

Book # 10 1788
RAMSEY COUNTY
RECREATION GROUNDS
TOPOGRAPHICAL SURVEY

FILE NO 10

FIELD BOOK
360 A

BOOK 1

10-6-26

"10"

KEUFFEL & ESSER CO.

DRAWING MATERIALS AND SURVEYING INSTRUMENTS. NEW YORK.

CHICAGO. ST. LOUIS. SAN FRANCISCO. MONTREAL.

TABLES FOR EXCAVATIONS AND EMBANKMENTS.

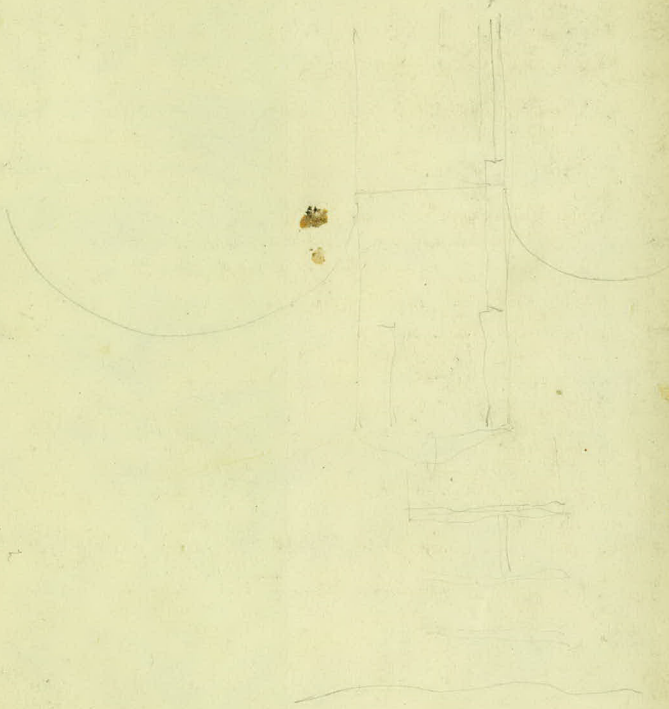
DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.
ROADWAY 18 FEET WIDE. SIDE SLOPES 1 TO 1.
FOR SINGLE TRACK EXCAVATION.

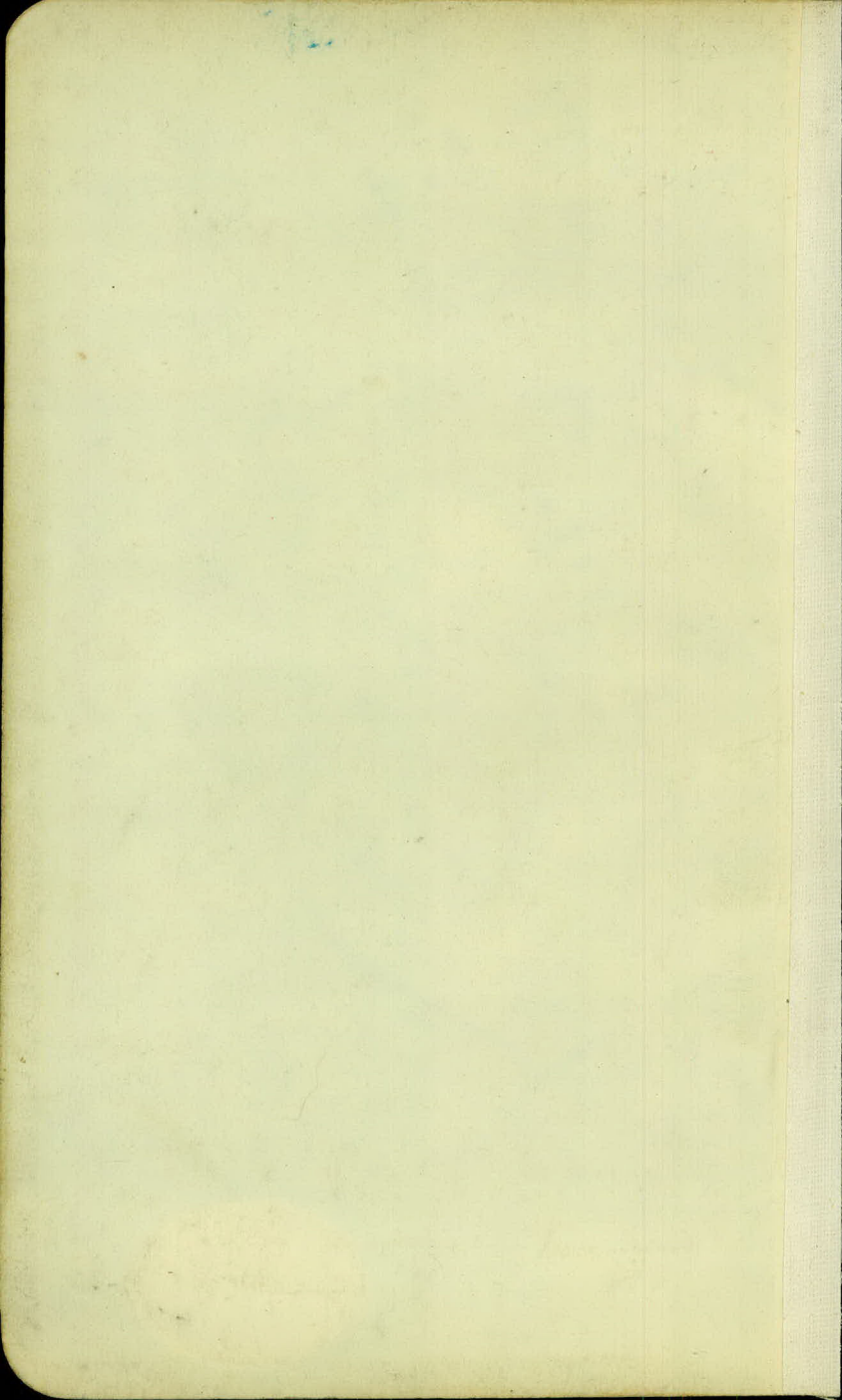
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2	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	2
3	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	3
4	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	4
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7	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	7
8	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	8
9	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	9
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13	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	13
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17	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	17
18	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	18
19	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	19
20	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	20
21	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	21
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27	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	27
28	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	28
29	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	29
30	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	30
31	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	31
32	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	32
33	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	33
34	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	34
35	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	35
36	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	36

Calculated by Julien A. Hall, M. Am. Soc. C. E.

For Keith's Railroad Curve Tables see end of book.





KELLER PARK

SURVEY

H.J.G.

9-21-26

Party

H.J.G.

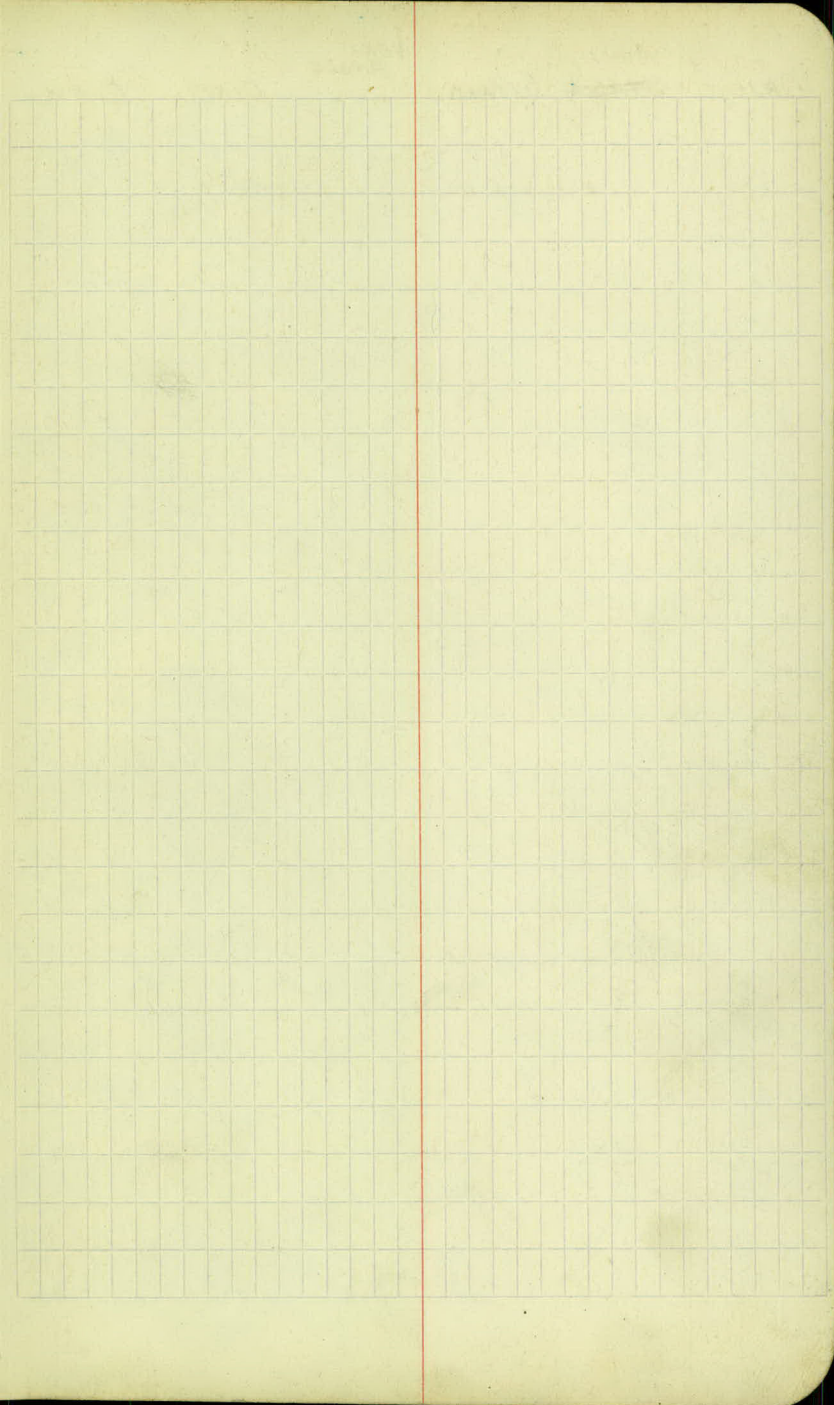
A.L.B.

A.M.

W.M.B.

DIRECTION OF A.W.L.

OBJECT	AZI.	STADIA	DIST.	VERT.
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OBJECT	Azi. STADIA (5.19)	STADIA H.I. =	VERT. ANGLE 882.46	DIFF.	ELEV.
ATA 0 NORTH E ARCADE	180°00'				877.27
Δ 1	90°00'	5.25		0.75	881.71 ✓
B.M. #1				5.08	877.38
TOE	89°30'	.22		5.30	77.2
Toe Draw	89°30'	.41		7.35	75.11
Toe Road	175°45'	2.50		4.27	78.19
E Draw	91°00'	.60		12.40	70.06
E Road	180°00'	2.50		4.28	78.18
Toe Draw	90°30'	.82		7.65	74.81
Toe Road	176°00'	2.50		4.25	78.21
Ridge	89°50'	1.18		5.05	77.41
Toe Shoulder	173°20'	2.50		9.50	72.96
Top of Ridge	73°50'	2.14		3.50	78.96
Toe of knoll	160°30'	2.87		11.80	70.66
Top of Ridge	68°50'	3.03		0.90	81.56
Toe of knoll	148°40'	2.85		9.45	73.01
Top of Ridge	62°00'	3.44		0.70	81.76
Toe of Hill	127°35'	3.70		10.25	72.31
Side of Hill	120°50'	4.10		4.35	78.11
E Draw	62°00'	4.00		3.60	78.86
Top Ridge	69°20'	4.80		1.60	80.86
Side Hill	105°50'	4.45		4.85	77.61
Top Ridge	78°10'	4.93		2.25	80.21
11 th Tee	151°15'	4.55		+5.0 1025'	
11 th Green	136°20'	5.65		+5.0 1010'	

9-21-26

TOE SHOULDER

Top of Ridge

E. of Draw

H.I. 885.46

Object	Azi.	Stadia	Vert. $\pm$	Diff.	Elev.
Side Hill	97°00'	4.50		6.45	76.01
Edge Water	98°00'	3.60	-4 10.10	24.50 ✓	58.0
AOA	119°40'	2.23	-2 14.20	18.66 ✓	863.80
	4.72	H.I. =	$\left. \begin{array}{l} 868.46 \\ 868.52 \end{array} \right\} 868.49 \checkmark$ $\left. \begin{array}{l} 863.77 \\ 863.80 \end{array} \right\}$		
ATAOA					
ΔO	299°40'	2.23	+5 2.34	+8.81 ✓	877.27
Shore Pond	29°10'	0.78		10.45	58.04
" "	28°00'	1.23		10.50	57.99
$\pm$ Draw	223°00'	1.40		0.80	67.69
Shore Pond	46°00'	2.13		10.45	58.04
$\pm$ Draw	44°00'	2.35		6.80	61.69
Slope	184°00'	0.80		0.85	67.64
Shore Pond	60°20'	2.00		10.40	58.09
$\pm$ Small Draw	132°30'	0.90		4.50	63.99
Shore Pond	84°30'	1.15		10.45	58.04
" "	99°00'	0.70		10.45	58.04
Slope	274°45'	0.43		3.55	64.94
" "	115°50'	0.44		6.70	61.79
" "	39°00'	0.42		7.00	61.49
" "	17°55'	0.74		6.65	61.84
" "	18°00'	0.93		8.95	59.54

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Water Hole

Water Surface

" " "

Flat on Slope

Slope to Pond

" " "
" " "
" " "

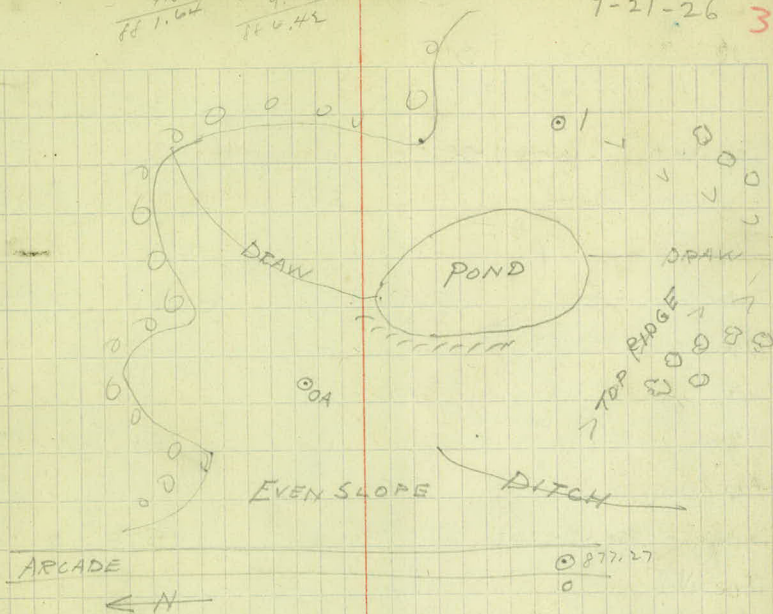
868.49

Object	Azi.	Stadia	Ver. $\times$	Diff.	
Top Ditch	297°15'	1.36	$+^3$ 1.25	+2.83	71.32
" "	300°00'	1.30		2.05	66.44
Top "	303°00'	1.25	$+^3$ 1.60	+2.15	70.64
Toe Ridge	311°10'	0.84		0.70	67.79
Side Slope	341°30'	0.60		3.20	65.29
" "	17°40'	1.40		1.90	66.59
" "	344°35'	0.58		3.50	64.99
" "	35°00'	2.15		1.00	67.49
£ Draw	40°00'	2.60		0.90	67.59
Top Ridge	272°05'	1.20	$+^3$ 1.50	+2.10	70.59
Side Slope	45°10'	2.74	$+^1$ 0.40	+2.34	70.83
" "	64°10'	2.63	$+^2$ 2.55	+2.71	71.20
" "	81°55'	2.16	$+^2$ 1.60	+2.72	71.21
Edge Trees	202°25'	1.54	$+^4$ 0.95	+5.21	73.70
" "	159°00'	1.85	$+^7$ 1.20	+11.75	80.24
" "	212°00'	2.55	$+^4$ 1.35	+8.85	77.34
" "	184°00'	2.39	$+^8$ 1.75	+17.37	85.86
Side Slope	117°55'	1.39	$+^1$ 0.00	+1.39	69.88
(4.85)	H.I.		$\left. \begin{matrix} 886.569 \\ 886.425 \end{matrix} \right\}$	886.49	881.64
At. A1					881.71
A0	270°00'	5.25		9.15	877.27
Top Ridge	218°45'	4.73	$+^{1/2}$ 1.90	+0.47	86.96
" "	203°30'	3.72		3.85	82.64
" "	355°00'	0.50		5.75	80.74

886.41-
#885
88 1.64

877.27
9.13
866.42

9-21-26 3



On Slope Edge of Trees

ON TOP RIDGE

Top Ridge in Saddle

H.I. = ^{886.49}~~886.56~~

Object	Azi.	Stadia	Ver. $\pm$	Diff.	Elev.
Top Ridge	334°10'	2.70		5.20	81.29
E Draw	204°00'	3.13		8.10	78.39
Slope East	345°30'	2.71		7.85	78.54
Side Slope	0°00'	2.72		14.92	71.57
Edge Draw	206°40'	2.50		3.60	82.89
Side Slope	08°00'	2.10		15.30	71.19
"	43°40'	1.26		15.00	71.49
Top Ridge	183°35'	1.85	⁺¹ 1.10	+ 0.75	87.24
Side of Hill	121°15'	1.32		15.75	70.74
Slope N.E.	166°00'	2.55		5.50	80.99
	148°30'	2.05		14.35	72.14
A1A	125°19'	4.40	⁻¹ 14.55		867.61
A2	24°50'	3.21	⁻² 15.13	21.55	864.44
(4.55)		H.I.	^{869.49} 869.38	869.43 ✓	864.88
HT A2					864.91
A1	204°50'	3.21	⁺⁵ 3.79	+12.26	881.64
A3	105°07'	5.72		9.14	860.2
Edge Swamp	173°20'	5.25		10.0	59.43
"	174°48'	2.00		9.95	59.48
"	170°26'	1.26		9.88	59.55
Ridge in Swamp	161°57'	1.10		10.59	58.84
Edge Swamp	167°09'	2.00		9.98	59.45
"	92°29'	0.80		10.98	58.45
"	154°35'	0.66		10.82	58.61

$$\begin{array}{r} 886.49 \\ 21.55 \\ \hline 864.94 \end{array}$$

22
21

$$\begin{array}{r} 6.42 \\ 15.13 \\ \hline 21.55 \end{array}$$

9-21-26 4

ON SLOPE NORTH

Toe Hill

" "

" "

Toe Hill

" "

" "

869.43

Object	Azi.	Stadia	Ver	Diff.	Elev.
Edge Swamp	78°20'	1.56		10.54	58.89
" "	127°34'	.51		10.82	58.61
" "	100°02'	.98		10.05	59.38
Toe Slope	203°16'	.54		8.01	61.42
On Slope	204°16'	1.10		2.50	66.93
Edge Swamp	112°40'	1.30		10.10	59.33
On Slope	252°00'	1.20	+2 1.05	+1.35	70.78
¢ Saddle	270°34'	.63		3.88	65.55
Edge Swamp	106°18'	2.95		9.88	59.55
G. E.	294°05'	.75		3.26	66.17
Top Bank	107°20'	1.98		9.60	59.83
Top Ridge	1°40'	.48		0.62	68.81
Water Level Creek	107°50'	2.05		9.00	860.43
¢ Draw	39°20'	.73		1.24	68.19
Toe Ridge	98°15'	1.90		6.98	62.45
Side Slope	67°45'	1.10		3.37	66.06
Top Ridge	96°40'	1.85		2.12	67.31
" "	78°35'	1.30		1.40	68.03
Toe Slope	99°35'	3.30		6.85	62.58
" "	91°04'	1.05		8.37	61.06
¢ Draw	87°45'	2.30		4.60	64.83
Toe Slope	98°50'	2.90		6.95	62.48
G. E. Swamp	125°20'	2.10		12.20	57.23
Toe Ridge	70°50'	.42		9.13	60.30



Toe Hill

" "

" "

03

CREEK

Toe Hill

SWAMP

01

WOODED

02

Object		Azi.	Stadia	Ver	Diff.	Elev.
869.43						
Toe Slope	59°20'	1.58		7.15		62.28
	4.55	H.I	864.843 864.875	864.85		860.30
ATA3						860.29
Δ2	285°07'	5.72	+ $\frac{1}{2}$ 2.35	+ .01		864.88
Δ4						
No. Edge Creek	61°00'	2.10				
So. " "	57°10'	2.20		9.40		855.45
Side Slope	53°45'	2.24		11.40		53.45
Top Slope	51°15'	2.30		9.40		55.45
" "	63°50'	2.05		10.30		54.55
So. Edge Creek	39°15'	1.20				
Top Bank	32°30'	1.23		10.05		54.80
N. Edge Creek	51°50'	1.23		9.50		55.35
Top Bank	58°10'	1.20		4.75		60.10
Edge Cree	345°20'	.40				
Top Bank	337°30'	.58		4.45		60.40
Edge Creek	270°10'	.62				
Top Bank	278°30'	.73		4.98		59.87
Edge Creek	41°50'	.53				
Top Bank	55°50'	.48		4.71		60.14
Edge Creek	249°50'	1.25				
Top Bank	253°10'	1.32		6.10		58.75
Edge Creek	284°10'	.18				
Top Bank	226°30'	.08		4.50		60.35

Top Bank Edge Creek

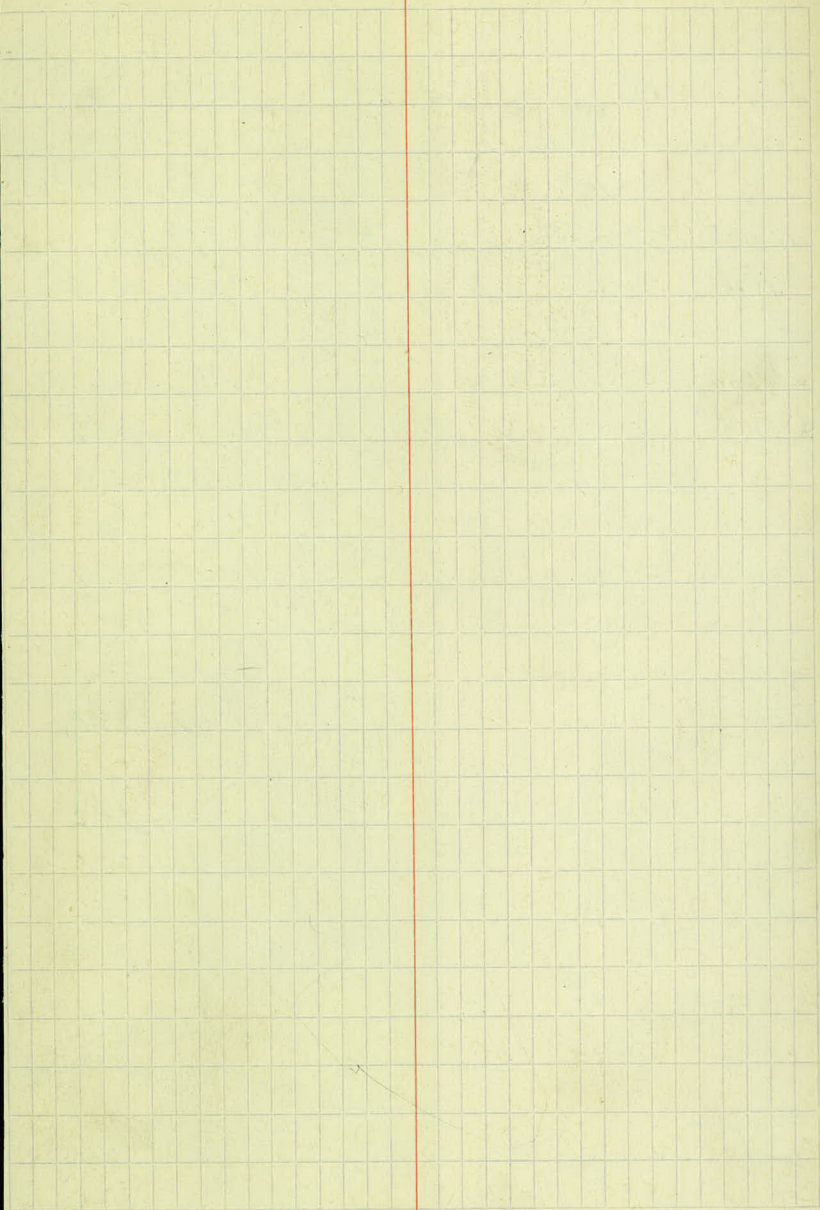
H.I. 864.85

Object	Azi.	Stadia	Ver A	Diff.	Elev.
EdgeCreek	243°40'	1.75			
Top Bank	246°20'	1.80		10.15	54.70
EdgeCreek	249°15'	.30			
Top Bank	221°10'	.28		4.35	60.50
EdgeCreek	232°40'	2.58			
Top Bank	234°40'	2.65		5.10	59.75
A3A	218°24'	2.09	+ $\frac{1}{2}$ 1.20	.15	864.70
A4	195°44'	3.75	+3 8.06	+3.19	868.04
A3B	129°22'	2.63	+9 5.48	+17.93	882.78
EdgeCreek	235°45'	1.28			
Top Bank	229°20'	1.30		8.48	56.37
Edge Creek	147°30'	1.85			
Top Bank	142°50'	1.85		2.15	62.70
☐ Draw	154°40'	1.80		3.76	61.09
" "	166°40'	2.37		5.05	59.80
Toe Slope	153°40'	1.40		1.63	63.22
Edge Woods	187°25'	1.26	+2 .82	+1.70	66.55
" "	202°00'	1.00		2.00	62.85
" "	134°15'	.64	+5 .53	+2.67	67.52
" "	101°45'	.78	+6 .93	+3.75	68.60
" "	67°00'	1.08		.50	64.35

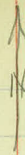
6.47

7

Object	Azi.	Stadia	Ver	Diff	Elev.
	4.30	H. I. 887.16	}	886.98	882.68
At. 43B		884.80			882.78
43	309°22'	2.63	-5 13.35	26.50	860.30
	4.51 H. I.	887.19			
At. 43B					882.68
43	309°22'				860.30
Sa. End of Bridge	0°12'	3.35		12.10	75.1
No. " " "	2°40'	2.25		11.95	75.2
Top Knoll	338°30'	1.15		10.25	76.9
End Road	9°05'	1.27		14.25	72.9
Top Knoll	280°30'	1.63	-1 13.50	15.13	72.1
End Road	72°15'	.85	-1/2 15.85	16.27	70.9
Top Knoll	264°20'	2.21	-1 13.55	15.76	71.4
End Road	94°25'	1.58	-1 15.80	17.38	69.8
Top Knoll	252°00'	2.25	-2 13.90	16.15	71.0
End Road	92°55'	2.52	-4 13.70	18.96	68.2
End Pot Hole	238°00'	2.10	12.95	21.35	65.8
Int. End Road	85°05'	4.23			
Top Slope	91°15'	3.55	-2 13.75	20.85	66.3
Top Slope	93°00'	3.37		14.95	72.2
On Slope	227°05'	1.65	-1 13.65	15.30	71.9
Top Slope	103°30'	2.34	-1/2 7.10	8.27	78.9
On Slope	200°30'	1.60		8.05	79.1
End Draw On Slope	109°00'	1.30		11.45	75.7



Top Slope



POTHOLE

KNOLL

KNOLL

DRAW

DRAW

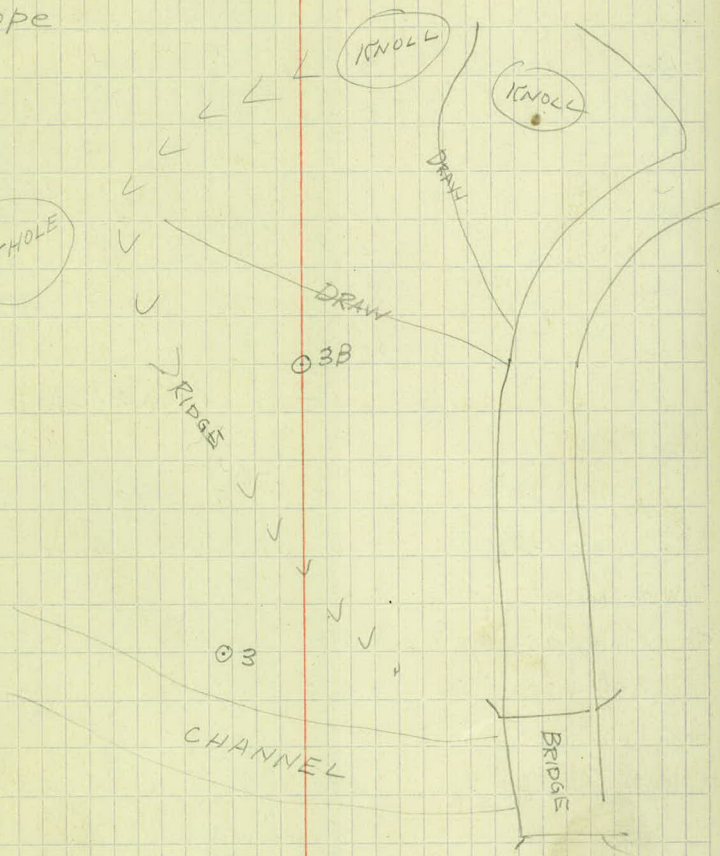
3B

RIDGE

3

CHANNEL

BRIDGE



Object	Azi.	Stadia	Ver &	Diff.	Elev.
£ Draw	165°45'	1.23		9.75	77.4
Side Slope	157°00'	2.00		4.10	83.1
Toe Slope	165°30'	1.84		7.65	79.5
Side Slope	150°30'	2.23		4.64	82.6
£ Draw	162°30'	2.10		7.05	80.1
" "	158°10'	2.50		8.78	78.4
Top Draw	160°20'	2.58		5.13	82.1
Top Ridge	191°00'	.30		3.30	83.9
Top Waste Bank	188°00'	.50		5.30	81.9
" " "	14°00'	.20		5.00	82.2
End " "	14°00'	.40		8.35	78.8
	4.51				

$\left. \begin{array}{l} 872.55 \\ \text{H.I. } 872.60 \end{array} \right\} 872.57 \text{ Note } \rightarrow$
 $\begin{array}{l} 868.06 \\ \hline 868.04 \end{array}$

At A 4					
A 3	15°44'	3.75	-1°07'	5	12.30 860.30
Shore Line	323°15'	1.01			
Top Waste Bank	332°30'	0.93		9.20	63.4
Shore Line	293°30'	0.86			
Top Waste Bank	321°05'	0.49		9.35	63.2
Shore Line S.	320°55'	1.85			
Top Waste Bank	314°20'	0.30		6.20	66.4
" " S.	317°30'	1.95		12.75	59.8
" " "	312°45'	0.25		8.00	64.6
Edge Creek	250°40'	0.29			
Shore Line	303°50'	1.40			

9-23-26

10

1.015.20

B&L #10920 Transit Constant = 1.01522 x Stadia
Hub on Top of Waste Bank

Object.	Azi.	Stadia	Vert. $\pm$	Diff
Toe Waste Bank	09°00'	0.20		11.50 61.1
Top " "	298°50'	1.55		12.80 59.8
" " "	129°30'	0.30		4.10 68.5
Shore Line	302°45'	1.28		
S.W. Cor. Fence	245°20'	0.18		
Top Waste Bank	297°20'	1.55		12.65 59.9
Toe Ridge	82°20'	0.41		8.50 64.1
Shore Line	292°50'	1.10		
$\pm$ Ridge	58°05'	0.88		6.10 66.5
Top Waste Bank	287°30'	1.25		9.30 63.3
$\pm$ Ridge	44°00'	1.15		5.85 66.7
Shore Line	272°10'	0.80		
$\pm$ Ridge	33°50'	1.85	+ $\frac{1}{2}$ 0.55'	+0.37 73.0
Top Waste Bank	271°10'	1.04		8.45 64.1
$\pm$ Draw	56°35'	1.76		4.35 68.2
Shore Line	260°00'	0.62		
Top Waste Bank	256°10'	0.92		5.85 66.7
$\pm$ Draw	84°50'	1.19		9.50 63.1
Top Waste Bank	249°47'	0.94		3.00 69.6
Fence Line	240°55'	0.87		12.95 59.6
Low	112°05'	1.08		11.70 60.9
End Waste Bank	117°55'	1.60		12.20 60.4
Top Ridge	120°30'	1.15	-2°00'	9.00 63.6
Toe Slope		1.70	5	

