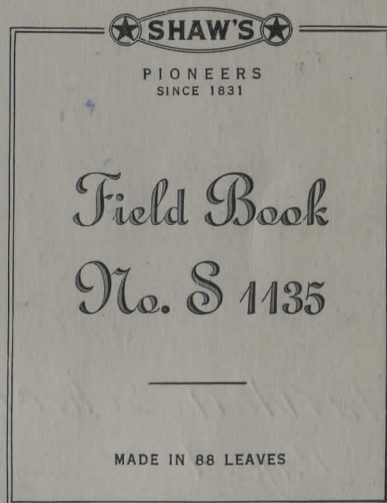


FIELD BOOK

S 1135

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



PAPER AND LITHOGRAPHING
GUARANTEED WATERPROOF

Book 123
East Claridon Bd of Education
Sewer levels Page 1 ✓

Cuyahoga River Bridge on
C.H. #13 South Hambden Road Page 6 ✓
SEC F

Bridge on Sperry Road Sec B.
SOUTH OF C.H. 39 Page 15 ✓

Bridge on Auburn Rd at Bass
Lake Outlet. Page 24 ✓

Culverts on Clark Rd No. 77-C
Chardon Twp. Page 33 ✓
T.H. # 77

Clark Road Sec B. Page 35 ✓
Part of Sec. C (see insert Pg. 41)

East Claridon School lot
Survey Page 4 ✓

Russell School Survey Page 44 ✓

Clarks Road Culvert 1939 " 40

Clarks Road (Hermitage-Auburn-Chardon) 48 ✓

Hosford Rd (Chardon Twp) T.H. 78 Pg. 61 ✓

Griswold Rd. (Chardon Twp) T.H. # 79 Pg. 60 ✓

Whiston Cemetery (Chardon Twp) Pg 74, 75 ✓

E. CLARIDON CEMETERY

70 ✓

Chardon-Windsor Rd. (X Sec) Pg. 11 ✓

7/10/36

Levels for Sewer at East Glendon

1228.05

Floor basement	6.00	22.05		
Bottom of beams	-1.80	29.85		
Ground 300' N	4.8	23.3		
100' NW	4.8	23.3		
100' W of Whine <small>NW line Arbor</small>	5.0	23.1		
225 "	8.0	20.1		
310 "	12.5	15.6		
TP	4.71	1230.50	2.26	1225.79
BM	2.13	1230.48	2.15	1228.35
BM		5.60		1224.88

Levels to East across Grunau

TP	1.50	1227.29		1225.79
200' E of well		8.5		18.8
300'		11.9		15.4
400'		16.0 +		11.

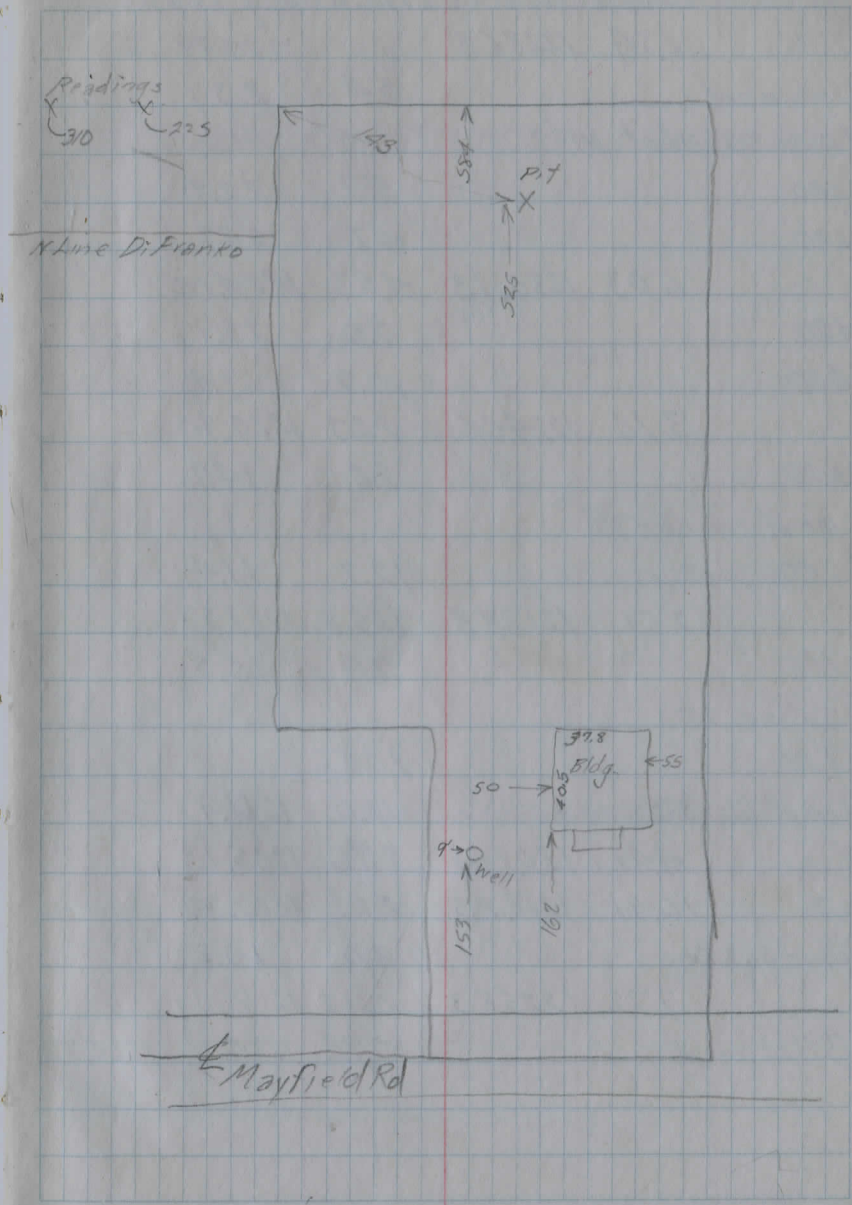
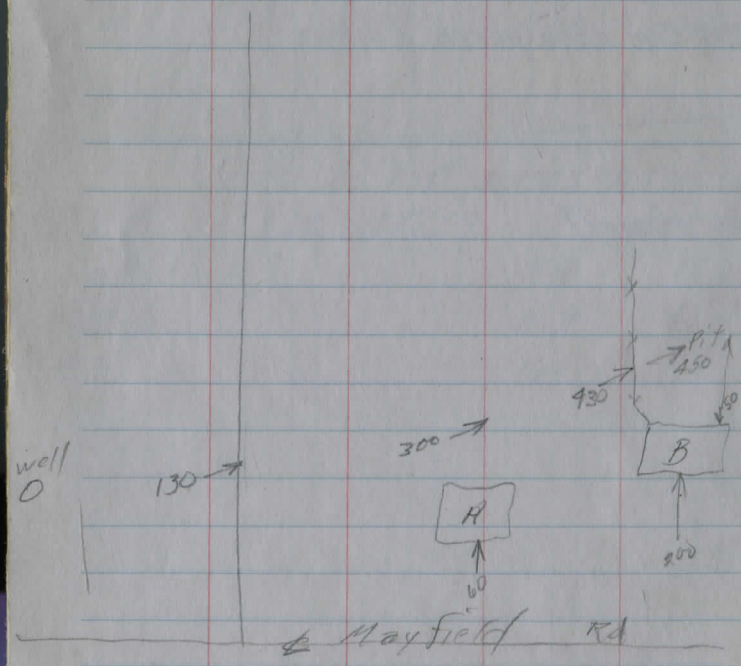
School

P.T
Outlet drain

NW stone at well
SE of Conc. platform NE Church
X found NW Cor. conc porch old store

NW stone of well

E Claridon School

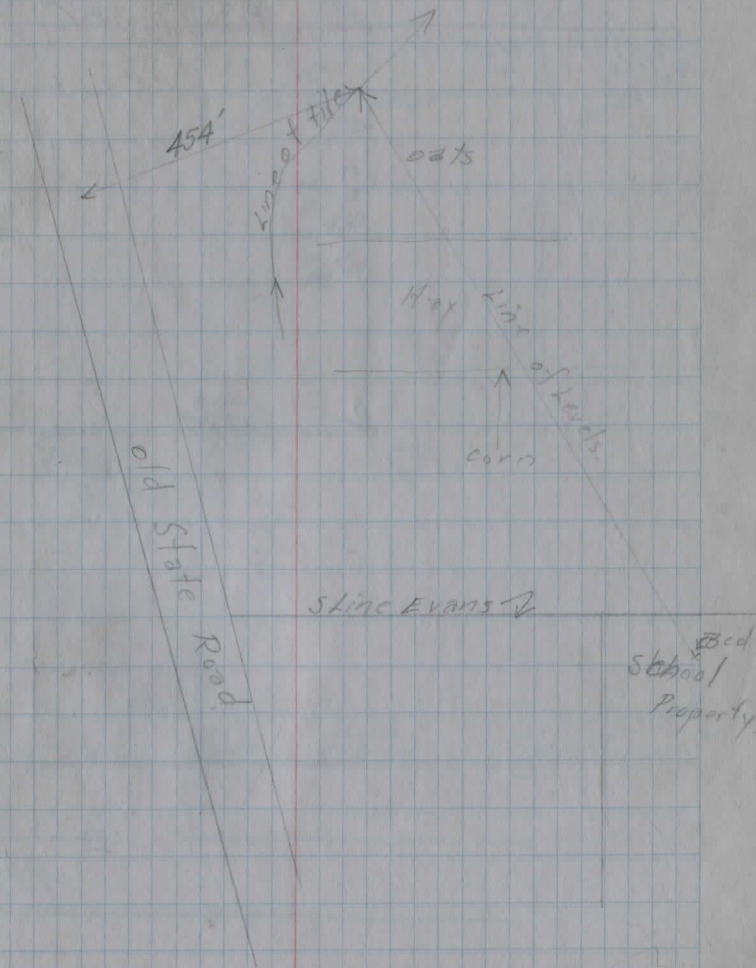


Levels to NW on Harry Evans

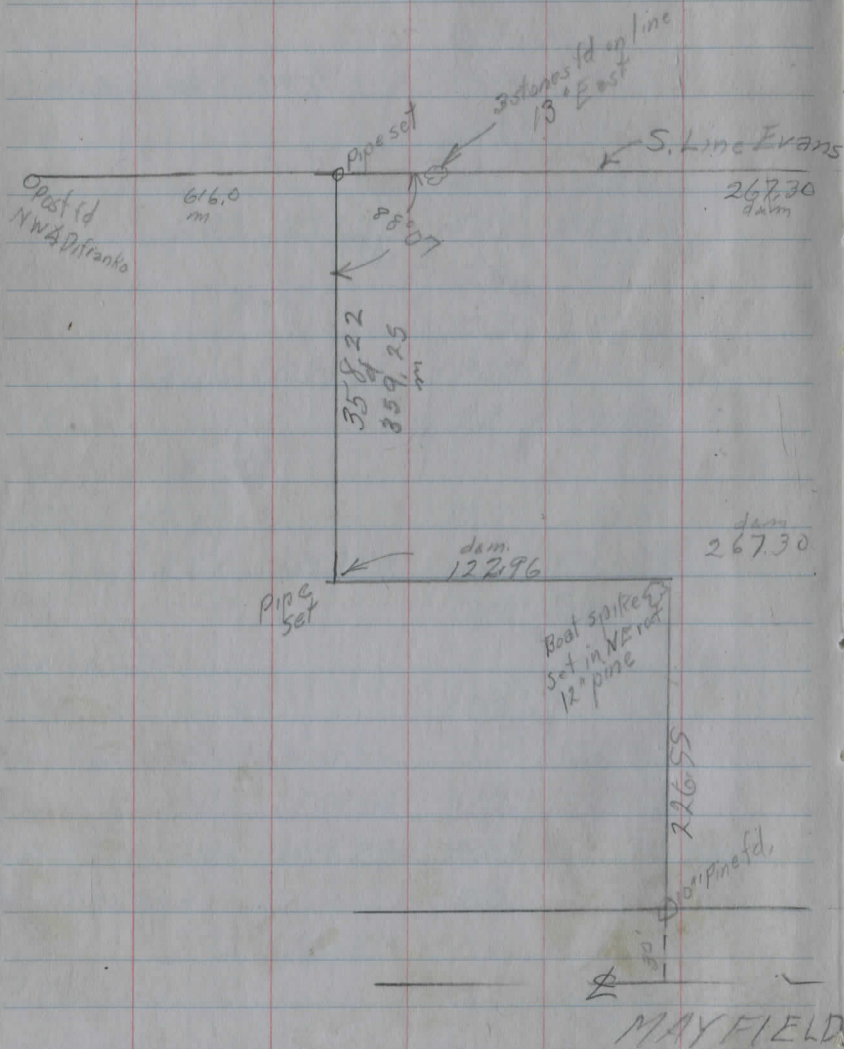
B.M.	2.84	1228.63		1225.79
Filtration bed			5.4	23.1
X Line School Lot = 64'				
100			5.7	22.9
200			4.7	23.9
	6.03	1230.13	4.53	1224.10
300			7.0	23.1
400			10.7	19.4
	3.16	1224.06	9.23	1220.90
500			9.2	14.9
N. Line of corn = 530'				
600			12.7	11.4
	2.51	1213.89	12.68	1211.38
700			7.4	06.5
S Line oats 780				
800			10.2	
Junction of file = 835				
	4.41	1209.54	8.76	1205.13
	10.91	1218.23	2.22	1207.32
Ditch at SW Evans				
	7.72	1225.83	0.12	1218.11
B.M. at X road				
			0.92	1224.91 1224.88

NW Stone at well

Levels taken to NW from filtration bed



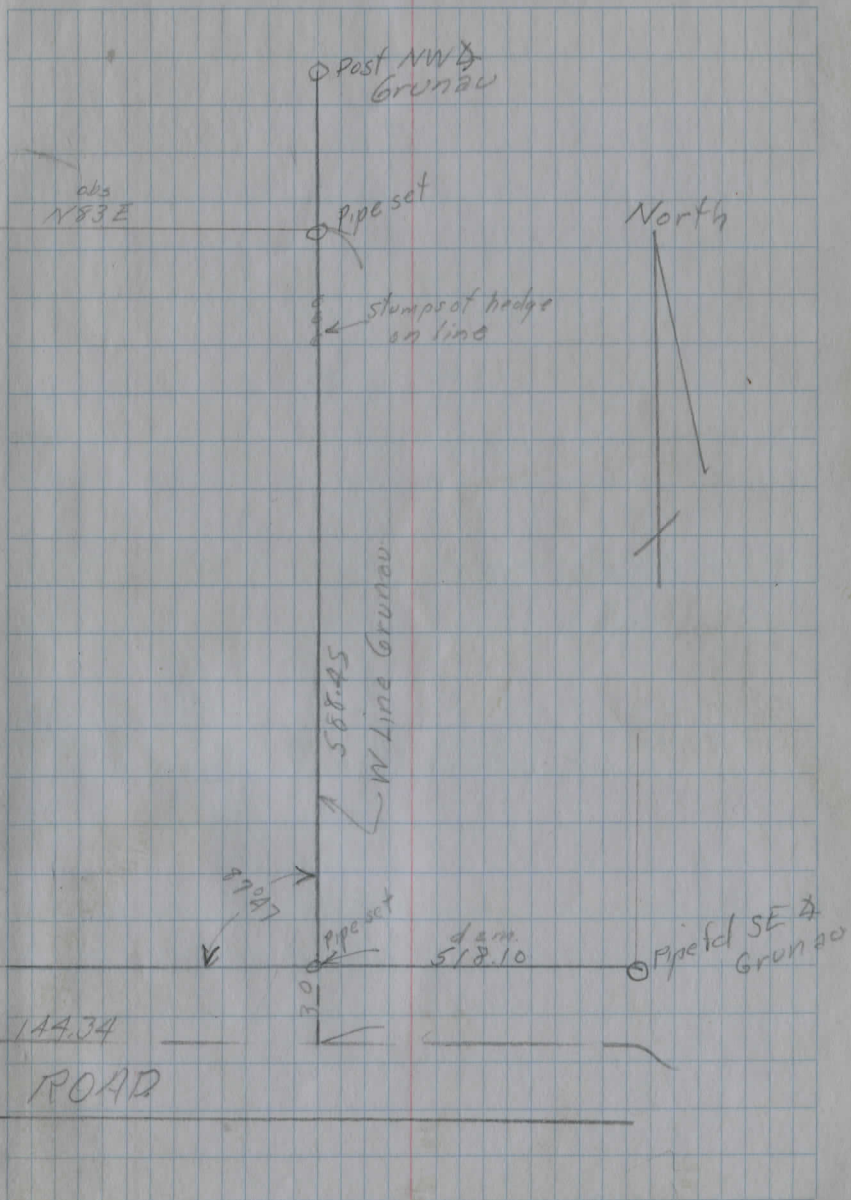
East Claridon School Lot Survey

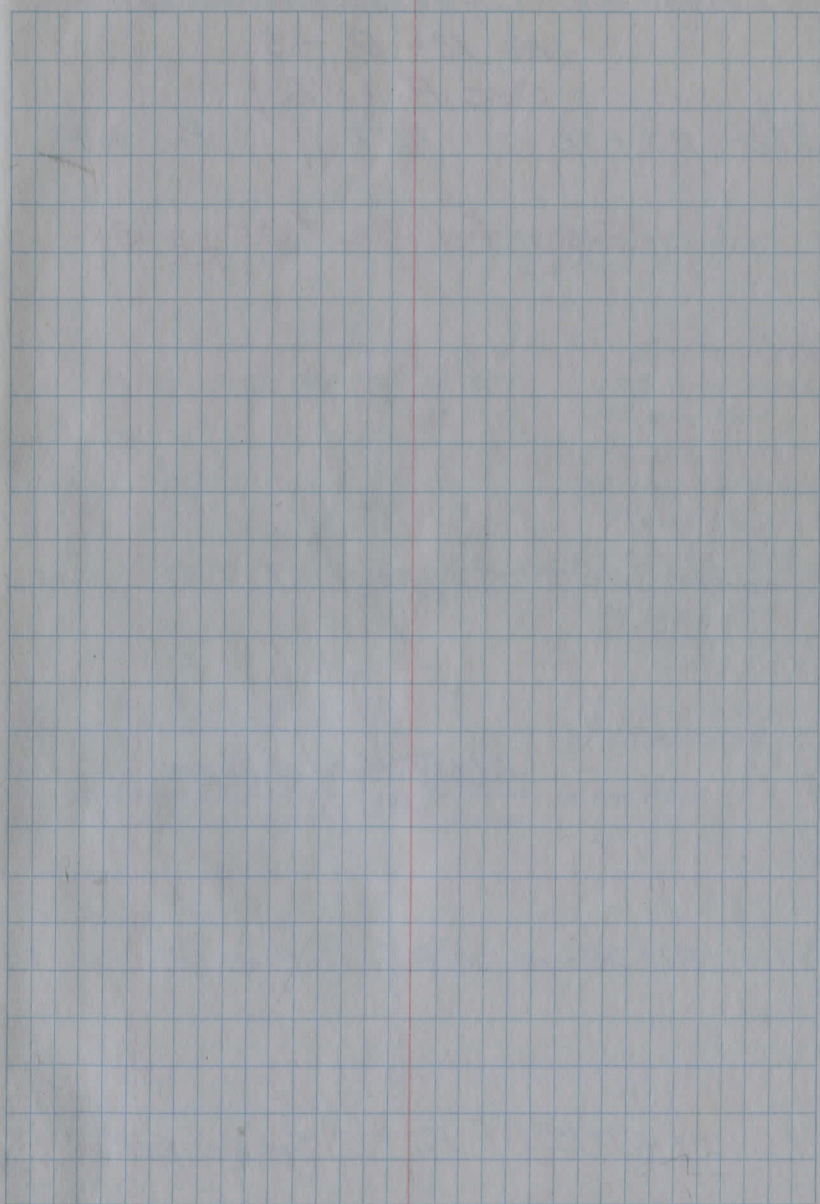
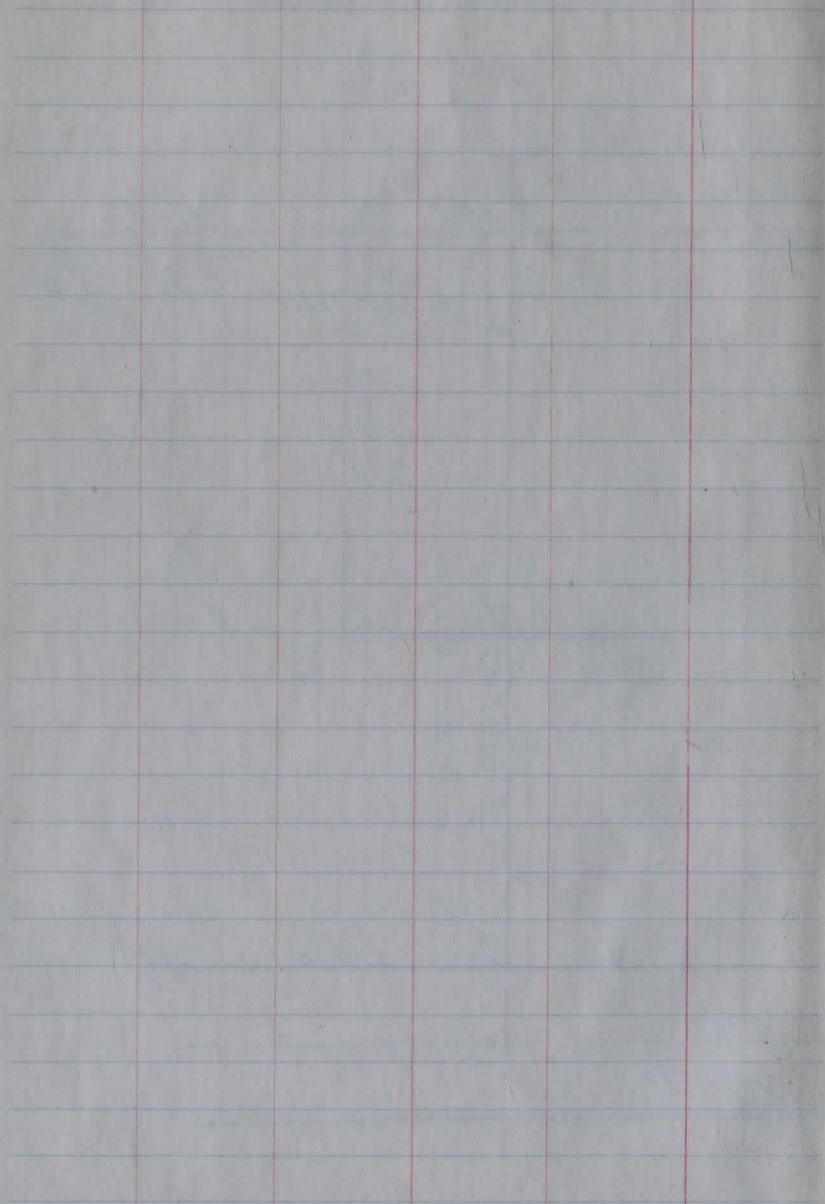


7/8/38

Richard's
Class

4





Bridge over Cuyahoga River on

No 13-D - .5

Sec F (1953)

Sta 22+50 POT Pin set

See Fd. BK #35 pg 38

Sta 21+98⁰⁰ PI Det Rt 0°45' Spike found

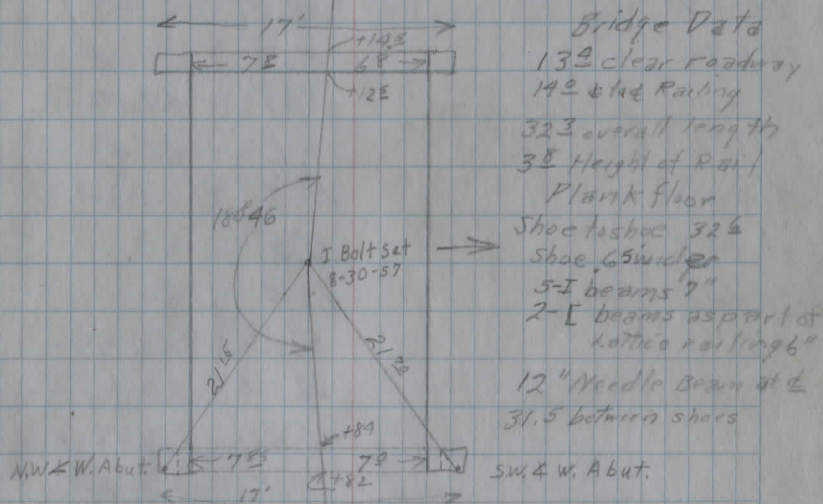
21+82 End of floor

Sta 21+50 POT Pin set

Sta 21+11⁸⁴ POT Spike set

South Hamden Road

Steel Beam Bridge
Lattice Rail



Bridge Data

13'9" clear roadway

14'2" tie Railing

32'3" overall length

3'8" Height of Rail

Plank floor

Shoe to shoe 32'6"

Shoe 6 5/16" dia

5-I beams 7"

2-E beams as part of lattice railing 6"

12" Needle Beam at e

31.5' between shoes

IP Fd 8-30-57

SEM
NW root
20" factory

32'52"

5'85"45"

Levels on Cuyahoga River Bridge

BM#3	304.	1174.62	1171.58
19		4.4	
20		4.6	
21		4.6	
21+50		4.4	
21+75		4.5	
21+82		4.52	70.10
"		5.35	69.27
"		9.2	65.4
21+84		10.3	64.3
21+98		11.5	63.1
22+12		10.4	64.2
"		5.15	69.47
"		4.54	70.08
"		5.40	1169.22
"		10.8	63.8
21+98		10.9	63.7
21+84		10.8	63.8
"		5.42	69.20
100' RT		12.2	62.4
200' RT		10.4	64.2
300' RT		10.8	63.8
	4.05	1173.15	5.52 1169.10

Spike W. root 10" Maple 25' Lt & Sta 18+45

$\frac{25}{6.7}$ $\frac{17}{7.6}$ $\frac{13}{5.3}$ $\frac{7}{4.6}$ $\frac{6}{4.7}$ $\frac{11}{5.5}$ $\frac{17}{8.0}$ $\frac{20}{6.8}$

$\frac{25}{8.0}$ $\frac{19}{8.7}$ $\frac{12}{5.3}$ $\frac{6}{4.5}$ $\frac{6}{4.6}$ $\frac{11}{5.0}$ $\frac{17}{8.2}$ $\frac{21}{6.7}$

Floor at &

Seat SW &

H₂O Level

flow S

" S

" S

Seat SE &

Floor at &

Seat at NE &

flow N

" N

" N

Seat at NW &

Channel

1173.15

600 ft 10.2 63.0

442 1170.59 698 1166.17

800 ft 7.6 63.0

NE Bridge seal 493 1174.15 1169.22

750' Lt 9.8 64.4

200' Lt 10.5 63.7

22 + 25 4.2

22 + 50 4.5

23 4.6

24 3.7

25 1.5

Test Holes.

NEA Bridge 550 1174.72 1169.22

1# 8.7 / 15.7 1159.0

2# 15.7 1152.0

Pushed down rod in #2 2.6 / 1.8 1156.9

Channel

channel

- -25 7 7 15 25 / 8.7 4.3 4.2 4.9 8.0 -

- -20 12 9 15 25 / 7.3 5.7 4.6 5.4 7.9 -

Test Hole #1 6'S of SEA of Bridge

Gravelly sand

Blue clay from 3' below H₂O

Test Hole #2 14' Lt Sta 21+75

Gravelly clay

Blue clay from 3' below H₂O

Bridge below Burt Kiles

10' high 26' overall length

245 sqft 24 1/2' clear span

Bridge at Mayfield

8' high 40' overall length

276 sqft 34 1/2' clear span

Jan 14, 1937

H₂O Level .26' below floor

= 1167.9

7/13/37

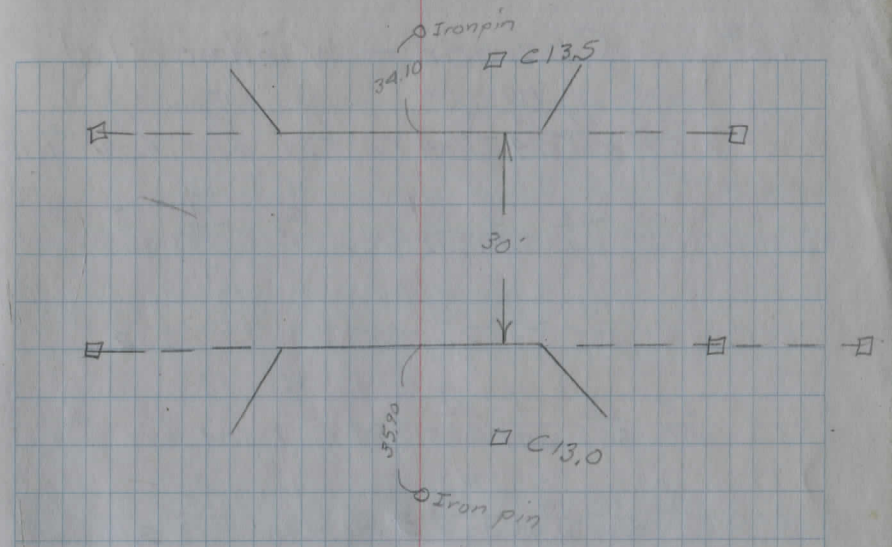
10

Location of Bridge 13-D-5

E. Abutment Sta 22+15.90

W. Abutment Sta 21+85.90

BM#3	3.04	1174.62		1174.58
seat		5.42	1169.20	
Footer Elev.		17.92	1156.70	
Stake W end		4.92		C 13.0
Stake E. end		4.42		C 13.5



Abutments built on design of Standard Drawing Beam 40'

13#

Chardon - Windsor Rd.

	²⁵	¹⁸	¹⁴	¹²		¹⁵	¹⁷	¹⁸	²⁵
57+0	OUT	4.68	5.14	5.16	4.76	5.30	6.10	4.09	4.12

	²⁵	¹⁸	¹⁴	¹²		¹⁵	¹⁶	¹⁸	²⁵
57-50	OUT	5.43	5.79	5.12	4.46	5.31	5.97	3.80	OUT

	²⁵	¹²	¹⁶	¹⁴		¹⁵	¹⁶	¹⁸	²⁵
58+0	OUT	4.35	5.40	4.67	4.13	4.29	5.70	4.32	OUT

	²⁵	¹⁸	¹⁶	¹⁵		¹⁶	¹⁷	¹⁸	²⁵
58+50	OUT	4.05	5.07	4.23	3.84	4.67	5.34	3.67	OUT

	²⁵	¹⁸	¹⁶	¹⁵		¹⁶	¹⁷	¹⁸	²⁵
59+0	OUT	3.99	4.93	4.19	3.60	4.40	5.13	3.12	OUT

T.P	4.47	179	163	3.43	15	175	16		
59-50	OUT	4.60	5.98	5.13	4.47	5.23	6.09	4.24	OUT

	²⁵	¹⁸	¹⁶	¹⁴		¹⁵	¹⁷	¹⁸	²⁵
60+0	OUT	4.35	5.84	5.05	4.38	5.17	5.94	4.04	OUT

	²⁵	¹⁸	¹⁴	¹²		¹²	¹⁴	¹⁸	²⁵
60+50	OUT	4.98	5.92	5.25	4.58	5.25	6.13	4.16	OUT

B.M. #5	1.24	177	22	3.65	17	5.98			
61+0	OUT	3.05	3.54	3.4	4.04	4.80	5.63	3.46	OUT

	²⁵	¹⁸	¹⁴	¹²		¹⁸	¹⁴	¹⁸	²⁵
61+50	OUT	4.29	6.30	5.34	6.03	5.63	6.44	4.62	OUT

	²⁵	¹⁸	¹⁴	¹²		¹²	¹⁴	¹⁸	²⁵
62+0	OUT	4.95	6.82	6.20	5.77	6.41	7.08	4.70	OUT

	²⁵	¹⁸	¹⁴	¹²		¹²	¹⁴	¹⁸	²⁵
62+50	OUT	5.80	7.70	7.00	6.66	7.31	7.97	6.90	OUT

Continued from Field Book 35 Pg 77

Vert Spk. South side 30" Maple 30' Lt Sta 61+0

177.22
 63+0 $\frac{25}{out} \frac{18}{5.93} \frac{14}{5.90} \frac{12}{7.90} 7.27 \frac{12}{8.03} \frac{14}{8.70} \frac{18}{7.53} \frac{25}{out}$

T.P. 1.63 171.10 7.75 169.47
 63+50 $\frac{25}{out} \frac{14}{.80} \frac{14}{3.17} \frac{12}{2.16} 163.233 \frac{12}{3.16} \frac{14}{2.16} \frac{18}{out}$

64+0 $\frac{25}{out} \frac{18}{1.83} \frac{14}{3.80} \frac{12}{2.80} 2.22 \frac{12}{2.90} \frac{14}{3.65} \frac{18}{2.45} \frac{25}{out}$

64+50 $\frac{25}{out} \frac{18}{1.65} \frac{14}{4.30} \frac{12}{3.45} 2.86 \frac{12}{3.51} \frac{14}{4.25} \frac{18}{2.44} \frac{25}{out}$

65+0 $\frac{25}{out} \frac{18}{2.01} \frac{14}{5.13} \frac{12}{4.21} 3.45 \frac{12}{4.35} \frac{14}{6.01} \frac{18}{2.77} \frac{25}{out}$

65+50 $\frac{25}{out} \frac{18}{2.64} \frac{14}{5.66} \frac{12}{4.86} 4.19 \frac{12}{5.89} \frac{14}{5.64} \frac{18}{3.08}$

66+50 $\frac{25}{2.82} \frac{18}{3.12} \frac{14}{6.73} \frac{12}{5.67} 6.40 \frac{12}{5.79} \frac{14}{6.67} \frac{18}{4.21} \frac{25}{out}$

67+0 $\frac{25}{4.13} \frac{18}{4.73} \frac{14}{7.76} \frac{12}{6.85} 6.62 \frac{12}{7.16} \frac{14}{8.10} \frac{18}{5.16} \frac{25}{out}$

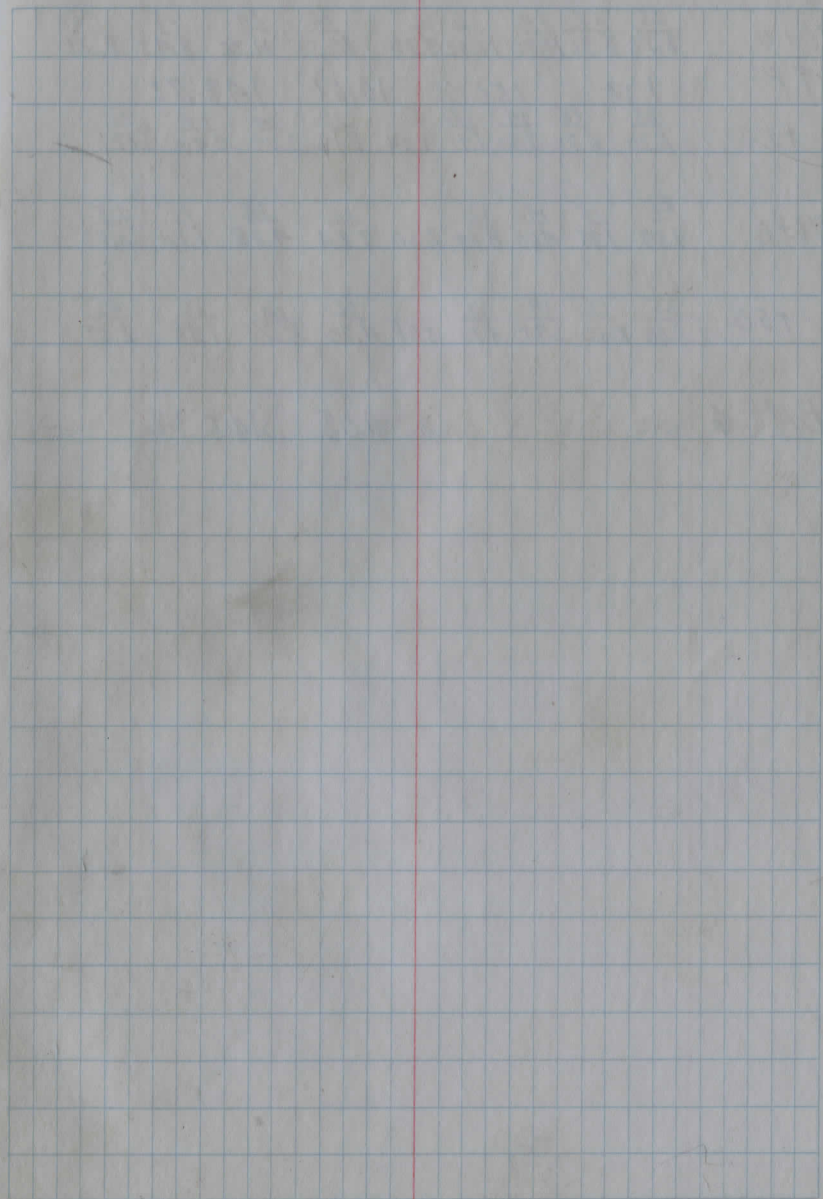
+50 $\frac{25}{6.21} \frac{18}{6.97} \frac{14}{10.35} \frac{12}{9.25} 8.73 \frac{12}{9.36} \frac{14}{10.80} \frac{18}{6.37} \frac{25}{7.57}$

T.P. 0.03 159.33 11.80 159.30
 68+0 $(\frac{25}{-0.83} \frac{18}{-1.33}) \frac{14}{1.67} \frac{12}{0.96} 0.07 \frac{12}{0.67} 1.55 (\frac{18}{-2.45} \frac{25}{-1.45})$

+50 out $\frac{18}{2.63} \frac{14}{4.80} \frac{12}{3.51} 2.97 \frac{12}{3.61} \frac{14}{4.66} \frac{18}{1.60} \frac{25}{1.75}$

69+0 $\frac{25}{5.23} \frac{18}{5.40} \frac{14}{7.50} \frac{12}{6.02} 5.54 \frac{12}{6.29} \frac{14}{7.45} \frac{18}{9.88} \frac{25}{5.27}$

+50 $\frac{25}{6.39} \frac{18}{7.42} \frac{14}{9.25} \frac{12}{8.18} 7.58 \frac{12}{8.25} \frac{14}{9.69} \frac{18}{6.75} \frac{25}{6.97}$



+ HI -
159.33

70+0 $\frac{25}{8.56}$ $\frac{18}{8.90}$ $\frac{14}{11.30}$ $\frac{12}{10.02}$ 4 $\frac{12}{10.35}$ $\frac{14}{11.22}$ $\frac{18}{8.93}$ $\frac{25}{8.70}$

T.P. 1.34 150.06 10.61 148.72

+50 $\frac{25}{0.20}$ $\frac{18}{0.20}$ $\frac{14}{3.50}$ $\frac{12}{1.91}$ 4 $\frac{12}{2.16}$ $\frac{14}{3.09}$ $\frac{18}{0.90}$ $\frac{25}{1.02}$

71+0 $\frac{25}{1.59}$ $\frac{18}{1.98}$ $\frac{14}{4.50}$ $\frac{12}{8.29}$ 2.50 $\frac{12}{3.24}$ $\frac{14}{4.28}$ $\frac{18}{1.10}$ $\frac{25}{0.98}$

+50 $\frac{25}{3.60}$ $\frac{18}{2.52}$ $\frac{14}{5.93}$ $\frac{12}{4.35}$ 3.98 $\frac{12}{4.70}$ $\frac{14}{5.78}$ $\frac{18}{1.98}$ $\frac{25}{2.39}$

BM# 6 4.05 145.98

Vert spt South side 4" Maple 25' Lt. Sta. 71+95

This page is a blank ledger with a grid of blue horizontal lines and three vertical red margin lines. The margins are located at approximately 10%, 25%, and 40% from the left edge of the page.

