

TRANSIT

BOOK

FIELD BOOK

76

18

NO 3

APR 18 1876

SPRINGFIELD

80

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.

Copyright, 1895, by Keuffel & Esser Co.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	0
1	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	1
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
5	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	5
6	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	6
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
10	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	10
11	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	11
12	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	12
13	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	13
14	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	14
15	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	15
16	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	16
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
22	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	22
23	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	23
24	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	24
25	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	25
26	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	26
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.

S.R.H.

No 80

13045789304

5280 } 365900
31680

49100
47520
1580

5280 = 1
369600

2640 = 1/2

1320 = 1/4

660 = 1/8

5280
70
369600

Sta. 3696 = M.P. 70

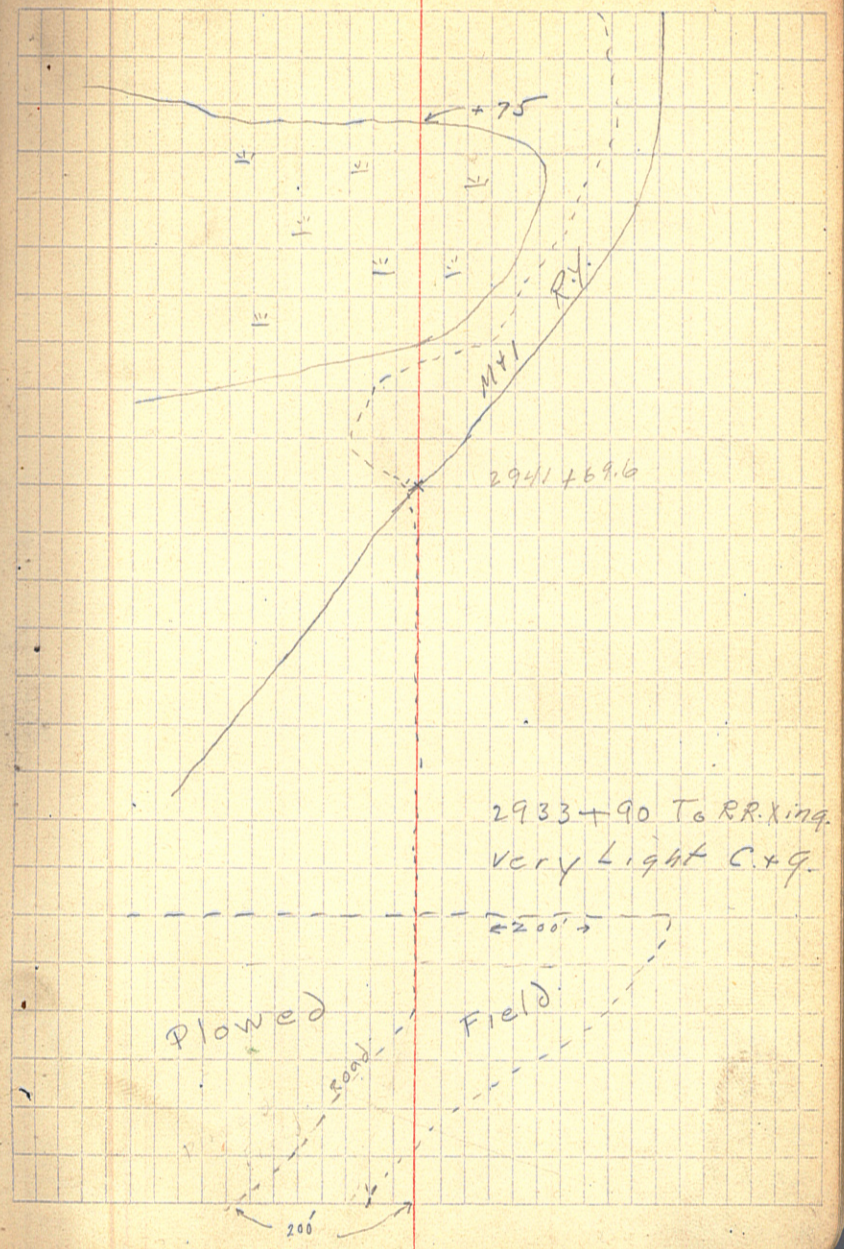
369600
365900
3700

2889
62

2951

	Def. G	Mag. Bearings
+20	$\Delta 64^{\circ} 46' L$	$S 83^{\circ} 30' W$
2948		
2947		
2946		
2945		
2944		
+80		
2943	O.P.O.T.	
2942		
+69.6		
2941		
2940		
2939		
2938		
2937		
2936	O.P.O.T.	
2935		
2934		
+90		
2933		
+85	$\Delta 19^{\circ} 12' R$	$N 31^{\circ} 00' W$
2932		
2931		
2930		
+40	$\Delta 47^{\circ} 02' L$	$N 56^{\circ} 30' W$

AWM JBC
CJW B.K.
J.H.



AWM JBC
CJW GK
J.H.

4/8/15

4

+73 Δ
2951
2950
2949

R.R. Xing To Sta
2952+50 No. C+9.

Square Iron Spite

— —
— —
— —

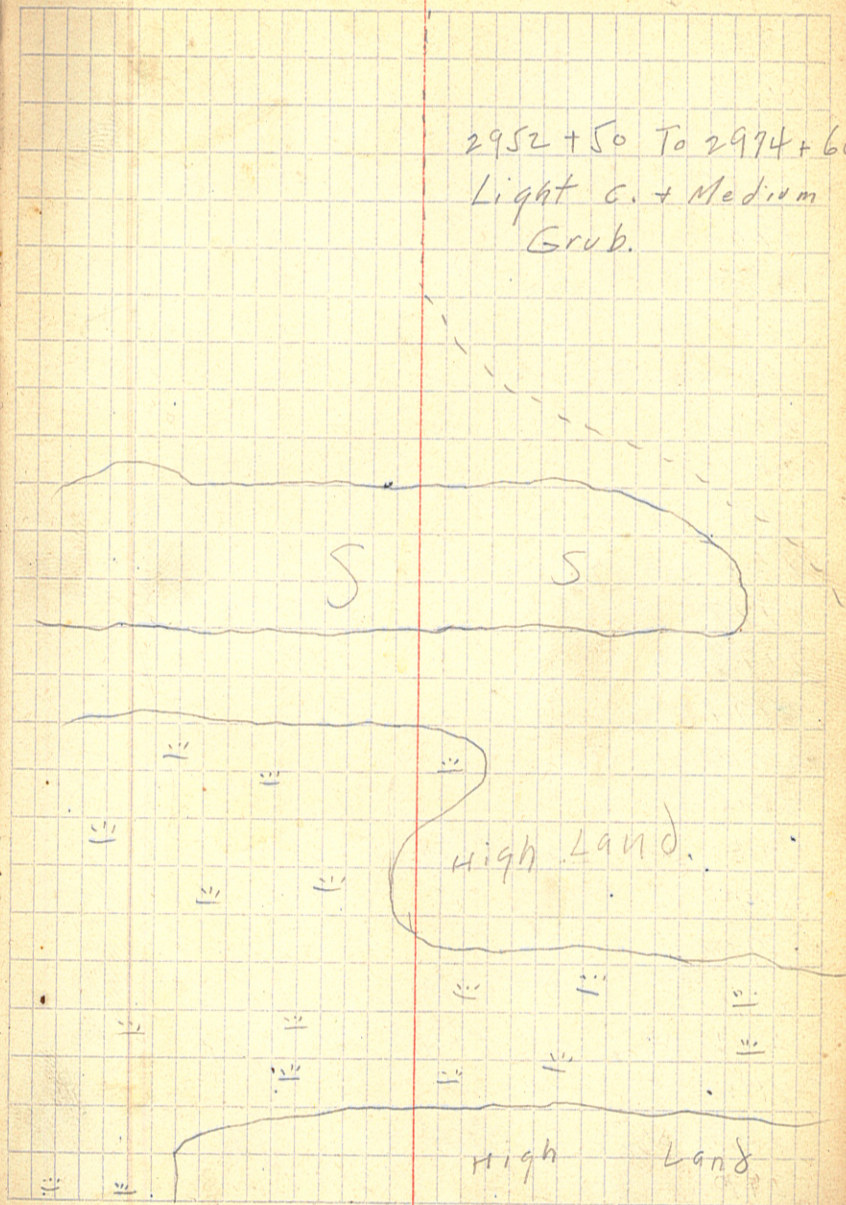
Sta.	Def. L ^s	Bearings
2969		
+78	A130°44'	S78°15'W.
2968		
2967		
2966		
+08	A32°37' L	N88°00' W
2965		
2964		
2963		
+60		
2962		
2961		
2960		
2959		
+50		
2958		
2957		
+23	A9°59' L.	N55°00' W
2956		
2955		
2954		
2953		
+50		
2952		
2951+73	A51°48' R.	N45°00' W

awm 9.15
 cjm J.H.
 vbc

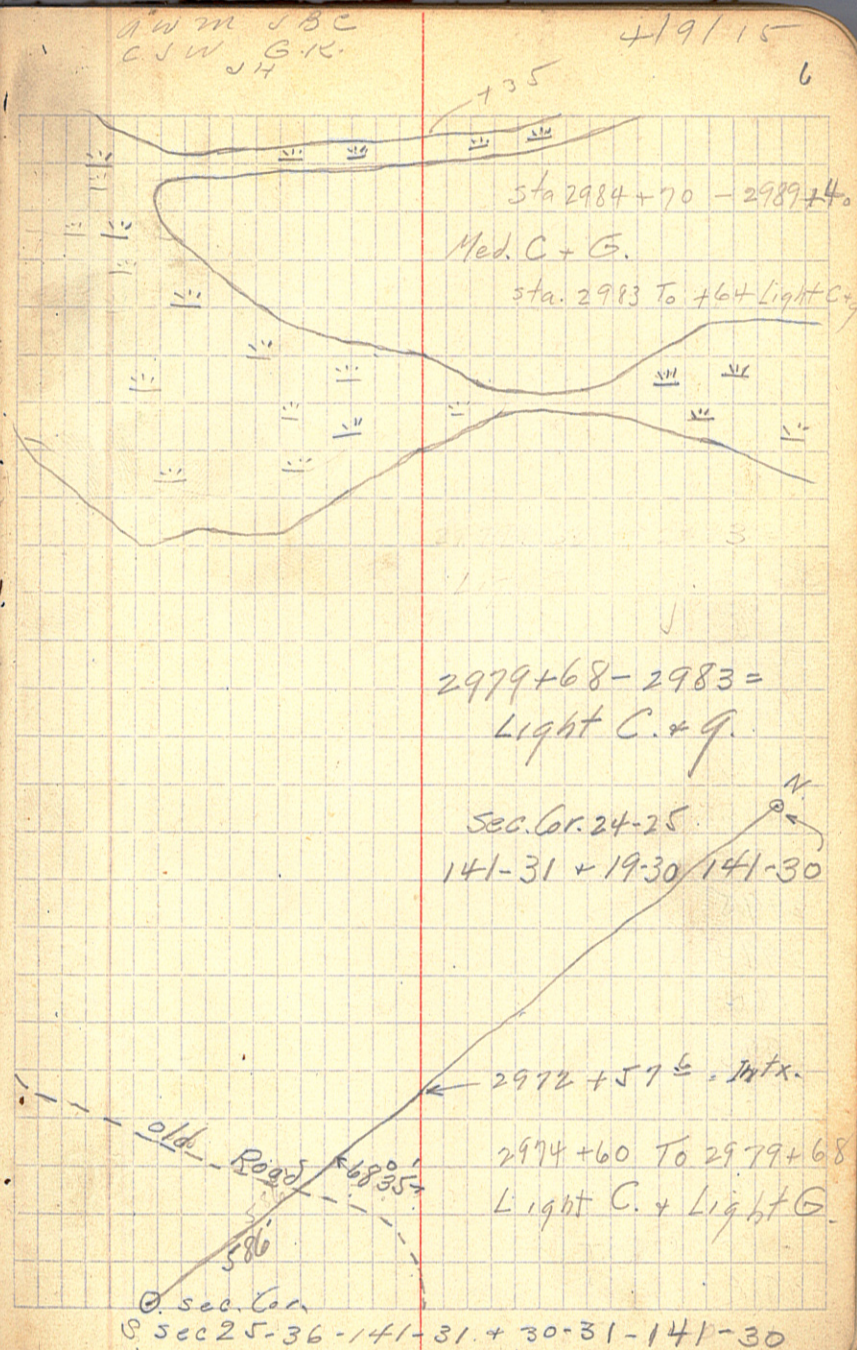
4/9/15

5

2952+50 To 2994+60
 Light G. + Medium
 Grub.



Sta.	Def. Δ	Bearing
2989		
2987		
2986		
2985		
+70		
2984		
+64		
2983	$\Delta 19^{\circ}09' L$	$S 79^{\circ}00' W$
2982		
2981		
2980		
+68	$\Delta 23^{\circ}30' L$	$N 81^{\circ}45' W$
2979		
2978		
2977		
2976		
2975		
+60	$\Delta 11^{\circ}14' R$	$N 88^{\circ}15' W$
2974		
2973		
2972		
+78	$\Delta 9^{\circ}24' R$	$N 69^{\circ}30' W$
2971		
+66 ¹	$\Delta 22^{\circ}54' R$	$N 78^{\circ}15' W$
2970		



3008

3007

3006

3005

3004

+24 $\Delta 6^{\circ}30'R. N56^{\circ}30'W$

3003

3002

3001 $\Delta 37^{\circ}58'R. N63^{\circ}15'W$

3000

+80

2999

2998

2997

2996

+80 \odot P.O.T.

2995

2994

+80

2993

2992

2991

2990

+40 \odot P.O.T.

2989

+80 To 97 = Light C+g

4/19/15

7

3023 = Lake 150' L.

3010 - 3015 ^{Varx} Light

C.+g.

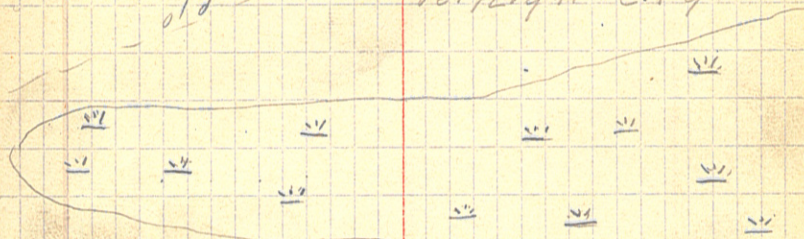
(3003 + 24 To
3016 = Ten Mile
L. 100' L.)

3003 + 24 - 3010

Med. C.+g.

old Road

3001 - 3003 + 24
Very Light C.+g.

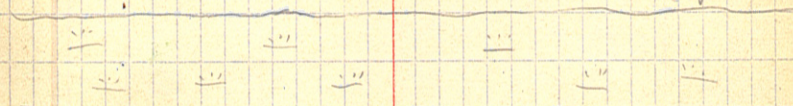


2995 + 80 To 2997
= Light C+g.

LAND.

HIGH

2993 + 80 To 2995 + 80
= Light C+g.