9-23-26

11

Game Refuge Fence

Toe of Slope

		H.I.	872.57		
Object	Azi.	Stadia	Vent. 4	Diff	
Outlet	126° 10'	0.88		12.00	60.6
E Ridge	87° 35'	1.80		3.40	69.2
E Waste Bank	128° 20'	0.70	0 +1.28	8.25	64.3
Side Slope	93° 00'	2.30	2.00	+3.9	76.5
Fence Line	130° 55'	0.97	-1° 55'	13.00	59.6
Toe Slope	99° 10'	2.00	5	-11.7	60.9
Fence Line	117° 38'	1.80	-1° 31'	13.00	59.6
Toe Slope	98° 00'	2.65	5	12.0	60.6
Fence Cor	111° 40'	3.20	-1° 20'	12.5	60.1
			5		
Gen. El. Flat.	101° 40'	2.66	-1/2	11.90	60.7
Toe Slope	99° 53'	3.25	10.90	12.6	60.0
Fence Line	116° 50'	4.08		13.00	59.6
G. El. Flat.	101° 30'	3.18		12.10	60.5
Δ 4 A	116° 27'	6.18		3.00	869.57
Δ 5	140° 45'	10.00		0.47	872.10
	(4.33)	H.I.	873.90 873.92	} 873.91	
At 4 A					869.58
4	396° 27'	6.18		5.86	868.06
E Top Ridge	355° 30'	.88		.97	72.9
" " "	333° 20'	1.75		1.27	72.6
Fence Corner	186° 40'	2.62	-2° 00'	14.1	59.8
E Ridge	327° 15'	2.75	5.00	4.00	69.9

Outlet thru Waste Bank

On Slope, West

Object	Azi.	Stadia	Ver. X	Diff.	Elev.
Toe Slope	183°40'	2.50	-1°55' 5	13.3	60.6
Top Hill	173°18'	2.50	+1°05' 5	0.3	73.6
Toe Slope	327°10'	3.08	+1°02'	3.50	70.4
Top Knoll	173°00'	2.06	2	+1.7	75.6
☿ Draw	333°30'	3.06		9.00	64.9
Toe Slope	173°50'	1.34		7.00	66.9
☿ Pot Hole	342°48'	2.95		13.15	60.7
☿ Draw	174°40'	.91		5.56	68.3
Toe Slope	343°50'	2.68		12.20	61.7
S.W. Cor. House	162°40'	.67		5.65	68.2
S.E. " "	142°40'	.75		3.75	70.5
On Slope	340°45'	2.34		6.20	67.7
Toe Slope	349°53'	2.27		10.00	63.9
On Slope	349°50'	1.72		5.10	68.8
Fence Cor.	217°00'	.90		13.60	60.3
Toe Slope	210°45'	.63		12.50	61.4
☿ Saddle	12°55'	2.40	+1 3.10	0.7	73.2
Fence Cor.	251°35'	.80		13.40	60.5
☿ Ridge	4°10'	3.15	+1°50' 5 +1°30'	+5.1	79.0
Side Slope	358°10'	3.36	5	+3.8	77.7
Toe "	261°40'	.52		11.85	62.0
" "	351°16'	3.10		6.75	67.1
Top Cut	275°00'	.24		7.00	66.9
Top Ridge	356°15'	3.65	+2°20' 5	+9.7	83.6

4 Ridge

House 24' x 26'

4 Draw

Object	Azi.	Stadia	Ver. A	Diff.	Elev.
Top Knoll	129°15'	.53		2.50	71.4
Top Ridge	348°18'	3.75	+2°24' 5	+10.6	84.5
Nor. End Pot Hole	119°00'	1.58		14.25	59.7
☿ Saddle	343°30'	3.87	+2°12' 5	+9.6	83.5
So. End Pot Hole	93°50'	1.36		14.50	59.4
Side Slope	342°20'	3.43		0.50	73.4
Toe Slope	342°30'	3.08		12.40	61.5
Toe Slope	73°18'	1.45		6.85	67.0
☿ Road	62°40'	1.90		10.98	62.9
☿ Ridge	56°25'	.68		2.75	71.1
☿ Road	113°35'	2.07		10.65	63.2
☿ Ridge	42°32'	1.20	+1°37' 2	+1.4	75.3
" "	26°25'	1.65	+1°40' 2	+2.8	76.7
" "	17°18'	2.55	+1°25' 5	+1.3	75.2
Toe Knoll	127°35'	1.96		9.05	64.8
☿ Draw	135°05'	1.55		9.35	64.5
Top Ridge	31°20'	2.10	+2°18' 10	+1.2	75.1
On Slope	140°25'	1.90		0.50	73.4
Top Ridge	45°00'	1.72	+1°30' 5	0.5	73.4
Shore Line	128°50'	2.86	-1°40' 10	18.3	55.6
Top Ridge	17°00'	.69		1.20	72.7
Shore Line	80°47'	2.23	-2°05' 10	18.3	55.6
G.E. Slope	329°30'	.41		4.75	69.1
G.E. Flat	68°10'	.52		3.25	70.6

Top Ridge

Draw

Saddle

Lake Phalen

Lake Phalen

Object	Azi.	Stadia	Ver X	Diff.	Elev.
Top Ridge	108°12'	.44		2.95	70.9
Fence Line	289°35'	1.66		14.35	59.5
Top Cut	316°35'	.77		5.75	68.3
Toe Cut In Dump	308°50'	1.49		13.65	60.2
Toe Cut	295°15'	.85		11.65	63.2
G. E. Dump	309°05'	2.50		13.70	60.2
" "	308°00'	1.90		14.05	59.8
Top Cut	315°40'	1.84		9.75	64.1
Toe Slope	314°55'	2.60	$-\frac{1}{2}$ 13.30	14.6	59.3
(4.88) H.I.		876.98 876.96	} 876.97 ✓		
At Δ5					872.09
Δ4		10.00		8.90	868.06
B.M. #2				5.42	871.5

W.S. LAKE PHALEN - SEPT. 24 - 1926
ELEV. 855.45

NEW TRANSIT K. & E. #44919

(4.98) H.I. 877.07

At Δ5					872.09
Δ4	320°45'	10.00		9.01	868.06
Δ6					
Nor. End Bridge	183°30'	.97		4.64	72.5
Int. Road	14°30'	2.50		13.05	64.0

15-

POAD

POT HOLE

House

Q4A

POTHOLE

7064

Page 2

WASTE
L L L

04 BANK

ROUND LAKE

FENCE



Object	Azi.	Stadia	Ver. X	Diff.	Elev.
Toe Cut	13°45'	3.23		11.25	65.8
Top Cut	11°30'	3.20		3.15	73.9
So. End Bridge	335°30'	.08		4.40	72.7
Top Bank	0°01'	3.05	+49°00' 1		
Top Ridge	27°20'	2.85		2.90	74.2
Shore Line	61°40'	1.05	-6°30' 10	21.80	55.3
Toe Slope	342°00	3.40		10.00	67.1
Shore Line	33°40'	2.22	-4°15' 5	21.33	55.8
¢ Drive	339°45'	3.20	-0°16' 10	10.2	66.9
" "	344°30'	2.25	-0°20' 10	11.3	65.8
Fence Cor.	335°40'	2.65	-2°37' 5	17.0	60.1
Toe Cut	346°05'	2.45	-0°14' 10	10.1	67.0
Fence Cor.	301°05'	1.32	-2°57' 10	16.6	60.5
Top Cut	348°20'	2.55			
Edge Creek	290°00'	1.32	-9°06' 1	21.3	55.8
¢ Drive	355°20'	2.10	-3°10' 5	16.6	60.5
G.E. Flat	330°15'	1.30	-3°06' 10	17.0	60.1
¢ Road	13°30'	4.70	-1° 9.25	14.0	63.1
" "	17°10'	2.40	-1°50' 5	12.7	64.4
" "	14°50'	3.66	-10°21' 5	13.6	63.5
" "	13°00'	.92		9.75	67.3
Shore Line	181°30'	.36			
" "	256°20'	.68	-12°30' 7	21.5	55.6
Top Slope	270°00'	.56	-12°00' 2	14.2	62.9

Bridge 30' wide. Side Walk East Side 6'

Lake Phalen

10

11

H.I. 87207

Object	Azi.	Stadia	Ver. &	Diff.	Elev.
Int. Road	187°00'	2.40	-1°17'	12.40	64.7
E Road	176°10'	3.35	5	12.50	64.6
Δ5A	192°36'	12.55		12.60	864.47
Swamp	191°30'	3.45	-1 12.85	16.30	60.8
Toe Knoll	189°00'	4.61	-1/2 13.60	15.90	61.2
Toe Slope	182°45'	4.50	-1/2 9.45	11.70	65.4
Δ6	191°56'	13.70	+1/2 3.80	+3.05	880.12
Toe Slope	174°00'	4.85	-1°40' 5	19.1	58.0
" "	180°30'	4.25	-1°20' 5	14.80	62.3
Δ5B	332°32'	2.22	-3°04' 5	16.80	60.3
(5.10)		H.I. 869.57		869.51	
ATA5A	E.R.D.	869.48			864.41 864.47
Δ5	12°36'	12.55	+1/2 3.65	2.63	872.09
E.R.D. ✓	8°-20'	8.32 ✓	✓	5.75	63.7 ✓
SWP. ✓	10°-30'	8.40 ✓	✓	10.10	59.4 ✓
TOE KNOLE ✓	10°-05'	7.80 ✓	✓	6.35	63.1 ✓
ON SLOPE ✓	14°-25'	7.60 ✓	✓	5.70	63.8 ✓
TOP KNOLE ✓	18°-30'	7.80 ✓	+1 5.75 ✓	+2.05	71.6 ✓
TOE " ✓	24°-30'	7.60 ✓	✓	5.00	64.5 ✓
E FROST ✓	134°-10'	1.15 ✓	✓	3.10	66.4 ✓
" ✓	130°-05'	1.95 ✓	✓	1.29	68.2 ✓
EDGE SWP.					
TOE KNOLE	19°-40'	16.70		9.50	60.0

Object	Azi.	Stadia	Ver. X	Diff.	Elev.
☿ Road	✓ 124°25'	4.30	✓ ^{+1°18'} 5	✓ +4.75	74.3 ✓
" "	✓ 356°05'	5.85	✓	✓ 5.90	63.6 ✓
" "	✓ 122°05'	6.15	✓ ^{+1°22'} 5	✓ +9.62	79.1 ✓
Swamp	✓ 358°15'	5.25	✓	✓ 12.75	56.7 ✓
Toe Fill	✓ 124°30'	6.25	✓ ^{+1°25'} 10	✓ +5.42	74.9 ✓
G.E. Swamp	✓ 19°15'	4.95	✓	✓ 11.30	58.2 ✓
Toe Slope	✓ 125°30'	5.45	✓ ^{+1°39'} 10	✓ +5.70	75.2 ✓
" "	✓ 129°00'	3.63	✓ ^{+0°53'} 5	✓ +0.6	70.1 ✓
" "	✓ 144°00'	1.65	✓	✓ 5.35	64.1 ✓
☿ Road	✓ 318°10'	1.22	✓	✓ 5.50	64.0 ✓
Int. Road	✓ 317°50'	4.12	✓	✓ 6.11	63.4 ✓
☿ Old Road	✓ 174°00'	.40	✓	✓ 6.37	63.1 ✓
☿ Road	✓ 345°30'	5.00	✓	✓ 5.95	63.5 ✓
Edge Road	235°25'	.25		7.30	62.2 ✓
☿ Road	✓ 330°05'	4.40	✓	✓ 6.25	63.2 ✓
☿ Old Road	✓ 280°20'	.96	✓	✓ 5.42	64.1 ✓
W.S. Creek	✓ 317°45'	4.60	✓	✓ 14.06	55.4 ✓
Ditch	✓ 241°15'	.65	✓	✓ 10.00	59.5 ✓
☿ Road	✓ 300°40'	4.60	✓	✓ 6.35	63.1 ✓
Toe Slope	✓ 269°30'	1.17	✓	✓ 6.15	63.2 ✓
☿ Road	✓ 295°00'	4.72	✓	✓ 3.90	65.6 ✓
Top Cut	✓ 284°35'	2.15	✓ ^{+2°28'} 5	✓ +3.9	73.4 ✓
W.S. Creek	✓ 301°30'	5.00	✓	✓ 14.05	55.4 ✓
Toe Cut	✓ 291°45'	3.80	✓	✓ 2.75	66.7 ✓

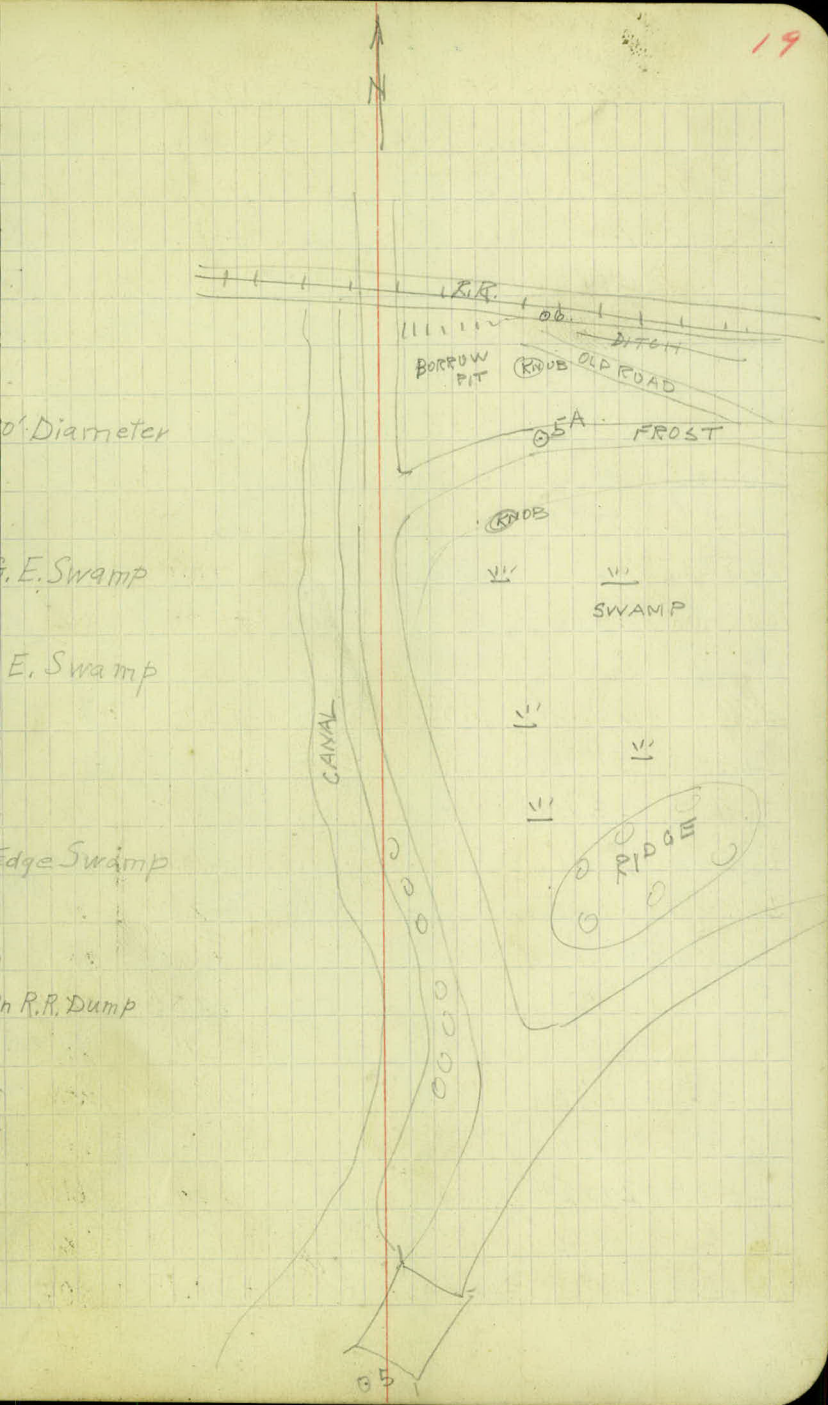
37°47' Ground Wire on Arc Light

18

X

X

Object	Azi.	Stadia	Ver. &	Diff.	Elev.
G.E. Flat	✓ 306°40'	3.70	✓ ✓	7.10	62.4 ✓
"	✓ 304°45'	2.76	✓ ✓	6.10	63.4 ✓
Toe Cut	✓ 291°10'	2.66	✓ ✓	3.80	65.7 ✓
Top Slope	✓ 313°45'	2.05	✓ ^{+1°10'} 10 ✓	+5.80	75.3 ✓
Hump	✓ 294°45'	1.64	✓ ✓	3.50	66.0 ✓
Toe Knob	✓ 294°40'	1.53	✓ ✓	4.88	62.6 ✓
Toe Slope	✓ 310°00'	2.05	✓ ✓		✓
Top Small Knob	✓ 323°45'	2.75	✓ ✓	5.10	64.4 ✓
Toe Shoulder	✓ 77°20'	.35	✓ ✓	10.50	59.0 ✓
G.E. Swamp	✓ 325°30'	3.40	✓ ✓	10.90	58.6 ✓
Toe Shoulder	✓ 120°20'	1.42	✓ ✓	10.30	59.2 ✓
G.E. Swamp	✓ 340°45'	2.30	✓ ✓	10.35	59.1 ✓
" " "	✓ 94°25'	1.74	✓ ✓	11.35	58.1 ✓
" " "	✓ 1°35'	3.00	✓ ✓	11.00	58.5 ✓
Toe Slope	✓ 119°15'	2.95	✓ ✓	10.10	59.4 ✓
± F.E.	✓ 121°05'	3.70	✓ ^{+1°13'} 5 ✓	+4.15	73.7 ✓
	(4.00)	H.I. 884.12 } 884.10			880.10
					880.12
A+A6					
A5	11°56'	13.70	^{-1/2} 5.15	+12.00	872.09
± R.R. Track	299°45'	3.38	✓	3.00	81.1 ✓
Toe Cut	301°15'	3.35	✓	3.75	80.3 ✓
Top Cut	303°00'	3.38	✓ ^{+0°15'} 5		
Toe Cut	297°30'	3.10	✓	4.10	80.0 ✓
Top Cut	307°30'	3.38	✓	1.95	82.1 ✓



0' Diameter

E. Swamp

E. Swamp

Edge Swamp

h R.R. Dump

R.R.

BORROW PIT

(KNOB)

DITCH

OLD ROAD

05A

FROST

CANAL

(KNOB)

SWAMP

RIDGE

05

Object	Azi.	Stadia	Ver. A	Diff.	Elev.
		H. 1.884.10			
Toe Slope	278°30'	3.82	✓	3.10	81.0
Top Cut	294°30'	3.87	✓	+2°30' 5	+11.30 95.4
Toe Slope	296°00'	4.37	✓	2.00	82.1
℄ R. R.	300°00'	5.40	✓		
" " "	300°15'	6.15	✓		
" " "	123°30'	1.50	✓		
" " "	300°20'	6.90			
" " "	120°15'	5.10	✓		
Toe Slope	302°45'	6.95		4.50	79.6
Top Bank	303°30'	7.35	✓	+1°05' 5	+5.39 89.5
Δ7	299°21'	5.45		2.00	882.10
Δ6A	319°46'	6.65		+1 2.65	+4.00 888.10
Top Ridge	288°04'	4.04		+3°30' 10	+14.5 98.6
℄ Ridge Top Cut	123°17'	5.41		+1°50' 5	+12.3 96.4
℄ Ridge	266°30'	4.30		+1°28' 4	+7.0 91.1
" "	139°25'	6.25		+1°28' 5	+11.0 95.1
" "	154°12'	6.63		+1/2 0.95	+2.30 86.4
" "	255°40'	4.72		1.45	82.6
" "	237°12'	5.77		14.05	70.0
Δ6B	240°24'	1.38		-7°21' 5	22.42 861.68
Δ6C	148°58'	4.25		-1°45' 5	17.98 866.12
Δ6D	110°28'	12.30		+1°12' -5	+20.75 904.85

Edge of Pond No. of R.R.

Object	Azi.	Stadia	Ver. X	Diff.	Elev
	(4.60)	H.I.	710.12 909.42		904.82 905.50

ATA6D

Δ6	290°28'	12.30	-0°44'	22.50	880.10
Δ6DI	179°21'	6.72	-0°30'	10.88✓	898.5
£ Road	289°45'	3.30	-2°15'	18.0	91.4
" "	298°15'	2.20	-0°44'	12.4	96.6
" "	352°15'	1.06	+2°48'	4.4	904.6
" "	53°00'	1.75	+0°41'	2.9	06.5

(4.30)	909.15 909.10	909.12	904.8
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ATA6D

Δ6	290°28'	12.30	-1°07'	-29.00✓	880.10
(4.22)	H.I.	909.04			

ATA6D

Δ6

Toe Cut	151°15'	1.18	-5°00'	20.2	88.8✓
£ R.R.	274°30'	4.12	-4°00'	38.6	70.4✓
Toe Cut	211°00'	1.00	-5°45'	20.1	88.9✓
" Slope	280°05'	4.20	-1°51'	23.6	85.4✓
" Cut	259°15'	2.42	-2°50'	22.0	87.0✓
Top Knoll	282°30'	4.05	-1°14'	18.7	90.3✓
Toe Cut	272°25'	4.00	-1°58'	23.7	85.3✓
" "	276°45'	3.68	-2°35'	21.6	87.4✓
Top Cut	279°30'	3.65	-0°57'	16.0	93.0✓
Toe Slope	269°30'	4.20	-1°57'	24.3	84.7✓
Top Cut	286°50'	2.55	-0°50'	13.7	95.3✓

Knoll Between
Post Ave. & R.R.

Don't

Object	Azi.	Stadia	Ver. X	Diff.	Elev.
		H. I.	909.04		
Top Cut	267°30'	3.75	-1°18' 5	13.5	95.5
Φ R.R.	267°45'	2.20	-2°25' 10	19.2	89.8
Toe Slope	261°45'	2.95	-1°40' 10	18.6	90.4
" "	269°45'	2.15	-2°46' 10	20.4	88.6
Φ Draw	253°45'	3.10	-1°20' 10	17.2	91.8
Top Cut	272°45'	2.20	-1°05' 10	14.2	94.8
" Ridge	240°00'	3.50		1.65	07.3
Fence Line	279°45'	1.90	-1°20' 10	14.4	94.6
Top Ridge	228°00'	2.75		0.90	908.1
Toe Cut	261°45'	1.40	-3°45' 10	19.2	89.8
Φ Draw	249°15'	2.88	-1°15' 10	16.3	92.7
Top Cut	267°00'	1.35	-0°55' 10	12.2	96.8
" "	260°00'	2.75	-2°35' 5	17.4	91.6
" "	305°30'	1.23	+0°05' 5	5.0	04.0
" "	331°50'	.77	+3°23' 5	0.5	08.5
Toe Slope	241°10'	2.30		14.10	94.9
Top Cut	246°50'	1.90	-1°10' 10	13.9	95.1
End Cut	226°05'	.45		10.20	98.8
ALDA	242°03'	5.30		0.75	908.2
Toe Cut	208°30'	.40	-10°15' 10	13.8	95.2
Φ R.R.	197°00'	.58			
Top Ridge	227°45'	2.75		0.65	908.3
Top Slope	197°00'	.05		5.50	03.5
Φ R.R.	240°15'	1.60			

P. A. W.

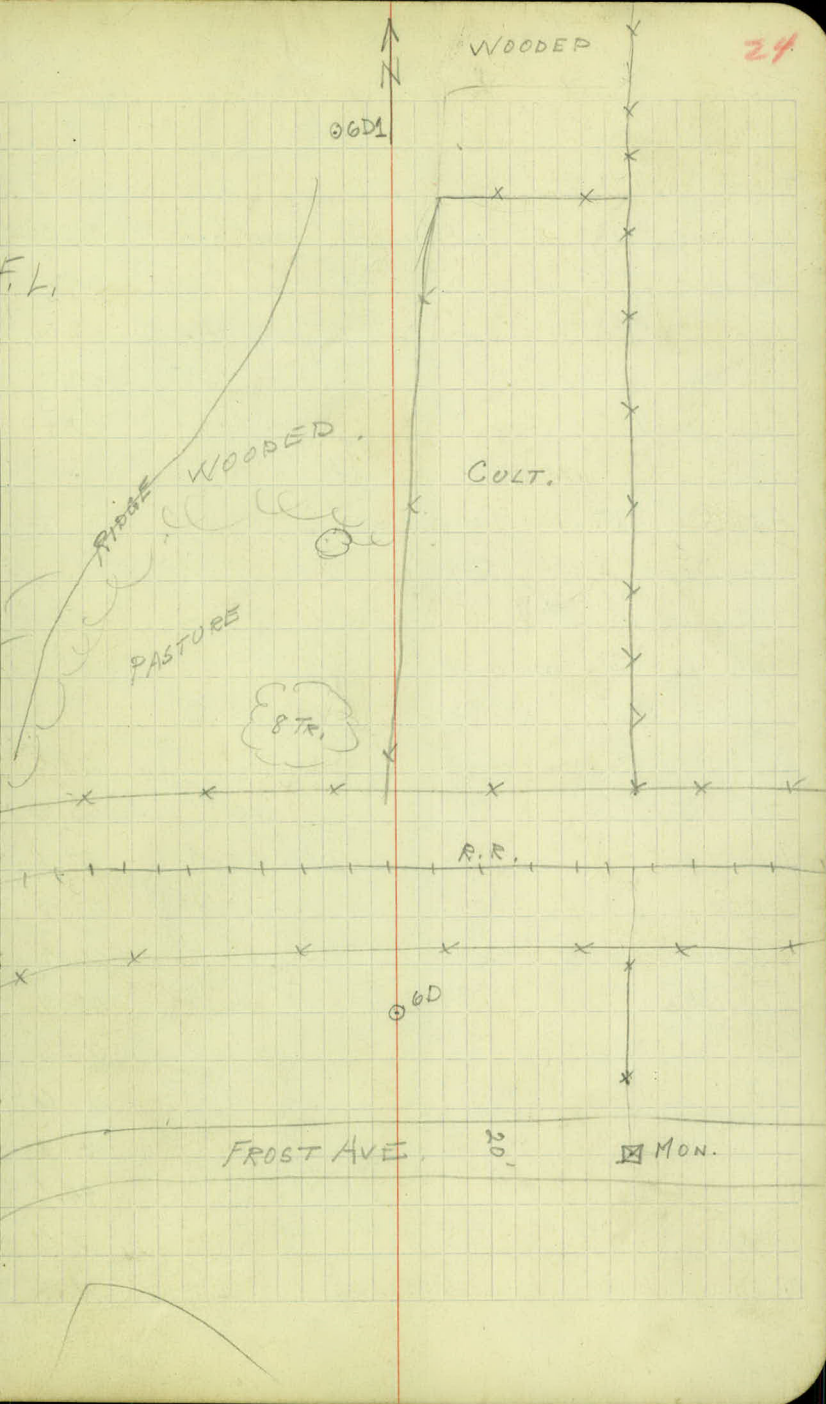
Object	Azi.	Stadia	Ver. $\times$	Diff.	Elev.
Toe Cut	111°15'	1.50	-3°05' 10	18.1	90.9
Toe Slope	222°10'	2.10	-1°40' 5	11.1	97.9
Top Cut	221°00'	1.25		10.50	98.5
" "	107°45'	1.03	-2°12' 10	13.4	95.6
Edge Trees	220°00'	1.50		10.50	98.5
Toe Cut	210°00'	.20	-15°42' 10	29.0	80.0
Top Cut F.C.	178°00'	1.15		13.05	95.9
Toe Slope	199°15'	2.20		13.00	96.0
Top Cut F.C.	102°30'	1.45	-1°05' 10	12.7	96.3
Top Ridge	208°30'	3.50	+1°00' 5	+1.1	10.1
Top Cut	63°15'	1.56	+2°04' 5	+0.6	09.6
G.E. Marsh	183°45'	2.10	-1°37' 10	15.9	93.1
Side Hill	102°00'	.15		4.50	04.5
Top Cut F.L.	159°50'	1.26		10.15	98.8
Top Cut	30°35'	.83	+2°28' 5	1.4	07.6
" " F.C.	133°50'	2.00		10.80	98.2
£ Draw F.L.	150°30'	2.95		15.40	93.6
" "	161°45'	2.85		14.10	94.9
Top Ridge	162°00'	3.52		10.65	98.3
" "	171°45'	4.00		7.35	01.6
£ Draw	180°00'	3.90		10.35	98.6
" " F.L.	159°45'	4.15		14.30	94.7
£ Ridge	171°05'	5.15		10.65	98.3
Toe Slope	173°15'	5.75		13.50	95.5

Edge Trees

cultivated

CLEAR 6 COOL

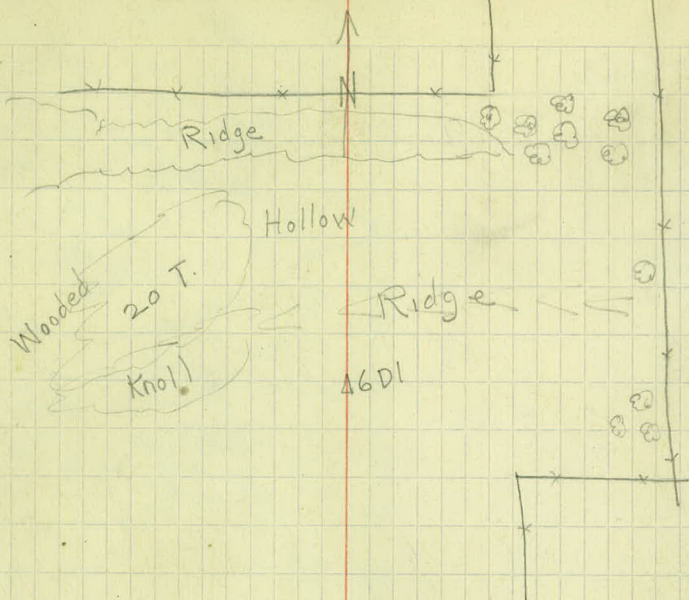
Object	Azi.	Stadia	Ver X	Diff.	Elev.
Toe Slope	179°00'	6.30	-0°39' 5	12.3	96.7 ✓
F.C.	166°45'	6.40		12.25	96.7 ✓
Edge Trees	173°45'	6.15	-0°38' 5	13.25	95.7 ✓
" "	176°35'	5.80		11.4	97.6 ✓
£ Ridge FL	177°30'	3.70		9.25	99.7 ✓
DITCH	281°00'	4.50	-30°-0' 15.0	30.8	78.2 ✓
£ POTHOLE	282°45'	4.60	-20°-30' 15.0	33.8	75.2 ✓
TO E.R. FILL	283°45'	6.00	-20°-16' 10.00	33.7	75.3 ✓
£ BORROW RIDGE PT.	286°00'	7.25	-0°-30' 15.0	19.2	89.8 ✓
	(4.28)	H.I.	902.82 } 902.68 902.55 }		898.40
A+Δ6DI					898.54
Δ6D	359°21'	6.72	+1 4.45	2.27	904.82
F.L.	110°25'	1.50		6.45	96.2
On Slope Edge Trees	244°45'	.33		4.80	97.9 ✓
F.L.	134°50'	1.95		10.05	82.6 ✓
Edge Trees	150°30'	2.60		6.25	86.4
" "			+4		
Top Knoll	324°15'	1.40	3.40	2.2	900.5
" "					
Edge Trees	165°45'	2.35		4.00	98.7
F.C.	164°30'	2.50		4.75	97.9 ✓
£ Hollow	157°15'	1.12		10.00	92.7 ✓
" "	215°30'	.88		9.35	93.3
" "	252°10'	1.38		8.05	94.6
" "	271°20'	2.38		6.30	96.4
Top Ridge		2.70	+3 2.25	5.8	96.9



Object	Azi.	Stadia	Ver. X	Diff.	Elev.
		H.I. 902.68.			
Edge Trees	271°15'	2.77		4.00	98.7 ✓
Top Ridge	115°00'	.10		4.80	97.9 ✓
" "	212°45'	2.05		0.00	02.7 ✓
F.L.	208°30'	2.70	+1 4.90	2.2	00.5 ✓
F.C.	244°15'	5.10		1.75	00.9 ✓
F.C.	164°45'	5.60	+1°03' 5	+5.1	07.8 ✓
	(4.07)	H.I. ^{912.36} 912.30 } 912.33			908.26
ATA6DA	On Wooded Knoll No. of R.R.				908.29
A6D	62°03'	5.30		7.48	904.82
⊕ Pot Hole	104°50'	1.58		14.50	97.8 ✓
Top Ridge	63°05'	1.50		3.80	08.5 ✓
" "	112°00'	2.55		6.65	05.6 ✓
" "	25°30'	1.75	-2°50' 5	14.3	98.0 ✓
" "	78°25'	2.90		3.75	08.5 ✓
⊕ Draw	10°15'	1.30	-3°30' 10	17.9	94.4 ✓
Top Ridge	68°25'	2.40		5.95	06.3 ✓
⊕ Draw	42°30'	.80		12.00	00.3
Top Ridge	129°45'	2.10		6.40	05.9 ✓
Top Knoll	338°35'	.58		4.85	07.4 ✓
Top Ridge	151°00'	1.45		6.25	06.0 ✓
⊕ Saddle	269°15'	.47		7.90	04.4 ✓
Toe Slope	149°15'	2.20	-1°24' 10	15.4	96.9 ✓
Top Slope	236°15'	.93		5.25	07.0 ✓
⊕ Draw	162°45'	1.65	-1°08' 5	8.3	04.0

