

198

POSTS

FIELD BOOK

No. 385F

EXCESS AND DEFICIT + OR - PER 100'

E. LINE 28TH AVE. W. TO C. LINE 25TH AVE. W. = +0.045

E. " 25TH " " " E. " 23RD " " " = +0.16

E. " 23RD " " " E. " 21ST " " " = +0.16

E. " 21ST " " " E. " 16TH " " " = +0.14

E. " 16TH " " " E. " 5TH " " " = -0.073

E. " 5TH " " " C. " LAKE " " " = +0.215

C. " LAKE " " " C. " 3RD " " " = +0.21

C. " 3RD " " " E. " C. " 13TH " " " = +0.18

C. " 13TH " " " E. " 19TH " " " = 0.00

E. " 19TH " " " 24TH " " " = +0.26

Our Leather Bound Engineers Note Books are carried in the following rulings:

No. 380 LEVEL BOOK. Left and Right Hand Page the same as Left Hand Page of this Book.

No. 382 FIELD BOOK. Left Hand Page as in this Book, Right Hand Page 4 x 4 to the inch, Center Line Red.

No. 384 MINING TRANSIT BOOK. Left Hand Page as in this Book, Right Hand Page 8x8 to the inch, Center Line Red.

No. 385 FIELD BOOK. Left Hand Page as in this Book, Right Hand Page 8 vertical and 4 horizontal lines to the inch, Center Line Red.

We also carry the Note Books listed above, bound in extra strong Fabri-Hide (otherwise the same quality of book), which can be furnished at a somewhat lower price.

In ordering Fabri-Hide covered books, add the letter "F" to catalog number.

THE FREDERICK POST CO.
ENGINEERING and DRAFTING SUPPLIES
IRVING PARK STATION
CHICAGO, ILL.

92 FIFTH ST.
PORTLAND, ORE.

79 NEW MONTGOMERY ST.
SAN FRANCISCO, CAL.

AGENTS FOR
"BERGER" TRANSITS and LEVELS
"GURLEY" SURVEYING and HYDRAULIC INSTRUMENTS
"CHICAGO" STEEL TAPES, etc.

53000 FS

N Δ 1	Δ 2	72°-51' R	110.20	
Δ 1 Δ 2	Δ 3	118°-30' R	115.45	
		17°-49' L	35.85	SWG #1
		58°-27' L	22.6	NWG #1
		27°-27' R	26.55	NEG #2
		75°-34' R	39.8	NW #2
		80°-50' R	58.15	SE #3
		116°-27' R	17.25	NE #3
Δ 2 Δ 3	Δ 4	152°-12'-50" L	68.66	old NW
		20°-09' R	7.48	NEG #4
		171°-18' R	23.23	NW #4
Δ 4 Δ 5		132°-00' R	76.88	
		34°-20' R	10.33	NEG #5
		126°-18' R	17.88	NWG #5
		145°-46' R	46.05	NE #5
		148°-04'	43.10	SE #5
Δ 5		160°-15' L	4.55	NEG #6
		116°-57' R	32.45	SE #6
	Δ 6	160°-24'-50" L	123.68	
Δ 6 Δ 7	Δ 7	174°-23' L	146.32	
		20°-30' L	8.90	SW #6
		85°-33' L	44.85	NW #7
		151°-04' L	81	SE #8
		135°-26' L	101.40	

EC 68
73 042
33 656

Δ 2 98.672
Δ 2 22.06
Δ 2 92.06
Δ 2 2E.68
"

BTM.

974

SW Cor of School.

Use W.T. 1' Nat Corner

BTM Foundation of houses

Store 15' 30" Corner

1296

131'

Harris
M. Donald
4/9/18

133'

942.0

76°-00'

210

210

314.15

49°-14'

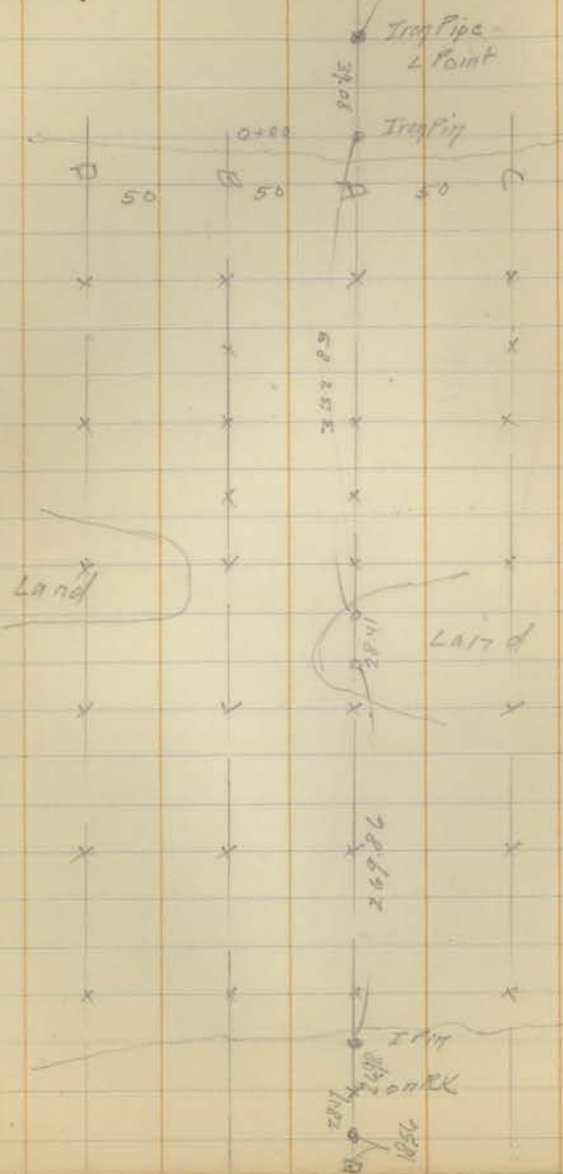
349.18

18°-46'

10 pipe
46

A Astell

Iron
Pipe

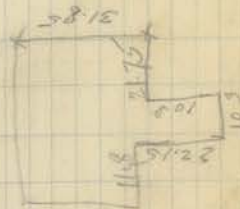
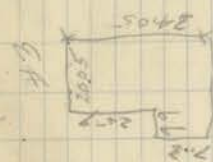


Line A

Line B

Sta		0+1	0
0+4	0	0+50	7.3
0+25	5	1	6.2
+50	6.6		5.7
+76	6		4.9
1+00	6		6.7
+25	6.1		3.0
+50	5.9	3+00 + 18' W =	
+75	5.6	Point of Land	
2+00	6.2		
+25	.2		
+50	2		
75	2.2		
3+00	2.4		
25	—		
3+12	Land		
5+01	11		
4+00	11.0		
+25	2.4		
+50	2.8		
+75	4.0		
3+00	6.0		
+25	7.0		
+50	8.2		
+75	10.9		
6+00	5.0		
6+17.9	Land		

		1064		
	Pat Hole	7.35	729	
	6.60	8.65	8.54	2.05
		8.0	0.6	SNAMP
?	50E	8.0	0.6	"
		6.7	2.0	Land
?	50N	6.0	2.6	"
		6.0	2.6	
?	50E	6.3	2.3	
	+50W	4.5	4.1	
		4.8	3.8	
	+50E	2.7	4.0	
	+50W	4.3	4.3	
		4.1	4.5	
	+50W	4.5	4.1	
	+50E	3.9	4.7	
		3.8	4.8	
	+50W	4.3	4.3	
	+50E	4.0	4.6	
		3.8	4.8	
	M+50W	3.5	5.1	
	M+50E	3.7	5.0	
	N Angle Point	3.2	5.4	
		3.2	5.4	



Iron Pin	8.65	3.8	4.85	
On Shore	Levels	7.6	1.0	
50 E	Minnesota side	4.1	4.5	
F.S. on Shore	End Here	7.8	0.8	
W		4.4	4.2	
on Shore		7.7	1.0	
B Ice		-3.3		Below Water
T.P. on Pipe		3.20	5.45	
B.M. Spike in Pole		3 rd St.	135 th Ave	

6.18 22.10 15.92

East on 3rd St.

Sta. 0-0 = C. 3rd St. 9th 135th Ave.

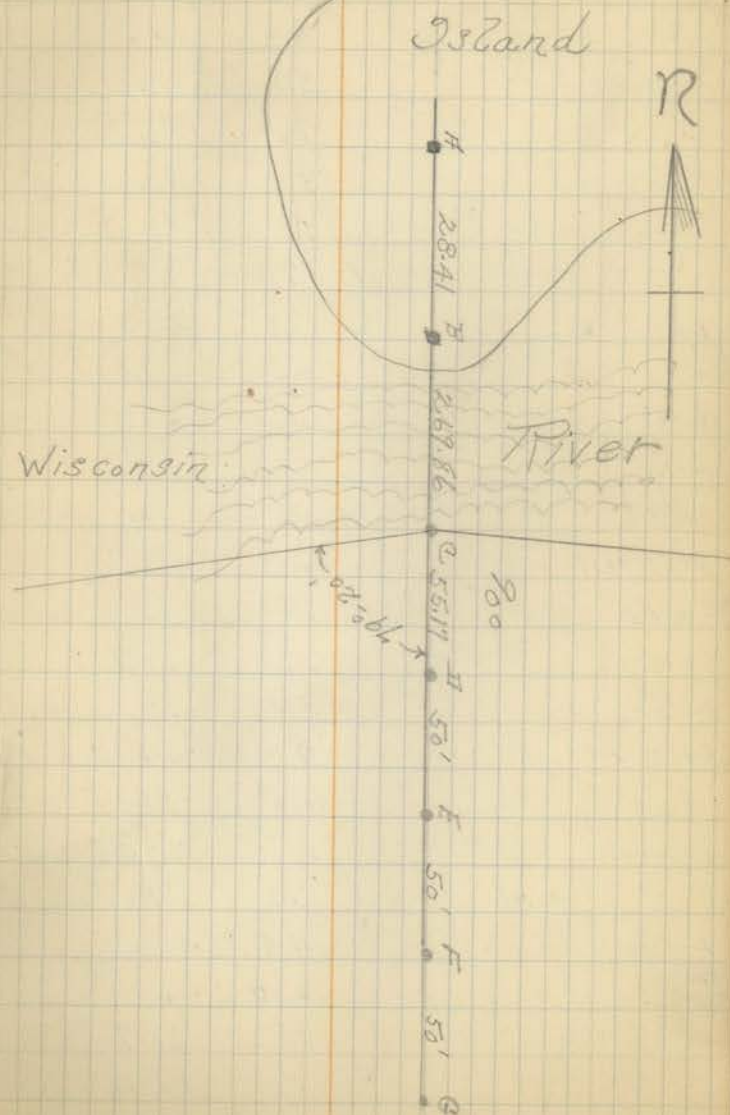
0		8.3		
50		7.4		
100		6.4		
150		5.8		
200		5.0		
B.M.		Pipe	Pipe	5.45
352	8.97		5.45	
A		6.4	2.6	
H+13N		8.3	0.7	Edge
H+20W		8.5	0.8	"
H+20E		5.6	3.4	"
" / " +35N		8.4	0.6	"

Levels on 28th St
Detail Next Page

14

20-E			6.3	2.6	
20E+20S			8.4	0.6	Edge
			5.9	3.0	
32W.			7.6	1.4	
22S.			8.2	0.8	
37'W.			8.3	0.7	Edge
20W+235			8.3	0.7	
M on Island			4.13	4.84	Hub East of line Rock on Wis. Side
	3.61	9.41	3.17	5.80	
Wisconsin here			5.0	4.4	
C+4N Bank			5.4	4.0	
C+50E			5.0	4.4	
+50+6N Bank			6.1	3.3	
+100E "			5.4	4.0	
+100E+5S Foot of Hill			3.4	6.0	
+50W.			3.7	5.7	
+50W-3N			4.1	5.3	
+100W			1.7	7.0	
C+100W+9N			5.0	4.4	
C+150W. Bank			2.4	7.0	
Water			8.68		
T.P.	11.74	20.85	0.30	9.11	
T.P.	11.62	32.44	0.03	20.72	
T.P.	5.70	36.12	2.02	30.42	

Iron Pins on Island



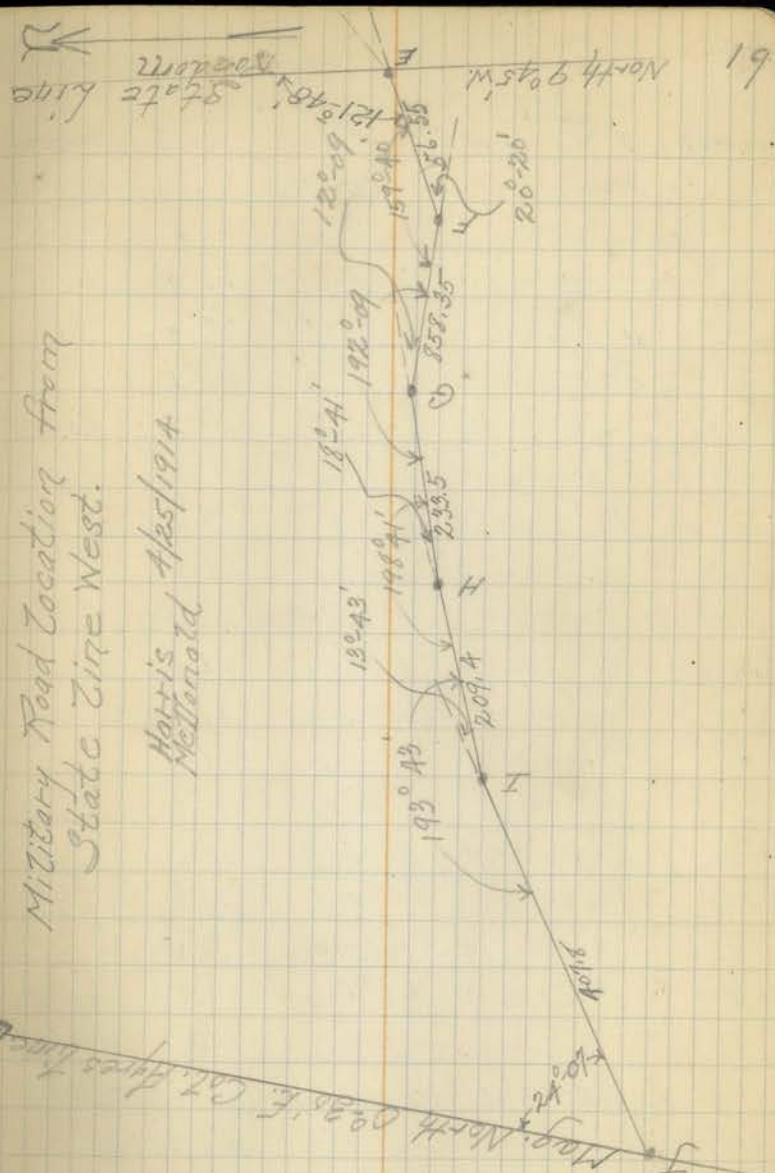
18

Station	B.S.	H.I.	F.S.	Elev.	Remarks
	2.63	36.39		33.76	Spike in W.R. State
= Bridge Line of R. Road					
			2.0	34.4	
	11.36	47.56	0.19	36.20	
	10.61	57.03	11.14	46.42	
			8.7	48.3	
			6.0	51.0	
			3.0	54.0	
	3.57	59.30	1.30	55.73	
			1.5	57.8	
			12.5	46.8	
	1.06	48.29	12.07	47.23	
			1.6	46.7	
			7.7	40.6	
			9.7	38.6	
			9.0	39.3	
			12.3	36.0	
			12.4	35.9	
			13.0	35.3	
	0.83	36.80	12.32	35.97	
			10.5	26.3	
	0.26	24.78	12.28	24.53	
			11.5	13.0	
			11.0	13.8	

Military Road Location from
State Line West.

Harris
McDonald
4/25/1914

Map North 02° 30' E. 27° 00' N. 27° 00' E. 27° 00' N.