2989 + 40 - 2992 =
Med. C.+g.

4/9/15 8

450 ©POT

3013

3012

3011

3010

3009

Sta. Defls. Bearings

3032

+65⁵ @ P.O.T. = St. Center stake.

3031

3030

3029

+30

3028

+88⁵ $\Delta 50^{\circ}47'2''$ $588^{\circ}45'W$ = St. Center stake.

3027

3026

3025

3024

+105 $\Delta 2^{\circ}48'R$ $N60^{\circ}30'W$.

3023

3022

3021

3020

3019

3018

3017

3016

3015

+27⁵ $\Delta 6^{\circ}44'L$ $N63^{\circ}15'W$

3014

3013 +50 @ P.O.T.

CJW G.H.
CDC J.B.C.
EWB

4/10/15

9

3033 +28⁵ - 3039 +57⁵

= Med. C. & G.

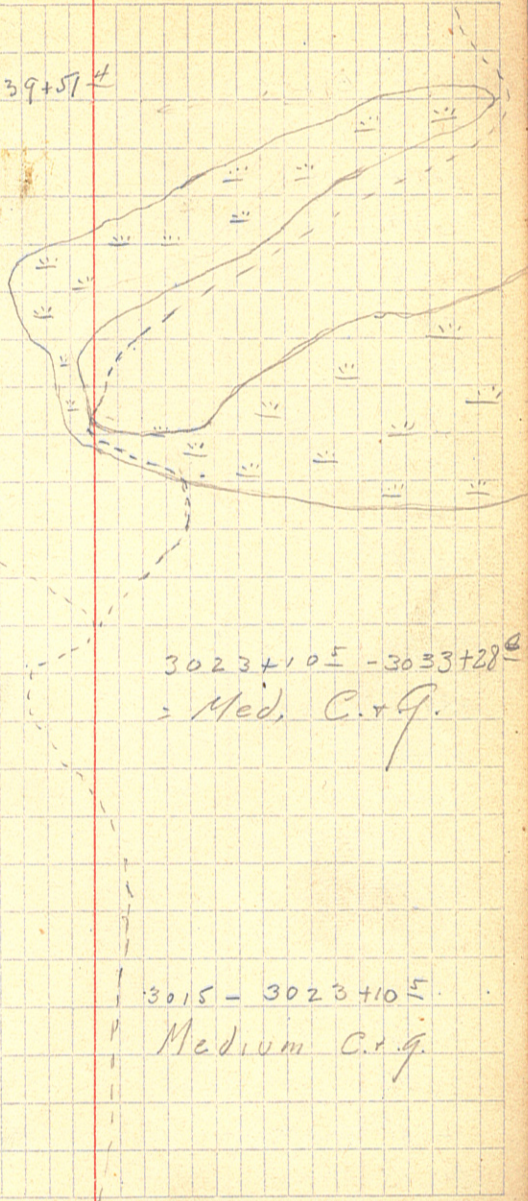
= Beginning of
street @ 10 M.L.

3023 +105 - 3033 +28⁵

= Med. C. & G.

3015 - 3023 +105

Medium C. & G.



Sta.	Def L.	Bearing:	
3051			
+91 [±]	Δ46°4'R	N14°00'E	N 17°12'E N. 14°00'E 3'12"
+15 [±]	0 P.O.T.		
3050			
3049			
3048			
3047			
3046			
+40 [±]	Δ12°52'R	N32°15'W	
3045			
+18			
3044			
+91.			
3043			
3042			
3041			
3040			
+51 [±]	0 P.O.T.		
3039			
3037			
3036			
3035			
3034			
+28 [±]	Δ46°41'R	N44°30'W	
3033			

CDC EW3
CJW GK J.H.
JRC

4/12/15
10

3050 + 91[±] To

3056 + 35[±] =

Light C.+g.

30 + 5 + 40[±] To 3050

+91[±] = Light C.+g.



3039 + 51[±] To 3045

+40[±] Light C.+g.

4/12/15

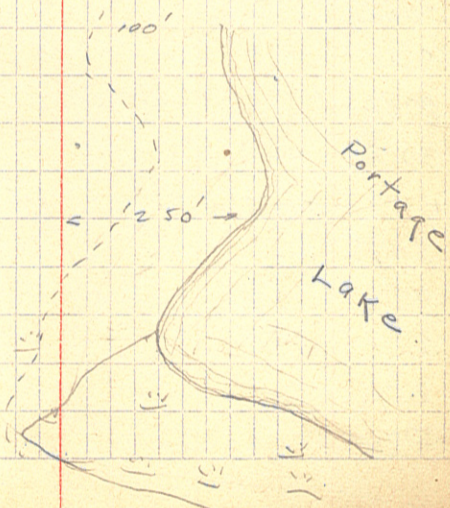
11

Sta.	Def. L.	Bearings
3073		
3072		
3071		
3070		
+10 [±]	Δ45°40'L.	N46°15'W. (R.P.'s 2 small J.P. Trees 28.65 + 29.5 out.)
3069		
3068		
3067		
3066		
3065		
3064		
3063		
3062		
3061		
+64 [±]	Δ11°48'L.	N10°45'W
3060		
3059		
3058		
3057		
+35 [±]	Δ3°09'L.	N11°00'E
3056		
3055		
3054		
3053		
3052		

Δ is in Centre
on R. of old Road. (Sta 3069+10[±]
to Sta.
old Road is
Roughly Turnpiked)

3060+64[±] To
3069+10[±] =
Light Cxg.

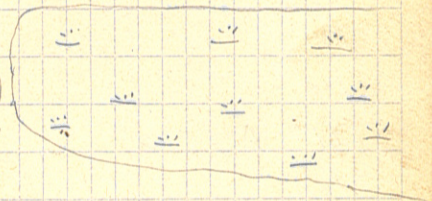
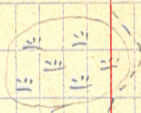
3056+35[±] To
3060+64[±] =
Light Cxg.



	Def Ls	Bearings
3094		
+372	$\Delta 15^{\circ} 33' L.$	$N 54^{\circ} 30' W$
3093		
3092		
+475	$\Delta 38^{\circ} 04' L.$	$N 39^{\circ} 00' W$
3091		
3090		
3089		
3088		
+282	$\Delta 41^{\circ} 02' R.$	$N 0^{\circ} 30' W.$
3089		
3086		$3086+32 \cdot 12" \times 28" Col$
3085		
3084	$\Delta 6^{\circ} 10' L.$	$N 41^{\circ} 45' W$ (R.P. stake 20" L. " 20" R.)
3083		
3082		
3081		
3080		
3079		
+492	$\Delta 10^{\circ} 35' R.$	$N 35^{\circ} 45' W$
3078		
3077		
3076		
3075		
3074		

+12/15

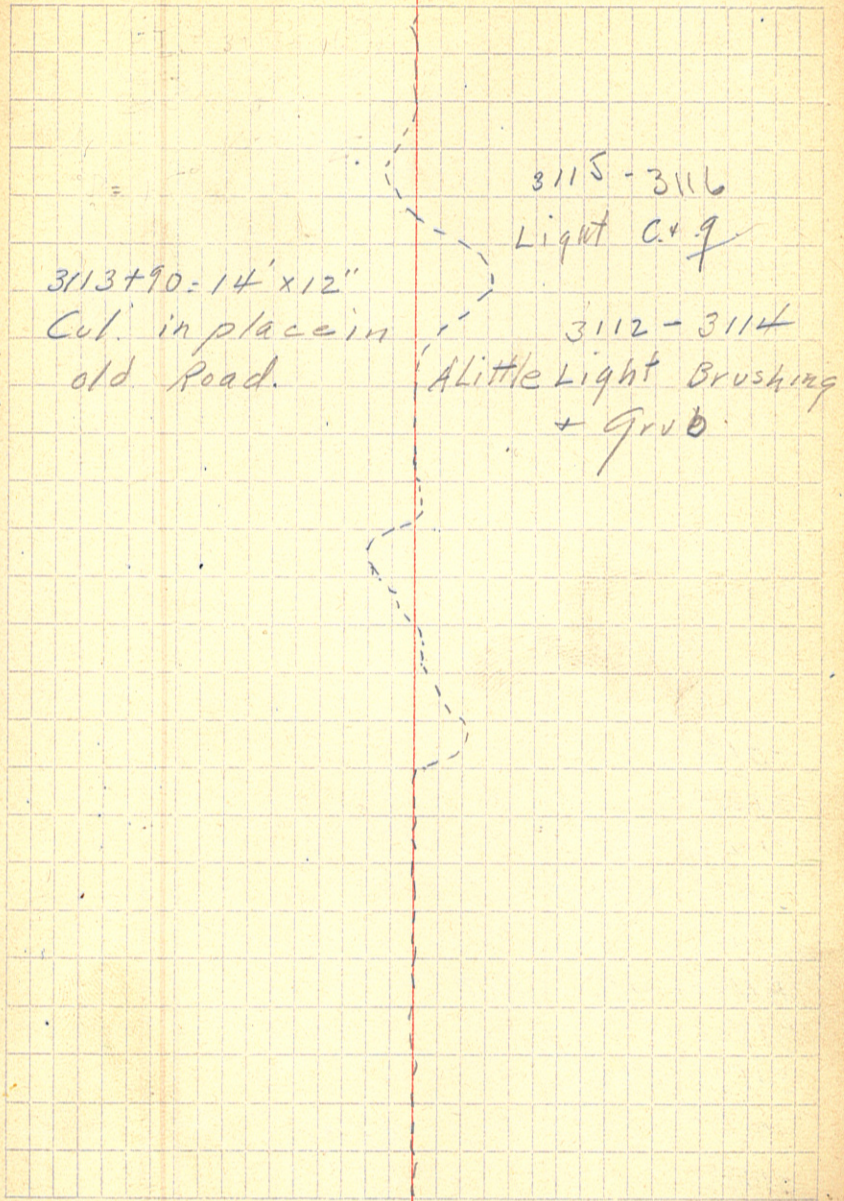
12



in place.

old P. rd

Sta.	Def L ₂	Bearings	
3117			
+673	0	P.C.	D = 15° L = 382.2 T = 209.4
3116			
3115			
3114			
3113			
3112			
3111			
3110			
+514	Δ22°24'R.	N50°00'W	
3109			
3108			
3107			
3106	Δ2°05'L	N72°00'W	
3105			
3104			
3103			
3102	Δ15°03'L	N70°00'W	
3101			
3100			
3099	0 P.O.T.		
3098			
3097			
3096			
3095			

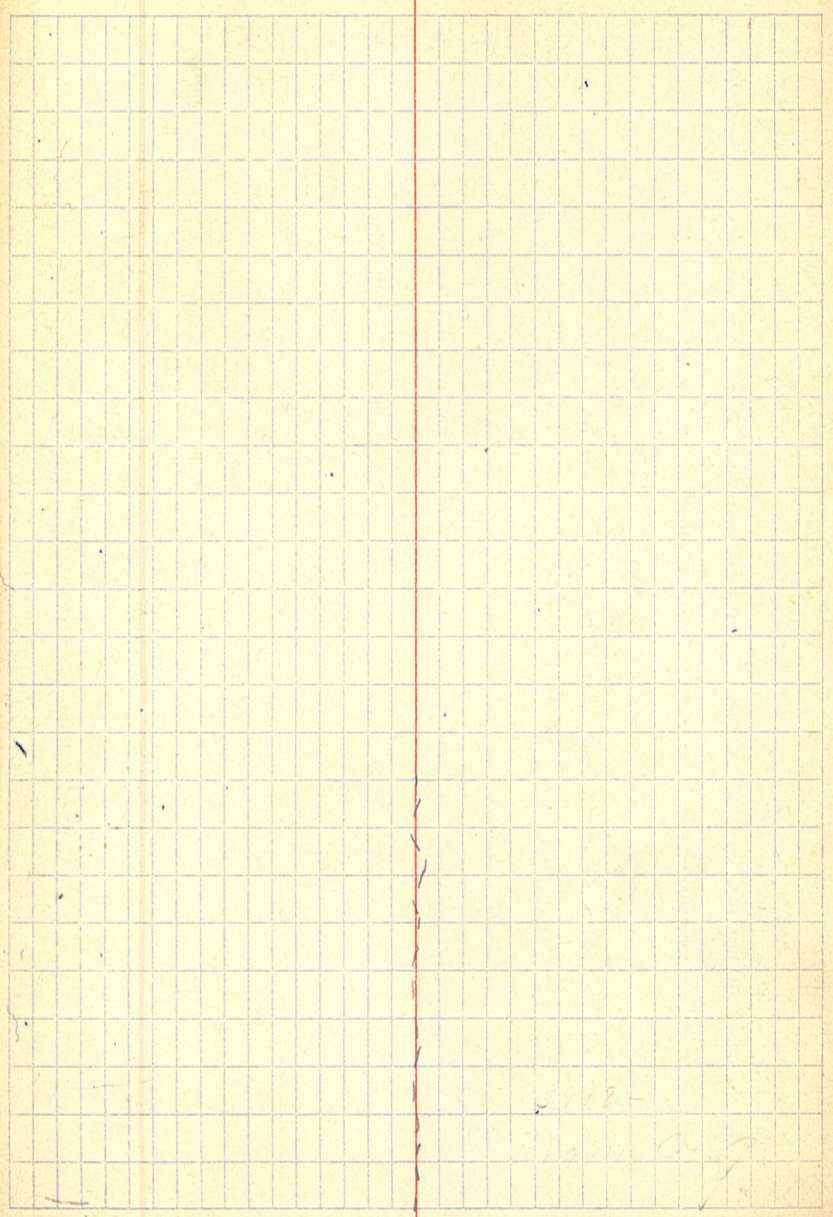


4/12/15

14

Sta	Def L.	Bearings
-----	--------	----------

+512	Δ	
3123		
3122		
+675	O.P.O.T.	
3121		
+495	P.T.	
3120		
3119	O.P.O.C.	
+762	57°20'R. P.L.	N7°00'E
3118		



+60 $\Delta 81^{\circ} 39' L$ 556'30" W

3142

3141

+17 $\Delta 19^{\circ} 50' R$ N41°45' W

3140

3139

3138

3137

+90 $\Delta 22^{\circ} 03' L$ N61°45' W

3136

3135

3134 $\Delta 16^{\circ} 09' R$ N39°30' W

3133

+16' O.P.O.T

3132

3131

3130

3129

+33' $\Delta 41^{\circ} 14' L$ N56°00' W

3128

3127

3126

3125

3124

3123+31' $\Delta 21^{\circ} 55' L$ N14°45' W

u w m
c s w 9 R
J B E

4/13/15

15

3134 To 3142+60
Light Ctg on
each side of
old Road.

3128+70 To 3134
Light Ctg.

CYPHERS - Road →

Sta.	Def. L.	Bearing
3162		
3161		
3160		
3159		
3158		
3157		
+52 ⁹	$\Delta 16^{\circ} 50' R.$	$N 35^{\circ} 30' W$
3156		
3155		
3154		
3153		
+60		
+25		
3152		
3151		
3150		
+39	$\Delta 36^{\circ} 27' R.$	$N 52^{\circ} 30' W$
3149		
3148		
+16	$\Delta 34^{\circ} 11' R.$	$N 89^{\circ} 00' W$
3147		
3146		
3145		
3144		
3143		

4/13/15 16

3159 To 3169 + 10
Light C + 9
on sides of old Road.

3149 + 39 To 3159
Medium C + 9.

