

K & E
FIELD BOOK
F 360

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

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

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



Cut or Fill	Distance out from Side or Shoulder Stake																			Cut or Fill
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9										
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0									
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1									
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2									
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3									
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4									
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5									
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6									
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7									
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8									
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9									
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10									
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11									
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12									
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13									
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14									
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15									
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16									
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17									
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18									
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19									
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20									
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21									
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22									
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23									
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24									
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25									
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26									
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27									
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28									
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29									
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30									
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31									
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32									
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33									
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34									
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35									
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36									
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37									
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38									
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59.7	59.9	39									
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40									

KEUFFEL & ESSER CO., N. Y.

For Curve Tables see end of book.

BOOK 164

PLEASE RETURN TO
 ENGINEERS OFFICE
 CHARDON, OHIO
 Phone 250-X

Road Township Pages
 HEATH (Sec. E¹) Chester 1-10
 FULLERTOWN Newby, Russell, Chester. 11-

26
 73 45

The paper in this book No. F360

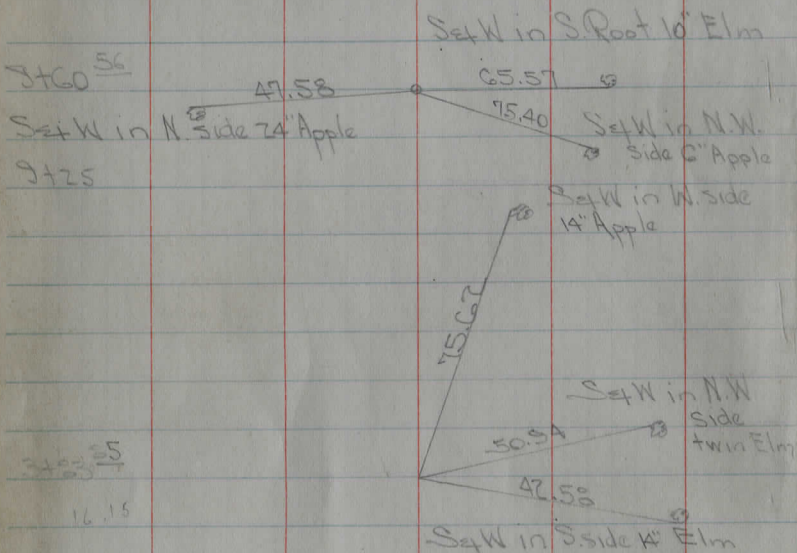
is made of 100% high grade rag stock
 with a WATER RESISTING surface sizing.

5/2/39 Fair-Cool
 Tomeroy - Clause - Willman

HEATH ROAD (Sec. E & F)

10:40 to 11:20

10 to 25' stake



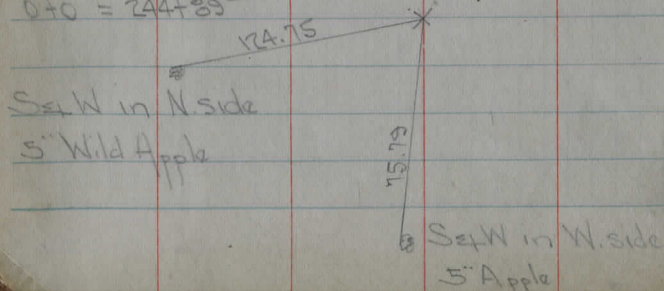
3 to 5
 16.15

3 to

20' stake

Stakes set at 30 unless otherwise noted.

0 to = 244+89⁰³



Note! Only tangent distances used. L

5' bank

66

97' Steep slope to creek

174-11 W
 348°-23'

I. Bolt (Set)

Hodse

Ex. Id.

SpK (set)

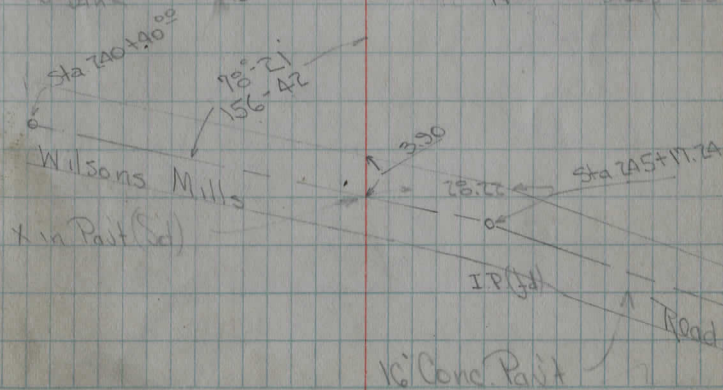
173-24 East
 352°-47'

5' bank

10'

14'

Steep dip 20'



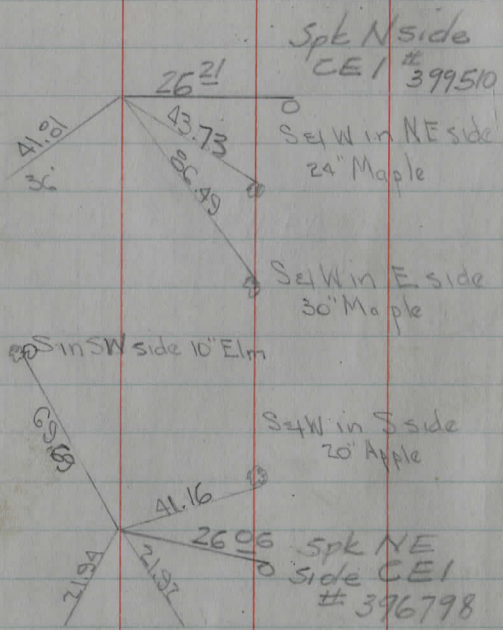
19+76²²

PC 17
Set W in SE side
side 30 Locust

19+35

15+05 to 10+0

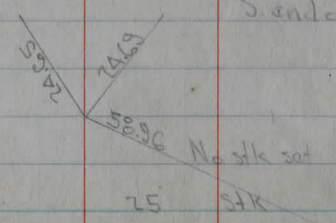
13+10⁸³



Inside edges steel uprights N end of bridge

13+0

North
Inside edges steel uprights
S end of bridge



Set W in W side 30 Sycamore

17+06⁶⁶

12+0

11+0

A = 5°-52' RT

D = 1°-30'

T = 135.75

L = 351.11

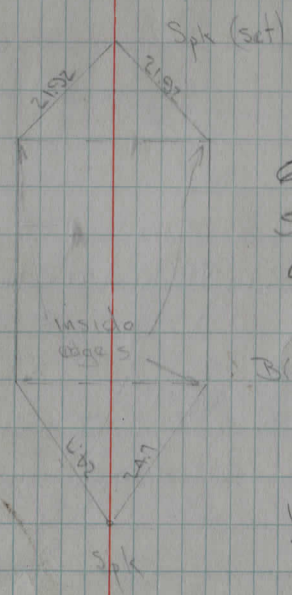
P.C. = 17+81.47

P.T. = 21+72.58

114-07 E
348-16
I. Bolt (set)
Fd 3" under Nov 48

3" Loc. 12.6 23 Rail fence
16' Hedge enter low

116-44 W
233-23

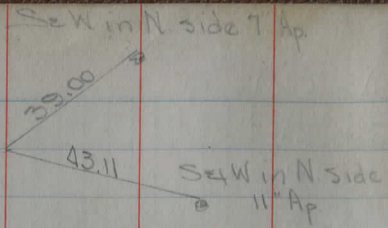


60' R.R. steel beams

Bridge 12+24

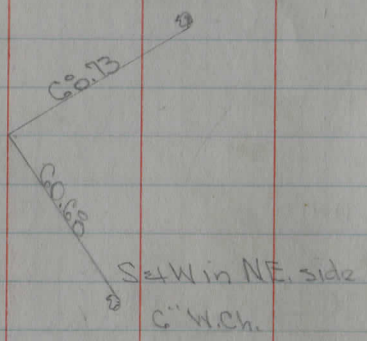
135-27 E
270-55

57+70⁸³



56+61⁷¹ = 109+09.09

se W in S.W. Root 20 Maple

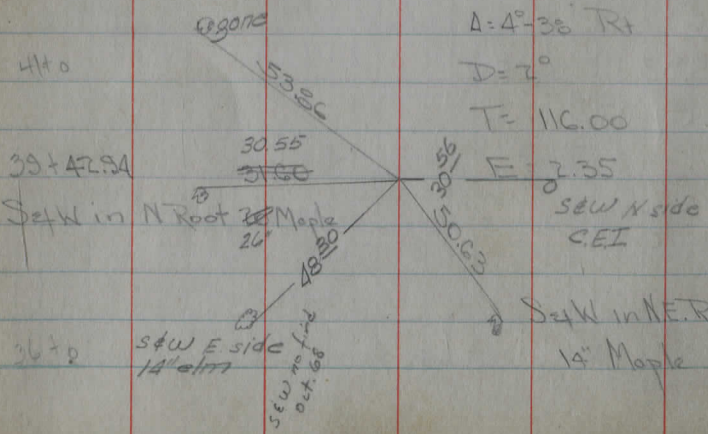


56+40⁶⁸

52+50

50+0

se W in S.W. Root 20 Elm



44+0

39+42.94

se W in N Root 20 Maple 20'

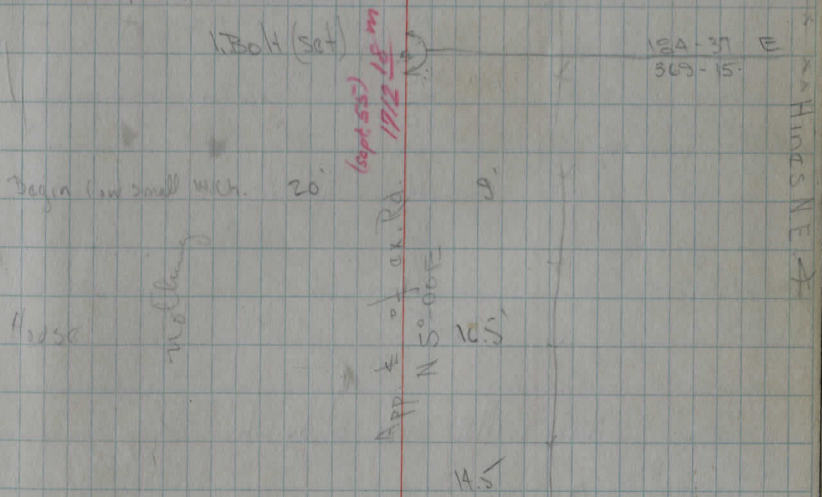
36+0

se W E side 14 Elm
se W in N side 14 Elm

I Pin set Sept 55 at the int. of Mulberry and the prolongation of the line from sta 39+42.94 to sta 56+46.68 (this took E. side of Rd)

Mulberry Corners

Gravel



I Bolt fd.

Sept. 55

24 M 30'

large apple 17'

I Bolt (set)

30'

12'

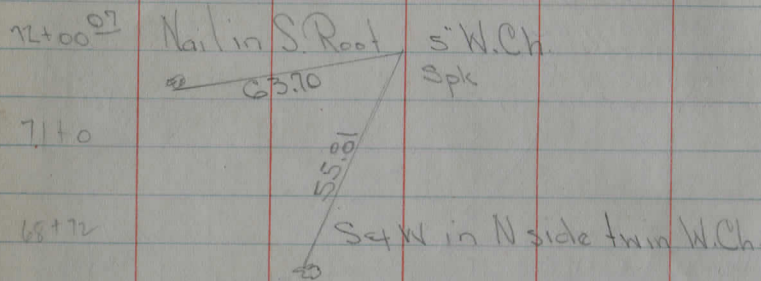
BOLT FD. BENT TO S. OCT 68

115.22 E

350.42

173.20

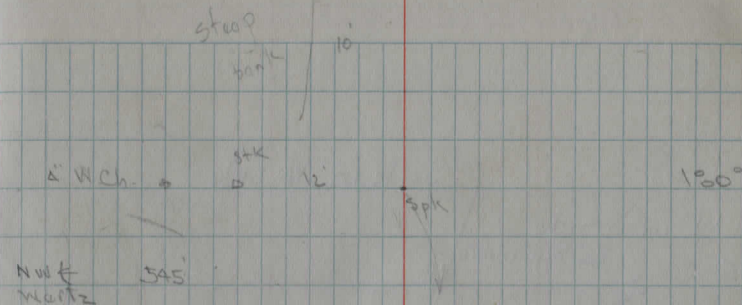
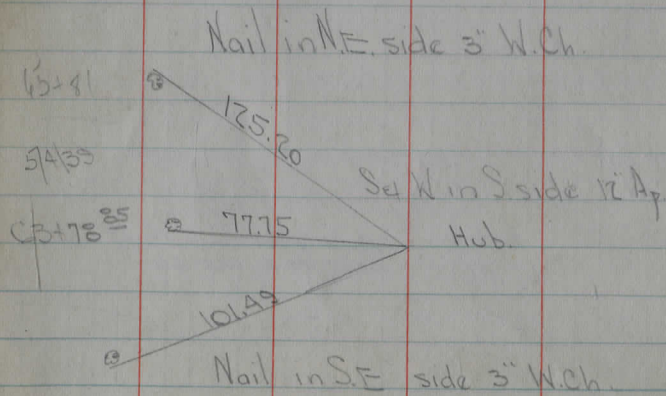
hence some tracks



67+01

N 15°-45' E (obs)

66+24

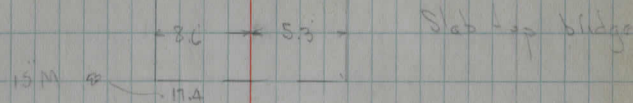


House 205'

E ± 3 E of ex. rd E

↑ Lateral M

18'



15 M 18'

Δ = 12°-24' R

D = 6°

R = 955.79

12 Ext

T = 154.718

101-30 E

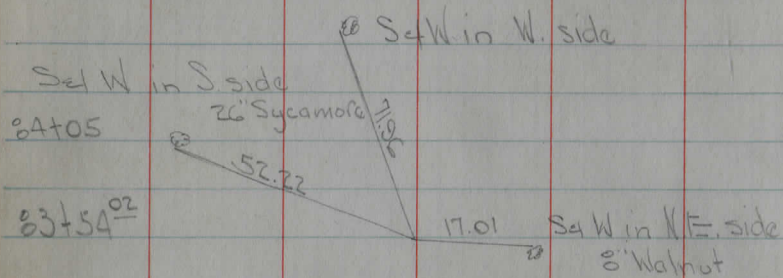
L = 306.67

323-12

E 12.44

P.C. = 62+24.13

P.T. = 65+30.80



80+0

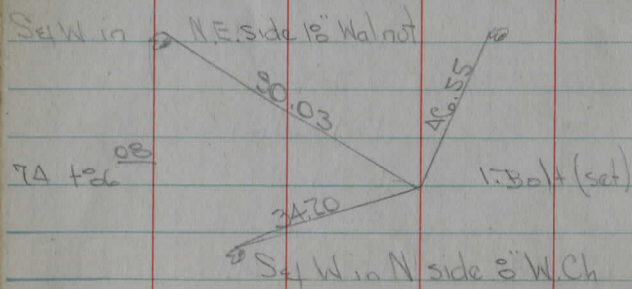
79+28

79+0

78+51

78+0

75+00



110-56 W
 221-52

Hub

SHK 25'

E 1' W of E edge of rd
 Pine
 32' → 22' Pine
 4.15' E of edge of rd
 30' → 50' Elm
 E at E edge of rd

104-13 W
 329-26

Δ = 15°-47' Lt
 D = 8"
 T = 99.3°
 E = C.86

Note: See book 29 page 37 for deviation
of Co. Line et of Co. Line Rd.

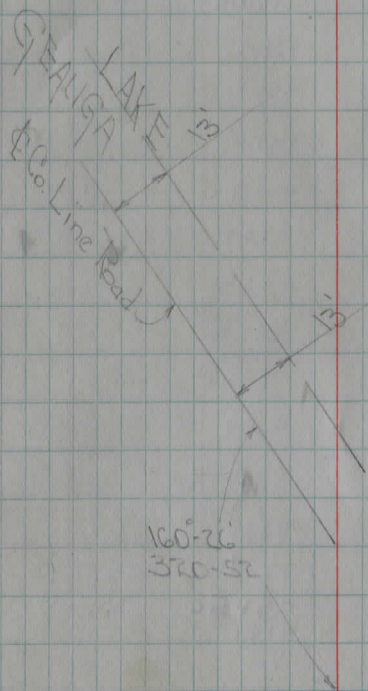
Set W in SE. side 10" Locust.

Set W in W side 10" W. Ch

25° 30' ^{OC}

Set W in NE. side 10" Walnut

25° 21' ^S



Approx. Heath Road in
Lake Co.

5/9/39 Squally Pameloy - Close - Willman

B.M. 552 942.59 937.09
135 929.1

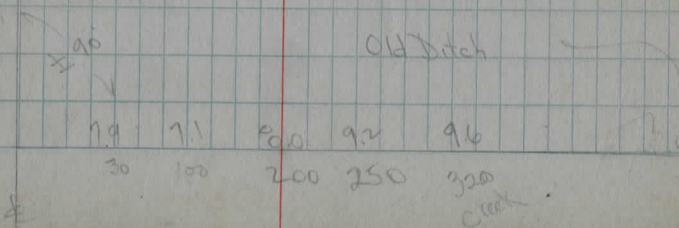
Transit set at Sta. 56 + 46⁶⁰ Ang's turned from south. (to left) Shots taken along channel

Ang.	Dist	Rod	
26-02	233	12.6	930.0 Creek
81-02	200	11.2	931.4
81-52	182	11.3	931.3
82-40	161	11.2	931.4
77-13	130	10.9	931.7
59-45	97	10.4	932.2
39-09	91	10.0	932.4
24-35	93	10.0	932.6
19-14	110	10.0	932.6
13-30	169	2.0 ✓	933.8
33-19	212	9.3	933.3
17-54	238	9.0	933.6
13-56	290	0.7	933.9
6-03	308	0.5	53 + 50 35 R4 934.1

54 to 5.9 ± 936.7
53 to 6.3 ± 936.3
53 + 60

Spk set in SE Root 22" Maple Sta 56 + 98 50' Rt
F.L. Inlet and culvert ± 230' East of intersection

±



		942.59		
TP	402	940.80	5.81	936.78
S2			4.7 ±	936.1
S1			4.5 ±	936.3
S0			4.6 ±	936.2
A9			4.3 ±	936.5
A8			4.1 ±	936.7
A7			3.0	939.2
A6			5.2	937.6
TP	673	944.33	3.70	937.60
A5			6.2	938.1
A4			5.5	938.8
A3			4.8	939.5
A2			3.9	940.4
A1			2.3	942.0
A0			1.2	943.1
39			2.9	941.4

#

5/27/33

Pomroy
Willman
Glouse

Stakes for culvert & Ditch
HEATH ROAD

ground E. of stakes

ground E. of stakes

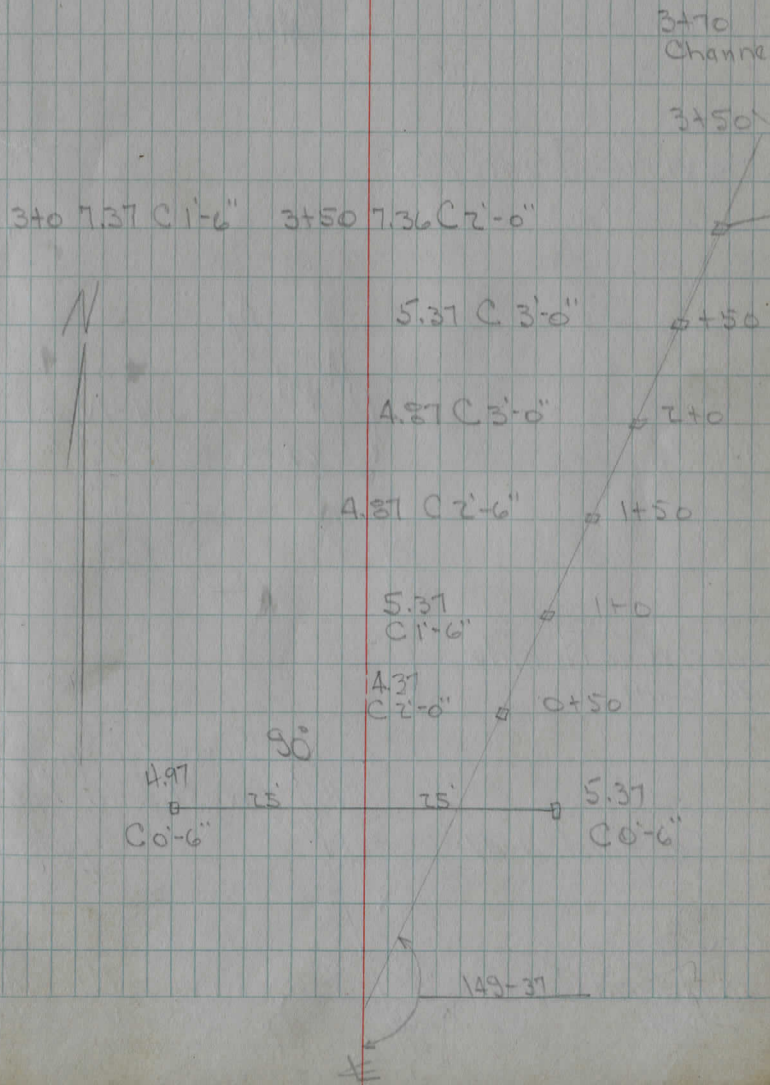
Channel	170	9.6
	150	8.2
	370	7.8
	150	5.9
	210	5.1
	450	5.7
	170	6.1
	0+50	5.4

-53+50

337
E

BM	760	939.67	937.07
53+31			

Grade = 1%



9/25/39

Pomeroy
Richards
Clause

Set W, W side
Tel. pole

22+00

31.28

90.72

Mon.
May 64
Set

Set W, NE side 20" Elm

17.00

9+13.00

P.I. ±

62.39

Mon.
May 64
Set

Set W - N side
20" Twin Ch.

170.36

Spike W in N side
24" Elm

Lowest step spike
west side Tel.
pole

Fd Flush 7-47

92.55

0+0

X N End Conc
Hdwall

31.40

74.00

Set W in NE side
Tel. pole
Set W in E side
Tel. pole

40.50

SPERRY C.H.#12

11

FULLERTOWN ROAD

N6-1730 W

N6-2730 E

Iron pipe (fd) $\Delta = 6'-45"$
 $D = 3"$

P.I. = 22+00

T = 112.63

PC = 20+87.37

L = 225.00

PT = 23+12.37

P.O.T.

Pio (fd) $\Delta = 0'-0"$

Bolt (set)

SH33
SR87

Cleveland 16' Bit.
Buttore Mac.

56 499.73

N.E. 4 Tile found House

38.88

Mon. Box Set May 64

Set Win

W. side 10"

Pear.

13.19

38.35

Set Win W side 12" Apple

Set Win S side 6" Elm

Set Win W side 22" Maple

46.50

44.30

Mon. Box Set May 64

43 01.80

62.84

Set Win N side 14" Apple

Set Win S.W

side C.F. l. pole # 15881

75.90

Mon. Box Set May 64

27 31.90

100.24

Set Win E side

C.F. l. pole # 15888

80.19

Set Win S.W. side 10" Apple

N4-29-30E

Iron pipe (fd) Δ = 1°-50' Lt

N6-19-30E

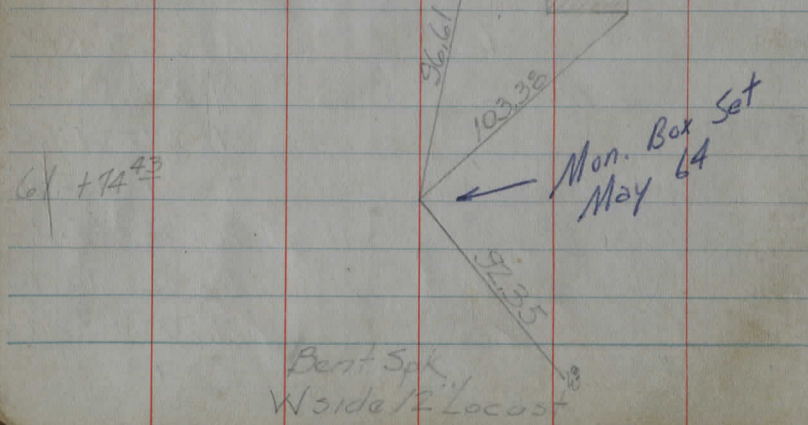
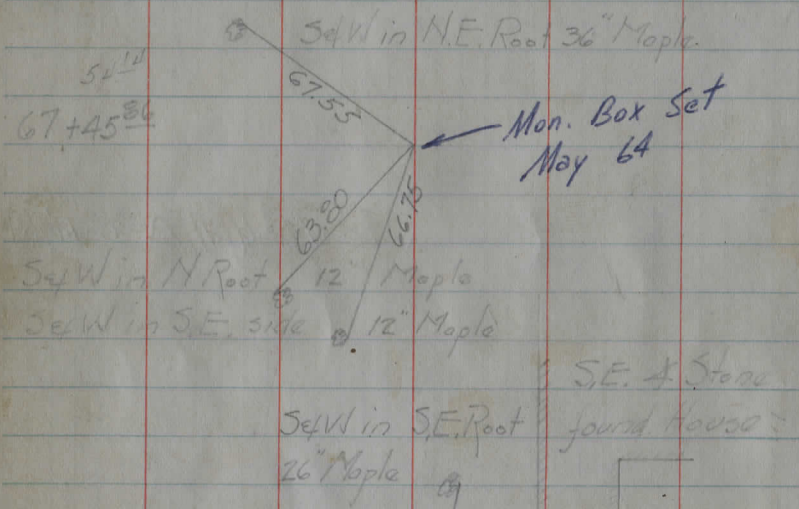
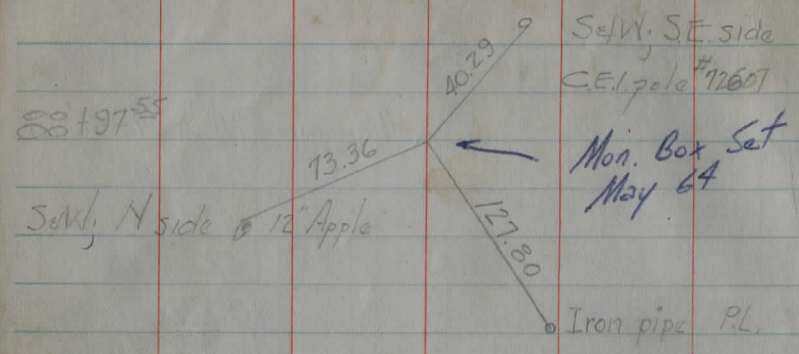
5699.73
4301.80
1397.93

N6-05-30E

Iron Rod (fd) Δ = 0°-14' Rt

N0-17-30W

Δ = 6°-23' Rt ✓
D = 3° ✓
PI = 27 + 31.90 ✓
T = 1 06.51 ✓
Bolt (set) PC = 26 + 25.38 ✓
L = 2 12.78 ✓
PT = 28 + 38.16 ✓
E = 2.97 ✓



P.O.T.