19

Station	B.S.	F.S.	Elev.	Remarks
	24.78	10.6	14.2	
		9.0	15.8	
T.P.	12.05	0.53	24.25	
B 1862		10.87	25.43	
B.M.	10.83	9.19	27.11	
19+00		6.6	31.3	
20+00		1.4	36.5	
T.P.	8.27	1.67	36.27	
21+00		7.0	37.5	
22+00		5.5	39.0	
23+00		4.7	39.8	
24+00		4.7	39.8	
25+00		4.8	39.7	
26+00		6.0	38.5	
27+00		5.3	39.2	
28+00		4.6	39.9	
T.P.	3.10	3.83	40.71	
29+00		7.4	36.4	
30+00		6.7	37.1	
T.P.	9.33	5.67	36.14	
31+00		7.7	35.2	
32+00		3.5	44.0	
T.P.	8.88	0.45	47.02	
33+00		7.0	48.9	
34+00		3.6	52.3	

Sta.	B.S.	H.I.	F.S.	Elev.	Remarks
K-3		439.51	5.2	434.3	
J-3			11.0	428.5	
K-2			2.5	437.0	
J-2			8.4	431.1	
K-1			0.7	438.8	
K-0			0.4	439.1	
J-0			6.0	433.5	
J-1			6.8	432.7	
T.P.			11.25	428.26	
	1.66	429.92			
I-0			1.6	428.3	
H-0			7.9	422.0	
H-1			9.3	420.6	
I-1			2.4	427.5	
I-2			4.6	425.3	
I-3			5.0	424.9	
H-2			9.5	420.4	
H-3			9.8	420.1	
H-4			11.9	418.0	
I-4			7.1	422.8	
"-5			7.8	422.1	
H-5			11.5	418.1	
H-6			10.8	419.1	
I-6			7.4	422.5	

22 Crestline Sw Lower

Sta. B.S. H.I. F.S. Elev. Remarks

429.92 4.77 425.15

3.96 429.11

8.9 420.2

8.9 420.2

3.0 426.1

5.4 423.7

9.2 419.9

10.0 419.1

5.8 423.3

5.9 423.2

10.1 419.0

5.8 423.3

6.2 422.9

12.02 417.09

3.36 420.45

5.5 414.9

5.2 415.2

5.0 415.4

8.3 412.1

4.8 415.6

8.6 411.8

8.0 412.4

3.6 416.8

5.9 414.5

Continued on Page 27

23

Station B.S. H.I. F.S. Elev. Remarks

3.5 52.4

5.0 50.9

5.3 50.6

4.43 51.47

35400

24

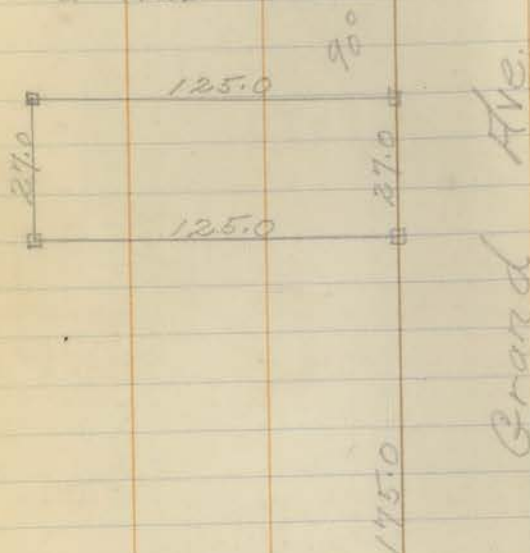
S

Lot 6 BK 35 Carnegie
Central Div.

Iron Pipe

Astell 10/9/15
Frink 10/9/15

π = Hub



Iron Pipe

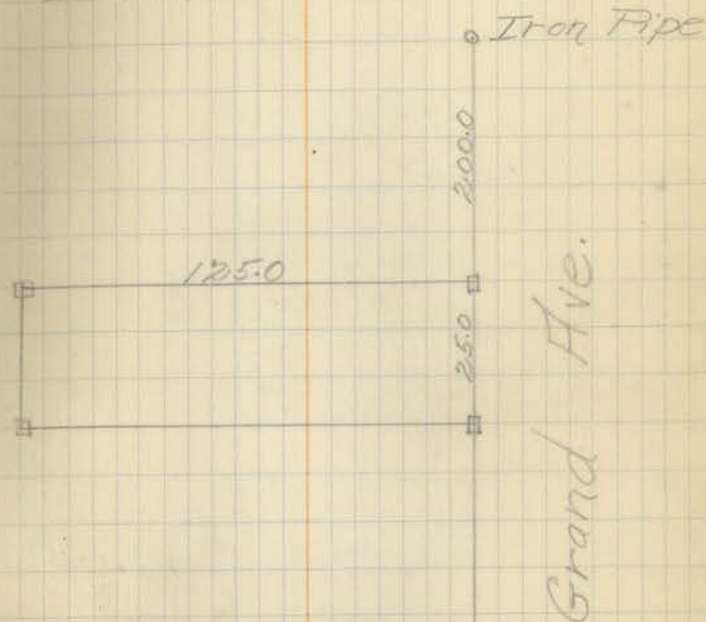
25

Lot 35 BK 30

Carnegie Central Div.

Astell 10/9/15
Frink 10/9/15

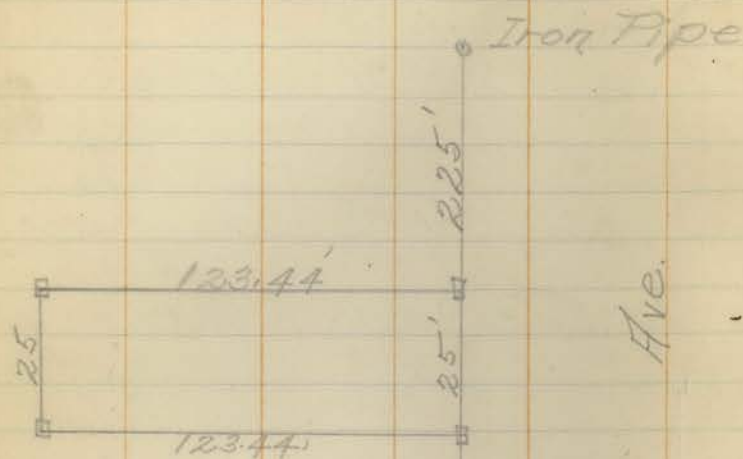
π = Hub



Iron Pipe

26

Lot 35 BIK 29
Carnegie Central Div.



Astell
Frick
10/9/15

Wright Ave.

Iron Pipe

Union St.

Crestline Sewer

27

Sta.	B.S.	H.I.	F.S.	Elev.	Remarks
			420.45		
			4.87	415.58	
		4.61	420.19		
2			7.0	413.2	
5			7.6	412.6	
5			5.1	415.1	
4			5.2	415.0	
4			7.4	412.8	
3			7.5	412.7	
F-2			8.2	412.0	
B-3			5.0	415.2	
B-2			5.1	415.1	
B-4	1		4.7	415.5	
B-0	0		3.6	416.6	
F-0	0		7.9	412.3	
F-1	1		7.4	412.8	
			9.24	410.95	
		4.40	415.35		
			6.1	409.2	
			7.2	408.1	
			7.2	408.1	
			8.0	407.3	
			5.1	410.2	
			5.0	410.3	
			5.1	410.2	

Continued on Page 44

Stations For Piers

+80		I. Pin on Mingo Shore
+07.5	Q	#1 Pier
+61.5	Q	#2 "
+15.5	Q	#3
+69.5	Q	#4
+23.5	Q	#5
+77.5	Q	#6
+31.5	Q	#7
+85.5	Q	#8
+39.5	Q	#9
+93.5	Q	#10
+47.5	Q	#11
+01.5	Q	#12
+55.5	Q	#13

704.81 - Hub

332.89		6+86.25	Iron Pin
28.41			
361.24	6+55.5 #13	6+58.08	Cross in Rock
269.86		6+81.10	I. Pin
631.10	#12	6+01.5	
26.98			
658.08	#11	5+47.5	
28.17			
686.25	#10	4+99.5	
18.56			
704.81			
	#9	4+29.5	
	#8	3+85.5	
		3+61.24	
28.41	#7	3+32.73	Island
		3+81.5	
	#6	3+77.5	
	#5	2+23.5	
	#4	1+69.5	
	#3	1+15.5	
	#2	0+61.5	Q #1 Pier
	#1	0+7.5	I. Pin
		0+00	
		39.68	I. Pipe

Levels in Wisdom's Add. to W.D.

B.M. 4.32 40.23 35.90

6.3 33.9

5.8 34.4

6.1 34.1

5.0 35.2

5.3 34.9

3.5 36.7

3.8 36.4

1.1 39.1

T.P. 8.94 47.45 1.72 38.51

5.0 42.4

5.0 42.4

9.4 38.0

5.4 42.0

3.7 43.7

4.2 43.1

4.7 42.7

7.0 40.4

3.7 43.7

2.6 44.8

- 4.0 43.4

4.3 43.1

4.4 43.0

4.4 43.0

Add. 3.5
Cor. 46.5
Fly. 3.5
Grand Ave.

Station B.S. H.I. F.S. Elevation

100' W 47.45 2.8 44.4

200' " 2.8 44.6

300' " 3.0 44.4

400' " 3.9 43.5

500' " 3.4 44.0

700' " 2.3 45.1

100' W 0.9 46.5

200' " 0.7 46.7

300' " 0.2 47.2

400' " 3.0 44.4

500' " 2.5 44.9

600' " 0.0 47.4

T.P. 10.80 58.13 0.12 47.33

7440 12.8 45.5

100' W 9.6 48.5

120' " 9.0 49.1

220' " 10.4 47.7

8400 11.0 47.1

100' W 9.6 48.5

200' " 11.1 47.0

300' " 8.3 49.8

400' " 11.4 46.7

500' " 11.7 46.4

9.9 48.2

10.0 48.1

Station	B.S.	H.I.	F.S.	Elev.	Remarks
	58.13		8.3	49.8	
			5.7	52.4	
			7.4	50.7	
			7.8	50.3	
			7.7	50.4	
			8.3	49.8	
			9.0	49.1	
			9.1	49.0	
			5.1	53.0	
			0.4	57.7	
			1.0	57.1	
			3.2	54.9	
			2.8	55.2	
			5.1	53.0	
			5.5	52.6	
			4.9	53.2	
485	61.36		1.62	56.51	
			5.3	56.1	
			5.1	56.3	
			5.6	55.8	
			2.7	58.7	
			4.8	56.6	
			4.0	57.4	
			4.6	56.8	
			4.1	57.3	
			3.8	57.6	

Station	B.S.	H.I.	F.S.	Elevation
4+00		61.36	4.0	57.4
5+00			4.1	57.3
On 6th St. 0+00 = E of 6th St. Going East				
1+00			5.9	55.5
2+00			4.6	56.8
3+00			3.9	57.5
4+00			4.0	57.4
5+00			2.6	58.8
6+00			3.0	58.4
7+00			3.4	58.0
8+00			4.4	57.0
+60			4.5	56.9
T.P.	8.32	63.29	6.39	54.97
20'S. of 0+40	on 6th		8.3	55.0
" " " "	sharp		10.2	53.1
	break			
12'S of 0+56			8.7	55.6
16' " " " "	" " "		10.7	52.6
21' " " 0+74			9.2	54.1
" " " "			12.0	51.3
30' " " 0+40			8.7	54.6
30' " " 0+55			16.1	47.2
30' " " 0+70			15.8	47.5
30' " " 0+25			10.1	53.2
80' " " 0+42			11.0	52.2
80' " " 0+62			18.0	45.3
80' " " 0+78			17.0	45.3
80' " " 1+00			13.5	49.8

Sta.	B.S.	H.I.	F.S.	Elev.	Rem.
1+24		63.29	8.2	55.1	
2+00			7.0	56.3	
"			7.3	56.0	
2+70			3.3	60.0	
"			6.1	57.2	
"			6.4	56.9	
3+00			7.2	56.1	
"			9.8	53.5	
3+64			8.1	55.2	
"			15.0	45.3	
"			17.6	45.7	
4+00			6.8	56.5	
"			12.2	51.1	
"			17.6	45.7	
4+60			5.1	58.2	
"			6.3	57.0	
"			4.7	58.6	
5+00			4.0	59.3	
"			3.6	59.7	
"			6.1	57.2	
6+00			5.5	57.8	
"			4.5	58.7	
"			5.0	58.3	
7+00			5.9	57.4	
"			5.3	58.0	
"			7.0	56.3	

Sta.	B.S.	H.I.	F.S.	Elevation
29'S. of 8+00	63.29		6.4	56.9
41'S. " "			5.1	58.3
80' " " "			5.7	57.6
29'S. 8+60			7.0	56.3
80' " " "			6.1	57.2
80' " 9+40			9.4	53.9
Line (a) 0+00 = 1+00				46th
B.M. 0.65		36.55		35.90
Curb at 1+00 79'S.			2.93	32.62
61'S. of 1+00			4.0	32.5
55'S. of "			5.6	30.9
21' " " "			7.6	28.9
1+00			6.7	29.8
Curb 79'S. of 2+00			3.40	32.15
73'S.			3.6	32.9
60' "			5.7	30.8
45' "			10.9	25.6
36' "			10.0	26.5
16' "			6.7	29.8
2+00			5.6	30.9
73'S. of 2+50			3.9	32.6
62' "			5.7	30.8
45' "			12.4	24.1
2+50			13.7	22.8
			3.88	22.7
			4.0	22.5

36

Sta.	B.S.	H.I.	F.S.	Elev.
		36.55	5.8	30.7
			14.2	22.3
			14.1	22.4
			4.1	32.4
			5.6	30.9
			8.0	28.5
			6.8	29.7
			7.5	29.0
			4.14	32.41
			4.3	32.2
			5.0	31.5
			7.6	28.9
			7.1	29.4
			9.0	27.5
			14.6	21.9
			14.9	21.6

Line 0+00 = 2+00 on 46th

3.70 39.60 35.90

5.0	34.6
5.8	33.8
14.8	24.8
15.0	24.6
14.6	25.0
5.4	34.2
6.2	33.4

37

Station	B.S.	H.I.	F.S.	Elevation
137		39.60	16.8	22.8
4+00			16.8	22.8
+67			2.8	36.8
5+00			2.9	36.7
+70			2.9	36.7
1+00 on (C) line			0.8	38.8
+44			1.9	37.7
+80			12.8	26.8
2+00			13.5	26.1
+26			13.2	26.4
+77			1.5	38.1
3+00			1.6	38.0
+48			15.1	24.5
4+00			14.6	25.0
+37			13.2	26.2
5+00			2.5	37.1
6+00			1.7	37.9
+30			1.7	37.9
T.P. #1	519	45.71	1.08	28.52
0+43 on (2) line			3.0	40.7
1+00			6.0	37.7
+09			4.2	39.5
+89			6.1	37.6
2+00			10.9	28.7
+13			15.0	28.7
+28			15.4	28.3
+65			5.6	37.1

Sta.	B.S.	H.I.	F.S.	Elev.
		43.71	5.2	38.5
			6.4	37.3
			17.9	25.8
			17.8	25.9
			17.2	26.5
			5.5	38.2
			4.4	39.3
			4.3	39.4
			4.4	39.3

T.P. 7.71 46.23 38.52

Line (E) 0+00 = 5+00 on 46th

3.5	42.7
5.2	41.0
15.4	30.8
15.5	30.7
5.3	40.9
4.9	41.3
6.1	40.1
9.8	38.4
18.9	27.3
17.0	27.2
16.4	27.8
7.2	39.0
5.6	40.6
6.4	39.8
6.3	39.7
6.5	39.7

Station B.S. H.I. F.S. Elevation
T.P. 6.61 49.84 3.0 43.8
Line ("F") 0+00 = 6+00 on 46th

1+00	5.6	44.2
+56	15.9	33.9
2+00	16.5	33.3
+53	8.7	41.1
3+00	8.9	41.1
4+00	9.6	40.2
+44	12.2	37.6
+64	18.8	31.0
+70	18.2	31.5
5+00	16.1	33.7
+44	6.7	43.1
6+00	6.0	43.8
7+00	6.2	43.6
8+00	7.8	42.0
9+00	7.2	42.6
+40	7.8	42.0

Line ("G") 0+00 = 7+00 on 46th

1+00	3.8	46.0
+32	6.2	43.6
+61	13.2	36.6
2+00	13.2	36.6
+37	6.8	43.0
+51	9.7	40.1

Station	B.S.	H.I.	F.S.	Elev.
	49.84		9.9	39.9
			5.1	44.7
			4.7	45.1
			5.7	44.1
			10.5	39.3
			16.2	33.6
			16.3	33.5
			5.0	44.8
			4.6	45.2
			4.6	45.2
			4.5	45.3
			3.7	46.1
			3.1	46.7
			3.1	46.7
	5.36	41.26		35.90

Section at 46th Ave West

E of 1+00	8.0
" " "	7.9
23 W " "	7.8
38 " " "	7.2
23 E of 2+00	6.6
31 " " "	6.1
	6.4
	6.4
	5.4
	4.8

Sta.	B.S.	H.I.	F.S.	Elev.
56' E of 3+00		41.26	1.6	
24 W " "			5.3	
39 " " "			4.4	
44 " " "			2.5	
21 E of 4+00			4.1	
31 " " "			3.4	
46 " " "			0.4	
23 W " "			3.9	
38 " " "			2.6	
46 " " "			0.1	
T.P.	10.48	51.06	0.68	40.58
22 E of 5+00			11.2	
37 " " "			10.8	
48 " " "			8.1	
23 W " "			11.3	
39 " " "			10.5	
47 " " "			7.9	
21 E of 6+00			9.0	
31 " " "			8.6	
46 " " "			6.0	
23 W " "			9.0	
40 " " "			8.3	
47 " " "			6.6	
22 E 7+00			6.4	
36 " " "			5.9	
51 " " "			4.7	

Station	B.S.	H.I.	F.S.	Elev.
22 W. of 7+00		51.06	6.4	
40 " " "			5.4	
47 " " "			4.5	
22 E. " 8+00			4.7	
33 " " "			3.8	
45 " " "			1.6	
23 W. " 8+00			4.6	
39 " " "			3.5	
51 " " "			2.2	
22 E. of 9+00			1.7	
29 " " "			0.5	
23 W " "			1.4	
38 " " "			0.3	
T.P. 9.28	60.02		0.32	50.74
W. of 9+00			6.8	
E of 10+00			7.5	
" " "			7.2	
28 W. " "			6.9	
37 " " "			5.7	
47 " " "			2.6	
T.P. *9	5.30	56.04		50.74
Line H				
1+00			9.4	46.6
			16.5	39.3
			18.0	37.0
			12.7	43.2
			6.5	49.5

Station	B.S.	H.I.	F.S.	Elev.
7+2			6.9	49.1
3+00			11.7	44.3
+25			18.4	37.6
4+00			19.0	37.0
+22			18.8	37.2
5+00			9.2	46.8
4+00			9.1	46.9
7+00			7.1	48.9
8+00			6.5	49.5
9+00			6.7	49.3
10+00			6.2	49.7
10+26			6.9	49.1
10+63			14.6	41.4
10+74			13.2	42.8
11+00			10.0	46.0
11+30			7.8	48.2
Line K				
0+58			12.3	43.7
1+00			13.7	42.3
1+25			14.3	41.7
1+61			6.1	49.9
2+00			4.3	51.7
2+66			5.2	50.8
3+00			16.0	40.0
+79			14.1	41.9
4+00			10.5	45.5

T 53 N. - R 12 W

15-16-21-22

Spruce 7" N 25 E 19 L.