3143 - 3149 + 39
Light C + 9
on Road sides

	Det Ls.	Bearing
3184	$\Delta 20^{\circ} 47' R$	$N 79^{\circ} 30' W$
3183	$\odot P.O.T.$	
3182		
3181	$\Delta 13^{\circ} 53' L$	$S 90^{\circ} 45' W$
3180		
3179		
3178		
+65	$\Delta 2^{\circ} 16' L$	$N 85^{\circ} 30' W$
3177		
3176		
3175		
3174		
3173		
3172		
3171		
3170		
+10	$\Delta 16^{\circ} 12' R$	$N 83^{\circ} 30' W$
3169		
3168		
3167		
3166		
3165		
3164		
3163		
+65 ⁴	$\Delta 64^{\circ} 22' L$	$S 80^{\circ} 15' W$

4/10/15
17

(Tack in sta. stake.)

3186+90 To 3190+70

Light C+9 on
sides.

3169+10 To 3186+90

Light C+9 on
road sides.

Sta. Det Ls. Bearings

+14 Δ
 3199
 3198 Δ19°47'R. N46°15'W
 3197
 +15 Δ42°14'L. N66°15'W
 3196
 3195
 3194
 +27 Δ33°09'R. N23°45'W
 3193
 3192
 3191
 +70 Δ53°00'L. N57°00'W
 3190
 3189
 3188
 3187
 +90 Δ74°30'R. N3°45'W
 3186
 3185

awm JBC
 CSW YK.

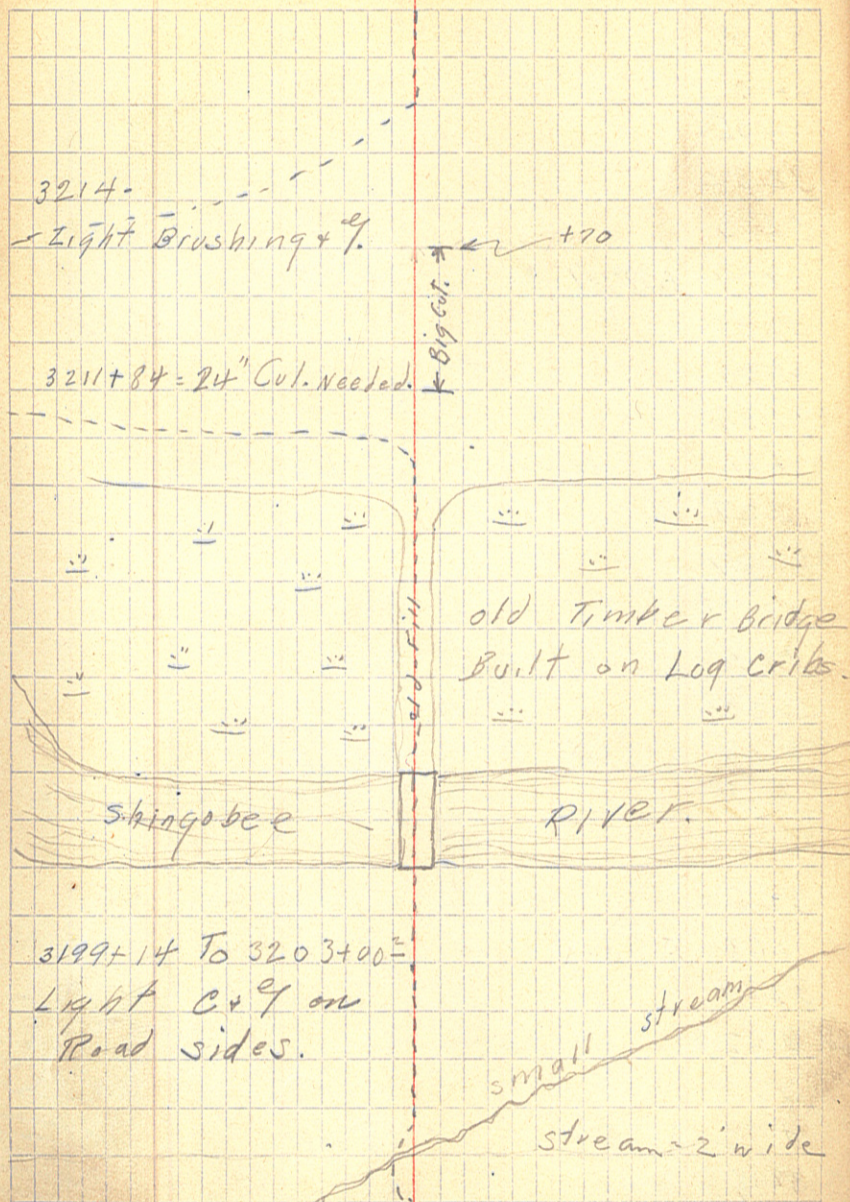
4/13/15 18

3190+70 - 3199+14
 Light C + eye on
 sides.

Sta.	Defls.	Bearing
3217		
+17	$\Delta 23^{\circ} 54' R$	$N 10^{\circ} 00' E$
3216		
3215		
3214	$\Delta 29^{\circ} 26' L$	$N 14^{\circ} 45' W$
+60	O.P.O.T.	
3213		
3212		
+77	O.P.O.T.	
3211		
3210		
3209		
3208		
3207		
3206		
+54		
3205		
+18		
3204		
+00 ²	$\Delta 33^{\circ} 20' R$	$N 15^{\circ} 15' E$
3203		
3202		
3201		
3200		
3199+14	$\Delta 28^{\circ} 32' R$	$N 18^{\circ} 00' W$

4/11/15

19



Sta.	Def L	Bearings
3237		
3236		
3235		
3234		
3233		
3232	Δ38°13'L ✓	N4°45'E
3231		
3230		
3229		
+11	Δ31°58'R. ✓	N42°45'E
3228		
3227		
3226		
+87	Δ18°48'L	N11°00'E
3225		
+45	Δ25°38'R.	N29°30'E
3224		
3223		
3222		
+68	Δ5°58'R.	N4°00'E
3221		
3220		
3219		
+72	Δ11°57'L	N2°00'W
3218		

4/14/15

20

Heavy Oak, W.P., Birch,
Elm, Poplar + SP.

3232 - To 3249+53

Heavy C+g.

on whole RofW.

3229+49 = 16" x 14"
Col. in place.

old Road - about 20' wide
including clearing.

3221+68 To 3232

Heavy C+g on
Road sides.

3216+17 To 3221+68

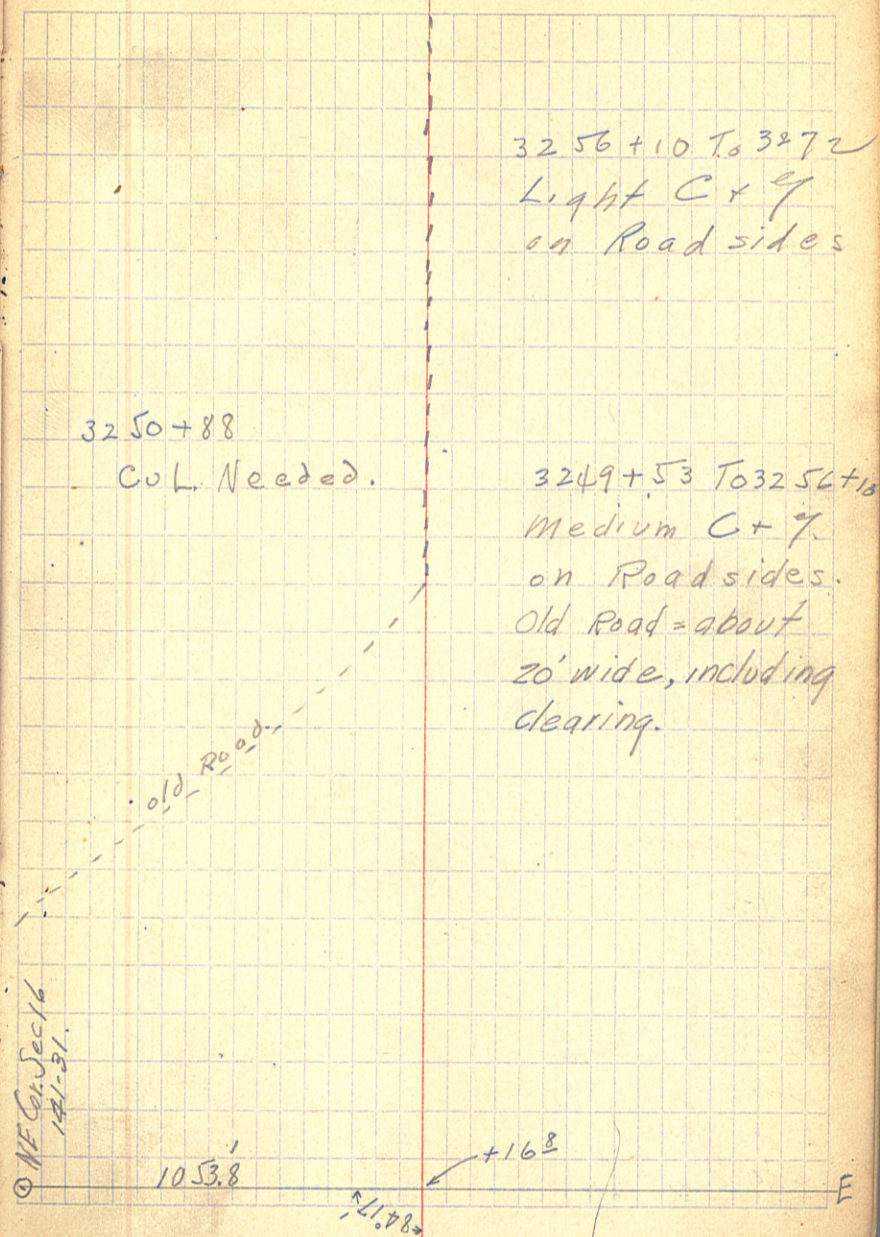
Med. C+g on
sides of Road.

3219+40 = 15" Col. needed

Sta.	Det L.	Bearing.
3258	$\Delta 11^{\circ} 58' L$	$N 26^{\circ} 15' E$
3257	$\Delta 10^{\circ} 10' L$	$N 38^{\circ} 15' E$
+10	$\Delta 32^{\circ} 15' L$	$N 48^{\circ} 30' E$
3256		
3255		
3254		
+60	$\Delta 20^{\circ} 30' R$	$N 80^{\circ} 45' E$
3253		
3252		
3251		
3250		
+53	$\Delta 47^{\circ} 51' R$	$N 60^{\circ} 15' E$
3249		
3248		
3247		
3246		
+70	$\Delta 19^{\circ} 51' R$	$N 12^{\circ} 15' E$
3245		
3244		
3243		
3242	$\Delta 12^{\circ} 28' L$	$N 7^{\circ} 45' W$
3241		
3240		
3239		
3238	$\odot P.O.T$	

4/14/15

21



Sta Def L. Bearing

7100
5240
1920

4/14/15

22

3270 Δ

3269

3268

3267

3266

3265

3264

3263

3262 Δ 8°44' L.

N 11° 15' W

3261 Δ 11° 07' L.

N 2° 30' W

3260 Δ 9° 31' L.

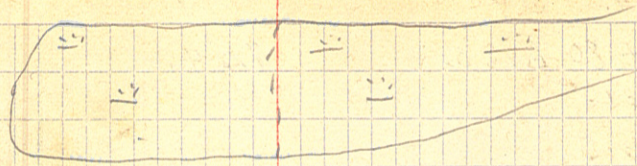
N 8° 30' E

3259 Δ 8° 06' L.

N 18° 00' E

Sta.	Def ^{ns} .	Bearing.
3293	$\Delta 6^{\circ} 52' L$	$N 6^{\circ} 15' W$
3292		
3291	$\Delta 12^{\circ} 57' L$	$N 0^{\circ} 30' E$
3290		
+ 53	$\Delta 12^{\circ} 27' L$	$N 13^{\circ} 30' E$
3289		
3288		
3287		
3286		
3285	$\Delta 7^{\circ} 08' R$	$N 25^{\circ} 30' E$
3284	$\Delta 9^{\circ} 40' R$	$N 18^{\circ} 45' E$
3283	$\Delta 8^{\circ} 34' R$	$N 9^{\circ} 00' E$
3282	$\Delta 7^{\circ} 36' R$	$N 0^{\circ} 30' E$
3281	$\Delta 6^{\circ} 29' R$	$N 7^{\circ} 00' W$
3280	$\Delta 10^{\circ} 35' R$	$N 13^{\circ} 30' W$
3279	$\Delta 6^{\circ} 12' R$	$N 24^{\circ} 15' W$
3278		
3277		
3276		
3275		
3274		
3273		
3272	$\Delta 6^{\circ} 00' L$	$N 30^{\circ} 30' W$
3271	$\Delta 2^{\circ} 47' L$	$N 24^{\circ} 30' W$
3270	$\Delta 10^{\circ} 08' L$	$N 21^{\circ} 30' W$

4/15/15 29

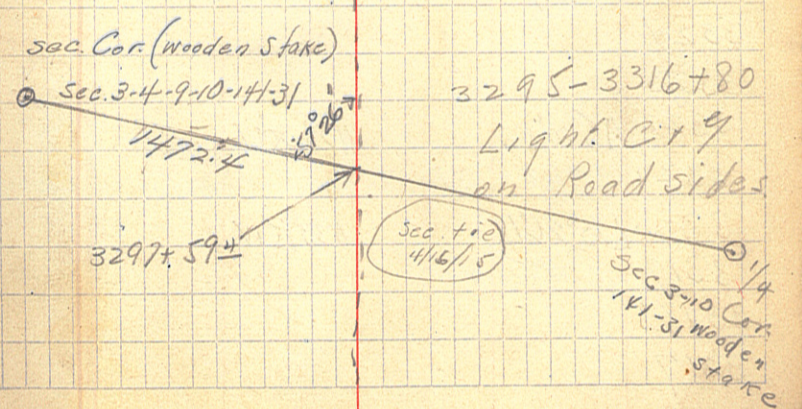


3272 To 3295
Light Cr^y
on Road sides

Sta.	Def Ls	Bearings
+ 80	$\Delta 15^{\circ} 32' R$	$N 22^{\circ} 45' W$
3316		
3315		
3314		
3313	$\Delta 5^{\circ} 44' L$	$N 38^{\circ} 30' W$
3312	$\Delta 8^{\circ} 54' L$	$N 32^{\circ} 30' W$
3311	$\Delta 10^{\circ} 02' L$	$N 23^{\circ} 45' W$
3310	$\Delta 10^{\circ} 28' L$	$N 13^{\circ} 30' W$
3309	$\Delta 6^{\circ} 28' L$	$N 3^{\circ} 15' W$
3308		
3307		
3306		
3305		
3304		
3303		
3302	$\Delta 5^{\circ} 10' R$	$N 3^{\circ} 15' E$
3301	$\Delta 9^{\circ} 00' R$	$N 2^{\circ} 00' W$
3300	$\Delta 10^{\circ} 31' R$	$N 11^{\circ} 00' W$
3299	$\Delta 12^{\circ} 43' R$	$N 21^{\circ} 30' W$
3298		$\diamond 3297+59.4$
3297		
+ 60	$\Delta 12^{\circ} 06' L$	$N 34^{\circ} 15' W$
3296		
3295	$\Delta 15^{\circ} 54' L$	$N 22^{\circ} 15' W$
3294		

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3310 + 50 = 15" Cul.
needed.



