

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

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960
550
16,100
5050
0.095

U.S.C.G.

3249
901
2348

G-198

Chosby
& Colton

23,799
612
17.68

CITY ENGINEER

S. D.

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

Made in U. S. A.

USGS.
NW Federal 29.64
- 6.12
23.52

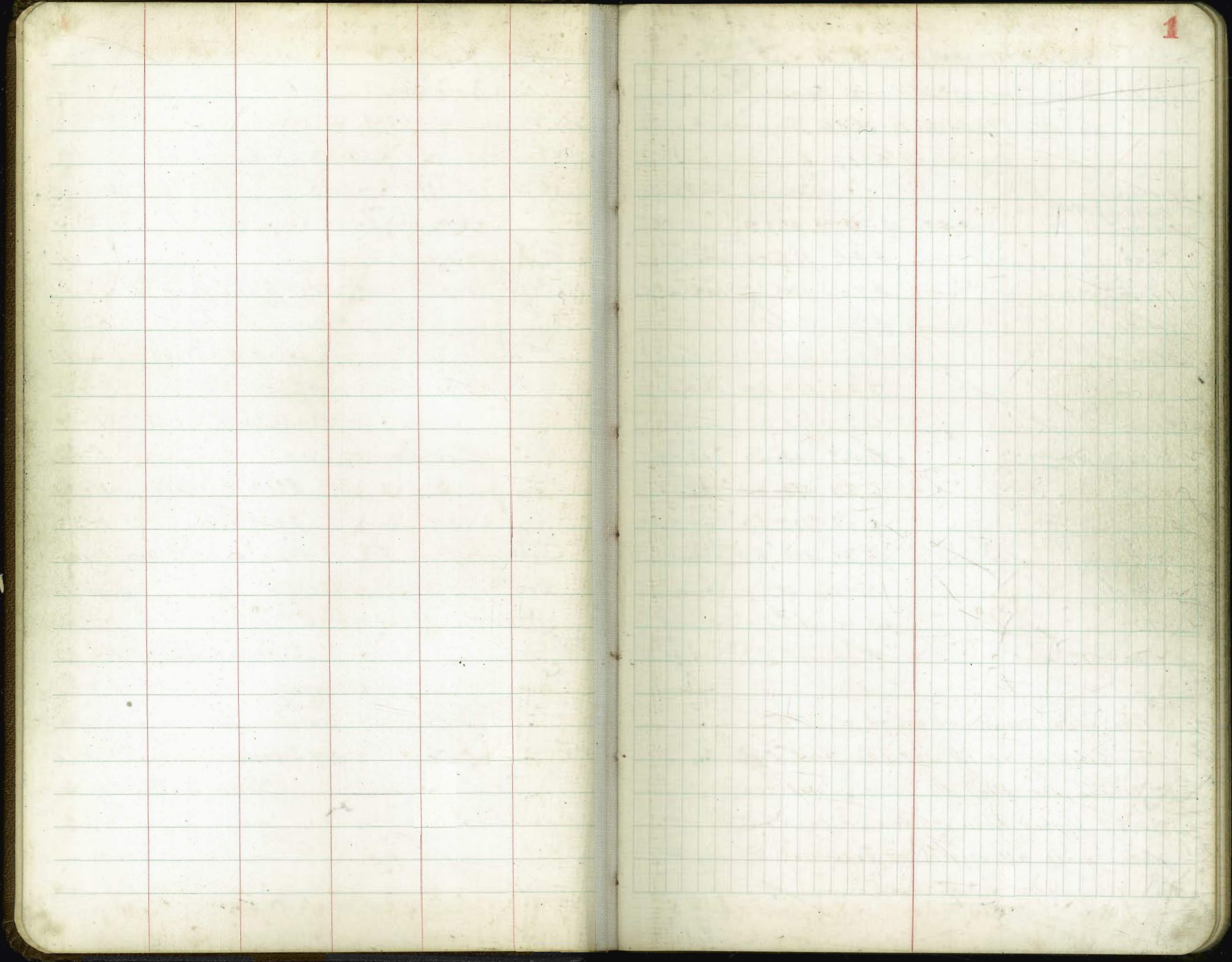
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APR 12 1965

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Walker
 GRADES SEWER CONST. 8 1/2" - M.
 Bet. 47TH And ESCUELA
 from Existing M.H. in E. FRANKLIN AVE.
 to DE. 39.64' South of St. Imperial Ave
 Drawing # 5937-L.

