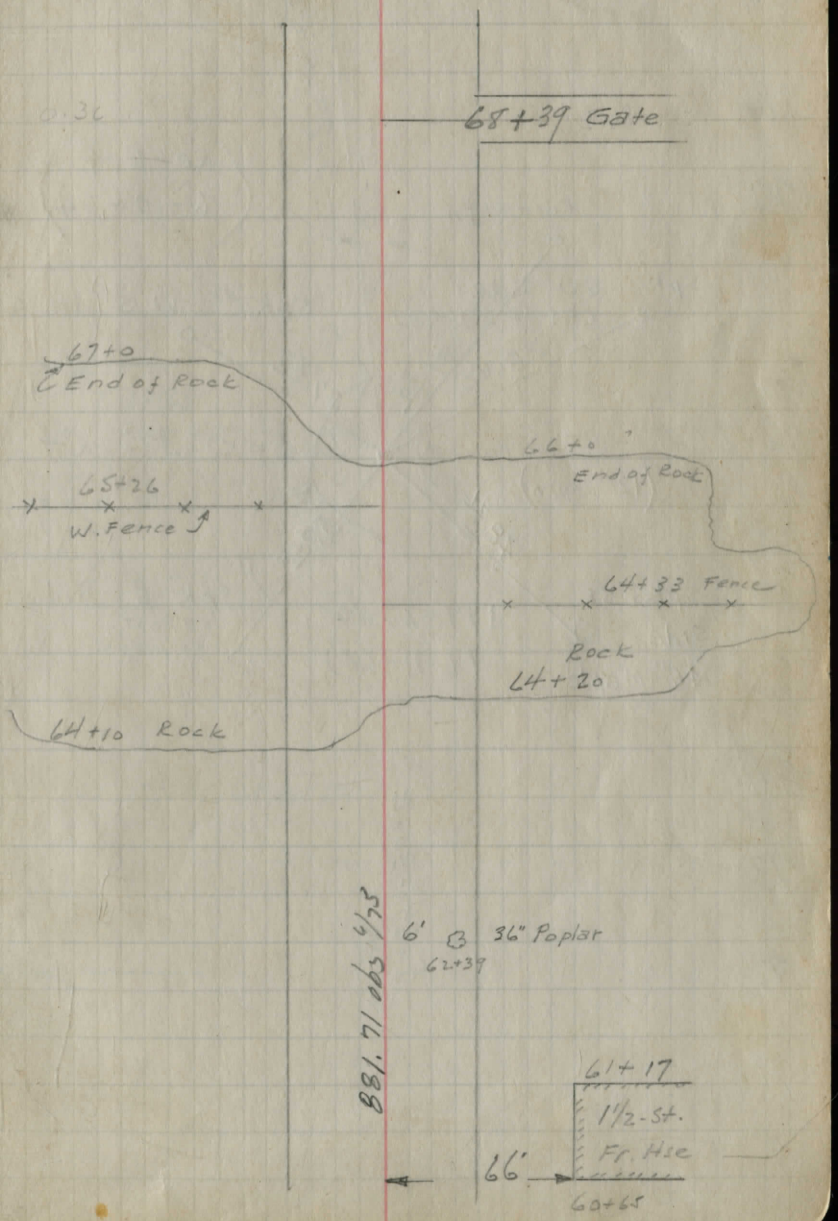
W. SIDE
18" MAPLE

I. PIPE 18" DOWN
Fd 5/75" raised
w/ large spk
to 8" dn.

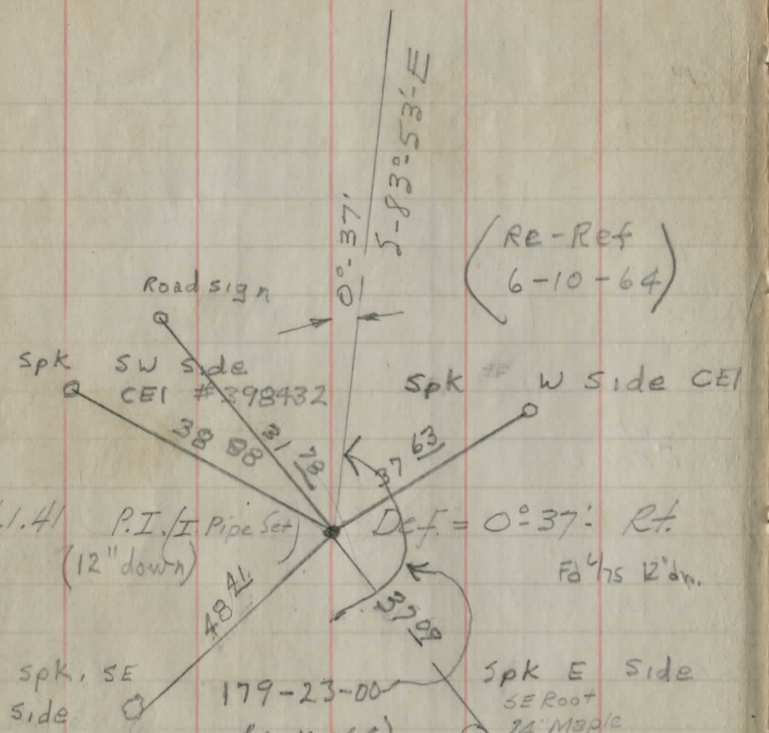

Re-Ref
6-10-64
*New Pin Set 87 - where fd best
60+0
*fd. Bent W, 1987
Box Set 87
59+58.45
P.O.T. I. Pipe Set
29.85
OBT # 55314
Fd 4/75 16" dn
±3" N. &
28.54
25.13
28
Spk E. Side
12" Maple
21.78
24.84
HUBS Set
Spk.
W Side
30 Ash
24.97
20.76
59
58
57
56
55
54
53
52
51
50
49
MOVED PIN
TO COINCIDE
WITH ROAD ALIGN.
6-10-64
Mag. S-84°30'-E

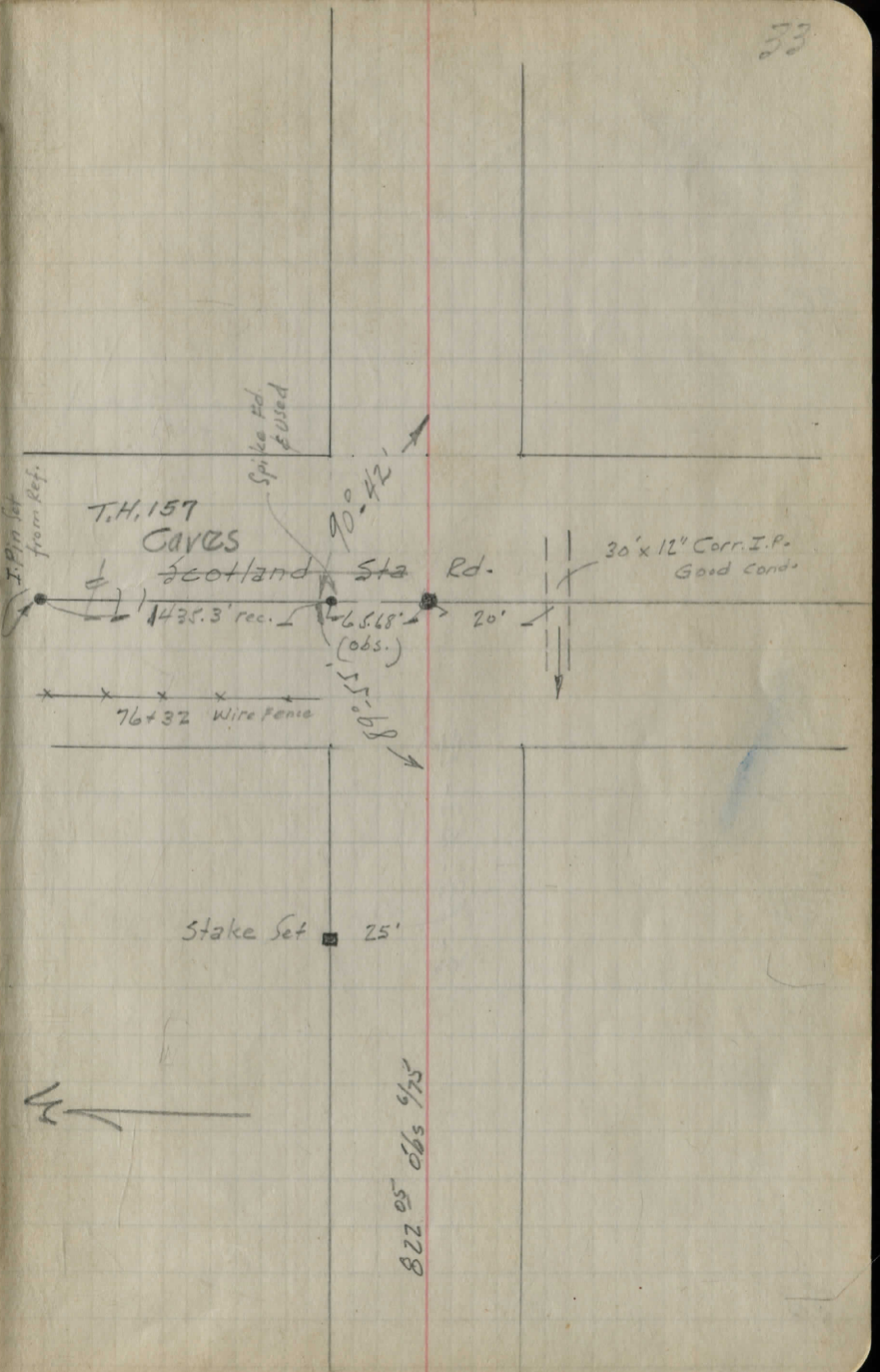

16
50+87
Rail Fence
Lot Line (?)


(RE-REF. 6-10-64)
Spk N Side
24" Maple
27.63
28.28'
Box Set '87
68+39.00 P.O.T.
I. Pipe Set
29.21
27.19
26.93'
Spk S Side
30" Maple
Gone 4/75
Spk N Side
24" Maple
S-84°-30'-E


68+39 Gate
67+0
End of Rock
66+0
End of Rock
65+26
W. Fence
64+33 Fence
Rock
64+20
64+10 Rock
881.71 obs 4/75
6' 36" Poplar
62+39
61+17
1½-St. Fr. Hse
66'
60+65

79
78
77
76
75
74
73
72
71
70





90

89

88

87

86

85

84

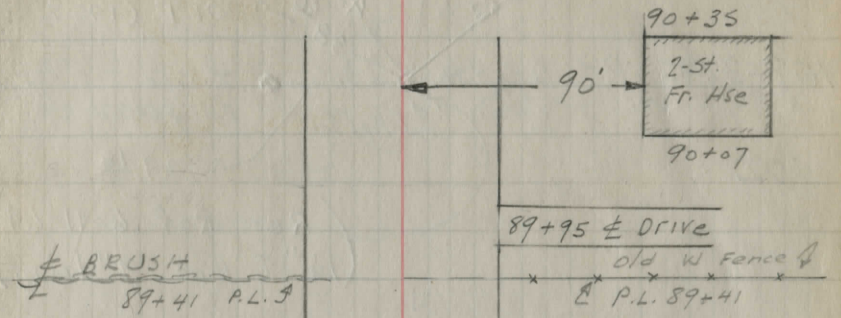
83

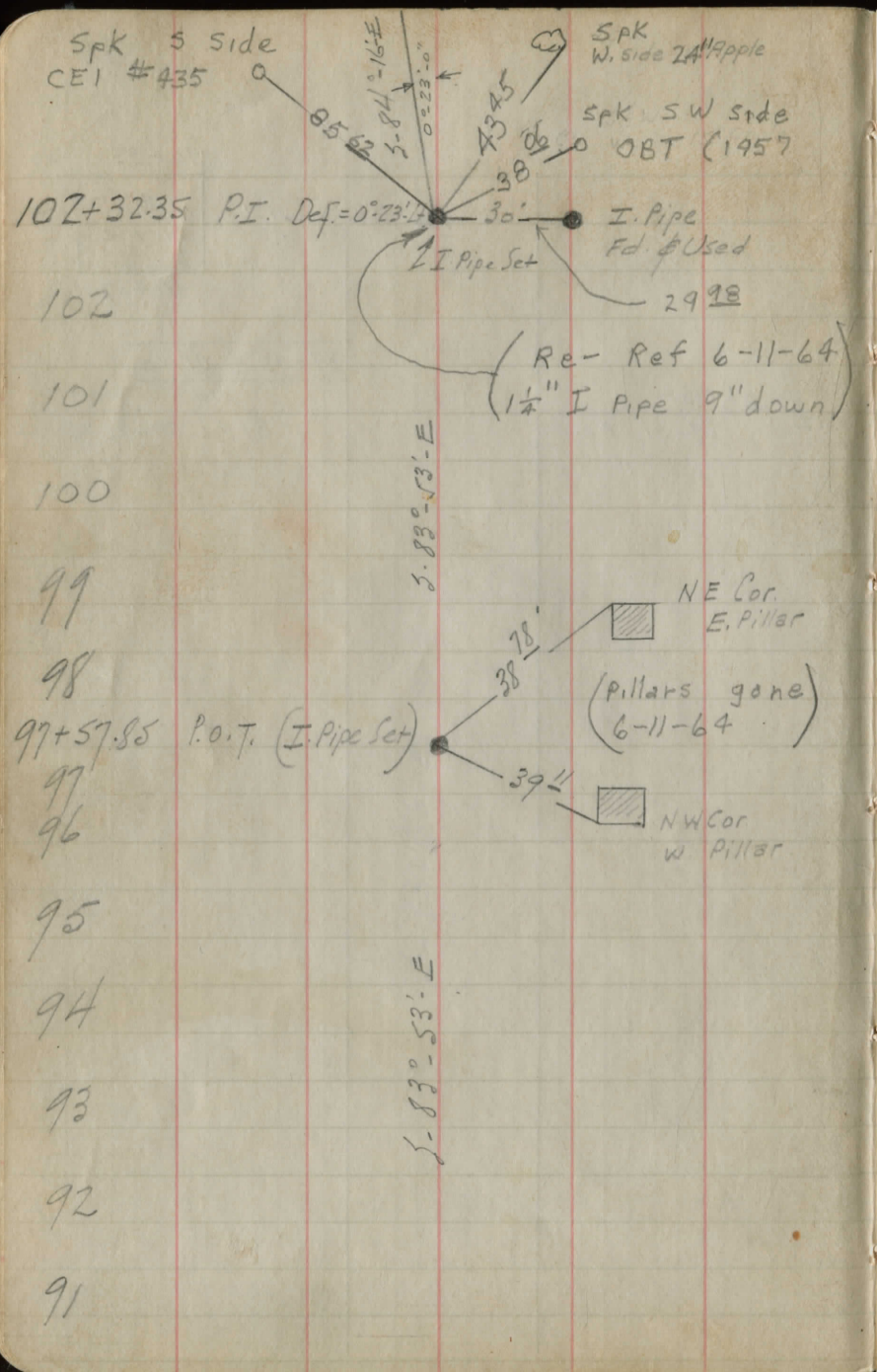
82

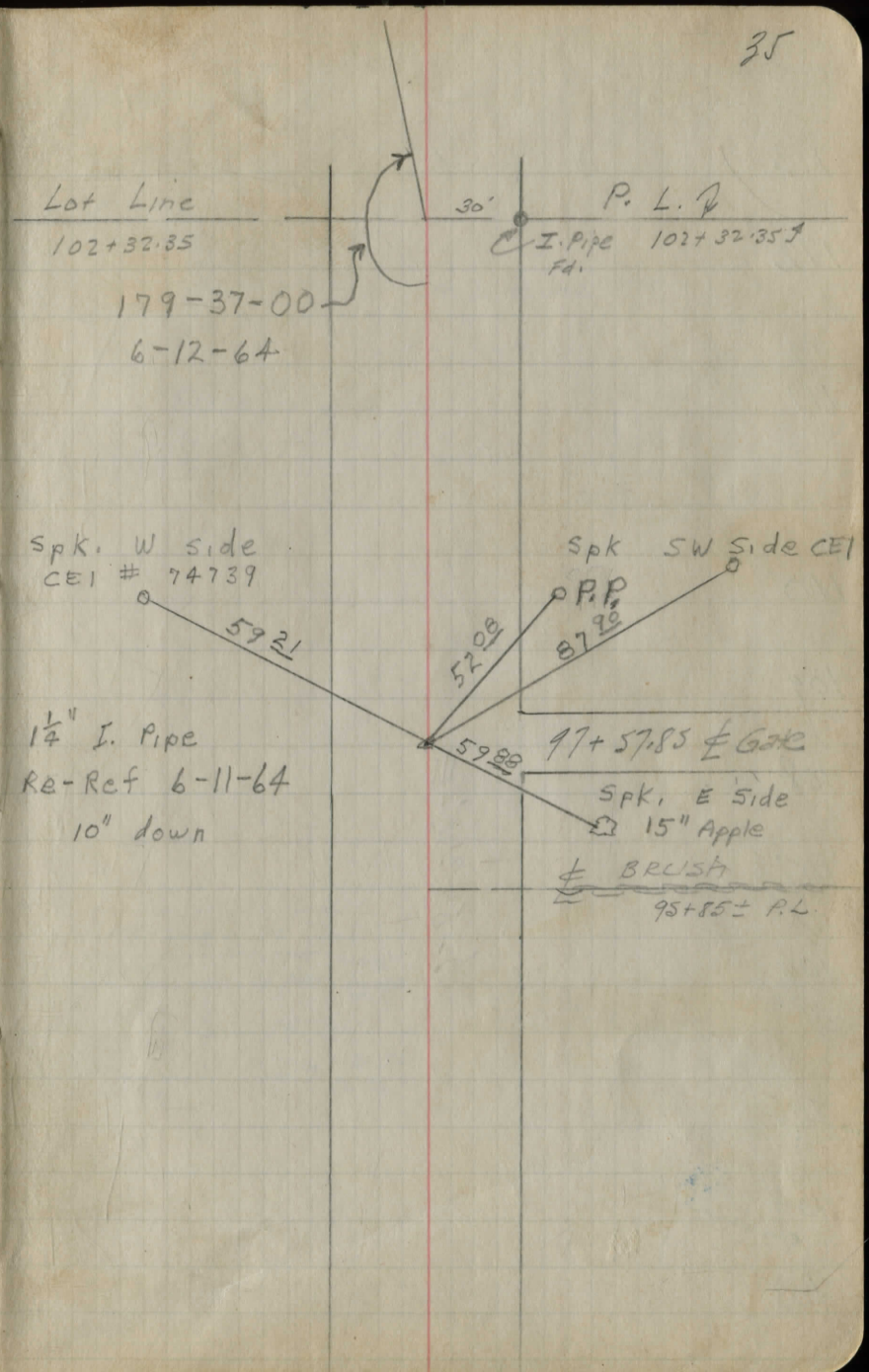
81

80

S-83° 53'-E

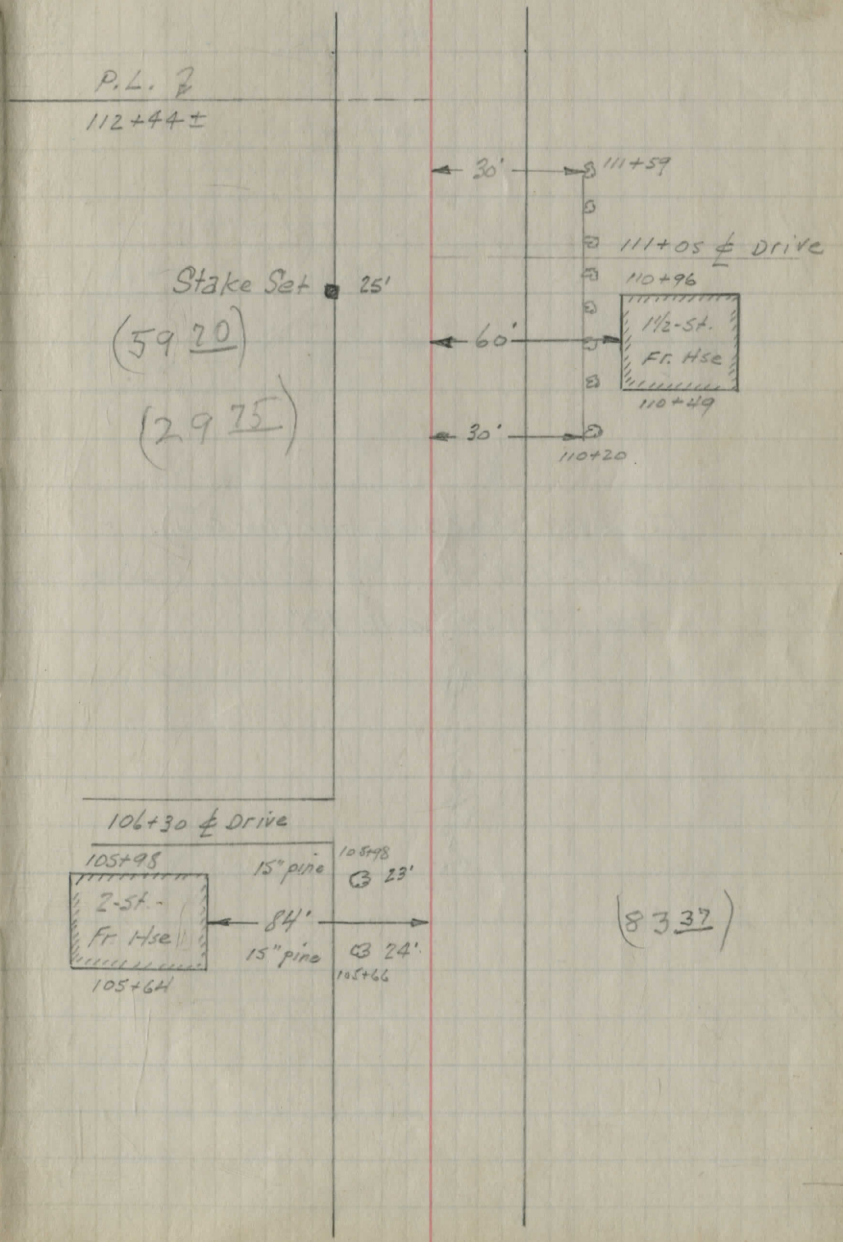



Spk S side
CEI #435
85.62
1-84½°-16'E
0°23'-0"
Spk
W. side 24" Apple
43.45
Spk SW side
OBT (1957
38.06
102+32.35 P.I. Def.=0°23'-0"
30'
I. Pipe
Fd. & Used
I Pipe Set
29.98
102
Re-Ref 6-11-64
(1¼" I Pipe 9" down)
101
100
S.88°-53'-E
99
NE Cor.
E. Pillar
98
38.78'
(Pillars gone
6-11-64)
97+57.85 P.O.T. (I. Pipe Set)
97
39.11'
96
NW Cor
W Pillar
95
94
S.-88°-53'-E
93
92
91


Lot Line
102+32.35
30'
P. L.
I. Pipe
Fd.
102+32.35
179-37-00
6-12-64
Spk. W side
CEI # 74739
59.21
Spk SW Side CEI
P.P.
52.08
87.98
1¼" I. Pipe
Re-Ref 6-11-64
10" down
59.88
97+57.85 ℄ Gate
Spk. E Side
15" Apple
℄ BRUSH
95+85± P.L.

