

1070

LA JOLLA DELMAR PIPELINE

DEZEN

ENGINEERS

FIELD BOOK

No. 403

# EUGENE DIETZGEN CO.

DRAWING MATERIALS, MATHEMATICAL and  
SURVEYING INSTRUMENTS

Chicago New York San Francisco New Orleans Pittsburg Toronto

Distances from Center of Roadway for Cross-Sectioning  
Roadway 16 feet wide. Side Slopes 1 on 1.  
For Single Track Embankment.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	H
0	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	0
1	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	1
2	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	2
3	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	3
4	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	4
5	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	5
6	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	6
7	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	7
8	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	8
9	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	9
10	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	10
11	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	11
12	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	12
13	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	13
14	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	14
15	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	15
16	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	16
17	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	17
18	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	18
19	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	19
20	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	20
21	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	21
22	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	22
23	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	23
24	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	24
25	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	25
26	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	26
27	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	27
28	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	28
29	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	29
30	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	30
31	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	31
32	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	32
33	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	33
34	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	34
35	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	35
36	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	36
37	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	37
38	46.0	46.1	46.2	46.3	46.4	46.5	46.6	46.7	46.8	46.9	38
39	47.0	47.1	47.2	47.3	47.4	47.5	47.6	47.7	47.8	47.9	39
40	48.0	48.1	48.2	48.3	48.4	48.5	48.6	48.7	48.8	48.9	40

**Example**—If point is 22.6 ft. above grade, how far should it be from center line to be a slope stake point? Ans. from Table 30.6. For same slopes but other widths of roadbed, correct above figures by one-half difference in width of roadbed; thus in example above, for 20 ft. roadbed distance will be  $30.6 + (20 - 16) \div 2$  or 2 ft. added to  $30.6 = 32.6$ . For slopes of 1 on 1½ see inside of back cover.

Copyright, 1914, by Eugene Dietzgen Co.

KWett Hillcrest 1197

18" Pipe = 1.77" Area.

2446.60  
6 91.60  
17 74.80

Linchits 027 South of Tack, ind. v. l.  
EdgocbluH

11.72  
9.50  
2.22

24 + 66.60

11.73  
8.10  
3.63

20 + 66.40

13 + 66.40

16 + 31.00

6 + 91.84

ADOLF FRESE OPTICAL CO., INC.

716-718 So. Hill St.

LOS ANGELES, - - - CAL.

Chicas

EXCH



$\frac{165.26}{3.30}$  5th Exchange - Torrey spk  
 $\frac{169.16}{6.88}$

$\frac{130.460}{6.03}$   $\frac{6.88}{162.28}$  = Top of 16" bell

H

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25
- 26
- 27
- 28
- 29
- 30
- 31
- 32
- 33
- 34
- 35
- 36
- 37
- 38
- 39
- 40

Ex  
 to be  
 of road  
 examp  
 30.6 =

Index

Page

Transit Notes on Pipe Line 1-16  
 Levels 17-49

Data for Del Norte La Jolla Pipeline 66-68

Levels on Long Tong across Biological Plate 50

Line Change to miss Rose-Laughery Prop 52

" " P.L. 1298 thru Biological 53

" " Levels - End King's Line

to Int. with Line P.L. 1335 produced 54-57

Line Change - End of King's Survey to ? 60-65

Survey from new res. site to int with

Line from old res. site 75

		16706	166
		330	
		<u>17036</u>	
		313	
		<u>16723</u>	
+	^		
		132.38	
13.2			145.58
	7.10	11.88	
		9.66	

Blaukenbergs Estimate up to April 30 1920

4000 feet of 18" Cement Pipe  
 finished end-in yards 4000 ft

June 17 10 yards 19798 feet  
 " " Oil job 1986 " Total 11784

Less May Estimate 4000  
 June 17 Estimate 18" pipe 7784 ft

June 17 " 8" pipe bell 200 ft  
 " " 3" drain tile 1700 feet

Survey for Pipe Line from City Reservoir to Jolla

To City Line near Del Mar.

Williams  
Dunkle  
C. Moor  
B. Moor

Nov 20-1919

11

111+00  $\Delta 4^{\circ}35'50''$  Lt

103+30<sup>o</sup> Pot

90+00 Pot.

88+90 Pot.

87+79.70 Int P.L.N. Line 1297

86+36.7<sup>o</sup> Int.  $N 27^{\circ}30'20'' E$

63+00

51+00<sup>o</sup>

25+50 Pot

16+50  $N 37^{\circ}07'35'' E$   $N 37^{\circ}07'35'' E$  Pot.

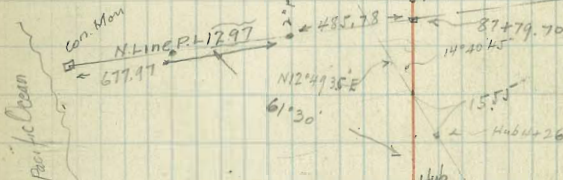
12+50 Pot.

6+18.90  $\Delta 12^{\circ}55''$  Lt

0+00  $N 50^{\circ}02'35'' E$  618.90

449.10  
36.68  
485.78

36.68



Hub. Flowed out Replaced

Hub.

Hub.

Hub.

Hub.

Hub.

Hub.

Hub.

Hub.

Hub.

12-44-35  
14-46-45  
17-30-20  
22-54-30  
25-15-50

27-50-0  
29-7  
87+79.70

Granite Mon.

Mar 20 1919  
Mar 20 1919  
Mar 20 1919  
Mar 20 1919

Read on N Line P.L. N 27 07 35 E  
1284



Trail in Golf Green  
Sta 22+74.96  
1284

171+77.49 \*

$\Delta 0^{\circ} 00' 20''$  Lt

$N 0^{\circ} 19' 40'' E$  2638.90

145+38.59

$\Delta 0^{\circ} 01' 10''$  R

$N 0^{\circ} 18' 20'' E$  Gmet  
 $N 0^{\circ} 19' 45'' E$  936.94

136+01.65

$\Delta 22^{\circ} 34' 45''$  Lt

122+00 Pot  $N 22^{\circ} 54' 30'' E$

177+66 Approx F Paved Highway Biological Grade  
117+61.67 Int. N. Line P.L. 1298

1324  
Granite Mon

1373

171+77.49

1313

1314

1313  
Granite Mon

1314

Hub  
125+32.59

P.L. Granite Mon 15'

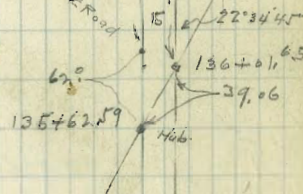
1317

1311

Hub 136+01.65

135+62.59

$$\left( \begin{array}{l} \Delta = 22^{\circ} 35' \\ R = 600 \\ T = 119.8 \\ L = 236.5 \end{array} \right)$$



36.06

Found old 6x6c Hub

1724.96

2466.6

Hub  
6728.45'

691.64

117+61.67

1312

1311

1298

Granite Mon.

911.0

6.0

973.00

36.06

938.94

224+56.49 →

$N0^{\circ}21'20'' E 2639^{\circ}$

198+17.49 ↓

$N0^{\circ}19'30'' E 2640^{\circ}$

1331

1330

3

Grand Canyon

1375

1376

Grand Canyon

1375

1376

1374

1373





297+33.3

373.70

293+39.40 N12°57'46" E

285+00 Pot

276+50.1

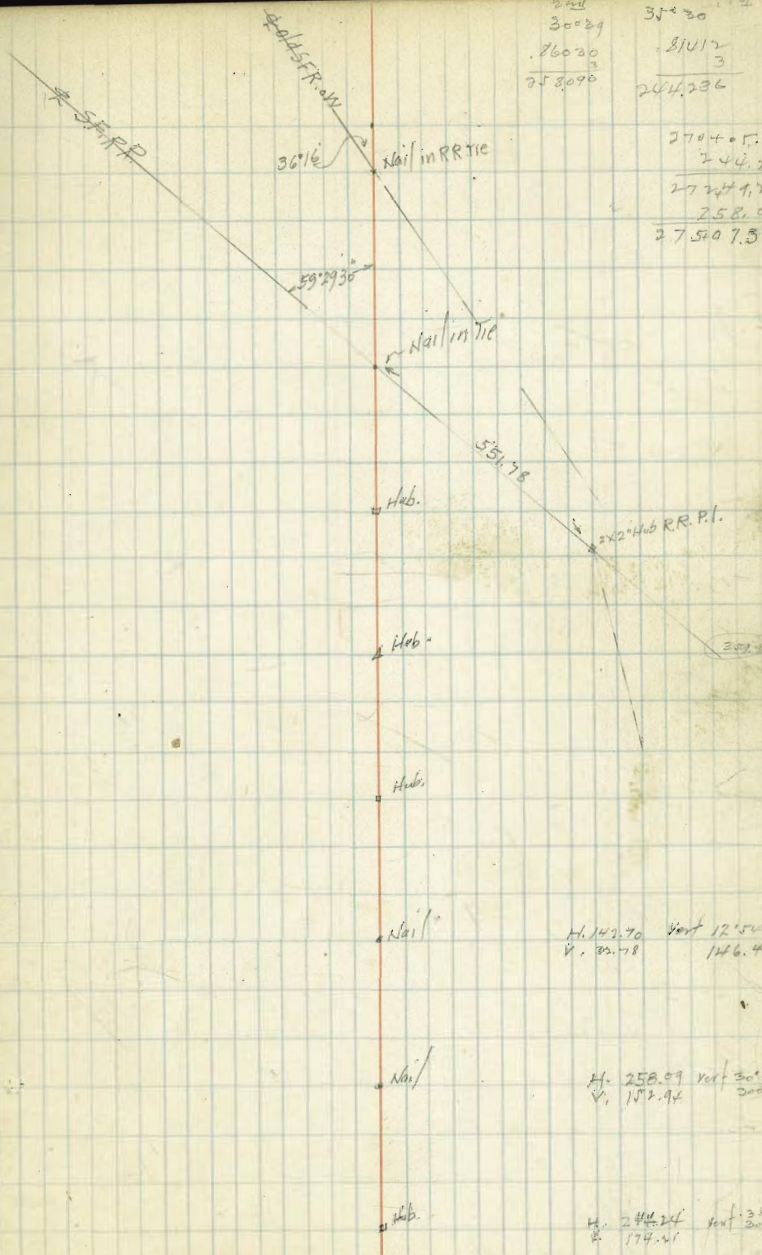
Δ 33°35' Lt ✓

275+70 Pot. N46°32'46" E

275+07.33 Pot. N46°32'46" E

272+49.34 Pot. N46°32'46" E

270+05.0 Pot. N46°32'46" E



303 + 61.83

638.52

N 12° 57' 46" E

6000  
541° 02' 17" E

6000

26.84

26.84

187.50  
111° 10' 00" E  
7 500.00

Survey of "B" Line to Connection "A" Line at Sta 276+50.0

304.30  
40.80  
281+54.91

7

337+22.0 Point on S.F. R.R. 32° 42' 30" L

18877

318+34.30 Int. City Line

1620.3

30116.10  
30241.40

2009.09

N 11° 56' 44" W

281+54.91  
282+04.91

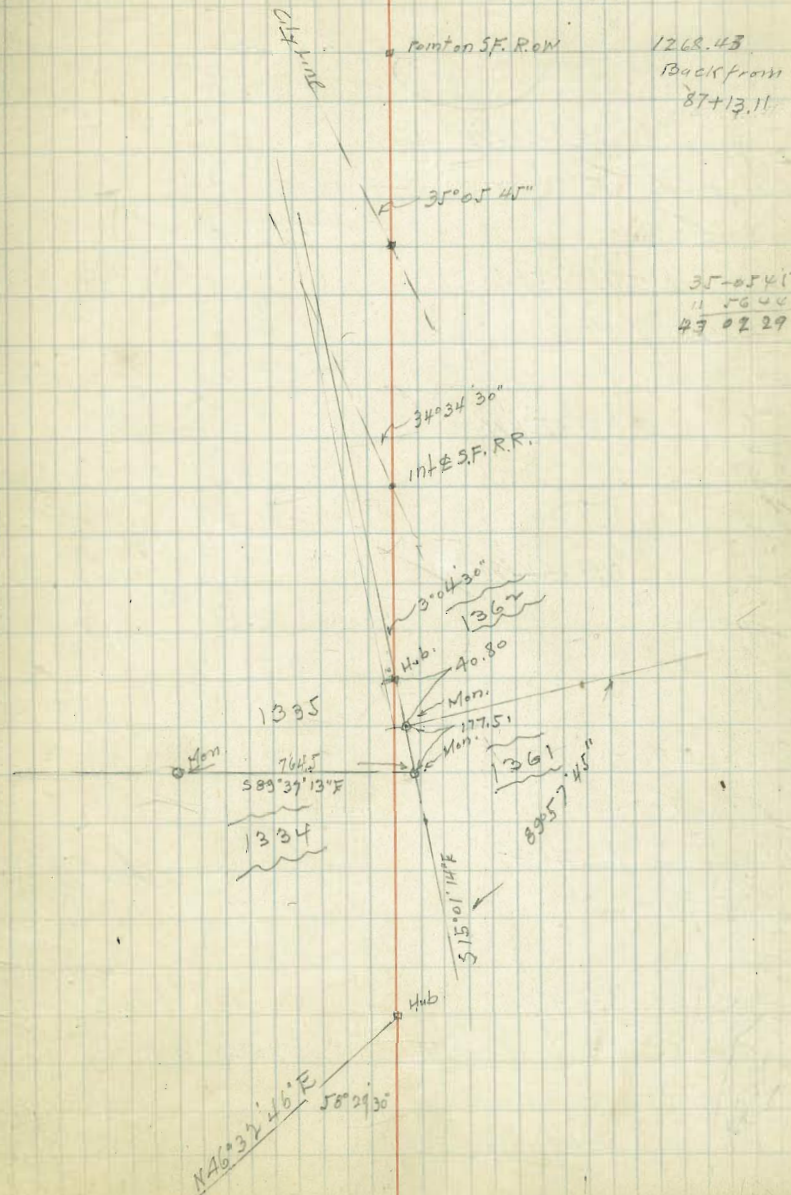
281.91

278+93.0 P.O.  
279+23.0

273

276+50.0 "A" Line =  
276+50.0 "B" Line

58° 29' 30" L



386+00 N50°59'14"W 5°16'30"L 600

384+64 N45°42'44"W 12°37'30"L 136°

378+00 P1 N33°05'14"W 28°00' R  
ST=150  
Ex=25° 664.0

373+15 PCC N61°05'14"W 9°59'30"L 485.0

372+00 RCC N51°05'44"W 8°25'L 215.0

361 356+35 P.O.T. 1877.4

352+24<sup>68</sup> N42°40'44"W 15°01' R 1498.88

340+25<sup>80</sup> N57°41'44"W 13°02'30"L 308.80

N44°39'14"W

□ Lath Hill

□ Lath Hill

□ Hub

□ Hub

□ Hub

□ Hub

□ Hub

□ Hub

R=1314.6  
ST=115°  
L=279.22

R=1359.06  
ST=100  
L=199.60

R=1000.0  
ST=131.8  
L=262.09



361 int & well travel  
dirt Road

	<sup>3</sup> 40 <del>X</del> +60		16°13'30" R		□ Lath Hut
386		N110°32'45"W		135°	
	<sup>2</sup> 40 <del>X</del> +25		18°29'30" R		□ Lath Hut
384		N29°02'15"W		125°	
	<sup>1</sup> 40 <del>X</del>		11°54'30" R	125°	□ Lath Hut
378		N40°56'45"W		125°	
	<sup>399</sup> 400+75		16°24'30" R	120°	□ Lath Hut
373		N57°21'15"W		120°	
	<sup>8</sup> 39 <del>X</del> +55		15°18'30" R	130°	□ Lath Hut
372				130°	
371		N72°39'45"W		130°	
	<sup>7</sup> 39 <del>X</del> +25		13°46" R	130°	□ Lath Hut
361				130°	
356		N86°25'45"W		125°	
	<sup>4</sup> 39 <del>X</del> +72		10°50" L	125°	□ Lath Hut
351		N75°35'45"W		125°	
	<sup>3</sup> 39 <del>X</del> +45		15°33'30" L	125°	□ Lath Hut
340		N60°02'14"W		125°	
	392+00		9°03" L	125°	□ Lath Hut

135°  
 125°  
 125°  
 120°  
 120°  
 130°  
 130°  
 125°  
 125°  
 125°

110+00  
191.31  
11191.31

125+72.40  
City Limit

188+51.22	40 <sup>5</sup> +48.25
174+69.67	13+81.55
<hr/> 1381.55	<hr/> 392+66.70
	391+66.70

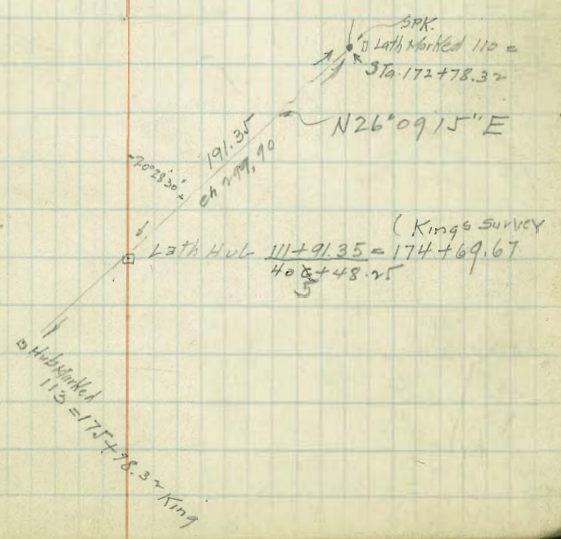
40<sup>5</sup>+48.25

20°28'30" N

N5°40'45" E

40<sup>4</sup>+65<sup>80</sup> Int. Paved Road

188+25





9+77.18 E.C.

