

1604

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 15 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 $1\frac{1}{2}$ see inside of back cover.
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1604

no 139

21

CITY ENGINEER

ENGINEERING DEPARTMENT
CITY OF SAN DIEGO,
CALIFORNIA.

254.49

181.91

436.40

15746° S.E. station

+62.8

+81.4 pillar 7° offset

2.8

78.6 depth footing

16732° N. station

16751

16768° End station

The paper stock of this book is made of a high grade 50% rag paper having a water resisting surface. This book is sewed with Bing Special Enamel Waterproof Thread.

Made in U. S. A.

Moore
5-13-41

Survey of Interceptor Sewer
via Pacific Blvd.
Beg. at N.W. Ash

4+87.2 end A.C. Pav.

3+64 Hercules oil lines ?

2+98 = Int. F.H.

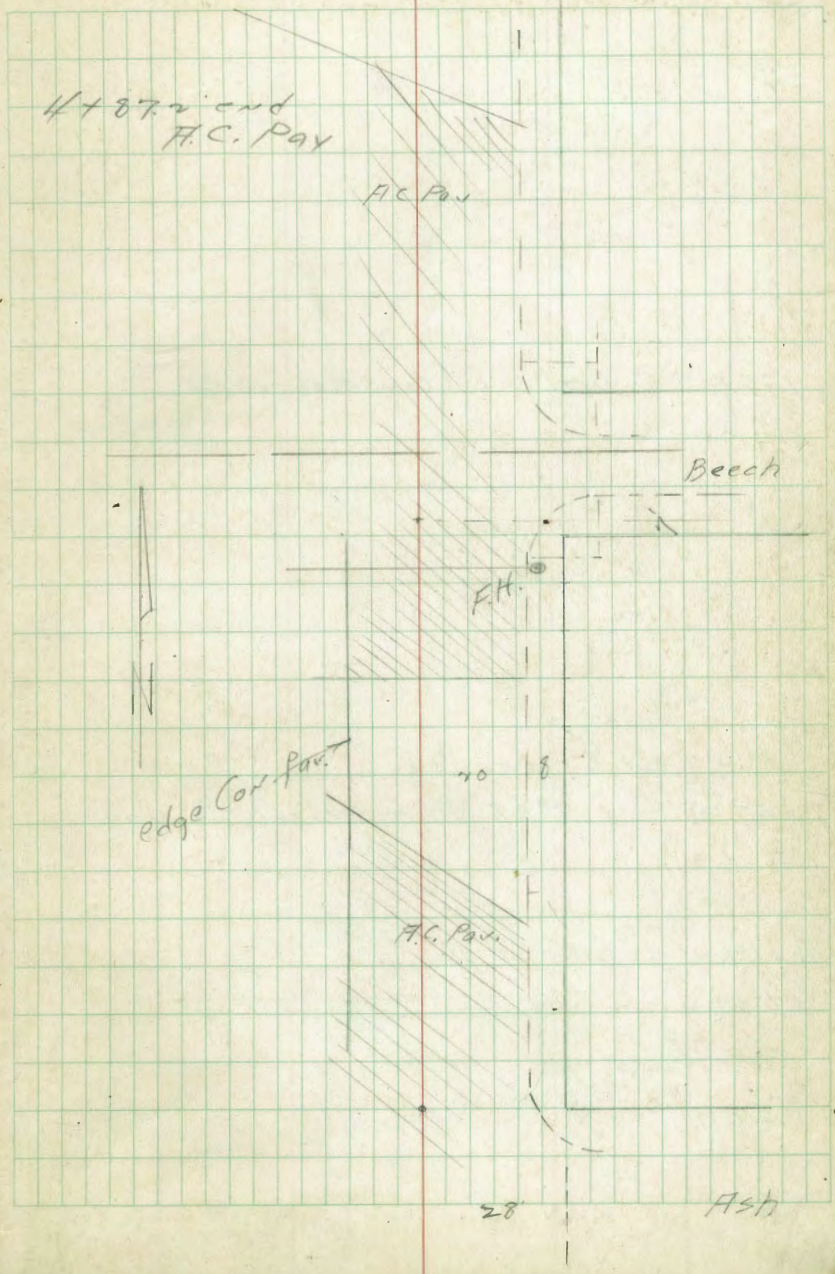
2+00.8 Beg. A.C. Pav.

1+19.2 end A.C. Pav.

0+00 N.W. Ash roofing nail F.C. Pav.

A Sewer

1



11+75.5 = INT. ? CON. PIPE DRAIN

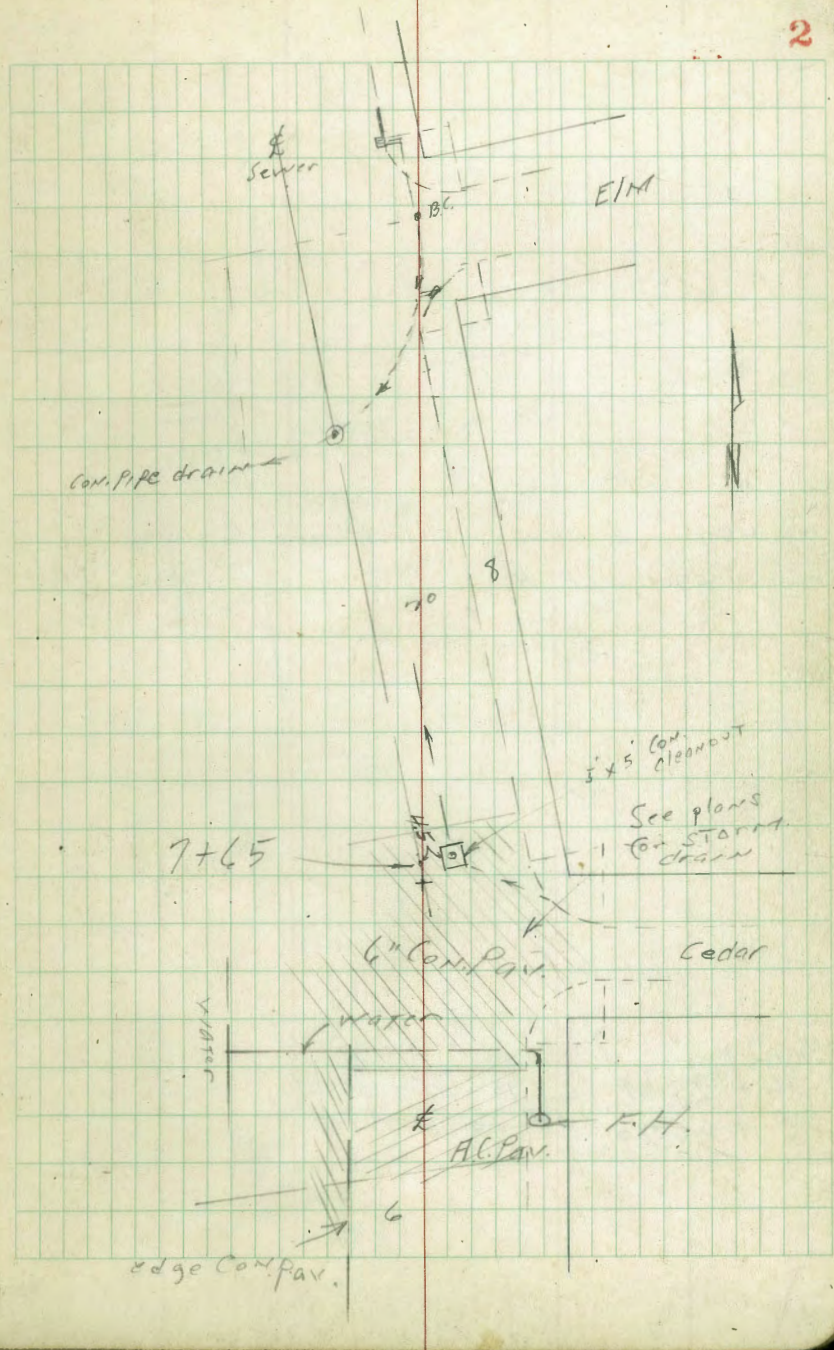
1+91.4 End 6" CON. PAV

7+57.31 $\Delta 9^{\circ}58'$ LT. chisel cut Pav.

6+77.4 INT. F.H.

6+49.4 end AC Pav. Beg. ^{CON.} 6" PAV

5+60 beg. AC PAV



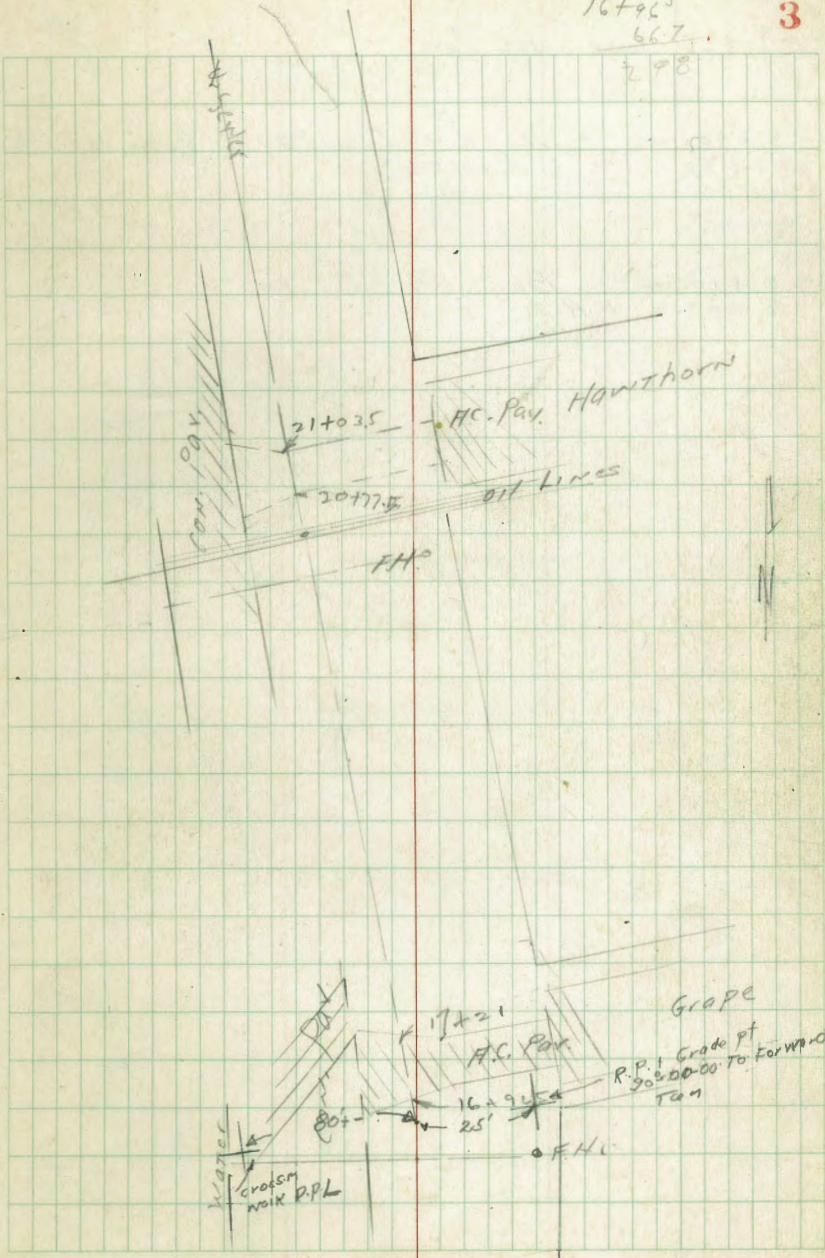
20+50 3 and oil lines to Bay
 20+47.6 F.H.

16+73.74 Δ 10°-16'-00 LT
 16+66.70 Δ 10°+6' LT
 7.04

16+92.5

3

66.7
 2.98



36 + 53.10 Int. Laurel

35 + 58.09 A 8° 33' LT.

35 + 38.3 Int. edge sidewalk

34 + 95.97 Int. R. S. RR Spur

34 + 46.4 Int. 18" Con. Pipe drain

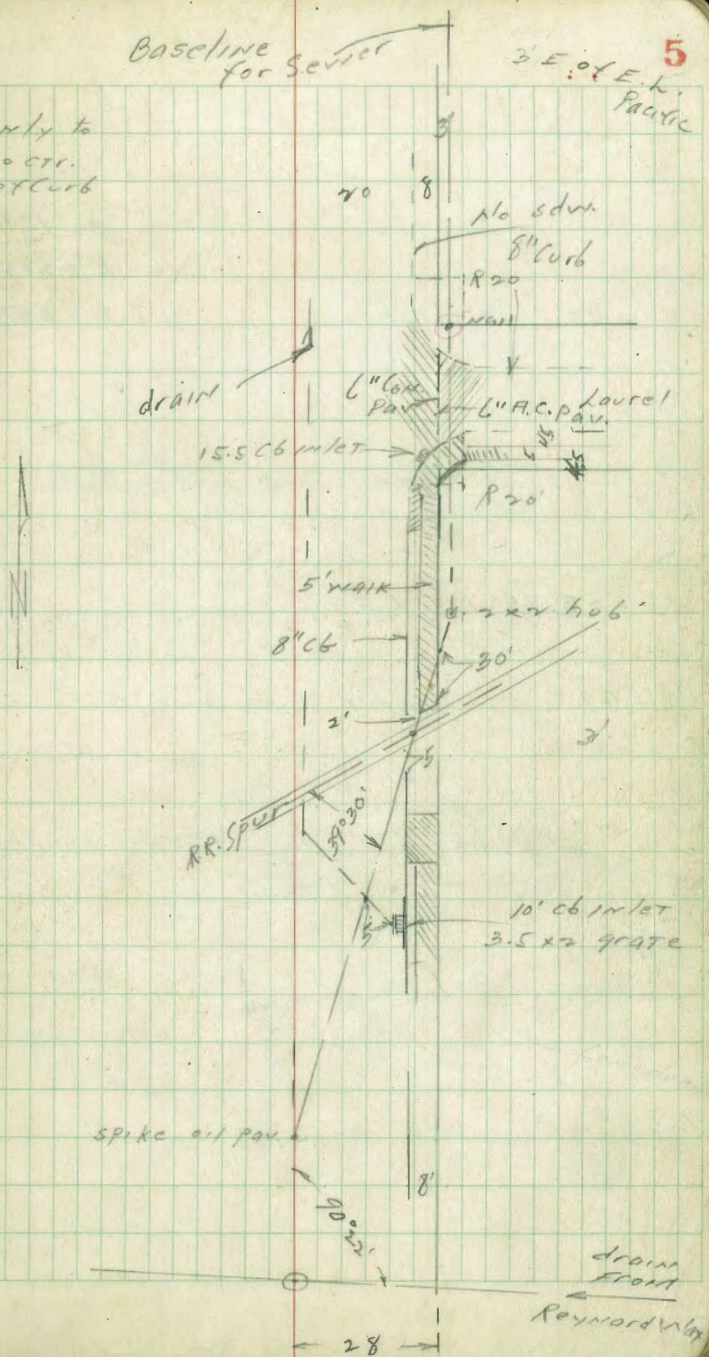
33 + 49.61 A - 8° 33' RT. 7-11-23f

32 + 33.62 Int. of \sqrt Con. Pipe drain
See Plans for size

Baseline for Sewer

3 E. of E. K. Pacific 5

From Laurel xly to
Palms 20 crr.
2' back of curb



$$A = 16^{\circ} 16' \text{ LT.}$$

$$R = 2140.5$$

$$L = 607.7$$

44+45 St. Light

44+70

43+50.5 Int. 24" Conc. pipe drain

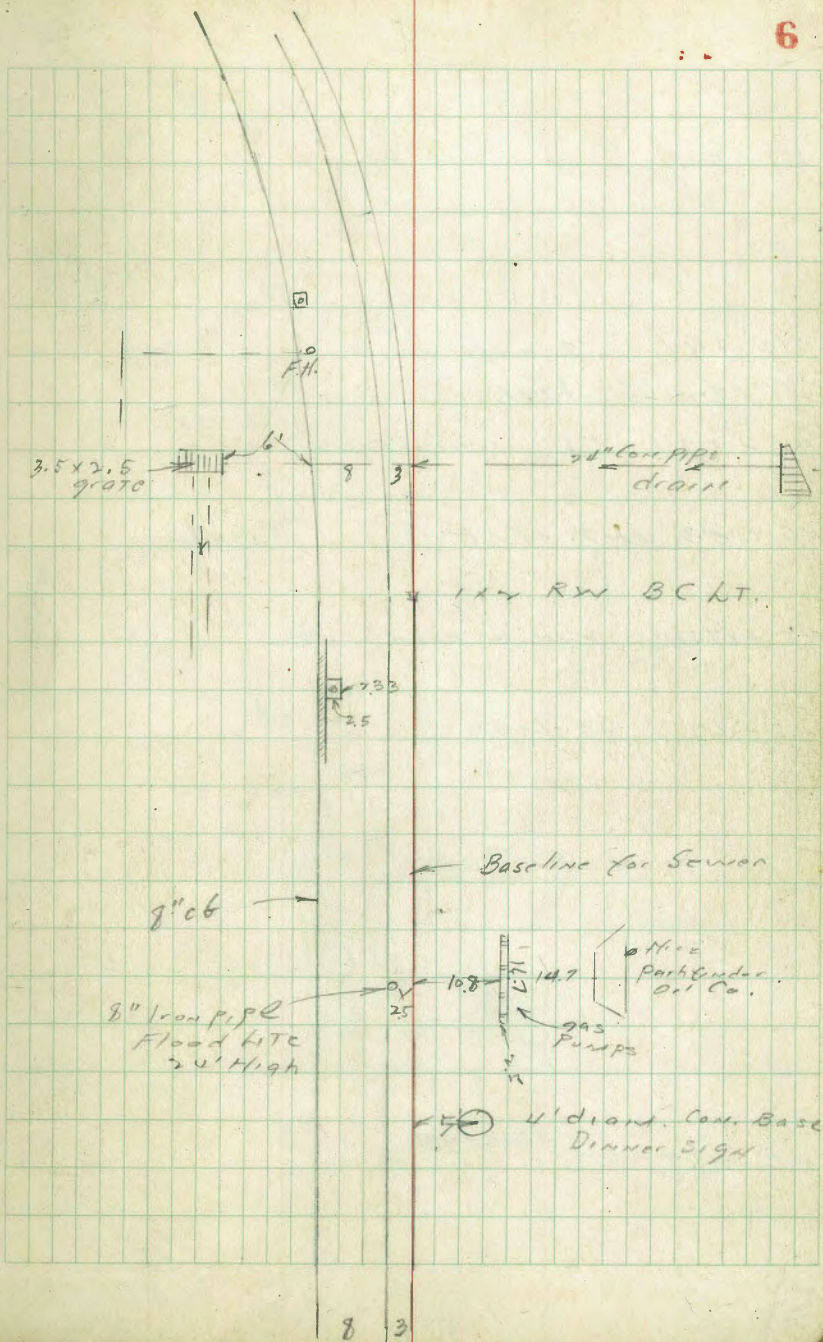
43+08.85 B.C. LT.

44+98 St. Light 223 x 225 Con. Base

N.L. Laurel to 39+00 oil rock
surfacing

38+54.5

37+33



47+58.5 S end ^{Gas} oil pump

46+94.4 S edge drive

46+80 ST. LIGHT

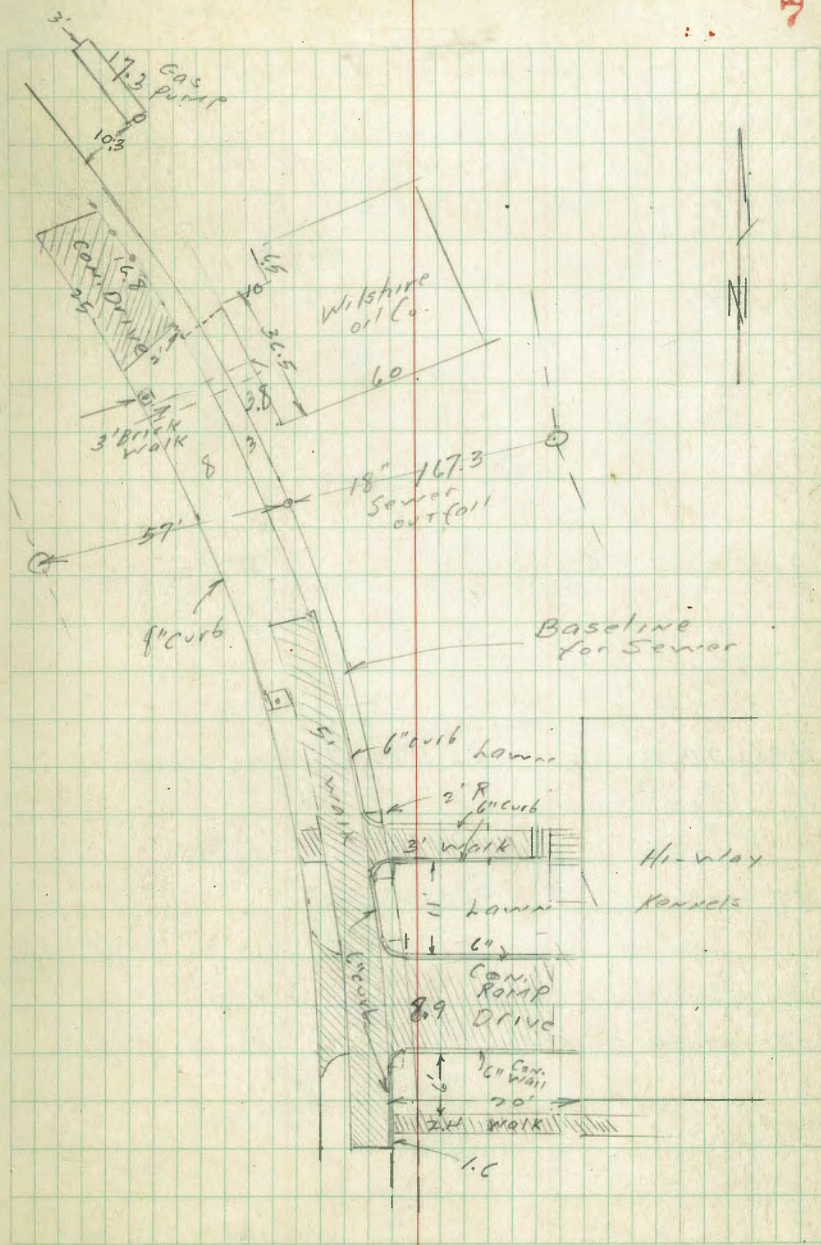
46+58.1 S. h. Stucco Fence Wilshire Oil Co

46+14.3 INT. of 18" Sewer outfall

45+87.50 end 5' curv walk

45+67 ST. LIGHT

45+09.7 ^{cent.} Beg. 5' walk



58+09 St. Light

56+79 St. Light

56+14.6 approx 2 Redwood

55+69 F.H.