9-27-26
H.J.G

25

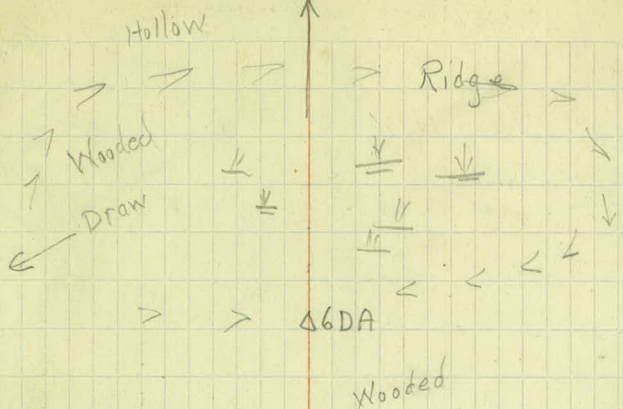


Object	Azi.	Stadia	Ver X	Diff.	Elev.
		H. 1.9/2.33			
Top Knoll	224°00'	.98	+3°00' 5	0.1	12.2
E Draw	193°45'	1.65	+0°45' 2	0.2	12.1
" "	213°00'	1.45	+1°25' 5	1.4	10.9
Top Knoll	197°00'	2.35	+2°25' 5	+4.9	17.2
" "	209°00'	2.10	+2°00' 5	+2.3	14.6
Top Knoll	164°00'	3.20		9.50	02.8
Top Knoll	200°00'	2.15	+3°05' 5	+6.6	18.9
E Hollow	162°45'	3.73		13.10	99.2
Top Knoll	197°45'	2.63	+2°00' 5	+4.4	16.7
Δ6DAI	171°19'	5.00	+2 3.76	+6.24	918.57
Δ6DAA	242°24'	5.60	-1 13.90	19.50	892.83
(4.20)		H. 1. 922.77 922.71	922.74		918.54
At Δ6DAI	On Knoll Between Old Trail & Fence		-2		918.57
Δ6DA	351°19'	5.00	4.46 +1	+14.46	908.26
Top Knoll	218°50'	1.50	0.70 +1°00'	+1.9	24.6
Edge Trees On Slope	224°10'	2.40	5 +1°33'	0.8	21.9
F.C.	185°45'	4.70	10 -1°15'	+2.7	25.4
Top Knoll	246°30'	2.05	5	9.5	13.2
F.L. On Slope	155°10'	5.10		9.40	13.3
On Slope	256°30'	2.80	-1°53' 10	19.2	03.5
F.C.	135°10'	6.40		11.10	11.6
Top Knoll	260°45'	3.00	-1°28' 10 -1°20'	17.7	05.0
Edge Trees	132°00'	2.13	15 -1°20'	20.0	02.7
" "	113°20'	2.15	15	20.0	02.7

06DA1

9-27-26

26



On Shoulder St. H. #1

Object	Azi.	Stadia	Ver. X	Diff.	Elev.
Old Trail	278°30'	2.40	+1°00' 10	5.8	16.9 ✓
" " "	105°30'	5.10	-2°28" 3	25.1	97.6 ✓
Top Knoll	289°30'	2.55	+1°24' 10	3.8	18.9 ✓
Trail	106°30'	4.50	-2°22' 5	33.4	89.3 ✓
Saddle	312°00'	3.05	-1°29" 10	17.9	04.8 ✓
Trail	108°50'	3.85	-3°00' 5	25.1	97.6 ✓
" "	106°15'	2.95	-3°07' 5	21.0	01.7 ✓
Draw	330°00'	1.78	-3°35' 5	16.1	06.6 ✓
Trail	109°10'	1.98	-3°50' 5	18.1	04.6 ✓
" "	295°30'	1.56		6.20	16.5 ✓
Edge Trees	103°10'	.92		10.60	12.1 ✓
" "	297°50'	2.35		6.35	16.3 ✓
" "	52°50'	1.27	-2°50' 15	21.4	01.3 ✓
Toe Slope	350°00'	1.48	-3°30' 10	19.0	03.7 ✓
Edge Trees	(4.20)	H.I. 897.03	897.05		892.85
ATA6DAA	On Shoulder St. H. #1				892.83
A6DA	62°24'	5.60	+3 5.60	11.20 ✓	908.26
Edge Trees	121°10'	1.38	-7°45' 5	23.1	78.0 ✓
Toe Slope	96°00'	1.90	-3°20' 10	21.0	76.1 ✓
" "	45°30'	1.25	-3°45' 10	18.3	78.8 ✓
" "	76°15'	2.75	-2°20' 10	21.2	75.9 ✓
Edge Trees	57°50'	3.25	-1°50' 10	20.4	76.7 ✓
Toe Slope	26°20'	2.96	-3°00' 5	20.4	76.7 ✓
" "	49°00'	4.85	-1°20' 10	21.3	75.8 ✓

9-27-26

27

tail 6' Wide

Object	Azi.	Stadia	Ver. X	Diff.	Elev.
		H.I. 897.05			
G.E. Swamp	35°40'	4.40	-1°38' 10	22.5	74.5
Toe Slope	44°45'	6.00	-1°08' 10	21.8	75.3
" F.L. "	44°15'	7.35	-0°52' 10	21.1	76.0
Toe Slope	36°10'	7.00	-1°10' 10	24.2	72.9
" "	40°30'	7.50	-0°51' 10	21.2	75.9
" "	35°15'	4.50	-1°40' 10	23.0	74.1
Δ6DAA1	179°11'	5.45		2.63	894.42
(4.03)		H.I. 896.88 } 896.84			892.81
		896.81 }			892.85
A+6DAA					
Δ6DA	62°24'	5.60	+3 5.35	11.45	908.26
Top Knoll	358°45'	1.30	+32.5 5	+2.7	99.5
Toe Slope	307°45'	3.10		7.55	89.2
" "	333°00'	2.50		10.10	86.7
" "	298°45'	2.90		11.70	85.1
Top Ridge	326°00'	3.40		5.20	91.6
" "	286°45'	2.70	+1 2.90	0.2	96.6
Top Knoll	319°00'	5.30		4.15	92.6
Top Ridge	250°00'	3.28	+30.11 5	+13.0	09.84
Toe Shoulder	308°45'	6.90		13.25	83.5
Top Ridge	229°40'	3.50	+2°32' 5	+10.4	07.2
Toe Cut	307°05'	6.30		9.25	87.5
On Slope	198°45'	3.10	+0°15' 6	3.6	93.2
Δ Road	309°25'	5.40		7.90	88.9
" " "	310°30'	4.10		6.70	90.1

9-28-26

28

Shoulder St. H. ⁴/₁.
of Keller Parkway.

Object	Azi.	Stadia	Ver X	Diff.	Elev.
☿ Road #1	178°00'	3.45		4.05	92.7
" " "	312°50'	2.75		5.80	91.0
Top Ridge	191°00'	1.65		3.35	93.4
☿ Road #1	319°40'	1.30		5.40	91.4
Toe Slope Edge Swamp	217°45'	1.80		9.55	87.2
☿ Road #1	295°45'	.26		5.45	91.3
Toe Slope Edge Swamp	252°15'	2.04		9.55	87.2
☿ Road #1	180°00'	1.30		4.95	91.8
Toe Slope Edge Swamp	330°00'	1.90		9.55	87.2
☿ Road #1	178°30'	2.50		4.60	92.2
" " "	178°00'	3.45		4.05	92.7
F.C.	79°40'	.35		11.90	84.9
F.L. ^{Edge} Woods	1°15'	.95		1.30	95.5
" " "	324°45'	2.25		9.45	87.3
F.C.	172°40'	3.10		5.15	91.6
F.L. ^{Edge} Woods	318°10'	3.15		5.90	90.9
^{Edge Woods} F.L. Toe Slope	171°30'	2.35		12.35	84.4
F.L. ^{Edge} Woods	314°30'	4.20		6.40	90.4
F.L. Toe Slope	161°15'	.86		10.85	85.9
F.L. ^{Edge} Woods	313°45'	5.50		5.35	91.4
F.C.	90°30'	.27		10.50	86.3
F.L. ^{Edge} Woods	310°40'	6.45		5.55	91.2
" " "	307°00'	7.10		11.60	85.2

GDAA

29



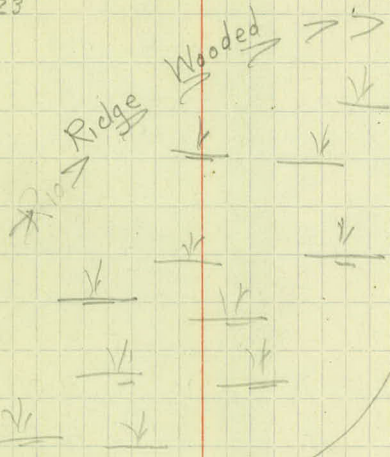
Keller Parkway

Width of Road 23'

Edge Trees

Edge Trees

Edge Trees



23'

NO. 1

GDAA

Ridge Wooded

Object	Azi.	Stadia	Ver X	Diff.	Elev.
	(4.28)	H.1.	^{898.70} 898.66 } 898.68		894.4
At Δ6 DAAI	On Shoulder of St. H. #1.	No. of Keller Parkway			894.4
Δ6 DAA	359°11'	5.45		5.85	892.8
Old Trail	352°30'	2.35	+1°37'		
Edge Swamp			10	3.4	95.3
Toe Slope	321°30'	2.10	-3°20'		
			5	17.2	81.5
F.C.	8°15'	2.25		4.65	94.0
Edge Swamp			-1°20'		
Toe Slope	72°10'	3.20	10	17.4	81.3
Top Cut	14°45'	1.75	+2°45'		
Edge Swamp			5	+3.4	02.1
Toe Slope	108°45'	3.50	-1°08'		
			10	16.9	81.8
Top Ridge	19°30'	2.20	+1°35'		
Edge Swamp			5	+1.1	99.8
F.L. Toe Slope	116°00'	3.60	-1°08'		
Edge Swamp			10	17.1	81.6
Toe Slope	149°30'	5.00	-0°30'		
			10	17.3	81.4
G.E. Swamp	93°15'	3.10	-2°20'		
			5	25.5	73.2
F.L. On Slope	150°00'	1.78	-1°30'		
			5	9.7	89.0
Int. of St. H. #1	2°25'	1.56		5.55	93.1
+ Keller PKWY.			-3°55'		
Edge Swamp	109°45'	1.10	10	17.5	81.2
Toe Slope					
Δ Keller PKWY.	340°45'	1.80		9.45	89.2
" " "	322°20'	2.50	-2°16'		
			5	14.8	83.9
Δ Road #1	171°15'	1.65		3.25	95.4
F.C. Edge Trees	160°45'	1.65		6.50	92.2
Toe Slope	350°45'	2.70		16.30	82.4
F.L. Edge Trees	86°15'	.45	+2°18'		
			5	7.15	91.5
Top Ridge	330°00'	3.45	-1°35'		
Edge Swamp			15	+9.0	07.7
Toe Slope Edge Trees	72°45'	.75	-3	17.1	81.6
Δ6 DAAIA	212°48'	7.35	13.15	35.20	863.4

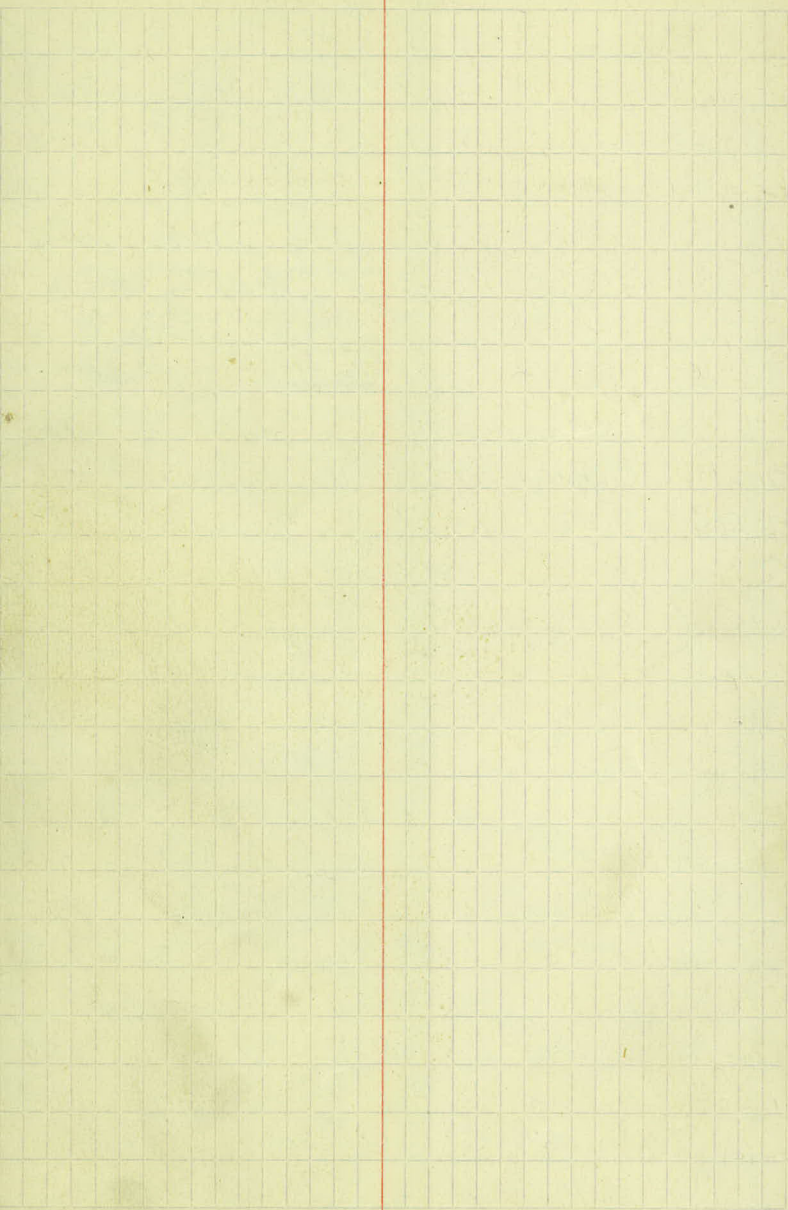
ge Trees

dge Trees

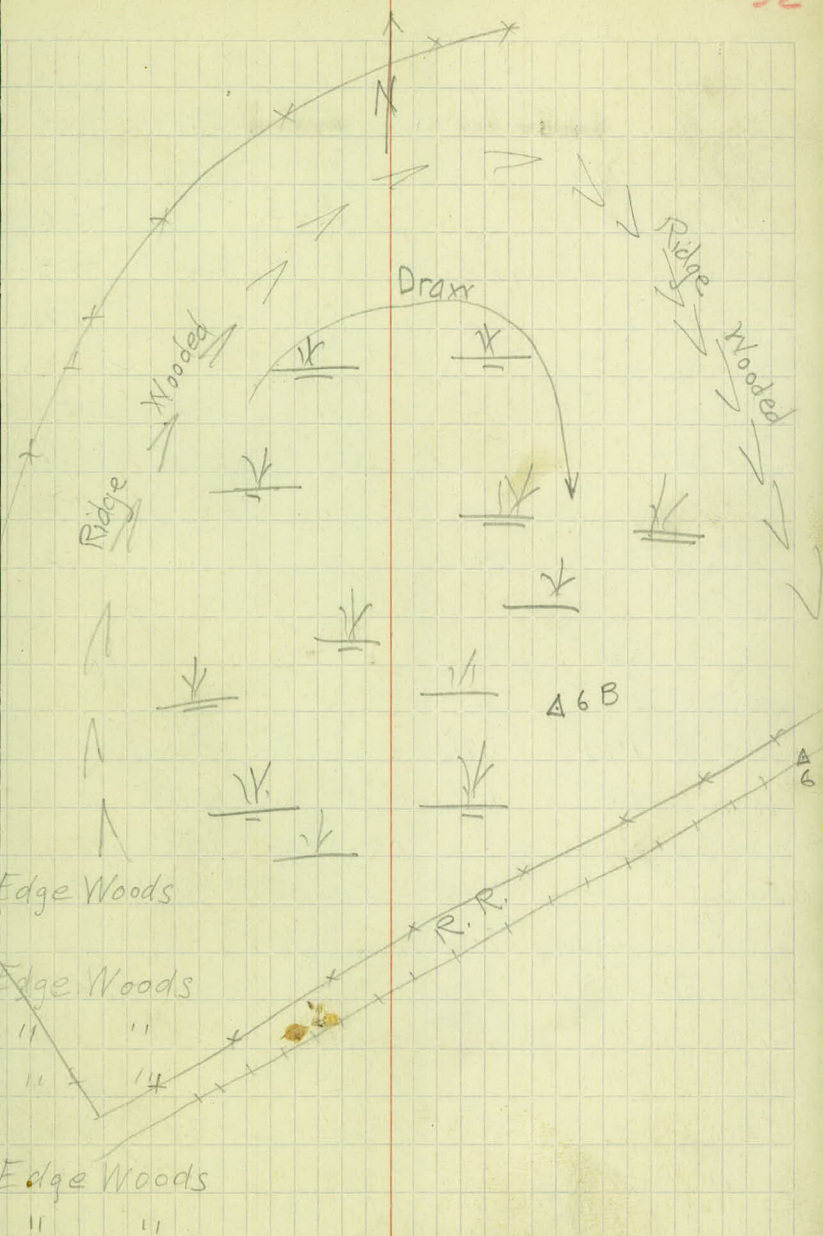
dge Trees

dge Trees

Object	Azi.	Stadia	Ver X	Diff.	Elev.
Edge Swamp			-2°19'		
Toe Slope Edge Trees	125°00'	1.35	12	17.1	81.6
Toe Slope			-9°58'		
Edge Trees	308°00'	1.70	5	34.2	65.5
" "			-14°45'		
Toe Slope	259°00'	.93	15	38.0	60.7
" "			-6°50'		
F.C. Edge Trees	204°30'	1.75	15	36.2	62.5
(4,32)		H.I. 870.44	870.48		866.16
		870.52			
A+Δ6C	Edge Pond No. 4 R.R.		+1°58'		866.12
Δ6	328°58'	4.25	5	+9.58	880.10
Toe R.R. Fill	343°15'	2.35		5.80	64.7
" " "	328°15'	3.45		8.00	62.5
Toe Slope	3°30'	1.90		2.75	67.7
" "					
F.L. Edge Swamp	330°00'	2.98	+7°10'	8.40	62.1
F.L. Top Ridge	77°20'	2.40	5	+24.2	94.7
" "	310°45'	2.85		1.25	69.23
" "			+7°20'		
Clump 12 Trees	134°20'	2.28	5	+24.0	94.5
			+3°04'		
Top Ridge	264°45'	3.40	5	+23.2	93.7
" "			+3°25'		
♂ Saddle	172°25'	3.00	5	+23.1	93.6
			+3°40'		
Top Ridge	246°20'	3.90	5	+19.3	89.8
" "			+4°40'		
" "	207°30'	3.05	5	+19.3	89.8
Edge Woods			+3°10'		
On Slope	231°10'	2.35	5	+8.0	78.5
" "			+3°15'		
Edge Woods	241°00'	3.20	5	+23.2	93.7
Toe Slope	214°30'	1.23		4.00	66.5
On Slope			+1°00'		
Edge Woods	280°00'	2.25	1.	+2.9	73.4
Toe Slope					
Edge Swamp	165°20'	1.27		5.90	64.6
" Woods	310°45'	1.98		7.85	62.6



Object	Azi.	Stadia	Ver X	Diff.	Elev.
Toe Slope					
Edge Pond	351°00'	.80		9.30	61.2 ✓
Toe Slope	314°30'	1.75		9.25	61.2 ✓
W.E. Pond				9.65	60.8 ✓
Edge Pond					
Toe Slope	328°45'	2.30		9.65	60.8 ✓
" "					
F.L. "	358°45'	1.70		5.45	61.0 ✓
Toe Slope					
Edge Pond	278°00'	1.40		9.20	61.3 ✓
Toe Slope	76°00'	1.00	+2°00'	1.50	69.0 ✓
" "			5		
" "	247°00'	1.05		5.95	64.5 ✓
Edge Pond	287°45'	.60		9.65	60.8 ✓
G.E. Flat	206°00'	.58		6.25	64.2 ✓
	(4.50)	H.I. ^{866.18} _{866.05}	866.12		861.62
A+A6B	Edge Swamp No. R.R.				861.68
A6	60°24'	1.38	+8°02'	14.05	880.10
			5		
Top Knoll	107°00'	1.15	+3°54'	+6.90	73.0
F.L. Toe R.R. Fill			1		
Edge Swamp	341°15'	1.00		5.15	60.9
Top Ridge	140°15'	1.70	+1°30'	+3.40	69.5
F.L. Toe R.R. Fill			1		
Edge Swamp	320°40'	1.75		5.10	61.0
Top Ridge	180°00'	3.20	+3°20'	+17.6	83.7
Toe Slope			1		
Edge Swamp	288°30'	2.10		5.50	60.6
Toe Slope	225°00'	4.25		5.50	60.6
Edge Swamp	257°30'	2.50		5.20	60.9
F.L. On Slope	229°30'	5.20	+0°35'	+4.30	70.5
Toe Slope			1		
Edge Swamp	240°00'	3.45	+0°45'	5.50	60.6
" "			10		
Toe Slope	229°15'	2.20		5.50	60.6



Object	Azi.	Stadia	Ver $\angle$	Diff.	Elev.
F.L. On Slope	238°00'	4.60 ✓	+0°45' 1	+5.00	71.1 ✓
Toe Slope	221°45'	2.68 ✓	+3°50' 5	5.75	60.3 ✓
Edge Swamp	264°00'	3.38 ✓	+5°50' 3	+17.50	83.6 ✓
Top Ridge	227°30'	1.50 ✓		6.20	59.9 ✓
G.E. Swamp	288°45'	3.30 ✓	+5°55' 2	+31.10	97.2 ✓
F.L. Top Ridge	310°15'	3.30 ✓		5.95	60.1 ✓
W.E. Swamp	150°45'	.40 ✓		+32.20	98.3 ✓
F.C. Top Ridge	157°00'	1.10 ✓	+0°55' 2	3.35	62.7 ✓
Edge Woods	180°00'	1.70 ✓	+0°45' 1	1.85	64.2 ✓
Edge Draw	196°20'	1.35 ✓		+0.70	66.8 ✓
" "	(4.25)	H.I. 886.35 ✓		+3.10	69.2 ✓
A+Δ7					882.10
Δ6	119°21'	5.45 ✓		6.25	880.10
Toe Cut	133°00'	1.05 ✓		5.70	80.7 ✓
RR Bridge	311°00'	.38 ✓		4.30	82.1 ✓
F.C. Toe Cut	180°00'	.30 ✓	-16°45' 10	37.60	48.8 ✓
Φ R.R.	303°00'	1.95 ✓	-9°15' 10	3.50	82.9 ✓
Φ Keller Pkwy	208°00'	.85 ✓	+2°30' 1	24.40	62.0 ✓
F.L. Top Cut	315°40'	2.05 ✓	-3°20' 10	+7.90	94.3 ✓
Int. Roads	190°00'	2.20 ✓	+2°15' 10	22.80	63.6 ✓
Φ Draw	312°15'	2.70 ✓	-1°30' 10	+0.60	87.0 ✓
Toe Cut	179°00'	3.00 ✓	+2°15' 5	17.80	68.6 ✓
Top Cut	309°30'	3.65 ✓		+9.50	95.9 ✓

Edge Woods

L, " "

Edge Woods

idge 20' wide

Object	Azi.	Stadia	Ver	Δ	Diff.	Elev.
℄ Road	185°20'	5.35	✓	-0°20' 10	13.10	73.3 ✓
℄ R.R.	301°45'	4.30	✓			
Int. St. H #1 + Keller Pkwy.	187°15'	8.10	✓	+1°15'	4.25	82.1 ✓
Top Cut	307°15'	5.70	✓	5	+7.40	93.8 ✓
℄ R.R.	301°15'	7.30	✓			
On Bridge Over K. Pkwy.	204°00'	8.50	✓		4.75	81.6
℄ Draw	304°00'	7.50	✓	+0°20' 15	10.60	75.8
F.L.	303°45'	8.75	✓	+0°40' 5	+5.20	91.6
Toe Fill	212°15'	4.20	✓	-0°38' 10	14.60	71.8
Toe Slope	301°35'	10.00	✓	+0°30' 10	1.30	85.1
Edge Woods	213°30'	6.40	✓	-1°15' 10	24.00	62.4
℄ R.R.	300°00'	9.00	✓	+0°35' 10	0.90	85.5
Toe Slope Edge Woods	214°45'	3.85	✓	-2°15' 10	25.00	61.4
F.L. Top Cut	295°50'	7.70	✓	+2°30' 10	+23.50	19.9 ✓
Toe Slope Edge Woods	221°45'	1.95	✓	-4°10' 10	24.20	62.2 ✓
" Toe Slope	259°30'	1.15	✓	-5°10' 10	20.30	66.1
Top Cut	294°40'	4.55	✓	+3°05' 5	+19.40	05.8
F.L. " "	291°10'	3.10	✓	+4°30' 2	+22.20	08.6
Edge Creek	249°15'	.95	✓			
F.L. Toe Slope	284°00'	1.55	✓		10.35	76.0
Edge Creek	209°15'	2.15	✓			
F.C.	289°30'	.88	✓		13.90	72.5
Edge Creek	205°30'	3.85	✓			
" "	209°00'	5.38	✓			

x

Object	Azi.	Stadia	Ver. X	Diff.	Elev.
		H.I. 886.85			
Gravel Road	191°00'	3.45 ✓	-1°22' 15	23.20	63.2
" " "	192°30'	5.70 ✓	-2°00' 5	25.00	61.4
Edge Creek	208°15'	6.65 ✓			
" "	208°15'	7.25 ✓			
Gravel Road	174°00'	6.00 ✓	-1°55' 5	26.10	60.3
Edge Creek	206°10'	8.30 ✓			
" "	208°20'	8.30 ✓			
" "	205°15'	6.20 ✓			
" "	206°00'	9.30 ✓			
" "	203°00'	5.25 ✓			
" "	201°40'	4.20 ✓			
" "	197°30'	2.90 ✓			
" "	204°30'	1.75 ✓			
A8	205°47'	9.00 ✓		4.68	881.67
Edge Creek	250°00'	1.62			
	(4.60)	H.I. 886.70 } 886.71 886.72 }			
A+A7					882.1
A6	119°21'	5.45		6.72	880.16
Edge Creek	10°00'	.95 ✓	-11°55' 12	31.30	55.4
" "	43°30'	2.45 ✓	-5°05' 10	31.60	55.1
" "	43°45'	3.55 ✓	-4°15' 5	31.30	55.4
" "	41°15'	6.05 ✓	-2°00' 10	31.30	55.4
" "	40°00'	7.80 ✓	-1°35' 10	31.60	55.1
" "	37°10'	10.80	-1°10' 10	32.00	54.7

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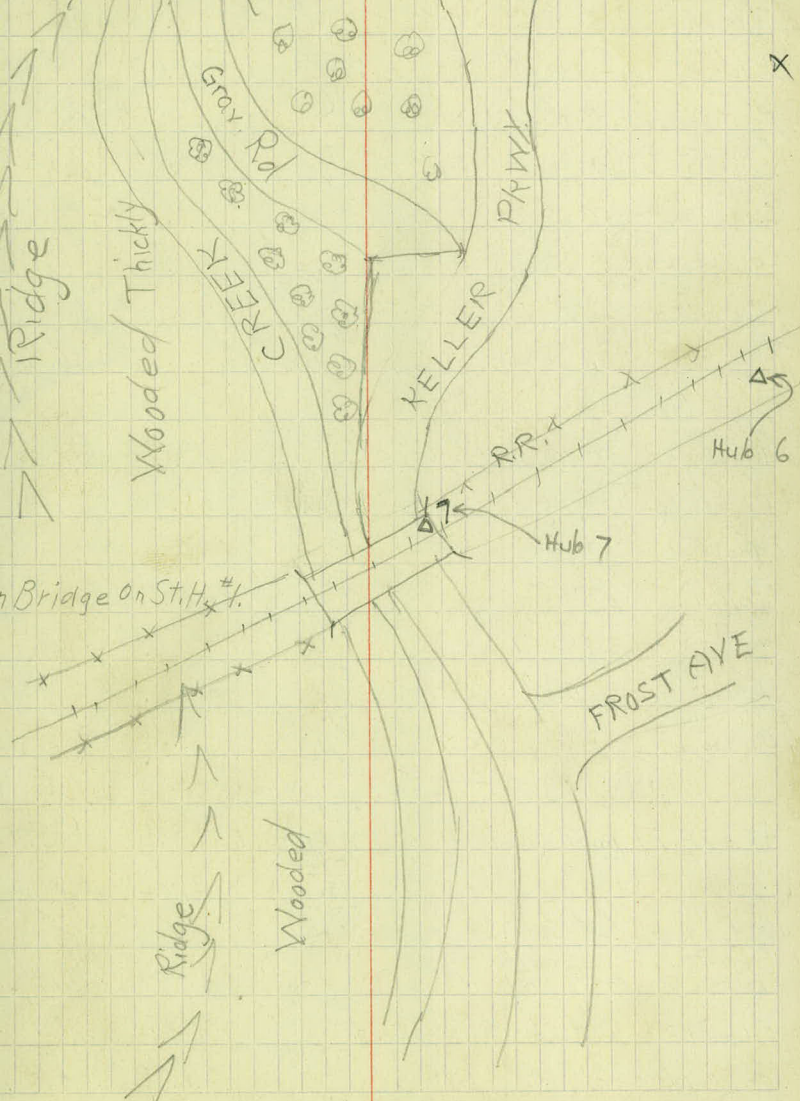
35-

N

S. H.

NO. 1

End of Pavement. Beginning of Road to Underpass



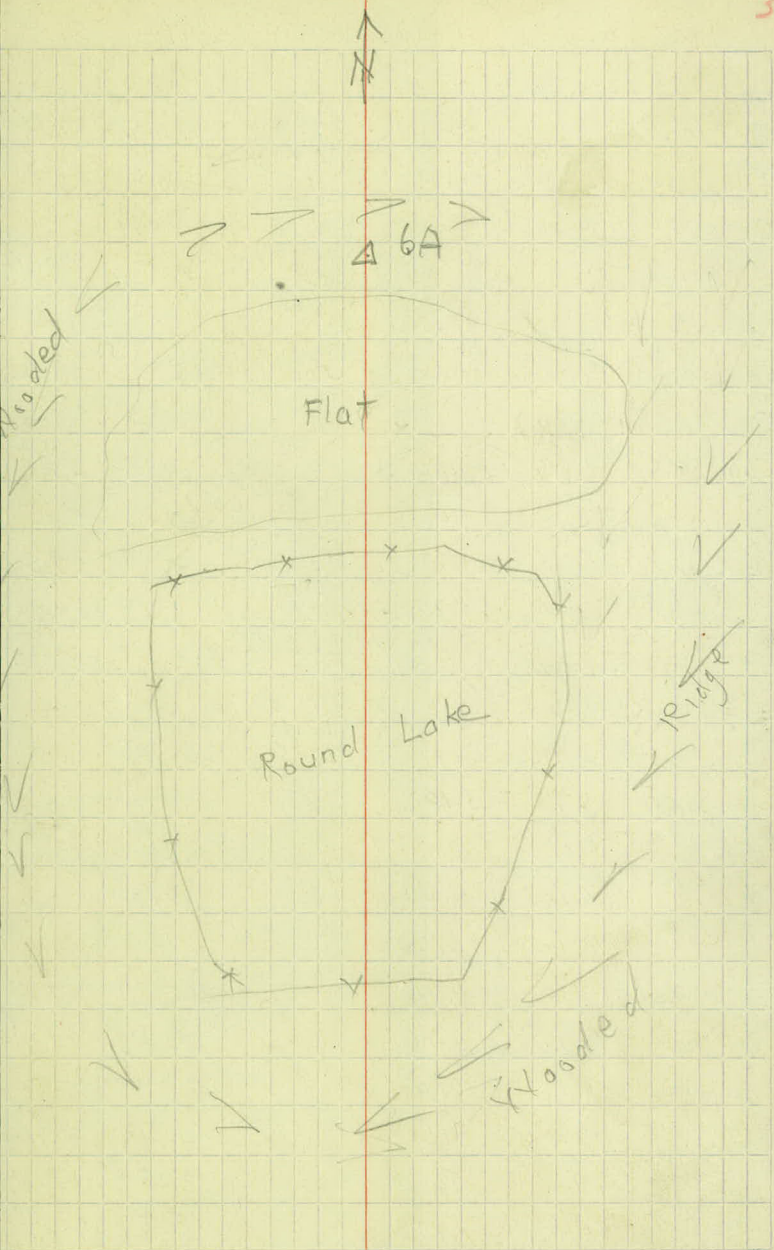
Object	Azi.	Stadia	Ver X	Diff.	Elev.
Beginning Guard Rail	188°20'	6.80	886.71 -0°15' 5	8.00	78.7
End G.R.	187°30'	3.35 ✓	-2°10' 10	22.60	64.1
Beg. G.R.	201°00'	1.63 ✓	-3°00' 15	23.50	63.2
End G.R.	47°00'	3.30 ✓	-1°30' 15	44.20	42.5
Edge Trees On Slope	337°30'	1.28 ✓	-3°20' 15	22.50	64.2
" "			-4°05' 15		
Edge Trees	19°00'	1.75 ✓	-9°50' 10	27.40	59.3
Edge Creek	4°30'	1.25 ✓	-6°28' 10	31.20	55.5
" "	28°20'	1.90 ✓	-4°00' 10	31.40	55.3
" "	36°30'	3.15 ✓	-2°10' 10	31.90	54.8
" "	36°15'	5.80 ✓	-2°15' 15	31.90	54.8
On Slope Edge Trees	34°30'	3.10 ✓	-2°40' 5	27.20	59.5
" "	35°00'	4.70 ✓	-1°45' 10	26.80	59.9
Edge Creek	35°45'	6.80	+0°35' 5	30.70	56.0
Top Ridge	273°10'	3.30 ✓	+5°20' 2	+0.30	87.0
" "	256°45'	3.80 ✓	+3°35' 1	+33.00	919.7
" "	240°00'	4.00 ✓	+0°30' 1	+24.00	10.7
On Slope	224°00'	3.00 ✓		+1.60	88.3
	(4.70)	H.I. 892.80 892.72	892.76		888.0
At A6 A Top Knoll W. Keller Pkwy & Frost Av.					888.10
A6	139°44'	6.65	-1/2 15.95	12.62	880.10
F.L.	21°30	8.40	-1°30' 10	32.00	60.8
Edge Trees On Slope	236°45'	1.80 ✓		2.40	90.4
" "					
Edge Trees	194°15'	.48 ✓	-5°40' 10	9.75	83.0
On Slope	84°00'	1.10 ✓		20.80	72.0