Station & Existing M.H.	Stakes	Fl. Elev.	Fl. Elev.
= 0+00	119.43	13.34	106.09 = Fl. 106.09
+50	4.41	115.02	106.44
+100	4.70	114.73	106.73
+150	4.92	114.51	107.14
+200	8.18	111.25	107.49
+250	7.20	112.23	107.84
+300	6.76	112.67	108.19
+350	5.23	114.20	108.40
+400	6.29	113.14	108.54
+450	6.07	113.36	108.89
+500	5.86	113.57	109.24
+550	5.40	114.03	109.59
+600	4.14	115.29	109.94
+650 = D.E.	4.14	115.29	110.22
			109.85

Note: The construction of Main Flow in Franklin is at El. 105.72 and Fl. to North for Alley 8 1/2" M is at El. 106.09 = 0.37 Higher than shown on plan. The grades were all raised as per inst. Mr. Hayler to maintain 0.7% grade

Indexed

S.M.P. Ocean View # 47 - 116.49
 119.43 T
 13.61
 105.82

Cuts	6" West	on Rock
✓	" "	113.65 TP
+8.58	" "	578.7
+7.94	" "	119.43
+7.37	6" Lb. nail in Header	578-
+3.76	6" West	Above Rod = 113.65 TP
+4.39	" "	12.50 -
+4.68	" "	126.15 T
+5.80	6.5" Nail in Pole	
+4.60	6" West	
+4.47	" "	
+4.33	" "	
+4.44	" "	
+5.35	" "	
+5.07	" "	

GRADES for SEWER CONST. IN BLK. J
in Ocean View Blvd.
And in Blk. K - in TRACT #2

Walker
Blk. 65
1 shell
2-17-41

of Alto Vista Suburb

Drawing # 929-D. Prelim. FB 1574

Station	El.	Stake	El.	F./lev.
East MH & Franklin				Flow line
= 0+00 Blk J	126.15	11.23 = MH	114.92	114.89
+50		2.96	123.19	115.53
1+00		1.09	125.06	116.15
+50		0.80	125.35	116.76
2+00	135.53	10.28	125.25	117.39
+50		9.66	125.87	118.01
3+00		10.58	124.95	118.64
+30 = MH #1		11.19	124.34	119.02
+50		11.07	124.46	119.27
4+00		10.14	125.39	119.89
+50		7.28	128.25	120.52
5+00		5.61	129.92	121.14
+50		3.38	132.15	121.77
6+00	140.58	8.82	131.76	122.39
+50		10.63	129.95	123.02
+64.53 in Ocean View		11.25	129.33	123.17
+90 ft + MH #2				
7+00		10.58	130.00	123.98
+50		9.16	131.42	125.13
8+00		6.92	133.66	126.28
+50		4.07	136.51	127.43
9+00		1.72	138.86	128.58

Cont. P-4

Cuts Offsets

+7.66'	6' W
+8.91'	" "
+8.59'	" "
+7.86'	" "
+7.86'	" "
+6.31'	" "
+5.32'	" "
+5.19'	" "
+5.50'	" "
+7.73'	" "
+8.78'	" "
+10.33'	" "
+9.37'	" "
+6.93'	" "
+6.16'	" "
+6.02'	6' South
+6.29'	" "
+7.38'	" "
+9.08'	" "
+10.28'	" "

Note First
3 grades
changed to meet flow line
.02 .01

140.58 x
5.87

134.71 ch. 466
623596
Book 1574-21

P-2 = 126.15 x
 0.80 -
 125.35 TP
 101.87
 135.53 x
 3.38 -
 132.15 TP
 8.43 -
 140.58 x

Station	X	EI. Stake	EI. Flow line
	140.58		
9+50		2.19	138.39
	-S. Alley 816 K.		129.73
	+89.55 = 90° Lt ± MH #3	2.03	138.55
			130.65
10+00		2.04	138.54
			130.72
+50	144.51	4.38	140.13
			131.07
11+00		3.73	140.78
			131.42
+50		2.79	141.72
			131.77
12+00	152.02	9.32	142.70
			132.12
+50		8.65	143.37
			132.47
13+00		8.00	144.52
			132.82
+21.65 = MH #4		7.99	144.03
			132.97
+50		6.88	145.14
			133.17
14+00		4.94	147.08
			133.52
+50		3.84	148.18
			133.87
15+00		3.27	146.76
			148.75
			134.22
+50		3.64	148.38
			134.57
16+00		5.67	146.35
	30' N of S Line		134.92
+51.65 = MH #5 in E. Franklin		8.07	143.95
			135.28