Sta	Def ^s	Bearing
3339		
3338		
3337		
3336		
+77	$\Delta 14^{\circ} 12' R$	$N 137^{\circ} 5 E$
3335		
3334	$\Delta 14^{\circ} 02' R$	$N 1^{\circ} 00' W$
3333		
+36	$\Delta 14^{\circ} 34' R$	$N 150^{\circ} 0' W$
3332		
3331		
3330	$\Delta 8^{\circ} 50' R$	$N 29^{\circ} 30' W$
3329		
3328		
3327		
3326		
3325	$\odot P.O.T.$	
3324		
3323		
3322	$\Delta 5^{\circ} 10' L$	$N 38^{\circ} 30' W$
3321	+86.8 = Sta. 0	on preliminary survey
3320	$\Delta 10^{\circ} 26' L$	$N 33^{\circ} 15' W$
3319	$\times R = 159^{\circ} 02'$	
3318		
3317		

4/15/15

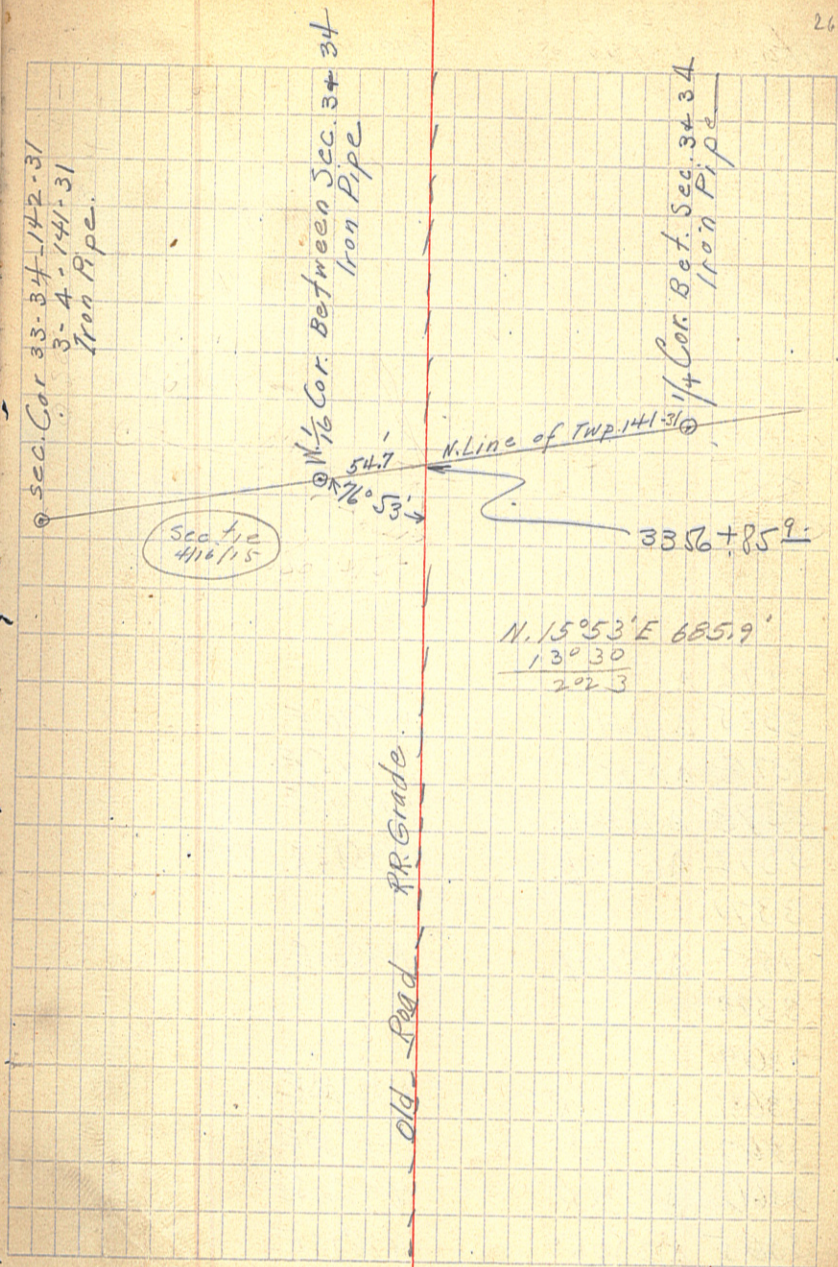
25

old - R.R. Grade

Walker Road 332+86.8

3316+80 To 3376
Light City
on Road sides

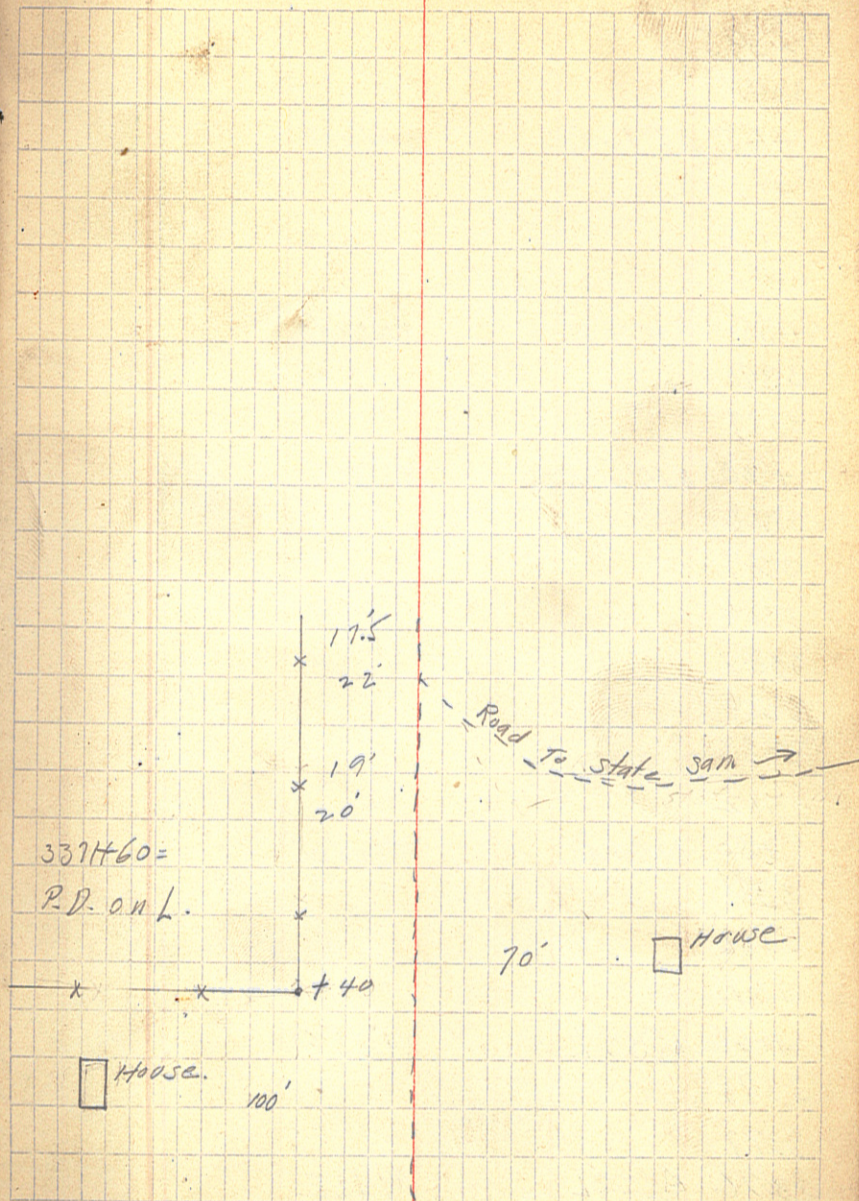
Sta	Def. Ls	Bearing
3364		
3363		
3362		
3361		
3360		
3359		
3358		
3357		
3356		
3355		
3354		
3353		
3352		
3351		
3350	$\Delta 0^{\circ} 10' R$	$N. 13^{\circ} 30' E$
3349		
3348		
3347		
3346		
3345		
3344		
3343		
3342		
3341		
3340		



Sta. Def. B. Bearing.

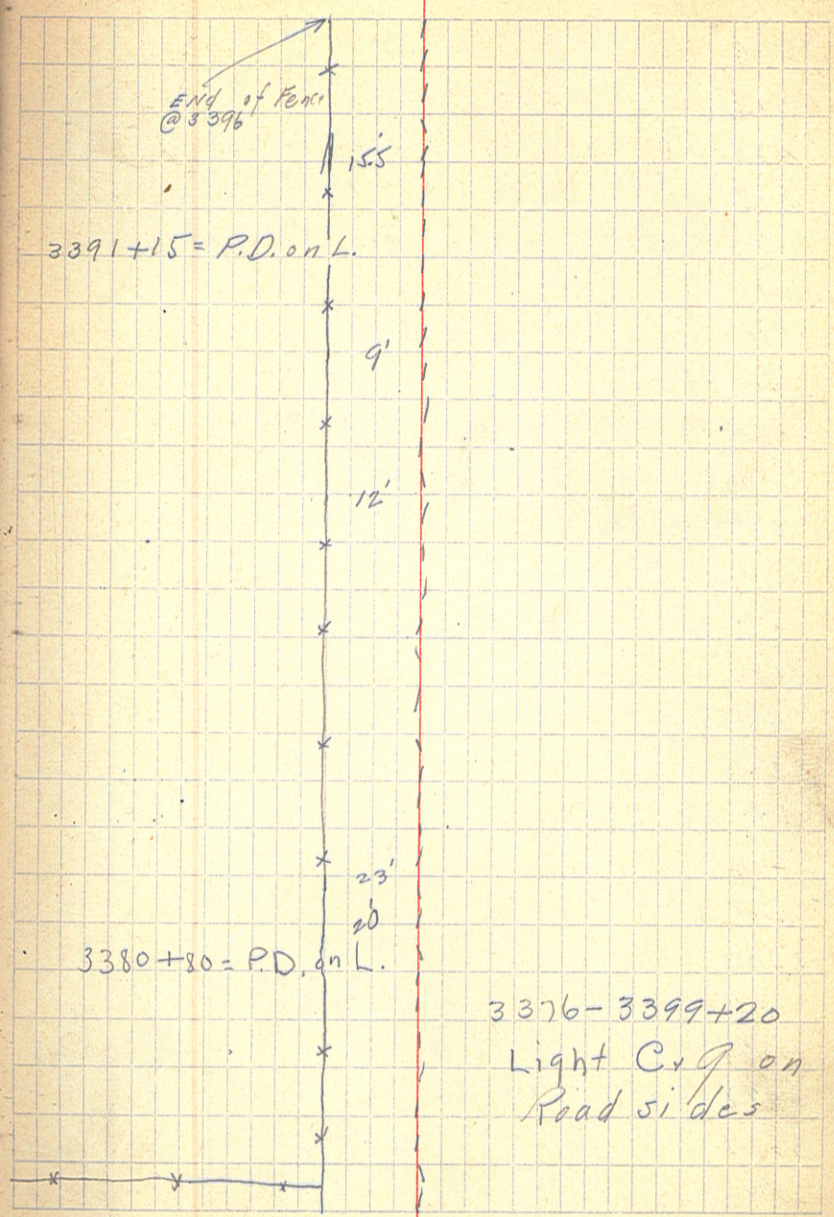
3376	A	
3375	$\Delta 11^{\circ}44'L$	N 15 ³⁰ E
3374	$\Delta 0^{\circ}21'L$	N 27 ¹⁵ E
3373	$\Delta 7^{\circ}32'L$	N 27 ⁴⁵ E
3372	$\Delta 6^{\circ}39'L$	N 35 ¹⁵ E
3371		
485	$\Delta 10^{\circ}47'L$	N 42 ⁰⁰ E
3370		
3369		
3368	$\Delta 10^{\circ}24'R$	N 52 ⁴⁵ E
3367	$\Delta 8^{\circ}32'R$	N 42 ³⁰ E
3366	$\Delta 7^{\circ}38'R$	N 32 ⁴⁵ E
3365	$\Delta 12^{\circ}50'R$	N 26 ¹⁵ E

4/15/15 27



Sta.	Def. Ls.	Bearing
3395		
3394		
+65	$\Delta 8^{\circ} 26' R.$	$N 21^{\circ} 00' E.$
3393		
3392		
3391		
+85	$\Delta 10^{\circ} 30' R.$	$N 12^{\circ} 30' E.$
3390		
3389		
+20	$\Delta 10^{\circ} 51' R.$	$N 2^{\circ} 00' E.$
3388		
3387		
3386		
3385		
3384		
3383		
3382		
+50	$\Delta 10^{\circ} 44' L.$	$N 9^{\circ} 00' W.$
3381		
3380		
3379		
+66	$\Delta 8^{\circ} 03' L.$	$N 1^{\circ} 45' E.$
3378		
3377		
3376	$\Delta 5^{\circ} 23' L.$	$N 9^{\circ} 45' E.$