P.I. Rt 8°10' P.I. 8+77.58  
R = 1400  
T = 99.45  
L = 199.55

7+77.63 P.C.

↑

6.8

7+70.53 E.C.

P.I. Lt 16° P.I. 6+87.6  
R = 600  
T = 84.32  
L = 167.55

6+00.28 P.C.

89.5

E.C. 5+13.76

P.I. Rt 25° 47' 1/2 3+47.87 P.I.

R = 750  
T = 171.74  
L = 337.61

P.C. 1+76.5

15°

9+72.48 E.C.

R = 1385  
T = 98.87  
L = 197.41

15°

7+75.07 P.C.

15°

7+68.27 E.C.

R = 615  
T = 86.43  
L = 171.74

← Tenney Road

5+96.53 P.C.

5+07.01 E.C.

15°

R = 735  
T = 168.76  
L = 330.86

1+76.15 P.C.



0+00 = 24' Hub Cor. 12.65

3°30' - 300' 90813 299.439  
 0.0 00 75.68  
 10044 50.12 49.24

Williams  
 Don Mc  
 C. Moore  
 Feb. 4 - 1920

Line hits on north side of v Hub.  $\uparrow$   
 3+75.12 Hub  
 4+24.30 Hub  
 6+85.88 Hub E. of Street  
 7+30.14 Hub W. of Street  
 8+64.14 Set Hub P.I.  
 8+73.30 Found 2nd Hub H.C. Marker  
 8+93.78 To Davis Hub P.I.  
 8+94.19 Int. Curve 15 E. E P. Lot

Davis Survey Torrey Road  
 21+35 P.I.  $\Delta = 40^\circ 50'$  Rt  $R = 100$   
 $T = 27.22$   $L = 71.27$

Davis P.C. 20+97.78  
 Int. Curve 15' Rt E Road 20+88.51  
 25+61.25  
 Pipeline Survey

Set Hub S.P.K. Hwy  
 on Line  
 Line H.C. 27.14  
 Line hits 0.85 north  
 Line intersects 0.07 North of Center of Curve

25+70.00  
 31.31  
 25+81.74

13

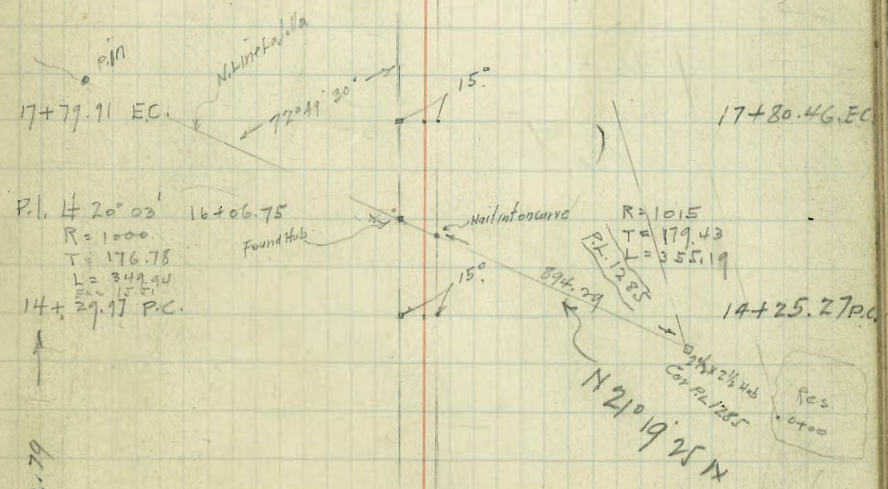
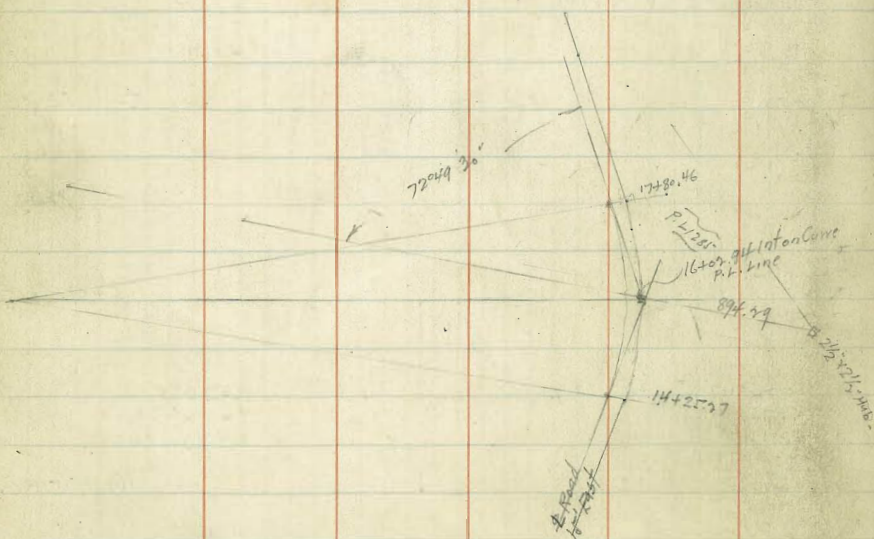
37.44  
 28.13  
 8.31

26+26.91 Pipeline Survey  
 21+61.93 EC

25+81.59 P.I.  $\Delta = 14^\circ 22' 30''$  Lt  
 $R = 400$   
 $T = 50.41$  Old  
 $L = 100.86$   
 Hub 25+70 old Reservoir pipe line  
 P.I. 20+87.06  
 $\Delta = 14^\circ 04' 30''$   
 $R = 600$  New  
 $T = 75.66$   
 $L = 150.53$

20+11.40 P.C.

6+18.90  $\Delta 12^\circ 55' 14''$



452.79

Res.  
 0.0400

Levels on Curve at 25+81.39 P.I.

1.78  $\frac{104.98}{\pi}$  103.7

0+00	P.C.	2.0	103.0
+25		3.1	101.9
+50		7.4	97.6
+75		8.0	97.0
11+00.76		9.2	95.8
26+50		11.2	93.8

# Terrace Road

Levels on Survey for Pipe Line from Int. State St + Exchange Place to State St and Prospect St 10' East of State St.

167.98

0+00		3.2	164.8
+30	Prop Line	3.1	164.9
1-		4.8	163.2
2-		7.4	160.6
3-		10.3	157.7
		T.P. 10.68	157.305
4	+2.55	5.0	154.85
5		7.8	152.0
+30		8.5	151.3
+70	approx E Prospect	8.7	151.1
6+08.55		9.1	150.7
DAVIS 0+00 Terrace Road		9.5	150.3
B.M. SW Cor. State + Prospect		9.88	149.915
Brass Plug in Curve			

# P.I. 276+50

276+50

280+18.87  
278+14.00  
3.67 17

# Survey of Change of Alignment on Del Mar

307+24.70 Point 90° & 10' West of NE Cor PL 1335

304+03.20 Int & Present S.F.R. of Way

302+60.25 Int R.O. way fence.

N 15° 01' 14" W

281+63.77 Point 90° & 10' West of Con Mon  $\frac{PL 1362}{PL 1361}$

280+18.87 Int. of Line 10' West of East Line P.L. 1335  $43^{\circ}04'30''$

N 11° 56' 44" W

276+50.0

$\Delta 58^{\circ}29'30''$

# Pipe Line at Sta. 280+18.87

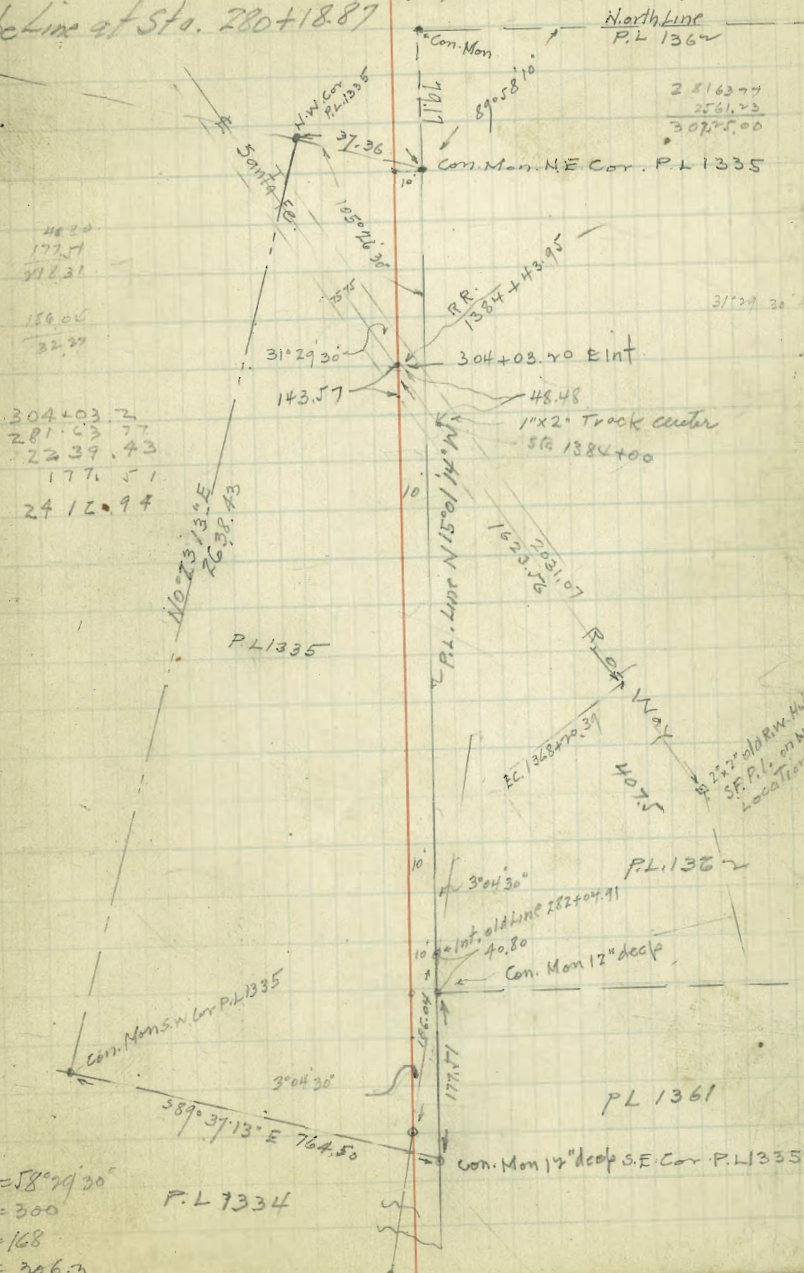
Jan. 21 1920

15

W. H. Gims  
Dunkle  
H. Ch. Moore Moore R. Ch.

North Line  
P.L. 1362

28163.77  
2561.23  
30725.00



46.20  
177.51  
223.71

158.06  
32.27

304+03.2  
281+63.77  
2239.43  
177.51  
2412.94

A =  $58^{\circ}29'30''$   
R = 300  
T = 168  
L = 306.3

P.L. 1334

1268.43  
 392  
 1660.43  
 8713.11  
 7052.68

N 15° 01' 14" W  
 39° 01'  
 N 47° 02' 14" W

0+00 North Cor P.L. San Diego  
 Square Cem. Mon.

341  
 184.75  
 342+84.75

$\frac{342+84.75}{341+48.02} = 1.5790$       36.95

$\Delta = 42^\circ 40' 30''$   
 $R = 400$   
 $T = 156.25$   
 $L = 297.93$

341+48.02 Int of Old S.F. R. of Way

339+579 Int. of County Road

N 15° 01' 14" W

322+11.13 Int East Line City Pueblo San Diego

Pacific Ocean

PL. 1360

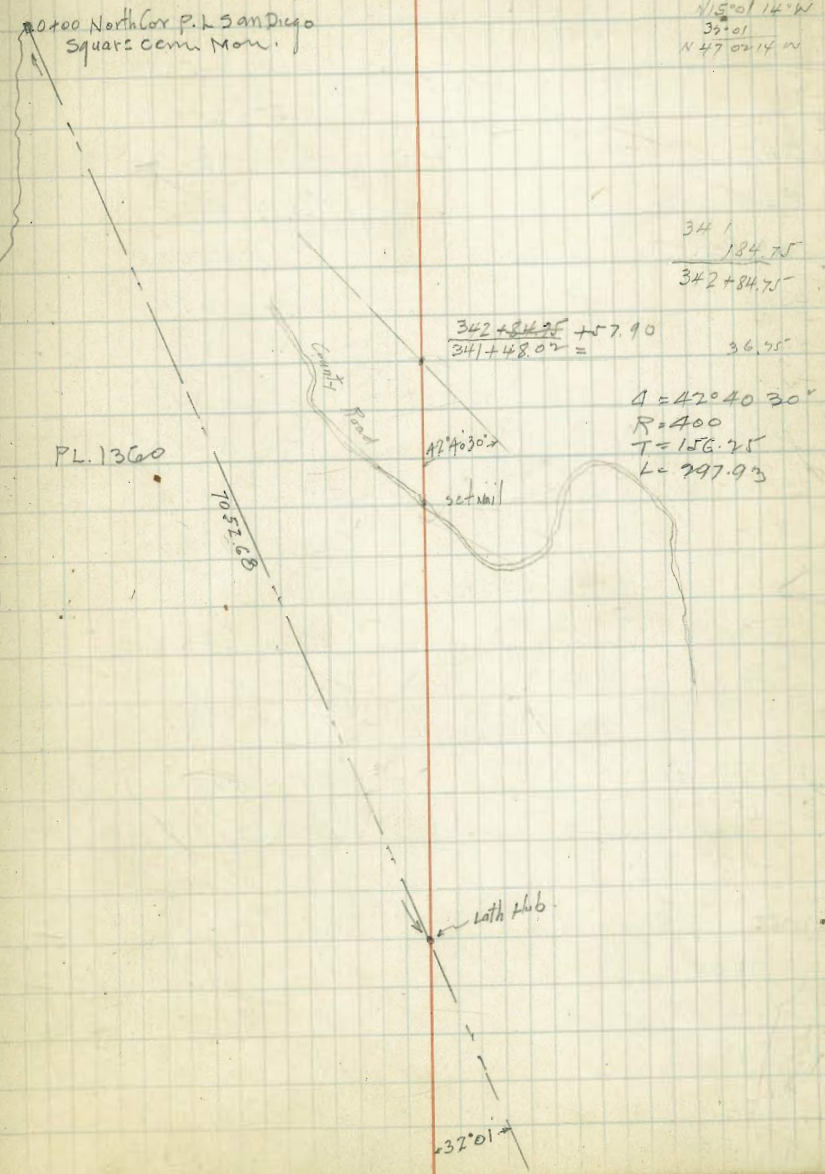
7052.68

$\Delta 42^\circ 30''$

section

Lat. 46.6

32° 01'



391+66.20

Levels on E Pipe Line Survey

La Jolla to City Line near Del Mar  
Top of Fire Hydrant Exchange Place below City Reservoir

Sta.	Level/Icon	E Pipe Line	Survey	Elev.	B.M.
	+ 10.74	233.37			272.63
	+ 12.99	245.87	- 0.49	234.88	
	+ 12.91	258.50	- 0.28	245.59	
	+ 10.68	268.53	- 0.65	257.85	
Top Con. Res.			2.4	266.13	
Top Roof			1.3	267.2	
Bottom Center Res.			18.30	250.23	
0+00			3.1	265.4	
+40			5.1	263.4	
	1.43	259.28	T.P. 10.68	257.85	
+88			11.5	247.8	
1-			11.7	247.6	
+35			13.1	246.2	
	0.03	246.29	T.P. 13.02	246.26	
+50			2.7	243.6	
+86			12.9	233.4	
	0.29	233.94	T.P. 12.64	233.65	
+90			5.5	228.4	
2-			5.3	228.61	
+50			6.4	227.5	
3-			9.5	224.4	
+50			11.1	222.8	
4-			9.4	224.5	
+50			5.8	228.1	
5-			5.0	228.9	
+50			6.0	227.9	

ST	+	*	-	Flu
6-		233.94	8.2	225.7
+18.9 A	1.44		T.P. 10.15	223.79
		225.23		
+50			6.0	219.2
+95			9.3	215.9
7			11.0	214.2
	+ 0.59	213.11	T.P. 12.71	212.51
+50			4.2	208.9
8-			9.4	203.7
+55			13.8	199.3
	+ 0.81	201.32	T.P. 12.60	200.51
9-			5.2	196.1
st. gutter +50			9.0	192.3
st. gutter 10-			11.7	189.6
+50			13.3	188.0
	+1.21	189.60	T.P. 12.93	188.39
11-			3.9	185.7
+50			6.3	183.3
12-			9.4	179.7
	+0.71	177.41	T.P. 12.90	176.70
+50			1.9	175.5
13-			13.5	163.9
	+ 0.54	165.26	T.P. 12.69	164.72
+25			11.50	153.8
	+0.35	152.88	T.P. 12.73	152.53
+45			12.4	140.5
			T.P. 12.92	139.96