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X

X

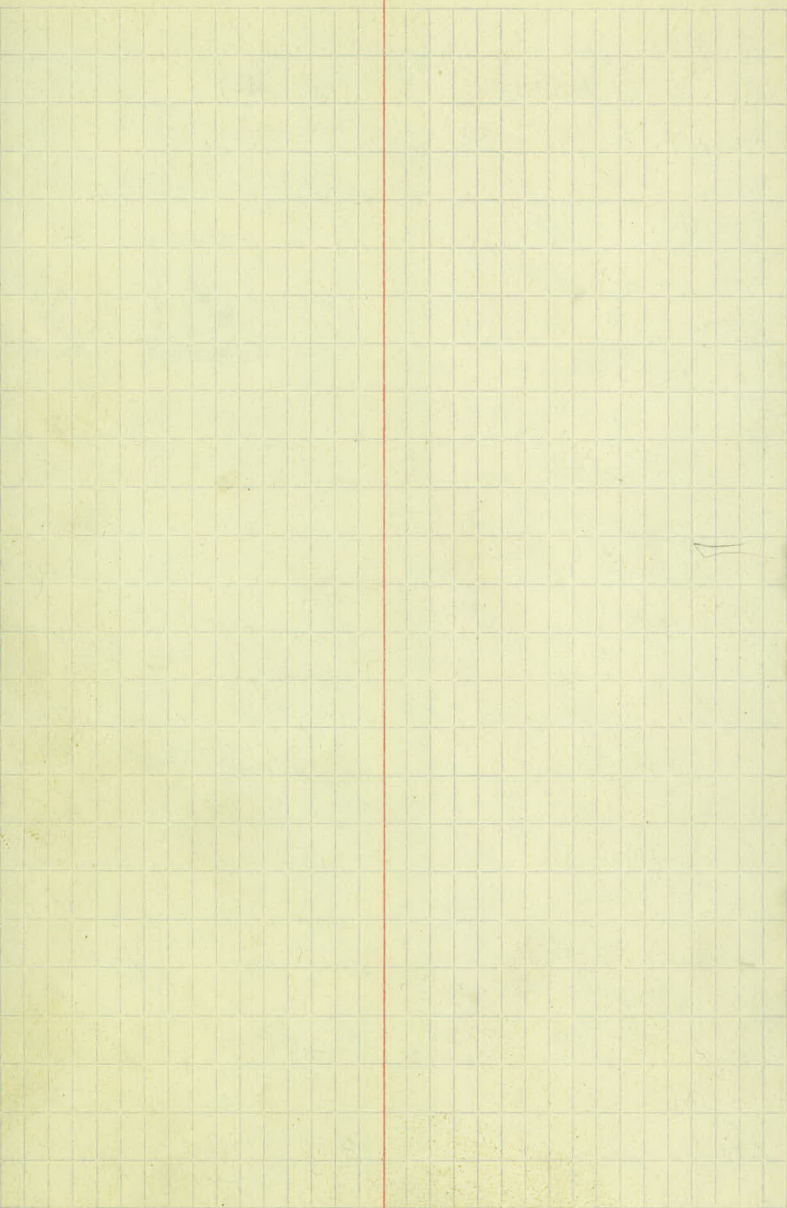
Object	Azi.	Stadia	Ver X	Diff.	Elev.
Top Waste Bank	22°15'	8.30	-1°05' 10	35.70	57.1
" " "	14°00'	6.60	-1°40' 10	29.20	63.6
F.L.	19°00'	7.60	-1°30' 10	30.00	62.8
" "	11°40'	6.50	-2°05' 10	33.60	59.2
Edge Woods On Slope	45°00'	3.35 ✓	-2°00' 10	21.70	71.1
End W.B.	10°40'	4.25	-2°10' 10	33.70	59.1
Edge Trees On Slope	22°45'	3.05 ✓	-2°15' 10	22.00	70.8
Top Ridge	36°00'	2.00 ✓		11.00	81.8 ✓
" "	58°00'	.60 ✓		6.20	86.6 ✓
" "					
Edge Trees	252°45'	1.20 ✓		2.50	90.3 ✓
F.C.	312°15'	4.80 ✓	-2°50' 10	33.80	59.0 ✓
F.L.	316°10'	7.85 ✓	-1°45' 10	34.00	58.8 ✓
F.C.	315°45'	11.00	-1°10' 10	32.40	60.4
" "	319°20'	12.80	-1°00' 10	32.40	60.4
Edge Trees Toe Slope	296°45'	2.10 ✓	-2°40' 10	29.70	63.1 ✓
" "	346°00'	1.30 ✓	-3°15' 15	22.70	70.1 ✓
F.C.	325°30'	14.20	-1°00' 10	34.80	58.0
G.E. Flat	5°45'	3.00 ✓	-2°15' 15	26.80	66.0 ✓
F.C.	341°30'	13.30	-1°00' 10	33.10	59.7
G.E. Flat	334°45'	2.50 ✓	-2°10' 15	34.40	58.4
" "					
Edge Woods	308°45'	3.25 ✓	-1°45' 15	34.90	57.9 ✓
F.C.	347°40'	14.50	-0°55' 10	33.10	59.7
F.L.	349°15'	15.10	-0°45' 10	29.90	62.9
Toe Slope	341°00'	13.80	-0°50' 10	30.00	62.8



Object	Azi.	Stadia	Ver X	Diff.	Elev.
Edge Trees	314°00'	4.70	✓ -2°40'		
Toe Slope			10	31.8	61.0
" "			-2°40'		
Edge Trees	310°00'	6.20	✓ 4	32.9	59.9
" "			-0°55'		
Toe Slope	334°00'	13.80	10	32.0	60.8
" "			-0°55'		
Edge Trees	326°00'	14.00	10	56.7	36.1
" "			-0°55'		
Toe Slope	320°30'	13.50	10	55.0	37.8
" "			-3°15'		
Edge Swamp	2°30'	4.90	✓ 5	32.8	60.0
" Trees			-1°00'		
Toe Slope	320°00'	13.50	10	33.5	59.3
" "			-2°55'		
Edge Swamp	18°30'	4.75	✓ 10	34.2	58.6
" Trees			-1°05'		
Toe Slope	315°45'	11.80	10	32.3	60.5
" "			-1°10'		
F.L. Edge Trees	315°00'	11.30	10	33.0	59.8
" "			-2°55'		
G.E. Swamp	25°00'	5.70	✓ 5	34.0	58.8
(4.40)		H.I. 867.88	867.81		863.4
		867.75			
ATABDAAIA	On S.E. Shore of Keller Lake.				863.40
			+4		
ABDAAI	32°48'	7.35	2.75	26.65	894.40
F.L. Lake Shore	29°15'	5.10		12.00	55.8
Toe Slope					
Edge Trees	35°45'	5.60		4.30	63.5
L.S.	20°15'	6.40		12.40	55.4
" "	10°45'	6.50		12.20	55.6
Toe Slope					
Edge Trees	22°00'	6.40		10.50	57.3
" "					
Toe Slope	14°15'	6.70		10.50	57.3
" "					
Edge Trees	0°00'	6.90		9.75	58.0
L.S.	352°45'	5.50		12.20	55.6
" "	336°30'	5.60		12.20	55.6
" "	327°00'	7.00		12.35	55.4

eller Lake Elev. 855.51

Object	Azi.	Stadia	Ver. X	Diff.	Elev.
		867.81			
Toe Slope					
Edge Tree	343°00'	5.50		9.75	58.0
" "					
Toe Slope	329°30'	6.90		11.00	56.8
" "					
Edge Trees	321°00'	8.90		8.80	59.0
Int. Lake + Creek	318°30'	9.20		12.70	55.1
Edge Creek	318°30'	10.20		12.25	55.5
on Slope			+0°10'		
Edge Trees	320°00'	9.80	5	4.7	63.1
Top Slope	329°00'	7.00		6.25	61.5
Edge Creek	318°15'	11.50		12.25	55.5
" "					
" "	311°30'	10.50		12.30	55.5
Top Slope	337°15'	6.10		3.50	64.3
Top Knoll	347°00'	6.50	+1°10'		
			5	4.8	63.0
Edge Creek	315°30'	8.40		12.25	55.5
			+0°40'		
Toe Knoll	343°00'	6.50	10	9.2	58.6
Int. Creek + Lake	316°00'	7.70		12.50	55.3
			+1°00'		
Toe Knoll	354°00'	6.00	5	4.0	63.8
L.S. Toe Slope	309°30'	6.00		12.40	55.4
" " " "					
" " " "	303°30'	5.40		12.40	55.4
Top Slope	9°00'	6.60		5.50	62.3
" "					
" "	301°45'	5.50		6.20	61.6
" "					
" "	308°30'	6.40		6.45	61.3
4 Road K.P.	1°45'	7.30	+1½		
			4	7.0	60.8
ALDAAIAI	303°45'	13.70		4.25	872.5



Object	Azi.	Stadia	Ver X	Diff.	Elev.
	(4.53)	H. 1.868.19 1.868.16	868.17		863.54 863.54
At. A6AIAI	On Shoulder of Arcade St.				863.54
A6AAIA	123°45'	13.70		4.75	863.41
Edge Swamp	147°00'	140		9.35	58.8 ✓
" "	136°45'	4.25		7.15	61.0 ✓
" "	109°30'	4.50		9.00	59.2 ✓
Top Ridge	98°30'	4.25		3.25	64.9 ✓
Toe Slope	98°15'	4.00		7.85	60.3 ✓
Edge Swamp					
Toe Slope	69°15'	3.45		8.00	60.2 ✓
Top Ridge	70°00'	3.65		2.35	65.8 ✓
Toe Slope	40°30'	5.00	+0°15'	4.8	63.4 ✓
" "	25°00'	4.25	5	5.15	63.0 ✓
Int. St. H. 1st Arcade	359°15'	8.00	+2°00'		
± Road			5	+23.0	91.2 ✓
20' wide	358°30'	6.20	+1°50'		
± Road			5	+14.8	83.0 ✓
Toe Slope					
Edge Swamp	11°15'	4.20		6.50	61.7 ✓
± Road	341°30'	1.33		4.65	63.5
Toe Slope	1°30'	5.30	+1°		
			1.30	4.3	63.9 ✓
Edge Swamp	16°30'	1.75		10.80	57.4 ✓
" "	5°30'	3.85		8.25	59.9 ✓
Top Knoll	10°30'	6.00	+3°20'		
			5	+29.8	98.0
End of Trees	26°00'	3.45		8.90	59.3
	(4.32)	922.86 922.76	922.81		918.42
At A6DAI					918.54
A6DA	351°19'	5.00	-2 4.50	+14.50	908.2
A6DAIB	172°04'	14.20	+1 5.85	+8.35	931.16

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40

lge Trees

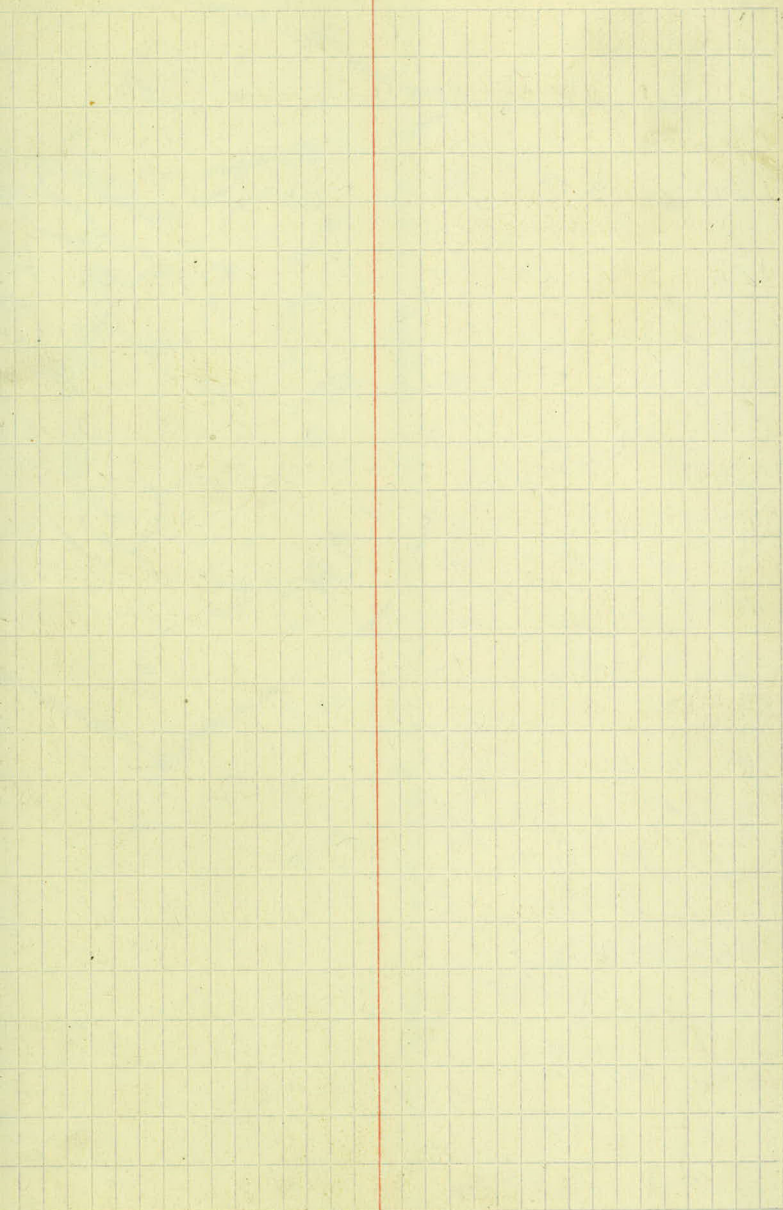
Object	Azi.	Stadia	Ver X	Diff.	Elev.
	(3.91)	H.I. $\frac{935.07}{935.04}$	935.06		931.15
At. ALDAIB	Top of Hill	E. St. H. #1 & Co. Rd. B.			931.16
ALDAI	352°04'	14.20	9.40	+16.55	918.49
F.C.	351°15'	.60		5.85	29.2
Top Knoll	358°45'	8.20		10.00	25.1 ✓
F.C.	202°15'	1.27		6.25	28.8 ✓
" "	188°20'	1.28		6.50	28.6 ✓
F.L.	350°00'	8.40	-0°55'	28.5	06.6 ✓
F.C. On Slope	191°15'	2.55	$\frac{15}{-1°00'}$	14.4	20.7 ✓
" "	343°45'	7.60	$\frac{10}{-1°10'}$	30.5	04.6 ✓
F.C.	183°45'	2.65		8.20	26.9 ✓
F.L.	187°45'	3.80	$\frac{10}{-1°00'}$	14.6	20.5 ✓
F.C.	155°00'	5.20		10.00	25.1 ✓
Toe Slope	350°00'	5.75	$\frac{15}{-0°50'}$	23.4	11.7 ✓
F.L.	134°45'	4.00		9.50	25.6 ✓
F.L. Top Slope	325°00'	6.75	$\frac{15}{-1°20'}$	30.8	04.3
F.L.	76°20'	4.40		14.00	21.1 ✓
G.E. Flat	327°45'	6.00	$\frac{15}{-1°05'}$	26.4	08.7
F.C.	313°00'	5.00	$\frac{15}{-1°55'}$	31.8	03.3
F.L.	327°30'	4.20	$\frac{15}{-2°10'}$	40.9	894.2
" "	50°00'	7.15	$\frac{10}{-0°25'}$	15.2	919.9
F.C.	1°45'	2.75		13.65	21.4
" "	327°30'	.95		13.30	21.8
G.E. Hill	34°00'	1.25		6.40	28.7
" " "	151°45'	2.00		5.30	29.8

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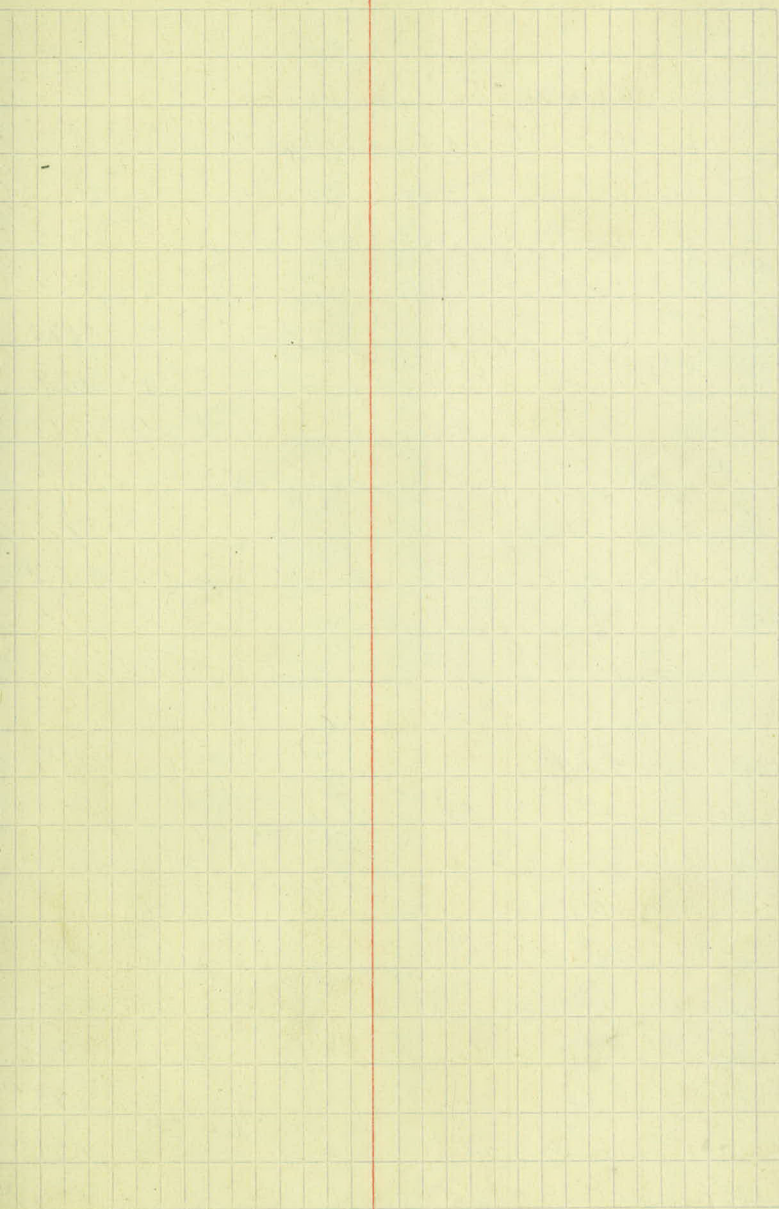
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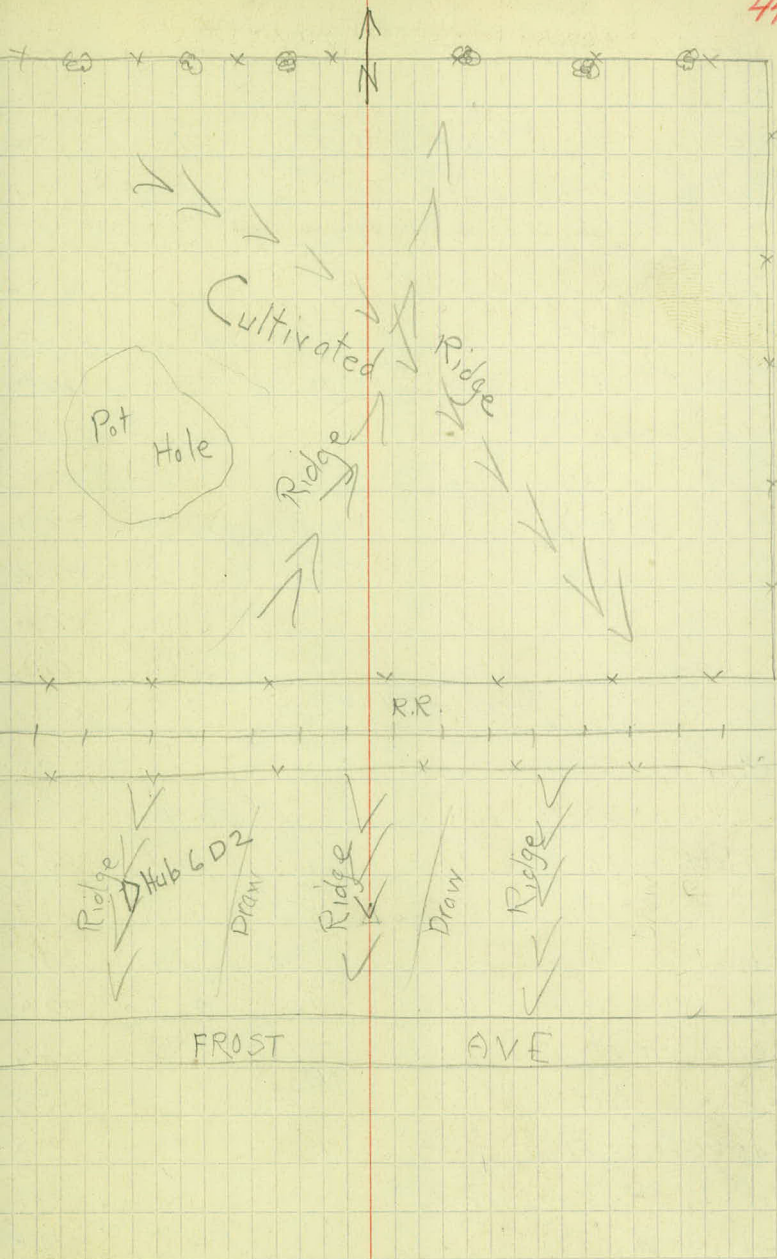
Object	Azi.	Stadia	Ver X	Diff.	Elev.
F.L. Toe Slope	293°00'	3.90.	-5°00'	49.0	86.1 ✓
F.L.	252°15'	3.35	15 -6°40'	53.5	81.6 ✓
F.C.	224°30'	4.00	15 -6°15'	58.0	77.1 ✓
± Road #1.	225°45'	4.40	15 -5°45'	58.9	76.2 ✓
F.C.	247°30'	5.80	10 -6°10'	71.0	64.1 ✓
± Road #1.	252°30'	3.70	15 -5°15'	54.1	81.0 ✓
Top Ridge	261°00'	5.65	10 -3°00'	61.7	73.4 ✓
F.L. " "	295°00'	5.50	5 -3°30'	33.8	01.3 ✓
± Road #1.	299°00'	4.50	15 -3°05'	42.5	92.6 ✓
Top Cut	295°00'	4.60	15 -3°00'	39.7	95.4 ✓
" "	304°00'	5.30	5 -1°58'	32.7	02.4 ✓
± Road #1.	318°20'	6.15	15 -5°30'	36.1	899.0 ✓
L.S. End Fence	257°45'	7.10	10 -5°30'	78.0	857.1 ✓
Toe Slope	310°15'	2.90	15 -7°45'	42.6	892.5 ✓
" "	287°00'	2.25	15	45.3	889.8 ✓
(4.31)	H.1.	909.13			
A+Δ6D					904.82
Δ6	290°28'	12.30			880.10
± R.R.	105°45'	5.05	-0°40'	15.9	93.2 ✓
" " "	103°10'	8.60	10		
F.L. Top Cut	122°00'	3.05		6.15	902.9
" " " "	114°30'	4.40		9.60	99.5
" " " "	111°00'	5.65		10.15	98.9
F.L. ± Draw	108°00'	7.50	-0°30'	21.5	87.6



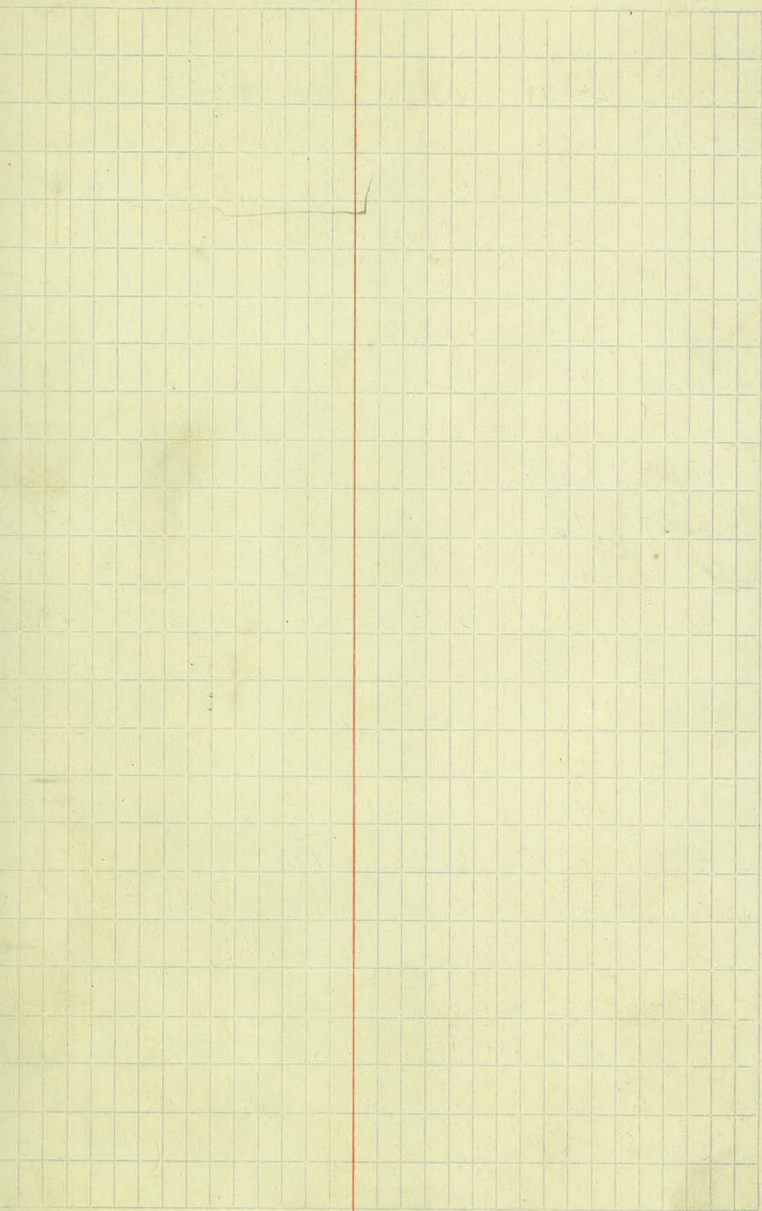
Object	Azi.	Stadia	Ver	Diff.	Elev.
Q R.R.	101°30'	15.00			
F.L. Toe Slope	103°15'	15.00	-0°28' 10	11.2	97.9
F.L. Top Ridge	106°00'	9.50		12.50	96.6 ✓
" "	115°20'	9.80		9.90	99.2 ✓
Q Draw	113°10'	7.80	-0°10' 15	17.3	96.8 ✓
Top Ridge	131°00'	8.80		11.50	907.6 ✓
Toe Slope	140°00'	7.80		15.25	893.8 ✓
F.L. On Slope	170°00'	12.20		0.00	909.0 ✓
Top Knoll	153°45'	9.50		12.15	896.9 ✓
Top Hill	169°45'	14.00	+0°35' 5	+9.2	918.3 ✓
On Slope	157°10'	14.50	+0°25' 5	+5.6	914.7 ✓
" "	148°15'	16.50	+0°15' 5	+5.0	14.1 ✓
(4.32)		909.14			
At A6D					904.82
A6	290°28'	12.30			880.10
A6D2	94°41'	4.25	+1 1.75	+2.50	911.64
(4.32)		H.I. 915.94 915.95			
At A6D2	Top Knoll	Between Frost Av. & R.R.			911.64
A6D	274°41'	4.25		11.13	904.82
F.L. Q Draw	269°15'	2.20	1°05' 15		
Top Cut Edge Trees	290°45'	2.95		6.80	09.2 ✓
Top Cut F.L.	235°45'	.50		8.25	07.7 ✓
Q Frost Av.	302°15'	2.65		9.10	06.9 ✓
" " "	57°00'	2.75		14.00	02.0 ✓



Object	Azi	Stadia	Ver X	Diff.	Elev.
F.L. Toe Slope	114°30'	1.30	-5°45' 10	22.8	893.2
☿ Draw	309°30'	1.95	-1°20' 10	14.5	901.3
F.L. Toe Slope	105°00'	3.20	-1°35' 15	23.8	892.2
Top Cut	351°30'	1.08		6.10	909.9
F.L. Top Knoll	102°45'	4.75		11.70	904.3
☿ Draw	41°00'	1.50	-3°45' 10	19.8	896.3
F.C.	100°15'	10.70	-0°40' 15	16.3	899.7
Top Cut	76°30'	4.45		9.40	906.3
F.C.	105°45'	10.80	-0°40' 15	16.3	899.7
☿ Draw	83°45'	2.60	-2°20' 10	20.6	895.4
F.L. Cult.	115°45'	12.00	-0°40' 15	29.0	887.0
Toe Slope	91°30'	6.00	-1°28' 10	25.7	890.3
F.L. Cult.	126°30'	13.50	-0°45' 15	32.6	883.4
Toe Slope	85°45'	6.50	-1°00' 10	21.4	894.6
F.L. Cult.	132°40'	14.50	-0°30' 15	27.6	888.4
☿ Frost Ar.	81°50'	10.50	-0°30' 10	19.2	896.8
F.C. Cult.	137°30'	16.00	-0°25' 15	26.6	889.4
F.L.	84°15'	10.50	-1°10' 10	31.4	884.6
" " Cult.	144°00'	14.20	-0°45' 15	33.5	882.5
" " "					
Top Ridge	153°40'	13.20		15.00	901.0
Toe Slope			-1/2		
F.L. Cult.	160°30'	12.50	14.75	21.0	895.0
" " "			-1°40'		
Toe Slope	109°30'	6.25	14	32.2	883.8
F.L. Cult			-1/2		
On Slope	173°30'	12.00	11.75	17.8	898.2
Toe Slope	173°30'	9.00	-0°35' 15	24.3	891.7



Object	Azi.	Stadia	Ver X	Diff.	Elev.
Toe Slope	125°30'	4.15	-2°28' 10	27.8	888.2
Top Ridge	166°00'	8.30		9.90	906.1
Toe Slope	146°30'	3.50	-2°35' 10	25.8	890.2
" "	174°00'	4.25	-1°25' 15	25.5	890.5
Edge Pot Hole	178°00'	4.20	-1°30' 15	26.0	890.0
Top Ridge	151°30'	5.00		9.90	06.1
♂ Saddle	143°00'	5.80	-0°50' 10	18.4	97.6
Top Ridge	140°00'	6.70	-0°40' 10	17.8	98.2
Toe Slope	136°00'	7.00	-1°15' 10	25.3	90.7
Top Ridge	80°00'	1.75		13.90	02.1
Toe Slope	125°00'	6.05	-1°30' 10	26.0	90.0
(4.82) H. 886.49 } 886.48 886.47 }					881.60 881.67
At. A 8					
Δ 7	25°47'	9.00		4.37	882.10
♀ Road K.P.	149°30'	.77	-7°35' 15	26.0	60.5
" " " "	179°15'	4.65	-1°00' 15	23.1	63.4
Edge Creek	176°20'	2.00	-4°35' 15	31.0	55.5
" "	184°35'	4.20	-2°10' 15	30.9	55.6
♂ St. H #1.	274°35'	2.10		3.50	83.0
" " " "	289°20'	5.30	+1°45' 5	21.2	65.3
Edge Creek	189°15'	5.70	-1°30' 15	30.0	56.5
Toe Slope	248°30'	2.70		8.20	78.3
Edge Creek	187°35'	6.40	-1°30' 15	31.8	54.7



Object	Azi.	Stadia H.I. 886.48	Ver X	Diff.	Elev.
Top Ridge	246°15'	1.92		6.15	80.3
Top Hill	226°00'	3.25	+2°00'		
Toe Slope			1		
Edge Trees	171°15'	4.50	-2°00'	+10.4	96.9
			5		
Top Hill	205°30'	2.75	+0°15'	20.8	65.7
			1		
Edge Trees on Slope	166°30'	3.10		+0.2	86.7
				13.00	
Toe Slope	217°15'	1.25	-6°50'		73.5
			10		
Top Hill			+1/2	25.0	61.5
Edge Trees	148°30'	2.55	1.45	+2.4	88.9
"			+3		
Top Hill	110°30'	2.20	3.85	+2.7	89.2
Toe Slope	194°45'	2.65	-2°10'		
			10	20.0	66.5
Edge Creek	191°45'	6.30	-1°50'		
			10	30.3	56.2
" "	193°30'	4.80			
" "					
" "	188°00'	3.90	-2°30'		
			10	27.0	59.5
On Slope					
Edge Trees	317°15'	1.70		2.25	84.2
Top Hill	316°00'	3.25	+4°50'		
			5		
Edge Creek	186°30'	3.05	-4°00'	+22.3	908.8
			10		
" "	191°00'	1.10	-10°00'	31.3	855.2
			12		
A8A	176°45'	4.45	-3	30.9	55.6
			9.90		
A8B	287°50'	5.60	+3	23.25	863.7
			4.15	+12.65	899.13
(4.18)	H.I. 867.41		867.44		863.2
	H.I. 867.46				863.2
At A8A					
A8	356°45'	4.45	+4	+14.20	881.66
			3.60		
± Road K.P.	131°45'	1.10		4.15	63.2
Woods G.E. Flat	192°15'	1.95		5.90	61.5
Edge Trees	119°45'	1.20		5.50	61.9

between K. P. & Creek
Y. Cor. Arcade & Frost Av.