Iron pipe (fd)

N 19-51-30 W

$\Delta = 3-43' Lt$

Bent pipe fd replaced with Iron rod.

N 16-08-30 W

check curve

$\Delta = 20-38' Lt$
 $D = 10'$
 $R = 572.958 \checkmark$

TH 144 Penn Rd
 ± 68-10
 of Dennis Cor.
 road.

± 111-26

Iron pipe (fd)

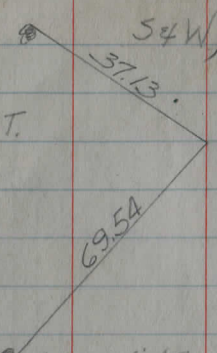
PC = 60+70.13 ✓
 PT = 62+76.46 ✓

T = 104.30 ✓
 L = 206.33 ✓

N 4-19-30 E

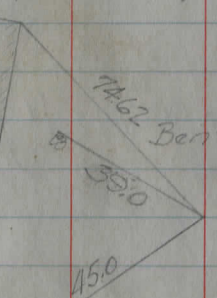
23.54

72 ⁵⁴
108+27 ⁵⁴ PT.
54 W; N side 15" Pine



Set W, E side 12" Maple

Stone found.
N.E. porch

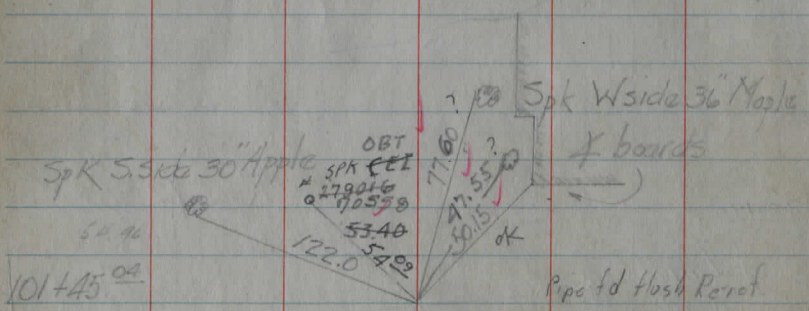


Bent spk; N side 24" Maple

106+74 ⁴⁰

15.0

Set W, S.E. side 12" Apple



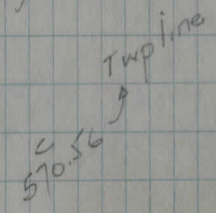
54.4
101+45 ⁰⁴

Pipe d flush Panel
5/96

Spk E side 12" Pine

Spk (set)

7438-39 W



OK (Mon Box set 1963)

Iron pipe (fd) $\Delta = 9^\circ - 12' - 30'' L+$

D = 3°

R = 1909.86

P.I. = 106 + 74.40

T = 1 53.80

PC = 105 + 20.60

L = 3 06.94

PT. = 108 + 27.54

106 74.40

101 45.04

529.36

729-76-30 W

C.H. #16 Fairmount Rd
North
Woodland

FG 11-26-65
± 1' Down

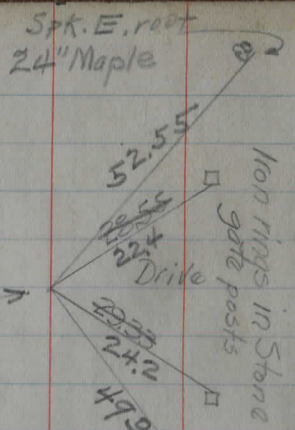
Iron bolt (fd) $\Delta = 9^\circ - 35' L+$

F.R.L.
114-16-40

719-51-30 W

(114-16)

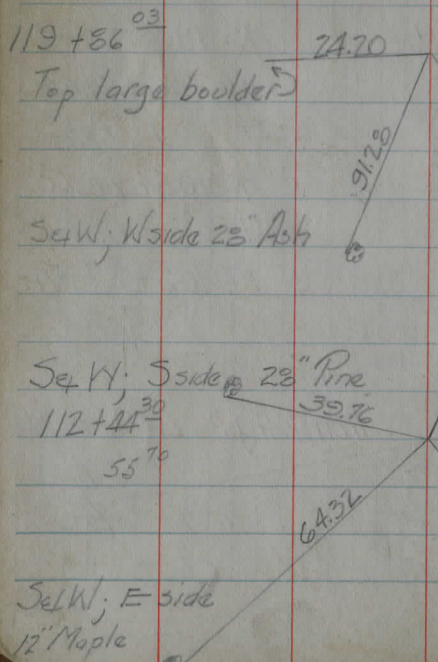
123+66.45
 120+60.08
 3 20.37
 6.19+
 38 2.28



Note: Data in this book OK. for \pm of R.W. See plan for \pm of roadway Sta. 112+44.3 to Sta 139+0

B.M. Spk. S. root
 N. Spruce

SEE PG 17 For ref



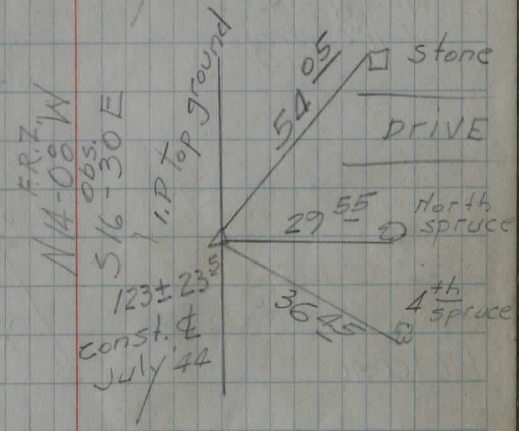
const. \pm
 Spk. fd
 12/29/47

Set W. E side
 10" Maple
 Spk W side
 15" Elm

I.P. set Flush
 July 46

P.O.T. not in Spike (set)

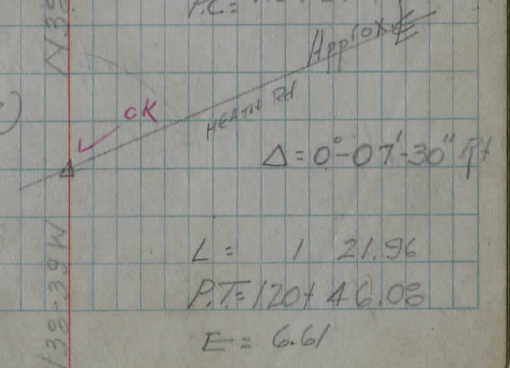
(No find "71")
 Spk set
 July '46



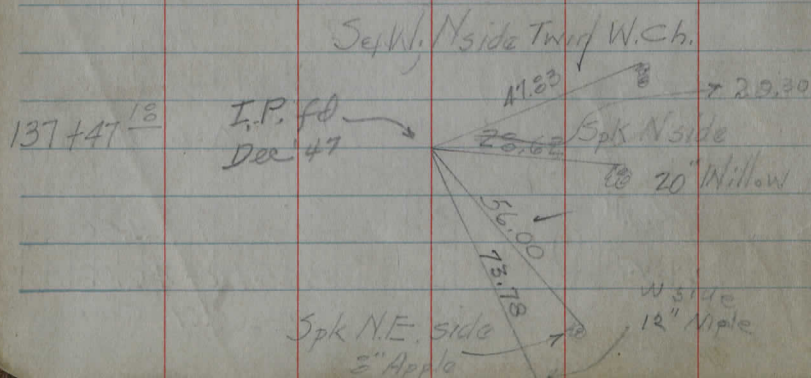
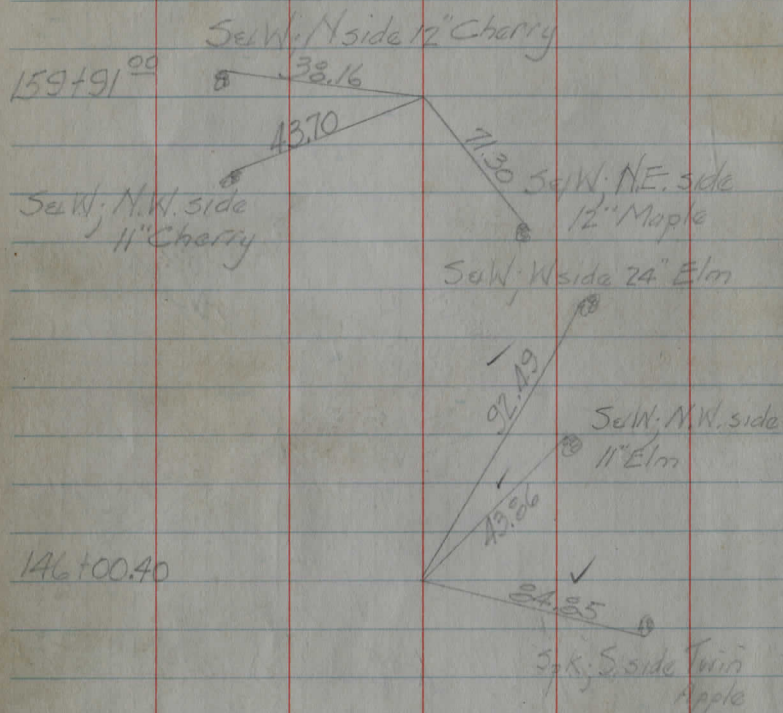
Iron pipe (fd) Δ ~~not found~~ $\Delta = 24-23-30$ RT
 $D = 20$
 $R = 286.479$
 $P.I. = 119 + 36.03$
 $T = 61.91$
 $P.C. = 119 + 24.12$

(Morr Box set 1963)

Iron pipe (fd)
 Russell
 Newbury



$\Delta = 0-07-30$ RT
 $L = 1 \quad 21.96$
 $P.T. = 120 + 46.08$
 $E = 6.61$



P.O.T.

16

OK

Iron ball (set)

(Mon Box set 1963)

Chester Russell

Iron pipe (fd)

I.P. set flush July '48

(Mon Box set 1963)

Δ = 0°-0'-30" Lt

Town Line Rd

Δ = 25°-12' Lt

D = 16°

R = 358.099

P.I. = 137 + 47.18

T = 80.05

PC = 136 + 67.13

L = 1 57.50

P.T. = 138 + 24.63

E = 8.837

Note: Present curve

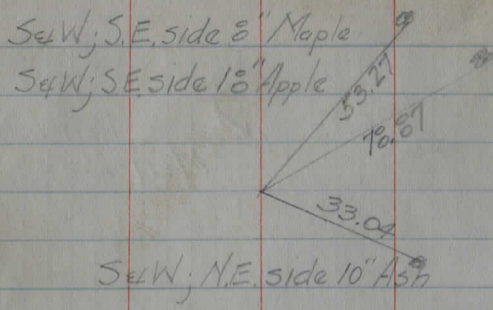
dangerous. Cut off inside bank

Iron pin (fd)

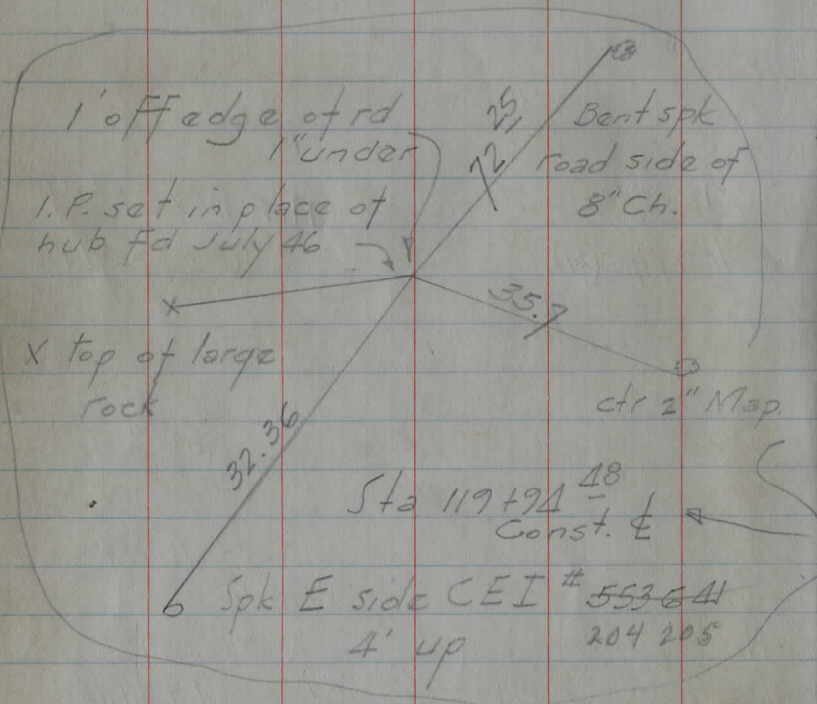
2" I.P. set over pin 2" down

OK

off Point.

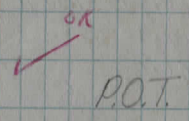


180+24¹⁹

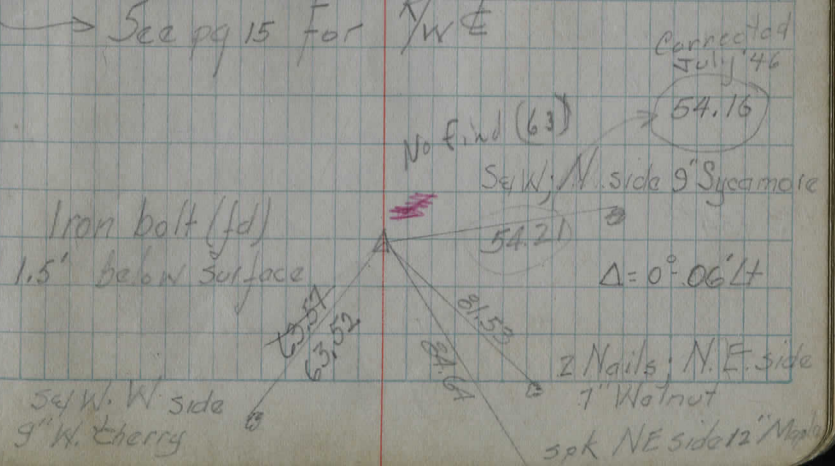


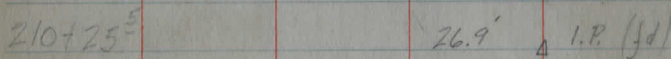
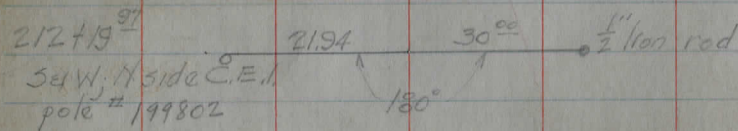
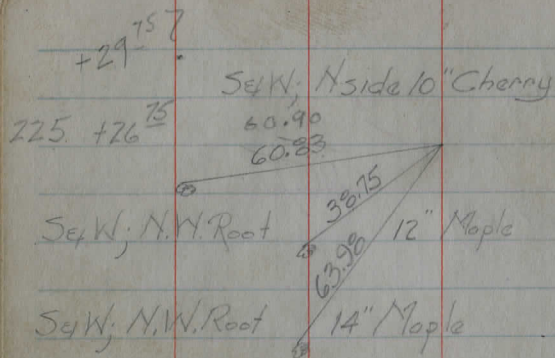
164+90²⁰

I.P. set over
 July '46
~~Iron bolt (set)~~
 (Mon Box set 1963)



See pg 15 for R/W E





A.M.
 10/7/39 Fair - Warm
 Pomeroy N&C
 Richards *
 Clouse

183 +54²⁰ (Cedar Rd. 4)

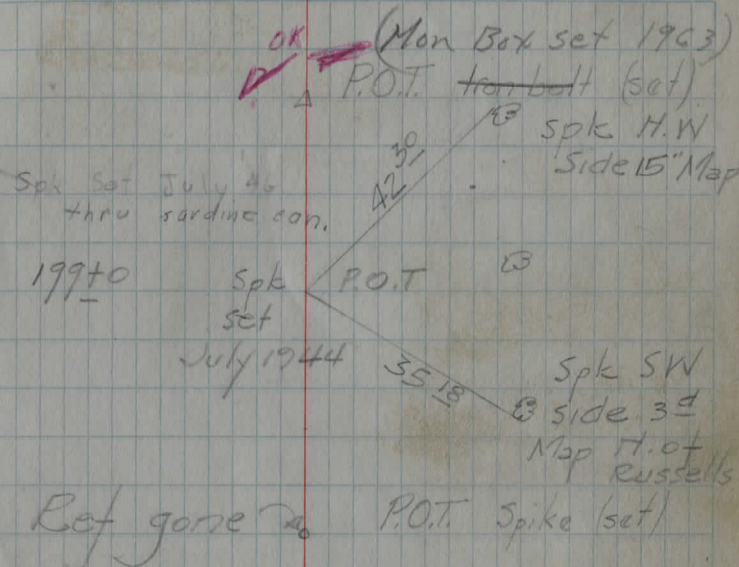
(Note:
 see road file #19921
 for E. R/W curve
 data)

From Plans (1941)

PI 183 +54²⁰
 A 45°-35' R⁺
 D 25'
 R 229.183
 T 96.30
 L 182.33
 E 19.41

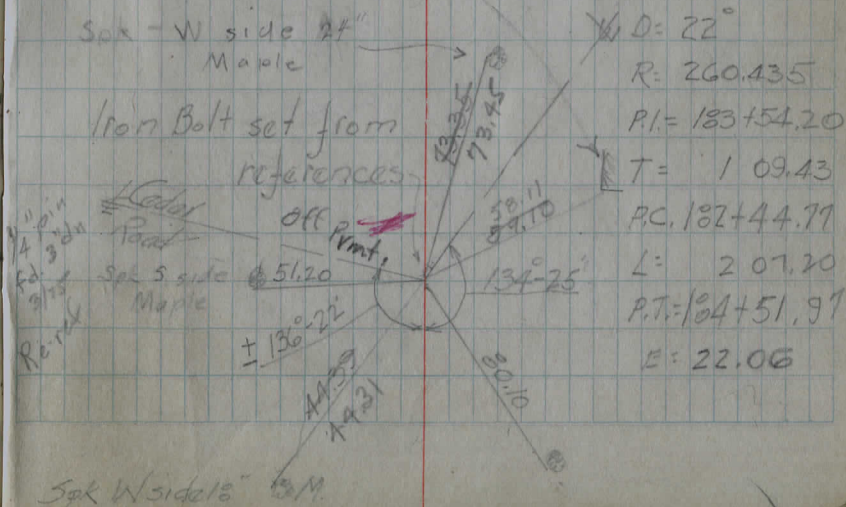
210 +28.63

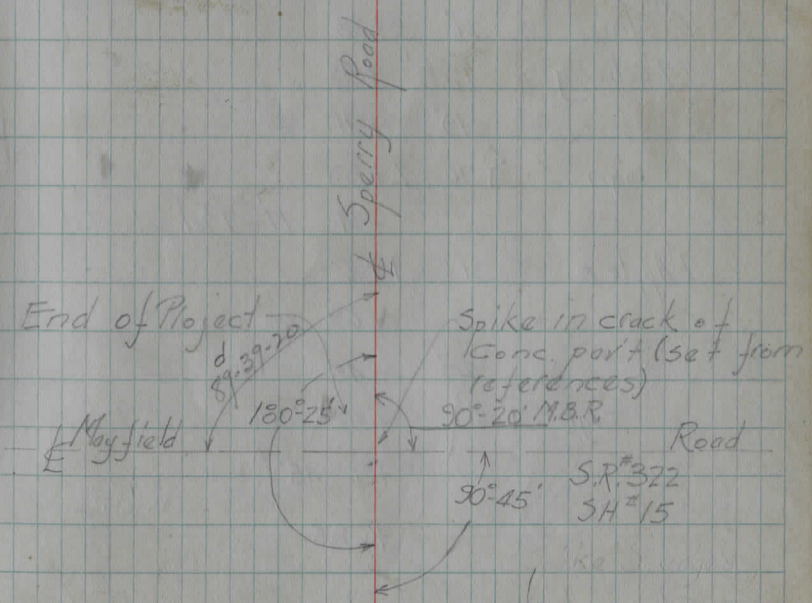
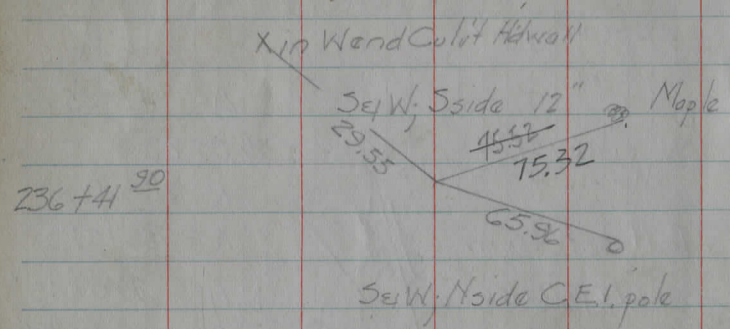
18



SET Headwall

Note: See plan for
 change in Curve data.
 Δ = 45°-35' R⁺



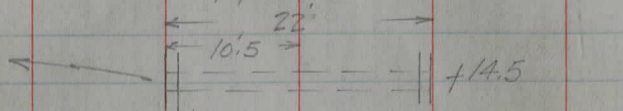


10/9/39 Tommfay
Richards
Clause

Topography

West ← East

10" X 22" Corr. pipe Culvert. Stone Channels. Pipe O.K.



21' 5+0

4+35 ± 30'

+54 20' →

Small
Trees

15" Elm 21' 3+28

7" cherry 18.5' +58

x x x 19' +41

Sign 10' 2+33

+34 11' Tel. pole stub

7" Apple 31' 1+16

+69 29' →

x x x x x 20' +45

Sign 18' ± +32

← Ditch +26 45' →

+08.5

16" Bit Mac
Cleveland
Burton

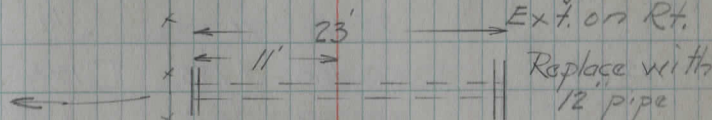
0+0

Road

Fullertown Road

x	20+70	17'	→
5" Map	x 23'	+95	
26" Elm	x 22'	19+11	
x	+74	22'	→

18+20 18" X 23" Stone box Culvert. 6' of 10" C.I.P.



17

15' 16+47 22' →

x Pit. x 17' +65

14+33 22.5' →

13+15 14' Field Drive
6" X 27" V.S.P.

12+17 23' →

10+05 22' →

+27 Seldom used field drive

9+13 P.L. Tree row

8+0

+84 22' →

15" Elm 23' 7+44

Begin sparse ± 13' 6+0

brush +74 20.5' →

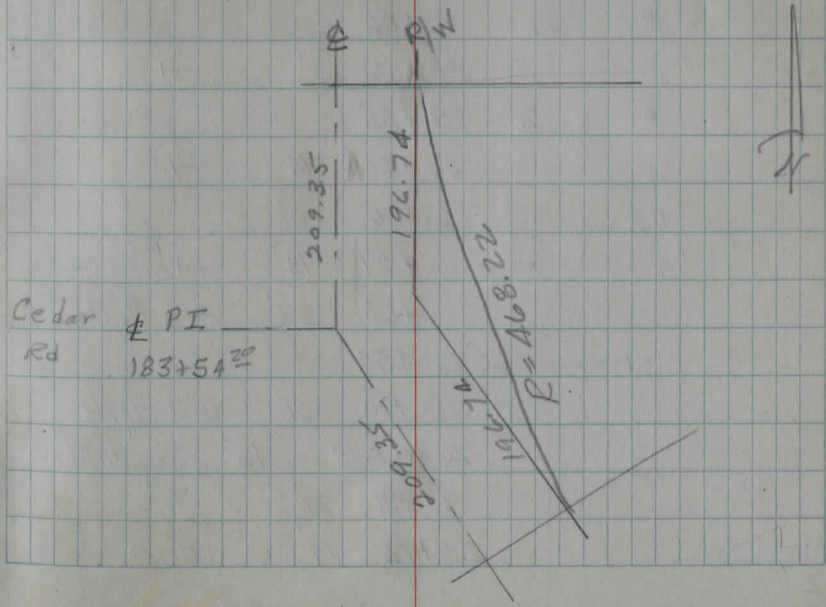
				25'	
				Fr. H.	
		± 70'			
Ditch		+63	+70'	18'	shrubs
		+50 to +65			
		+52			
		+44	13'		Gravel
		+38	26'		12" x 16" Corri. pipe
					2 M.B.
End sparse brush	30'	+33			
PL		25 + 26	26'		PL x
Omission		23 + 50	± 175'		15' Fr. Cot.
		+06	20'		
12" Whitewood		25+			
	22'	+39			
		+51	28'		2" Map
14" Map	22'	+43			
		+25	27'		2" Peach
		24 + 05	27'		2" Map
14" Map	22'	+85			
		23 + 52	25'		4" Map
		23 + 29	25'		2" cherry
Omissions	23 + 15	± 200'			15' Fr. Cortado
		+43	13'		Dirt Dr.
					12" x 19" boilers
15" Map	21'	23 + 32			
		+89	17'		Cinder drive
		22 + 29	14'		12" x 19"
24" Elm	22'	+82			Corri. pipe OK.
		21 + 29			PL. Δ

43 V.S.P.

#12 PI Sta 183+54²⁰ ±
Curve data E. R/W @ Cedar Rd.

Δ = 45-35
D = 12-14-13
R = 468.22
T = 196.74
L = 372.51

± Tan = 209.35



6 Elm ^{clump}

36' +82

35+62 + 1X1X Stone Box Culit. 12" X 52" V.S.P

Ext. Rt F.L. should be toward.



29' 35 +54

34 +88 11' +

26' 34 +08

+87

+75 13' +

24' 32 +57

22' 31 +06

30 +68 13' +

20' 29 +55

+83 14' +

19' 28 +06

+87 19' +

+61 32' 37' Apple

26' +54

+30 31' 29' Apple

26 to 15 18' shrubs

+91 27' 2" Map.