This page is a blank ledger with a grid of blue horizontal lines and one vertical red margin line. The margin is located at approximately 10% from the left edge of the page. The page number '14' is written in the top right corner.

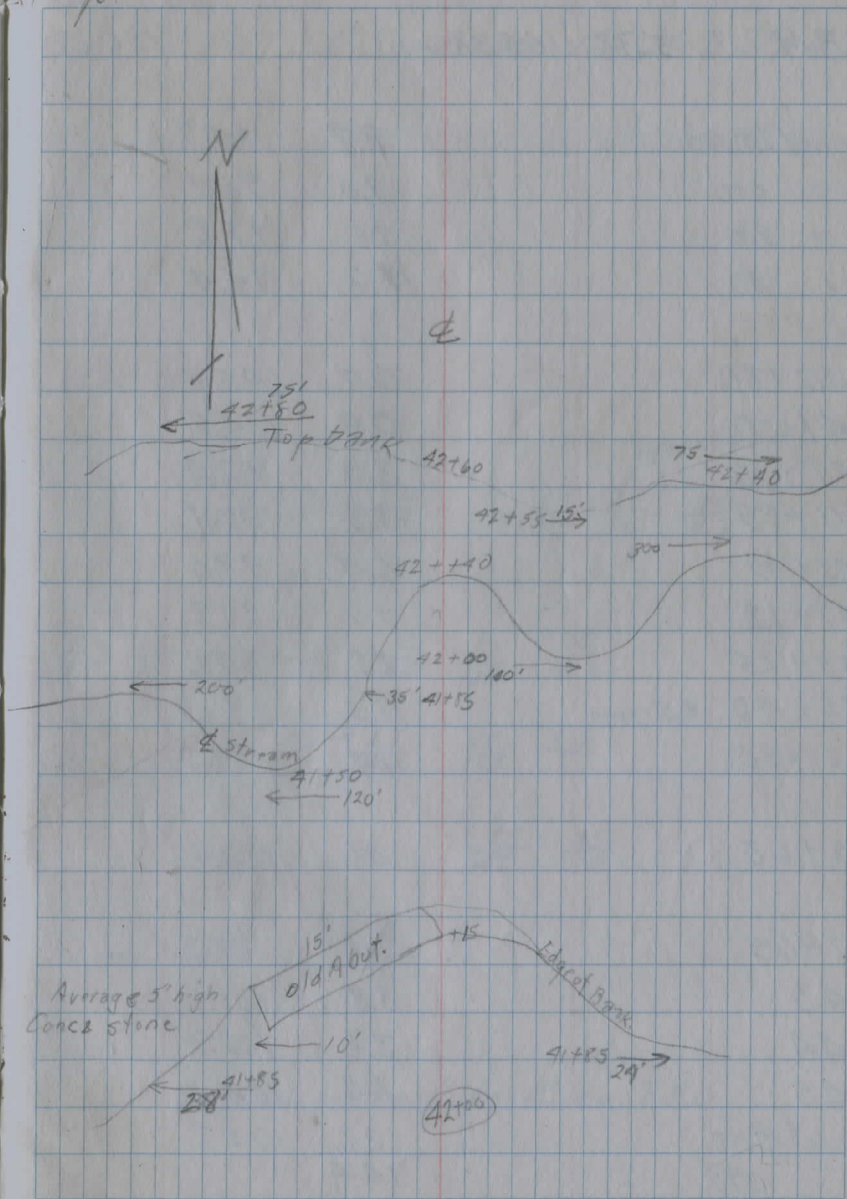
Bridge on Sperry Road Chester Twp.
Sta 42+20

Relocate channel Lt. 200'

Locate new S. Abut at 42+15
" " N " " 42+33

42+15

42+00



BM 5.38 105.38 100.00

Channel Lt 100	9.7	95.7
" 200	9.0	96.4
" 300	7.8	97.6
" 50	11.0	94.4

40+80 0.0 105.4

41+00 0.9 104.5

41+70 3.0 102.4

41+85 3.3 102.1

42+00 6.4 99.0

42+12 9.6 95.8

42+15 9.8 95.6

42+40 ±Stream 11.5 93.9

42+50 11.4 94.0

42+60 40 101.4

42+65 3.7 101.7

43 3.8 101.6

44 3.1 102.3

45 1.4 104.0

Channel Rt 100 12.6 92.8

225 14.4

350 15.9

Spike E. root 18" Sycamore 125 Lt ± Sta 41+75

Edge of bank.

35	22	12	8	18	24	30
11.0	4.1	4.3	2.9	5.3	5.6	4.7

26	22	17	-15	10	18	30
8.9	9.6	11.5	11.7	10.0	10.0	10.2

25	-13	10	25
9.4		12.8	5.0

15	25
4.2	5.0

Average of field $\frac{26}{89}$ 18-7
43

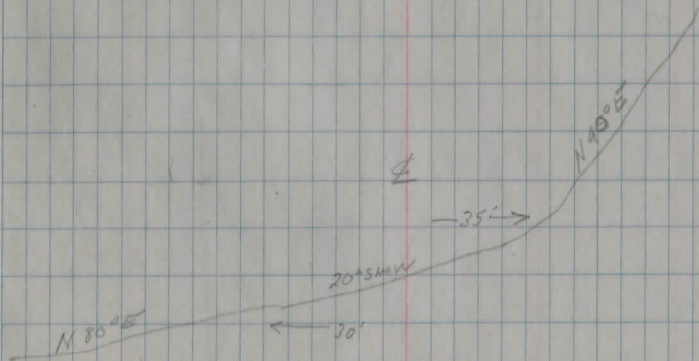
Pushed rod to Elev 88.0

Levels for Culvert Sperry Road Sta 24+50

BM	5.50	100.00
Channel Lt 100'	6.8	
" \pm	8.0	
" Rt 100'	10.2	
\pm 25+00	6.0	
26+00	6.9	
24+00	4.1	
23+00	-0.5	

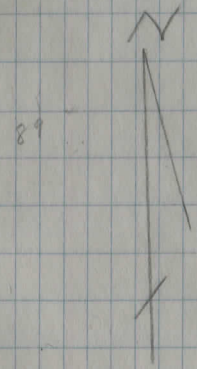
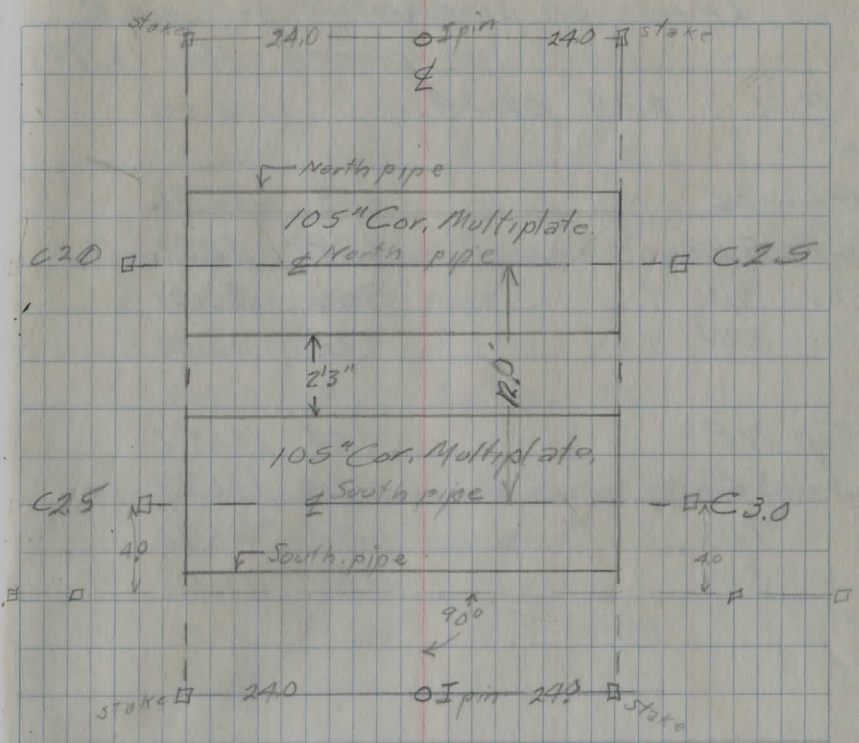
Spike E root 15" Elm 30' Lt \pm Sta 24+50

Build new 8x3 slab Top. Culv.
20° skew Rt. End.



Layout & Levels Sperry Rd Bridge

BM	0.82	100.82	100.00
		93.4	
Grade Elev. W end	7.52	93.30	
W end N pipe	5.52	C 2.0	
W " S pipe	5.02	C 2.5	
Grade Elev. E end	8.02	92.80	
E " S pipe	5.02	C 3.0	
E " N pipe	5.52	C 2.5	



89

Levels on pipe before fill was
placed May 12, 1933

B.M. 2.29 102.24 100.50

Flow NE 9.28 92.96

" SE 9.38 92.86

" NW 9.16 93.08

" SW 9.24 93.00

Top NE 0.44 101.80

" SE 0.45 101.79

" NW 0.34 101.90

" SW 0.36 101.88

Sperry Rd. Bridge

Readings taken in trough of corrugations
1' from each end.

Readings taken on ridge of corrugations
on 1st ridge from end.

+ H.I. - ELV

BM	10.04	1194.99		1184.95
T.P.	11.43	1206.31	0.11	1194.88
T.P.	12.74	1219.05	0.0	1206.31
T.P.	11.42	1230.47	0.0	1219.05
B.M.			3.65	1226.82
T.P.	0.80	1227.62	7.27	1220.35
T.P.	1.89	1222.24	3.86	1218.38
T.P.	6.95	1217.84	11.35	1210.89

SET ON SPK A. BACKSIGHT ON I.P. (B) ALL ANGLES TO RT.

ANGLE	STADIA	ROD		
0-0	54'	9.70	1208.14	✓
43-30	60'	8.40	09.44	✓
43-30	137'	4.60	13.24	✓
43-30	216'	0.60	17.24	✓
43-30	55'	9.2	08.6	✓
43-30	46'	9.5	08.3	✓
43-30	34'	9.3	08.5	✓
82-00	130'	4.5	13.3	✓
82-00	69'	8.4	09.4	✓
82-00	59'	8.8	09.0	✓
82-00	37'	8.7	09.1	✓
106-30	106'	7.2	10.6	✓
106-30	135'	6.1	11.7	✓

EAST CLARIDON CEMETERY JULY '59
TEMPLE - D. CANFIELD - MAYNARD

20

U.S.G.S. E-15 DISC IN CONC 36' SW of E 322 W. RAIL BROTHERLY

N. SIDE 322 E, CLARIDON
AZ DISC IN CONCRETE, GROUND LEVEL, ± 5 SW OF S.W. M.E. CHURCH

TOP I.P. (B) AT NE CORNER ADDITION

HUB (North Center New ADD)

rear fence old cem.

15' NW of I.P. at SE CORNER OLD CEM.

UP NWLY

S FENCE

+	H ¹	-	ELV	
	1217.84			
ANG	STA	ROD		
125-30	100'	7.5	1210.3	✓
125-30	148'	6.6	11.2	✓
139-00	93'	6.0	11.8	✓
139-00	165'	5.7	12.1	✓
0-00	59'	10.3	07.5	✓
	80'	10.5	07.3	✓
	190'	8.4	09.4	✓
	255'	6.7	11.1	✓
	310'	5.2	12.6	✓
	365'	2.2	15.6	✓
356-30	330	4.7	13.1	✓
351-30	268'	9.5	1208.3	✓
340-00	170'	12.4	05.4	✓
340-00	90'	11.3	06.5	✓
340-00	62'	9.8	08.0	✓
340-00	54'	9.4	08.4	✓
326-00	79'	10.2	07.6	✓
326-00	90'	11.8	06.0	✓
		11.4	06.4	✓
326-00	132	12.7	05.1	✓
330-30	190'	14.0	03.8	
331-30	300'	15.5	1202.3	
	2.36	1213.25	1210.84	
B.M. SET		1.73	1211.52	

S. FENCE

UP WEST

S. FENCE UP WEST

± 60' farther to NEZ (I.P.(B)) ADD.

± Nly line ADD

" " "

" " "

E Fence old CEM

E. Fence

low hole

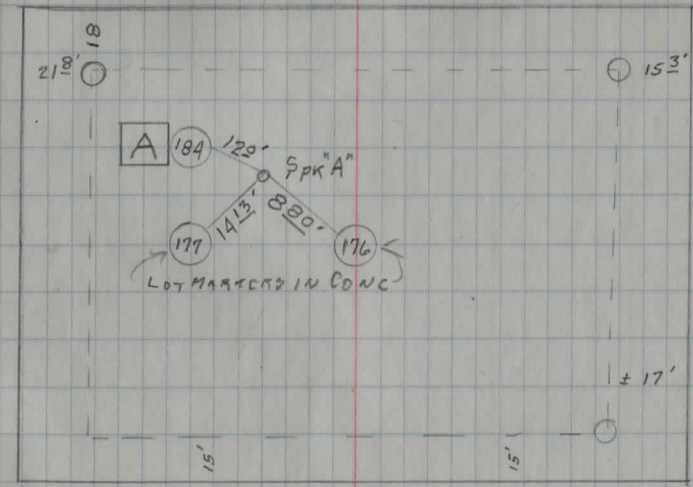
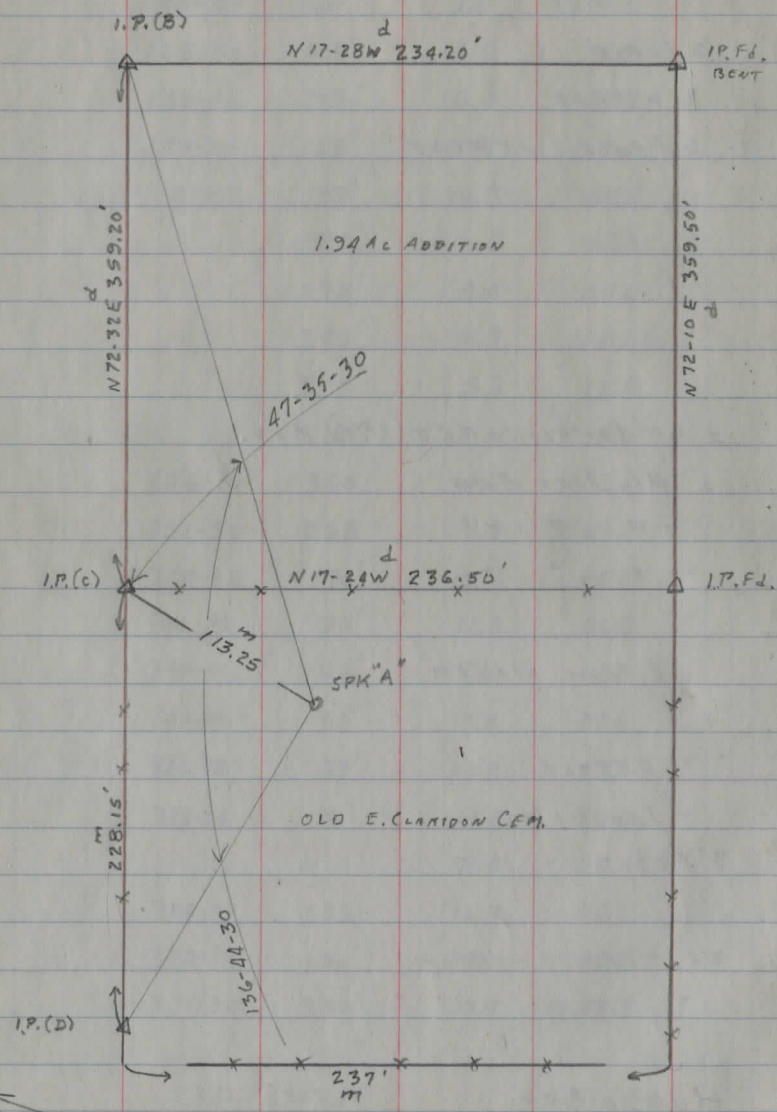
3' E of " "

WET WEATHER STREAM

" " "

HUB IN ADD

V.S.P. N. Root 48' MAPLE, FIRST SOUTH OF N. GATE.



2.H.4 at T.H.97

Location Bridge on Auburn Road
over Bass Lake Outlet

Sta 30+55.00 POT Pipe set

Sta 29+84.92 is 2.55' E of pipe centerline

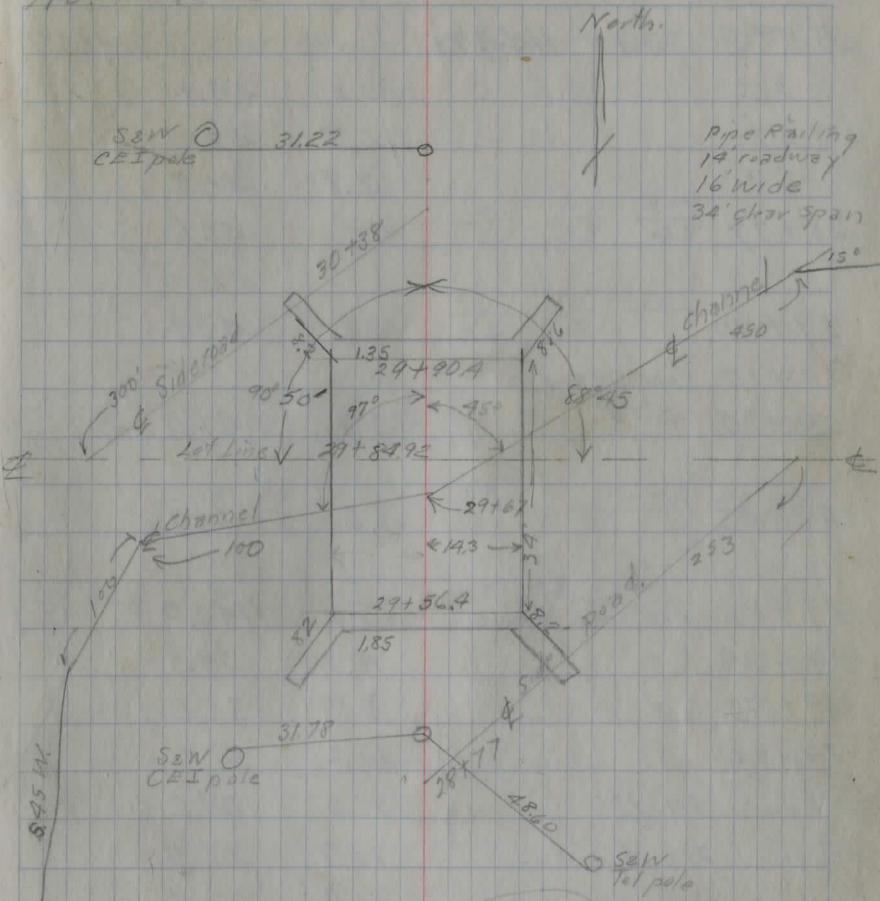
Sta 29+00 POT pipe set

4/3/37

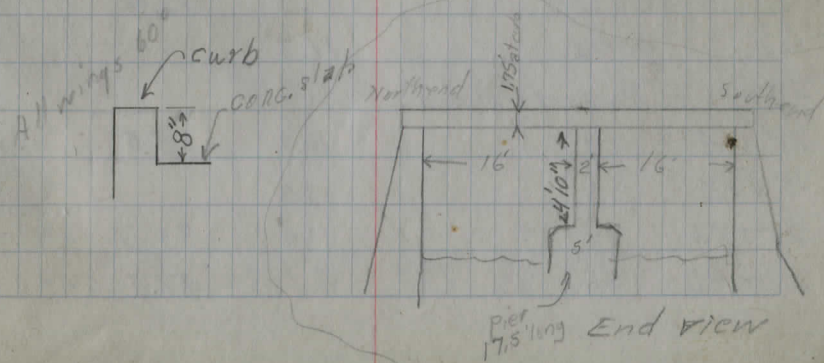
Richy
Marks
Strong

24

No. 4-N-16



Pipe Railing
10' roadway
16' wide
34' clear span



	1144.75		
30+02	3.6	41.1	
30+20	4.1	40.6	
30+38	4.4	40.3	
31	4.3	40.4	
32	2.4	42.3	
32+	0.0	44.7	

NBM	3.76	1140.99
Channel 100' RT.	10.9	33.8
" 200 R	10.9	33.8
" 300 R	10.7	34.0
" 400 R	10.7	34.0

	14	4	14	24-27	30-				
	8.1	4.0	3.6	8.5	10.7				
	25	13	3	13	20-23	28	30	40	45
	3.5	5.6	4.2	4.1	8.3	7.6	8.7	10.1	
	300	200	100	40	11	19			
	4.5	3.8	6.2	6.1	4.5	7.7			

Spike SE root 10" Pine 20' N of E-W Road
 160' Lt. of Sta 30+50

Test Holes

Hole #1 0.65 1142.22 1141.57
 29+40 24' Left. 4.4 1137.8
 1135.3
 1131.0

Hole #3 1.7 1143.3 1141.6
 11.4 1131.9 (clayey gravel)
 39
 25
 114

Hole #2 1.7 1143.3 1141.6
 15.2 1128.1 (clayey gravel)

Hole #3 0.0 1141.6 1141.6
 12.0 1129.6 (clayey gravel)

65
 27
 92

7-8

B.M. X at S.W. cor. N. Curve.

Ground Surface

Sandy Loam

Gravel

Test Hole #1

Limit of boring with auger used

14.5 Lft Sta 29+88

20 Lft Sta 29+82

25 Lft Sta 30+05

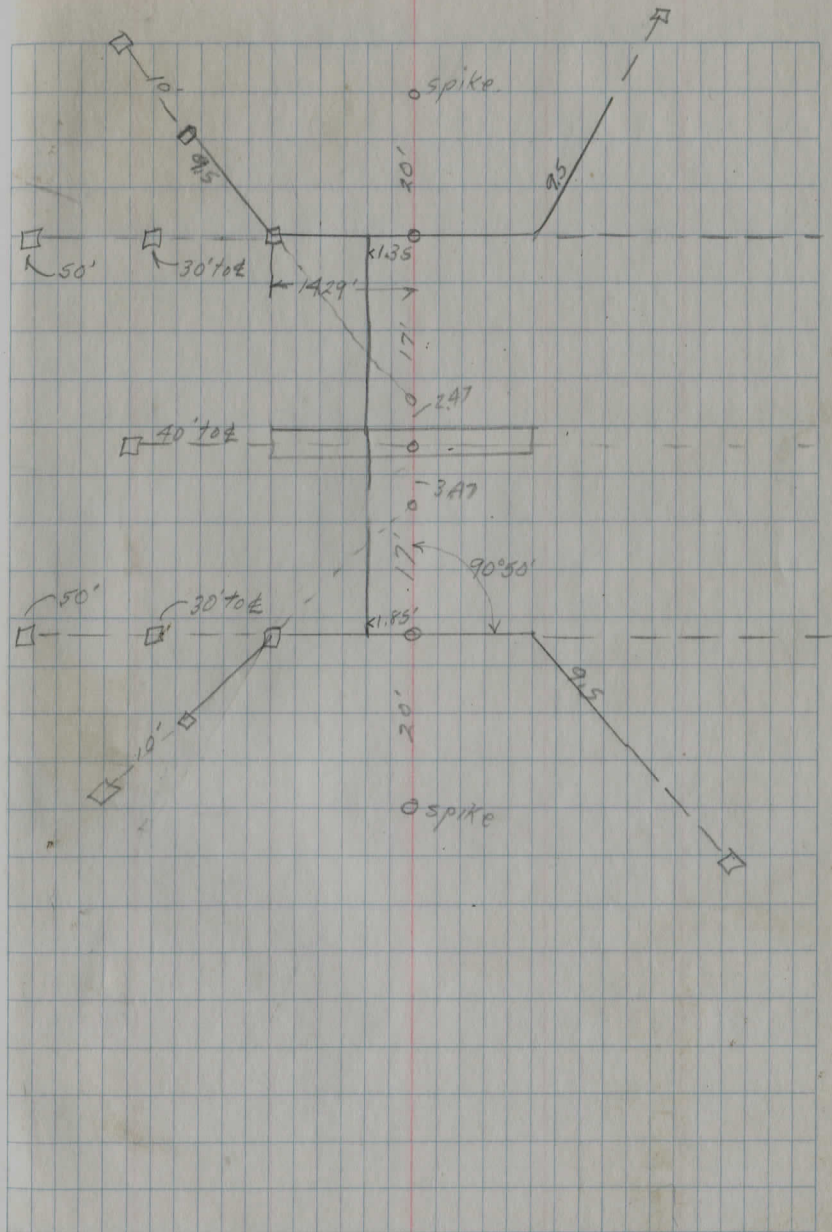
Chagrin River Bridge on Auburn Rd
30 + 70.50 spike set on \pm

29 + 90.50 Face North Abutment

29 + 73.50 \pm Pier

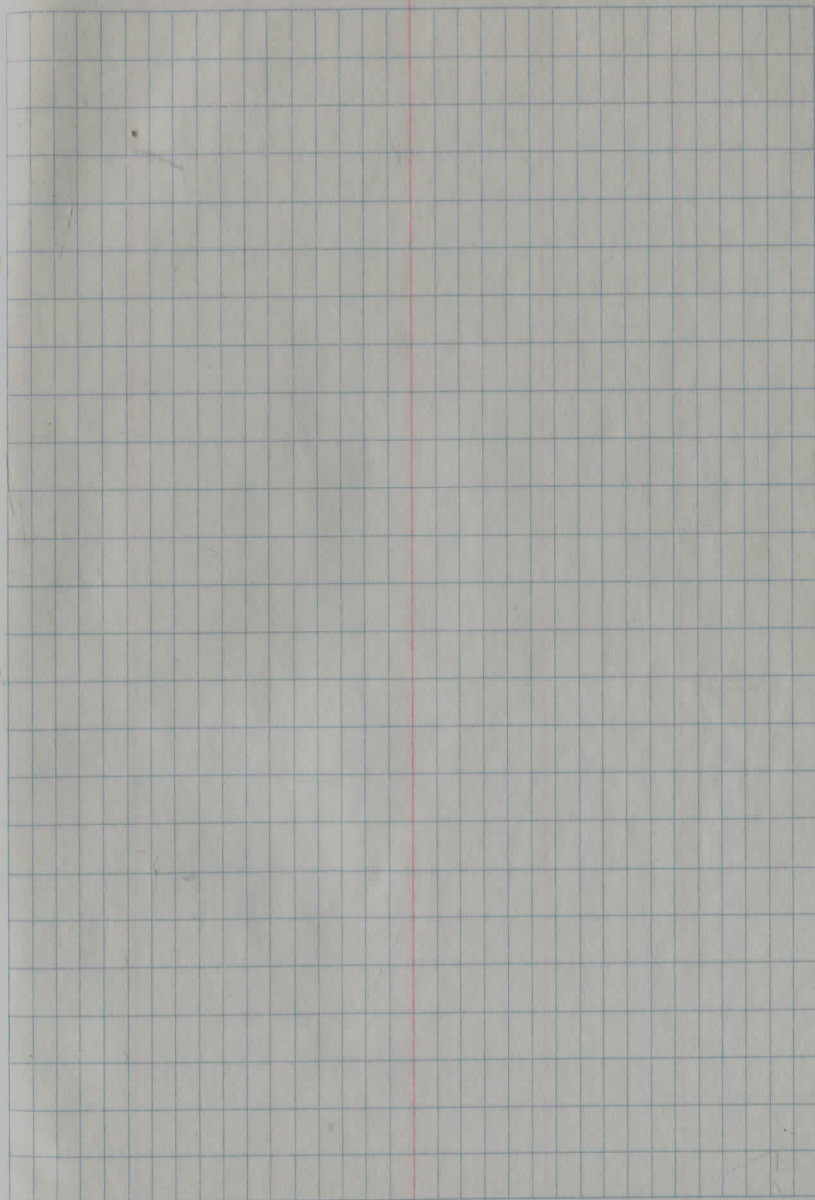
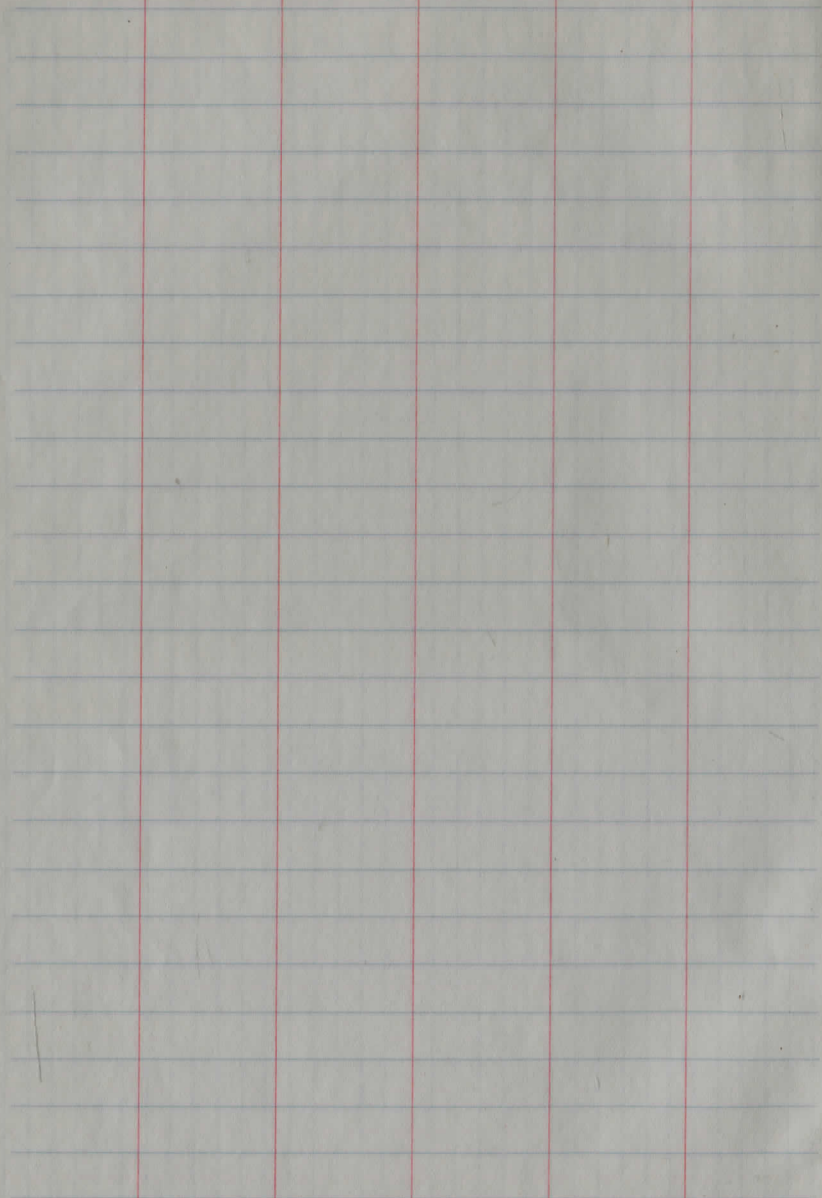
29 + 56.50 Face South Abutment