Object	Azi.	Stadia	Ver X	Diff.	Elev.
Woods Toe Slope	151°30'	3.10	+1°10' 10	3.7	63.7
£ Road K.P.	132°10'	3.05		2.25	65.1
Toe Slope	122°30'	4.15	+0°15' 5	3.2	64.2
£ Road K.P.	129°30'	5.40	+½ 0.75	+1.9	69.3
Woods Top Knoll	141°45'	3.60	+1°20' 5	+3.4	70.8
£ Road K.P.	126°30'	6.70	+0°55' 5	+5.8	73.2
Woods On Slope	131°45'	6.50	+0°40' 1	+6.6	74.0
Toe Slope			+1°00'		
Edge Trees	126°15'	5.60	5	+4.8	72.2
On Slope	115°15'	5.70	+2°30' 5	+7.2	84.6
£ Draw	58°00'	1.70	+3°15' 5	+4.6	78.0
Top Ridge	86°00'	2.90	+4°10' 5	+16.0	83.4
Toe Slope	82°10'	1.40	+1°05' 6	+20.5	87.9
£ Road K.P.	1°50'	4.60		5.85	61.5
Edge Creek	357°45'	4.40			
	(4.30) H. 1.	867.71			
At. A6DAAIA					863.4
A6DAAI	32°48'	7.35			894.4
Lake Shore	177°00'	1.15		11.75	55.9
" "	162°00'	3.05		12.25	55.4
" "	153°15'	5.70		12.00	55.7
Toe Slope					
Edge Trees	72°10'	2.65	+2°10'	5.10	52.6
£ Draw	82°30'	2.45	7	+3.8	70.7
Toe Slope	153°30'	5.80		11.40	56.3
Top Knoll	94°00'	1.85	+4°00' 5	+7.9	75.6

eller Lake

Object	Azi.	Stadia	Ver X	Diff.	Elev.
Edge Trees					
Toe Slope	80°15'	1.15		4.90	62.8
" "					
Edge Trees	135°45'	2.50		5.00	62.7
Top Knoll	128°15'	4.90	+2°45'		
			5	+18.5	86.2
☿ Draw	129°45'	4.10	+0°40'		
			5	0.2	67.5
Toe Slope	148°10'	4.25		4.50	63.2
Top Knoll	139°30'	4.75	+1°40'		
			5	+8.8	73.5
Toe Slope	148°30'	5.55		6.40	61.3
L.S.	214°15'	.55		12.20	55.5
" "	359°00'	.40		11.90	55.8
" "	37°20'	1.90		11.55	56.1
☿ Farm Yard	112°15'	5.00	+4°00'		
			6	+28.8	96.5
(4.12) H.I. $\left. \begin{matrix} 872.18 \\ 872.20 \end{matrix} \right\} 872.19$					
At A 4					868.06
Δ 3	15°44'	3.75	-0°54'		
			6	11.90	860.30
Lake Shore	145°00'	9.00			
" "	140°00'	7.05			
" "	231°15'	1.05			
" "	133°00'	6.25			
" "	237°15'	3.10			
" "	127°45'	5.65			
" "	234°30'	5.10			
" "	117°45'	3.65			
" "	233°30'	6.75			
" "	118°00'	2.50			

Elev. Round Lake 855.41

Oct. 1, 1926

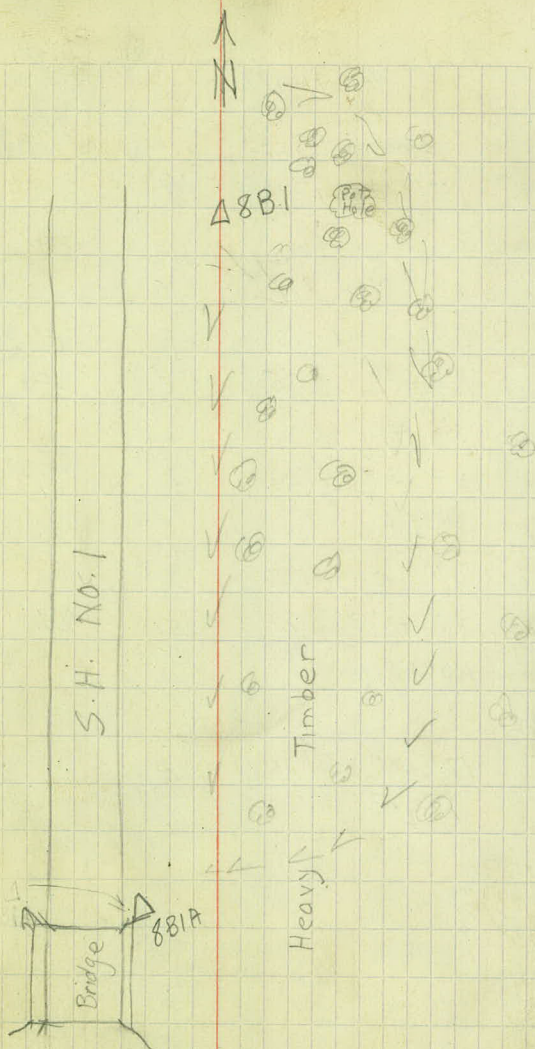
between House & Barn

around Lake

Object	Azi.	Stadia	Ver &	Diff.	Elev.
Lake Shore	144°15'	.95			
" "	235°00'	9.70			
" "	229°40'	10.75			
" "	221°45'	11.20			
" "	214°30'	11.10			
" "	196°45'	11.00			
" "	186°30'	10.40			
F.C. "	156°30'	9.50			
" "	176°00'	10.00			
" "	157°45'	8.45			
" "	162°30'	8.55			
(4.30) H.I. $\left. \begin{matrix} 903.43 \\ 903.41 \end{matrix} \right\} 903.42$					899.12 899.13
At. Δ8B.					
A8	107°50'	5.60	-2 10.55	+21.75	881.66
Toe Slope					
Edge Trees	84°30'	.95		12.95	890.4
" "			+3°25'		
Top Cut	37°30'	1.25	2	+2.5	905.9
Edge Trees					
Toe Slope	24°45'	1.80		1.85	01.5
E. St. H. #1.	7°50'	1.90	+1/2 0.25 +1°50'	+0.6	04.0
Top Ridge	11°25'	2.85	5 +1°25'	+4.1	07.5
E. St. H. #1.	2°45'	5.20	5 +1°00'	+7.9	11.3
Toe Slope	28°00'	3.25	6 +2°50'	0.3	03.1
Top Knoll			10 +1°55'	+11.8	15.2
Edge Trees	37°00'	4.40	5 +1°10'	+13.4	16.8
" "			5	+4.0	07.4
Top Knoll	26°15'	5.50			
Toe Slope	7°30'	4.40			

ound Lake

Object	Azi.	Stadia	Ver X	Diff	Elev.
		H.I. 903.42			
Δ8B1	6°30'	6.50	+4 5.25	+20.75	924.17
	(4.22) H.I.	928.39 928.47	928.43		924.2 924.17
A+Δ8B1					
Δ8B	186°30'	6.50	-4 3.35	29.35	899.12
St. H. #1	282°15'	.50	-7°35' 10	16.6	11.8 ✓
" " " "	347°40'	2.25	-1°45' 10	16.9	11.5 ✓
Top Cut Edge Trees	182°15'	1.30	-1°30' 5	8.4	20.0 ✓
Bridge over Soo Line R.R.	353°45'	4.80	-1°30' 5	17.6	10.8 ✓
Top Cut Edge Trees	184°30'	.23	-5°10' 6	3.40	25.0 ✓
Pat Hole	71°40'	1.00	-0°50'	15.0	13.4 ✓
Woods Top Knoll	73°30'	1.90	5 -1°15'	7.8	20.6 ✓
" Toe Knoll	74°00'	3.60	10 -0°45'	11.8	16.6 ✓
" Top Ridge	92°30'	4.00	5 -1°2	10.2	18.2 ✓
Δ8B1A =	354°51'	3.80	12 -1°30'	17.70	910.73 ✓
Woods Top Ridge Toe Slope	67°45'	3.50	5 -1°40'	14.2	14.2 ✓
Edge Woods	357°45'	1.48	10	14.3	14.1 ✓
Woods Top Ridge Top Cut	47°00'	1.75		8.80	19.6 ✓
Edge Woods	353°45'	.85		5.75	22.6 ✓
	(4.05) H.I.	914.78 914.64	914.72		910.67 910.73
A+Δ8B1A	On Shoulder St. H. T. N.E. End Bridge		+3		
Δ8B1	174°51'	3.80	1.85	9.55	924.21
L.I.B.M. #37	Elev.	911.49		3.35	911.37
Woods Toe Slope	113°30'	.85	-14°30' 10	30.6	84.1 ✓
No. End Bridge	344°30'	.25		4.90	09.8 ✓



idge 38' Over All.
Walk on Each Side

Object	Azi.	Stadia	Ver X	Diff	
		H. 914.72			
F.C.	312°00'	.38	-3°15' 10 -115'	12.2	02.5
Woods On Slope	156°30'	1.00	5	7.2	07.5
So. End Bridge	355°10'	1.70		7.25	07.4 ✓
Woods On Slope	124°00'	2.70	-2°40' 5	16.4	08.3 ✓
☼ St. H. #1	357°10'	3.10		14.40	00.3 ✓
Edge Woods			-8°10' 5		
FL. Toe Slope	104°45'	2.35	-0°58' 10	38.1	76.6 ✓
☼ St. H. #1	358°15'	5.25	-1°05' 10	18.9	45.8 ✓
" " " "	358°40'	4.75	-3°20' 5	22.8	91.9 ✓
Woods Top Knoll	18°50'	2.80	-4°00' 3	21.3	93.4 ✓
" " "	39°15'	2.60	-3	21.2	93.5 ✓
Δ B1AA	358°43'	6.70	7.70	27.80	886.92
(4.98) H. 1.		891.90			
AT Δ B1AA					886.92
Δ B1A	178°43'	6.70			910.67
Δ O	0°02'				
AT Δ 7					882.10
Δ 6	✓ 119°21'	5.45	✓		880.10
☼ K. P.	✓ 49°10'	3.58	✓		
Int. K. P. & Frost	51°50'	2.60	✓		
☼ K. P.	✓ 49°10'	1.60	✓		
" " "	✓ 27°10'	.65	✓		
" " "	✓ 233°30'	.35	✓		
" " "	✓ 198°30'	1.30	✓		

nt. No 1 & Payne Ave Cut Off

Object	Azi.	Stadia	Ver X	Diff.	Elev.
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☼ K.P.	✓ 188°45'	2.30	✓		
" " "	✓ 184°30'	3.30	✓		
" " "	✓ 184°00'	4.35	✓		
" " "	✓ 185°30'	5.40	✓		

At Δ 5A Approx. ☼ Frost Av.

Δ 5 12°36' ✓

Δ 6 184°33' 1.22 ✓

Int. Frost K.P. 317°50' 4.15 ✓

☼ Frost Av. 316°40' .23

" " " 138°40' .25

" " " 134°10' 1.25 ✓

" " " 129°25' 2.21 ✓

" " " 126°30' 3.20 ✓

" " " 124°50' 4.20 ✓

" " " 123°45' 5.15 ✓

" " " 122°25' 6.20 ✓

At Δ 6 DAIB

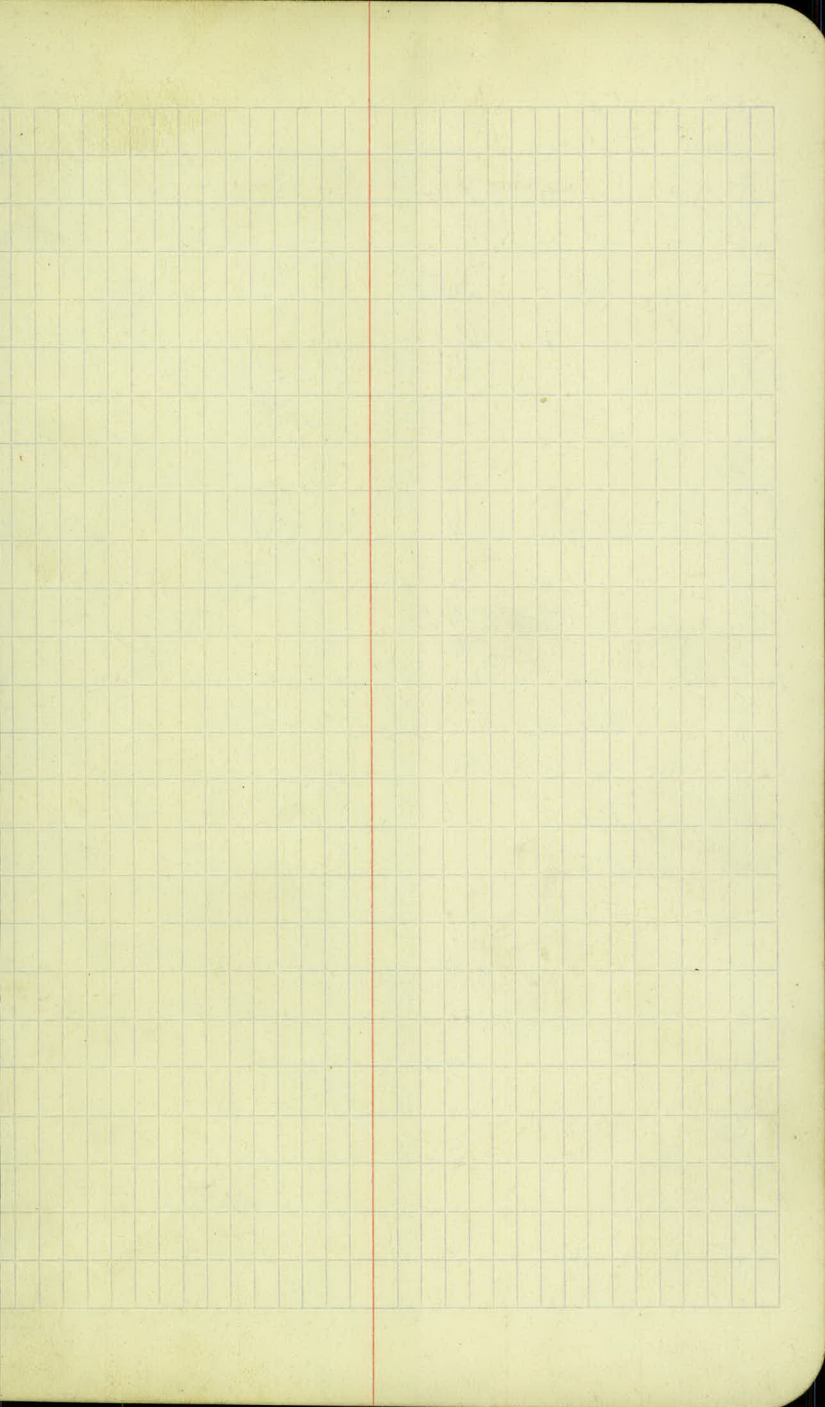
Δ 6 DA1 352°04' 14.20

Δ 6 DAIB1 320°33' 11.70

At Δ 6 DAIB1

Δ 6 DAIB 140°33' 11.70

Δ 6 DAA1 355°41' 1.98



Object	Azi.	Stadia	Ver. X	Diff.	Elev.
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St. H. #1.	✓ 162°30'	7.10			
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" " " "	✓ 164°05'	6.15			
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" " " "	✓ 165°35'	5.20			
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" " " "	✓ 167°30'	4.25			
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" " " "	✓ 169°15'	3.25			
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" " " "	✓ 170°20'	2.30			
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" " " "	✓ 169°20'	1.30			
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" " " "	✓ 151°45'	.35			
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" " " "	✓ 8°05'	.67			
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(4.41) H.I. 928.62

AT ABB1

924.21

ABB	186°30'	6.50			
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S.W. Cor. House	125°45'	4.00		12.60	916.02
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N.W. " "	129°30'	4.20 ^{Approx.}	A on line		
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'x20' HOUSE

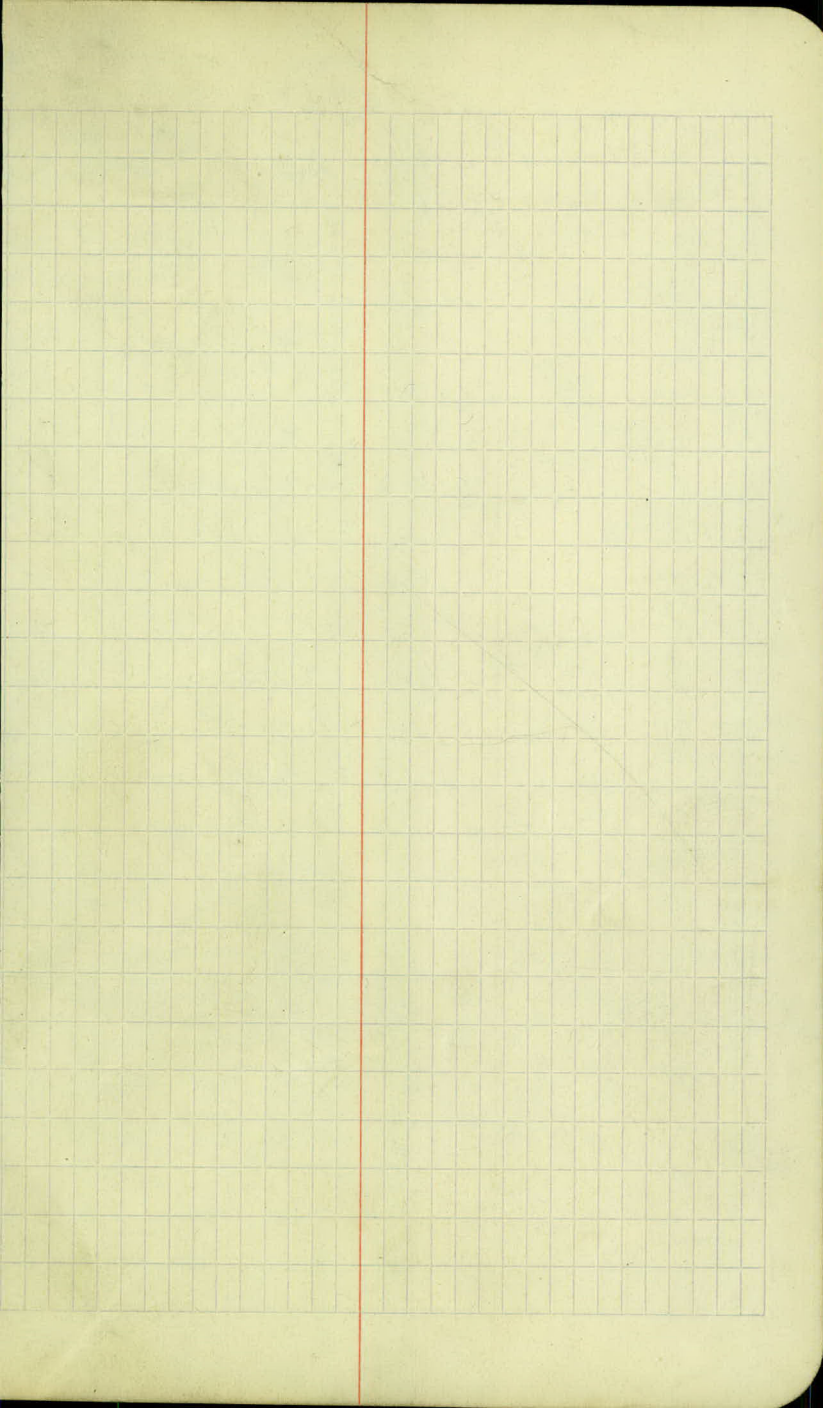
(4.50) H.L.

923.2

Diff.

At Δ6DA1

	Δ6DA	351°19'	5.00			
	Δ6DA2	260°10'	2.75	-1.3	+1 4.10	21.9
1	Trail	278°00'	2.45	-6.9	6.90	16.3
2	Top Slope	257°30'	1.38	-1.3	1.25	21.9
3	Trail	295°00'	1.60	-8.5	8.50	11.7
4	Top Slope	215°45'	1.45	+1.5	+1 0.0	24.7
5	Saddle	312°40'	2.85	-16.2	16.2	07.0
6	Slope	190°00'	3.10	-5.2	5.20	18.0
7	E Draw	345°00'	1.60	-18.2	-2 15.00	05.0
8	F.L. (E&W)	180°00'	4.60	+0.8	+1 1/2 1.50	24.0
9	Toe S. E Slope	54°20'	1.95	-29.0	-6 17.0	94.2
	E.W. S.S. Slope				+1	
10	F.L. (E&W)	184°15'	4.68	+2.9	1.8	26.1
	W. Slope					
11	F.L. E&W	194°15'	4.75	-4.6	4.6	18.6
12	Toe S. Slope	96°36'	4.20	-29.2	-5 8.2	94.0
	Toe N. S.S.					
13	Slope S.E. Draw	166°20'	3.00	-13.0	13	10.2
14	Toe Slope	101°20'	5.50	-39.9	-3 13.4	83.2
	N. & S. Fence					
15	S. Slope	163°25'	4.90	-9.0	9	14.5
	E. & W. Fence					
16	Toe S. Slope	102°45'	5.55	-28.0	-5 0.0	95.2
	N. S.S. Fence					
17	S. Slope	150°00'	5.30	-8.8	8.8	14.4
	E. & W. Fence					
18	Top Ridge	106°20'	4.80	-24.2	-4 5	99.1
19	Trail					
19	E. & W. Fence	141°00'	5.90	-8.6	8.6	14.1
	Top Slope					
20	S. W. Fence	137°00'	4.75	-8.6	8.6	14.1
21	" "	130°20'	4.45	-10.2	10.2	13.1
22	Trail	109°00'	3.80	-25.5	-5 6.50	97.1



923.2

Toe S.					
23 <u>Slope</u>	114°45' ⁰	3.50		Same El. as (22)	
24 "	114°45' ⁰	4.50		"	
Toe S.E.				-3	
25 S.W. Slope	130°45'	2.50	-20.7	13.2	02.5
Toe E Slope					
26 <u>Trail</u>	109°00'	2.15	-16.6	16.6	06.6
27 S.W. slope	141°30'	3.30	-13.0	13	10.2
28 " "	141°30'	3.90	-13.0	13	10.2
29 N.E. Slope	142°20'	1.25	-10.2	10.2	13.0
30 E. "	176°00'	1.70	-5.5	5.5	17.7
31 <u>Trail</u>	00°00'	.30	-7.0	7.0	16.2
32	310°00'	.75	-6.4	6.4	16.4
33 S.E. Slope	256°00'	1.00	-1.0	1.0	22.5

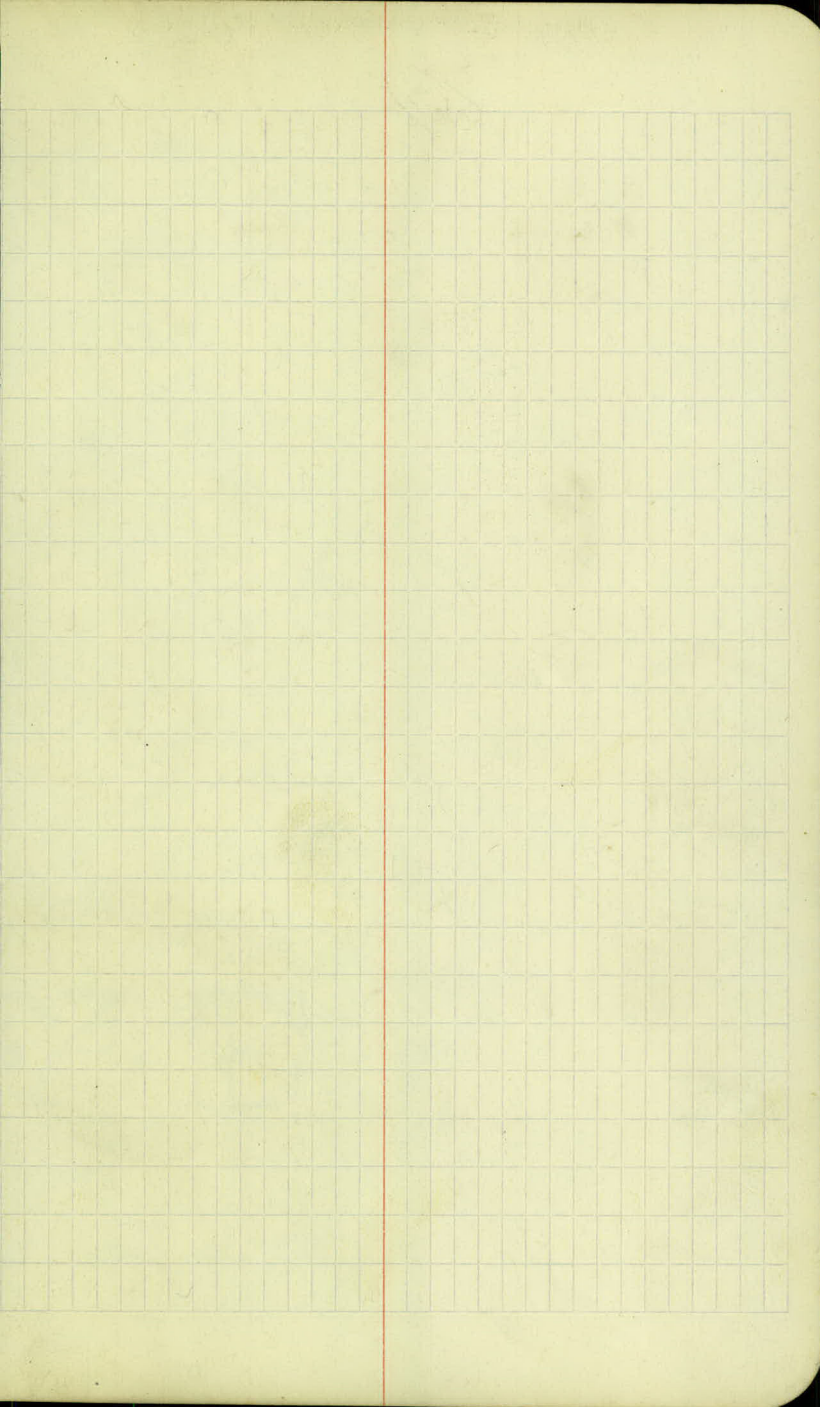
£ Draw

(4.79) H. 1.

926.3

A6DA2

	6DA1	80°10'	2.75		7.70	
Edge Swamp	1. Top W. Slope	120°00'	1.00	-7.5	7.5	18.8
	2. Toe Slope	170°00'	2.00			
	3. Toe N. Slope	208°00'	1.50			
	4. . . .	235°00'	2.50			
	5. Trail	302°00'	.70	-17.0	17.0	19.2
	Top Ridge				2. Above Pavement	95.0
	6. Trail	259°00'	1.75			
	7. W. Slope	292°00'	2.70		3. . .	96.0
	8. Top Knob	250°30'	3.40		8. . .	901.0



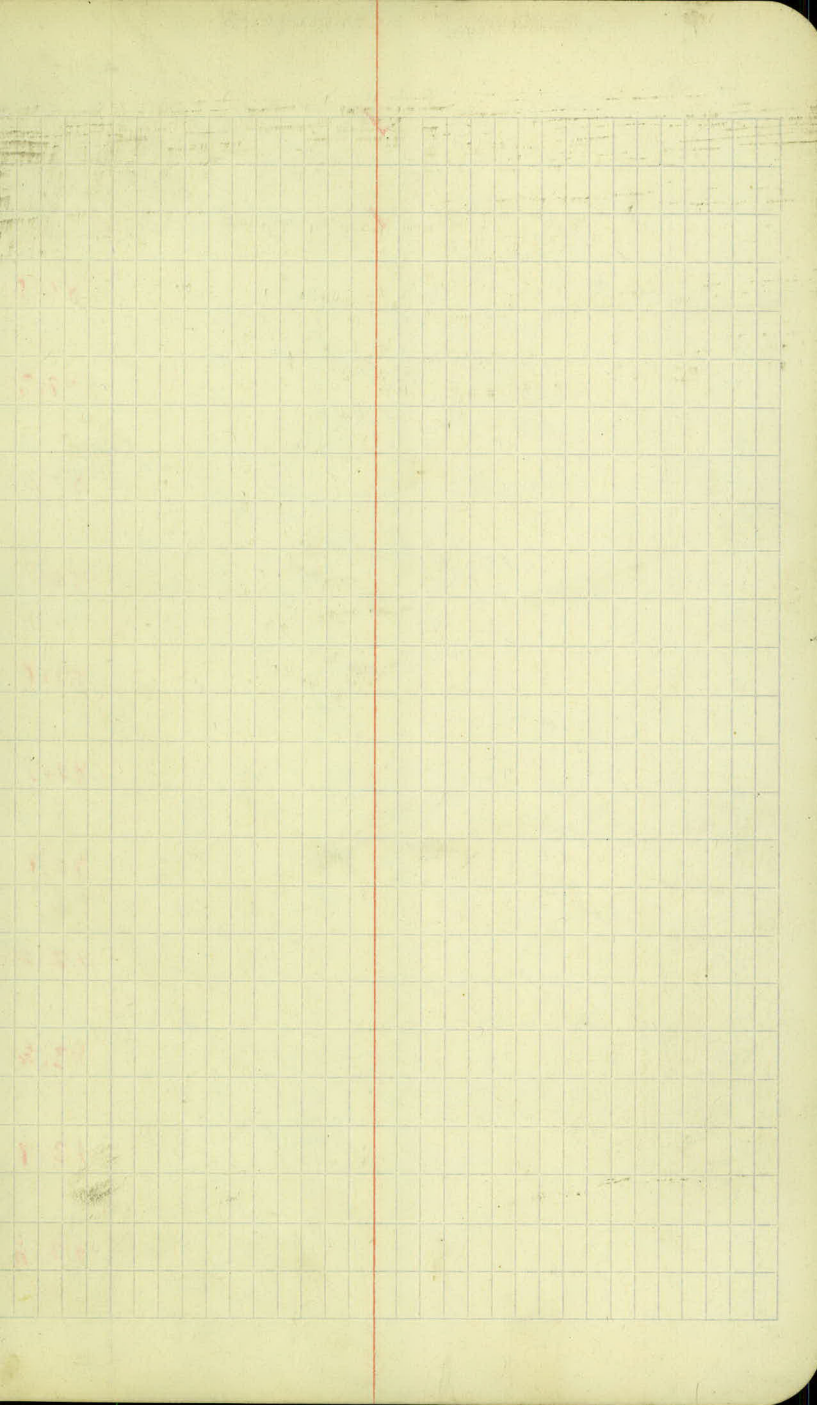
Levels

Soo Line R.R.