113
112
111
110
109
108
107
106
105
104
103

S-84°-16'-E



120

119

118+40 2'x2'x22.7' Stone Box Culvert (Poor Cond.)
NOTE: Eliminate Pres. Culvert. Replace
118 Pres. 12" V.S.P. with 18"

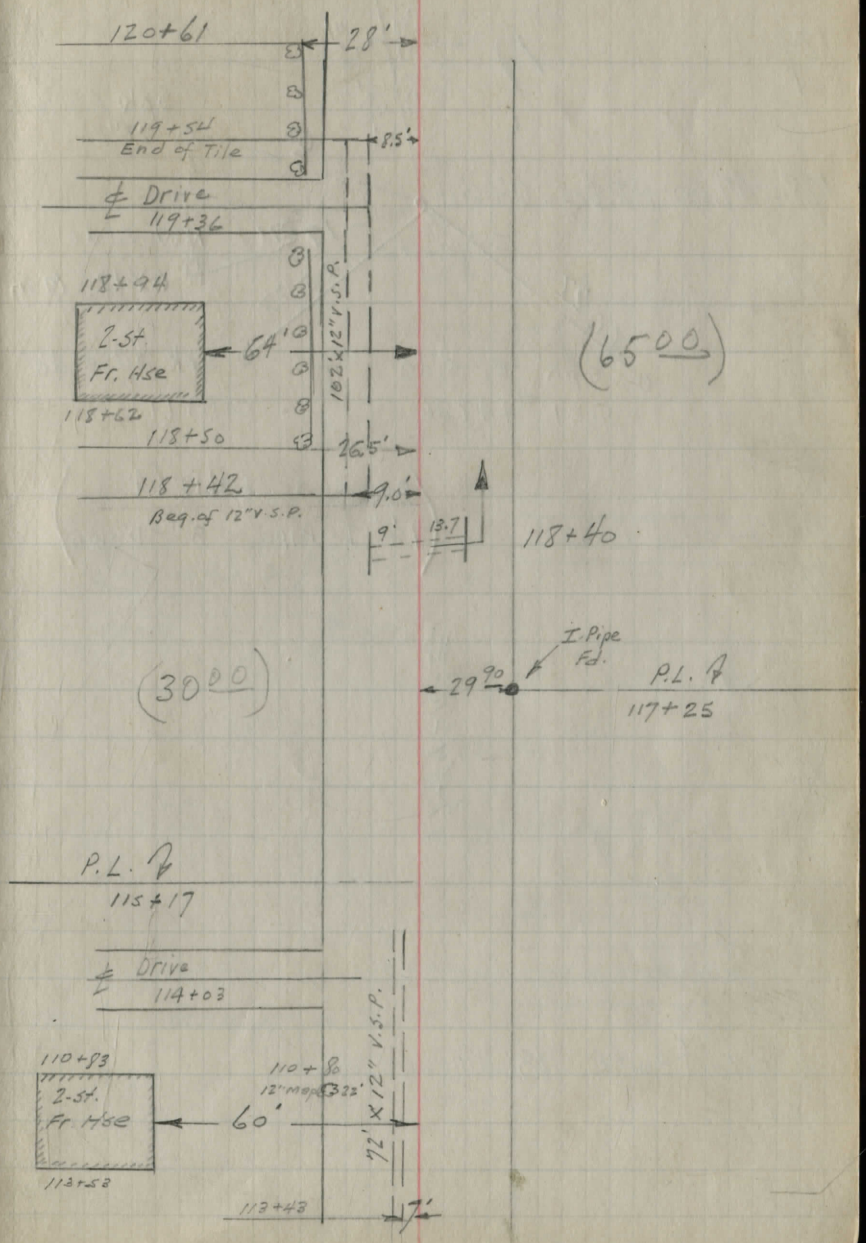
117

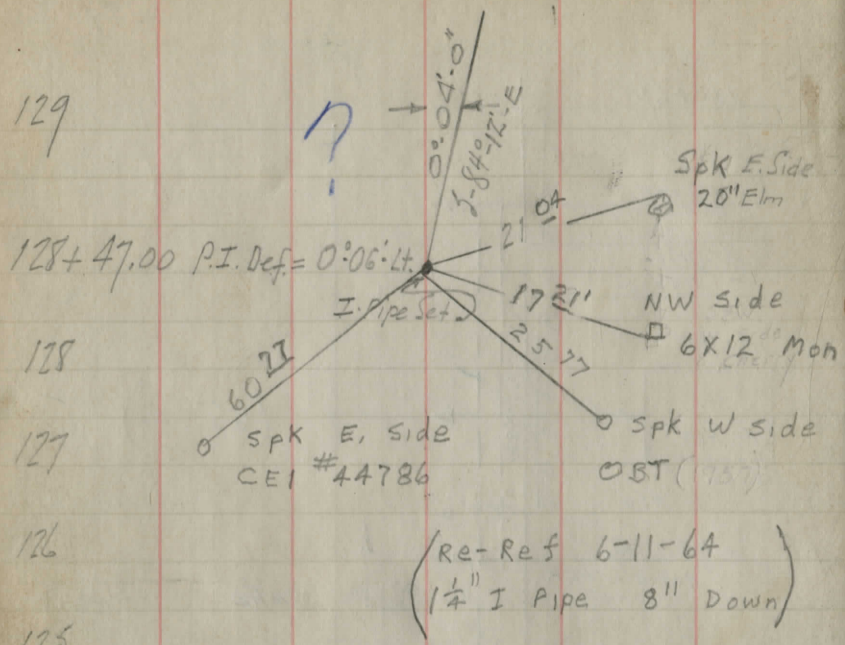
116

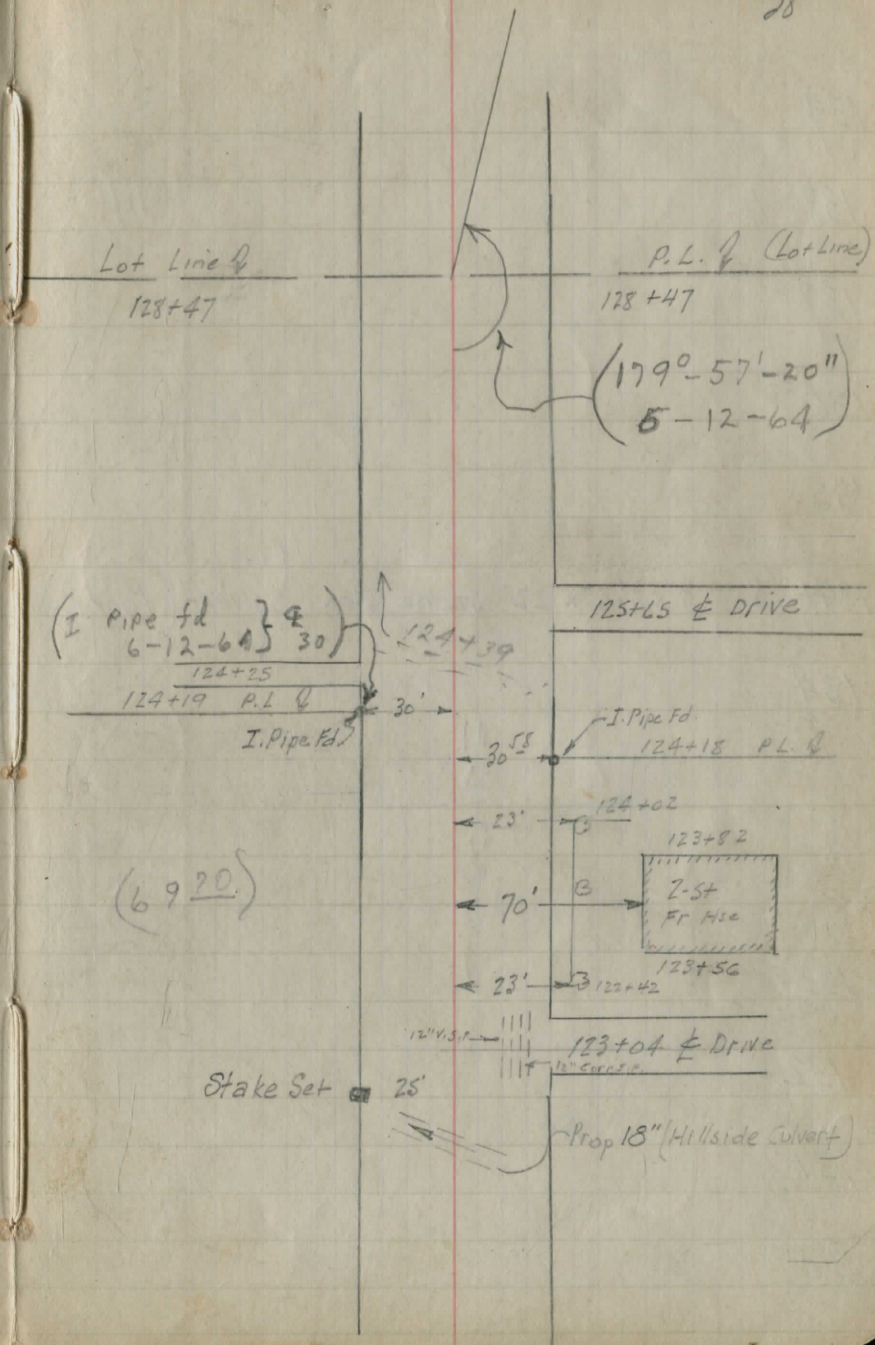
115

114

S-84°-16'-E




129
128+47.00 P.I. Def. = 0°06' Lt.
128
127
126
125
124
123
122+90
122
121
?
0°04'-0"
S-84°-12'-E
Spk E. Side
20" Elm
21.04
17.21'
NW Side
6X12 Mon
I. Pipe Set
60.21
25.77
Spk E, Side
CE1 #44786
Spk W Side
OBT
(Re-Ref 6-11-64
1¼" I Pipe 8" Down)
S-84°-16'-E
(Build 18" Hillside Culvert)


Lot Line ℄
128+47
P.L. ℄ (Lot Line)
128+47
(179°-57'-20"
5-12-64)
125+65 ℄ Drive
(I Pipe fd 6-12-64 ℄ 30)
124+39
124+25
124+19 P.L. ℄
30'
I. Pipe Fd.
I. Pipe Fd.
124+18 P.L. ℄
30.58
124+02
23'
123+82
Z-St Fr Hse
70'
123+56
23'
123+42
12" V.S.P.
123+04 ℄ Drive
18" C.S.P.
Stake Set
25'
Prop 18" Hillside Culvert
(69.70)

139

138

137

136

135

134+68 3'x2'-6"x 22' Stone Box Culvert (Poor cond)

134

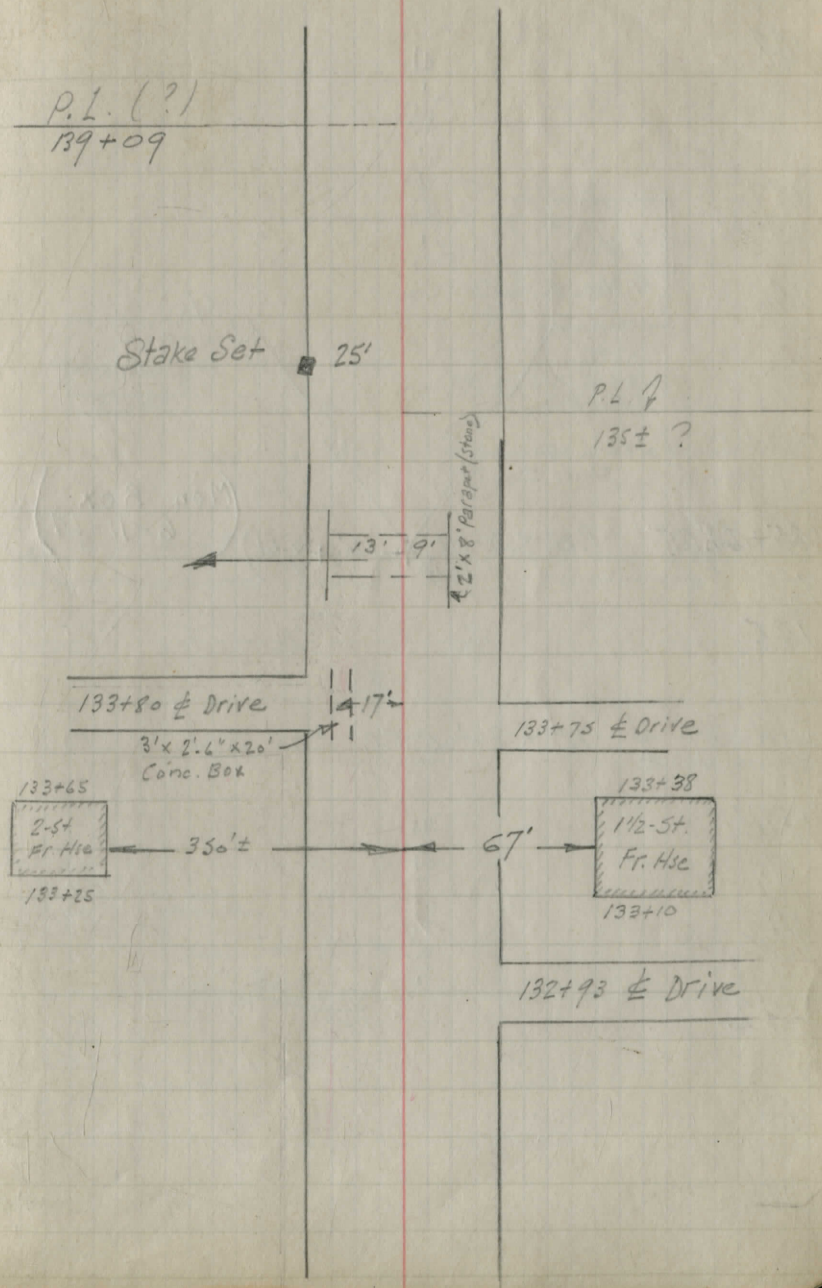
133

132

131

130

∫-84°-12'-E



148

147

146

145+25

145+04.05

145

144+87

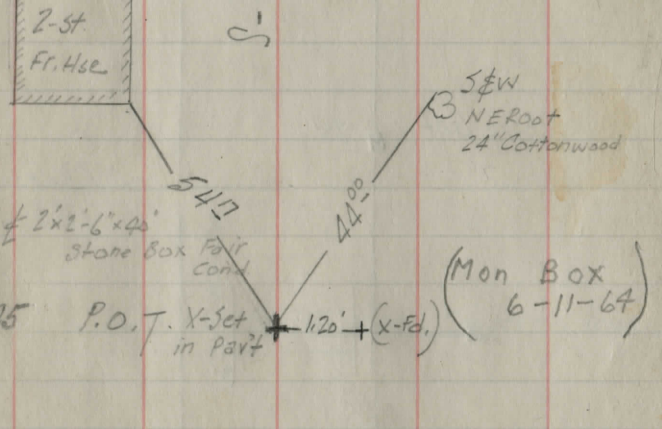
144

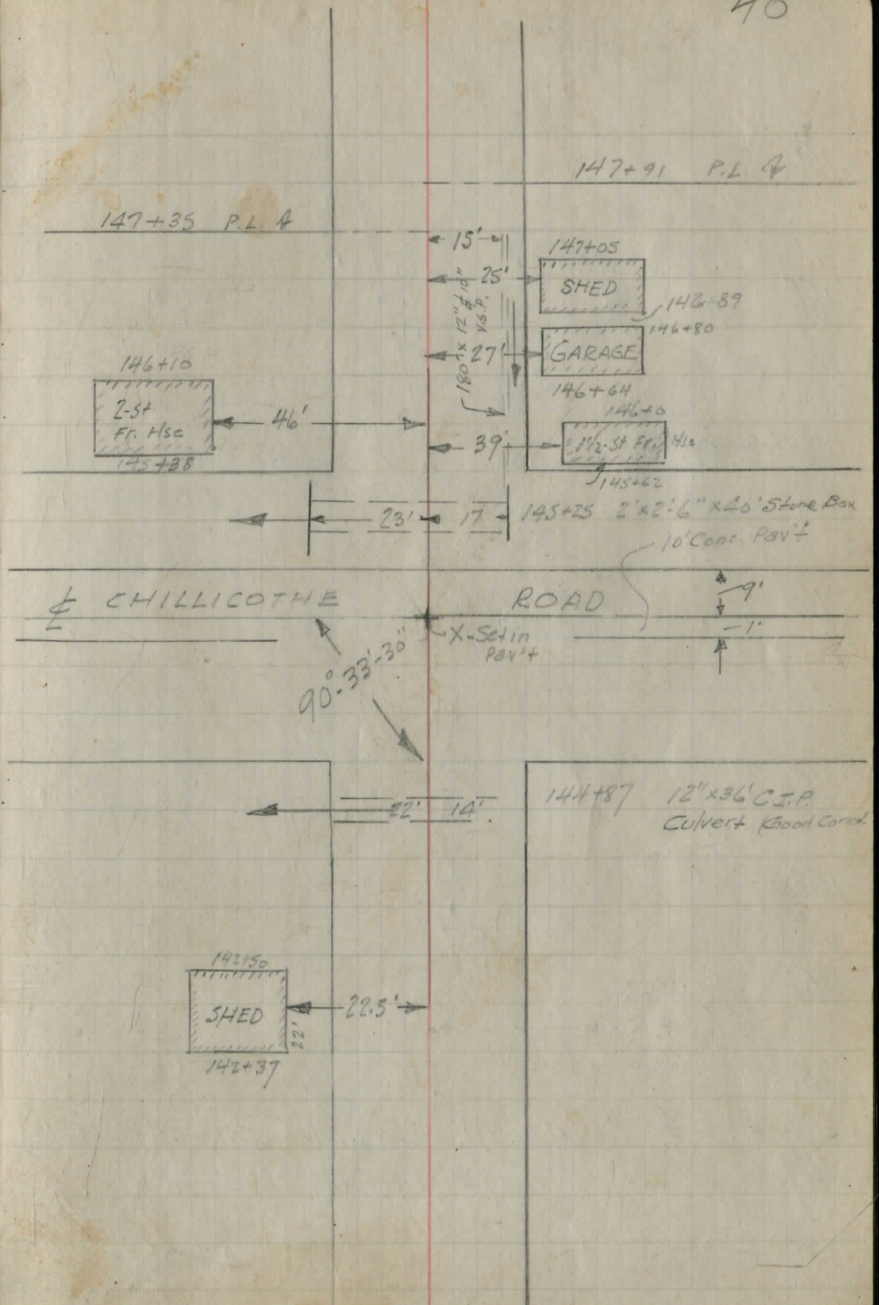
143

142

141

140





156

155 S&W W Side
24" Poplar

38.16

154+31.53 P.I. Def = 0°-27'-Rt I Pipe Set

33.0

154 S&W W Side
6" cherry

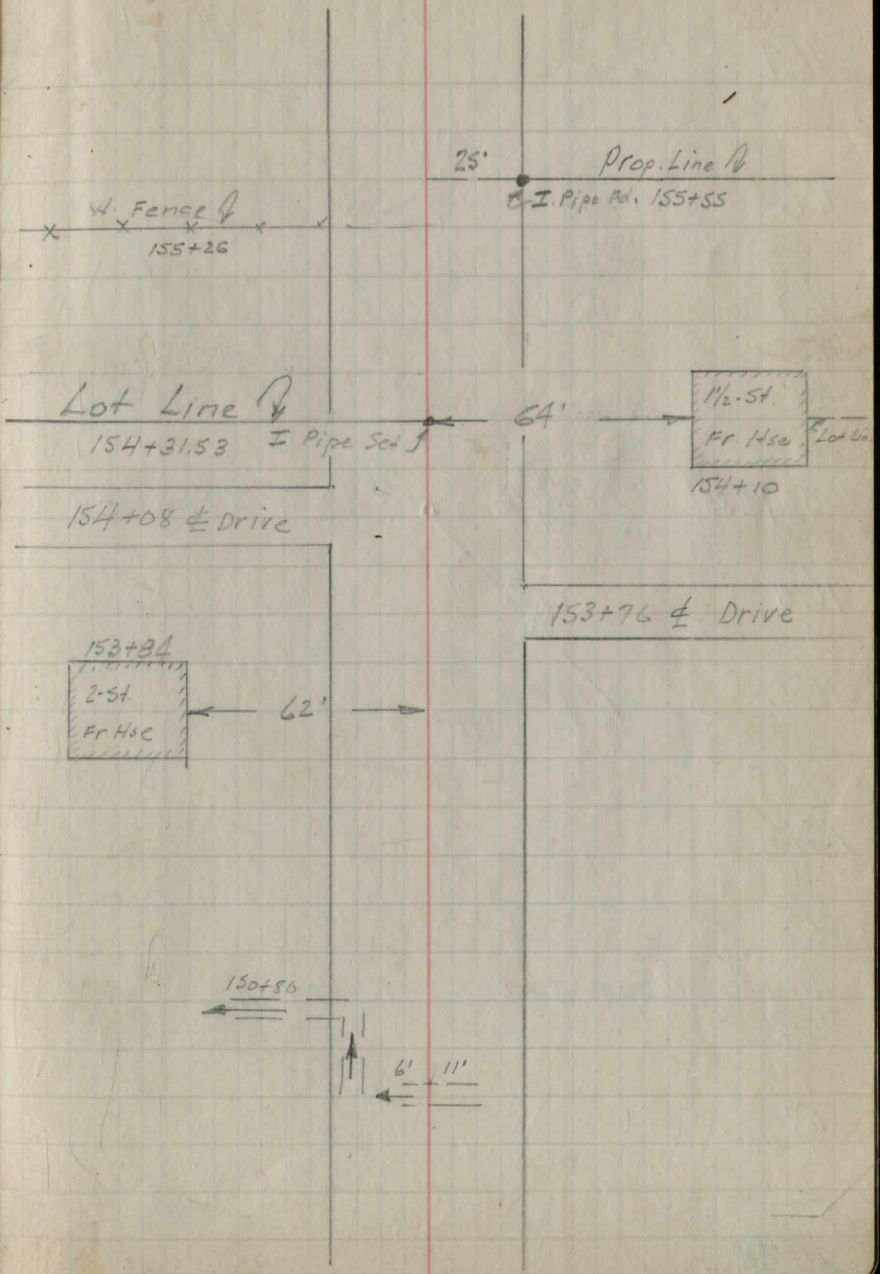
153

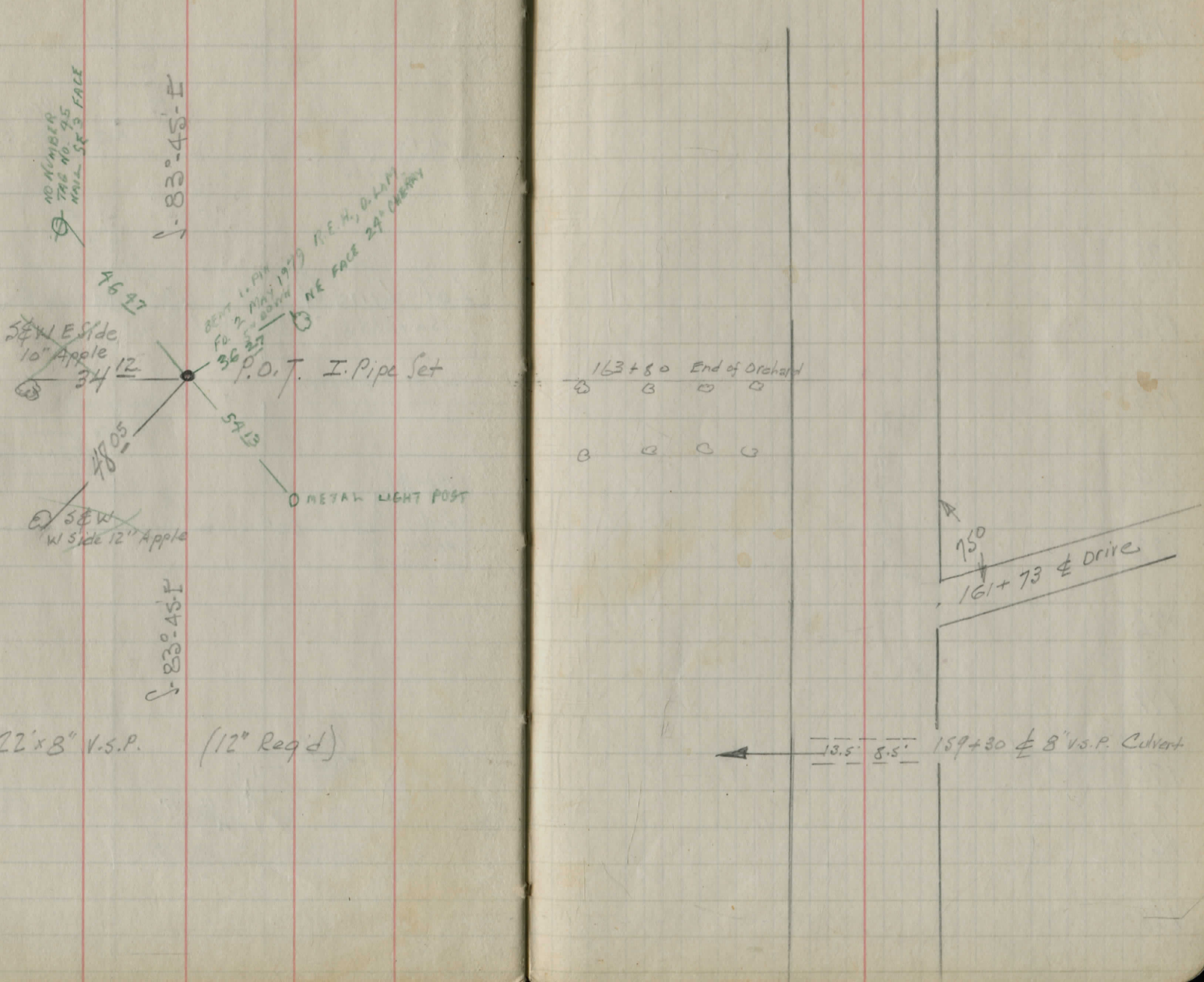
152

151

150

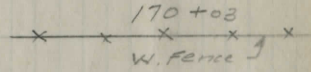
149+41 ℄ 1'-6" x 1'-6" x 17' Stone Box Culvert (Poor Cond.)
149 (24" Pipe Reqd Skew 30°)




167
166
165
164
163+79.85
163
162
161
160
159+30
159
158
157
NO NUMBER TAG NO. 95 NAIL SET 3 FACE
↓ 83°-45'-E
46.47
SET 1" PIN 2' RIGHT 1.97 FD. 36.27
R.E.H. O.LIN NE FACE 24" CHERRY
SET E Side 10" Apple 34 12
P.O.T. I. Pipe Set
S 45 E
48.05
METAL LIGHT POST
SET W Side 12" Apple
↓ 83°-45'-E
22'x8" V.S.P. (12" Req'd)
163+80 End of Orchard
75°
161+73 ℄ drive
13.5' 8.5'
159+30 ℄ 8" V.S.P. Culvert

180
179
178
177
176
175
174
173
172
171
170
169
168

S. 83°-45'-E.



187

186

185

184+54 ℄ 2'-6" × 3' × 22' Stone Box Culvert (Poor Cond)

184

183+96 Prop. Location for New Culvert

183

182

181

180+05.13 P.I. Def = 0°-19'-0" Rt.

N-83°-26'-E

0°-19'-obs.

180°-19'-obs.

90°-23'-obs.

80

I. Pipe Fd & Use

25.32

I. Pipe Fd.

5 in N Root 36" W. cherry

187+81 W Fence

187+40 W Fence

P. L. J

2.13'

13.5'

8.5'

183+96

Inlet Channel

45° ±

183+72 ℄ Drive

20' × 12" V.S.P.