Sta	+	∏	-	Elev.
				129.96
	+0.21	140.17		
	+2.05	129.56	T.P. 12.66	127.51
+85			14.3	115.3
+90			12.2	117.4
14+35			7.3	122.3
+45			6.8	124.8
	+12.68	142.05	T.P. 0.19	129.37
+95			1.7	140.4
	+12.00	153.65	T.P. 0.40	141.65
15+05			11.2	142.5
+30			6.5	147.2
+50			4.1	149.6
	+6.93	159.39	T.P. 3.19	150.46
16-			3.2	154.2
st On Hub. +50			6.65	150.74
17			12.90	144.5
	+1.03	145.44	T.P. 12.98	144.41
+50			9.1	136.3
	+0.72	139.23	T.P. 12.93	132.51
18			5.8	127.4
+50			12.9	120.3
	+0.53	120.72	T.P. 13.04	120.19
+75			9.0	111.7
+80			14.2	106.5
	+7.76	116.10	T.P. 12.38	108.34
+95			10.4	105.7
19			17.0	99.1

Sta	+	∩	-	Elev
		116.10		
19+50			11.5	104.6
20-			4.9	111.2
+50			2.3	113.8
	+1.32	105.18	T.P. 12.24	103.86
21-			3.8	101.4
+20			3.9	101.3
+50			10.6	94.6
+85			17.8	87.4
+90			10.9	94.3
22+20			4.2	101.0
	+1.69	106.86	T.P. 0.01	105.17
+37			1.1	105.8
+60			4.8	102.1
23-			5.9	101.0
+50			4.7	102.2
+53			3.5	103.4
On Com Carb +63.5			3.73	103.13
" " +95.1			4.94	101.92
24+07			4.50	102.4
+50			1.30	105.6
25-			0.40	106.5
+50			3.7	103.2
	0.85	99.42	T.P. 8.29	98.57
+85			0.3	99.1
+87			2.8	96.6



Sta.	+	*	-	Elev
		99.42		
26			2.0	96.8
+50			5.6	93.8
27			10.1	89.3
	+1.43	88.37	T.P. 12.48	86.94
+50			4.7	83.7
28			13.3	75.1
	+0.49	76.40	T.P. 12.46	75.91
+25			7.7	68.7
+50			9.1	67.3
29-			10.8	65.6
+50			12.6	63.8
+60			13.2	63.2
30			13.8	62.6
+50			12.2	64.2
31			9.3	67.1
5/16/66, 31+50		T.P. 11.67		64.73
	+1.26	66.09		
32			6.7	59.4
	+0.47	54.12	T.P. 12.44	53.65
+50			4.0	50.1
	+0.46	44.21	T.P. 12.37	41.75
33			2.7	39.5
+50			8.0	34.2
34			12.9	29.3
T.P.	1.33	30.94	12.60	29.61

26+40 6" Tee

6" Connector

Sta	+	∓	-	Elev.
		30.94		
34+50			6.8	24.1
35			11.0	19.9
T.P.	1.47	19.26	12.55	18.39
+50			3.6	16.3
36			7.6	12.3
T.P.	1.19	8.14	12.91	+6.95
+50			1.8	6.3
+62			4.5	3.6
+65			7.8	0.3
+90			8.5	-0.4
37			11.2	-3.1
38			12.0	-3.9
39			12.0	-3.9
T.P.	4.31	+1.12	11.33	-3.19
40			4.8	-3.7
41			4.7	-3.6
42			4.8	-3.4
43			4.5	-3.4
44			3.8	-2.7
45			3.3	-2.2
T.P.	4.80	+3.37	2.55	-1.43
46			5.5	-2.1
47			5.3	-1.9
48			4.9	-1.5
49			5.2	-0.8

6" Tee 30+65

-Elev. below City Datum

Sta.	+	∩	-	Elev.
		3.37		
50+0			5.9	-1.5
+50			4.0	-0.6
51			2.4	+1.0
T.P.			2.40	+0.97
	9.87	10.84		
52			7.5	3.4
53			5.3	5.5
54			4.5	6.3
55			3.1	7.7
56			0.9	9.9
	10.14	20.74	T.P. 0.26	10.58
57			9.0	11.7
58			7.6	13.1
59			7.5	13.2
60			4.8	15.9
61			0.4	20.3
	+ 8.89	29.61	T.P. 0.00	20.74
62			6.4	23.2
Hub, 63			5.30	24.3
64			4.6	25.0
65			2.8	26.8
66			1.6	28.0
67			2.3	27.3
	7.64	35.66	T.P. 1.59	28.04
68			10.6	25.1
+57			11.4	24.3

50+20 6" Tee

35.66

68 + 60		17.4	18.3
Wash. + 61		17.4	18.3
+ 68		11.5	24.2
69		9.5	26.2
+ 88	£ Torrey Road	6.9	28.8
70		6.6	29.1
71		1.7	34.0
	+ 12.00	T.P. 0.76	34.90
			# 6.90
72		8.1	38.8
73		3.6	43.3
	+ 11.90	T.P. 0.48	46.42
			58.32
74		9.0	49.3
75		4.3	54.0
76		1.7	56.6
	+ 11.43	T.P. 1.14	57.18
			68.61
77		8.0	60.6
78		3.1	65.5
+ 55		3.4	65.2
+ 75		10.0	58.6
79 + 07		10.2	58.4
Wash. + 12		26.2	42.2
+ 26		26.2	42.4
+ 30		10.0	58.6
+ 57		8.7	59.9
80 -		5.3	63.3
+ 35		2.7	65.9
		T.P. 0.56	68.05
	+ 12.67		80.72
+ 38		11.6	69.1
+ 50		10.1	70.6
81 -		4.9	75.8
	+ 13.08	T.P. 0.17	80.55
			93.63
+ 50		13.80	79.8

68+88 6" Tee

on Top 71-

77+80 6" Tee

Toward Crescent Beach

Sta.	+	⌊	-	Elev.
		93.63		
82-			5.7	87.9
	+12.63	105.97	T.P. 0.29	93.34
+50			10.2	95.8
83-			0.5	105.4
	+12.44	118.40	T.P. 0.01	105.96
+50			2.4	116.0
	+12.35	130.57	T.P. 0.18	118.22
84-			3.2	127.4
	+12.50	142.53	T.P. 0.24	130.38
+50			7.5	135.3
	+12.65	155.27	T.P. 0.21	142.64
85-			8.6	146.7
	+12.74	167.66	T.P. 0.35	154.92
+50			8.8	158.9
	+12.59	180.09	T.P. 0.16	167.50
86			10.60	169.5
on Hub +36.7			5.73	174.36
	+12.84	192.65	T.P. 0.28	179.81
87			38	188.8
	+12.63	204.86	T.P. 0.42	192.23
+50			7.1	197.8
88-			0.0	204.9
	+12.46	217.05	T.P. 0.27	204.59
+50			3.2	213.8
	+9.17	226.04	T.P. 0.18	216.87
on hub +90			7.67	218.37
89-			7.6	218.4
+50			4.5	221.5
on hub 90-			1.2	224.8
Top Dirt Bank Booster Reservoir			7.5	218.5
" Concrete "			14.6	211.4
Bottom Reservoir Booster			18.6	207.4
+50			4.1	221.9
+75			8.3	217.7
91 + 10			21.2	204.8

Sta.	+	∓	-	Elev.
		226.04		
91+50			25.7	210.3
92			3.4	221.6
	5.47	228.83	T.P. 2.68	223.36
+50			4.7	224.1
93			3.7	225.1
+50			4.0	224.8
	+ 0.69	217.55	T.P. 11.97	216.86
94 -			3.8	213.8
+50			11.2	206.4
+95			16.0	201.6
95 -			14.3	203.3
+50			12.8	204.8
96			8.1	209.5
+50			2.7	214.9
	+ 12.27	229.35	T.P. 0.47	217.08
97 -			10.0	219.4
	12.37	241.51	T.P. 0.21	229.14
+50			3.2	238.3
	+12.57	253.82	T.P. 0.26	241.25
	+ 12.73	266.33	T.P. 0.22	253.60
98			12.0	254.3
	+ 12.57	278.60	T.P. 0.30	266.03
+50			12.0	266.6
99 -			0.7	277.9
	+ 12.53	290.96	T.P. 0.17	278.43
+50			4.1	286.9
	+ 12.73	303.43	T.P. 0.26	290.70

Peg 10' East  
Tree

216.86  
89  
217.55

25

Sta.	+	X	-	Elev.
		303.43		
100			5.5 T.P. 0.0	297.9 303.43
	+12.64	316.07		
+50			9.6 T.P. 0.34	306.5 315.75
	+12.69	328.44		
101			10.6	317.8
+50			0.5 T.P. 0.39	327.9 328.15
	+12.64	340.79		
102			8.2	332.6
+50			3.4 T.P. 1.07	337.4 339.72
	+12.50	352.22		
103			10.7	341.5 338.5
on hub +30			7.35	344.87
+50			6.4	345.8
104			3.7	348.5 345.0
+50			0.7 T.P. 0.26	351.5 351.96 346.0
	+12.62	364.58		
Gold Road +75			11.5	353.1
105			10.0	354.6 351.0
+50			7.1	357.5 353.75
106			4.6	360.0 356.5
+50			1.5 T.P. 0.66	363.1 363.92 359.3
	+12.65	376.57		
107			11.1	365.5 362.0
+50			7.3	369.3 365.5
108			3.7	372.9 369.0
+50			T.P. 0.19	376.38 371.5
	+12.09	388.47		
109			11.1	377.4 372.0
110			7.7	380.8 377.0
Hub 111			4.75	383.72 379.0
112			3.00	385.5 380.0
113			3.8	384.7 380.0
114			5.6	382.9 379.0
	0.60	384.04	T.P. 5.03	383.44
115			3.4	380.6 376.0
116			6.1	377.9 374.0

C 3.5  
C 3.6  
C 3.5  
C 3.5  
C 3.5  
C 3.8  
C 3.8  
C 5.5  
C 4.7  
C 3.9  
C 3.9  
C 3.9

111+00 Plowed out replaced C 4.7

384.04

117+00			6.5	377.5	373.5	C 4.0
117+66	⊕ Paved Road		8.0	376.0	373.2	
118			7.4	376.6	373.0	C 3.6
119			6.6	377.4	374.2	C 3.2
			T.P. 5.84	378.20		
120	+ 7.49	385.69	6.8	378.9	375.5	C 3.4
121 +50			5.4	380.3	376.7	C 3.6
on Hub 122			4.70	381.0	377.4	C 3.5
+50			5.0	380.7	376.5	C 4.1
123-			7.1	378.6	374.7	C 3.9
+50			10.4	375.3	372.4	C 3.1
			T.P. 12.18	373.51		
124	+ 4.36	377.87	4.8	373.1	370.2	C 2.9
+25			10.3	367.6	369.8	
+39			12.1	365.8		
Wash +50			18.3	359.6	369.4	
+54			12.8	365.1		
125			8.1	369.8	369.5	C 3
+15			4.7	373.2		
+50			3.4	374.5	370.2	C 4.3
on Hub near +50			T.P. 3.45	374.22		
	10.35	384.77				
			2.46	382.31		
			T.P. 10.35	374.49		
	9.61	384.03				
126			10.6	373.4	371.0	C 2.4
+50			9.9	374.1	371.7	C 2.4
127			8.1	375.9	372.5	C 3.4
+50			7.2	376.8	373.2	C 3.6
128			6.7	377.3	374.0	C 3.3
+50			4.9	379.1	374.5	C 4.6
* Road +70			5.0	379.0		
129-			5.1	378.9	375.0	C 3.9
130			4.1	379.6	376.0	C 3.6
131 +50			2.5	381.5	377.5	C 3.8
134			1.6	382.4	379.2	C 3.2
+50			T.P. 0.86	383.17	381.1	C 2.1
133	10.14	393.31	6.3	387.0	383.0	C 4.0
+50			5.4	387.9	384.9	C 3.0
+45			5.0	388.3	383.5	C 4.8
135			8.5	384.8	382.5	C 2.3
+6.5			10.1	383.2		
on Hub 136+01.65			9.08	384.23		

386

Tie out Hub. Sta. 4+57.56 "Davis" Elev 382.18

382.0  
1.4  
383.8  
381.1  
2.7



Williams  
Dunkle  
C. Moore  
B. Moore  
Dec. 1 - 1919

28

Sta	+	+	-	Elev.	
		393.31			
137			9.5	383.8	✓
+80			10.0	383.3	✓
138			9.8	383.5	✓
139 -			6.5	386.8	✓
	+6.86	394.05	T.P. 6.1	387.19	
140 -			2.6	390.5	✓
141 -			3.1	391.0	✓
142 -			4.3	389.8	✓
143 -			6.8	387.3	✓
+55			8.1	386.0	✓
144			7.5	386.6	✓
145			5.5	388.6	✓
on Hub. +38.59			4.51	389.54	✓
146			3.9	390.2	✓
147			4.5	389.6	✓
	0.19	389.96	T.P. 4.28	389.77	
148		390.00	2.4	387.6	✓
149			4.9	385.1	✓
150			5.9	384.1	✓
151			6.7	383.3	✓
152			8.4	381.6	✓
153			10.2	379.8	✓
	0.26	380.05	T.P. 10.17	379.79	
154			2.8	377.3	✓
155			4.1	376.0	✓
156			5.2	374.9	✓
157			5.7	374.4	✓
158			6.5	373.6	✓
159			7.9	372.2	✓
	+ 1.83	373.90	T.P. 7.98	372.07	
160			3.7	370.2	✓
161			5.5	368.4	✓
162			7.5	366.4	✓
163			9.1	364.8	✓
164			11.8	362.1	✓
	+0.60	267.64	T.P. 11.86	362.04	
165			3.5	359.1	✓
166			6.0	356.6	✓
167			7.4	355.2	✓
168			8.1	354.5	✓
169			8.1	354.5	✓
170			8.2	354.4	✓
	4.67	359.21	T.P. 8.10	354.54	

	+	↑	-	Ex.
		359.21		
171 + 00			4.5	354.7 ✓
on Mon. + 77.49			3.57	355.64 ✓
High Cor. on Ground			4.60	354.61 ✓
172			4.70	354.5 ✓
173			5.10	354.1 ✓
174			5.0	354.2 ✓
175			4.11	355.1 ✓
176			3.0	356.2 ✓
177			1.1	358.1 ✓
			T.P. 1.01	358.20
	+ 8.72	366.92		
178			7.7	359.7 ✓
179			5.8	361.1 ✓
180			5.3	361.6 ✓
181			5.0	361.9 ✓
182			4.8	362.1 ✓
183			4.3	362.6 ✓
184			3.5	363.4 ✓
			T.P. 3.38	363.14
	7.20	370.74		
185			6.5	364.2 ✓
186			5.6	365.1 ✓
187			5.0	365.7 ✓
188			5.1	365.6 ✓
189			4.5	366.2 ✓
190			3.8	366.9 ✓
191			2.8	367.9 ✓
			T.P. 2.59	368.15
	+ 7.92	378.07		
192			8.9	369.2 ✓
193			7.5	370.6 ✓
194			8.1	370.0 ✓
195			5.7	372.4 ✓
196			1.6	378.5 ✓
			T.P. 1.86	376.21
	+ 2.23	378.04		
197			2.7	375.7 ✓
198			5.4	373.0 ✓
on Hub + 17.49			5.86	372.58 ✓
199			7.7	370.7 ✓
200			8.0	370.4 ✓
201			8.6	369.8 ✓
			T.P. 9.19	369.25
	+ 4.64	373.94		
202			7.1	366.8 ✓
203			9.6	364.3 ✓
204			9.1	364.8 ✓
205			6.3	367.8 ✓
			T.P. 5.95	367.99
	11.78	379.77		

B.M. on Granite Mass Pt. Cor.

7.20  
3.38  
3.82

366.02  
3.82  
370.74

	+	↑	-	Flor.	
		377.77			
206 + 00			8.7	371.1	✓
207			7.5	372.3	✓
208	10.42	385.96	4.3	375.5	✓
			T.P. 4.23	375.54	
209			7.4	376.6	✓
210			7.9	378.1	✓
211			6.2	379.8	✓
212			5.2	380.8	✓
			T.P. 5.38	380.58	
213	+ 11.19	391.77	9.0	382.8	✓
214			6.5	385.3	✓
215			4.3	387.5	✓
216			2.4	389.4	✓
217			1.9	389.9	✓
	+ 7.54	396.64	T.P. 2.67	389.10	
218			6.8	389.8	✓
219			8.0	388.6	✓
220			8.9	387.7	✓
221			8.0	388.6	✓
222			6.6	390.0	✓
223			4.0	392.6	✓
	+ 12.66	405.09	T.P. 4.21	392.43	
224			9.3	395.8	✓
<sup>center</sup> On Mon. P.L. Gen. + 56.5			8.27	396.82	
225			7.2	397.9	✓
226			5.3	399.8	✓
227			3.0	402.1	✓
	+ 6.08	409.06	T.P. 2.11	402.98	
228			5.1	404.0	✓
229			4.4	404.7	✓
230			6.0	403.1	✓
231			7.3	401.8	✓
232			9.8	399.3	✓
	+ 9.21	406.13	T.P. 12.14	396.92	
233			11.0	395.1	✓
+ 25			11.4	394.4	✓
234			7.3	398.8	✓
235			5.0	401.1	✓
236			4.2	401.7	✓
237			3.0	403.1	✓
238			4.5	401.6	✓
	+ 19.1	403.58	T.P. 4.46	401.67	

30

224 4569

P.O.T. Hub.