Sta. # L. Imp.	+	H.I.	-	Elev
37 B.M	0.55	912.04 ✓		911.49
	0.60	900.19 ✓	12.45	899.59 ✓
	1.40	888.31 ✓	13.28	886.91 ✓
0 + 00			1.9	86.4
1			2.0	86.3
2			2.4	85.9
3			2.8	85.5
4			3.2	85.1
5			3.8	84.5
6			4.4	83.9
7			4.9	83.4
8			5.3	83.0
9			5.8	82.5
10			6.2	82.1

Sta. 0 + 00 = E. End of Conc Bridge on No. 1

Sta.	+	H.I.	-	Elev.
		888.31 ✓		
T.P.	6.00	887.29 ✓	7.02	881.29 ✓
11				5.6 81.7
12				6.0 81.3
13				6.6 80.7
14				7.2 80.1
15				7.2 80.1
16				6.8 80.5
17				6.2 81.1
18.				5.3 82.0
19				4.1 83.2
20				3.4 83.9
21				2.7 84.6



887.29 ✓

22

2.2

85.1

T.1²

11.1

896.11 ✓

2.28

885.01 ✓

23

9.9

86.2

24

8.4

87.7

25

7.1

89.0

26

6.0

90.1

27

5.1

91.0

28

4.4

91.7

29

4.1

92.0

30

3.9

92.2

31

3.7

92.4

32

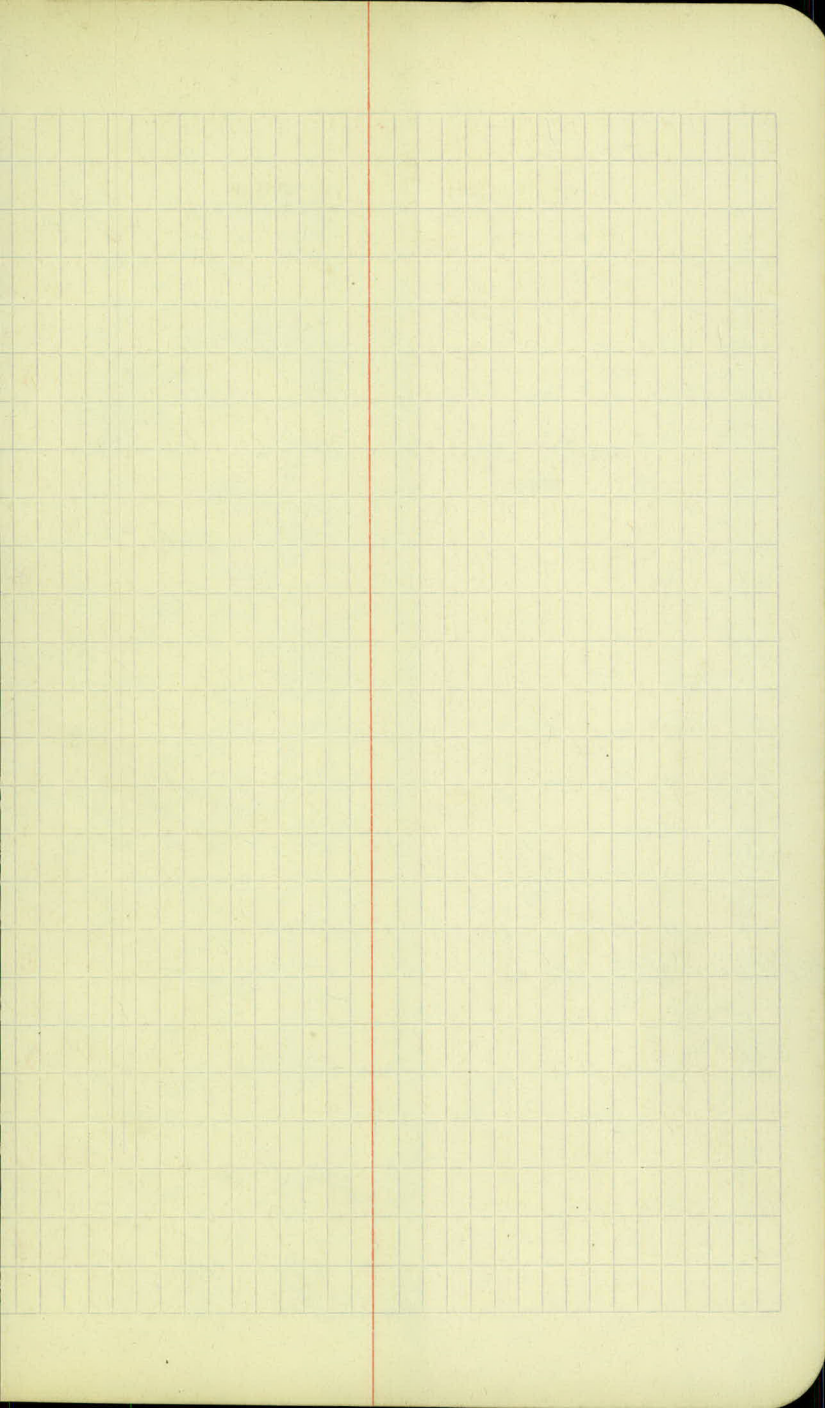
3.5

92.6

33

3.3

92.8



896.11 ✓

T.P.

4.16

897.07

3.20

892.91 ✓

34

4.2

92.9

35

4.2

92.9

36

4.2

92.9

37

4.1

93.0

38

4.0

93.1

39

4.0

93.1

40

3.8

93.3

41

3.5

93.6

42

3.2

93.9

43

3.0

94.1

44

2.7

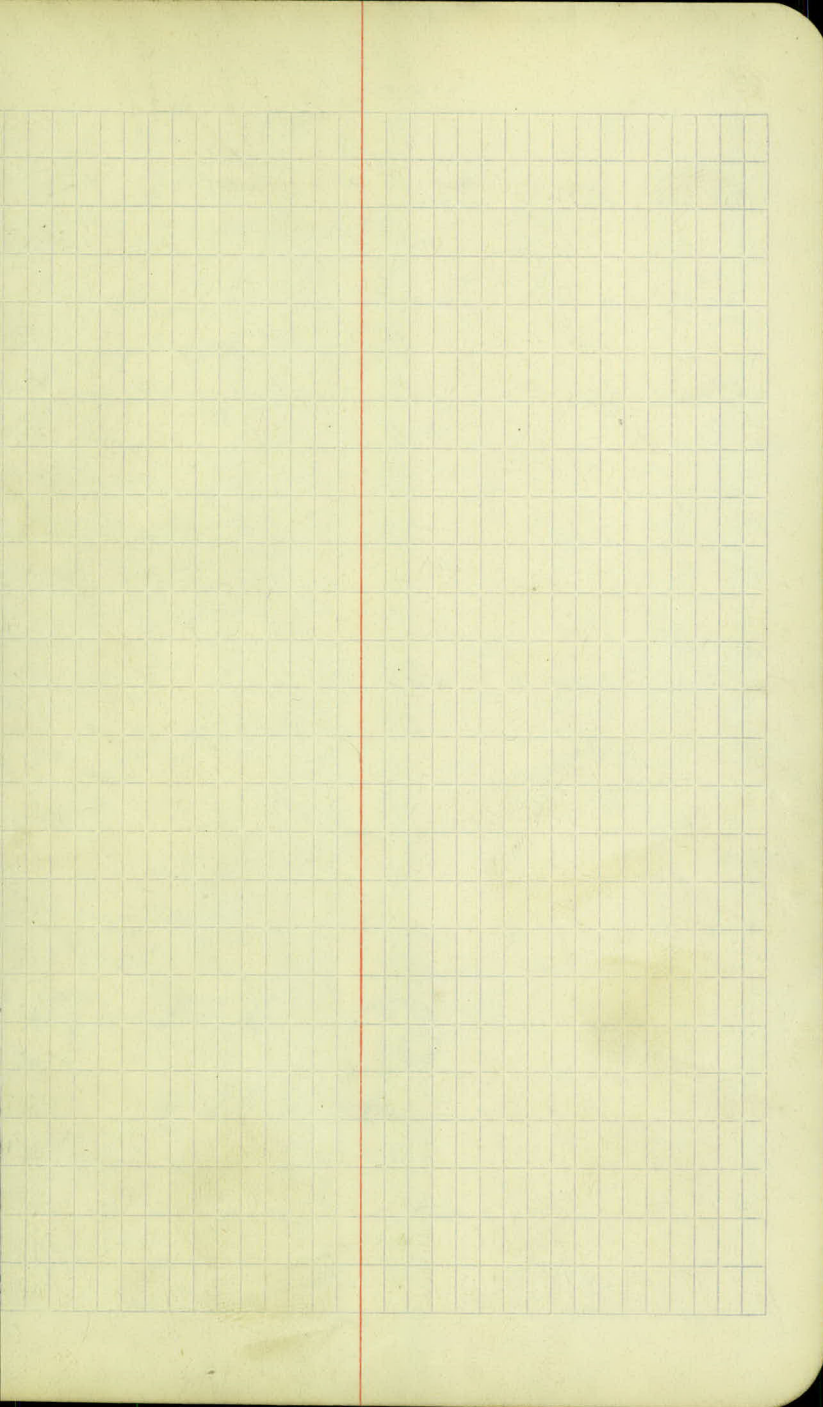
94.4

T.P.

3.45 893.62 ✓

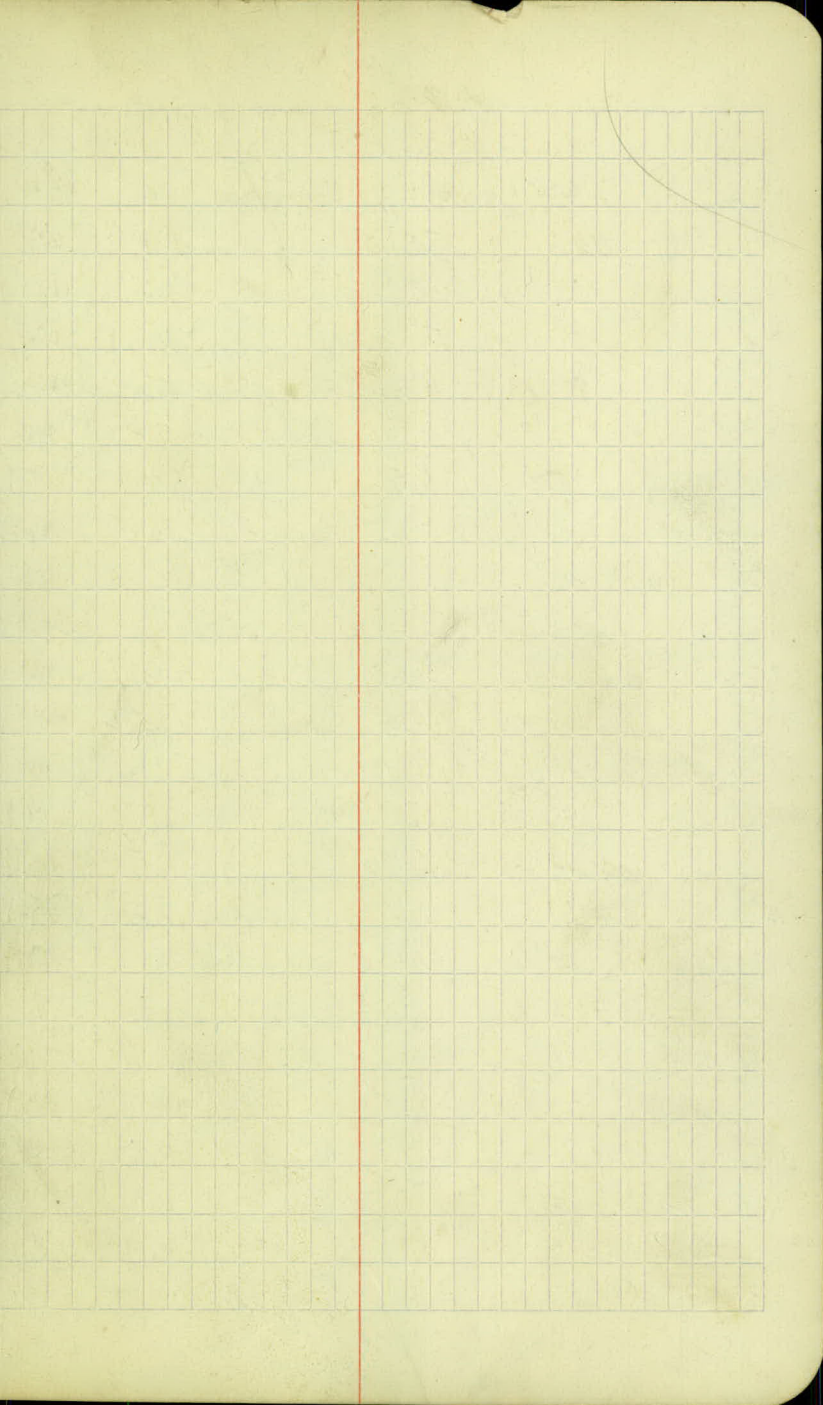
RR. Sp in R.R. Sign Rt. Sta 38 to 0

	(4.50)	H.I. 902.90	D. 44.	Elev.
A.T. A6D1				898.40
Δ6D	359°21'	4.72		904.00
1 Top knob	329°00'	1.50	+1°59'	3 04.9
2 " "	14°00'	2.20		1.5 901.4
3 " "	318°00'	1.10	+2°10'	3 04.1
4 N. & S. Fence	22°20'	3.65		5.9 97.0
5 " "	79°00'	1.40		6 96.9
6 E Small Depression	80°00'	.70		8 94.9
7 N. & S. Fence	111°30'	1.50		6.7 96.7
8 " "	25°20'	3.10		8.5 94.1
9 " "	32°00'	2.55		5.9 97.0
10 E Draw	135°30'	2.00		10.3 92.0
11 N. & S. Fence	49°00'	1.80		7.5 96.1
12 Top knob	297°00'	.80		0.0 902.9
13 " N. & S. Fence Ridge	150°10'	2.75		6.7 96.7
14 E Draw	252°00'	1.10		8.8 94.1
15 Toe Ridge N. & S. Fence	156°00'	3.30		7.2 96.7
16 E Small Swale	22°00'	1.15		8.8 94.1
17 " "	01°00'	2.20		5.5 97.4
18 Top Ridge	238°00'	2.35		0.0 902.9
19 Cor. E. W. N. & S. Fence	165°35'	5.45	+ $\frac{1}{2}$ °0'	0.0 0.0
20 Toe in Draw	194°00'	.75		10.0 92.0
21 " "	194°00'	1.40		9.0 93.9
22 E Pocket On Ridge	228°00'	2.85		1.8 01.1
23 E Trail	200°00'	2.00		4.5 98.4



902.90

24	Toe Slope	224°00'	3.25		0.0	02.9
25	E. W. Fence	179°30'	5.40	+1°30'	6.0	11.1
26	Toe Slope	200°00'	2.50		5.3	97.6
	On Ridge					
27	Trail	224°40'	2.10		0.0	02.9
28	Top Ridge	207°00'	1.90		0.0	02.9
29	S. Slope	180°00'	4.30	+1.37	3.0	12.1
30	Toe ..	183°00'	2.35		5.4	97.5
31		212°00'	2.55		2.4	00.5
32	Top Ridge	166°00'	2.20		4.0	94.9
32	E. Slope	170°00'	4.60	+0.25	0.0	06.3
33	Toe E. ..	166°00'	4.45		1.7	01.2
34	.. N+S. ..	169°00'	2.70		7.0	95.9
35	.. E+S. ..	163°20'	3.60		5.3	97.6
36	.. Ridge	159°00'	2.90		7.5	95.4
37		156°00'	1.80		9.4	93.5
38		150°00'	1.00		9.4	93.5
39	.. N Slope	285°00'	2.10		8.0	94.9
40	S. ..	272°00'	2.20		8.0	94.9
41	.. E. ..	97°00'	2.50		11.0	91.9
42	Divide	114°00'	2.60		9.0	93.9
43	..	71°00'	2.00		9.0	93.9
→	Δ6D2	41°56'	6.40		2.10	900.8
44	Top Slope E	75°00'	3.10		8.5	94.4
45	Toe W. ..	96°00'	4.50		12.2	90.7



902.90

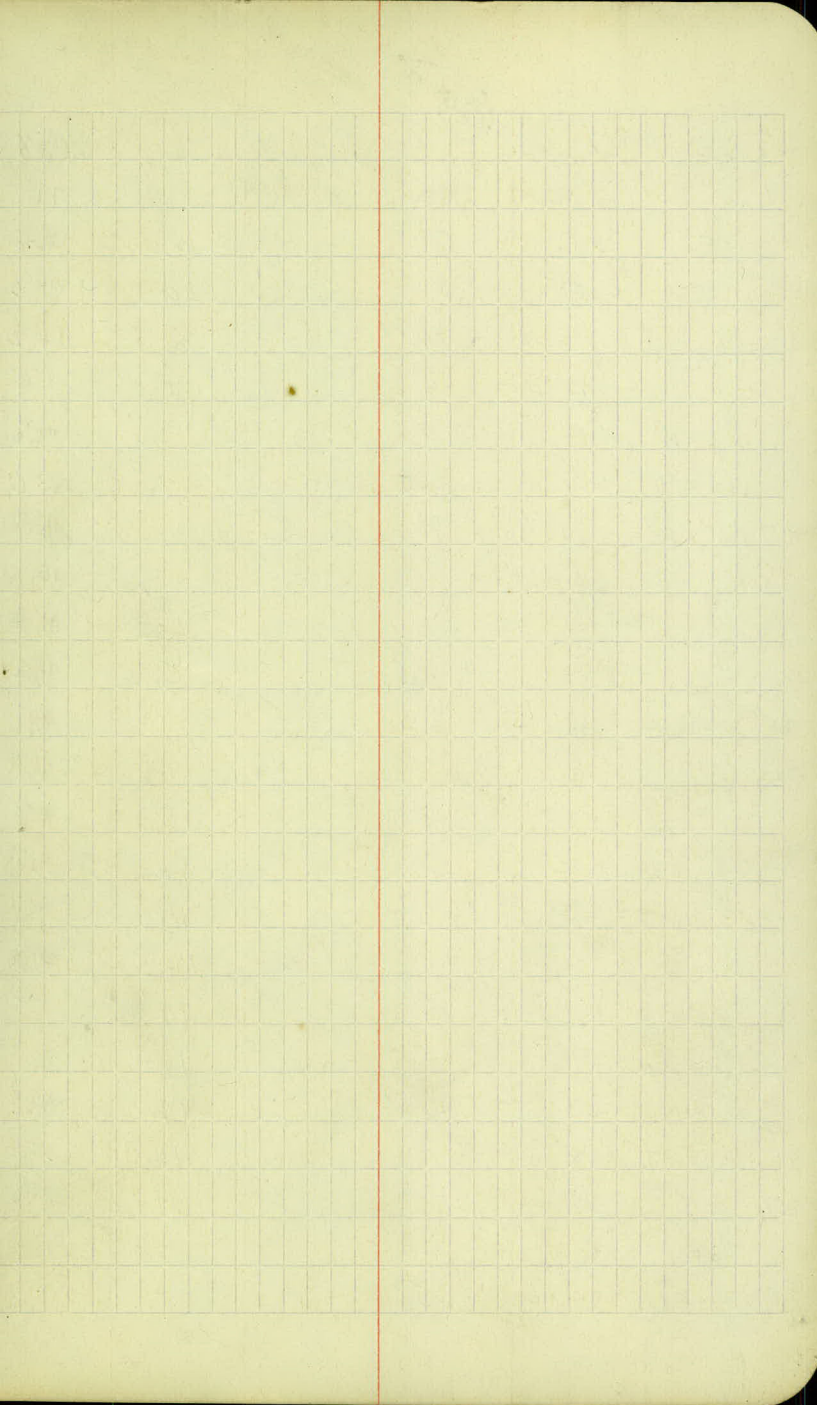
46 Toe E. Slope	75°00'	3.80		13.0	89.9
47 W. "	79°00'	5.25		8.0	94.9
48 Top Ridge	103°00'	5.90		+ $\frac{1}{2}$ 0.0	05.8
49 " "	98°00'	5.80		+ $\frac{1}{2}$ 0.0	05.8
50 " "	92°00'	5.65		0.0	02.9
51 " "	79°30'	6.25	+ 0°20'	0.0	06.5
52 W. Slope	92°30'	4.50		7.8	95.1
53 Top Ridge	71°30'	6.50	+ 0°17'	0.0	06.1
54 Toe E+W. Slope	111°30'	5.25		10.0	92.9
55 Top Knob	113°00'	4.60		5.0	97.9
56 Toe " "	119°00'	5.00		12.0	90.9
57 Top Slope ^{S.E.} W.	131°00'	5.65		4.7	98.0
58 Gen. Elev.	138°00'	6.40		5.2	97.7
59 E. & W. Fence	141°00'	6.90		1.0	01.9
60 S. Slope	147°00'	5.70		4.8	98.1
61 " "	158°00'	5.60		+ $\frac{1}{2}$ 0.0	05.7
→ Δ 6 D I E	99°00'	5.80		+ $\frac{1}{2}$ + 0.2	05.9
62 Toe S. Slope	149°00'	4.40		9.0	93.9

(4.70) H.I.

910.80

At Δ 6 D I E

Δ 6 D I	279°00'	5.80			98.40
1 Toe E Slope	68°00'	1.00	- 9°38'	0.0	95.6
2 " " "	92°00'	1.70	- 5°45'	0.0	93.8
3 " W. "	217°00'	1.40	- 7°13'	0.0	93.1
4 E Draw. E	205°00'	1.80	- 6°13'	0.0	91.4



910.40

5. E Draw N.	119°00'	2.00	-6°05'	0.0	89.8
6 Top Ridge	21°00'	2.00	-	3.8	07.0
7 E. Slope	41°00'	.80		16.0	94.4
8 E Draw E.	135°30'	2.08	-3°43'	10.0	87.2
9 N. Edge Draw	190°00'	2.30	-4°09'	0.0	94.2
10 W. Slope	190°30'	2.90		14.0	96.4
11 E Draw N	193°00'	2.90		17.0	93.4
12 E Draw E	109°00'	4.15	-3°08'	5.0	83.0
13 Top Slope E	77°00'	2.90		15.0	95.4
14 " " "	101°00'	3.00		16.0	94.4
15 " " "	65°00'	3.00		15.0	95.4
16 Top	103°00'	2.40		14.0	96.4
17 Top Slope E.	48°00'	3.40		11.2	99.6
18 Top	172°00'	2.90		12.0	94.4
19 Top Slope S	157°00'	3.00		13.3	97.5
20 " " S. E.	125°30'	3.90		14.0	96.8
21 E. N. S. Swale	147°00'	3.25		17.0	93.4
22 Slope S.	136°00'	3.60		14.5	96.3
23 Top E. Slope	131°00'	5.00		14.2	96.3
24 Small N. S. Draw	41°00'	3.00		14.0	96.8
25 Gen Elev.	144°00'	4.10		17.0	93.4
26 Toe N. S. Slope	138°00'	4.30		16.0	94.4
27 " E. Slope	152°00'	4.00		17.0	93.4
28 ^{Top E. Slope} E. N. Fence	136°10'	6.15		12.0	94.4
29 E. N. S. Swale	31°00'	3.65		13.0	97.4

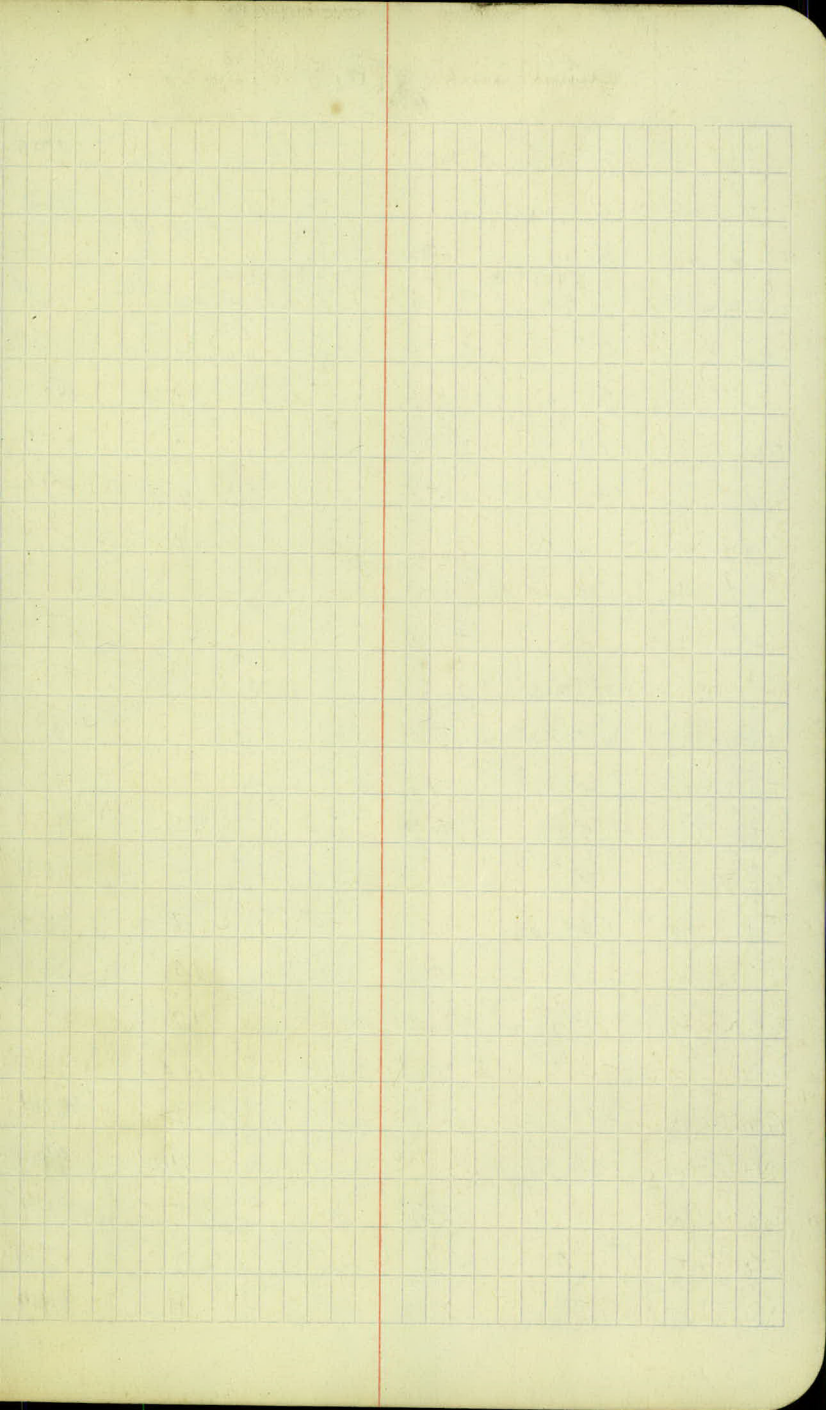
$$\begin{array}{r} 910.80 \\ 23.5 \\ \hline 87.3 \end{array}$$

910.40

30 E.W. Fence	152°00'	4.90		15.0	95.4
31 N. Toe Knob	160°00'	4.40		15.0	95.4
32 Top E. Slope	35°00'	5.00		12.5	98.3
33 E.W. Fence	168°00'	4.40		12.0	94.4
34 Top E.W. Slope R.R.-R.O.W.	31°45'	5.90		8.7	02.1
35 E.W. Fence	142°00'	5.60		8.0	02.4
36 Toe Slope	120°00'	5.70	-2°30'	5.0	81.0
37 E.W. Fence	125°15'	7.50	-1°28'	10.0	71.6
Fence Line 80' W. is 3.0' higher - toe of E. Slope					
38 E.W. Fence	120°25'	8.60		$-\frac{1}{2}$ 18.0	88.5
39 Toe E. Slope	78°00'	4.10	-2°43'	10.0	81.2
40 E.W. Fence	117°00'	9.70		$-\frac{1}{2}$ 16.0	89.5
41 Toe E. Slope	97°00'	4.30	-2°33'	10.0	81.5
42 Gen Elev.	115°00'	7.75		$-\frac{1}{2}$ 16.0	87.0
43 W. Slope	92°30'	5.45	-2°26'	0.0	87.8
44 Toe N. Slope	102°00'	5.90	-2°28'	5.0	80.1
45 W. Slope	97°00'	7.30		$-\frac{1}{2}$ 17.0	90.1
46 Gen. Flat.	89°30'	6.60	-1°00'	9.0	90.2
47 N.S. Fence	102°35'	8.90		$-\frac{1}{2}$ 19.0	87.4
48 Top Slope W.	76°00'	5.50	-1°40'	5	89.8
49 N.S. Fence	90°00'	8.70		$-\frac{1}{2}$ 16.5	85.6
50 Gen Flat	78°00'	7.25	1°36'	0.0	90.6
51 N.S. Fence	76°45'	8.90		$-\frac{1}{2}$ 14	87.9
52 Top Ridge	160°00'	0.75		4.0	06.4
53 Toe of Draw	160°00'	1.50			

$$\begin{array}{r} 910.6 \\ - 39.2 \\ \hline 871.4 \end{array}$$

910.80					
→ Δ6 D I E E	41° 43'	7.00		$-\frac{1}{2}$ 13.8	93.5
54 Gen Elev.	73° 00'	7.40	-0° 52'	10.0	90.2
(4.50) 14.1					
898.00					
At 6 D I E E					
6 D I E	221° 43'	7.00			
1 Toe R.R. Fill	190° 00'	.30		18.0	80.0
2 Toe E.+W. Slope	202° 00'	1.75		16.0	82.0
3 " R.R. Fill	102° 30'	2.20		8.0	90.0
4 Top R.R. Cut	270° 00'	1.35		+4.0	902.0
5 " " "	295° 00'	1.60		+5.0	903.0
6 Toe R.R. Fill	121° 00'	4.40		9.9	88.1
7 E.+W. Fence R.R.-R.O.W	104° 45'	4.20		9.9	88.1
8 Toe R.R. Fill	92° 00'	2.40		8.0	90.0
9 " " "	95° 00'	4.10		9.9	88.1
10 R.R.-R.O.W	91° 10'	4.15		9.5	88.5
11 Toe Fill	77° 00'	1.00		7.0	91.0
12 Top Ridge	317° 00'	2.40		+3.0	01.0
13 Frost Ave Cut Top Ridge	332° 00'	3.35	+1° 25'	0.0	06.3
14 Toe R.R. Fill	339° 00'	4.0		13.0	85.0
15 E Frost Ave	339° 30'	3.65		+1.5	99.5
16 N.+S. Fence	74.20	4.30		8.3	89.7
17 Top Slope W	60° 00'	2.50		8.5	89.5
18	322° 00'	1.20		3.5	94.5
19 Toe Frost Fill	53° 00'	5.15		9.2	88.8
20	2° 00'	1.70		9.0	89.0



898.0

Toe S+E Slope	345°00'	220	9.0	89.0
" Frost Ave	353°00'	310	5.2	92.8
Top Knob	5°00'	2.40	4.0	94.0
Toe Frost Ave	6°00'	3.05	6.8	91.2
" "	44°00'	430	13.8	84.2
" "	34°00'	3.65	15.0	83.0
± Gravel Pit	19°00'	2.35	17.0	81.0
Gen Elev.	40°00'	1.75	16.0	82.0
Slope W.	51°30'	3.10	10.5	87.5