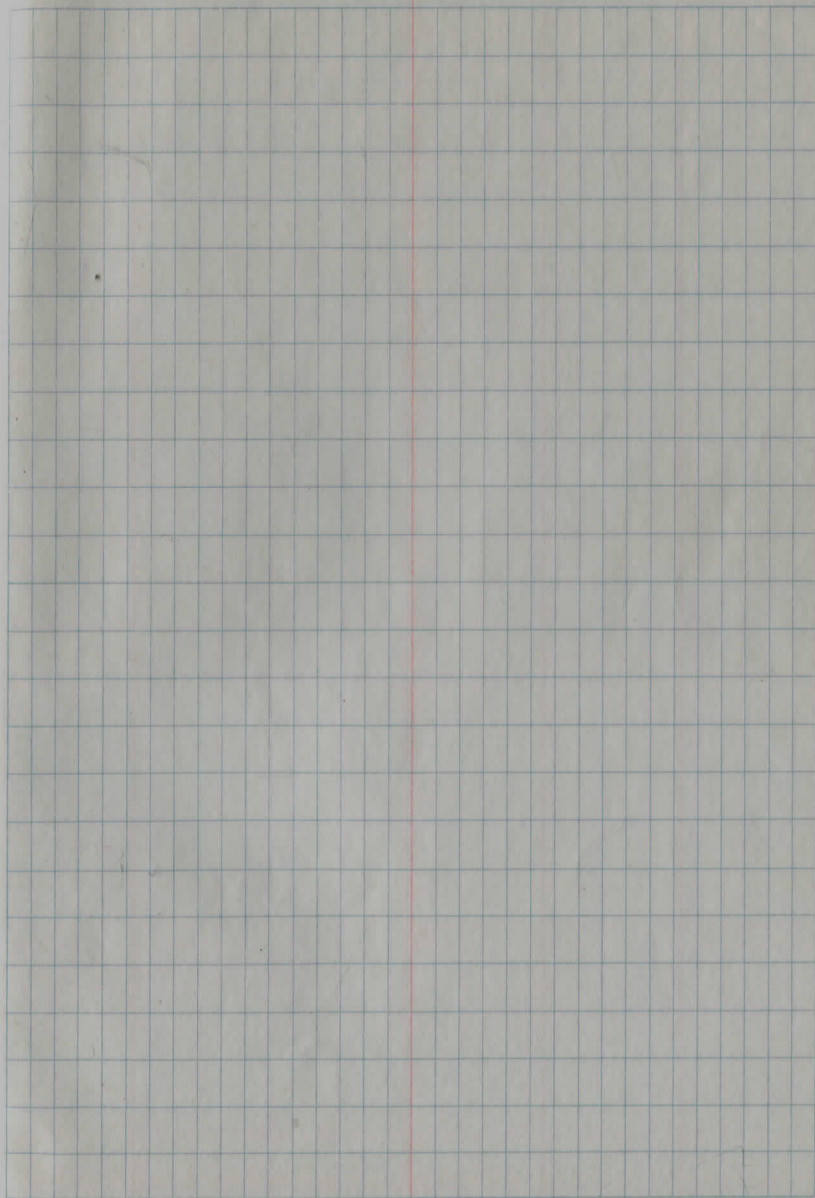
29 + 36.50 spike set on \pm

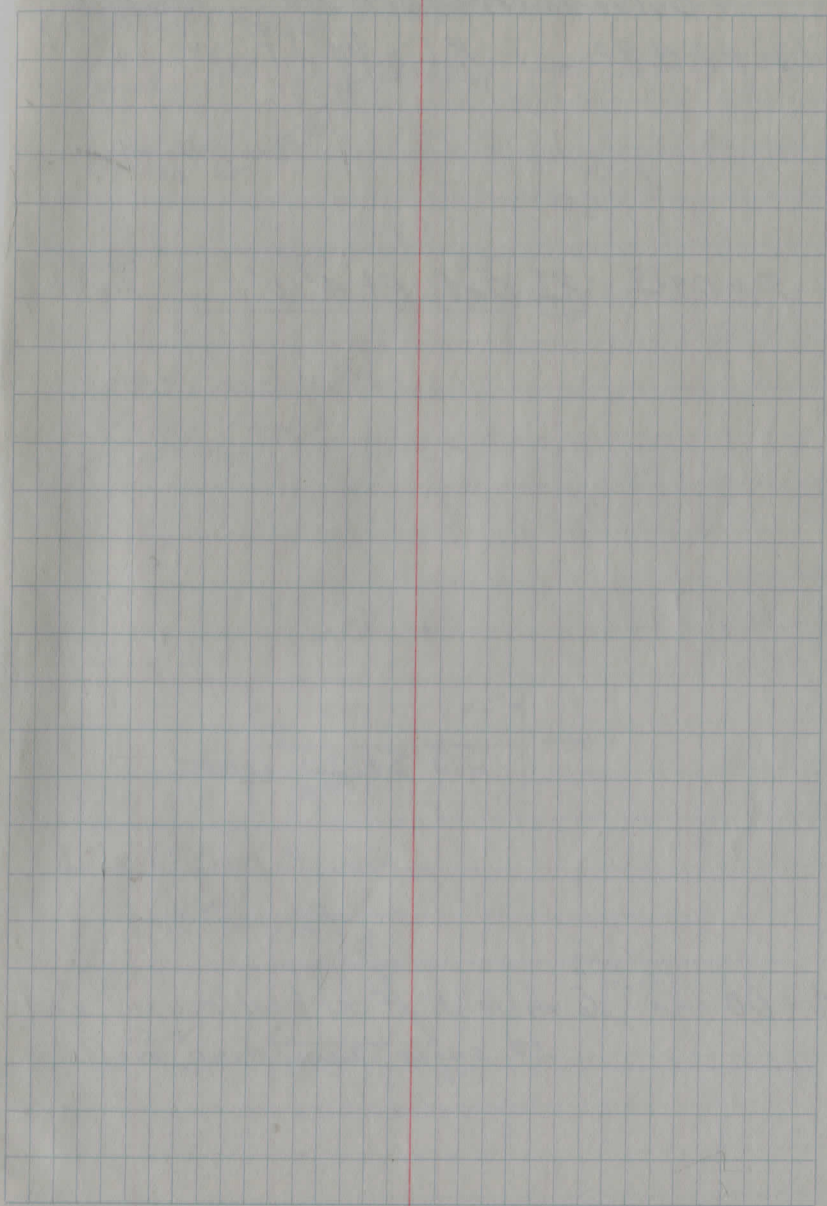
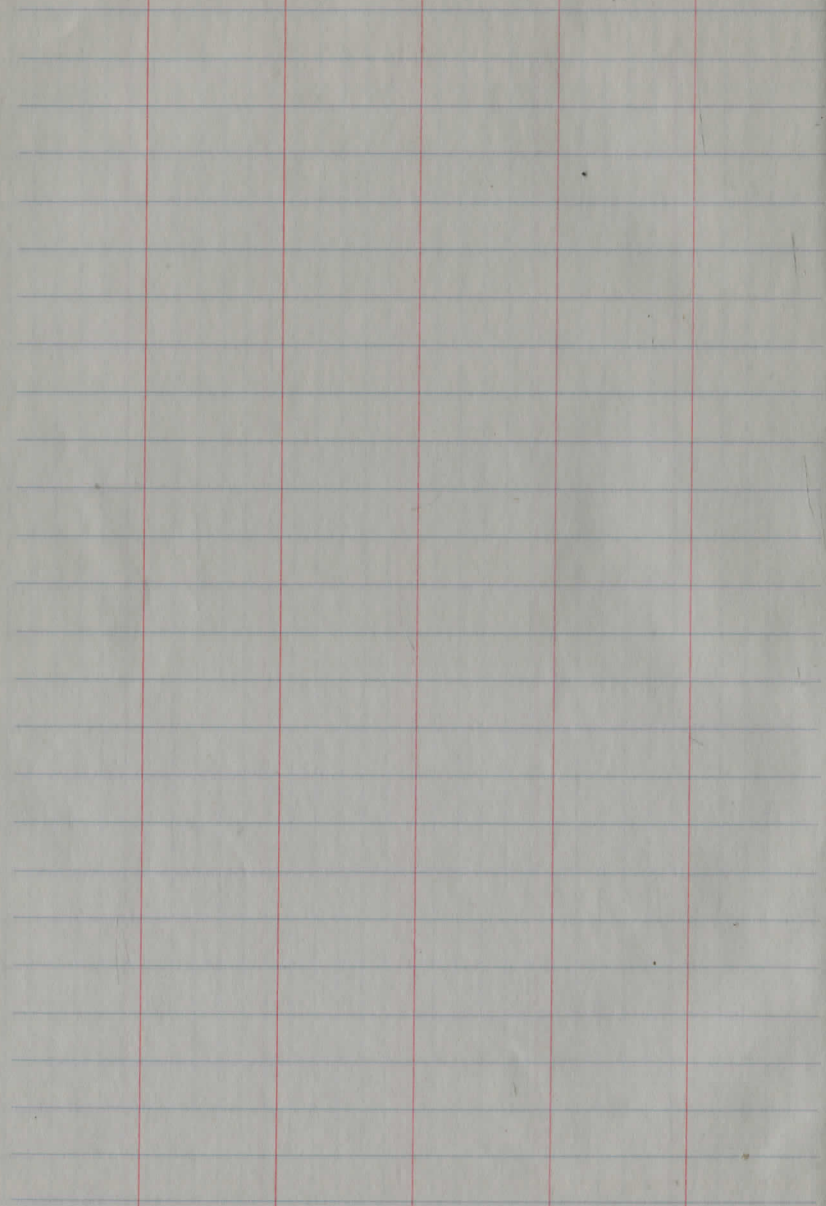


Blank lined page with three vertical red margin lines.

Blank grid page with a vertical red margin line on the left side.







Culverts on Clark Rd No 77-C
 13+24.90 PI Det Lt spike set

5+09.30 P.I. Det Rt 4°10' Spike set over culv.

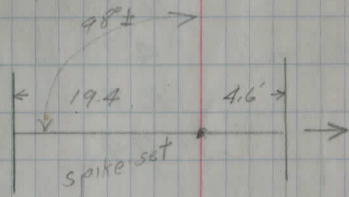
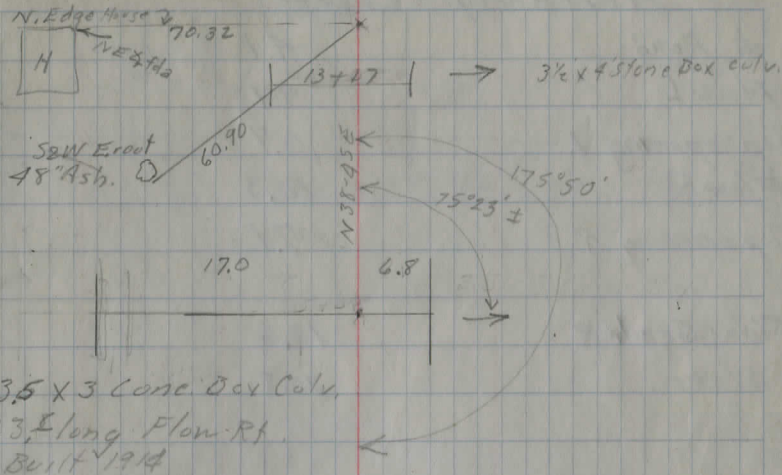
5/2 3+13.5 culvert

0+00 6 mile E. of school house and
 3rd Angle 1/2 way down hill.

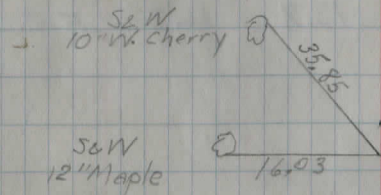
14+76 = Cuts Rd.

9/3/37

33



3.5 x 3.5 Conc. Box Culv.



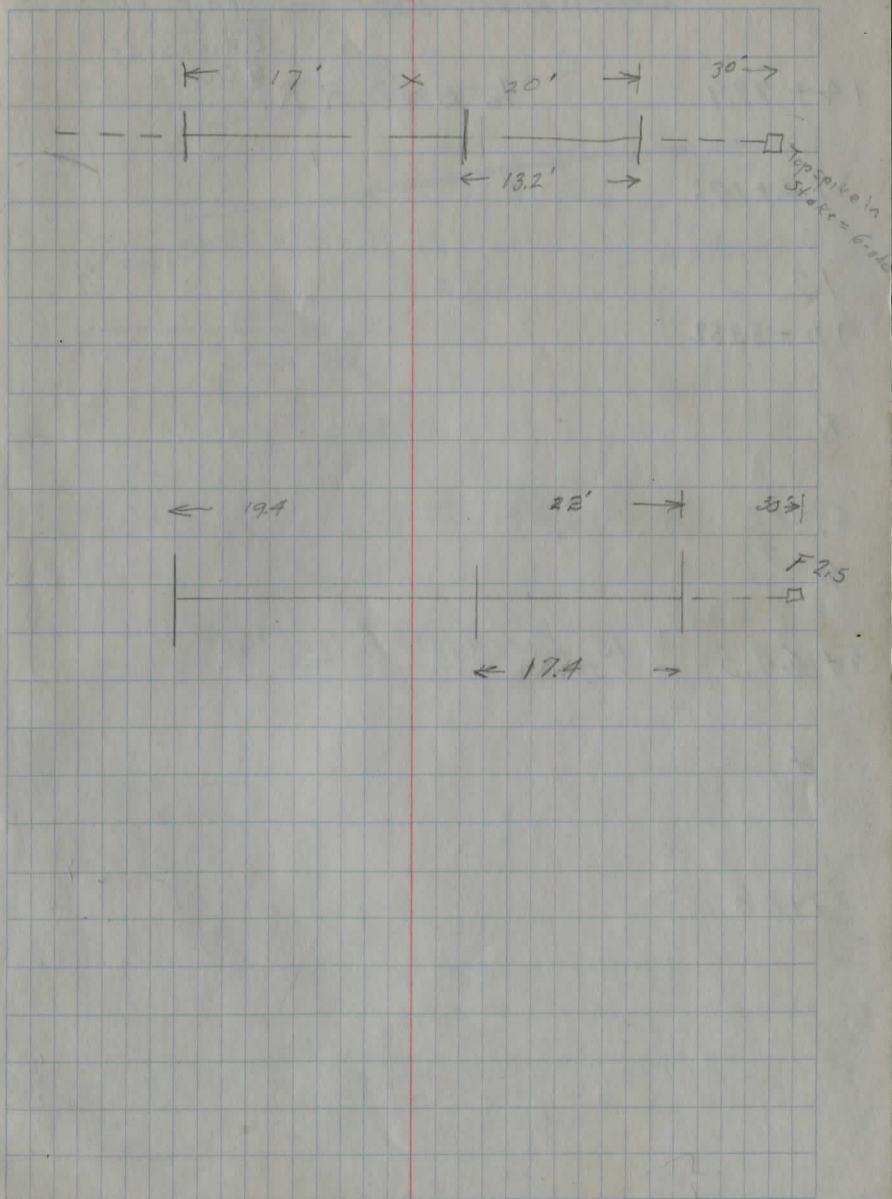
0+40 Drive

Northberly Culvert

± Road	4.1
Flow L	9.9
Top opening L	6.7
Flow R	10.3
Top opening R	7.1
Flow Grade R	10.6
Stake	10.8

Southerly Culvert

Flow L	10.3		
Top Opening L	6.9		
± Road	4.7		
Flow R	10.8		
Top opening	7.4		
Flow Grade R	13.5		
Stake R	13.8	16.3	F.2.5



TH. 77 CLARK'S CROSSING ROAD. SEC B

From N. + S. Center Rd. to Route 44
 CHARDON TWP. May 4, 1938
 fair, 80°±

W.C. Marks
 E. Richards
 G. Dietz.

14+79.9 ± B. + O. R. R.

14+19±

12

10+53.5±

8

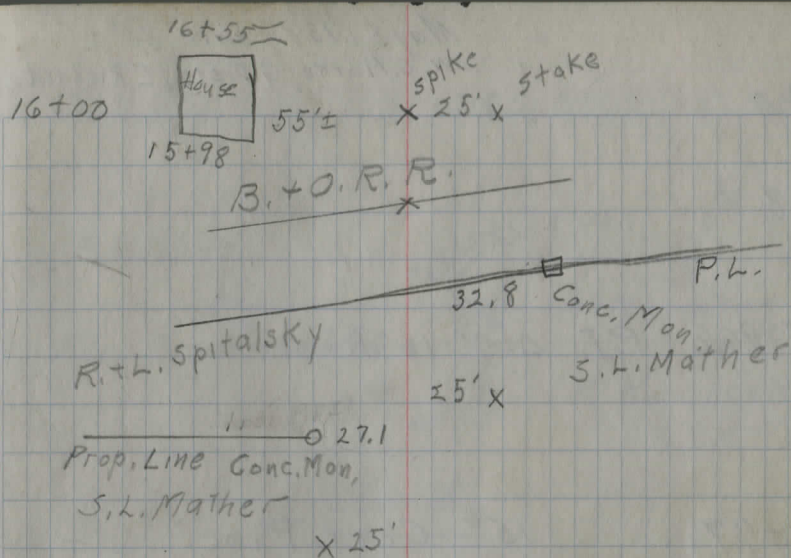
6+82

6

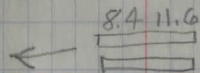
5+64.5 15" Corrugated Iron Pipe
 12" " " "

4

1+00

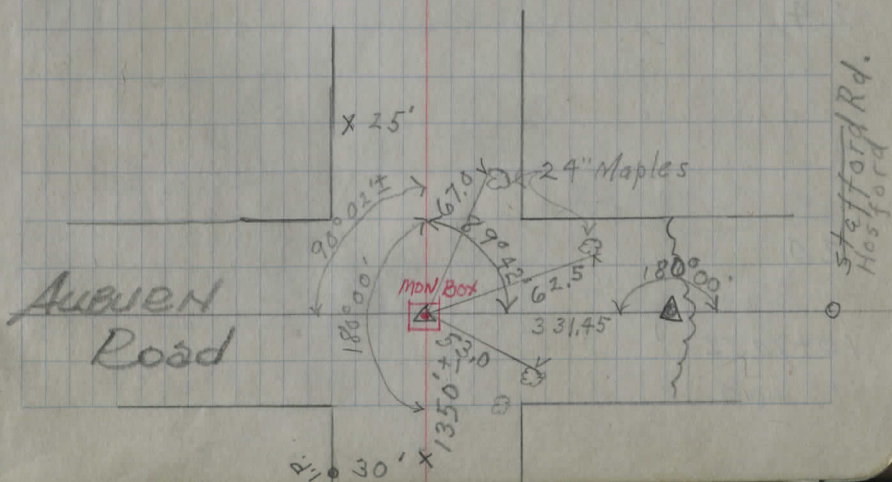


1' x 1' Stone Sluice Abandoned
 x 25'



x 25'

x 25'



May 5, 1938, fair, 80° ±
 W.C. Marks, G. Dietz, E. Richards.

40

38

35+96.6 P.I. Δ=0° 16' Right.

30+97 15" Corr. Pipe

28

25+05 12" Corr. Iron Pipe

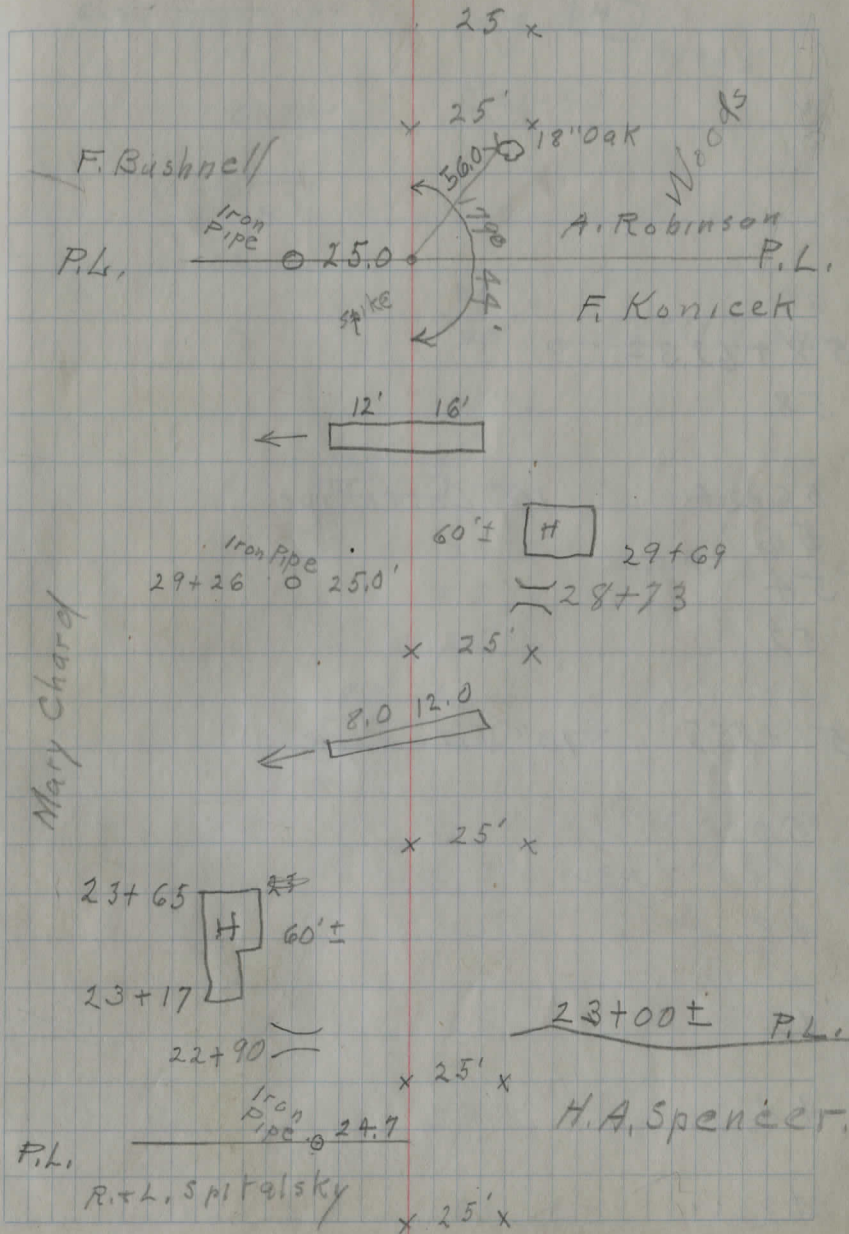
24

2

20

16+70.5 ±

16+00



61+80 H 60'±

60'± H 61+65

61+30

61+40

60+90 B 25.5
60+64

25' x
30' 58+62.3 P.L.

25' x

17.8' 0.6' →

Meadow

25' x

55+74

25' x

25' x

18.0' 4.3' →

Pasture

x 25' x

25' x

49+75

25' x

Woods

25' x

25' x

60
58+62.3±

58

56+24 10" Corr. Pipe

56

54

52

51+85.5 10" Vit. Pipe

50

48

46

44

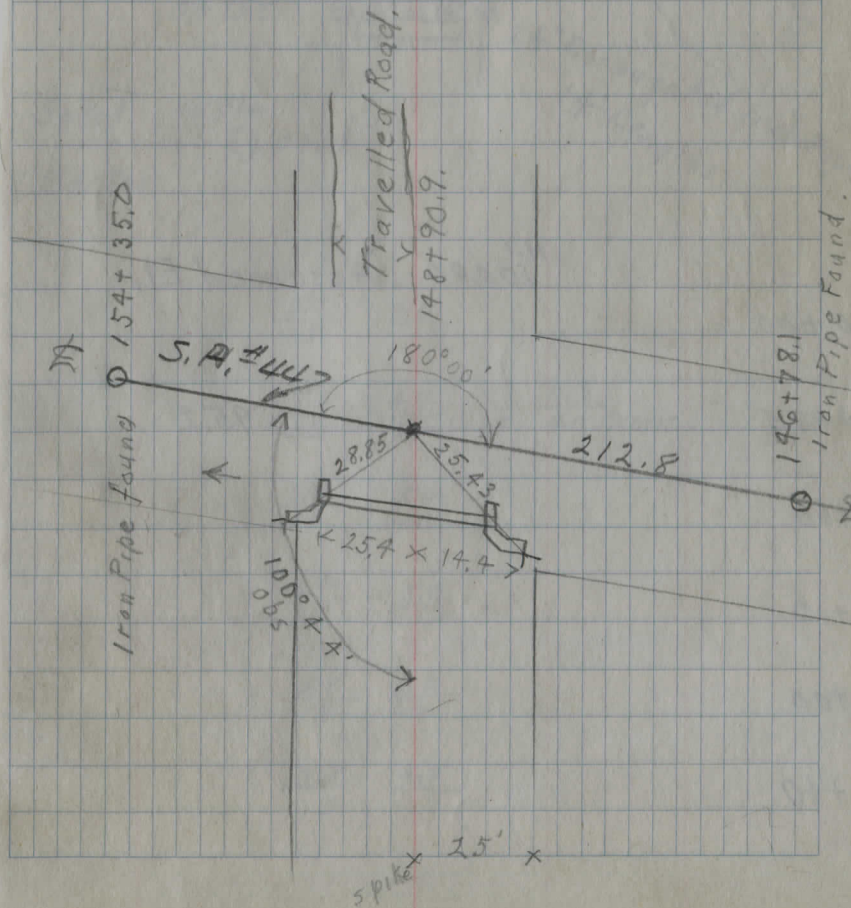
42

5280 / 62745
1.188 miles

62+74.5 \neq State Route #44, spike set.

62+58 12" Vit. Pipe

62



Culvert on Griswold Rd. June 17, 1938.

W.C. Marks
G. Dietz
E. Richards.

100.00

0+75

16' Left

Grade

92.0

16' Right

91.7

NOTE: THIS PROBABLY T.H. #77 S.E.D. Jm MSZ

H.I.
100.00 Assumed El.

0+00

0+75

95.2

1+60

2+10

3+00

3+40

Gr. Rod

8.0

Cut from
Top of stake
3.5'

8.3

4.5'

1+60

0+75±

14' 14'
16' x 16'

24" Corrugated Iron Pipe
14' Lengths.

Sokal 40" Elm

0+00

Barton

$\frac{5.1}{15}$ $\frac{7.0}{15}$

$\frac{5.0}{30}$ $\frac{4.8}{27}$ $\frac{5.1}{27}$ $\frac{11.3}{40}$ Creek

$\frac{6.2}{15}$ $\frac{5.4}{15}$

$\frac{6.4}{15}$ $\frac{5.8}{15}$

$\frac{5.8}{15}$ $\frac{5.3}{15}$

$\frac{3.3}{15}$ $\frac{4.5}{15}$

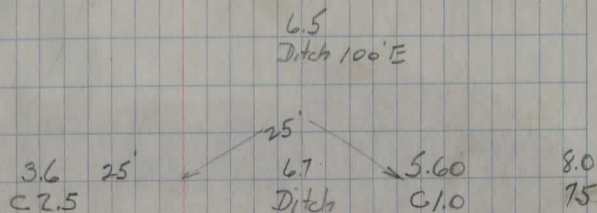
TH. #77 1/13/39 Clear windy 80° Graber
 Richards
 Pomaroy

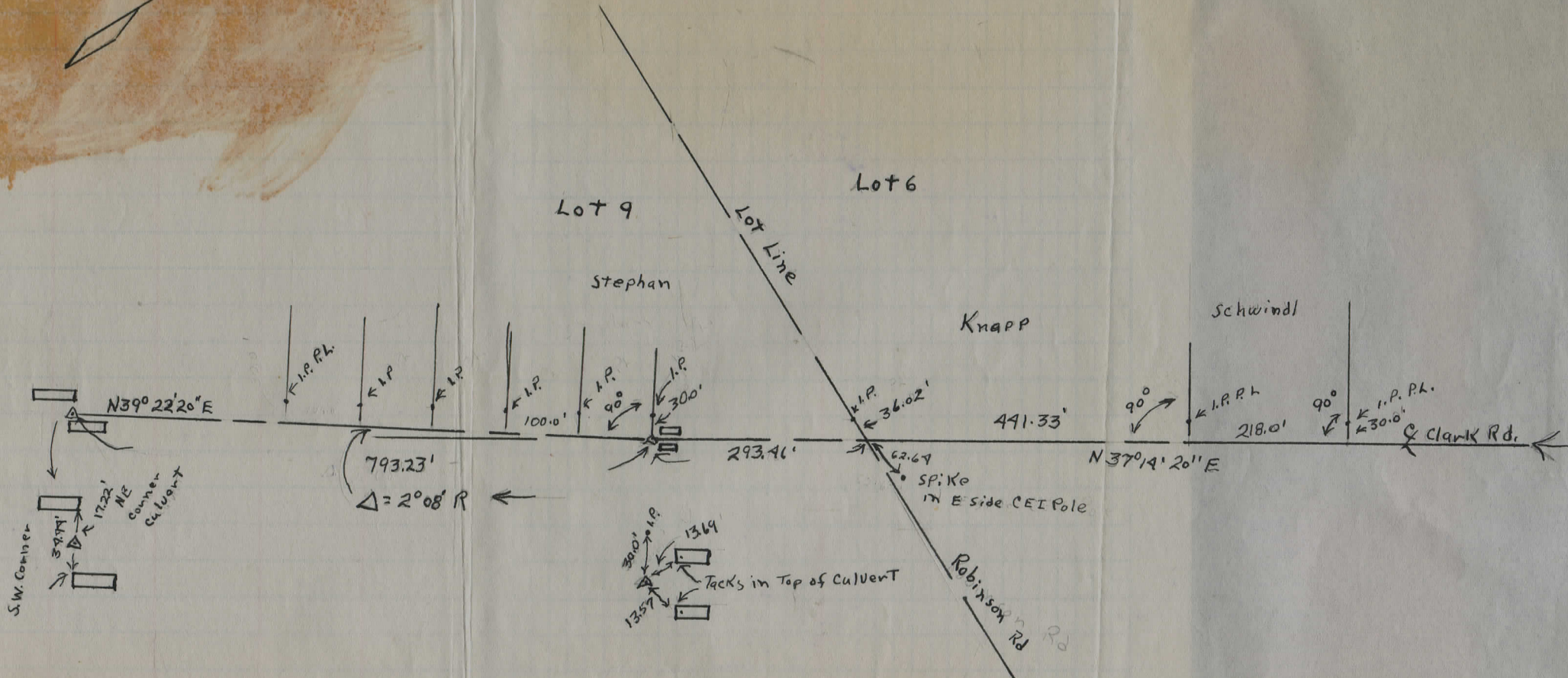
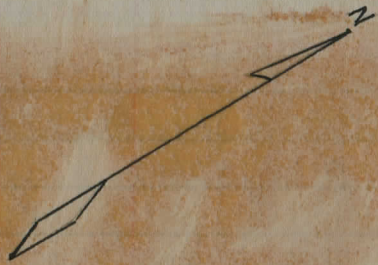
B.M.	7.57	1135.48		1127.91
62+74 ^S			9.1	
61			7.5	
60			4.5	
59			4.5	31.0
58			4.2	31.3
57			4.7	30.8
T.P.	5.42	1135.05	5.85	1129.63
56			4.3	30.7
55			4.2	30.8
54			3.4	31.6
53			2.9	32.1
55+83			4.47	

Clarks Xing Road
 Culit Sta. 55+83

40

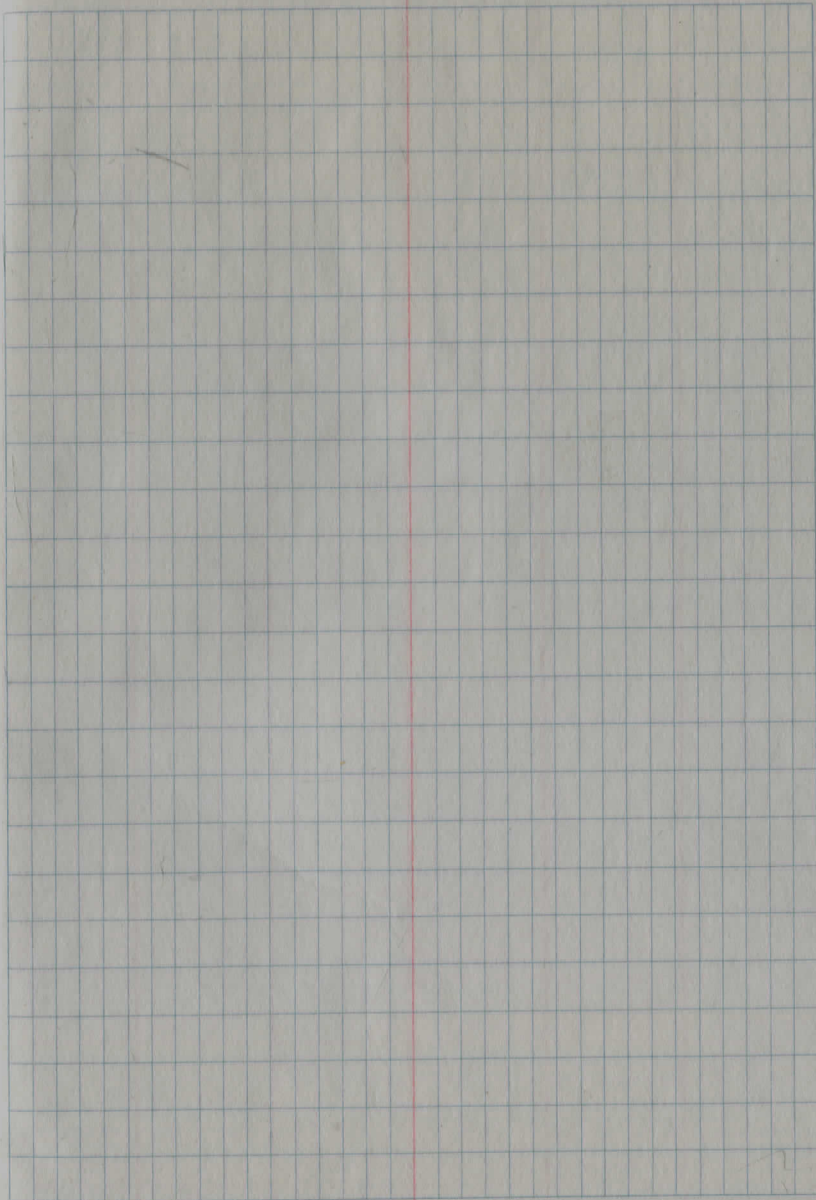
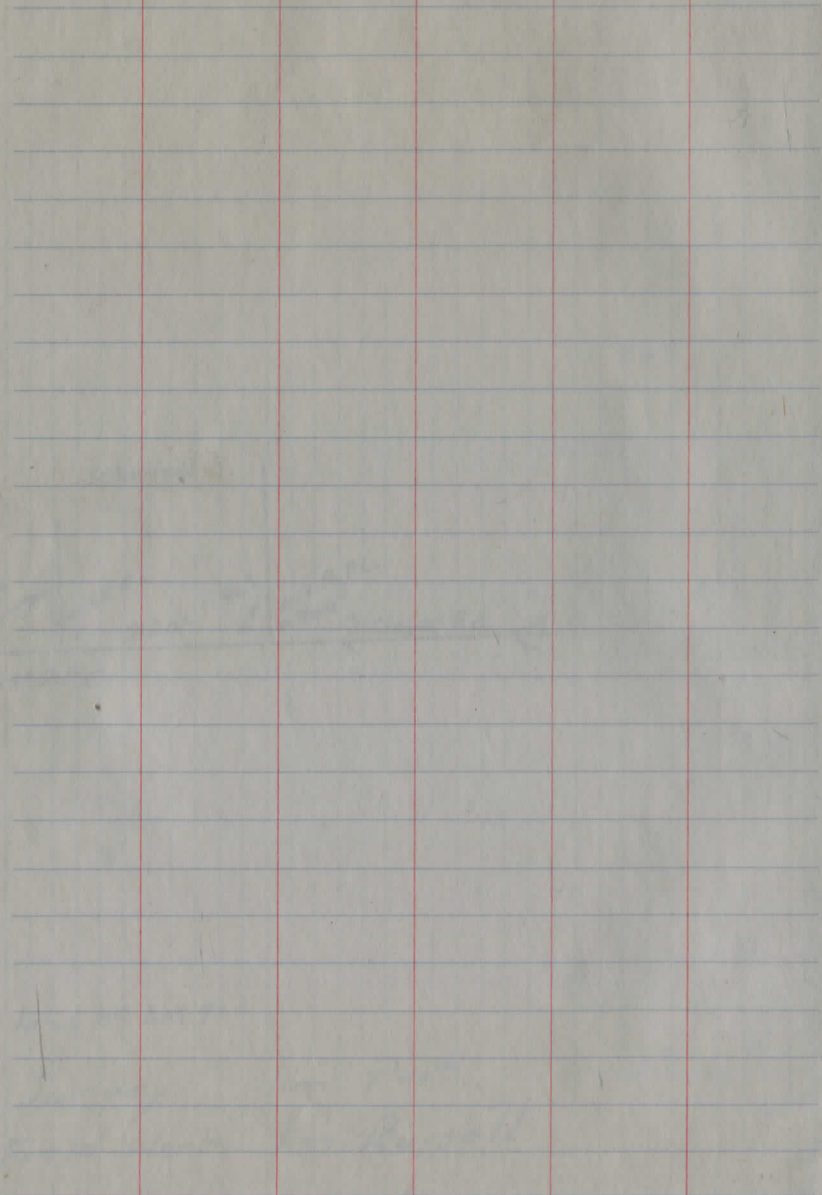
Nail in 5" Root 12" Maple 4th tree E side of
 #44 So. of Clarks Xing Road.