12'

Stake Set

25'

182+48

11'

182+59 ℄ Drive

187+34

2-St. Fr. Hse.

100'

12" V.S.P.

187+90

181+64

Prop. Line ℄ Lot Line

180+05.13

25.32

I. Pipe Fd.

Prop. Line ℄ Lot Line

180+05.13

199

198

197

196+34.40 P.O.T. I Pipe Set

196

195

194

193

192

191

190

189

188+22

188

S&W NE Side 18" Apple

42.82

81.39'

S&W W Side 24" Apple

S 83°26' E

℄ 3' × 3' × 17' Stone Box Culvert (Poor Cond.)

℄ P.L. (occupy) 197+78 =

Stake Set 25'

Stake Set 25'

192+49 W. Fence

190+46 W. Fence

2.9'

15' 2'

208+86 ℄ 12" x 24' R.C.P. Culvert (Good Cond)

208

207

206

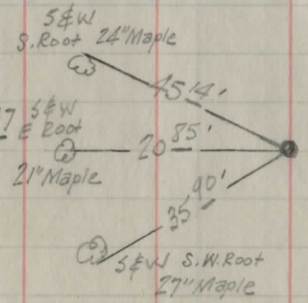
S. 83° 26' E

205

204+22 ℄ 12" x ? Corr. I. Pipe (Outlet End Caved in) 15" Pipe Req'd.

204

203



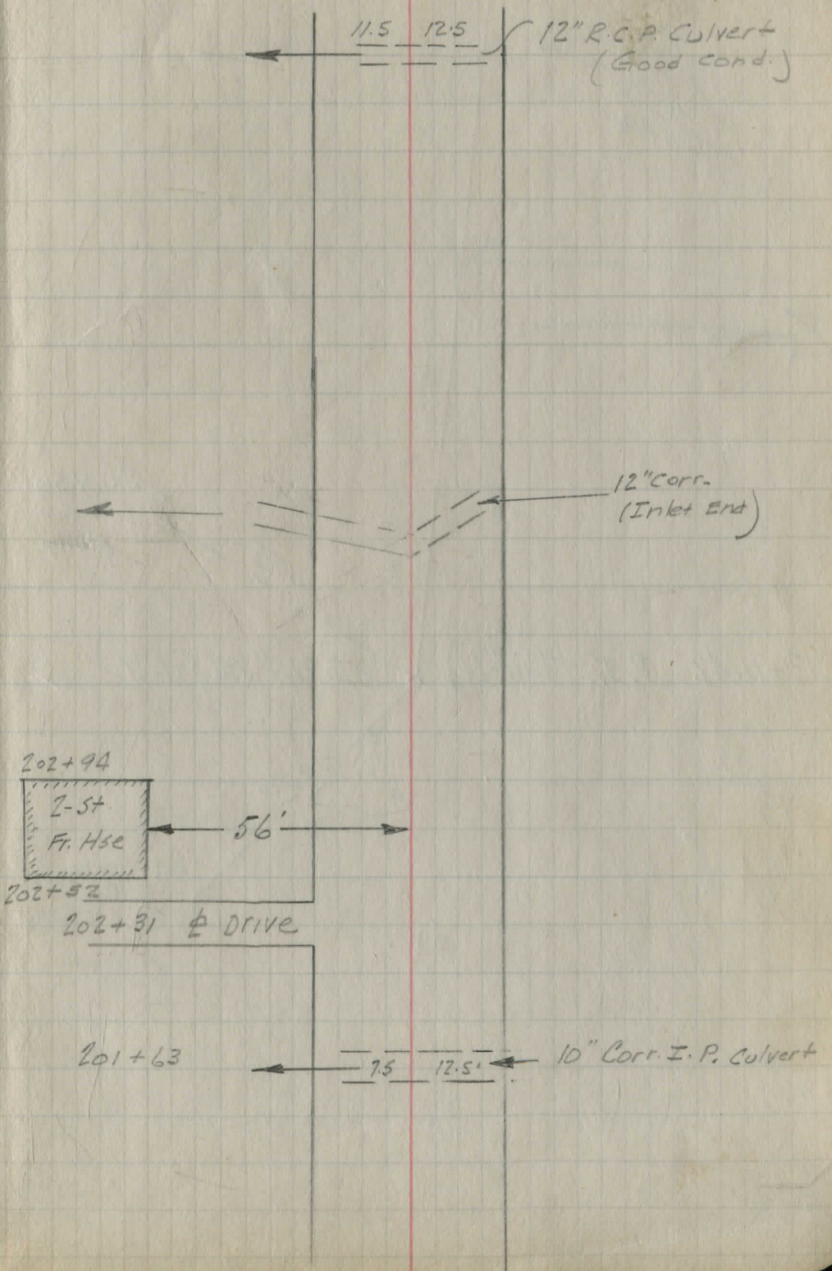
202+77 47 P.O.T. I. Pipe Set

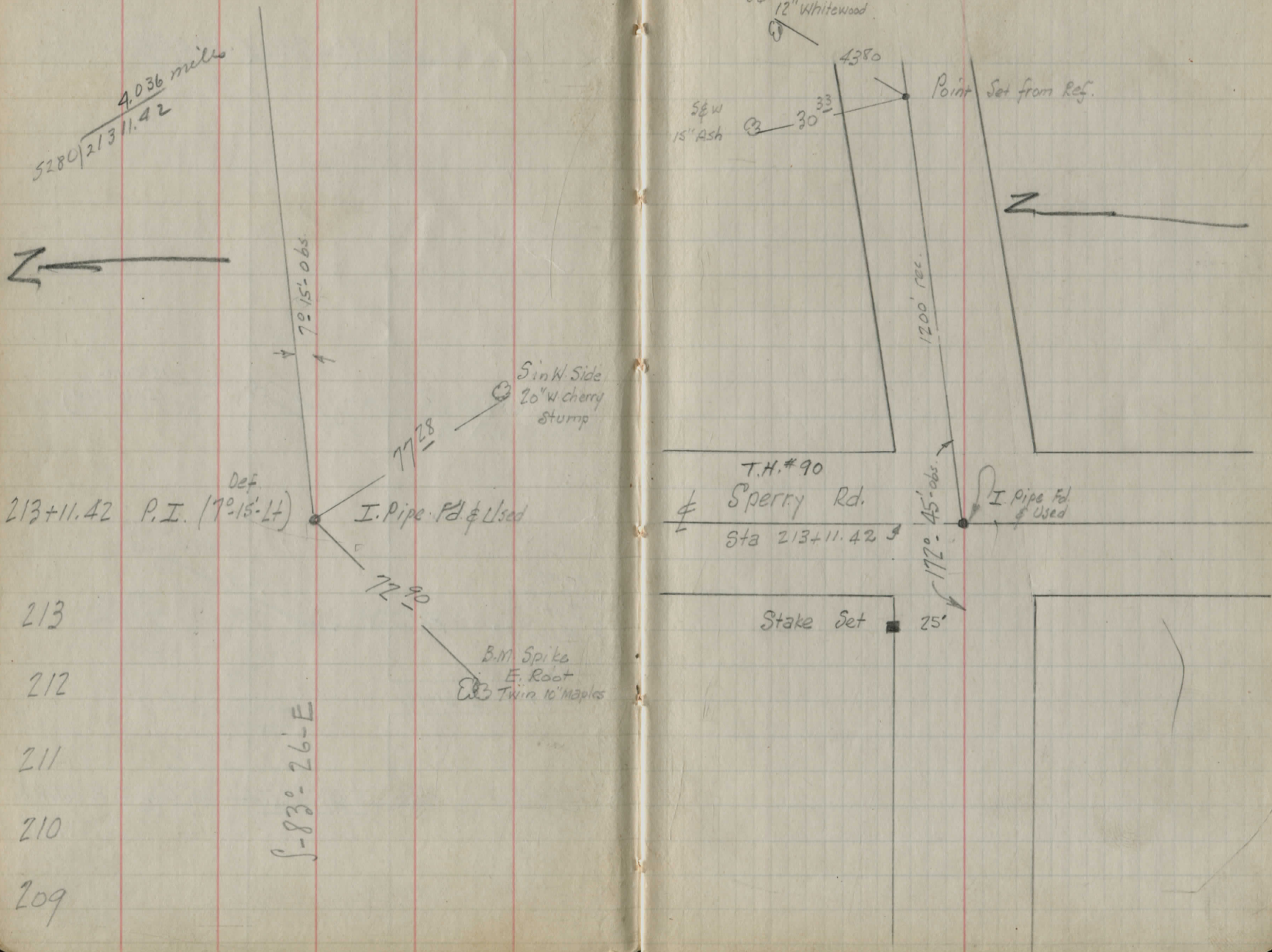
202

201+63 ℄ 10" x 20' Corr. I.P. (Plugged) 12" Req'd.

201

200

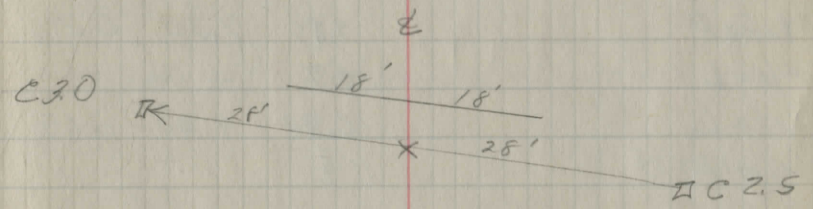



4.036 miles
5280 | 21311.42
7°15' Obs.
S in W Side
20" W cherry
stump
77.28
Def.
213+11.42 P.I. (7°-15'-Lt)
I. Pipe Fd & Used
72.90
B.M. Spike
E. Root
Twin 10" Maples
S-83°-26'-E
213
212
211
210
209
S&W
12" Whitewood
4380
Point Set from Ref.
S&W
15" Ash
30
33
T.H. #90
℄ Sperry Rd.
Sta 213+11.42
I Pipe Fd & Used
Stake Set
25'

Levels for Culvert at Sta 124+39

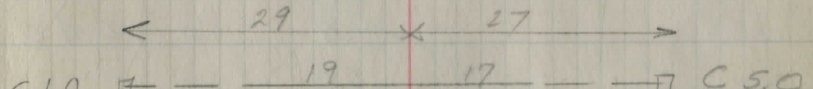
120'S on W. Line Fdtn	4.5		
65'S " " "	5.4		
℄ Road	3.0		
N Ditch	5.8		
" 100'E	6.6		
Flow R	6.0		
Grade R	5.85	3.35	C 2.5
Flow L	6.4		
Grade L	6.55	3.55	C 3.0

Sta 124+39 10° skew ±



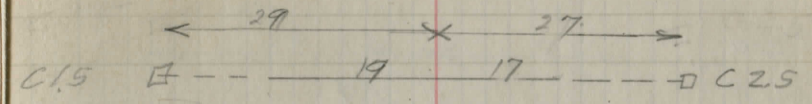
Culvert at 150+84

℄ Road	3.8		
Flow R	6.3 (53)		
Stake R	6.05	1.05	C 5.0
Flow L	8.3		
Stake L	8.55	7.55	C 1.0



Culvert at Sta 188+22

℄ Road	3.9		
Flow R	10.0		
Stake R	9.80	7.30	C2.5
Flow L	10.7		
Stake L	10.90	9.40	C1.5
channel 125' Lt	11.9		

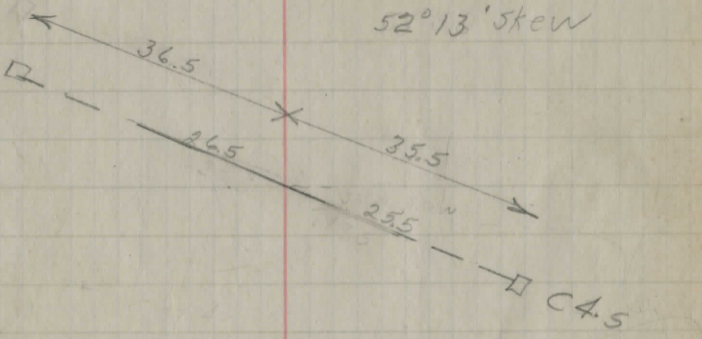


stakes set 10' from end of pipe

36" CMP

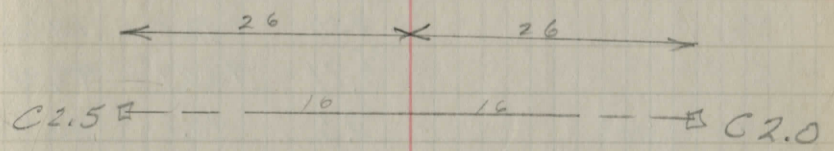
Culvert at Sta 184+54

℄ Road	5.2		
Flow R	9.7	7.9	
Stake R	9.5	5.0	C4.5
Flow L	10.3		
Stake L	10.5	6.5	C4.0



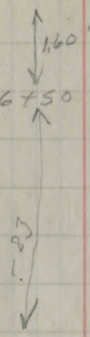
Culvert at 134+68

℄ Road	4.7			
Flow R	8.9			
Stake R	8.80	6.8	C 2.0	
Flow L	9.3			
Stake L	9.40	6.9	C.25	
Channel Lt. 100'	9.6			
200	10.9			



Ditch from Kolson to Southwick.

				Stake Elev.	Grade	Cut		
		100.00						
Flow Southwick 9+00			13.00	87.00	87.00	00		
8			9.40	90.60	88.60	2.0	2'0"	
6			6.71	93.29	91.00	2.29	2'4½"	
6+50 Channel			2.3	90.7	90.70			
4	7.89	102.42	5.47	94.53	92.66	1.87	1'10½"	
2			6.89	95.53	94.33	1.20	1'2½"	
0			6.35	96.07	96.10	OK		



9 9.07

96.0
90.5
65 55

96.00
1.67
94.33
1.67
92.66
1.67
91.00

96.1
90.7
65 5.4 83
520
200
195

90.17
87
3.17

1.58

41

63
3
189

83
3 2.50
24

1.6
25 4.0
25
150
150

Partial Topog. WARD DRIVE

7/29/49

Good crown

0+0

ditch 12' | edge metal 8' | 3+0 | edge metal 8' | ditch 13' | 53

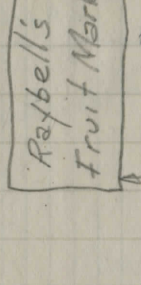
8' 2" loose slag & gravel | ℄ 4" gravel | 8' 2" grav | 3+0

1+76

end 6" tile

down ← 13' 1+60

slog drive



21' 1+03

ditch 14'

8' 3" loose slag | ℄ 1" slag 1" gravel | 8' 1" loose ℄ 6 slag | 1+0

21.5 0+37

±6" tile

inlet

0+37 15

0+30 107.4 ±6" tile 177

Use ± 25' R

turnouts

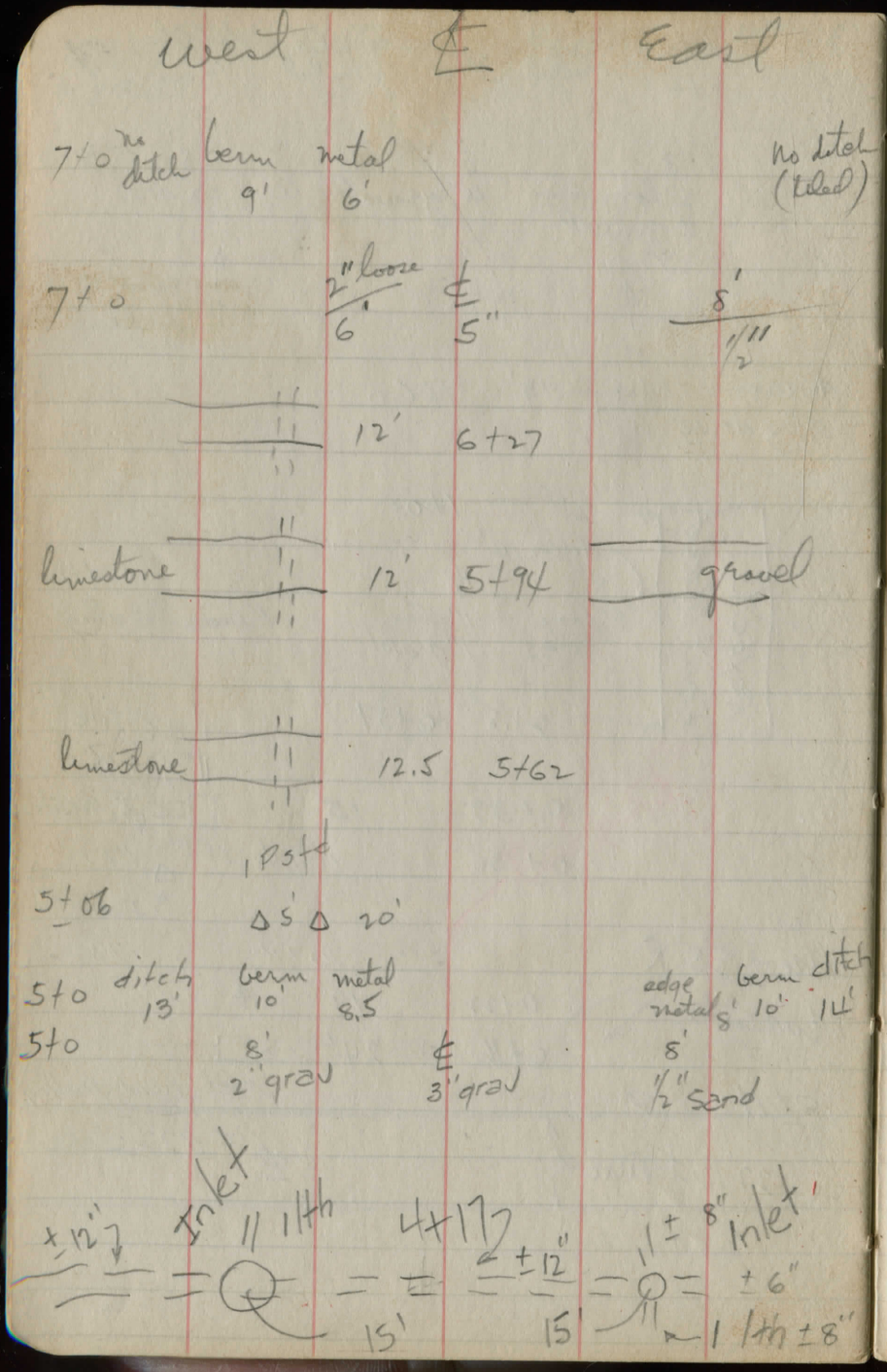
0+22 19' ≠

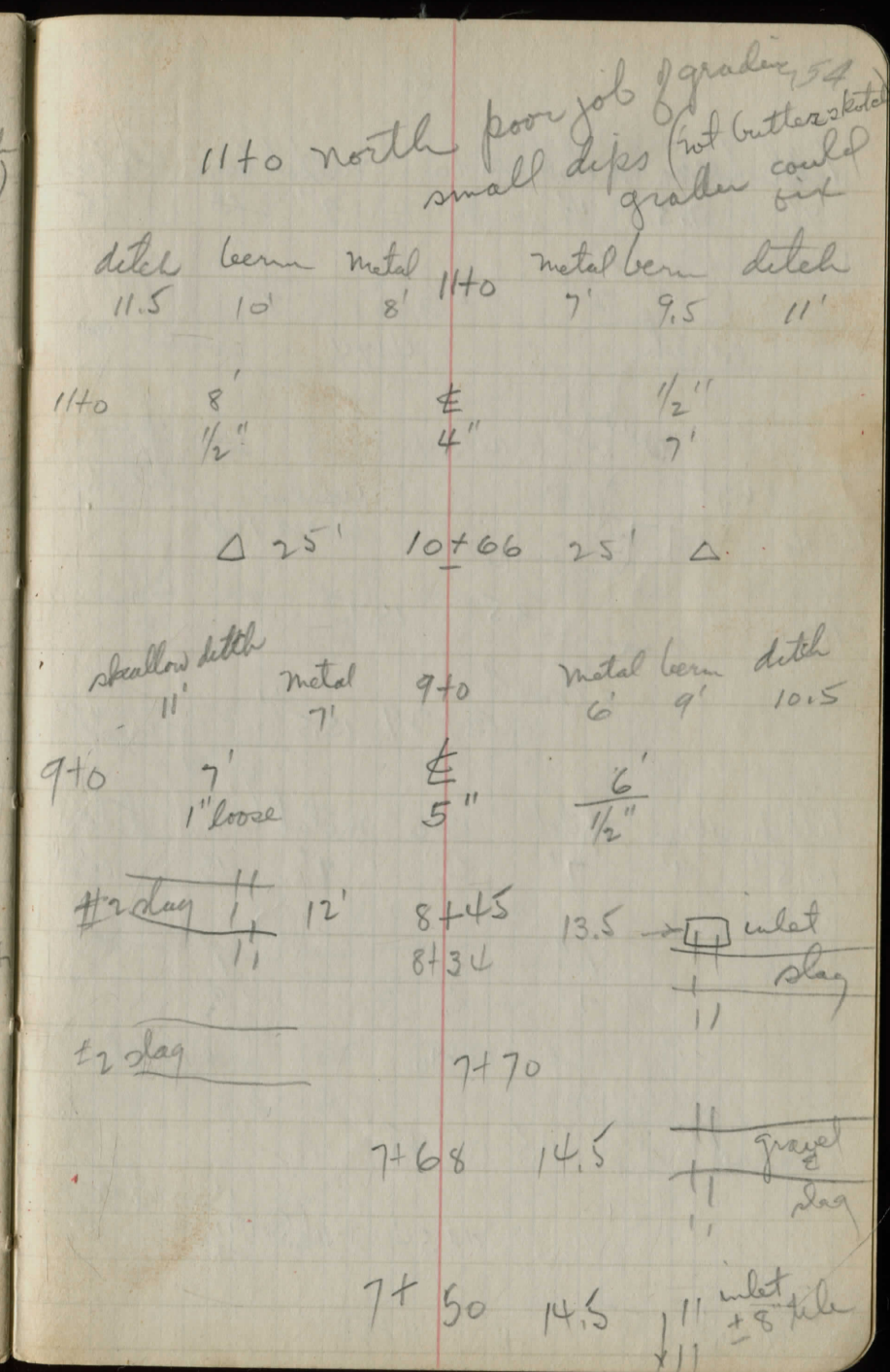
0+16 24' inlet (wood grating)

0+11

22' Bit Mac

℄ ≠ 322


West
℄
East
7+0 No ditch berm 9' metal 6'
No ditch (ideal)
7+0
2" loose
6'
℄
5"
8'
1/2"
12'
6+27
limestone
12'
5+94
gravel
limestone
12.5
5+62
Psta
5+06
Δ 5' Δ 20'
5+0 ditch 13' berm 10' metal 8.5
edge metal 8' berm 10' ditch 14'
5+0
8'
2" grav
℄
3" grav
8'
1/2" sand
±12"
inlet
11 11th
4+17
15'
15'
11 ± 8"
inlet
±6"
11th ±8"


11+0 north poor job of grader, 54 small dips (not butterskotch grader could hit
ditch 11.5 berm 10' metal 8'
11+0
metal 7' berm 9.5 ditch 11'
11+0
8'
1/2"
℄
4"
1/2"
7'
Δ 25' 10+66 25' Δ
shallow ditch 11'
metal 7'
9+0
metal 6' berm 9' ditch 10.5
9+0
7'
1" loose
℄
5"
6'
1/2"
#2 slag
12'
8+45
8+34
13.5
inlet
slag
±2 slag
7+70
7+68
14.5
gravel
slag
7+50
14.5
inlet ±8" tile

ditch berm metal 15+0 metal berm ditch
9' 7.5' 4' 9' 13' 15'

15+0 4' 9'
2" 2½" 2"

earth

14+74

14+54 open ditch

+67 bucket inlet

washes access rd

13+86 10'

13+83 8.5 15.7

8" Conc

13+29 15.5 gravel

ditch berm metal 13+0 metal berm ditch
10.5' 9' 7' 9' 13' 14.5'

13+0 1" 2" 9'
7' ½"

12+90 earth

gravel 11.5 12+45

11+54 14.5 slag

gravel 11' 11+27

21+0 to 22+0 hill should have 1' to 1.5' knocked & carried South

18" Conc

20+0

12.5 18.5

ditch berm met 19+0 met berm ditch
9' 5' 3' 9' 10' 13'

19+0 3' 2' 9'
½" ½" ½"

8'-8" 13'

8" Conc

17+96

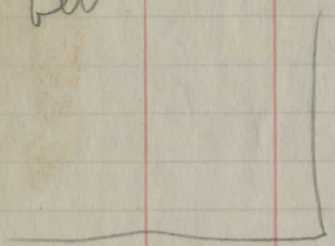
ditch berm met 17+0 met berm ditch
9'½ 8'½ 2' 10' 13' 14.5'

17+0 3" 4" 1½"
2' 3' 10'

15+53 slag

32' new Conc pipe ± 1' cover
35' SO turn to east

Why pave beyond Maple?
better not figure on it 1949



℄ Maple 23+20

2+0 ditch 8' berm 6½ berm 11½

2+0 natural gravel soil only

± 100' @ ± 10% grade

spring hole at bottom hill ± 300' W @ 306

tile!!

℄ & W graded 27
d to d North ditch
crowding valley

WARD DR.