Station	+	-	Elev.
229		403.58	
240			5.5 398.1
241			8.9 394.7
242			8.2 395.4
243			7.3 396.3
244			6.5 397.1
245			7.1 396.5
246			8.1 395.5
247			8.1 395.5
T.P. 770			395.88
248	+10.59	406.47	10.5 396.6
249			10.7 395.5
250			8.4 398.1
251			3.64 401.83
T.P. 0.44			4.70 401.8
			1.2 405.3
	+12.02	419.05	406.03
252			10.1 409.0
253			6.6 412.5
254			4.9 414.7
255			4.8 414.3
256			3.9 415.2
T.P. 2.17			416.88
257	+9.86	426.74	10.2 416.5
258			8.2 418.5
259			6.7 420.0
260			4.8 421.9
261			4.1 422.6
262			4.2 422.5
263			5.2 421.5
264			6.5 420.2
T.P. 5.76			420.98
265	+30.1	423.99	5.2 418.8
266			5.59 418.40
267			6.3 417.7
268			8.0 416.0
269			9.6 414.4
270			10.8 413.2
271			12.2 411.8
T.P. 12.51			411.48
272	+2.51	413.99	3.7 410.3
273			5.3 408.7
274			7.3 406.7
Hub, P. of			T.P. 11.51 402.48
275	+0.77	403.25	5.7 397.5
276			8.0 395.2

Station	+	-	Elev.
415.2			
413.0			
2.2			
415.82			
2.00			
413.82			
420.0			
7.15			
427.15			
4.65			
422.50			
5.15			
417.35			
261+50			
415.2			
Bot 417.0			
SPILWAY			
6.4			
6.4			
5.60			
421.55			
Gate			
5.70			
421.45			
D.M. on Granite Man			
402.58			
416.0			
04.77			
8.95			
418.20			
Bot 413.0			
1+00			
C.28			
11.33			
415.82			
Open ditch Cr			
412.4			
1+25			
Ground			
EI.			
414.0			
412.2			
200.3			
422.00			
7.53			
421.47			
1.87			
423.34			
T.P.			
414.0			
11.13			
24 - 12" Pipe Overall			
12 - Space between 8" Drain			
11 = 8" main Tile drain			
45 = 3" below sub. Grade			
48 = Total			
412.21			
257 + 00			
Spilling			
7.43			
Outlet			
7.51			
Bot ditch			
12.49			
429.0			
421.6			
421.5			
417.1			
412.5			

	+	π	-	Elcv.	
269+95		403.25	11.1	392.2	
	0.29	378.63 TIP	12.91	390.34	✓
270+05			4.31	387.32	386.32
+15			10.0	381.6	380.6
+25	0.03	<sup>8</sup> 378.03	T.P. 12.63	<sup>8</sup> 378.00	
+35			4.0	375.0	374.0
			13.2	365.8	364.8
+45	0.58	<sup>5</sup> 368.74	T.P. 12.85	<sup>5</sup> 368.18	
			9.3	357.5	356.5
			T.P. 12.63	354.13	
+55	0.53	354.66	7.0	347.7	346.7
			T.P. 12.72	341.94	
+65	0.46	342.40	2.2	340.2	339.2
+75			9.8	332.6	331.6
			T.P. 12.91	329.49	
271	0.17	329.66	3.2	326.5	325.5
			12.9	316.8	315.8
			T.P. 12.75	316.91	
✓ +10	0.06	316.97	6.7	310.3	309.3
			T.P. 12.80	304.17	
+20	0.21	304.38	1.6	302.8	301.8
+30			8.7	295.7	294.7
	0.22	292.02	T.P. 12.58	291.80	
+40			3.7	288.3	287.3
+50			11.1	280.9	279.9
			T.P. 12.74	279.28	
+60	0.96	280.24	7.0	273.2	272.2
			T.P. 12.81	267.43	
+70	0.28	267.71	2.2	265.5	264.5
+80			9.3	258.4	257.4
			T.P. 12.68	255.03	
+90	0.31	255.34	4.3	251.0	250.0
272			11.9	243.4	242.4
			T.P. 12.43	242.91	241.91
+10	+ 0.17	243.08	7.1	236.0	235.0
			T.P. 12.63	230.45	
	+ 0.07	230.52			

	+	↑	-	Elev.	
272+20		230.52	13.	227.2	228.2
+30			6.0	224.5	223.5
+40			10.8	219.7	218.7
			T.P. 12.60	217.92	
+50	+ 0.54	218.46	4.5	214.0	213.0
+60			11.2	207.3	206.3
			T.P. 12.73	205.73	
+70	+ 0.62	206.35	5.4	201.0	200.0
+80			12.6	193.8	192.8
			T.P. 12.89	193.46	
+90	+ 0.0	193.46	6.9	186.6	185.6
			T.P. 12.60	180.86	
+0.16		181.02			
273			2.0	179.0	178.0
+10			8.5	172.5	171.5
			T.P. 12.61	168.41	
+0.50		168.91			
+20			3.3	165.6	164.6
+30			9.3	159.6	158.6
			T.P. 12.43	156.48	
+0.61		157.09			
+40			3.5	153.6	152.6
+50			9.5	147.6	146.6
			T.P. 12.70	144.39	
+0.55		146.94			
+60			2.9	142.0	141.0
+70			8.7	136.2	135.2
			T.P. 12.59	132.35	
+0.48		132.83			
+80			2.6	130.2	129.2
+90			8.4	124.4	123.4
			T.P. 12.78	120.05	
+0.29		120.34			
274			1.5	118.8	117.8
+15			9.4	110.9	109.9
			T.P. 13.01	107.33	
+0.36		107.69			
+30			4.5	103.2	102.2
+45			12.0	95.7	94.7
			T.P. 13.05	94.64	
+0.26		94.90			
+60			6.6	88.3	87.3
			T.P. 12.44	82.46	
0.43		82.89			

5' above 714475

		22.89			
274+75			2.5	20.4	79.4
+90			10.3	72.6	71.6
			T.P. 12.57	70.32	
275	0.43	70.75	3.9	66.9	65.9
+07 <sup>33</sup>			8.0	62.8	61.8
			T.P. 12.69	58.06	
+25	0.16	58.22	4.1	54.1	53.1
+40			10.3	47.9	46.9
			T.P. 12.70	45.52	
+55	0.27	45.79	3.5	42.3	41.3
+70 Hub			7.21	37.88	36.88
+80			10.3	35.5	34.5
276+0			11.6	34.2	33.2
Δ +50			14.2	31.6	30.6
277			12.0	33.8	32.8
+50			10.6	35.2	34.2
278			8.8	37.0	36.0
+50			8.6	37.2	36.2
279			8.9	35.9	34.9
P.O.T. +23 Hub	0.72	36.03	T.P. 10.48	35.31	34.31
280			3.2	32.8	31.8
+50			5.3	30.7	29.7
281+50			9.6	26.4	25.4
On Man P.L. Cr. 1320 1321 1325			10.86	25.17	24.17
Hub 282+04.91			10.45	25.58	
+50			12.2	23.8	22.8
			T.P. 12.00	24.03	
283+50	+113	25.14	7.3	17.9	16.9
284+50			12.8	12.4	11.4
			T.P. 12.33	12.83	
285+50	+0.99	13.82	8.2	5.5	4.5
286-			11.4	2.4	1.4
+50			12.6	1.2	0.2
	+4.77	6.89	T.P. 11.70	2.12	

280+18.87 line change from  
breakhead see page 39

B.M. 25.17

249+95.94  
224+56.49  
25-39.45

See page 39-41

	+	↑	-	Elev.	
287+50		6.89	4.9	2.0	1.0
288+50			5.0	1.9	0.9
289+50			4.9	2.0	1.0
290+50			5.6	1.3	0.3
291+50			4.7	2.2	1.2
292+50			4.8	2.4	1.4
			T.P. 410	2.79	
292+50	3.22	6.01	3.7	2.3	1.3
294+50			4.5	1.5	0.5
295+50			4.3	1.7	0.7
296+50			4.7	1.3	0.3
297+50			5.1	0.9	-0.10
298+50			5.5	0.5	-0.50
299+50			4.7	1.3	+0.3
			T.P. 398	2.03	
300+50	5.67	7.70	7.2	0.5	-0.5 ✓
301+00			7.1	-1.4	-2.4
301+50			8.1	-0.4	-1.4
301+75			6.4	+1.3	+0.3
P.O.T. 302+14	Sta. Fe. R.R.		1.85	5.8 on rail	4.85
302+36			3.5	4.2	3.2
302+52			8.1	-0.4	-1.4
303+00			8.3	-0.6	-1.6
304			8.4	-0.7	-1.7
305			8.6	-0.9	-1.9
306			8.7	-1.0	-2.0
			T.P. 209	-0.34	
307	4.58	+4.24	5.1	-0.9	-1.9
308			5.0	-0.8	-1.8
309			5.0	-0.8	-1.8
310			4.8	-0.6	-1.6
311			4.9	-0.7	-1.7
312			4.7	-0.5	-1.5
			T.P. 437	-0.13	
313	4.40	4.27	5.1	-0.8	-1.8
314			5.1	-0.8	-1.8
315			4.9	-0.6	-1.6
316			4.8	-0.5	-1.5
317			4.8	-0.5	-1.5
318			5.0	-0.7	-1.7
			T.P. 453	-0.26	
319	4.47	4.21	4.7	-0.5	-1.5
320			4.8	-0.6	-1.6
321			4.9	-0.7	-1.7



421

322 +00

323

324

5.0 -0.8 -1.8  
 5.2 -1.0 -2.0  
 5.7 -1.5 -2.5  
 T.P. 5.27 -1.06

325

3.80

2.74

4.4 -1.7 -2.7

326

4.5 -1.8 -2.8

327

5.0 -2.3 -3.3

328

4.8 -2.1 -3.1

329

4.8 -2.1 -3.1

330

4.6 -1.9 -2.9

T.P. 4.17 -1.43

331

4.05

2.65

5.1 -2.5 -3.5

+55

332

5.4 -2.8 -3.8

333

5.0 -2.4 -3.4

334

4.8 -2.2 -3.2

335

4.6 -2.0 -3.0

336

4.8 -2.2 -3.2

5.4 -2.8 -3.8

T.P. 4.87 -2.27

+40

11.80

9.58

10.4 -0.8 -1.8

+74

2.9 +6.7 5.7

+90:4 road

3.0 6.6 5.6

A 337 +22 on Hub

8.24

16.23

T.P. 1.59 7.99 6.99

338

7.7 8.5 7.5

339

6.1 10.1 9.1

340

3.9 12.3 11.3

A +2520

T.P. 2.95 13.38 on Hub 17.78

341

9.98

23.26

2.0 14.3 13.3

342

6.9 16.4 15.4

343

5.0 18.3 17.3

344

3.0 20.3 19.3

T.P. 0.12 23.14 22.14

11.73

34.87

345

11.2 23.7 22.7

346

10.3 24.6 23.7

347

6.9 28.0 27.0

+40

4.7 30.2 29.2

348

5.2 29.7 28.7

349

4.0 30.9 29.9

350

1.5 33.4 32.4

T.P. 0.85 34.02

12.03

46.05

351

10.2 35.9 34.9

352

8.1 38.0 37.0

See page 39-41

	+	T	-	Floy	
Hub 352		46.65	8.11	37.94	36.94
353			6.1	40.0	39.0
354			4.2	41.9	40.9
355			2.3	43.8	42.8
			T.P. 0.90	45.15	
356	10.10	55.25	9.1	45.2	44.2
Hub 735	Ref.		5.94	49.31	48.3
455			8.0	47.30	46.6
357			7.4	47.9	46.9
358			5.0	50.3	49.3
359			4.9	50.4	49.4
+40			2.4	52.9	51.9
360			0.8	54.5	53.5
			T.P. 0.39	54.86	
361	11.41	66.27	8.8	57.5	56.5
362			7.3	59.0	58.0
363			5.3	61.0	60.0
364			3.2	63.1	62.1
365			0.9	65.4	64.4
			T.P. 0.70	65.57	
366	+11.22	76.79	9.0	67.8	66.8
367			7.0	69.8	68.8
368			4.6	72.2	71.2
369			2.0	74.2	73.2
370			0.2	76.6	75.6
			T.P. 0.08	76.71	
on Hub 371	10.84	87.55	9.22	78.33	77.33
372			6.7	80.9	79.9
373			4.6	83.0	82.0
on Hub +15			4.51	83.04	82.0
374			2.40	85.2	84.2
			T.P. 0.67	86.88	
375	10.55	97.43	10.7	86.7	85.7
376			9.1	88.3	87.3
377			6.2	91.2	90.2
on Hub P. 378			4.71	92.72	91.72
378	75 East & Roadbed		4.5	92.9	91.9
379			2.8	94.6	93.6
380			1.0	96.4	95.4
			T.P. 0.16	97.27	
381	912	106.39	8.3	98.1	97.1
382			6.4	100.0	99.0
383			4.4	102.0	101.0
384			2.5	103.9	102.9
on Hub +64			T.P. 1.31	105.08	104.08
939		114.47			

APPROX E Road

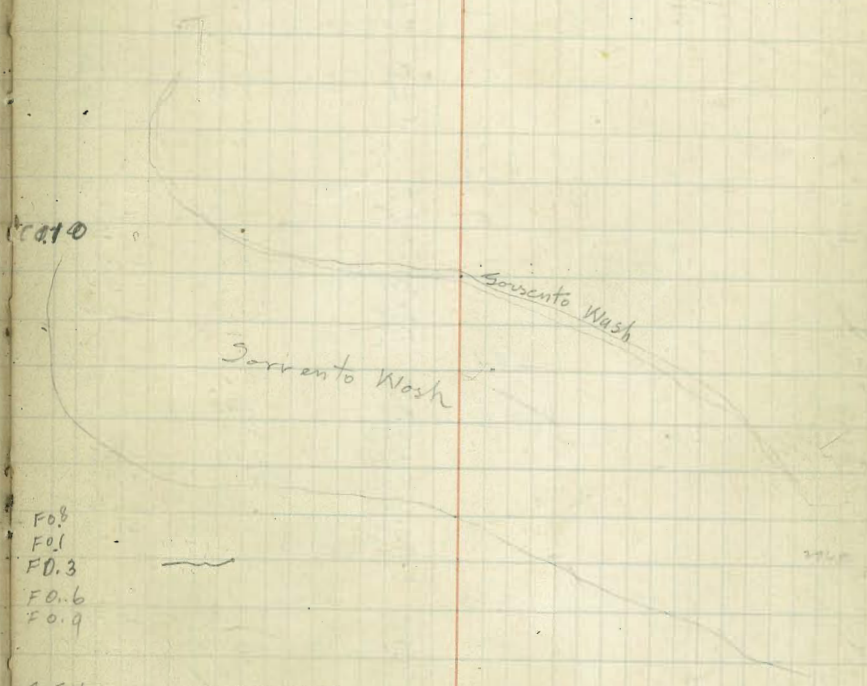


6377  
4080  
04.17

Levelson Line Change from Sta. 280+18.87 to

	+	π	-	Elev
				24.17
280+18.87	+ 7.60	31.77		
281			0.73	31.04
+50			4.0	27.8
282+04.64			5.4	26.4
283			6.06	25.71
			9.8	22.0
			T.P. 13.10	18.67
284	0.60	19.27	3.4	15.9
285			9.8	9.5
			T.P. 12.79	6.48
286	0.23	6.71	4.9	1.8 1.7
+50			6.4	0.3
287			5.2	1.5 1.7
+15			6.2	0.5
+45			4.6	2.1
288			5.8	0.9 1.7
289			6.0	0.7 1.7
290			5.6	1.1
			T.P. 4.73	1.98
291	4.13	6.11	5.9	0.2
+80			5.1	1.0
292			5.2	0.9 1.90
293			4.6	1.5 1.60
294			4.9	1.2 1.50
295			5.3	0.8 1.35
296			5.8	0.3 1.20
			T.P. 5.20	0.91
297	3.60	4.51	4.0	0.51 1.05
298			4.3	+0.2 +0.9
299			4.6	-0.1 +0.65
300			4.8	-0.3 +0.40
+35			4.9	-0.4 0.
301			5.6	-1.1 -0.20
302			5.4	-0.9 0.
			T.P. 4.74	-0.23
303	6.45	6.22	8.5	-2.3
+40			7.8	-1.6
304+03.70 on West Trail			1.41	4.81
+30			3.90	2.3
+45			8.1	-1.9
305+00			8.3	-2.1