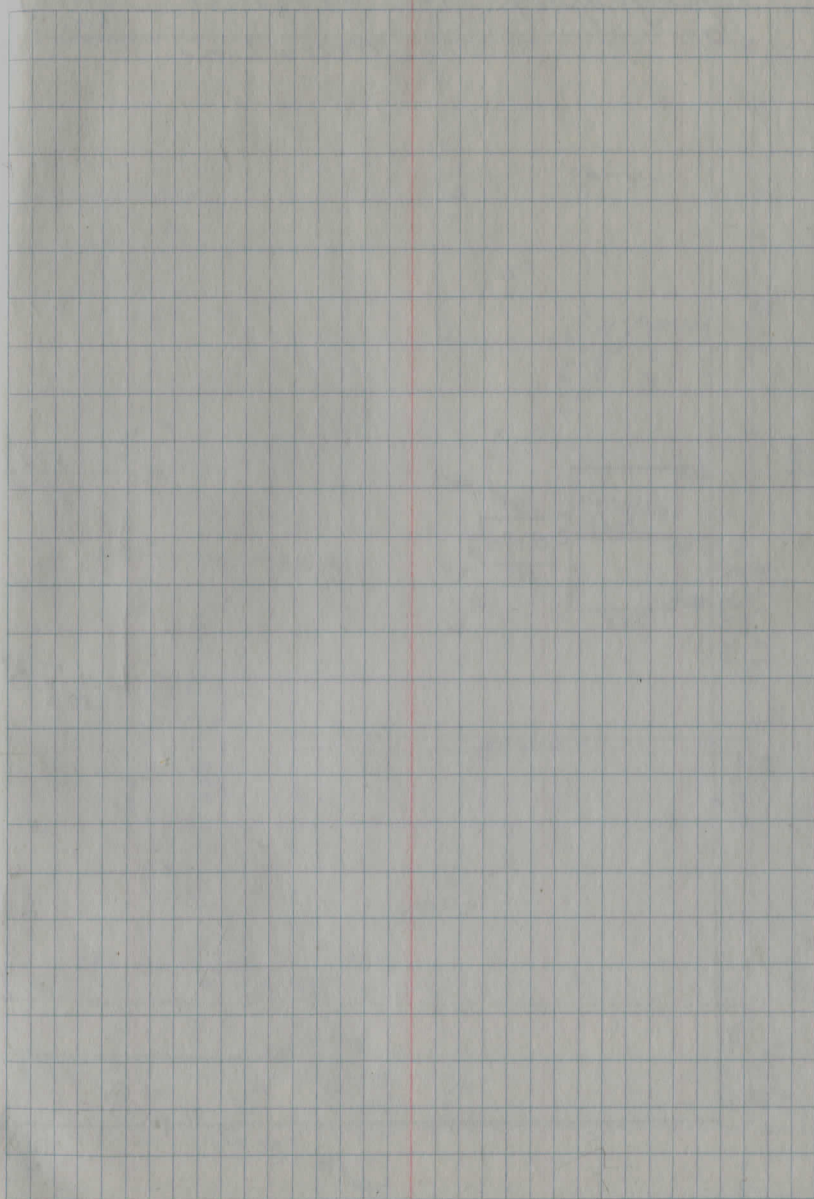
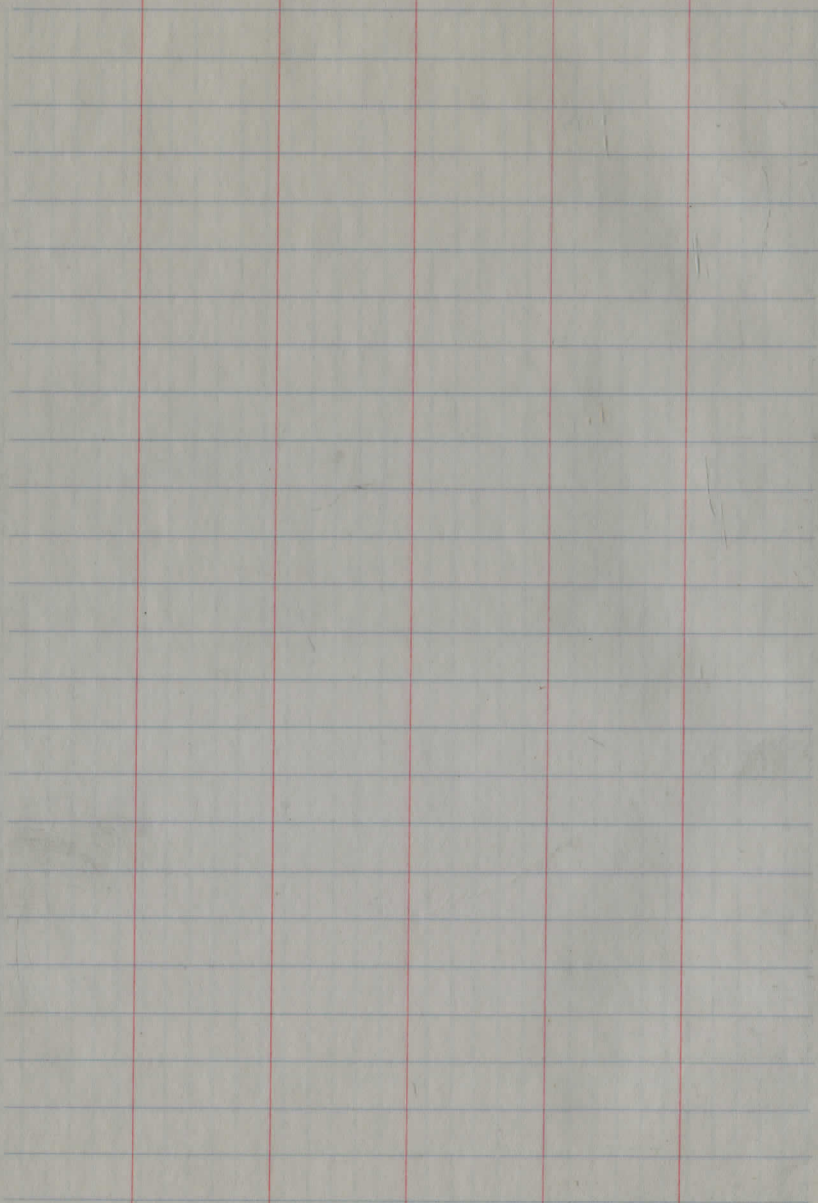




References for Clark Rd 659.33' North of Nly line of Lot 9
and 1086.69' South of the Nly line of Lot 9

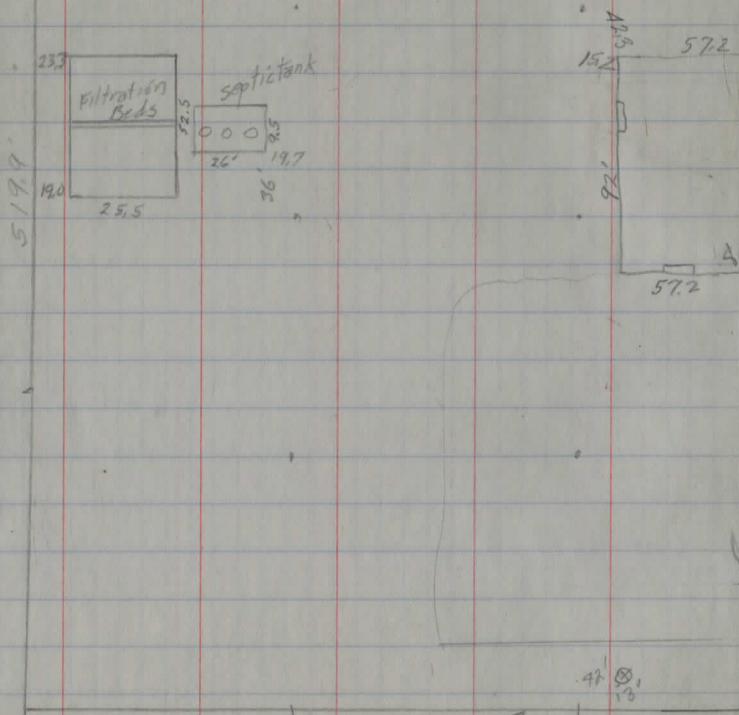
Survey Jim Post
Field Work Jim Russell
spring 1966





Topography for Russell School

North Line



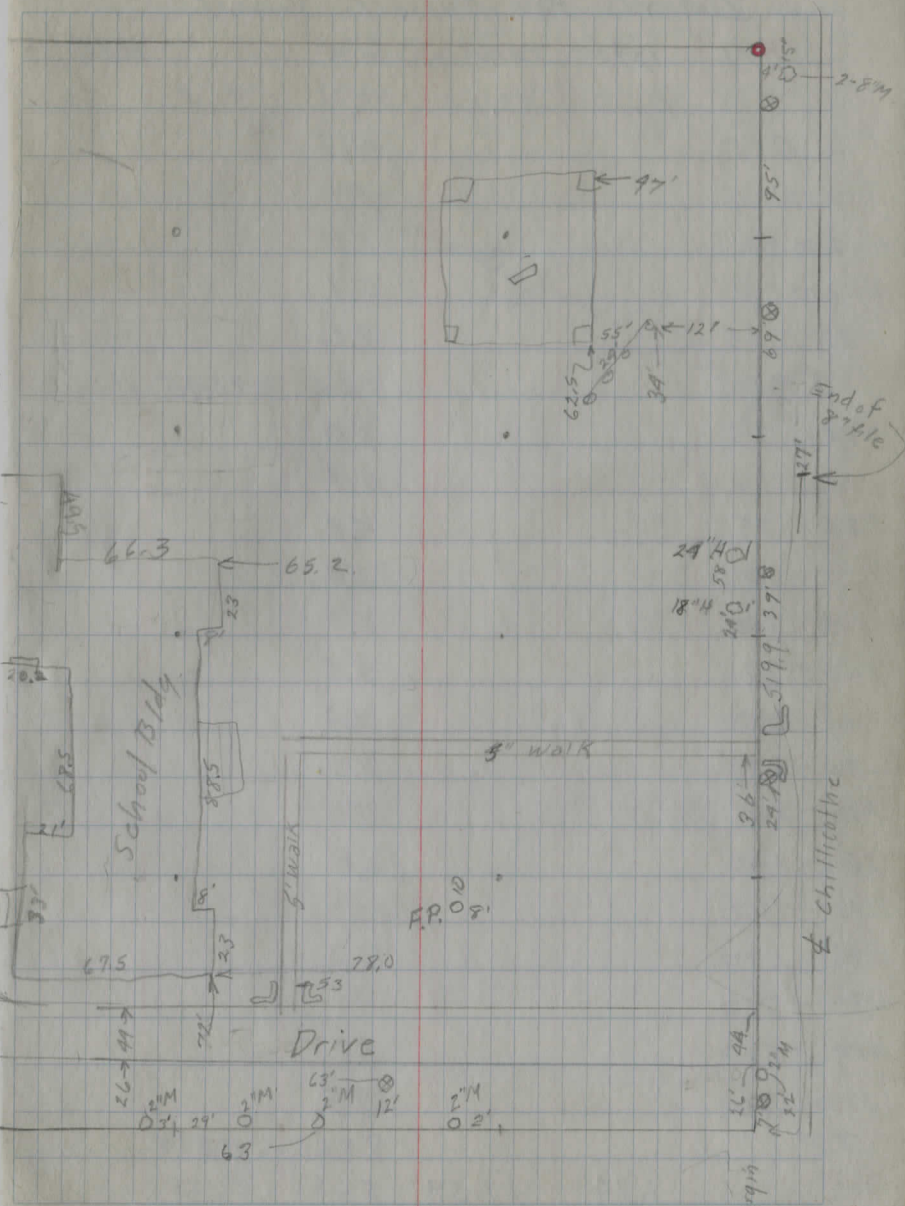
South line →

500.0

8/25/38

Riley
Clouse

74



End of 8" tile

Chillicothe

N. Margin

BS
+
Levels for Russell School

	BS	HJ	FS	Elev
B.M.	1.41	10.41		1094.03
	0.70	92.10	10.01	91.40
0-0			4.5	
100-0			5.6	
200-0			6.9	
300-0			8.1	
300-35			7.2	
T.P.			5.65	86.45
200-35			6.0	
100-35			5.4	
30-35			4.8	
100-0			6.4	
100-100			5.7	
178-72			5.5	
0-200			8.4	
30-200			8.0	
100-200			7.0	
169-200			6.0	
0-300			10.0	
15-300			12.3	
30-300			9.8	
100-300			8.7	
200-300			9.5	
T.P.			9.92	82.18
	1.14	87.59	5.65	86.45

USGS B.M. Plate SE & Fda, Town Hall

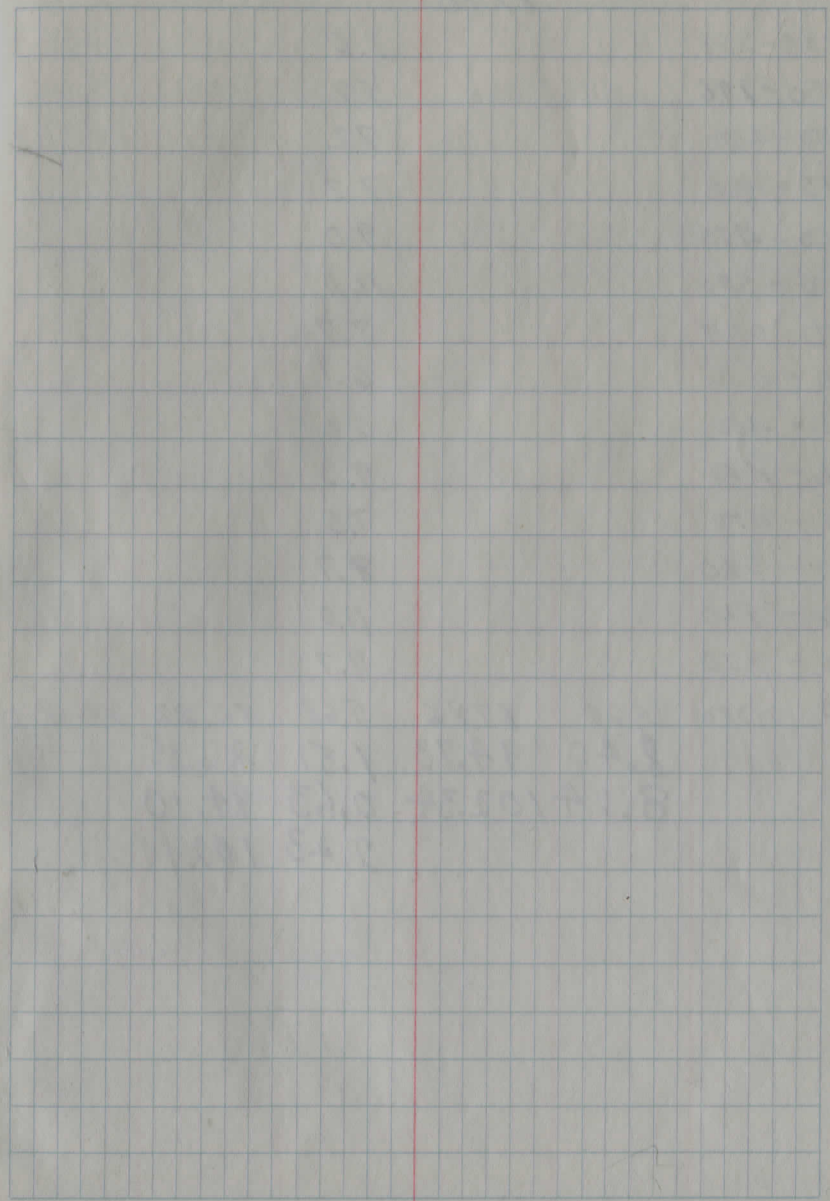
Coordinates from SE Cor. of prop

Rock at 250-40

x on prt 10-300

87.59

250-100	1.4
250-150	2.0
300-100	2.5
400-0	5.7
400-40	4.7
400-100	4.7
500-0	8.8
500-100	8.2
500-200	11.1
Curb of Filt. Bed	10.6
400-200	7.1
320-200	5.2
300-200	3.3
285-262	4.0
320-260	6.0
300-285	7.7
300-300	7.8
300-400	10.3
300-520	12.8
400-520	15.1
400-400	13.4
400-300	11.2
500-300	15.4
500-400	16.3
500-520	17.4
T.P	4.22
	87.90
	3.91
	83.68

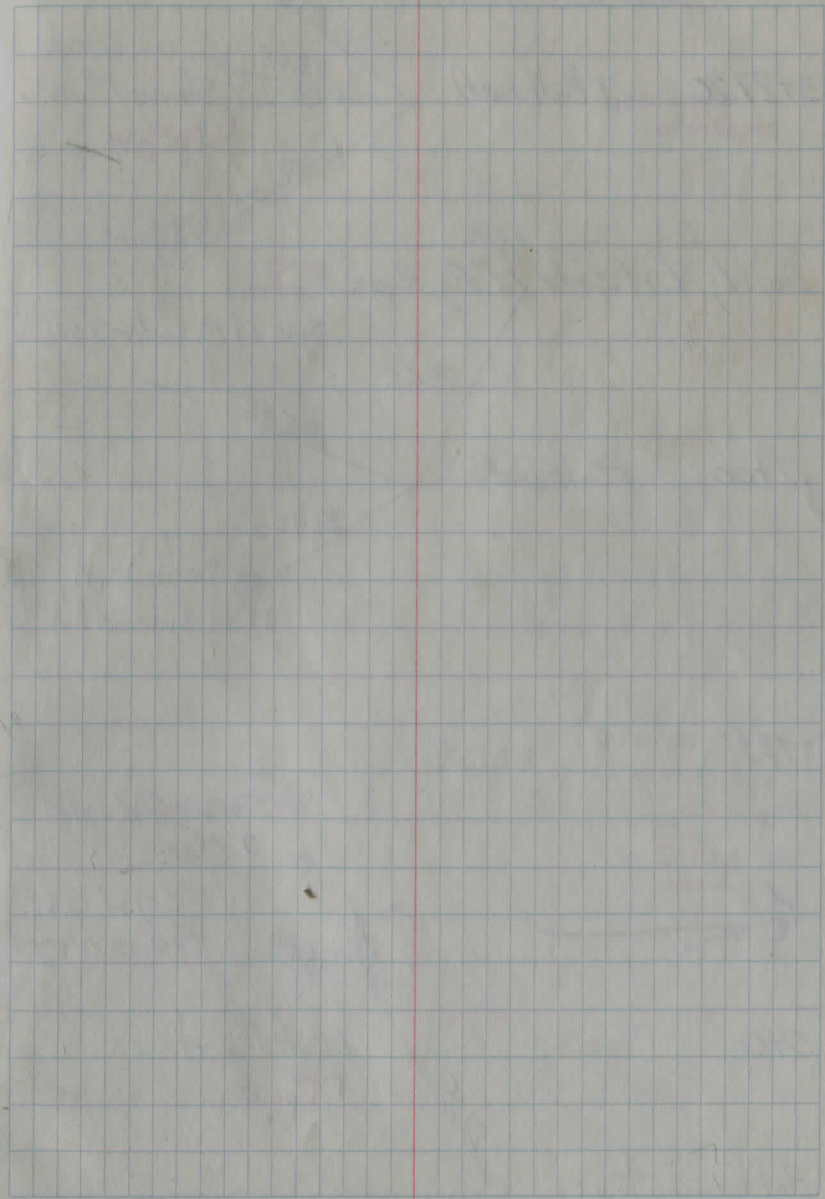


+ HI - Elev

87.90

220-258			3.6	
220-290			5.7	
200-400			7.2	
175-400			7.2	
200-475			9.0	
200-520			11.0	
100-520			8.7	
100-400			6.1	
30-400			6.2	
16-400			9.3	
0-400			7.5	
30-520			8.7	
16-520			11.0	
0-520			9.7	

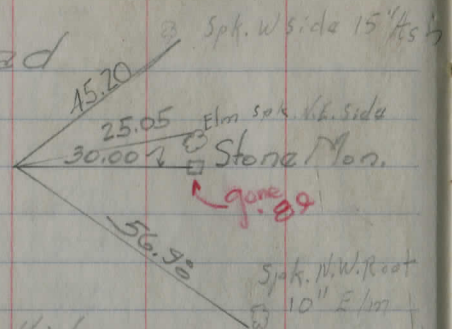
TP 10-300	5.68	87.86	5.68	82.22	82.18
	8.40	94.73	1.51	86.35	
	8.24	102.34	0.63	94.10	
			2.43	100.11	



5/6/40 Pomeroy - Richards - Hostford
 TH#77

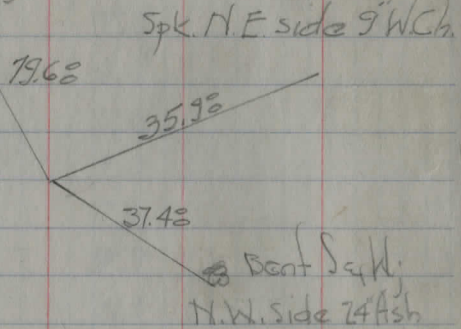
Clarks Road

23+27.20 1. Bolt (set)



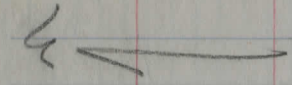
Set W; N.W. side 12" P.g. Hick.

12+00 1. Bolt (set)

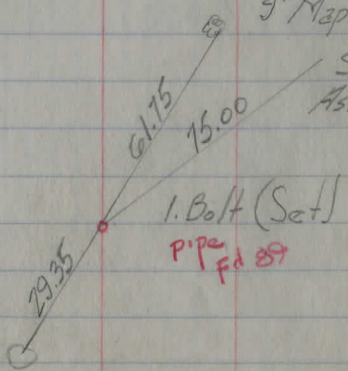


7+01

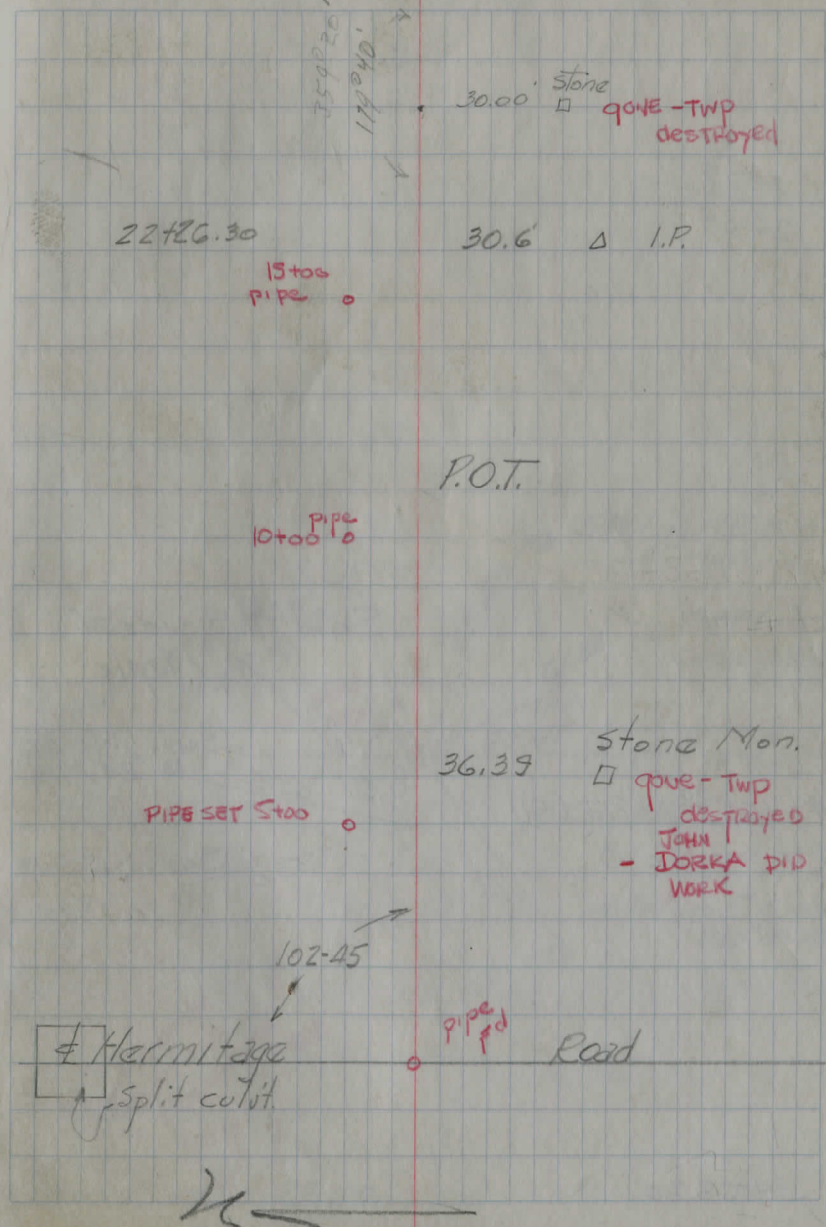
Set W; S.W. side 9" Map.
 Set W; S.W. Ash clump.



0+0



Hole in top large boulder.

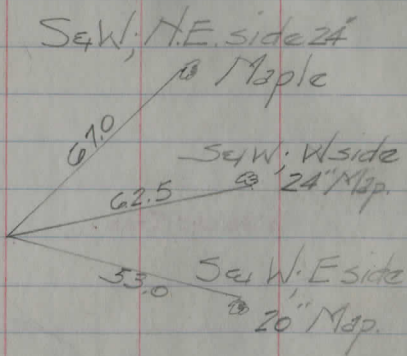


4962

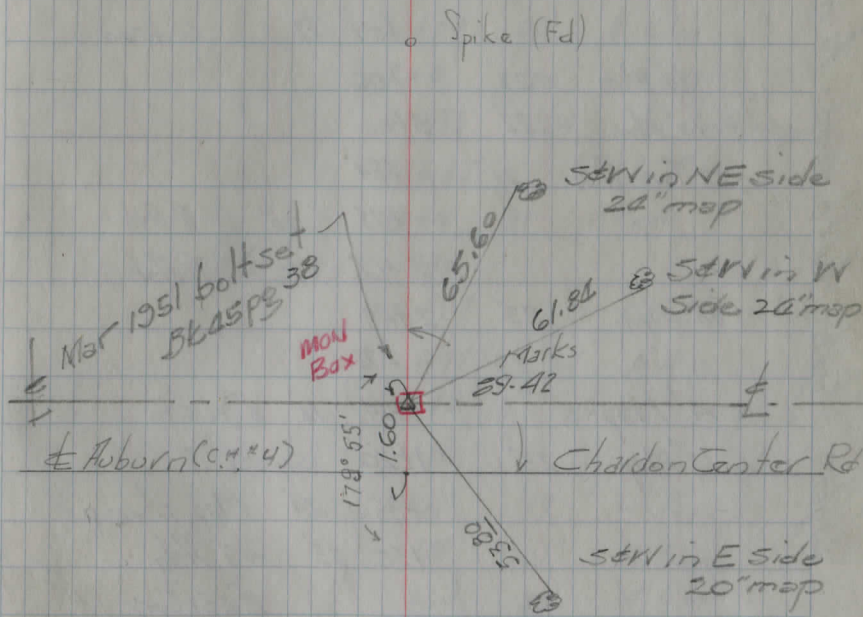
2327

2635

49 + 62³⁰ 1 Pin (Fd)
= 0 to of Sec. B.



34 to 8.00



Cancelled
Township
destroyed - 58
gaze

Stone 17.00 28.00

North

South

7' Elm	20'	+90	13' creek
		+89	17' 20" Elm
		+86	20.5 6" Ash
		+62	21' 7" Wal

+61 12x18 Corr. l.P.	10.5	7.5	Fair
----------------------	------	-----	------

Stone

20" Trip. Elm	22'	+50	
		+18	17' 11" Map
		+09	18' 6" tree

10' Elm	23'	+06	
---------	-----	-----	--

10' Elm	22'	+00	
---------	-----	-----	--

12" Twin Ash	21'	+84	
--------------	-----	-----	--

		+78	20' 8" Ash
--	--	-----	------------

		+66	18' 7" Ash
--	--	-----	------------

10' Elm	23'	+49	
---------	-----	-----	--

	23'	+72	
--	-----	-----	--

14" Map		+24	12' 8" W. Ch
---------	--	-----	--------------

12" Map	23'	+20	
---------	-----	-----	--

		+95	24' Map clump
--	--	-----	---------------

		+56	25' 1" Ash
--	--	-----	------------

12x51 Corr. l.P.

OK.

	31'	+26	20'
--	-----	-----	-----

18' Earth

33' ditch centers

0+0

12' Gravel

33' ditch centers

Light brush both sides to ditch

50

+28	21'	12" W. Ch
-----	-----	-----------

8+15	28'	12" Ash
------	-----	---------

+95	26'	10" Ash
-----	-----	---------

6" Elm	15'	+87	30'
--------	-----	-----	-----

+81	29'	6" Pop.
-----	-----	---------

+78		Horse trail
-----	--	-------------

Field Dirt Dr.

+74		
-----	--	--

+27	23'	12" Elm
-----	-----	---------

+04	23'	8" Elm
-----	-----	--------

+0	20'	creek
----	-----	-------

+73	24'	30" W. Wood
-----	-----	-------------

+55	22'	6" Ash
-----	-----	--------

6+0	38'	creek
-----	-----	-------

12" Map	20'	+90
---------	-----	-----

+87	17'	5-6" Elm & Ash
-----	-----	----------------

+77	18'	6" Ash
-----	-----	--------

+42	13'	creek
-----	-----	-------

7" Map	21'	+36
--------	-----	-----

5+4	17'	6" Pop.
-----	-----	---------

+71	21'	12" Elm
-----	-----	---------

+64	20'	14" Elm
-----	-----	---------

+51	15'	2-C Ash
-----	-----	---------

6" Elm	20'	+38
--------	-----	-----

+26	14'	rock
-----	-----	------

6" Elm	22'	+22	12' creek 15' 12" Elm
--------	-----	-----	-----------------------

Light brush both sides

6" Wch 18' +55
 +27 28' 2-6" Ash
 14+26 24' @ 8" Wch
 +94 27' @ 12" Wch.

12" VSP 13+20 12" x 24.5 Corr I.P. Fail
 10' 14.5'

Field Dr. +90
 +78 25' 8" Wch

13" Pig Hick 20' 12+77 Fence N.G.

+76 27' @ 24" Ash

+64 25' @ 6" Wch

+36 24' @ 6" Wch

11+05 25' @ 22" Ash

+59 26' @ 14" Wch.

26.5'

+15 26' @ 10" W. Ch.

+10 20' @ 6" W. Ch

10+0 26' @ 16" Ash

6" Ash 18' +95

+70 27' @ 13" Ash

+55 26' @ 12" Ash

+35 25' @ 12" Elm

9+11 25' @ 13" W. Apple

+78 28' @ 13" Wch.

8+42 24' @ 12" Elm

+60 27' 10" Elm 51
 12" Map x 22' +57 20' 26" Elm
 6" Map 20' +44 26' 12" Hick
 Rail fence from dr. 22+27 28' 30" Elm
 12" Pig Hick 19' +91
 Pasture Dr. +78 28' 10" W. ch
 21' +51 28' 10" Elm
 +44 20' 6" Elm
 +18 28' 14" Ash
 Wh. Wood clump 27' 21+0
 +86 27' 7" W. ch
 +60 27' 15" Elm
 22' 20+03
 +97 27' 9" W. ch.
 +83 28' @ 14" Elm
 +75 28' @ 12" Elm
 +43 27' 10" W. ch
 19+24 20' @ 18" Ash
 15" W. ch. 16' +54
 18+40 25' @ 18" Elm
 +83 24' @ 13" W. ch.
 17+30 21.5' @ 13" Map
 16+0
 +71 Field ditch
 15+ 45 20' @ 12" Ash
 14+80 24' 11" W. ch

Light blush

Heady blush

Light blush

heavy blush

North

South

7" Elm	a	15	+91		
			+67	28'	15" Map
20" Map		16'	+31		
12" Elm		14'	+24		
			27+05	25'	8" Ash
7" Elm	o	17'	+72		
12" Oak	o	13'	+36		
			26+13	28'	8" Map
			+93	29'	8" Map
26" Oak	o	26'	+36		
			+29	26'	6" Ash
13" Oak	o	14'	25+08		
			+90	26'	6" Hick
			+59	27'	12" Ash
9" Beech	o	20'	+47		
			+27	25'	6" Elm
7" Ash	o	23'	+06		
		23'	24+03	25'	6" Ash
			+93	24'	7" Ash
10" Wch	o	19'	+83		
6" Ash	o	18'	+65	25'	13" Ash
			+30	25'	12" Elm
7" Elm	o	19'	23+25		
			+78	26'	10" Elm
8" Elm		21'	+74		
			22+69		
Rail fence					Dirt Dr.