Birch 7" N 45 W 22 L.

Pine 18" S 30 W. 25 L.

Birch 9" S 30 E 15 L.

14-15-22-23

Aspen 15" N 65 E 6 Links

W. Pine 15" N 80 W 9 "

Fir 10" S 59 W 30 "

Pine 8" S. 62 E 19 "

13-14-23-24

Ash 8" N. 60 E. 8 "

Birch 8" N 70 W. 32 "

Cedar 11" S. 10 W 19 "

Ash 8" S. 49 E 10 "

W. Pine 9" N. 52 W. 19 "

Spruce 10" S. 35 W. 7 "

W. Cedar 8" N. 35 E. 27 "

" 8" S. 40 E 20 "

L

Cedar 9" N 80 W 43 "

10" S. 10 W 31 "

9" N 40 E 4 "

9" S. 66 E 13 "

Govt. Bearing. trees

23-24-25-26

Lign 15" N 46 E. 73 Links

48.2'

Fir 8" N. 40 W. 6 "

4.0'

W. Pine 30" S. 49 W. 56 "

38.3'

Cedar 10" S. 50 E. 39 "

25.7'

22-23-26-27

Tarn 12" N 46 E 57 Links

Ash 6" N 30 W 21 "

Tarn 8" S. 30 W 31 "

Tarn 7" S. 65 E 24 "

21-22-27-28

W. Pine 15" N. 65 E. 7 Links

" 10" N 27 W 28 "

" 10" S. 69 W 21 "

" 11" S. 50 E 10 "

27-28-33-34

W. Pine 12" N 83 E 13 "

Fir 13" N 41 W 10 "

Aspen 17" S 31 W 8 "

Fir 6" S 15 E 11 "

26-27-34-35

Cedar 6" N 40 E 29 Links

" 6" N 10 W 13 "

" 7" S 50 W 8 "

" 6" S. 40 E. 29 "

25-26-35-36

Birch	6"	N. 31 E	17" Links	11.2'
Cedar	7"	N. 55 W	8 "	5.3'
Birch	7"	S. 45 W	10 "	6.6'
Cedar	6"	S. 73 E	4 "	2.6'

M

Aspen	18"	N. 36 W	31 Links	20.5'
Spruce	7"	S. 85 W	22 "	14.5'
Birch	12"	N. 53 E	42 "	27.7'
Aspen	16"	S. 40 E	34 "	22.4'

N

W. Pine	10"	N. 20 W	12 Links	7.9'
" "	15"	N 37 E	25 "	16.5'
" "	10"	S. 41 W	45 "	29.7'
" "	10"	S. 36 E	16 "	10.6'

O

Birch	14"	N. 47 W	37 Links	24.4'
"	14"	S. 38 W	33 "	21.8'
"	14"	S. 20 E	3 "	2.5'
"	10"	N 38 E	50 "	33.5'

P

Birch	12"	N. 65 W	11 Links	7.8'
Spruce	7"	S. 40 W	3 "	2.0'
Birch	8"	N 12 E	31 "	20.5'
	10"	S. 42 E	23 "	15.2'

W. Pine	12"	N. 39 W	45 Links
"	12"	N. 12 E	5 "
"	12"	S. 79 W	20 "
"	8"	S. 49 E	21 "

K to Wat 1

Tom	13"	N. 44 W	10 "
Spruce	8"	S. 42 E	32 "

K to Wat 2

Ash	8"	N. 20 E	24 "
Birch	7"	S. 37 W	26 "

K to Wat 3

Fir	6"	N 70 E	25 "
Tom	9"	S 52 W	24 "

K to Wat 4

W. Pine	11"	N 75 E	17 "
Tom	8"	S 62 W	9 "

L to V at 1

Fir	6"	N. 20 W	22 "
Birch	20"	S. 50 E	12 "

L to V at 2

Birch	8"	N. 37 E	34 "
Fir	10"	S. 29 W	74 "

L to V at 3

Birch	6"	N 55 E	50 "
"	9"	S. 62 W	46 "

M to U

1

Pine 10" N. 72 E 47 Links 31.0
 Birch 8" S. 71 W. 21 " 13.9

✓

Pine 16" N. 35 W. 20 " 13.4
 Aspen 18" S. 40 E 41 " 22.1

2

Pine 6" N. 56 E. 17 "
 Birch 7" S. 60 W. 13 "

k

Birch 6" N. 68 W. 29 "
 " 8" S. 58 E. 6 "

l

Spruce 8" S. 27 W. 15 "
 Tam 8" N. 39 E. 23 "

m

W. Cedar 12" N. 13 W. 9 "
 Birch 16" S. 55 E. 23 "

n

Aspen 15" N. 50 W. 22 " 14.5'
 Birch 10" S. 65 E. 12 " 7.9'

o

Spruce 10" N. 73 E. 18 " 11.9'
 " 10" N. 38 W. 24 " 15.8'

p

12" N. 40 W. 13 "
 10" S. 60 E. 11 "

O to F at 1

Birch 9" N. 50 W. 35 Links 17.5
 " 10" S. 61 E. 19 " 12.5

2

Fir 7" N. 43 E 25 " 16.5
 Tam 12" S. 49 W 21 " 13.9

3

W. Pine 12" N. 39 W. 12 "
 " " 10" S. 55 E. 12 "

P to E at 1

Cedar 12" N. 44 W 17 "
 Birch 8" S. 20 E 22 "

2

Aspen 10" N. 51 E 21 "
 Spruce 10" S. 25 W 19 "

3

W. Pine 9" N. 69 W. 15 "
 " 6" S. 85 E. 16 "

Q to J at 1

Fir 6" N. 22 W. 12 "
 W. Pine 10" S. 85 E. 20 "

2

Birch 8" N. 57 W. 23 "
 " 6" S. 25 E. 5 "

3

W. Pine 13" N. 75 E 37 "
 " 12" S. 74 W 9 "

Section 26

Birch 8" N. 37 E. 39 L Birch Still in
Fir 10" S. 29 W. 74 L is a stump

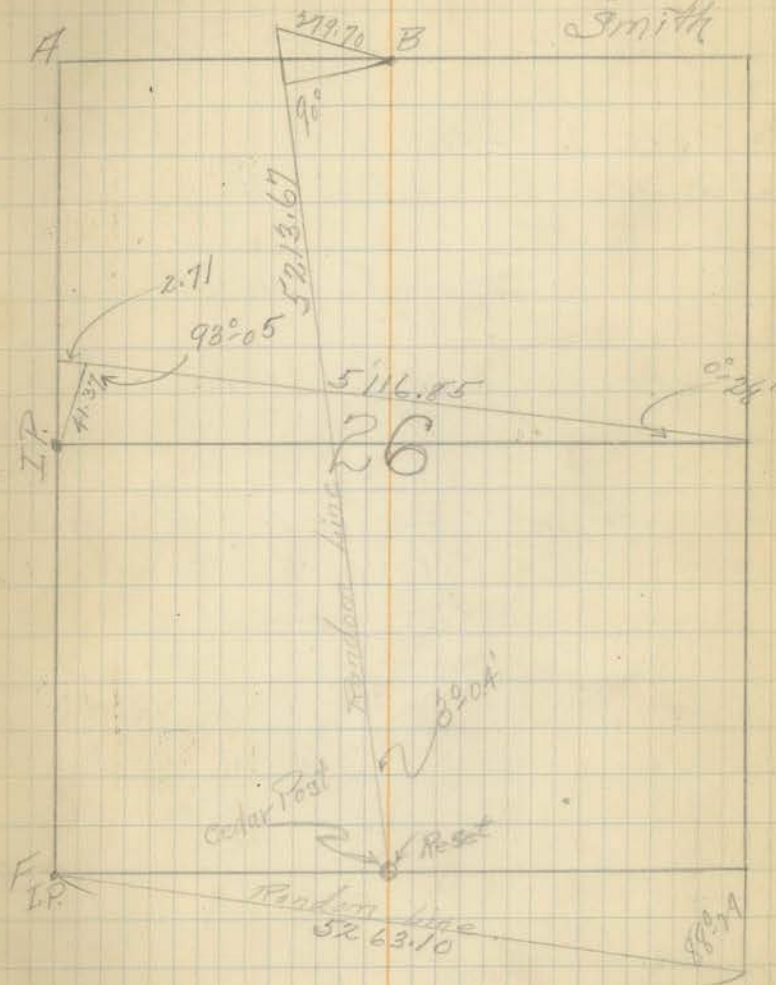
Aspen 10" N. 58 E. 21 L Iron Pipe
Spruce 10" S. 25 W. 19 L Spruce BF
Stump, Aspen
is down but marks

Fir 7" N. 43 E. 25 L Still visible.

Tam 12' 12" S. 49 W. 21 L Tam. Still in
is a burnt stump.
I. Pipe in Center of Road.

Cedar 6" N. 40 E. 29 L Iron Pipe, in
" 6" N. 10 W. 13 L Center of road under
" 7" S. 50 W. 8 L gateway all trees
" 6" S. 40 E. 29 L are stumps.

Birch 6" N. 31 E. 17 L
Cedar 7" N. 55 W. 8 L
Birch 7" S. 45 W. 10 L
Cedar 6" S. 73 E. 4 L
W. Pine 16" N. 35 W. 20 L
Aspen 18" S. 40 E. 41 L

Section 26-53-12 Wilson
Berg
Smith

Iron Pipe Set, Cedar Stump
due North 26 ft.
Pipe in Center of Road.

Sec. 35

Sec. K 9 Sec. 26

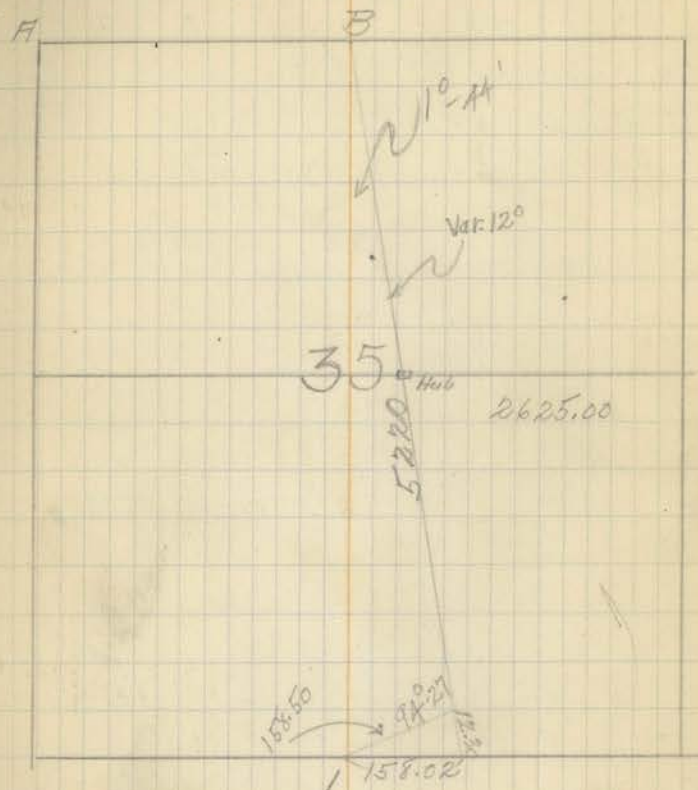
" " " " 26

" " " " 26

Spruce 10" N. 73 E. 18 L
10" S. 38 W. 24 L

Both trees are Stumps
Old stake has been
replaced.

Wilson
Berg
Smith



52-14 8/6/21

Wilson
Berg
Smith

Maple 10" N. 47 $\frac{1}{2}$ ° W 47.5
 Birch 11" S. 43° W 54.3 $\frac{20}{29}$ $\frac{21}{28}$ Tot. Pote S. 39° E
 5 tacks 36.75'

Established this Cor.
 Found old Cor 2' in ground.

2634
 N 20° 0' W

• Pop - 6" S. 73° E 39

2643
 112° 11' 0" W

Pop 5" N. 37° W 56" $\frac{29}{32}$ $\frac{28}{33}$
 " 7" S. 17° W 46

52-14

18 17 Spruce 10' S. 42° W 67
 19 20 Sugar 8" N. 83° W 86

52.62.0

Wooden Hub
 1/4 Gone

Maple 10" N 47 $\frac{1}{2}$ ° W 47.5

I.P. $\frac{19}{30}$ $\frac{20}{29}$ Birch 11" S 43° W 54.3 No. B.T. $\frac{20}{29}$

5301.0
 1/4 Gone

$\frac{30}{31}$ $\frac{29}{32}$ Torn. 7" S. 54° W.
 " 4" S. 47° E.

52-14

397.68

25' Offset

925.35 Edge Lake, 46' 79" E to line

Hub on Rd to Hub on South Sec. Line

2635.00-87 = 2634.13

SEC 20-52-14

N.W. Cor-

1. Pipe N 52° 20' E (Mag) 60.0

1. " N 49° 30' W . 46.67

+ on Boulder N 38° 20' E . 48.65

W 1/4 Cor

5 tacks in 10 Bas N+W. 65.90

1. Pipe N.E. 46.90

52-14

Rice Lake

Iron rod

Road

School

1/4 Cor. 17420

52+83.5

2000 IPH

Line with N+5 fence

4' Pipe

6' 27.3

Iron Rod

32.2

34.1

3 1/4 Sec. 16

E of Rd. 1/4 P.O.

76.0

25.10

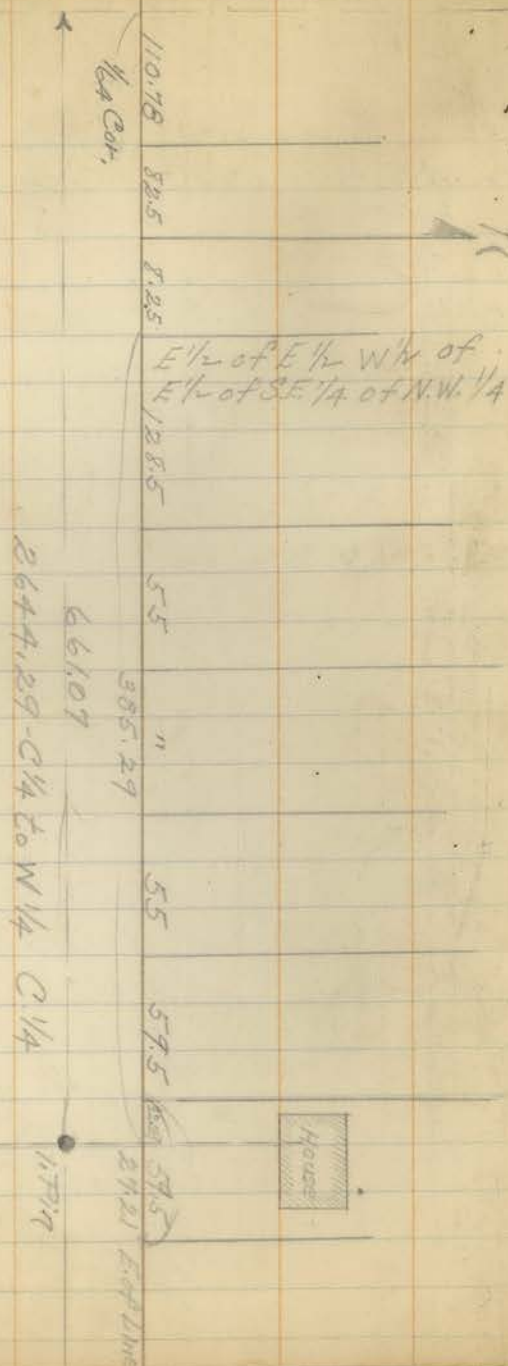
5 tacks in Telephone Pole.

Sec. 20-52-14

S 1/4 Cor
South Section line

C 1/4 line E. and W.





Sec. 20-52-14
N 1/4 Cor. 1. Pipe in rd.



E 1/4 Cor. Wooden Stake, at Cor. of fence
N and S and E No. Bts.