25+72 19' 5' Sign

P.L. #92
Field Dr.

W

E

22

+87 21' +

+43 25' 26" Map.

+ 22' +35

Cobblestone Dr.
6" X 33" V.S.P. 15' +12

10" or 12" pipe req'd. 39+04 28' 26" Map.

12" Map 26' +91

+87

+78

14" Map 27' +75

+69 27'

11" Map 29.5' +62

M.B. 13' +58

2-12" Map 26' +37 21' +

12" Map 38' +21
18" Map 38' +21

+18 26' 28" Map.

38 +04

1/2 St. Fr.
Bungalow

+72' +76

15" Hick 40' +23 10' +

Gravel M.B. 16' 37 +12

12" X 37 Boilers 19' +98

+87 20' +

4" Elm 36' 56 +40

~~20' 20'~~ Dirt + Dr.
boulders
both sides
+80'
25 St. Fr. H

	W	E	
Locust brush 6 wide	13'	55 to 60	
		+95	36 @ 14" Apple
		+62	17 —
+	21'	54 + 20	
		53 + 13	13' —
+	21'	52 + 47	
16" Hick,	8	29'	+84
		51 + 62	19' —
+	19'	+96	
		50 + 13	19' —
+	20'	+66	
		48 + 62	22' —
Field Dr.	=	+65	= Field Dr.
		47 + 11	23' —
+	20'	46 + 77	
		45 + 60	22' —
+	20'	+92	
		44 + 11	22' —
		+55	25' Rock Pile
		+55	P.L. End brush
		+39	27' @ 16" Map.
P.L.	+	20'	43 + 28
		42 + 15	22' —
+	20'	+61	
		41 + 31	22' —
		40 + 50	10-15' Begin brush 6 wide or large

	W	E	
	19'	+80	23
		+68	27' @ 30" Loc.
		+25	27' @ 32" Loc.
End brush		+15	18' —
		59 + 09	29' @ 20" Loc.
M.B.	11'	+99	
		+95	14' Gravel Dr. 12" x 12" Boilers
		+68	
		+55	23' @ 26" Loc.
		+39	+90' 25' Fr. H.
		+36	24' @ 26" Loc.
		+20	End brush
+	21'	58 to 5	
Begin Loc Brush 8 wide		+60	18' —
Int Dr. 12" x 18" Cor pipe O.K.		12'	+41
M.B.	9.5'	+26	
		57 + 18	12' Begin Loc. brush 20' wide
		+92	
1 1/2' St Fr. H.		+64	
		+38	33' @ 10" Apple
		56 + 13	17' —
		+86	36' @ 14" Apple
+	22'	+70	
		+60	36' @ 12" Apple
		55 + 55 to 56 + 10	Loc. brush 3" wide

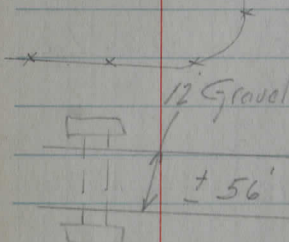
63+0 34' @ 9" Map
 +65 32' @ 34" Map.
 +63

2 St.
 Fr.
 H

+27 + 70'

20' 62 +20

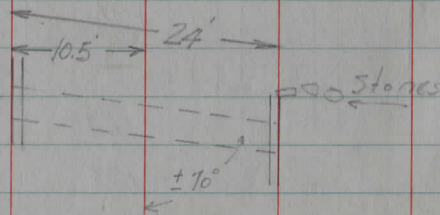
+90 29' —



Pekin +74⁴³ Road 16' Gravel

M.B. 15' +60

61+44 2' x 1.3' x 24' Stone Box Culit. Not so good



Note: Topo taken from tangents
 to all curves from here +29 26 @ 20" Loc.
 on. +58 19' —
 60 +08 28 @ 26" Loc.

2 St. +70 — 17' —
 Fr. 16" Map @ 35' +65
 H 13" Map @ 35' +51

+85' +30

Dirt Di. = 67 +03

14" Map @ 33' +88

+ 22' +86

+ 30' +80

+19 17.5' —

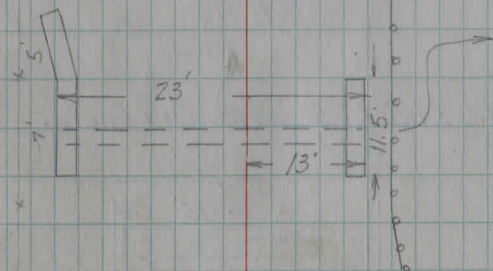
66+10 8.5'

7'

20 Sy. Yds brush +47
 + 21' 65+45

64+90 2' x 2' x 23' Stone box culit. Conc. Hd walls.

O.K.



+72 9'

64+70 19' —

+ 21' +30 33' @ 32" Map.

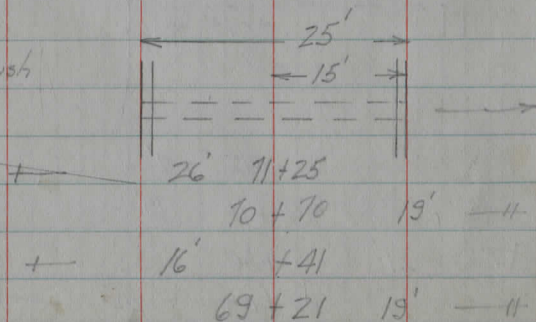
+ 63 +09 22' —

		+20	23'	
		+18	22'	
brush	Field Dr	01+0		
		00+0		
		+69	21'	
+	25'	79+67		
		78+18	20'	
+	25'	77+82		
		76+68	20'	
+	25'	+75		
		75+18	20'	
Field Dr.	Light	+ 26	74+23	
			+75	
			73+70	19'
+	29'	+65		
		72+18	18'	

71+36 1.5x1.5'x25' Conc Box Culvert O.K.

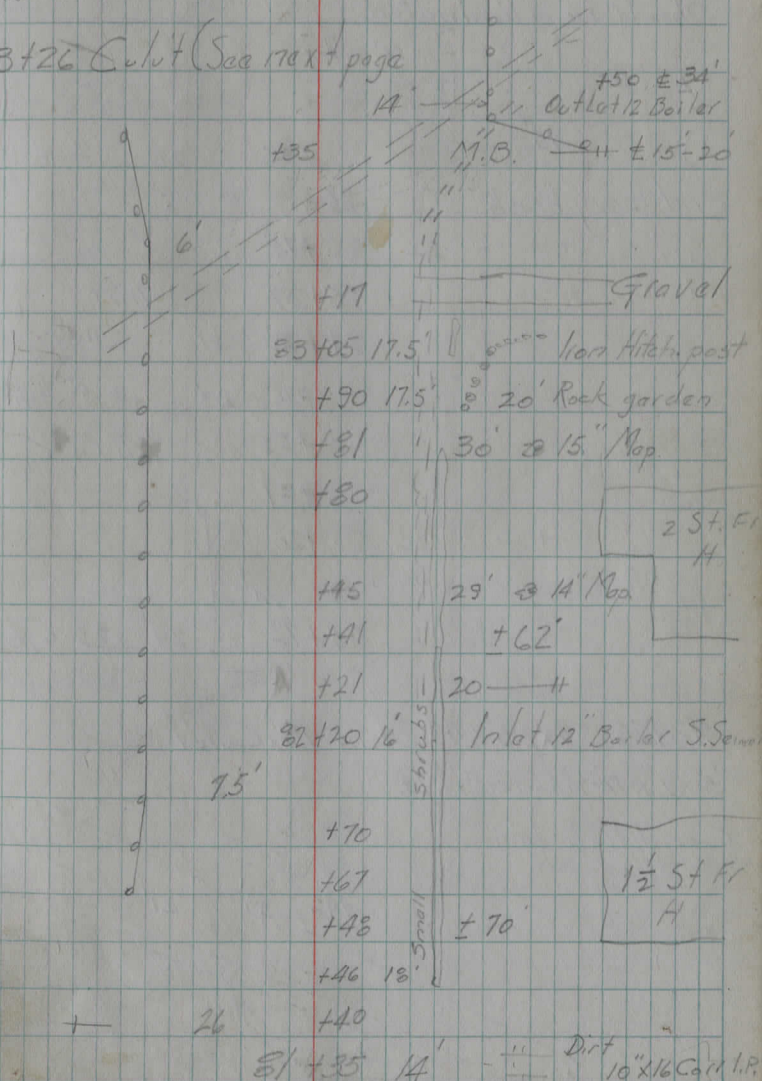
71+10 to +30
66 sq yds brush

Approx P.L.
71+20

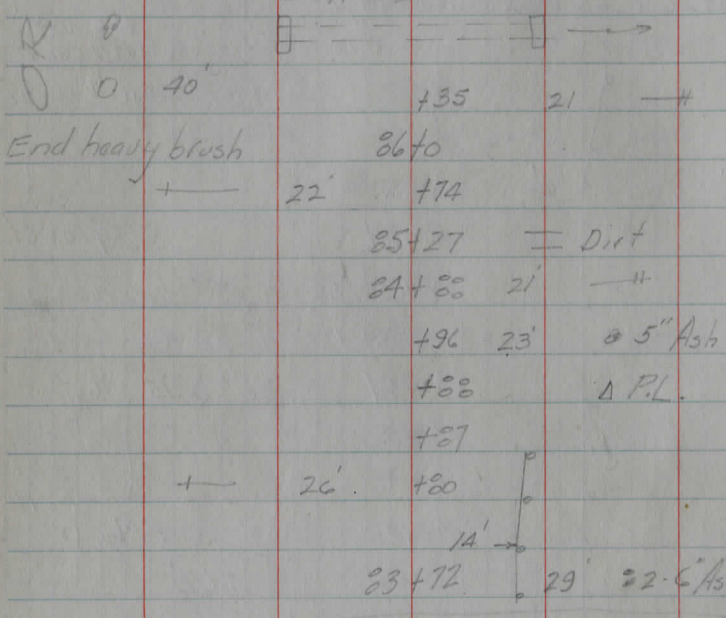


+14 Begin heavy brush
± 15' 12' wide

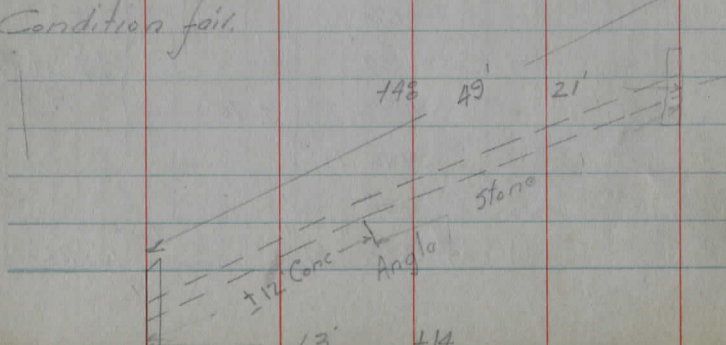
83+26 Culvert (See next page)



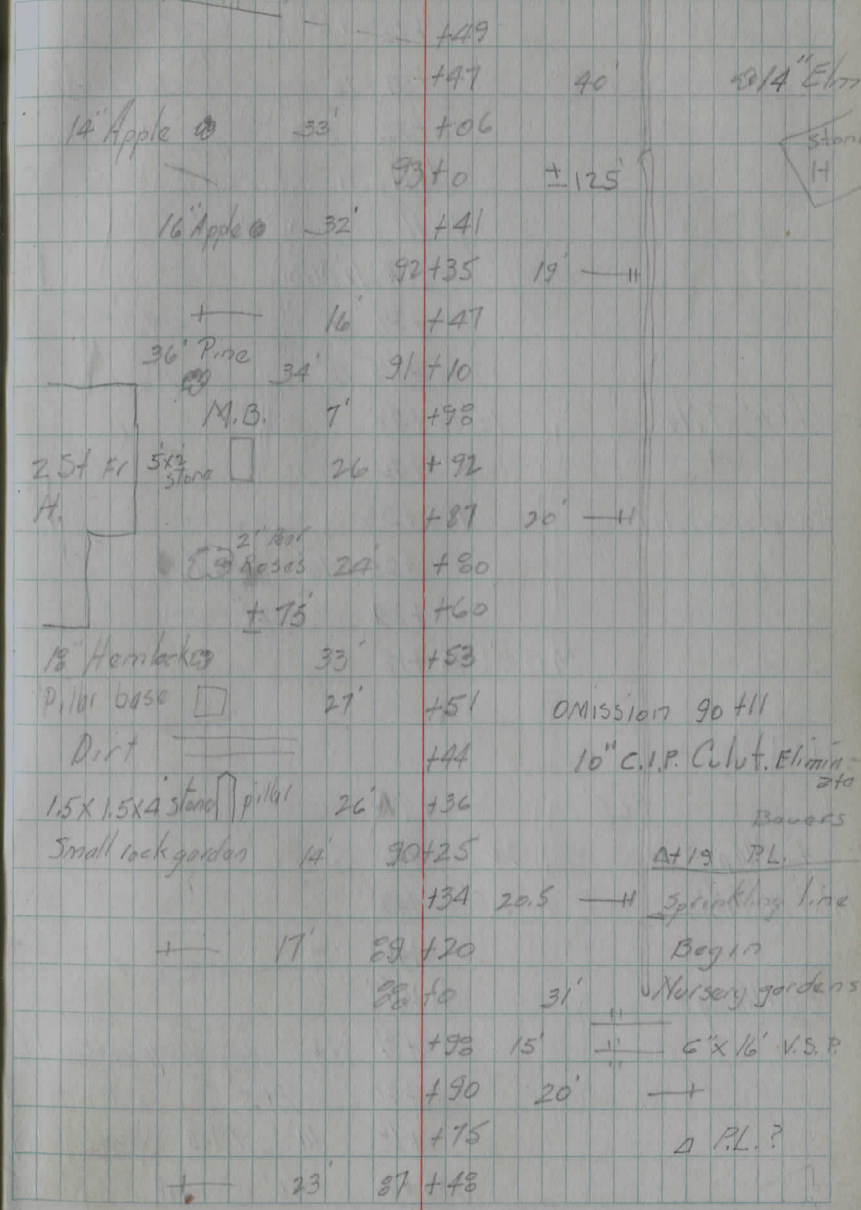
W E
 86+42 10" x 10" x 22 Stone Culvert Pool
 Should be eliminated



83+26 3' x 2.5' x 49' Stone Box Culvert
 5' x 2' x 12'-14' Conc. Ext. Lt.



Adggs ← 20 W E 26
 P/L + 19 +64



814" E/H

Omission 90+11

10" C.I.P. Culvert. Eliminate

Bowers

At 19 P.L.

sprinkling line

Begin

Nursery gardens

6' x 16' V.S.P

Δ P.L.?

+75 21' — H
 +72 16' End Hedge
 +59 12' 10" x 16" Cor. I.P.
 +42
 +17 11 outlet
 10" C.I.P. 25' Fr. H
 96 + 11 +40
 +90 13' M.B.
 +89 31' 94" Spruce
 Gravel
 +75 12' 10" C.I.P.
 outlet 10" Tile 10' +48
 + 16.5 +46
 Gravel & Cinder 11' +33
 +25 16' Hedge
 +24 21' — H
 M.B. 9' 95' +18
 25' Fr. H. +65' +17
 4" Map. Co 26' +46
 Inlet 10" Tile 8.5' +43
 +46
 End Hedge 94' 125' x x P.L.
 +91 14 Gravel
 10" x 24" Cor. I.P. +42
 +80 30.5' End
 +76 14 M.B. sprinkler
 93 + 72 20' — H system

outlet 10" Tile
 +
 Gravel & Cinder

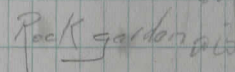
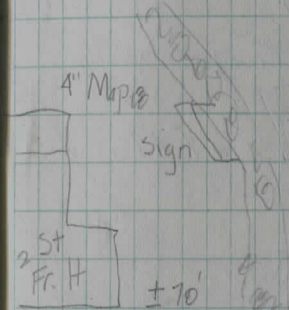
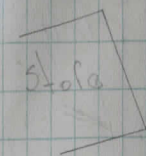
25' Fr. H.
 H. +65'
 4" Map. Co
 Inlet 10" Tile

End Hedge

2h

N. Woodland

+45 94
 14' Gravel
 5' Stone
 Conc. 31' +27
 Gas pump
 D. base 25' 101 + 14
 41'
 4" Map. 31' +80
 sign 16' +71
 +70 21 — H
 M.B. 7' +56
 25' Fr. H. +70' +51
 Rock garden 8' +37
 No ditch
 May be tiled
 Lay 12" pipe
 e/ run water
 down side Road
 Gravel +27
 15" Loc. 22' +17
 + 13' 100 +12
 +71 22' — H
 +55 31' x x
 +42
 99 + 35 30 — Apple Rd
 98 + 23 21' — H
 + 17' 97 + 90



No ditch
May be tiled

Lay 12" pipe
e/ run water
down side Road

Apple Rd

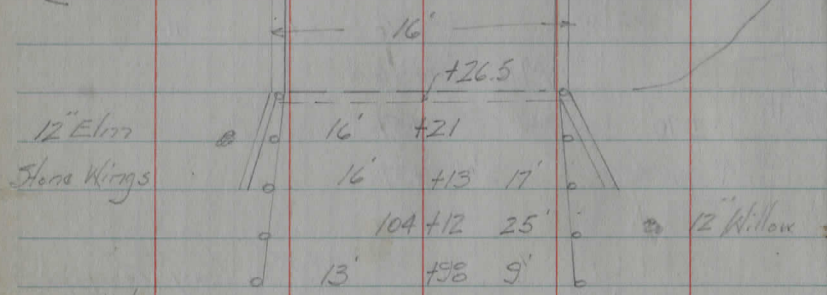
2-5' Apples 18' +19
 2-4' Apple 18' 105+11
 15' 105+04
 2.5' 9. Rail 6.5'
 +32.5

Stone Retaining Wall

Chagrin River

Steel Truss Bridge. Wood flooring. Stone Abutts.

Roady = 13.4' Span = 57'
 +34 18' 7" Elm



CE 1/4 Tel # 18' 103 +95

CE 1/4 Tel # 18' +95

6" Apple 29 +80
 2 1/2" St. Fr. H 2" Pine 21 +73
 ± 90' +46

2" Map 37' +11
 102 +08 44' 36" Map
 Gravel
 10' x 27' Corri. I.P.
 4' boiler. N.G.

CE 1/4 Tel # 18' +81 25" St. Fr.
 +74 43' 24" H.
 +69 ±50'

21 +90 28

+80 = Dirt

M.B 11' +77

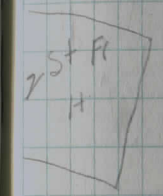
+66 19' +

+64 29' 6" Loc.

13" Maple 29' +50
 +43 28' 29" Ash

2" Map 14' +32

+15



10' 107+0

24" Map 32 +93

Dirt 18' +89

+60

16 +60

+48 24' +

Bagby RL 8' Loc 27' +33

+30

+17 29' 6" Loc

+09 9.5'

12' 106 +07

+89 22' Willow clump

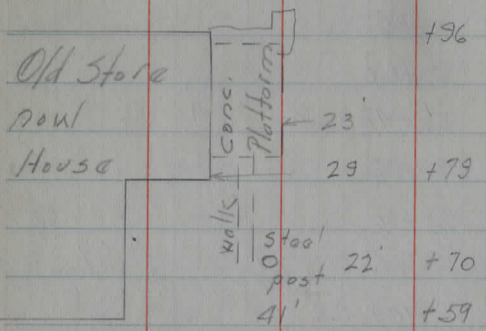
+71 13' Willow clump

+69 22' Retaining wall

CE 1/4 Tel # 18' 105 +40 20' River

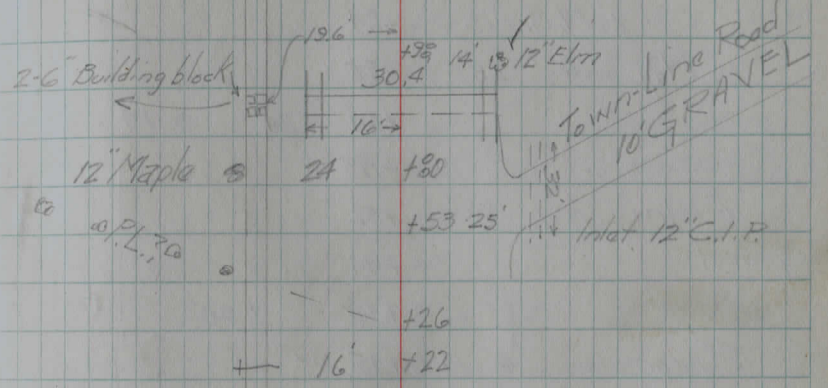
Cinder = +39 22' @ 22" Map
 M.B. 11' 110to +12

2 1/2 St. Fr. H. } +94 21' @ 30" Map
 +72 21' @ 26" Map.
 44' 150 45'
 34 Pine @ 31 +51 21' @ 20" M } 2 1/2 St. Fr. H.
 +41
 +32 17' M.B.
 +27 19' —"
 + 20' 109 +15



29 +79
 22' +70
 41' +59
 M.B. 9' +44
 12 Pine @ 32' +43
 +39
 +27 19' M.B. } 2 1/2 St. Fr. H.
 +26 ±60
 +12
 100 +04

112 +93 2.5 x 1 x Stone Box Culvert



13" Maple @ 22' 112 +17
 +90
 2 1/2 St. Fr. H. } +73 22' @ 15" Map.
 +42' +63
 WALK } 15' +57
 Stone Sidewalk
 12" Maple @ 22' +47
 Dirt } +26
 16.5' +20
 11" Maple @ 22' 111 +18 22' @ 12" Map.
 +94 — Dirt
 8" Maple @ 22' +84
 + 17.5' 110 +72 18' —"

			+12	24'	17" Map
8" Map	⊙	24'	+09		
			115+0	= Dirt	
			+86	24'	15" Map
		2 M.B.	+83	13	
12" Map	⊙	25'	+80		
			+64	24'	14" Map
			+59		
10" Elm		36'	+52		
Gravel	—		+44		15" Fr. Cot.
			+36	± 80'	
12" Sycamore	⊙	13	+35		
12" Ash	⊙	24'	+32		
		← 20.5'	+31		
6" Map	⊙	24'	+16	25'	32" Map
25" Fr. H.			+11		
12" Map	⊙	24'	+05		
			114+0	= Dirt	
			+65	+92	
			+90	24'	14" Map
			+70	19'	→ ✓
36" Elm	⊙	24'	+64		
			+63	24.5'	20" Map
13" Map	⊙	23'	+46		
			+40	24'	16" Map
13" Map	⊙	23'	113+12		

Stone Walk

			+36	15'	4" Spruce ✓
			+35	25'	8" Map
			+32	18'	4" Spruce ✓
			+30	13'	" " ✓
117		220-30			12" shrubs ✓
			+85		Slog Drive
			+84	20'	6" x 43" C.I.P. (Well casing)
			+72	19'	
			+68	23'	20" Map
			+22		P.L. (Doed)
			+16		Gravel
116		+10		19'	Conc. Steps
			+84	28'	Kirk
			+76	28'	14" Elm

Note: This culit could be eliminated if 1/20 carried to Culit south.

115+72.5 18" x 6" x 29' Stone Box Culit



			+34	24'	17" Map
			+21	19.5'	→ ✓
			+18'	115+21	

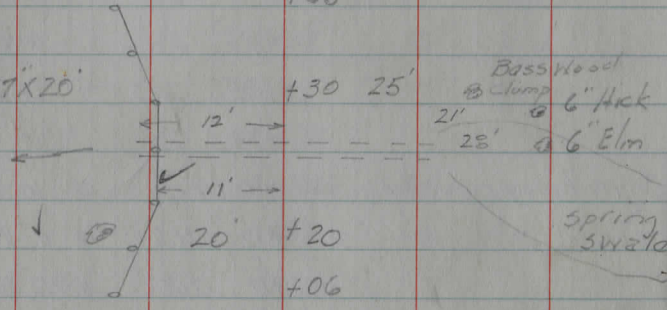
	4'	12010		
		+94	29'	—
	6'	+76		
#	23'	+69		
			Begin thick roses	
		+27	extending edge of Rd back ±40'	
		+26'	27'	4" Sp.
		+18'	27'	4" Sp.
		+09	38'	3" Map.
		119 +06	30'	2.2" Sp.
20' Ash	27'	+90		
		+84	35'	7" Map.
		+71	10'	3" Sp. uca
24' W.Ch.	25'	+60		
		+63	24'	2" Sp. uca
		+59	30'	10" Map.
		+45	28'	—
			35'	Divide
		+32	29'	10" Map.
E 23 Erd saplings	# 21'	+20		
20 Sq yds		118 +05	29'	9" Map.
		+83	29'	7" Map.
Begin saplings	24'	+65		
		+58	29'	10" Map.
15" Map	27'	+46		
		117 +45	25'	3 shrubs

PL. Δ	122 +00	31		
		+95	20'	11" Pine
		+90	24'	29" Elm
		+75	24'	18" Pine
		+70	23'	18" Pine
		+67	3'	M.B.
		+65.5'		stone steps
		+54		15" Pine
outlet 6" VSP House drain		+40	28'	18" Pine
		+38	28"	10" Pine
		+35	24.5'	End Ret. Wall
		+34	22'	10" Ash ✓
		+30	22'	10" W.Ch. ✓
CE 19 Tel	+ 20'	+19	21.5'	6" W.Ch. ✓
		121 +17	21.5'	12" Elm
		+94	18.5'	6" Ch. ✓ 2 St. Fr.
		+90	18.5'	6" W.Ch. ✓ Bang.
		+78	25'	+70 ±75E
		+75	19.5'	Large cut stone Retaining wall
		+74	21'	6" W.Ch.
		+69	20'	7" W.Ch.
		+61	28'	12" Elm
		+53	16"	6" W.Ch. ✓
		+37		Begin brush
				Erd Roses
Clump W.Ch.	14'	+22		
W. Apple Clump	18'	+16		
W.Ch. Clump	120 +01			

10" Bass'd ✓ @ 15.5' +35 23' @ 1/4" Willow
 10" W.Ch. ✓ @ 14' +28
 ✓ + 11' 9' +26
 ✓ 10" W.Ch. @ 17' +19

126 +16 31' @ 6" Map
 +50

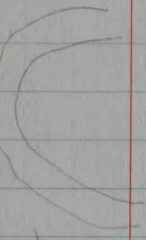
125+27 17'x20'
 Conc. P. O.K.