Cuts.	offsets.
+ 8.66	6' South
+ 7.90	" "
+ 7.82	6' West
+ 9.06	" "
+ 9.36	" "
+ 9.95	" "
+ 10.58	" "
+ 10.90	" "
+ 11.20	" "
+ 11.70	" "
+ 11.06	" "
+ 11.97	" "
+ 13.56	" "
+ 14.31	" "
13.54	
+ 14.53	
+ 13.81	6' W.
+ 11.43	" "
+ 8.67	" "

X from P-3 = 140.58 X

1.92 -
138.6677
585.1
141.517
138.5
142.6377
939.1
152.02 X
7.37 -
144.65
144.62 = stub
1.05 diff

chk. stub 4 + 8754
4' W of 10800
1574-28

Reset 5-8-41

Walker
Bliss
Isbell
2-27-41

GRADES for SEWER CONST.
17 FRANKLIN AVE.
Between 48th + 49th.
And in 49th St. Between Imperial + Ocean View

See Drawing # 942-D

Preliminary Notes E.B. 1574

Station	El.	Stakes	Flow Pipe	Cuts	Offsets
0+00 = MH #5 P-4	151.00	7.05	143.95	135.28	+8.67
+50	5.67	145.33	135.63	+9.70	8' South
1+00	4.55	146.45	135.98	+10.47	" "
+62.5 = MH #6 Gloria	4.65	146.35	136.42	+9.93	8' North
2+00	6.11	144.89	136.68	+8.21	South
+45			137.00		
+50	6.41	144.59	137.03	+7.69	" "
3+00	6.01	144.99	137.38	+7.61	" "
+50	4.39	146.61	137.73	+8.88	" "
4+00	3.38	147.62	138.08	+9.54	" "
+50	4.10	146.90	138.43	+8.47	" "
5+123 MH #7	4.88	146.12	138.87	+7.25	10' E

← 2' E of Proposed 60' St.

Note; 49th St. Sewer staked for 60'
proposed width st. and is
2.0' E of proposed 60' st. which
is 6' E of present West cb.

Indexed
JG

E.I. Cut stake 16+51.65 P-4 = 143.95
7.05
151.00

5

Walker GRADERS for Sewer Const.
 Bliss in 49th St. 1'E of E. 60' Proposed Width St.
 Isbell 2-27-41 Between Ocean View ^{Mid} Imperial Ave
 See R 80 for ^{RPS} Drawing 942-D

151.00
 - 275
 148.25 TP
 Franklin + 49th
 - 148.21
 FB 1574-29
 0.04

Station	K P. 5	E.I. Stake	E.I. Flow line	Cuts	Offsets	Above TP = 148.25
0+00 - MH #7	151.00		138.87			7.23 +
+50	155.48	8.23 147.25	139.22	+8.03 ✓	7.5' West cross on cb.	155.48 +
1+00		6.98 148.50	139.57	+8.93 ✓	" " " " "	
+50		5.82 149.66	139.92	+9.74 ✓	" " " " "	
2+00		4.65 150.83	140.27	+10.56 ✓	" " " " "	
+50		4.20 151.28	140.62	+10.66 ✓	" " " " "	
3+00 = MH #8		4.56 150.32	140.97	+9.95 ✓	" " " " "	
+50		5.04 150.44	141.32	+9.12 ✓	" " " " "	
4+00		5.47 150.01	141.67	+8.34 ✓	" " " " "	
+50		6.07 149.41	142.02	+7.39 ✓	" " " " "	
5+00		6.50 148.98	142.37	+6.61 ✓	" " " " "	
+20' DE 114.5' South St. Imp. Ave.		6.75 148.73	142.51	+6.22 ✓	" " " " "	
21'E of Proposed 360' St. South of E. Franklin in 49th						
0+00 - MH #7 - E. Franklin	151.00 P-5		138.87		10' E	
+50		5.63 145.37	139.22	+6.15 ✓	7.5' W Cross on cb.	
1+00		5.91 145.09	139.57	+5.52 ✓	" " " " "	
+60' DE		6.27 144.73	139.99	+4.74 ✓	" " " " "	

See Notation P-5

GRADES FOR SEWER CONST.