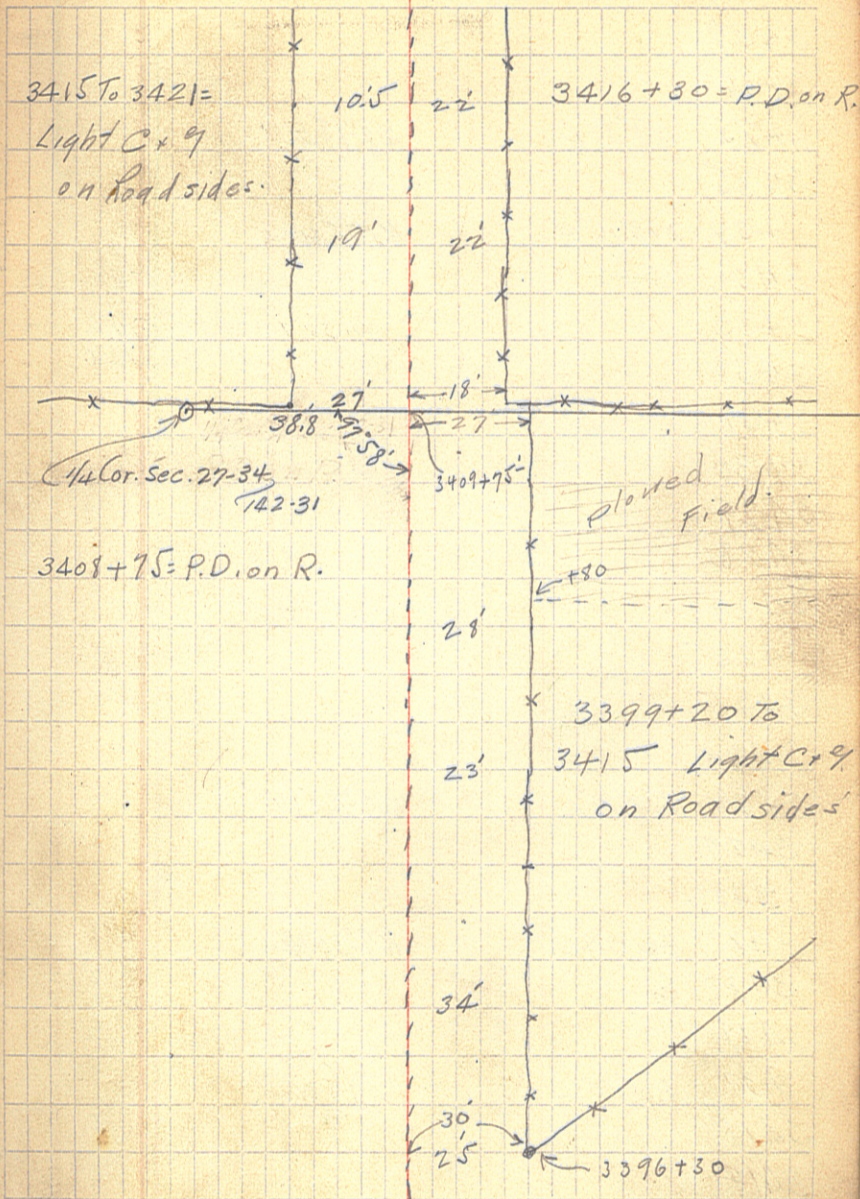
4/17/15



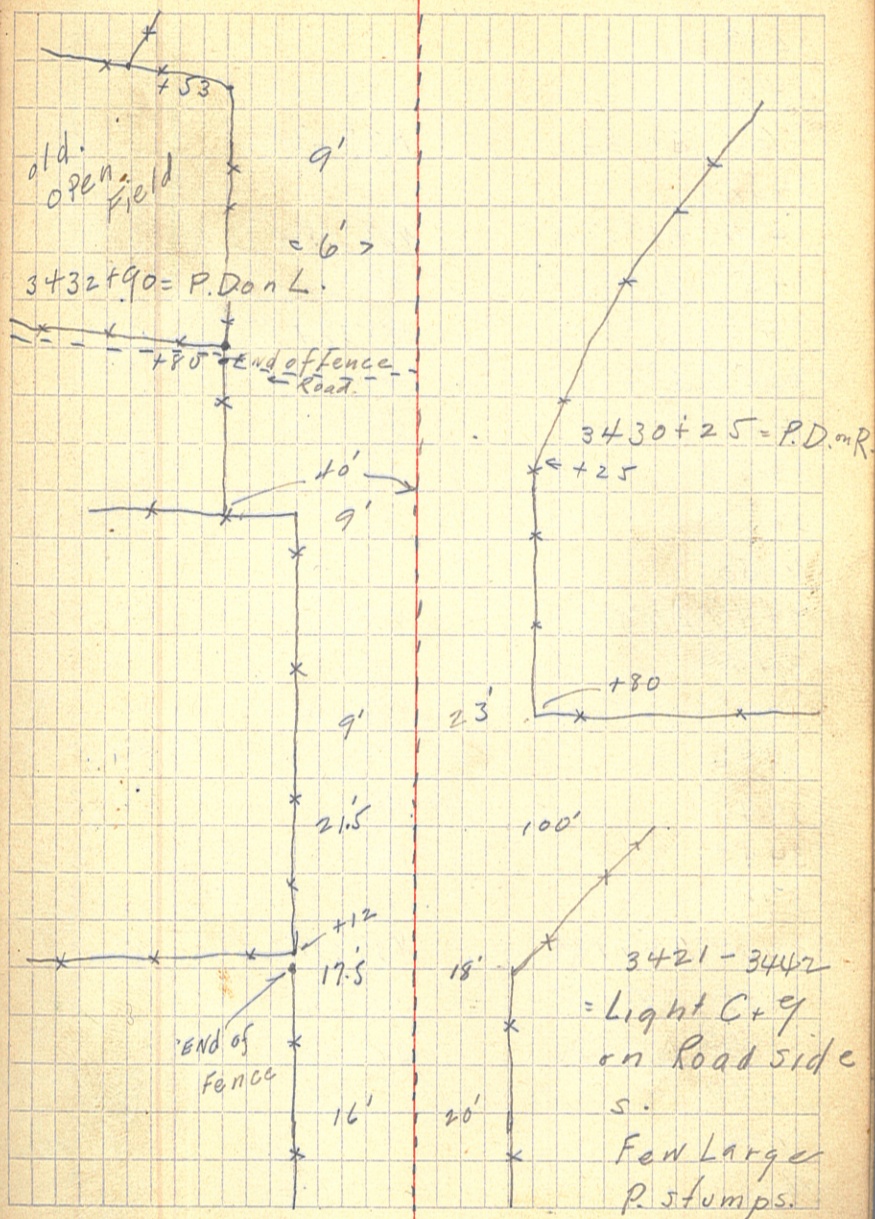
Sta	Defcs.	Bearing
3416		
3415	$\Delta 74^{\circ} 4' R.$	$N 10^{\circ} 15' E.$
3414		
3413		
+50	$\Delta 10^{\circ} 40' R.$	$N 2^{\circ} 35' E.$
3412		
3411		
3410		$\pm 16''$ Cul. needed.
3409		
3408		
+38	$\Delta 11^{\circ} 11' L.$	$N 87^{\circ} 5' W.$
3407		
+50	$\Delta 12^{\circ} 43' L.$	$N 3^{\circ} 00' E.$
3406		
3405		
3404	$\Delta 18^{\circ} 58' L.$	$N 15^{\circ} 30' E.$
3403		
3402		
3401		
3400		
+20	$\Delta 6^{\circ} 11' R.$	$N 30^{\circ} 45' E.$
3399		
3398		
3397	$\Delta 7^{\circ} 35' R.$	$N 28^{\circ} 00' E.$
3396		

4/17/15
9758

29



sta	Def L.	Bearing
3437		
3436		
+75	$\Delta 9^{\circ}39'R$	$N 8^{\circ}15'E$
3435		
+37	$\Delta 18^{\circ}12'R$	$N 19^{\circ}5'W$
3434		
3433		$3432+70=20'' \text{ Col. needed.}$
3432		
3431		
3430		
3429		
3428		
3427		
3426		
3425		
3424		
+70	$\Delta 10^{\circ}31'L$	$N 19^{\circ}45'W$
3423		
3422		
3421	$\Delta 6^{\circ}04'L$	$N 9^{\circ}30'W$
3420		
3419		
+37	$\Delta 13^{\circ}30'L$	$N 3^{\circ}15'W$
3418		
3417		



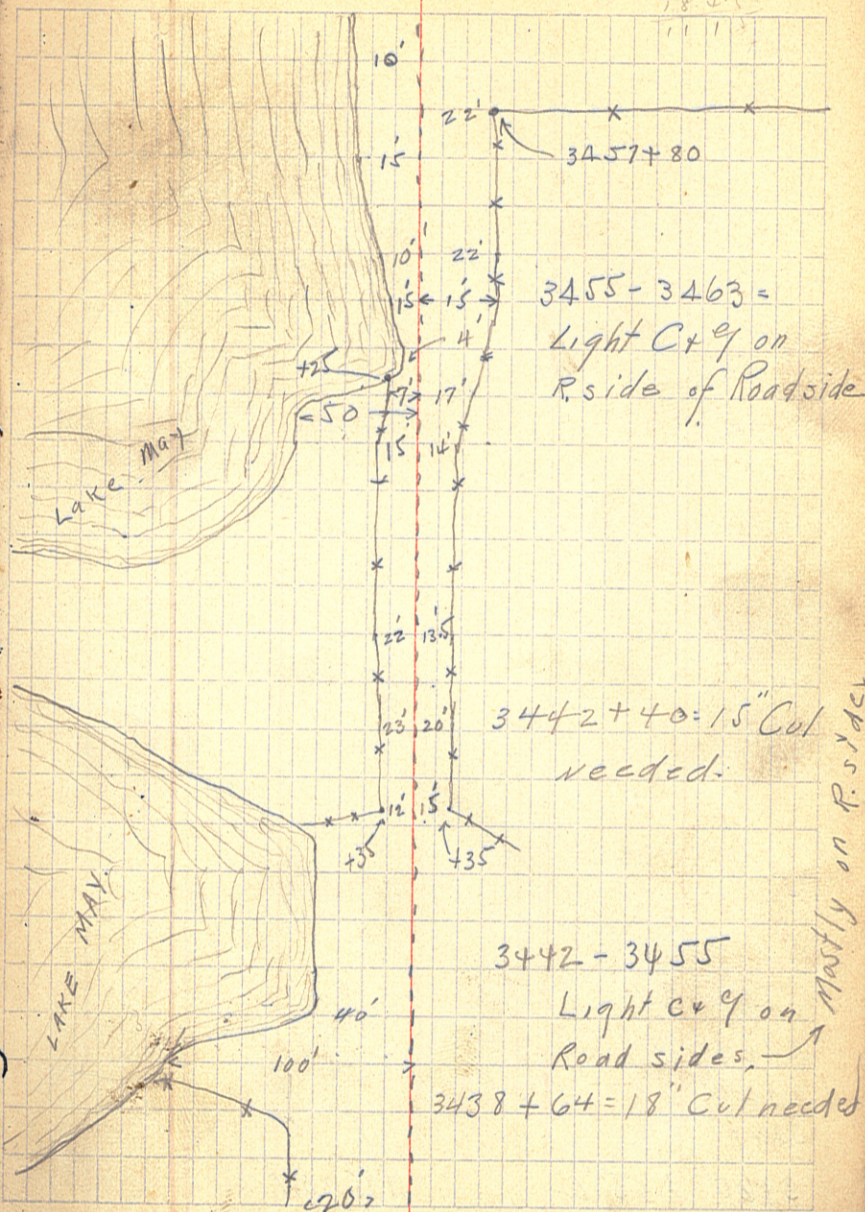
Sta.	D of Ls	Bearing.
3459		
3458		
+60	$\Delta 4^{\circ} 45' L.$	$N 31^{\circ} 30' W$
3457		
3456	$\Delta 4^{\circ} 51' L.$	$N 26^{\circ} 45' W$
3455	$\Delta 8^{\circ} 25' L.$	$N 22^{\circ} 00' W$
3454	$\Delta 9^{\circ} 33' L.$	$N 13^{\circ} 30' W$
3453	$\Delta 8^{\circ} 28' L.$	$N 4^{\circ} 00' W,$
+20	$\Delta 14^{\circ} 11' L.$	$N 4^{\circ} 45' W.$
3452		
3451		
3450		
3449	$\Delta 10^{\circ} 50' L.$	$N 18^{\circ} 25' E.$
3448		
3447	$\Delta 9^{\circ} 54' L.$	$N 30^{\circ} 00' E$
3446		
3445		
3444		
3443		
3442	$\Delta 5^{\circ} 09' R.$	$N 39^{\circ} 30' E$
3441	$\Delta 8^{\circ} 21' R.$	$N 34^{\circ} 15' E$
+08 \pm	$\Delta 17^{\circ} 53' R.$	$N 26^{\circ} 00' E$
3440		
3439		
3438		

VARIATION = $8^{\circ} 15'$

4/17/15

2960
1845
1115

31



Sta Defl. Bearing

4/17/55

32

432 A

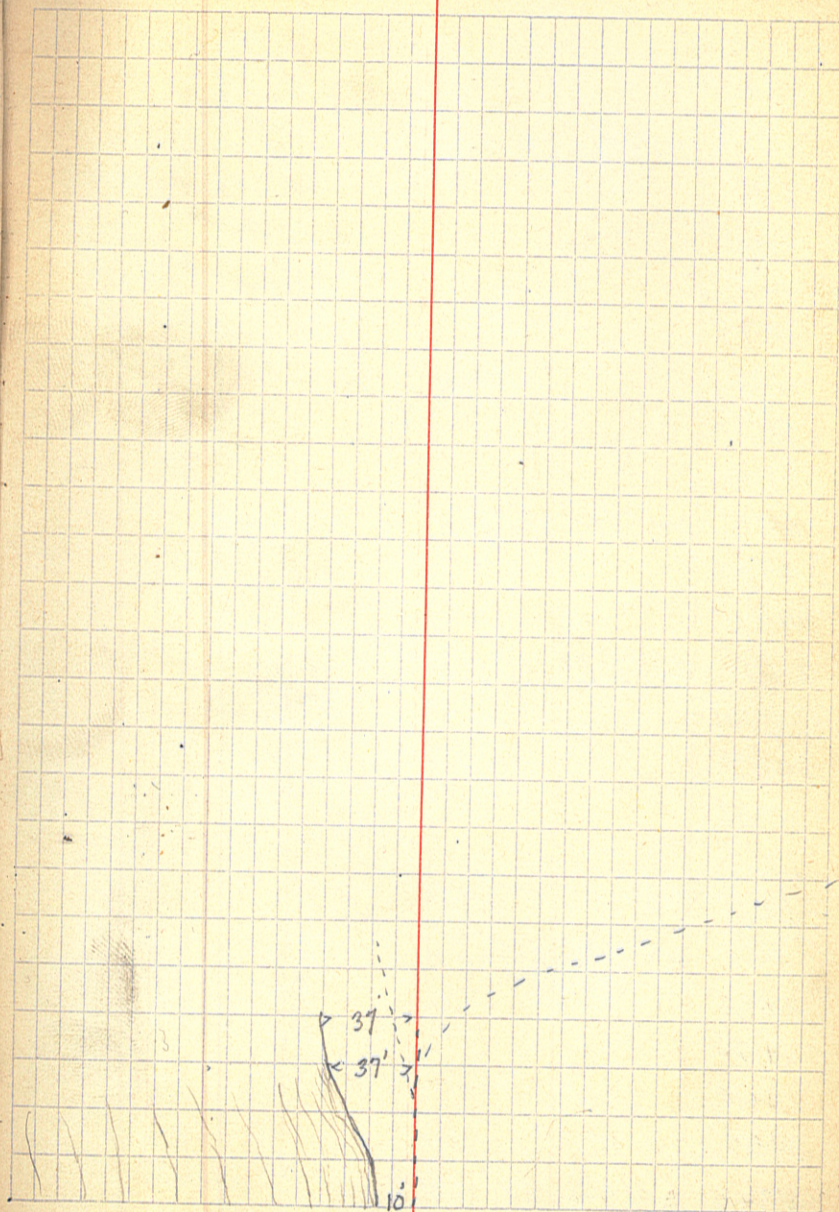
3463

3462

3461

3460 $\Delta 3^{\circ} 57' L$

$N 35^{\circ} 30' W$



Sta	Def ^{ns}	Bearing
3480		
3479		
+57	$\Delta 41^{\circ}49' L.$	$S 19^{\circ}00' W.$
3478		
+342		
+13		
3477		
3476		
3475		
3474		
+56	$\Delta 29^{\circ}57' R.$	$S 60^{\circ}45' W.$
3473		
3472		
3471	$\Delta 79^{\circ}30' L.$	$S 32^{\circ}45' W.$
3470		
3469		
3468		
3467		
3466		
+60	$\Delta 3^{\circ}07' R.$	$N 67^{\circ}45' W.$
3465		
+25		
+19		
3464		
3463+32	$\Delta 35^{\circ}25' L.$	$N 71^{\circ}00' W.$