55+48 St. Light

54+19 St. Light

52+89 St. Light

51+61 St. Light

50+61.5 fence

S.M.H.



50

8 1/2" sewer

8" curb

Baseline for Sewer

Auto Park

1-5/8" Cable fence

3' picket fence

61+89 ST LIGHT

60+64 ST. LIGHT

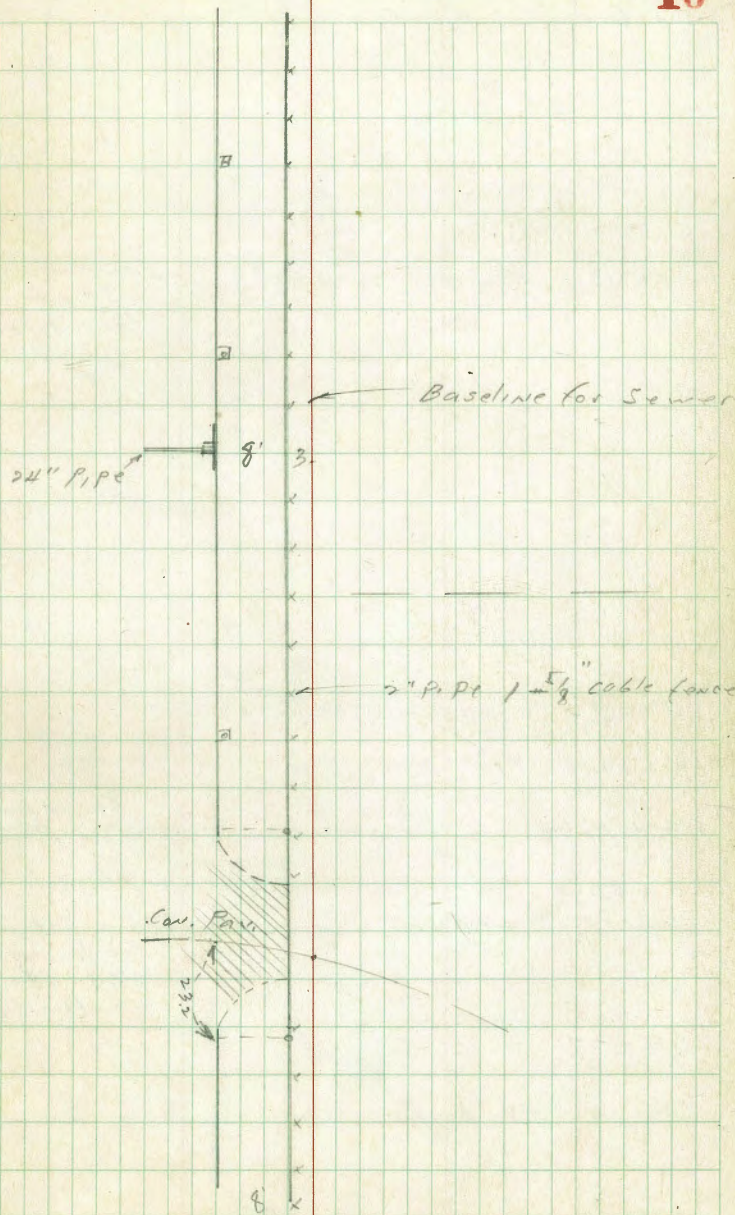
60+47 Φ 10' cb. inlet59+95.3 Φ Spruce

59+39 ST LIGHT

59+16.4 To 8' cb. R

58+92 Φ S. Fc. R.P. Spur

58+78.5 To 8' cb. R



65+30 S.L. Stucco frame Hancock
 0.1 office
 65+16.5 S edge Cond drive

64+85.3 = S.L. Bldg. under const Sandwich
 shop
 Conc. Tile.

64+06.10 4" Hi. Pres. gas line

63+99.10 Tel. Cond.

63+75.64 2 Sassafras ST Sassafras
 Conc. Paved.

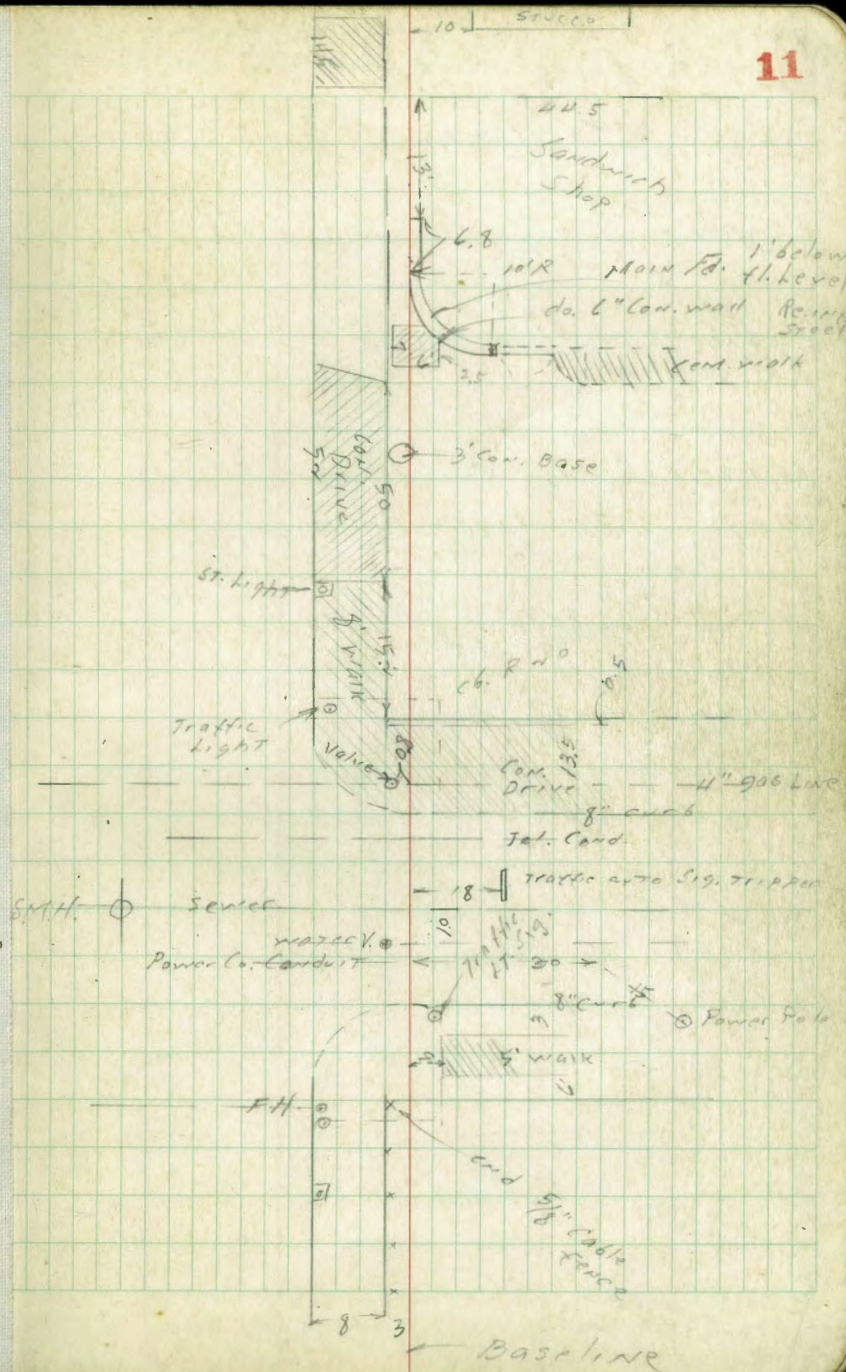
63+57.60 Power Co. Cond. Note! See

63+48 = 8" curb East of Tel. Co
 for location
 also see
 Traffic Sig. Plan.

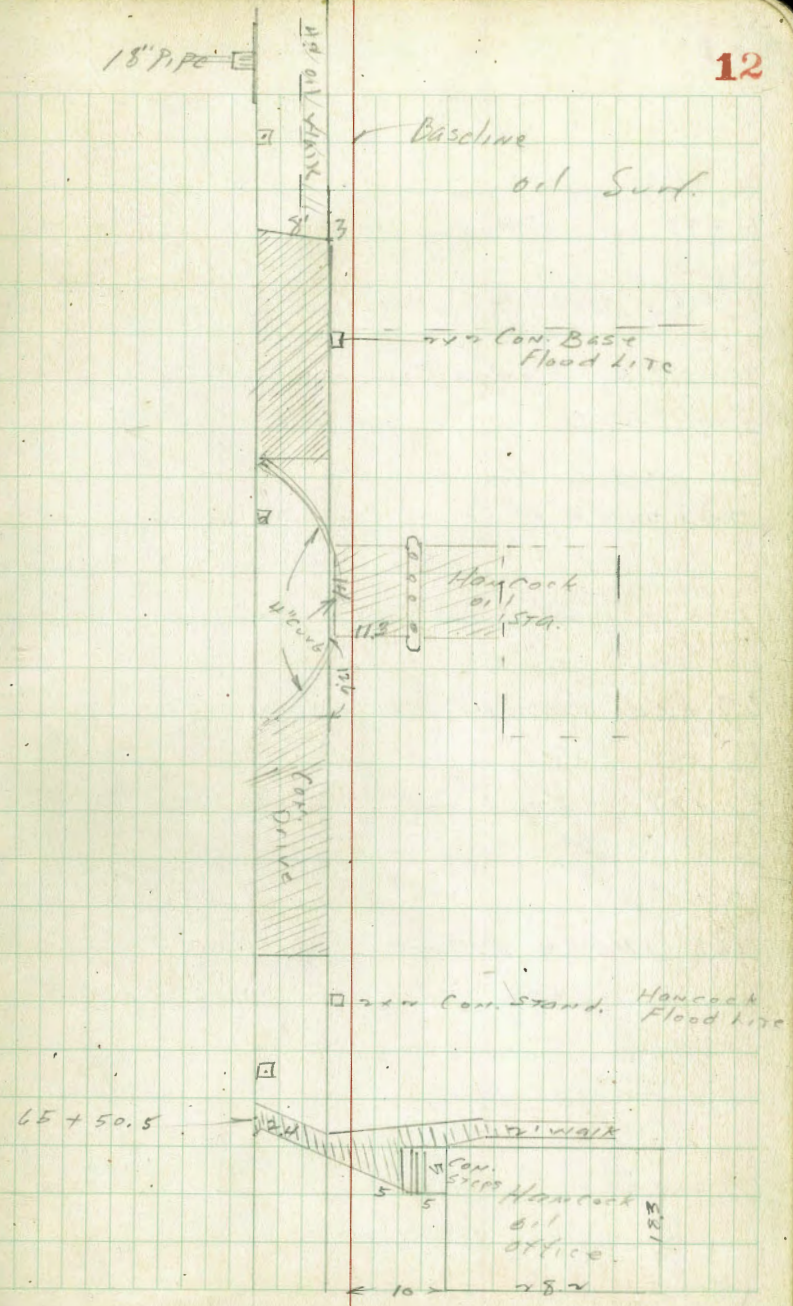
63+01 = F.H.
 63+28 = 16" Guy Pole

63+16 ST. Light

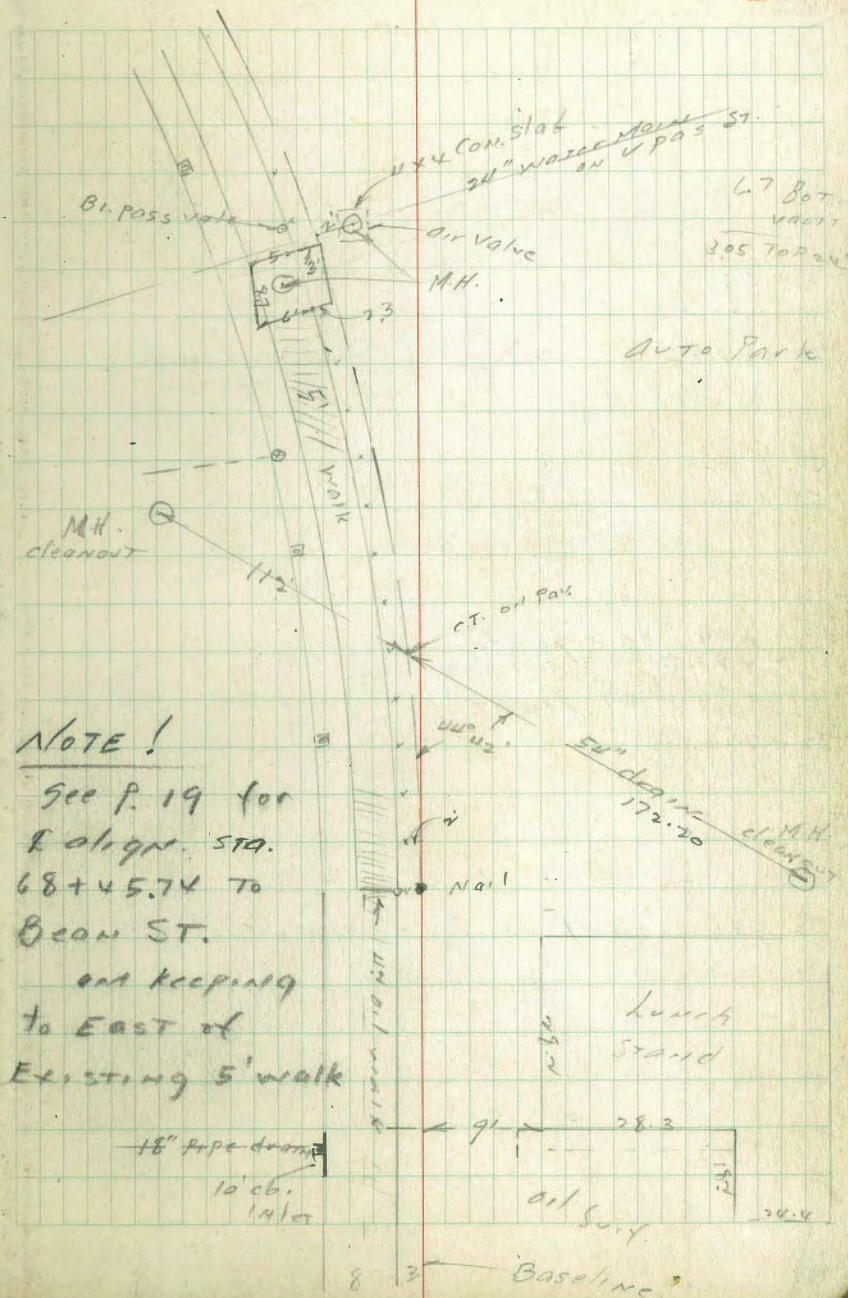
11



68 68+08 ϕ 10' curb inlet
 65 67+95 St. light
 67+82 N edge Can. drive
 64 67+16
 66+81.6 S edge Can. drive
 66+75 St. Light
 66+40 N edge drive
 64
 63
 6
 63 +75.9 S. edge Can Drive
 65+73 Flood line
 65+56 St Light.
 6
 6
 65+30 St office



- 71+57 ST. Light
- 71+16 INT. 2" C.I. Water Main UPAS ST.
- 71+07.5 S edge Con. Water Valve Vault
- 70+90 F.H.
- 70+36 ST. Light
- 69+64 INT. of 54" drain (Con. Pipe)
- 69+18 ST Light
- 68+45.74 BC LT. Beg. for 5/8" cable fence
- 68+14.5 SL Lunch stand



NOTE!

See p. 19 for
align. STA.
68+45.74 TO
BEAN ST.
and keeping
to EAST of
Existing 5' walk

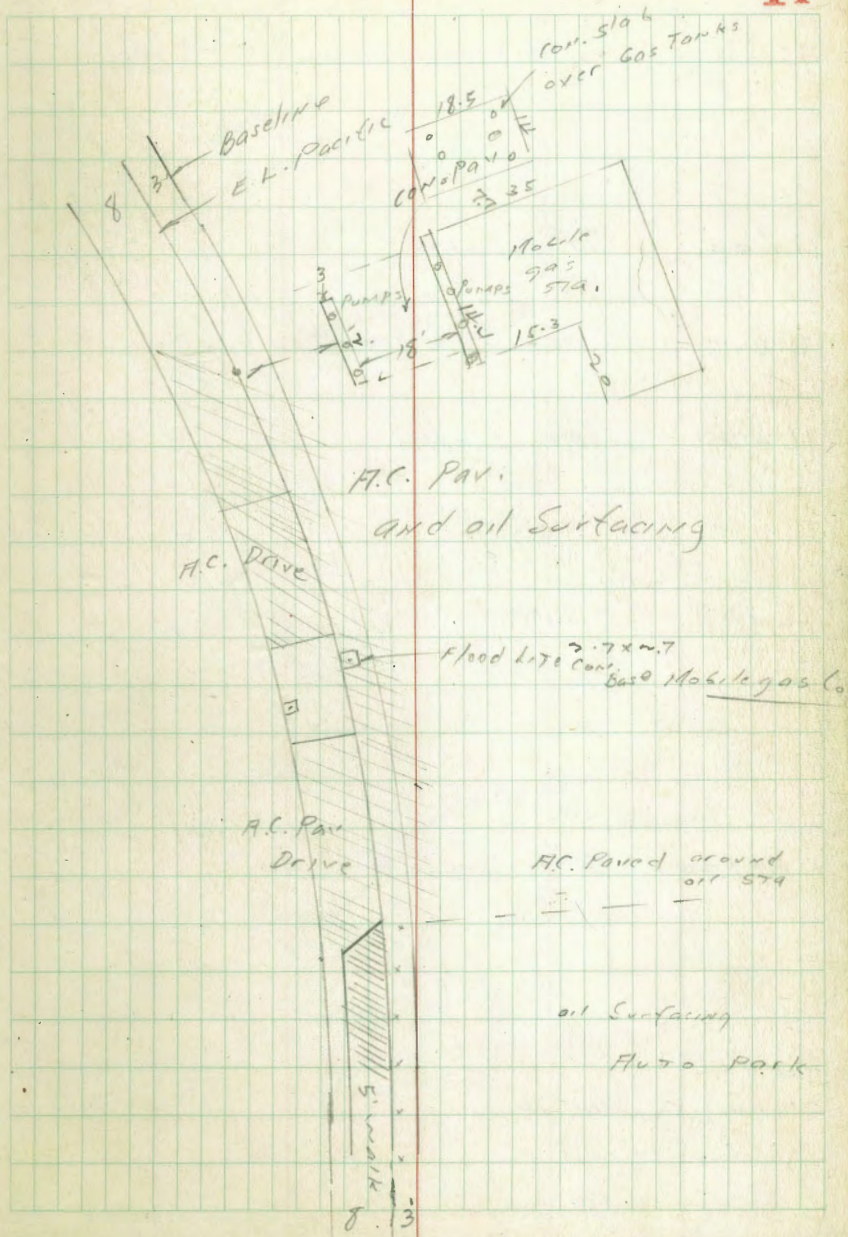
73 + 47.9 9 Gas Pump stand

73 + 30 N edge drive

+ 89 S edge drive
+ 83.8 Flood light
+ 76 ST light

72 + 71.3

72 + 31 end edge + end of 1-5/8" cable fence
72 + 26 " curb



78+11 Foster & Kleiser sign

77+54 ST Light

76+43 Foster & Kleiser sign

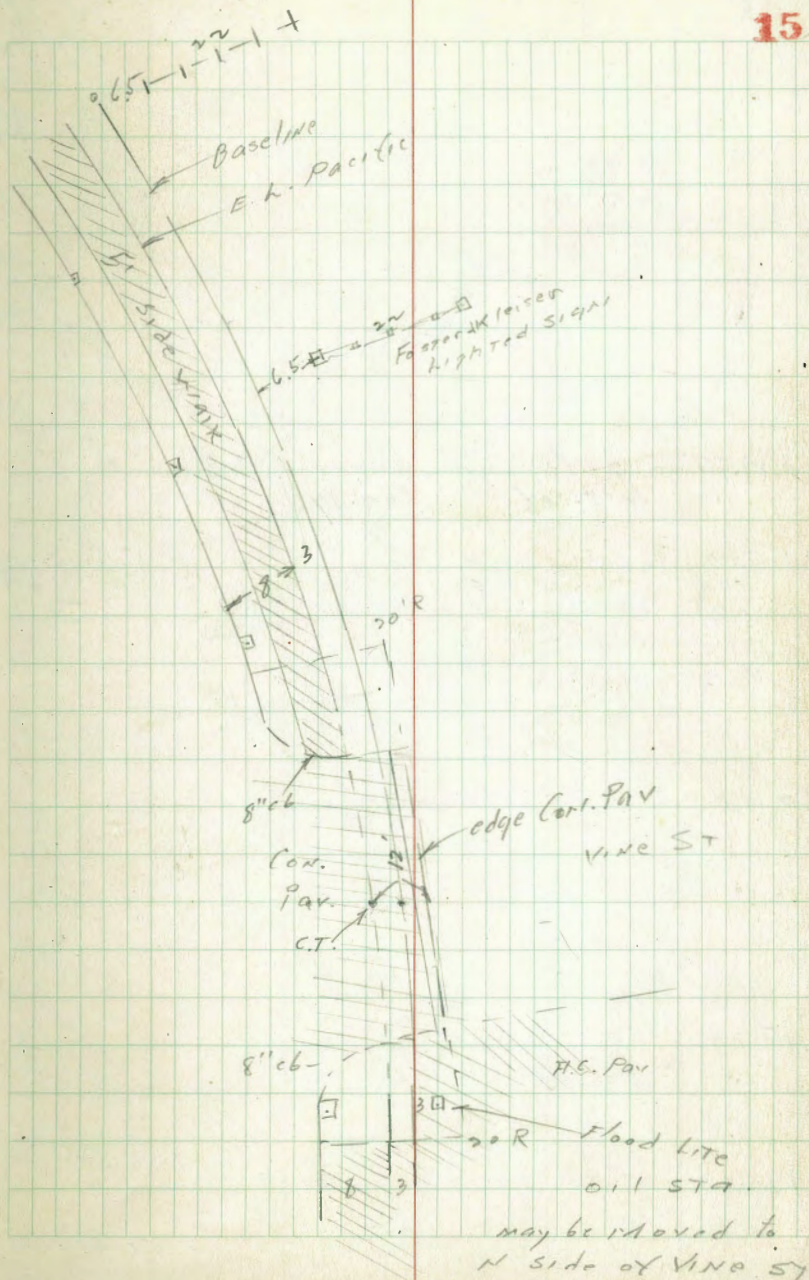
76+24 ST Light

75+09 ST Light

74+820 I Vine ST

74+06

74+01.5 N.L.