4.05
1.75
6.2

Cut out ℄+17 Plug inlet pipes (those parallel to ℄) & make. H_2O go into top of catch basins build up road side of inlets (C.B) with ± 1 layer conc block

Sta. 17±75 Fill dip from both sides (cut slightly N&S

Cut out 13±83
BM 9.22 100.00

Place cut at ±14+45 & open ditch ± N 80° W

top "outlet tile in C.B. 13±76

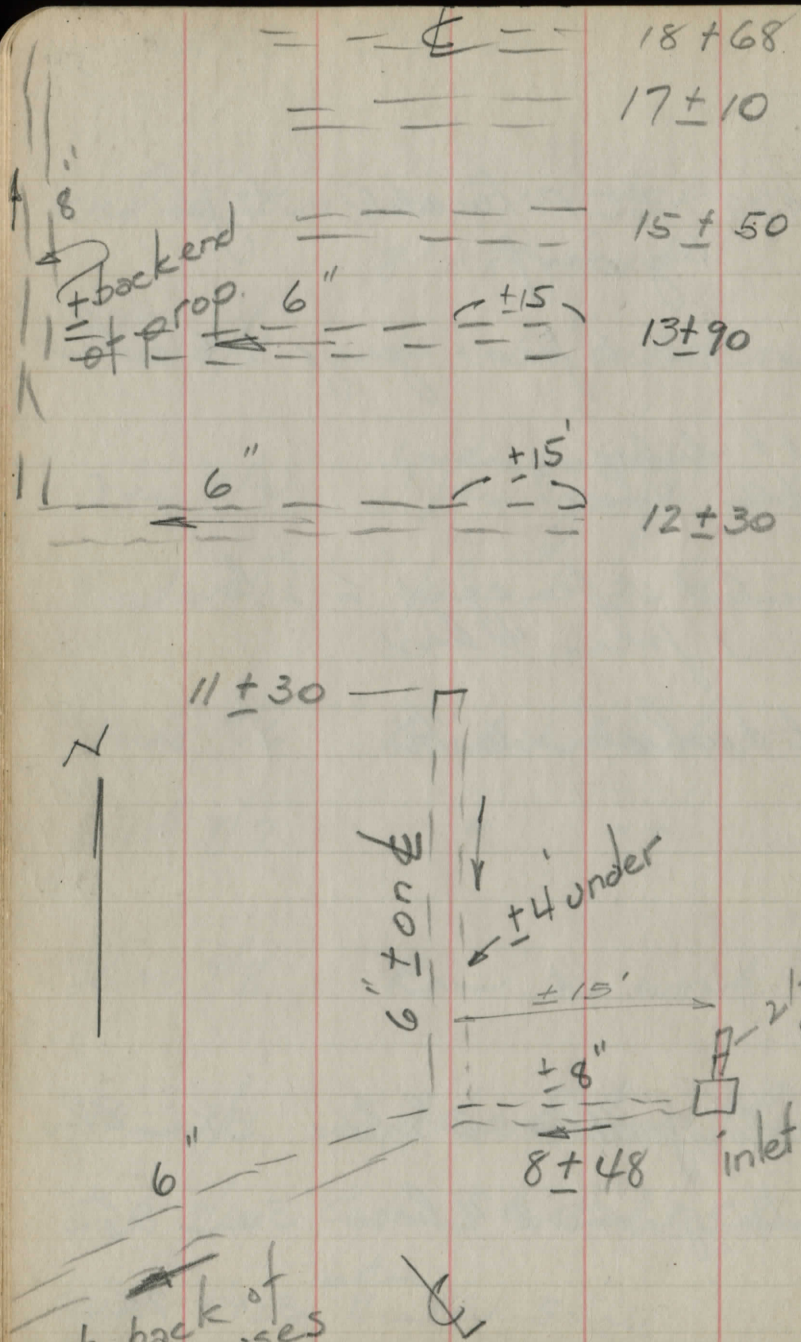
℄	13+0	3.9	W marg	13+0	4.5
"	14+0	4.3	"	14+0	5.6
"	14+50	4.45	"	+50	5.45
"	15+0	4.0	"	15+0	5.1
"	16+0	3.1	"	16+0	3.9

100' W. of marg.

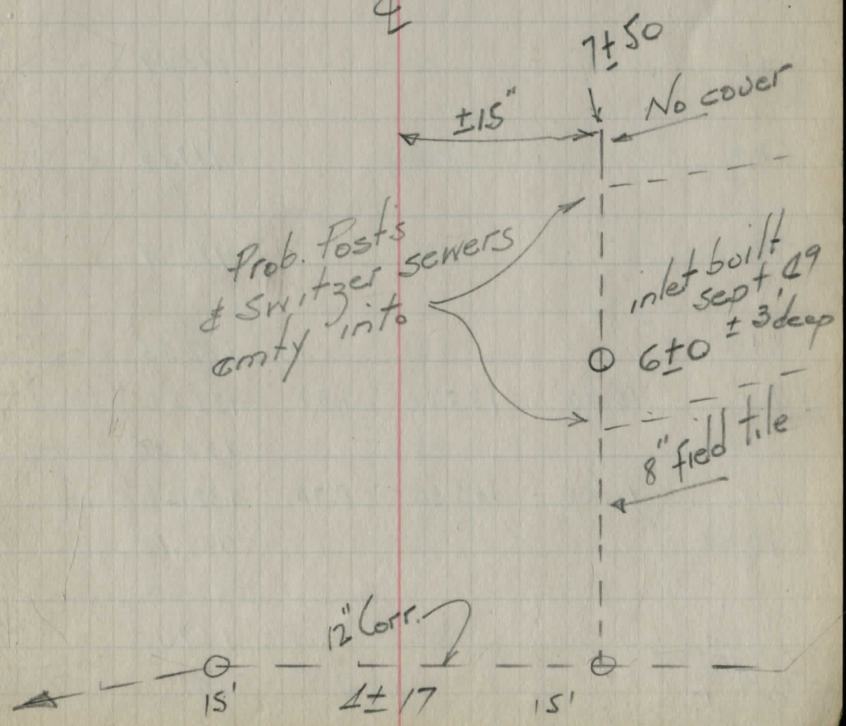
13+0	7.5
13+45	8.05
13+80 existing ditch	7.85
14+0	7.1
14+50	7.3

HARD DRIVE

Wed	8/31	32'×15" RCP & 8'×8" used	8'×18" R.C.P. trucked onto job by Emp.
Thurs	9/1	8'×18" culvert extension	1 pce equip ± 6½ hrs
Fri	9/2	(motor grader) 1 pce equip 8 hrs	cat & wheeler 1 pce 4 hrs
Sat	9/3	placed 32'×15" pipe	culvert 1 pce equip 6½ hrs 1 pce 4 hrs
Mon	9/6	Grader 6½ hrs	cat & wheeler 6½
Wed	9/7	" "	" " "
Thur	9/8	Rain no work	
Fri	9/9	Cat & wheeler 7 hrs	Motor grader 6½ hrs 3 men 8 hrs
Sat	9/10	Cat and Euclid ± 5 hrs	Motor grader ± 4 hrs 3 men 8 hrs
Mon	9/12	moter Grader 5 hrs	3 " 7 hrs
Tues	9/13	Mot grader ± 4 hrs	2 men ? hrs



Approx. Sewer Lines Existing Ward Dr. Sept '49



June 11 1959
Hot 90°
H. Pa Harvar
P. Young
D. Ridenour

Cedar Rd Sec A.

B.M.'s - Profile of X Sec.

	+	HI	-	Elev Assumed		N ℄ S
BM #1	11.23	111.23		100.00	I.P. in	Mon box Int. County line Rd & Cedar
0+0				100.70		10.53
1+0				103.83		7.40
2+0				105.23		6.00
3+0				108.13		3.10
TP	11.99	123.09	0.13	111.10		
4+0				111.84		11.25
5+0				115.09		8.00
6+0				117.69		5.40
7+0				120.09		3.00
8+0				122.45		.64
TP	10.70	133.20	0.59	122.50		
9+0				126.30		6.90
TP	11.55	143.85	0.90	132.30		
10+0				133.15		10.70
11+0				139.15		4.70
BM #2			1.73	142.12 ✓	Hart.	SPK. N. side C.E.I. # 578627

		143.86					
12+0				143.38			0.48
TP	9.99	153.40	0.45	143.41			
13+0				145.35			8.05
14+0				147.60			5.80
15+0				149.53			3.87
16+0				150.07			3.33
17+0			~~8.85~~	146.95 ~~144.55~~			6.45
TP	4.36	148.91	8.85	144.55			
18+0				139.11			9.80
19+0				133.41			15.5
20+0				133.71			15.2
21+0				140.76			8.15
22+0				144.01			4.90
BM #3			0.31	148.60 ✓	Hort.	Spk S. side 6" Whitewood	45' Lt Sta 21+0
TP	3.23	151.63	0.51	148.40			

June 13-1939
Cool 70°
Patterson
P. Young
D. Ridenour

	+	151.63				
TP	2.03	142.41	11.25	140.38		
BM #2			0.29	142.12	✓	
T.P.	0.03	131.13	11.31	131.10		
T.P	0.26	119.85	11.61	119.52		
TP	1.77	109.81	11.74	108.04		
BM # 1			9.81	100.00	✓	
BM #3	0.32	148.92		148.60	✓	
TP	4.77	142.48	11.21	137.71		
BM #A			9.85	132.63	✓ Lead	Top Spk. SE ∠ S. Hwl. Culvt. Sta 25+05 12' Rt
T.P	11.69	152.15	2.02	140.46		
T.P	11.94	163.01	1.08	151.07		
TP	11.15	173.24	0.92	162.09		
T.P	10.56	182.33	1.47	171.77		
BM #5	3.07	182.23	3.17	179.16	✓ R.P.	SPK. S. Side 28" Beech 30' Lt ∠ Sta. 31+50
T.P.	0.52	170.94	11.81	170.42		
T.P.	0.03	159.42	11.55	159.39		
T.P.	0.27	148.63	11.06	148.36		
T.P	0.90	138.03	11.50	137.13		
BM #A			5.40	132.63	✓	
T.P.	10.12	147.49	0.66	137.37		
TP	5.72	148.85	4.36	143.13		
BM #3			0.25	148.60	✓	
BM #5	3.17	182.33		179.16	✓	
T.P.	11.35	192.20	1.48	180.85		

6-15-59
Cool 65°
H. Patterson
P. Young
D Ridenour

	+	HI	−	Elev		
		192.20				
TP	11.98	203.60	0.58	191.62		
TP	3.79	205.52	1.87	201.73		
BM #6			6.12	199.40	Hort. Spk	SE Side Quad Ash clump 72' Lt Sta. 41+55 also is NW & Int. Cedar & Woodcrest Ln.
TP	10.01	215.35	0.18	205.34		
BM #7	4.62	216.34	3.63	211.72	Hort. Spk	S. side 16" Trip Whitewood 33' Lt Sta. 49+30
TP	5.64	219.42	2.56	213.78		
BM #8			3.37	216.05	Hort. Spk	S. side CEI# 593619 31' Lt Sta. 58+81
T.P.	3.10	216.57	5.95	213.47		
BM #7			4.85	211.72		
T.P.	2.39	213.22	5.74	210.83		
T.P.	4.41	206.12	11.51	201.71		
BM #6	5.70	205.10	6.72	199.40		
TP	0.44	198.38	7.16	198.94		
TP	0.35	188.65	10.08	188.30		
TP	2.40	182.50	8.55	180.10		
BM #5			3.34	179.16		
BM #8	1.00	217.05		216.05		
TP	1.65	208.82	9.88	207.17		
TP	2.06	202.20	8.68	200.14		
T.P.	0.02	192.99	9.23	192.97		
BM #9	9.92	195.00	7.91	185.08	SE &	S. Hdwl Culvt. Sta 69+50
T.P.	10.12	203.16	1.96	193.04		
T.P.	11.38	212.20	2.34	200.82		
TP	11.96	222.79	1.37	210.83		
BM #10			6.35	216.44	Hole	2" above V Cut in Boulder SW & Int. Caves & Cedar Rd

6-16-59 Cool! Rain showers
H. Patterson 60°
P. Young
D. Ridenour

	+	HI 222.79	+	Elev		
T.P.	0.37	211.40	11.76	211.03		
T.P.	1.71	201.38	11.73	199.67		
T.P.	0.46	190.44	11.40	190.98		
B.M.#9			5.36	185.08		
T.P.	10.08	197.39	3.13	187.31		
T.P.	8.87	203.63	2.63	194.76		
T.P.	10.06	211.46	2.23	201.40		
T.P.	8.65	218.36	1.73	209.83		
B.M.#8			2.33	216.05		
B.M.#10	10.97	227.41		216.44		
T.P.	11.86	238.81	0.46	226.95		
	10.53	248.30	1.04	237.77		
B.M.#11			0.69	247 ~~61~~ 58	Hort.	R.P. Spike N.W. side W. Cherry 28' Rt. Sta. 81+52
T.P.	0.36	242.13	6.53	241.77		
T.P.	0.22	230.74	11.61	230.52		
T.P.	0.59	220.38	10.95	219.79		
T.P.	0.24	208.86	11.76	208.62		
T.P.	0.65	198.74	10.77	198.09		
T.P.	0.70	188.50	10.94	187.80		
T.P.	0.67	177.52	11.65	176.85		
T.P.	0.84	166.51	11.85	165.67		
B.M.12	4.03	161.04	9.50	157.01	X Cut	in N.W. & N Hdwl. Culvt. Sta. 93+58
T.P.	9.97	168.51	2.50	158.54		
T.P.	9.99	177.70	0.80	167.71		

		177.70				
T.P.	10.59	186.31	1.98	175.72		
B.M.#13	4.43	187.96	2.78	183.53	Use Hort	RP spike NE Side CEI # 590328 30' Rt. Sta 107+14
T.P.	8.43	191.15	5.24	182.72		
B.M.#14			2.05	189.10	Use Hort Spk	NW Side C.E.I. # 378849 30' Rt Sta. 114+18
T.P.	3.75	193.39	1.51	189.64		
B.M.#15	5.87	195.35	3.91	189.48	Use Hort RP	Spk NE Side CEI # 886144 30' Lt Sta. 118+30
T.P.	10.34	204.35	1.34	194.01		
T.P.	3.45	199.14	8.66	195.69		
T.P.	11.40	209.33	1.21	197.93		
T.P.	5.39	210.46	4.26	205.07		
B.M.#16	6.82	211.46	5.82	204.64	Use N.W.4	N. Hdwl Culvt. 20' Lt Sta 136+70
T.P.	0.47	201.27	10.66	200.80		
T.P.	9.31	199.65	10.93	190.34		
T.P.	2.55	201.62	0.58	199.07		
T.P.	2.14	193.81	9.95	191.67		
B.M.#15	3.90	193.38	4.33	189.48		
T.P.	1.05	191.70	2.73	190.65		
B.M.#14			2.60	189.10	Use	
T.P.	4.62	187.09	9.23	182.47		
B.M.#13			3.56	183.53	Use	
T.P.	0.15	179.70	7.54	179.55		
T.P.	0.63	171.16	9.17	170.53		
T.P.	0.69	161.93	9.92	161.24		
B.M.	11.61	168.57	4.97	7.01 ~~156.96~~	Use	
T.P.	11.00	179.07	0.50	168.07		

6-17-57
Cool 65°
H Patterson
P. Young
D. Ridenour

	+	HI 179.07	-	Elev
T.P.	10.61	189.26	0.42	178.65
T.P.	10.94	199.61	0.09	189.17
T.P.	11.93	211.33	0.21	199.40
T.P.	11.71	222.69	0.35	210.98
T.P.	11.85	234.38	0.16	222.53
T.P.	11.90	245.57	0.21	233.67
T.P.	4.78	249.73	0.62	244.95
B.M.#11			2.21	247.52 B use
T.P.	0.47	238.76	11.44	238.29
T.P.	0.26	227.50	11.52	227.24
B.M.C10			11.14	216.44 use
BM#2	4.57	146.69		142.12
TP	0.01	135.03	11.67	135.02
970				126.2
T.P.	9.20	143.43	0.80	134.23
1070				133.13
1170				139.33
T P	6.87	149.82	0.48	142.95
1270				143.22
1370				145.32
T.P.	2.91	152.63	0.10	149.72

D = occ. ℄

66

N — ℄ Tang — S

out	6.0/30	5.5/26	D 10.5/16	8.8/14	8.80/5	8.80	9.0/4	D 9.5/6	7.0/15	out
out	7.6/22	11.4/18	10.3/13	D 10.2/5	10.3	10.4/3	8.7/8	8.2/21	8.0/30	
	1.2/30	2.2/21	5.9/16	4.2/14	D 3.9/5	4.2	4.2/5	2.8/12	2.6/30	
	5.4/30	4.8/21	5.6/19	6.8/12	D 6.5/4	6.6	6.4/4	6.8/12	6.9/21	7.0/30	
	4.7/30	5.4/24	5.7/19	4.9/15	D 4.4/5	4.5	4.7/4	6.4/10	6.4/16	6.3/29	out

		152.63		
14+0				147.63
T.P.	5.61	155.33	2.91	149.72
15+0				149.43
T.P.	4.15	155.39	9.09	151.24
16+0				149.99
17+0				146.89
T.P.	2.09	147.33	10.14	145.25
18+0				139.23
TP	2.28	138.89	10.72	136.61
19+0				133.49
TP	5.45	139.22	5.12	133.77
20+0				133.82
TP	9.81	148.77	0.26	138.96
21+0				140.51
BM #3	11.46	160.07	0.16	148.61
22+0				144.07
BM #4	8.35	140.98		132.63
23+0				138.48
T.P.	4.67	136.02	9.63	131.35
24+0				131.62
T.P.	3.98	136.61	3.39	132.63
25+0				131.51

□ = occ ℄

67

Temp

N ℄ S

3.4/30 3.4/20 6.2/16 5.4/14 □ 5.0/5 5.0 5.3/5 5.6/7 3.8/17 3.7/22 4.1/30

3.9/30 4.1/22 6.6/15 6.2/17 □ 5.8/5 5.9 6.2/5 6.7/7 4.6/13 4.5/21 4.6/20

3.5/30 4.1/17 5.7/15 5.4/13 □ 5.3/3 5.4 6.0/7 6.5/9 5.3/12 5.6/17 6.7/28 down

3.4/30 7.8/17 8.6/15 8.3/14 □ 8.3/4 8.5 9.2/7 9.2/9 8.5/10 5.1/17 4.5/30

3.3/30 3.7/25 8.5/15 9.1/15 8.5/13 □ 8.1/3 8.1 8.7/7 9.5/11 9.0/14 6.5/18 6.3/30

8.7/30 8.4/19 6.2/14 □ 5.4/3 5.4 5.8/9 6.7/13 9.1/21 9.6/30

cream 13.5/30 10.0/28 8.4/20 5.8/14 □ 5.4/2 5.4 5.7/11 8.0/19 9.4/26 9.7/30

2.3/40 4.4/30 9.3/15 9.8/17 8.5/13 8.2 9.1/11 10.0/19 7.0/25 6.8/30

3.3/45 3.6/30 16.4/12 16.0 16.7/13 5.3/29 5.7/30

0.1/30 3.8/23 3.2/13 □ 2.4/3 2.5 2.9/7 3.2/10 11.1/28 down 2' 35

8.2/30 7.7/20 4.7/13 4.4 4.9/8 6.8/18 9.1/25 9.1/30

7.6/30 9.1/20 5.3/13 □ 5.6/11 5.1 5.4/12 10.6/24 out

		136.61		
26+0				136.11
T.P.	12.00	148.17	0.44	136.17
27+0				146.67
TP	11.56	158.09	1.64	146.53
TP	10.74	167.43	1.40	156.69
28+0				158.13
T.P.	6.74	163.92	0.25	167.18
29+0				166.82
30+0				173.06
T.P.	9.07	182.13	0.86	163.06
31+0				176.83
B.M. #5	3.23	182.39	3.03	179.10
32+0				179.39
T P	5.96	185.35	3.00	179.39
33+0				179.75
34+0				179.95
				181.95
35+0				
T.P.	10.21	194.90	0.66	184.69
36+0				186.10
37+0				190.70
T.P.	10.49	205.14	0.25	194.65