26" Elm ↓ @ 20' +20
 +06

125 +01 15' @ 5" Map

Gravel parking circle



+85 18' @ 6" Bass'd ✓
 +82 21' @ 6" W.Ch. ✓
 +40 23' @ 22" Walnut
 +21

+ 18' 124 +10

+72 22.5' □ Stone
 +55 26' □ Slag posts

123 +27 25.5' @ End Pine row

+ 20' +35 20 trees

122 +14 24' @ Begin 20' Pine row

12" Will. @ 26' +95 ✓
 +85 30' @ 7" Pop.
 +78 ✓
 +71 31' @ 10" Map

10" Willow 23' +53 ✓
 6" Elm @ 22' 129+47 ✓
 +72

△ P.L.

10" W.Ch. 23' +68 ✓
 + 11.5' +56 ✓

16" Elm @ 24' 128 +20 ✓

13" Elm @ 26' +74 ✓

13" Map @ 26' +61 ✓

+55 26' @ 7" Pop.

+26 25' @ 6" Pop.

127+19 31' @ 9" Bls Beach

12" El 177 @ 15' 127+0 ✓
 6' +90

boulders @ 36' @ 12" Hick

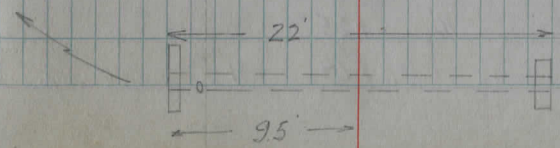
10" Map @ 15' +78 ✓

Clump Willows @ 26' +56

Clump Willows @ 22' +47 ✓

126 +44.5 30" x 30" x 22" Stone Box Culvert

O.K.



West

E

East

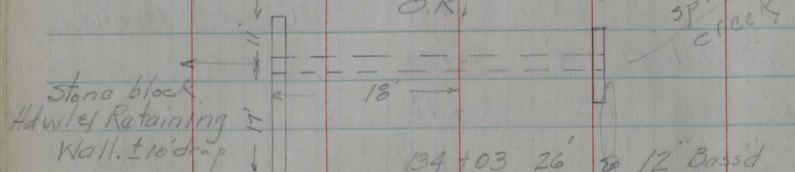
15" Willow @ 20' 135+69

+ 19' 478 ✓

20" Will. @ 20' +17 ✓

134+11 30"X30"X28" Stone box Cylut

O.K.



6" W.Ch. @ 19' +90 ✓

+ 19' 133+16 ✓

12" Willow @ 22' +90

12" Willow @ 22' 132+67

+ 17' +87 ✓

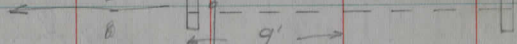
+73 26' } Begin Orange hedge

7' +42

+28 28' } Willow clump

Willows @ 23' 131+20 30"X30"X22.5" Stone Box

22.5' O.K.



7' +06 ✓

20" Map. 23' +02

131+00 28' } 14" Map.

+ 16' +85 ✓

130+69 31' } 6" Ap.

33

13" Map. @ 28.5 +85 29.5

14" Map. @ 29.5 +49

✓ + 13 +46

+36 37' } 20" Will

+26 34' } 9" W.Ch.

+23 34' } 14" W.Ch.

* P.L.? @ 25' 199+22

6" W.Ch. @ 25' +99

End brush +64 35' } 14" Dead Tree

+58 34' } 12" Ash

6" W.Ch. @ 29' +45

+40 35' } 18" Will

138+12 30.5' } W.Ch. Clump

+ 19' ✓ 137+42 29' } 20" Will

+92 24' } 1" Apple

✓ +76 20' } 7" Map.

✓ 20' } Orange hedge

✓ +40 19.5' } 9" W.Ch.

+ 19' +23

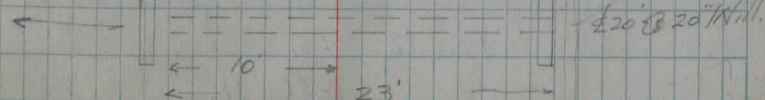
✓ 136+17 20' } Will. Clump

2-15" Elm @ 29' 24' +93

+89 30"X30"X23" Stone Box. Fair Cond.

Historic knocked off base

14" Will. @ 20'

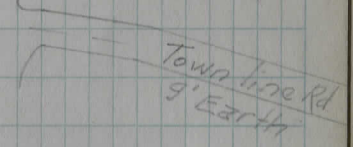


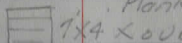
135+

Dry 3/20/10

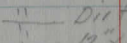
6" W.Ch.	14 ✓	+97	
8" Apple	16 ✓	+92	
6" Apple	16 ✓	+87+91	24
9" W.Ch.	19 ✓	+83	
Begin brush	21 ✓	+36	
	143+30	22	20" Twin Ch.
	142 to	23	Begin light brush
	7	+60	
	+55	33	12" W.Ch.
141+23	30'x24'x26.5'	Stone Culot.	Fair Cond
	26.5	+23	29' Large Will. clump
12'x7' K.S.P.	± 27'	8.5'	Low swale
12" Fir	27'	+21	
Gravel	Wood box 4'x4'x29'	105'	+09
		141	+05
25' Fir	13' Fir	28'	+98
H.		+96	29' Large Will. clump
	± 70'	+69	
		+68	26' 11" W.Ch.
2' Map	x	28'	+61
			slobs old logging Dr Not used
		+61	
	M.B.	12	+52
		+51	28.5' 9" Elm
13' Map	x	28.5	140 +24 End heavy brush

	+53	29'	6" Elm
	+30	20'	14" Elm
	+28	36'	12" Elm
146 +24	2.2'x2.5'x30.5'	Stone Culot.	O.K.
	30.5'	17'	
11" Elm	✓	14'	146 +20
End brush			+41
9" W.Ch.	29' 23'	145	+05
12" Syc.	23'	+96	
10" Elm	12' ✓	+93	
6" Elm	22'	+85	
6" Syc.	22'	+83	
7" W.Ch.	22'	+78	
		+76	31' 10" W.Ch.
		+50	30' 15" Elm
10" Sycamore	22'	+41	
9" W.Ch.	✓ 10'	+38	
		+32	26' 7" W.Ch.
10" Elm	✓ 18'	+30	
6" "		+16	35' 13" Elm
8" Sycamore	21' ✓	+10	
6" Elm	19' ✓	144 +02	



+35 36 20" Map
 +29 29 2-6" Fir
 +26 23 10" Map
 149 +10 23 12" Map
 13" Apple 32 +97
 +72 24 11" Map
 +66 13 ✓  1x4 plank
 +47 27 20" Elm
 11" W.Ch 23 +29 23 12" Map
 148 +13 23 12" Map
 +94 24 15" Map
 +80 24 16" Map
 +79

125+Fr
 H

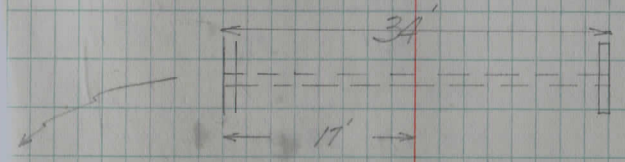
+55 +105
 +47 25 16" Map
 +30 25 18" Map
 +21 12  12x17 V.S.P.
 +16 25 5" Map
 +03 24 13" Map

+ 23 +01
 147 to End light brush
 +89 28 20" Elm

Old C/E R/W

+11.5

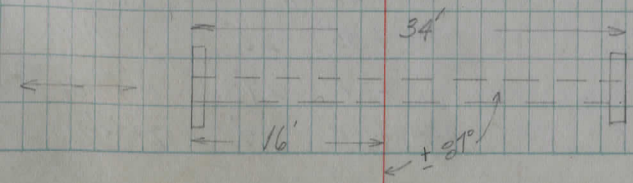
+20 26 End Hedge
 ✓ 159 +16 25 Δ I.P. (P.L.?)
 ✓ +86 25 5" Trip. 6" Map
 ✓ 158 +72 24.5 5" Map
 157
 156 +60 25.5 1" Map
 157 +0 -end +88 26 Begin Os. Hedge
 155 +30 10" X 34" Enc. Corr. I.P. Conc. Hd walls, O.K.



155 to
 154
 End Hedge

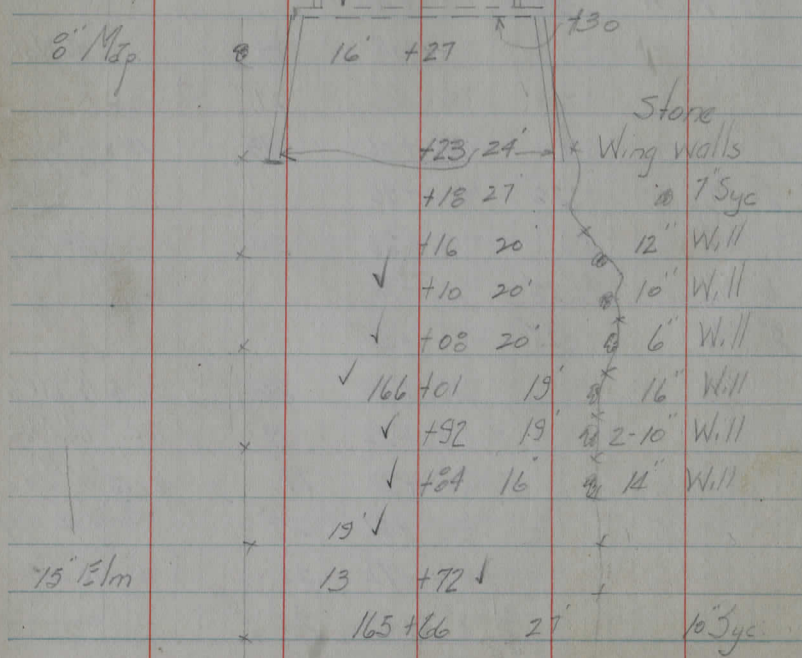
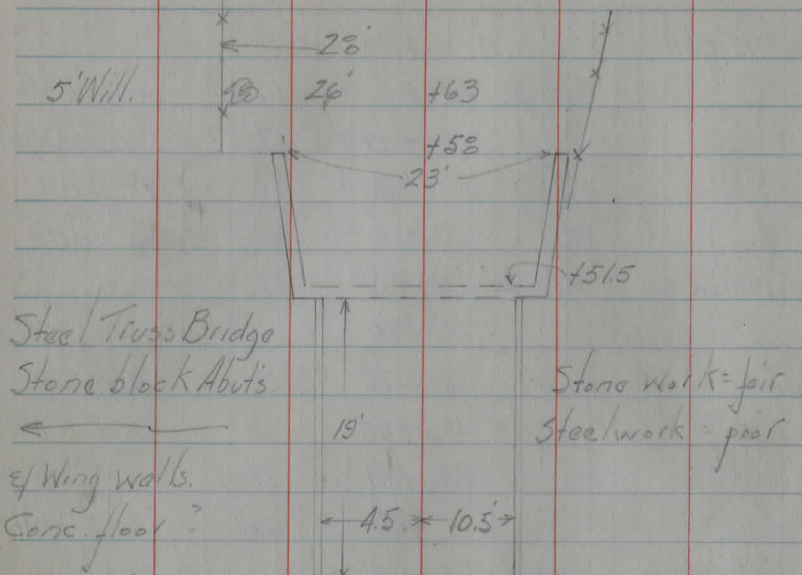
+63 27 9" Map
 153 +30 32 27" W.Ch.
 +22 27 8" W.Ch.
 Elim. 200' hedge → ✓ 152 +11 26 10" Map ✓
 +64 24 Begin Csage Hedge
 +09 20 20" Elm

150 +07 20" X 34" Enclosed Corr. I.P. Conc. Hd walls O.K.



Dirt	11				
12x13 Conc.	11				
	18'	+27			
	162	+22	13'	Gravel	
				12" x 35 V.S.P.	
a ±37		+86	29'	3" Map.	
		+30	±275'	1st Fr H	
	161	+07	27'	12" Map	
		+26	27'	11" "	
		+76	27'	7" "	
		+61	28'	8" "	
				25th Fr.	
		+19	27-29'	10" Map 6" "	H.
		+17	±200'		
	160	+06	29'	2" "	
		+97	29'	2" Map	
		+94	29'	5" x 1	
	✓	+87	26'	2-26" "	
		+77	27'	6" "	
	✓	+74	26'	6" "	
16" Wch ±38		+69	27'	4" "	
		+63	27'	6" Map	
		+48	11'	Dirt 8" x 18" Corr. I.P.	
	✓	+35	26'	8" Map ^{New}	
	✓	+30	27'	3" Map	
	159	+25	28'	12" Map	

12" Elm	17'	+39	✓		
		+21	✓	17'	4-10" W.I.I.
		+17	✓	17'	12" 6" W.I.I.
		+12	✓	20'	5" Will
		+06	✓	16'	5-10" Will
5" Willow	20'	165	+0	✓	15'
		+90			
		+78	✓	13'	4-10" "
		+65	✓	20'	6" "
		+61	✓	17'	8" "
		+56	✓	20'	8" W.I.I.
8" Wch	28'	+46			
		+15		29'	26" Wch
				27'	
		164	+06	✓	15'
8" Map.	28'	+96			12" Map.
		+82		30'	26" Map
6" Map	28'	+79			
8" Map	25'	+50			
		+39	✓	26'	12" Wch
		163	+22	✓	19'
		+99	✓	17'	6" Map
		+81		29'	18" Map.
		+72	✓	22'	12" Map.
		+40		28'	12" Map.



Cinder di.			+52		
M.B.	7.5'		+63 ✓		
Outlet 10" V.S.P.	9.5'		+61 ✓		
			+55		
2 St. Fr.	10" W.Ch.	24'	+47 ✓		
H	5' Loc.	18' ✓	+05 ✓		
			+115'	173 +0	
			+94	29'	—H
	5' Loc	✓ 18'	+93 ✓		
	4' Loc	✓ 18'	+80 ✓		
34 Pine	28'		+61		
	28'		172 +04		
End brush			171 +19	30'	—H
			170		
			+80	30' Begin Usage hedge	
			169 +42	30'	—H
			+80	21' Begin brush	
			+17	+79	
			+60	±80	
					2 St. Fr.
					H
Begin brush	11'		+41	13	M.B.
			+40	14	Dirt
			168 +15	31'	12x22 Corr & V.S.P.
			167 +0		+26 Soil
					10' dead trace
				23'	
20' Will	30'	27'	+25		

West E East.

		+29	29'	10' Ash
+	27'	178+0		
Begin Os. Hedge	25'	+31	25'	13' WCh.
Dirt 10' x 22' V.S.P.	11'	177+12 ✓		
	"			
Fl. Cot. ± 175'		+90		
		+80	25'	8" WCh
		+56	25'	7" WCh
+	27	176 +26	27'	Hedge
		+80	29'	6" Map.
4" WCh	27'	+83 ✓		
5" WCh	27'	+75 ✓		
inlet 10' V.S.P.				Broken wire fence along here ± 20'
175+27 ± 12'		+69	27'	6' Ash
4" WCh.	27'	+65		
Begin light brush	20'	175+50		
		+74	27'	4" Map.
+	28'	+53		
4" Blm	23'	+41		
2 Evergreen	25'	174+12		
Bucket Corro	13	+90 ✓		
base		173+94	16'	Dirt 12' x 16' Corro. OK

P.L. same as long.
to N

P.L.

38

+36

± Dirt Di.

6" x 30' V.S.P.

8" Map, shrubs 29'-21'

3" Pine 20' 182+06

+ 29' +50

+87

+81

+44

+09

181 +08

+75

+69

+35

+61

+52

+69

+61

+52

+41

+38

+06

180 +0

+75

+59

179 +32

+32

+32

31'

31'

31'

26'-29'

28'

31'

25'

26'

31'

32'

28'

13'

25'-33'

26'

26'

25

24

27

27

1" Map 5" WCh

4" Map

16" Apple

6" Ash

3" Map.

6" Map.

15" Apple

4" Ash

12' x 16' Corro. OK

2" Map 14" Stub

12" Ash

End Os Hedge

4" Map.

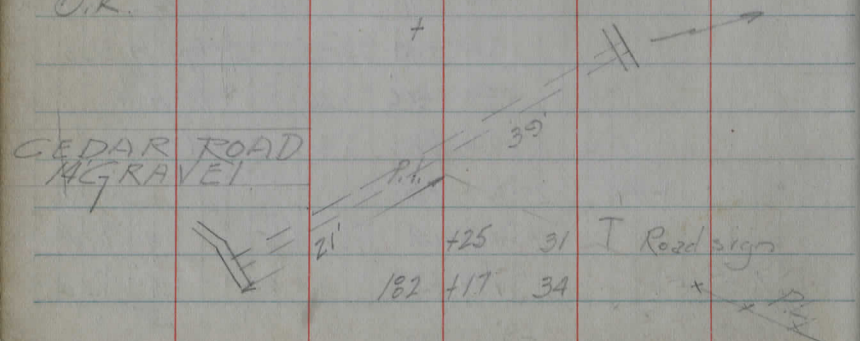
5" Map

3" "

29' - 132

	West	E	East
11" Map	24'	188	+0 ✓
14" W.Ch.	24'	+76	✓
12" W.Ch.	25'	+70	✓
	22'	+54	✓
14" W.Ch.	27'	187	+46 ✓
	23'	186	+06
10" Elm	24'	+94	
18" Map	25'	+75	
13" W.Ch.	25'	+55	
14" Elm	19'	185	+21 ✓
14" Apple	16'	+97	✓
12" Map	22'	+74	
	23'	+53	
12" Map	25'	+21	
15" Map	25'	184	+07
	30'		

183+54²⁰ 24"X12"X60' Conc. Box Culvert
O.K.



39

	West	E	East
New Bridge			
Conc. Abut. and			
Wings. Wood (2x4)			
flooring supported by steel I beams			
Plank railings O.K.			
11" Elm	27'	+99	
	21'	192	+73
Large Conc. pieces along fill			+90
6" Elm Swamp	25'	+42	
	21'	191	+28
12" W.Ch.	30'	+55	
Pasture Dr Gate	18'	+49	
14"X21" Conc. pipe	27'		
	21'	190	+11
Brush			+46
			+34
22" Elm	24'	189	+10
	21'	+89	
			+70
12" W.Ch. (dend)	22'	+14	✓

Diagram details:
 - Top diagram: A trapezoidal shape representing a bridge or roadway. Dimensions include 29' 35" at the top, 13.5' height, 8.5' and 14.2' widths, and a +25' elevation. Labels include 'West', 'East', and 'Roadway'.
 - Middle diagram: A trapezoidal shape representing a gate or culvert. Dimensions include 193' 04" at the bottom, 35' width, and a +08' elevation. Labels include 'West', 'East', and 'Roadway'.
 - Right side: A large arrow pointing right, labeled '189 to Gravel' and '2 M.B.' (2 Miles Back).

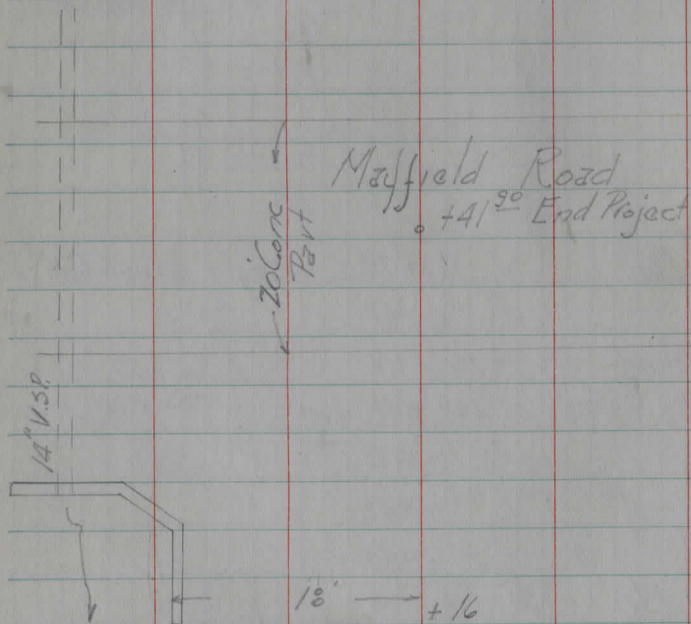
12" Map	25'	+62
Ditch filled in		+42
Unable to locate pipe		
Approx P.L.	227	+42
+	23	+96
Gravel Dr.		
1 1/2 St 6x13 termite	13'	+20
Fr. H	± 110	226 +45
+	24	225 +49
10" Map		+98
Dirt walk 8'x6 V.S.P.	10'	+97
13" Map	26'	+67
		+62
Lilac	26'	+51
10" Map	26'	+35
2 St. Fr Flagstone steps	95	+28 ✓
H 6'x6.5 V.S.P.	M.B. B.6.5	+25 ✓
	± 60'	+13
+	24	224 +04
	N = 13' ✓	
12" Map	26'	+99
Gravel Drive		
10'x25' V.S.P. OK	3'	+69
End brush	+45	27
	223	+34

Field Dr

Place 12' of 10" P.p

+	22'	234 +99 ✓
+	21'	+45
		233 +30
		End brush
		232 +
End brush	+	21' 231 +98
± 88.5	3'x2.5'x24'	Conc. box culot. Side walls
		taddy cracked
		Will do.
	24'	
	13'	
34" Elm	30'	+73
+	21.5'	+47
8" Walnut	26'	230 +07
+	23'	229 +47
+	23'	+49
Outlet 12" Corral P.	13'	+42
P.L.?	1. P Δ	+40
14" Map	24'	+32
Gravel Dr.		+20
Flower bed	11'	+08
		+0
M.B.	9'	228 +0 ✓

Flower bed



sign post

29' +06

+05

27

Rd sign

236 +03

21

Rd sign
STOP

10/16/39 Fair - Warren Farm - Richards Clause

CROSS SECTIONS

5+14.5	Culvert	(No.)	1266.25	65.79
	H.I.	-	Elev.	
5+0			1266.25	65.79
			70.28	67.19
P.	3.09	1270.75	7.32	1267.66
4+0			1266.58	66.11
3+0			1267.48	67.01
2+0			1269.28	68.81
1+0			1271.38	70.91
			74.51	71.67
P.	2.24	1274.98	10.64	1272.14
0+50			1273.98	73.51
0+0			1279.33	78.86
			82.31	1276.53
B.M. #1	5.18	1282.18	1277.00	

Note: 0+0 to 3+0 ± 15 along West side of travelled road.

See note on page 19

West ± East 44

Fullertown Road

7.1	6.8	6.2	5.7	4.6	4.8	4.5	4.7	4.0	5.2	6.4	5.9	5.8
50	20	FL.	Top	10	9		10	14w/	Top	FL.	20	30
	30		Op						Op			
	6.6	5.5	6.4	4.8	4.5	4.9	6.4	5.3	5.9			
	25	14	12	8		10	12	16	30			
	30											
	10.1	9.2	9.9	9.1	8.4	9.0	10.0	9.3				
	25	12	10	8		10	13	16				
	30							30				
	8.1	8.0	8.2	8.1	7.5	8.0	8.5	8.0	8.1			
	25	11	9	7		12	14	18	30			
	30											
	6.4	6.2	7.0	6.1	5.7	5.5	6.2	6.7	5.9	5.3	5.1	
	25	10	7	5		4	13	15	17	24	30	
	30											
	1.3	1.5	3.4	5.0	3.2	3.6	3.4	4.0	3.1	1.0		
	25	12	7	4.5	3	±	8	16	19	29		
	30									30		
	3.7	5.5	7.3	8.3	9.9	9.1	8.8	8.1	8.2	9.3	6.2	
	32	19	12	8	4	3	±	10	23	29	36	
	5.3	3.6	3.45	4.1	4.9							
	200	100	±	100	200							

See W. NE Root 30" Maple, South side C. leve. Barton Rd ± 400' E of intersection with Fullertown Rd

	+	H.I.	-	Elev.	
21 to				1245.93	45.46
20 to				1246.43	45.96
		52.06			
BM #3	5.85	1252.53	5.26	1246.68	46.21
19 to				1246.14	45.67
↓					46.37
±20	Colvt	(No)		1246.84	8.5 100
18 to				1247.04	46.57
17 to				1247.54	47.07
P	3.45	1251.94	8.09	1248.49	48.02
		51.47			
16 to				1248.58	48.11
15 to				1250.28	49.81
14 to				1252.48	52.01

~~1256.58~~
56.11

470	45.8	44.6	45.2	45.4	45.2	46.5	46.8	46.5			
55	6.7	7.9	7.3	6.6	7.1	7.3	6.0	5.7	6.0		
18	14	11	9.5	10	11	13	24	30			
30											
45.6	45.8	45.4	44.7	46.0	46.0	45.0	46.8	47.2	46.8		
6.9	6.7	7.1	7.8	6.5	6.1	6.5	7.5	5.7	5.3	5.7	
25	18	12	11	7	11	13	16	25	30		
30											
Spike SE. Root 2C Elev. 19 + 11, 22 'L/T											
45.0	45.2	45.6	44.7	45.3	45.34	44.4	45.9	45.4	46.1	45.5	
6.9	6.7	6.3	7.3	6.4	5.8	6.4	7.5	6.0	6.4	5.8	6.4
25	20	13	11	9	11	13	15	20	25	30	
30											
7.7	7.5	7.3	7.6	6.6	5.6	5.3	5.1	5.4	7.0	6.8	6.5
50	30	25	FL	Top	Adwl	7	11	FL	20	30	
			18	op			Adwl				
7.2	7.1	6.4	6.6	5.1	4.9	5.3	6.4	5.8	6.0	6.6	
30	25	14	11	8	11	13	15	25	30		
5.9	5.0	5.4	4.8	4.4	4.8	5.7	5.0	5.3	6.0		
25	11	9	7	12	14	15	25	30			
30											
8.4	8.6	9.2	8.5	8.0	8.4	8.9	8.3	8.1	8.8		
25	10	8	7	12	14	17	25	30			
30											
5.3	5.9	7.2	7.0	6.3	6.5	7.2	6.3	5.6	6.3		
25	12	8	7	12	13	15	25	30			
30											
7.8	2.6	4.2	5.6	4.7	4.1	4.0	4.5	4.6	3.6	2.7	3.2
30	16	10	7	6	4	12	15	18	22	30	

Sta	+	H.I.	—	Elev.	
30+0				1220.33	19.86
29+0				1221.83	21.36
28+0				1223.93	23.46
27+0				1226.59	26.11
P	0.18	1230.33 29.86	11.92	1230.15	29.68
26+0				1229.97	29.50
25+0				1234.07	33.60
24+0				1237.47	37.00
P	2.49	1242.07 41.60	12.95	1239.58	39.11
23+0				1240.13	39.66
22+0				1242.83	42.36