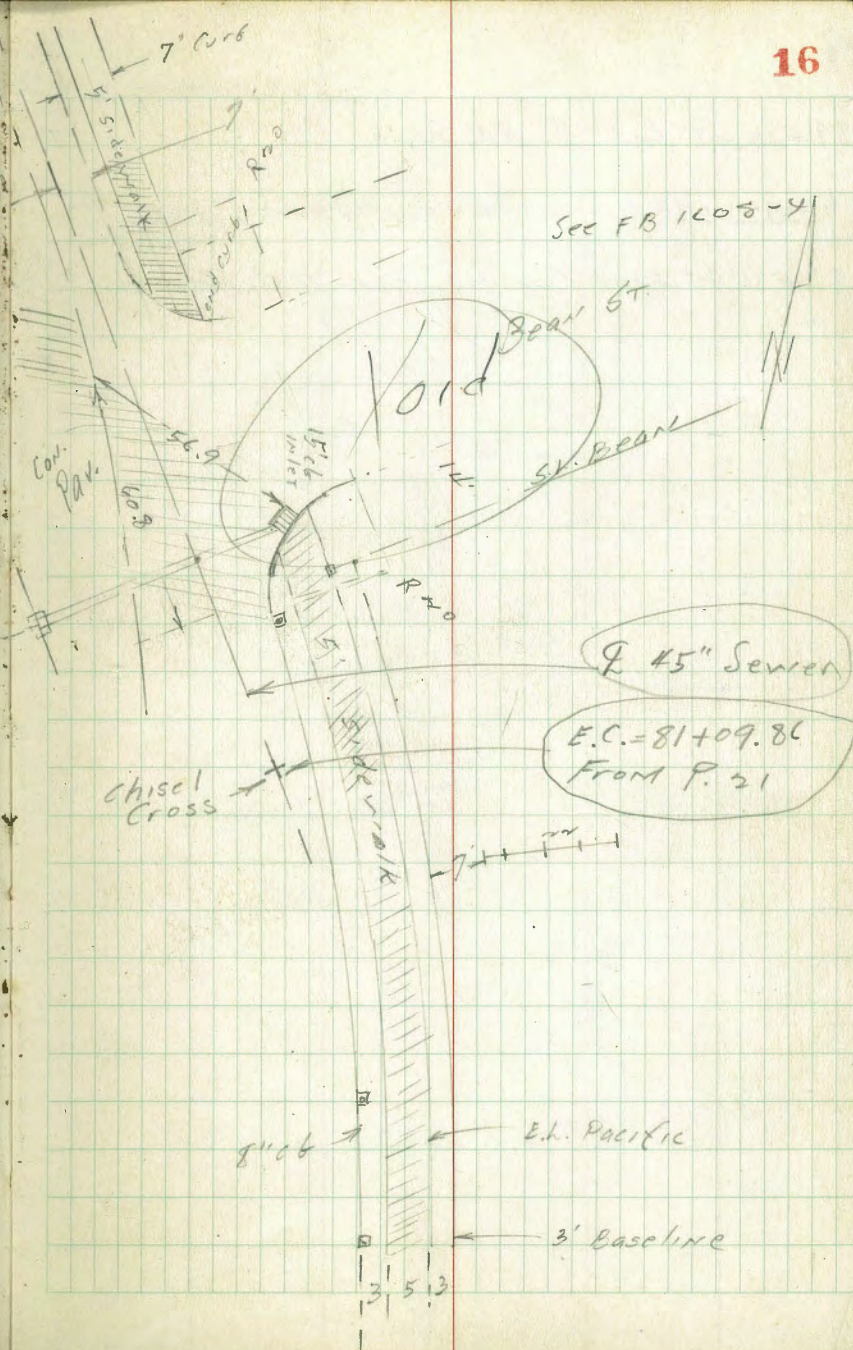
81+19.57 S.E.ly Cor Pacific & Bean
Int. of Con. Pipe Culv

71+10 ST. light

80+09 Foster & Kleiser sign

79+29 ST. light

78+69 ST. light



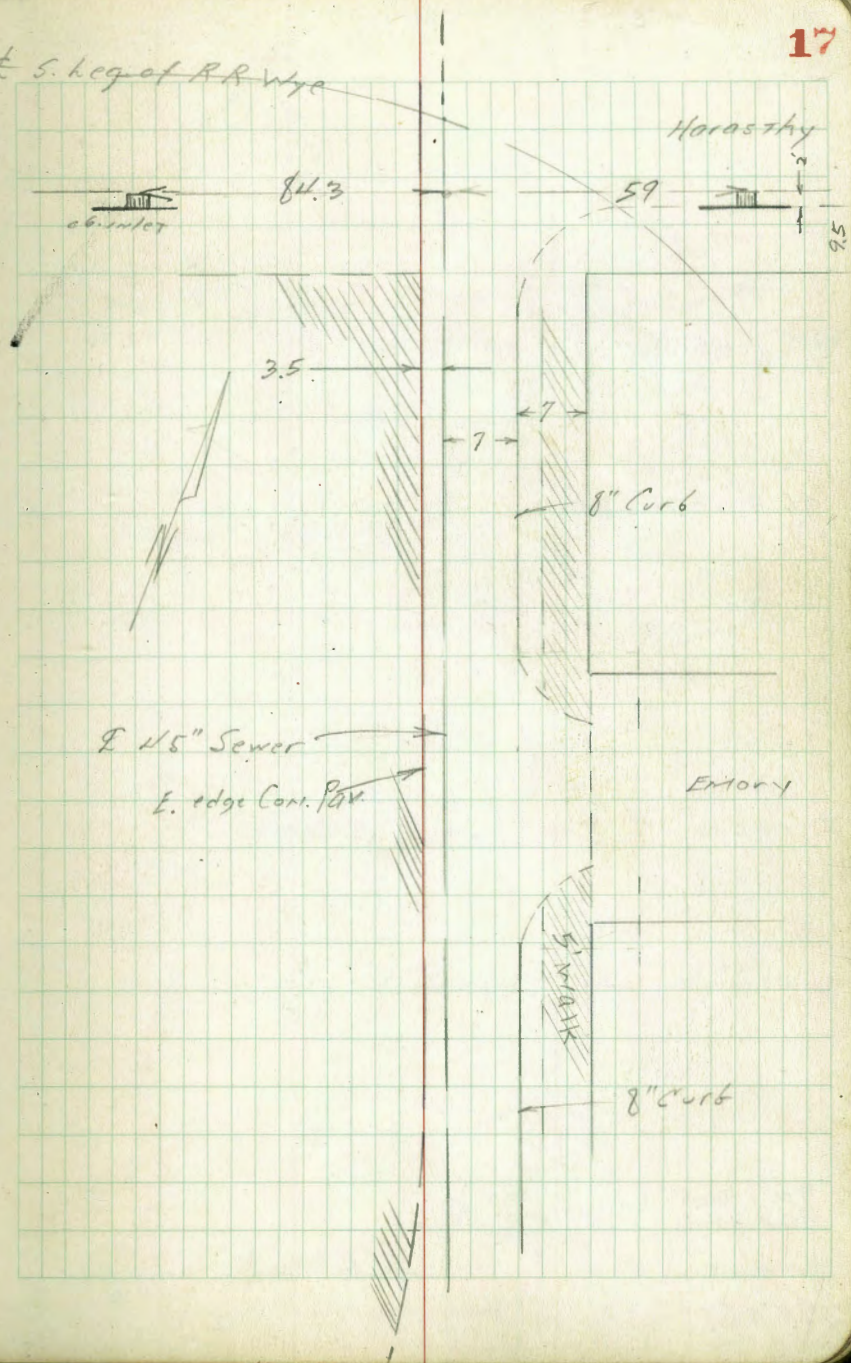
89+12.48 Int. of RR Wye

88+92.45 Int. of 36" Conc. Pipe drain

88+80.95 End Con. Pav. Beg. A.C. Pav.

E.C. of Ho' Con. Strip Pav.

E. S. leg of RR Wye



Cont'd p 17

$R = 25$
 $T = 45.05$
 $L = 39.92$
 $96 + 45.80 = \Delta = 90^\circ 06' 30'' R$

96 + 20.75 BC

93 + 12.72 ϕ Con. Junction Box

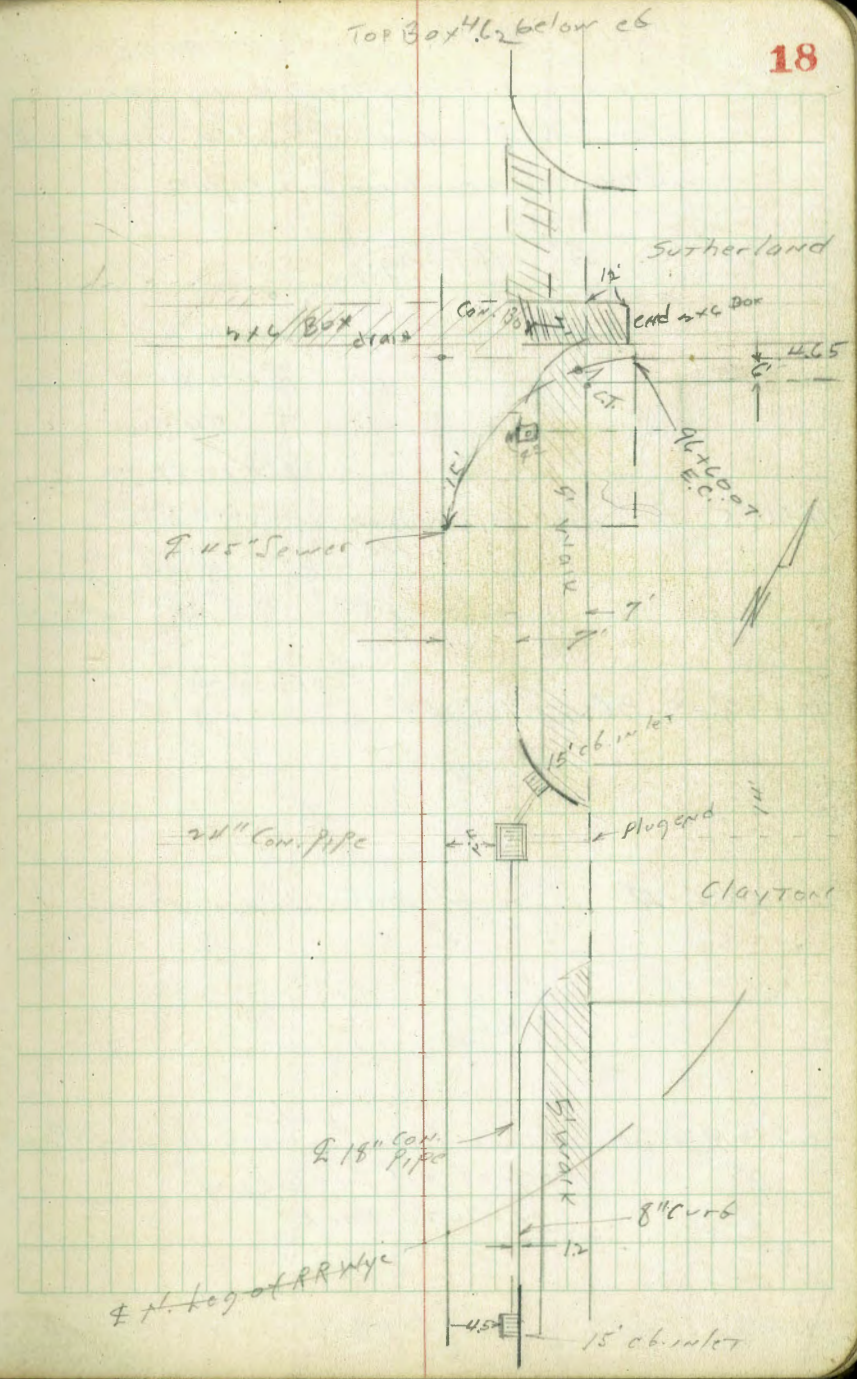
92 + 60.08 Sh Clayton

$90 + 96.5$
 $90 + 86.5$ ϕ RR Wye

90 + 38 ϕ L.S. ϕ to outside edge Box

90 + 67

Top Box 46.2 below cs



line thru Cons. aircraft
 Parking lot, avoiding re-
 placing 5' sdw. + valve vault of
 24" C.I. waterline on UPAS ST.

Note! Δ^s off TANG.
 AT STA. PT.

$$A = 24^\circ 47' \text{ LT}$$

$$R = 2500$$

$$T = 5119.25$$

$$L = 1081.27$$

71+16.5 INT. 24" C.I. WATER
 LINE

$$0.6875'$$

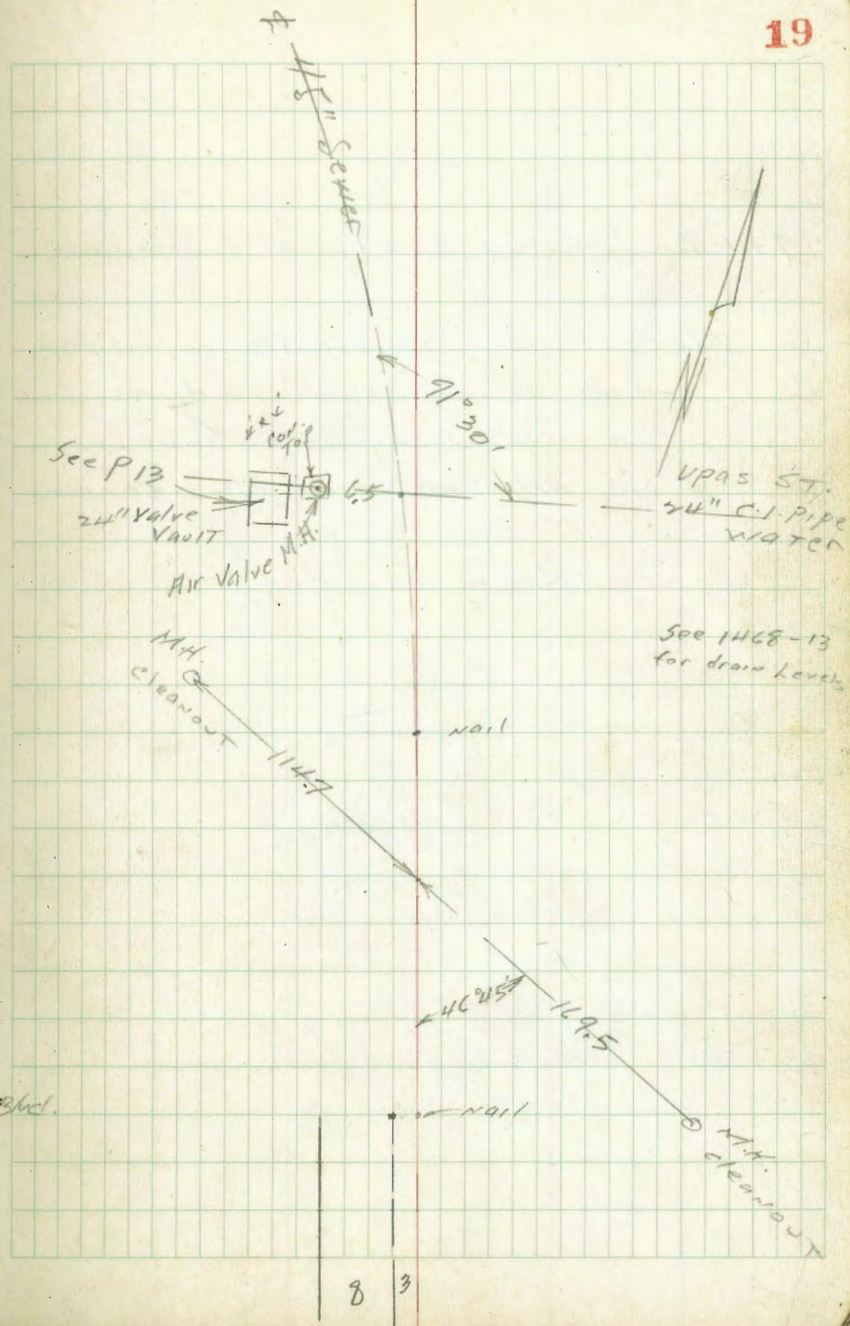
void see FB-
 1608-p.2
 for alignment
 N of this B.C.

Proposed

70+28.49 B.C. LT. of 45" Sewer

69+62.14 Int. of 54" Cor. pipe drain

68+45.74 B.C. LT for ^{EAST} Property line of Prop.
 Beg. of oil surfacing
 of Auto Park



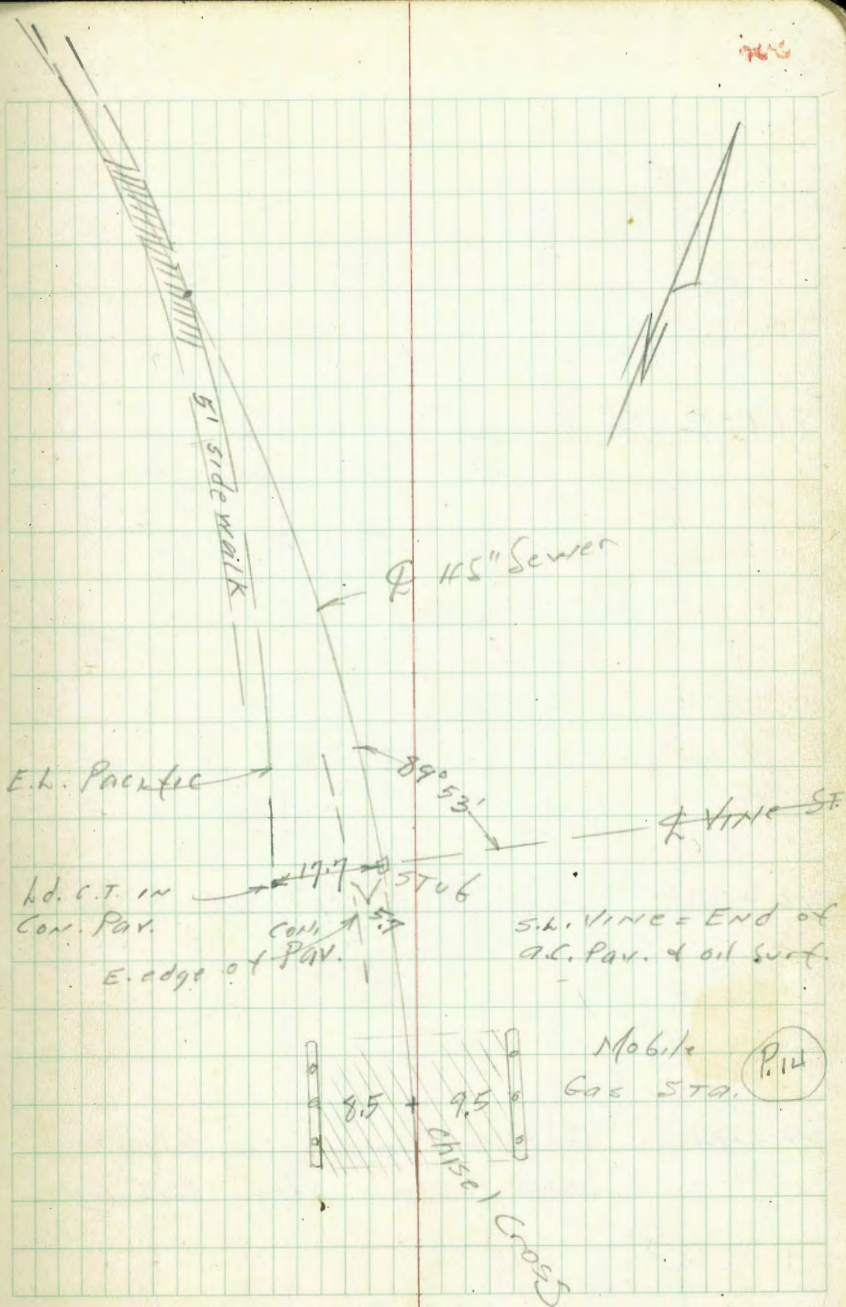
79+48 Int. of E. edge of 5' sidewalk

Note! Set roof nails in oil Pav.
and $1\frac{1}{2} \times 1\frac{1}{2}$ stubs in dirt
" chisel crosses on Conc.
on all Sta.^s and plus 50^s etc.

See P 22 for det.