R.P.'s
To R. Stump 26.0
To L. Sec. House 41.6

3478+57
3474+80

377

3473+56
3471

2+56

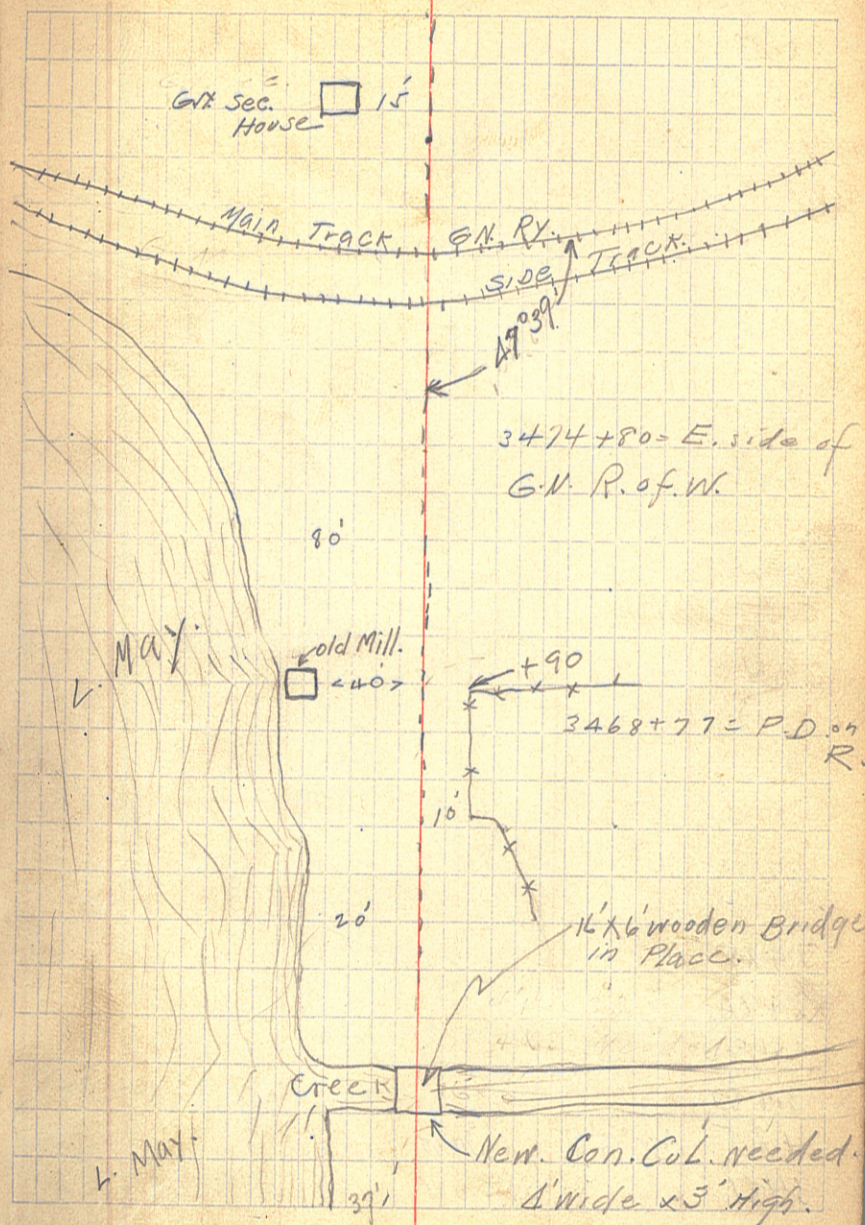
3471
3465+60

540

R.P.'s Tel. Pole 62' } R
stump 45' }

4/21/15

37



Sta. Def^{ts} Bearings

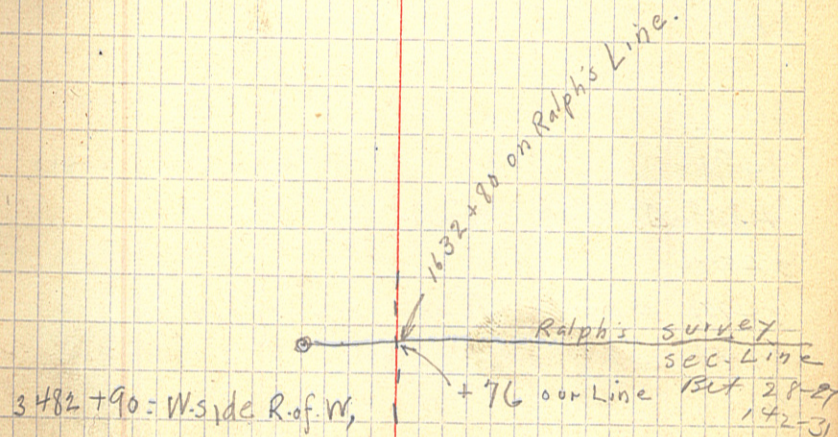
3485	Δ	
3484		
3483		
3482		
+85	A30°19'R.	54930'W
3481		

$$\begin{array}{r} 3483+76 \\ 3481+85 \\ \hline 191 \end{array}$$

$$\begin{array}{r} 3482+90 \\ 3481+85 \\ \hline 105 \end{array}$$

4/21/15

34



3505
 3504
 3503 $\Delta 17^{\circ} 28' L. 563^{\circ} 15' W$
 3502
 3501
 +79² $\Delta 7^{\circ} 28' R. 580^{\circ} 45' W$
 3500
 3499
 3498
 3497
 3496
 +84² $\Delta 14^{\circ} 53' L. 573^{\circ} 15' W.$
 3495
 +43⁸ \odot P.O.T.
 3494
 3493 ~
 3492
 3491
 +82² $\Delta 30^{\circ} 58' R. 588^{\circ} 00' W.$
 3490
 3489 \odot P.O.T. Temporary \odot (Lath)
 3488
 3487
 3486
 3485 $\Delta 7^{\circ} 05' R. 557^{\circ} 00' W$

A.M. 4/22/15

35

3490+82² To 3507
 Light C+G on
 Road sides.

3489-3490+82²
 = 5 Large P. stamps.

80'

\square House

3527

+24 $\Delta 13^{\circ}08' L$ $561^{\circ}00' W$

3526

3525

3524

3523

3522

3521

3520

3519

3518

+84 $\Delta 8^{\circ}01' L$ $574^{\circ}15' W$

3517

3516

3515

3514 $\odot P.O.T.$

3513

3512

3511

3510

3509

3508

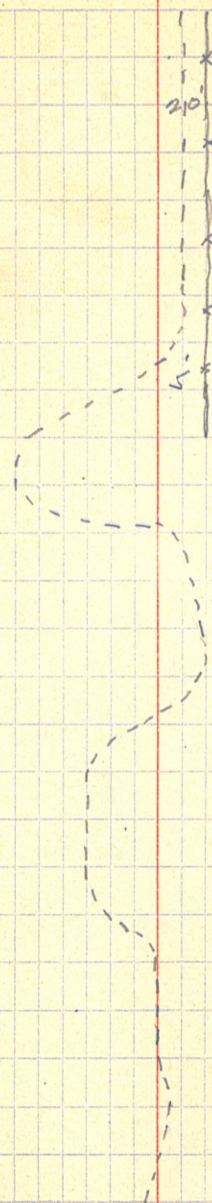
3507 $\Delta 18^{\circ}57' R$ $582^{\circ}15' W$

3506

+58^g $\odot P.O.T.$

Am. 4/22/15

36



3517+84 To 3533
Light Brushing +
Heavy g .

3514 - 3517+84.
Light $C+g$ on
whole Ref. W.

3507 - 3514
very Light $C+g$
on Road sides.

A.M. 4/22/15

37

3546

3545

3544

3543

3542

3541

3540

3539

3538

3537

3536

3536 + 88

3535

3535 + 21 $\frac{1}{2}$ $\Delta 14^{\circ} 26' R. 57^{\circ} 30' W$

3535 + 08 $\frac{5}{8}$ @ P.O.T.

3534

3533

+ 78

3532

3531

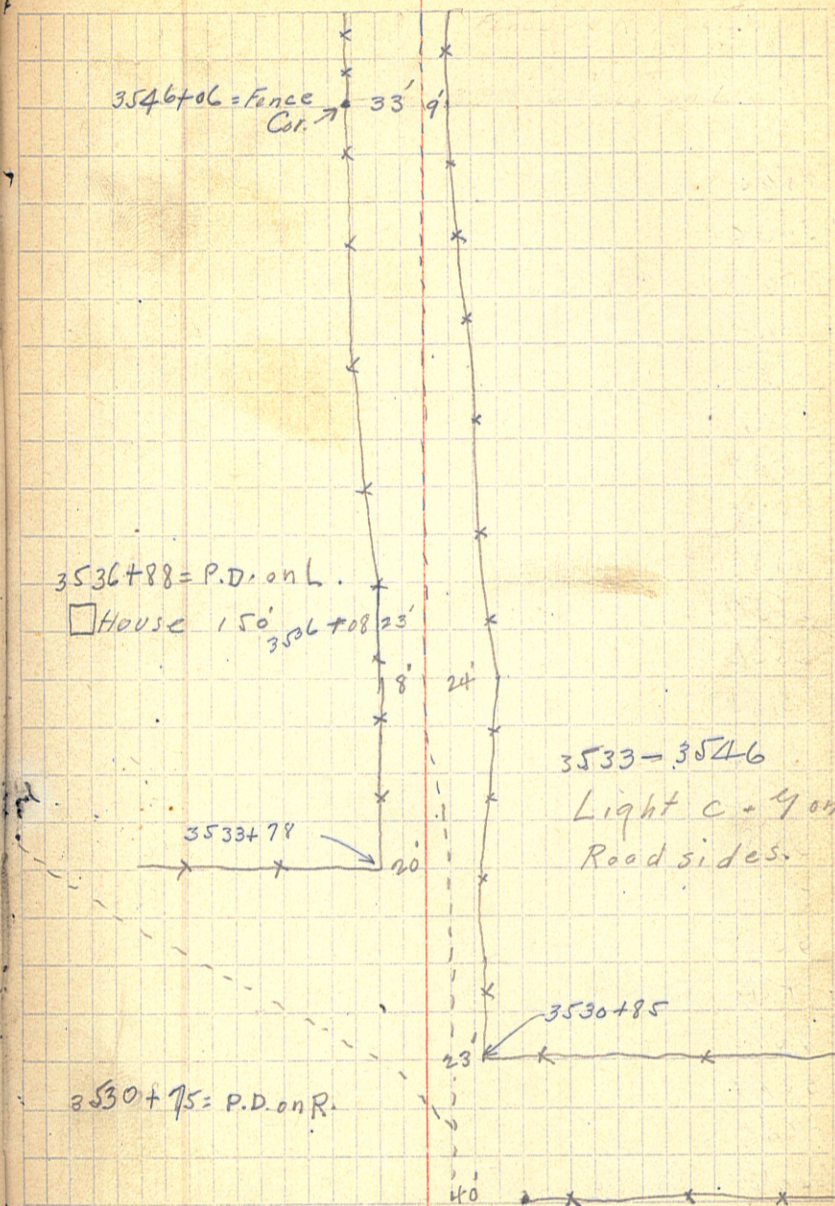
3530

+ 85

3529

3528

+ 25



4/24/15 P.M.

38

BY NEW LINE

Cut off

~~3565 O.P.T.~~

~~3564~~

~~3563~~

~~+85° Δ66°42'R. S73°45'W~~

~~3562~~

~~3561~~

~~3560~~

~~3559~~

~~3558~~

~~3557~~

~~3556~~

~~3555~~

~~3554~~

~~3553~~

~~3552~~

~~3551~~

~~3550~~

~~+77° O.P.T.~~

~~3549~~

~~3548~~

~~3547~~

~~3546+286 Δ68°50'L S64°5'W~~

Sec. Cor. 28-29-32-33-142-31

(Iron Pipe) Grade

ON

old

x x x x x

46'

+60'

x

x

x

x

x

x

x

R.P.s at Rt. 6

R.P. stake

R.P. stake

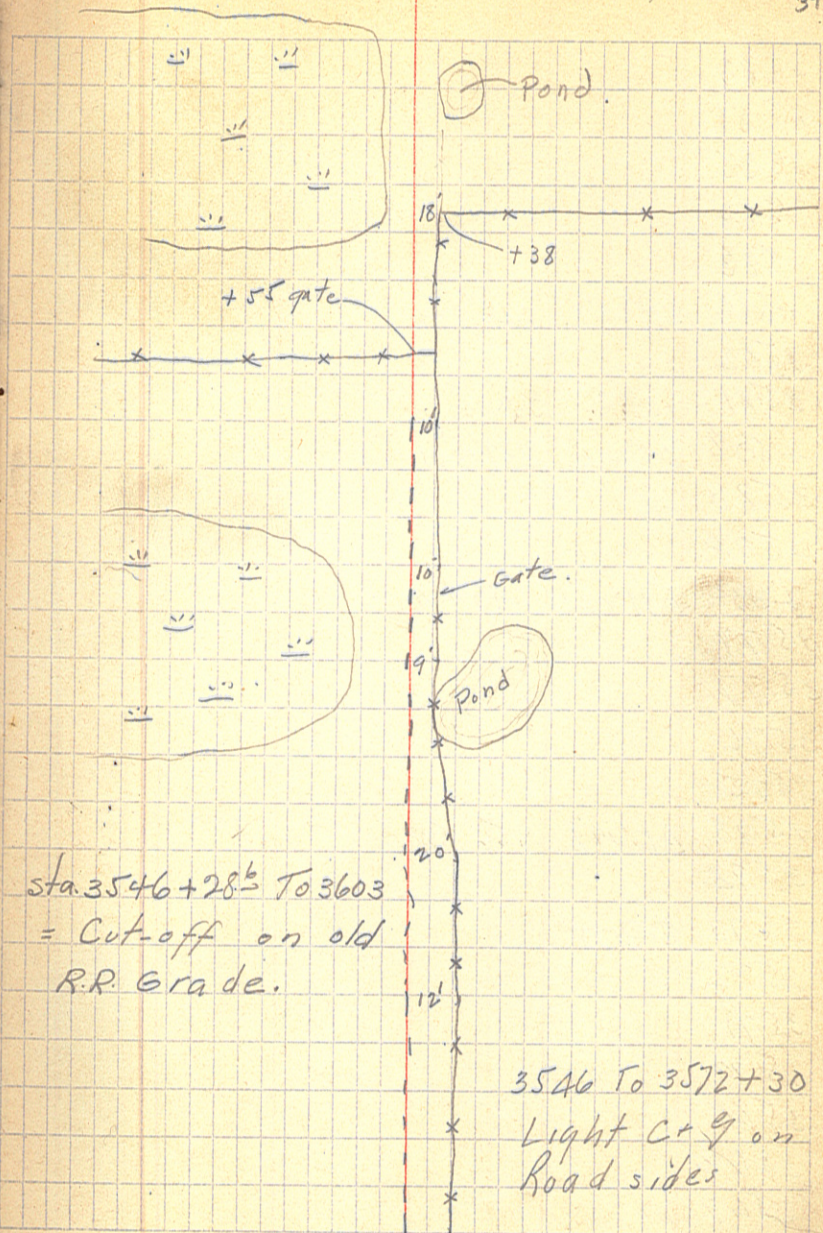
Sta 3546+285 To 3562+85

partly Graded
AP Prox.
Road on Sec.
Lines.