B.M. on Men 1335-1367-1361



F0.8  
F0.1  
F0.3  
F0.6  
F0.9  
  
F.54  
0.7  
0.7 Fill Bottom Pipe  
  
0.9 Fill Bottom Pipe

6.22

306+	8.3	-2.1
307-	8.3	-2.1
+24.7	8.27	-2.05
	T.P. 8.16	-1.94
524	3.30	

on Corn Mon. N.E. Cor P.L. 1335

308	5.1	-1.8	-1.0
309	4.9	-1.6	-1.0
310	4.9	-1.6	-1.0
311	4.9	-1.6	-1.0
312	5.0	-1.7	-1.0
313	5.1	-1.8	-1.0
314	4.6	-1.3	-0.76
	T.P. 393	-0.63	

F 0.8 Top Corn Pier

4.16 3.53

315	4.6	-1.1	-0.63
316	4.5	-1.0	-0.5
317	4.8	-1.3	-0.64
318	5.1	-1.6	-0.78
319	5.1	-1.6	-0.72
320	5.2	-1.7	-0.86
	T.P. 4.49	-0.96	

F 0.5  
F 0.5  
F 0.7  
F 0.8  
F 0.7  
F 0.6

380 2.84

321	4.9	-2.1	-1.10
322	4.9	-2.1	-1.30
+11-13 on Hub - City Line	4.83	-2.0	
323	4.80	-2.0	-1.48
324	4.90	-2.1	-1.60
325	5.0	-2.2	-1.76
326	5.2	-2.4	-1.90
	T.P. 4.58	-1.74	

F 0.9  
F 0.8  
F 0.5  
F 0.5  
F 0.4  
F 0.5

3.97 2.23

327	4.8	-2.6	-2.0
328	5.1	-2.9	-2.2
+50	5.8	-3.6	
329	4.8	-2.6	-2.4
+40	5.7	-3.5	
330	5.0	-2.8	-2.6
331	5.4	-3.2	-2.8
332	5.8	-3.6	-3.0
	T.P. 5.14	-2.91	

F 0.6 Top Corn Pier  
F 0.5  
F 0.2  
F 0.2  
F 0.4  
F 0.6

4.10 1.19

333	5.0	-3.9	-3.0
+10	4.9	-3.7	-3.0
334	4.8	-3.6	-3.0
335	4.9	-3.7	-3.0
336	4.7	-3.5	-3.0
337	4.6	-3.4	-3.0
338	4.5	-3.3	-3.0

F 0.9  
F 0.7  
F 0.6  
F 0.7  
F 0.5  
F 0.4  
F 0.3

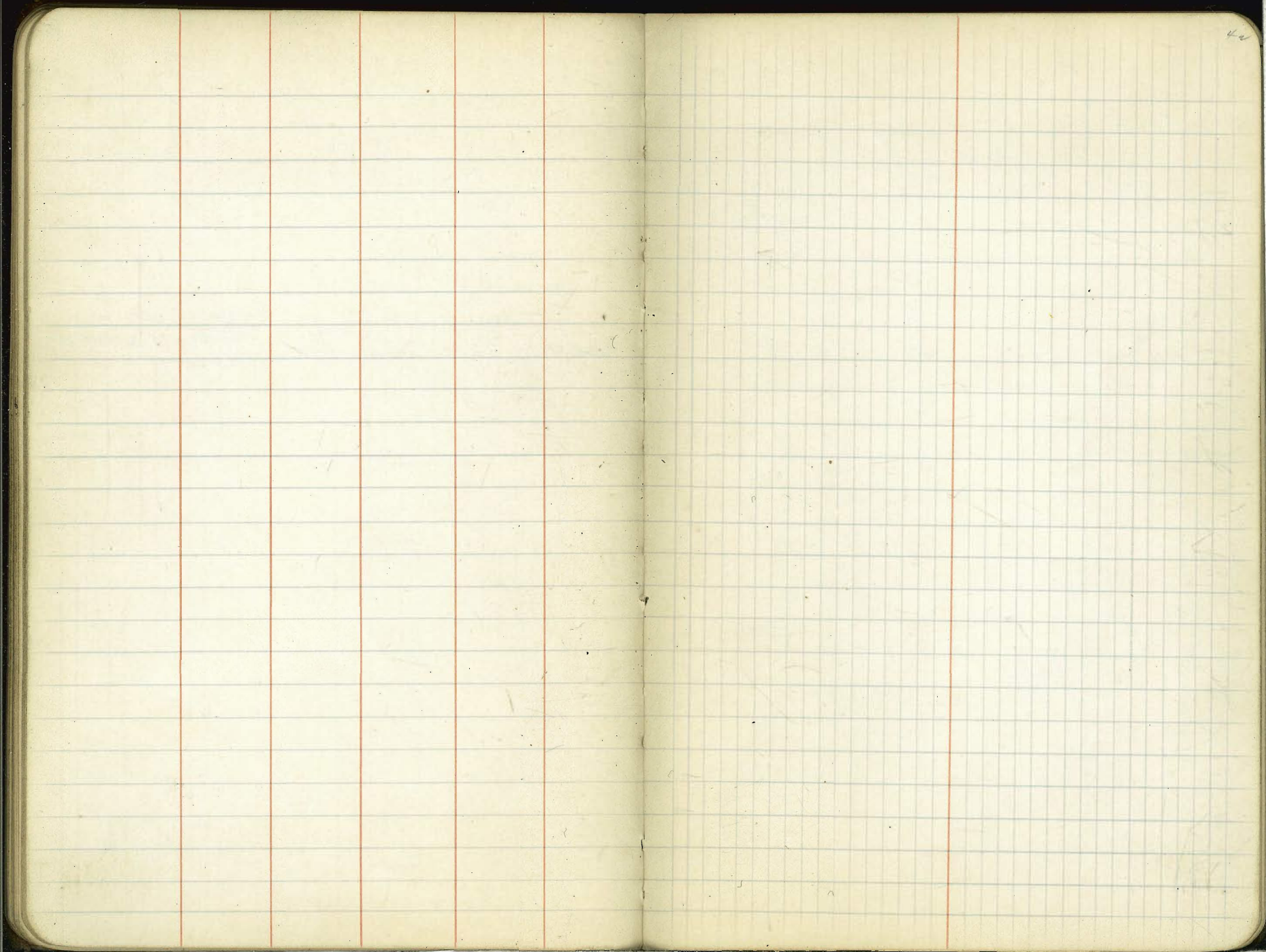
	128 <sup>v</sup>	119 10.30	T.P. 371	- 2.52	
339			13.6	- 3.3	- 3.0
+25			14.7	- 4.4	
+57	Road		10.2	+ 0.1	
+67			10.2	+ 0.1	
+75			12.6	- 2.3	
340			9.3	+ 1.0	
+60			2.5	7.8	
	9.92	19.66	T.P. 0.56	9.74	
341			7.4	12.3	
341 + 48.02	on Hub		3.18	16.48	
340 + 25.8	on Hub		7.41	12.25	

B.M. 12.28 on Hub Sta. 340 + 25.8 old Line  
 see page 36 for Continuation

341 + 48.02 =  
 342 + 84.75 ahead on  
 Old Line

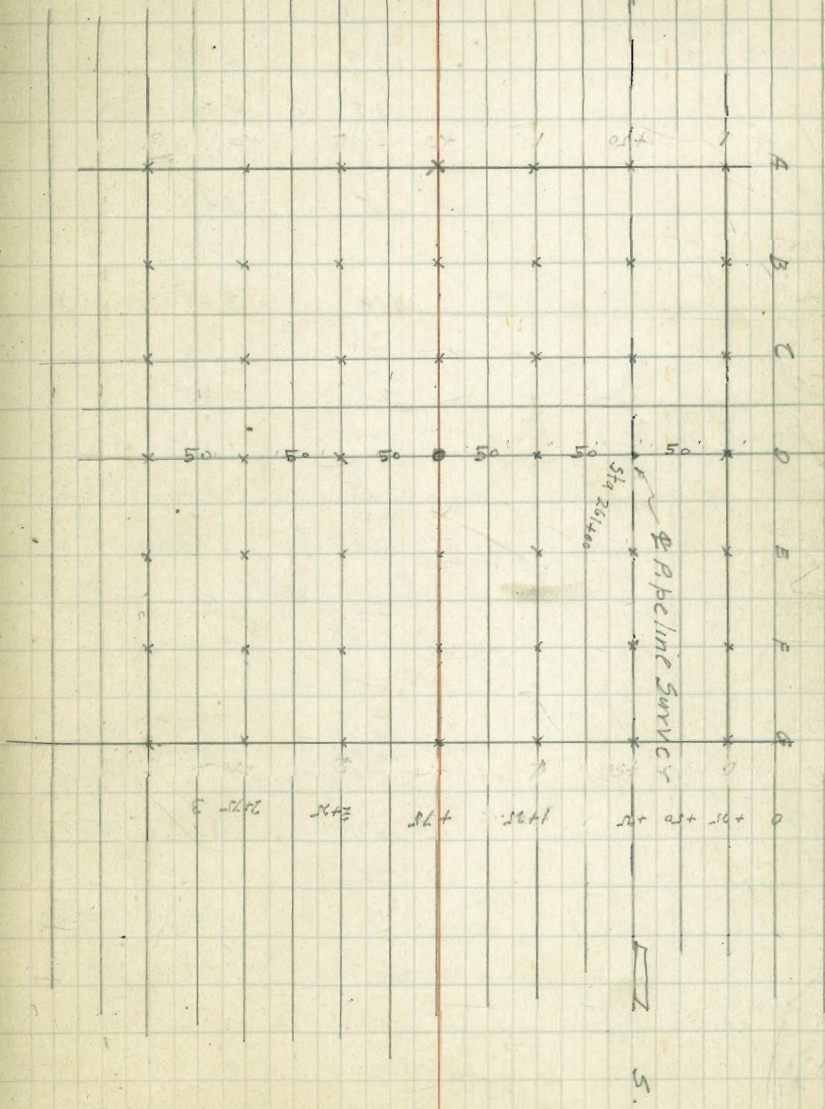
20 1/2  
 8  
 28 1/2

4.90  
 1.83  
 3.10  
 24 1/2  
 3.1  
 24 1/2  
 7 1/2



+	π	-	Elev	B.M
26.5+26.85 on Hub 9.26	427.66			418.40
	7.38	4.22	423.44	
0+00 D		12.70	418.1	
+50 D		9.8	421.0	
+75 D		8.27	422.55	
1+25 D		5.3	425.5	
	8.21	T.P 36.3	427.19	
1+75 D		7.5	427.9	
2+25 D		5.7	429.7	
2+75 D		4.8	430.6	
3+00		4.3	430.6	
3+25.5 Edge Road		5.9	429.5	

on Hub RL 2-61+00





	+	T	-	Flv
	7.29	352.16		344.87

on Hub 103+30

104+12.13 EC			2.8	349.4	346.0	03.4
104-			3.8	348.4	345.0	03.4
103+75			5.1	347.1	343.4	03.7
103+50			6.5	345.7	342.0	03.7
103+25			7.9	344.3	340.5	03.8
103+00			11.0	341.2	338.5	02.7
+ 75	0.04	T.P. 341.80	10.40	341.76	339.6	336.5
102+71			2.3	339.5		31
102+47.49 RC			5.13	336.7	333.6	03.1
102+00			9.30	332.5	329.0	03.5
101+75	0.29	T.P. 330.34	11.75	330.05	325.0	
101+50			5.8	324.5	321.0	
	0.35	T.P. 318.41	12.48	318.06		
101+00			4.20	314.2	310.0	
	0.29	T.P. 306.88	11.84	306.59		
100+50			3.20	303.6	300.0	
	0.07	T.P. 294.14	12.83	294.05		
100			2.6	291.5	288.0	
99+50			12.9	281.4	277.5	
	1.65	T.P. 283.50	12.27	281.85		
	0.76	T.P. 274.10	12.16	271.34		
99+00			3.7	268.4	265.0	
		T.P. 259.62	12.48	259.62		

667.5	667.5
333.75	333.75

329	329
12	21
341	334.5

4.6

	0.40	260.02		259.64	
98+50			2.3	257.7	254.0
98-			9.9	250.1	246.5
	1.71	249.09	T.P. 12.64	247.38	
97+50			7.8	241.3	238.0
97+00			13.5	235.6	232.0
	1.24	237.69	T.P. 12.64	236.45	
96+50			4.4	233.3	229.4
96-			6.0	231.7	228.2
95+50			5.5	232.2	229.1
95-			2.8	234.9	231.3
	11.85	248.52	T.P. 1.02	236.67	
94+50.69 EC.			7.92	240.6	237.0
94+50			7.9	240.6	237.0
94+25			4.6	243.9	240.4
94+00			1.8	246.7	243.1
93+75	1.99	T.P. 250.40	0.11	248.41	245.0
93+50			1.4	249.0	245.4
93+25			2.5	247.9	245.0
93+00			4.0	246.4	244.1
92+75			5.9	244.5	241.8
92+49.97 PC.			8.07	242.3	241.5
92+00			11.3	239.1	238.9
91+50			10.4	240.0	236.4
91+00			13.2	237.2	234
		T.P.	11.57	235.83	

✓ air gauge 250 feet above gauge to top Reservoir 78.4

GV

46

				238.83	
	0.17	239.00			
91+00			1.7	237.3	234.0
90+50			9.5	229.5	226.0
			T.P. 12.56	226.44	
	0.30	226.74			
90+00			8.6	218.1	214.4
			T.P. 12.33	214.41	
	0.31	214.72			
			12.05		
	0.10	202.77		202.67	
89+50			1.5	200.3	
			T.P. 12.74	190.03	
	0.22	190.25			
89-			5.4	184.8	
			T.P. 12.34	177.91	on Pot.
	0.21	178.12			
			T.P. 12.58	165.54	Top 88+00
	0.47	166.01			
88+50			1.2	164.8	
			T.P. 12.62	153.37	
	0.53	153.90			
88+00			9.8	144.1	
			T.P. 12.30	141.60	
	0.93	142.53			
			T.P. 12.80	129.73	
	1.35	131.08			
87+50			6.0	125.1	
			T.P. 12.80	118.28	
	0.10	118.38			
87+00			12.2	106.2	
			T.P. 12.41	105.97	
	0.93	106.90			
			T.P. 12.51	94.39	
	1.48	95.87			
86+50			3.9	92.0	
86+00			9.6	86.3	
			T.P. 8.93	86.94	Top 86+00

85+67.82 EC	1.37	88.31	70.3	86.94	81.3
85+50			10.7		79.6
		TP.	12.96	75.35	
85+25	2.30	77.65	3.0	74.60	
85+00			6.7		70.9
84+75			10.6		67.0
	3.94	TP.	12.73		64.92
		68.84			
			2.70	66.14	66.49
84+50			4.60		64.2
84+25			7.4		61.4
84+00			8.9		59.9
83+75			16.7		58.1
83+50			12.3		56.5
83+39.18 EC.			13.03		55.8

55.81

B. Mon. Fire Hydrant Post.

249.95.94

10.63 413.46

0.59 412.87

8.49 421.36

0.28 421.08

8.05 429.13

A 261+50

8.6 420.5

A 262

8.7 420.4

A +50

9.0 420.1

A 263

9.2 419.9

A +50

9.3 419.8

B 263+50

7.7 421.4

B 263+43

9.0 420.1

B 263

9.6 419.5

B 262+50

8.9 420.2

B 262

8.3 420.8

B 261+50

7.8 421.3

C 261+50

5.5 423.6

C 262+00

6.8 424.3

C 262+50

7.5 421.6

C 263+00

8.7 420.4

C 263+40

9.2 419.9

263+50 C

7.0 422.1

D 263+50

6.1 423.0

263+45 D

7.1 422.0

263+00 D

6.8 422.3

262+50 D

5.9 423.2

24.17

402.83

B. Men Men Cor P.L 1335-1362-1361

Gm. m. m.