N E S

7.4/30 7.3/25 6.0/20 0.8/12 1.1/10 0.5 0.8/8 4.5/16 4.6/25 out

5.1/30 5.5/20 1.6/12 2.1/10 1.5 1.2/7 5.8/21 5.1/26 5.5/30

3.0/30 2.5/25 9.5/11 9.3 9.5/8 11.2/10 0.6/25 up 2.3' out/30

6.9/30 5.0/15 8.1/11 7.1 7.4/10 8.8/11 0.2/21 out

0.8C

5.3

3.0

5.6

5.4

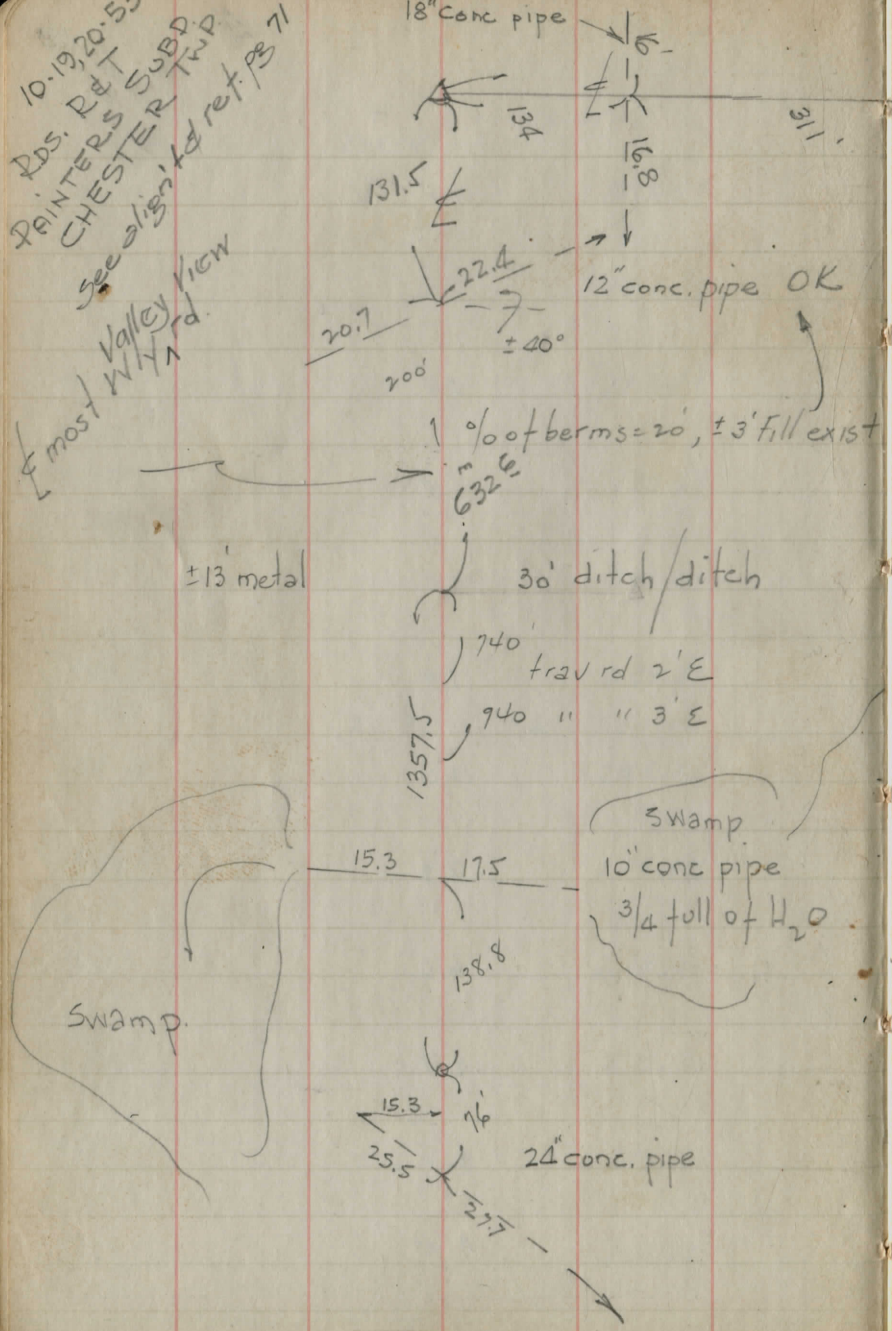
3.4

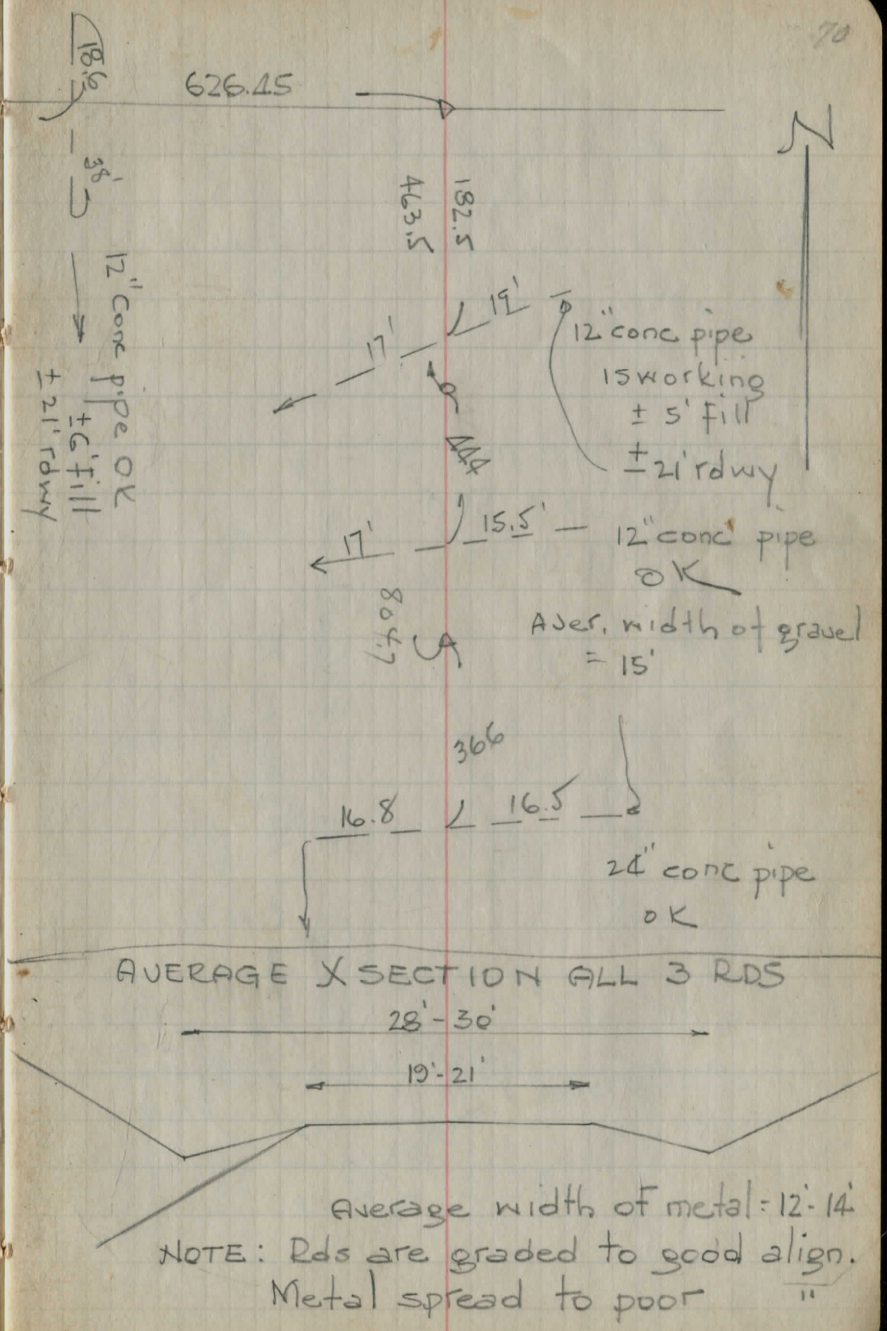
8.8

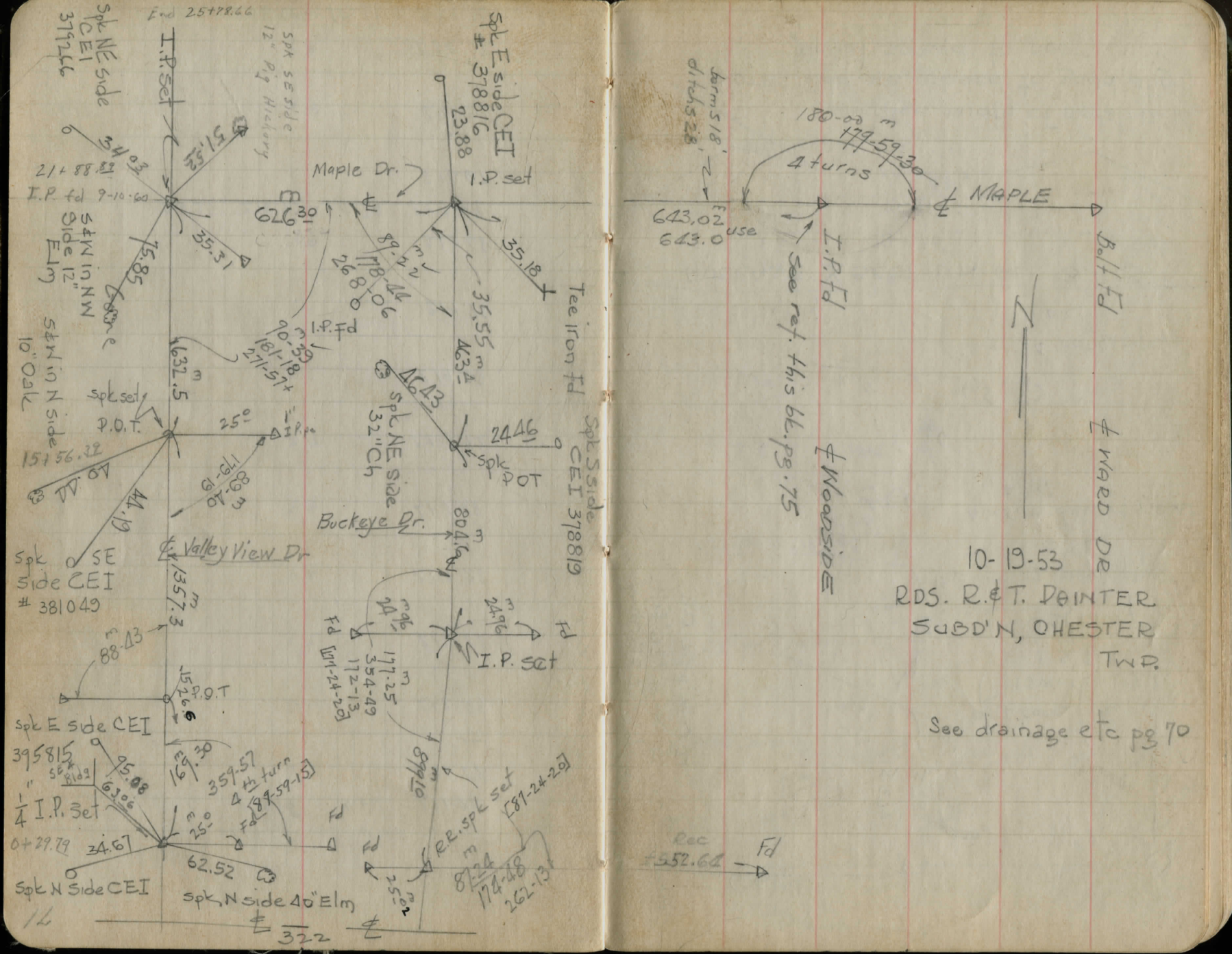
4.2

		HI 205.14			
38+0				195.44	9.7
39+0				198.14	7.0
40+0				199.64	5.5
41+0				199.64	5.5
42+0				201.34	3.8
43+0				203.24	1.9
TP	11.70	215.72	1.12	204.02	
44+0				205.72	10.0
45+0				208.42	7.3
46+0				209.70	6.0
47+0				210.82	4.9
48+0				211.22	4.5
49+0				211.22	4.5
50+0		Cont Pg 22		211.22	4.5

10-19,20-53
Rds. R&T
PAINTERS SUBD.
CHESTER TWP
see align'td ref pg 71



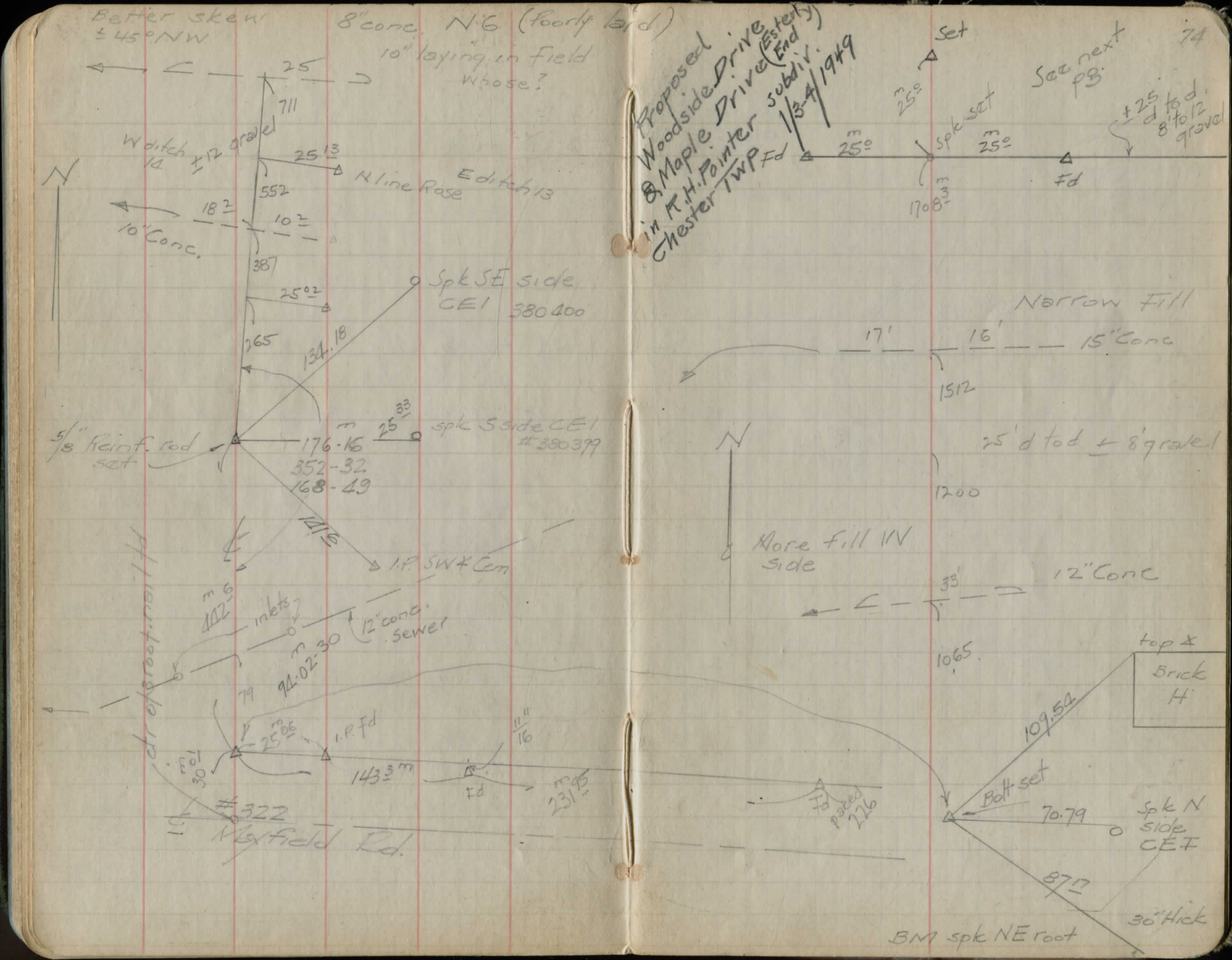


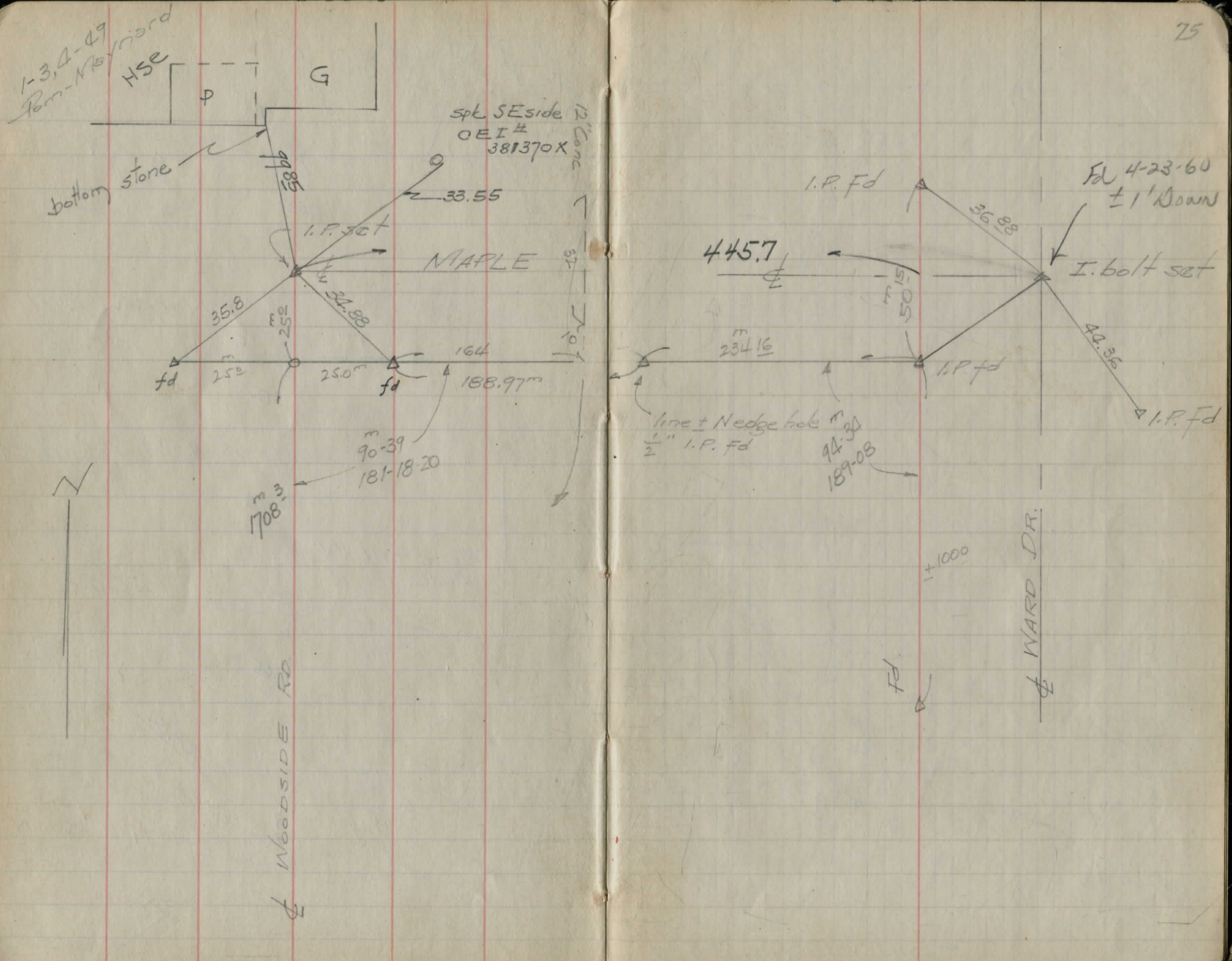

End 25+78.66
Spk NE side 379776
I.P. set
12" Pin Hickory
Spk SE side
21+88.82
I.P. fd 9-10-60
Maple Dr.
626.30
Spk E side CEI # 378816
23.88
I.P. set
Spk W in N side 12" Elm
Spk W in N side 10" Oak
Spk set P.O.T.
I.P.
151 56.22
Spk SE side CEI # 381049
Valley View Dr.
1357.3
I.P. fd
Tee iron fd
Spk S side CEI 378819
Spk NE side 32" Ch
2446
Spk P.O.T.
Buckeye Dr.
804.64
I.P. set
Spk E side CEI 395815
1/4 I.P. set
0+29.79
Spk N side CEI
Spk N side 40" Elm
322
R.R. spk set
Rec +352.64 Fd
Farm 518.2
ditch 2.8
180-02
179-59-30
4 turns
MAPLE
643.02
643.0
use
I.P. Fd
See ref. this bk. pg. 75
Woodside
Bolt Fd
WARD DR
10-19-53
RDS. R. & T. POINTER
SUBD'N, CHESTER TWP.
See drainage etc pg 70

		215.72			
T.P.	6.46	218.18	4.00	211.72	
51+0				211.88	6.3
52+0				212.58	5.6
53+0				212.88	5.3
54+0				213.28	4.9
55+0				213.88	4.3
56+0				213.98	4.2
57+0				214.28	3.9
58+0				214.78	3.4
59+0				213.68	4.5
T.P.	0.53	213.97	4.74	213.44	
60+0				210.67	3.3
61+0				207.37	6.6
62+0				204.07	9.9
T.P.	1.92	205.08	10.81	203.16	

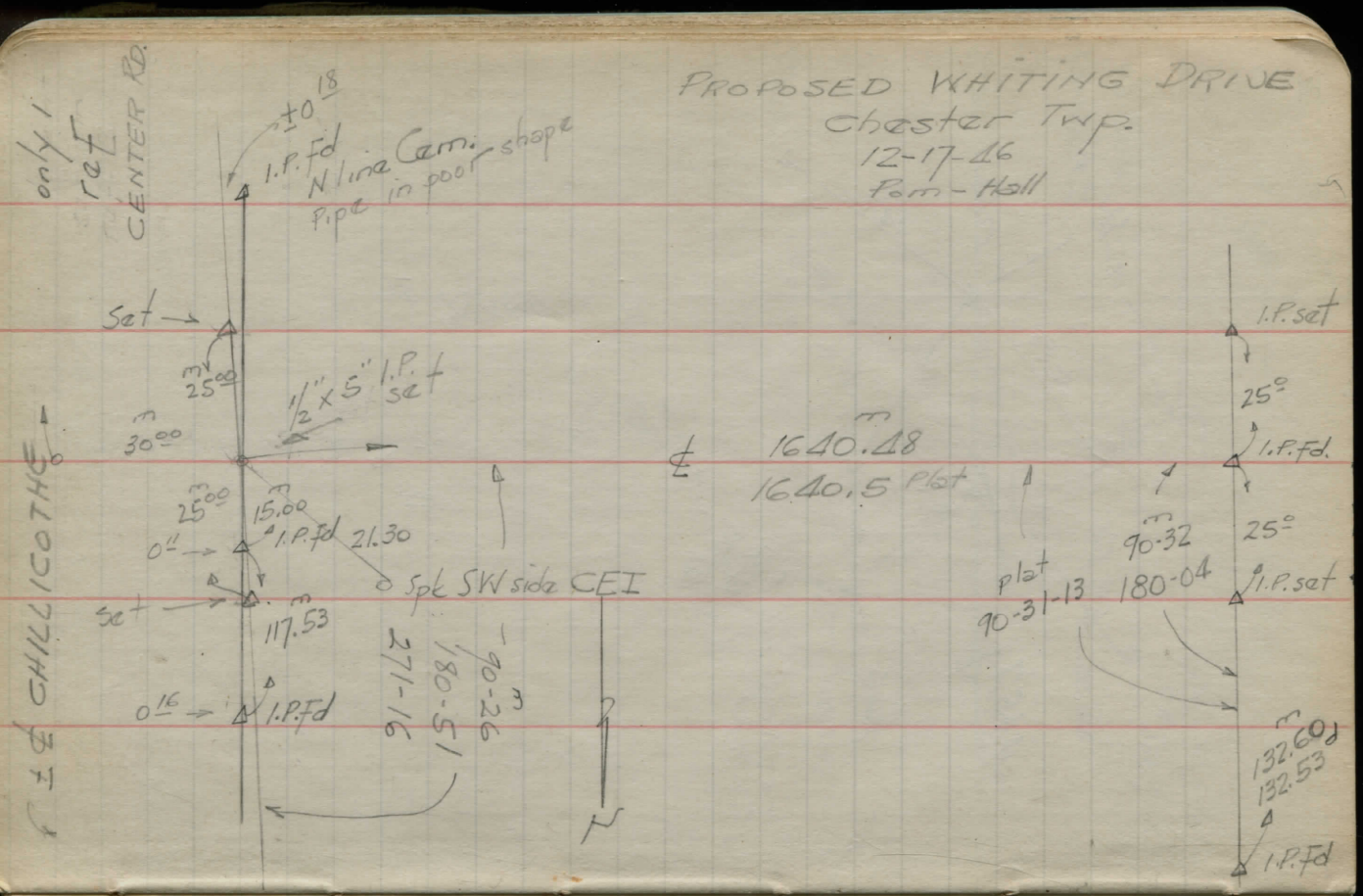
						N	Targ	S
		205.08						
63+0				201.78			3.3	
64+0				199.28			5.8	
65+0				187.38			7.7	
66+0				195.28		7.8/30 8.0/15 11.0/13 10.4/7	9.8	□ 9.7/4 10.3/13 10.9/16 8.8/19 9.2/30
TP	0.97	196.21	9.84	195.24				
67+0				191.61		1.6/30 1.7/15 4.9/11 6.0/9 5.1/8	4.6	□ 4.6/2 5.1/13 6.1/15 2.4/22 1.9/30
68+0				187.51		8.0/30 7.8/21 9.0/12 10.0/10 8.9/5	8.9	□ 8.7/8 9.4/15 8.3/19 7.1/30
	3.81	190.36	9.66	186.55				
69+0				185.96		6.8/30 5.9/11 5.0/6	4.9	□ 4.8/4 5.3/15 6.0/18 6.3/30
70+0				185.96		3.1/30 3.7/14 5.7/10 4.7/7	4.4	□ 4.3/4 4.8/12 5.6/15 4.5/19 7.0/30
T.P.	9.63	198.17	1.82	188.54				
71+0				188.37		6.0/30 6.5/15 9.0/14 11.0/10 10.4/8	9.8	□ 9.8/4 10.7/13 11.3/16 10.0/15 9.1/30
72+0				191.87		3.0/30 3.4/19 6.6/11 7.7/9 6.1/6	6.3	□ 6.2/5 6.7/14 7.1/16 4.1/21 3.8/30
73+0				194.97		Obst 3.3/15 3.7/11 4.1/10 3.7/6	3.2	□ 3.0/6 3.6/14 4.6/17 4.3/19 4.7/30
TP	10.17	204.28	4.06	194.11	Top Lg Stone	W Side Lakeside Drive	Sta 72+10	
74+0				197.18		6.3/30 6.9/12 7.9/9 7.1/7 7.3/4	7.1	□ 7.0/7 8.0/16 8.7/19 7.9/25 8.1/30

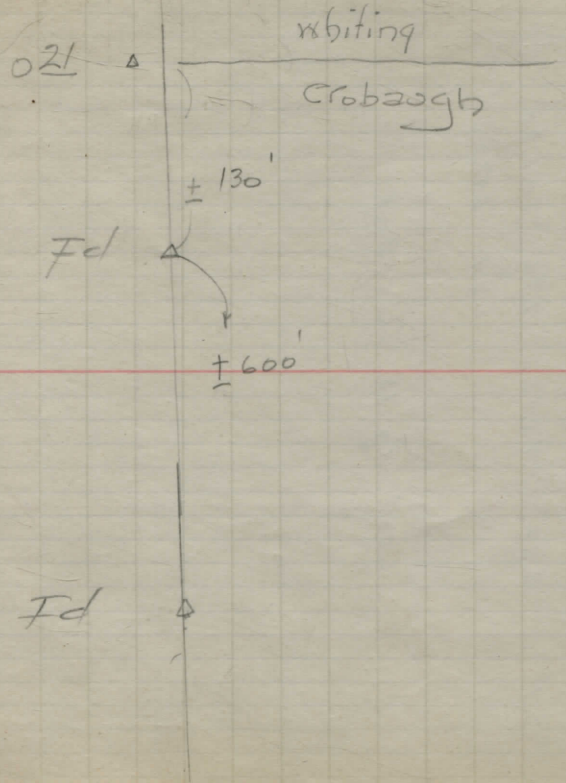
Cont. Pg 77 This Book


Better skew ± 45° NW
8" conc. N·6 (poorly laid)
10" laying in field
Whose?
25
711
W ditch 14
± 12 gravel
25 13
552
N line Rose
E ditch 13
18 2
10 2
10" Conc.
387
25 02
365
134.18
Spk SE side CE1 380400
5/8" reinf. rod set
176·16
352-32
168-49
25 33
spk S side CE1 # 380379
116
I.P. SW & Cem
m 102.6
inlets
12" conc. sewer
m 94.02-30
79
I.P. Fd
25 05
143.3 m
Fd
231.45 m
#322
Fd paced 226
11/16
rod 30
Proposed Woodside Drive & Maple Drive (Easterly End) in R.H. Pointer subdiv. Chester Twp
1/3-4/1949
Set
m 25°
spk set
m 25°
Fd
1708.3 m
See next pg.
74
± 25 d to d 8' to 12' gravel
Narrow Fill
17'
16'
15" Conc
1512
25' d to d ± 8' gravel
1200
More fill 1V side
33'
12" Conc
1065
top ∠ Brick H
109.54
Bolt set
70.79
Spk N side CE1
87 ft
30" Hick
BM spk NE root


1-3,4-49
Rem-Maynard
HSE
P
G
bottom stone
spk SE side
OEI #
381370X
12" conc
99.85
33.55
I.P. set
MAPLE
35.8
34.88
25.0
164
188.97
fd
fd
90-39
181-18-20
708.3
32'
10'
I.P. Fd
36.88
Fd 4-23-60
±1' Down
445.7
I. bolt set
50.15
234.16
44.36
I.P. fd
I.P. Fd
line ± Nedge hole
½" I.P. fd
94.30
189.08
±1000
Fd
WARD DR.
WOODSIDE RD.