SE. Sec. Cor. 1. Pipe Set here
Orig. Maple 5 tacks N 47 1/2° W - 47.8
Orig. Birch ' 9.43° W - 54.3
Tel. Pole 3.39° E 36.75

S 1/4 Cor. 1. Pipe Set 1/2 Dist
Orig Bts gone Fence 3' South
New Tel. Pole 3.16° E. 5 tacks 20.65
Maple Blazed 3.13° E
S.W. Sec. Cor. 19 20 01.P
1.7 46
0 40 No Bts
30 29

11078
125
27574
8264
12527
24791
3787

I.P. 1 2 292°-57 219.75

	Sta	F.S.	Hor. L	Hor. Dist.
1	2	3	156°-26	256.35
2	3	4	^{347°-59} 173-57	151.20
3	4	5	^{120°-43} 240-21 1/2	125.72
4	5	6	119-40	119.28
5	6	7	157-3 1/2	72.23
"	"	8	157-30 1/2	157.51
6	8	Lake Shore	67°-55	126.0
"	"	"	92°-30	134.0
"	"	"	110°-00	132.0
"	"	"	139-10	61.0
"	"	"	195°-40	36.0
"	"	"	229-00	24.0
6	7	9	^{112°-22} 254-57	392.60
7	9	10	185°-41	256.40
9	10	11	^{347°-28} 173-32	160.41
10	11	12	166-17	78.70
11	12	Prop. Stake	130-16 1/2	175.45
"	"	Lake Shore	"	29.0
"	"	"	"	122.0
12	Prop. Cor.	Nail	198-04	
3	44	13	129°-14	25.84
44	13	L. Shore	110°-40	87.0
"	"	"	102-00	68.0
"	"	"	111°-40	28.0
"	"	"	180-00	11.0

100' S. side rd. 200' S.S. rd.
 Δ 3 Centered, 100' S.S. rd. Δ N.S. rd.
 30' W. side rd, 50' C. rd, 100' E side rd Δ S.S.
 30' N " " 100' 2' N of Center Δ Center
 rd 3' S.

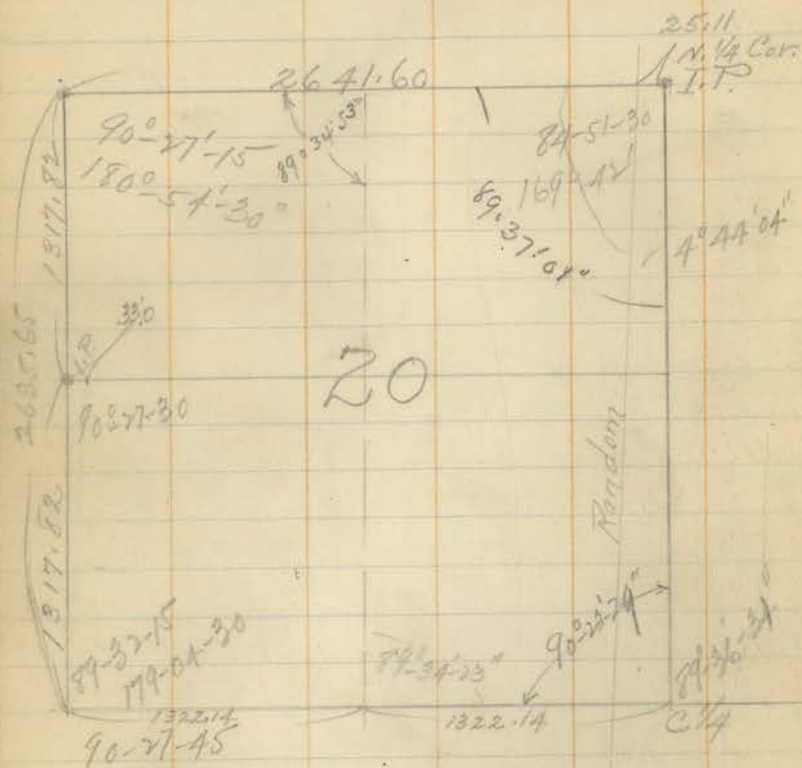
Along Line 7-9
 100' 69' Left 200' 46' L 300' 62' at 2972
 Along Line 9-10
 100, 94' Δ 10-75'
 " Line 10-10 95-55 L Δ 11 40 L
 " " 11-12 45'-22 L Δ 12' 19 L
 " " 12 Prop. Stake 75' 5 to R
 " " 5 to 6 72.0 125.0 L
 I.P. to rd 62.80 South of 1/16 Cot.

72

Sec. 20-52-14

Wilson.
Berg
Father

Oct. 31-21



Graphical Survey

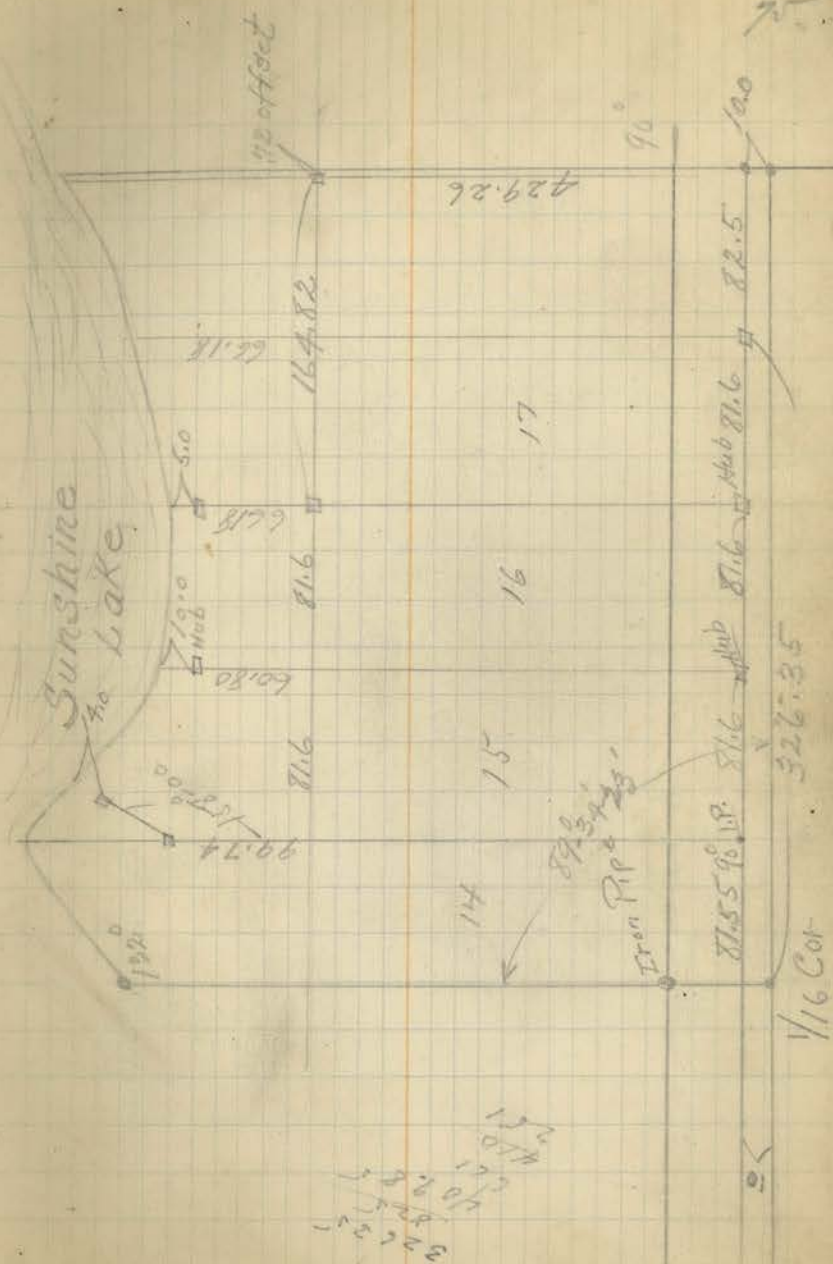
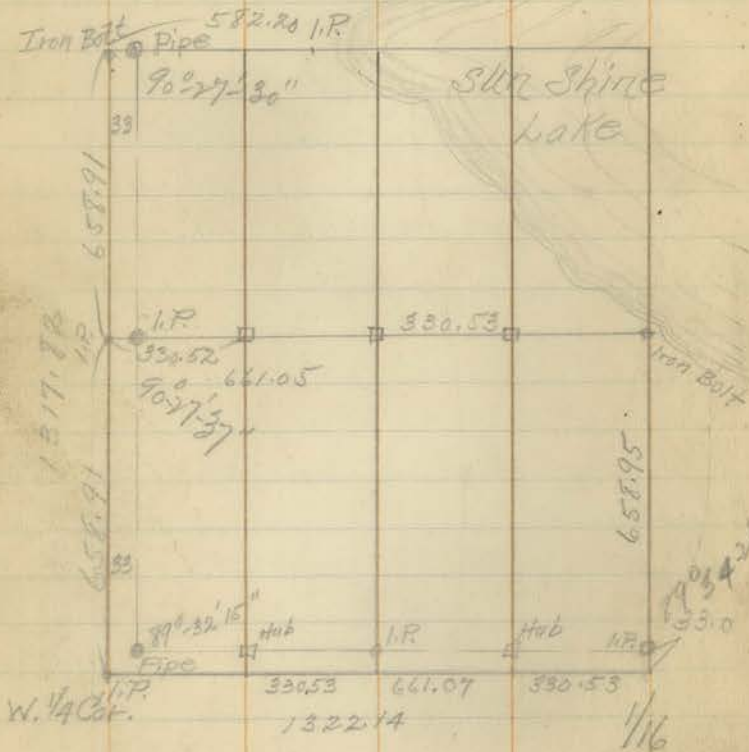
73

Sta.	B.S.	H.I.	F.S.	Elev.	Remarks
				450.60	
	2.61	453.4			
			1.2	452.0	
			1.9	451.8	
			3.7	449.5	
			4.3	448.9	
			4.6	448.6	
			5.0	448.2	
			5.4	447.8	
			5.3	447.9	
			6.0	447.2	
			7.4	445.8	

For Plot See Page 95

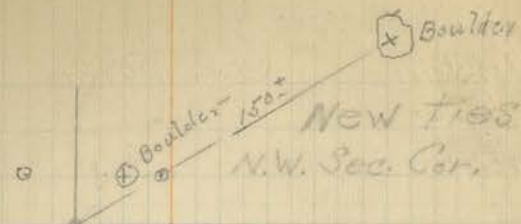
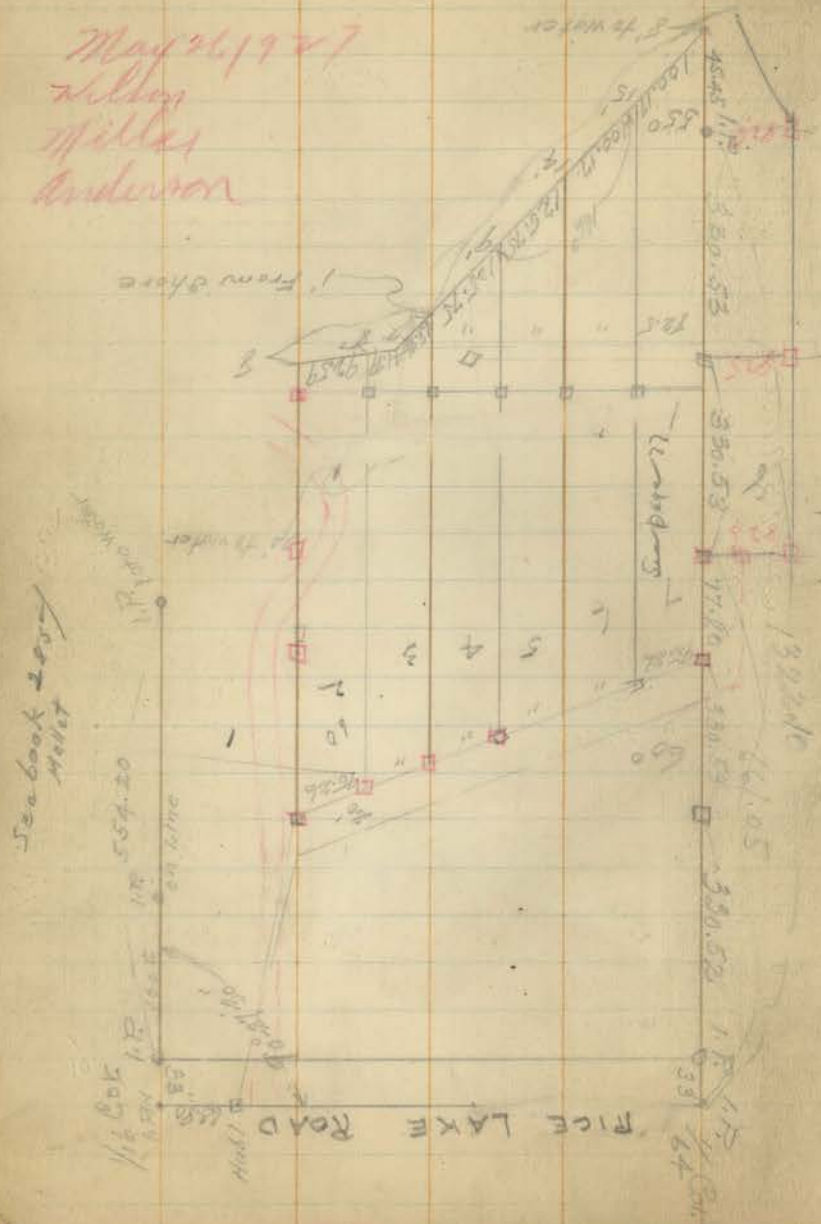
74

S.W. 1/4 - NW. 1/4 - 20-52-14



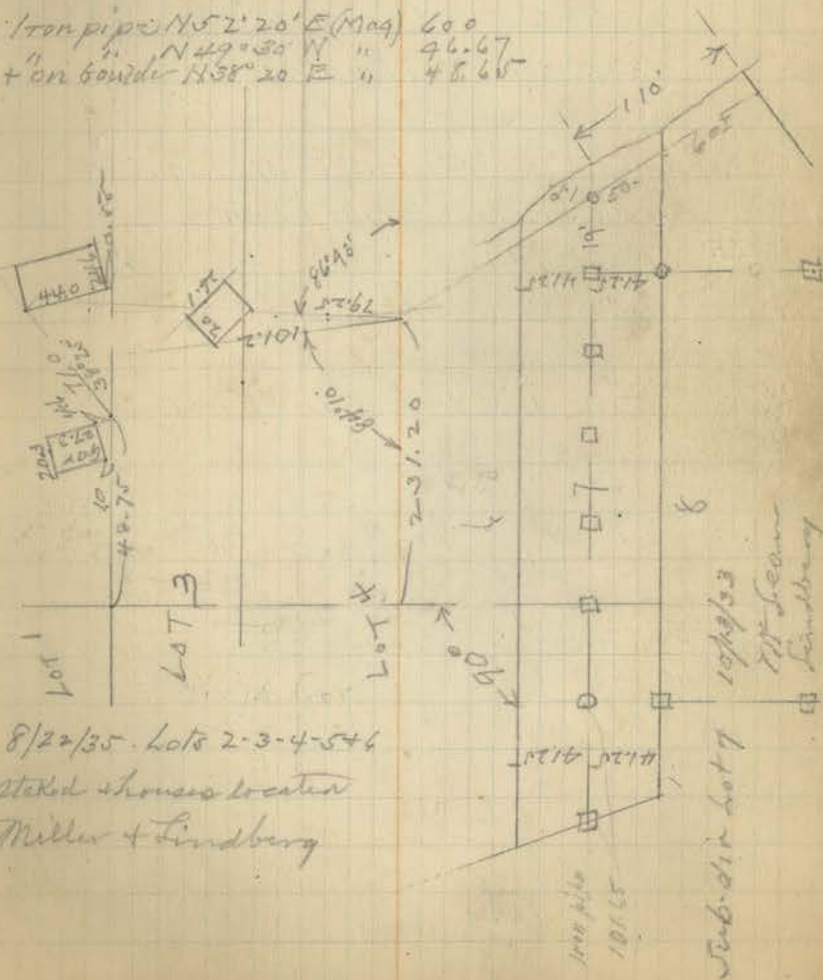
Restaked eastman Plat

May 26, 1927
Miller
Anderson



Ties to N.W. Cor Sec 20-52-14

Iron pipe N 52° 20' E (Mag) 600
" " N 49° 30' N " 96.67
+ on boulder N 58° 20' E " 48.65



78 Caribou Lake

Wilson

Jan. 20, 21

Berg

Lather

North
I.P.

Set S $\frac{1}{16}$ Corner

1342.40 on Random and offset
11.17

Set Lot Cor. 330.14 + .15 Temp. From $\frac{1}{16}$
Cor. on medial Angle From

I.P. Random Line.

1342.60 on Random

For Ties See P. 94



No B. trs. Reset
From E $\frac{1}{4}$ and $\frac{1}{16}$
Ties opposite Page

$$\frac{1}{16} = 1318.41$$

79

S.E. Cor. 12.514

760.15 Hub Set

Hub 1300

24' Butt " at 2572.50 +

" " 1300 from above

" " 2901.20

$\frac{1}{4}$ Cor. Set at 2436.82

offset 4.47

00170209

0'-5'-10"

Found Pipe at 2580.50
offset the Pipe
evidently moved. (Reset)

I.P. Reset W $\frac{1}{4}$ of Sec. 16-57

chained 10° below



See Page 84
For details of this N.W. 1/4

Sec. 18-51-16

Random

line

Hub

57.36

44.02

C. 1/4

1/4

90°

8.

S.W. 1/4 chained 14' above

Hub at 666.12 on 20' offset

" " 1275.00 " True Line

" " 2589.93

" " 2607.00

Inter " 2653.02

" 12.95 on 21' offset line

Set 1/16 Cor. 1/2

Measured 1317.95 on Random offset
27.38

S.W. 1/4 7-51-15

54.60

Hub 2600

Random line

Sec.
Cor.