74+50.5 Int. of Vine

73+50 Mobile Gas Sta.

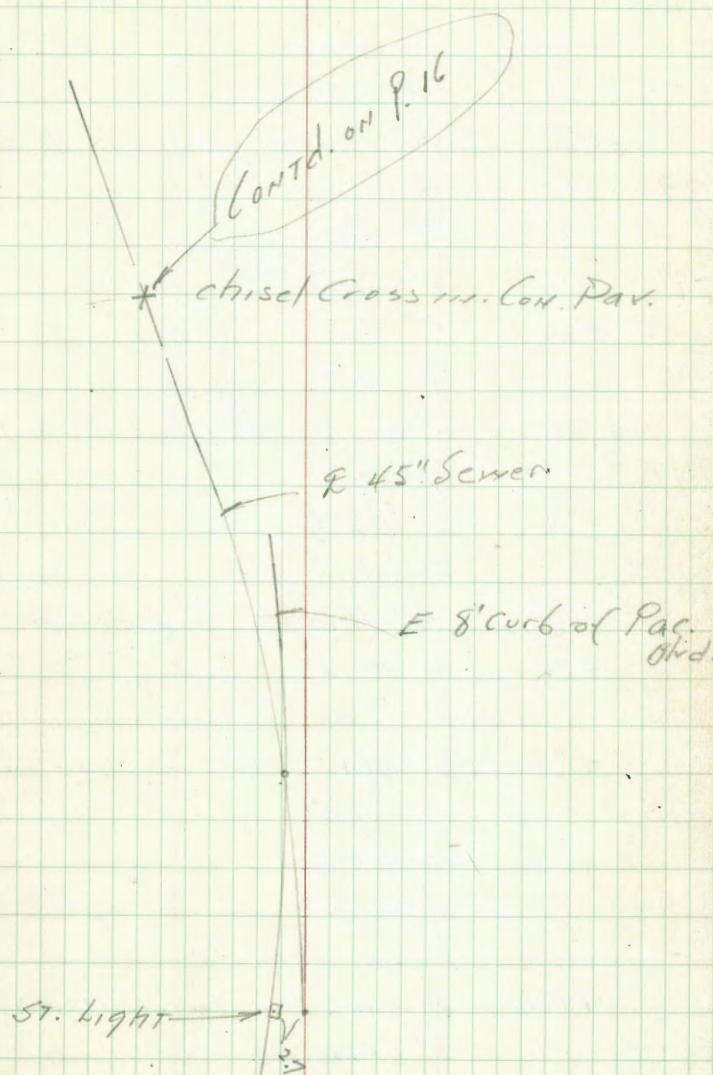


81+09.86 E.C.

80+54.5 Int. of 8" - 8' curb line

Note!

79+94 Remove Lamp & Con. Base
and Replace after back-fill



def. for Curve 24° 47' LT.
R 2500

80	11° 08.0	
+94	11° 04.0	27 LT. = St. Light
+50	10° 33.6	
+48	10° 32.2	E edge 5' walk
79	9° 59.2	
+50	9° 24.9	
78	8° 50.5	
+50	8° 16.1	
77	7° 41.7	
+50	7° 07.3	P.O.C. T
76	6° 33.0	
+50	5° 58.6	
75	5° 24.2	
+50.5	4° 50.0	♀ Vine St
+50	4° 49.8	
74	4° 15.4	
+50	3° 41.1	
73	3° 06.7	
+50	2° 32.3	
72	1° 57.9	
+50	1° 23.5	
+16.5	1° 01.5	INT. 24" WATER
71	0° 49.2	
+50	0° 14.8	

B.C. LT. 70+28.49

♀ 45" Sewer

22

81+09.86	E.C.	12° 23.5
81		12° 16.7
+54.5		11° 47.4
80+50		11° 44.3

INT. of Curb

109+10 P.P.

Estudillo

106+85.7 ST line

106+76 P.P.

104+76 P.P.

Noell

103+0449 ST line

104+94 P.P.

100+96 P.P.

A = 90° 06' 30" LT

16'

R = 100

T = 100.19

E.S. 100+22.19

L = 157.27

Sutherland

98+44.94 P.C.

0.1

0.2

0.3

0.4

0.5

ST

KURTZ

$\Delta = 39' 18" LT$

107+03.60

106+72.22

23

31.24 Estudillo

KURTZ

S.F. RR.

Void

103+24.11 H.O.

Noell

102+90.88

101+00

100+95.66
10° 12' LT

E.C. 100+49.75

$\Delta = 86' 49" LT$
R = 150
T = 141.89
L = 227.29

Pacific

98+22.19

74

135

"H"

"B" = 2nd choice

Sutherland

126.64

1193+66.11
11.5° 31' LT

170+0v P.P. 5' W of E
 119+5v Tel. P. 7.5 W of E
 118+87.6 = Int. 15" Con. Pipe

11096
 1106870
 29.90
 E.L. 15" Pipe O.L.
 above E.L. 2x6 Box
 drain

118+28.13 S 7' line Couts
 Return curbed to Sh Couts
 No curb along 5' sdw.

117+48 Sand sidewalk

116+21 P.P.

114+80.5 W edge Top outside 2x6 Con. Box drain
 E.L. Sewer 0.3 below Top Box

114+47.48 S 7' Line Bandini

114+46 Tel. P. on line
 114+39 P.P.

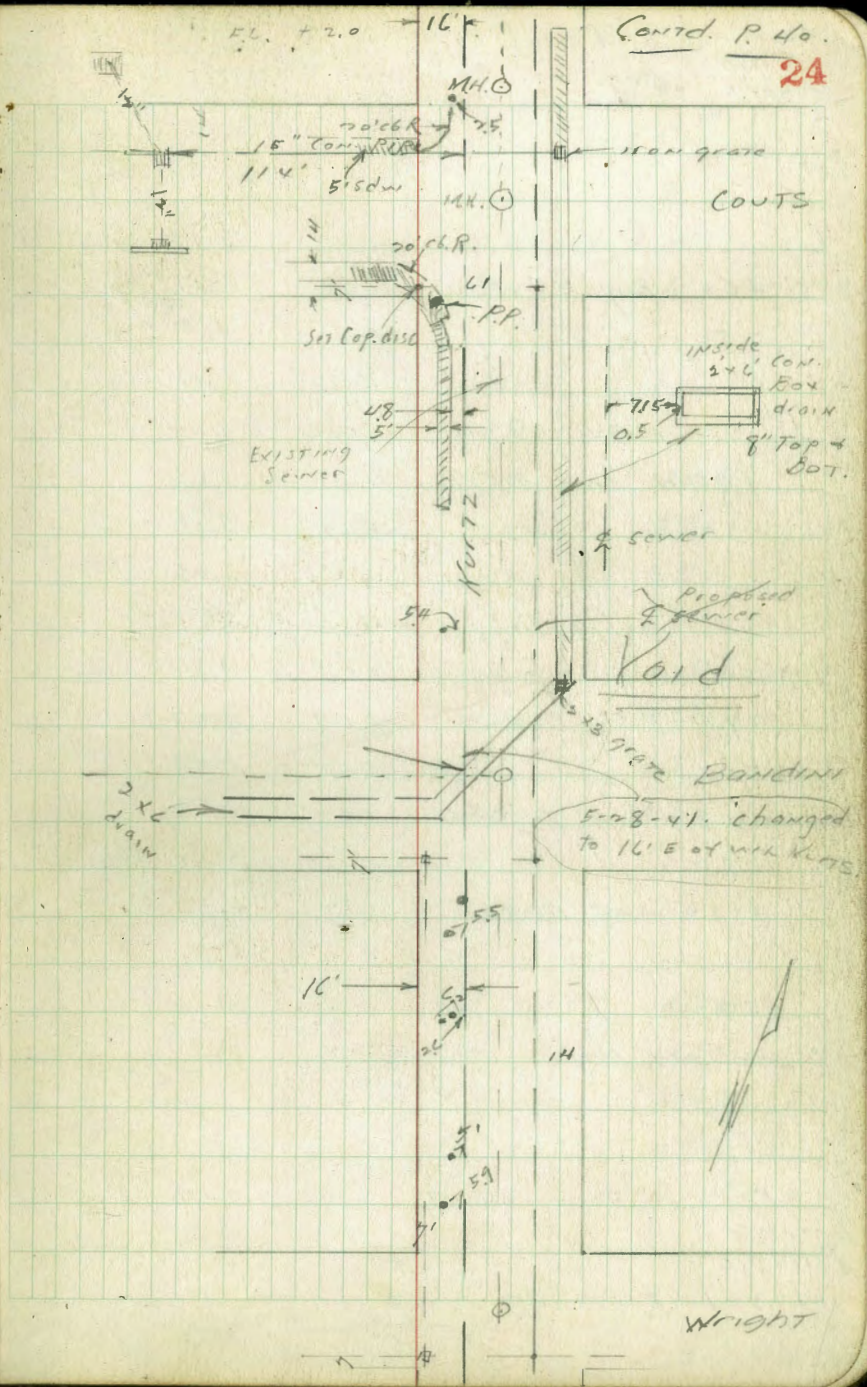
112+91 Tel. P.

112+90.9 P.P. 6' W of E Sewer

111+64 Tel. P.

111+43 P.P.

110+28.10 S 7' line Wright



Moore Osborne
Covert
5-19-41
W.P.A. (Lagrange)

F Levels on 51" Interception
Beg. at Ash via Pacific NLY

5/17/41
Revised
2d W.

L		4.66	5.13	✓
5 + 60	Beg. A.C. Pav.	4.68	5.11	✓
+ 50		5.0	4.8	✓
5		4.8	5.0	✓
T.P.	4.846 9.793	4.502	4.947	✓ B.M. Beech Pav.
+ 87.0	end A.C. Pav	4.36	5.09	✓
+ 50		4.37	5.08	✓
4		4.40	5.05	✓
+ 64	oil lines	4.63	4.82	✓
3 + 50		4.58	4.87	✓
2 + 99.9	S.L. Beech	4.59	4.86	✓
+ 50		4.67	4.78	✓
2 + 00.8	Beg. A.C. Pav	4.37	4.58	✓
+ 50		4.95	4.50	✓
+ 19.0	end A.C. Pav	5.13	4.32	✓
1	w	5.14	4.31	✓
+ 50		5.31	4.14	✓
0 + 00	N.L. Ash	5.48	3.97	✓ A.C. Pav

SEBP 4.502 9.449
Beech + Pacific
1423-1-15
CITY
DATUM

25

+ 50		5.0	3.3	✓
+ 15.5	R ELM	5.0	3.3	✓
17		5.0	3.3	✓
+ 75.5	ground	5.0	3.3	✓
11 + 75.5	R Top	6.70	1.6	✓
	Con. Pipe drain			See plan for size
T.P.	5.131 8.292	5.905	3.161	✓
+ 50		5.8	3.3	✓
11		5.6	3.5	✓
+ 50		5.4	3.7	✓
10		5.3	3.8	✓
+ 50		5.0	4.1	✓
9		4.8	4.3	✓
+ 50		4.6	4.5	✓
8		4.6	4.5	✓
T.P.	4.265 9.666	4.992	4.801	✓
7 + 91.0	end 6" Con. Pav.	5.17	4.62	✓
7 + 57.31	Δ 9° 58' LT.	5.16	4.63	✓
+ 50		5.12	4.67	✓
7 + 00		4.90	4.89	✓
6 + 49.4	end A.C. Pav. and beg. 6" Con. "	4.75	5.04	✓

9.793

T.P.	5.901	14.253	2.800	8.350
+ BP SE Cor check Grape + Pac.		4.226	6.548	6.00
+50 SL Hornstein		2.6	8.6	✓
20		3.1	8.1	✓
+50		3.0	7.6	✓
19		3.9	7.3	✓
+50		4.2	7.0	✓
18		4.7	6.5	✓
+50		5.0	6.2	✓
17		5.3	5.9	✓
16 + 6670 Δ 10012.27		5.6	5.6	✓
+50		5.7	5.5	✓
16		6.1	5.1	✓

T.P.	6.21	11.174	3.328	4.964
+50		3.5	4.8	✓
15		3.8	4.5	✓
+50		4.0	4.3	✓
14		4.4	3.9	✓
+50		4.6	3.7	✓
13		4.8	3.5	✓

8.292

+50	HC Pav	7.7	9.1	26
29	Pay "H.C."	7.6	9.2	✓
+90.12	609 #C Pav END "C" Can Pav	7.6	9.2	✓
+50	Pav	7.5	9.3	✓
+10.12	609 Con. Pav	7.4	9.4	✓
28		7.4	9.4	✓
+50		7.3	9.5	✓
27		7.2	9.6	✓
+50		7.2	9.6	✓
26		7.0	9.8	✓
+50		7.0	9.8	✓

T.P.	6.34	16.758	3.835	10.418
25		4.6	9.7	✓
+50		4.7	9.6	✓
+30	SL Ivy	4.7	9.6	✓
24		4.7	9.6	✓
+50		4.8	9.5	✓
23		4.9	9.4	✓
+50		5.0	9.3	✓
22		5.1	9.2	✓
+50		5.2	9.1	✓
21 + 00		5.3	9.0	✓

14.253

19.5	S.L. drive	5.86	15.57	✓
19.5	Top 6" Ret. wall	4.26	16.97	✓
13.5	E. 2.4' CEM. walk	4.30	16.93	✓
45		4.7	16.5	✓
50		4.6	16.6	✓
44		4.5	16.7	✓
50.5	RT	1.97	19.26	grate ✓
50.5	RT	4.74	14.51	FL. 24" ✓
50.5	17' LT	10.71	10.52	FL. 24" pipe ✓
50.5	17' LT	6.41	14.82	or grate ✓
50.5	Int. 24" pipe	5.4	15.8	ground ✓
3 + 08.85	= B.C.L.T.	6.1	15.1	✓
42		5.9	15.3	✓
50		5.6	15.6	✓
40		6.1	15.1	✓
75		5.3	15.9	✓
50		6.5	14.7	✓
41		7.9	13.3	✓
T.P.	8.13	21.231	7.24	13.101 ✓
50		7.3	13.1	✓
40		3.0	12.4	✓
39 + 50		3.6	11.8	✓
B.M. check to B.P.		7.388	7.973	✓
	15.361			

6/11/50
✓ 3/2/50

Reduced by
2400 R. 4/24
6/11/50

N.W. curb
level to
Pacific

7.85 from Fed. Bldg. 14-3-1-40

+50	PAV.		4.83	8.28	✓
T.P.	2.870	13.110	5.038	9.200	✓
80	PAV		6.00	8.28	✓
+50	PAV		5.93	8.35	✓
+18	GUTTER PAV.		5.80	8.48	✓
+18	TOP CURB		5.21	9.07	✓
79			5.22	9.1	✓
+50			5.0	9.3	✓
78			4.8	9.5	✓
+50			4.6	9.7	✓
T.P.	0.571	14.278	1.578	13.707	on LAND POST
77	+09.96 BC LT		5.55	9.74	✓
77	on sdw		5.52	9.77	✓
	+44.5 on edge sdw		5.33	9.96	EL PAV.
76			5.22	10.1	✓
+50			5.1	10.2	✓
75			5.0	10.3	✓
+84			4.5	10.8	✓
+76.33	E.C.		5.22	10.1	✓
+50			4.7	10.6	✓
+34	and oil STA. PAV		5.1	10.2	✓
74			5.0	10.3	✓
+50	oil STA. on CONC. DRIVE		5.08	10.21	✓
73	+00 P.C.C.		5.22	10.1	✓

15.785 ↓

87			5.3	10.3	✓
+50			5.5	10.1	✓
86			5.7	9.9	✓
+50			5.9	9.7	✓
85			6.8	8.8	✓
T.P.	6.090	15.568	3.632	9.478	✓
+50			3.8	9.3	✓
84			3.9	9.2	✓
+50			4.3	8.8	✓
83			4.5	8.6	✓
+50			4.8	8.3	✓
82	+35.30 E.C. = 84 + 37.63		4.8	8.3	✓
81			4.9	8.2	✓
+58	and Pav		4.79	8.32	✓
+50	PAV		4.81	8.30	✓
Ed. #			3.951	9.159	SE cor. Iron Bolt
BM 1					NO. Pac. & Seag
					909 = STATE
					NY
+30	8 1/2 LT F.L. 18" PIPE		9.69	3.42	✓
+30	9 1/2 LT grate		5.94	7.17	✓
+30	11.5 RT F.L. 18" PIPE		8.52	4.59	✓
+30	11.5 RT. grate		5.38	7.73	✓
+30	PAV		4.84	8.27	✓
81	700 PAV		4.89	8.22	✓

13.110 ↓

T.P.	1649	10681 ^x	7.558	9.032 ^x	
+60	FL Box		12.48	4.11	✓
+60	4.5 RT grate		8.18	8.41	✓
+60	Pav.		7.78	8.81	✓
+50			7.65	8.94	✓
90			7.10	9.49	✓ Pav.

NEBP Curb 6.52 10.05^x ^{Horoshy} Pacific

+50			5.40	11.19	✓ Pav
+12.48	E Sky RR Wye		5.40	11.19	✓ Pav
89			5.5	11.1	✓ "
+92.45	84.3 LT		14.56	2.03	FL 36" pipe
+92.45	84.3 LT		7.61	8.98	grate
+92.45	58 RT		9.60	6.99	FL 36" pipe
+92.45	58 RT		4.51	12.08	grate
+92.45	Int. 36" ^{Con. Pipe} drain				Pav

T.P.	634	16.59 ^x	5.318	10.25	
+80.95	609 6" AL Pav		4.8	10.8	✓
+50			4.9	10.7	✓
88			5.1	10.5	✓
87+50			5.2	10.4	✓

15.568^x

97+00			3.8	5.4	33
Top inlet of 2 x 6 Box			9.17	0.02	✓
96+60.07 EC RWS			4.6	4.6	✓
Int gutter			5.10	4.09	✓
Int. curb Top			4.48	4.71	✓
+45.8 = P.I.			4.81	4.38	✓ "
+20.75 BC RT			4.76	4.43	✓ "
96			4.70	4.47	✓ Pav

T.P.	3731	9.187 ^x	5.225	5.456	✓
+50			5.96	4.72	✓ "
95			5.24	4.84	✓ "
+50			5.59	5.09	✓ "
94			5.41	5.27	✓ "
+50			5.21	5.47	✓ Pav
+26.2	42 RT		11.17	-0.44	FL 24" pipe
+26.2	42 RT		5.45	5.23	✓ grate
+26.2	Int. 24" pipe		5.04	5.64	✓ "
93			4.91	5.77	✓ "
+50			4.53	6.15	✓
92			3.77	6.91	✓ "
+50			7.98	7.70	✓ "
91			1.66	9.02	✓ "
90+90.5	E Sky Wye		1.62	9.06	✓ Pav.