PROPOSED WHITING DRIVE
Chester Twp.
12-17-16
Fom-Hall





	+	HI	−	elev
		204.28		
75+0				
76+0				
T.P.	11.91	215.08	1.11	203.17
77+0				
78+0				
T P	10.77	224.80	1.05	214.03
78:80	Int. Cedar & Orvas			
T.P.	11.68	134.22	2.26	122.54
T.P.	10.42	143.82	0.82	133.40
T.P.	6.62	148.32	1.92	141.90
B.M.			1.00	247.52

Cont. Pg 18 This Book

Temp

N 199.1 S

3.9/30 3.9/20 5.6/9 5.2 5.0/6 5.8/16 6.6/19 6.0/21 5.9/30

201.7

out 1.5/29 1.8/14 3.5/8 2.6 2.4/7 3.2/17 3.9/21 3.4/27 4.0/30

205.4

6.4/30 6.6/25 9.6/11 10.3/8 9.7 9.5/7 10.4/17 11.2/19 10.5/21 9.7/24 11.1/30

211.4

UP 1st. OP 3.8/9 4.7/8 3.7 3.6/5 4.1/13 4.5/16 4.4/17 4.5/30

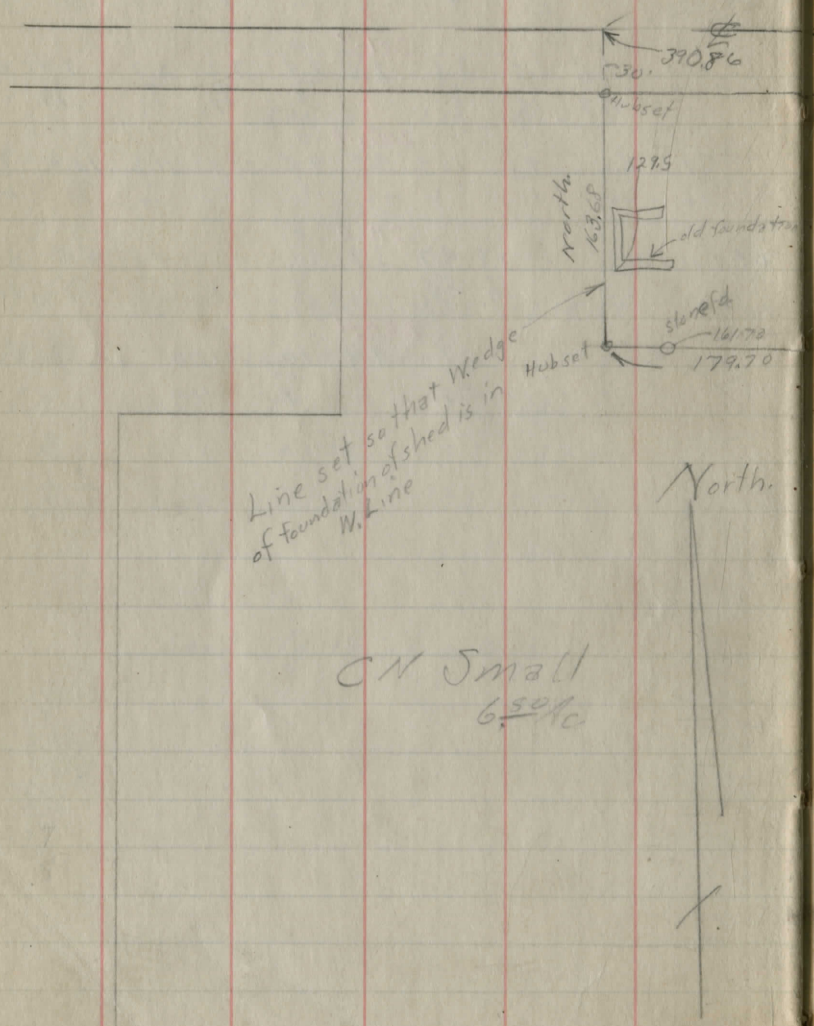
30 25

220.4

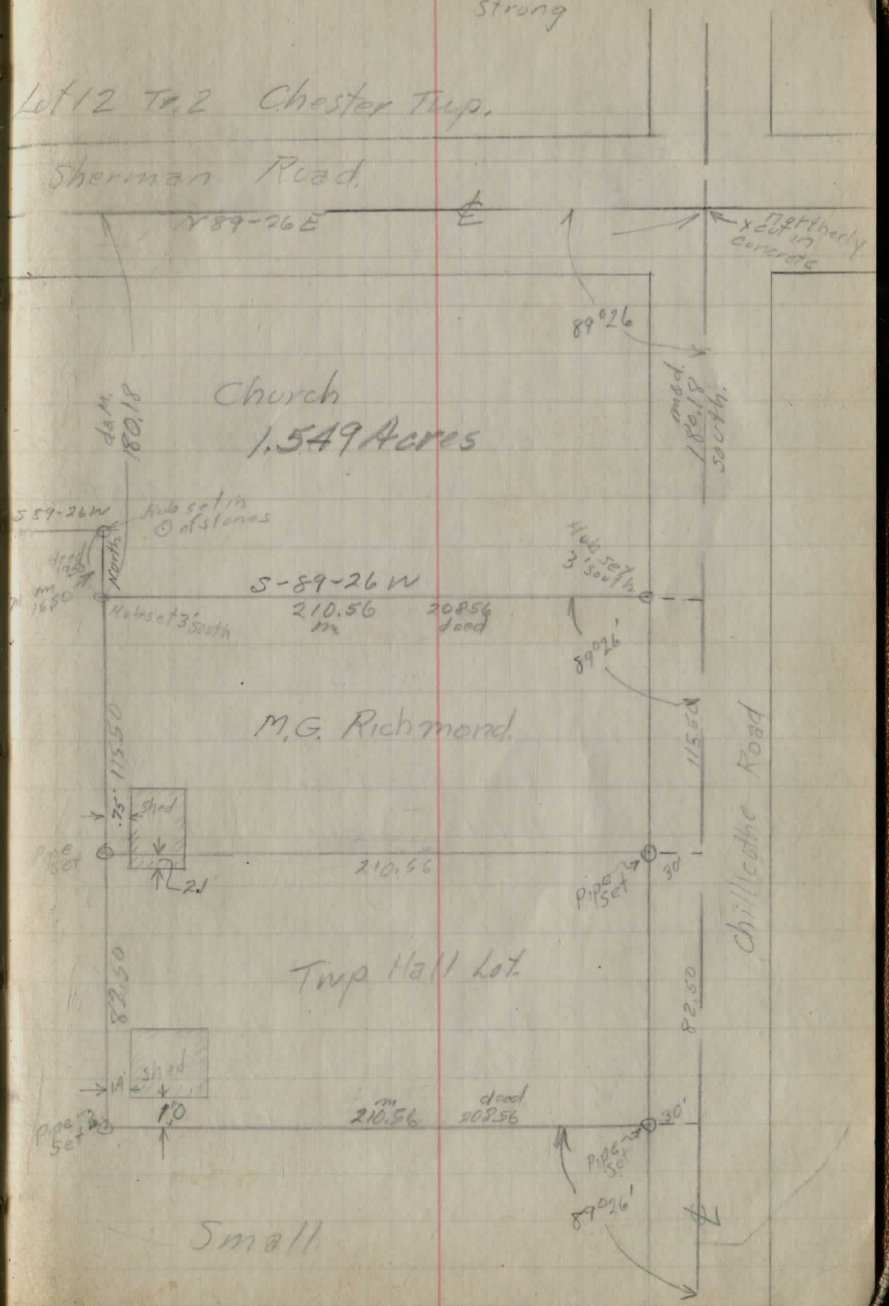
UP Same % 0.1/45 4.4 10.5/50 17.0/100 down

5/10/37 Richey Marks Strong

Chester Twp. Hall Survey



Lot 12 Tr. 2 Chester Twp.



BM #6	6.57	205.97		199.40				
Culvt	Woodcrest Dr	Sta. 41+74	Running N.	12" X	61.5'	E Inlet 6.4	4.7	W Outlet 7.5
1+0							6.4	
2+0							8.8	
3+0							12.0	
BM #2	5.95	148.07		142.12				
Culvt	Westchester Dr	Run N.	Sta 12+61		12" X 48.5' C.P.	E Inlet 4.7	3.3	W Outlet 5.7
1+0							2.3	
2+0							0.3	
2+80							0.0	
BM #12	6.79	163.79		157.00				
Culvt	20' wide Green Dr	Run S.	Sta. 96+83		Conc. 15" X 41'	Inlet 6.5	4.7	W Outlet 7.5
T P 1+0	11.00	174.19	0.60	163.19				
2+0							3.6	
2+50	Carry Same Grade out to 3+0						0.0	
BM #13	2.65	186.18		183.53				
T.P.	4.24	181.63	8.79	177.39				
Culvt	Hickory Dr	Run S.	Sta. 103+01		Conc 12" X 41'	E Inlet 7.1	5.3	W Outlet 7.6
1+0							5.3	
2+0							9.6	
3+0							9.4	

Cont F.B. 137 Pg 76

11 4.5
12 4.9
5.9 5.75
4.5
1.25

IMPROVED TABLES
AND
INFORMATION

DIRECTIONS FOR USE OF TABLES

TABLE No. 1.

Distance of slope stake from side or shoulder stake for any width roadway, slope 1½ to 1. If ground is nearly level, the cut or fill at side stake is located by the double entry method in left column and top row. The number in body of table in same row and column gives distance from side stake to slope stake. If ground is not level estimate the difference in elevation between the side stake and slope stake, lower target by this amount if cut, elevate if fill. Add this amount to cut or fill and find distance in table. Set up rod at this point, and line of sight should cut target. If it does not make the slight adjustment necessary.

TABLE No. 9.

To find Tangent and External for curve of any other degree, divide by degree of curve and add correction found in column of corrections.

Degree of curve with a given I may be found by dividing tangent, (or external), opposite I by given tangent, (or external).

The distance from a point on the tangent to the curve is very nearly the square of the tangent lenth divided by twice the radius.

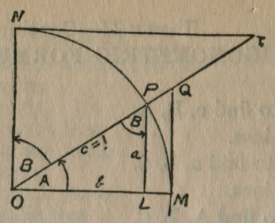


TABLE II

TRIGONOMETRIC FORMULÆ.

$\angle A = \angle MOP \qquad \angle B = \angle PON = \angle OPL$

$R = OB = c = 1$

$$\sin A = \frac{a}{c} = \frac{a}{1} = a = \cos B = LP$$

$$\cos A = \frac{b}{c} = \frac{b}{1} = b = \sin B = OL$$

$$\tan A = \frac{a}{b} = \frac{MQ}{OM} = \frac{MQ}{1} = MQ = \cot B = MQ$$

$$\cot A = \frac{NT}{ON} = \frac{NT}{1} = NT = \tan B = NT$$

$$\sec A = \frac{OQ}{OM} = \frac{OQ}{1} = OQ = \csc B = OQ$$

$$\csc A = \frac{OT}{ON} = \frac{OT}{1} = OT = \sec B = OT$$

$$\text{vers } A = \frac{LM}{OP} = LM = \text{covers } B \#$$

$$\text{covers } A = \frac{OP - LP}{OP} = OP - LP = \text{vers } B$$

$$\text{exsec } A = PQ = \text{coexsec } B$$

$$\text{coexsec } A = PT = \text{exsec } B$$

$$\sin \tfrac{1}{2} A = \sqrt{\frac{1 - \text{Cos } A}{2}} \qquad \cos \tfrac{1}{2} A = \sqrt{\frac{1 + \text{Cos } A}{2}}$$

$$\sin 2A = 2 \sin A \cos A \qquad \cos 2A = \cos^2 A - \sin^2 A$$

Law of Lines $\dfrac{\sin A}{a} = \dfrac{\sin B}{B} = \dfrac{\sin C^1}{C}$

Law of Cosines $c^2 = a^2 + b^2 - 2 ab \cos C$

Law of Tangents $\dfrac{a+b}{a-b} = \dfrac{\tan \frac{1}{2}(A+B)}{\tan \frac{1}{2}(A-B)}$

Table II—Continued

TRIGONOMETRIC FORMULAE (continued)

In any triangle:

Given a, b, C; to find c, B, A.

Use Law of Lines.

Given A, B, c; to find a, b, C.

Use Law of Lines.

Given a, b, c; to find A, B, C.

Let $\frac{a+b+c}{2} = s$, $\sqrt{\frac{(s-a)\ (s-b)\ (s-c)}{s}} = r$

$$\cos \tfrac{1}{2} A = \sqrt{\frac{s(s-a)}{bc}}$$

$$\tan \tfrac{1}{2} A = \frac{r}{s-a}$$

$$\tan \tfrac{1}{2} B = \frac{r}{s-b}$$

$$\tan \tfrac{1}{2} C = \frac{r}{s-c}$$

Area of a triangle:

Area $= \tfrac{1}{2}$ ab Sin C

Area $= \sqrt{s\ (s-a)\ (s-b)\ (s-c)}$

PRISMOIDAL FORMULA.

$$\text{Vol.} = \frac{h}{6}(B+b+4M)$$

h = altitude; b, B = bases; M = midsection

Table III

INCHES AND FRACTIONS OF AN INCH IN DECIMALS OF A FOOT

	0	1	2	3	4	5	6	7	8	9	10	11	
1/16	.0052	.0885	.1719	.2552	.3385	.4219	.5052	.5885	.6719	.7552	.8385	.9219	1/16
1/8	.0104	.0938	.1771	.2604	.3438	.4271	.5104	.5938	.6771	.7604	.8438	.9271	1/8
3/16	.0156	.0990	.1823	.2656	.3490	.4323	.5156	.5990	.6823	.7656	.8490	.9323	3/16
1/4	.0208	.1042	.1875	.2708	.3542	.4375	.5208	.6042	.6875	.7708	.8542	.9375	1/4
5/16	.0260	.1094	.1927	.2760	.3594	.4427	.5260	.6094	.6927	.7760	.8594	.9427	5/16
3/8	.0313	.1146	.1979	.2813	.3646	.4479	.5313	.6146	.6979	.7813	.8646	.9479	3/8
7/16	.0365	.1198	.2031	.2865	.3698	.4531	.5365	.6198	.7031	.7865	.8698	.9531	7/16
1/2	.0417	.1250	.2083	.2917	.3750	.4583	.5417	.6250	.7083	.7917	.8750	.9583	1/2
9/16	.0469	.1302	.2135	.2969	.3803	.4635	.5469	.6302	.7135	.7969	.8802	.9635	9/16
5/8	.0521	.1354	.2188	.3021	.3854	.4688	.5521	.6354	.7188	.8021	.8854	.9688	5/8
11/16	.0573	.1406	.2240	.3073	.3906	.4740	.5573	.6406	.7240	.8073	.8906	.9740	11/16
3/4	.0625	.1458	.2292	.3125	.3958	.4792	.5625	.6458	.7292	.8125	.8958	.9792	3/4
13/16	.0677	.1510	.2344	.3177	.4010	.4844	.5677	.6510	.7344	.8177	.9010	.9844	13/16
7/8	.0729	.1563	.2396	.3229	.4063	.4896	.5729	.6563	.7396	.8229	.9063	.9896	7/8
15/16	.0781	.1615	.2448	.3281	.4115	.4948	.5781	.6615	.7448	.8281	.9115	.9948	15/16
1	.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167	1.000	1
	0	1	2	3	4	5	6	7	8	9	10	11	

Table IV

USEFUL RELATIONS.

Lineal feet	×.00019	= miles
Lineal yards	×.0006	= miles
Square inches	×.007	= square feet
Square feet	×.111	= square yards
Square yards	×.0002067	= acres
Acres	×4840	= square yards
Cubic inches	×.00058	= cubic feet
Cubic feet	×.03704	= cubic yards
Links	×.22	= yards
Links	×.66	= feet
Feet	×1.5	= links

360° = 21600′ = 1296000″

Radius = arc of 57.2957790°

Arc of 1° (radius = 1) = .017453292

Arc of 1′ (radius = 1) = .000290888

Arc of 1″ (radius = 1) = .000004848

$\pi = 3.141592654$

$\frac{\pi}{4} = 0.785398163$

$\frac{\pi}{6} = 0.523598776$

$\sqrt{\frac{4}{\pi}} = 1.128379167$

$\frac{\pi}{6} = 0.523598776$

$\frac{4.\pi}{3} = 4.188790205$

$\sqrt{\frac{1}{\pi}} = 0.564190$

$\sqrt[3]{\frac{6}{\pi}} = 1.240700982$

$\pi^2 = 9.869604401$

$\frac{1}{\pi^2} = 0.101321184$

$\sqrt{\pi} = 1.772453851$

$\frac{1}{\pi} = 0.3183099$

Curvature of Earth's surface = about 0.7 feet in 1 mile

Curvature in feet = 0.667 (Dist. in miles)²

Difference between arc and chord length, 0.05 feet in 11½ miles

Probable error of a single observation $= 0.6754\sqrt{\frac{\Sigma v^2}{n-1}}$

Error in chaining of 0.01 feet in 100 feet:

Due to—

1. Length of tape error of 0.01 feet
2. Alignment. One end 1.4 feet out of line
3. Sag of tape at centre of 0.61 feet.
4. Temperature difference of 15°
5. Difference of pull of 15 lbs.

STADIA REDUCTION FORMULÆ.

Horizontal Distance $= R - R \sin^2 a + C \cos a$

Vertical Distance $= R\ \tfrac{1}{2} \sin 2a + C \sin a$

$$R = \text{Reading} \times \frac{\text{distance from Object glass to cross hairs}}{\text{distance between cross hairs}}$$

C = distance from Object glass to cross hairs + distance from Object glass to center of instrument.

a = angle of elevation for mid Reading

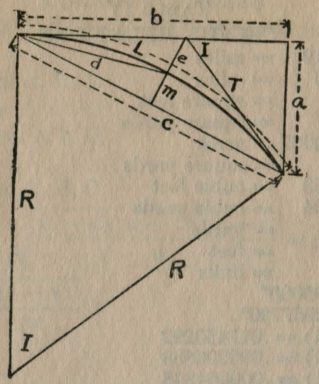


Table V

CURVE FORMULAE FOR SIMPLE CURVES

Compiled by J. Calvin Locke, C.E.

(1) $c = \sqrt{2Ra}$ (2) $c = \sqrt{a^2+b^2}$

(3) $c = \sqrt{2R\,(R-\sqrt{(R+b)\,(R-b)}} = \sqrt{2R(R-\sqrt{R^2-b^2})}$

(4) $c = 2\sqrt{m\,(2R-m)}$

(5) $c = 2R \sin \frac{1}{2} I$ (6) $c = 2T \cos \frac{1}{2} I$

(7) $e = R \operatorname{exsec} \frac{1}{2} I$

(8) $e = R \tan \frac{1}{2} I \tan \frac{1}{4} I$ (9) $e = T \tan \frac{1}{4} I$

(10) $b = \sqrt{a\,(2R-a)}$

(11) $b = \sqrt{\left(c+\frac{c^2}{2R}\right)\left(c-\frac{c^2}{2R}\right)} = \sqrt{c^2-\frac{c^4}{4R^2}}$

(12) $b = R \sin I$ (13) $b = a \cot \frac{1}{2} I$

(14) $R = \frac{a^2+b^2}{2a} = \frac{c^2}{2a}$ (15) $R = \frac{d^2}{2m} = \frac{c^2+4m^2}{8m}$

(16) $d = \sqrt{R\,(2R-\sqrt{(2R+c)\,(2R-c)}} = \sqrt{R(2R-\sqrt{4R^2-c^2})}$

(17) $d = \sqrt{2Rm}$ (18) $d = 2R \sin \frac{1}{4} I$ (19) $m = \frac{d^2}{2R}$

(20) $m = R \mp \sqrt{\left(R+\frac{c}{2}\right)\left(R-\frac{c}{2}\right)} = R \mp \sqrt{R^2-\frac{c^2}{4}}$

(21) $m = R \operatorname{vers} \frac{1}{2} I$ (22) $m = R \sin \frac{1}{2} I \tan \frac{1}{4} I$ (23) $m = \frac{1}{2} c \tan \frac{1}{4} I$

(24) $a = \frac{c^2}{2R}$ (25) $a = R - \sqrt{(R+b)\,(R-b)} = R - \sqrt{R^2-b^2}$

(26) $a = 2R\,(\sin^2 \frac{1}{2} I)^2$ (27) $a = R \operatorname{vers} I$ (28) $a = R \sin I \tan \frac{1}{2}$

(29) $a = b \tan \frac{1}{2} I$ (30) $a = T \sin I$ (31) $T = R \tan \frac{1}{2} I$

(32) $I = \frac{L}{R} \times 57.295780$ (33) $R = \frac{L}{I} \times 57.295780$

(34) $L = IR \times 0.01745329$ (35) $L = \frac{8d-c}{3}$

(36) Area Seg. $= \frac{LR - R^2 \sin I}{2} = \frac{LR - Rb}{2}$

Table VI

SINES, COSINES, TANGENTS, COTANGENTS

deg.	sin 0′	tan 0′	sin 10′	tan 10′	sin 20′	tan 20′	sin 30′	tan 30′	sin 40′	tan 40′	sin 50′	tan 50′	deg.
0	0000	0000	0029	0029	0058	0058	0087	0087	0116	0116	0145	0145	89
1	175	0175	0204	0204	0233	0233	0262	262	291	291	320	320	88
2	349	349	378	378	407	407	436	437	465	466	494	495	87
3	523	524	552	553	581	582	610	612	640	641	669	706	86
4	698	699	727	729	756	758	785	787	814	816	843	864	85
5	872	875	901	904	929	934	958	963	987	992	1016	1022	84
6	1045	1051	1074	1080	1103	1110	1132	1139	1161	1169	190	198	83
7	219	228	248	257	279	287	305	317	334	346	363	376	82
8	392	405	421	435	449	465	478	495	507	524	536	554	81
9	564	584	593	614	622	644	650	673	679	703	708	733	80
10	736	763	765	793	794	823	822	853	851	883	880	914	79
11	908	944	937	974	965	2004	994	2035	2022	2065	2051	2095	78
12	2079	2126	2108	2156	2136	186	2164	217	193	247	221	278	77
13	250	309	278	339	306	370	334	401	363	432	391	462	76
14	419	493	447	524	476	555	504	586	532	617	560	648	75
15	588	679	616	711	644	742	672	773	700	805	728	836	74
16	756	867	784	899	812	931	840	962	868	994	896	3026	73
17	924	3057	952	3089	2979	3121	3007	3153	3035	3185	3062	217	72
18	3090	249	3118	281	3145	314	173	346	201	378	228	411	71
19	256	443	283	476	311	508	338	541	365	574	393	607	70
20	420	640	448	673	475	706	502	739	529	772	557	805	69
21	584	839	611	872	638	906	665	939	692	973	719	4006	68
22	746	4040	773	4074	800	4108	827	4142	854	4176	881	210	67
23	907	245	934	279	961	314	987	348	4014	383	4041	417	66
24	4067	452	4094	487	4120	522	4147	557	173	592	200	628	65
25	226	663	253	699	279	734	305	770	331	806	358	841	64
26	384	877	410	913	436	950	4462	986	488	5022	514	5059	63
27	540	5095	566	5132	592	5169	617	5206	643	243	669	280	62
28	695	317	720	354	746	392	772	430	797	467	823	505	61
29	848	543	874	581	899	619	924	658	950	696	975	735	60
30	5000	774	5025	5812	5050	851	5075	890	5100	930	5125	969	59
31	150	6009	175	6048	200	6088	225	6128	250	6168	275	6208	58
32	299	249	324	289	348	330	5373	371	398	412	422	453	57
33	446	494	471	536	495	577	519	619	544	661	568	703	56
34	592	745	616	787	640	830	664	873	688	916	712	959	55
35	736	7002	760	7046	783	7089	807	7133	831	7177	854	7221	54
36	878	265	901	310	925	355	948	400	972	445	995	490	53
37	6018	536	6041	581	6065	627	6088	673	6111	720	6134	766	52
38	157	813	180	860	202	907	225	954	248	8002	271	8050	51
39	293	8098	316	8146	338	8195	361	8243	383	292	406	342	50
40	428	391	450	441	472	491	494	541	517	591	539	642	49
41	561	693	583	744	604	796	626	847	648	899	670	952	48
42	691	9004	713	9057	734	9110	756	9163	777	9217	799	9271	47
43	820	325	841	380	862	435	884	490	905	545	926	601	46
44	947	657	967	713	988	770	7009	827	7030	884	7050	942	45
45	7071	1.0000	7092	1.0058	7112	1.0117	133	1.0176	153	1.0235	173	1.0295	44
deg.	60′ cos	60′ cot	50′ cos	50′ cot	40′ cos	40′ cot	30′ cos	30′ cot	20′ cos	20 cot	10′ cos	10′ cot	deg.