89° 46' 17"

1317.95

2631.21

1318.06

1318.06

N.W. 1/4-18-51-15 20° above

Continuation of Random line

Hub at 976.40 from 2600

" " 1865.00 "

" " 1896.90 "

Ties
See P. 87

Hub 568.50 From 290.20

1109.40 " "

at 640' on offset line

" 1331.40" " "

Reset 1/16

11.23 Offset to $\frac{1}{16}$ Cor. from

Hub on shore
2901.20

P. 79

5.56 offset

NW-NW
19

S.W. S.W.
19

910 1730 W 1/4 Cor. 19-51-15

Pine N 71° E 78

For Ties to Grad H.Ps

This Random run
from M. Cor. of Friend
Set at inter. of this
line as corrected from
to orig Cor. Cor.
Sec. W 1/4

S.W. 1/4 Sec

18-51-15

May 29 of 20

chained - 18° above

11 From East to West

Hub a 972.38 From East

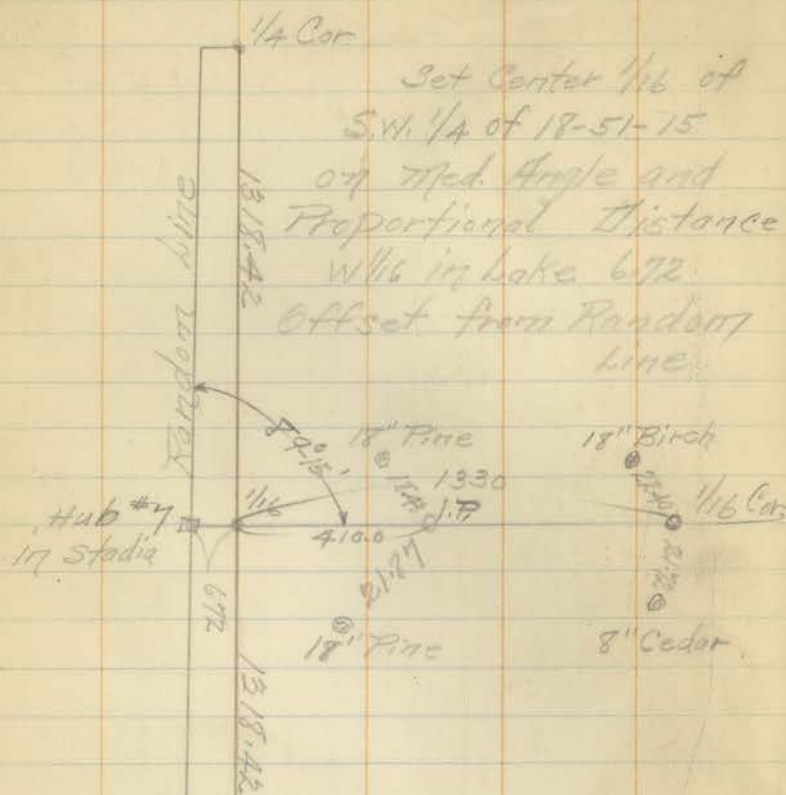
1" " 1369.8% = 34.28 on Random to 1/4A

" 2109.53 - 107.0 " " to $\frac{1}{32}$

10" ≈ 545.0 1.88 at 1/3 set to

№ 78.40

T. O. W.

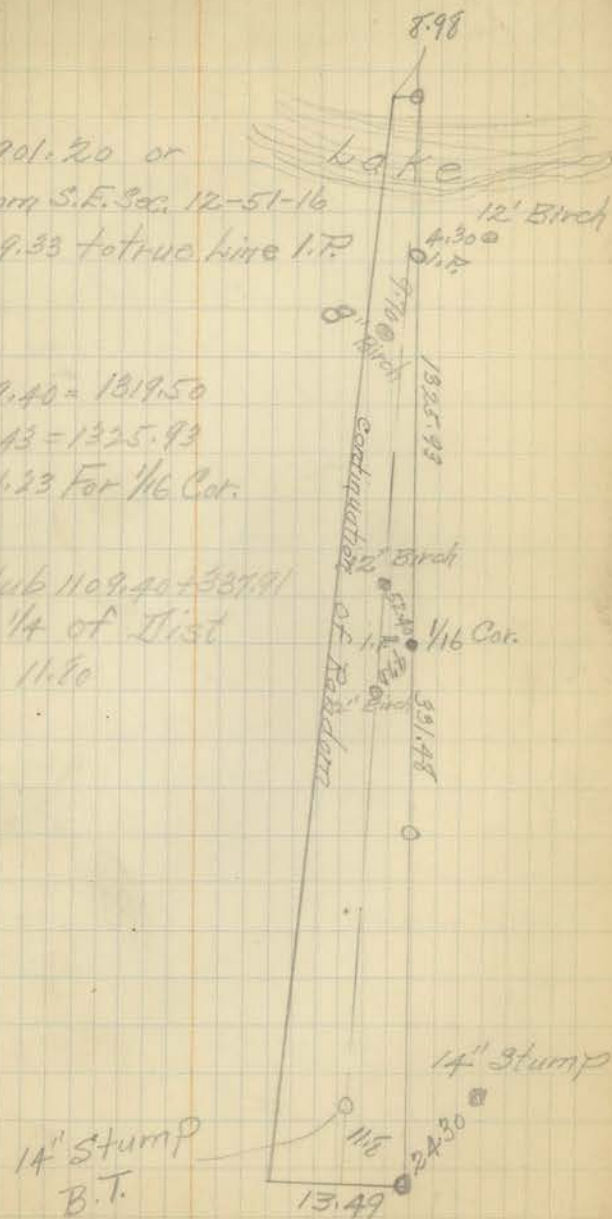


Hub at 410.0 from $\frac{1}{16}$
" " 665.0
" " 780.0
 $\frac{1}{16}$ Set at 1330.0

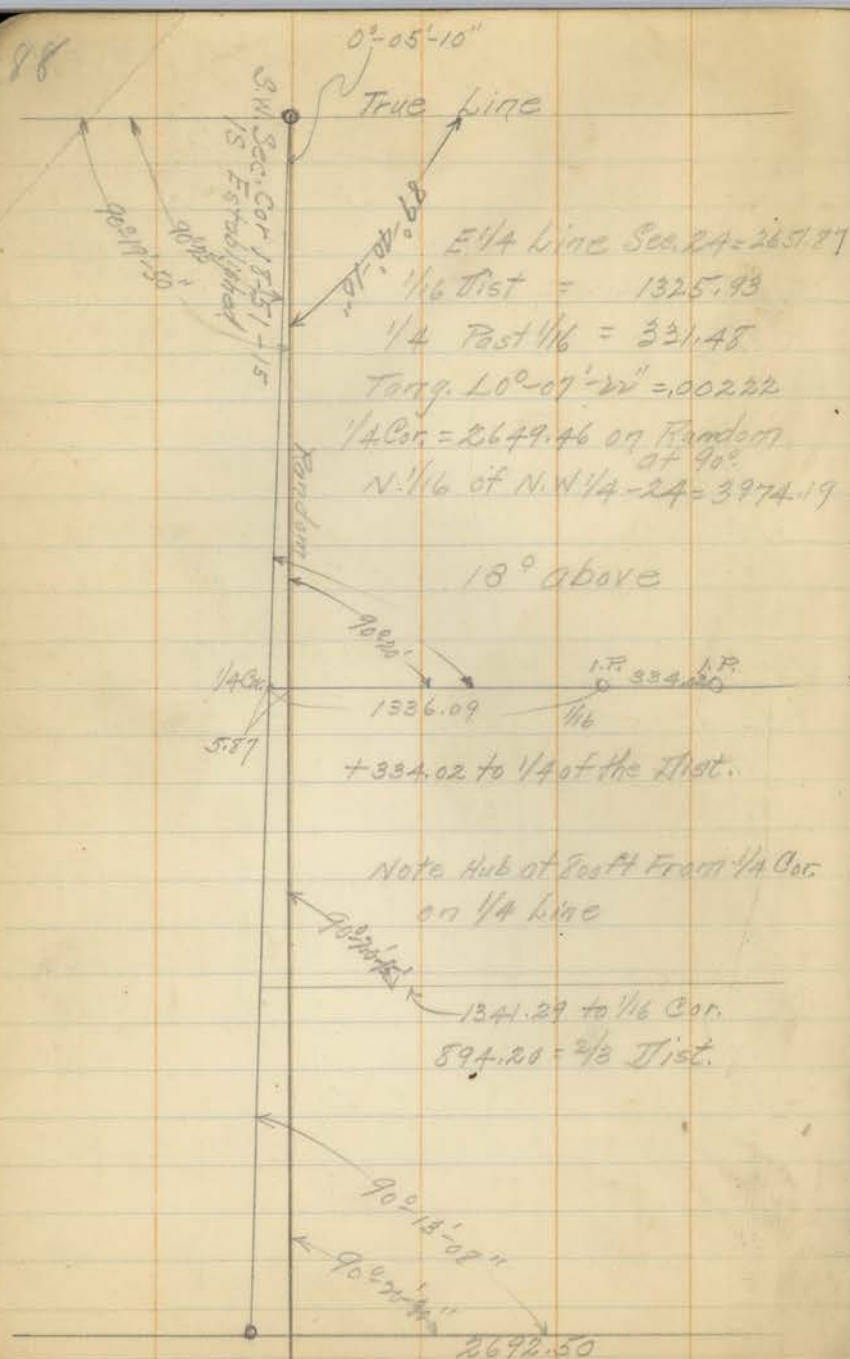
Hub 3901.20 or
5483.70 From S.E. Sec. 12-51-16
P. 79 off 9.33 to true line 1.P.

Hub 1109.40 = 1319.50
 $1319.50 + 6.43 = 1325.93$
offset 11.23 For $\frac{1}{16}$ Cor.

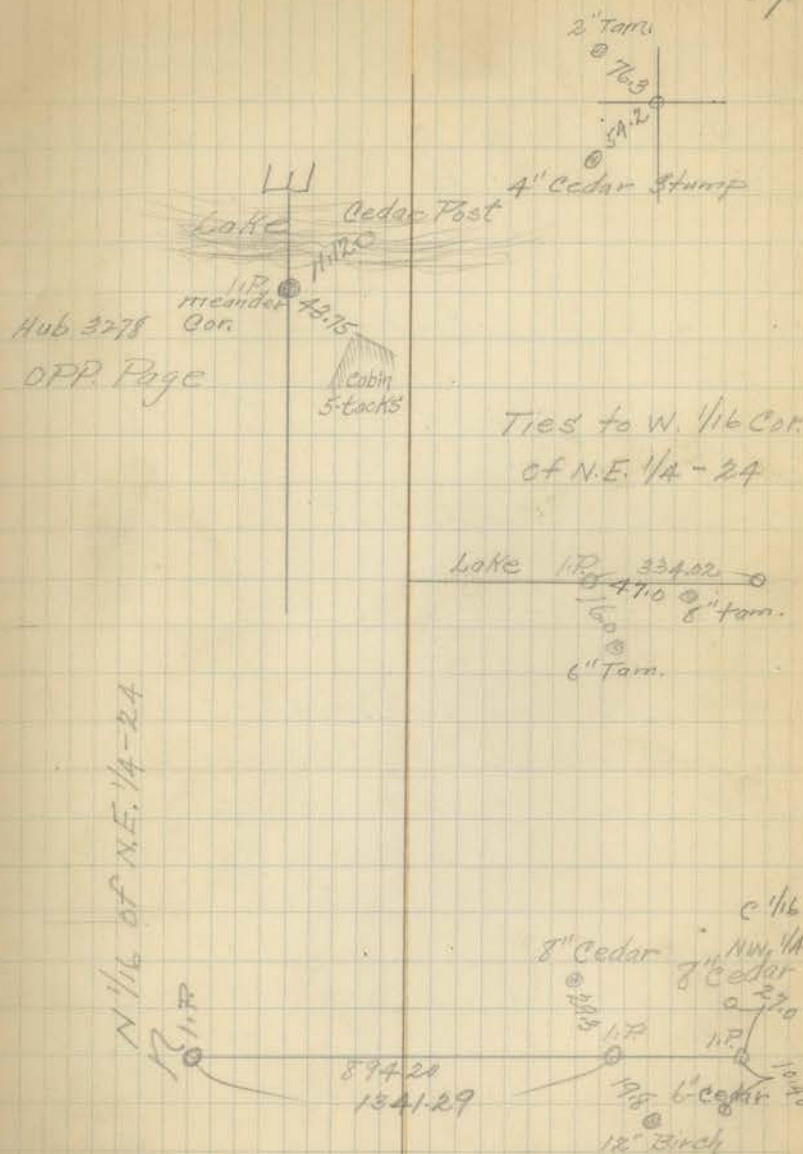
above Hub 1109.40 + 337.91
= 331.48 or $\frac{1}{4}$ of Dist
offset 11.60



88



89



Sec. 13-51-16

Corrected Dist 5257.89 Hub at 1800 on
Tang $L 46^{\circ} 34' = 0.1355$ *Random*

Hub at 2134.90

" " 5252.50

L to Cor. $93^{\circ} 57'$

Dist 71.45

W $\frac{1}{4}$ Cor. Set I.P.2626.25 $L = 93^{\circ} 57'$

Offset 35.72

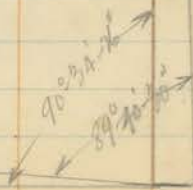
Sec. 13-51-16

West line 26° above

N.W. Sec. Cor.

W $\frac{1}{4}$

5252.50
18" $\odot$ 53.10 I.P.
14 Cor. 29.20 $\odot$
18" Pipe 18" Pine



Random

7'-22"

Chained all of line
 20° below.

I.P. Reset
N.W. Sec. Cor.
13-51-16

1345.0

I.P.

 $\frac{1}{16}$

1345.0

 $\frac{1}{4}$

Sec. 11-51-16 Previous Survey

96 Stadio Carbou, Lake Shore

B.S.	OCC.	Hor. Dist.	Hor. Angle	
W 1/2-18	5300.5 on true line	220.0	180°	
West	1800	439	71°-35	
		318	67°-35	
		200	55°-40	
		125	29°-30	
		144	15°	
		201	12°-05	
W.	2200	167	156°-50	
		215	100°-25	
		250	81°-30	
		311	50°-15	
		366	27°-35	
		444	16°-35	
W.	2900	53	90°	
W.	3000	18	90°	
W.	3050	9	90°	
W.	3100	16	90°	
N	601.70	351	23°-20 L	Swamp 73
		286	17°-10 L	" 65
		217	8°-30 L	" 55
		147	10° R	" 48
		94	60°-35 R	" 30
		147	100°-30	
		253	111°-55 R	

For Location of these Hubs
See Page 92

97

B.S.	OCC	Hor. Dist.	Hor. Angle	Remark
W	4600	565	57°-40° R	
		433	69°-30° R	
		361	76°	
		326	89°	
		321	105°-40°	
		381	128°-15	
		490	135°-05	
W	3900	474	50°-15	
		450	61°-30	
		405	78°-35	
		415	95°-10	High Land
		417	105°-50	" "
		385	129°	" "
		358	128°-30	Swamp
		368	98°	"
		377	140°	"
		377	140°	High Land
		440	151°	" "
		502	162°-05°	" "
W	3500	207	143°	
		260	160°	
		339	177°-30 R	

B.S.	OCC.	Hor. Dist.	Hor. Angle	
W	800	4.1	65°-30	See Page 88
		738	64°-15	
		710	71° L	
		663	75°	
		644	78°-30	
		675	80°-50	
		650	88°-30	
		628	98°	
		598	106°-40	
		571	112°-50	
		548	121°-55'	
		517	129°-15	
		466	140°-25	
		450	151°	
		474	162°-30	
		509	173°-30	
		528	180	
		536		Iron Pipe
		533	176°-50 P	
		537	171°-30	
		500	163°-15	
		466	154°-30	
		474	144°-15	
		532	135°	
F.S. Hub #1	700		107°	

B.S.	OCC.	Hor. Dist.	Hor. Angle	Remarks
800	Hub #1	342	47°-30' L.	
		271	57°-40	
		211	78°	
		197	105°-25	
		226	113°-45	
		253	122°-30	
		294	136°-10	
		353	148°-05	
		443	160°-35	
		501	166°-20 L.	
	F.S. Hub #2	800	160° R.	
Hub #1	Hub #2	400	41°-30 L.	
		328	48°-30	
		262	56°-05	
		201	70°-35	
		166	100°-10	
		184	134°-15	
		275	162	
		365	173°-30	
		501	183°	
		800	143°-22 P	
		1522.90	143°-21'-30	

For Location Hub #4 See Page 83
being on Random Line and 898 West
S.W. Sec. Cor. of 18-51-15

B.S.	OCC.	Hor. Dist.	Hor. Angle
Hub #2	Hub #3	407	45°-20 L.
		344	57°-10
		299	72°
		275	91°-50
		282	116°-15
		248	138°-30
		418	145°-40
#2	#4	330	35°-40
		250	38°
		198	45°-15
		125	60°-30
		118	78°-50
		99	115°-30
		89	142°-15
		135	158°-30
		194	178°
		291	169°-15 R
		355	170° R
		419	165
	F.S. Western Ranch	39°-19'	
North	Hub #4	800	20° R
	Hub #5	800.0	20° R
Hub #4	Hub #5	306	12°-50 L
		262	23°-15 L

B.S.	OCC.	Hor. Dist.	Hor. Angle
		184	33°-25 L
		110	47°-50
		53	81°-10'
		95	156°-15
		180	173°
		265	179°-15 L
Hub #5	F.S. Hub #6	400	158° R 300 R. 86
Hub #5	" #6	124	58°-05 L
		105	82°-45 L
		122	123°-15
		149	133°-30
		196	150°
	F.S. Hub #7	308.80	124°-48 R
Hub #6	Hub #7		
	F.S. Hub #4		57°-13 R

B.S.	Occ.	Dist	Hor. Angle	
	W. 1/4-18	15	180°	
		9	90°	
	2582.0	22	90°	R. 79
	24000	15.0	90°	
		4510	0° 00	
	2200.0	138	153°-15 R	
		150	146°-30 R	
		202	146°-30 R	
		256	138° R	
		327	133°-15 R	
2200	F.S. Hub #1	500	90° R	
2200	Hub #1	303	49° L.	
		302	65°-45 L	
		336	81°-25	
		349	91°-35	
		312	103° L	
		263	113° L	
		235	133°-30	
		216	150	
		211	165° L.	
		226	174°-35 R	
		261	158°-30	
		307	146°-35	
		362	136°-35	

B.S.	Occ.	Dist.	Hor. Angle	Remarks
Hub #1	F.S. Hub #2	700	96°-58 R	
#1	Hub #2	378	33°-45 L	
		300	40°-15	
		241	47°-40	
		173	64°-30	
		136	89°-25	
		120	120°-15 L.	
		149	159°-45 L.	
		219	180°	
		291	167°-30 R	
		348	160°-45 R	
	F.S. Hub #1	263.54	129°-17	
	F.S. Hub #3	600	129°-17	
#2	Hub #3	290	38°-30 L	
		231	49°-30 L	
		186	62°-05	
		141	87°-30	
		112	118°-15	
		109	155°-25 L	
		154	177° R.	
		196	163°-25	
		262	158°-40	
		334	157°	
#3	F.S. Hub #4	700	155° R	
#3	Hub #4	255	6° L	

B.S. OCC. Dist. Hor. Angle

196 190° L

166 37°-10

185 56°-10

225 67°-25

277 71° L

319 69°-45

364 72°-25

390 82°-35 Swamp

F.S. #5
Hub #5 600 130° L

Hub #5 390 47°-25

344 52°-30

269 62°-30

188 74°-30

131 92°-45

91 129°

96 175° L

141 152°-40 R.