A line EAST EDGE Bottom  
 B 3050' west  
 C 100' west  
 D 110' west  
 E 700' west

28

	+	∓	-	Elev
D 262		429.13	5.0	424.1
D 261+50			4.0	425.7
E 261+50			2.0	429.1
E 262+00			3.2	425.9
E 262+50			4.1	425.0
E 263+00			4.8	422.3
E 263+31			4.9	422.2
E 263+50			2.5	426.6
			5.23	423.90
260+50 Pipelme			7.03	422.10

2.49	426.39	10.78	423.90
1.9	417.31	12.65	415.41
2.50	407.16	4.27	404.66
			402.89

10.04      433.94      3.90      430.00

7.90      431.84      423.90

12.3	419.5	419.13	E.04
13.6	418.2	419.3	F.1.1
13.6	418.2	419.5	F.1.2
13.1	418.70	419.5	F.0.8
12.7	419.14	419.63	F.0.5
13.6	418.2	419.70	F.1.5
13.2	418.6	419.80	F.1.2
11.2	420.65	419.95	E.0.7
12.2		419.60	

427.94  
6.57  
421.00  
421.9

423.90  
0.00  
427.94  
2.30  
419.60  
4.00      259

103+30.00  
83.51  
102+47.49

9046      4 43      .02151

425.22  
6.43

420.25  
1.43

423.90  
+ 7.53  
431.43

B.M. in Pole 423.90 New Pole NE Cor Corral

402.83 check back

P.M. in Pole NE Cor Corral 423.90

402.83

Sta. Lev. + - Elev.  
Levels on long tang across Biological flats

Sta.	Lev.	+	-	Elev.
48+74.64 EC	1.40	33.74		32.30
0+00			1.40	32.30
0+00 N. Eon Hub			1.65	32.09
1			4.3	29.4
2			7.3	26.4
3			11.0	22.7
	T.P. Top 3+00		10.13	23.61
4	+0.66	24.27		
5			3.3	21.0
6			6.3	18.0
7			7.9	16.4
8			9.4	14.9
	T.P. Top 8+00		10.7	14.1
			9.93	14.34
9	2.40	16.78		
+10			3.0	13.8
+15			2.9	13.9
+70			2.2	14.6
10			2.5	14.3
11			3.9	12.9
12			5.3	11.5
13			4.7	12.1
Sct B.M. on Pole No 10237 - 3d E of 13+60			3.9	12.9
14			2.9	13.86
15			3.3	13.5
	T.P. Top 15+00		1.4	15.4
		26.05	0.62	16.16
16	7.89		7.8	18.2
17			4.8	21.2
+17 Hub			3.67	22.38
+17 15' E on Hub Tie out			3.79	22.26
18			2.80	23.2
19			1.50	24.5
	T.P. Top 19+00		0.61	25.44
	+ 7.5	32.59		
20			6.6	26.0
21			5.5	27.1
22			4.9	27.7
23			4.0	28.6
24			3.6	29.0
25			4.3	28.3
Sct B.M. Nail Pole No 10245 E of 26+60			2.90	29.69
26			5.6	27.0
27			4.8	27.8
	T.P. Top 27+00		4.22	28.37
	12.32	40.69		
28			10.3	30.4
29			7.7	33.0
29 3' east Top bank			6.7	34.0

48+74.64 EC. 48+74.64

Grade	Cut
29.0	3.3
26.7	2.9
23.5	2.9
20.5	2.2
17.5	3.5
15.0	3.0
13.5	2.9
12.0	2.9
11.0	3.1
10.5	3.3
10.0	2.9
9.5	2.0
9.5	2.4
10.0	2.9
11.0	2.5
12.5	2.9
15.0	3.2
18.0	3.2
20.0	3.2
21.5	3.0
22.5	3.5
23.0	4.1
23.66	4.0
24.33	4.3
24.99	4.0
25.66	3.6
26.33	2.7
27.00	2.8
27.5	2.9
30.0	3.0

Handwritten calculations and notes on the right page.

1451  
1416  
35.25

32.26  
3.32  
25.58

102.5  
102.5  
157.0

37.0  
31.0  
68.0  
46.5  
58.5

30.53

24.09 T.P.  
5.93  
33.20

0.232  
4.4  
1.03  
13.4  
11.60  
4.28  
16.44

487.46  
17.51  
667.86

263.1  
2.0

37.30  
7.13  
39.43

26.70  
9.73

0.232  
11.60  
7.29  
26.60  
2.0

25.67  
7.78  
33.45

2.9  
10.43

26.60  
2.0

24.92  
8.53

24.3  
8.7

24.32  
7.12

24.0  
24.0  
4.9  
27.24  
24.3

24.0  
24.0  
24.0

24.0  
24.0  
24.0





Del Mar Pipe Line Change of Alignment to miss Rose - Loughery Property

EC 85+67.84

P.I.  $\frac{84+54.0}{84+73.0}$

413°06' RT  
 R=1000'  
 T=114.82'  
 L=228.64'

P.C.  $\frac{83+39.18}{42+81.56}$

$\frac{24+63.50}{39+46.53}$   
 16.77

$\frac{93+91.95}{85+67.32}$   
 82.416

$\frac{94+78}{86+53.84}$

$\frac{85+67.52}{86+53.84}$

$\frac{127.1}{85+67.32}$   
 86.732

$\frac{29.50}{85+67.52}$   
 85.9732

86.02

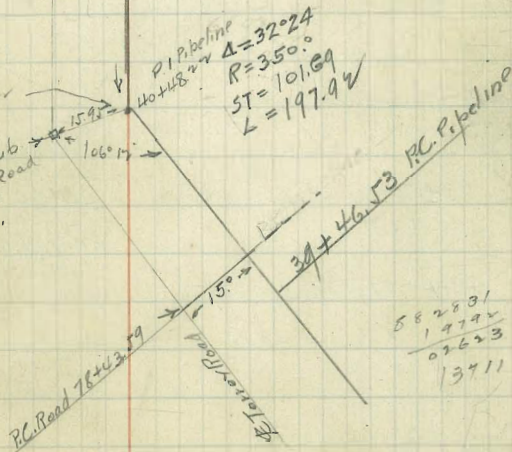
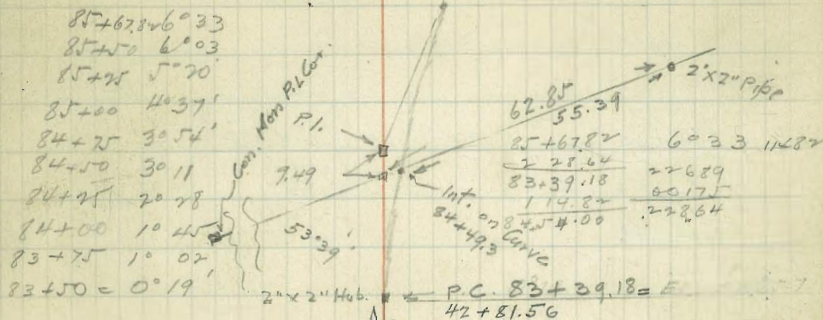
+44.45 = 16°12'  
 +25 = 140°26'30"  
 41- = 12°33'45"  
 +75 = 10°31'  
 +50 = 8°28'11"  
 +25 = 6°25'30"  
 40+0 = 40°24'  
 +75 = 2°20'  
 39+46.53 = 0°00'

Ex. 00657

$\frac{64.25}{7.46}$   
 55.39

$\frac{11 \times 63}{25} = \frac{73.19}{25} = 2.9276$

Williams  
 Keeler April 15  
 Corrol. -102



Change of Alignment PL 12 98 Through Biological

P.T. 104+12.13

P.I. 103+30

P.C. 102+47.49

Ref. 101+50

P.T. 94+50.69

P.I. 93+50.0

P.C. 92+47.97

$\Delta = 90^\circ 26' 14''$   
 $R = 1000'$   
 $T = 82.51$   
 $L = 164.64$

$\Delta = 110^\circ 30'$   
 $R = 1000'$   
 $T = 100.69$   
 $L = 200.92$

		set Hub	157.08
			107.76
			164.64
			102.47.49
		1st Hub R.P. 50°	10414.12
40 43' 00"	104+12.13		
40 27' 20"	104+00		
30 39' 20"	103+75		
20 56' 20"	103+50		
20 13' 30"	103+25	90°	43'
			420
75' 10 30 70'	103+00	set Hub	470.20
25° 47' 20"	102+75		
025' = 4' 20"	102+50		

	125
1000	1125
	470.20
	43
	1030.20
	43
	2073.40
	43
	2056.20
	43
	3037.20
	43
	4022.20

94+50.69 5° 45'  
 94+75 5° 01'  
 94+00 4° 18'  
 93+75 3° 25'  
 93+50 = 2° 52'  
 93+25 = 2° 09'  
 93+00 = 1° 26'  
 92+75 = 0° 40'

5° 45'	10069
	1199
	10073
	20072
	1° 26
	43
	20 01
	43
	20 52
	43
	30 35
	43
	40 18
	43
	50 01

U.S.G.S. BM USCA 6.119 above city (6.00 Elev = U.S.G.S. 6.119)

April 28-1920  
Williams  
Keeler  
Dick

Levels on change of Alignment from END Kings Line to Int. with Line P. 21335 Produced

	+	X	-	Elev.
	5.59+	15.51		
King Hub 125+72.90 = on Hub. End King line			6.77	8.74
187+98.80 BC			5.2	10.3
188+25			5.5	10.0
+50			6.6	8.9
+75			7.2	8.3
189			7.7	7.8
+15			7.6	7.9
189+38.56 EC on Hub			7.83	7.68
190			9.50	6.01
191			10.1	5.4
192			9.9	5.6
		TP 7.90	9.23 T.P.	6.28
193	+1.6v		2.80	5.1
194			4.0	3.9
195			5.6	2.9
+40			3.6	4.5
196			3.2	4.7
197			2.7	5.2
	317	10.03	1.04 T.P.	6.86
198			3.2	6.8
199			4.3	5.7
200			4.0	6.0
201			4.7	4.3
202			5.1	4.9

Nail in  
1.92 B.M. on Fence post angle in S. E. P. of Wax fence

Location for meter

	+	$\pi$	-	Elev
+75 Top slope		10.03	4.1	5.9
203 approx Pavement			2.8	7.2
Mon. Cityline H.S. Road C.			3.83	6.20
203 +50			4.7	5.3
204			4.8	5.2
T.P. Top of Lot 204	8.06	14.19	3.90 T.P.	6.13
205			7.1	7.1
206			5.5	8.7
207			4.0	10.2
208			3.3	10.9
209			2.8	11.4
	6.99	18.44	2.74 T.P.	11.45
210			6.9	11.5
210 + 0.72 PC			6.9	11.5
+50			6.0	12.4
211			5.3	13.1
+50			5.5	12.9
212			6.1	12.3
+41.80 EC. on Hub			6.48	12.16
213			6.40	12.2
214			5.80	12.6
			5.28 T.P.	13.16
215	+3.32	16.48	4.9	11.6
216			5.4	11.1
216 + 25			5.3	11.2
+30			7.6	8.9

	+	X	-	Elev.
216+55		16.48	8.0	8.5
+60			6.0	10.5
217			6.8	9.7
218			9.4	7.1
219			11.8	4.9
+20			12.3	4.2
+25			11.0	5.5
+50			11.1	5.4
+60			12.5	4.0
	7.37	12.69	11.16 T.P.	5.32
220			9.3	3.4
221			9.3	3.4
222	on Hub		7.6	5.07
223			4.2	8.5
224			3.7	9.0
225			3.6	9.1
226			3.3	9.4
	7.16	17.25	2.60 T.P.	10.09
+65			7.1	10.1
227	on Hub.		4.40	12.85
227+41.15	on Hub		5.10	12.15
+75.0			6.60	10.65
+85			6.3	10.9
+90			7.6	9.6
228			7.6	9.6
+25			7.2	10.0
+50			7.3	9.9
228 +69.15 EC. on Hub.			7.5	9.72
229			9.0	8.2

Top 4'x4' Marker S. Side St

	+	↑	-	
		17.25		
229+50			10.3	6.9
230			8.6	8.6
+70			5.6	11.6
+75			7.2	10.0
231			7.2	10.0
+10			6.9	10.3
+15			5.7	11.5
232			4.9	12.3
			4.54 T.P.	12.71
	+ 3.90	16.61		
232+50			4.8	11.8
233			6.9	9.9
234			6.3	10.3
235			10.6	6.0
236			10.4	6.2
237			7.2	9.4
+50			7.3	9.3
237+81	EC. 6.92	13.56	7.97 T.P.	6.64
238			7.3	6.3
+45			6.6	7.0
+85			6.9	6.7
239			8.2	5.4
240			10.6	3.0
241			10.8	4.8
242			10.6	3.0
			10.43 T.P.	3.13
243	4.48	7.61	4.65	2.96
244			4.7	2.9

↳ of Highway  
Edge of "

↑  
7.61

245	4.7	2.9
246	4.8	2.8
247	5.0	2.6
247 + 0.21 = F.C. New Line	4.93	2.68
334 + 4.11 old Line	5.0	2.6
334		
333	4.9	2.7
335	5.0	2.6

58  
6.2  
~~6.6~~  
6.3

- 3.6

- 3.9

- 3.7

612

6.2

6.6

6.3

4.55  
3.03  
1.52

269  
274  
275  
278

302450

20" C.I. Pipe Inside bell 1'70"  
spigot 1'70"  
outside bell 2'2 1/2" 1'1 1/4"

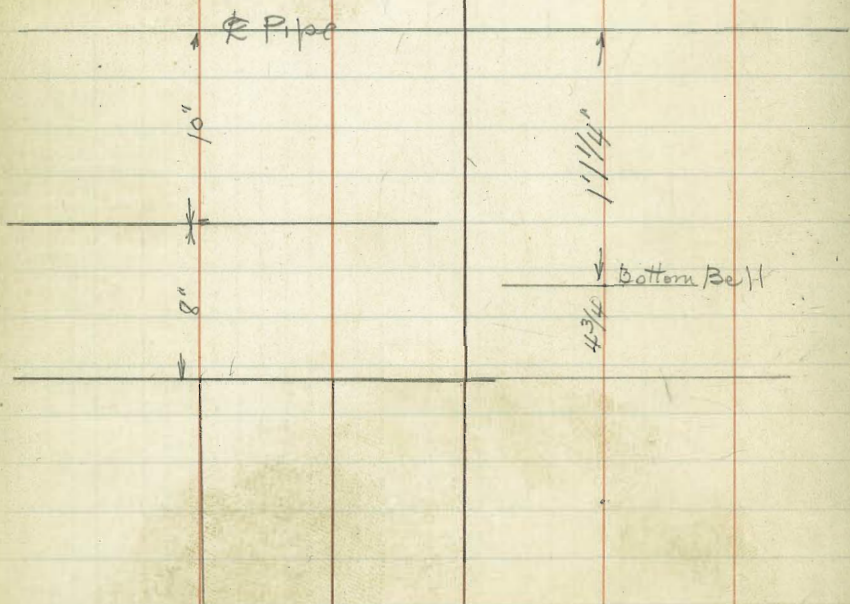
18" W.S. spigot 1'8"

4 3/4 = .38

18"

18"

4.56





Change of Location on pipe Line from End of Kings Survey to Sta

203+00  $\Delta 2^{\circ} 52' Lt$

202+00  $\Delta 2^{\circ} 52' Rt$

196+00 =  
10 + 51.85 City Line

189+38.56 EC

188+69.75 P.I

187+98.80 BC

$\Delta 24^{\circ} 19' Lt$   
R = 330  
T = 70.95  
L = 139.76

City Line  
10 + 51.85 =  
196+00

City Line  
10+00

184+38.56 =  $12^{\circ} 08' 40''$   
189+95 =  $10^{\circ} 58'$   
189+00 =  $8^{\circ} 48'$   
188+75 =  $6^{\circ} 37'$   
188+50 =  $4^{\circ} 27'$   
188+25 =  $2^{\circ} 16.30''$   
187+98.80 =  $0^{\circ} 00.00''$

EAST LINE CITY SAN DIEGO

Line through west  
0.47

15'

10.5

10.5

0.47

230  
207  
201  
194  
187

217+00 Set Hub. pot.

216+71.59 Street Cor.

216+21.59 Sheet Cor.

212+41.80 EC.

211+22.29 P.I.

$\Delta = 13.45$   
 $R = 1008.0$   
 $T = 120.57$   
 $L = 239.98$

210+01.72 BC.

209+12.37

23+62.55 city line survey

196+00 3362.55 12.37  
1310.70 1057.85 10.70  
209+10.70 1310.70 1.67

6052'30" 61  
27689  
01309  
23998

5000  
1.72  
48.28  
02414  
1000 26.14

Found 2"x2" Hub 23.5

Found 2"x2" Hub 23.5

35.0 Linepoles

35.0 Linepole

Set Hub

Set Hub

Set Hub

212+41.80 = 6052'30"

212+00 = 5041'

211+50 = 4015'

211+00 = 2049'

210+50 = 1023'

EC, 210+01.72

1023.  
25 = 1026

2069

1126

4015

1026

5041

4180

2090

1012

6053

25.00  
- 1.15  
-----  
23.85

227+80.08  
25.00  
-----  
228+05.08  
15  
-----  
228+05.23

232+50.00 Ref.

set 1" x 1" Hub.

228+69.15 EC.

228+69.15 = 3040

2" x 2" Hub  
ST. Cor.

EC. set 1" x 1" Hub

228+50 = 3007

228+05.23 P.I.

A = 7° 20'  
R = 1000.0'  
L = 128.0'  
T = 64.08

228+25.00 20 34'

228+00 10 41'

227+75 0 58'

227+41.15 0 00'

227+80.08  
227+41.15 BC.  
227+00 Ref.

227+80.08 = 2" x 2"  
ST. Cor.

B.G. set 1" x 1" Hub

222+51.5 2" x 2"  
ST. Cor.

222+01.5 2" x 2"  
ST. Cor.

1" x 1" Hub.

222+00 Ref.

247+09.21 = EC New Line  
334+41.11 BC. Old Line

339+41.15 P.I. old Line  
242+81.90 P.I.

237+81.86 BC.

$A = 53^{\circ}08'$   
 $R = 1000.0$   
 $T = 500.04$   
 $L = 927.35$

247+09.21 =  $26^{\circ}34'$   
247+00 =  $26^{\circ}19'$   
246+00 =  $23^{\circ}27'$   
245+00 =  $20^{\circ}35'$

244+00 =  $17^{\circ}43'$   
243+00 =  $14^{\circ}51'$

242+00 =  $11^{\circ}59'$   
241+00 =  $9^{\circ}07'$  ✓

240+00 =  $6^{\circ}15'$

239+00 =  $3^{\circ}23'$

238+00 =  $0^{\circ}31'$

237+81.86 =  $0^{\circ}00'$

202+92.49 EC

P.I.  
201+09.6

$\Delta = 28^{\circ}33'$   
R=750  
T=190.83  
L=373.72

199+18.77 RC.