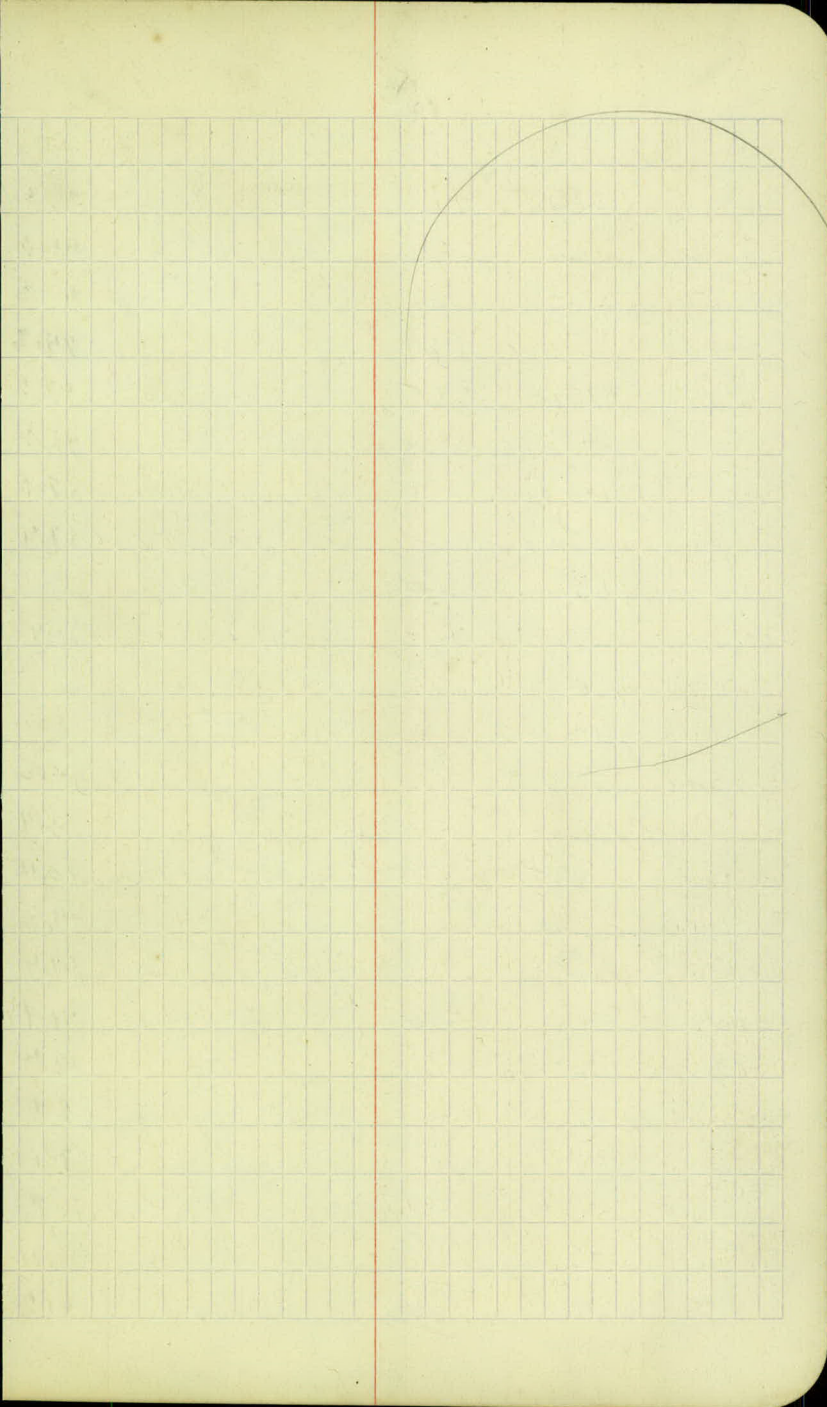
(4.60) H, 1

At 6D2

905.40

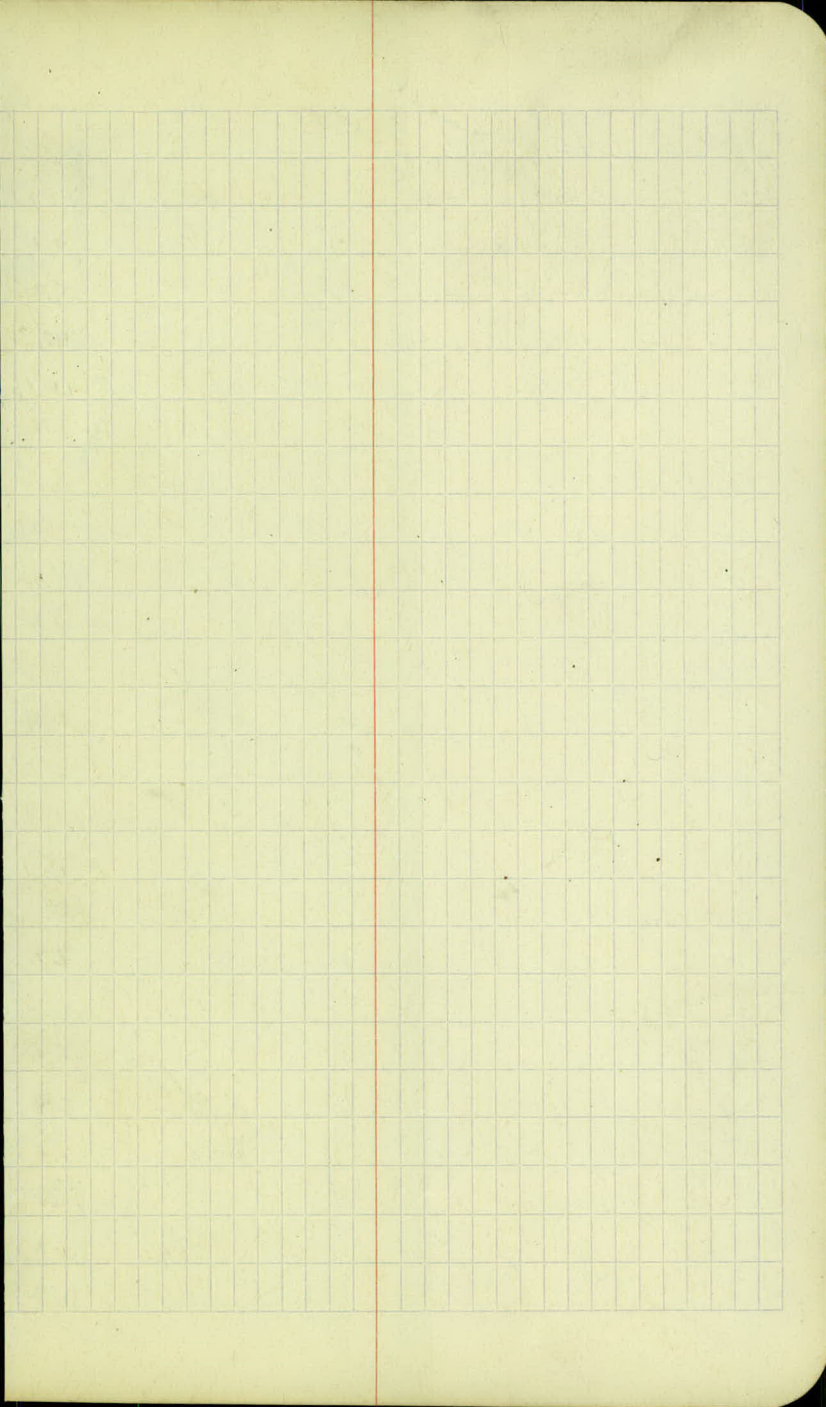
900.80

6D1	221°56'	6.40		
1 Top R.R. Cut	280°30'	1.70	2.0	03.4
2 Top N. Ridge	261°00'	1.70	3.0	02.4
3 Toe	168°00'	.60	14.0	91.4
4 Top R.R. Cut	96°30'	.75	5.0	00.4
5 " N. Ridge	125°00'	.75	7.0	98.4
6 ± Draw	207°00'	1.40	14.0	91.4
7 Toe R.R. Fill	95°00'	3.00	17.0	88.4
8 " W. Slope	174°00'	2.60	14.0	91.4
9 Gen Elev	200°00'	2.60	14.0	91.4
10 N+S. Fence	238°30'	2.60	11.0	94.4
11 Top W. Slope	160°00'	2.50	3.5	01.9
12 Pocket	113°40'	3.60	16.0	89.4
13 W. Slope	157°00'	2.00	11.2	94.2



(905.40)

14 Slope	140°00'	170.0	14.0	91.4
15 Top Knob	115°00'	240.	13.2	92.4
16 N. & S. Fence	251°30'	315.	10.2	95.2
17 Toe N. Slope	250°00'	2.80	10.2	95.2
18 Slope	278°15'	3.05	7.2	98.2
19 N. "	248°00'	1.20	10.2	95.2
20 Toe R.R. Cut	285°00'	3.00	16.0	89.4
21 " " "	10°00'	.20	17.0	88.4
22 W. Toe Knob	115°00'	2.00	17.0	88.4
23 Toe N. Slope	220°00'	1.40	7.4	91.4
24 & R.R. Farm Cross.	84°10'	2.15	11.5	93.9
25 Toe R.R. Cut	340°00'	1.00	16.0	89.4
26 Gen Elev.	227°00'	2.10	10.2	95.2
27	230°00'	2.80	11.5	93.9
28 R.R. Fence	73°20'	2.40	13.4	92.0
29 Toe R.R. Cut	35°00'	1.00	16.0	89.5
30 Toe N. Slope	60°00'	1.50	16.0	89.4
31 Swale	57°00'	2.85	11.0	94.4
32 & Frost Ave	38°20'	3.70	3.0	02.4
33 & Swale	22°00'	2.20	8.5	96.9
34 & Swale	30°00'	1.60	8.0	97.4
35 Toe Frost Ave Fill	20°00'	2.75	9.5	95.9
36 Flat 3. to Pav Top Ridge	45°00'	2.00	4.2	01.2
37 Slope to RR	359°00'	1.90	15.0	10.4



			<u>905.40</u>			
38	Top Ridge	345°00	1.50	+2.30	0.0	11.9
39	R. R. Cut	315°00	2.00		0.0	05.4
40	S. End Swale	327°00	3.00		3.0	02.4
41	Top R. R. Cut	302°00	2.90		7.5	97.9
42	W. End 40 Ac.	297°30	2.40		9.5	95.9
43	Top	308°30	4.00		+5.0	10.4

(4.10) 4.1.

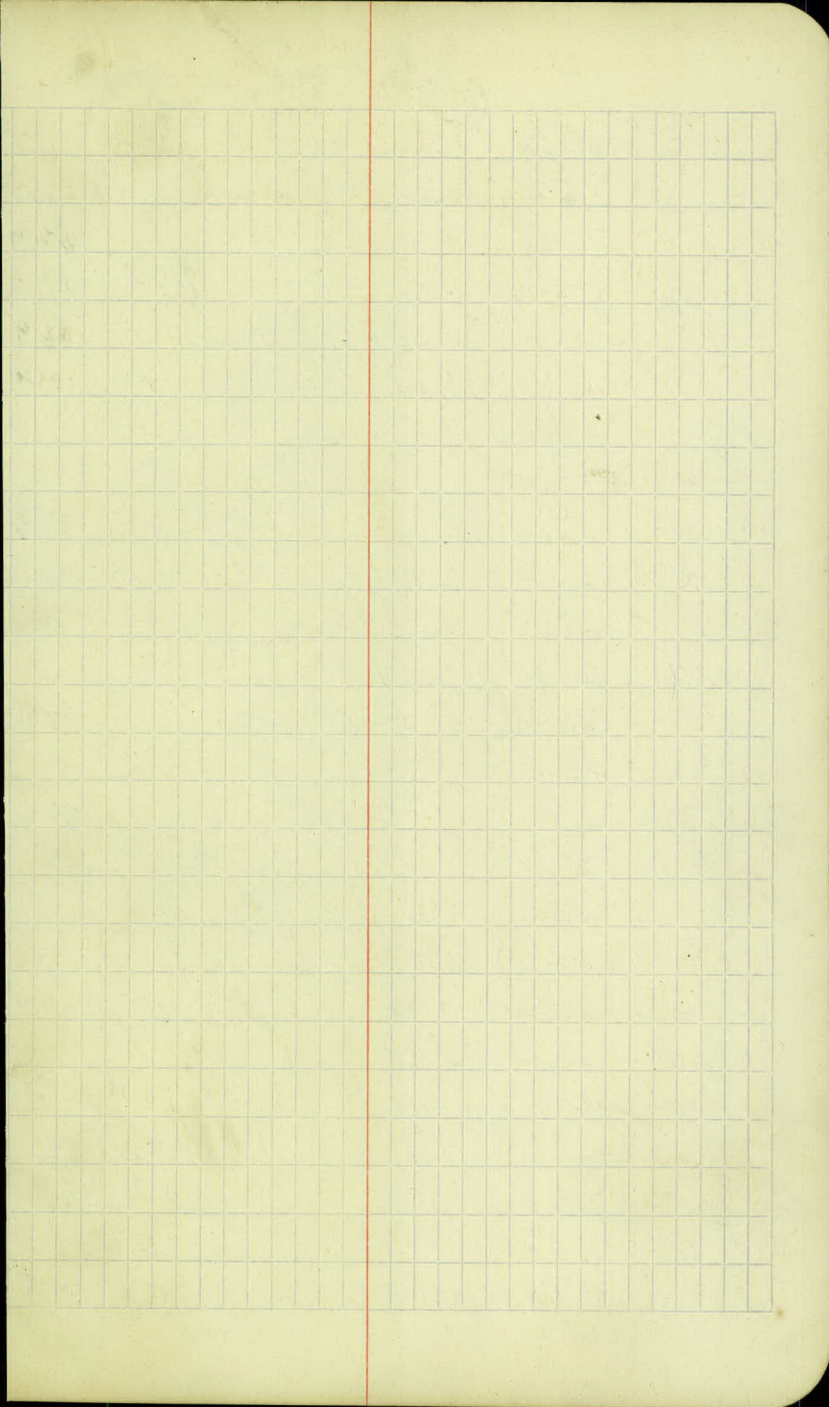
At Δ6DA18

935.26

931.16

Δ6DA1 352°04' 14.20

G.E. Flat	95°00	1.65		6.8	28.5
Top. W. Slope	240°00	.30		5.2	30.1
" "	330°00	.80		6.4	28.9
N. S. Fence	94°30	3.60		10.8	24.5
Fence W. Slope	325°30	1.40		12.2	23.1
Top " "	348°00	1.50		6.4	28.9
Cor. N. & W. Fence	342°00	2.75		13.2	22.1
Top W. Flat	359°00	3.50		11.2	24.1
Cor. S. & W. Fence	135°20	5.05		10.0	25.3
G. E. Elev.	135°20	2.50		6.0	29.3
Toe of Break	325°00	3.10	-2°34'	10.0	11.4
G. E. Elev.	24°00	3.40		12.5	22.8
E. & W. Fence	158°30	3.95		8.0	27.3
Top. W. Slope	168°00	1.70		8.5	26.8
W. Slope	157°00	1.50		5.0	30.3



935.26

G.E.Elev	38°40'	4.35		15.0	20.3
" "	55°00'	2.50		8.0	27.3
E.M. Fence	318°00'	3.70	-2°58'	7.0	22.0
N+S. Fence	45°00'	5.00		14.0	21.3
E+W. "	305°00'	4.25	-3°35'	5.0	03.8
Fence Line Top Rd. Cut	292°10'	5.00	-2°43'	7.0	03.3
Break in slope	304°30'	2.00	6°52'	5.0	06.7
N+S. Fence	32°15'	6.30		16.0	19.3
G.E.Elev.	15°00'	2.00		6.5	28.8
→ Δ6X	260°38'	3.60	-7°37'	0.0	887.8
G.E.Elev.	21°00'	5.75		15.5	19.8
→ Δ6Y	01°32'	7.00		16.25	19.0
→ Δ6Z	312°40'	6.30	-1°50'	5.0	910.0

(4.20) H.I.

At Δ6Y					919.01
Δ6DAIB	181°32'	7.00			
Saddle	235°00'	1.50		4.5	18.7
Top Slope NW	159°00'	3.45	+0°40'	5.0	32.7
N.W. slope	235°00'	3.30		11.3	11.9
Top N.W. "	216°00'	3.55		3.0	20.2
" S+W. "	122°00'	1.40		1.0	22.2
G.E.Elev.	216°00'	2.20		2.2	21.0
Top N End Ridge	262°30'	2.90		+1 0.0	26.1
Toe N. Slope	134°00'	2.70		3.8	19.4
Top S. Slope	203°00'	1.60		1.0	22.2

923.21

On No. 1 W. of Δ6DAIB

S. of Δ6DAIB

S.W. of Δ6DAIB

$$\begin{array}{r} 935.26 \\ 25.2 \\ \hline 910.06 \end{array}$$

$$\begin{array}{r} 935.26 \\ 47.4 \\ \hline 887.86 \end{array}$$

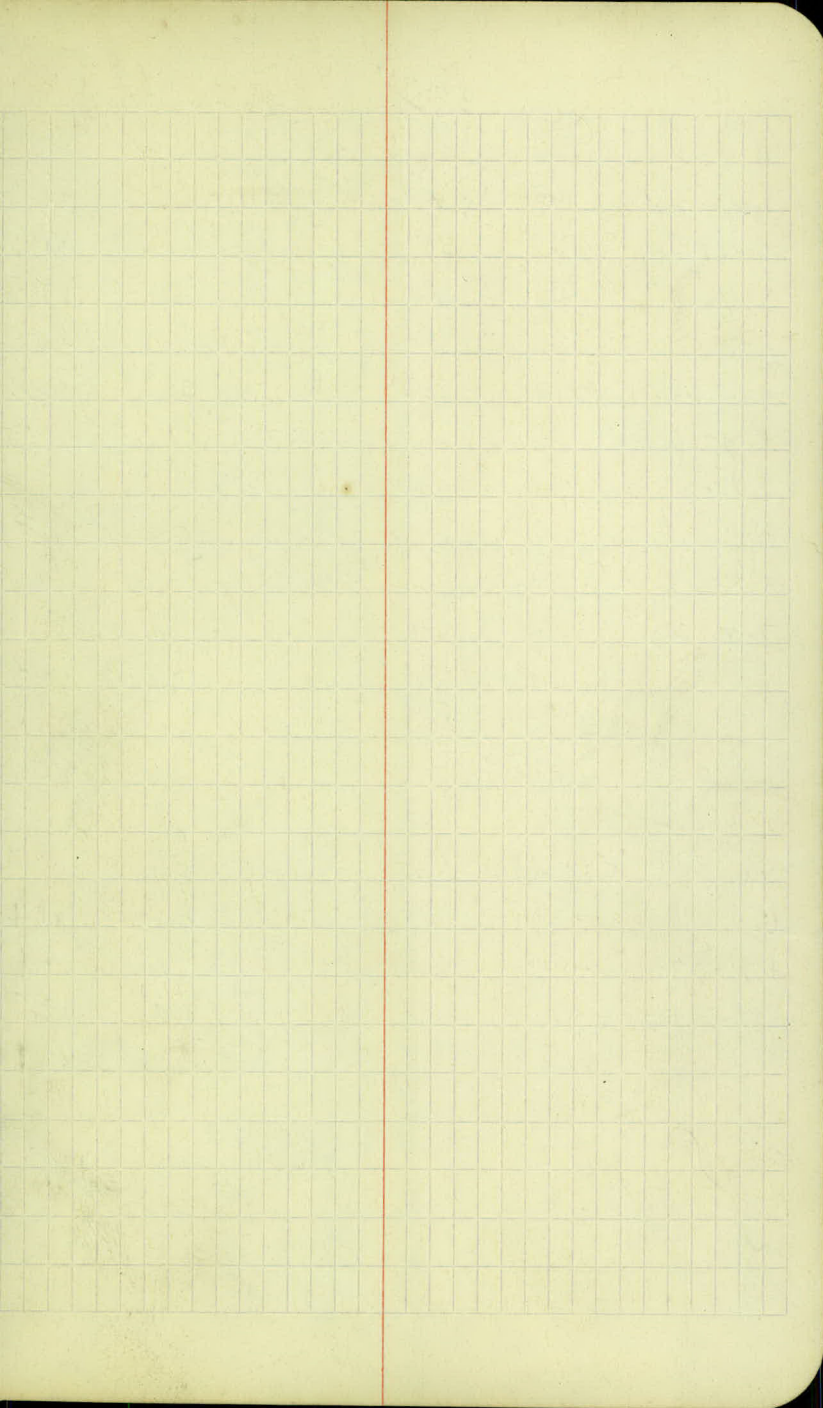
(923.21)

Top S. Slope	170°00'	1.20		1.5	21.7
N. & S. Fence	120°00'	3.90	+1°	-10.0	20.0
In Depression	165°00'	2.80		2.8	20.4
Top W. Slope	285°30'	3.40		+ $\frac{1}{2}$ 0.0	24.9
N. & S. Fence	92°40'	3.30		2.8	20.4
Toe E. Slope	312°00'	2.00		5.5	17.7
2 Draw S.E.	82°30'	3.65		7.0	16.2
G.E.E. lev.	33°30'	1.50		8.0	15.2
N. & S. Fence & Draw	67°20'	3.35		11.2	12.0
Toe E. Slope	275°00'	1.50		4.1	19.1
Top " "	262°00'	2.00		0.0	23.2
" E.W. & S. "	80°00'	1.65		3.0	20.2

(4.40) H. 1.

(914.46)

At Δ 62					910.06
Δ 6 DAIB	132°40'	6.30	+1°58'	5.0	
G.E.	160°00'	1.00		4.8	09.7
Top Rd. Cut N. & S. Fence	227°00'	1.05		10.0	04.5
Top Bank	324°00'	1.20		11.0	03.5
" "	324°00'	.40		5.5	09.0
Top Rd. Cut Fence	193°30'	1.70		8.3	06.2
W. Slope	103°00'	3.00	+1°55'	5.0	19.5
Top Bank	167°00'	2.50		7.0	07.5
S.E. + Cor. N. Fence	275°00'	1.30		16.2	98.3



914.46

Toe W. Slope	108°00'	2.10	5.2	09.3
4 in Fence Slope	130°00'	5.15	3.5	11.0
& No. 1	270°00'	1.55	15.4	99.1
Toe W. Slope	20°00'	2.80	5.0	09.5
" " "	68°00'	1.70	3.0	11.5
" " "	34°00'	2.10	3.0	11.5
G. Elev.	40°00'	1.00	5.5	09.0

(4.55) H.I.

892.41

At. Δ 6v				887.86
Δ 6 DA/B	80°38'	3.60	+7°02'	5.0
Toe N.W. Slope	21°00'	1.70	2.6	89.8
" Rd. Fill	340°00'	7.0	7.0	85.4
" " "	140°00'	4.0	8.5	83.9
W. Slope	82°00'	1.60	0.0	92.4
" " "	40°00'	1.65	1.0	91.4
Toe Rd. Fill				
Reg. Cut	333°40'	1.65	0.0	92.4
N. Slope	02°00'	1.60	1.0	91.4
W. " "	134°00'	4.50	3.5	88.9
Toe W. Slope				
E. R.O.W. Fence	149°00'	3.70	16.7	75.7
Toe W. Slope	142°00'	1.65	10.5	81.9

$$\begin{array}{r} 887.86 \\ 455 \\ \hline 892.41 \end{array}$$

	AZIMU.	DIST.	Vert.	Diff.	
At. Δ 6	H.I (4.05)		(484.15)		880.10
Δ 7	299°21'	5.45			
Δ 6 W	340°17'	5.25	-1°42' 5	20.6	463.5
Top cut.	304°00'	4.20	3.0	3.0	81.2
" "	305°15'	3.80	0.0	0.0	84.2
" "	307°00'	3.20	1.0	1.0	83.2
" "	308°30'	3.08	7.0	7.0	77.2
Toe R.R. fill	320°30'	1.15	-6°30' 10.0	23.0	61.2
Δ 6 E	78°37'	4.90	-0°40' 5		473.45

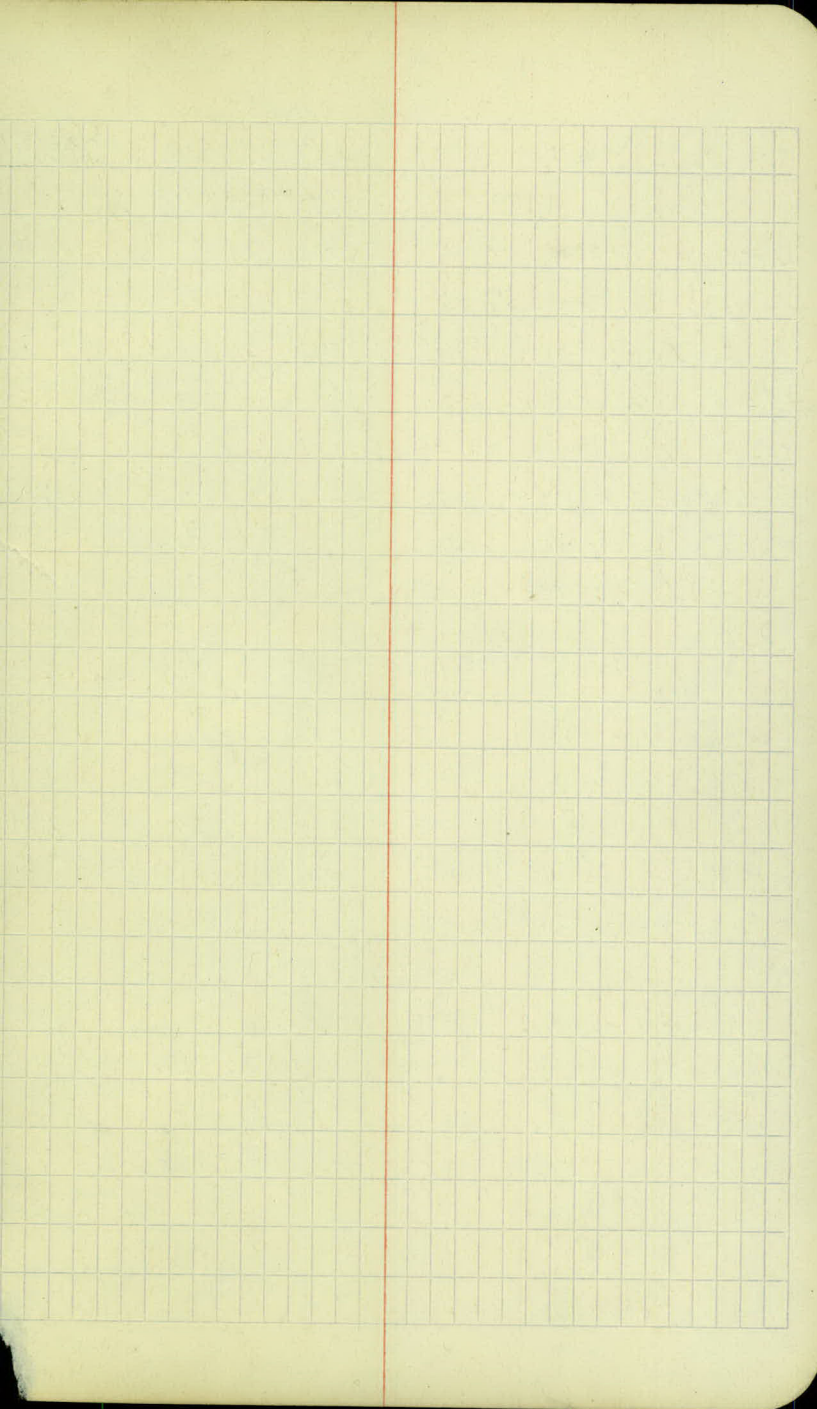
AT Δ 6 W	H.I (4.65)		(468.20)		463.55
Δ 6	160°17'	5.25			
Toe slope	54°00'	1.45	8.6	8.6	59.6
" "	45°30'	2.00	10.00	10.0	58.2
" "	40°15'	3.60	9.5	9.5	58.7
" "	39°15'	4.30	7.2	7.2	61.0
Toe Frost cut.	139°45'	9.00	+1°03' 5		79.7
Toe fill	38°00'	5.30	6.5	6.5	61.7
Toe slope	138°30'	9.00	+0°45' 5		75.0
Toe fill	200°00'	0.95	8.7	8.7	59.5
" "	38°10'	5.50	9.0	9.0	59.2
" "	37°30'	6.10	8.5	8.5	59.7
" "	140°45'	8.00	+0°38' 5.0		72.1
" "	150°45'	4.00	9.2	9.2	59.0
" "	143°30'	7.40	+0°15' 5		66.4

$$\begin{array}{r} 84.15 \\ 127 \\ \hline 73.95 \end{array}$$

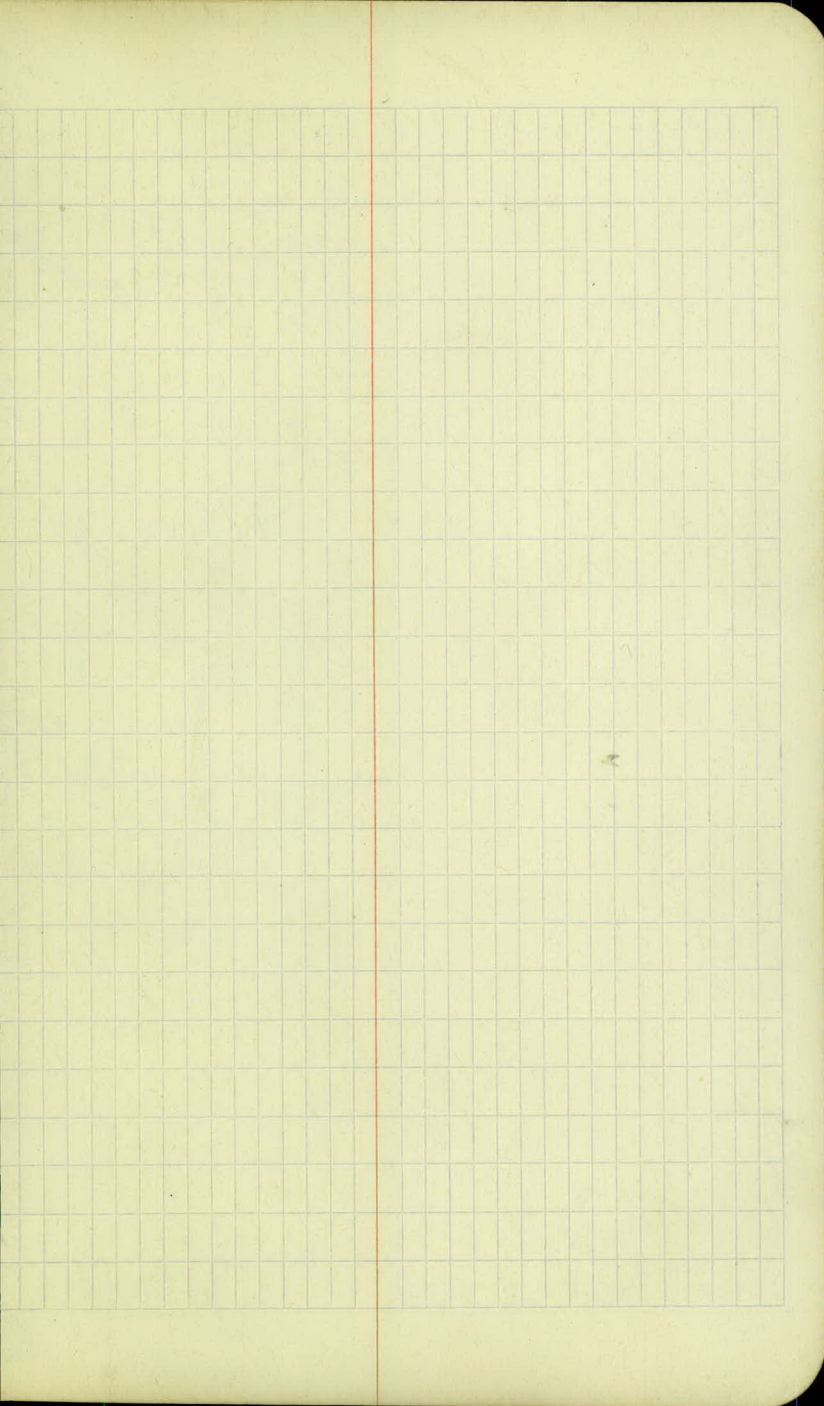
$$\begin{array}{r} 84.15 \\ 20.6 \\ \hline 63.55 \\ 64.65 \\ \hline 68.20 \end{array}$$

2155 868.20

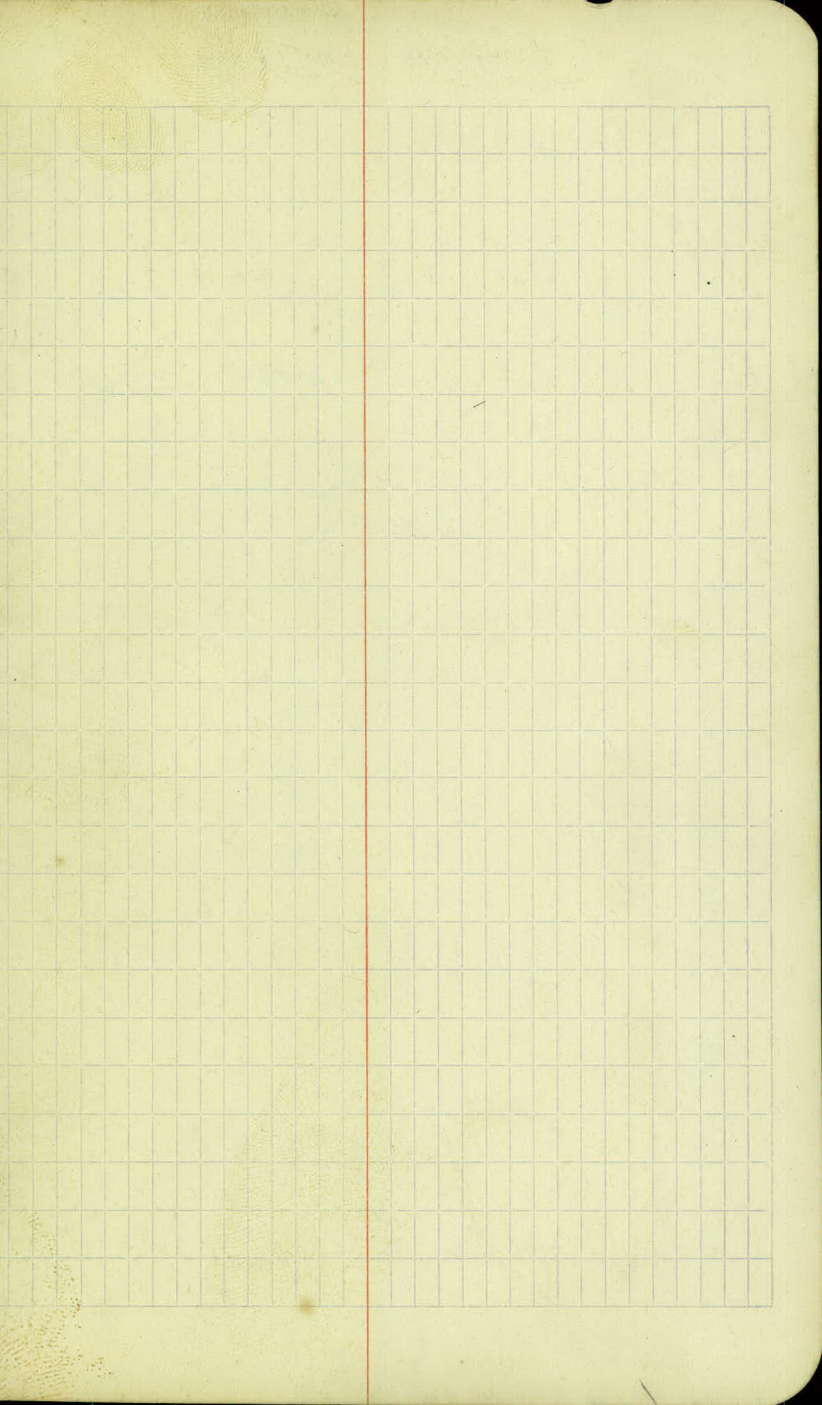
Toe slope	45°00'	5.10	6.5	6.5	61.7
" fill	145°40'	5.45	9.2	9.2	59.0
Top slope	49°30'	5.00	-1/2 0.0		65.7
Toe slope	139°15'	7.00	8.0	8.0	60.2
Top Knoll	50°30'	5.00'	+0°50' 4.0		71.5
Top "	55°30'	4.60'	+0°55' 5.0		70.6
Toe W slope	125°45'	7.00	8.0	8.0	60.2
Top Knoll	54°00'	5.20	+0°50' 4		71.8
Toe "	49°45'	4.70	7.2	7.2	61.0
E Road	118°30'	7.00	6.5	6.5	61.7
Toe fill	158°00'	4.40	5	5.0	63.2
E Road	107°30'	7.00	8.0	8.0	60.2
Toe Knoll	60°45'	5.60	8.0	8.0	60.2
E Road	94°15'	7.40	8.0	8.0	60.2
S.W. Cor. Bldg	60°40'	5.80	6.0	6.0	62.2
N.W. Cor. "	63°30'	5.60	7.8	7.8	60.4
E Road	84°30'	8.30	8.0	8.0	60.2
" "	74°15'	8.80	8.5	8.5	59.7
Toe cut	169°30'	3.70	5.4	5.4	62.8
N.E. cor. B.	68°30'	6.10	8.3	8.3	59.9
Toe cut	195°45'	2.80	2.5	2.5	65.7
G.E. swamp	84°00'	5.00	10.2	10.2	58.0
Toe cut	217°00'	2.85	2.9	2.9	65.3
G.E. swmp.	115°00'	4.00'	10.1	10.1	58.1
" "	114°00'	2.80'	9.0	9.0	59.2