17 S. GEORGIA ST.

from S. Franklin Ave South

Drawing 942-D

Stations	El.	Fl.	Cuts	Offsets
	Stake	Flow Guide		
0+00 = MH #6	151.00	136.42	0-5	
+50	5.66 145.34	136.77	+8.57	6' East
1+00	6.11 144.89	137.12	+7.77	6' "
+50	3.78 145.25	137.47	+7.78	6' "
2+00	5.39 145.61	137.82	+7.79	6' "
+40 = D.F.	5.53 145.47	138.10	+7.37	6' "

M

Indexed
J

7

Walker
Bliss
Isbell
3-7-41 from Treatment Plant at Unit
to
See Drawing# D

Station	Filey Stakes	Fl. Flori Linc		
0+00 = 0+9181				-12.00
0+77.64 = MHN#1	See P-82			-11.97
1+00				-11.92
1+50				-11.88
1+93.53	60' MHN#2 88°55'43" RT			-11.82
2+50				-11.77
3+00				-11.72
4+00	12.69	5.60	7.09	-11.67
4+50		6.44	6.25	-11.62
5+10	= MHN#3 11.72 25°11'27" RT	5.99	5.73	-11.56
5+50		6.16	5.56	-11.52
6+00		6.30	5.42	-11.47
6+50		6.16	5.56	-11.42
7+00		6.38	5.34	-11.37
7+50	9.18			-11.32
8+00				-11.27
8+50				-11.22
9+00		4.33	4.85	-11.17
+29.25	MHN#4 33°46'44" 27°00' RT	4.56	4.62	-11.14
9+50		3.93	5.25	-11.12

Check Levels P-25

Reference Points P-81
P-82

Cuts	Offsets	Utah Kingswood BM 13' 1400	824 475+ 1249 731 538 1156 3694+ 11700
+13.76	-	Reset See P-21	
+17.87			
+17.29	12' RT	BM, Con. Map Fisher & Union = 582	590
+17.08	" "		117.27
+16.89	" "		638
+16.98			TD = 534
+16.71			3.847
			9.18
+16.02			
+15.76			
+16.37			

see P-21

chk 5110 cut above ditch by Obennock

from 9+29.25 to 9+32.12
line change see New Cuts P-20

60" Interceptor Line

Cont. from P. 8

Station		Fl. Stake	Fl. Floor line
10+00	^{P. 8} 3.18	3.84	5.34 -11.07
+50		4.63	4.55 -11.02
11+00		4.18	5.00 -10.97
+50		4.95	4.23 -10.92
12+00		5.71	3.47 -10.87
+50		3.42	5.76 -10.82
13+00	12.69	6.34	6.35 -10.77
+50		6.31	6.38 -10.72
14+00			-10.67
+50		5.54	7.15 -10.62
15+00	7.56	4.14	3.42 -10.57
15+28.78	M4#5	5.39	
15+40.84	Equation = $\frac{1}{2} \cdot 32 \cdot \sin^2 25^\circ (140 \cdot \sin^2 25^\circ) = 1.7$		1.7 -10.54

Line Change
see New Guts p. 10

Cuts	Offsets	
+16.41	12 ft	9.18T
+15.57	" "	3.42 -
+15.97	" "	5.76 TP
+15.15	" "	6.73 +
+14.34	" "	12.69 T
+16.58	" "	10.54 -
+17.12	15 ft	2.15 TP
+17.10	12 ft	5.41 +
+17.77		7.56 T
+13.96 = P. 25		15140.8V FOR 157.5.5.59
+18.99		chk. C.T. 10.24 1.97
+12.67 = P. 25		chk. Levels make above
+12.71 on CT 10 23		truck - 1.93 - 1900

Line change
see New Guts
p. 10

Use this Elev 1.93 in Cont. of levels

start of 8' cut

Walker
8105
15 ball - 7
3-22-41

GRADES 60" Interceptor Sewer
Line Change

from Sta 9+29.25 to E 32nd St.