3562+85

+50
 3566
 3565
 3564
 3563
 3562
 3561
 3560
 +10[±] Δ7°28'L. 569°00'W.
 3559
 3558
 +90[±] Δ10°20'L. 576°30'W.
 3557
 3556 Δ9°50'L. 587°00'W
 3555
 3554
 3553
 +60 Δ9°36'R. N83°15'W
 3552
 3551
 +39 Δ11°21'R. 587°00'W.
 3550
 3549
 3548
 3547
 3546+28[±] ○ P.O.T.

4/24/15



3587

3586

3585

3584

3583

+58² $\Delta 10^{\circ}22'L$ $526^{\circ}30'W$

3582

3581

+50² $\Delta 8^{\circ}01'L$ $537^{\circ}00'W$

3580

3579

+33² $\Delta 11^{\circ}03'L$ $544^{\circ}45'W$

3578

3577

3576

3575

+58² $\Delta 13^{\circ}19'L$ $556^{\circ}15'W$

3574

3573 D.P.O.T.

3572

3571

3570

3569

3568

3567

4/24/15

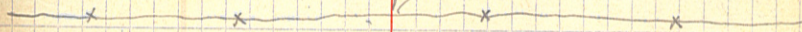
40

3579-3625+54
Light c. on
Road sides.

3572+30-3581
Cultivated Field.

House
100'

gate +30



3610

3609

3608

3607

3606

3605

3604 $\Delta 4^{\circ} 56' L. S 38^{\circ} 00' W.$ 3603 $\Delta 9^{\circ} 19' L. S 42^{\circ} 45' W$ 3602 $\Delta 10^{\circ} 43' L. S 52^{\circ} 00' W.$ 3601 $\Delta 6^{\circ} 16' L. S 62^{\circ} 30' W.$

3600

3599

3598 $\Delta 7^{\circ} 53' R. S 68^{\circ} 30' W$ 3597 $\Delta 17^{\circ} 53' R. S 60^{\circ} 45' W.$ + 32⁵ $\Delta 8^{\circ} 12' R. S 51^{\circ} 00' W.$

3596

3595

+ 94⁵ $\Delta 15^{\circ} 57' R. S 42^{\circ} 45' W$

3594

3593

3592

3591

3590

3589

3588

Partly Graded Road -

Intx.

3603 + 91 = APPROX.

S. Line of Sec. 29

142-31

+43. Δ

3623

3622

3621

3620

3619

3618

3617

3616

same { +68 Δ 17°58' L S3°15' E

+68 22°54' L

3615 19°36' L

3614 14°39' L

3613 10°03' L

3612 Δ

+65[±] Δ 4°53' L S33°00' W B.C.

3611

4/24/53

42

Sta. 3622+18 = 14' x 12" Metal Col. in Place.

BS. on Sta. 3611+65[±]

Def. Is Turned From Sta. 3611+65[±] B.S. on Sta. 3604.

3644

3643

3642

3641

3640

3639

3638

3637

+262 @ P.O.T.

3636

3635

3634

3633

3632

3631

+40 $\Delta 33^{\circ} 35' L$ $58^{\circ} 00' E$

3630

3629

3628

3627

3626

+54 $\Delta 22^{\circ} 21' R$ $53^{\circ} 00' W$

3625

3624

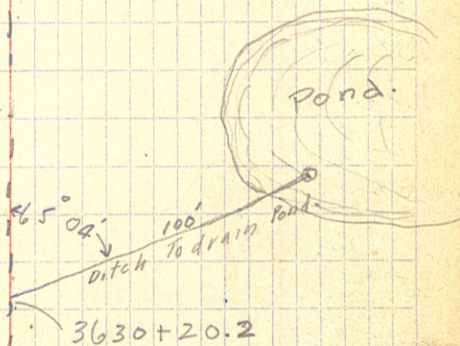
3623+43 $\Delta 13^{\circ} 18' R$ $59^{\circ} 30' W$

4/27/15

43

3632+22 10" Col.
in place 14 Long.

Ditch To Run down
R. side of Road
To Sta. ³⁶¹⁷ + Then
Cross over, into
Large meadow.



3630+20.2

3625+51 - 3649
Light c. + 9 on
Road sides.

3668
 3667
 3666
 3665
~~36~~+47 Δ27°41' L. 514°15' W.
 3664
 3663 Δ19°18' L. 542°00' W.
 3662
 3661
 3660
 3659
 3658 ○ P.O.T.
 3657
 3656
 3655
 3654
 3653
 3652
 3651
 3650
 3649 Δ63°24' R. 561°15' W.
 3648
 3647
 3646
 3645

ANN-CJN.GK.JBC.

4/27/15

44

3669 = 15" Cul. needed

3664 + 47 - 3705

Light C + 7 on Road sides.

3659 + 50 = 12" Cul. Needed.

3658 - 3664 + 47

Light C + 9 on R of W.

3650 + 30 = 15" Cul. needed.

3651 - 3658
Medium C + 9 on R + W.

3649 - 3651 Light
C + 9 on Road sides.

3693

3692

3691

3690

3689

3688

3687

3686 O.P.O.T.

3685

3684

3683

3682

3681

3680

3679

3678

3677

3676

3675 Δ 0°10' R. S 14°30' W.

3674

3673

3672

3671

3670

3669

+127/11

45

3688 + 75 = 18" Col needed

3676 + 45 = P. Don R.

3716

3715

3714

3713

3712

3711

+10 O.P.O.T.

3710

3709

+63² A9°05' L. S37°30' W.

3708

3707

3706

3705 A32°00' R. S46°30' W.

3704

3703

3702

3701

3700

3699

3698

3697

3696

3695

3694

4/27/15 46

3712 + 10 = 15" Col.
needed

3710 + 10 - 3741 + 52

Light C + 4 on

Road sides.

R.P. Tack in 10' Oak. ⁴ ← 48' → 25' ← ⁴ R.P. Tack in Pop. Tree

3705 - 3710 + 10

Log Med C + 4 on

whole R of W.

3693 + 48 = 10" x 14" Col in place

+31 $\Delta 33^{\circ}36' L, 53^{\circ}30' W$
 3739
 3738
 3737
 3736 \odot P.O.T.
 3735
 3734
 3733
 3732
 3731
 3730
 3729
 3728
 3727
 3726
 3725
 3724
 3723
 3722
 3721
 +55 \odot P.O.T.
 3720
 3719
 3718
 3717

R.P.'s 4" oak, 40' out
 Tack in stake 11" on R.

on L.

257
 Rock

$3740 + 70 = 15''$
 Cul Needed.

stony as hell.

R.P. 3" pop. Tack
 R.P. 4" pop. Tack
 R.P. 2" 26" 7"

+40 Δ
3745
3744
+75 $\Delta 40^{\circ} 43' L. 52^{\circ} 50' E.$
3743
3742
+52 $\Delta 12^{\circ} 10' R. 516^{\circ} 00' W$
3741
3740

3744 + 50 = 15" Cul.
needed.

4/27/15 48
12" Cul. needed.
under P.D.

3741 + 52 - 3745 + 40
Light C + g on
Road sides.

3764		
3763		
3762		
3761	$\Delta 15^{\circ} 15' L$	$518^{\circ} 00' W$
3760		
+30	$\Delta 16^{\circ} 38' R$	$533^{\circ} 15' W$
3759		
3758		
3757	$\Delta 22^{\circ} 25' L$	$516^{\circ} 45' W$
+25	$\Delta 12^{\circ} 38' L$	$539^{\circ} 00' W$
3756		
3755		
3754		
3753	$\Delta 21^{\circ} 45' R$	$551^{\circ} 30' W$
3752		
+92	$\Delta 46^{\circ} 32' R$	$529^{\circ} 45' W$
3751		
3750		
+72	$\Delta 26^{\circ} 34' L$	$517^{\circ} 00' E$
3749		
3748		
3747		
+140	$\Delta 22^{\circ} 16' R$	$59^{\circ} 45' W$
3746		
3745+40	$\Delta 12^{\circ} 42' R$	$519^{\circ} 30' E$

4/28/15

49

R.P. 5 pop. tree \rightarrow $\leftarrow 47^{\circ}$ R.P. 3" Birch tree \rightarrow $\leftarrow 29^{\circ}$ 3761 + 15 = 18" Cul
needed.3745 + 40 - 3785 + 59.5
Light on
Road sides,

END of SURVEY

+575 A35°15' L. = Def. B on

Last Course of
Hubbard Co. Survey.
= sta. 592+20 of
Hubbard Co. Survey

- 3785
- 3784
- 3783
- 3782
- 3781
- 3780
- 3779
- 3778
- 3777
- 3776
- 3775
- 3774
- 3773
- 3772
- 3771
- 3770
- 3769
- 3768
- 3767
- 3766
- 3765

A20°43' R

S34°45' W

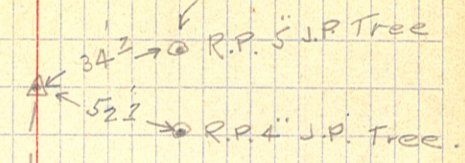
A4°15' L

S13°30' W

4/28/15 50

B.M. on Hubbard Survey

Tie into sta. 592+20 of
on Hubbard Co.
Survey.



SURVEY FROM

- 23
- 22
- 21
- 20
- 19
- 18
- 17
- 16
- 15
- 14
- 13
- 12
- 11
- 10
- 9
- 8
- 7
- 6
- 5
- 4
- 3
- +219
- 2
- 1
- 00

$\Delta 5^{\circ}27' L.$

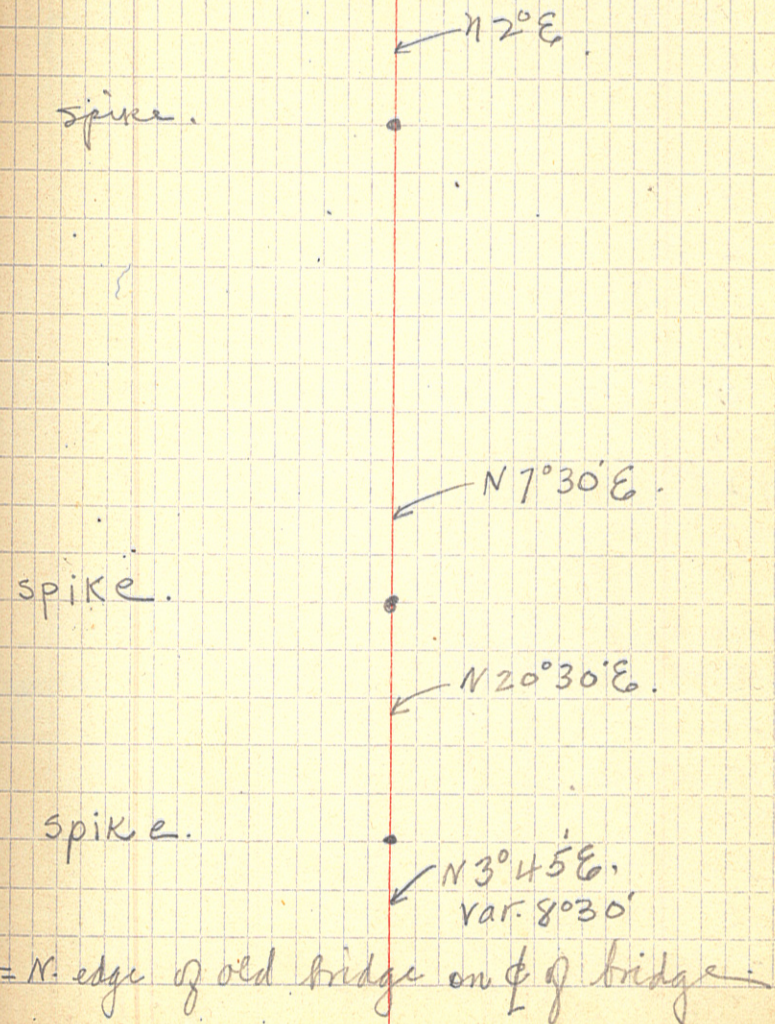
$\Delta 12^{\circ}52' L.$

$\Delta 16^{\circ}50' R.$

= Sta. 1683 + 33 1st Survey.

PINE R. TO S. LIMITS ^{SI}

CGW CAN JAC. 3/23/16



43+06 Village Limits.

42

41

+54⁵ Δ 90°33' L.

40

39

38

37

36

35

34

+67⁸ Δ 45°16' R.

33

+25

32

31

30

+38¹ Δ 5°30' L.