~~1252.53~~
52.06

20.1 20.0 79.4 13.7 19.7 19.2 20.3 19.6

10.2 10.3 10.9 10.6 10.0 10.6 11.1 10.0 10.7
 30 18 14 12 9 11 14 30
 22.7 22.4 21.1 21.4 21.3 21.1 22.2 22.4
 7.6 7.9 9.2 8.9 8.5 9.0 9.2 8.1 7.9
 30 16 13 11 9 11 14 30

24.8 24.7 22.6 23.5 23.3 23.1 24.8 25.0
 5.5 5.6 6.3 7.7 6.8 6.4 7.0 7.2 5.5 5.3
 30 25 15 11 9 10 11 14 30

28.4 27.8 25.2 26.1 25.9 25.4 28.6 28.7
 1.9 2.5 5.1 4.2 3.75 4.4 4.9 1.7 1.6
 30 18 12 10 10 11 17 30

31.8 31.5 30.5 30.1 29.7 29.7 28.9 31.6 32.3
 10.3 10.6 11.6 13.0 12.4 12.1 12.4 13.2 10.5 9.8
 30 25 15 12 10 10 12 17 30
 13

36.3 33.1 33.6 33.9 33.3 35.4 36.9 36.4 36.2
 5.8 9.0 8.5 8.0 8.2 8.8 6.7 5.2 5.7 5.9
 16 10 9 11 13 17 22 26 30
 21
 30

37.7 36.4 36.9 37.1 36.7 38.0 38.3
 4.4 5.7 5.2 4.6 5.0 5.4 4.1 3.8
 12 9.5 8 12 13 17 30
 21
 30

39.2 40.1 39.4 39.8 39.0 39.9 40.4
 12.7 12.8 13.1 12.4 12.7 13.5 12.6 12.1
 22 12 9 11 12 15 24
 30 10 30

44.2 44.0 42.1 42.0 42.4 41.7 42.7 43.2
 8.3 8.5 10.4 10.5 9.7 10.1 10.8 9.8 9.3
 25 19 12 11 10 12 15 25
 30 30

26.40

P	10.27	1226.87	1.94	1216.60	16.13
37 to				1215.64	15.17
B.M.#4			4.90	1213.64	13.17
36 to				1213.54	13.07
162	Culot	Lower F.L. (No)		1213.34	12.87
35 to				1213.14	12.67
P	4.46	1218.54	8.38	1214.08	13.61
		18.07			
34 to				1213.86	13.39
33 to				1214.96	14.49
32 to				1216.96	16.49
31 to				1218.61	18.14
P	1.58	1222.46	9.45	1220.88	Sta. 30 to
		21.99		20.41	
		1230.33			
		29.86			

15.1	15.3	14.2	15.7	15.0	14.3	12.9
3.4	3.2	4.3	2.8	2.9	3.5	4.2
30	19	17	12	8	14	30
Spike E. Root 4' Elm; 36+40, 36' Lt.						
11.5	12.3	11.9	13.4	13.8	13.0	12.1
7.0	6.2	6.6	5.1	4.7	5.0	5.5
30	22	21	16	7	5	9
12.1	11.5	11.1	11.7			
7.0	6.2	6.6	5.1	4.7	5.0	5.5
30	22	21	16	7	5	9
13.1	13.3	10.68	10.1	10.6	10.2	10.7
9.4	6.7	5.3	8.4	6.7	4.9	5.2
100	26	21	FL Top	Hdwl 16	4	Hdwl FL 9
	11.8	9.8	11.8	13.6	13.3	10.68
	11.8	11.5	12.9	13.4	12.7	12.4
	6.7	7.0	5.6	5.1	5.4	5.8
	22	19.5	17	5	6	8
	30				11	12
					12	30
13.2	12.1	13.6	14.2	13.4	13.3	12.9
9.3	10.4	8.9	8.3	8.6	9.1	9.2
23	20	16.5	5	7	10	11
30					30	
15.1	14.7	13.4	14.6	14.8	14.5	15.2
7.4	7.8	9.1	7.9	7.4	7.7	8.0
30	21	17	16	6	7	9
17.4	16.7	15.4	16.6	16.6	16.0	16.9
5.1	5.8	7.1	5.9	5.5	5.9	6.5
30	19	15	14	6.5	8	11
					30	
18.8	18.5	17.4	18.2	18.3	17.6	18.8
3.7	4.0	5.1	4.3	3.85	4.2	4.9
30	18	15	13	7	8	11
					30	

Staz.	T	H.I.	-	Elev	
		3934			
P	3.23	1239.81	11.20	1235.98	35.51
14 to				1239.78	39.31
43 to				1243.58	43.11
		47.31			
P	4.66	1247.78	0.55	1243.12	42.65
42 to				1242.17	41.70
41 to				1239.27	38.80
40 to				1235.41	1235.00
P	8.20	1243.67	0.00	1235.47	35.00
		43.20			
39 to				1230.17	29.70
+50				1226.17	25.70
P	10.34	1235.47	1.74	1225.13	24.66
		35.00			
38 to					21.20
				1221.67	
		1226.87			26.40

3.3	3.6	4.7	8.4	8.3	8.0	8.4	9.2	7.5	7.1
30	20	15	9	8		12	13	16	30

1.3	2.7	4.8	4.3	4.2	4.8	5.2	4.4	5.1	6.2
30	13	9	8		11	13	14	20	30

4.0	6.9	0.7	2.5	1.8	1.5	2.1	2.4	4.0	4.2
30	17	15	12	11		9	10	28	30

2.2	3.8	3.2	5.1	4.5	4.4	4.8	5.2	4.5	5.2	6.9
30	19	18	14	12		9	10	13	18	30

4.9	6.3	5.7	9.0	8.6	8.2	8.7	8.9	6.5	7.8	8.3
30	13	17	13	11		10	11	14	25	30

Hub 33±60 4' off Wedge of road Fair - working

1.7	3.0	5.7	5.4	5.3	5.3	6.2	4.9	3.4
30	21	14	9		9	12	16	30
		15				14		

4.3	2.6	9.7	9.4	9.3	9.7	10.0	6.4	7.0
27	16	13	11		9	10	19	30
30		14				13		

3.8	5.1	6.1	5.5	5.2	5.6	5.4	2.1	3.4
23	18	14	13		7	10	17	30
30								

Sta.	+	H.I.	-	Elev.
53to				1215.40 14.93
52to				1217.60 17.13
BM'S		3.55		1220.15 19.68
51to				1219.50 19.03
50to				1220.40 19.93
		23.23		
P.	2.78	1223.70	2.85	1220.92 20.45
49to				1221.47 21.00
48to				1223.17 22.70
47to				1225.77 25.30
		29.30		
P.	1.39	1229.77	11A3	1228.38 27.91
46to				1229.51 28.94
45to				1231.77 33.64

1239.81
39.34

West E East 50

6.8 6.4 7.7 9.0 8.8 8.3 9.0 9.3 8.1 7.7 7.4
22 15 11 10 9 10 13 15 30

5.1 5.3 6.2 7.4 6.6 6.1 6.5 6.9 5.6 5.1 5.5
30 21 16 12 11 9 10 12 16 30

Spike E. Root 16" Hickory; 51to 8A, 29' Lt

4.9 4.6 4.9 5.4 4.9 4.2 4.8 5.5 4.8 4.2 4.6
30 23 15 13 11 9 10 13 18 30

3.9 4.4 3.9 3.3 4.0 4.7 4.0 3.9 3.5
15 12 11 9 11 12 17 30
30

9.8 9.2 9.6 8.8 8.3 8.9 10.2 9.6 9.9
30 15 12 10 9 11 12 30

8.3 7.5 8.0 7.3 6.6 7.4 8.1 8.0 8.1 8.9
30 14 12 10 10 11 13 18 30

3.3 3.8 4.2 4.7 4.4 4.0 4.6 5.6 4.4
22 20 12 10 9 11 12 14
30 30

7.3 7.4 8.5 11.0 10.9 10.4 10.9 11.1 9.3 8.7
30 19 14 9 8 11 12 15 30

11. 1.0 2.2 6.0 5.7 6.1 6.7 4.8 4.1
30 21 15 7 12 13 17 30

0

Sta. + H.I. - Elev.

West East 51

61to 1191.00 90.53

8.4 7.8 8.1 15.7.1 7.4 8.7 8.3 7.2
30 13 11 8 12 14 18 30
12 17

60to 1192.60 92.13

5.2 5.5 6.5 5.9 5.5 6.0 6.5
30 15 11 10 11 13 15 30
12

59to 1195.10 94.63

0.0 0.2 3.6 3.4 3.0 3.5 4.3 3.0
30 20 10 9 11 13 15 30
12

97.63
F. 1.36 1198.10 10.22 1196.74 1196.27

58to 1200.66 1200.19

1.1 0.0 7.4 6.8 6.3 6.9 8.0 6.4 6.9 7.0
30 19 9 7 13 15 18 23 30
10

06.49
F. 1.43 1206.96 12.13 1205.53 05.06

57to 1206.36 05.89

7.0 10.1 12.5 11.9 11.3 11.9 12.4 11.7 12.9 13.4
30 17 13 11 10 11 14 20 30
14

+90 House drain (6" Farm tile)

11.9
F.L.
12

56to 1208.16 07.69

5.9 6.7 8.1 10.5 10.1 9.5 10.0 10.6 8.8 7.1 8.1
22 13 11 20 10 11 15 20 30

55to 1210.46 09.99

5.3 5.0 6.7 8.1 7.5 7.2 7.8 6.3
30 22 15 11 10 9 14 10 30

17.19
F. 4.67 1217.66 10.71 1212.99 JK 54to

54to 1213.50 13.03

9.2 9.1 10.2 11.5 10.7 10.2 11.1 11.7 10.9 10.6 11.6
30 21 14 11 10 10 11 14 16 30

1223to
23.23

Sta.	+	H.I.	-	Elev.	
7270				1160.23	59.76
+36	Colut	(No)		1161.03	60.56
7170				1161.33	60.86
		65.06			
T.P.	3.03	1165.53	13.23	1162.50	62.03
7070				1163.53	63.06
6970				1168.53	68.06
		75.26			
F.	1.64	1175.43	13.25	1174.09	73.62
6870				1176.54	76.07
750				1180.64	80.17
6770				1181.74	81.27
F.	2.13	1187.34		1179.21	78.74
B.M. 6	Corrected	→	5.49	1175.42	(1174.84)
		80.44		74.95	
F.	1.70	1180.91	2.53	1179.21	78.74
		1181.74			
		81.27			

	West	±	East	53								
	3.7	4.6	5.5	6.2	6.6	6.4	5.8	5.3	5.7	6.3	6.1	7.1
	30	23	18	15	11	10	8		13	15	18	30
					12					16		
	6.1	8.4	6.75	4.6	5.2	4.5	4.9	4.75	7.01	8.4	9.9	11.0
	30	FL	Top	Adwl	10		14	Adwl	Top	FL	30	50
			op		10			15	op			
	6.1	7.4	6.1	6.0	6.3	4.7	4.2	4.7	7.1	6.6	7.8	
	22	19	17	15	11	8		11	15	18	30	
	30	20			12			16				
	13.0	13.6	14.0	13.0	12.2	12.9	13.4	13.0	12.7			
	30	14	12	11		11	12	15	30			
					13		13					
	4.5	5.8	8.0	8.2	7.8	7.2	7.4	8.2	6.0	5.6		
	30	23	18	13.5	12	9	8	9	14	30		
								11				
	3.4	4.7	10.6	11.0	10.8	11.5	9.5	7.5				
	30	26	16	13		8	13	30				
						10						
	0.2	1.6	4.3	7.0	6.7	7.1	6.7	5.7				
	30	25	17	11		9	13	30				
					14							
	Taken	ndive	3.6	4.7	5.3	5.6	5.6	6.0	5.2	3.6		
			30	16	10		9	10	13	30		
							11					
	X in N.E.	±	of East	Adwall	of	Colut.	Sta	64	+44			
								Began	10/13/33	P.M.		
	End	Top	rail	E	guard	railing				Very	Windy	

Sta. + H.I. —
2/40 1137.66 37.19

20 to ~~1140.36~~
1140.36 39.89

79 to 1144.06 43.59
50.19

T.P. 2.94 1150.66 11.90 1147.72 47.25

78 to 1147.62 47.15

77 to 1151.22 50.75

76 to 1154.72 54.25
59.15

T.P. 3.82 ~~1159.62~~ 12.62 1155.80 55.33

75 to ~~1159.02~~ 58.55

74 to ~~1163.42~~ 62.95

73 to 1165.32 66.85
67.95

T.P. 5.43 ~~1168.42~~ 2.54 1162.99 62.52

1165.53
65.06

West # East 54

13.8 13.4 13.6 13.3 13.0 13.3 13.7 12.3 11.5
30 19 10 9 10 11 16 30

5.8 6.5 9.1 11.7 10.2 10.3 10.5 10.9 6.7 6.3
30 23 16 12 10 10 11 17 30

3.1 3.7 1.3 6.9 6.6 7.0 7.3 6.3 4.4 4.2
30 17 9 8 11 12 14 18 30

8.6 9.8 12.8 12.5 12.0 12.5 12.8 11.5 10.2 11.0
30 16 9 8 12 13 16 19 30

4.9 6.0 9.7 8.9 8.4 8.9 9.2 7.7 6.9 7.1
30 17 11 8 13 14 17 20 30

2.4 4.0 5.6 5.8 5.4 4.9 5.4 5.6 4.4
30 13 11 9 8 13 15 17 30

5.9 6.9 10.1 9.7 9.4 9.9 10.1 9.2 9.3
30 15 8 7 13 15 17 30

2.4 2.7 4.5 5.4 5.3 5.0 5.3 5.7 4.7 4.4 4.9
19 13 8 7 5 14 15 16 12 30
30

2.7 3.5 5.0 7.6 7.5 7.1 7.3 7.8 5.5 5.6
30 21 12 8 7 13 14 19 30

Sta	+	H.L.	-	Elv	
T.P.	0.17	25.32 125.79	12.52	#25.62	25.15
BM #0			2.89	#29.25	28.78
94+0				1126.04	25.51
93+0				1128.94	28.47
92+0				1132.04	31.57
T.P.	1.07	37.67 #38.14	8.04	#37.07	36.60
91+0				1134.51	34.04
90+0				1137.21	36.74
89+0				1139.91	39.44
88+0				1140.51	39.84
87+0				1139.11	38.64

1145.11
44.64

West

E

56

Spike W. Root 14" Elm Sta. 93+47, 40' R+

88	10.1	12.1	13.0	12.3	12.1	12.4	12.7	11.7
30	12	10	8	6		12	14	30

5.8	6.5	6.7	10.0	9.7	9.2	9.7	8.5	7.8
30	13	10	8	7		12	19	30

4.7	5.2	4.9	6.0	6.8	6.5	6.1	6.6	7.1	6.7
30	23	20	10	7	6		12	14	16

8.1	10.6	11.3	10.6	11.0	10.6	11.0	11.9	12.5
30	10	7	6	5		12	15	30

4.2	4.9	6.4	8.3	9.0	8.1	8.3	7.9	8.4	9.7	10.3
30	20	13	10	8	7	6		13	15	30

2.2	2.8	5.3	6.3	5.7	5.2	5.7	6.4
30	15	10	8	7		12	14

3.1	5.7	6.2	5.2	5.3	4.8	5.4	7.1	8.9
30	13	11.5	11	10		11	14	30

4.1	4.5	6.8	7.4	6.4	6.0	6.5	9.8	10.4
30	25	14	12	11		11	18	30

Sta.	+	H.I.	-	Elev.	
100+50				1098.65 ✓ 98.18	
101+0				1097.35 ✓ 96.88	
100+0				1100.85 ✓ 09.38	
T.P.	0.21	1102.35	11.96	1102.14 ✓ 01.67	
99+0				1102.60 ✓ 02.13	
98+0				1107.30 ✓ 03.83	
97+0				1108.50 ✓ 07.83	
T.P.	0.95	1114.10	12.64	1113.15 ✓ 12.68	
96+0				1113.39 ✓ 12.92	
95+43		F.L. 10" Tile (Outlet)		1115.19 ✓	
94+43		F.L. 10" Tile (Inlet)		1123.29 ✓ 2	
95+0				1120.09 ✓ 19.62	
				1125.79 25.32	

Elev. 57

0.7	1.0	3.5	4.0	3.7	4.4	4.9	3.4	4.6
30	13	6	5		15	12	21	30
						17		

2.1	3.6	5.2	5.0	5.6	7.0
30	27	5		18	35

2.1	2.2	2.1	1.6	1.5	2.2	2.9	1.9	3.2	3.3
30	11	9	7		13	14	16	25	30
		10				15			

13.2	12.5	13.4	12.0	11.5	12.2	11.8	12.3	13.5
30	14	12	8		13	14	16	30

16.0	22.9	9.9	10.5	10.2	9.0	10.5	9.0	10.3
30	15	12	10	9		13	15	30
			11					

11	1.3	5.3	6.6	6.1	5.0	6.6	6.0	5.6	5.4
30	20	13	11	9		11	12	14	30

7.6	7.6	12.6	13.5	12.0	12.4	12.9	12.6	12.8
30	26	13	12	10		11	20	30

9.6
10

2.5
8.5

7.08	1.3	5.3	5.0	5.7	6.1	6.8	6.1	6.4
30	16	0	7		11	12	15	30
						13		

Sta

+

-

119+0

~~1087.28~~

86.81

118+0

~~1085.18~~

84.71

117+0

~~1084.58~~

84.11

T.P.

4.19

~~1083.58~~¹¹

2.57

~~1085.39~~

84.92

116+0

~~1084.06~~

83.59

+72.5

Colut

No

~~1083.86~~

83.39

115+0

~~1083.26~~

82.79

114+0

~~1082.96~~

81.99

113+0

~~1083.05~~

82.59

112+93

Colut

No

~~1083.36~~

82.89

87.49
~~1087.96~~

West

±

East

60

32	3A	29	21	2.3	24	2.0	0.6	+5.0	+5.5
23	20	16	5		4	5	13	28	30
30									

6A	58	49	59	5.0	4.9	4.3	4.4	4.5	4.2	3.3	3.0	+1.0	+1.9
30	27	22	20	18.5	16	7		3	3.5	6.5	11	27	30
			21										

8.0	6.6	7.0	5.7	5.0	5.0	4.4	3.8	4.0	3.5
30	19	17	14		5	7	20	26	28
		18						27	30

6.2	5.7	4.7	5.0	4.4	3.9	4.1	3.9	2.5
30	23	20	15	13		8	9	25
			16					

Note: Small ditch comes down from East. Carries very little ⁵⁰

7.6	7.2	6.9	6.1	3.9	4.6	4.1	4.4	3.8	3.3	3.4	5.5	6.1	4.7
50	30	FL	Top	Hdul	12		9	10	14	Hdul	Top	FL	30
		op								op			

7.3	5.8	5.4	4.7	5.1	5.4	4.8	3.9	2.6
30	22	12		9	11	13	20	30
					12			

6.6	5.6	5.5	5.8	4.6	4.1	3.8
20	7		8	14	21	30
30			12			

6.4	6.1	6.5	5.5	4.9	5.1	5.3	6.6	5.3	5.0
30	19	14	12		9	14	17	21	30
		15					16		

80.7

8.9	7.6	6.4	5.8	4.5	5.2	4.6	4.8	4.4	3.4	6.1	6.8	6.6	4.6	
100	FL	Top	Hdul	15	13		8	12	Hdul	Top	FL	18	22	7
		op								op			30	

Stz + H.L. - Elev

138+0 1077.85 77.38

137+0 1081.45 80.98

136+0 1079.35 78.88

+89 C.vt (No)

135+0 1079.55 79.08

T.P. C.ZZ 1086.55 G.90 1080.33 79.86

+11 C.vt (No) 79.06

134+0 1079.53 79.06

133+0 1081.63 81.16

132+0 1083.33 82.86

1084.23
86.76

West East 63

6.5 5.9 5.4 8.3 9.7 8.7 9.1 9.3 5.7 5.2 4.8
30 25 12 7 6 12 4 20 25 30
15

4.3 3.2 3.5 5.4 5.1 5.1 5.5 3.4 5.0
30 16 9 6 13 4 13 30
15

8.2 8.3 8.6 7.1 7.2 7.7 10.4 11.2
30 18 11 8 9 15 30

13.3 13.1 12.1 12.13 9.67 24 7.6 7.3 7.7 7.4 9.15 12.0 11.4 10.4
30 22 16 FL Top 10 8 9 Hdwl Top 21 30
op op

7.8 7.3 8.5 7.5 7.0 7.8 8.5 6.9 4.8 3.8
2.8 1.5 1.2 1.0 9 1.0 1.3 1.8 3.0
30 13

21.9 18.1 13.7 10.6 7.7 8.3 8.2 7.7 8.2 6.8 10.0 13.3 11.0 7.9
25 18.5 FL Top 18 16 11 8 10 Top 17 30
op Hdwl op

25.7
30

20.5 19.9 12.7 9.7 8.3 7.7 8.1 10.4 7.0 4.8
30 25 18.5 18 12 7 9 15 30
Rot Well

9.7 6.2 6.0 5.6 5.9 6.2 5.5 5.0 2.8 3.0 1.6
30 19 12 6 7 9 13 19 21 25
8 1.5
30

4.0 2.8 3.3 4.4 3.9 4.2 3.2 0.5 +1.0
30 23 19 12 6 7 16 30 1

Sta	+	H.L.	-	Elev.
+41	Approx. ± Town line Rd.			1060.54 60.07
145 to				1061.04 60.57
144 to				1063.84 63.37
T.P.	-0.01	1066.34 ^{✓47} 8.40		1066.35 [✓] 48
143 to				1068.15 67.68
+50			60 ±	1069.35 68.88
142 to				1069.15 68.68
+23	Readings on skew.		(No)	
141 to				1070.15 69.78
B.M. #11			6.05	1069.30 68.83
140 to				1071.35 70.88
T.P.	1.92	1075.35 ^{74.88} 13.12		1073.43 [✓] 72.96
139 to				1073.75 73.28

~~1086.55~~
.08

West	±	East	64
		64 5.1 1.4	
		50 100	
8.8 7.1 6.2 6.4 5.9 5.2 6.2 6.6 4.8 4.5			
30 21 7 6 5 16 17.5 22 30			
5.7 6.0			
13.4 9.4 9.7 2.9 2.6 3.2 3.1 3.0 3.2 2.5 0.4 +1.2			
35 30 21 9 7 4 6 16 17 23 30			
5.7 7.7 6.8 7.4 7.2 7.0 7.3 5.8 4.8 4.1			
30 8 3.5 3 5 15 17 25 30			
8.0 7.0 6.4 6.2 5.9 6.3 6.9 5.9 5.6 5.0 4.8			
30 8 4 5 15 16 21 26 27 30			
10.5 10.3 9.8 9.3 14.0 4.8 5.6 5.8 5.4 5.7 4.8 7.3 7 9.3 8.8 7.9 8.6 9.3			
30 26 19 19 14 15 15 14 15 15 15 15 26 28 30 50			
FL. FL. FL. Top Hdwl S G Hdwl Top FL. 26 28 30 50			
Pipe Pipe op op Swzle			
12.5			
50			
6.6 6.4 5.5 5.2 5.7 6.8 7.2 6.6 8.4			
30 20 8 12 13 9 21 30			
Spike E. Root 13" Fir S. of drive 140±90 2± Lt			
4.0 3.8 4.3 4.0 4.4 4.6 3.0 1.4 1.8 1.0			
30 21 9 10 13 15 25 27 30			
12.4 11.4 12.2 13.1 12.8 13.3 11.5 10.8			
30 20 9 7 11 16 28 30			

Sta. + H.I. - Elev.
 T.P. 10.66 1074.~~84~~⁰⁷ 7.53 1063.~~80~~⁴¹

+07 Cul. (No) ~~1064.71~~ 64.27

150 to ~~1064.71~~ 64.24

149 to ~~1066.71~~ 66.24

148 to ~~1066.71~~ 65.94

+40 ~~1063.81~~ 63.34

147 to ~~1062.01~~ 61.54

T.P. 10.69 1071.~~41~~^{70.94} 6.22 1060.~~72~~²⁵

+24 Cul. (No) ~~1060.72~~ 59.57

146 to ~~1060.04~~ 59.57

1066.~~34~~⁴⁷

West East 65
 N.W. of W. Headwall

11.5-11.2 11.047.5 2.9 7.2 6.7 7.0 8.6 7.2 10.73 9.9
 50 30 FL. Hdwl 15 9 11 18 Hdwl FL 30

9.1 8.5 7.2 6.7 7.0 8.9 9.6
 19 12 8 12 18 30
 30

2.2 2.8 4.5 5.6 5.1 4.7 5.4 6.6 5.1 4.1 3.9
 30 20 15 11 9 12 14 18 25 30

7.1 6.3 7.2 5.5 5.0 5.8 6.8 5.6 4.8
 30 17 14 10 9 12 14 30
 15

4.7 3.9 6.1 8.8 8.1 7.6 8.0 8.5 4.7 2.5
 30 25 19 14 12 9 10 16 30
 21 15 11

11.3 11.4 11.2 9.9 9.4 9.9 10.1 7.9 7.0
 30 26 15 12 9 11 16 30
 16

11.70 10.9 11.50 9.00 6.6 7.6 7.3 6.9 7.3 6.6 9.00 11.67 10.5 10.4
 50 30 FL. Top Hdwl 15 9 11 Hdwl Top FL. 16 30
 op op

9.0 8.2 8.7 7.2 6.9 7.4 7.9 8.4 9.2
 30 11 14 8 12 14 20 30
 16

Sta	+	H.I.	-	Elev.
152to				1083.10 82.63
157to				1077.30 76.83
T.P.	11.76	1087. 50 ⁰³	2.66	1075.74 74.27
156to				1074.90 74.43
155+30	Culit (No)			1073.90 73.43
155to				1073.50 73.03
154to				1073.10 72.63
153to				1073.30 72.83
T.P.	5.50	1072. 40 ⁹³	1.64	1072.90 72.43
152to				1068.74 68.27
151to				1065.84 65.37
		1074. 54 ⁰⁷		

Begin 10/31/39 Cloudy-warm

West		E		East		66			
2.6	2.2	6.1	4.2	4A	5.0	5.5	1.1	0.5	0.9
30	23	15	12		11	12	23	26	30
		17				14			
2.8	1.4	11.8	10.6	10.20	10.6	11.4	9.5	7.6	
30	16	13	10		12	14	19	25	
		15				15		30	
7.1	5.3	3.8	3.5	3.9	4.7	4.6	3.8	5.2	
30	15	10			12	15	9	24	30
10.3	8.6	9.56	6.6	7.4	5.1	4.5	5.1	7.4	5.95
50	30	FL	Hdw	16	9.5		11	16	Hdw
			FL						FL
									23
									30
									50
9.5	8.0	5.5	4.9	5.4	7.1	6.7	6.0	5.0	
30	18.5	11		12	13.5	17	23	30	
					14.5				
7.6	6.5	7.2	6.6	5.5	5.3	5.8	6.4	4.6	3.6
30	17	15	14	10.5		11	11.5	15	23
		16					12.5		30
6.6	5.4	9.0	5.4	5.1	5.6	6.3	3.7	2.3	
30	16	12	9.5		11	12	18	25	
		14				13		30	
5.0	4.6	7.4	6.3	5.8	6.4	6.8	5.9	2.6	1.3
30	18	12	9		11.5	12	15	22	30
			13			13			
9.1	9.2	10.0	9.0	8.7	9.1	10.1	9.0	7.4	
30	16	11	9		13	16	21	30	
						18			

Stz	+	H.I.	-	Elal	
166 to				1066.42	65.95
165 to				1067.72	61.25
164 to				1071.42	70.95
T.P.	1.52	1073.42	12.70	1071.50	43
+50		12.95		1075.00	74.53
163 to				1078.20	77.73
T.P.	2.15	1084.60	9.27	1082.45	81.98
162 to				1084.72	84.25
T.P.	1.41	1092.32	4.01	1090.25	38
161 to		91.85		1090.72	90.25
160 to				1094.02	93.55
159 to				1089.22	88.75
T.P.	12.38	1095.72	4.16	1083.34	82.87
		1087.56			.03

West	+	East	
13.0	7.4	7.0	7.2 13.4
25	9	9	22
30			30
11.2	6.1	5.7	6.3 11.1 12.4
25	12	8	18 30
30			
13.5	3.7	2.4	2.0 2.6 3.3 1.8 1.9 4.6
31	16	12	8 9 13 21 30
	19		10
5.5	5.2	11.4	10.0 9.6 10.2 10.9 2.1 1.7
30	28	16	13 8 9 23 28
		18	10 30
4.7	3.9	2.1	6.4 6.4 7.0 7.3 1.0 0.8
30	26	18	13 7. 9 20 30
		20	10
7.4	6.8	9.7	2.3 1.6 2.0 9.6 7.7 2.9
30	27	15	14 9 11 15 30
		17	
Hub 161 to R bank Rain			
1.9	5.8	5.0	5.8 6.3 5.1 3.1 0.3 +0.8
22	13	10	10.5 13.5 21 24 30
30		15	11.5
+4.5	1.7	2.1	1.7 2.0 1.4 +6.0
25	13	12	10 14 24
30			30
1.9	1.2	7.4	7.1 6.5 7.0 7.8 5.9 1.7 1.2
30	25	14	12 9 11 14 21 30
		15	12 17

Sta + H.L. - Eto

174+0 1096.16 95.69

T.P. 13.14 1106.96²⁹ 0.47 1093.62 ✓ 15

173+0 1090.49 90.02

172+0 1082.99 82.52

T.P. 12.23 1094.09^{93.62} 1.01 1081.26 ✓ 80.79

171+0 1077.17 76.70

170+0 1072.57 72.10

T.P. 10.21 1082.27^{81.80} 0.79 1071.00 ✓ 71.53

169+0 1068.59 68.12

168+0 1066.59 66.12

Note: See page 7 for B.M.