196+68.96 EC

P.I.  
193+85.45

$\Delta = 17^{\circ}32'$  Rt  
R=500  
T=84.82  
L=168.31

195+90.63 P.C.

192+87.88 Rot.

192+00

551°00E

550.94

x

725.48

x

EC 202	+92.49	14°16'30"
	+75'	13°35'50"
	+50'	12°38'35"
	+25'	11°41'20"
202		10°44'05"
	+75'	9°46'50"
	+50'	8°49'35"
	+25'	7°52'20"
201		6°55'05"
	+75'	5°57'50"
	+50'	4°00'35"
	+25'	3°03'20"
200		2°06'05"
	+75'	1°08'50"
	+50'	0°11'35"
	+25'	0°14'20"
199+18.77		0°00'

$\Delta = 28^{\circ}33'$   
R=750  
T=190.83  
L=373.72  
E=23.87

+68.96	8°46'00"
+50'	7°47'05"
+25'	6°28'52"
196	5°10'29"
+75'	3°52'26"
+50'	2°34'13"
+25'	1°16'
193+00.63	0°00'

$\Delta = 17^{\circ}32'$   
R=500  
T=84.82  
L=168.31

El. 112.51 on Hub

El. 116.0  
Gr 111.0

-1.846 Gr



Capacity 3000,000-24hrs 125,000 pr. hour  
 2083 gals pr minute 34.72 gals pr second  
 Actual Lift = 284.8 ft + friction 2.44  
 Total Lift = 287.44"  
 Actual H.P.

EC.  $238 + 04.65 =$   
 $339 + 48.57$  old line across flat

236 + 27.45 P1

234 + 20.95 P6

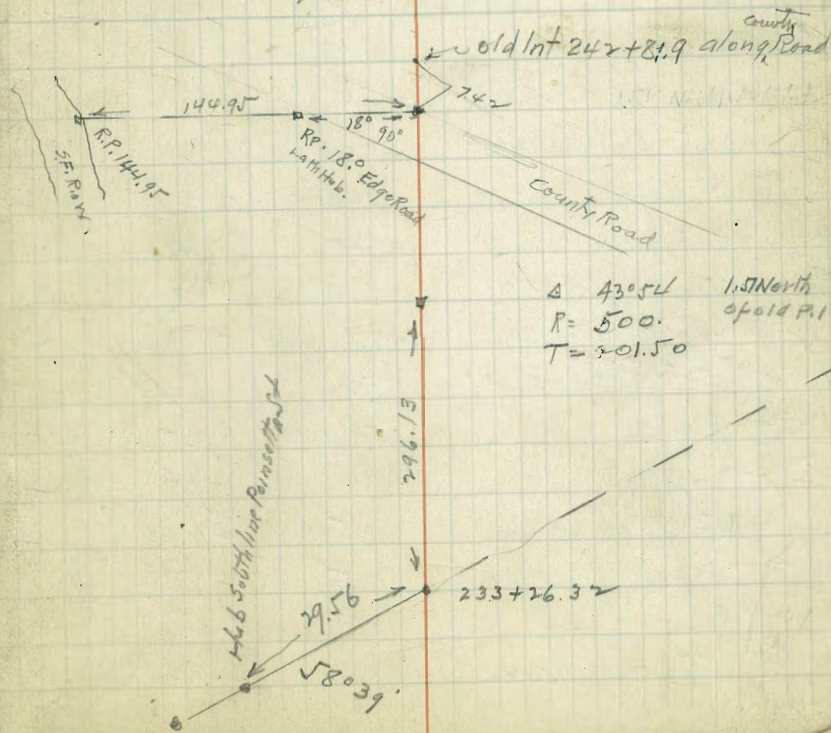
233 + 26.32 Int E. Line Del Mar Heights

$\Delta = 430.54$  Rf  
 $P = 500$   
 $ST = 201.50$   
 $L = 38310$

4763

913.93

66  
 Capa. 3,000,000 2084 min 25 Sec  
 Total Lift 284.8  
 Length • 1780 = 1365 grad Measurement  
 Friction  $\frac{2.44}{287.44}$   
 215 H.p. 70% Efficiency 250 H.P.M  
 160 K.W @  
 195 K.W. 87% @  
 $240 \times 195 = 46800$  KW @ 20  
 290 per Hour 1,000,000 gals  
 103.1 pr 1000 gals



$\Delta = 430.54$  1.5 North  
 $R = 500.$  of old P.1  
 $T = 201.50$

+      π      -      Elev.

Santa Fe Crossing

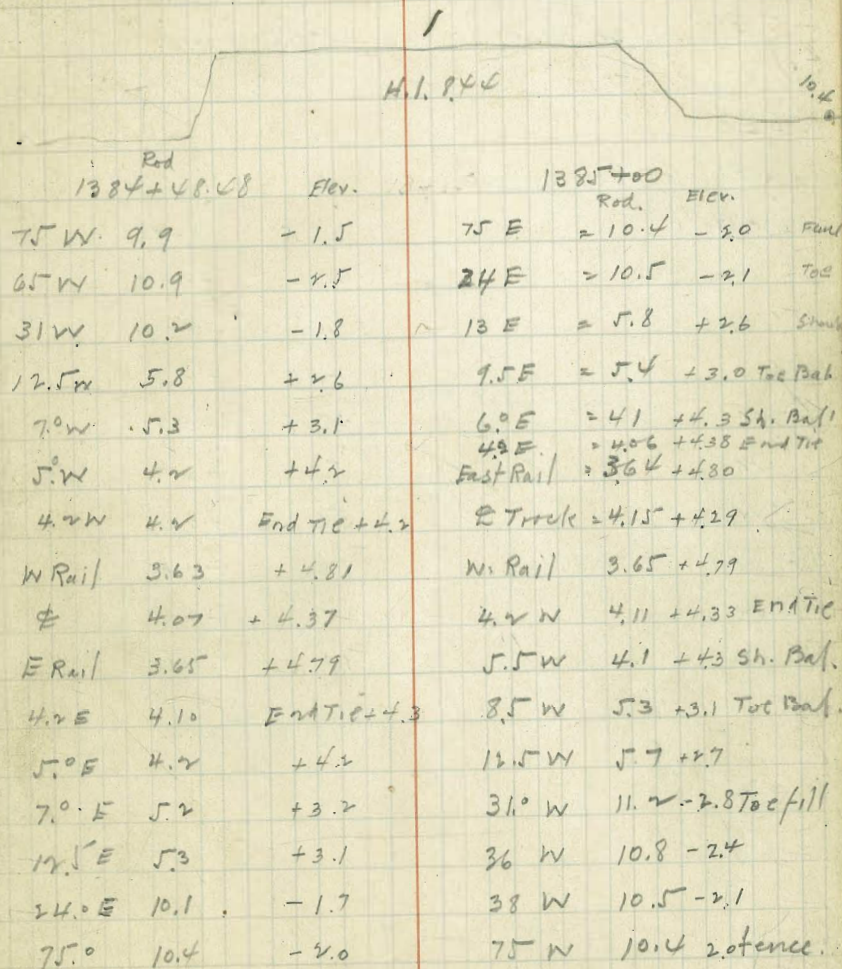
8.67      8.44

302+50		8.6	-0.8
+60.25	Fence int Row	9.2	-0.8
+75.0		10.2	-1.8
303+00		10.7	-2.3
+09.		11.1	-2.7
+12		10.7	-2.3
+25		10.5	-2.1
+50		9.4	-1.0
+65		8.2	+0.2
+79		6.0	+2.4
+88	Toe Ballast	5.4	+3.0
+96.5	Shoulder Ballast	4.2	+4.2
Rail West		3.63	+4.81
304+03.25	Truck	4.07	+4.37
Rail East		3.65	+4.79
+12.5	Shoulder Ballast	4.1	+4.3
+18.5	Toe Ballast	5.3	+3.1
+29		5.9	+2.5
+47		10.0	-1.6
+75		10.5	-2.1
305		10.5	-2.1
+25		10.5	-2.1
+46.55	Fence Row	10.6	-2.2

Williams  
C Moore May  
Keeler

67

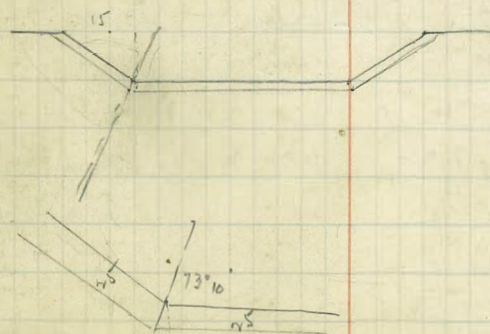
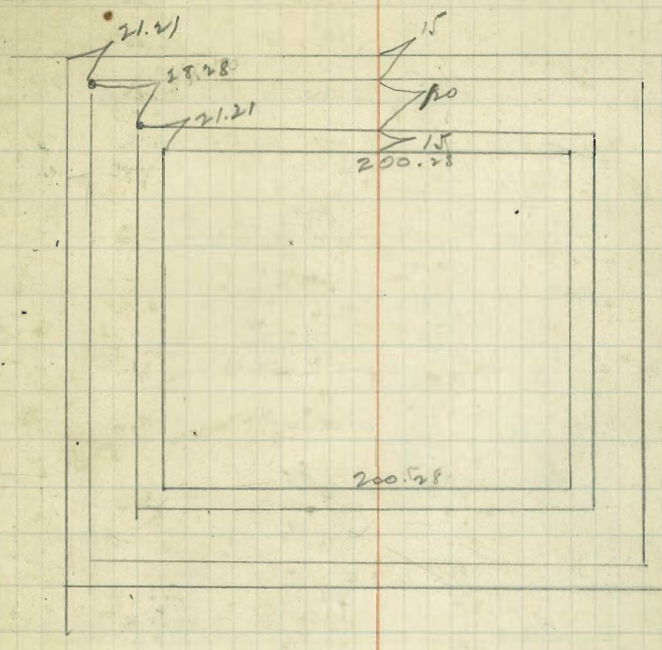
302+00 Top Lat 6 BM - 0.23





	+	⊥	-	Elev.
		8.40		
			1384+00	
75° E fence			10.3	-1.9
25° E	Toe slope		10.3	-1.9
12.5° E	Sh. slope		5.3	+3.1
8° E	Toe Ballast		5.0	+3.4
5.5° E			4.1	+4.3
4.2° E	End Tie		4.1	+4.3
East Rail			3.65	+4.79
R on Hub			4.04	+4.40
W Rail			3.65	+4.79
4.2° W			4.1	+4.3
5° W			4.2	+4.2
8° W			5.2	+3.2
12.5° W			5.6	+2.8
32° W	Toe Hill		9.8	-1.4
69° W			10.8	-2.4
75° W	fence		9.9	-1.5

49.50	1.41421	1.41421	1.41421
21.21	11	35	50
70.71	707105	707105	7071050
	141421	424263	
	21.21311	49.49935	
1.41421			
20			
25.28420			
			21.21
			28.28
			21.21
			70.70



1.50038

56.19
90.00
146.19
73.10
90.00
16.50
1.20417
25
1512.76
608.10
7548.31

423.90  
 7.59  
 431.49  
 11.47  
 420.02  
 4.05  
 424.07

419.63	419.75	419.88	420.0	420.13
419.56				420.86
419.50	419.63	419.76	419.88	420.0
419.44				419.94
419.38	419.5	419.63	419.75	419.88 N
419.34				419.84
419.26	419.38	419.5	419.63	419.76
419.20				419.70
419.13	419.45	419.38	419.50	419.63

7.82      431.72      423.90      137  
 80

423.90  
 7.83  
 431.73

419.63	12.09
419.76	11.96
419.88	11.84
419.75	11.97
419.63	12.09

34

431  
 935  
 396

House south of P.L. 1785 La Jolla

423.81	419.26	4.55	5.88	419.13	4.68
	419.38	4.43		419.25	4.56
	419.50	4.31		419.38	4.43
419.94	419.63	4.18		419.50	4.31
	419.76	4.05		419.60	4.21

Steps  
 125  
 121

419.38	4.43	✓	419.5	4.31
419.50	4.31	✓	419.63	4.18
419.63	4.18		419.76	4.05
419.75	4.06		419.88	3.92
419.88	3.93			

434.10	9.40	✓	440.70	419.63	5.1
	11.50		422.6	419.75	3.9
	12.90		421.20	419.88	1.3
	13.00		421.10	420.00	1.10
	9.80		424.3	420.13	4.2

B.M. 402.65

	+	T	-	FR
	3.93	406.58		
54 E 7+04			4.9	4017
" F 5+77			2.2	4044
27 E 6+77			7.2	3994
E 6+77			12.4	394.2
E 6+50			11.3	395.3
27 E 6+50			6.9	399.7
54 E 6+50			2.7	393.9
54 E 6+23			4.0	402.6
27 E 6+23			7.6	399.0
E 6+23			11.5	395.1
E 5+96			12.6	394.0
27 E 5+96			9.9	396.7
54 E 5+96			7.5	399.1
54 E 5+69			16.7	389.9
27 E 5+69			15.3	391.3
			T.P. 12.96	393.62
	4.69	398.31		
27 W 5+69			7.6	390.7
27 W 5+69			11.2	387.1
27 W 5+44			14.4	383.9
E 5+44			14.0	384.3
27 E 5+44			17.1	381.2
27 W 5+96			9.0	389.3
27 W 6+23			7.5	390.8
27 W 6+50			7.8	390.5
27 W 6+77			11.4	386.9
	+1.24	387.46	T.P. 12.09	386.22
7+64.43 on Hub	+1.04	376.18	12.22 T.P.	375.14
7+97.08 on Hub			10.09	366.09
8-			10.9	365.3
	1.04	364.30	T.P. 12.92	363.26
	0.12	351.46	T.P. 12.96	351.34
	0.68	339.28	T.P. 12.86	338.60
9-			6.2	333.0
	0.19	326.84	T.P. 12.63	326.65
			13.11	313.73
9+87.4	0.04	313.77	10.1	303.7
	0.56	301.60	T.P. 12.73	301.04
10-			1.8	299.8
			T.P. 12.82	288.78

	6.04		
	27		27
		5+77	
		5+50	
		5+23	
		4+96	
		4+69	
	27	4+42	27

			Elev.
		288.89	288.78
10 + 59.5	0.11		277.0
11 -			272.2
			T.P. 12.90 275.99
	+ 1.46	277.45	
			T.P. 12.90 264.55
	0.30	264.85	
16 + 60 F Road			10.7 254.7
14 + 80.30			11.82 T.P. 253.03
	0.89	253.92	
2 + 0.7			8.4 245.5
			T.P. 12.25 241.67
	0.14	241.81	
12 + 60			9.2 232.6
+ 73			14.7 227.1
12 + 95			17.7 224.1
			T.P. 12.75 229.06
13 + 50	+ 0.02	229.08	
14 -			7.4 221.7
			11.4 217.7
			T.P. 13.00 216.08
	0.85	216.93	
+ 45			4.8 212.10
+ 75			13.0 203.9
			T.P. 13.04 203.89
15 -	0.60	204.49	
			10.8 193.7
			T.P. 12.61 191.88
	0.10	191.78	
+ 30			12.5 179.5
			T.P. 12.71 179.27
	1.93	181.20	
+ 70			7.7 173.5
+ 80			12.2 169.0
16 + 17			14.4 166.8
+ 65			14.0 167.2
+ 75			14.8 166.4
17 -			9.7 171.5
+ 23			4.2 177.0
			T.P. 181 179.39
	12.59	191.98	
+ 55 -			7.8 182.2
			T.P. 0.68 191.30
	5.26	196.56	
18 -			4.8 191.8
+ 50			0.6 196.0
19 -			2.4 194.2
+ 50			5.1 191.5
20			8.8 187.8
			T.P. 12.59 183.97
	0.07	184.04	
+ 60			6.3 177.7

100' show

(1295 should be)

OK

	+	+	-	Elev.	
21+10		184.04	9.4	174.6	
	1.01	172.35	T.P. 12.70	171.34	
+50			5.3	167.1	✓
+88			15.1	157.3	✓
22+04	wash		26.0	146.4	✓
+08			27.0	145.4	✓
+13			20.6	151.8	✓
+50			15.3	157.1	✓
23			7.0	165.4	✓
738			0.2	172.2	✓
24			4.3	168.1	✓
on curb, +24.6			10.0	162.4	✓
on curb +60.15			16.5	160.9	✓
			T.P. 11.79	160.56	
on Hub 25-	3.57	164.13	2.32	161.81	✓
+36			5.4	158.7	✓
+58			11.9	152.2	✓
			T.P. 12.92	151.21	
+84	0.87	152.08	7.8	144.3	✓
			T.P. 13.04	139.04	
26+18	0.59	139.63	7.6	132.0	✓
+53	0.83	127.71	T.P. 12.75	126.88	✓
+67			25.1	102.6	✓
27+00			26.8	100.9	✓
+25			21.7	106.0	✓
+36	PO.T.		6.3	121.4	✓
+70			4.58	123.13	✓
			10.3	117.4	✓
			T.P. 12.52	115.19	
28+00	0.28	115.47	6.0	109.5	✓
+20			14.0	101.5	✓
			T.P. 12.82	102.65	
+36	0.49	103.14	5.8	97.3	✓
+43			11.1	92.0	✓
+58	Terry Road		11.3	91.8	✓
29			9.8	93.3	✓
+50			11.6	91.5	✓
30			11.8	91.3	✓
			T.P. 9.74	93.40	at Sta 27+00
+50	3.32	96.72	9.9	86.8	
31			12.9	82.8	
			T.P. 12.37	84.35	
31+50	0.48	84.83	7.5	77.3	
32			13.4	72.4	