10.681^x

+50		5.1	15.1	✓
102		5.1	15.1	✓
+50		4.6	15.6	✓
101		4.1	16.1	✓
+50		5.5	14.7	✓
+22 19	10 LT.	7.0	13.2	✓
+22 19	5 RT	3.0	17.2	✓
+22 19	EC.	3.6	16.6	✓
100	5 RT	3.2	17.0	✓
100	6' LT	8.0	12.2	✓
100		5.4	14.8	✓
+85		8.1	12.1	✓
+50		9.2	11.0	✓
+35		7.4	12.6	✓
99		8.9	11.3	✓
98+64.92	BC LT.	9.9	10.3	✓
+50		10.5	9.7	✓

T.P. 11.567 20.171^x 0.583 8.604^x

B.M. #4
Top
N.E. Ret. curb
chiseled
Mark

4.845 4.364 Pacific
Sutherland
U.S. State

98		1.1	8.1	✓
97+50		2.6	6.6	✓

9.187^x

Set B.M.
7'
220 HUG

		4.343	9.78	Kurtz 34
111		4.1	10.0	✓
+50		5.5	8.6	✓
+25		5.9	8.2	✓
110		4.7	9.4	✓
+50		5.3	8.8	✓
109		5.0	9.1	✓
+50		4.3	9.8	✓
108		4.0	10.1	✓
T.P.	3.483 14.123 ^x	5.635	10.640 ¹	
+50		6.0	10.3	✓
107		5.7	10.6	✓
+50		5.2	11.1	✓
106		5.2	11.1	✓
+50		5.1	11.2	✓
105		4.8	11.5	✓
+50		4.5	11.8	✓
104		4.2	12.1	✓

T.P. 2.892 16.275 6.788 13.383
Set B.M. 1 SW. 7' Mon
Kurtz

+50		6.9	13.3	✓
103		5.5	14.7	✓

20.171¹

119			4.8	2.0	✓
+87.6	114	LT	8.16	-1.36	✓
+87.6	51	RT	9.70	-2.92	✓
+87.6	51	RT	3.87	2.98	✓
+87.6	Int.	of 15" Pipe	4.8	2.0	✓
+50			4.8	2.0	✓
118			4.9	1.9	✓
+50			5.1	1.7	✓
117			5.0	1.8	✓
+50			5.1	1.7	✓
T.P.	4.888	6.804	6.978	1.916	✓
116			7.0	1.9	✓
+50			6.8	2.1	✓
115			6.8	2.1	✓
+80.48		GROUND	6.6	2.3	✓
+80.48		N edge 2x6 Box drain	8.93	-0.04	✓
+50			6.4	2.5	✓
114			6.4	2.5	✓
+50			5.8	3.1	✓
113			5.0	3.9	✓
+50			3.9	5.0	✓
112			4.4	6.7	✓
T.P.	0.113	8.894	5.344	8.781	✓
111	+50		4.9	9.2	✓

14.123 ✓

Fd. 817. B.P.
W. end N Subway
Can. Ret. wall

10' LT. STA
124+00

6.33 2.454

35

125	+19.02		5.06	3.72	✓
125			4.7	4.1	✓
+50			5.5	3.3	✓
124			6.1	2.7	✓
+81.7	Top	Can. Ret wall	6.34	2.44	✓
+81.7	N edge	Pav	8.84	-0.06	✓
123	+70.7	EC Pav	9.15	-0.37	✓
+50		Can	9.58	-0.80	✓
+36.7	S edge	Subway Pav.	9.71	-0.93	✓
+36.7	Top	cb & sdw	8.18	0.60	✓
+28.1	Top	sdw	8.26	0.52	✓
+28.1	Top	15 Ret wall	6.40	2.38	✓
+22.5		Pav	6.70	2.08	✓
123		Beq. Pav "AC"	6.49	2.29	✓
+50			6.0	2.8	✓
+0933		BLT.	6.3	2.5	✓
122			6.4	2.6	✓
+50			6.3	2.5	✓
121			6.5	2.3	✓
T.P.	5.508	8.784	3.528	3.276	✓
+50			4.6	2.2	✓
120			4.8	2.0	✓
119	+50		4.4	2.4	✓

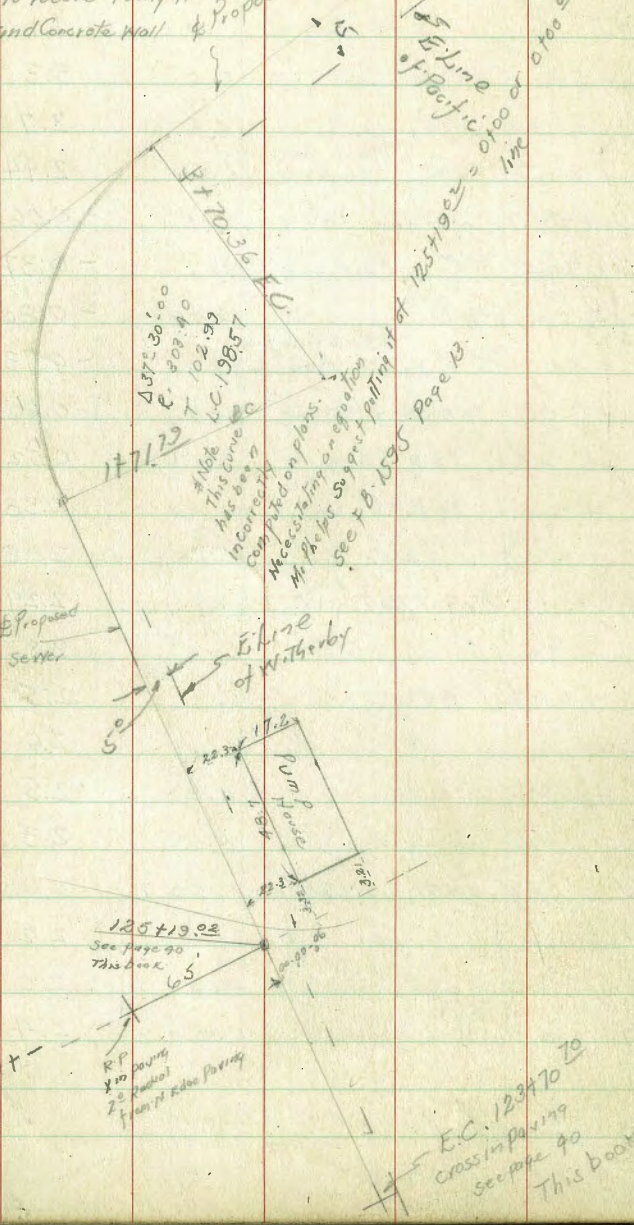
6.804 ✓

Has wire
Cond. at
below

Bless
Sommernyer
Beggs
1/7/42

Retracement Survey
Pacific Interceptor Sewer
to locate Pump House
and Concrete Wall of Proposed Sewer

Line of Pacific 0700 or 0700 ± old



Δ 108° 30' 00"
E 908.90
T 108.99
L.C. 198.57
Note: This curve has been computed on plans. Accuracy on equation Mr. Beggs is first filling it at 125419.02 = Page 13.

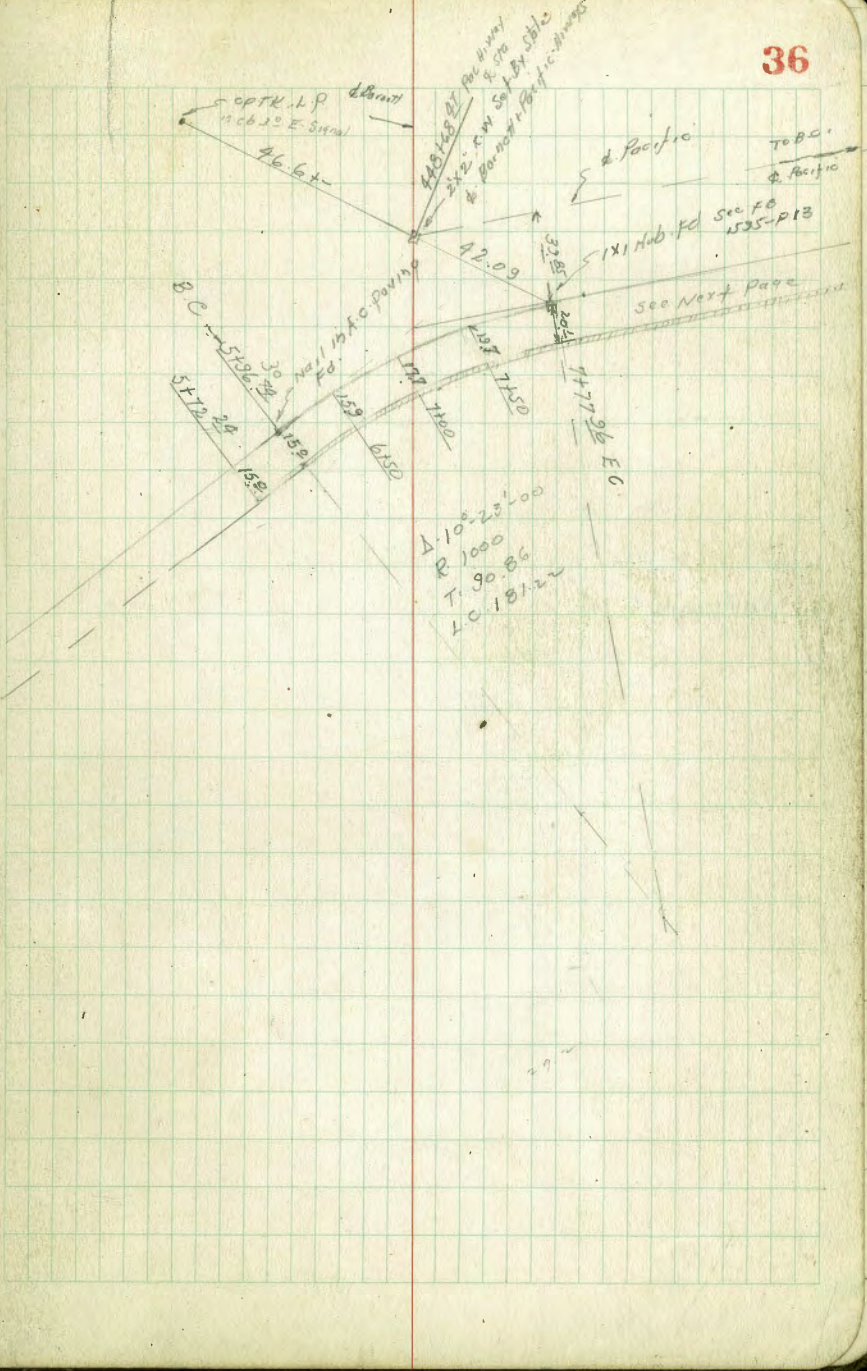
5' E. Line of Witherby



125419.02
See page 90
This book

R.P. 120
20' Radius
From pt. Edge Paving

E.C. 123770
Cross in Paving
see page 90
This book



OPTV L.P.
120620 E. S. 1111
46.64
E.C. 123770
see page 90
This book

IXI Hub Fd
see page 13
See Next Page
177.29
108° 23' 00"
R 1000
T 90.86
L.C. 181.22

Cross
1966
30'-00"
To back Ten

CPRK
Ed. 2x3p
Stone
in Island
North of Cons. Overhead.

1 of TR
These markers
are set 90'-00"
To back Ten

For line
Non Pacific
To fortz see
FB 1623-91

37

This Pacific & set
From State Hwy
#.

14537.53 86' Lt on Moore's
Frontier Line

127 11 840' < 30' End wall
& Pacific Hwy
as Established
from State Hwy
pts

9" concrete wall

& prop
Sewer
< 40' > 20'

39.85' set 7777.96

set
1x1" set by
Moore

See page
36

2x2" RW
& Pacific + Barnett Ave
This hub is set in
Traffic Island
in Black Paving - State
Hwy

Ed. R.H.
Nail in paving set by Moore
see FB 15

Line Change Profile Levels from 104134²³ see sketch
 on Kottner to 117480²² Pacific + Beech Pages 27-28+30

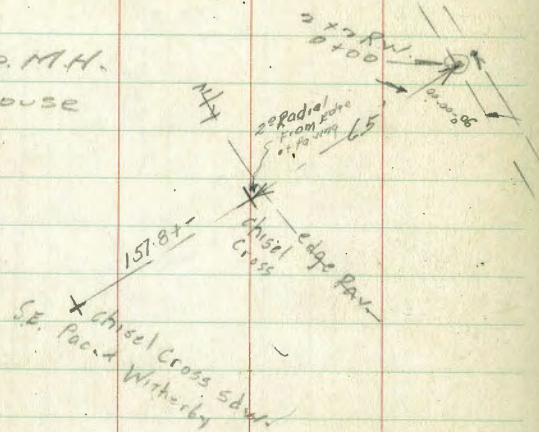
BM.	547	18.75	13.28
105100			
check 104100	5.87	12.88	
104134 ⁷³ BC	5.79	12.96	
+50	5.67	13.08	
+75	5.48	13.27	
+78 ² E Rail E Track S DERR	5.42	13.29	
+90 ¹¹ " " " " " " " "	5.41	13.34	
+99 int Sewer & Kottner	5.90	13.35	
105	5.90	13.35	
+04 E Rail W Track	5.47	13.28	
+13 W " " " "	5.43	13.32	
+25	5.69	13.06	
+51 ³ End AC paving	5.75	13.00	
+75	6.0	12.7	
106	6.4	12.3	
+12 ⁹¹ E.C.	6.88	11.87	
+50	7.5	11.2	
+60	7.1	11.6	
TP 422	7.99	10.76	
+87 ²⁵ E Rail of Santa Fe Track	9.22	10.76	
107100	4.7	10.3	
+04 ⁴ E Rail S Fe Track	4.50	10.48	
+30	5.6	9.4	
+31 ²⁸ E " " " "	5.20	9.78	
+90 ⁰⁴ " " Santa Fe Track	5.27	9.71	
+50	5.7	9.3	

14.98

+53 ¹⁸ E Rail Santa Fe RR	5.34	9.64
+76.60	5.99	9.49
TP 468	6.15	8.83
+90 ²⁰ E Rail S Fe	4.38	9.13
+95 ⁹⁰ " " " "	4.40	9.11
108	4.9	8.6
+19.45 E Rail S Fe	4.98	8.53
+23 ²⁵ " " " "	5.03	8.48
+30	5.5	8.0
TP 005	3.91	9.60
+50	1.9	7.7
109	3.3	6.3
+50	4.7	4.9
+82 ⁰⁰ BC pt on stub	6.04	3.61
110	6.3	3.3
+25	6.9	2.7
+41 ⁴	6.9	2.7
" " 4.5 ft To Edge curb w/d box	7.60	2.05
+46 ³ Ground	7.3	2.3
" " 3.7 ft To Edge curb w/d box	7.60	2.05
+50	7.4	2.2
+75	7.1	2.5
+88 ²³ EC on stake	7.13	2.52
TP 528	7.14	2.51
111	5.2	2.6

FROM P 24
& Sewer

125+19.07 = Prop. M.H.
at Pump House
on P 34



Paved to S 15 Ret wall

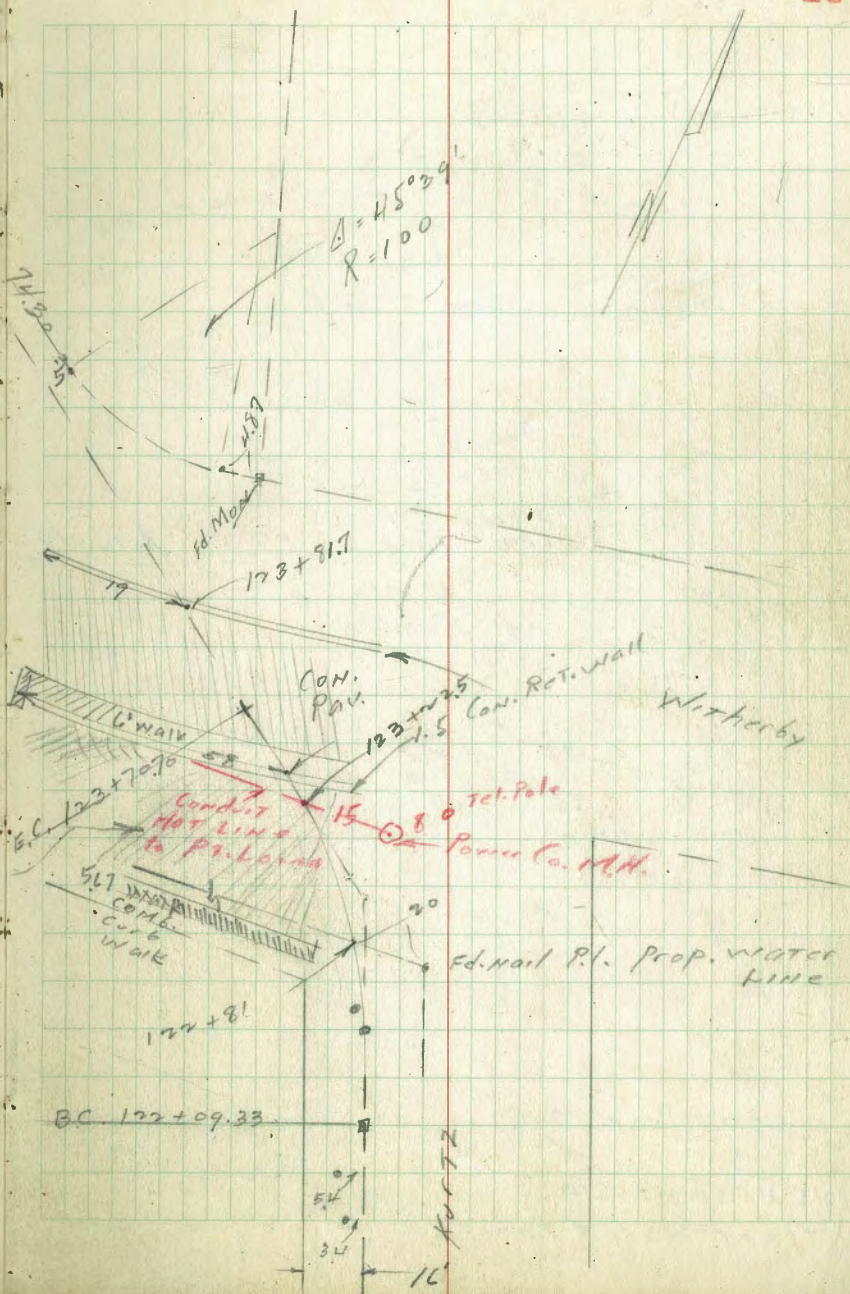
123+00 beg. 6" A.C. Pav.

124+63 P.P. 1' Lt. of Line
122+54 Tel. p. on line

$\Delta = 36^{\circ} 59' 47''$
 $R = 250$
 $L = 161.37$

121+57 P.P.

121+01 Tel. Pole



BC 122+09.33

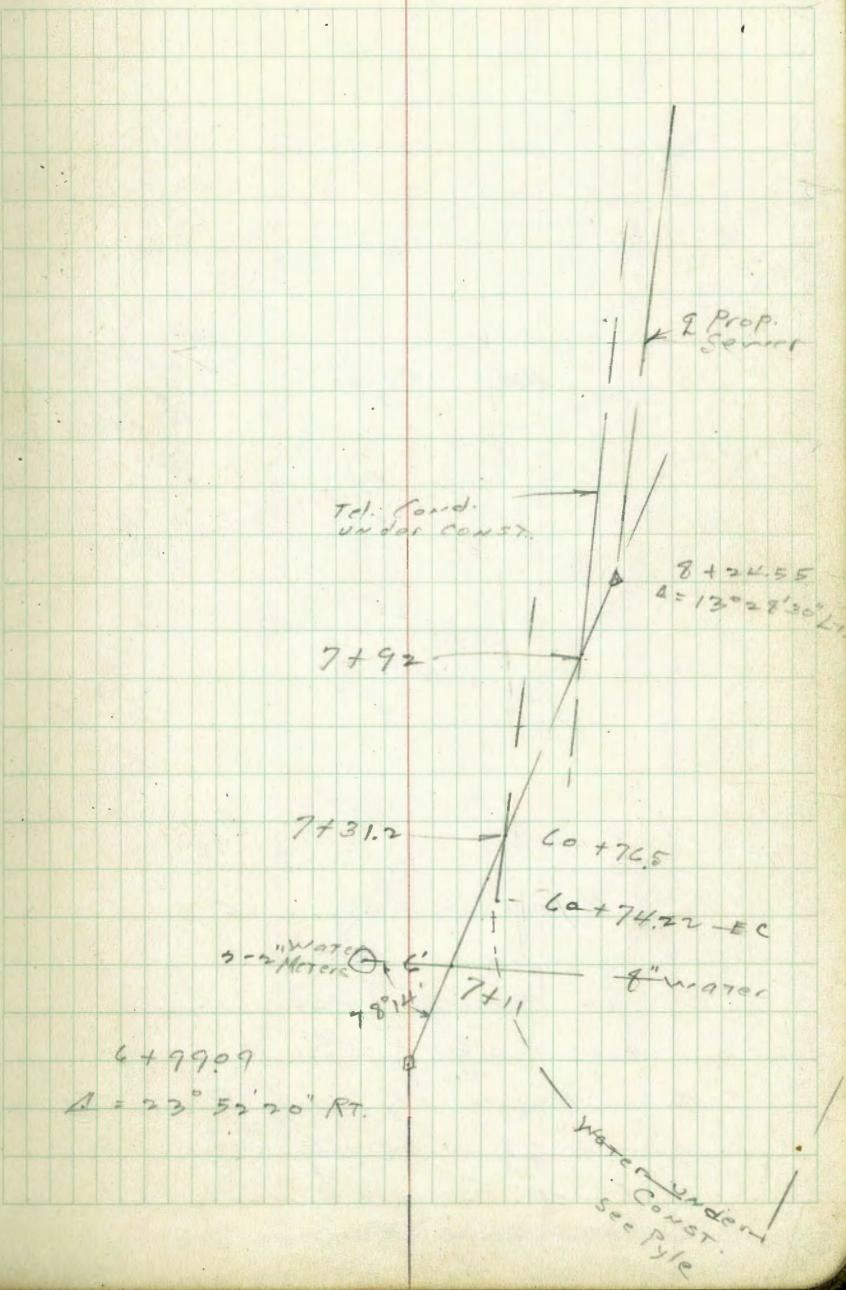
N 1/2 S 1/2

BC 712

4x3

34x21

42



Tel. Cond.
under const.