167+0 1066.09 65.62

+51.5 Mend bridge 1066.69 66.22

166+30 Mend bridge 1072.45³² 460 1068.82 ✓ Rain

T.P. 3.97 1073.42³⁵ 72.95

West East 600

914 96.0 95.56 94.6 96.0 96.6

5.4 10.8 10.6 11.2 12.2 10.0 10.2
30 6 15 17 20 30
9 18

+1.5 +1.2 5.4 1 3.6 3.4 3.9 5.1 0.4 1.2
30 20 6 5 15 17 24 30
9 6 18

7.4 6.3 12.1 11.3 11.1 11.2 12.1 10.4 6.1
30 18 8 6 14 16 20 26
11 17 30

5.0 4.3 3.0 6.6 5.6 5.1 5.5 6.7 5.3 1.7 0.2
30 26 16 10 8 13 14 17 26 30
11 15

2.0 1.0 10.2 11.1 10.1 9.7 10.2 11.6 9.3 6.1 5.6
30 17 13 9 8 12.5 14 19 23 30
11 15

3.3 2.5 2.4 5.1 4.6 4.2 4.6 5.4 4.7 1.1 1.5
30 26 16 11 8 12 15 17 24 30
10 16

7.7 6.9 8.2 6.7 6.6 6.2 6.5 6.0 8.1 7.5
30 14 12 10 7 13 16 22 30
13

10.6 9.2 7.1 6.7 6.6 7.1 9.5 10.3
30 13 8 6.1 3 12 20 30

18.0
FL 6.2

End of N. Bridge rail. Begin 11/3/39

Fd 11 35"
2:45 P.M.

Sia	+	H.I.	-	Mod.	
T.P.	0.96	1112.51 1112.95	12.40	1112.02 ✓	11.55
182 to					12.85
181 to					17.35
180 to				1020.22	19.55
179 to			Boj.	1118.02	17.55
178 to			Stop.	1113.22	12.75
T.P.	9.01	2395 1124.12	0.00	1114.81 ✓	34
177 to				1108.91	08.44
176 to				1104.41	03.94
T.P.	9.24	34 1114.81	1.79	1104.99 ✓	50
175 to				1099.96	99.49

1106.40 ✓
29

West	E	East	
7.9	7.7	8.4	12.4 11.8 11.1 11.7 12.5 8.1 8.6 8.3
30	25	18	11 9 13 14.5 23 25 30
			12 15 16.5
5.6	4.8	6.1	8.4 13.6 6.9 7.6 8.4 6.5 5.8 6.2
30	25	19	13 11 6 11 17 25 30
			15 13
4.4	4.7	6.4	4.7 4.4 5.1 6.7 5.2 5.4
30	19	14	11 9 12 15 30
			15
18.9	19.6	18.5	16.5 17.6 17.2 16.7 18.9 19.3 19.0
5.5	4.8	5.9	7.9 6.8 6.4 7.2 7.7 5.5 5.1 5.4
30	25	21	15 14 9 11 16 25 30
			16
14.4	15.2	11.8	12.7 12.7 12.0 15.5 15.9
10.0	9.2	12.6	11.7 11.2 11.7 12.4 8.9 8.5
30	26	15	17 13 10 12 18 25 30
			17
Hub Editch		178 to 20	Began 11/4/39 Fair-34
12.5	11.1	06.9	08.5 08.4 0.2 0.2 0.2 0.5
2.3	3.1	7.9	6.3 5.9 6.4 7.6 5.6 6.3
30	23	14	11 10 13 17 30
			16 14
09.3	09.6	02.1	03.9 02.7 07.4 05.9
5.5	5.2	12.1	10.9 10.4 10.9 12.1 7.4 8.9
30	22	12	13 10 12 14 22 30
			13 15
03.3	03.0	99.9	99.7 99.3 98.6 02.0 03.0 02.6
3.5	3.8	6.9	7.1 6.8 7.5 8.2 4.8 3.8 4.2
30	19	13	9 13 15 21 25 30
			9 16

Sta	+	H.I.	-	Elev.
188 to				108.580
		30		91.15
T.P.	0.75	1092.67	9.75	1091.92
187 to				1093.30
T.P.	0.90	1101.69	12.21	1100.79

186 to 1101.01

Profile Cedar Road

Culot 1106.50

185 to 1105.01

184 to 1105.41

F.L. Drive way pipe to culot 7.14

BM# B		6.41		1106.50
BM	(.67 High)	6.03		1106.48 (1106.23)
(Appox.) BM		1.05		1111.46 (1111.19)

183 to 1107.71

1112.98
.51

West	±	East	70						
0.0	3.2	7.4	6.8	6.4	7.0	7.4	5.6	1.6	1.9
25	16	10			14	14.5	13	26	30
30		11				15.5			

Began 11/6/39 Cloudy - 40°

4.0	4.6	8.6	9.0	8.5	1.9	2.5	9.0	4.1	4.8
30	21	14	11	13	10	14	16	23	30
							11		

9.8	13.4	2.0	11.5	12.1	12.8	10.3	10.1
20	12.5	10		12	14	13.5	30
30	13.5				15		

5.2 6.1 6.0
100 50 P.I.

9.41	9.60	6.01	6.01	7.9	7.2	6.9	9.1	8.73	10.7
F.L. Tile	F.L.	P.I.	22	31	38	Hdwl	F.L. Top	66	

6.9	9.3	8.3	1.5	8.1	9.0	7.8
16	12	8		3	14	18
30	13				15	30

6.6	8.4	9.0	8.1	7.4	7.1	8.0	10.2	10.8
25	21	17	15	12		13	21	30
30		19						

Drill hole Conc. Hawaii; SW. quad. of Intersection
(2.4 from E end)

4.7	5.1	4.9	6.1	5.8	4.8	6.1	4.9	2.6	2.4
30	25		12	11		15	17	22	30
			13				18		

Sta.	+	H.I.	-	E	±
194to				1081.11 81.22	
				81.42	Bridge
193to				81.10	
192to				80.10	
191to				80.10	
190to				81.20	
T.P.	2.79	1085.27 84.80	10.19	1082.48 .01	
189to				82.50	
188to150				83.70	
BM#12			0.00	1075.64	.20
I.P.	6.85	1075.61 1075.20		1068.87 35	

								±	East	71
6.5	6.9	6.3	4.3	3.5	4.0	6.0	5.0			
30	21	15	8		12	20	30			
								1081.89		
					10.7	3.38	10.6			
					F.L.	± Bridge	F.L.			
7.6	8.3	8.8	3.9	3.7	4.1	7.9	7.7			
30	22	19	9		14	22	30			
1.9	2.6	5.5	4.7	5.4	8.4					
30	15	8.5		13.5	20					
5.7	6.7	8.1	7.2	6.9	5.4	4.7	5.3	8.6	9.2	
30	16	14	12	11	9		13	19.5	30	
6.0	6.2	7.5	4.5	4.2	3.6	4.4	5.0	5.9	6.2	
30	18	14	11	9		13	16.5	20	30	
11.8	11.5	11.4	10.4	9.7	10.5	12.1	13.0			
28	22	11	9		13	20	30			
3.0	8.6	9.6	9.3	8.5	9.2	9.7	10.0	7.8		
28	15	10	9		19	14	20	30		
Spika N.W. Root Twin 26" Map. 163482; 30' Rt Sand W bridge rail										

Sta	+	H	-	E
206 to				15.85
205 to				13.75
204 to				11.95
203 to		118.27		10.40 10.35
T.P.	1.35	119.22	2.27	111.04
202 to				09.27
201 to				08.27
+59	Culot.	Dentuse for computation		07.97
200 to				07.67
199 to		113.14		1105.27 07.17
T.P.	1.45	114.14	0.37	1106.09
198 to				03.29
197 to		1106.06		1093.65 ¹² 98.39
T.P.	12.47	1107.06	0.08	1094.59
196 to				89.00 →
Note: Deduct i for all Elev. from here on.				
195 to		1093.67 20		83.20 →
T.P.	12.69	1094.67	3.29	1081.98
		1085.27		1080.51
		84.80		

72											
103	112	0.6	3.5	2.4	1.9	2.3	2.8	1.7	1.5	2.1	
30	22	15	8	10		16	17	21	24	30	
30	31	3.8	5.6	4.4	4.0	4.5	4.9	4.3	3.8	4.7	
30	22	11	8	6		16	19	21	26	30	
	6.1	6.3	5.4	1.0	6.4	5.8	6.4	6.7	6.8	7.8	
	30	20	11	8	6		18	19	25	30	
6.9	1.0	7.1	8.8	1.9	1.4	1.8	2.3	1.2	1.9		
30	20	11	8	5		18	19	25	30		
2.3	3.5	5.1	3.1	3.4	4.1	4.7	3.7				
30	14	8	6		17.5	19	21				
			10			20	30				
5.6	5.4	6.6	4.8	4.4	4.9	5.6	5.9	5.3	6.3		
	2.5	4	11	4		16	17	19	25	30	
	30		9								
5.9	6.4	1.8	8.3	4.7	5.6	5.0	4.7	4.6	5.3	6.0	5.0
2.5	17	15	FL	Hawl	9	6		5	15	18	Hawl
											FL
											30
											50
3.7	4.4	6.7	5.8	5.0	5.8	6.2	5.7	6.3			
30	14	9.5	8			17	17.5	23	30		
		10.5									
3.7	3.6	7.2	6.3	5.5	6.0	6.7	5.8	4.9	6.2		
30	17	11	9		15	17	19	24	30		
			13			18					
0.2	10.2	11.3	3.5	3.1	2.3	2.6	1.1	0.2			
30	21	17	10	9		13	17	21.5	30		
			11								
5.4	4.8	7.9	7.6	7.2	7.6	8.4	4.2	3.8			
30	16	10	9		13	16	17	24	30		
			11								
6.0	4.9	4.3	5.7	4.8	4.2	4.9	5.6	3.2	1.1		
30	21	14	13	10		12	14	21	30		
			10				17				
11.1	10.1	10.2	10.8	10.7	10.0	10.5	10.9	7.9	5.3		
30	26	4	13	9		12	15	23	30		
							18				

Sta	+	H.I.	-	Elev
218to				55.56
217to				54.06
216to				51.85 52.16 52.32
# B.M. 14		56.86	5.01	H53.32
215to		1157.33		49.12 50.16
T.P.	7.74	1158.33	0.70	1150.59 Stk 214
214to				47.92
213to				45.02
212to				42.22
211to		49.82 1150.29		37.43 37.72
T.P.	12.39	1151.29	1.03	1138.90
210to		1138.93 46		27.68 31.26
T.P.	10.78	1139.93	0.32	1129.15
209to				25.60
208to				21.40
207to				18.40
T.P.	10.53	1128.47 1128.47 17.75	0.28	1118.94

73

0.9	1.4	0.1	2.1	1.1	1.3	1.7	3.0	2.1	2.6
30	20	13	8	6		14	17	20	30
			9				18		
1.4	1.9	4.0	3.2	2.8	3.1	4.1	3.0	3.4	
25	13	8	6			15	19	21	30
30		10				20			
3.2	2.8	3.1	5.8	5.4	4.7	5.2	6.0	4.6	4.9
30	22	13	9	6		15	17	21	30
			10				18		
Spike S.W. Root 20" Maple Sta 215 to 6; 45' Rt									
5.9	6.3	8.2	7.2	6.7	7.3	8.2	6.6	6.0	
30	13	9	7		4	16	20	30	
			10			11			
1.7	0.8	3.1	2.6	1.9	2.5	3.6	1.5	2.1	
30	14	9	7		15	18	24	25	30
			10			19			
2.9	2.4	6.4	5.5	4.8	5.2	6.2	3.0	3.9	
30	16	10	9		17	19	21	26	27
			11						30
6.7	7.0	9.0	8.0	7.6	8.1	9.3	6.9	7.8	
30	16	12	9		15	18	25	30	
			13			20			
8.5	1.5	11.6	12.7	12.1	12.8	14.4	12.3	14.4	
30	25	12	10		16	18	22	30	
			13			19			
1.9	6.4	9.6	8.3	7.2	7.9	9.2	8.0	3.0	3.6
30	19	12	11		16	17	21	28	30
			13			18			
3.4	3.6	4.5	3.3	2.4	3.3	3.8	2.3	1.9	
30	16	13	11		15	18	22	30	
			14			19			
1.9	1.6	8.3	7.3	6.6	7.3	8.3	7.1	8.2	
23	15	12	10		16	19	23	30	
30		14				21			
8.8	9.0	10.0	11.5	10.1	9.6	10.1	10.6	12.3	
30	25	15	12	8		17	20	30	
			13						
Hub									
Quit 2:40 Rain & Sleat									
Degan 11/2/39 Cloudy 42									

Std

+

H.I.

-

Elou

E

7A

229to

74.94
1175.41

7108 68.84

T.P.

3.86

~~1176.41~~ 10.21

~~1172.55~~

228to

71.39

227to

74.89

226to

76.39

225to

1181.76 29

72.20 74.09

T.P.

9.09

1182.76 0.36

~~1173.69~~

224to

68.26

223to

63.66

222to

72.56
1173.03

60.66

T.P.

10.70

~~1174.03~~ 0.34

~~1162.33~~ Sk 222to

221to

58.50

220to

56.90

219to

56.10

218+11

Culit

62.20
1162.67

4.05

55.54 55.80

T.P.

6.66

~~1163.67~~ 1.32

~~1157.01~~

~~1158.33~~
56.86

7.8 7.0 8.5 6.7 6.1 7.3 3.3 2.7
2.5 17 13 9 14 24 30
30 15 17

11.9 11.1 10.9 9.9 11.0 10.9 10.1 7.6
30 12 7 14 16 21 27
30

9.0 7.6 8.9 7.1 6.4 7.6 7.5 4.4 4.3
30 11 12 9 13 17 24 30
14

5.2 4.4 3.8 6.2 5.4 4.8 5.8 3.2 3.0
30 22 15 10 8 15 20 30
11

5.9 6.0 6.9 8.4 7.5 7.2 7.8 8.0 5.4 5.0
30 22 14 10 7 15 16 22 30
11

0.9 1.0 3.5 5.1 4.6 4.3 4.9 5.5 3.0 3.3
30 24 13 8 5 15 18 24 30
9

6.1 7.0 10.4 9.2 8.9 9.5 10.3 8.9 9.5
2.5 12 7 5.5 16 17 22 30
30 8

11.0 11.1 13.4 12.4 11.9 12.4 13.3 11.7 11.9
2.5 12 7 6 11 20 23 30
30 8 21

4.0 3.8 4.6 5.4 4.1 3.7 4.3 4.7 4.4 4.8
30 24 10 8 6 16 18 20 30
9

5.6 5.5 6.2 6.6 5.8 5.3 5.7 7.6 8.4
30 24 10 8 6 16 22 30
9

6.8 7.1 7.2 6.3 6.1 6.1 10.3 11.2
30 12 9 6 14 22 30
10

6.0 5.6 7.3 9.0 5.3 6.9 6.7 6.4 6.8 7.9 5.9 10.1 12.3
30 22 15 Fl Hwl 9.5 5 15 17 Hwl Fl 30

Sta + H.I. - E
 + Profile Mayfield Road 82.04

+ F.L. Culot 7.13
 236 to 80.94

BM^H 15 3.82 ~~86.21~~ 1.10 ~~82.39~~ 1181.21
 85.74 81.92 (1.18 High)

235 to 2
 1183.49.02 70.34 75.62

T.P. 12.68 ~~84.49~~ 4.60 ~~71.81~~ S.K. 234

234 to 70.24

233 to 67.94

232 to 66.94

231 to 67.44

+005 Culot No 13.5 13.0
 60 A0

230 to 67.34
 74.94
 1175.41
 1176.41

3.3 3.1 5.5
 100 E 100

See note on page 19

33.52 73 5.6 5A 4.8 5.1 6.2 5.9 6.0
~~27~~ 22 ~~16~~ 14 10 17 ~~20~~ 24 30
 30 13 21

Xon N.W. + Hwall; N.W. quad. Mayfield & Sperry
 Roads intersection

3.0 2.4 10.5 8.3 7.4 8.0 5.8 4.2 4.6
 30 22 9 7 15 21 25 30
 12 17

3.4 5.1 6.2 5.3 4.7 5.3 5.9 5.6 5.8
~~25~~ 13 10 8 15 16 18 30
 30 12 11

10.0 8.9 7.1 8.0 1.3 1.0 7.6 8.9 6.7 4.5
 30 24 13 12 8 13 16 30 40
 20

12.1 10.8 9.8 8.4 8.0 8.6 10.0 3.1
 30 24 12 9 13 15 39
 18

12.1 11.2 11.8 7.1 7.5 8.0 13.0 6.8
 30 17 13 6 13 14 30
 16 10

12.8 11.1 12.1 12.5 10.5 8.7 7.7 7.5 7.9 10.33 13.0 12.0 6.8
 30 20 18 F.L. Top H.W. 17 13 Top 20 30
 op. F.L.

12.1 10.0 10.8 8.0 7.6 8.5 9.1 8.2
 30 20 16 9 13 15 18
 18 16 30

Check Levels

11/5/39
Pomeroy
Clause

T.P.	12.62	1096.40	3.27	1083.72
£ 195 to			2.4	1084.59 (1084.67)
£ 194			4.2	1082.79 (1081.77)
£ Bridge			4.14	1082.85 (1081.89)
T.P.	0.04	1086.99	12.22	1086.95
T.P.	0.71	1099.17	12.58	1098.45
£ 199			2.4	1108.63 (1108.64)
T.P.	1.87	1111.03	6.52	1109.16
T.P.	1.20	1115.68	10.63	1114.48
T.P.			6.16	1118.93 (1118.94)
T.P.	0.31	1125.11	11.93	1124.80
T.P.	0.82	1136.73	12.86	1135.91
T.P.	0.20	1148.77	9.74	1148.59
T.P.			7.72	1150.59 (1150.59)
BM #14			5.00	1153.31 (1153.32)
T.P.	1.31	1158.31	6.85	1157.00 (1157.01)
T.P.	0.52	1163.85	11.30	1163.33 (1163.33)
T.P.	0.96	1174.63	1.61	1173.61
T.P.	9.02	1181.34	5.40	1172.32 (1171.81)
T.P.	5.91	1177.72	12.02	1171.81 (Stk 213)
BM #15	0.44	1183.83		1183.39

Profile Speerly Road

85.74

Hub Hedge Road

Stk 213

Stk 214

Stake 222 to

1.9 83.84
200

2.9 82.84

100

BM # 6			7.53	1175.43 (1176.42)
T.P.			3.73	1179.23 (1179.2)
± 64 to			5.10	1177.86 (1177.94)
T.P.	0.00	1182.96	10.48	1182.96
± 63 to			7.7	1185.74 (1185.78)
T.P.	2.29	1193.44		1191.15

BM # 5			1.97	1221.15 (1220.15)
T.P.	10.31	1223.12	0.29	1212.81
T.P.	12.56	1213.10	0.48	1200.54
T.P.			0.57	1192.15 (1191.15)
T.P.	11.77	1201.02	0.14	1189.25
BM # C	12.97	1189.39		1176.42

B.M.			2.61	1096.88 (1098.47)
T.P.	5.51	1099.55	1.02	1094.04
T.P.	12.24	1095.06	0.37	1082.82
T.P.	13.10	1083.19	0.47	1070.09
B.M.	5.92	1070.56		1064.64

BM			3.18	1107.89 (1106.95)
BM # 13			3.56	1107.51 (1106.57)
T.P.	4.50	1111.07	0.76	1106.51
T.P.	10.98	1107.33	0.05	1096.35
T.P.	0.05		3.52	1092.88 (1091.92)
		1096.40		

Top rail E. guard railing

N.W. & W. Hdwall

N.W. & W Hdwall

X N.E. & E Hdwall

X in Conc. Gds pump base

R.P. for Township line So. Woodland Rd.

BM			6.95	1098.58	(1098.47)
£ 101+0					(1097.35)
£ 99+0			2.7	1102.83	(1102.69)
T.P.	0.77	1105.53	13.03	1104.76	
£ 96+0			4.3	1113.49	(1113.39)
T.P.	0.46	1117.79	12.78	1117.33	
BM	0.74	1130.11	12.15	1129.37	(1129.25)
90+0			4.15	1137.37	(1137.21)
T.P.	1.87	1141.52	2.30	1139.65	
£ 85+0			4.4	1137.55	(1137.36)
£ 83+0			9.3	1132.65	(1132.53)
T.P.	5.13	1141.95	12.55	1136.82	
T.P.			8.89	1140.48	(1140.41)
£ 81+0			11.80	1137.57	(1137.60)
T.P.	3.82	1149.37	11.80	1145.55	
£ 78+0			9.1	1147.65	(1147.62)
T.P.	1.21	1157.35	12.08	1156.14	
£ 15			9.00	1154.22	(1159.02)
£ 12+0			7.80	1160.42	(1160.23)
T.P.	5.63	1168.22	12.49	1162.59	
£ 10+0			11.50	1163.58	(1163.53)
T.P.	0.50	1175.08	12.05	1174.58	
£ 68+0			10.2	1176.43	(1176.54)
T.P.	7.42	1186.63		1179.21	

Gas Pump base

School H. stop

Top rail, E railing

BM ^{#4}			4.68	1213.63	(1213.64)
T.P.	0.07	1218.31	11.11	1218.24	
T.P.	0.48	1229.35	13.12	1228.87	
± 23			1.7	1240.29	
± 26 to			11.9	1230.09	(1229.97)
T.P.	1.04	1241.99	9.20	1240.95	
BM ^{#3}			3.43	1246.72	(1246.68)
T.P.	2.12	1250.15	10.47	1248.03	
± 13 to			2.7	1255.80	(1255.78)
T.P.	0.19	1258.50	11.39	1258.31	
T.P.	0.26	1269.70		1269.44	
BM ^{#2}			3.04	1270.76	1270.76
T.P.	4.36	1273.80	3.04	1269.44	
T.P.	4.48	1272.48	11.66	1268.00	
T.P.	1.85	1279.66		1277.81	1277.29 + .52
BM			3.43	1176.48	(1277.00)
T.P.	7.62	1279.91	3.82	1277.29	
0 to			2.35	1278.76	(1279.39)
T.P.	10.61	1281.11	0.15	1270.50	
B.M.	8.14	1270.65		1261.91	

Reset of Elev. of 1261.96 in 1934 ↗

B.M. #1 was reset in 1934 with Elev. of 1276.53
 B.M. #15 was checked to U.S.G. Bat Chester X Reads by C.C.G. checking out 0.18 low, making Elev. of B.M. #15 1181.39

30" Maple Side S.R. 87 ± 400' E Fullertown Rd

15" Cherry N side State Route 87 ± 700' W of Fullertown Road

6.4 - 8 34.220 2.0 = 30 6.1

9.3 9.3 6.1 6.3 4.2

6.4 3.4 3.4 2.4 1.1

2.9 5.9 2.7 3.9

2.4 2.4

+ 0.5 + 3.5

10.6 10.6 5.1 5.1 5.1 0.2 27

3.7 20 2.9 30 3.4 = 22 4.2 = 27

6.9 7.7

9.4 9.4 5.1 = 30 2.58

6.9 7.7

2.5 1.7

8.2 7.2

0.5 = 24 - 30 1.0 - 25 - 30

7.7 6.2 1.9900

1.7 1.7 112.44

+ 6 4.5 86.56

5.6 2.36419 100.100

9 2.12419 19.97

4.7 2.4229 80.03

24 + 0.2 30

4.7 60.3

49.5

183 + 54.2 10.30

96.3

184 + 50.80 49.5

49.50

184.50.5

CURVE TABLES.