29

28

27

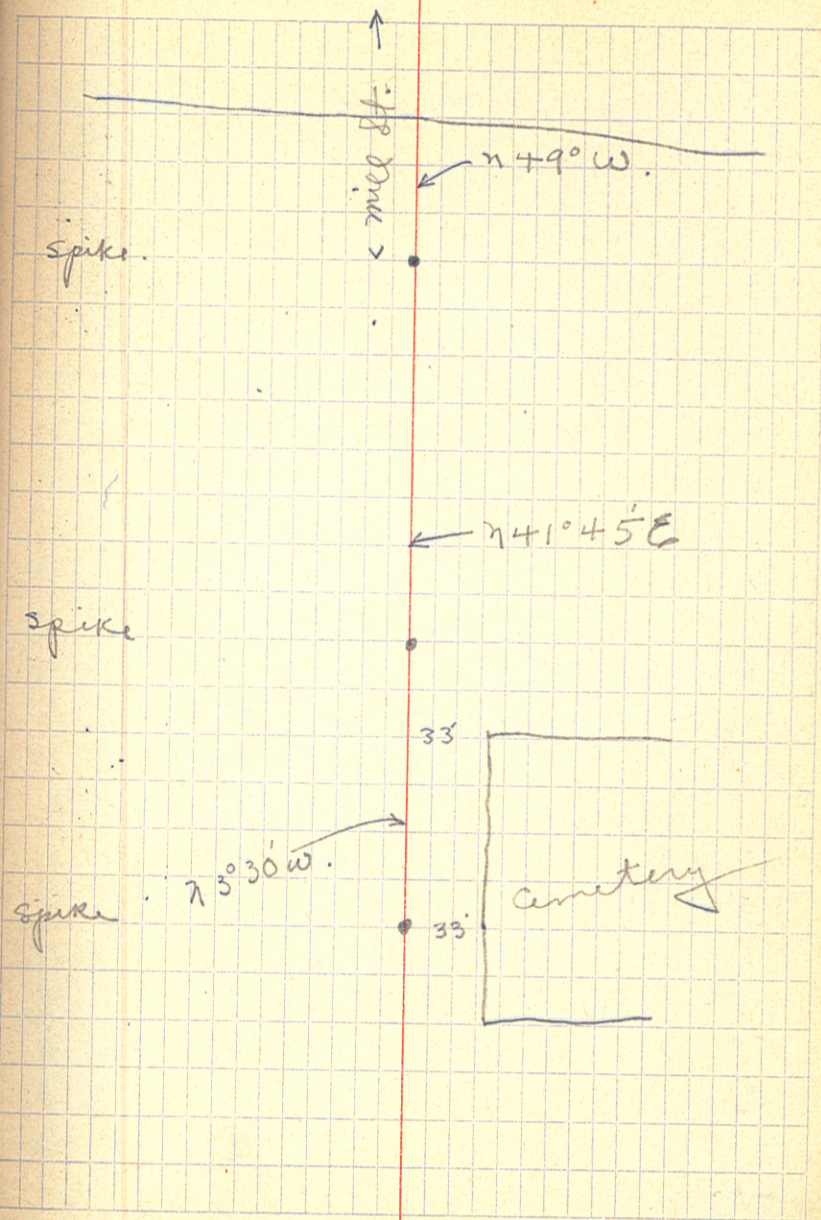
26

25

24

4516

52



Sta.	LEVELS			
	+S	H.I.	-S	Red. Elev.
	2.35	1103.24		1100.89
T.P.	0.37	1091.60	12.01	1091.23
00			2.3	89.3
00			10.1	81.5
1			5.5	86.1
2			6.0	85.6
3			2.5	89.1
T.P.	7.23	98.03	0.80	90.80
4			8.0	90.0
5			7.9	90.1
+50			7.8	90.2
6			6.9	91.1
7			4.9	93.1
8			3.6	94.4
9			1.8	96.2
10			2.5	95.5
11			3.6	94.4
12			4.2	93.8
13			2.4	95.6
T.P.	7.07	04.60	0.50	97.53
14			8.7	95.9
15			8.5	96.1
16			7.1	97.5
17			5.2	99.4
18			3.5	01.1

ON S.R.H. 80 Bridge - Limits.

3/23/16

53

Elev. middle of Bridge on floor.

00 = ^{T.P.} Bridge head.

on natural ground edge of River.

Sta.	+S	H.S.	-S	Pod.	Elv.
19		04.60		2.9	01.7
20				2.7	01.9
21				4.0	00.6
22				4.3	00.3
T.P.	0.60	0 2.10	3.10		01.50
23				4.1	98.0
24				8.3	93.8
25				10.7	91.4
26				11.9	90.2
27				12.7	89.4
28			12.1	14.1	88.0
T.P.	5.83	03.83	4.10		98.00
29				6.9	96.9
B.M.	6.84	03.79			1096.95
30				6.1	97.7
+50				5.8	98.0
31				8.6	95.2
+50				9.4	94.4
32				7.6	96.2
33				5.3	98.5
T.P.	3.98	99.90	7.87		95.92
+67	A			2.3	97.4
34				3.6	96.3
+30				4.5	95.4

12.1 L. 12.5 11.8 R 11.7 12.9

03.83
96.95
6.88
6.84

54

$$\begin{array}{r} 11.7 \\ 25 \\ \hline 14.5 \\ 25 \\ \hline 17.9 \\ 25 \end{array}$$

$$\begin{array}{r} 11.4 \\ 25 \\ \hline 13.8 \\ 25 \\ \hline 12.5 \\ 25 \\ \hline 10.3 \\ 25 \end{array}$$

7.6/25 5.4/25

starting over from other B.M. failed to check by .04

5.3/25

$$\begin{array}{r} 7.5 \\ 22 \\ \hline 7.3 \\ 25 \\ \hline 5.6 \\ 25 \\ \hline 5.2 \\ 25 \end{array}$$

$$\begin{array}{r} 9.2 \\ 25 \\ \hline 10.7 \\ 16 \\ \hline 4.9 \\ 25 \\ \hline 10.1 \\ 25 \end{array}$$

Ext. 20' used as Center

$$\begin{array}{r} 4.4 \\ 25 \\ \hline 4.6 \\ 25 \end{array}$$

$$\begin{array}{r} 4.5 \\ 20 \\ \hline 2.3 \\ 25 \end{array}$$

Sta.	+S	H.O.	-S	Pod.	El.
+70		99.90		6.0	93.9
35				9.0	90.9
36				11.3	88.6
37				9.9	90.0
T.P.	13.10	04.15	8.85		91.05
38				8.1	96.1
39				3.8	00.4
40				2.4	01.8
T.P.B.M.	748	09.63	2.00		02.15
B.M.			6.61		1103.02
41				7.0	02.6
42				6.1	03.5
43				4.9	04.7
+06				80.80	04.7

L 2.0

13.0

R

55

9.3/17
swamp from 35 to 36+50

center - about 1' higher than swamp.

~~13.2/24~~
5.5/14

7.2/12

9.9/10

16.0/20

9.1/20

2.3/13

3.6/10

sp. in the pole 30' L. 41.

Sta.	ts	Levels		Rod.	Elev.
		N.S.	-S		
B.M.	1.98	102.87			1100.89
1680				5.5	97.4
+50				6.4	96.5
1681				10.7	92.2
T.P.	1.60	1093.64	10.83		1092.04
+16				4.0	89.6
T.P.	3.46	1086.59	10.51		1083.13
+31				2.7	83.9
+50				3.6	83.0
B.M.			170		1084.89
			5.14 Ice.		1081.45
T.P.	5.87	1090.76			
1682			en ice.		81.5
+52				9.5	81.3
1683				8.3	82.5
+08				8.3	82.5
+45				5.6	85.2
1684				4.8	86.0
1685				2.6	88.2
T.P.	8.25	1098.28	0.73		1090.03
1686				8.8	89.5
1687				8.2	90.1
1688				8.2	90.1
1689				6.2	92.1

P.R. BRIDGE SURVEY. 3/25/16
 O.J.W. VBC. CAH. 56
 L. R.

$\frac{9.3}{2.5}$

$\frac{4.5}{2.5}$

$\frac{13.2}{2.5}$

$\frac{10.1}{2.5}$

$\frac{4.3}{2.5}$

$\frac{4.4}{2.0}$

$\frac{4.8}{2.5}$

3' out same as
 at 23 on other
 side.

$\frac{2.3}{1.3}$

$\frac{4.8}{2.3}$

2' higher
 than

level
 spike in end of bulkhead plank on
 S. end bridge and on up. stream
 side.

$\frac{3.4}{2.5}$

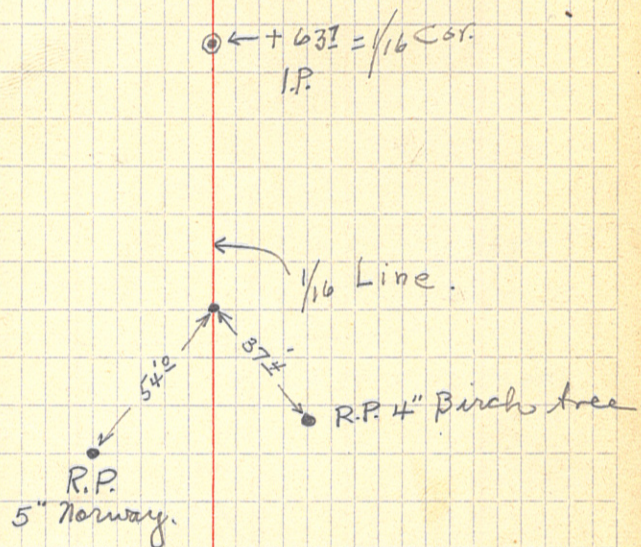
$\frac{5.7}{2.5}$

TRANSIT

87		
86		
1685		
1684	Δ 24° 45' R.	
1683		
1682		
1681+56	P.T. + 3° 56' L.	$\Delta = 87^{\circ} 52' L.$
1681	28° 31' L.	$D = 55^{\circ} L.$
1680+50	14° 46' L.	$T = 104.37$
1679+96	P.C. 55° E. L.	$E.C. = 159.75$
+00	Δ 87° 52' L. P.I.	
81		
80		
79		
78	⊙	
77		
76		
75		
74		
73		
72		
71		
70		
69		
1668+45	Δ	

Notes BRIDGE SURVEY 3/25/16

58



81+77

60

82+37

15

52

59

82+52 = N. edge moor

• ← 82+37 = N. B. head.

1681+77 = S. Bank
S. Bridge head, edge water.

+ 56⁴ Δ 17° 09' L.

89

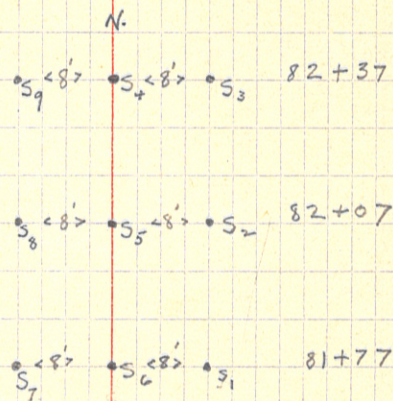
88

= Sta. 7 previous survey = sta. 1690

SOUNDING PLAN.

60

- $S_1 =$ Same as S_6 gravel bottom - some loose mud.
- $S_2 =$ 7.8 water to sand \downarrow sand.
- $S_3 =$ 6' to gravel bottom. some mud.
- $S_4 =$ 7' water to sand Gravel bottom
- $S_5 =$ 4.6 Water to Boulders + Rocky bottom 6' to gravel bottom.
- $S_6 =$ 4.0 ^{water} to rocky gravel bottom.
- $S_7 =$ " " " "
- $S_8 =$ 5.8 ^{water} to rocky bottom. struck boulder
- $S_9 =$ 6.8 water to compact gravel & sand struck boulder here.



Re-survey of Cyanite

Gulch.

4/19/15

+68 ⁵	$\Delta 8^{\circ} 16' L.$	$N 11^{\circ} 00' E.$
3219		
3218		
+20	$\Delta 62^{\circ} 39' L.$	$N 19^{\circ} 00' E.$
3217		
3216		
+15	$\Delta 57^{\circ} 21' R.$	$N 81^{\circ} 45' E.$
3215		
+73	$\Delta 49^{\circ} 06' R.$	$N 24^{\circ} 15' E.$
+23	$\Delta 49^{\circ} 06' R.$	$N 24^{\circ} 45' W.$
3214		
3213		
3212	$\Delta 41^{\circ} 35' L.$	$N 74^{\circ} 00' W.$
3211+25	$\Delta 48^{\circ} 27' L.$	$N 32^{\circ} 30' W.$

= sta. 3216+17 of First Survey.

5280) 178200.0 (33.7
15840
19800
15840
39600
36960
640

16 1700
3482
1700
5280) 78200 (1
5280
25400

Natural Tangents

sec.	0'	10'	20'	30'	40'	50'	sec.	0'	10'	20'	30'	40'	50'	sec.	
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	1.0590	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	1.3435	1.3514	1.3597	1.3680	36
14	2493	2524	2555	2586	2617	2648	75	54	1.3704	1.3788	1.3874	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	2.2460	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	2.9310	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

Natural Cotangents

sec.	60'	50'	40'	30'	20'	10'	sec.	60'	50'	40'	30'	20'	10'	sec.
80	5.6713	5.7694	5.8708	5.9758	6.0844	6.1970	9	1.0000	0.9999	0.9998	0.9997	0.9996	0.9995	9
81	6.3138	6.4348	6.5606	6.6912	6.8269	6.9682	8	0.9994	0.9993	0.9992	0.9991	0.9990	0.9989	8
82	7.1154	7.2687	7.4287	7.5958	7.7704	7.9530	7	0.9984	0.9983	0.9982	0.9981	0.9980	0.9979	7
83	8.1443	8.3450	8.5555	8.7769	9.0098	9.2553	6	0.9970	0.9969	0.9968	0.9967	0.9966	0.9965	6
84	9.5144	9.7882	10.078	10.385	10.711	11.059	5	0.9950	0.9949	0.9948	0.9947	0.9946	0.9945	5
85	11.430	11.826	12.250	12.706	13.197	13.724	4	0.9920	0.9919	0.9918	0.9917	0.9916	0.9915	4
86	14.300	14.924	15.605	16.350	17.169	18.075	3	0.9880	0.9879	0.9878	0.9877	0.9876	0.9875	3
87	19.081	20.206	21.470	22.903	24.542	26.432	2	0.9820	0.9819	0.9818	0.9817	0.9816	0.9815	2
88	28.636	31.242	34.368	38.189	42.964	49.104	1	0.9740	0.9739	0.9738	0.9737	0.9736	0.9735	1
89	57.290	68.750	85.940	114.588	171.885	343.770	0	0.9640	0.9639	0.9638	0.9637	0.9636	0.9635	0

52 30
35 30
17 00

56 30 28 80
41 45 8 45
97 75 20 45

56 60
23 45
33 15

106655
9696
9696
16 66
179 60
98 15
81 45
37

88 00
52 30
36 30

445 89 00
745

83 30

11 90
120 1078 30
80 45

158 75
160 15

68 90
69 30
68 35
179 60
163 45
16 15

179 60
160 15
19 45

Distance from Sec. Cor. 3-4-9-10
141-31-(Wooden stake), E. to intx
with Road Centre =

163200.0
10665
162133.5

5280) 314017.00
 26400
 50017
 47520

~~594~~
~~143-16~~
~~1875-1-18~~
~~1873-9-18~~
~~1-3-25~~

St. Bearings. 587°30' W.
 33 71
 32 30
 1° 41'

20 30
 3 45
 16 45
 16 45
 15 50

5280) 31400017
 26400
 50000
 47520
 24801

3147
 289
 258

337-03
 50
 3425

314000
 314017

5280
 5630
 3215

J. Johnson

Chief ENGR.

C.D. NUTS

Chief Mt.

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	28
29	50.5	50.7	50.8	51.0	51.1	51.3	51.4	51.6	51.7	51.9	29
30	52.0	52.2	52.3	52.5	52.6	52.8	52.9	53.1	53.2	53.4	30
31	53.5	53.7	53.8	54.0	54.1	54.3	54.4	54.6	54.7	54.9	31
32	55.0	55.2	55.3	55.5	55.6	55.8	55.9	56.1	56.2	56.4	32
33	56.5	56.7	56.8	57.0	57.1	57.3	57.4	57.6	57.7	57.9	33
34	58.0	58.2	58.3	58.5	58.6	58.8	58.9	59.1	59.2	59.4	34
35	59.5	59.7	59.8	60.0	60.1	60.3	60.4	60.6	60.7	60.9	35
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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