8+24.55
Δ = 13° 28' 30" L

7+92

7+31.2

6+76.5

6+74.22-EC

Water
2-2 Meters

Water

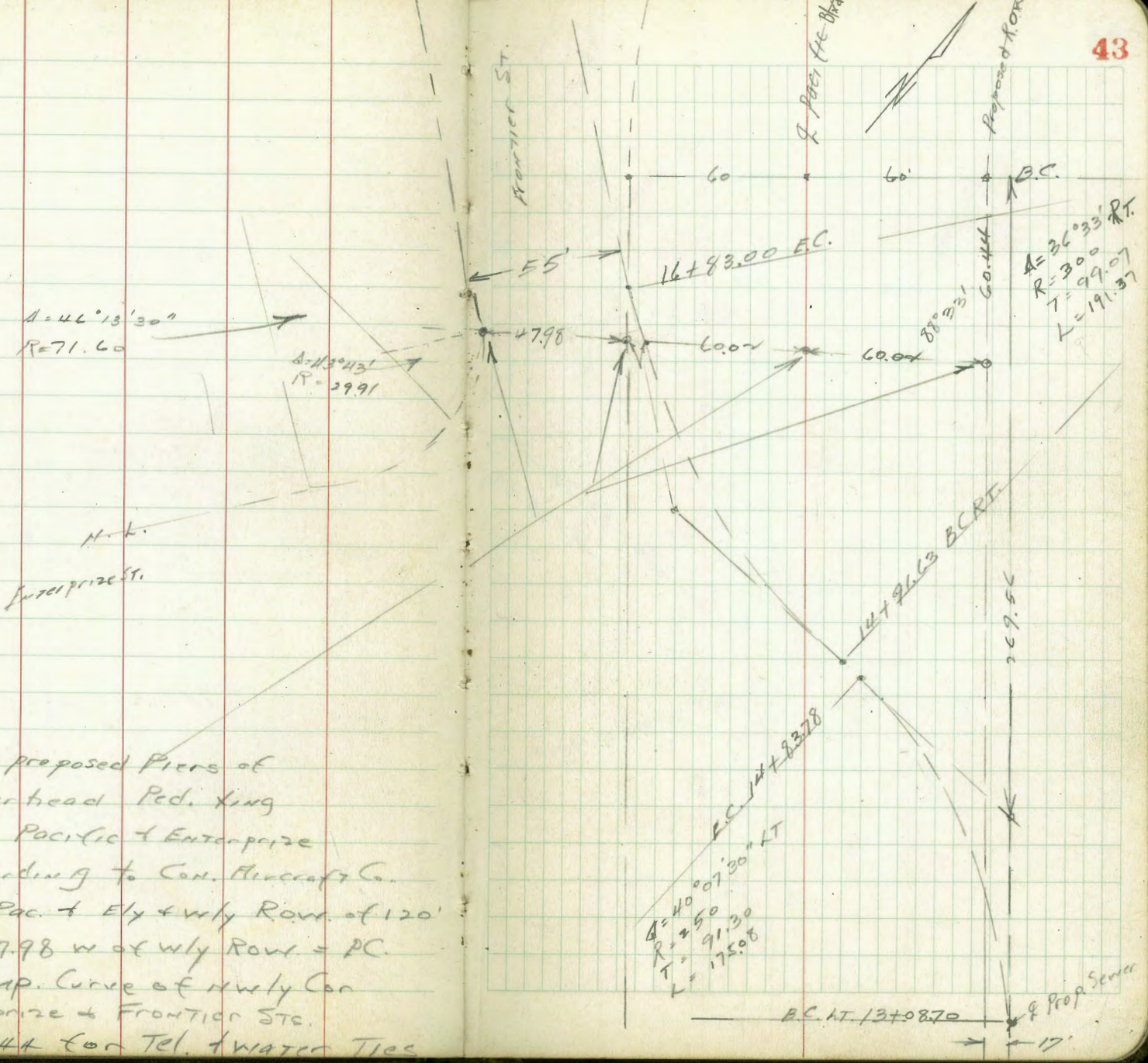
7+814

7+11

6+9909

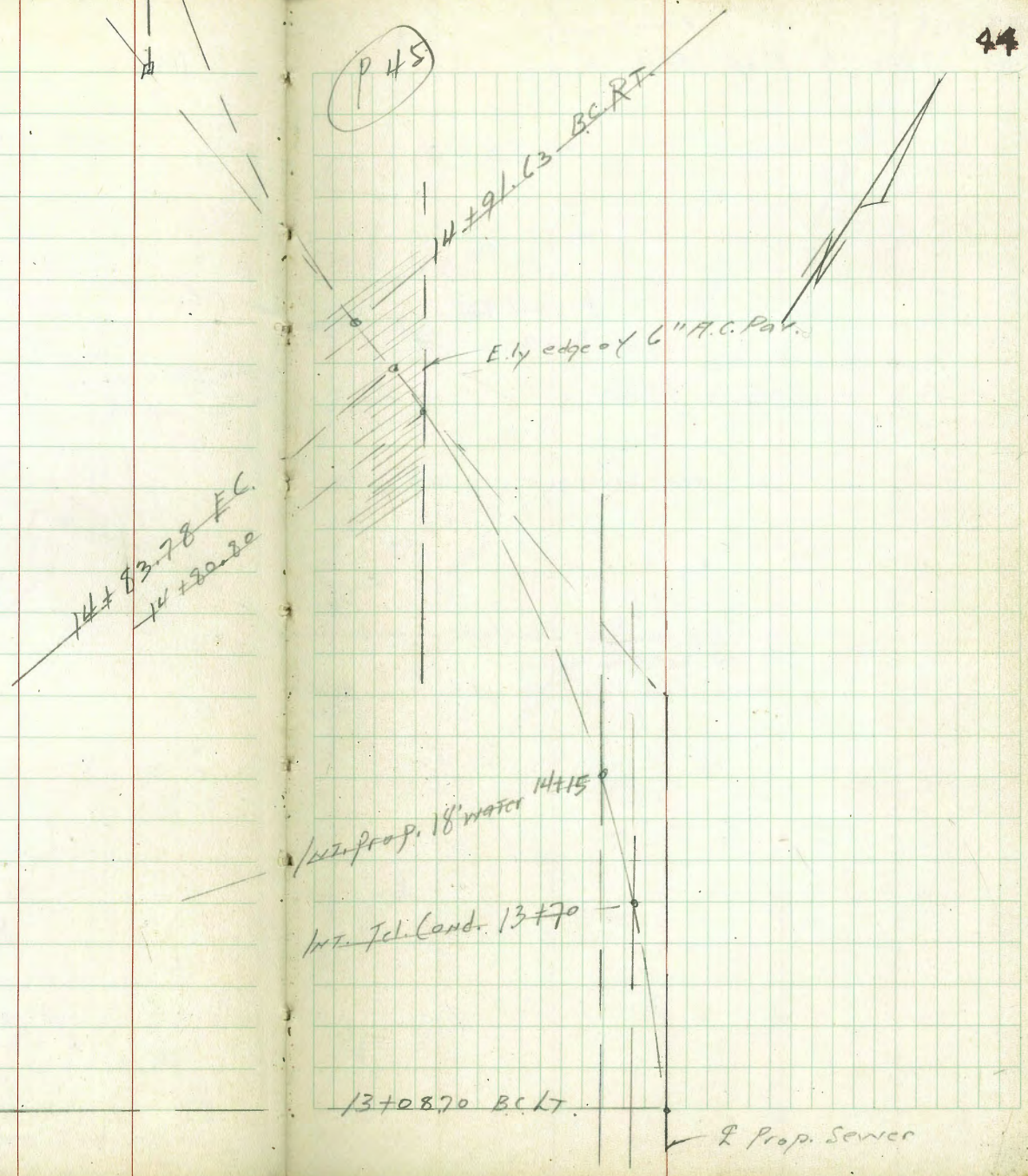
Δ = 23° 52' 20" RT.

Water - under const.
See Pyle



Proposed Piers of
 overhead Ped. King
 at Pacific & Enterprise
 according to Con. Aircraft Co.
 of Pac. & Ely & wly Row. of 120'
 and 47.98 w of wly Row = PC.
 of Comp. Curve of newly Con
 Enterprise & Frontier Sts.
 See P 44 for Tel. & Water Ties

P 45

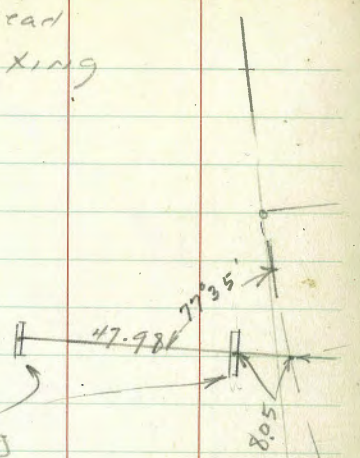


overhead
Ties to Prop. Ped. Xing

Prop. Con. Piers for
Ped. Overhead Xing

A's are Tang of STA. PT.

4.5' Top Pav. 36" Con. Pipe
to Top 30" Pipe
water line to be placed within 30"
Pipe



E.C. 16+83.00

16+44.25

51.97 60.00

with edge 6" R.C. Pav

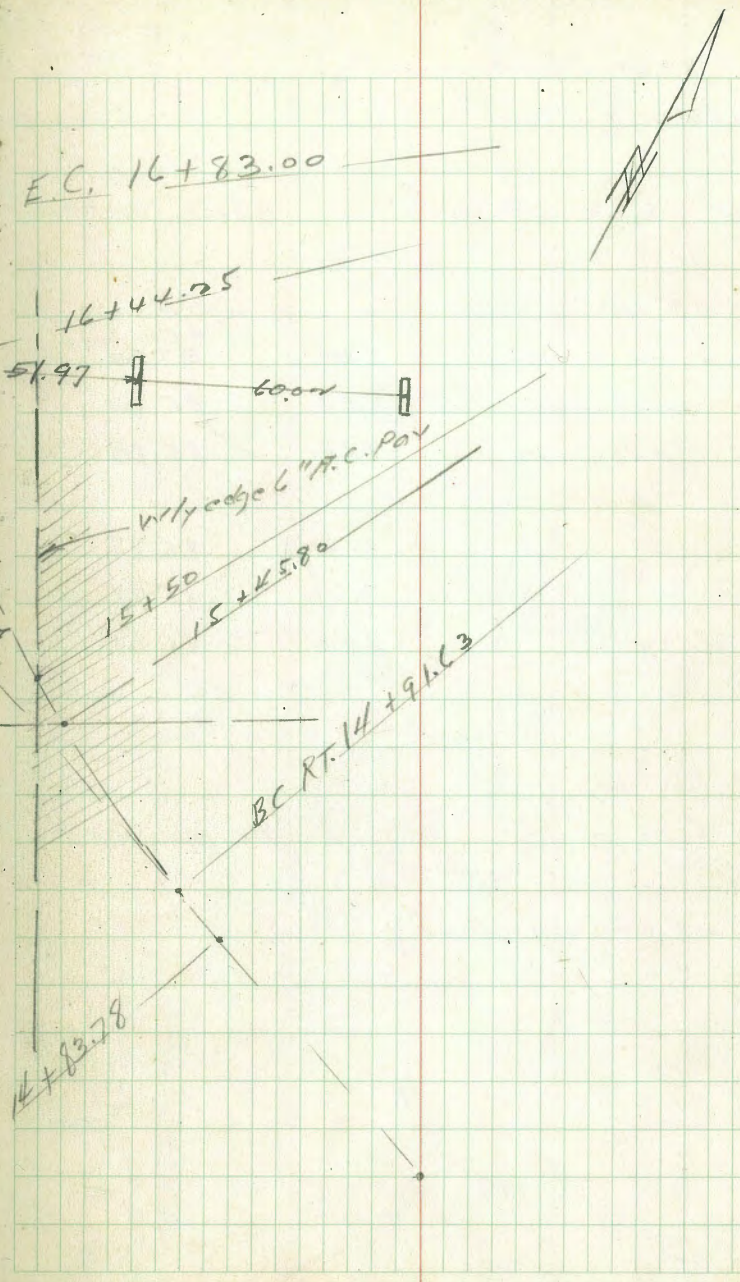
15+50

15+45.80

BC PT. 14+91.63

14+83.78

E.C.



Xsec Carleton ST.

Willow to Plura

70' wide
18' Curbs
8 1/2' / 1/4"

SW BP 8.84 95.24 Willow
86.40 Carleton

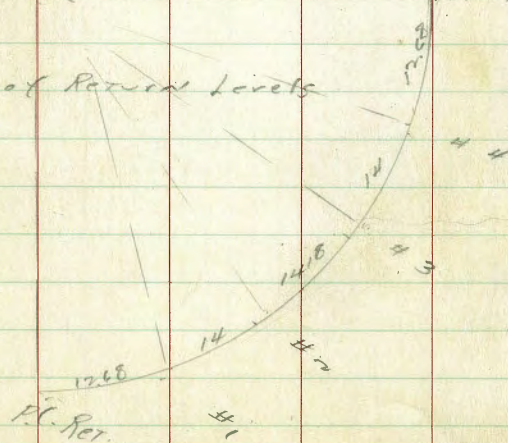
S wly RETURN ON Willow

P.C. Curb on Willow	8.04	87.20
" GUTTER	8.83	86.61
" edge gut	8.14	86.60
#1		
curb	8.54	86.72
gut	9.27	85.97
edge gut	9.14	86.08

113' C.R.

E.C. Ret. #5

Detail of Retard Levels

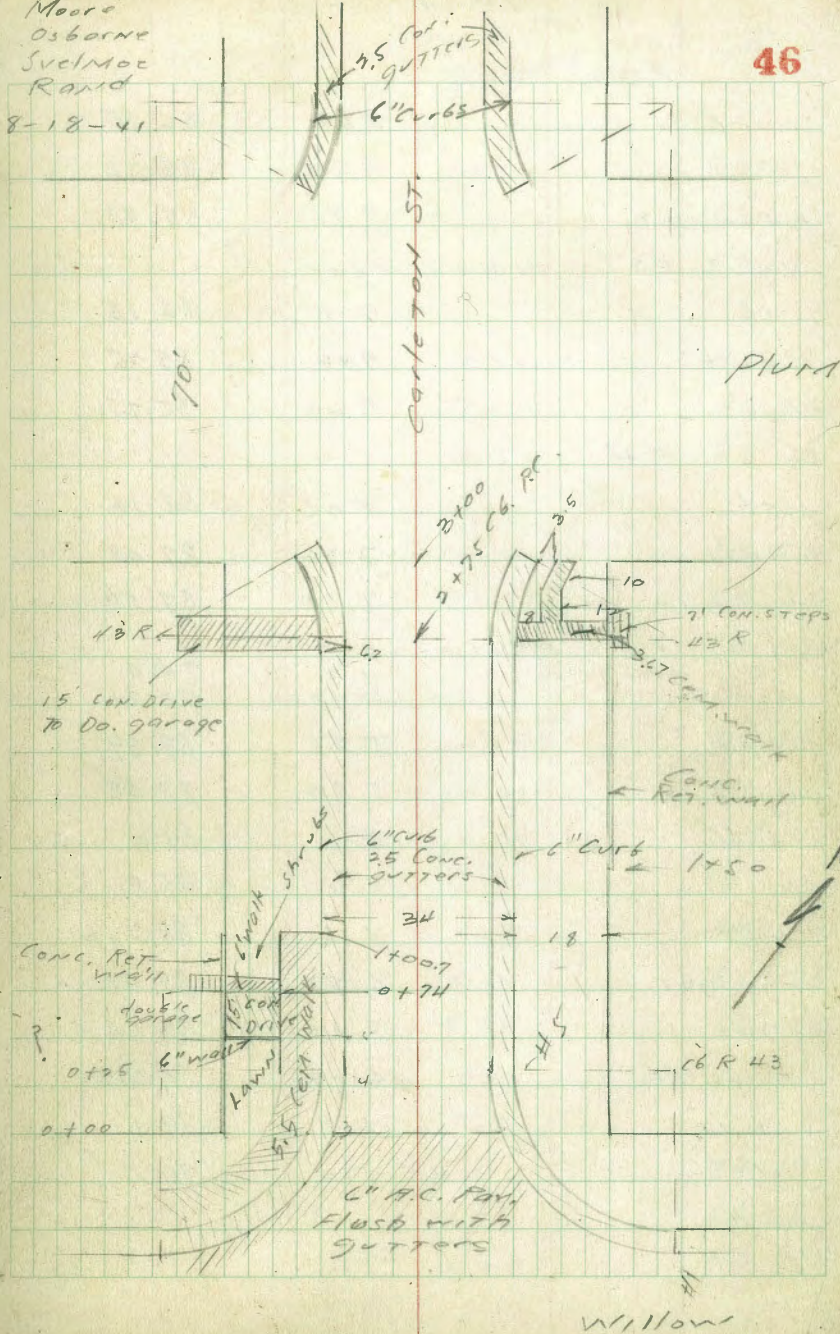


Plot. double scale
both ways. 8-19-41
C.B.H.

Moore
Osborne
Svelmoe
Roxid

8-18-41

46



57

	#2		
curb		8.89	86.35
gut		9.54	85.72
edge gut		9.51	85.73
	#3 = w.l. willow		
cb		9.11	86.13
gut		9.48	85.76
edge		9.49	85.75
	#4		
cb		7.06	88.18
gut		7.76	87.48
edge gut		7.65	87.59
	#5 = F.C. = 0+25		
S	ON LOW W	4.8	90.4
cb		5.03	90.21
gut		5.85	89.39
edge gut		5.84	89.42
S 1/4		6.4	89.0
L		6.4	88.8
N 1/4		6.6	88.6
edge gut		6.83	88.41
gut		7.00	88.24
N cb P.C.		6.19	89.05
+ 13		5.8	89.4
N		5.0	90.2

See page 59 for check Levels 47

	N.W. by Ret. on Willow & Carleton		
P.C. curb on Willow	11.44		83.82
gut	12.30		83.04
edge gut	12.05		83.19
	#1		
cb	10.90		84.34
gut	11.65		83.59
edge gut	11.56		83.68
	#2		
cb	10.40		84.84
gut	11.19		84.05
edge gut	11.07		84.17
	#3 w.l. willow		
cb	10.15		85.09
gut	10.91		84.23
edge gut	10.77		84.47
	#4		Sec 0+25
cb	8.14		87.10
gut	8.95		86.29
edge gut	8.78		86.46
	Levels on Pav. on Willow		
0-18 = willow w/cb line			
N pav	11.11		84.13
cb "	10.58		84.66
1/4 "	10.28		84.96

c Pav	10.05	85.19	
1/2 "	9.90	85.34	
cb "	9.75	85.49	
S "	9.52	85.72	
0-9			
S cb pav	9.66	85.58	
S 1/4 "	9.72	85.52	
C " on M.H.	9.86	85.38	
N 1/4 "	10.12	85.12	
N cb "	10.50	84.74 X	
0 to w. f. Willow			
N cb on pav	10.24	85.00 01	
N 1/4 "	9.73	85.51	
C "	9.43	85.81	
S 1/4 "	9.34	85.90	
S cb "	9.36	85.88	
0 + 31 = Break in Cur 6			
S cb	3.91	91.33	
gUT	4.69	90.55	
edge gUT	4.68	90.56	
T.P.	12.82	107.95	0.11 95.13
0 + 59			
edge gUT	13.52	94.43	

S gUT in drive	13.60	94.35
S cb	12.82	95.13
+ C east edge dri	12.49	95.46
+ 12 " " "	10.16	97.79
S Garage cont. 1/2	8.64	99.31
S Lawn	12.5	95.15
0 + 75		
S cont drive	8.64	99.31
+ C " "	9.23	98.72
+ 12 " " + sdwr	10.10	97.85
S cb	10.15	97.85
gUT	10.96	96.99
edge gUT	10.77	97.18
C 1/4	11.0	97.0
C	11.3	96.7
N 1/4	11.5	96.5
edge gUT	11.52	96.43
gUT	11.71	96.24
N cb	10.96	96.99
+ 12	10.6	97.4
N	9.6	98.4
1700		
N	5.2	102.8
+ C	6.6	101.4
cb	6.98	100.97

gut	7.76	100.19
edge gut	7.62	100.33
1/4	7.2	100.8
c	7.2	100.8
1/4	7.0	101.0
edge gut	6.87	101.08
gut	7.03	100.92
cb	6.23	101.72
+6 edge walk	6.17 ^p	101.78
5" ground RET. wall	7.0	100.9 ^{end} _{Shed back}
1+25		
5	1.2	106.8
cb	2.34	105.61
gut	3.16	104.79
edge gut	2.98	104.97
1/4	3.3	104.7
c	3.4	104.6
1/4	3.4	104.6
edge gut	1+23 to 1+26	GUTTER OUT ✓
gut	-	
cb TOP	3.00	104.95
+ 12	2.9	105.1
11	2.2	105.8

1+26		
11 cb	2.80	105.15
gut	3.60	104.35
edge gut	3.40	104.55
T.P. 13.02	<u>120.80</u>	0.17 107.78
1+50		
11 6sq. Corn RET. wall	11.1	109.7 ^{beg. Lower} _{ground}
+6	11.6	109.2
cb	11.80	109.00
gut	12.62	108.18
edge gut	12.44	108.36
1/4	12.2	108.6
c	12.3	108.5
1/4	12.2	108.6
edge gut	11.96	108.84
gut	12.06	108.74
cb	11.49	109.51
+9	11.3	109.5
5	10.3	110.5
1+75		
5	5.8	115.0
+5	7.9	112.9
cb	7.36	113.44

gut	8.16	112.64
edge gut	7.99	112.81
$5\frac{1}{4}$	8.1	112.7
c	8.3	112.5
$1\frac{1}{4}$	8.3	112.5
edge gut	8.46	112.34
gut	8.62	112.18
cb	7.83	112.97
N Lawry	7.1	113.7
$2+00$		
N Lawry	3.7	117.6
cb	3.79	117.01
gut	4.60	116.20
edge gut	4.44	116.36
$1\frac{1}{4}$	4.4	116.4
c	4.4	116.4
$1\frac{1}{4}$	4.2	116.6
edge gut	4.17	116.63
gut	4.28	116.52
cb	3.52	117.28
+13	3.3	117.5
5	1.4	119.4
T.P.	12.89	133.38
	0.21	120.49

$2+25$		
5	9.6	123.8
+5	11.9	121.5
cb	12.14	121.24
gut	12.90	120.48
edge gut	12.75	120.63
$1\frac{1}{4}$	12.8	120.6
c	12.9	120.5
$1\frac{1}{4}$	13.0	120.4
edge gut	13.06	120.32
gut	13.25	120.13
cb	12.43	120.95
N	11.9	121.5
$2+50$		
N	8.4	125.0
cb	8.47	124.91
gut	9.26	124.12
edge gut	9.04	124.34
$1\frac{1}{4}$	9.0	124.4
c	9.0	124.4
$1\frac{1}{4}$	8.8	124.6
edge gut	8.83	124.55
gut	8.96	124.42
cb	8.16	125.22
+13	7.7	125.7
5	5.5	127.9

2 + 67

S cb	5.52	127.86
gut	6.30	127.08
edge gut	6.14	127.28
2 + 68.5		
S gut & E edge drive	5.96	127.42
S " " "	3.60	129.78
+ 17 E edge dr. gen	1.47	131.91
2 + 75		
S ^{Comp.} on Drive	3.31	130.07
cb in gut on Drive	5.02	128.36
edge gut	4.82	128.50
1/4	5.1	128.3
c	5.0	128.4
1/4	5.1	128.3
edge gut	5.02	128.34
gut	5.22	128.16
cb	4.40	128.98
N	4.3	129.1
2 + 87.5 = 12.08 on curb arc		
N. cb	2.42	130.96
N. gut	3.22	130.16
N. edge gut	3.07	130.31 ✓
" " on South	2.90	130.48
gut " "	2.96	130.42
S cb " "	2.30	131.08

3 + 00 E.H. PLUM

S	0.4	133.0
S + 10 Top end Curb	0.48	132.90
gut	1.24	132.14
edge gut on Radial	1.05	132.33
cb	1.5	131.9
1/4	1.9	131.5
c	1.9	131.5
1/4	1.9	131.5
curb	1.7	131.7
edge gut on Radial	1.11	132.27
gut	1.24	132.14
N. curb + 8 end Curb ^{Comp.}	0.44	132.94
N	0.6	132.8

T.P. 6.63 139.59 0.42 132.96

E cb line PLUM

N	6.3	133.3
cb	7.0	132.6
1/4	6.8	132.8
c	6.5	133.1
1/4	6.8	132.8
cb	7.0	132.6
S	6.6	133.0

R PLUM

S	6.4	133.2
cb	6.8	132.8

1/4		6.3	133.3
c	M H R. M	5.92	133.63
1/4		6.4	133.2
c6		6.8	132.8
N		5.2	134.4
	W c6 PLUM		
N		4.6	135.0
c6		6.4	133.2
1/4		6.2	133.4
c		6.0	133.6
1/4		6.0	133.6
c6		6.4	133.2
S		5.4	134.2
	W h PLUM = 0.400		
S		3.6	136.0
	+ 10 END CENT. RET. 5.50		134.09
	cent. gut.	6.30	133.29
	edge end gut.	6.17	133.42
			on Radial
c6		5.7	133.9
1/4		5.7	133.9
c		5.5	134.1
1/4		5.6	134.0
c6		5.7	133.9
	edge gut	6.03	133.56
	gut	6.28	133.31

N c6 + 8	5.49	134.10	cent end Ret.
N	4.9	134.7	
	W c6 PLUM + 125		
N curb TOP	4.84	134.75	
gut	5.62	133.97	
edge gut	5.46	134.13	
S " "	5.44	134.15	
gut	5.51	134.08	
S c6 TOP	4.69	134.90	
	0 + 25		
S	3.3	136.3	
c6	4.24	135.35	
gut	5.02	134.57	
edge gut	4.79	134.80	
1/4	4.7	134.9	
c	4.7	134.9	
1/4	4.8	134.8	
edge gut	4.84	134.75	
gut	5.05	134.57	
N c6	4.76	135.33	
N	3.6	136.0	
	0 + 50		
N c6	2.97	136.62	
gut	3.73	135.86	
edge gut	3.53	136.06	

Improvements East Side Pacific Highway
Hawthorn & 14th St.