161.81 B.M. on Sta 25+00 on Hub

	+	↑	-	Flv
		84.83		
			T.P. 12.57	72.26
32+50	110	73.36	11.3	62.1
			T.P. 12.29	60.57
33	0.51	61.08	8.2	52.9
+50			12.5	48.3
			T.P. 12.68	48.40
34+50	0.23	48.63	11.2	37.2
			T.P. 12.95	35.68
35+50	0.25	35.93	10.0	25.9
			T.P. 12.02	22.90
36	0.90	23.80	7.2	16.6
			T.P. 13.02	10.78
	0.28	11.16		
+50			4.1	7.1
37			7.4	3.8
38			10.9	0.3
39			13.5	- 2.3
			T.P. 12.85	- 1.49
	3.92	2.43		
40			4.2	- 1.8
41			4.5	- 2.1
42			4.9	- 2.5
43			4.7	- 2.0
44			3.4	
45			3.4	
			T.P. 2.67	- 0.24
	5.38	5.14		
46			6.3	
47			6.8	
48			4.8	
49			6.7	
50			6.1	
on Hub 51			4.19	+ 0.95

below City Datum

T.P. 45.00

+ 0.97  
B.M. on Hub Sta. 51+00

Elev 402.65  
 Contour Line from point 1306.34 West of N.E. Cor. P.L. 1284

Horiz. Rod Intercept Vert. Ang.

from ME  
 13

37 E  
 Const 1.15

N 74° 43' E			
	118° 12' L		1626.80
S 12° 55' W			
	8° 27' L	1.21	0° 0'
S 21° 22' W			
	0° 0'	1.30	0° 0'
S 21° 22' W			
	29° 03' R	2.59	0° 0'
S 7° 41' E			
	24° 04' L	1.97	0° 0'
S 16° 23' W			
	36° 17' R	1.74	0° 0'
S 19° 49' E			
	85° 34' R	2.04	0° 0'
N 74° 37' E			
	0° 0'	0.72	7° 41'

74° 37' 70  
 85° 34'  
 160° 01'  
 519° 49' E  
 36° 17' R  
 S 16° 23' W  
 24° 04' L  
 S 7° 41' E  
 29° 03' R  
 S 21° 22' W  
 8° 27' L  
 S 12° 55' W  
 118° 12' L  
 105° 17'  
 N 74° 43' E

S. Elev. Pt. 1306  
 1626.8  
 P.L. 1284

- Hub Sta. 9+93.06
- Hub Elev. 402.65
- Hub Elev. 402.61
- Hub Elev. 402.61
- Hub Elev. 402.61
- Hub Elev. 402.61
- Hub Elev. 402.61

• Point 1306.34 West  
 of N.E. Cor. P.L. 1284

Survey from New Reservoir Site to

Int. With Line from old Reservoir Site

20

51+00 int with line from present LaJolla Reservoir

40+00.0 Pot

30+00.0 Pot

27+36.0 Pot

25+00.0 Pot

23+38.0 Pot

18+50.0 Pot N27°30'20"E

10+80.30 Pot

7+92.16 Pot

6+64.43 Pot

5+72.47 Pot

4+71.47

set Hub

set Hub

set Hub

set Hub

set Hub

set Hub

set Hub

set Hub

set Hub

set Hub

set Hub

47°06'

INT PL. LINE  
5104+71.47

1306.34  
RANDOM LINE  
N74°37'E

P.L. 1284

Common Measure P.L. 1284



+	T	-	Elev.
			222.64
8.73	231.37	T.P. 0.37	231.00
12.92	243.81	T.P. 0.13	243.69
12.61	256.30	T.P. 0.49	255.81
12.48	268.29	T.P. 0.59	267.70
12.77	280.47	T.P. 0.77	280.70
11.62	292.81	T.P. 0.24	292.58
12.51	305.09	T.P. 0.76	304.33
12.60	316.93	T.P. 0.69	316.24
13.02	329.32	T.P. 0.65	328.67
11.72	340.39	T.P. 0.09	340.30
12.74	353.04	T.P. 0.13	352.91
12.90	365.81	T.P. 0.22	365.59
11.84	377.43	T.P. 0.26	377.17
13.05	390.27	T.P. 0.16	390.06
12.59	402.65	0.0	402.65
0.50	402.99	T.P. 0.16	402.83
		0.34	402.65 402.65
		0.34	402.65
		0.34	402.65
		0.34	402.65

B.M. on Fire Hyd. Solidad Exchange

Set B.M. Lath Hub about 7 in north of Path

Set B.M. Lath Hub on 1st Ridge north

Set B.M. " " " 220 " "  
 Set B.M. " " " 312 " " South side  
 Set B.M. " " " 319 " " North side

51400  
 42100  
 30100  
 27436  
 25400  
 23438  
 18450  
 10480.30  
 9680  
 9283.50  
 10750.20  
 1477.90  
 8487.40  
 Pot. 7492.16  
 6497.08  
 Pot 6464.43  
 Pot 5777.47  
 101.00  
 Int. W.L. 4471.47  
 P.L. 1284  
 1473 N. of 13476.56  
 47006

9.05	92.46	0.99	91.47
11.82	103.29	4.72	98.57
		2.68	100.61

83.465

SPK in Pole N.E. Cor Princess + Torrey Road

= T.P. 75.94  
Set nail in Gas Light Pole # (1960) N.E. Torrey Road

(402.58 Mon. P.L. Cor) E.S. Ridge Road

382.18 Tie out Hub Sta 4 + 50.56

16"	6" Joints	444 Rad	1/4 opening
16"	8" Joints	592	1/4 opening
18"	6" Joints	378 Rad	3/8 opening
18"	6"	492 "	1/4 opening

E/bows 2° 30' + 45°

424.05	4.92	419.13	✓	4.42	419.63	✓	4.30	419.75
	4.85	419.20	✓	4.35	419.70	✓		
	4.79	419.26	✓	4.29	419.76	✓		
	4.73	419.32	✓	4.23	419.82	✓		
	4.67	419.38	✓	4.17	419.88	✓		
	4.61	419.44		4.11	419.94	✓		
	4.55	419.50		4.05	420.00	✓		

2,000,000

0.7 @ 1000 ft 18"

1.2 @ 1000 ft 16"

2.25 @ " 14"

4.7 @ " 12"

3,000,000 gals 24 hrs = 2083 gals per hr  
34.72 gal per sec.  
125000 gals per hr.

188+57.24 Sta City Line Elev 168.0

3,000,000

1.1 @ 1000' 18"

cut. fr sec  
4.642

1.8 " 16"

3.8 " 14"

8.0 @ " 12"

8" single stage High-Duty Allis Chalmers

250 H.P. \$4200 installed

3,000 Gals 74% Efficiency

180+00 Del. Hd 168° U.S.G.S. Data

180+00 Outlet Hd 165°

Bulletin 376 U.S. Dept Agriculture

Gals 24 Hrs  
3,000,000 18" pipe Frnt. 1.6 + 5% Curvature 168

2,000,000 18" " 0.7 + 5% "

3,000,000 16" " 2.9 " " 3.045

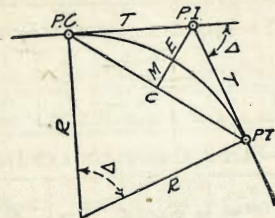
2,000,000 16" " 1.2 " " "

Cal. on Drift  
40 minor inches = 1 C.F.S.

1778 Cu. in

# DIETZGEN'S RAILROAD CURVE AND REDUCTION TABLES

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2900

## CURVE FORMULAS

Radius =  $R = \frac{50}{\sin. \frac{D}{2}}$  (1) Degree of Curve = D and  $\sin. \frac{D}{2} = \frac{50}{R}$  (2)

Tangent =  $T = R \tan \frac{\Delta}{2}$  (3) Length of Curve =  $L = 100 \frac{\Delta}{D}$  (4)

Middle ordinate =  $M = R(1 - \cos. \frac{\Delta}{2})$  (5) =  $R \text{vers} \frac{\Delta}{2}$  (6)

External =  $E = T \tan \frac{\Delta}{4}$  (7) =  $R \div \cos \frac{\Delta}{2} - R$  (8) =  $R \text{exsec} \frac{\Delta}{2}$  (9)

Long Chord =  $C = 2 R \sin. \frac{\Delta}{2}$  (10)  $\Delta$  = Central Angle

## EXPLANATION AND USE OF TABLES

Stations.—Given P. I. = Sta. 161 + 60.35 to find Sta. of P. C. and P. T.  $\Delta = 62^\circ 10'$   $D = 8^\circ 20'$ . From Table IV for  $1^\circ$  curve  $T = 3454.1$  and  $\div 8\frac{1}{2} = 414.49$  ft. From Table V correction = .36 or  $T = 414.85$  ft. P. C. = Sta. P. I. -  $T = 157 + 45.50$ . Also from (4)  $L = 746.00$  and P. T. = Sta. P. C. +  $L = 164 + 91.50$ .

Offsets.—Tangent offsets vary (approximately) directly with D and with square of the distance. Thus tangent offset for Sta. 158 on above curve is 2.16 ft. found as follows. From Table III tangent offset for 100 ft. = 7.27 ft. Distance =  $158 - \text{Sta. P. C.} = 54.50$ , hence offset =  $7.27 (54.50 \div 100)^2 = 2.16$  ft. Also square of any distance divided by twice the radius equals (approximately) the distance from tangent to curve. Thus  $(54.50)^2 \div (2 \times 688.26) = 2.16$  ft.

Deflections.—Deflection angle =  $\frac{1}{2} D$  for 100 ft.,  $\frac{1}{4} D$  for 50 ft., etc. For c ft. = (in minutes)  $.3 \times C \times D^\circ$  or = defl. for 1 ft. from Table III  $\times C$ . For Sta. 158 of above curve =  $.3 \times 54.5 \times 8\frac{1}{2} = 136.2'$  or  $2^\circ 16.2'$ , or =  $2.50 \times 54.5 = 136.2'$  from Table III. For Sta. 159 deflection angle =  $2^\circ 16.2' + 8^\circ 20' \div 2 = 6^\circ 26.2'$ , etc.

Externals.—May be found in similar manner to tangents. Thus E for curve above is 115.37. For from Table IV for  $1^\circ$  curve  $E = 960.6$  for  $8^\circ 20' = 960.6 \div 8\frac{1}{2} = 115.27$  and from Table V correction = .10 or  $E = 115.37$ . Or suppose  $\Delta = 32^\circ$  and E is measured and found to be 42 ft. What is D? From Table IV  $E = 230.9$  and  $\div 42 = 5.5$  or  $D = 5^\circ 30'$ .



177.51  
40.80  
136.71

282404.91  
~~126~~  
136.71  
280268.20

281463.77  
+ 177.51  
279286.26

H

0  
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38  
39  
40

line t  
dths +  
xamp  
=43.

4800  
1915  
2885

5745  
2885

89 10 15  
16 35  
5626.5

261  
18.2  
15702  
176715.

279 2300  
95.47

280 + 10.47

75.60  
20.18  
55.42

713

77  
46  
3414

165  
12.5  
79.5

693

73.74

3767.0163

Bulletin 376 U.S. Dept Ag.

Flow water in road stove pipe



108400

40079.5

20.1395

100000  
5375  
46950  
43000  
32000  
32200  
25000  
21500

23  
23  
253

185.70

100000  
5385  
46150  
43030  
30700  
26985

37750  
37695

282404.91  
186.84  
282418.77  
155.76  
282404.57  
40.80  
282463.77

DISTANCES FROM CENTER OF ROADWAY FOR  
CROSS-SECTIONING.

Roadway 16 feet wide. Side Slopes 1 on 1 1/2.  
For Single Track Embankment.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	H
0	8.0	8.2	8.3	8.5	8.6	8.8	8.9	9.1	9.2	9.4	0
1	9.5	9.7	9.8	10.0	10.1	10.3	10.4	10.6	10.7	10.9	1
2	11.0	11.2	11.3	11.5	11.6	11.8	11.9	12.1	12.2	12.4	2
3	12.5	12.7	12.8	13.0	13.1	13.3	13.4	13.6	13.7	13.9	3
4	14.0	14.2	14.3	14.5	14.6	14.8	14.9	15.1	15.2	15.4	4
5	15.5	15.7	15.8	16.0	16.1	16.3	16.4	16.6	16.7	16.9	5
6	17.0	17.2	17.3	17.5	17.6	17.8	17.9	18.1	18.2	18.4	6
7	18.5	18.7	18.8	19.0	19.1	19.3	19.4	19.6	19.7	19.9	7
8	20.0	20.2	20.3	20.5	20.6	20.8	20.9	21.1	21.2	21.4	8
9	21.5	21.7	21.8	22.0	22.1	22.3	22.4	22.6	22.7	22.9	9
10	23.0	23.2	23.3	23.5	23.6	23.8	23.9	24.1	24.2	24.4	10
11	24.5	24.7	24.8	25.0	25.1	25.3	25.4	25.6	25.7	25.9	11
12	26.0	25.2	26.3	26.5	26.6	26.8	26.9	27.1	27.2	27.4	12
13	27.5	27.7	27.8	28.0	28.1	28.3	28.4	28.6	28.7	28.9	13
14	29.0	29.2	29.3	29.5	29.6	29.8	29.9	30.1	30.2	30.4	14
15	30.5	30.7	30.8	31.0	31.1	31.3	31.4	31.6	31.7	31.9	15
16	32.0	32.2	32.3	32.5	32.6	32.8	32.9	33.1	33.2	33.4	16
17	33.5	33.7	33.8	34.0	34.1	34.3	34.4	34.6	34.7	34.9	17
18	35.0	35.2	35.3	35.5	35.6	35.8	35.9	36.1	36.2	36.4	18
19	36.5	36.7	36.8	37.0	37.1	37.3	37.4	37.6	37.7	37.9	19
20	38.0	38.2	38.3	38.5	38.6	38.8	38.9	39.1	39.2	39.4	20
21	39.5	39.7	39.8	40.0	40.1	40.3	40.4	40.6	40.7	40.9	21
22	41.0	41.2	41.3	41.5	41.6	41.8	41.9	42.1	42.2	42.4	22
23	42.5	42.7	42.8	43.0	43.1	43.3	43.4	43.6	43.7	43.9	23
24	44.0	44.2	44.3	44.5	44.6	44.8	44.9	45.1	45.2	45.4	24
25	45.5	45.7	45.8	46.0	46.1	46.3	46.4	46.6	46.7	46.9	25
26	47.0	47.2	47.3	47.5	47.6	47.8	47.9	48.1	48.2	48.4	26
27	48.5	48.7	48.8	49.0	49.1	49.3	49.4	49.6	49.7	49.9	27
28	50.0	50.2	50.3	50.5	50.6	50.8	50.9	51.1	51.2	51.4	28
29	51.5	51.7	51.8	52.0	52.1	52.3	52.4	52.6	52.7	52.9	29
30	53.0	53.2	53.3	53.5	53.6	53.8	53.9	54.1	54.2	54.4	30
31	54.5	54.7	54.8	55.0	55.1	55.3	55.4	55.6	55.7	55.9	31
32	56.0	56.2	56.3	56.5	56.6	56.8	56.9	57.1	57.2	57.4	32
33	57.5	57.7	57.8	58.0	58.1	58.3	58.4	58.6	58.7	58.9	33
34	59.0	59.2	59.3	59.5	59.6	59.8	59.9	60.1	60.2	60.4	34
35	60.5	60.7	60.8	61.0	61.1	61.3	61.4	61.6	61.7	61.9	35
36	62.0	62.2	62.3	62.5	62.6	62.8	62.9	63.1	63.2	63.4	36
37	63.5	63.7	63.8	64.0	64.1	64.3	64.4	64.6	64.7	64.9	37
38	65.0	65.2	65.3	65.5	65.6	65.8	65.9	66.1	66.2	66.4	38
39	66.5	66.7	66.8	67.0	67.1	67.3	67.4	67.6	67.7	67.9	39
40	68.0	68.2	68.3	68.5	68.6	68.8	68.9	69.1	69.2	69.4	40

Example—If point is 22.6 ft. above grade, how far should it be from center line to be a slope stake point? Ans. from Table 41.9. For same slopes but other widths of roadbed correct above figures by one-half difference in width of roadbed; thus in example above for 20 ft. roadbed distance will be 41.9 + (20 - 16) \* 2 or 2 ft. added to 41.9 = 43.9. For slopes of 1 on 1 see inside of front cover.