Published by KEUFFEL & ESSER CO.

HOW TO USE CURVE TABLES.

Table I. contains Tangents and External to a 1° curve. Tan. and Ext. to any other radius may be found nearly enough, by dividing the Tan. or Ext. opposite the given Central Angle by the given degree of curve.

To find Deg. of Curve, having the Central Angle and Tangent: Divide Tan. opposite the given Central Angle by the given Tangent.

To find Deg. of Curve, having the Central Angle and Tangent: Divide Ext. opposite the given Central Angle by the given External.

To find Nat. Tan. and Nat. Ex. Sec. for any angle by Table I.: Tan. or Ext. of twice the given angle divided by the radius of a 1° curve will be the Nat. Tan. or Nat. Ex. Sec.

EXAMPLE.

Wanted a Curve with an Ext. of about 12 ft. Angle of Intersection or I. P. = 23° 20' to the R. at Station 542+72.

Ext. in Tab. I opposite 23° 20' = 120.87
120.87 ÷ 12 = 10.07. Say a 10° Curve.

Tan. in Tab. I opp. 23° 20' = 1183.1
1183.1 ÷ 10 = 118.31.

Correction for A. 23° 20' for a 10° Cur. = 0.16
118.31 + 0.16 = 118.47 = corrected Tangent.

(If corrected Ext. is required find in same way)
Ang. 23° 20' = 23.33° ÷ 10 = 2.3333 = L. C.

2° 19½' = def. for sta.	542	I. P. = sta.	542+72
4° 49½' = " " "	+50	Tan. =	1.18.47
7° 19½' = " " "	543	B. C. = sta.	541+53.53
9° 49½' = " " "	+50	L. C. =	2.33.33
11° 40' = " " "	543+	E. C. = Sta.	543+86.86

100 - 53.53 = 46.47 × 3' (def. for 1 ft. of 10° Cur.) = 139.41' =
2° 19½' = def. for sta. 542.

Def. for 50 ft. = 2° 30' for a 10° Curve.

Def. for 36.86 ft. = 1° 50½' for a 10° Curve.

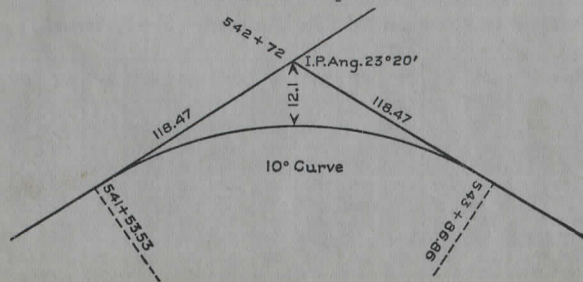


TABLE I. — Tangents and External to a 1° Curve.
Chord = 100 ft.

Int. Angle	Tangent	External	Int. Angle	Tangent	External	Int. Angle	Tangent	External
1°	50.00	.22	8°	400.66	13.99	15°	754.32	49.44
10'	58.34	.30	10'	409.03	14.58	10'	762.80	50.55
20	66.67	.39	20	417.41	15.18	20	771.29	51.68
30	75.01	.49	30	425.79	15.80	30	779.77	52.82
40	83.34	.61	40	434.17	16.43	40	788.26	53.97
50	91.68	.73	50	442.55	17.07	50	796.75	55.13
2	100.01	.87	9	450.93	17.72	16	805.25	56.31
10	108.35	1.02	10	459.32	18.38	10	813.75	57.50
20	116.68	1.19	20	467.71	19.06	20	822.25	58.70
30	125.02	1.36	30	476.10	19.75	30	830.76	59.91
40	133.36	1.55	40	484.49	20.45	40	839.27	61.14
50	141.70	1.75	50	492.88	21.16	50	847.78	62.38
3	150.04	1.96	10	501.28	21.89	17	856.30	63.63
10	158.38	2.19	10	509.68	22.62	10	864.82	64.90
20	166.72	2.43	20	518.08	23.38	20	873.35	66.18
30	175.06	2.67	30	526.48	24.14	30	881.88	67.47
40	183.40	2.93	40	534.89	24.91	40	890.41	68.77
50	191.74	3.21	50	543.29	25.70	50	898.95	70.09
4	200.08	3.49	11	551.70	26.50	18	907.49	71.42
10	208.43	3.79	10	560.11	27.31	10	916.03	72.76
20	216.77	4.10	20	568.53	28.14	20	924.58	74.12
30	225.12	4.42	30	576.95	28.97	30	933.13	75.49
40	233.47	4.76	40	585.36	29.82	40	941.69	76.86
50	241.81	5.10	50	593.79	30.68	50	950.25	78.26
5	250.16	5.46	12	602.21	31.56	19	958.81	79.67
10	258.51	5.83	10	610.64	32.45	10	967.38	81.09
20	266.86	6.21	20	619.07	33.35	20	975.96	82.53
30	275.21	6.61	30	627.50	34.26	30	984.53	83.97
40	283.57	7.01	40	635.93	35.18	40	993.12	85.43
50	291.92	7.43	50	644.37	36.12	50	1001.7	86.90
6	300.28	7.86	13	652.81	37.07	20	1010.3	88.39
10	308.64	8.31	10	661.25	38.03	10	1018.9	89.89
20	316.99	8.76	20	669.70	39.01	20	1027.5	91.40
30	325.35	9.23	30	678.15	39.99	30	1036.1	92.92
40	333.71	9.71	40	686.60	40.99	40	1044.7	94.46
50	342.08	10.20	50	695.06	42.00	50	1053.3	96.01
7	350.44	10.71	14	703.51	43.03	21	1061.9	97.57
10	358.81	11.22	10	711.97	44.07	10	1070.6	99.16
20	367.17	11.75	20	720.44	45.12	20	1079.2	100.75
30	375.54	12.29	30	728.90	46.18	30	1087.8	102.35
40	383.91	12.85	40	737.37	47.25	40	1096.4	103.97
50	392.28	13.41	50	745.85	48.34	50	1105.1	105.60

Corrections to be Added (T = Tangent. E = External.)

Int. Angle	Curve 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
5°	T=.02 E=.000	.03 .000	.05 .001	.06 .001	.08 .002	.10 .002	.11 .003	.13 .003	.15 .004	.16 .004	.18 .004	.20 .005	.21 .005	.23 .005
10°	T=.03 E=.001	.05 .003	.09 .004	.13 .007	.16 .007	.19 .008	.22 .009	.25 .011	.28 .012	.31 .014	.34 .015	.38 .017	.42 .018	.46 .020
15°	T=.04 E=.003	.10 .007	.14 .010	.19 .014	.24 .018	.29 .023	.34 .027	.39 .032	.45 .035	.51 .039	.58 .043	.63 .047	.68 .051	
20°	T=.06 E=.006	.13 .011	.19 .017	.26 .022	.32 .028	.39 .034	.45 .040	.51 .045	.58 .051	.65 .057	.72 .063	.79 .070	.84 .076	.90 .083
25°	T=.08 E=.009	.16 .018	.24 .027	.33 .036	.42 .045	.51 .054	.59 .063	.68 .072	.77 .081	.86 .090	.95 .099	1.04 .106	1.13 .114	1.23 .122
30°	T=.10 E=.013	.19 .025	.29 .035	.39 .045	.49 .055	.59 .065	.69 .075	.79 .085	.89 .095	.99 .105	1.09 .115	1.19 .125	1.29 .135	1.39 .145
35°	T=.11 E=.018	.22 .035	.34 .045	.47 .055	.58 .065	.69 .075	.80 .085	.91 .095	1.01 .105	1.11 .115	1.21 .125	1.31 .135	1.41 .145	1.51 .155
40°	T=.13 E=.023	.26 .046	.40 .070	.53 .093	.67 .117	.80 .141	.93 .172	1.06 .203	1.19 .234	1.32 .265	1.45 .296	1.58 .327	1.71 .358	1.84 .389
45°	T=.15 E=.030	.30 .060	.44 .093	.60 .119	.76 .153	.91 .184	1.06 .216	1.21 .254	1.37 .289	1.52 .325	1.67 .351	1.82 .378	1.97 .411	2.11 .445

TABLE I. — Tangents and External to a 1° Curve.
Chord = 100 ft.

Int. Angle	Tangent	External	Int. Angle	Tangent	External	Int. Angle	Tangent	External
22°	1113.7	107.24	29°	1481.8	188.51	36°	1861.7	294.9
10'	1122.4	108.90	10'	1490.7	190.74	10'	1870.9	297.7
20	1131.0	110.57	20	1499.6	192.99	20	1880.1	300.6
30	1139.7	112.25	30	1508.5	195.25	30	1889.4	303.5
40	1148.4	113.95	40	1517.4	197.53	40	1898.6	306.4
50	1157.0	115.66	50	1526.3	199.82	50	1907.9	309.3
23	1165.7	117.38	30	1535.3	202.12	37	1917.1	312.2
10	1174.4	119.12	10	1544.2	204.44	10	1926.4	315.2
20	1183.1	120.87	20	1553.1	206.77	20	1935.7	318.1
30	1191.8	122.63	30	1562.1	209.12	30	1945.0	321.1
40	1200.5	124.41	40	1571.0	211.48	40	1954.3	324.1
50	1209.2	126.20	50	1580.0	213.86	50	1963.6	327.1
24	1217.9	128.00	31	1589.0	216.3	38	1972.9	330.2
10	1226.6	129.82	10	1598.0	218.7	10	1982.2	333.2
20	1235.3	131.65	20	1606.9	221.1	20	1991.5	336.3
30	1244.0	133.50	30	1615.9	223.5	30	2000.9	339.3
40	1252.8	135.35	40	1624.9	226.0	40	2010.2	342.4
50	1261.5	137.23	50	1633.9	228.4	50	2019.6	345.5
25	1270.2	139.11	32	1643.0	230.9	39	2029.0	348.6
10	1279.0	141.01	10	1652.0	233.4	10	2038.4	351.8
20	1287.7	142.93	20	1661.0	235.9	20	2047.8	354.9
30	1296.5	144.85	30	1670.0	238.4	30	2057.2	358.1
40	1305.3	146.79	40	1679.1	241.0	40	2066.6	361.3
50	1314.0	148.75	50	1688.1	243.5	50	2076.0	364.5
26	1322.8	150.71	33	1697.2	246.1	40	2085.4	367.7
10	1331.6	152.69	10	1706.3	248.7	10	2094.9	371.0
20	1340.4	154.69	20	1715.3	251.3	20	2104.3	374.2
30	1349.2	156.70	30	1724.4	253.9	30	2113.8	377.5
40	1358.0	158.72	40	1733.5	256.5	40	2123.3	380.8
50	1366.8	160.76	50	1742.6	259.1	50	2132.7	384.1
27	1375.6	162.81	34	1751.7	261.8	41	2142.2	387.4
10	1384.4	164.86	10	1760.8	264.5	10	2151.7	390.7
20	1393.2	166.95	20	1770.0	267.2	20	2161.2	394.1
30	1402.0	169.04	30	1779.1	269.9	30	2170.8	397.4
40	1410.9	171.15	40	1788.2	272.6	40	2180.3	400.8
50	1419.7	173.27	50	1797.4	275.3	50	2189.9	404.2
28	1428.6	175.41	35	1806.6	278.1	42	2199.4	407.6
10	1437.4	177.55	10	1815.7	280.8	10	2209.0	411.1
20	1446.3	179.72	20	1824.9	283.6	20	2218.6	414.5
30	1455.1	181.89	30	1834.1	286.4	30	2228.1	418.0
40	1464.0	184.08	40	1843.3	289.2	40	2237.7	421.4
50	1472.9	186.29	50	1852.5	292.0	50	2247.3	425.0

Corrections to be Added (T = Tangent. E = External.)

Int. Angle	Curve 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
20°	T=.06 E=.006	.13 .011	.19 .017	.26 .022	.32 .028	.39 .034	.45 .038	.51 .045	.58 .051	.65 .057	.72 .063	.79 .070	.84 .076	.90 .083
25°	T=.08 E=.009	.16 .018	.24 .027	.33 .036	.42 .045	.51 .054	.59 .063	.68 .072	.77 .081	.86 .090	.95 .099	1.04 .106	1.13 .114	1.23 .122
30°	T=.10 E=.013	.19 .025	.29 .035	.39 .045	.49 .055	.59 .065	.69 .075	.79 .085	.89 .095	.99 .105	1.09 .115	1.19 .125	1.29 .135	1.39 .145
35°	T=.11 E=.018	.22 .035	.34 .045	.47 .055	.58 .065	.69 .075	.80 .085	.91 .095	1.01 .105	1.11 .115	1.21 .125	1.31 .135	1.41 .145	1.51 .155
40°	T=.13 E=.023	.26 .046	.40 .070	.53 .093	.67 .117	.80 .141	.93 .172	1.06 .203	1.19 .234	1.32 .265	1.45 .296	1.58 .327	1.71 .358	1.84 .389
45°	T=.15 E=.030	.30 .060	.44 .093	.60 .119	.76 .153	.91 .184	1.06 .216	1.21 .254	1.37 .289					

TABLE I. — Tangents and External to a 1° Curve.

Chord = 100 ft.

Int. Angle	Tangent	External	Int. Angle	Tangent	External	Int. Angle	Tangent	External
43°	2257.0	428.5	50°	2871.8	592.3	57°	3110.9	790.1
10'	2266.6	432.0	10'	2681.9	596.6	10'	3121.7	795.2
20	2276.2	435.6	20	2692.1	600.9	20	3132.6	800.4
30	2285.9	439.2	30	2702.3	605.3	30	3143.4	805.6
40	2295.6	442.8	40	2712.5	609.6	40	3154.2	810.9
50	2305.2	446.4	50	2722.7	614.0	50	3165.1	816.1
44	2314.9	450.0	51	2732.9	618.4	58	3176.0	821.4
10	2324.6	453.6	10	2743.1	622.8	10	3186.9	826.7
20	2334.3	457.3	20	2753.4	627.2	20	3197.8	832.0
30	2344.1	461.0	30	2763.7	631.7	30	3208.8	837.3
40	2353.8	464.6	40	2773.9	636.2	40	3219.7	842.7
50	2363.5	468.4	50	2784.2	640.7	50	3230.7	848.1
45	2373.3	472.1	52	2794.5	645.2	59	3241.7	853.5
10	2383.1	475.8	10	2804.9	649.7	10	3252.7	858.9
20	2392.8	479.6	20	2815.2	654.3	20	3263.7	864.3
30	2402.6	483.4	30	2825.6	658.8	30	3274.8	869.8
40	2412.4	487.2	40	2835.9	663.4	40	3285.8	875.3
50	2422.3	491.0	50	2846.3	668.0	50	3296.9	880.8
46	2432.1	494.8	53	2856.7	672.7	60	3308.0	886.4
10	2441.9	498.7	10	2867.1	677.3	10	3319.1	892.0
20	2451.8	502.5	20	2877.5	682.0	20	3330.3	897.5
30	2461.7	506.4	30	2888.0	686.7	30	3341.4	903.2
40	2471.5	510.3	40	2898.4	691.4	40	3352.6	908.8
50	2481.4	514.3	50	2908.9	696.1	50	3363.8	914.5
47	2491.3	518.2	54	2919.4	700.9	61	3375.0	920.2
10	2501.2	522.2	10	2929.9	705.7	10	3386.3	925.9
20	2511.2	526.1	20	2940.4	710.5	20	3397.5	931.6
30	2521.1	530.1	30	2951.0	715.3	30	3408.8	937.3
40	2531.1	534.2	40	2961.5	720.1	40	3420.1	943.1
50	2541.0	538.2	50	2972.1	725.0	50	3431.4	948.9
48	2551.0	542.2	55	2982.7	729.9	62	3442.7	954.8
10	2561.0	546.3	10	2993.3	734.8	10	3454.1	960.6
20	2571.0	550.4	20	3003.9	739.7	20	3465.4	966.5
30	2581.0	554.5	30	3014.5	744.6	30	3476.8	972.4
40	2591.0	558.6	40	3025.2	749.6	40	3488.3	978.3
50	2601.1	562.8	50	3035.8	754.6	50	3499.7	984.3
49	2611.2	566.9	56	3046.5	759.6	63	3511.1	990.2
10	2621.2	571.1	10	3057.2	764.6	10	3522.6	996.2
20	2631.3	575.3	20	3067.9	769.7	20	3534.1	1002.3
30	2641.4	579.5	30	3078.7	774.7	30	3545.6	1008.3
40	2651.5	583.8	40	3089.4	779.8	40	3557.2	1014.4
50	2661.6	588.0	50	3100.2	784.9	50	3568.7	1020.5

Corrections to be Added (T = Tangent. E = External.)

Int. Angle	Curve 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
40°	T = .13 E = .023	.26 .046	.40 .070	.53 .093	.67 .117	.80 .141	.93 .172	1.06 .203	1.20 .234	1.34 .265	1.49 .297	1.64 .315	1.79 .341	1.94 .341
45°	T = .15 E = .030	.30 .060	.44 .093	.60 .119	.76 .153	.91 .184	1.06 .216	1.21 .254	1.37 .289	1.52 .325	1.70 .351	1.87 .378	2.04 .411	2.21 .445
50°	T = .17 E = .037	.34 .075	.51 .116	.68 .151	.85 .189	1.02 .227	1.19 .266	1.36 .305	1.54 .345	1.72 .384	1.91 .425	2.10 .467	2.29 .508	2.48 .550
55°	T = .19 E = .046	.38 .093	.57 .142	.76 .188	.95 .236	1.14 .283	1.32 .332	1.52 .381	1.72 .420	1.92 .479	2.14 .530	2.35 .582	2.56 .641	2.77 .700
60°	T = .21 E = .056	.42 .112	.63 .168	.84 .225	1.05 .283	1.27 .340	1.49 .398	1.71 .457	1.94 .516	2.17 .575	2.38 .636	2.60 .697	2.83 .758	3.07 .807
65°	T = .23 E = .067	.46 .135	.69 .204	.93 .273	1.16 .343	1.40 .412	1.64 .481	1.88 .550	2.13 .620	2.38 .689	2.63 .758	2.88 .827	3.13 .896	3.39 .922
70°	T = .25 E = .080	.51 .159	.76 .220	1.02 .291	1.28 .361	1.54 .431	1.80 .501	2.06 .571	2.32 .641	2.58 .711	2.83 .781	3.09 .851	3.34 .921	3.72 .951
75°	T = .27 E = .095	.56 .182	.83 .259	1.12 .332	1.40 .403	1.69 .474	1.98 .545	2.27 .616	2.57 .687	2.87 .758	3.17 .829	3.47 .899	3.78 .970	4.09 1.000
80°	T = .30 E = .110	.61 .220	.91 .302	1.22 .373	1.53 .444	1.84 .515	2.15 .586	2.46 .657	2.78 .728	3.10 .799	3.44 .870	3.78 .941	4.12 1.012	4.46 1.083
85°	T = .33 E = .128	.66 .259	1.00 .381	1.33 .452	1.68 .523	2.02 .594	2.37 .665	2.72 .736	3.07 .807	3.42 .878	3.77 .949	4.14 1.020	4.55 1.091	4.89 1.162

TABLE I. — Tangents and External to a 1° Curve.

Chord = 100 ft.

Int. Angle	Tangent	External	Int. Angle	Tangent	External	Int. Angle	Tangent	External
64°	3580.3	1026.6	71°	4086.9	1308.2	78°	4639.8	1643.0
10'	3591.9	1032.8	10'	4099.5	1315.6	10'	4653.6	1651.7
20	3603.5	1039.0	20	4112.1	1322.9	20	4667.4	1660.5
30	3615.1	1045.2	30	4124.8	1330.3	30	4681.3	1669.2
40	3626.8	1051.4	40	4137.4	1337.7	40	4695.2	1678.1
50	3638.5	1057.7	50	4150.1	1345.1	50	4709.2	1686.9
65	3650.2	1063.9	73	4162.8	1352.6	79	4723.2	1695.8
10	3661.9	1070.2	10	4175.6	1360.1	10	4737.2	1704.7
20	3673.7	1076.6	20	4188.5	1367.6	20	4751.2	1713.7
30	3685.4	1082.9	30	4201.2	1375.2	30	4765.3	1722.7
40	3697.2	1089.3	40	4214.0	1382.8	40	4779.4	1731.7
50	3709.0	1095.7	50	4226.8	1390.4	50	4793.6	1740.8
66	3720.9	1102.2	73	4239.7	1398.0	80	4807.7	1749.9
10	3732.7	1108.6	10	4252.6	1405.7	10	4822.0	1759.0
20	3744.6	1115.1	20	4265.6	1413.5	20	4836.2	1768.2
30	3756.5	1121.7	30	4278.5	1421.2	30	4850.5	1777.4
40	3768.5	1128.2	40	4291.5	1429.0	40	4864.8	1786.7
50	3780.4	1134.8	50	4304.6	1436.8	50	4879.2	1796.0
67	3792.4	1141.4	74	4317.6	1444.6	81	4893.6	1805.3
10	3804.4	1148.0	10	4330.7	1452.5	10	4908.0	1814.7
20	3816.4	1154.7	20	4343.8	1460.4	20	4922.5	1824.1
30	3828.4	1161.3	30	4356.9	1468.4	30	4937.0	1833.6
40	3840.5	1168.1	40	4370.1	1476.4	40	4951.5	1843.1
50	3852.6	1174.8	50	4383.3	1484.4	50	4966.1	1852.6
68	3864.7	1181.6	75	4396.5	1492.4	82	4980.7	1862.2
10	3876.8	1188.4	10	4409.8	1500.5	10	4995.4	1871.8
20	3889.0	1195.2	20	4423.1	1508.6	20	5010.0	1881.5
30	3901.2	1202.0	30	4436.4	1516.7	30	5024.8	1891.2
40	3913.4	1208.9	40	4449.7	1524.9	40	5039.5	1900.9
50	3925.6	1215.8	50	4463.1	1533.1	50	5054.3	1910.7
69	3937.9	1222.7	76	4476.5	1541.4	83	5069.2	1920.5
10	3950.2	1229.7	10	4489.9	1549.7	10	5084.0	1930.4
20	3962.5	1236.7	20	4503.4	1558.0	20	5099.0	1940.3
30	3974.8	1243.7	30	4516.9	1566.3	30	5113.9	1950.3
40	3987.2	1250.8	40	4530.4	1574.7	40	5128.9	1960.2
50	3999.5	1257.9	50	4544.0	1583.1	50	5143.9	1970.3
70	4011.9	1265.0	77	4557.6	1591.6	84	5159.0	1980.4
10	4024.4	1272.1	10	4571.2	1600.1	10	5174.1	1990.5
20	4036.8	1279.3	20	4584.8	1608.6	20	5189.3	2000.6
30	4049.3	1286.5	30	4598.5	1617.1	30	5204.4	2010.8
40	4061.8	1293.6	40	4612.2	1625.7	40	5219.7	2021.1
50	4074.4	1300.9	50	4626.0	1634.4	50	5234.9	2031.4

Corrections to be Added (T = Tangent. E = External.)

Int. Angle	Curve 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
60°	T = .21 E = .056	.42 .112	.63 .168	.84 .225	1.05 .283	1.27 .340	1.49 .398	1.71 .457	1.94 .516	2.17 .575	2.38 .636	2.60 .697	2.83 .758	3.07 .807
65°	T = .23 E = .067	.46 .135	.69 .204	.93 .273	1.16 .343	1.40 .412	1.64 .481	1.88 .550	2.13 .620	2.38 .689	2.63 .758	2.88 .827	3.13 .896	3.39 .922
70°	T = .25 E = .080	.51 .159	.76 .220	1.02 .291	1.28 .361	1.54 .431	1.80 .501	2.06 .571	2.32 .641	2.58 .				

TABLE I. — Tangents and External to a 1° Curve.

Chord = 100 ft.

Int. Angle	Tangent	External	Int. Angle	Tangent	External	Int. Angle	Tangent	External
85°	5250.3	2041.7	92°	5933.2	2518.5	99°	6708.6	3092.7
10'	5265.6	2052.1	10'	5950.5	2531.0	10'	6728.4	3107.7
20	5281.0	2062.5	20	5967.9	2543.5	20	6748.2	3122.9
30	5296.4	2073.0	30	5985.3	2556.0	30	6768.1	3138.1
40	5311.9	2083.5	40	6002.7	2568.6	40	6788.1	3153.3
50	5327.4	2094.1	50	6020.2	2581.3	50	6808.2	3168.7
86°	5343.0	2104.7	93°	6037.8	2594.0	100°	6828.3	3184.1
10	5358.6	2115.3	10	6055.4	2606.8	10	6848.5	3199.6
20	5374.2	2125.0	20	6073.1	2619.7	20	6868.8	3215.1
30	5389.9	2136.7	30	6090.8	2632.6	30	6889.2	3230.8
40	5405.6	2147.5	40	6108.6	2645.5	40	6909.6	3246.5
50	5421.4	2158.4	50	6126.4	2658.5	50	6930.1	3262.3
87°	5437.2	2169.2	94°	6144.3	2671.6	101°	6950.6	3278.1
10	5453.1	2180.2	10	6162.6	2684.7	10	6971.3	3294.1
20	5469.0	2191.1	20	6180.2	2697.9	20	6992.0	3310.1
30	5484.9	2202.2	30	6198.3	2711.2	30	7012.7	3326.1
40	5500.9	2213.2	40	6216.4	2724.5	40	7033.6	3342.3
50	5517.0	2224.3	50	6234.6	2737.9	50	7054.5	3358.5
88°	5533.1	2235.5	95°	6252.8	2751.3	102°	7075.5	3374.9
10	5549.2	2246.7	10	6271.1	2764.8	10	7096.6	3391.2
20	5565.4	2258.0	20	6289.4	2778.3	20	7117.8	3407.7
30	5581.6	2269.3	30	6307.9	2792.0	30	7139.0	3424.3
40	5597.8	2280.6	40	6326.3	2805.6	40	7160.3	3440.9
50	5614.2	2292.0	50	6344.8	2819.4	50	7181.7	3457.6
89°	5630.5	2303.5	96°	6363.4	2833.2	103°	7203.2	3474.4
10	5646.9	2315.0	10	6382.1	2847.0	10	7224.7	3491.3
20	5663.4	2326.6	20	6400.8	2861.0	20	7246.3	3508.2
30	5679.9	2338.2	30	6419.5	2875.0	30	7268.0	3525.2
40	5696.4	2349.8	40	6438.4	2889.0	40	7289.8	3542.4
50	5713.0	2361.5	50	6457.3	2903.1	50	7311.7	3559.6
90°	5729.7	2373.3	97°	6476.2	2917.3	104°	7333.6	3576.8
10	5746.3	2385.1	10	6495.2	2931.6	10	7355.6	3594.2
20	5763.1	2397.0	20	6514.3	2945.9	20	7377.8	3611.7
30	5779.9	2408.9	30	6533.4	2960.3	30	7399.9	3629.2
40	5796.7	2420.9	40	6552.6	2974.7	40	7422.2	3646.8
50	5813.6	2432.9	50	6571.9	2989.2	50	7444.6	3664.5
91°	5830.5	2444.9	98°	6591.2	3003.8	105°	7467.0	3682.3
10	5847.5	2457.1	10	6610.6	3018.4	10	7489.6	3700.2
20	5864.6	2469.3	20	6630.1	3033.1	20	7512.2	3718.2
30	5881.7	2481.5	30	6649.6	3047.9	30	7534.9	3736.2
40	5898.8	2493.8	40	6669.2	3062.8	40	7557.7	3754.4
50	5916.0	2506.1	50	6688.8	3077.7	50	7580.5	3772.6

Corrections to be Added (T = Tangent. E. = External.)