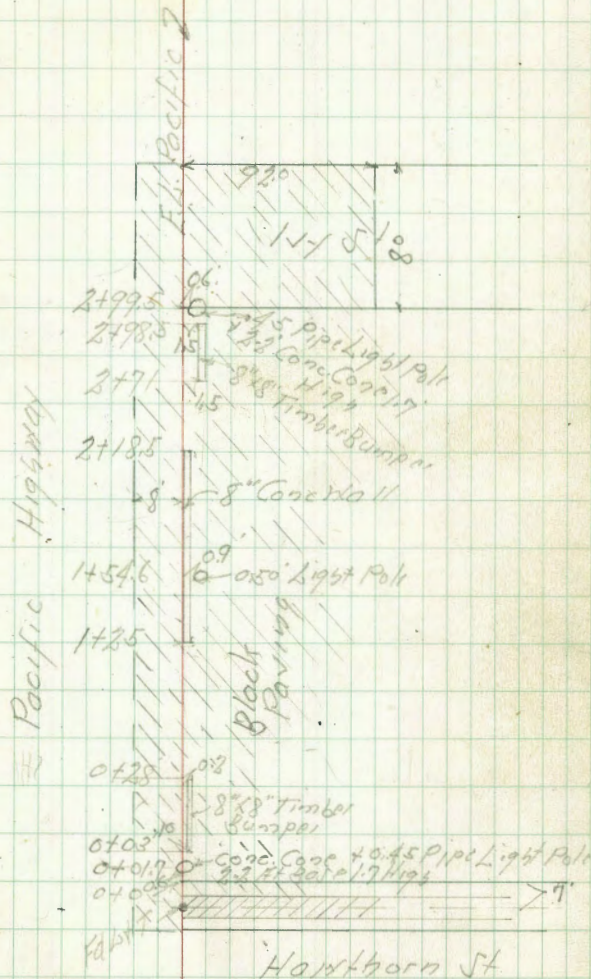
Indexed

LM

Sept. 23 41
Sisson
Northorn
Wood

54

Editt. N 7' 6" at Juniper



370

2755

TP 11.71 314.04 0.45 302.33

2750

270

1798 226 Lt of L = 1/4 Ply Porcelain Plate ✓

1750

TP 11.72 302.78 0.01 291.06

1726.5 1/4 25" Steel Pipe Cut 4.07 R1

291.07

307.7	307.0	304.5	304.4	305.9	305.0	303.8	306.0	306.0
6.0 0.0	7.0 1.5	9.0 10.5	8.8 0.6	8.1	9.0 1.4	10.5 1.9	8.0 1.2	8.0 0.0

303.2	300.5	299.5	301.0	301.5	300.6	299.7	300.8	300.6
10.8 2.0	13.5 1.4	14.5 1.2	13.0 1.7	12.5	12.4 1.3	14.0 1.9	13.0 1.3	13.4 0.8

314.04

301.9	301.2	299.1	300.7	300.9	300.3	299.0	300.3	300.2
6.0 0.0	1.6 1.6	4.7 1.1	1.1 1.1	1.9	2.5 1.4	1.0 1.0	1.1 1.1	1.6 0.0

296.7	296.5	294.4	295.4	295.6	295.3	294.1	295.5	294.8
6.6 0.0	6.3 1.6	8.4 1.1	7.1 0.8	7.2	7.5 1.4	8.7 1.8	7.0 1.1	6.9 0.0

292.1	291.6	290.7	291.1	290.9	290.8	290.9
10.7 0.0	11.0 1.4	12.1 1.6	11.7	11.9 1.3	12.0 1.0	11.9 0.0

302.78

286.81 ✓

4.26
1.45 - 1/4 25" Steel Pipe
CON

291.07

681651

23

BM

9.39

325.94

S.W. Hill Pole
Hunderlin
681651

4+964 = Approx N.L. Hunderlin ✓

4+85 22.5 Lt of L = W.Y. Anchor Pole

4+66.4 = Z

4+50

4+38 22.4 Lt of L = W.Y. Power Pole ✓

TP 10.87 335.33 0.19 324.46

4+36.4 Approx S.L. Hunderlin

0.7
0.0

4+0

TP 10.92 324.65 0.31 313.73

3+50

314.04

47

PT

58

327.0 6.0 0.0	326.6 8.7 0.0	324.73 10.6 14.0	326.3 9.0 10.0	326.5 8.8	326.7 8.6 1.5	332.0 6.5 1.5	331.5 6.0 0.0
326.4 8.8 0.0	325.9 9.4 1.5	325.6 9.7	325.1 10.2 1.5	325.7 9.6			
324.0 0.7 0.0	322.62 20.3 15.4	323.9 0.8 1.1	322.5 2.2 7.2	322.5 2.2	322.5 2.2	22.5 6.2 1.9	323.7 1.0 0.0
319.5 6.2 0.0	318.9 6.5 0.0	318.7 6.0 1.4	317.1 7.6 9.0	317.1 7.0	317.7 7.0 1.0	316.4 8.0 0.0	318.7 6.0 0.0
313.3 0.7 0.0	312.7 1.0 0.0	312.7 1.0 1.5	312.1 0.9 1.0	311.3 2.7 7.0	311.5 2.5	310.8 2.2 1.0	310.0 4.0 0.0
					324.65		
					314.04		

12-29-4

Mags

Curb Level Check
Carleton, Willow to PUMA

			See P. 46	
	9.21	95.61	86.40	
#3	S	9.48	86.13	
	N	10.53	84.08	
#4	S	7.43	87.18	
	N	8.52	82.09	
	S	5.41	90.20	
#5 = 0+45	N	6.55	89.06	
	S	1.78	93.83	
0+50	N	2.59	93.02	
	S	0.50	95.11	
T.P.	11.64	106.78	0.47	95.14
0+75	S	8.95	97.93	
	N	9.79	96.99	
	S	5.04	101.94	
1+00	N	5.80	100.98	
	S	1.16	105.92	
1+25	N	1.82	104.96	
T.P.	12.61	119.33	0.06	106.72
1+50	S	9.80	109.53	
	N	10.31	109.02	

119.33

59

1+75	S	5.88	113.45
	N	6.34	112.99
2+00	S	2.03	117.30
	N	2.30	117.03
T.P.	11.85	131.03	0.15
	S	9.77	121.46
2+25	N	10.06	120.87
	S	5.80	125.23
2+50	N	6.09	124.94
2+75	S	3.17	127.86
	S in gut	2.66	127.37
2+75	N curb	2.05	128.98
T.P.	6.36	135.54	1.85
	S	4.46	131.07
2+87.5	N	4.56	130.97
	S	2.67	132.97
3+00	N	2.58	132.96

South Return

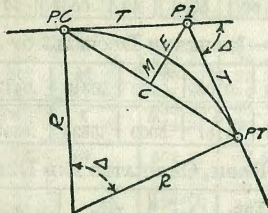
Station	Dist	Elev	BM
0 = P.C. Willow #1		86.21	BM
0+1268	4.41	90.62	4.79
0+2668		5.38	85.83
0+4082		Diff	84.78

East Return

Station	Dist	Elev	BM
0+00 P.C. Willow		82.80	BM
0+1268	6.09	88.89	5.54
0+2668		5.01	83.35
0+4082		4.90	83.88
0+5482		7.57	83.99
0+6784		9.92	81.32
			79.90

DIETZGEN'S RAILROAD CURVE AND REDUCTION TABLES

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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) Δ = 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° curve $T = 3454.1$ and $+8\frac{1}{2} = 414.49$ 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 - 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 91.37. For from Table IV for 1° curve $E = 960.6$ for $8^\circ 20' = 960.6 \div 8\frac{1}{2} = 91.27$ and from Table V correction = .10 or $E = 91.37$ ft. 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 $+42 = 5.5$ or $D = 5^\circ 30'$.

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

Central Angle	Tangent	External	Central Angle	Tangent	External	Central Angle	Tangent	External
31°	1589.0	216.3	41°	2142.2	387.4	51°	2732.9	618.4
10'	1598.0	218.7	10'	2151.7	390.7	10'	2743.1	622.8
20	1606.9	221.1	20	2161.2	394.1	20	2753.4	627.2
30	1615.9	223.5	30	2170.8	397.4	30	2763.7	631.7
40	1624.9	226.0	40	2180.3	400.8	40	2773.9	636.2
50	1633.9	228.4	50	2189.9	404.2	50	2784.2	640.7
32	1643.0	230.9	42	2199.4	407.6	52	2794.5	645.2
10	1652.0	233.4	10	2209.0	411.1	10	2804.9	649.7
20	1661.0	235.9	20	2218.6	414.5	20	2815.2	654.3
30	1670.0	238.4	30	2228.1	418.0	30	2825.6	658.8
40	1679.1	241.0	40	2237.7	421.4	40	2835.9	663.4
50	1688.1	243.5	50	2247.3	425.0	50	2846.3	668.0
33	1697.2	246.1	43	2257.0	428.5	53	2856.7	672.7
10	1706.3	248.7	10	2266.6	432.0	10	2867.1	677.3
20	1715.3	251.3	20	2276.2	435.6	20	2877.5	682.0
30	1724.4	253.9	30	2285.9	439.2	30	2888.0	686.7
40	1733.5	256.5	40	2295.6	442.8	40	2898.4	691.4
50	1742.6	259.1	50	2305.2	446.4	50	2908.9	696.1
34	1751.7	261.8	44	2314.9	450.0	54	2919.4	700.9
10	1760.8	264.5	10	2324.6	453.6	10	2929.9	705.7
20	1770.0	267.2	20	2334.3	457.3	20	2940.4	710.5
30	1779.1	269.9	30	2344.1	461.0	30	2951.0	715.3
40	1788.2	272.6	40	2353.8	464.6	40	2961.5	720.1
50	1797.4	275.3	50	2363.5	468.4	50	2972.1	725.0
35	1806.6	278.1	45	2373.3	472.1	55	2982.7	729.9
10	1815.7	280.8	10	2383.1	475.8	10	2993.3	734.8
20	1824.9	283.6	20	2392.8	479.6	20	3003.9	739.7
30	1834.1	286.4	30	2402.6	483.3	30	3014.5	744.6
40	1843.3	289.2	40	2412.4	487.2	40	3025.2	749.6
50	1852.5	292.0	50	2422.3	491.0	50	3035.8	754.6
36	1861.7	294.9	46	2432.1	494.8	56	3046.5	759.6
10	1870.9	297.7	10	2441.9	498.7	10	3057.2	764.6
20	1880.1	300.6	20	2451.8	502.5	20	3067.9	769.7
30	1889.4	303.5	30	2461.7	506.4	30	3078.7	774.7
40	1898.6	306.4	40	2471.5	510.3	40	3089.4	779.8
50	1907.9	309.3	50	2481.4	514.3	50	3100.2	784.9
37	1917.1	312.2	47	2491.3	518.2	57	3110.9	790.1
10	1926.4	315.2	10	2501.2	522.2	10	3121.7	795.2
20	1935.7	318.1	20	2511.2	526.1	20	3132.6	800.4
30	1945.0	321.1	30	2521.1	530.1	30	3143.4	805.6
40	1954.3	324.1	40	2531.1	534.2	40	3154.2	810.9
50	1963.6	327.1	50	2541.0	538.2	50	3165.1	816.1
38	1972.9	330.2	48	2551.0	542.2	58	3176.0	821.4
10	1982.2	333.2	10	2561.0	546.3	10	3186.9	826.7
20	1991.5	336.3	20	2571.0	550.4	20	3197.8	832.0
30	2000.9	339.3	30	2581.0	554.5	30	3208.8	837.3
40	2010.2	342.4	40	2591.0	558.6	40	3219.7	842.7
50	2019.6	345.5	50	2601.1	562.8	50	3230.7	848.1
39	2029.0	348.6	49	2611.2	566.9	59	3241.7	853.5
10	2038.4	351.8	10	2621.2	571.1	10	3252.7	858.9
20	2047.8	354.9	20	2631.3	575.3	20	3263.7	864.3
30	2057.2	358.1	30	2641.4	579.5	30	3274.8	869.8
40	2066.6	361.3	40	2651.5	583.8	40	3285.8	875.3
50	2076.0	364.5	50	2661.6	588.0	50	3296.9	880.8
40	2085.4	367.7	50	2671.8	592.3	60	3308.0	886.4
10	2094.9	371.0	10	2681.9	596.6	10	3319.1	892.0
20	2104.3	374.2	20	2692.1	600.9	20	3330.3	897.5
30	2113.8	377.5	30	2702.3	605.3	30	3341.4	903.2
40	2123.3	380.8	40	2712.5	609.6	40	3352.6	908.8
50	2132.7	384.1	50	2722.7	614.0	50	3363.8	914.5

- 264 0.00 3.0
266+ 783 V

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

Central Angle	Tangent	External	Central Angle	Tangent	External	Central Angle	Tangent	External
61°	3375.0	920.2	71°	4086.9	1308.2	81°	4893.6	1805.3
10'	3388.3	925.9	10'	4099.5	1315.6	10'	4908.0	1814.7
20	3397.5	931.6	20	4112.1	1322.9	20	4922.5	1824.1
30	3408.8	937.3	30	4124.8	1330.3	30	4937.0	1833.6
40	3420.1	943.1	40	4137.4	1337.7	40	4951.5	1843.1
50	3431.4	948.9	50	4150.1	1345.1	50	4966.1	1852.6
62	3442.7	954.8	72	4162.8	1352.6	82	4980.7	1862.2
10	3454.1	960.6	10	4175.6	1360.1	10	4995.4	1871.8
20	3465.4	966.5	20	4188.5	1367.6	20	5010.0	1881.5
30	3476.8	972.4	30	4201.2	1375.2	30	5024.8	1891.2
40	3488.3	978.3	40	4214.0	1382.8	40	5039.5	1900.9
50	3499.7	984.3	50	4226.8	1390.4	50	5054.3	1910.7
63	3511.1	990.2	73	4239.7	1398.0	83	5069.2	1920.5
10	3522.6	996.2	10	4252.6	1405.7	10	5084.0	1930.4
20	3534.1	1002.3	20	4265.6	1413.5	20	5099.0	1940.3
30	3545.6	1008.3	30	4278.5	1421.2	30	5113.9	1950.3
40	3557.2	1014.4	40	4291.5	1429.0	40	5128.9	1960.2
50	3568.7	1020.5	50	4304.6	1436.8	50	5143.9	1970.3
64	3580.3	1026.6	74	4317.6	1444.6	84	5159.0	1980.4
10	3591.9	1032.8	10	4330.7	1452.5	10	5174.1	1990.5
20	3603.5	1039.0	20	4343.8	1460.4	20	5189.3	2000.6
30	3615.1	1045.2	30	4356.9	1468.4	30	5204.4	2010.8
40	3626.8	1051.4	40	4370.1	1476.4	40	5219.7	2021.1
50	3638.5	1057.7	50	4383.3	1484.4	50	5234.9	2031.4
65	3650.2	1063.9	75	4396.5	1492.4	85	5250.3	2041.7
10	3661.9	1070.2	10	4409.8	1500.5	10	5265.6	2052.1
20	3673.7	1076.6	20	4423.1	1508.6	20	5281.0	2062.5
30	3685.4	1082.9	30	4436.4	1516.7	30	5296.4	2073.0
40	3697.2	1089.3	40	4449.7	1524.9	40	5311.9	2083.5
50	3709.0	1095.7	50	4463.1	1533.1	50	5327.4	2094.1
66	3720.9	1102.2	76	4476.5	1541.4	86	5343.0	2104.7
10	3732.7	1108.6	10	4489.9	1549.7	10	5358.6	2115.3
20	3744.6	1115.1	20	4503.4	1558.0	20	5374.2	2126.0
30	3756.5	1121.7	30	4516.9	1566.3	30	5389.9	2136.7
40	3768.5	1128.2	40	4530.4	1574.7	40	5405.6	2147.5
50	3780.4	1134.8	50	4544.0	1583.1	50	5421.4	2158.4
67	3792.4	1141.4	77	4557.6	1591.6	87	5437.2	2169.2
10	3804.4	1148.0	10	4571.2	1600.1	10	5453.1	2180.2
20	3816.4	1154.7	20	4584.8	1608.6	20	5469.0	2191.1
30	3828.4	1161.3	30	4598.5	1617.1	30	5484.9	2202.2
40	3840.5	1168.1	40	4612.2	1625.7	40	5500.9	2213.2
50	3852.6	1174.8	50	4626.0	1634.4	50	5517.0	2224.3
68	3864.7	1181.6	78	4639.8	1643.0	88	5533.1	2235.5
10	3876.8	1188.4	10	4653.6	1651.7	10	5549.2	2246.7
20	3889.0	1195.2	20	4667.4	1660.5	20	5565.4	2258.0
30	3901.2	1202.0	30	4681.3	1669.2	30	5581.6	2269.3
40	3913.4	1208.9	40	4695.2	1678.1	40	5597.8	2280.6
50	3925.6	1215.8	50	4709.2	1686.9	50	5614.2	2292.0
69	3937.9	1222.7	79	4723.2	1695.8	89	5630.5	2303.5
10	3950.2	1229.7	10	4737.2	1704.7	10	5646.9	2315.0
20	3962.5	1236.7	20	4751.2	1713.7	20	5663.4	2326.6
30	3974.8	1243.7	30	4765.3	1722.7	30	5679.9	2338.2
40	3987.2	1250.8	40	4779.4	1731.7	40	5696.4	2349.8
50	3999.5	1257.9	50	4793.6	1740.8	50	5713.0	2361.5
70	4011.9	1265.0	80	4807.7	1749.9	90	5729.7	2373.3
10	4024.4	1272.1	10	4822.0	1759.0	10	5746.3	2385.1
20	4036.8	1279.3	20	4836.2	1768.2	20	5763.1	2397.0
30	4049.3	1286.5	30	4850.5	1777.4	30	5779.9	2408.9
40	4061.8	1293.6	40	4864.8	1786.7	40	5796.7	2420.9
50	4074.4	1300.9	50	4879.2	1796.0	50	5813.6	2432.9

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

FOR SUB-CHORDS ADD										Excess of arc per 100 ft.	LONG CHORDS				
D	10	20	30	40	50	60	70	80	90		D	200	300	400	500
4°	.00	.00	.01	.01	.01	.01	.01	.01	.00	.02	1	199.99	299.97	399.92	499.85
6	.00	.01	.01	.02	.02	.02	.02	.02	.01	.05	2	199.97	299.88	399.70	499.39
8	.01	.02	.02	.03	.03	.03	.03	.02	.01	.08	3	199.93	299.73	399.32	498.63
10	.01	.02	.03	.04	.05	.05	.05	.04	.02	.13	4	199.88	299.51	398.78	497.57
12	.02	.04	.05	.06	.07	.07	.07	.05	.03	.18	5	199.81	299.24	398.10	496.20
14	.02	.05	.07	.08	.09	.10	.09	.07	.04	.25	6	199.73	298.90	397.26	494.53
16	.03	.06	.09	.11	.12	.12	.12	.09	.05	.33	7	199.63	298.51	396.28	492.57
18	.04	.08	.11	.14	.15	.16	.15	.12	.07	.41	8	199.51	298.05	395.14	490.31
20	.05	.10	.14	.17	.19	.20	.18	.15	.09	.51	9	199.38	297.54	393.86	487.75
22	.06	.12	.17	.21	.23	.24	.22	.18	.10	.62	10	199.24	296.96	392.42	484.90
24	.07	.14	.20	.25	.28	.28	.26	.21	.12	.74	12	198.90	295.63	389.12	478.34
26	.09	.17	.24	.29	.32	.33	.31	.25	.15	.86	14	198.51	294.06	385.22	470.65
28	.10	.19	.27	.34	.37	.38	.36	.29	.17	1.00	16	198.05	292.25	380.76	461.86
30	.11	.22	.31	.39	.43	.44	.41	.33	.19	1.15	18	197.54	290.21	375.74	452.02
32	.13	.25	.36	.44	.49	.50	.47	.38	.22	1.31	20	196.96	287.94	370.17	441.15
34	.15	.28	.40	.50	.55	.57	.53	.43	.25	1.48	22	196.32	285.44	364.06	429.30
36	.17	.32	.45	.56	.62	.64	.59	.48	.28	1.66	24	195.63	282.71	357.43	416.53
38	.18	.36	.51	.62	.70	.71	.66	.53	.31	1.86	26	194.87	279.76	350.30	402.89
40	.21	.40	.56	.69	.77	.79	.73	.59	.35	2.06	28	194.06	276.59	342.69	388.43
42	.23	.44	.62	.76	.85	.87	.81	.65	.38	2.23	30	193.18	273.20	334.61	373.20
44	.25	.48	.68	.84	.94	.96	.89	.72	.42	2.50	32	192.25	269.61	326.08	357.28
46	.27	.52	.75	.92	1.02	1.05	.98	.78	.46	2.74	34	191.26	265.81	317.12	340.73
48	.30	.57	.81	1.00	1.12	1.14	1.06	.86	.50	2.99	36	190.21	261.80	307.77	323.61
50	.32	.62	.89	1.09	1.21	1.24	1.15	.93	.55	3.24	38	189.10	257.60	298.03	305.99
52	.35	.67	.96	1.18	1.31	1.35	1.25	1.01	.59	3.52	40	187.94	253.21	287.94	287.94
54	.38	.73	1.04	1.28	1.42	1.46	1.35	1.09	.64	3.80	42	186.72	248.63	277.51	269.54
56	.41	.78	1.12	1.38	1.53	1.57	1.46	1.17	.69	4.09	44	185.44	243.87	266.78	250.85
58	.44	.84	1.20	1.48	1.65	1.69	1.57	1.26	.74	4.40	46	184.10	239.93	255.78	231.95
60	.47	.91	1.29	1.59	1.76	1.81	1.68	1.35	.80	4.72	48	182.71	233.83	244.51	212.92

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

TABLE VII.—MIDDLE ORDINATES FOR RAILS IN FEET.