Blush

Blush

Cont'd. Page 59

52

7" Elm		16	+79		
12" Elm	o	16'	+60	25'	6" Map
6" Elm		17'	+47		
12" Ash	o	20'	+35		
			32+11	25'	7" Ash
			+58	25'	12" Map
			+60	25'	8" Elm
18" Elm	o	20'	+36		
12" Elm	o	21'	+38		
18" Elm	o	26'	+25		
			31+03.5	10" x 22" C.I.P.	
		9'	13'		Pipe O.K. Lower F.L.?
11" Elm	o	17'	+77		
			+69	28'	12" Elm
			+52	26'	13" Elm
10" Elm	o	18'	+32		
			+29	21'	18" Ash
12" Elm		15'	30+10		
9" Elm	o	15'	+85		
12" Elm	o	19'	+23		
		17'	29+05		
9" Map	o	18'	+71		
18" Map		23'	+61		
12" Elm	o	14'	+17		
5" Elm	o	14'	23+11		
					Rail Fence

Blush

Blush

5/6/40 Parneloy - Hoosford 65° Windy

+ H.I. - Elev

Clarks Road Sec. A. Levels

42+0				1089.7
43+0				1090.1
44+0				1090.4
45+0				1090.7
46+0				1091.1
T.P.	3.22	1094.53	10.45	1091.31
47+0				1092.1
48+0				1093.8
49+0				1095.4
49+62				1097.6

R. 41 1106.76 1099.35 B.M.

B.M.	1.14	1106.71	7.42	1099.35
T.P.	0.11	1116.81	11.18	1105.63
T.P.	1.60	1125.51	8.81	1116.70
B.M.			7.45	1123.91
T.P.	4.90	1131.36	12.78	1126.46
T.P.	4.12	1139.24	5.89	1135.12
T.P.	5.23	1141.01	1.36	1135.78
T.P.	6.11	1137.14	4.34	1131.03
B.M.	7.46	1135.37		1127.91

4.8

4.4

4.1

3.8

3.4

9.7

8.0

6.4

4.2

48.6 00.3

Wood 225' $\frac{2.2}{100}$ $\frac{1.5}{200}$

Road North

$\frac{2.3}{200}$ $\frac{1.3}{100}$ $\frac{3.1}{100}$ $\frac{1.9}{200}$

Rel. South

Spike S. Root 20" Maple 5th tree on Lt. from Car.

Spike S. Root 12" Hick. 26 to Lt

Nail in S. Root 12" Maple 4th tree E side of Route 44 & Sof Clarks Road.

check back

	+	H.I.	-	E	
B.M.			2.61	1090.08	(1090.12)
T.P.	7.45	1092.69	4.87	1085.24	
T.P.	2.95	1090.11	1.90	1087.16	
B.M.			4.82	1084.24	(1084.25)
T.P.	5.84	1089.06	1.07	1080.22	
T.P.	12.29	1081.29	0.82	1069.00	
T.P.	10.43	1069.82	0.49	1059.39	
B.M.			3.42	1051.46	(1051.46)
T.P.	9.94	1059.88	0.02	1049.94	
T.P.	12.45	1049.96	0.07	1037.51	
T.P.	11.68	1037.58	1.47	1025.90	
B.M.	7.22	1027.37		1020.15	
B.M.			2.65	1020.15	
0 to				14.8	
+26 culvt.				15.7	
1 to				17.4	
2 to				20.9	
T.P.	0.53	1022.80	12.48	1022.27	
3 to				24.8	
+61 Culvt.				26.3	
4 to				27.5	
5 to				31.0	
T.P.	0.26	1034.75	12.25	1034.49	
6 to				35.6	
		1046.74			

Ref. spk 2 W; S.W. side 9" Map.

" " " " " " "

	13.1	2.0	1.4
	100		90
12.4		7.1	2.5
FL.		5.4	FL.
		1.9	

10.0

10.9	2.5	10.7
FL.		FL.

7.3

3.8

11.1

T.P.	3.70	1134.95	2.03	1127.92	1127.91
T.P.	2.99	1135.77	4.52	1131.25	
T.P.	4.22	1139.99	7.21	1132.78	
T.P.	11.60	1132.83	3.06	1135.77	
T.P.	8.03	1132.00	3.77	1128.23	
B.M.	11.12	1124.14	0.17	1122.97	(1123.91)
T.P.	8.95	1113.15	0.43	1113.02	
T.P.	7.32	1106.67	2.17	1104.50	

used

B.M.			0.04	1099.39	(1099.35)
T.P.	2.77	1099.43	3.73	1090.66	
T.P.	2.93	1094.39	1.23	1091.46	

1092.09

Blank lined page with three vertical red margin lines.

Blank grid page with a vertical red margin line on the left side.

Blush both sides

		196	23'	8" Wch.
		+81	24'	8" Elm
8" Wch	22'	40+56		
		+82		P.L. ?
		160		Dirt V.
		39+17	24'	12" Elm
13" Elm	20'	+82		
		+64	20'	10" Map
		+30	21'	10" Map
30" Beech	21'	35+14		
		+45	22'	24" Elm
6" Map	17'	37+09		
		+86	26'	13" Hick
		+34	19'	12" Map
10" Map	18'	+29		
14" Elm	18'	+25		
11" Ash	16'	36+02		
6" Ash	21'	+51		
		35+79	22'	8" Map
15" Map	19'	+60		
26" Elm	19'	+10		
		34+05	26'	9" Map
12" Elm	18'	+55		
		+43	23'	
6" Elm	19'	+29		7" Map
10" Elm	17'	33+06		

Ditches 27' Metal 12' slag cinders & gravel 59

				12" x Conc. pipe
Ditches 30'				12" x 33' Conc. pipe
Metal 20'				Ditches 28'
slag & gravel		+62.3	48"	Metal 16'
				slag & gravel
14" Map	16'	49+06		
		+84	25'	13" Wal.
12" Map	17'	+73		
		+68	24'	12" Wal.
13" Map	18'	+50		
12" Map	18'	48+25		
		47+96	24'	6" W. Ch
End blush both sides		+93	25'	13" Apple
		46+07	25'	13" Elm
		45+14	28'	6" Apple
24" Elm.	17'	44+54		
		43+16	24'	12" Map
		42+11	24'	20" Elm
		15.5'	13'	lower H. and
		41+47	23'	14" Elm

This page features a grid of blue horizontal lines with three vertical red margin lines. The margins are located at approximately 10%, 20%, and 30% from the left edge of the page. The page is otherwise blank.

This page features a full grid of blue lines. A vertical red margin line is present on the left side, approximately 10% from the edge. The page is otherwise blank.

T.H. 78

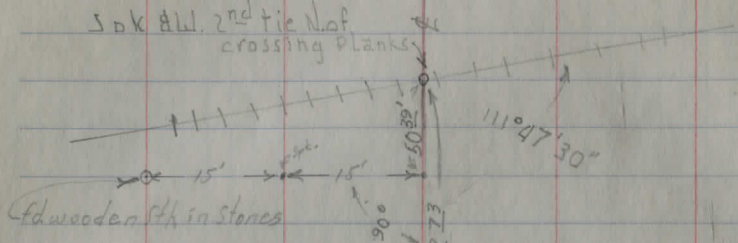
Dec. 17th 1941 (52 yr.)

Richards
Woodhill

Hosford Rd.

Chardon Twp fr. SR #44 to B+D RR.

50k AW. 2nd tie Naf
crossing Planks



Edwooden sth in Stones

S.W. N.W. side
30" Maple

30°

spt. P.O.T.

Quad. Oak
S.W. side

S.W. side
12" Maple

6122'

517' 26"

2289'

Sta.

P.O.T.

Box + Sok set

30°

2890'

S.W. side
24" Oak

Tract line

Hosford Rd

2208.27'

67° 15"

L. Pine fl

Cross on Culvert
S.W. side

15'

15'

3026'

Cross on hill

SR #44

2289'

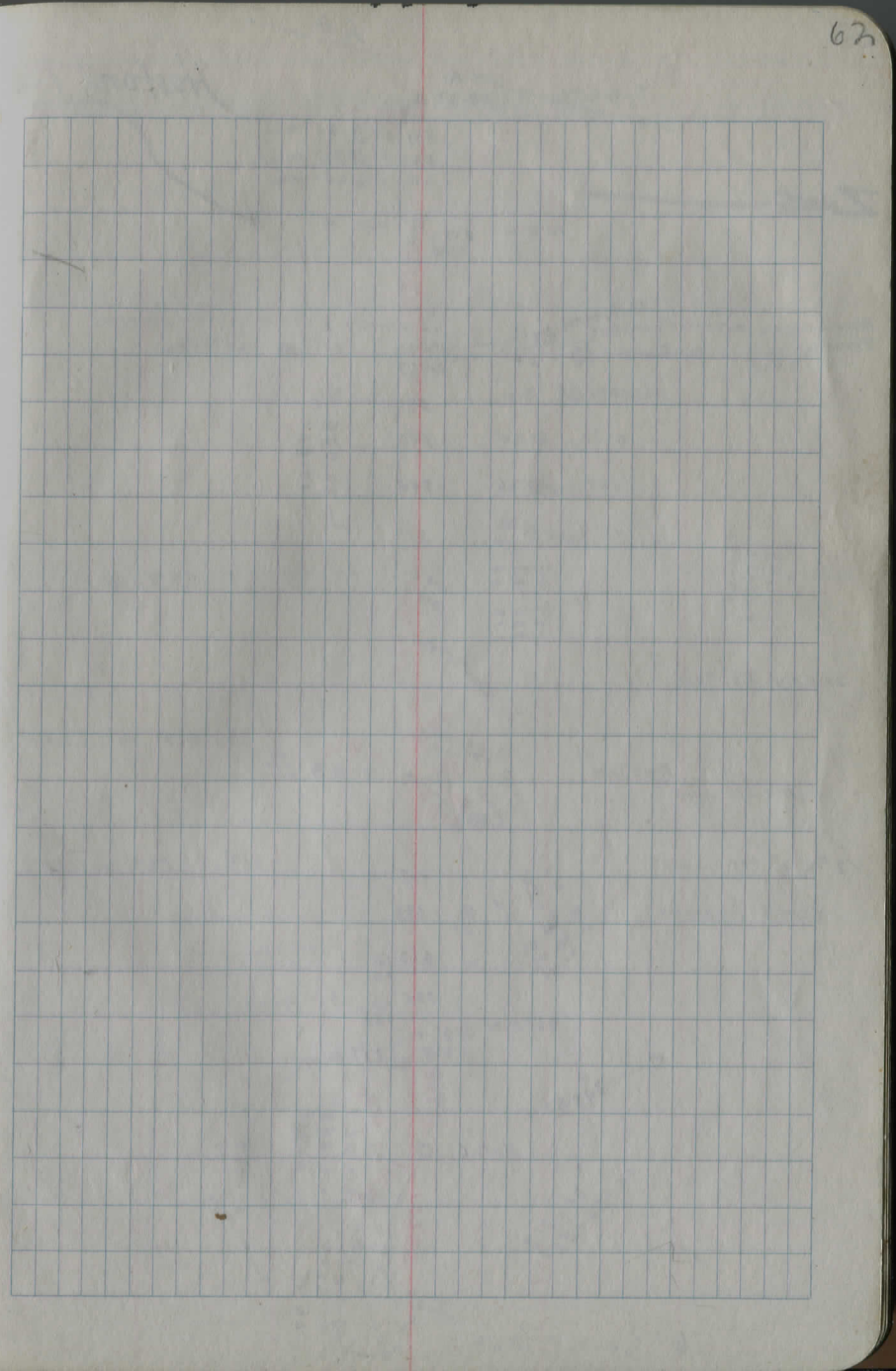
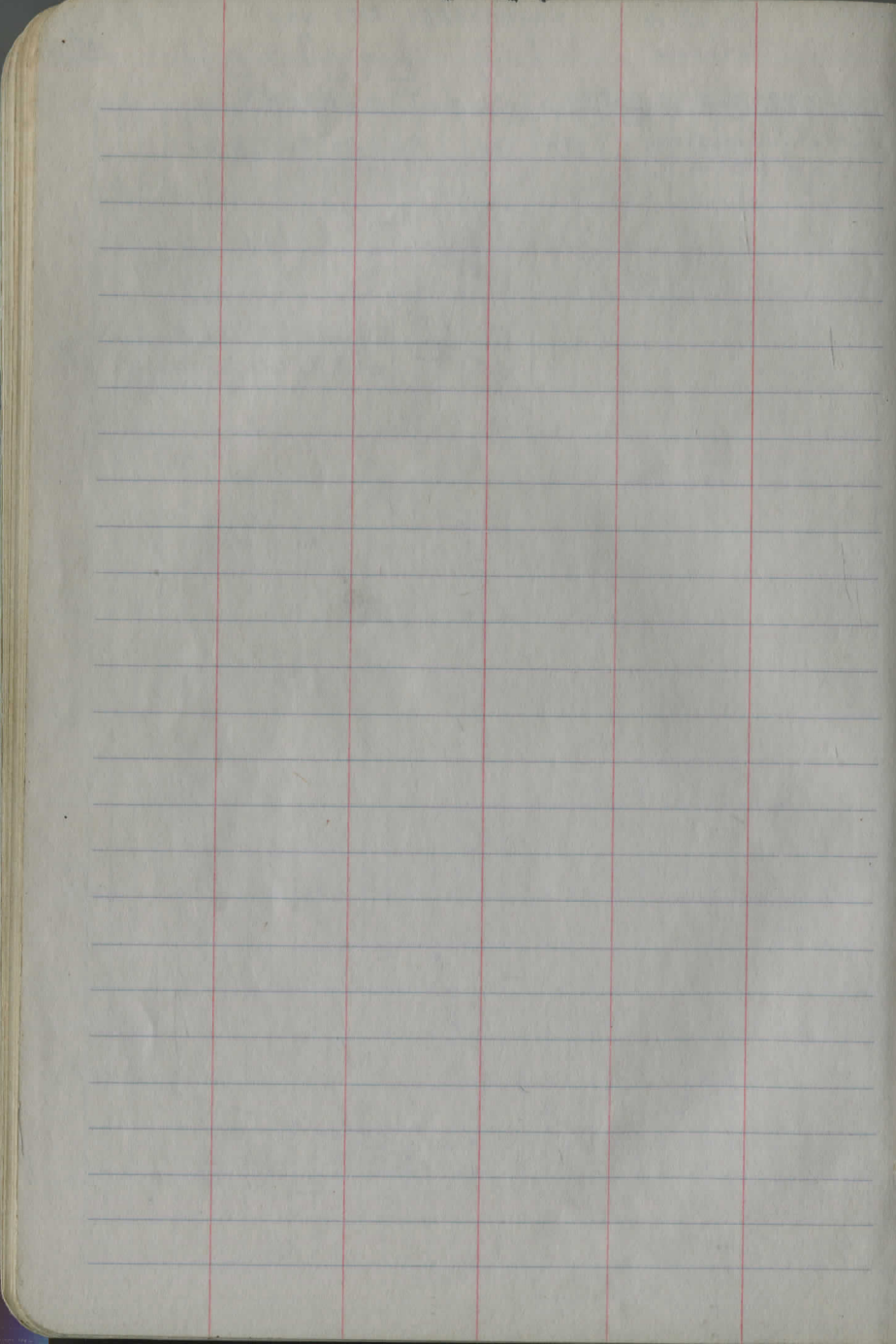
E

S.W. N.W.
Cor. R.R. Crossing
Sign post

2289'

2318'

S.W. S.E. cor.
of R.R. Crossing Sign Post



HOB □



176.56
353.52
984.80

507

0 519

WOLFORD RD. T.H.#78
chardon Twp.

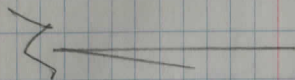
FD. 6/82 R.E.H., D.W.S. 1/2" REBAR 9" DN.

3175¹³

$$\text{ADD } .0052/c = 0.165 + .725 \text{ SAG}$$

$$2355.88 + 0.1225 + 0.048 = 2356.05$$

64



± Pville Ravenna

18.4 OBS
6/82
± 17.4

X in Wend culv
hdwl

17.48 X
29.93 Δ I.P.
(top)

X 16.61

X in Wend
culv hdwl

I. pin set
Fd. Oct 1969
J.A.T.

353.55

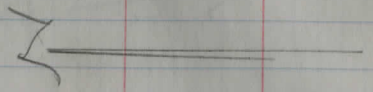
68.76

58 W SE root
30" Map

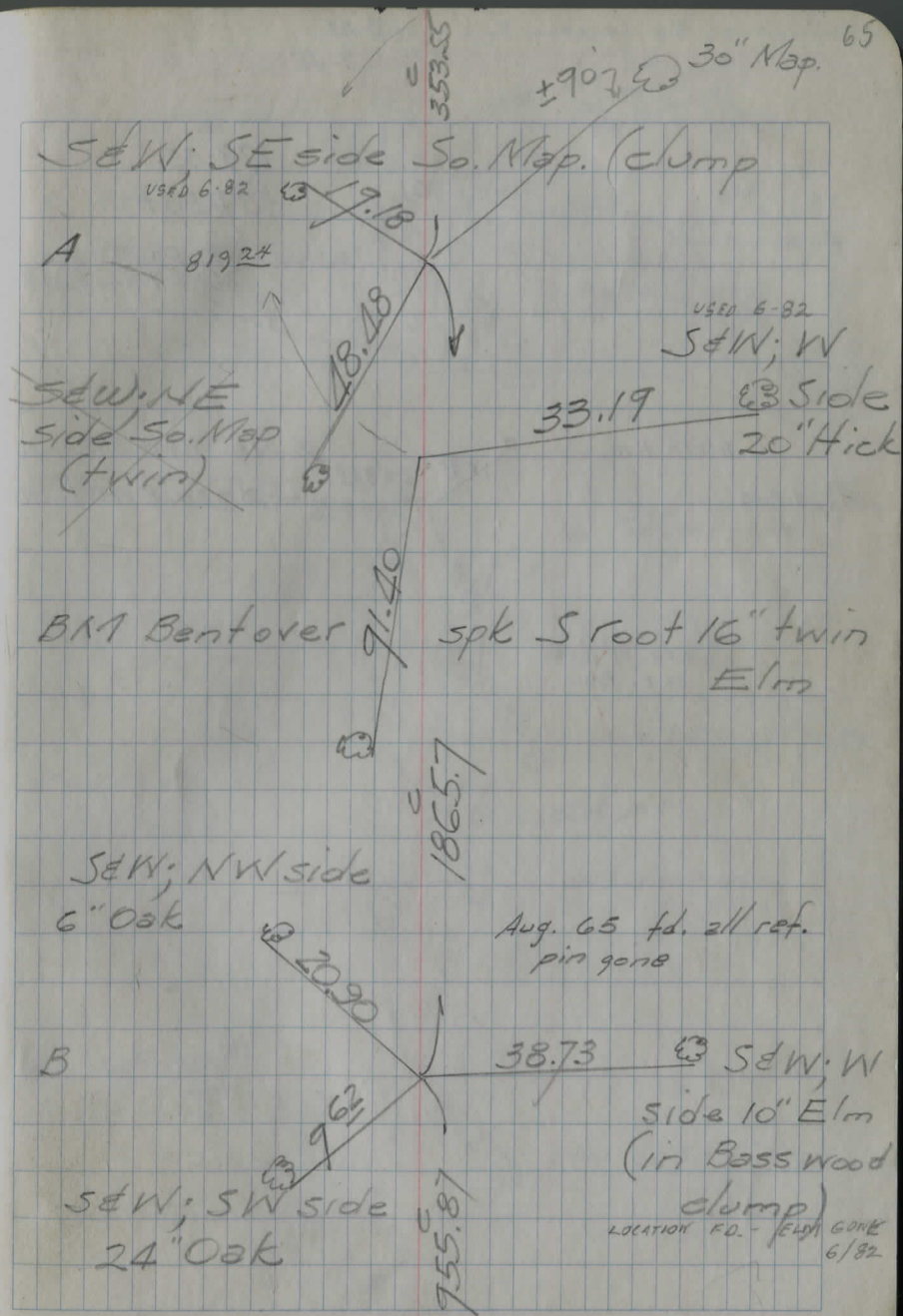
HOSFORD RD
Oct '48

~~P.O.T.
I.P. set in
N ditch~~

intermed P.O.T.
PIPE FD. 10" DN. 3' S OF DITCH E
6-82 REH, DWS
I.P. set in
N ditch

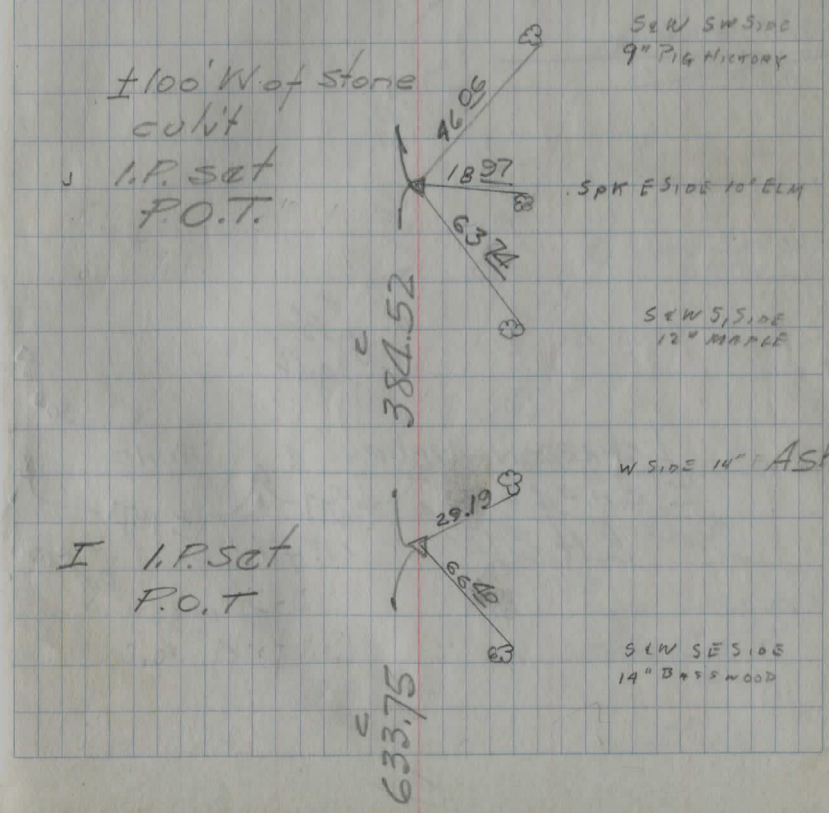
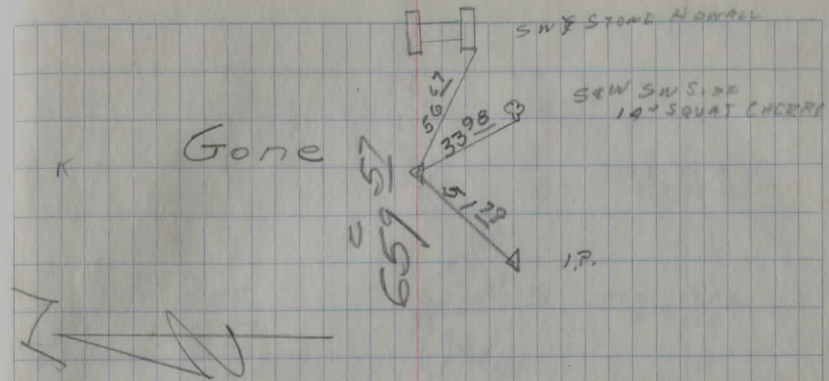


P.O.T.
I. Pin set 1' Not
N ditch

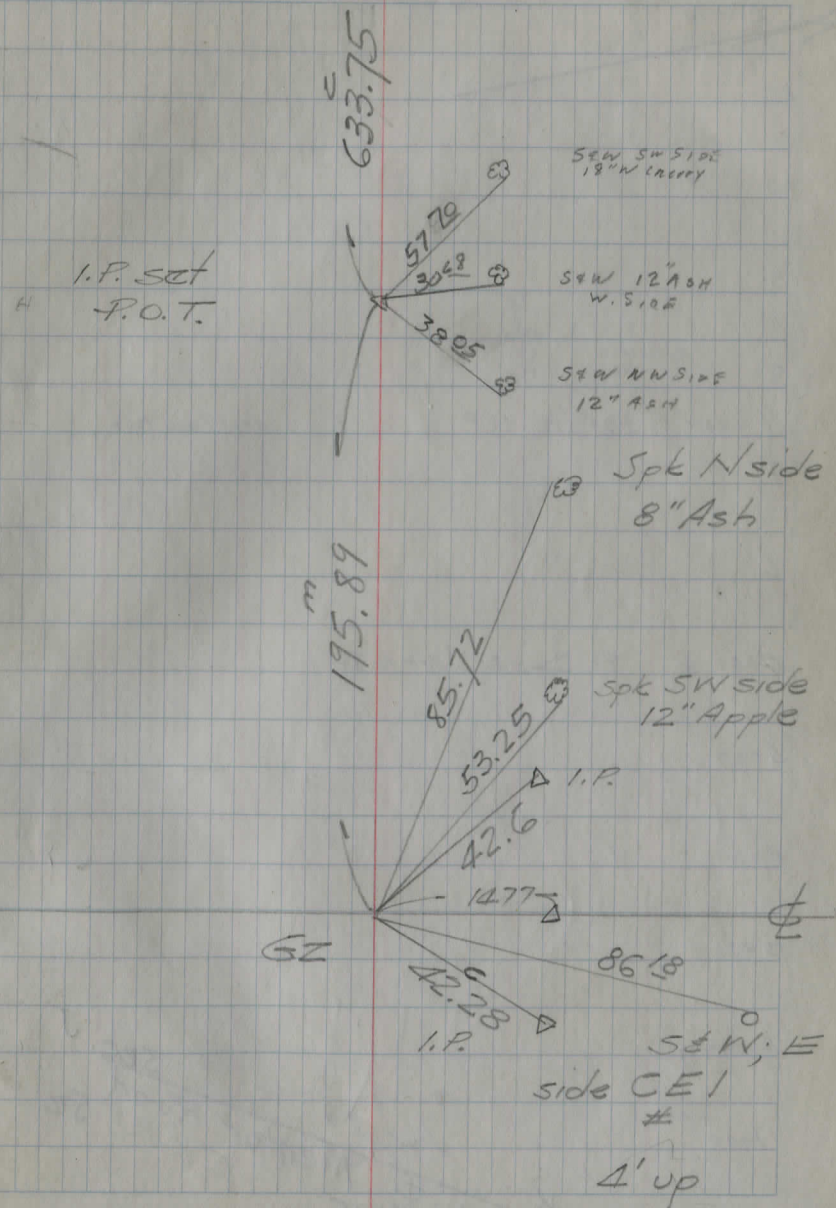
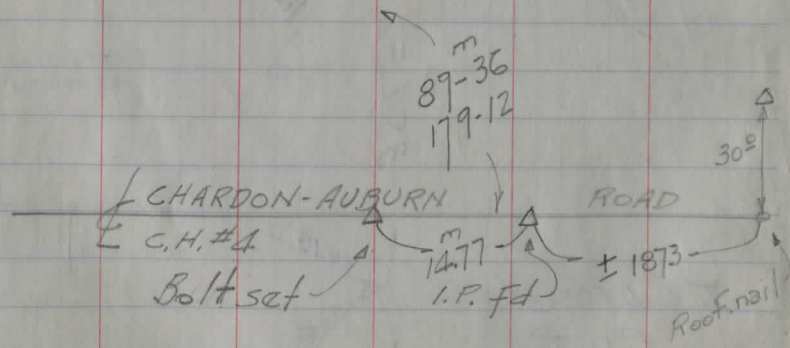


HOSFORD RD.

can see Cz &
Gz



Hasford Rd.



Griswold Road.
C.H. #79

July 11, 1949

69

± 11470

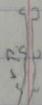
11

10

9

8

APPROXIMATE
DRIVE



± 40 ± 20' ± 12" C.I.P

HALL FOLL HOD

7



6

5+61 ± P.L. → ± 20° DEPT TO RT

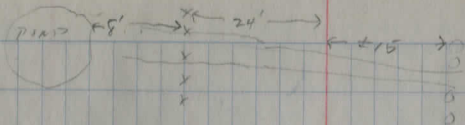
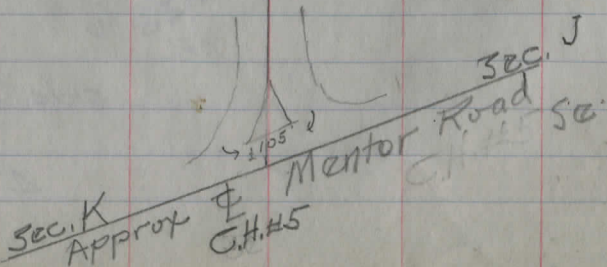
5+00

4+00

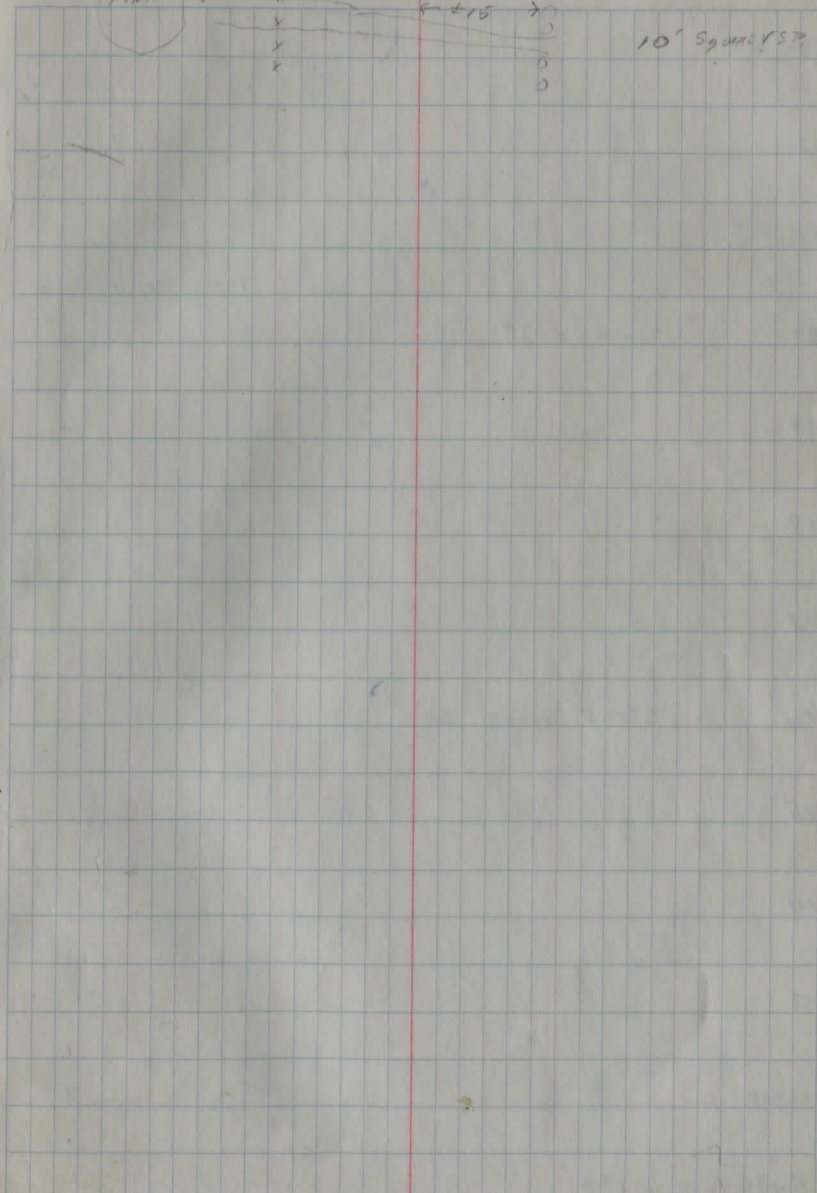
3+00

2+00

1+00



10' Spacing



Griswold Rd

23

22

21

20x60 MATHER DRIVE

20

DEPT ± 3°

19

18

17

16

6" VSP COVERT 30'

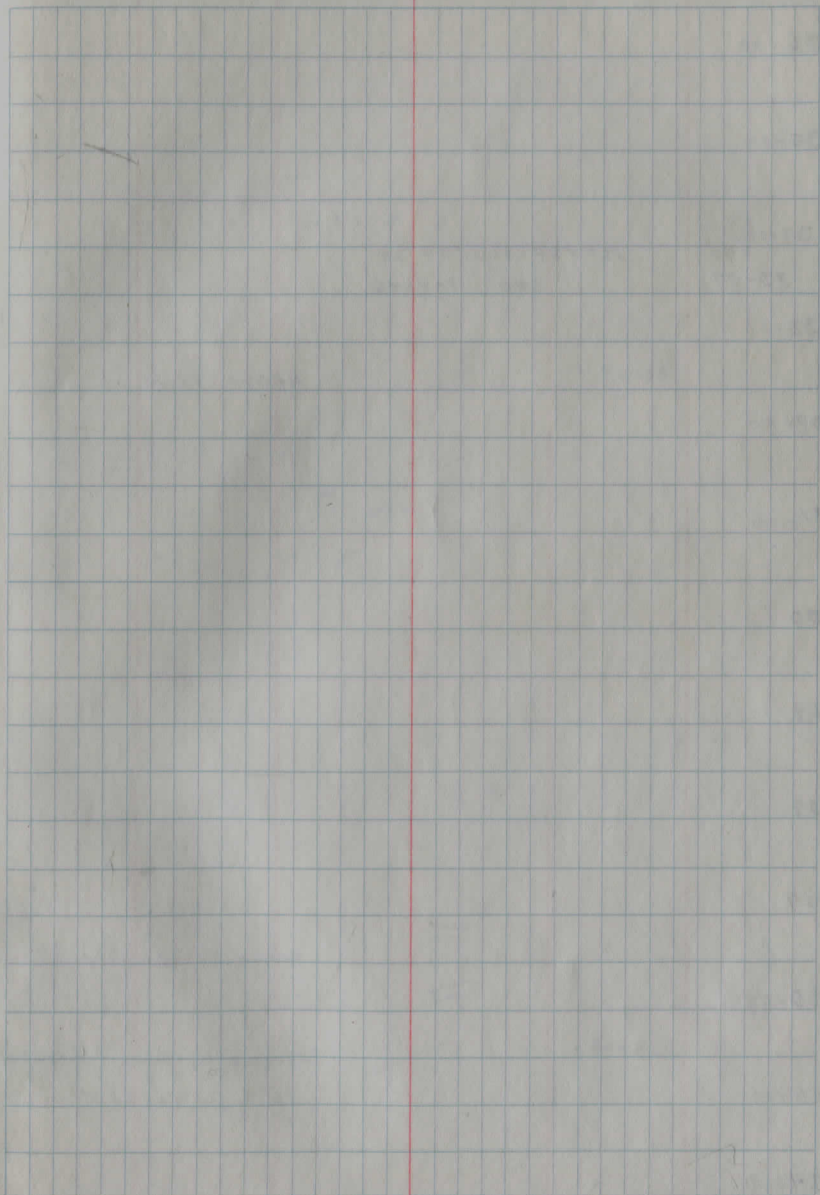
15

14

13

12+00

11+75 DEPT ± 1° 87



Griswold Rd

36+00

35+00

34+00

490

12" VSP CULVERT 24'