Table VI (continued)
SINES, COSINES, TANGENTS, COTANGENTS (continued)

deg.	sin 0′	tan 0′	sin 10′	tan 10′	sin 20′	tan 20′	sin 30′	tan 30′	sin 40′	tan 40′	sin 50′	tan 50′	deg.
46	7193	1.0355	7214	1.0416	7234	1.0477	7254	1.0533	7274	1.0599	7294	1.0661	43
47	314	.0724	333	.0786	353	.0850	373	.0913	392	.0977	412	.1041	42
48	431	.1106	451	.1171	470	.1237	490	.1303	509	.1369	528	.1436	41
49	547	.1504	566	.1571	585	.1640	604	.1708	623	.1778	642	.1847	40
										1.2203			
50	660	1.1918	7679	1.1988	7698	1.2059	7716	1.2131	7735	.2647	7753	1.2276	39
51	771	.2349	790	.2423	808	.2497	826	.2572	844	.3111	862	.2723	38
52	880	.2799	898	.2876	916	.2954	934	.3032	951	.3597	969	.3190	37
53	986	.3270	8004	.3351	8021	.3452	8039	.3514	8056	.4106	8073	.3680	36
54	8090	.3764	107	.3848	124	.3934	141	.4019	158	.4641	175	.4193	35
55	192	.4281	208	.4370	225	.4460	241	.4550	258	.5204	274	.4733	34
56	290	.4826	307	.4919	323	.5013	339	.5108	355	.5798	371	.5301	33
57	387	.5399	403	.5497	418	.5597	434	.5697	450	.6426	465	.5900	32
58	480	.6003	496	.6107	511	.6212	526	.6319	542	.7090	557	.6534	31
59	572	.6643	587	.6753	601	.6864	616	.6977	631		646	.7205	30
60	660	1.7321	8675	1.7437	8689	1.7556	8704	1.7675	8718	1.7797	8732	1.7917	29
61	746	.8040	760	.8165	774	.8291	788	.8418	802	.8546	816	.8676	28
62	829	.8807	843	.8940	857	.9074	870	.9210	884	.9347	897	.9486	27
63	910	.9626	923	.9768	936	.9912	949	2.0057	962	2.0204	975	2.0353	26
64	988	2.0503	9001	2.0655	9013	2.0809	9026	.0965	9038	.1123	9051	.1283	25
65	9063	.1445	075	.1609	088	.1775	100	.1943	112	.2113	124	.2286	24
66	135	.2460	147	.2637	159	.2817	171	.2998	182	.3183	194	.3369	23
67	205	.3559	216	.3750	228	.3945	239	.4142	250	.4342	261	.4545	22
68	272	.4751	283	.4960	293	.5172	304	.5386	315	.5605	325	.5826	21
69	336	.6051	346	.6279	356	.6511	367	.6746	377	.6985	387	.7228	20
70	397	2.7475	9407	2.7725	9417	2.7980	9426	2.8239	9436	2.8502	9446	2.8770	19
71	455	.9042	465	.9319	474	.9600	483	.9887	492	3.0178	502	3.0475	18
72	511	3.0777	520	3.1084	528	3.1397	537	3.1716	546	.2041	555	.2371	17
73	563	.2709	572	.3052	580	.3402	588	.3759	596	.4124	605	.4495	16
74	613	.4874	621	.5261	628	.5656	636	.6059	644	.6470	652	.6891	15
75	659	.7321	667	.7760	674	.8208	681	.8657	689	.9136	696	.9617	14
76	703	4.0108	710	4.0611	717	4.1126	724	4.1653	730	4.2193	737	4.2747	13
77	744	.3315	750	.3897	757	.4494	763	.5107	769	.5736	775	.6382	12
78	781	.7046	787	.7729	793	.8430	799	.9152	805	.9894	811	5.0658	11
79	816	.1446	822	5.2257	827	5.3093	833	5.3955	838	5.4845	843	.5764	10
80	9848	5.6713	9853	5.7694	9858	5.8708	9863	5.9758	9868	6.0844	9872	6.1970	9
81	877	6.3138	881	6 4348	886	6.5606	890	6.6912	894	.8269	899	.9682	8
82	903	7.1154	907	7.2687	911	7.4287	914	7.5958	918	7.7704	922	7.9530	7
83	925	8.1443	929	8.3450	932	8.5555	936	8.7769	939	9.0098	942	9.2553	6
84	945	9.5144	948	9.7882	951	10.078	954	10.385	957	10.711	959	11.059	5
85	962	11.430	964	11.826	967	12.250	969	12.706	971	13.197	974	13.727	4
86	976	14.300	978	14.924	980	15.605	981	16.350	983	17.169	985	18.075	3
87	986	19.081	988	20.206	989	21.470	990	22.903	992	24.542	993	26.432	2
88	994	28.636	9995	31.242	9996	34.368	997	38.189	997	42.964	9998	49.104	1
89	9998	57.290	9999	68.750	9999	85.940	9999	114.58	1.000	171.88	1.000	343.77	0
deg.	60′ cos	60′ cot	50′ cos	50′ cot	40′ cos	40′ cot	30′ cos	30′ cot	20′ cos	30′ cot	10′ cos	10′ cot	deg.

TABLE VII
RODS IN FEET AND INCHES

Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches
1	16—6	21	346—6	41	676—6	61	1006—6	81	1336—6
2	33—0	22	363—0	42	693—0	62	1023—0	82	1353—0
3	49—6	23	379—6	43	709—6	63	1039—6	83	1369—6
4	66—0	24	396—0	44	726—0	64	1056—0	84	1386—0
5	82—6	25	412—6	45	742—6	65	1072—6	85	1402—6
6	99—0	26	429—0	46	759—0	66	1089—0	86	1419—0
7	115—6	27	445—6	47	775—6	67	1105—6	87	1435—6
8	132—0	28	462—0	48	792—0	68	1122—0	88	1452—0
9	148—6	29	478—6	49	808—6	69	1138—6	89	1468—6
10	165—0	30	495—0	50	825—0	70	1155—0	90	1485—0
11	181—6	31	511—6	51	841—6	71	1171—6	91	1501—6
12	198—0	32	528—0	52	858—0	72	1188—0	92	1518—0
13	214—6	33	544—6	53	874—6	73	1204—6	93	1534—6
14	231—0	34	561—0	54	891—0	74	1221—0	94	1551—0
15	247—6	35	577—6	55	907—6	75	1237—6	95	1567—6
16	264—0	36	594—0	56	924—0	76	1254—0	96	1584—0
17	280—6	37	610—6	57	940—6	77	1270—6	97	1600—6
18	297—0	38	627—0	58	957—0	78	1287—0	98	1617—0
19	313—6	39	643—6	59	973—6	79	1303—6	99	1633—6
20	330—0	40	660—0	60	990—0	80	1320—0	100	1650—0

Table VIII
LINKS IN FEET AND INCHES

Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches
1	0- 7.92	18	11-10.56	35	23- 1.20	52	34- 3.84	69	45- 6.48	86	56- 9.12
2	1- 3.84	19	12- 6.48	36	23- 9.12	53	34-11.76	70	46- 2.40	87	57- 5.04
3	1-11.76	20	13- 2.40	37	24- 5.04	54	35- 7.68	71	46-10.32	88	58- 0.96
4	2- 7.68	21	13-10.32	38	25- 0.96	55	36- 3.60	72	47- 6.24	89	58- 8.8
5	3- 3.60	22	14- 6.24	39	25- 8.88	56	36-11.52	73	48- 2.16	90	59- 4.80
6	3-11.52	23	15- 2.16	40	26- 4.80	57	37- 7.44	74	48-10.08	91	60- 0.72
7	4- 7.44	24	15-10.08	41	27- 0.72	58	38- 3.36	75	49- 6.00	92	60- 8.64
8	5- 3.36	25	16- 6.00	42	27- 8.64	59	38-11.28	76	50- 1.92	93	61- 4.56
9	5-11.28	26	17- 1.92	43	28- 4.56	60	39- 7.20	77	50- 9.84	94	62- 0.48
10	6- 7.20	27	17- 9.84	44	29- 0.48	61	40- 3.12	78	51- 5.76	95	62- 8.40
11	7- 3.12	28	18- 5.76	45	29- 8.40	62	40-11.04	79	52- 1.68	96	63- 4.32
12	7-11.04	29	19- 1.68	46	30- 4.32	63	41- 6.96	80	52- 9.60	97	64- 0.24
13	8- 6.96	30	19- 9.60	47	31- 0.24	64	42- 2.88	81	53- 5.52	98	64- 8.16
14	9- 2.88	31	20- 5.52	48	31- 8.16	65	42-10.80	82	54- 1.44	99	65- 4.08
15	9-10.80	32	21- 1.44	49	32- 4.08	66	43- 6.72	83	54- 9.36	100	66- .000
16	10- 6.72	33	21- 9.36	50	33- 0.00	67	44- 2.64	84	55- 5.28	101	66 -7.92
17	11- 2.64	34	22- 5.28	51	33- 7.92	68	44-10.56	85	56- 1.20	102	67- 3.34

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=10°	I	T	E	I=20°	I	T	E	I=30°
1°	50.00	.218	+	11°	551.70	26.500	+	21°	1061.9	97.577	+
10′	58.34	.297	5° C.	10′	560.11	27.313	5° C	10′	1070.6	99.155	5° C
20′	66.67	.388	T	20′	568.53	28.137	T	20′	1079.2	100.75	T
30′	75.01	.491	.03	30′	576.95	28.974	.06	30′	1087.8	102.35	.10
40′	83.34	.606	E	40′	585.36	29.824	E	40′	1096.4	103.97	E
50′	91.68	.733	.001	50′	593.79	30.686	.006	50′	1105.1	105.60	.013
2°	100.01	.873		12°	602.21	31.561		22°	1113.7	107.24	
10′	108.35	1.024		10′	610.64	32.447		10′	1122.4	108.90	
20′	116.68	1.188		20′	619.07	33.347		20′	1131.0	110.57	
30′	125.02	1.364		30′	627.50	34.259		30′	1139.7	112.25	
40′	133.36	1.552		40′	635.93	35.183		40′	1148.4	113.95	
50′	141.70	1.752		50′	644.37	36.120		50′	1157.0	115.66	
3°	150.04	1.964	10° C.	13°	652.81	37.070	10° C.	23°	1165.7	117.38	10° C.
10′	158.38	2.188	T	10′	661.25	38.031	T	10′	1174.4	119.12	T
20′	166.72	2.425	.06	20′	669.70	39.006	.13	20′	1183.1	120.87	.19
30′	175.06	2.674	E	30′	678.15	39.993	E	30′	1191.8	122.63	E
40′	183.40	2.934	.003	40′	686.60	40.992	.011	40′	1200.5	124.41	.025
50′	191.74	3.207		50′	695.06	42.004		50′	1209.2	126.20	
4°	200.08	3.492		14°	703.51	43.029		24°	1217.9	128.00	
10′	208.43	3.790		10′	711.97	44.066		10′	1226.6	129.82	
20′	216.77	4.099		20′	720.44	45.116		20′	1235.3	131.65	
30′	225.12	4.421		30′	728.90	46.178		30′	1244.0	133.50	
40′	233.47	4.755		40′	737.37	47.253		40′	1252.8	135.35	
50′	241.81	5.100	15° C.	50′	745.85	48.341	15° C.	50′	1261.5	137.23	15° C.
5°	250.16	5.459	T	15°	754.32	49.441	T	25°	1270.2	139.11	T
10′	258.51	5.829	.09	10′	762.80	50.554	.19	10′	1279.0	141.01	.29
20′	266.86	6.211	E	20′	771.29	51.679	E	20′	1287.7	142.93	E
30′	275.21	6.606	.004	30′	779.77	52.818	.017	30′	1296.5	144.85	.038
40′	283.57	7.013		40′	788.26	53.969		40′	1305.3	146.79	
50′	291.92	7.432		50′	796.75	55.132		50′	1314.0	148.75	
6°	300.28	7.863		16°	805.25	56.309		26°	1322.8	150.71	
10′	308.64	8.307		10′	813.75	57.498		10′	1331.6	152.69	
20′	316.99	8.762		20′	822.25	58.699		20′	1340.4	154.69	
30′	325.35	9.230		30′	830.76	59.914		30′	1349.2	156.70	
40′	333.71	9.710	20° C.	40′	839.27	61.141	20° C.	40′	1358.0	158.72	20° C.
50′	342.08	10.202	T	50′	847.78	62.381	T	50′	1366.8	160.76	T
7°	350.44	10.707	.13	17°	856.30	63.634	.26	27°	1375.6	162.81	.39
10′	358.81	11.224	E	10′	864.82	64.900	E	10′	1384.4	164.86	E
20′	367.17	11.753	.006	20′	873.35	66.178	.022	20′	1393.2	166.95	.051
30′	375.54	12.294		30′	881.88	67.470		30′	1402.0	169.04	
40′	383.91	12.847		40′	890.41	68.774		40′	1410.9	171.15	
50′	392.28	13.413		50′	898.95	70.091		50′	1419.7	173.27	
8°	400.66	13.991		18°	907.49	71.421		28°	1428.6	175.41	
10′	409.03	14.582		10′	916.03	72.764		10′	1437.4	177.55	
20′	417.41	15.184	25° C.	20′	924.58	74.119	25° C.	20′	1446.3	179.72	25° C.
30′	425.79	15.799	T	30′	933.13	75.488	T	30′	1455.1	181.89	T
40′	434.17	16.426	.16	40′	941.69	76.869	.32	40′	1464.0	184.08	.49
50′	442.55	17.065	E	50′	950.25	78.264	E	50′	1472.9	186.29	E
9°	450.93	17.717	.007	19°	958.81	79.671	.028	29°	1481.8	188.51	.065
10′	459.32	18.381		10′	967.38	81.092		10′	1490.7	190.74	
20′	467.71	19.058		20′	975.96	82.525		20′	1499.6	192.99	
30′	476.10	19.746		30′	984.53	83.972		30′	1508.5	195.25	
40′	484.49	20.447		40′	993.12	85.431		40′	1517.4	197.53	
50′	492.88	21.161		50′	1001.7	86.904		50′	1526.3	199.82	
10°	501.28	21.887	30° C.	20°	1010.3	88.389	30° C.	30°	1535.3	202.12	30° C.
10′	509.68	22.624	T	10′	1018.9	89.888	T	10′	1544.2	204.44	T
20′	518.08	23.375	.19	20′	1027.5	91.399	.39	20′	1553.1	206.77	.59
30′	526.48	24.138	E	30′	1036.1	92.924	E	30′	1562.1	209.12	E
40′	534.89	24.913	.008	40′	1044.7	94.462	.034	40′	1571.0	211.48	.078
50′	543.29	25.700		50′	1053.3	96.013		50′	1580.0	213.86	

T = R tan ½ I E = R exsec ½ I

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=40°	I	T	E	I=50°	I	T	E	I=60°
31°	1589.0	216.3	+	41°	2142.2	387.4	+	51°	2732.9	618.4	+
10′	1598.0	218.7	5° C.	10′	2151.7	390.7	5° C.	10′	2743.1	622.8	5° C.
20′	1606.9	221.1	T	20′	2161.2	394.1	T	20′	2753.4	627.2	T
30′	1615.9	223.5	.13	30′	2170.8	397.4	.17	30′	2763.7	631.7	.21
40′	1624.9	226.0	E	40′	2180.3	400.8	E	40′	2773.9	636.2	E
50′	1633.9	228.4	.023	50′	2189.9	404.2	.037	50′	2784.2	640.7	.056
32°	1643.0	230.9		42°	2199.4	407.6		52°	2794.5	645.2	
10′	1652.0	233.4		10′	2209.0	411.1		10′	2804.9	649.7	
20	1661.0	235.9		20′	2218.6	414.5		20′	2815.2	654.3	
30′	1670.0	238.4		30′	2228.1	418.0		30′	2825.6	658.8	
40′	1679.1	241.0		40′	2237.7	421.4		40′	2835.9	663.4	
50′	1688.1	243.5		50′	2247.3	425.0		50′	2846.3	668.0	
33°	1697.2	246.1	10° C.	43°	2257.0	428.5	10° C.	53°	2856.7	672.7	10° C.
10′	1706.3	248.7	T	10′	2266.6	432.0	T	10′	2867.1	677.3	T
20′	1715.3	251.3	.26	20′	2276.2	435.6	.34	20′	2877.5	682.0	.42
30′	1724.4	253.9	E	30′	2285.9	439.2	E	30′	2888.0	686.7	E
40′	1733.5	256.5	.046	40′	2295.6	442.8	.075	40′	2898.4	691.4	.112
50′	1742.6	259.1		50	2305.2	446.4		50′	2908.9	696.1	
34°	1751.7	261.8		44°	2314.9	450.0		54°	2919.4	700.9	
10′	1760.8	264.5		10′	2324.6	453.6		10′	2929.9	705.7	
20′	1770.0	267.2		20′	2334.3	457.3		20′	2940.4	710.5	
30′	1779.1	269.9		30′	2344.1	461.0		30′	2951.0	715.3	
40′	1788.2	272.6		40′	2353.8	464.6		40′	2961.5	720.1	
50′	1797.4	275.3	15° C.	50′	2363.5	468.4	15° C.	50′	2972.1	725.0	15° C.
35°	1806.6	278.1	T	45°	2373.3	472.1	T	55°	2982.7	729.9	T
10′	1815.7	280.8	.40	10′	2383.1	475.8	.51	10′	2993.3	734.8	.63
20′	1824.9	283.6	E	20′	2392.8	479.6	E	20′	3003.9	739.7	E
30′	1834.1	286.4	.070	30′	2402.6	483.4	.116	30′	3014.5	744.6	.168
40′	1843.3	289.2		40′	2412.4	487.2		40′	3025.2	749.6	
50′	1852.5	292.0		50′	2422.3	491.0		50′	3035.8	754.6	
36°	1861.7	294.9		46°	2432.1	494.8		56°	3046.5	759.6	
10′	1870.9	297.7		10′	2441.9	498.7		10′	3057.2	764.6	
20′	1880.1	300.6		20′	2451.8	502.5		20′	3067.9	769.7	
30′	1889.4	303.5		30′	2461.7	506.4		30′	3078.7	774.7	
40′	1898.6	306.4	20° C.	40′	2471.5	510.3	20° C.	40′	3089.4	779.8	20° C.
50′	1907.9	309.3	T	50′	2481.4	514.3	T	50′	3100.2	784.9	T
37°	1917.1	312.2	.53	47°	2491.3	518.2	.68	57°	3110.9	790.1	.84
10′	1926.4	315.2	E	10′	2501.2	522.2	E	10′	3121.7	795.2	E
20′	1935.7	318.1	.093	20′	2511.2	526.1	.151	20′	3132.6	800.4	.225
30′	1945.0	321.1		30′	2521.1	530.1		30′	3143.4	805.6	
40′	1954.3	324.1		40′	2531.1	534.2		40′	3154.2	810.9	
50′	1963.6	327.1		50′	2541.0	538.2		50′	3165.1	816.1	
38°	1972.9	330.2		48°	2551.0	542.2		58°	3176.0	821.4	
10′	1982.2	333.2		10′	2561.0	546.3		10′	3186.9	826.7	
20′	1991.5	336.3	25° C.	20′	2571.0	550.4	25° C.	20′	3197.8	832.0	25° C.
30′	2000.9	339.3	T	30′	2581.0	554.5	T	30′	3208.8	837.3	T
40′	2010.2	342.4	.67	40′	2591.0	558.6	.85	40′	3219.7	842.7	1.05
50′	2019.6	345.5	E	50′	2601.1	562.8	E	50′	3230.7	848.1	E
39°	2029.0	348.6	.117	49°	2611.2	566.9	.189	59°	3241.7	853.5	.283
10′	2038.4	351.8		10′	2621.2	571.1		10′	3252.7	858.9	
20′	2047.8	354.9		20′	2631.3	575.3		20′	3263.7	864.3	
30′	2057.2	358.1		30′	2641.4	579.5		30′	3274.8	869.8	
40′	2066.6	361.3		40′	2651.5	583.8		40′	3285.8	875.3	
50′	2076.0	364.5		50′	2661.6	588.0		50′	3296.9	880.8	
40°	2085.4	367.7	30° C.	50°	2671.8	592.3	30° C.	60°	3308.0	886.4	30° C.
10′	2094.9	371.0	T	10′	2681.9	596.6	T	10′	3319.1	892.0	T
20′	2104.3	374.2	.80	20′	2692.1	600.9	1.02	20′	3330.3	897.5	1.27
30′	2113.8	377.5	E	30′	2702.3	605.3	E	30′	3341.4	903.2	E
40′	2123.3	380.8	.141	40′	2712.5	609.6	.227	40′	3352.6	908.8	
50′	2132.7	384.1		50′	2722.7	614.0		50′	3363.8	914.5	.340

T = R tan ½ I E = R exsec ½ I

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=70°	I	T	E	I=80°	I	T	E	I=90°
61°	3375.0	920.2		71°	4086.9	1308.2		81°	4893.6	1805.3	
10′	3386.3	925.9	+	10′	4099.5	1315.6	+	10′	4908.0	1814.7	+
20′	3397.5	931.6	5° C.	20′	4112.1	1322.9	5° C.	20′	4922.5	1824.1	5° C.
30′	3408.8	937.3	T	30′	4124.8	1330.3	T	30′	4937.0	1833.6	T
40′	3420.1	943.1	.25	40′	4137.4	1337.7	.30	40′	4951.5	1843.1	.36
50′	3431.4	948.9	E	50′	4150.1	1345.1	E	50′	4966.1	1852.6	E
62°	3442.7	954.8	.080	72°	4162.8	1352.6	.110	82°	4980.7	1862.2	.149
10′	3454.1	960.6		10′	4175.6	1360.1		10′	4995.4	1871.8	
20′	3465.4	966.5		20′	4188.5	1367.6		20′	5010.0	1881.5	
30′	3476.8	972.4		30′	4201.2	1375.2		30′	5024.8	1891.2	
40′	3488.3	978.3		40′	4214.0	1382.8		40′	5039.5	1900.9	
50′	3499.7	984.3		50′	4226.8	1390.4		50′	5054.3	1910.7	
63°	3511.1	990.2		73°	4239.7	1398.0		83°	5069.2	1920.5	
10′	3522.6	996.2	10° C.	10′	4252.6	1405.7	10° C.	10′	5084.0	1930.4	10° C.
20′	3534.1	1002.3	T	20′	4265.6	1413.5	T	20′	5099.0	1940.3	T
30′	3545.6	1008.3	.51	30′	4278.5	1421.2	.61	30′	5113.9	1950.3	.72
40′	3557.2	1014.4	E	40′	4291.5	1429.0	E	40′	5128.9	1960.2	E
50′	3568.7	1020.5	.159	50′	4304.6	1436.8	.220	50′	5143.9	1970.3	.299
64°	3580.3	1026.6		74°	4317.6	1444.6		84°	5159.0	1980.4	
10′	3591.9	1032.8		10′	4330.7	1452.5		10′	5174.1	1990.5	
20′	3603.5	1039.0		20′	4343.8	1460.4		20′	5189.3	2000.6	
30′	3615.1	1045.2		30′	4356.9	1468.4		30′	5204.4	2010.8	
40′	3626.8	1051.4		40′	4370.1	1476.4		40′	5219.7	2021.1	
50′	3638.5	1057.7	15° C.	50′	4383.3	1484.4	15° C.	50′	5234.9	2031.4	15° C.
65°	3650.2	1063.9	T	75°	4396.5	1492.4	T	85°	5250.3	2041.7	T
10′	3661.9	1070.2	.76	10′	4409.8	1500.5	.91	10′	5265.6	2052.1	1.09
20′	3673.7	1076.6	E	20′	4423.1	1508.6	E	20′	5281.0	2062.5	E
30′	3685.4	1082.9	.240	30′	4436.4	1516.7	.332	30′	5296.4	2073.0	.450
40′	3697.2	1089.3		40′	4449.7	1524.9		40′	5311.9	2083.5	
50′	3709.0	1095.7		50′	4463.1	1533.1		50′	5327.4	2094.1	
66°	3720.9	1102.2		76°	4476.5	1541.4		86°	5343.0	2104.7	
10′	3732.7	1108.6		10′	4489.9	1549.7		10′	5358.6	2115.3	
20′	3744.6	1115.1		20′	4503.4	1558.0		20′	5374.2	2126.0	
30′	3756.5	1121.7		30′	4516.9	1566.3		30′	5389.9	2136.7	
40′	3768.5	1128.2	20° C.	40′	4530.4	1574.7	20° C.	40′	5405.6	2147.5	20° C.
50′	3780.4	1134.8	T	50′	4544.0	1583.1	T	50′	5421.4	2158.4	T
67°	3792.4	1141.4	1.02	77°	4557.6	1591.6	1.22	87°	5437.2	2169.2	1.45
10′	3804.4	1148.0	E	10′	4571.2	1600.1	E	10′	5453.1	2180.2	E
20′	3816.4	1154.7	.321	20′	4584.8	1608.6	.445	20′	5469.0	2191.1	.603
30′	3828.4	1161.3		30′	4598.5	1617.1		30′	5484.9	2202.2	
40′	3840.5	1168.1		40′	4612.2	1625.7		40′	5500.9	2213.2	
50′	3852.6	1174.8		50′	4626.0	1634.4		50′	5517.0	2224.3	
68°	3864.7	1181.6		78°	4639.8	1643.0		88°	5533.1	2235.5	
10′	3876.8	1188.4		10′	4653.6	1651.7		10′	5549.2	2246.7	
20′	3889.0	1195.2	25° C.	20′	4667.4	1660.5	25° C.	20′	5565.4	2258.0	25° C.
30′	3901.2	1202.0	T	30′	4681.3	1669.2	T	30′	5581.6	2269.3	T
40′	3913.4	1208.9	1.28	40′	4695.2	1678.1	1.53	40′	5597.8	2280.6	1.83
50′	3925.6	1215.8	E	50′	4709.2	1686.9	E	50′	5614.2	2292.0	E
69°	3937.9	1222.7	.403	79°	4723.2	1695.8	.558	89°	5630.5	2303.5	.756
10′	3950.2	1229.7		10′	4737.2	1704.7		10′	5646.9	2315.0	
20′	3962.5	1236.7		20′	4751.2	1713.7		20′	5663.4	2326.6	
30′	3974.8	1243.7		30′	4765.3	1722.7		30′	5679.9	2338.2	
40′	3987.2	1250.8		40′	4779.4	1731.7		40′	5696.4	2349.8	
50′	3999.5	1257.9		50′	4793.6	1740.8		50′	5713.0	2361.5	
70°	4011.9	1265.0	30° C.	80°	4807.7	1749.9	30° C.	90°	5729.7	2373.3	30° C.
10′	4024.4	1272.1	T	10′	4822.0	1759.0	T	10′	5746.3	2385.1	T
20′	4036.8	1279.3	1.54	20′	4836.2	1768.2	1.84	20′	5763.1	2397.0	2.20
30′	4049.3	1286.5	E	30′	4850.5	1777.4	E	30′	5779.9	2408.9	E
40′	4061.8	1293.6	.485	40′	4864.8	1786.7	.671	40′	5796.7	2420.9	.910
50′	4074.4	1300.9		50′	4879.2	1796.0		50′	5813.6	2432.9	