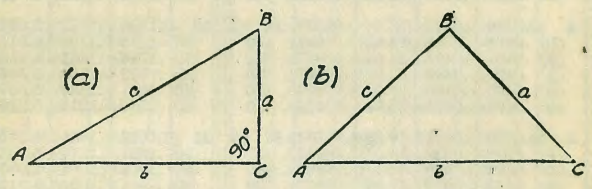
Deg. of Curve	LENGTH OF RAILS							Deg. of Curve	LENGTH OF RAILS.						
	32	30	28	26	24	22	20		32	30	28	26	24	22	20
1°	.022	.020	.016	.013	.011	.009	.008	16°	.356	.313	.273	.236	.200	.170	.139
2	.045	.038	.034	.029	.025	.021	.017	17	.378	.333	.290	.252	.213	.180	.148
3	.067	.058	.051	.044	.037	.031	.026	18	.400	.351	.306	.265	.225	.190	.156
4	.089	.079	.069	.060	.050	.042	.035	19	.423	.371	.324	.280	.238	.201	.165
5	.112	.099	.086	.074	.063	.053	.044	20	.445	.392	.341	.296	.250	.212	.174
6	.134	.117	.102	.088	.076	.064	.052	21	.466	.410	.357	.309	.262	.222	.182
7	.156	.137	.120	.104	.088	.074	.061	22	.487	.430	.375	.325	.275	.233	.191
8	.179	.158	.137	.119	.100	.085	.070	23	.509	.450	.390	.338	.287	.243	.199
9	.201	.175	.153	.133	.112	.095	.078	24	.531	.469	.408	.354	.299	.253	.208
10	.223	.196	.171	.148	.125	.106	.087	25	.552	.486	.424	.367	.311	.263	.216
11	.245	.216	.188	.163	.139	.117	.096	26	.573	.506	.441	.382	.323	.274	.225
12	.268	.236	.206	.179	.151	.128	.105	27	.594	.524	.457	.396	.335	.284	.233
13	.290	.254	.222	.192	.163	.138	.113	28	.618	.545	.475	.411	.348	.294	.242
14	.312	.275	.239	.207	.175	.148	.122	29	.638	.564	.491	.424	.361	.303	.250
15	.334	.295	.257	.223	.188	.159	.131	30	.660	.583	.508	.438	.374	.313	.259

SLOPE REDUCTIONS.

When distances are measured on a slope they may be reduced to the equivalent horizontal distance by the following approximate rule:— subtract from the slope distance the square of the rise divided by twice the slope distance. Thus for a slope distance of 250.3 ft. and a rise of 15 ft. correction=15² ÷ 2 × 250.3 = .45 (by slide rule) or horizontal distance=250.3— .45=249.85. When vertical angle=V. A. is measured horizontal distance=slope distance—slope distance (1—Cos. V. A.). Thus for slope distance of 248.7 ft. and V. A. of 4° 20' from Table VIII Cos=.99714 and correction=1—.99714=.00286 per foot or total of .286 × 2½ (near enough)=.57 and horizontal distance=248.7—.57=248.13 ft.

TRIGONOMETRICAL FORMULAS.

- See fig. (a).
- sin. $A = \frac{a}{c}$
- cos. $A = \frac{b}{c}$
- tan. $A = \frac{a}{b}$
- cot. $A = \frac{b}{a}$
- sec. $A = \frac{c}{b}$
- cosec. $A = \frac{c}{a}$



FORMULA FOR SOLVING TRIANGLES.

Given	Sought.	Right triangles. See fig. (a).
a, c	A, B, b	sin. $A = \frac{a}{c}$, cos. $B = \frac{a}{c}$, $b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	tan. $A = \frac{a}{b}$, cot. $B = \frac{a}{b}$, $c = \sqrt{a^2 + b^2}$
A, a	B, b, c	$B = 90^\circ - A$, $b = a \cot. A$, $c = \frac{a}{\sin. A}$
A, b	B, a, c	$B = 90^\circ - A$, $a = b \tan. A$, $c = \frac{b}{\cos. A}$
A, c	B, a, b	$B = 90^\circ - A$, $a = c \sin. A$, $b = c \cos. A$
Given	Sought.	Oblique triangles. See fig. (b).
A, B, a	b	$b = \frac{a \sin. B}{\sin. A}$
A, a, b	B	$\sin. B = \frac{b \sin. A}{a}$
a, b, C	A — B	$\tan. \frac{1}{2}(A - B) = \frac{(a - b) \tan. \frac{1}{2}(A + B)}{a + b}$
a, b, c	A	$\left\{ \begin{aligned} \text{If } s = \frac{1}{2}(a + b + c), \sin. \frac{1}{2} A &= \sqrt{\frac{(s - b)(s - c)}{bc}} \\ \cos. \frac{1}{2} A &= \sqrt{\frac{s(s - a)}{bc}}, \tan. \frac{1}{2} A = \sqrt{\frac{(s - b)(s - c)}{s(s - a)}} \\ \sin. A &= \frac{2\sqrt{s(s - a)(s - b)(s - c)}}{bc} \end{aligned} \right.$
A, B, C, a	area	$\text{area} = \frac{a^2 \sin. B \sin. C}{2 \sin. A}$
A, b, c	area	$\text{area} = \frac{1}{2} b c \sin. A$
a, b, c	area	$s = \frac{1}{2}(a + b + c), \text{area} = \sqrt{s(s - a)(s - b)(s - c)}$

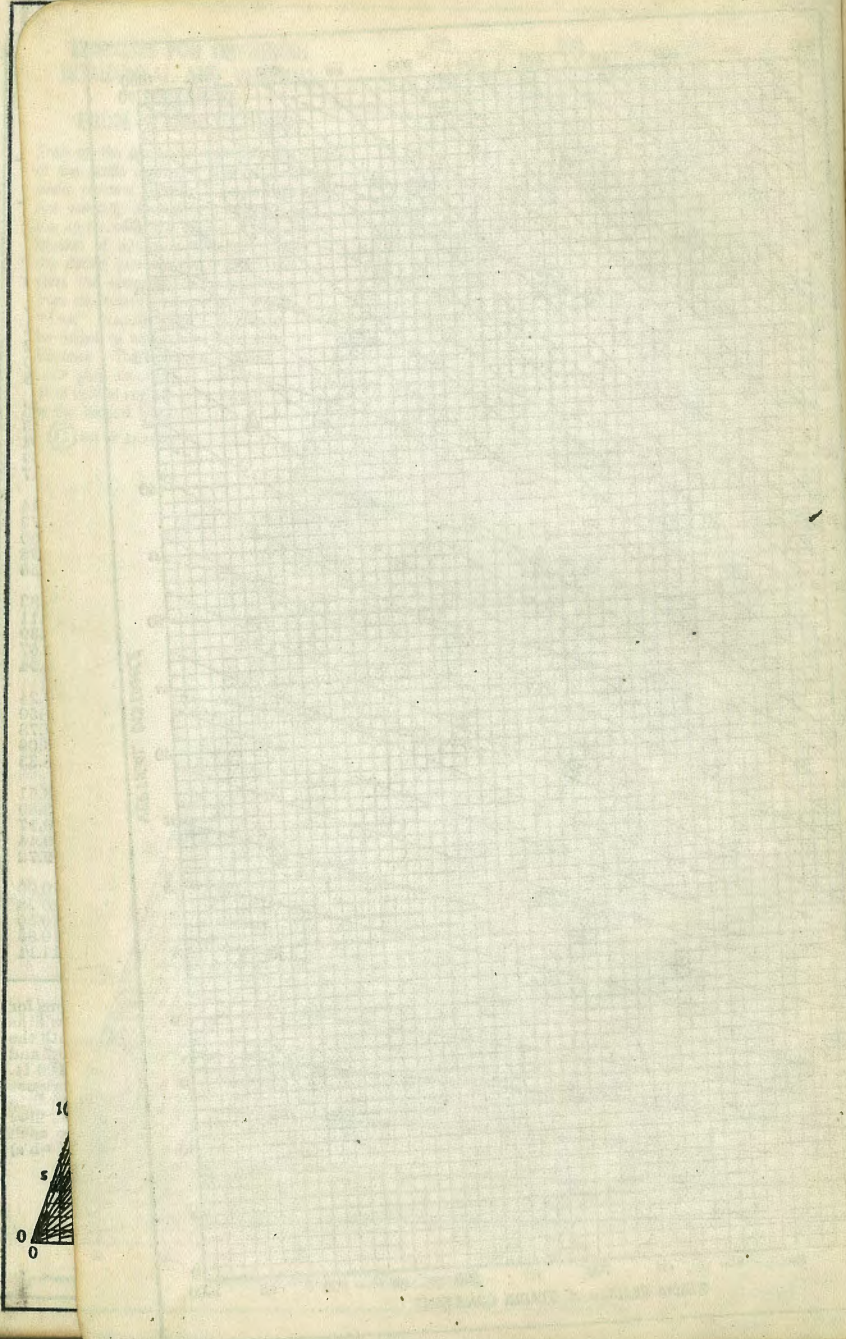
TABLE VIII.—NATURAL TRIGONOMETRICAL FUNCTIONS.

Angle	Sine.	Tan.	Cotg.	Cosin.		Angle	Sine.	Tan.	Cotg.	Cosin.	
or						or					
32	.5299	.6249	1.600	.84805	58	30	.6225	.7954	1.257	.78261	
10	.5324	.6289	1.590	.84650	50	40	.6248	.8002	1.250	.78079	
20	.5348	.6330	1.580	.84495	40	50	.6271	.8050	1.242	.77897	
30	.5373	.6371	1.570	.84339	30						
40	.5398	.6412	1.560	.84182	20	39	.6293	.8098	1.235	.77715	
50	.5422	.6453	1.550	.84025	10	10	.6316	.8146	1.228	.77531	
						20	.6338	.8195	1.220	.77347	
33	.5446	.6494	1.540	.83867	57	30	.6361	.8243	1.213	.77162	
10	.5471	.6536	1.530	.83708	50	40	.6383	.8292	1.206	.76977	
20	.5495	.6577	1.520	.83549	40	50	.6406	.8342	1.199	.76791	
30	.5519	.6619	1.511	.83389	30						
40	.5544	.6661	1.501	.83228	20	40	.6428	.8391	1.192	.76604	
50	.5568	.6703	1.492	.83066	10	10	.6450	.8441	1.185	.76417	
						20	.6472	.8491	1.178	.76229	
34	.5592	.6745	1.483	.82904	56	30	.6494	.8541	1.171	.76041	
10	.5616	.6787	1.473	.82741	50	40	.6517	.8591	1.164	.75851	
20	.5640	.6830	1.464	.82577	40	50	.6539	.8642	1.157	.75661	
30	.5664	.6873	1.455	.82413	30						
40	.5688	.6916	1.446	.82248	20	41	.6561	.8693	1.150	.75471	
50	.5712	.6959	1.437	.82082	10	10	.6583	.8744	1.144	.75280	
						20	.6604	.8796	1.137	.75088	
35	.5736	.7002	1.428	.81915	55	30	.6626	.8847	1.130	.74896	
10	.5760	.7046	1.419	.81748	50	40	.6648	.8899	1.124	.74703	
20	.5783	.7089	1.411	.81580	40	50	.6670	.8952	1.117	.74509	
30	.5807	.7133	1.402	.81412	30						
40	.5831	.7177	1.393	.81242	20	42	.6691	.9004	1.111	.74314	
50	.5854	.7221	1.385	.81072	10	10	.6713	.9057	1.104	.74120	
						20	.6734	.9110	1.098	.73924	
36	.5878	.7265	1.376	.80902	54	30	.6756	.9163	1.091	.73728	
10	.5901	.7310	1.368	.80730	50	40	.6777	.9217	1.085	.73531	
20	.5925	.7355	1.360	.80558	40	50	.6799	.9271	1.079	.73333	
30	.5948	.7400	1.351	.80386	30						
40	.5972	.7445	1.343	.80212	20	43	.6820	.9325	1.072	.73135	
50	.5995	.7490	1.335	.80038	10	10	.6841	.9380	1.066	.72937	
						20	.6862	.9435	1.060	.72737	
37	.6018	.7536	1.327	.79864	53	30	.6884	.9490	1.054	.72537	
10	.6041	.7581	1.319	.79688	50	40	.6905	.9545	1.048	.72337	
20	.6065	.7627	1.311	.79512	40	50	.6926	.9601	1.042	.72136	
30	.6088	.7673	1.303	.79335	30						
40	.6111	.7720	1.295	.79158	20	44	.6947	.9657	1.036	.71934	
50	.6134	.7766	1.288	.78980	10	10	.6967	.9713	1.030	.71732	
						20	.6988	.9770	1.024	.71529	
38	.6157	.7813	1.280	.78801	52	30	.7009	.9827	1.018	.71325	
10	.6180	.7860	1.272	.78622	50	40	.7030	.9884	1.012	.71121	
20	.6202	.7907	1.265	.78442	40	50	.7050	.9942	1.006	.70916	
							.7071	1.	1.	.70711	
										or	
	Cosin.	Cotg.	Tan.	Sine.	Angle.		Cosin.	Cotg.	Tan.	Sine.	Angle.

TABLE IX.—CALCULATION OF EARTHWORK.

Width	HEIGHT														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	.02	.04	.06	.07	.09	.11	.13	.15	.17	.18	.20	.22	.24	.26	.28
2	.04	.07	.11	.15	.18	.22	.26	.30	.33	.37	.41	.44	.48	.52	.56
3	.06	.11	.17	.22	.28	.33	.39	.44	.50	.56	.61	.67	.72	.78	.83
4	.07	.15	.22	.30	.37	.44	.52	.59	.67	.74	.81	.89	.96	1.04	1.11
5	.09	.19	.28	.37	.46	.56	.65	.74	.83	.93	1.02	1.11	1.20	1.30	1.39
6	.11	.22	.33	.44	.56	.67	.78	.89	1.00	1.11	1.22	1.33	1.44	1.55	1.67
7	.13	.26	.39	.52	.65	.78	.91	1.04	1.16	1.30	1.42	1.55	1.68	1.81	1.94
8	.15	.30	.44	.59	.74	.89	1.04	1.19	1.33	1.48	1.63	1.78	1.92	2.08	2.22
9	.17	.33	.50	.67	.83	.99	1.17	1.33	1.50	1.67	1.83	2.00	2.17	2.33	2.50
10	.18	.37	.56	.74	.93	1.11	1.30	1.48	1.67	1.85	2.04	2.22	2.41	2.59	2.78
11	.20	.41	.61	.82	1.02	1.22	1.43	1.63	1.83	2.04	2.24	2.44	2.65	2.85	3.06
12	.22	.44	.67	.89	1.11	1.33	1.56	1.78	2.00	2.22	2.44	2.67	2.89	3.11	3.33
13	.24	.48	.72	.96	1.20	1.44	1.68	1.92	2.16	2.41	2.65	2.89	3.13	3.37	3.61
14	.26	.52	.78	1.04	1.30	1.55	1.81	2.08	2.33	2.59	2.85	3.11	3.37	3.63	3.89
15	.28	.56	.83	1.11	1.39	1.67	1.94	2.22	2.50	2.78	3.06	3.33	3.61	3.89	4.17
16	.30	.59	.89	1.18	1.48	1.78	2.07	2.37	2.67	2.96	3.26	3.56	3.85	4.15	4.44
17	.31	.63	.94	1.26	1.57	1.89	2.20	2.52	2.83	3.15	3.46	3.78	4.09	4.41	4.72
18	.33	.67	1.00	1.33	1.67	2.00	2.33	2.67	3.00	3.33	3.67	4.00	4.33	4.67	5.00
19	.35	.70	1.06	1.41	1.76	2.11	2.46	2.82	3.17	3.52	3.87	4.22	4.57	4.92	5.28
20	.37	.74	1.11	1.48	1.85	2.22	2.59	2.96	3.33	3.70	4.07	4.44	4.81	5.18	5.56
21	.39	.78	1.17	1.55	1.94	2.33	2.72	3.11	3.50	3.89	4.28	4.67	5.06	5.44	5.83
22	.41	.81	1.22	1.63	2.04	2.44	2.85	3.26	3.67	4.07	4.48	4.89	5.30	5.70	6.11
23	.43	.85	1.28	1.70	2.13	2.56	2.98	3.41	3.83	4.26	4.68	5.11	5.54	5.96	6.39
24	.44	.89	1.33	1.78	2.22	2.67	3.11	3.56	4.00	4.44	4.89	5.33	5.78	6.22	6.67
25	.46	.92	1.39	1.85	2.31	2.78	3.24	3.70	4.17	4.63	5.09	5.56	6.02	6.48	6.94
26	.48	.96	1.44	1.92	2.41	2.89	3.37	3.85	4.33	4.82	5.30	5.78	6.26	6.74	7.24
27	.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50
28	.52	1.04	1.55	2.07	2.59	3.11	3.63	4.15	4.67	5.18	5.70	6.22	6.74	7.26	7.78
29	.54	1.07	1.61	2.15	2.68	3.22	3.76	4.30	4.83	5.37	5.91	6.44	6.98	7.52	8.06
30	.56	1.11	1.67	2.22	2.78	3.33	3.89	4.44	5.00	5.55	6.11	6.67	7.22	7.78	8.33
31	.57	1.15	1.72	2.30	2.87	3.44	4.02	4.59	5.17	5.74	6.32	6.89	7.46	8.04	8.61
32	.59	1.18	1.78	2.37	2.96	3.56	4.15	4.74	5.33	5.92	6.52	7.11	7.70	8.30	8.89
33	.61	1.22	1.83	2.44	3.05	3.67	4.28	4.89	5.50	6.11	6.72	7.33	7.94	8.55	9.17
34	.63	1.26	1.89	2.52	3.15	3.78	4.40	5.04	5.67	6.29	6.93	7.56	8.18	8.81	9.44
35	.65	1.30	1.94	2.59	3.24	3.89	4.53	5.18	5.83	6.48	7.13	7.78	8.42	9.08	9.72
36	.67	1.33	2.00	2.67	3.33	4.00	4.66	5.33	6.00	6.67	7.33	8.00	8.67	9.33	10.00
37	.68	1.37	2.06	2.74	3.42	4.11	4.79	5.48	6.17	6.85	7.54	8.22	8.91	9.59	10.28
38	.70	1.41	2.11	2.82	3.52	4.22	4.92	5.63	6.33	7.03	7.74	8.44	9.15	9.85	10.56
39	.72	1.44	2.17	2.89	3.61	4.33	5.05	5.78	6.50	7.22	7.95	8.67	9.39	10.11	10.83
40	.74	1.48	2.22	2.96	3.70	4.44	5.18	5.92	6.67	7.41	8.15	8.89	9.63	10.37	11.11

Table gives cu. yds. in 1 ft. of a triangle of given width and height. Corrections for tenths of width are one tenth the values found under each height considering the widths from 1 to 9 as tenths and similarly the corrections for tenths of height are one tenth the figures opposite width considering the heights from 1 to 9 as tenths. Thus if w = 16.2 and h = 5.3, cu. yds. = 1.48 + .028 + .089 = 1.597 cu. yds. or practically 160 cu. yds. per 100 ft. If w exceeds 40 ft., use one half and multiply result by 2, if both w and h are large use one half of each and multiply result by 4. Any cross-section may be divided into triangles by the following rule. To the triangle of the sum of the outside cuts (or fills) = h, and 1/2 the roadbed = w, add the triangles formed by taking the distance out to each break in turn (=w's) by the difference between the cuts (or fills) on each side of it (=h's) always subtracting the outer from the inner.



2 x 6 7 x
3 2 5
1.85 9 x

18" Sensor
 17.74
 10337.5
 10753
 26.75
 35°-15'-30"
 167.3
 18.43
 126.6
 59.9
 7.17
 7.32
 2.17
 6.15

8.54
 M.H. 54"
 75
 16
 20
 75
 36
 39
 2935
 8733
 96.68
 44°42'
 46431
 909
 Clayton
 24"
 5.2
 5.77
 2.73
 18"
 118+36.55
 E7° line Bandini
 on New Line
 FB 1223
 Lindberg BM = 1224C
 " " 12.175
 From BM "B"
 17.426 RRC
 CITY
 8.24 = hd. CT. curb

43708 85
 39-160
 43708 85
 35
 10
 1.4

**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	26.2	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.