205 140°-30

285 130°

346 126°-15

#5 F.S. #6
Hub #6 668 109°-28 R.

#5 #6 292 19° L.

226 20°-15

152 27°-30

110 46°

B.S. OCC. Dist Hor. Angle

99 75°-40 -

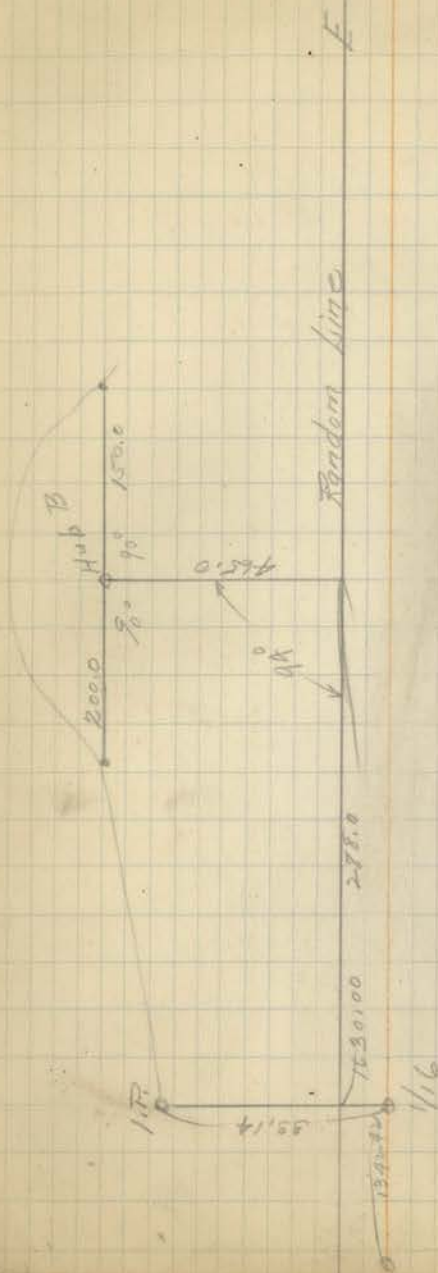
Hub #6 F.S. offset 95 102°-25
1/16 Hub. 240.90 90°-23F.S. #4
Hub #4 33°-05#6 Hub 1/16
F.S. East of
Random Line 91°-13'Location North Side of Swamp SE 3/4 Sec 17
West of Random 1630.00 on Random LineF.S.
Hub B 46.50 94° Right
South Hub-B 200.0 90° " Edge of
Swamp

150.0 90° L. "

200.0 180° " "

B.S.	OCC.	Dist	Hor. Angle
North	N. W. Sec. Cor. 18	8' of Rd.	90° R. E. of Rd.
		170	160°-15 "
		388	160°-10 "
		590	158°-50 "
		150	32°-30 "
F.S.	Stadia Hb.	301	47°-09 L
" "		35.	70° R Edge SW.
		28	70° L "
		92.0	164°-45 R E. Rd.
		195.0	169°-00 R "
		214.0	168°-45 R Edge SW.

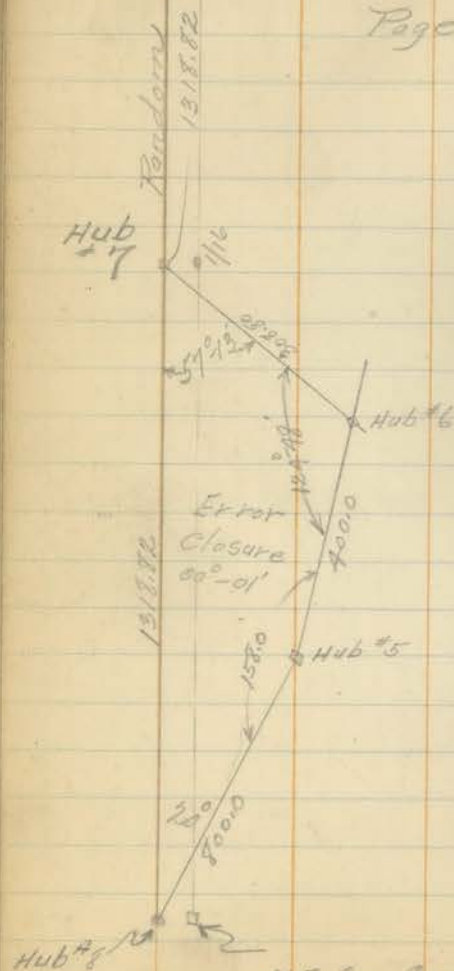
Above Location Rd in N.W. NWI.-
18-51-16 and Part of Swamp
S.E. S.E. - 12-51-15



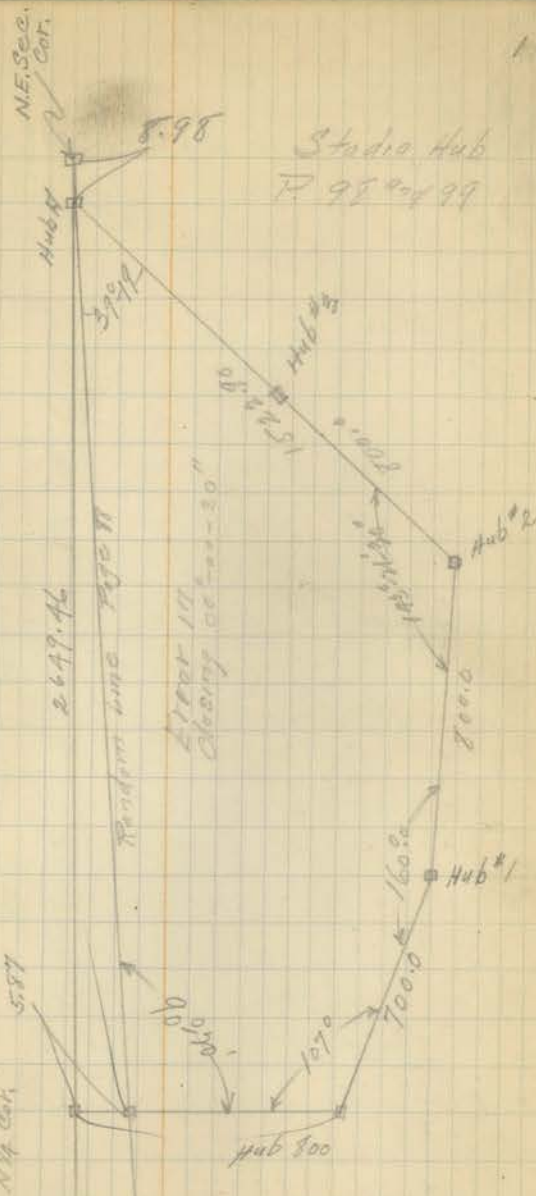
Explanation Note P. 105
Swamp S.E. S.E. - 12

N

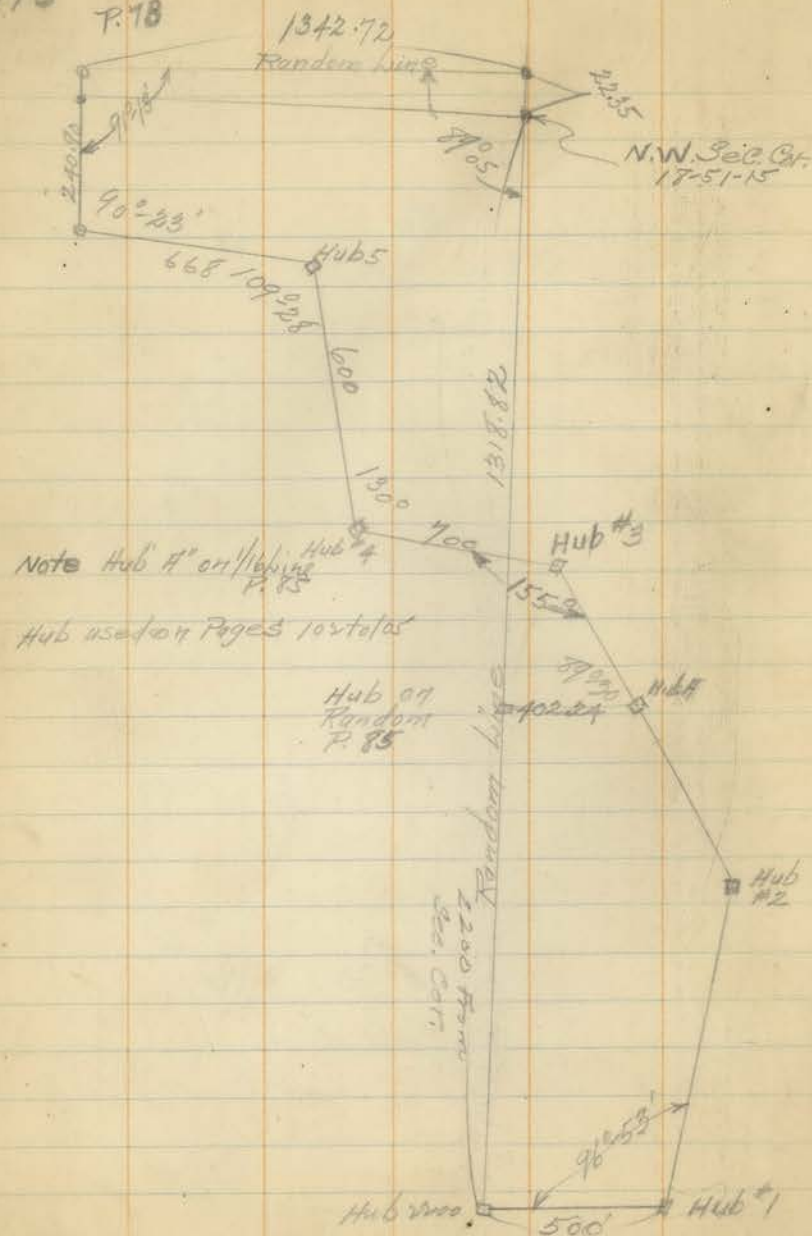
Hub 3tadio
Page 100 9th 101



N.E. Sec. Cor. 24 opp. Page



N



B.S.	O.C.C.	F.S.	Hor. Dist	Hor. Angle
Hub #1	I.P. #2	Hub #3	300	180°
#1	#3	" #4	900	180°
			347	41° 50' R.
			320	25° 30'
			255	5° 45' R.
			215	12° L.
			279	32° 25'
			284	53° 25'
			365	74° 20'
			432	81° 20'
			499	98° 15'
			494	106° 50'
			446	118° 30'
			462	136° 45'
			534	140°
			404	68° 25'
			310	80°
			220	103° 45'
			209	129° 15'
			170	160° L.
			192	164° 15' R.
			325	151°
			458	145° 15'
			598	143° 30'
			Hub #5 11.00	141° 10' R.

4" Pop. 4" Pop.
 5/10 0/15
 Sec. Cor.
 10-11
 14-15
 T. 52-16

210 13.51
 11425 12420
 870 ft
 363.20
 10" Birch 6475
 10" Pine stump
 5420
 9" Poplar
 5430

long lake Base
 line
 Sec. 14-51-16

W. 1/507
 Betty
 Saffel

lake

Canadian Northern R.R.

B.S.	OCC.	F.S.	Dist.	Hor. Angle
	Hub #5		375	5° L.
			255	90° 45
			157	142° 30
			134	22° 10
			66	90° 45
			153	139° 20' Swamp
			287	150° 10 " "
			432	158° 25 " "
			574	164° " "
#5	Hub #6		1200	168° 58' R
			608	25° L.
			449	32° 15
			326	39° 30
			247	49° 40
			155	70° 30
			131	112° 40
			154	144° 15
			242	162° 20
			334	169° 30
			422	173° 35
			500	176° 40
	Hub #7		1200	172° 01
#6	Hub #7		678	8° 10' Stake
			559	11° 05
			473	18° 05 L.

B.S.	OCC.	F.S.	Hor. Dist.	Hor. Angle
			402	
			361	
			335	
			306	
			334	
			359	
			349	
			321	
			317	
			285	
			296	
			348	
			414	
			473	
			525	
			557	
			594	
			629	
#7	Hub #8	Hub #8	700	77° 22' R.
			175	67° 40
			80	79° 30
			105	156° 10
			209	147° 30
			355	136° 25
			466	131° 25

B.S.	Occ.	F.S.	Hor. Dist.	Hor. Angle
		Hub #9	700	114°-05' R
			230	87°-15' L.
			228	47°
			172	62°
			110	83°-50'
			139	138°-40'
			205	163°
			244	179°
				180°-00'
			300	offset 20 to Chute
			400	11
			500	9
			600	25
			700	39
			900	13
			925	6
			1000	6
			1050	25
			1100	58
			1200	114
			1300	144
			1400	142
			1500	150
			1600	128
			1700	82

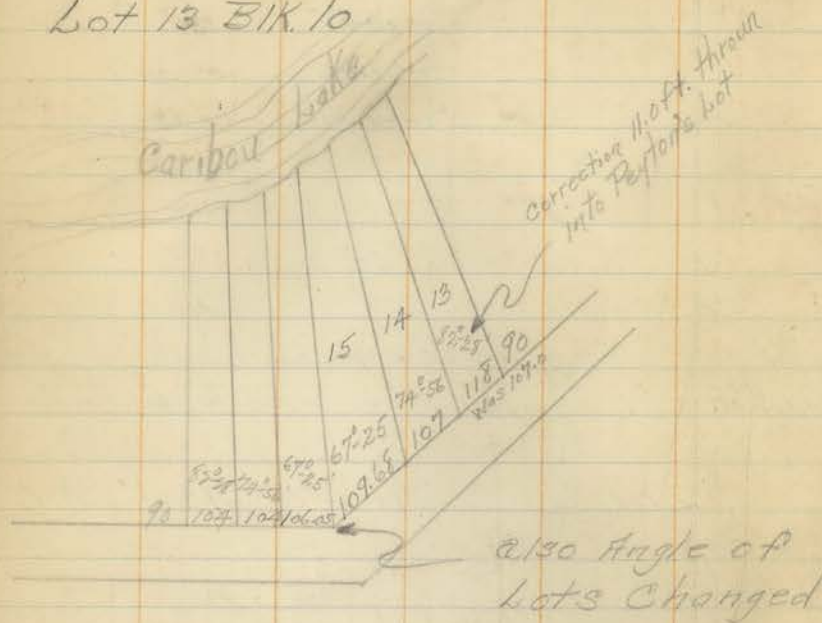
B.S.	Occ.	F.S.	Hor. Dist.	Hor. Angle
			1800	
			1900	
			2000	
			2100	
			2200	
			2300	
			2600	
			2700	
		#10	2708.75	180°
		#3	414.85	116°-26'
		#1		88°-04'
		#9		
		#10		
		#3		
		#1		
		#2		