33+07

END PAVING

33+00

32+69

MARKER PINS

32+00

31+00

30

29

28

27

||

PAVING BEGINS SLY

||

26+00

25+09

PRODUCE H₂O LINE CROSSES

25+00

16" BORED W₂ CWT

24+00

49

48

47

46

Ditch 7' Up Beam
Tree lined

45

44

43

42+00

41+00

30' Culvert ^{10' x 12'}

15" Conc

110

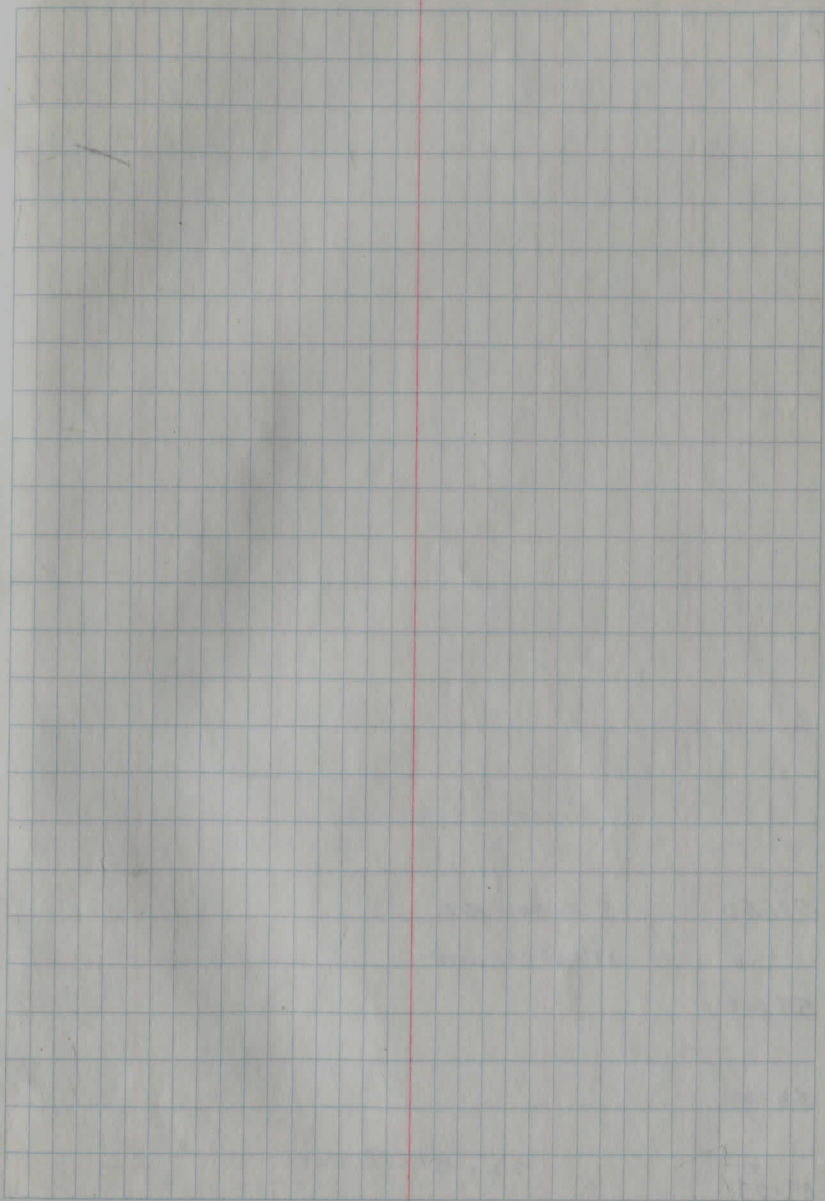
40

DRIVE

39

38

37



51+50 $\frac{1}{2}$ HERMITAGE

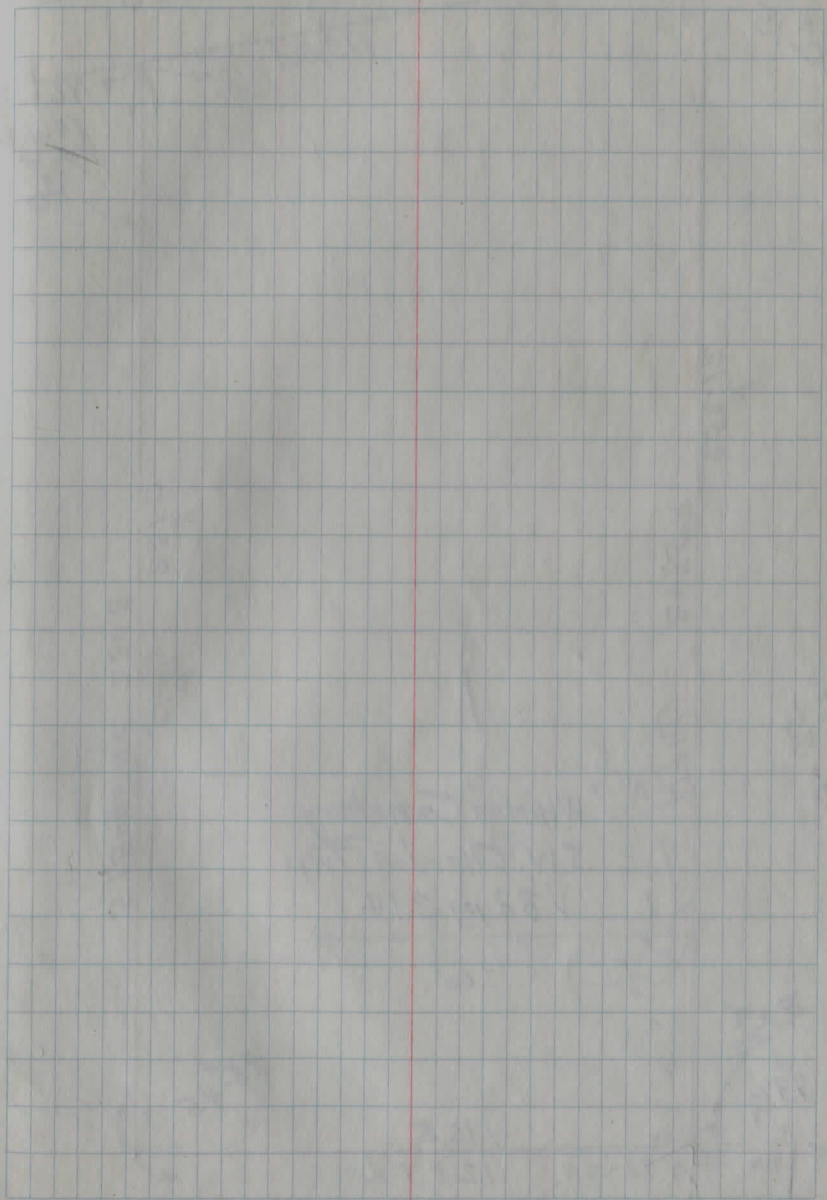
+ 16 27'-6" C.P. CULVERT

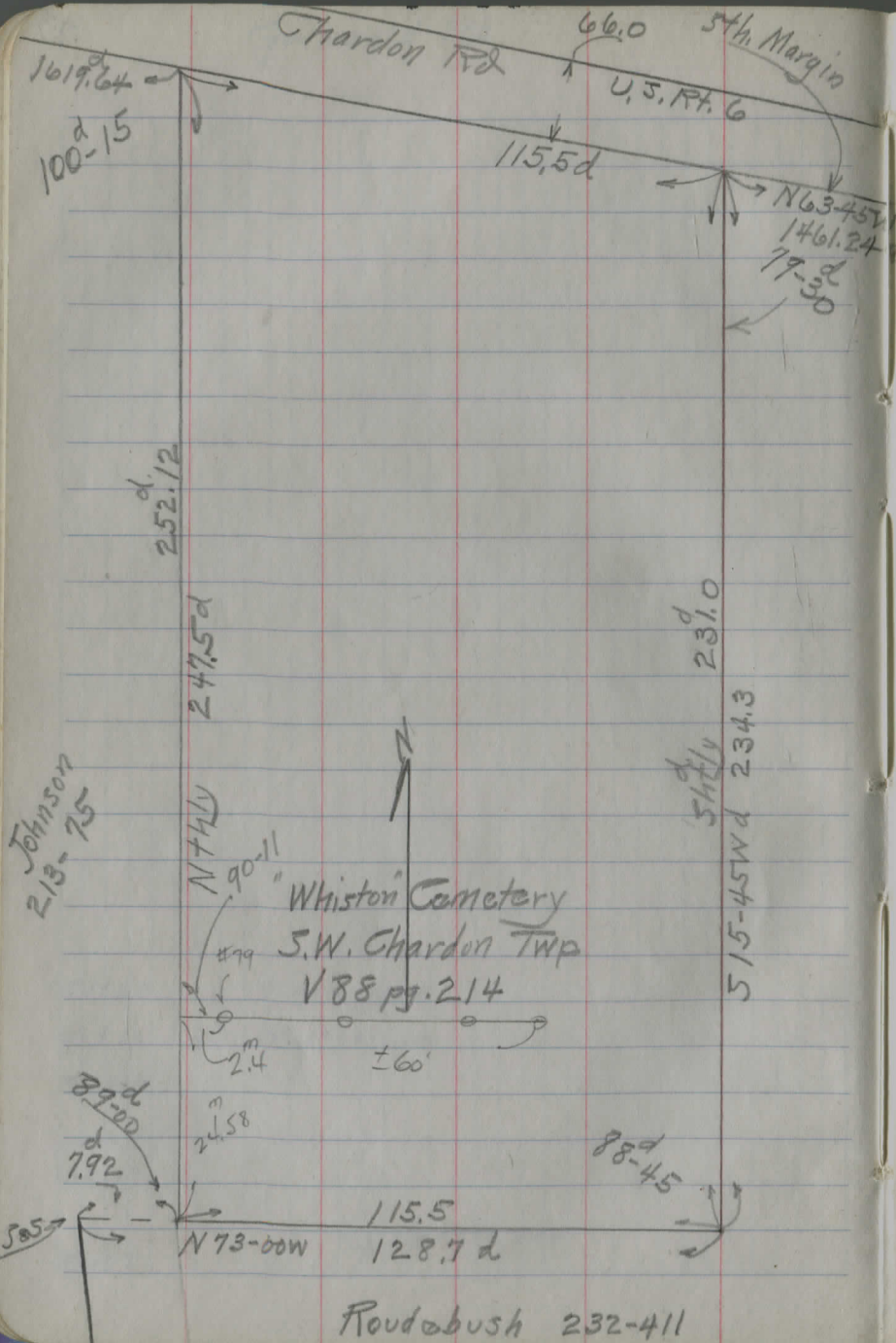
51+00

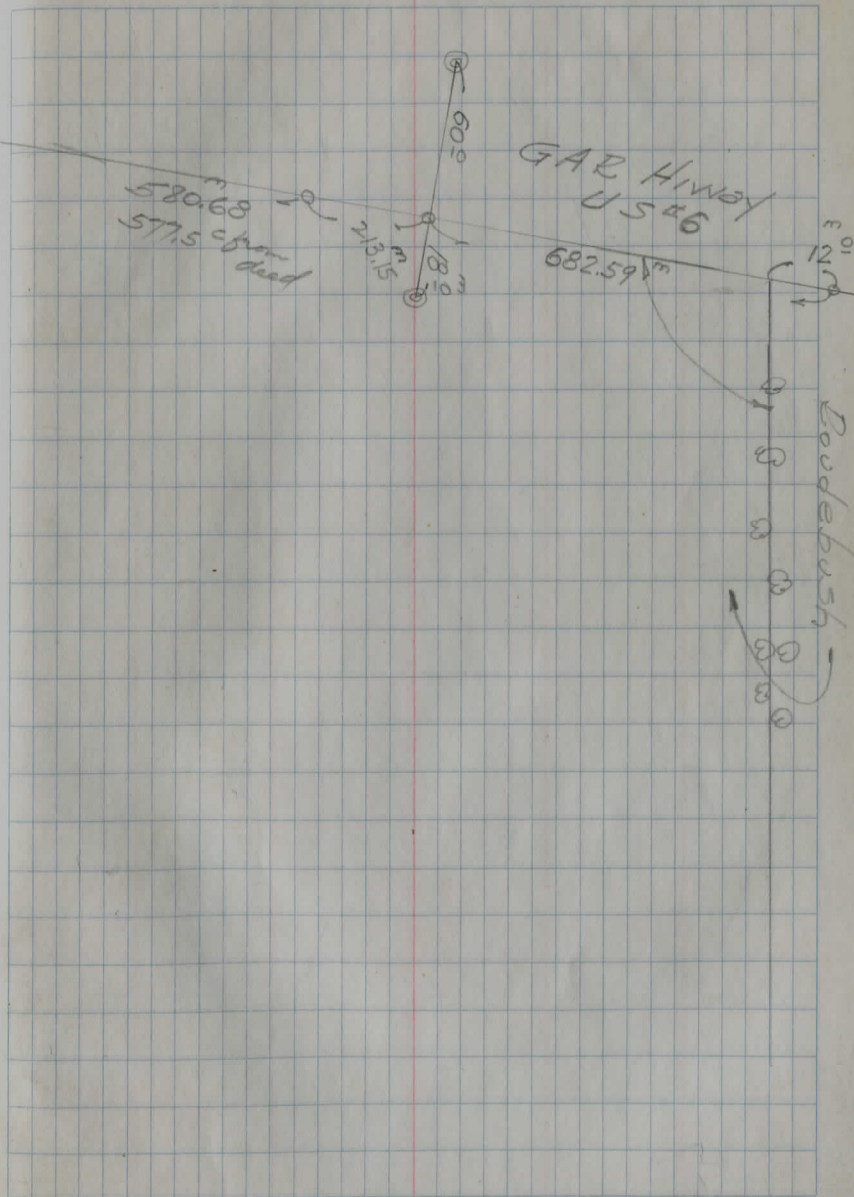
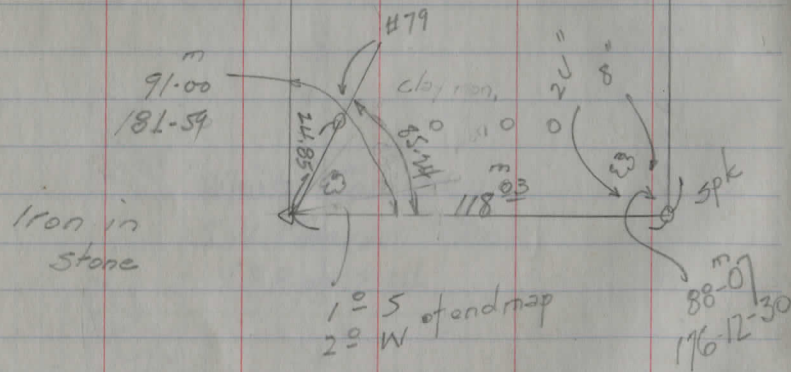
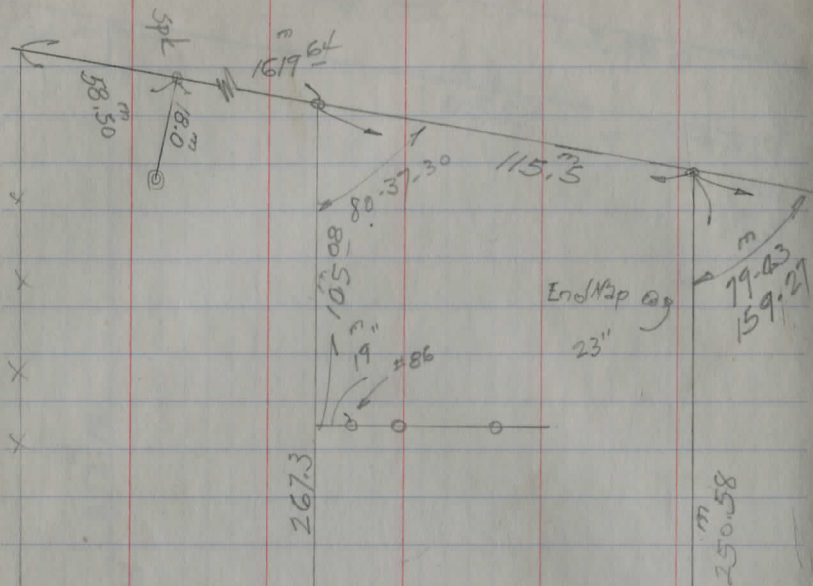
50+00

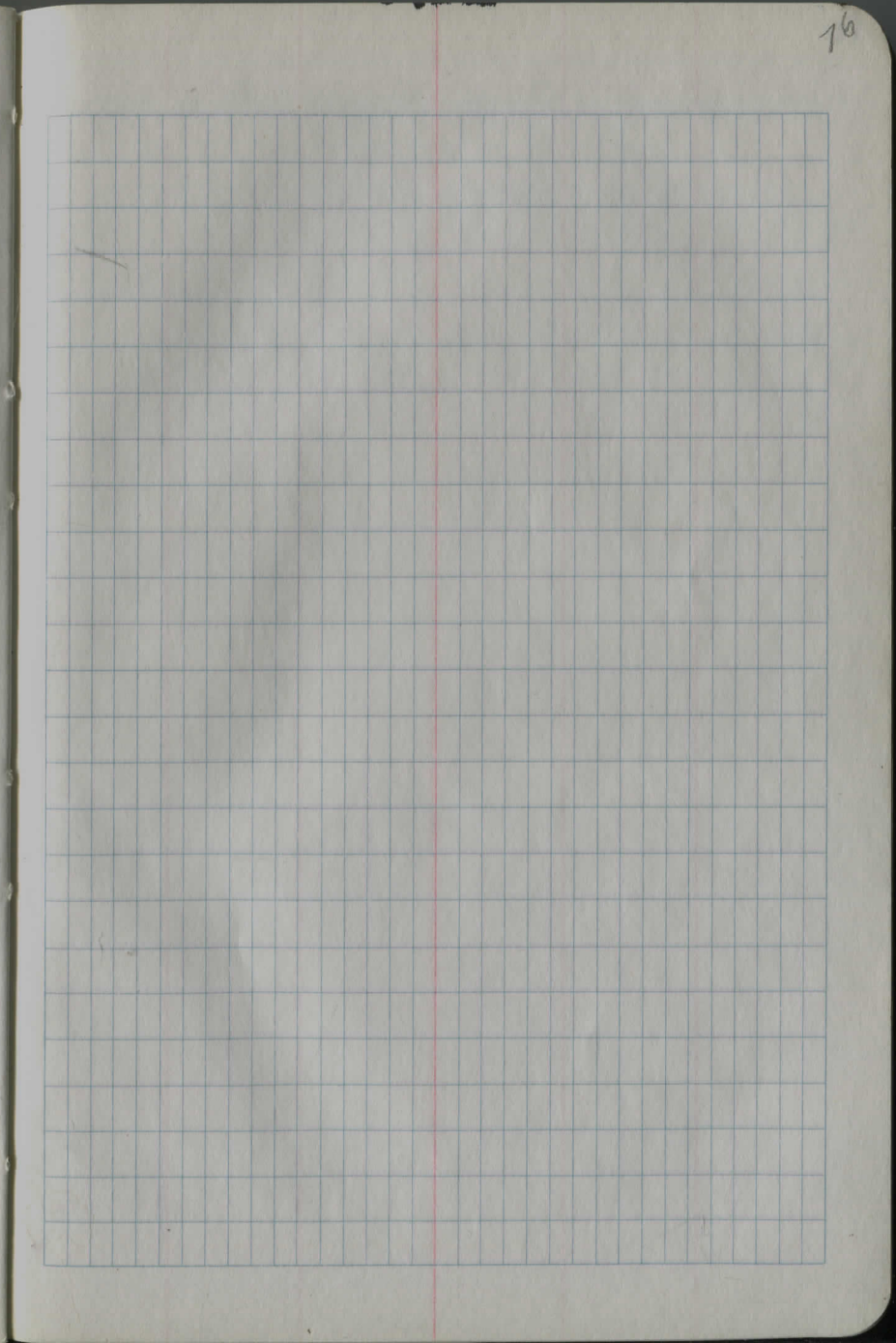
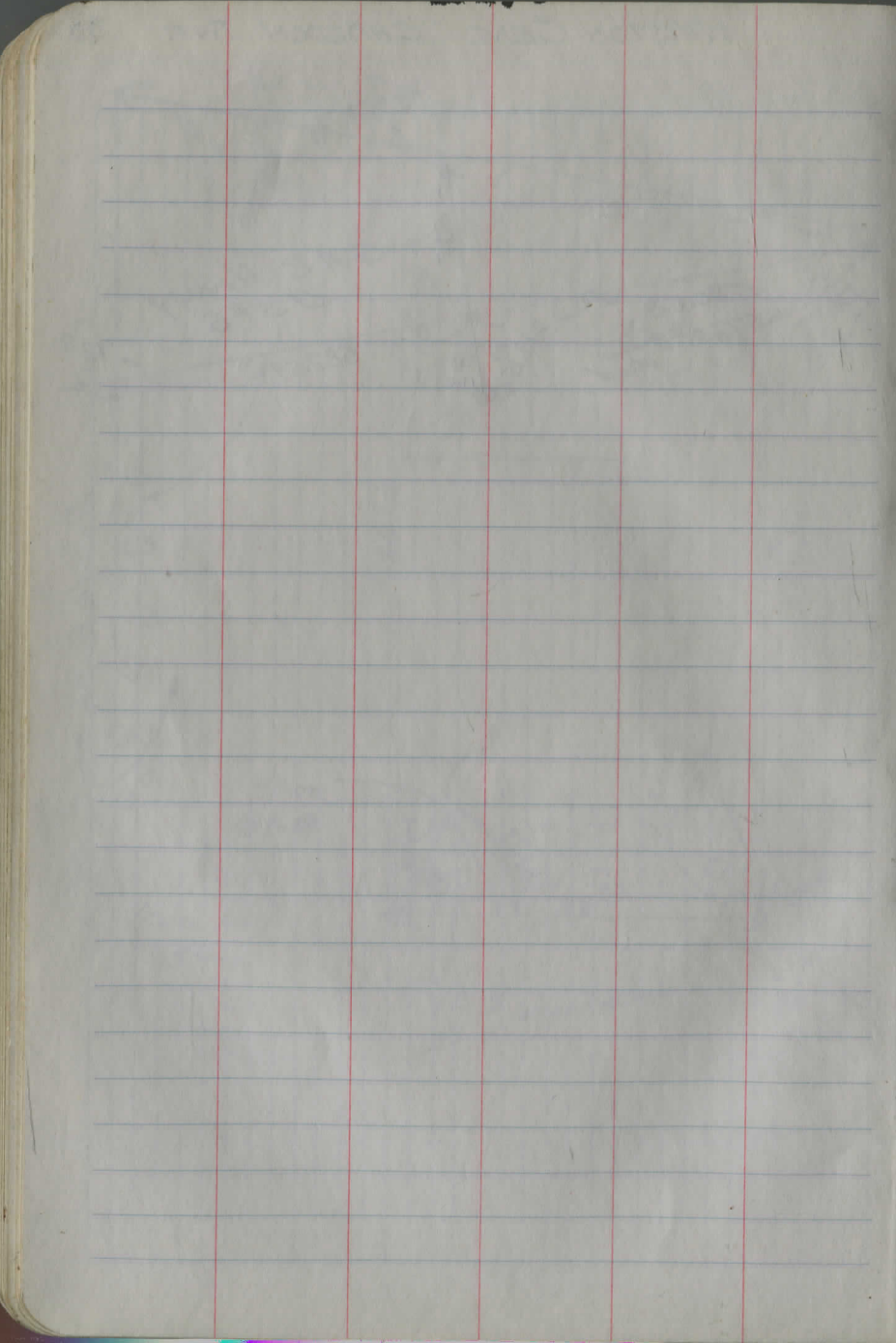
49+03

23'-15" C.P. G.S.V



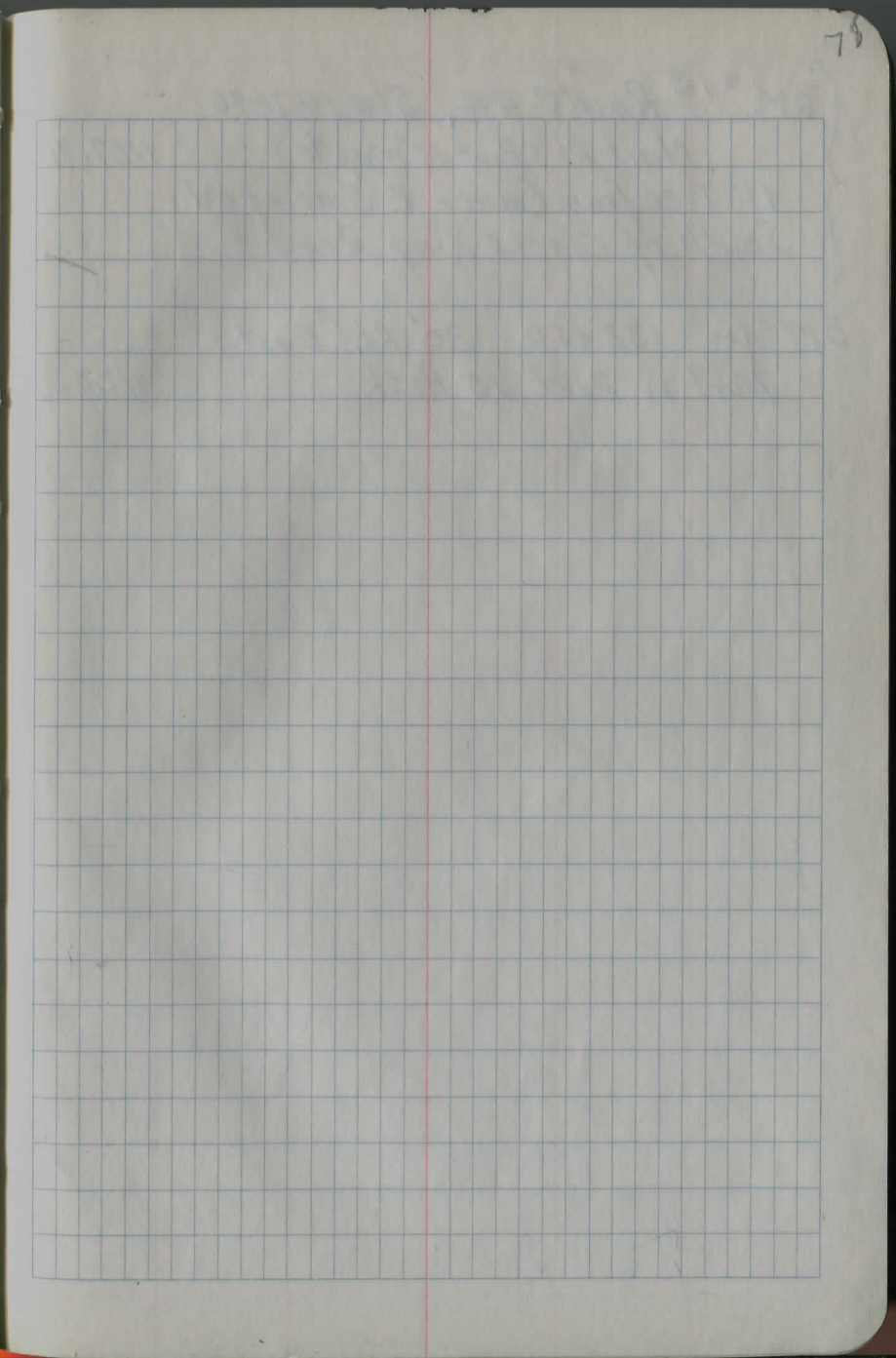
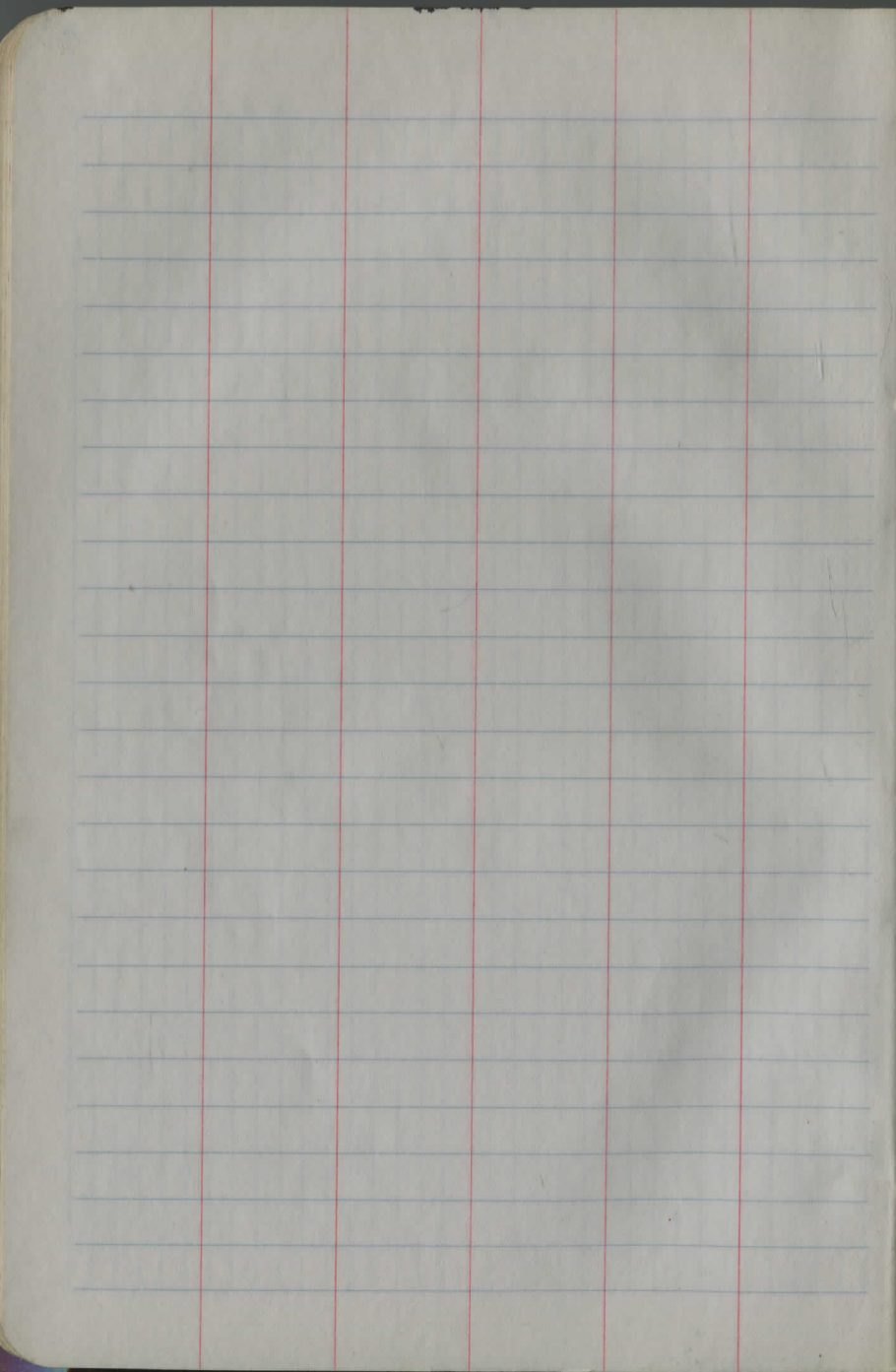






This page is a blank ledger with horizontal blue lines and four vertical red margin lines. The margins are located at approximately 10%, 20%, 80%, and 90% of the page width from the left edge.

This page is a blank ledger with a grid of blue lines and one vertical red margin line. The grid consists of 20 columns and 25 rows. The red margin line is located at approximately 10% of the page width from the left edge.



BM. #13 Route 44, Sta 147+90
Nail in S Root 12" Maple 1127.91
4th Tree from Corner E Side of Rd
South of Clarks King Road.

BM #12 133+50 30' Rt. (East)
Nail W Root 15 Hick 1133.29

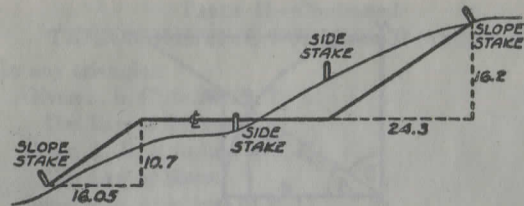


TABLE I.—DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING
SLOPE 1 1/4 TO 1. ROADWAY OF ANY WIDTH

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0.00	0.15	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	0
1	1.60	1.65	1.80	1.95	2.10	2.25	2.40	2.55	2.70	2.85	1
2	3.00	3.15	3.30	3.45	3.60	3.75	3.90	4.05	4.20	4.35	2
3	4.50	4.65	4.80	4.95	5.10	5.25	5.40	5.55	5.70	5.85	3
4	6.00	6.15	6.30	6.45	6.60	6.75	6.90	7.05	7.20	7.35	4
5	7.50	7.65	7.80	7.95	8.10	8.25	8.40	8.55	8.70	8.85	5
6	9.00	9.15	9.30	9.45	9.60	9.75	9.90	10.05	10.20	10.35	6
7	10.50	10.65	10.80	10.95	11.10	11.25	11.40	11.55	11.70	11.85	7
8	12.00	12.15	12.30	12.45	12.60	12.75	12.90	13.05	13.20	13.35	8
9	13.50	13.65	13.80	13.95	14.10	14.25	14.40	14.55	14.70	14.85	9
10	15.00	15.15	15.30	15.45	15.60	15.75	15.90	16.05	16.20	16.35	10
11	16.50	16.65	16.80	16.95	17.10	17.25	17.40	17.55	17.70	17.85	11
12	18.00	18.15	18.30	18.45	18.60	18.75	18.90	19.05	19.20	19.35	12
13	19.50	19.65	19.80	19.95	20.10	20.25	20.40	20.55	20.70	20.85	13
14	21.00	21.15	21.30	21.45	21.60	21.75	21.90	22.05	22.20	22.35	14
15	22.50	22.65	22.80	22.95	23.10	23.25	23.40	23.55	23.70	23.85	15
16	24.00	24.15	24.30	24.45	24.60	24.75	24.90	25.05	25.20	25.35	16
17	25.50	25.65	25.80	25.95	26.10	26.25	26.40	26.55	26.70	26.85	17
18	27.00	27.15	27.30	27.45	27.60	27.75	27.90	28.05	28.20	28.35	18
19	28.50	28.65	28.80	28.95	29.10	29.25	29.40	29.55	29.70	29.85	19
20	30.00	30.15	30.30	30.45	30.60	30.75	30.90	31.05	31.20	31.35	20
21	31.50	31.65	31.80	31.95	32.10	32.25	32.40	32.55	32.70	32.85	21
22	33.00	33.15	33.30	33.45	33.60	33.75	33.90	34.05	34.20	34.35	22
23	34.50	34.65	34.80	34.95	35.10	35.25	35.40	35.55	35.70	35.85	23
24	36.00	36.15	36.30	36.45	36.60	36.75	36.90	37.05	37.20	37.35	24
25	37.50	37.65	37.80	37.95	38.10	38.25	38.40	38.55	38.70	38.85	25
26	39.00	39.15	39.30	39.45	39.60	39.75	39.90	40.05	40.20	40.35	26
27	40.50	40.65	40.80	40.95	41.10	41.25	41.40	41.55	41.70	41.85	27
28	42.00	42.15	42.30	42.45	42.60	42.75	42.90	43.05	43.20	43.35	28
29	43.50	43.65	43.80	43.95	44.10	44.25	44.40	44.55	44.70	44.85	29
30	45.00	45.15	45.30	45.45	45.60	45.75	45.90	46.05	46.20	46.35	30
31	46.50	46.65	46.80	46.95	47.10	47.25	47.40	47.55	47.70	47.85	31
32	48.00	48.15	48.30	48.45	48.60	48.75	48.90	49.05	49.20	49.35	32
33	49.50	49.65	49.80	49.95	50.10	50.25	50.40	50.55	50.70	50.85	33
34	51.00	51.15	51.30	51.45	51.60	51.75	51.90	52.05	52.20	52.35	34
35	52.50	52.65	52.80	52.95	53.10	53.25	53.40	53.55	53.70	53.85	35
36	54.00	54.15	54.30	54.45	54.60	54.75	54.90	55.05	55.20	55.35	36
37	55.50	55.65	55.80	55.95	56.10	56.25	56.40	56.55	56.70	56.85	37
38	57.00	57.15	57.30	57.45	57.60	57.75	57.90	58.05	58.20	58.35	38
39	58.50	58.65	58.80	58.95	59.10	59.25	59.40	59.55	59.70	59.85	39
40	60.00	60.15	60.30	60.45	60.60	60.75	60.90	61.05	61.20	61.35	40
41	61.50	61.65	61.80	61.95	62.10	62.25	62.40	62.55	62.70	62.85	41
42	63.00	63.15	63.30	63.45	63.60	63.75	63.90	64.05	64.20	64.35	42
43	64.50	64.65	64.80	64.95	65.10	65.25	65.40	65.55	65.70	65.85	43
44	66.00	66.15	66.30	66.45	66.60	66.75	66.90	67.05	67.20	67.35	44
45	67.50	67.65	67.80	67.95	68.10	68.25	68.40	68.55	68.70	68.85	45
46	69.00	69.15	69.30	69.45	69.60	69.75	69.90	70.05	70.20	70.35	46
47	70.50	70.65	70.80	70.95	71.10	71.25	71.40	71.55	71.70	71.85	47
48	72.00	72.15	72.30	72.45	72.60	72.75	72.90	73.05	73.20	73.35	48
49	73.50	73.65	73.80	73.95	74.10	74.25	74.40	74.55	74.70	74.85	49
50	75.00	75.15	75.30	75.45	75.60	75.75	75.90	76.05	76.20	76.35	50

Computed by L. Leland Locke.