Int. Angle	Curve 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
85°	T = .33 E = .128	.66 .259	1.00 .391	1.33 .524	1.68 .657	2.02 .790	2.36 .926	2.70 1.06	3.05 1.20	3.40 1.34	3.77 1.47	4.14 1.62	4.55 1.76	4.89 1.91
90°	T = .36 E = .149	.72 .299	1.09 .450	1.45 .603	1.83 .756	2.20 .910	2.57 1.07	2.94 1.22	3.32 1.38	3.70 1.54	4.10 1.70	4.50 1.87	4.91 2.03	5.32 2.20
95°	T = .39 E = .174	.79 .350	1.19 .522	1.55 .706	2.00 .885	2.40 1.06	2.80 1.25	3.20 1.43	3.61 1.62	4.02 1.80	4.49 1.99	4.98 2.18	5.38 2.38	5.83 2.58
100°	T = .43 E = .200	.86 .401	1.30 .604	1.74 .809	2.18 1.01	2.62 1.22	3.06 1.43	3.50 1.64	3.95 1.85	4.40 2.06	4.88 2.28	5.37 2.50	5.85 2.73	6.34 2.96
105°	T = .46 E = .230	.94 .470	1.42 .700	1.90 .938	2.38 1.17	2.87 1.42	3.34 1.65	3.84 1.90	4.35 2.14	4.85 2.39	5.35 2.64	5.87 2.90	6.40 3.16	6.93 3.41
110°	T = .50 E = .260	1.03 .535	1.55 .765	2.08 1.03	2.60 1.36	3.14 1.63	3.66 1.91	4.21 2.19	4.76 2.49	5.31 2.81	5.86 3.05	6.43 3.35	7.01 3.65	7.59 3.95
115°	T = .54 E = .307	1.13 .624	1.70 .854	2.29 1.12	2.86 1.46	3.45 1.79	4.03 2.21	4.63 2.54	5.23 2.87	5.83 3.20	6.44 3.53	7.07 3.88	7.70 4.23	8.35 4.58
120°	T = .61 E = .339	1.25 .720	1.89 1.08	2.52 1.45	3.16 1.82	3.81 2.20	4.44 2.56	5.11 2.95	5.78 3.33	6.44 3.72	7.11 4.10	7.80 4.50	8.51 4.91	9.21 5.32

TABLE I. — Tangents and External to a 1° Curve.

Chord = 100 ft.

Int. Angle	Tangent	External	Int. Angle	Tangent	External	Int. Angle	Tangent	External
106°	7603.5	3791.0	111°	8336.7	4386.1	116°	9169.4	5082.7
10'	7626.6	3809.4	10'	8362.7	4407.6	10'	9199.1	5107.9
20	7649.7	3827.9	20	8388.9	4429.2	20	9229.0	5133.3
30	7672.9	3846.5	30	8415.1	4450.9	30	9259.0	5158.8
40	7696.3	3865.2	40	8441.5	4472.7	40	9289.2	5184.5
50	7719.7	3884.0	50	8468.0	4494.6	50	9319.5	5210.3
107°	7743.2	3902.9	112°	8494.6	4516.6	117°	9349.9	5236.2
10	7766.8	3921.9	10	8521.3	4538.8	10	9380.5	5262.3
20	7790.5	3940.9	20	8548.1	4561.1	20	9411.3	5288.6
30	7814.3	3960.1	30	8575.0	4583.4	30	9442.2	5315.0
40	7838.1	3979.4	40	8602.1	4606.0	40	9473.2	5341.5
50	7862.1	3998.7	50	8629.3	4628.6	50	9504.4	5368.2
108°	7886.2	4018.2	113°	8656.6	4651.3	118°	9535.7	5395.1
10	7910.4	4037.8	10	8684.0	4674.2	10	9567.2	5422.1
20	7934.6	4057.4	20	8711.5	4697.2	20	9598.9	5449.2
30	7959.0	4077.2	30	8739.2	4720.3	30	9630.7	5476.5
40	7983.5	4097.1	40	8767.0	4743.6	40	9662.6	5504.0
50	8008.0	4117.0	50	8794.9	4766.9	50	9694.7	5531.7
109°	8032.7	4137.1	114°	8822.9	4790.4	119°	9727.0	5559.4
10	8057.4	4157.3	10	8851.0	4814.1	10	9759.4	5587.7
20	8082.3	4177.5	20	8879.3	4837.8	20	9792.0	5615.5
30	8107.3	4197.9	30	8907.7	4861.7	30	9824.8	5643.8
40	8132.3	4218.4	40	8936.3	4885.7	40	9857.7	5672.3
50	8157.5	4239.0	50	8965.0	4909.9	50	9890.8	5700.9
110°	8182.8	4259.7	115°	8993.8	4934.1	120°	9924.0	5729.7
10	8208.2	4280.5	10	9022.7	4958.6	10	9957.5	5758.6
20	8233.7	4301.4	20	9051.7	4983.1	20	9991.0	5787.7
30	8259.3	4322.4	30	9080.9	5007.8	30	10025.0	5817.0
40	8285.0	4343.6	40	9110.3	5032.6	40	10059.0	5846.5
50	8310.8	4364.8	50	9139.8	5057.6	50	10093.0	5876.1

Corrections to be Added (T = Tangent. E = External.)

Int. Angle	Curve 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
100°	T = .43 E = .200	.86 .401	1.30 .604	1.74 .809	2.18 1.01	2.62 1.22	3.06 1.43	3.50 1.64	3.95 1.85	4.40 2.06	4.88 2.28	5.37 2.50	5.85 2.73	6.34 2.96
105°	T = .46 E = .230	.94 .470	1.42 .700	1.90 .938	2.38 1.17	2.87 1.42	3.34 1.65	3.84 1.90	4.35 2.14	4.85 2.39	5.35 2.64	5.87 2.90	6.40 3.16	6.93 3.41
110°	T = .50 E = .260	1.03 .535	1.55 .765	2.08 1.03	2.60 1.36	3.14 1.63	3.66 1.91	4.21 2.19	4.76 2.49	5.31 2.81	5.86 3.05	6.43 3.35	7.01 3.65	7.59 3.95
115°	T = .54 E = .307	1.13 .624	1.70 .854	2.29 1.12	2.86 1.46	3.45 1.79	4.03 2.21	4.63 2.54	5.23 2.87	5.83 3.20	6.44 3.53	7.07 3.88	7.70 4.23	8.35 4.58
120°	T = .61 E = .339	1.25 .720	1.89 1.08	2.52 1.45	3.16 1.82	3.81 2.20	4.44 2.56	5.11 2.95	5.78 3.33	6.44 3.72	7.11 4.10	7.80 4.50	8.51 4.91	9.21 5.32

TABLE II. — Radii, Ordinates and Deflections. Chord = 100 ft.

Deg.	Radius	Mid. Ord.	Tan. Dist.	Def. Dist.	Def. for 1 Ft.	Deg.	Radius	Mid. Ord.	Tan. Dist.	Def. Dist.	Def. for 1 Ft.
	ft.	ft.	ft.	ft.			ft.	ft.	ft.	ft.	
0° 10'	34377.7	.036	.145	.291	0.05	7°	819.0	1.528	6.105	12.21	2.10
20	17189.9	.073	.291	.582	0.10	20'	781.8	1.600	6.395	12.79	2.20
30	11459.9	.109	.436	.873	0.15	30	764.5	1.637	6.540	13.08	2.25
40	8594.4	.145	.582	1.164	0.20	40	747.9	1.673	6.685	13.37	2.30
50	6875.5	.182	.727	1.454	0.25	50	716.8	1.746	6.976	13.95	2.40
1	5729.6	.218	.873	1.745	0.30	20	688.2	1.819	7.266	14.53	2.50
10	4911.2	.255	1.018	2.036	0.35	30	674.7	1.855	7.411	14.82	2.55
20	4297.3	.291	1.164	2.327	0.40	40	661.7	1.892	7.556	15.11	2.60
30	3819.8	.327	1.309	2.618	0.45	50	637.3	1.965	7.846	15.69	2.70
40	3437.9	.364	1.454	2.909	0.50	20	614.6	2.037	8.136	16.27	2.80
50	3125.4	.400	1.600	3.200	0.55	30	603.8	2.074	8.281	16.56	2.85
2	2864.9	.436	1.745	3.490	0.60	40	593.4	2.110	8.426	16.85	2.90
10	2644.6	.473	1.891	3.781	0.65	50	573.7	2.183	8.716	17.43	3.00
20	2455.7	.509	2.036	4.072	0.70	10	546.4	2.292	9.150	18.30	3.15
30	2292.0	.545	2.181	4.363	0.75	20	521.7	2.402	9.585	19.16	3.30
40	2148.8	.582	2.327	4.654	0.80	30	499.1	2.511	10.02	20.04	3.45
50	2022.4	.618	2.472	4.945	0.85	40	478.3	2.620	10.45	20.91	3.60
3	1910.1	.655	2.618	5.235	0.90	50	459.3	2.730	10.89	21.77	3.75
10	1809.6	.691	2.763	5.526	0.95	10	441.7	2.839	11.32	22.64	3.90
20	1719.1	.727	2.908	5.817	1.00	20	425.4	2.949	11.75	23.51	4.05
30	1637.3	.764	3.054	6.108	1.05	30	410.3	3.058	12.18	24.37	4.20
40	1562.9	.800	3.199	6.398	1.10	40	396.2	3.168	12.62	25.24	4.35
50	1495.0	.836	3.345	6.689	1.15	50	383.1	3.277	13.05	26.11	4.50
4	1432.7	.873	3.490	6.980	1.20	10	370.8	3.387	13.49	26.97	4.65
10	1375.4	.909	3.635	7.271	1.25	20	359.3	3.496	13.92	27.84	4.80
20	1322.5	.945	3.718	7.561	1.30	30	348.5	3.606	14.35	28.70	4.95
30	1273.6	.982	3.926	7.852	1.35	40	338.3	3.716	14.78	29.56	5.10
40	1228.1	1.018	4.071	8.143	1.40	50	319.6	3.935	15.64	31.29	5.40
50	1185.8	1.055	4.217	8.433	1.45	10	302.9	4.155	16.51	33.01	5.70
5	1146.3	1.091	4.362	8.724	1.50	20	287.9	4.374	17.37	34.73	6.00
10	1109.3	1.127	4.507	9.014	1.55	30	274.4	4.594	18.22	36.44	6.30
20	1074.7	1.164	4.653	9.305	1.60	40	262.0	4.814	19.08	38.16	6.60
30	1042.1	1.200	4.798	9.596	1.65	50	250.8	5.035	19.94	39.87	6.90
40	1011.5	1.237	4.943	9.886	1.70	10	240.5	5.255	20.79	41.58	7.20
50	982.6	1.273	5.088	10.18	1.75	20	231.0	5.476	21.64	43.28	7.50
6	955.4	1.309	5.234	10.47	1.80	30	222.3	5.697	22.50	44.99	7.80
10	929.6	1.346	5.379	10.76	1.85	40	214.2	5.918	23.35	46.69	8.10
20	905.1	1.382	5.524	11.05	1.90	50	206.7	6.139	24.19	48.38	8.40
30	881.9	1.418	5.669	11.34	1.95	20	199.7	6.360	25.04	50.07	8.70
40	859.9	1.455	5.814	11.63	2.00	30	193.2	6.583	25.88	51.76	9.00

The middle ordinate in inches for any cord of length (C) is equal to .0012 C² multiplied by the middle ordinate taken from the above table. Thus, if it desired to bend a 30 ft. rail to fit a 10 degree curve, its middle ordinate should be .0012x900x2.183 or 2.36 inches.

TABLE III. Deflections for Sub Chords for Short Radius Curves.

Degree of Curve	Radius 50	1/2 sub chord / R = sin of 1/2 def. angle				Length of arc for 100 ft.
		12.5 Ft.	15 Ft.	20 Ft.	25 Ft.	
30°	193.18	1° 51'	2° 17'	2° 58'	3° 43'	101.15
32°	181.39	1° 59'	2° 25'	3° 10'	3° 58'	101.33
34°	171.01	2° 06'	2° 33'	3° 21'	4° 12'	101.48
36°	161.80	2° 13'	2° 41'	3° 33'	4° 26'	101.66
38°	153.58	2° 20'	2° 49'	3° 44'	4° 40'	101.85
40°	146.19	2° 27'	2° 57'	3° 55'	4° 54'	102.06
42°	139.52	2° 34'	3° 05'	4° 07'	5° 08'	102.29
44°	133.47	2° 41'	3° 13'	4° 18'	5° 22'	102.53
46°	127.97	2° 48'	3° 21'	4° 29'	5° 36'	102.76
48°	122.92	2° 55'	3° 29'	4° 40'	5° 50'	103.00
50°	118.31	3° 02'	3° 38'	4° 51'	6° 04'	103.24
52°	114.06	3° 09'	3° 46'	5° 02'	6° 17'	103.54
54°	110.11	3° 16'	3° 54'	5° 13'	6° 31'	103.84
56°	106.50	3° 22'	4° 02'	5° 23'	6° 44'	104.14
58°	103.14	3° 29'	4° 10'	5° 34'	6° 57'	104.43
60°	100.00	3° 35'	4° 18'	5° 44'	7° 11'	104.72

CURVE FORMULAS

$$T = R \tan \frac{1}{2} I$$

$$T = \frac{50 \tan \frac{1}{2} I}{\text{Sin. } \frac{1}{2} D}$$

$$\text{Sin. } \frac{1}{2} D = \frac{50}{R}$$

$$\text{Sin. } \frac{1}{2} D = \frac{50 \tan \frac{1}{2} I}{T}$$

$$R = T \cot. \frac{1}{2} I$$

$$R = \frac{50}{\text{Sin. } \frac{1}{2} D}$$

$$E = R \text{ ex. sec } \frac{1}{2} I$$

$$E = T \tan \frac{1}{4} I$$

$$\text{Chord def.} = \frac{\text{chord}^2}{R}$$

$$\text{No. chords} = \frac{I}{D}$$

$$\text{Tan. def.} = \frac{1}{2} \text{ chord def.}$$

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft. see Table II.), and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance. Multiply the angle by .01745, and the product by the distance.

GENERAL DATA

RIGHT ANGLE TRIANGLES. Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt. 10 10² ÷ 200 = .5. 100 + .5 = 100.5 hyp.

Given Hyp. 100, Alt. 25 25² ÷ 200 = 3.125. 100 - 3.125 = 96.875 = Base.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

LEVELING. The correction for curvature and refraction, in feet and decimals of feet is equal to 0.5774 d², where d is the distance in miles. The correction for curvature alone is closely, 1/8 d². Both corrections are negative.

PROBABLE ERROR. If d₁, d₂, d₃, etc. are the discrepancies of various results from the mean, and if Σd² = the sum of the squares of these differences and n = the number of observations, then the probable error of the mean = ± 0.6745 √(Σd² / n(n-1))

SOLAR EPHEMERIS. Attention is called to the Solar Ephemeris for the current year, published by Keuffel & Esser Co., and furnished free of charge upon request, which is 3 1/4 x 5 1/4 in., with about 90 pages of data very useful to the Surveyor; such as the adjustments of transits, levels and solar attachments; directions and tables for determining the meridian and the latitude from observations on the sun and Polaris; stadia measurements; magnetic declination; arithmetic constants; English and Metric conversions; trigonometric formulas; Natural and Logarithmic Functions; and Logarithms of Numbers.

TABLE IV. — Minutes in Decimals of a Degree.

1'	.0167	11'	.1833	21'	.3500	31'	.5167	41'	.6833	51'	.8500
2'	.0333	12'	.2000	22'	.3667	32'	.5333	42'	.7000	52'	.8667
3'	.0500	13'	.2167	23'	.3833	33'	.5500	43'	.7167	53'	.8833
4'	.0667	14'	.2333	24'	.4000	34'	.5667	44'	.7333	54'	.9000
5'	.0833	15'	.2500	25'	.4167	35'	.5833	45'	.7500	55'	.9167
6'	.1000	16'	.2667	26'	.4333	36'	.6000	46'	.7667	56'	.9333
7'	.1167	17'	.2833	27'	.4500	37'	.6167	47'	.7833	57'	.9500
8'	.1333	18'	.3000	28'	.4667	38'	.6333	48'	.8000	58'	.9667
9'	.1500	19'	.3167	29'	.4833	39'	.6500	49'	.8167	59'	.9833
10'	.1667	20'	.3333	30'	.5000	40'	.6667	50'	.8333	60'	1.0000

TABLE V. — Inches in Decimals of a Foot.

1-16	3-32	1/2	3-16	1/4	5-16	3/8	1/2	5/8	3/4	7/8
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729
1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

Natural Trigonometrical Functions

Table with columns: Angle, Sin., Tan., Sec., Cosec., Cotg., Cosin. Rows 0 to 90.

Cosin. Cotg. Cosec. Sec. Tan. Sin. Angle

Natural Trigonometrical Functions

Table with columns: Angle, Sin., Tan., Sec., Cosec., Cotg., Cosin. Rows 16 to 90.

Cosin. Cotg. Cosec. Sec. Tan. Sin. Angle

Cosin. Cotg. Cosec. Sec. Tan. Sin. Angle

Natural Trigonometrical Functions

Angle.	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.	Angle.	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.
32	.5299	.6249	1.1792	1.887	1.600	.84805	58	.6203	.8098	1.2868	1.589	1.235	.77715
10	.5324	.6289	1.1813	1.878	1.590	.84650	50	.6316	.8146	1.2898	1.583	1.228	.77531
20	.5348	.6330	1.1835	1.870	1.580	.84495	40	.6338	.8195	1.2929	1.578	1.220	.77347
30	.5373	.6371	1.1857	1.861	1.570	.84339	30	.6361	.8243	1.2959	1.572	1.213	.77162
40	.5398	.6412	1.1879	1.853	1.560	.84182	20	.6383	.8292	1.2991	1.567	1.206	.76977
50	.5422	.6453	1.1901	1.844	1.550	.84025	10	.6406	.8342	1.3022	1.561	1.199	.76791
33	.5446	.6494	1.1924	1.836	1.540	.83867	57	.6428	.8391	1.3054	1.556	1.192	.76604
10	.5471	.6536	1.1946	1.828	1.530	.83708	50	.6450	.8441	1.3086	1.550	1.185	.76417
20	.5495	.6577	1.1969	1.820	1.520	.83549	40	.6472	.8491	1.3118	1.545	1.178	.76229
30	.5519	.6619	1.1992	1.812	1.511	.83389	30	.6494	.8541	1.3151	1.540	1.171	.76041
40	.5544	.6661	1.2015	1.804	1.501	.83228	20	.6517	.8591	1.3184	1.535	1.164	.75851
50	.5568	.6703	1.2039	1.796	1.492	.83066	10	.6539	.8642	1.3217	1.529	1.157	.75661
34	.5592	.6745	1.2062	1.788	1.483	.82904	56	.6561	.8693	1.3251	1.524	1.150	.75471
10	.5616	.6787	1.2086	1.781	1.473	.82741	50	.6583	.8744	1.3284	1.519	1.144	.75280
20	.5640	.6830	1.2110	1.773	1.464	.82577	40	.6604	.8796	1.3318	1.514	1.137	.75088
30	.5664	.6873	1.2134	1.766	1.455	.82413	30	.6626	.8847	1.3352	1.509	1.130	.74896
40	.5688	.6916	1.2158	1.758	1.446	.82248	20	.6648	.8899	1.3386	1.504	1.124	.74703
50	.5712	.6959	1.2183	1.751	1.437	.82082	10	.6670	.8952	1.3421	1.499	1.117	.74509
35	.5736	.7002	1.2208	1.743	1.428	.81915	55	.6691	.9004	1.3456	1.494	1.111	.74314
10	.5760	.7046	1.2233	1.736	1.419	.81748	50	.6713	.9057	1.3492	1.490	1.104	.74120
20	.5783	.7089	1.2258	1.729	1.411	.81580	40	.6734	.9110	1.3527	1.485	1.098	.73924
30	.5807	.7133	1.2283	1.722	1.402	.81412	30	.6756	.9163	1.3563	1.480	1.091	.73728
40	.5831	.7177	1.2309	1.715	1.393	.81242	20	.6777	.9217	1.3600	1.476	1.085	.73531
50	.5854	.7221	1.2335	1.708	1.385	.81072	10	.6799	.9271	1.3636	1.471	1.079	.73333
36	.5878	.7265	1.2361	1.701	1.376	.80902	54	.6820	.9325	1.3673	1.466	1.072	.73135
10	.5901	.7310	1.2387	1.695	1.368	.80730	50	.6841	.9380	1.3711	1.462	1.066	.72937
20	.5925	.7355	1.2413	1.688	1.360	.80558	40	.6862	.9435	1.3748	1.457	1.060	.72737
30	.5948	.7400	1.2440	1.681	1.351	.80386	30	.6884	.9490	1.3786	1.453	1.054	.72537
40	.5972	.7445	1.2466	1.675	1.343	.80212	20	.6905	.9545	1.3824	1.448	1.048	.72337
50	.5995	.7490	1.2494	1.668	1.335	.80038	10	.6926	.9601	1.3863	1.444	1.042	.72136
37	.6018	.7536	1.2521	1.662	1.327	.79864	53	.6947	.9657	1.3902	1.440	1.036	.71934
10	.6041	.7581	1.2549	1.655	1.319	.79688	50	.6967	.9713	1.3941	1.435	1.030	.71732
20	.6065	.7627	1.2577	1.649	1.311	.79512	40	.6988	.9770	1.3980	1.431	1.024	.71529
30	.6088	.7673	1.2605	1.643	1.303	.79335	30	.7009	.9827	1.4020	1.427	1.018	.71325
40	.6111	.7720	1.2633	1.636	1.295	.79158	20	.7030	.9884	1.4061	1.422	1.012	.71121
50	.6134	.7766	1.2661	1.630	1.288	.78980	10	.7050	.9942	1.4101	1.418	1.006	.70916
38	.6157	.7813	1.2690	1.624	1.280	.78801	52	.7071	1.0000	1.4144	1.414	1.000	.70711
10	.6180	.7860	1.2719	1.618	1.272	.78622	50						
20	.6202	.7907	1.2748	1.612	1.265	.78442	40						
30	.6225	.7954	1.2778	1.606	1.257	.78261	30						
40	.6248	.8002	1.2808	1.601	1.250	.78079	20						
50	.6271	.8050	1.2838	1.595	1.242	.77897	10						

Cosin. Cotg. Cosec. Sec. Tan. Sin. Angle

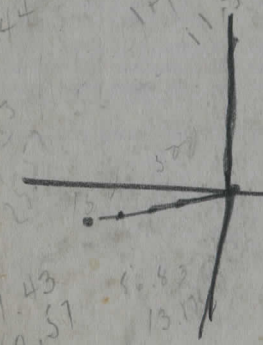
Cosin. Cotg. Cosec. Sec. Tan. Sin. Angle

22586
11244
1282
318

28642
11244
12378

159-22
120 + 5530 318-44
118 + 94.48
8082 20-38
8.84
21.16
119 + 51.82
123.48
120 + 530 309-32
154-48-30
25-11-30
138 + 24.63
75.37
134° 25'
D.B. 268° 50'
30.0 -
18.5
11.5
5.6
5.1
2.4
2.7
5.1
1.3
1.3
1.9
10.3
10.3
0.5
10.3
9.8
3.9
+ 5.9
+ 1.4
4.98
7-3
7-8
158 AA-3
1.59
22.7
14.2
8.5
181-50
363-39
5.8
5.1
.7
5.9
1.7
5.1
2.5
8 lower
Bowels
1dc from S side
75 frontage
67
5.6
1.1
10.3
0.0
10.3
3.9
+ 6.4

2124 66.43 = 66 38.16
 53.92 61.84
 24.75 hedge 16' R4 176-174
 184-37 108 352.34
 359.48 28-35 3-43
 179-54 56.50 2-07 61.71
 31.43 26-31 38.29
 8383 77.12 153-29
 16.17
 83.5 161-48 Topography 86.08
 26.5 80-54 13.92
 570 576.73 122-33 20
 383.83 4.5 114-15.2
 960.56 1.6 228-24
 246.66 79.1 932.38
 206.33 5647.05
 104.33 6379.43
 370.99
 625.23
 1976.22
 538.33
 1244.10 6570
 1976.22
 538.33
 1057000 7482 23.14
 183354.20 6379 23.14
 145.80 1108 48
 119 11984.48
 62.66
 39.15
 173-38
 347-15
 6-22
 79-43 124.2
 20.57 167.44 5647.05
 13.17 8521.46 377.25
 8354.02 124.2
 167.44 5647.05
 8530.06 377.25
 55.70



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

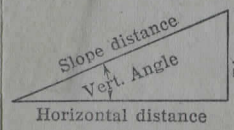
Right Triangle Solution of Right Triangles
 For Angle A. $\sin A = \frac{a}{c}$, $\cos A = \frac{b}{c}$, $\tan A = \frac{a}{b}$, $\cot A = \frac{b}{a}$, $\sec A = \frac{c}{b}$, $\csc A = \frac{c}{a}$

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

Solution of Oblique Triangles

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

REDUCTION TO HORIZONTAL



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