Dist. Sec. Cot. to Hub #1 = 1114.15

Caribou Lake
Lots Staked

Wilson
Berg
Sather

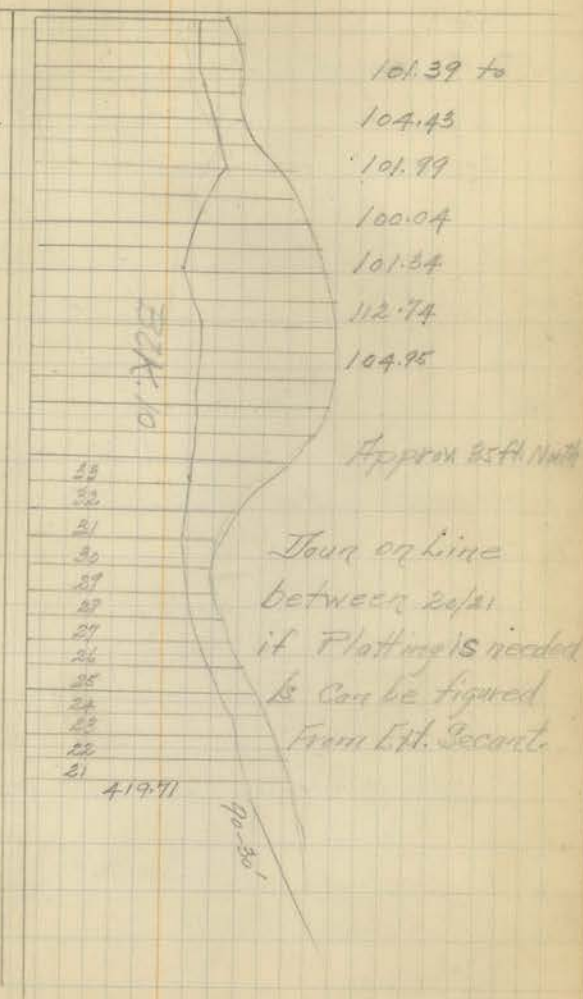
Lot 13 BIK 10



also Lot 16 Block 3
Should read 240.42 instead
of 140.42

Caribou Lake

Wilson
Berg
Sather



122 B.M. Hydrant St. Marie ²/₃ Wallace Ave.

Station	B.S.	H.I.	F.S.	Elev.
T.P. #1	0.87	448.30		447.43
			11.95	436.35
T.P. #2	6.19	442.54		
			3.66	438.88
T.P. #3	2.90	441.78		
			11.27	430.51
T.P. #4	0.24	430.75		
			11-11 1/2	419.63
T.P. #5	0.18	419.815		
			11.11	408.705
T.P. #6	-0.02	408.685		
			11.57	397.115
T.P. #7	2.73	399.845		
			9.94	389.905
T.P. #8	0.48	390.385		
			11.55	378.835
T.P. #9	0.04	378.875		
			11.555	367.32
	1.20	368.52		
15+11.04			6.2	362.3
15+00			6.8	361.7
T.P. #10			7.22	361.30
	3.00	364.30		
			3.5	360.8
			4.3	360.0

Cushman River

123

Station	B.S.	H.I.	F.S.	Elev.
12 Station		364.30	5.4	358.9
T.P. Station			5.23	359.07
10+45.46				
	3.38	362.45		
10			4.6	357.8
9			4.2	358.2
8			4.1	358.3
7			4.4	358.0
6			4.1	358.3
5			4.7	357.7
4			5.3	357.1
3			6.1	356.3
2			6.9	355.5
1			8.2	354.2
0			8.9	353.5
B.M. 36.0 - top of stake			9.0	353.4
T.P. #9				357.32
	11.40	378.72		
16			12.9	365.8
17			7.4	371.3
18			11.4	377.3
T.P. #11			0.80	377.9
	11.66	389.58		
19			6.6	383.0
19+32 (B.M.)			2.16	387.42
T.P. #12			0.83	388.75

124 Crestline Sewer

Station	B.S.	H.I.	F.S.	Elev.
T.P. # 12	11.99	400.74		
Sta. 21			4.6	396.1
T.P. # 13			0.42	400.52
	11.86	412.18		
Sta. 22			8.7	403.5
" 23			1.9	410.3
T.P. # 14			0.07	412.11
	12.1	424.21		
Sta. 23+25'			10.0	414.2
" 24			4.2	420.0
T.P. # 15			0.42	423.79
	11.72	435.51		
Sta. 24+35'			7.1	428.4
" 24+47'			2.0	433.5
" 24+48' Bottom of Stone wall				
T.P. # 16			0.11	435.40
	9.98	445.38		
			5.0	440.4
Sta. 25+13.25				
Nail in Pole				
B.M. North End of Bridge			3.28	442.10
Sta. 25+13			4.7	440.7
25+20			5.1	440.3
25+28			10.2	435.2
			9.2	436.2
			3.8	441.6

Crestline Sewer

125

Station	B.S.	H.I.	F.S.	Elev.
28		445.38	0.90	444.48
T.P.			6.44	438.94
	4.68	443.62		
			4.74	438.88
	4.02	442.90		
			1.54	441.36
	6.07	447.43		
			0.12	447.31
	4.59	449.07		
29			2.3	446.8
T.P.			0.66	448.41
	11.23	459.64		
30			7.7	451.9
31			4.8	454.8
32			5.0	454.6
33			5.5	454.1

Station	B.S.	H.I.	F.S.	Elev.
B.M. ^{Nail in Pole} North End of Bridge				442.10
	2.66	444.76		
T.P. #1			11.81	432.95
	2.41	435.36		
T.P. #2			11.08	424.28
	0.95	425.23		
T.P. #3			11.11	414.12
	0.23	414.35		
T.P. #4			11.56	402.79
T.P. #5			11.64	391.90
	0.45	392.38		
T.P. #6			11.45	380.93
	0.42	381.35		
T.P. #7			11.52	369.83
	1.45	371.28		
T.P. #8			8.26	363.02
	2.34	365.36		
			2.4	263.0
			3.2	262.2
			3.4	262.0
			3.8	261.6
			4.0	261.4
			4.4	261.0
			5.0	260.4

Station	B.S.	H.I.	F.S.	Elev.	Remarks
		365.36	4.9	360.5	
			5.0	360.4	
			5.4	360.0	
			5.9	359.5	
			6.0	359.4	
			5.9	359.5	
			5.7	359.7	
			5.8	359.6	
T.P. #9			5.73	359.63	
	0.91	360.54			
			1.4	359.1	
			2.1	358.4	
			2.6	357.9	
			2.8	357.7	
			3.2	357.3	
			3.5	357.0	
			4.5	356.0	
			4.6	355.9	
			4.6	355.9	
			5.4	355.1	
			5.8	354.7	
			6.5	354.0	
			6.7	353.8	
			6.7	353.8	
			7.8	352.7	

Station	B.S.	H.I.	F.S.	Elev.	Remarks
		360.54	8.0	352.5	
20			8.2	352.3	
19			8.6	351.9	
18			8.7	351.8	
17			9.0	351.5	
			9.29	351.25	
	1.40	352.65			
16			1.7	350.9	
15			2.2	350.4	
14			2.4	350.2	
13			3.2	349.4	
12			3.8	348.8	
11			4.2	348.4	
10			4.0	348.6	
9			5.0	347.6	
8			5.5	347.1	
7			5.6	347.0	
6			6.2	346.4	
5			6.0	346.6	
4			5.8	346.8	
3			6.7	345.9	
2			7.5	345.1	
1			7.6	345.0	
0			7.8	344.8	
			1.40	351.45	

Station	B.S.	H.I.	F.S.	Elev.
	9.51	360.76		
T.P. #12			1.13	359.63
	6.17	365.80		
T.P. #8 (B.M.)			2.78	363.02
	8.99	372.01		
T.P. #13			0.68	371.33
	10.61	381.94		
T.P. #14			0.28	381.66
	11.53	393.19		
T.P. #15			1.11	392.08
	9.98	402.06		
T.P. #16			0.49	401.57
	11.02	412.59		
T.P. #17			0.90	411.69
	11.76	423.45		
T.P. #18			0.17	423.28
	10.32	433.60		
			1.46	432.14
	12.08	444.22		
			2.17	442.05
T.P. #9 (B.M.)				
	8.65	371.67		
52			7.9	363.9
53			5.8	366.0

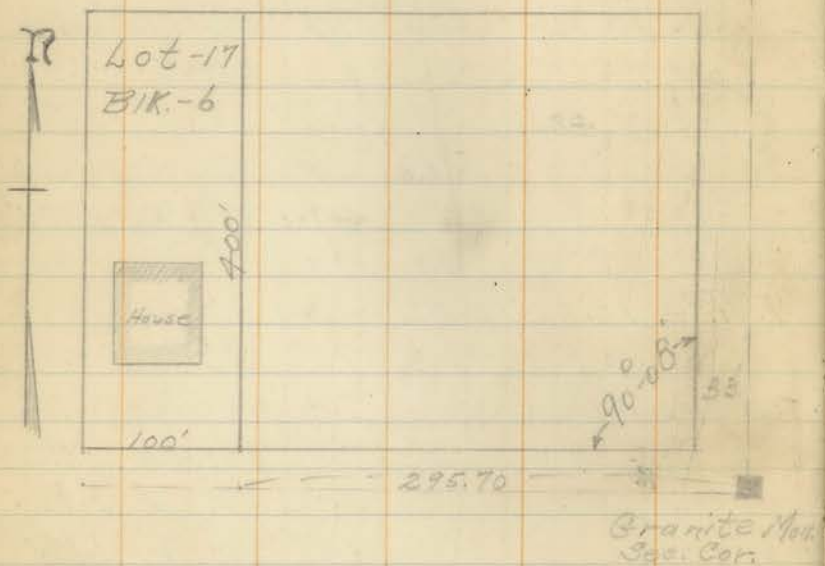
Sta.	Rock	Sta.	Rock
51	5 ft. +	26	5' +
50	5' +	25	5' +
49	5' +	24	5' +
48	5' +	23	5' +
47	5' +	22	5' +
46	5' +	21	5' +
45	5' +	20	5' +
44	5' +	19	5' +
43	5' +	18	5' +
42	5' +	17	5' +
41	5' +	16	5' +
40	5' +	15	5' +
39	5' +	14	5' +
38	5' +	13	5' +
37	5' +	12	5' +
36	6.5' +	11	5' +
35	5' +	10	5' +
34	5' +	9	5' +
33	5' +	8	5' +
32	5' +	7	5' +
31	5' +	6	5' +
30	5' +	5	5' +
29	5' +	4	5' +
28	5' +	3	5' +
27	5' +	2	5' +
		1	5' +

Station	B.S.	H.I.	F.S.	E/c.v.	Rock Sounding
		371.67	4.8	366.9	2 ft.
			3.1	368.6	2 "
			1.7	370.0	1.4 "
			0.19	371.48	
	10.30	381.78			
			10.1	371.7	1.5 "
			7.7	374.1	3.5 "
			6.1	375.7	2.5 "
			4.0	377.8	2.5 "
			2.3	379.5	1.9 "
			0.48	381.3	2.4 "
			0.10	381.68	
T.P.	10.53	392.21			
			9.2	383.0	3.0 "
			7.4	384.8	1.9 "
			5.0	387.2	2.25 "
			3.0	389.2	1.9 "
			1.8	390.4	1.15 "
			0.12	392.09	
	10.18	402.39			
			9.6	392.7	1.8 "
			8.7	393.6	3.0 "
			6.2	396.1	1.85 "
			3.4	398.9	5.5 "
			1.5	400.7	3.55 "

Park View Farms Lot 17-BIK-6

S.E. 1/4 Sec. 30-51-13

September 30, 1922

Berg
Lynch
LangleeRock
Sounding

Station B.S.

H.I.

F.S.

Elev.

11.95

402.27

0.66

401.61

413.56

10.4

403.2

5.5' +

8.7

404.9

5' +

6.9

406.7

5.5' +

5.0

408.6

2.25'

2.4

411.2

4'

T.P.

0.33

413.23

10.55 423.78

10.0

413.8

2.05 "

6.6

417.2

2.00 "

3.7

420.1

5.5' "

1.1

422.7

1.65

T.P.

0.52

423.26

11.41 434.67

9.0

425.7

1.25

2.8

431.9

5.5' +

0.70

424.0

5.5' +

2.85

431.82

10.03 441.85

1.83

440.02

5.83 445.75

3.26

442.57

10.18

435.0

9.2

436.6

Sta.	B.S.	H.I.	F.S.	Elev.
86		445.85	6.1	439.7
87			5.5	440.3
88			4.3	441.5
T.P.			3.13	442.72
	7.71	450.43		
			7.8	444.6
			6.3	444.1
			5.4	445.0
			4.6	445.8
			3.8	446.6
			3.0	447.4
T.P.			7.71	442.72
	3.15	445.87		
			3.25	442.62

Station	B.S.	H.I.	F.S.	Elevation
				447.43
	11.66	459.09		
			0.54	458.55
	10.06	468.61		
			0.26	468.35
	12.03	480.38		
			11.57	468.79
			1.07	479.31
	8.37	487.68		
			0.17	487.49
				468.79
	1.09	469.88		
			11.53	458.35
	2.34	460.69		
			4.46	456.23
	11.72	467.95		
	11.64	479.12	0.17	467.48
B.M.				361.95
	1.91	363.76		
			1.00	362.76
	7.38	370.24		
			13.37	356.87

Sta.	B.S.	H.I.	F.S.	Elev.
B.M.	Hydt.	Victoria		471.02

1.26 472.28

11.24 461.01

1.00 462.04

11.72 450.36

0.64 450.96

10.12

1.98 442.82

Hydt. ^{St. Marie} Wallace Ave. 11.55 430.97

Hydt. St. Marie St. Should be

455.94
<u>447.43</u>
8.50

Station	B.S.	H.I.	F.S.	Elev.
				450.60

4.20 454.80

11.02 443.78

6.61 450.37

4.5 445.9

6.8 443.6

7.0 443.4

4.2 446.2

4.2 446.2

7.8 443.6

9.4 441.0

10.5 439.9

5.6 447.8

6.1 444.3

10.0 440.4

10.5 439.9

14.4 436.0

15.3 435.1

17.7 432.7

16.6 433.8

10.5 439.9

13.5 436.9

10.8 439.6

14.0 436.4

Sta.	B.S.	H.I.	F.S.	Elev.
771 7		450.89	8.8	441.6
" 7/5E			10.7	439.7
771 8			7.4	443.0
771 9			5.8	444.6
" 10			4.8	445.6
" 11			7.1	443.3
" 12			8.8	441.6
T.P.			9.56	440.83
	0.93	441.76		
			1.2	440.6
			3.3	438.5
			5.8	436.6
			8.9	432.9
			15.4	426.4
			5.8	436.0
			7.8	434.0
			8.1	433.7
			11.4	430.4
			13.4	428.4
			14.6	427.2
			10.97	430.77
	5.89	436.66		
			12.8	423.9
			11.8	424.9

Sta.	B.S.	H.I.	F.S.	Elev.
K-14	436.66		8.1	438.6
J-14			13.3	423.4
J-13			10.5	426.2
J-12			10.2	426.5
K-13			6.9	429.8
K-12			6.2	430.5
" -11			5.1	431.6
J-11			10.1	426.6
K-10			4.3	432.4
J-10			8.2	428.5
K-9			3.4	433.3
J-9			6.6	430.1
K-8			3.5	432.2
J-8			7.8	428.9
K-7			3.6	433.1
J-7			8.8	427.9
K-6			6.8	429.9
J-6			10.4	426.3
K-5			7.8	428.9
K-5			11.7	425.0
K-4			5.7	431.0
			4.56	432.10
	7.41	437.57		
			7.4	432.1
			12.7	426.8

for remainder of Notes
see Page 21-22

RX

"

"

"

"

"

"

"

Lot	BLK.	Div.	Page
	Fondulac	Bridge data	1
	35	Carnegie-Cen	24
	30	" "	25
✓	29	" "	26
Sec. 7-48-15	Fondulac	Bridge	1-14
		Traverse Military Road	15-19
		Tie to State Line	16-17
✓	Sec. 7-49-14	N.W. 1/4 of N.E. 1/4 Topog.	30-44
✓	Sec. 7-49-14	" " " " " Points	
✓		N & W. of 6 th St.	45-46
✓	Sec. 26-53-12	E & W & N & S 1/4 Lines	55
✓	" 35	53-12 N & S 1/4 Line	57
✓		53-12 Govt. B. Ts.	48-53
✓	Sec 20-52-14	Sunshine Lake 121	58-77
	Secs. 18-19-51-15	} Caribou Lake Plat	78-120
	" 12-13-24-51-16		
	" 14 -51-16		
	Sec 12-50-14	S.W. of S.W. levels & soundings	122-143
	" 30-51-13	Lot 17 BLK 6 Park View Farms	136
	Sec 20-52-14	N.W. 1/4	121-126

DIRECTIONS FOR USE OF TABLES

TABLE No. 1.

Distance of slope stake from side or shoulder stake for any width roadway, slope 1 1/2 to 1. If ground is nearly level, the cut or fill at side stake is located by the double entry method in left column and top row. If no number in body of table in same row and column gives distance level estimate the difference in elevation between the side stake and slope stake by the amount it cut, elevate it fill. Add this amount to cut or fill and find the slope stake. Set up rod at the slope stake and find the cut or fill. If it does not make the slight adjustment necessary.

TABLE No. 2.