TABLE No. 1

Distance of slope stake from side or shoulder stake for any width roadway, slope 1 1/4 to 1. If ground is nearly level, the cut or fill at side stake is located by the double entry method in left column and top row. The number in body of table in same row and column gives distance from side stake to slope stake. If ground is not level estimate the difference in elevation between the side stake and slope stake, lower target by this amount if cut, elevate if fill. Add this amount to cut or fill and find distance in table. Set up rod at this point, and line of sight should cut target. If it does not make the slight adjustment necessary.

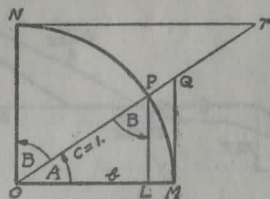


TABLE II

TRIGONOMETRIC FORMULAE

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

$$R = OB = c = 1$$

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

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

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

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

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

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

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

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

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

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

$$\sin \frac{1}{2}A = \sqrt{\frac{1 - \cos A}{2}} \quad \cos \frac{1}{2}A = \sqrt{\frac{1 + \cos A}{2}}$$

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

$$\text{Law of Sines} \quad \frac{\sin A}{a} = \frac{\sin B}{B} = \frac{\sin C}{C}$$

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

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

TABLE II—Continued
TRIGONOMETRIC FORMULAE (continued)

In any triangle:

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

Use Law of Tangents.

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

Use Law of Sines.

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

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

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

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

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

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

Area of a triangle:

$$\text{Area} = \frac{1}{2} ab \sin C$$

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

PRISMOIDAL FORMULA

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

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

TABLE III
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	.10000

TABLE IV
INCHES IN DECIMALS OF A FOOT

$\frac{1}{16}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
.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

TABLE V.—RADII, ORDINATES AND DEFLECTIONS

Deg.	Radius	Mid. Ord.	Tan. Offset	Def. for 1 Foot	Deg.	Radius	Mid. Ord.	Tan. Offset	Def. for 1 Foot		
0°	10'	34377.5	.036	.145	0.05'	7°	819.02	1.528	6.105	2.10'	
	20	17188.8	.073	.291	0.10		20'	781.84	1.600	6.395	2.20
	30	11459.2	.109	.436	0.15		30	764.49	1.637	6.540	2.25
	40	8594.42	.145	.582	0.20		40	747.89	1.673	6.685	2.30
	50	6875.55	.182	.727	0.25						
1		5729.65	.218	.873	0.30	8	716.78	1.746	6.976	2.40	
	10	4911.15	.255	1.018	0.35		20	688.16	1.819	7.266	2.50
	20	4297.28	.291	1.164	0.40		30	674.69	1.855	7.411	2.55
	30	3819.83	.327	1.309	0.45		40	661.74	1.892	7.556	2.60
	40	3437.87	.364	1.454	0.50						
	50	3125.36	.400	1.600	0.55	9	637.28	1.965	7.846	2.70	
2		2864.93	.436	1.745	0.60		20	614.56	2.037	8.136	2.80
	10	2644.58	.473	1.891	0.65		30	603.80	2.074	8.281	2.85
	20	2455.70	.509	2.036	0.70		40	593.42	2.110	8.426	2.90
	30	2292.01	.545	2.181	0.75	10	573.69	2.183	8.716	3.00	
	40	2148.79	.582	2.327	0.80		30	546.44	2.292	9.150	3.15
	50	2022.41	.618	2.472	0.85		30	521.67	2.402	9.585	3.30
3		1910.08	.655	2.618	0.90		30	499.06	2.511	10.02	3.45
	10	1809.57	.691	2.763	0.95		12	478.34	2.620	10.45	3.60
	20	1719.12	.727	2.908	1.00		30	459.28	2.730	10.89	3.75
	30	1637.28	.764	3.054	1.05		13	441.68	2.839	11.32	3.90
	40	1562.88	.800	3.199	1.10		30	425.40	2.949	11.75	4.05
	50	1494.95	.836	3.345	1.15		14	410.28	3.058	12.18	4.20
4		1432.69	.873	3.490	1.20		30	396.20	3.168	12.62	4.35
	10	1375.40	.909	3.635	1.25		15	383.07	3.277	13.05	4.50
	20	1322.53	.945	3.718	1.30		30	370.78	3.387	13.49	4.65
	30	1273.57	.982	3.926	1.35		16	359.27	3.496	13.92	4.80
	40	1223.11	1.018	4.071	1.40		30	348.45	3.606	14.35	4.95
	50	1185.78	1.055	4.217	1.45		17	338.27	3.716	14.78	5.10
5		1146.28	1.091	4.362	1.50		18	319.62	3.935	15.64	5.40
	10	1109.33	1.127	4.507	1.55		19	302.94	4.155	16.51	5.70
	20	1074.68	1.164	4.653	1.60		20	287.94	4.374	17.37	6.00
	30	1042.14	1.200	4.798	1.65		21	274.37	4.594	18.22	6.30
	40	1011.51	1.237	4.943	1.70		22	262.04	4.814	19.08	6.60
	50	982.64	1.273	5.088	1.75		23	250.79	5.035	19.94	6.90
6		955.37	1.309	5.234	1.80		24	240.49	5.255	20.79	7.20
	10	929.57	1.346	5.379	1.85		25	231.01	5.476	21.64	7.50
	20	905.13	1.382	5.524	1.90		26	222.27	5.697	22.50	7.80
	30	881.95	1.418	5.669	1.95		27	214.18	5.918	23.35	8.10
	40	859.92	1.455	5.814	2.00		28	206.68	6.139	24.19	8.40
							29	199.70	6.360	25.04	8.70
							30	193.18	6.583	25.88	9.00

Note. Chord Deflection = 2 times tangent deflection.

TABLE VI.—TANGENTS AND EXTERNALS TO A 1° CURVE

Central Angle	Tangent	External	Central Angle	Tangent	External	Central Angle	Tangent	External	
1°	50.00	.22	11°	551.70	26.50	21°	1061.9	97.57	
	10'	58.34	.30	10'	560.11	27.31	10'	1070.6	99.16
	20	66.67	.39	20	568.53	28.14	20	1079.2	100.75
	30	75.01	.49	30	576.95	28.97	30	1087.8	102.35
	40	83.34	.61	40	585.36	29.82	40	1096.4	103.97
	50	91.68	.73	50	593.79	30.68	50	1105.1	105.60
2	100.01	.87	12	602.21	31.56	22	1113.7	107.24	
	10	108.35	1.02	10	610.64	32.45	10	1122.4	108.90
	20	116.68	1.19	20	619.07	33.35	20	1131.0	110.57
	30	125.02	1.36	30	627.50	34.26	30	1139.7	112.25
	40	133.36	1.55	40	635.93	35.18	40	1148.4	113.95
	50	141.70	1.75	50	644.37	36.12	50	1157.0	115.66
3	150.04	1.96	13	652.81	37.07	23	1165.7	117.38	
	10	158.38	2.19	10	661.25	38.03	10	1174.4	119.12
	20	166.72	2.43	20	669.70	39.01	20	1183.1	120.87
	30	175.06	2.67	30	678.15	39.99	30	1191.8	122.63
	40	183.40	2.93	40	686.60	40.99	40	1200.5	124.41
	50	191.74	3.21	50	695.06	42.00	50	1209.2	126.20
4	200.08	3.49	14	703.51	43.03	24	1217.9	128.00	
	10	208.43	3.79	10	711.97	44.07	10	1226.6	129.82
	20	216.77	4.10	20	720.44	45.12	20	1235.3	131.65
	30	225.12	4.42	30	728.90	46.18	30	1244.0	133.50
	40	233.47	4.76	40	737.37	47.25	40	1252.8	135.35
	50	241.81	5.10	50	745.85	48.34	50	1261.5	137.23
5	250.16	5.46	15	754.32	49.44	25	1270.2	139.11	
	10	258.51	5.83	10	762.80	50.55	10	1279.0	141.01
	20	266.86	6.21	20	771.29	51.68	20	1287.7	142.93
	30	275.21	6.61	30	779.77	52.89	30	1296.5	144.85
	40	283.57	7.01	40	788.26	53.97	40	1305.3	146.79
	50	291.92	7.43	50	796.75	55.13	50	1314.0	148.75
6	300.28	7.86	16	805.25	56.31	26	1322.8	150.71	
	10	308.64	8.31	10	813.75	57.50	10	1331.6	152.69
	20	316.99	8.76	20	822.25	58.70	20	1340.4	154.69
	30	325.35	9.23	30	830.76	59.91	30	1349.2	156.70
	40	333.71	9.71	40	839.27	61.14	40	1358.0	158.72
	50	342.08	10.20	50	847.78	62.38	50	1366.8	160.76
7	350.44	10.71	17	856.30	63.63	27	1375.6	162.81	
	10	358.81	11.22	10	864.82	64.90	10	1384.4	164.86
	20	367.17	11.75	20	873.35	66.18	20	1393.2	166.95
	30	375.54	12.29	30	881.88	67.47	30	1402.0	169.04
	40	383.91	12.85	40	890.41	68.77	40	1410.9	171.15
	50	392.28	13.41	50	898.95	70.09	50	1419.7	173.27
8	400.66	13.99	18	907.49	71.42	28	1428.6	175.41	
	10	409.03	14.58	10	916.03	72.76	10	1437.4	177.55
	20	417.41	15.18	20	924.58	74.12	20	1446.3	179.72
	30	425.79	15.80	30	933.13	75.49	30	1455.1	181.89
	40	434.17	16.43	40	941.69	76.86	40	1464.0	184.08
	50	442.55	17.07	50	950.25	78.26	50	1472.9	186.29
9	450.93	17.72	19	958.81	79.67	29	1481.8	188.51	
	10	459.32	18.38	10	967.38	81.09	10	1490.7	190.74
	20	467.71	19.06	20	975.96	82.53	20	1499.6	192.99
	30	476.10	19.75	30	984.53	83.97	30	1508.5	195.25
	40	484.49	20.45	40	993.12	85.43	40	1517.4	197.53
	50	492.88	21.16	50	1001.7	86.90	50	1526.3	199.82
10	501.28	21.89	20	1010.3	88.39	30	1535.3	202.12	
	10	509.68	22.62	10	1018.9	89.89	10	1544.2	204.44
	20	518.08	23.38	20	1027.5	91.40	20	1553.1	206.77
	30	526.48	24.14	30	1036.1	92.92	30	1562.1	209.12
	40	534.89	24.91	40	1044.7	94.46	40	1571.0	211.48
	50	543.29	25.70	50	1053.3	96.01	50	1580.0	213.86

TABLE VI.—TANGENTS AND EXTERNALS TO A 1° CURVE

Central Angle	Tangent	External	Central Angle	Tangent	External	Central Angle	Tangent	External
31°								
10'	1539.0	216.3	41°	2142.2	387.4	51°	2732.9	618.4
20'	1598.0	218.7	10'	2151.7	390.7	10'	2743.1	622.8
30'	1606.9	221.1	20'	2161.2	394.1	20'	2753.4	627.2
40'	1615.9	223.5	30'	2170.8	397.4	30'	2763.7	631.7
50'	1624.9	226.0	40'	2180.3	400.8	40'	2773.9	636.2
	1633.9	228.4	50'	2189.9	404.2	50'	2784.2	640.7
32°								
10'	1643.0	230.9	42°	2199.4	407.6	52°	2794.5	645.2
20'	1652.0	233.4	10'	2209.0	411.1	10'	2804.9	649.7
30'	1661.0	235.9	20'	2218.6	414.5	20'	2815.2	654.3
40'	1670.0	238.4	30'	2228.1	418.0	30'	2825.6	658.8
50'	1679.1	241.0	40'	2237.7	421.4	40'	2835.9	663.4
	1688.1	243.5	50'	2247.3	425.0	50'	2846.3	668.0
33°								
10'	1697.2	246.1	43°	2257.0	428.5	53°	2856.7	672.7
20'	1706.3	248.7	10'	2266.6	432.0	10'	2867.1	677.3
30'	1715.3	251.3	20'	2276.2	435.6	20'	2877.5	682.0
40'	1724.4	253.9	30'	2285.9	439.2	30'	2888.0	686.7
50'	1733.5	256.5	40'	2295.6	442.8	40'	2898.4	691.4
	1742.6	259.1	50'	2305.2	446.4	50'	2908.9	696.1
34°								
10'	1751.7	261.8	44°	2314.9	450.0	54°	2919.4	700.9
20'	1760.8	264.5	10'	2324.6	453.6	10'	2929.9	705.7
30'	1770.0	267.2	20'	2334.3	457.3	20'	2940.4	710.5
40'	1779.1	269.9	30'	2344.1	461.0	30'	2951.0	715.3
50'	1788.2	272.6	40'	2353.8	464.6	40'	2961.5	720.1
	1797.4	275.3	50'	2363.5	468.4	50'	2972.1	725.0
35°								
10'	1806.6	278.1	45°	2373.3	472.1	55°	2982.7	729.9
20'	1815.7	280.8	10'	2383.1	475.8	10'	2993.3	734.8
30'	1824.9	283.6	20'	2392.8	479.6	20'	3003.9	739.7
40'	1834.1	286.4	30'	2402.6	483.3	30'	3014.5	744.6
50'	1843.3	289.2	40'	2412.4	487.2	40'	3025.2	749.6
	1852.5	292.0	50'	2422.3	491.0	50'	3035.8	754.6
36°								
10'	1861.7	294.9	46°	2432.1	494.8	56°	3046.5	759.6
20'	1870.9	297.7	10'	2441.9	498.7	10'	3057.2	764.6
30'	1880.1	300.6	20'	2451.8	502.5	20'	3067.9	769.7
40'	1889.4	303.5	30'	2461.7	506.4	30'	3078.7	774.7
50'	1898.6	306.4	40'	2471.5	510.3	40'	3089.4	779.8
	1907.9	309.3	50'	2481.4	514.3	50'	3100.2	784.9
37°								
10'	1917.1	312.2	47°	2491.3	518.2	57°	3110.9	790.1
20'	1926.4	315.2	10'	2501.2	522.2	10'	3121.7	795.2
30'	1935.7	318.1	20'	2511.2	526.1	20'	3132.6	800.4
40'	1945.0	321.1	30'	2521.1	530.1	30'	3143.4	805.6
50'	1954.3	324.1	40'	2531.1	534.2	40'	3154.2	810.9
	1963.6	327.1	50'	2541.0	538.2	50'	3165.1	816.1
38°								
10'	1972.9	330.2	48°	2551.0	542.2	58°	3176.0	821.4
20'	1982.2	333.2	10'	2561.0	546.3	10'	3186.9	826.7
30'	1991.5	336.3	20'	2571.0	550.4	20'	3197.8	832.0
40'	2000.9	339.3	30'	2581.0	554.5	30'	3208.8	837.3
50'	2010.2	342.4	40'	2591.0	558.6	40'	3219.7	842.7
	2019.6	345.5	50'	2601.1	562.8	50'	3230.7	848.1
39°								
10'	2029.0	348.6	49°	2611.2	566.9	59°	3241.7	853.5
20'	2038.4	351.8	10'	2621.2	571.1	10'	3252.7	858.9
30'	2047.8	354.9	20'	2631.3	575.3	20'	3263.7	864.3
40'	2057.2	358.1	30'	2641.4	579.5	30'	3274.8	869.8
50'	2066.6	361.3	40'	2651.5	583.8	40'	3285.8	875.3
	2076.0	364.5	50'	2661.6	588.0	50'	3296.9	880.8
40°								
10'	2085.4	367.7	50'	2671.8	592.3	60°	3308.0	886.4
20'	2094.9	371.0	10'	2681.9	596.6	10'	3319.1	892.0
30'	2104.3	374.2	20'	2692.1	600.9	20'	3330.3	897.5
40'	2113.8	377.5	30'	2702.3	605.3	30'	3341.4	903.2
50'	2123.3	380.8	40'	2712.5	609.6	40'	3352.6	908.8
	2132.7	384.1	50'	2722.7	614.0	50'	3363.8	914.5

TABLE VI.—TANGENTS AND EXTERNALS TO A 1° CURVE

Central Angle	Tangent	External	Central Angle	Tangent	External	Central Angle	Tangent	External
51°								
10'	3375.0	920.2	71°	4086.9	1308.2	81°	4893.6	1805.3
20'	3386.3	925.9	10'	4099.5	1315.6	10'	4908.0	1814.7
30'	3397.5	931.6	20'	4112.1	1322.9	20'	4922.5	1824.1
40'	3408.8	937.3	30'	4124.8	1330.3	30'	4937.0	1833.6
50'	3420.1	943.1	40'	4137.4	1337.7	40'	4951.5	1843.1
	3431.4	948.9	50'	4150.1	1345.1	50'	4966.1	1852.6
52°								
10'	3442.7	954.8	72°	4162.8	1352.6	82°	4980.7	1862.2
20'	3454.1	960.6	10'	4175.6	1360.1	10'	4995.4	1871.8
30'	3465.4	966.5	20'	4188.5	1367.6	20'	5010.0	1881.5
40'	3476.8	972.4	30'	4201.2	1375.2	30'	5024.8	1891.2
50'	3488.3	978.3	40'	4214.0	1382.8	40'	5039.5	1900.9
	3499.7	984.3	50'	4226.8	1390.4	50'	5054.3	1910.7
53°								
10'	3511.1	990.2	73°	4239.7	1398.0	83°	5069.2	1920.5
20'	3522.6	996.2	10'	4252.6	1405.7	10'	5084.0	1930.4
30'	3534.1	1002.3	20'	4265.6	1413.5	20'	5099.0	1940.3
40'	3545.6	1008.3	30'	4278.5	1421.2	30'	5113.9	1950.3
50'	3557.2	1014.4	40'	4291.5	1429.0	40'	5128.9	1960.2
	3568.7	1020.5	50'	4304.6	1436.8	50'	5143.9	1970.3
54°								
10'	3580.3	1026.6	74°	4317.6	1444.6	84°	5159.0	1980.4
20'	3591.9	1032.8	10'	4330.7	1452.5	10'	5174.1	1990.5
30'	3603.5	1039.0	20'	4343.8	1460.4	20'	5189.3	2000.6
40'	3615.1	1045.2	30'	4356.9	1468.4	30'	5204.4	2010.8
50'	3626.8	1051.4	40'	4370.1	1476.4	40'	5219.7	2021.1
	3638.5	1057.7	50'	4383.3	1484.4	50'	5234.9	2031.4
55°								
10'	3650.2	1063.9	75°	4396.5	1492.4	85°	5250.3	2041.7
20'	3661.9	1070.2	10'	4409.8	1500.5	10'	5265.6	2052.1
30'	3673.7	1076.6	20'	4423.1	1508.6	20'	5281.0	2062.5
40'	3685.4	1082.9	30'	4436.4	1516.7	30'	5296.4	2073.0
50'	3697.2	1089.3	40'	4449.7	1524.9	40'	5311.9	2083.5
	3709.0	1095.7	50'	4463.1	1533.1	50'	5327.4	2094.1
56°								
10'	3720.9	1102.2	76°	4476.5	1541.4	86°	5343.0	2104.7
20'	3732.7	1108.6	10'	4489.9	1549.7	10'	5358.6	2115.3
30'	3744.6	1115.1	20'	4503.4	1558.0	20'	5374.2	2126.0
40'	3756.5	1121.7	30'	4516.9	1566.3	30'	5389.9	2136.7
50'	3768.5	1128.2	40'	4530.4	1574.7	40'	5405.6	2147.5
	3780.4	1134.8	50'	4544.0	1583.1	50'	5421.4	2158.4
57°								
10'	3792.4	1141.4	77°	4557.6	1591.6	87°	5437.2	2169.2
20'	3804.4	1148.0	10'	4571.2	1600.1	10'	5453.1	2180.2
30'	3816.4	1154.7	20'	4584.8	1608.6	20'	5469.0	2191.1
40'	3828.4	1161.3	30'	4598.5	1617.1	30'	5484.9	2202.2
50'	3840.5	1168.1	40'	4612.2	1625.7	40'	5500.9	2213.2
	3852.6	1174.8	50'	4626.0	1634.4	50'	5517.0	2224.3
58°								
10'	3864.7	1181.6	78°	4639.8	1643.0	88°	5533.1	2235.5
20'	3876.8	1188.4	10'	4653.6	1651.7	10'	5549.2	2246.7
30'	3889.0	1195.2	20'	4667.4	1660.5	20'	5565.4	2258.0
40'	3901.2	1202.0	30'	4681.3	1669.2	30'	5581.6	2269.3
50'	3913.4	1208.9	40'	4695.2	1678.1	40'	5597.8	2280.6
	3925.6	1215.8	50'	4709.2	1686.9	50'	5614.2	2292.0
59°								
10'	3937.9	1222.7	79°	4723.2	1695.8	89°	5630.5	2303.5
20'	3950.2	1229.7	10'	4737.2	1704.7	10'	5646.9	2315.0
30'	3962.5	1236.7	20'	4751.2	1713.7	20'	5663.4	2326.6
40'	3974.8	1243.7	30'	4765.3	1722.7	30'	5679.9	2338.2
50'	3987.2	1250.8	40'	4779.4	1731.7	40'	5696.4	2349.8
	3999.5	1257.9	50'	4793.6	1740.8	50'	5713.0	2361.5
60°								
10'	4011.9	1265.0	80°	4807.7	1749.9	90°	5729.7	2373.3
20'	4024.4	1272.1	10'	4822.0	1759.0	10'	5746.3	2385.1
30'	4036.8	1279.3	20'	4836.2	1768.2	20'	5763.1	2397.0
40'	4049.3	1286.5	30'	4850.5	1777.4	30'	5779.9	2408.9
50'	4061.8	1293.6	40'	4864.8	1786.7	40'	5796.7	2420.9
	4074.4	1300.9	50'	4879.2	1796.0	50'	5813.6	2432.9

TABLE VI.—TANGENTS AND EXTERNALS TO A 1° CURVE

Central Angle	Tangent	External	Central Angle	Tangent	External	Central Angle	Tangent	External
91°	5830.5	2444.9	101°	6950.6	3278.1	111°	8336.7	4386.1
10'	5847.5	2457.1	10'	6971.3	3294.1	10'	8362.7	4407.6
20	5864.6	2469.3	20	6992.0	3310.1	20	8388.9	4429.2
30	5881.7	2481.5	30	7012.7	3326.1	30	8415.1	4450.9
40	5898.8	2493.8	40	7033.6	3342.3	40	8441.5	4472.7
50	5916.0	2506.1	50	7054.5	3358.5	50	8468.0	4494.6
92	5933.2	2518.5	102	7075.5	3374.9	112	8494.6	4516.6
10	5950.5	2531.0	10	7096.6	3391.2	10	8521.3	4538.8
20	5967.9	2543.5	20	7117.8	3407.7	20	8548.1	4561.1
30	5985.3	2556.0	30	7139.0	3424.3	30	8575.0	4583.4
40	6002.7	2568.6	40	7160.3	3440.9	40	8602.1	4606.0
50	6020.2	2581.3	50	7181.7	3457.6	50	8629.3	4628.6
93	6037.8	2594.0	103	7203.2	3474.4	113	8656.6	4651.3
10	6055.4	2606.8	10	7224.7	3491.3	10	8684.0	4674.2
20	6073.1	2619.7	20	7246.3	3508.2	20	8711.5	4697.2
30	6090.8	2632.6	30	7268.0	3525.2	30	8739.2	4720.3
40	6108.6	2645.5	40	7289.8	3542.4	40	8767.0	4743.6
50	6126.4	2658.5	50	7311.7	3559.6	50	8794.9	4766.9
94	6144.3	2671.6	104	7333.6	3576.8	114	8822.9	4790.4
10	6162.6	2684.7	10	7355.6	3594.2	10	8851.0	4814.1
20	6180.2	2697.9	20	7377.8	3611.7	20	8879.3	4837.8
30	6198.3	2711.2	30	7399.9	3629.2	30	8907.7	4861.7
40	6216.4	2724.5	40	7422.2	3646.8	40	8936.3	4885.7
50	6234.6	2737.9	50	7444.6	3664.5	50	8965.0	4909.9
95	6252.8	2751.3	105	7467.0	3682.3	115	8993.8	4934.1
10	6271.1	2764.8	10	7489.6	3700.2	10	9022.7	4958.6
20	6289.4	2778.3	20	7512.2	3718.2	20	9051.7	4983.1
30	6307.9	2792.0	30	7534.9	3736.2	30	9080.9	5007.8
40	6326.3	2805.6	40	7557.7	3754.4	40	9110.3	5032.6
50	6344.8	2819.4	50	7580.5	3772.6	50	9139.8	5057.6
96	6363.4	2833.2	106	7603.5	3791.0	116	9169.4	5082.7
10	6382.1	2847.0	10	7626.6	3809.4	10	9199.1	5107.9
20	6400.8	2861.0	20	7649.7	3827.9	20	9229.0	5133.3
30	6419.5	2875.0	30	7672.9	3846.5	30	9259.0	5158.8
40	6438.4	2889.0	40	7696.3	3865.2	40	9289.2	5184.5
50	6457.3	2903.1	50	7719.7	3884.0	50	9319.5	5210.3
97	6476.2	2917.3	107	7743.2	3902.9	117	9349.9	5236.2
10	6495.2	2931.6	10	7766.8	3921.9	10	9380.5	5262.3
20	6514.3	2945.9	20	7790.5	3940.9	20	9411.3	5288.6
30	6533.4	2960.3	30	7814.3	3960.1	30	9442.2	5315.0
40	6552.6	2974.7	40	7838.1	3979.4	40	9473.2	5341.5
50	6571.9	2989.2	50	7862.1	3998.7	50	9504.4	5368.2
98	6591.2	3003.8	108	7886.2	4018.2	118	9535.7	5395.1
10	6610.6	3018.4	10	7910.4	4037.8	10	9567.2	5422.1
20	6630.1	3033.1	20	7934.6	4057.4	20	9598.9	5449.2
30	6649.6	3047.9	30	7959.0	4077.2	30	9630.7	5476.5
40	6669.2	3062.8	40	7983.5	4097.1	40	9662.7	5504.0
50	6688.8	3077.7	50	8008.0	4117.0	50	9694.7	5531.7
99	6708.6	3092.7	109	8032.7	4137.1	119	9727.0	5559.4
10	6728.4	3107.7	10	8057.4	4157.3	10	9759.4	5587.4
20	6748.2	3122.9	20	8082.3	4177.5	20	9792.0	5615.5
30	6768.1	3138.1	30	8107.3	4197.9	30	9824.8	5643.8
40	6788.1	3153.3	40	8132.3	4218.4	40	9857.7	5672.3
50	5808.2	3168.7	50	8157.5	4239.0	50	9890.8	5700.9
100	6828.3	3184.1	110	8182.8	4259.7	120	9924.0	5729.7
10	6848.5	3199.6	10	8208.2	4280.5	10	9957.5	5758.6
20	6868.8	3215.1	20	8233.7	4301.4	20	9991.0	5787.7
30	6889.2	3230.8	30	8259.3	4322.4	30	10025.0	5817.0
40	6909.6	3246.5	40	8285.0	4343.6	40	10059.0	5846.5
50	6930.1	3262.3	50	8310.8	4364.8	50	10093.0	5876.1

TABLE VII.—CORRECTIONS FOR TANGENTS AND EXTERNALS

These corrections are to be added to the approximate values, found by dividing the tangent, or external, for a 1° curve (Table VI) by the degree of curve, in order to obtain the true tangents, or externals. Intermediate values may be obtained by interpolation.

FOR TANGENTS ADD

Central Angle	DEGREE OF CURVE													
	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
10°	.03	.06	.09	.13	.16	.19	.22	.25	.28	.31	.34	.38	.42	.46
15°	.04	.10	.14	.19	.24	.29	.34	.39	.45	.51	.53	.58	.63	.68
20°	.06	.13	.19	.26	.32	.39	.45	.51	.58	.65	.72	.79	.84	.90
25°	.08	.16	.24	.33	.40	.49	.58	.67	.75	.83	.90	.99	1.06	1.14
30°	.10	.19	.29	.39	.49	.59	.69	.79	.89	.99	1.09	1.20	1.29	1.39
35°	.11	.22	.34	.47	.58	.69	.79	.81	.92	1.04	1.29	1.42	1.54	1.66
40°	.13	.26	.40	.53	.67	.80	.93	1.06	1.20	1.34	1.49	1.64	1.79	1.94
45°	.15	.30	.44	.60	.76	.91	1.06	1.21	1.37	1.52	1.70	1.87	2.04	2.21
50°	.17	.34	.51	.68	.85	1.02	1.19	1.36	1.54	1.72	1.91	2.10	2.29	2.48
55°	.19	.38	.57	.76	.95	1.14	1.32	1.52	1.72	1.92	2.12	2.35	2.56	2.77
60°	.21	.42	.63	.84	1.05	1.27	1.49	1.71	1.94	2.17	2.38	2.60	2.83	3.07
65°	.23	.46	.69	.93	1.16	1.40	1.64	1.88	2.13	2.38	2.63	2.88	3.13	3.39
70°	.25	.51	.76	1.02	1.28	1.54	1.80	2.06	2.33	2.60	2.88	3.16	3.44	3.72
75°	.27	.56	.83	1.12	1.40	1.69	1.98	2.27	2.57	2.87	3.16	3.47	3.78	4.09
80°	.30	.61	.91	1.22	1.53	1.84	2.15	2.46	2.78	3.10	3.44	3.78	4.12	4.46
85°	.33	.66	1.00	1.33	1.68	2.02	2.36	2.70	3.05	3.40	3.77	4.14	4.55	4.89
90°	.36	.72	1.09	1.45	1.83	2.20	2.57	2.94	3.32	3.70	4.10	4.50	4.91	5.32
95°	.39	.79	1.19	1.55	2.00	2.40	2.80	3.20	3.61	4.02	4.40	4.98	5.38	5.83
100°	.43	.86	1.30	1.74	2.18	2.62	3.06	3.50	3.95	4.40	4.88	5.37	5.85	6.34
110°	.51	1.03	1.56	2.08	2.61	3.14	3.67	4.21	4.76	5.31	5.86	6.43	7.01	7.60
120°	.62	1.25	1.93	2.52	3.16	3.81	4.45	5.11	5.77	6.44	7.12	7.80	8.50	9.22

FOR EXTERNALS ADD

Central Angle	DEGREE OF CURVE													
	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
10°	.001	.003	.004	.006	.007	.008	.009	.011	.012	.014	.015	.017	.018	.020
15°	.003	.007	.010	.014	.018	.023	.027	.032	.035	.039	.043	.047	.051	
20°	.006	.011	.017	.022	.028	.034	.038	.045	.051	.057	.063	.070	.076	.083
25°	.009	.018	.027	.036	.046	.056	.065	.074	.083	.093	.106	.120	.127	.135
30°	.013	.025	.038	.051	.065	.078	.090	.103	.116	.129	.149	.170	.179	.188
35°	.018	.035	.054	.072	.086	.109	.131	.153	.175	.197	.213	.230	.247	.264
40°	.023	.046	.070	.093	.117	.141	.172	.203	.234	.265	.277	.290	.315	.341
45°	.030	.060	.093	.119	.153	.184	.216	.254	.289	.325	.351	.378	.411	.445
50°	.037	.075	.116	.151	.189	.227	.266	.305	.345	.384	.425	.467	.508	.550
55°	.046	.093	.142	.188	.236	.283	.332	.381	.420	.479	.530	.582	.641	.700
60°	.056	.112	.168	.225	.283	.340	.398	.457	.516	.575	.636	.697	.774	.851
65°	.067	.135	.204	.273	.343	.412	.483	.554	.625	.697	.771	.845	.922	1.01
70°	.080	.159	.240	.321	.403	.485	.568	.652	.735	.819	.906	.994	1.08	1.17
75°	.095	.182	.266	.353	.440	.528	.618	.707	.797	.877	1.07	1.18	1.29	1.39
80°	.110	.220	.332	.445	.558	.671	.787	.903	1.02	1.13	1.25	1.38	1.50	1.62
85°	.128	.259	.391	.524	.657	.790	.926	1.06	1.20	1.34	1.47	1.62	1.76	1.91
90°	.149</													

TABLE VIII.—CORRECTIONS FOR SUB-CHORDS AND LONG CHORDS

FOR SUB-CHORDS ADD										Excess of Arc per 100 ft.	LONG CHORDS				
D	10	20	30	40	50	60	70	80	90		D	200	300	400	500
4°	.00	.00	.01	.01	.01	.01	.01	.01	.00	.02	1	199.99	299.97	399.92	499.85
6	.00	.01	.01	.02	.02	.02	.02	.01	.01	.05	2	199.97	299.88	399.70	499.39
8	.01	.02	.02	.03	.03	.03	.03	.02	.01	.08	3	199.93	299.73	399.32	498.63
10	.01	.02	.03	.04	.05	.05	.05	.04	.02	.13	4	199.88	299.51	398.78	497.57
12	.02	.04	.05	.06	.07	.07	.07	.05	.03	.18	5	199.81	299.24	398.10	496.20
14	.02	.05	.07	.08	.09	.10	.09	.07	.04	.25	6	199.73	298.90	397.26	494.53
16	.03	.06	.09	.11	.12	.12	.12	.09	.05	.33	7	199.63	298.51	396.28	492.57
18	.04	.08	.11	.14	.15	.16	.15	.12	.07	.41	8	199.51	298.05	395.14	490.31
20	.05	.10	.14	.17	.19	.20	.18	.15	.09	.51	9	199.38	297.54	393.86	487.75
22	.06	.12	.17	.21	.23	.24	.22	.18	.10	.62	10	199.24	296.96	392.42	484.90
24	.07	.14	.20	.25	.28	.28	.26	.21	.12	.74	12	198.90	295.63	389.12	478.34
26	.09	.17	.24	.29	.32	.33	.31	.25	.15	.86	14	198.51	294.06	385.22	470.65
28	.10	.19	.27	.34	.37	.38	.36	.29	.17	1.00	16	198.05	292.25	380.76	461.86
30	.11	.22	.31	.39	.43	.44	.41	.33	.19	1.15	18	197.54	290.21	375.74	452.02
32	.13	.25	.36	.44	.49	.50	.47	.38	.22	1.31	20	196.96	287.94	370.17	441.15
34	.15	.28	.40	.50	.55	.57	.53	.43	.25	1.48	22	196.32	285.44	364.06	429.30
36	.17	.32	.45	.56	.62	.64	.59	.48	.28	1.66	24	195.63	282.71	357.43	416.53
38	.18	.36	.51	.62	.70	.71	.66	.53	.31	1.86	26	194.87	279.76	350.30	402.89
40	.21	.40	.56	.69	.77	.79	.73	.59	.35	2.06	28	194.06	276.59	342.69	388.43
42	.23	.44	.62	.76	.85	.87	.81	.65	.38	2.28	30	193.18	273.20	334.61	373.20
44	.25	.48	.68	.84	.94	.96	.89	.72	.42	2.50	32	192.25	269.61	326.08	357.28
46	.27	.52	.75	.92	1.02	1.05	.98	.78	.46	2.74	34	191.26	265.81	317.12	340.73
48	.30	.57	.81	1.00	1.12	1.14	1.06	.86	.50	2.99	36	190.21	261.80	307.77	323.61
50	.32	.62	.89	1.09	1.21	1.24	1.15	.93	.55	3.24	38	189.10	257.60	298.03	305.99
52	.35	.67	.96	1.18	1.31	1.35	1.25	1.01	.59	3.52	40	187.94	253.21	287.94	287.94
54	.38	.73	1.04	1.28	1.42	1.46	1.35	1.09	.64	3.80	42	186.72	248.63	277.51	269.54
56	.41	.78	1.12	1.38	1.53	1.57	1.46	1.17	.69	4.09	44	185.44	243.87	266.78	250.85
58	.44	.84	1.20	1.48	1.65	1.69	1.57	1.26	.74	4.40	46	184.10	239.93	255.78	231.95
60	.47	.91	1.29	1.59	1.76	1.81	1.68	1.35	.80	4.72	48	182.71	233.83	244.51	212.92

NOTE.—When a chord of less than 100 ft. is used the corrections given in the above table should be added to the nominal length of chord to get the length which should be used in order that the 100 ft. points will check with those obtained by using the standard 100 ft. chord. Thus in locating a 14° curve by 25 ft. chords measure 25'.06 for each chord. Long chords are useful in passing obstacles.