	Azi.	Dist	Vert.	
G.E. SW 1/2	65°00'	300'	10.0	58.2
4 th . 6 E		(440)	(877.85)	
Δ 6	258°37'	4.95		873.45
E Trail	221°00'	2.20	7.8	70.1
Top cut	216°15'	2.20	-1/2 3	73.8
Toe ridge	155°30'	.30	10.7	67.2
Ridge	34°25'	2.80	+30301 5	90.1
Top cut	207°30'	2.20	3	74.9
E Trail			+10301	
Break ridge	280°00'	1.75	2	80.5
Ridge	272°15'	.35	5.4	72.5
Toe fill	281°45'	2.40	8.0	69.9
Ridge	20°45'	0.65	0.0	77.9
Toe E. slope	184°00'	1.60	11.1	66.8
" " "	193°30'	.80	10.9	67.0
Divide	205°30'	.75	8.4	69.5
Toe fill	173°30'	2.75	8.0	69.9
Toe E. slope	165°30'	1.80	10.3	67.6
E Ridge	75°45'	2.30	7.5	70.4
Toe ridge	52°00'	2.00	10.0	67.9
Toe slope	135°30'	1.50	10.0	67.9
" "	75°00'	3.60	10.3	67.6
Ridge	86°00'	3.70	3.5	74.4
Sum ridge	119°00'	2.00	9.5	68.4
Toe	104°00'	4.00	11.0	66.9



Assumed	+	H.I.	-	Elev.	
B.M.	5.49	105.49		100.00	= 877.3
T.P.	9.96	113.05	2.40	103.09	
T.P.	12.24	124.93	0.36	112.69	
T.P.	9.07	133.56	0.44	124.49	
B.M.	+ .55			134.11	= 911.4
T.P.	0.45	911.94	10.06	901.88	
T.P.	0.00	901.88	11.35	890.53	
T.P.	2.11	892.64	12.16	880.48	
T.P.	2.40	882.88	5.49	877.37	



877.85

Ridge	94°30'	3.80	2.7	75.2
Toeslope	128°30'	3.50'	11.0	66.9
G.E. swp.	103°00'	2.00'	12.3	65.6
" "	103°00'	3.10	12.3	65.6
" "	110°00'	1.00	12.6	65.3
Top Knoll	140°45'	2.80	+10.15' 2.0	82.0
Draw	146°30'	2.20	3.0	74.9
Knoll	153°00'	2.20	2.0	75.9
Draw	155°30'	2.60	3.7	74.2
Knoll	161°00'	2.80	0.0	77.9
Toe fill	152°00'	3.50	3.5	74.4
ΔGEI	66°15'	3.30'	7.2	70.7
Δ Draw	135°00'	4.40'	3.0	74.9
Toe fill	140°30'	5.00	+10.15' 3.0	85.8

ΔGEI	H.I (+4.70)		875.35	870.65
ΔGE	246°15'	3.30	0.0	75.4
Trail	250°00'	2.80	0.0	75.4
Knoll	44°00'	1.25	3.0	72.4
Ridge	355°00'	3.50	+0.40' 3.5	76.0
Trail	257°30'	2.20	0.4	75.0
Topslope	20°00'	1.40	5.0	70.4
Ridge	354°15'	4.50	+0.40' 3.00	77.7
Trail	269°00'	1.60	3.8	71.6

$$\begin{array}{r} 870.65 \\ 4.7 \\ \hline 875.35 \end{array}$$

875.35

Toe slope	86°00'	1.00	^{+0°18'} 13.0	63.0
Trail	288°00'	1.40	5.0	70.4
Toe slope	95°45'	3.00'	11.0	64.4
Ridge	9°15'	5.80	^{+0°45'} 5.0	78.0
Toe slope	78°00'	3.80	^{-0°10'} 10.0	74.3
" "	18°30'	5.80	12.0	63.4
Trail	89°00	4.20	4.5	70.9
Toe slope	49°30'	4.40	11.7	63.7
" "	4°30'	3.50	12.0	63.4
Trail	104°00	3.00		
Toe slope	32°30'	5.80	14.0	64.4
" "	18°00'	2.00	11.5	63.9
G.E. swp.	31.°30'	4.20	12.9	62.5
" "		1.55	12.0	63.4
" "	44°00	2.55	12.0	63.4
Toe slope	5°13'	2.00	8.6	66.8
G.E.	62°00'	3.00	12.5	62.9
Toe slope	2°00'	1.60	10.0	65.4
G.E.	60°00'	4.00	12.5	62.9
Draw	319°00	1.40	7.0	68.4

KEITH'S RAILROAD CURVE TABLES.

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HOW TO USE KEITH'S TABLES.

EXAMPLE.

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

Ext. in Tab. IV opposite $23^{\circ} 20' = 120.87$

$120.87 \div 12 = 10.07$. Say a 10° Curve.

Tan. in Tab. IV opp. $23^{\circ} 20' = 1183.1$

$1183.1 \div 10 = 118.31$.

Tab. V. correction for A. $23^{\circ} 20'$ for a 10° Cur. = 0.16

$118.31 + 0.16 = 118.47 =$ corrected Tangent.

(If corrected Ext. is required find in same way)

Ang. $23^{\circ} 20' = 23.33^{\circ} \div 10 = 2.3333 =$ L. C.

$2^{\circ} 19\frac{1}{2}' =$ def. for sta.	542	I. P.=sta.	542+72
$4^{\circ} 49\frac{1}{2}' =$ " " "	+50	Tan.=	1.18.47
$7^{\circ} 19\frac{1}{2}' =$ " " "	543	B. C.=sta.	541+53.53
$9^{\circ} 49\frac{1}{2}' =$ " " "	+50	L. C.=	2.33.33
$11^{\circ} 40' =$ " " "	543+	E. C.=sta.	543+86.86
	86.86		

$100 - 53.53 = 46.47 \times 3' (\text{def. for 1 ft. of } 10^{\circ} \text{ Cur.}) = 139.41' =$
 $2^{\circ} 19\frac{1}{2}'' =$ def. for sta. 542.

Def. for 50 ft. = $2^{\circ} 30'$ for a 10° Curve.

Def. for 36.86 ft. = $1^{\circ} 50\frac{1}{2}'$ for a 10° Curve

(These tables are published in Field Books of
KEUFFEL & ESSER Co., New York, N. Y.)

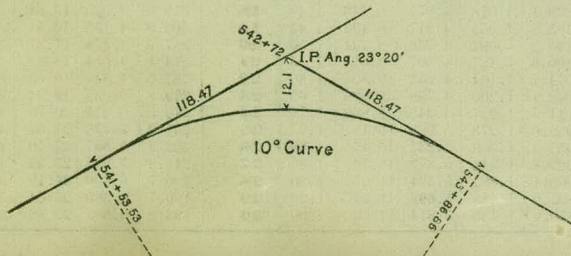


TABLE I. — Minutes in Decimals of a Degree.

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 II. — Inches in Decimals of a Foot.

1-16	3-32	$\frac{1}{8}$	3-16	$\frac{1}{4}$	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 III. — Radii, Ordinates and Deflections.

Deg.	Radius	Mid. Ord.	Tan. Def.	Chd. Def.	Def. for 1 Foot	Deg.	Radius	Mid. Ord.	Tan. Def.	Chd. Def.	Def. for 1 Foot
0° 10'	34377.	.036	.145	.291	0.05'	7°	819.0	1.528	6.105	12.21	2.10'
20	17189.	.073	.291	.582	0.10	20'	781.8	1.600	6.395	12.79	2.20
30	11459.	.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	8	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	9	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	10	573.7	2.183	8.716	17.43	3.00
20	2455.7	.509	2.036	4.072	0.70	30	546.4	2.292	9.150	18.30	3.15
30	2292.0	.545	2.181	4.363	0.75	11	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	12	478.3	2.620	10.45	20.91	3.60
3	1910.1	.655	2.618	5.235	0.90	30	459.3	2.730	10.89	21.77	3.75
10	1809.6	.691	2.763	5.526	0.95	13	441.7	2.839	11.32	22.64	3.90
20	1719.1	.727	2.908	5.817	1.00	30	425.4	2.949	11.75	23.51	4.05
30	1637.3	.764	3.054	6.108	1.05	14	410.3	3.058	12.18	24.37	4.20
40	1562.9	.800	3.199	6.398	1.10	30	396.2	3.168	12.62	25.24	4.35
50	1495.0	.836	3.345	6.689	1.15	15	383.1	3.277	13.05	26.11	4.50
4	1432.7	.873	3.490	6.980	1.20	30	370.8	3.387	13.49	26.97	4.65
10	1375.4	.909	3.635	7.271	1.25	16	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	17	338.3	3.716	14.78	29.56	5.10
40	1228.1	1.018	4.071	8.143	1.40	18	319.6	3.935	15.64	31.29	5.40
50	1185.8	1.055	4.217	8.433	1.45	19	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	21	274.4	4.594	18.22	36.44	6.30
20	1074.7	1.164	4.653	9.305	1.60	22	262.0	4.814	19.08	38.16	6.60
30	1042.1	1.200	4.798	9.596	1.65	23	250.8	5.035	19.94	39.87	6.90
40	1011.5	1.237	4.943	9.886	1.70	24	240.5	5.255	20.79	41.58	7.20
50	982.6	1.273	5.088	10.18	1.75	25	231.0	5.476	21.64	43.28	7.50
6	955.4	1.309	5.234	10.47	1.80	26	222.3	5.697	22.50	44.99	7.80
10	929.6	1.346	5.379	10.76	1.85	27	214.2	5.918	23.35	46.69	8.10
20	905.1	1.382	5.524	11.05	1.90	28	206.7	6.139	24.19	48.38	8.40
30	881.9	1.418	5.669	11.34	1.95	29	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

TABLE IV. — Tangents and Externals to a 1° Curve.

Angle	Tangent	External	Angle	Tangent	External	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 IV. — Tangents and Externals to a 1° Curve.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
31°	1589.0	216.3	41°	2142.2	387.4	51°	2732.9	618.4
10'	1598.0	218.7	10'	2151.7	390.7	10'	2743.1	622.8
20	1606.9	221.1	20	2161.2	394.1	20	2753.4	627.2
30	1615.9	223.5	30	2170.8	397.4	30	2763.7	631.7
40	1624.9	226.0	40	2180.3	400.8	40	2773.9	636.2
50	1633.9	228.4	50	2189.9	404.2	50	2784.2	640.7
32	1643.0	230.9	42	2199.4	407.6	52	2794.5	645.2
10	1652.0	233.4	10	2209.0	411.1	10	2804.9	649.7
20	1661.0	235.9	20	2218.6	414.5	20	2815.2	654.3
30	1670.0	238.4	30	2228.1	418.0	30	2825.6	658.8
40	1679.1	241.0	40	2237.7	421.4	40	2835.9	663.4
50	1688.1	243.5	50	2247.3	425.0	50	2846.3	668.0
33	1697.2	246.1	43	2257.0	428.5	53	2856.7	672.7
10	1706.3	248.7	10	2266.6	432.0	10	2867.1	677.3
20	1715.3	251.3	20	2276.2	435.6	20	2877.5	682.0
30	1724.4	253.9	30	2285.9	439.2	30	2888.0	686.7
40	1733.5	256.5	40	2295.6	442.8	40	2898.4	691.4
50	1742.6	259.1	50	2305.2	446.4	50	2908.9	696.1
34	1751.7	261.8	44	2314.9	450.0	54	2919.4	700.9
10	1760.8	264.5	10	2324.6	453.6	10	2929.9	705.7
20	1770.0	267.2	20	2334.3	457.3	20	2940.4	710.5
30	1779.1	269.9	30	2344.1	461.0	30	2951.0	715.3
40	1788.2	272.6	40	2353.8	464.6	40	2961.5	720.1
50	1797.4	275.3	50	2363.5	468.4	50	2972.1	725.0
35	1806.6	278.1	45	2373.3	472.1	55	2982.7	729.9
10	1815.7	280.8	10	2383.1	475.8	10	2993.3	734.8
20	1824.9	283.6	20	2392.8	479.6	20	3003.9	739.7
30	1834.1	286.4	30	2402.6	483.8	30	3014.5	744.6
40	1843.3	289.2	40	2412.4	487.2	40	3025.2	749.6
50	1852.5	292.0	50	2422.3	491.0	50	3035.8	754.6
36	1861.7	294.9	46	2432.1	494.8	56	3046.5	759.6
10	1870.9	297.7	10	2441.9	498.7	10	3057.2	764.6
20	1880.1	300.6	20	2451.8	502.5	20	3067.9	769.7
30	1889.4	303.5	30	2461.7	506.4	30	3078.7	774.7
40	1898.6	306.4	40	2471.5	510.3	40	3089.4	779.8
50	1907.9	309.3	50	2481.4	514.3	50	3100.2	784.9
37	1917.1	312.2	47	2491.3	518.2	57	3110.9	790.1
10	1926.4	315.2	10	2501.2	522.2	10	3121.7	795.2
20	1935.7	318.1	20	2511.2	526.1	20	3132.6	800.4
30	1945.0	321.1	30	2521.1	530.1	30	3143.4	805.6
40	1954.3	324.1	40	2531.1	534.2	40	3154.2	810.9
50	1963.6	327.1	50	2541.0	538.2	50	3165.1	816.1
38	1972.9	330.2	48	2551.0	542.2	58	3176.0	821.4
10	1982.2	333.2	10	2561.0	546.3	10	3186.9	826.7
20	1991.5	336.3	20	2571.0	550.4	20	3197.8	832.0
30	2000.9	339.3	30	2581.0	554.5	30	3208.8	837.3
40	2010.2	342.4	40	2591.0	558.6	40	3219.7	842.7
50	2019.6	345.5	50	2601.1	562.8	50	3230.7	848.1
39	2029.0	348.6	49	2611.2	566.9	59	3241.7	853.5
10	2038.4	351.8	10	2621.2	571.1	10	3252.7	858.9
20	2047.8	354.9	20	2631.3	575.3	20	3263.7	864.3
30	2057.2	358.1	30	2641.4	579.5	30	3274.8	869.8
40	2066.6	361.3	40	2651.5	583.8	40	3285.8	875.3
50	2076.0	364.5	50	2661.6	588.0	50	3296.9	880.8
40	2085.4	367.7	50	2671.8	592.3	60	3308.0	886.4
10	2094.9	371.0	10	2681.9	596.6	10	3319.1	892.0
20	2104.3	374.2	20	2692.1	600.9	20	3330.3	897.5
30	2113.8	377.5	30	2702.3	605.3	30	3341.4	903.2
40	2123.3	380.8	40	2712.5	609.6	40	3352.6	908.8
50	2132.7	384.1	50	2722.7	614.0	50	3363.8	914.5

TABLE IV. — Tangents and Externals to a 1° Curve.

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

VI

TABLE IV. — Tangents and Externals to a 1° Curve.

Angle	Tangent	External	Angle	Tangent	External	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	9662.6	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	6808.2	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 V. Corrections for use with table IV,

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For Tangents Add															
ANGLE	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	.70	.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	2.14	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	4.49	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

For External Add

ANGLE	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	.029	.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	.286	.383	.480	.578	.678	.777	.877	.977	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	.299	.450	.603	.756	.910	1.07	1.22	1.38	1.54	1.70	1.87	2.03	2.20	
95°	.174	.350	.522	.706	.985	1.06	1.25	1.43	1.62	1.80	1.99	2.18	2.38	2.58	
100°	.200	.401	.604	.809	1.01	1.22	1.43	1.64	1.85	2.06	2.28	2.50	2.73	2.96	

Table VI. Deflections for Sub Chords for Short Radius Curves.

Degree of Curve	Radius 50 sin. def. ang.	$\frac{1}{2}$ sub chord R = sin of 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.

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

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

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

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

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

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

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

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

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

$$\text{No. chords} = \frac{\frac{1}{2} I}{D}$$

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

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

Table IV. 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 IV.: 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.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.), 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.

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

Given Base 100, Alt 10. $10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. 25. $25^2 \div 200 = 3.125$. $100 - 3.125 = 96.875 = \text{Base}$

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.

Natural Sines

DEG.	0'	10'	20'	30'	40'	50'	DEG.	DEG.	0'	10'	20'	30'	40'	50'	DEG.
0	0000	0029	0058	0087	0116	0145	89	40	6428	6450	6472	6494	6517	6539	49
1	0175	0204	0233	0262	0291	0320	88	41	6561	6583	6604	6626	6648	6670	48
2	0349	0378	0407	0436	0465	0494	87	42	6691	6713	6734	6756	6777	6799	47
3	0523	0552	0581	0610	0640	0669	86	43	6820	6841	6862	6884	6905	6926	46
4	0698	0727	0756	0785	0814	0843	85	44	6947	6967	6988	7009	7030	7050	45
5	0872	0901	0929	0958	0987	1016	84	45	7071	7092	7112	7133	7153	7173	44
6	1045	1074	1103	1132	1161	1190	83	46	7193	7214	7234	7254	7274	7294	43
7	1219	1248	1279	1305	1334	1363	82	47	7314	7333	7353	7373	7392	7412	42
8	1392	1421	1449	1478	1507	1536	81	48	7431	7451	7470	7490	7509	7528	41
9	1564	1593	1622	1650	1679	1708	80	49	7547	7566	7585	7604	7623	7642	40
10	1736	1765	1794	1822	1851	1880	79	50	7660	7679	7698	7716	7735	7753	39
11	1908	1937	1965	1994	2022	2051	78	51	7771	7790	7808	7826	7844	7862	38
12	2079	2108	2136	2164	2193	2221	77	52	7880	7898	7916	7934	7951	7969	37
13	2250	2278	2306	2334	2363	2391	76	53	7986	8004	8021	8039	8056	8073	36
14	2419	2447	2476	2504	2532	2560	75	54	8090	8107	8124	8141	8158	8175	35
15	2588	2616	2644	2672	2700	2728	74	55	8192	8208	8225	8241	8258	8274	34
16	2756	2784	2812	2840	2868	2896	73	56	8290	8307	8323	8339	8355	8371	33
17	2924	2952	2979	3007	3035	3062	72	57	8387	8403	8418	8434	8450	8465	32
18	3090	3118	3145	3173	3201	3228	71	58	8480	8496	8511	8526	8542	8557	31
19	3256	3283	3311	3338	3365	3393	70	59	8572	8587	8601	8616	8631	8646	30
20	3420	3448	3475	3502	3529	3557	69	60	8660	8675	8689	8704	8718	8732	29
21	3584	3611	3638	3665	3692	3719	68	61	8746	8760	8774	8788	8802	8816	28
22	3746	3773	3800	3827	3854	3881	67	62	8829	8843	8857	8870	8884	8897	27
23	3907	3934	3961	3987	4014	4041	66	63	8910	8923	8936	8949	8962	8975	26
24	4067	4094	4120	4147	4173	4200	65	64	8988	9001	9013	9026	9038	9051	25
25	4226	4253	4279	4305	4331	4358	64	65	9063	9075	9088	9100	9112	9124	24
26	4384	4410	4436	4462	4488	4514	63	66	9135	9147	9159	9171	9182	9194	23
27	4540	4566	4592	4617	4643	4669	62	67	9205	9216	9228	9239	9250	9261	22
28	4695	4720	4746	4772	4797	4823	61	68	9272	9283	9293	9304	9315	9325	21
29	4848	4874	4899	4924	4950	4975	60	69	9336	9346	9356	9367	9377	9387	20
30	5000	5025	5050	5075	5100	5125	59	70	9397	9407	9417	9426	9436	9446	19
31	5150	5175	5200	5225	5250	5275	58	71	9455	9465	9474	9483	9492	9502	18
32	5299	5324	5348	5373	5398	5422	57	72	9511	9520	9528	9537	9546	9555	17
33	5446	5471	5495	5519	5544	5568	56	73	9563	9572	9580	9588	9596	9605	16
34	5592	5616	5640	5664	5688	5712	55	74	9613	9621	9628	9636	9644	9652	15
35	5736	5760	5783	5807	5831	5854	54	75	9659	9667	9674	9681	9689	9696	14
36	5878	5901	5925	5948	5972	5995	53	76	9703	9710	9717	9724	9730	9737	13
37	6018	6041	6065	6088	6111	6134	52	77	9744	9750	9757	9763	9769	9775	12
38	6157	6180	6202	6225	6248	6271	51	78	9781	9787	9793	9799	9805	9811	11
39	6293	6316	6338	6361	6383	6406	50	79	9816	9822	9827	9833	9838	9843	10
DEG.	60'	50'	40'	30'	20'	10'	DEG.	DEG.	60'	50'	40'	30'	20'	10'	DEG.

DEG.	0'	10'	20'	30'	40'	50'	DEG.
80	9848	9853	9858	9863	9868	9872	9
81	9877	9881	9886	9890	9894	9899	8
82	9903	9907	9911	9914	9918	9922	7
83	9925	9929	9932	9936	9939	9942	6
84	9945	9948	9951	9954	9957	9959	5
85	9962	9964	9967	9969	9971	9974	4
86	9976	9978	9980	9981	9983	9985	3
87	9986	9988	9989	9990	9992	9993	2
88	9994	9995	9996	9997	9997	9998	1
89	9998	9999	9999	9999	I.0000	I.0000	0

DEG.	60'	50'	40'	30'	20'	10'	DEG.
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Natural Cosines

Natural Tangents

DEG.	0'	10'	20'	30'	40'	50'	DEG.	0'	10'	20'	30'	40'	50'	DEG.	
0	0000	0029	0058	0087	0116	0145	89	40	8391	8441	8491	8541	8591	8642	49
1	0175	0204	0233	0262	0291	0320	88	41	8693	8744	8796	8847	8899	8952	48
2	0349	0378	0407	0437	0466	0495	87	42	9004	9057	9110	9163	9217	9271	47
3	0524	0553	0582	0612	0641	0670	86	43	9325	9380	9435	9490	9545	9601	46
4	0699	0729	0758	0787	0816	0846	85	44	9657	9713	9770	9827	9884	9942	45
5	0875	0904	0934	0963	0992	1022	84	45	1.0000	1.0058	1.0117	1.0176	1.0235	1.0295	44
6	1051	1080	1110	1139	1169	1198	83	46	1.0355	1.0416	1.0477	1.0533	1.0599	1.0661	43
7	1228	1257	1287	1317	1346	1376	82	47	1.0724	1.0786	1.0850	1.0913	1.0977	1.1041	42
8	1405	1435	1465	1495	1524	1554	81	48	1.1106	1.1171	1.1237	1.1303	1.1369	1.1436	41
9	1584	1614	1644	1673	1703	1733	80	49	1.1504	1.1571	1.1640	1.1708	1.1778	1.1847	40
10	1763	1793	1823	1853	1883	1914	79	50	1.1918	1.1988	1.2059	1.2131	1.2203	1.2276	39
11	1944	1974	2004	2035	2065	2095	78	51	1.2349	1.2423	1.2497	1.2572	1.2647	1.2723	38
12	2126	2156	2186	2217	2247	2278	77	52	1.2799	1.2876	1.2954	1.3032	1.3111	1.3190	37
13	2309	2339	2370	2401	2432	2462	76	53	1.3270	1.3351	1.3432	1.3514	1.3597	1.3680	36
14	2493	2524	2555	2586	2617	2648	75	54	1.3764	1.3848	1.3934	1.4019	1.4106	1.4193	35
15	2679	2711	2742	2773	2805	2836	74	55	1.4281	1.4370	1.4460	1.4550	1.4641	1.4733	34
16	2867	2899	2931	2962	2994	3026	73	56	1.4826	1.4919	1.5013	1.5108	1.5204	1.5301	33
17	3057	3089	3121	3153	3185	3217	72	57	1.5399	1.5497	1.5597	1.5697	1.5798	1.5900	32
18	3249	3281	3314	3346	3378	3411	71	58	1.6003	1.6107	1.6212	1.6319	1.6426	1.6534	31
19	3443	3476	3508	3541	3574	3607	70	59	1.6643	1.6753	1.6864	1.6977	1.7090	1.7205	30
20	3640	3673	3706	3739	3772	3805	69	60	1.7321	1.7437	1.7556	1.7675	1.7797	1.7917	29
21	3839	3872	3906	3939	3973	4006	68	61	1.8040	1.8165	1.8291	1.8418	1.8546	1.8676	28
22	4040	4074	4108	4142	4176	4210	67	62	1.8807	1.8940	1.9074	1.9210	1.9347	1.9486	27
23	4245	4279	4314	4348	4383	4417	66	63	1.9626	1.9768	1.9912	2.0057	2.0204	2.0353	26
24	4452	4487	4522	4557	4592	4628	65	64	2.0503	2.0655	2.0809	2.0965	2.1123	2.1283	25
25	4663	4699	4734	4770	4806	4841	64	65	2.1445	2.1609	2.1775	2.1943	2.2113	2.2286	24
26	4877	4913	4950	4986	5022	5059	63	66	2.2450	2.2637	2.2817	2.2998	2.3183	2.3369	23
27	5095	5132	5169	5206	5243	5280	62	67	2.3559	2.3750	2.3945	2.4142	2.4342	2.4545	22
28	5317	5354	5392	5430	5467	5505	61	68	2.4751	2.4960	2.5172	2.5386	2.5605	2.5826	21
29	5543	5581	5619	5658	5696	5735	60	69	2.6051	2.6279	2.6511	2.6746	2.6985	2.7228	20
30	5774	5812	5851	5890	5930	5969	59	70	2.7475	2.7725	2.7980	2.8239	2.8502	2.8770	19
31	6009	6048	6088	6128	6168	6208	58	71	2.9042	2.9319	2.9600	2.9887	3.0178	3.0475	18
32	6249	6289	6330	6371	6412	6453	57	72	3.0777	3.1084	3.1397	3.1716	3.2041	3.2371	17
33	6494	6536	6577	6619	6661	6703	56	73	3.2709	3.3052	3.3402	3.3759	3.4124	3.4495	16
34	6745	6787	6830	6873	6916	6959	55	74	3.4874	3.5261	3.5656	3.6059	3.6470	3.6891	15
35	7002	7046	7089	7133	7177	7221	54	75	3.7321	3.7760	3.8208	3.8657	3.9136	3.9617	14
36	7265	7310	7355	7400	7445	7490	53	76	4.0108	4.0611	4.1126	4.1653	4.2193	4.2747	13
37	7536	7581	7627	7673	7720	7766	52	77	4.3315	4.3897	4.4494	4.5107	4.5736	4.6382	12
38	7813	7860	7907	7954	8002	8050	51	78	4.7046	4.7729	4.8430	4.9152	4.9894	5.0658	11
39	8098	8146	8195	8243	8292	8342	50	79	5.1446	5.2257	5.3093	5.3955	5.4845	5.5764	10
DEG.	60'	50'	40'	30'	20'	10'	DEG.	60'	50'	40'	30'	20'	10'	DEG.	

DEG.	60'	50'	40'	30'	20'	10'	DEG.	60'	50'	40'	30'	20'	10'	DEG.
80	5.6713	5.7694	5.8708	5.9758	6.0844	6.1970	9							
81	6.3138	6.4348	6.5606	6.6912	6.8269	6.9682	8							
82	7.1154	7.2687	7.4287	7.5958	7.7704	7.9530	7							
83	8.1443	8.3450	8.5555	8.7769	9.0098	9.2553	6							
84	9.5144	9.7882	10.078	10.385	10.711	11.059	5							
85	11.430	11.826	12.250	12.706	13.197	13.727	4							
86	14.300	14.924	15.605	16.350	17.169	18.075	3							
87	19.081	20.206	21.470	22.903	24.542	26.432	2							
88	28.636	31.242	34.368	38.189	42.964	49.104	1							
89	57.290	68.750	85.940	114.588	171.885	343.770	0							
DEG.	60'	50'	40'	30'	20'	10'	DEG.							

Natural Cotangents

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 14 FEET WIDE. SIDE SLOPES 1 1/2 TO 1.

FOR SINGLE TRACK EMBANKMENT.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	7.0	7.2	7.3	7.5	7.6	7.8	7.9	8.1	8.2	8.4	0
1	8.5	8.7	8.8	9.0	9.1	9.3	9.4	9.6	9.7	9.9	1
2	10.0	10.2	10.3	10.5	10.6	10.8	10.9	11.1	11.2	11.4	2
3	11.5	11.7	11.8	12.0	12.1	12.3	12.4	12.6	12.7	12.9	3
4	13.0	13.2	13.3	13.5	13.6	13.8	13.9	14.1	14.2	14.4	4
5	14.5	14.7	14.8	15.0	15.1	15.3	15.4	15.6	15.7	15.9	5
6	16.0	16.2	16.3	16.5	16.6	16.8	16.9	17.1	17.2	17.4	6
7	17.5	17.7	17.8	18.0	18.1	18.3	18.4	18.6	18.7	18.9	7
8	19.0	19.2	19.3	19.5	19.6	19.8	19.9	20.1	20.2	20.4	8
9	20.5	20.7	20.8	21.0	21.1	21.3	21.4	21.6	21.7	21.9	9
10	22.0	22.2	22.3	22.5	22.6	22.8	22.9	23.1	23.2	23.4	10
11	23.5	23.7	23.8	24.0	24.1	24.3	24.4	24.6	24.7	24.9	11
12	25.0	25.2	25.3	25.5	25.6	25.8	25.9	26.1	26.2	26.4	12
13	26.5	26.7	26.8	27.0	27.1	27.3	27.4	27.6	27.7	27.9	13
14	28.0	28.2	28.3	28.5	28.6	28.8	28.9	29.1	29.2	29.4	14
15	29.5	29.7	29.8	30.0	30.1	30.3	30.4	30.6	30.7	30.9	15
16	31.0	31.2	31.3	31.5	31.6	31.8	31.9	32.1	32.2	32.4	16
17	32.5	32.7	32.8	33.0	33.1	33.3	33.4	33.6	33.7	33.9	17
18	34.0	34.2	34.3	34.5	34.6	34.8	34.9	35.1	35.2	35.4	18
19	35.5	35.7	35.8	36.0	36.1	36.3	36.4	36.6	36.7	36.9	19
20	37.0	37.2	37.3	37.5	37.6	37.8	37.9	38.1	38.2	38.4	20
21	38.5	38.7	38.8	39.0	39.1	39.3	39.4	39.6	39.7	39.9	21
22	40.0	40.2	40.3	40.5	40.6	40.8	40.9	41.1	41.2	41.4	22
23	41.5	41.7	41.8	42.0	42.1	42.3	42.4	42.6	42.7	42.9	23
24	43.0	43.2	43.3	43.5	43.6	43.8	43.9	44.1	44.2	44.4	24
25	44.5	44.7	44.8	45.0	45.1	45.3	45.4	45.6	45.7	45.9	25
26	46.0	46.2	46.3	46.5	46.6	46.8	46.9	47.1	47.2	47.4	26
27	47.5	47.7	47.8	48.0	48.1	48.3	48.4	48.6	48.7	48.9	27
28	49.0	49.2	49.3	49.5	49.6	49.8	49.9	50.1	50.2	50.4	
29	50.5	50.7	50.8	51.0	51.1	51.3	51.4	51.6	51.7	51.9	
30	52.0	52.2	52.3	52.5	52.6	52.8	52.9	53.1	53.2	53.4	
31	53.5	53.7	53.8	54.0	54.1	54.3	54.4	54.6	54.7	54.9	
32	55.0	55.2	55.3	55.5	55.6	55.8	55.9	56.1	56.2	56.4	
33	56.5	56.7	56.8	57.0	57.1	57.3	57.4	57.6	57.7	57.9	
34	58.0	58.2	58.3	58.5	58.6	58.8	58.9	59.1	59.2	59.4	
35	59.5	59.7	59.8	60.0	60.1	60.3	60.4	60.6	60.7	60.9	
36	61.0	61.2	61.3	61.5	61.6	61.8	61.9	62.1	62.2	62.4	36

Calculated by Julien A. Hall, M. Am. Soc. C. E.

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