To find Tangent and External for curve of any other degree, divide by degree of curve and add correction found in column of corrections. Degree of curve with a given L may be found by dividing tangent, (or external), opposite L by given tangent, (or external). The distance from a point on the tangent to the curve is very nearly the square of the tangent length divided by twice the radius.

DIRECTIONS FOR USE OF TABLES

TABLE No. 1.

Distance of slope stake from side or shoulder stake for any width roadway, slope $1\frac{1}{2}$ to 1. If ground is nearly level, the cut or fill at side stake is located by the double entry method in left column and top row. The number in body of table in same row and column gives distance from side stake to slope stake. If ground is not level estimate the difference in elevation between the side stake and slope stake, lower target by this amount if cut, elevate if fill. Add this amount to cut or fill and find distance in table. Set up rod at this point, and line of sight should cut target. If it does not make the slight adjustment necessary.

TABLE No. 9.

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

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

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

TRIGONOMETRIC FORMULAE

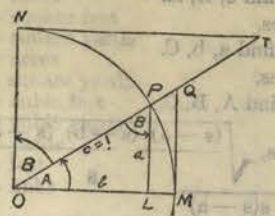


TABLE II
TRIGONOMETRIC FORMULAE.

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

$$R = OB = c = 1$$

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

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

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

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

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

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

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

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

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

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

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

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

$$\text{Law of Lines} \quad \frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

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

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

TABLE II—Continued
TRIGONOMETRIC FORMULAE (continued)

In any triangle:

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

Use Law of Lines.

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

Use Law of Lines.

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

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

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

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

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

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

Area of a triangle:

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

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

PRISMOIDAL FORMULA.

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

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

TABLE III
INCHES AND FRACTIONS OF AN INCH IN DECIMALS OF A FOOT

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

TABLE IV
USEFUL RELATIONS.

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

$$360^\circ = 21600' = 1296000''$$

$$\text{Radius} = \text{arc of } 57.2957790^\circ$$

$$\text{Arc of } 1^\circ (\text{radius} = 1) = .017453292$$

$$\text{Arc of } 1' (\text{radius} = 1) = .000290888$$

$$\text{Arc of } 1'' (\text{radius} = 1) = .000004848$$

$$\pi = 3.141592654 \quad \sqrt{\frac{1}{4}} = 0.564190$$

$$\frac{\pi}{4} = 0.785398163 \quad \sqrt{\frac{6}{\pi}} = 1.240700982$$

$$\frac{\pi}{6} = 0.523598776 \quad \pi^2 = 9.869604401$$

$$\sqrt{\frac{4}{\pi}} = 1.128379167 \quad \frac{1}{\pi^2} = 0.101321184$$

$$\frac{\pi}{6} = 0.523598776 \quad \sqrt{\pi} = 1.772453851$$

$$\frac{4\pi}{3} = 4.188790205 \quad \frac{1}{\pi} = 0.3183099$$

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

Curvature in feet = $0.667 (\text{Dist. in miles})^2$

Difference between arc and chord length, 0.05 feet in $11\frac{1}{2}$ miles

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

Error in chaining of 0.01 feet in 100 feet:

Due to—

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

STADIA REDUCTION FORMULAE.

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

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

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

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

a = angle of elevation for mid Reading

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

deg.	sin 0'	tan 0'	sin 10'	tan 10'	sin 20'	tan 20'	sin 30'	tan 30'	sin 40'	tan 40'	sin 50'	tan 50'	deg.
46	7193	1.0355	7214	1.0416	7234	1.0477	7254	1.0533	7274	1.0599	7294	1.0661	43
47	314	.0724	333	.0786	353	.0850	373	.0913	392	.0977	412	.1041	42
48	431	.1106	451	.1171	470	.1237	490	.1303	509	.1369	528	.1436	41
49	547	.1504	566	.1571	585	.1640	604	.1708	623	.1778	642	.1847	40
50	660	1.1918	7679	1.1988	7698	1.2059	7716	1.2131	7735	1.2203	7753	1.2276	39
51	771	2.349	790	.2423	808	.2497	826	.2572	844	.2647	862	.2723	38
52	880	.2799	898	.2876	916	.2954	934	.3032	951	.3111	969	.3190	37
53	986	.3270	8004	.3351	8021	.3452	8039	.3514	8056	.3597	8073	.3680	36
54	8090	.3764	107	.3848	124	.3934	141	.4019	158	.4106	175	.4193	35
55	192	.4281	208	.4370	225	.4460	241	.4550	258	.4641	274	.4733	34
56	290	.4826	307	.4919	323	.5013	339	.5108	355	.5204	371	.5301	33
57	387	.5399	403	.5497	418	.5597	434	.5697	450	.5798	465	.5900	32
58	480	.6003	496	.6107	511	.6212	526	.6319	542	.6426	557	.6534	31
59	572	.6643	587	.6753	601	.6864	615	.6977	631	.7090	646	.7205	30
60	660	1.7321	8675	1.7437	8689	1.7556	8704	1.7675	8718	1.7797	8732	1.7917	29
61	746	.8040	760	.8165	774	.8291	788	.8418	802	.8546	816	.8676	28
62	829	.8807	843	.8940	857	.9074	870	.9210	884	.9347	897	.9486	27
63	910	.9626	923	.9768	936	.9912	949	2.0057	962	2.0204	975	2.0353	26
64	988	2.0503	9001	2.0655	9013	2.0809	9026	.0965	9038	.1123	9051	.1283	25
65	9063	.1445	075	.1609	088	.1775	100	.1943	112	.2113	124	.2286	24
66	135	.2460	147	.2637	159	.2817	171	.2998	182	.3183	194	.3369	23
67	205	.3559	216	.3750	228	.3945	239	.4142	250	.4342	261	.4545	22
68	272	.4751	283	.4960	293	.5172	304	.5386	315	.5605	325	.5826	21
69	336	.6051	346	.6279	356	.6511	367	.6746	377	.6985	387	.7228	20
70	397	2.7475	9407	2.7725	9417	2.7980	9426	2.8239	9436	2.8502	9446	2.8770	19
71	455	.9042	465	.9319	474	.9600	483	.9887	492	3.0178	502	3.0475	18
72	511	3.0777	520	3.1084	528	3.1397	537	3.1716	546	.2041	555	.2371	17
73	563	.2709	572	.3052	580	.3402	588	.3759	596	.4124	605	.4495	16
74	613	.4874	621	.5261	628	.5656	636	.6059	644	.6470	652	.6891	15
75	659	.7321	667	.7760	674	.8208	681	.8657	689	.9136	696	.9617	14
76	703	4.0108	710	4.0611	717	4.1126	724	4.1653	730	4.2193	737	4.2747	13
77	744	.3315	750	.3897	757	.4494	763	.5107	769	.5736	775	.6382	12
78	781	.7046	787	.7729	793	.8430	799	.9152	805	.9894	811	5.0658	11
79	816	.1446	822	5.2257	827	5.3093	833	5.3955	838	5.4845	843	.5764	10
80	9848	5.6713	9853	5.7694	9858	5.8708	9863	5.9758	9868	6.0844	9872	6.1970	9
81	877	6.3138	881	6.4348	886	6.5606	890	6.6912	894	.8269	899	.9682	8
82	903	7.1154	907	7.2687	911	7.4287	914	7.5958	918	7.7704	922	7.9530	7
83	925	8.1443	929	8.3450	932	8.5555	936	8.7769	939	9.0098	942	9.2553	6
84	945	9.5144	948	9.7882	951	10.078	954	10.385	957	10.711	959	11.059	5
85	962	11.430	964	11.826	967	12.250	969	12.706	971	13.197	974	13.727	4
86	976	14.300	978	14.924	980	15.605	981	16.350	983	17.169	985	18.075	3
87	986	19.081	988	20.206	989	21.470	990	22.903	992	24.542	993	26.432	2
88	994	28.636	995	31.242	996	34.368	997	38.189	997	42.964	998	49.104	1
89	9998	57.290	9999	68.750	9999	85.940	9999	114.58	1.000	171.88	1.000	343.77	0
deg.	60'	60'	50'	50'	40'	40'	30'	30'	20'	30'	10'	10'	deg.
cos	cot	cos	cot	cos	cot	cos	cot	cot	cos	cot	cos	cot	

TABLE VII
RODS IN FEET AND INCHES

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

TABLE VIII
LINKS IN FEET AND INCHES

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

TABLE X.
MIDDLE ORDINATES OF RAILS
Length of Rail (feet)

C	R	30	28	26	24	22	20	C	R	30	28	26	24	22	20
o /	Feet	Inch	Inch	Inch	Inch	Inch	Inch	o	Feet	Inch	Inch	Inch	Inch	Inch	Inch
0-20	17189	.08	.07	.06	.05	.04	.03	8	716.8	1.88	1.64	1.42	1.20	1.01	.84
0-40	8594	.16	.14	.12	.10	.08	.07	9	637.3	2.12	1.84	1.60	1.35	1.14	.94
1-0	5730	.24	.20	.18	.15	.13	.10	10	573.7	2.36	2.05	1.78	1.50	1.27	1.04
1-20	4297	.31	.27	.23	.20	.17	.13	11	521.7	2.59	2.26	1.95	1.65	1.39	1.15
1-40	3438	.39	.34	.29	.25	.21	.17	12	478.3	3.83	3.47	3.15	2.81	2.54	2.26
2-0	2865	.47	.41	.35	.30	.25	.20	13	441.7	3.05	2.66	2.30	1.96	1.66	1.36
2-20	2456	.55	.48	.41	.35	.29	.23	14	410.3	3.30	2.87	2.48	2.10	1.78	1.46
2-40	2149	.63	.55	.47	.40	.33	.27	15	383.1	3.54	3.08	2.68	2.26	1.91	1.57
3-0	1910	.71	.62	.53	.45	.38	.31	16	359.3	3.76	3.28	2.83	2.40	2.04	1.67
3-20	1719	.78	.68	.59	.50	.42	.35	17	338.3	4.00	3.48	3.02	2.57	2.16	1.78
3-40	1563	.86	.75	.65	.55	.46	.38	18	319.6	4.21	3.67	3.18	2.70	2.28	1.87
4-0	1433	.94	.82	.71	.60	.50	.42	19	302.9	4.45	3.89	3.36	2.86	2.41	1.98
4-20	1323	1.02	.89	.77	.65	.55	.45	20	287.9	4.70	4.09	3.55	3.00	2.54	2.09
4-40	1228	1.10	.96	.83	.70	.59	.48	22	262.0	5.16	4.44	3.84	3.30	2.80	2.29
5	1146	1.18	1.03	.89	.75	.63	.52	24	240.5	5.64	4.92	4.20	3.59	3.04	2.50
6	955.3	1.41	1.23	1.06	.90	.76	.62	26	222.3	6.07	5.29	4.58	3.88	3.29	2.70
7	819.0	1.65	1.44	1.24	1.05	.89	.73								

TABLE XI.
SHORT RADIUS CURVES

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

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

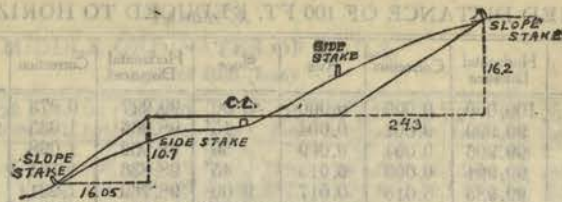
TABLE XII.
INCLINED DISTANCE OF 100 FT. REDUCED TO HORIZONTAL

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

For each foot take one one-hundredth of each reading.

TABLE XIII.
MINUTES IN DECIMALS OF A DEGREE.

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



DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING.

SLOPE $1\frac{1}{2}$ TO 1. ROADWAY OF ANY WIDTH.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0.00	0.15	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	0
1	1.50	1.65	1.80	1.95	2.10	2.25	2.40	2.55	2.70	2.85	1
2	3.00	3.15	3.30	3.45	3.60	3.75	3.90	4.05	4.20	4.35	2
3	4.50	4.65	4.80	4.95	5.10	5.25	5.40	5.55	5.70	5.85	3
4	6.00	6.15	6.30	6.45	6.60	6.75	6.90	7.05	7.20	7.35	4
5	7.50	7.65	7.80	7.95	8.10	8.25	8.40	8.55	8.70	8.85	5
6	9.00	9.15	9.30	9.45	9.60	9.75	9.90	10.05	10.20	10.35	6
7	10.50	10.65	10.80	10.95	11.10	11.25	11.40	11.55	11.70	11.85	7
8	12.00	12.15	12.30	12.45	12.60	12.75	12.90	13.05	13.20	13.35	8
9	13.50	13.65	13.80	13.95	14.10	14.25	14.40	14.55	14.70	14.85	9
10	15.00	15.15	15.30	15.45	15.60	15.75	15.90	16.05	16.20	16.35	10
11	16.50	16.65	16.80	16.95	17.10	17.25	17.40	17.55	17.70	17.85	11
12	18.00	18.15	18.30	18.45	18.60	18.75	18.90	19.05	19.20	19.35	12
13	19.50	19.65	19.80	19.95	20.10	20.25	20.40	20.55	20.70	20.85	13
14	21.00	21.15	21.30	21.45	21.60	21.75	21.90	22.05	22.20	22.35	14
15	22.50	22.65	22.80	22.95	23.10	23.25	23.40	23.55	23.70	23.85	15
16	24.00	24.15	24.30	24.45	24.60	24.75	24.90	25.05	25.20	25.35	16
17	25.50	25.65	25.80	25.95	26.10	26.25	26.40	26.55	26.70	26.85	17
18	27.00	27.15	27.30	27.45	27.60	27.75	27.90	28.05	28.20	28.35	18
19	28.50	28.65	28.80	28.95	29.10	29.25	29.40	29.55	29.70	29.85	19
20	30.00	30.15	30.30	30.45	30.60	30.75	30.90	31.05	31.20	31.35	20
21	31.50	31.65	31.80	31.95	32.10	32.25	32.40	32.55	32.70	32.85	21
22	33.00	33.15	33.30	33.45	33.60	33.75	33.90	34.05	34.20	34.35	22
23	34.50	34.65	34.80	34.95	35.10	35.25	35.40	35.55	35.70	35.85	23
24	36.00	36.15	36.30	36.45	36.60	36.75	36.90	37.05	37.20	37.35	24
25	37.50	37.65	37.80	37.95	38.10	38.25	38.40	38.55	38.70	38.85	25
26	39.00	39.15	39.30	39.45	39.60	39.75	39.90	40.05	40.20	40.35	26
27	40.50	40.65	40.80	40.95	41.10	41.25	41.40	41.55	41.70	41.85	27
28	42.00	42.15	42.30	42.45	42.60	42.75	42.90	43.05	43.20	43.35	28
29	43.50	43.65	43.80	43.95	44.10	44.25	44.40	44.55	44.70	44.85	29
30	45.00	45.15	45.30	45.45	45.60	45.75	45.90	46.05	46.20	46.35	30
31	46.50	46.65	46.80	46.95	47.10	47.25	47.40	47.55	47.70	47.85	31
32	48.00	48.15	48.30	48.45	48.60	48.75	48.90	49.05	49.20	49.35	32
33	49.50	49.65	49.80	49.95	50.10	50.25	50.40	50.55	50.70	50.85	33
34	51.00	51.15	51.30	51.45	51.60	51.75	51.90	52.05	52.20	52.35	34
35	52.50	52.65	52.80	52.95	53.10	53.25	53.40	53.55	53.70	53.85	35
36	54.00	54.15	54.30	54.45	54.60	54.75	54.90	55.05	55.20	55.35	36
37	55.50	55.65	55.80	55.95	56.10	56.25	56.40	56.55	56.70	56.85	37
38	57.00	57.15	57.30	57.45	57.60	57.75	57.90	58.05	58.20	58.35	38
39	58.50	58.65	58.80	58.95	59.10	59.25	59.40	59.55	59.70	59.85	39
40	60.00	60.15	60.30	60.45	60.60	60.75	60.90	61.05	61.20	61.35	40
41	61.50	61.65	61.80	61.95	62.10	62.25	62.40	62.55	62.70	62.85	41
42	63.00	63.15	63.30	63.45	63.60	63.75	63.90	64.05	64.20	64.35	42
43	64.50	64.65	64.80	64.95	65.10	65.25	65.40	65.55	65.70	65.85	43
44	66.00	66.15	66.30	66.45	66.60	66.75	66.90	67.05	67.20	67.35	44
45	67.50	67.65	67.80	67.95	68.10	68.25	68.40	68.55	68.70	68.85	45
46	69.00	69.15	69.30	69.45	69.60	69.75	69.90	70.05	70.20	70.35	46
47	70.50	70.65	70.80	70.95	71.10	71.25	71.40	71.55	71.70	71.85	47
48	72.00	72.15	72.30	72.45	72.60	72.75	72.90	73.05	73.20	73.35	48
49	73.50	73.65	73.80	73.95	74.10	74.25	74.40	74.55	74.70	74.85	49
50	75.00	75.15	75.30	75.45	75.60	75.75	75.90	76.05	76.20	76.35	50

Computed by L. Leland Locke.

33
195

400

660.75

880

1229

90-26

19-35

19-34

91-26

29-34

660.75

126

78 6.75 on E. Line Pipe

132-22

405

82.5
 163.0
 41.25
 204.25

5.5
 3.5
 9.0



297.26
 330.53
 627.79
 33
 660.79

17965661
 402610
 843510
 17965660

90° 27' 30"

Ball Can



84.44
 4.77
 537.01