TABLE IX.—MIDDLE ORDINATES FOR RAILS IN FEET

Deg. of Curve	LENGTH OF RAILS						Deg. of Curve	LENGTH OF RAILS							
	32	30	28	26	24	22		20	32	30	28	26	24	22	20
1°	.022	.020	.016	.013	.011	.009	.008	16°	.356	.313	.273	.236	.200	.170	.139
2	.045	.038	.034	.029	.025	.021	.017	17	.378	.333	.290	.252	.213	.180	.148
3	.037	.058	.051	.044	.037	.031	.026	18	.400	.351	.306	.265	.225	.190	.156
4	.089	.079	.069	.060	.050	.042	.035	19	.423	.371	.324	.280	.238	.201	.165
5	.112	.099	.086	.074	.063	.053	.044	20	.445	.392	.341	.296	.250	.212	.174
6	.134	.117	.102	.088	.076	.064	.052	21	.466	.410	.357	.309	.262	.222	.182
7	.156	.137	.120	.104	.088	.074	.061	22	.487	.430	.375	.325	.275	.233	.191
8	.179	.158	.137	.119	.100	.085	.070	23	.509	.450	.390	.338	.287	.243	.199
9	.201	.175	.153	.133	.112	.095	.078	24	.531	.469	.408	.354	.299	.253	.208
10	.223	.196	.171	.148	.125	.106	.087	25	.552	.486	.424	.367	.311	.263	.216
11	.245	.216	.188	.163	.139	.117	.096	26	.573	.506	.441	.382	.323	.274	.225
12	.268	.236	.206	.179	.151	.128	.105	27	.594	.524	.457	.396	.335	.284	.233
13	.290	.254	.222	.192	.163	.138	.113	28	.618	.545	.475	.411	.348	.294	.242
14	.312	.275	.239	.207	.175	.148	.122	29	.638	.564	.491	.424	.361	.303	.250
15	.334	.295	.257	.223	.188	.159	.131	30	.660	.583	.508	.438	.374	.313	.259

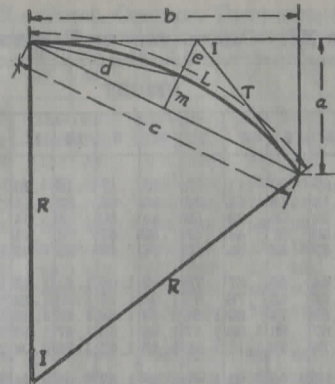


TABLE X
CURVE FORMULAE FOR SIMPLE CURVES
COMPILED BY J. CALVIN LOCKE, C.E.

- (1) $c = \sqrt{2Ra}$ (2) $c = \sqrt{a^2 + b^2}$
- (3) $c = \sqrt{2R(R - \sqrt{(R+b)(R-b)})} = \sqrt{2R(R - \sqrt{R^2 - b^2})}$
- (4) $c = 2\sqrt{m(2R - m)}$
- (5) $c = 2R \sin \frac{1}{2} I$ (6) $c = 2T \cos \frac{1}{2} I$
- (7) $e = R \operatorname{exsec} \frac{1}{2} I$
- (8) $e = R \tan \frac{1}{2} I \tan \frac{1}{4} I$ (9) $e = T \tan \frac{1}{4} I$
- (10) $b = \sqrt{a(2R - a)}$
- (11) $b = \sqrt{\left(c + \frac{c^2}{2R}\right)\left(c - \frac{c^2}{2R}\right)} = \sqrt{c^2 - \frac{c^4}{4R^2}}$
- (12) $b = R \sin I$ (13) $b = a \cot \frac{1}{2} I$
- (14) $R = \frac{a^2 + b^2}{2a} = \frac{c^2}{2a}$ (15) $R = \frac{d^2}{2m} = \frac{c^2 + 4m^2}{8m}$
- (16) $d = \sqrt{R(2R - \sqrt{(2R+c)(2R-c)})} = \sqrt{R(2R - \sqrt{4R^2 - c^2})}$
- (17) $d = \sqrt{2Rm}$ (18) $d = 2R \sin \frac{1}{4} I$ (19) $m = \frac{d^2}{2R}$
- (20) $m = R \sqrt{\left(R + \frac{c}{2}\right)\left(R - \frac{c}{2}\right)} = R \sqrt{R^2 - \frac{c^2}{4}}$
- (21) $m = R \cos \frac{1}{2} I$ (22) $m = R \sin \frac{1}{2} I \tan \frac{1}{4} I$ (23) $m = \frac{1}{2} c \tan \frac{1}{4} I$
- (24) $a = \frac{c^2}{2R}$ (25) $a = R - \sqrt{(R+b)(R-b)} = R - \sqrt{R^2 - b^2}$
- (26) $a = 2R(\sin^2 \frac{1}{2} I)^2$ (27) $a = R \operatorname{vers} I$ (28) $a = R \sin I \tan \frac{1}{2} I$
- (29) $a = b \tan \frac{1}{2} I$ (30) $a = T \sin I$ (31) $T = R \tan \frac{1}{2} I$
- (32) $I = \frac{L}{R} \times 57.295780$ (33) $R = \frac{L}{I} \times 57.295780$
- (34) $L = IR \times 0.01745329$ (35) $L = \frac{8d - c}{3}$
- (36) $\text{Area Seg.} = \frac{LR - R^2 \sin I}{2} = \frac{LR - Rb}{2}$

TABLE XIII.—SINES, COSINES, TANGENTS, COTANGENTS (Continued)

Deg.	sin 0'	tan 0'	sin 10'	tan 10'	sin 20'	tan 20'	sin 30'	tan 30'	sin 40'	tan 40'	sin 50'	tan 50'	Deg.
46	7193	1.0355	7214	1.0416	7234	1.0477	7254	1.0533	7274	1.0599	7294	1.0661	43
47	314	.0724	333	.0786	353	.0850	373	.0913	392	.0977	412	.1041	42
48	431	.1106	451	.1171	470	.1237	490	.1303	509	.1369	528	.1436	41
49	547	.1504	566	.1571	585	.1640	604	.1708	623	.1778	642	.1847	40
50	660	1.1918	7679	1.1988	7698	1.2059	7716	1.2131	7735	1.2203	7753	1.2276	39
51	771	.2349	790	.2423	808	.2497	826	.2572	844	.2647	862	.2723	38
52	880	.2799	898	.2876	916	.2954	934	.3032	951	.3111	969	.3190	37
53	986	.3270	8004	.3351	8021	.3452	8039	.3514	8056	.3597	8073	.3680	36
54	8090	.3764	107	.3848	124	.3934	141	.4019	158	.4106	175	.4193	35
55	192	.4281	208	.4370	225	.4460	241	.4550	258	.4641	274	.4733	34
56	290	.4826	307	.4919	323	.5013	339	.5108	355	.5204	371	.5301	33
57	387	.5399	403	.5497	418	.5597	434	.5697	450	.5798	465	.5900	32
58	480	.6003	496	.6107	511	.6212	526	.6319	542	.6426	557	.6534	31
59	572	.6643	587	.6753	601	.6864	616	.6977	631	.7090	646	.7205	30
60	660	1.7321	8675	1.7437	8689	1.7556	8704	1.7675	8718	1.7797	8732	1.7917	29
61	746	.8040	760	.8165	774	.8291	788	.8418	802	.8546	816	.8676	28
62	829	.8807	843	.8940	857	.9074	870	.9210	884	.9347	897	.9486	27
63	910	.9626	923	.9768	936	.9912	949	2.0057	962	2.0204	975	2.0353	26
64	988	2.0503	9001	2.0655	9013	2.0809	9026	.0965	9038	.1123	9051	.1283	25
65	9063	.1445	075	.1609	088	.1775	100	.1943	112	.2113	124	.2286	24
66	135	.2460	147	.2637	159	.2817	171	.2998	182	.3183	194	.3369	23
67	205	.3559	216	.3750	228	.3945	239	.4142	250	.4342	261	.4545	22
68	272	.4751	283	.4960	293	.5172	304	.5386	315	.5605	325	.5826	21
69	336	.6051	346	.6279	356	.6511	367	.6746	377	.6985	387	.7228	20
70	397	2.7475	9407	2.7725	9417	2.7980	9426	2.8239	9436	2.8502	9446	2.8770	19
71	455	.9042	465	.9319	474	.9600	483	.9887	492	3.0178	502	3.0475	18
72	511	3.0777	520	3.1084	528	3.1397	537	3.1716	546	.2041	555	.2371	17
73	563	.2709	572	.3052	580	.3402	588	.3759	596	.4124	605	.4495	16
74	613	.4874	621	.5261	628	.5656	636	.6059	644	.6470	652	.6891	15
75	659	.7321	667	.7760	674	.8208	681	.8657	689	.9136	696	.9617	14
76	703	4.0108	710	4.0611	717	4.1126	724	4.1653	730	4.2193	737	4.2747	13
77	744	.8315	750	.8897	757	.4494	763	.5107	769	.5736	775	.6382	12
78	781	.7046	787	.7729	793	.8430	799	.9152	805	.9894	811	5.0658	11
79	816	.1446	822	5.2257	827	5.3093	833	5.3955	838	5.4845	843	.5764	10
80	9848	5.6713	9853	5.7694	9858	5.8708	9863	5.9758	9868	6.0844	9872	6.1970	9
81	877	6.3138	881	6.4348	886	6.5606	890	6.6912	894	.8269	899	.9682	8
82	903	7.1154	907	7.2687	911	7.4287	914	7.5958	918	7.7704	922	7.9530	7
83	925	8.1443	929	8.3450	932	8.5555	936	8.7769	939	9.0098	942	9.2553	6
84	945	9.5144	948	9.7882	951	10.078	954	10.385	957	10.711	959	11.059	5
85	962	11.430	964	11.826	967	12.250	969	12.706	971	13.197	974	13.727	4
86	976	14.300	978	14.924	980	15.605	981	16.350	983	17.169	985	18.075	3
87	986	19.081	988	20.206	989	21.470	990	22.903	992	24.542	993	26.432	2
88	994	28.636	9995	31.242	9996	34.368	997	38.189	997	42.964	9998	49.104	1
89	9998	57.290	9999	63.750	9999	85.940	9999	114.58	1000	171.88	1000	343.77	0
Deg.	60'	60'	50'	50'	40'	40'	30'	30'	20'	30'	10'	10'	Deg.
	cos	cot	cos	cot	cos	cot	cos	cot	cos	cot	cos	cot	

ER

144.48
4825
492.73

70.4
70.0
140.4

280.58

1135.05
68 FL S
28.45
50 FL N
28.95

210.4
40.19
250.59

1135.05
28.45
6.60

1135.05
28.95
6.10
3.6
2.5

22.64
19.05
30.26

178-40 ≈
357-20 ≈
ON S

22.60 stw N.W. x RR x sign
**PLEASE RETURN TO
GEAUGA COUNTY ENGINEER
COURT HOUSE
CHARDON, O.
PHONE 250-X**

2075.04

131.30

81
119

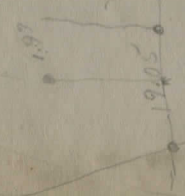
193

67° 15' N.W.
184° 30'

1905

1905
193
1712

1061.20
670.59
790.65
213.15
577.50
31.18
580.68



TRYGVE HOFF & ASSOCIATES, ENGINEERS, CLEVELAND, OHIO

Project 60018

Description Of Work Establish & Clark Road - Recover angle point in
PERSONNEL Clark Road - Per County Engineer's Field Book
153 Pg. 36

Sheet No. 637

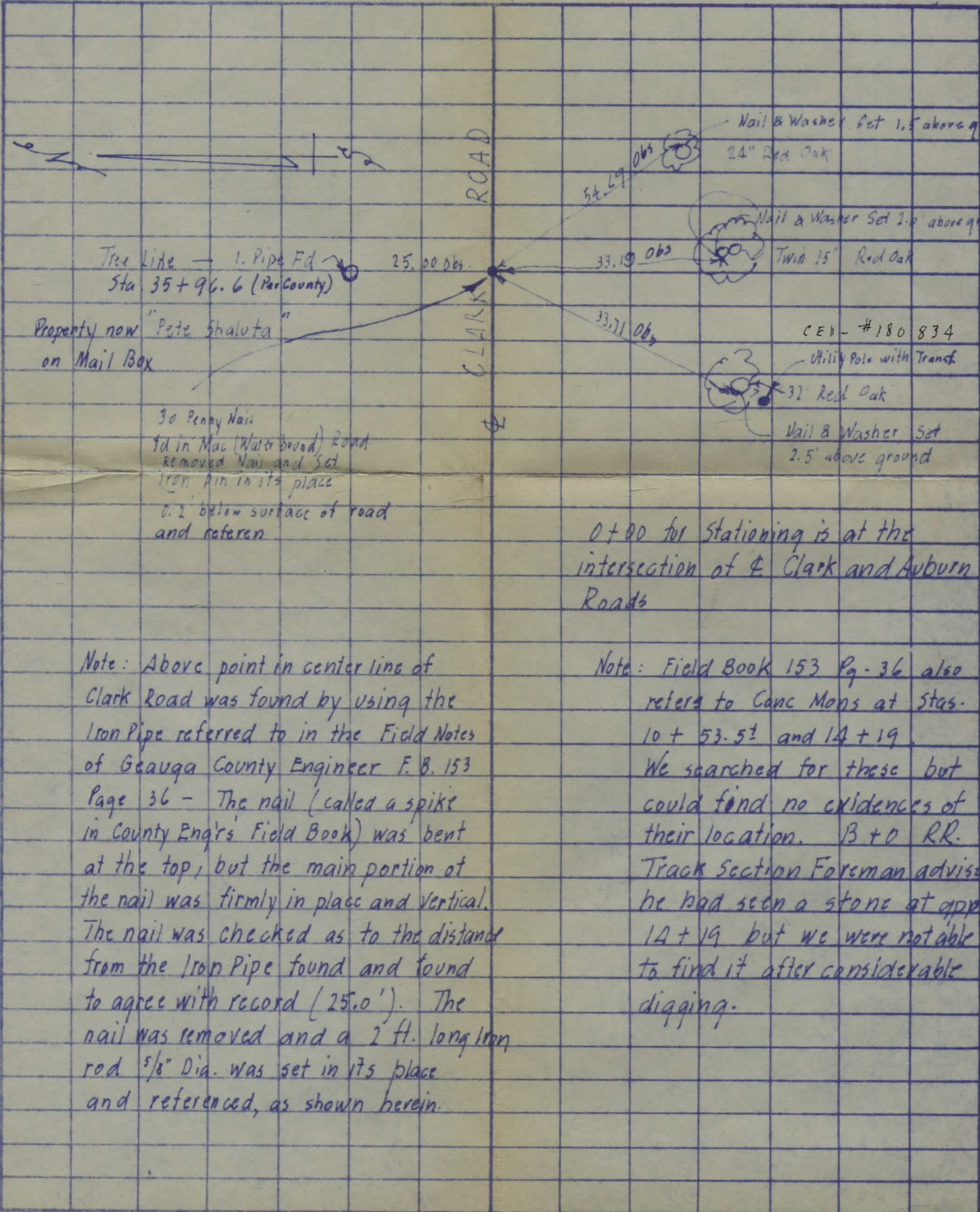
Date Nov. 7, 1960

Weather Clearing

Temp. _____

Time P.M. _____

Instr. _____ Rod _____ Notes Red. By _____ Date _____
Notes H.J. Stroebel Chain D.H. Sankay Checked By _____ Date _____
Rod _____ Chain S. Kaminski Approved By _____ Date _____



Form No. 1001

R. E. HERSHBERGER
D. W. SKWELL
J. CHOLLEY

TR 78 HOSFORD

M. 7 JUNE 1980
CLDY. BREEZY. 60°F

0+00 IS 1ST PIPE W. OF RAVENNA ϕ (18" TRAV.)

7+23⁵ N DRIVE OUT

44 N 12" RCP IN

81 S 29° PC PIPE

96 S 28² C POLE

8+19³² - 0.043 TEMP. COR. - 0.032 SAG ϕ +19.24 CORRECTED

9+16 S ϕ 11' GRAVEL DRIVE - NO PIPE

47⁵ S 29² PC PIPE

75 S 29³ C POWER POLE

87⁵ N ϕ 9' GRAVEL DRIVE

95⁵ N 5³ W OF 12" DRIVE PIPE

77 N OUT

10+01 S ϕ 10' GRAY DR. - NO PIPE

11+12 S 29²⁰ P. COR. PIPE

+50 S 28⁵⁸ C. POW. POLE

12+50 S END FOX WOOD DR. APRON

13+07 S 29²² PIN IN M.B.

8 N 1⁰ OUT 8" CONC. PIPE

21 N ϕ 10' STONE DRIVE

32⁵ N 1.75' IN CONC. PIPE

59 S END APRON - NO PIPE

60 S 28⁷² C. POW. POLE

14+00 LINE OFFSET 5.00' S (START)

15+02⁵ S 24⁸ BENT P. COR. PIPE

J.L. DARLING CORP.
TACOMA, WASH. U.S.A.

Pat. in the Process
WEATHERPROOF

No. 312

BASE LINE 5.00' S OF ϕ

- 15+09 S 24 C. POW. POLE
39 S 25 DITCH CURVES S LEAVING P/W
48 S 20²⁵ S DITCH STARTS CURVING S
78 S 20⁰ S START 12' CULV. C.M.P.
88 S ϕ 13³⁵ CONC. DR.
98⁵ S 19³ IN. 12" CMP
16+86 S 22⁸ C POW. POLE
93 S 16⁴⁵ ϕ 12" CMP OUT
17+02 S ϕ 8' STONE DR.
11⁵ S 17⁴ ϕ 12" CMP IN
40 N 7⁸⁵ ϕ 12" CMP OUT
51 N ϕ 12' STONE DRIVE
60⁵ N 7⁶⁵ 12" CMP IN
18+33 S 24⁷⁸ BENT P-COR. PIPE
38 S 17⁵⁸ 12" CMP ϕ OUT
49 S ϕ 11' SLAG DRIVE
58 S 17⁷⁵ ϕ 12" CMP IN
66 S 24³⁰ C POW. POLE
20+11 S 23⁶⁷ P-COR. PIPE
41 N 8 12" CMP OUT
42 S 24⁴⁵ C. POW. POLE
51 N ϕ 10⁶ STONE DRIVE
61 N 8⁵ ϕ 12" CMP IN
21+42 S 18⁷ ϕ 12" CMP OUT

8 June 1982
740 O.C. CALM

80°

R. E. H.
D. W. S.

TR10 HOSFORD
Q

- 21+58 S Q 11' STONE DRIVE
- 473 S 19¹⁵ Q 12" CMP IN
- 82 S 24⁸ P. COR. PIPE
- 87 S 19⁹³ Q 12" CMP. OUT
- 98 S Q 11' GRAVEL DR.
- 22+00 N 8⁴ Q DITCH
- 7 S 19⁶⁶ Q 12" CMP IN
- 27 S 23⁰⁵ C POW. POLE
- 23+00 S 19⁵⁵ Q DITCH
- N 8⁷⁰ Q DITCH
- 44 S 22⁵² Q 18" CMP OUT
- 48⁵ S START PAVE RADIUS
- 87 S Q PAYMENT FOX MEADOW LN.
- 24+00 N 9⁸ DITCH Q
- 41⁵ S END PAVE RADIUS
- 42 S 21³¹ Q 18" CMP.
- 41 S 23⁰³ C POW. POLE
- 25+00 S 17²³ Q DITCH
- N 10⁴ Q DITCH
- 26+00 S 17⁴⁸ Q DITCH
- N 8³ Q NON DITCH
- 10 S 24⁰ C POW. POLE
- 84 S 18¹⁷ Q 12" CMP OUT
- 93 S Q 9⁷ STONE DRIVE

83°F

J. L. DARLING CORP.
TACOMA, WASH. U.S.A.
Weatherproof
No. 312

27+00 S 18⁴⁵ \angle DITCH
N 8⁴ \angle DITCH
35 S 18³³ \angle 12" CMP IN
90 S 24⁴ C POW. POLE
28+00 S 20⁴⁵ \angle DITCH
N 8³ \angle DITCH
54 S 20⁴ \angle 12" CMP OUT
64 S \angle 10' STONE DR.
73⁵ S 20¹⁴ \angle 12" CMP IN

29+00 S 19⁷³ \angle DITCH
N 98 \angle DITCH
14 S 24⁸⁰ P-COR. PIPE
7.5 S 23⁷³ C POW. POLE

30+00 S 19³⁰ \angle DITCH
N 10⁵⁰ \angle DITCH
24 S 19²⁴ \angle 12" CMP IN
34 S \angle 11' STONE, GRAVEL, CINDER DR.
44 S 19²² \angle 12" CMP OUT

31+00 S 18⁵¹ \angle DITCH
N 9⁷⁰ \angle DITCH
31+71¹² S 18⁵⁰ \angle DITCH
N 9⁵⁰ \angle DITCH

END 5' OFFSET S
LINE 5.16' OFF PIPE
LENGTH 0.14' SHORT OF PIPE

R. E. HERSHBERGER
 O. W. SEWELL
 J. CHOLLET

TR 78 HOSFORD
 PROFILES

TH. 10 JUNE 1982

	B. S.	H. I.	F. S.	ELEV.	
T.B.M. 1	11.31	111.31		100.00	NW COR. OF S. HDWL.
± CH 601			11.02	100.29	
0+00			10.37	100.94	±
17° S			2.90 + 11.30 14.20	97.11	INV. X. CULV.
15 ² N			12.56	98.75	
1+00			5.2	106.1	5 ² S TRAY ±
20° S			6.5	104.8	± DITCH
8 ² N			6.4	104.9	"
2+00			2.9	108.4	5 ² S TRAY ±
16° S			3.5	107.8	1176 DITCH ENDS
6 ⁵ N			4.0	107.3	EDGE TRAY RD
3+00			1.5	109.8	± DITCH
17 ² S			2.2	109.1	5 ⁸ S TRAY ±
5 ⁸ N			2.6	108.7	NO DITCH
4+00			0.4	110.9	EDGE TRAY RD
17 ⁴ S			0.9	110.4	± DITCH
5 ⁹ N			1.3	110.0	6 ¹ S TRAY ±
T.P. 1			0.31	111.00	NO DITCH
	6.45	117.45			EDGE TRAY RD
5+00			4.7	112.8	7 ⁰ S TRAY ±
18 ² S			5.1	112.4	EDGE TRAY RD
5 ² N			5 ³	112.2	± DITCH

J. L. DARLING CORP.
 TACOMA WASH. U.S.A.

Pat. in the Process
 WEATHERPROOF

No. 312

6+00	117.45	4.3	113.2	7 ⁰ S TRAV. Q
19 ⁰ S		4.6	112.8	EDGE TRAV. RD
3 ³ N		4.9	112.6	Q DITCH
7+00		5.2	112.2	8 ⁰ S TRAV. Q
19 ⁵ S		5.6	111.8	EDGE TRAV. RD
3 ² N		6.3	111.2	Q DITCH
7+23 ⁵ N		6.53	110.92	OUT
44 N		6.17	111.28	11V
8+00		4.2	113.2	9 ⁰ S TRAV. Q
20 ⁶ S		4.5	113.0	EDGE RD.
3 ⁰ N		5.1	112.4	Q DITCH
9+00		3.2	114.2	9 ⁰ S TRAV. Q
20 ⁴ S		3.6	113.8	EDGE TRAV. RD
4 ⁰ N		4.1	113.4	Q DITCH
10+00		2.2	115.2	9 ⁹ Q TRAV. RD
21 ⁰ S		2.9	114.6	EDGE TRAV. RD
3 ³ N		2.8	114.65	Q DITCH
T.P. 2		2.10	115.35	
	11.05	126.40		
11+00		9.0	117.4	8 ⁴ S TRAV. Q
19 ¹ S		9.5	116.9	EDGE TRAV. RD
3 ⁵ N		9.6	116.8	Q DITCH

R. E. HERSHBERGER TD
 D. W. SEWELL
 J. CHOLLEY

TR 78 HOSFORD
 ADDITIONAL PROFILES

M 14 JUNE 1982
 AL. BREEZY, 70°F.

STA.	BACK	H.I.	FORE.	ELEV.	NOTES
TBM 2	2.88	135.88		133.00	
17+00			5.5	130.4	& DRIVE S R/W
			4.0	131.9	113N
			3.5	132.4	N R/W
TP			7.15	128.73	
	4.83	133.56			
16+00			5.6	128.0	S R/W
			4.2	129.4	10 ³ N
			2.7	130.9	N R/W
TP			6.29	127.27	
	4.53	131.80			
15+00			5.2	126.6	S R/W
			3.4	128.4	11 ⁵ N
			2.4	129.4	N R/W
T.P.			6.18	125.62	
	4.43	130.05			
14+00			5.3	124.8	S R/W
			2.8	127.2	13 ⁰ N
			1.5	128.6	N R/W END OFFSET
TP			6.49	123.56	
	4.58	128.14			
13+00			5.04	123.1	PAVED RD. S R/W
			1.0	127.1	7 ⁵ N
			0.7	127.4	N R/W

J. L. DARLING CORP.
 TACOMA, WASH. U.S.A.

"Rite in the Rain"
 WEATHERPROOF

No. 312

	T	K	-	E	
TP		128.14	7.35	120.79	
	4.48	125.27			
12+00			4.4	120.9	S R/W
			2.0	123.3	8° N
			1.1	124.2	N R/W
TP			8.01	117.26	
	4.55	121.81			
11+00			5.7	116.1	S R/W
			1.3	120.5	11° N
			0.1	121.7	N R/W
TP			6.54	115.27	
	4.28	119.55			
10+00			6.0	113.6	Q GR. DRIVE S R/W
			3.0	116.6	7° N
			2.4	117.2	N R/W
T.P.			5.27	114.28	
	4.55	118.83			
9+00			5.9	112.9	S R/W
			5.2	113.6	8° N
			5.3	113.5	N R/W
T.P.			5.28	113.55	
	4.36	117.91			
8+00			3.9	114.0	S R/W
			3.6	114.3	7° N
			4.3	113.6	H R/W

TR 78 HOSFORD
ADDITIONAL PROFILES (2)

M. 14 JUN 8 1982

	+	π	-	ε	
T.P.			5.73	112.18	
	4.77	116.95			
7100			6.5	110.4	S R/W
			4.5	112.4	6 ¹ / ₂ N TOP DITCH
			3.5	113.4	N R/W
T.P.			3.90	113.05	
	5.11	118.16			
6100			4.7	113.5	S R/W
			4.1	114.1	5 ¹ / ₂ N TOP DITCH
			3.7	114.5	N R/W
T.P.			5.50	112.66	
	4.55	117.21			
5100			4.4	112.8	S R/W
			3.5	113.7	7 ¹ / ₂ N TOP DITCH
			3.7	113.5	N R/W
T.P.			6.50	110.71	
	4.69	115.40			
4100			4.7	110.7	S R/W
			4.1	111.3	7 ¹ / ₂ N TOP DITCH
			4.3	111.1	N R/W
T.P.			5.92	109.48	
	4.87	114.35			

	114.35	-	
3+00		4.9	109.4 S R/W
		4.7	109.6 8° N TOP DITCH
		5.2	109.2 N R/W
T.P.		6.14	108.21
	4.86	113.07	
2+00		4.4	108.7 S R/W
		3.6	109.5 8° N TOP DITCH
		4.7	108.4 N R/W
T.P.		7.22	104.85
	4.73	109.58	
1+00		3.5	107.1 S R/W
		3.3	107.3 11° N TOP DITCH
		4.3	106.3 N R/W
T.P.		8.90	100.68
	5.02	106.70	
0+10		5.4	101.3 TRAVEL R/W
		5.8	100.9 EDGE TRAV. RD.
		7.4	99.3 17° S DITCH
		4.0	102.7 23° S TOP BANK
		4.2	102.5 30° S R/W
		5.6	101.1 10° N EDGE TRAV. RD.
		6.1	100.6 15° N DITCH
		3.7	103.0 20° N
		2.7	104.0 30° N R/W

R.F.H.
D. W. S.
J.C.

TR 78 HOSFORD
ADDITIONAL PROFILES (3)

M 14 JUNE 1982
80° P.C., WINDY

0+00

7.1

99.6

30° N.
& DITCH

10.4

96.3

30° S

TBM 1

6.79

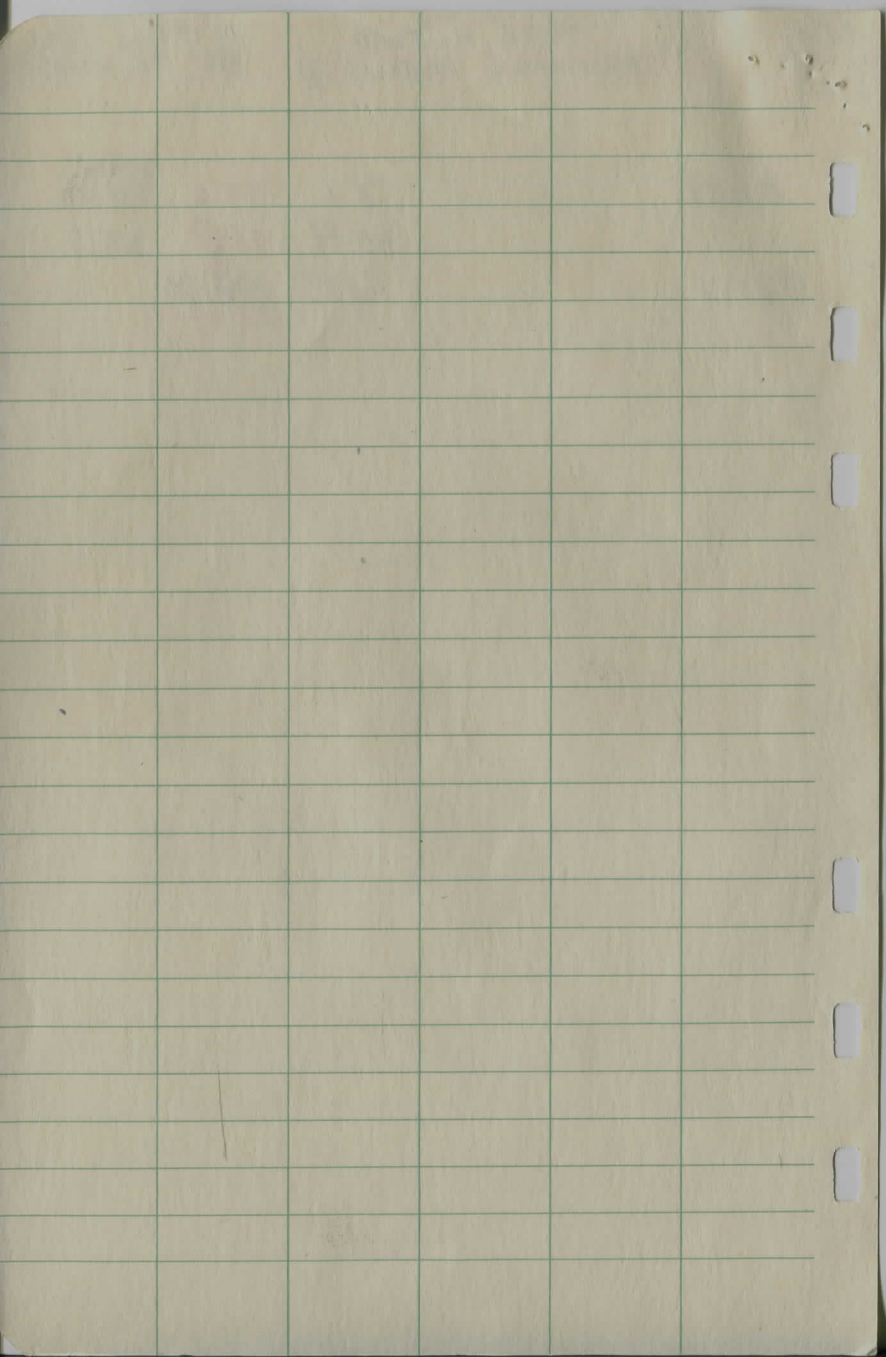
98.91

PCW 16 June 82

J. L. DARLINS COFF
TACOMA, WASH. USA

Not in the Rain
WEATHERPROOF

No. 312



REH
D.W.S.

TR 78 HOSPORA
PROFILES

2/

+ π - E

126 40

12+00		5.6	120.8	9.6 S TRAY. &
19 ⁵ S		5.8	120.6	TRAY. EDGE RD
3 ⁰ N		6.5	119.9	1/2 DITCH 106 S
13+00		2.8	123.6	TRAY. &
20 ⁰ S		2.93	123.47	EDGE ASPHALT
1 ⁵ N		3.3	123.1	1/2 DITCH
08 N		3.22	123.18	OUT
32 ⁵ N		2.73	123.67	1N 47.5
BEGIN 5' OFFSET S 14+00		0.9	125.5	TRAY. &
19 ² S		1.4	125.0	EDGE TRAY. RD
8 ⁰ N		1.4	125.0	1/2 DITCH
T.P. 3		0.54	125.86	
	9.04	134.90		
15+00		7.5	127.4	5.2 S TRAY. &
16 ² S		8.0	126.9	EDGE TRAY. RD.
7 ⁴ N		8.5	126.4	1/2 DITCH 25 S
34		9.4	125.5	20 ^{7.5} S
48		8.8	126.1	20 ⁰ S
78		8.28	126.62	CULV. OUT
98 ⁵		7.62	127.28	19 ² S CULV. 1N
16+00		6.1	128.8	5.5 TRAY. &
20 ⁰ S		7.5	127.4	1/2 DITCH
6 ⁴ N		6.8	128.1	1/2 DITCH

J. L. DARLING CORP.
TACOMA, WASH. U.S.A.

Put in the Rain
WEATHERPROOF

No. 312

	+	K	-	i.	
		134.90			
17+00			4.3	130.6	48 S TRAY. 4
16+93			5.50	129.40	16 ⁴⁵ S OUT
17+11 ^S			5.13	129.77	17 ⁴⁵ S IN
17+00			5.9	129.0	68 N DITCH
40			4.37	130.53	70 ⁵ N OUT
60 ^S			4.02	130.88	7 ⁶⁵ N IN
TBM 2			1.90	133.00	NO. OF N. SIDE POLE 843028
T.P. 4					