T = R tan ½ I E = R exsec ½ I

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=100°	I	T	E	I=110°	I	T	E	I=120°
91	5830.5	2444.9		101°	6950.6	3278.1		111°	8336.7	4386.1	
10′	5847.5	2457.1	+	10′	6971.3	3294.1	+	10′	8362.7	4407.6	+
20′	5864.6	2469.3	5° C.	20′	6992.0	3310.1	5° C.	20′	8388.9	4429.2	5° C.
30′	5881.7	2481.5	T	30′	7012.7	3326.1	T	30′	8415.1	4450.9	T
40′	5898.8	2493.8	.43	40′	7033.6	3342.3	.51	40′	8441.5	4472.7	.62
50′	5916.0	2506.1	E	50′	7054.5	3358.5	E	50′	8468.0	4494.6	E
92°	5933.2	2518.5	.200	102°	7075.5	3374.9	.268	112°	8494.6	4516.6	.360
10′	5950.5	2531.0		10′	7096.6	3391.2		10′	8521.3	4538.8	
20′	5967.9	2543.5		20′	7117.8	3407.7		20′	8548.1	4561.1	
30′	5985.3	2556.0		30′	7139.0	3424.3		30′	8575.0	4583.4	
40′	6002.7	2568.6		40′	7160.3	3440.9		40′	8602.1	4606.0	
50′	6020.2	2581.3		50′	7181.7	3457.6		50′	8629.3	4628.6	
93°	6037.8	2594.0	10° C.	103°	7203.2	3474.4	10° C.	113°	8656.6	4651.3	10° C.
10′	6055.4	2606.8	T	10′	7224.7	3491.3	T	10′	8684.0	4674.2	T
20′	6073.1	2619.7	.86	20′	7246.3	3508.2	.103	20′	8711.5	4697.2	1.25
30′	6090.8	2632.6	E	30′	7268.0	3525.2	E	30′	8739.2	4720.3	E
40′	6108.6	2645.5	.401	40′	7289.8	3542.4	.536	40′	8767.0	4743.6	.721
50′	6126.4	2658.5		50′	7311.7	3559.6		50′	8794.9	4766.9	
94°	6144.3	2671.6		104°	7333.6	3576.8		114°	8822.9	4790.4	
10′	6162.2	2684.7		10′	7355.6	3594.2		10′	8851.0	4814.1	
20′	6180.2	2697.9		20′	7377.8	3611.7		20′	8879.3	4837.8	
30′	6198.3	2711.2		30′	7399.9	3629.2		30′	8907.7	4861.7	
40′	6216.4	2724.5		40′	7422.2	3646.8		40′	8936.3	4885.7	
50′	6234.6	2737.9	15° C.	50′	7444.6	3664.5	15° C.	50′	8965.0	4909.9	15° C.
95°	6252.8	2751.3	T	105°	7467.0	3682.3	T	115°	8993.8	4934.1	T
10′	6271.1	2764.8	1.30	10′	7489.6	3700.2	1.56	10′	9022.7	4958.6	1.93
20′	6289.4	2778.3	E	20′	7512.2	3718.2	E	20′	9051.7	4983.1	E
30′	6307.9	2792.0	.604	30′	7534.9	3736.2	.806	30′	9080.9	5007.8	1.09
40′	6326.3	2805.6		40′	7557.7	3754.4		40′	9110.3	5032.6	
50′	6344.8	2819.4		50′	7580.5	3772.6		50′	9139.8	5057.6	
96°	6363.4	2833.2		106°	7603.5	3791.0		116°	9169.4	5082.7	
10′	6382.1	2847.0		10′	7626.6	3809.4		10′	9199.1	5107.9	
20′	6400.8	2861.0		20′	7649.7	3827.9		20′	9229.0	5133.3	
30′	6419.5	2875.0		30′	7672.9	3846.5		30′	9259.0	5158.8	
40′	6438.4	2889.0	20° C.	40′	7696.3	3865.2	20° C.	40′	9289.2	5184.5	20° C.
50′	6457.3	2903.1	T	50′	7719.7	3884.0	T	50′	9319.5	5210.3	T
97°	6476.2	2917.3	1.74	107°	7743.2	3902.9	2.08	117°	9349.9	5236.2	2.52
10′	6495.2	2931.6	E	10′	7766.8	3921.9	E	10′	9380.5	5262.3	E
20′	6514.3	2945.9	.809	20′	7790.5	3940.9	1.08	20′	9411.3	5288.6	1.46
30′	6533.4	2960.3		30′	7814.3	3960.1		30′	9442.2	5315.0	
40′	6552.6	2974.7		40′	7838.1	3979.4		40′	9473.2	5341.5	
50′	6571.9	2989.2		50′	7862.1	3998.7		50′	9504.4	5368.2	
98°	6591.2	3003.8		108°	7886.2	4018.2		118°	9535.7	5395.1	
10′	6610.6	3018.4	25° C.	10′	7910.4	4037.8	25° C.	10′	9567.2	5422.1	25° C.
20′	6630.1	3033.1	T	20′	7934.6	4057.4	T	20′	9598.9	5449.2	T
30′	6649.6	3047.9	2.18	30′	7959.0	4077.2	2.61	30′	9630.7	5476.5	3.16
40′	6669.2	3062.8	E	40′	7983.5	4097.1	E	40′	9662.6	5504.0	E
50′	6688.8	3077.7		50′	8008.0	4117.0		50′	9694.7	5531.7	
99°	6708.6	3092.7	1.02	109°	8032.7	4137.1	1.36	119°	9727.0	5559.4	1.83
10′	6728.4	3107.7		10′	8057.4	4157.3		10′	9759.4	5587.4	
20′	6748.2	3122.9		20′	8082.3	4177.5		20′	9792.0	5615.5	
30′	6768.1	3138.1		30′	8107.3	4197.9		30′	9824.8	5643.8	
40′	6788.1	3153.3		40′	8132.3	4218.4		40′	9857.7	5672.3	
50′	6808.2	3168.7		50′	8157.5	4239.0		50′	9890.8	5700.9	
100°	6828.3	3184.1	30° C.	110°	8182.8	4259.7	30° C.	120°	9924.0	5729.7	30° C.
10′	6848.5	3199.6	T	10′	8208.2	4280.5	T	10′	9957.5	5758.6	T
20′	6868.8	3215.1	2.62	20′	8233.7	4301.4	3.14	20′	9991.0	5787.7	3.81
30′	6889.2	3230.8	E	30′	8259.3	4322.4	E	30′	10025.0	5817.0	E
40′	6909.6	3246.5		40′	8285.0	4343.6		40′	10059.0	5846.5	
50′	6930.1	3262.3	1.22	50′	8310.8	4364.8	1.63	50′	10093.0	5876.1	2.20

T = R tan ½ I E = R exsec ½ I

Table X.

MIDDLE ORDINATES OF RAILS

Length of Rail (feet)

C ° ′	R Feet	30 Inch	28 Inch	26 Inch	24 Inch	22 Inch	20 Inch	C °	R Feet	30 Inch	28 Inch	26 Inch	24 Inch	22 Inch	20 Inch
0–20	17189	.08	.07	.06	.05	.04	.03	8	716.8	1.88	1.64	1.42	1.20	1.01	.84
0–40	8594	.16	.14	.12	.10	.08	.07	9	637.3	2.12	1.84	1.60	1.35	1.14	.94
1–0	5730	.24	.20	.18	.15	.13	.10	10	573.7	2.36	2.05	1.78	1.50	1.27	1.04
1–20	4297	.31	.27	.23	.20	.17	.13	11	521.7	2.59	2.26	1.95	1.65	1.39	1.15
1–40	3438	.39	.34	.29	.25	.21	.17	12	478.3	3.83	2.47	2.15	1.81	1.54	1.26
2–0	2865	.47	.41	.35	.30	.25	.20	13	441.7	3.05	2.66	2.30	1.96	1.66	1.36
2–20	2456	.55	.48	.41	.35	.29	.23	14	410.3	3.30	2.87	2.48	2.10	1.78	1.46
2–40	2149	.63	.55	.47	.40	.33	.27	15	383.1	3.54	3.08	2.68	2.26	1.91	1.57
3–0	1910	.71	.62	.53	.45	.38	.31	16	359.3	3.76	3.28	2.83	2.40	2.04	1.67
3–20	1719	.78	.68	.59	.50	.42	.35	17	338.3	4.00	3.48	3.02	2.57	2.16	1.78
3–40	1563	.86	.75	.65	.55	.46	.38	18	319.6	4.21	3.67	3.18	2.70	2.28	1.87
4–0	1433	.94	.82	.71	.60	.50	.42	19	302.9	4.45	3.89	3.36	2.86	2.41	1.98
4–20	1323	1.02	.89	.77	.65	.55	.45	20	287.9	4.70	4.09	3.55	3.00	2.54	2.09
4–40	1228	1.10	.96	.83	.70	.59	.48	22	262.0	5.16	4.44	3.84	3.30	2.80	2.29
5	1146	1.18	1.03	.89	.75	.63	.52	24	240.5	5.64	4.92	4.20	3.59	3.04	2.50
6	955.3	1.41	1.23	1.06	.90	.76	.62	26	222.3	6.07	5.29	4.58	3.88	3.29	2.70
7	819.0	1.65	1.44	1.24	1.05	.89	.73								

Table XI.

SHORT RADIUS CURVES

Radius Feet	Chord Feet	Central Angle	Deflection Angle	Deflection for 1 Foot
35	10	16-26	8-13	49.3
45	10	12-46	6-23	38.3
50	15	17-16	8-38	34.5
60	15	14-22	7-11	28.8
75	15	11-30	5-45	23.0
100	20	11-30	5-45	17.3
120	20	9-34	4-47	14.3
150	20	7-39	3-49	11.5
190	25	7-32	3-46	9.15
200	25	7-10	3-35	8.6
225	25	6-25	3-12	7.7
240	25	5-58	2-59	7.2
250	25	5-44	2-52	6.9
275	25	5-12	2-36	6.2
288	50	9-58	4-59	6.0
300	50	9-32	4-46	5.7
350	50	8-12	4-06	4.9
376	50	7-40	3-50	4.6
400	50	7-10	3-35	4.3
410	50	7-00	3-30	4.2

To find length of curve divide angle from P. C. to P. T. by central angle of chord, and multiply by length of chord.

Table XII.

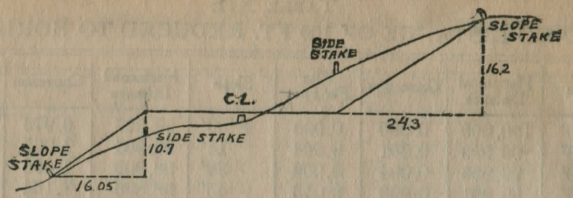
INCLINED DISTANCE OF 100 FT. REDUCED TO HORIZONTAL

Slope	Horizontal Distance	Correction	Rise Per Foot	Slope	Horizontal Distance	Correction	Rise Per Foot
0°00′	100.000	0.000	0.000	8°00′	99.027	0.973	0.139
15′	99.999	0.001	0.004	15′	98.965	1.035	0.143
30′	99.996	0.004	0.009	30′	98.902	1.098	0.148
45′	99.991	0.009	0.013	45′	98.836	1.164	0.152
1 00	99.985	0.015	0.017	9 00	98.769	1.231	0.156
15	99.976	0.024	0.022	15	98.700	1.300	0.161
30	99.966	0.034	0.026	30	98.629	1.371	0.165
45	99.953	0.047	0.031	45	98.556	1.444	0.169
2 00	99.939	0.061	0.035	10 00	98.481	1.519	0.174
15	99.923	0.077	0.039	15	98.404	1.596	0.178
30	99.905	0.095	0.044	30	98.325	1.675	0.182
45	99.885	0.115	0.048	45	98.245	1.755	0.187
3 00	99.863	0.137	0.052	11 00	98.163	1.837	0.191
15	99.839	0.161	0.057	15	98.079	1.921	0.195
30	99.813	0.187	0.061	30	97.992	2.008	0.199
45	99.786	0.214	0.065	45	97.905	2.095	0.204
4 00	99.756	0.244	0.070	12 00	97.815	2.185	0.208
15	99.725	0.275	0.074	15	97.723	2.277	0.212
30	99.692	0.308	0.078	30	97.630	2.370	0.216
45	99.657	0.343	0.083	45	97.534	2.466	0.221
5 00	99.619	0.381	0.087	13 00	97.437	2.563	0.225
15	99.580	0.420	0.092	15	97.338	2.662	0.229
30	99.540	0.460	0.096	30	97.237	2.763	0.233
45	99.497	0.503	0.100	45	97.134	2.866	0.238
6 00	99.452	0.548	0.105	14 00	97.030	2.970	0.242
15	99.406	0.594	0.109	15	96.923	3.077	0.246
30	99.357	0.643	0.113	30	96.815	3.185	0.250
45	99.307	0.693	0.118	45	96.705	3.295	0.255
7 00	99.255	0.745	0.122	15 00	96.593	3.407	0.259
15	99.200	0.800	0.126	15	96.479	3.521	0.263
30	99.144	0.856	0.131	30	96.363	3.637	0.267
45	99.087	0.913	0.135	45	96.246	3.754	0.271

Table XIII.

MINUTES IN DECIMALS OF A DEGREE.

0 30″	.00833	10′ 30″	.17500	20′ 30″	.34167	30′ 10″	.50833	40′ 30″	.67500	50′ 10″	.84167
1 00	.01667	11 00	.18333	21 00	.35000	31 00	.51667	41 00	.68333	51 00	.85000
30	.02500	30	.19167	30	.35833	30	.52500	30	.69167	30	.85833
2 00	.03333	12 00	.20000	22 00	.36667	32 00	.53333	42 00	.70000	52 00	.86667
30	.04167	30	.20833	30	.37500	30	.54167	30	.70833	30	.87500
3 00	.05000	13 00	.21667	23 00	.38333	33 00	.55000	43 00	.71667	53 00	.88333
30	.05833	30	.22500	30	.39167	30	.55833	30	.72500	30	.89167
4 00	.06667	14 00	.23333	24 00	.40000	34 00	.56667	44 00	.73333	54 00	.90000
30	.07500	30	.24167	30	.40833	30	.57500	30	.74167	30	.90833
5 00	.08333	15 00	.25000	25 00	.41667	35 00	.58333	45 00	.75000	55 00	.91667
30	.09167	30	.25833	30	.42500	30	.59167	30	.75833	30	.92500
6 00	.10000	16 00	.26667	26 00	.43333	36 00	.60000	46 00	.76667	56 00	.93333
30	.10833	30	.27500	30	.44167	30	.60833	30	.77500	30	.94167
7 00	.11667	17 00	.28333	27 00	.45000	37 00	.61667	47 00	.78333	57 00	.95000
30	.12500	30	.29167	30	.45833	30	.62500	30	.79167	30	.95833
8 00	.13333	18 00	.30000	28 00	.46667	38 00	.63333	48 00	.80000	58 00	.96667
30	.14167	30	.30833	30	.47500	30	.64167	30	.80833	30	.97500
9 00	.15000	19 00	.31667	29 00	.48333	39 00	.65000	49 00	.81667	59 00	.98333
30	.15833	30	.32500	30	.49167	30	.65833	30	.82500	30	.99167
10 00	.16667	20 00	.33333	30 00	.50000	40 00	.66667	50 00	.83333	60 00	1.00000



DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING.

SLOPE 1½ TO 1. ROADWAY OF ANY WIDTH.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0 00	0 15	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	0
1	1.50	1 65	1 80	1.95	2.10	2.25	2.40	2.55	2.70	2.85	1
2	3.00	3.15	3.30	3 45	3.60	3 75	3.90	4.05	4.20	4 35	2
3	4.50	4 65	4.80	4.95	5.10	5 25	5 40	5.55	5.70	5.85	3
4	6.00	6 15	6.30	6.45	6.60	6.75	6.90	7.05	7.20	7.35	4
5	7 50	7.65	7.80	7.95	8.10	8.25	8.40	8.55	8.70	8.85	5
6	9 00	9 15	9.30	9.45	9.60	9.75	9.90	10.05	10.20	10.35	6
7	10.50	10 65	10.80	10.95	11.10	11.25	11.40	11.55	11 70	11.85	7
8	12.00	12 15	12.30	12.45	12.60	12.75	12.90	13.05	13.20	13.35	8
9	13 50	13.65	13 80	13 95	14.10	14.25	14.40	14 55	14.70	14.85	9
10	15.00	15 15	15 30	15 45	15.60	15.75	15.90	16.05	16.20	16 35	10
11	16 50	16 65	16 80	16.95	17 10	17.25	17.40	17.55	17.70	17.85	11
12	18 00	18.15	18.30	18 45	18.60	18 75	18.90	19.05	19.20	19.35	12
13	19 50	19 65	19.80	19.95	20.10	20.25	20 40	20.55	20.70	20.85	13
14	21.00	21 15	21.30	21.45	21 60	21.75	21.90	22 05	22 20	22 35	14
15	22 50	22 65	22 80	22 95	23.10	23.25	23.40	23.55	23.70	23.85	15
16	24.00	24 15	24 30	24 45	24.60	24.75	24 90	25 05	25.20	25.35	16
17	25.50	25 65	25.80	25 95	26.10	26 25	26 40	26.55	26.70	26.85	17
18	27.00	27 15	27.30	27 45	27.60	27.75	27.90	28.05	28 20	28.35	18
19	28 50	28 65	28 80	28.95	29.10	29.25	29.40	29.55	29.70	29.85	19
20	30 00	30.15	30.30	30.45	30.60	30.75	30.90	31.05	31.20	31.35	20
21	31 50	31 65	31.80	31.95	32 10	32 25	32.40	32.55	32 70	32 85	21
22	33 00	33 15	33 30	33 45	33.60	33 75	33.90	34.05	34.20	34.35	22
23	34 50	34 65	34.80	34.95	35.10	35 25	35 40	35.55	35.70	35 85	23
24	36.00	36 15	36.30	36 45	36.60	36.75	36.90	37.05	37.20	37.35	24
25	37.50	37.65	37 80	37.95	38.10	38.25	38.40	38.55	38.70	38.85	25
26	39 00	39 15	39.30	39 45	39 60	39.75	39.90	40.05	40.20	40.35	26
27	40 50	40 65	40 80	40.95	41.10	41.25	41 40	41.55	41.70	41.85	27
28	42 00	42 15	42.30	42.45	42.60	42 75	42.90	43.05	43.20	43.35	28
29	43 50	43 65	43.80	43 95	44.10	44 25	44 40	44.55	44.70	44 85	29
30	45 00	45 15	45.30	45 45	45.60	45.75	45.90	46.05	46 20	46.35	30
31	46.50	46.65	46.80	46 95	47.10	47.25	47.40	47.55	47.70	47.85	31
32	48 00	48.15	48.30	48 45	48.60	48 75	48.90	49.05	49 20	49.35	32
33	49.50	49 65	49.80	49.95	50.10	50.25	50.40	50.55	50.70	50.85	33
34	51 00	51.15	51.30	51.45	51.60	51.75	51.90	52.05	52.20	52.35	34
35	52 50	52.65	52.80	52.95	53.10	53.25	53.40	53.55	53.70	53.85	35
36	54 00	54.15	54.30	54 45	54.60	54.75	54.90	55.05	55.20	55.35	36
37	55 50	55 65	55.80	55.95	56.10	56.25	56.40	56.55	56.70	56.85	37
38	57.00	57.15	57.30	57 45	57.60	57.75	57.90	58.05	58.20	58 35	38
39	58 50	58.65	58 80	58.95	59.10	59 25	59.40	59 55	59.70	59.85	39
40	60 00	60.15	60 30	60 45	60 60	60.75	60 90	61.05	61 20	61.35	40
41	61.50	61 65	61 80	61 95	62 10	62 25	62.40	62 55	62 70	62.85	41
42	63 00	63.15	63 30	63 45	63 60	63 75	63 90	64 05	64 20	64.35	42
43	64.50	64 65	64 80	64.95	65.10	65 25	65 40	65.55	65.70	65.85	43
44	66 00	66 15	66 30	66.45	66.60	66.75	66.90	67.05	67.20	67.35	44
45	67 50	67 65	67 80	67.95	68.10	68.25	68.40	68.55	68.70	68.85	45
46	69 00	69 15	69 30	69.45	69.60	69.75	69.90	70.05	70.20	70.35	46
47	70.50	70 65	70 80	70 95	71.10	71.25	71.40	71.55	71.70	71.85	47
48	72.00	72 15	72.30	72.45	72.60	72.75	72.90	73 05	73.20	73 35	48
49	73 50	73 65	73.80	73.95	74.10	74.25	74.40	74.55	74.70	74.85	49
50	75.00	75.15	75.30	75.45	75.60	75.75	75.90	76.05	76.20	76.35	50

Computed by L. Leland Locke.

TABLE OF INCHES REDUCED TO DECIMALS OF A FOOT.

Ins.	Dec.	Ins.	Dec.	Ins.	Dec.	Ins.	Dec.	Ins.	Dec.	Ins.	Dec.	Ins.	Dec.	Ins.	Dec.
1/16	.0052	5/16	.1094	9/16	.2135	13/16	.3177	1/16	.4219	5/16	.5260	9/16	.6302	13/16	.7344	1/16	.8385	5/16	.9427
1/8	.0104	3/8	.1146	5/8	.2188	7/8	.3229	1/8	.4271	3/8	.5313	5/8	.6354	7/8	.7396	1/8	.8438	3/8	.9479
3/16	.0156	7/16	.1198	11/16	.2240	15/16	.3281	3/16	.4323	7/16	.5365	11/16	.6406	15/16	.7448	3/16	.8490	7/16	.9531
1/4	.0208	1/2	.1250	3/4	.2292	1	.3333	1/4	.4375	1/2	.5417	3/4	.6458	1	.7500	1/4	.8542	1/2	.9583
5/16	.0260	9/16	.1302	13/16	.2344	1 1/16	.3385	5/16	.4427	9/16	.5469	13/16	.6510	1 1/16	.7552	5/16	.8594	9/16	.9635
3/8	.0313	5/8	.1354	7/8	.2396	1 1/8	.3438	3/8	.4479	5/8	.5521	7/8	.6563	1 1/8	.7604	3/8	.8646	5/8	.9688
7/16	.0365	11/16	.1406	15/16	.2448	1 3/16	.3490	7/16	.4531	11/16	.5573	15/16	.6615	1 3/16	.7656	7/16	.8698	11/16	.9740
1/2	.0417	3/4	.1458	1	.2500	1 1/4	.3542	1/2	.4583	3/4	.5625	1	.6667	1 1/4	.7708	1/2	.8750	3/4	.9792
9/16	.0469	13/16	.1510	1 1/16	.2552	1 5/16	.3594	9/16	.4635	13/16	.5677	1 1/16	.6719	1 5/16	.7760	9/16	.8802	13/16	.9844
5/8	.0521	7/8	.1563	1 1/8	.2604	1 3/8	.3646	5/8	.4688	7/8	.5729	1 1/8	.6771	1 3/8	.7813	5/8	.8854	7/8	.9896
11/16	.0573	15/16	.1615	1 3/16	.2656	1 7/16	.3698	11/16	.4740	15/16	.5781	1 3/16	.6823	1 7/16	.7865	11/16	.8906	15/16	.9948
3/4	.0625	1	.1667	1 1/4	.2708	1 1/2	.3750	3/4	.4792	1	.5833	1 1/4	.6875	1 1/2	.7917	3/4	.8958	1	1.0000
13/16	.0677	1 1/16	.1719	1 5/16	.2760	1 9/16	.3802	13/16	.4844	1 1/16	.5885	1 5/16	.6927	1 9/16	.7969	13/16	.9010	1 1/16	1.0052
7/8	.0729	1 1/8	.1771	1 3/8	.2813	1 5/8	.3854	7/8	.4896	1	.5938	1 3/8	.6979	1 5/8	.8021	7/8	.9063	1 1/8	1.0104
15/16	.0781	1 3/16	.1823	1 7/16	.2865	1 11/16	.3906	15/16	.4948	1 1/16	.5990	1 7/16	.7031	1 11/16	.8073	15/16	.9115	1 3/16	1.0156
1	.0833	1 1/4	.1875	1 1/2	.2917	1 3/4	.3958	1	.5000	1 1/8	.6042	1 1/2	.7083	1 3/4	.8125	1	.9167	1 1/4	1.0208
1 1/16	.0885	1 5/16	.1927	1 9/16	.2969	1 13/16	.4010	1 1/16	.5052	1 3/16	.6094	1 9/16	.7135	1 13/16	.8177	1 1/16	.9219	1 5/16	1.0260
1 1/8	.0938	1 3/8	.1979	1 5/8	.3021	1 7/8	.4063	1 1/8	.5104	1 5/16	.6146	1 5/8	.7188	1 7/8	.8229	1 1/8	.9271	1 3/8	1.0313
1 3/16	.0990	1 7/16	.2031	1 11/16	.3073	1 15/16	.4115	1 3/16	.5156	1 7/16	.6198	1 11/16	.7240	1 15/16	.8281	1 3/16	.9323	1 7/16	1.0365
1 1/4	.1042	1 1/2	.2083	1 3/4	.3125	2	.4167	1 1/4	.5208	1 1/2	.6250	1 3/4	.7292	2	.8333	1 1/4	.9375	1 1/2	1.0417

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