See P. 82 - for Ties

Station	M.H. #	El. Stake	El. Flow Line
9+29.25	24026 RT		-11.17
+50	9.475	4.190	5.285 -11.12
10+00		4.120	5.355 -11.07
+50		4.830	4.645 -11.02
11+00		4.365	5.110 -10.97
+50		5.270	4.205 -10.92
12+00		6.340	3.135 -10.87
+50		3.780	5.695 -10.82
13+00		2.815	6.660 -10.77
+50	11.160	4.700	6.460 -10.72
14+00			-10.67
+50		4.050	7.110 -10.62
15+00	M.H. #5 = E 32nd St	8.190	3.080 -10.57
15+36.32	(See Grade Book 201-16)	201	2.150 -10.54
15+50			-10.52
16+00			-10.47
+50			-10.42
17+00			-10.37
+50			-10.32
17+69.54	= B.C. RT. ch. 30.65		-10.27
18+00	48.93'		-10.22
ch = 50.30			-10.17
+50	2°09.25'		-10.12
19+00	3°29.57'		
+50	4°49.89'		

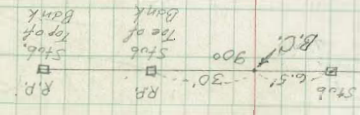
Line changed from E 32nd
= 15+36.32 } Equation
= 15+48.92 } Equation
to station 32+36.13 } Equation
-32+83.47 } Equation
at East inside edge chamber
to Siphon East side cholla
creek
Grade Book 201-16-17
from 15+36.32
to 32+84.13

Tele. Stake 9+29.25 P. 25 = 4.615

Mean
136
π = 9.475
3.115
TP 6.360
4800
π 11.160

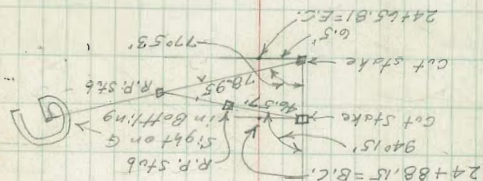
Cuts	Offsets
+16.41	12' RT
+16.43	12' RT
+15.66	12' RT
+16.08	12' RT
+15.13	12' RT
-14.01	8' RT
+16.52	8' RT
+17.42	8' RT
+17.18	14' RT
Cut over	
+17.73	6' RT
+13.57	8' RT
+12.69	13.57' RT on Copper Disk E 32nd

New Alignment from 15+36.32
to 32+36.16 } F.B. 1607-23-26



Station	El. Stakes	El. Flow line
20+00	6'10.21'	-10.07
+50	7°30.53'	-10.02
21+00	8°50.85'	-9.97
+50	10°11.17'	-9.92
22+00	11°31.49'	-9.87
+50	12°51.81'	-9.82
23+00	14°12.13'	-9.77
+50	15°32.45'	-9.72
24+00	16°52.77'	-9.67
+50	18°13.09' ch=15.91	-9.62
+65.81 = E.C.	18°38'50"	
+788.15 = B.C.		
Ch=11.73		
25+00	0°32.80'	
Ch=49.46		
+50	2°50.30'	
26+00	5°07.80'	
+50	7°25.30'	
27+00	9°42.80'	
27+50	12°00.30'	-9.32
28+00	14°17.80'	-9.27
28+50	16°35.30'	-9.22
29+00	18°52.80'	-9.17
29+50	21°10.30'	-9.12
30+00	23°27.80' ch=39.50	-9.07
+39.93 = E.C.	25°17.50'	
30+50		-9.02
31+00		-8.97
31+50		-8.92
32+00		-8.87

Line change see Notation P-10



Walker
Bliss

Grades 60" Interceptor Sewer

Eastly
Isbill May 9-1941

Station	Red	Flow ft/sec	Flow Flow Line
32+50			-8.82
32+77.93 = 5' 10" 2' 30" Lt	6.72	2.05	-2.33
33+00			
+50			
34+00			
+50			
35+00			
35+56.93 = 12' 11" 145" Lt	10.55	-3.83	-8.52
36+10		2.28	-2.56
+45	6.89	6.14	0.75
37+00		5.05	1.84
+50		4.66	2.23
38+00		4.60	2.29
+50		4.96	1.93
39+00		5.01	1.88
+50		5.02	1.87
40+00		5.47	1.42
+50		5.34	1.55
41+00			-7.98
+50		5.12	1.77
42+00		5.07	1.82
42+25.57		5.18	1.71
42+39.95			-7.85

Line change
from 32nd
to East and
Siphon

See Notation
Page 10

Wend Siphon

Equation
 $\Delta 10^{\circ} 41' 18''$

Cont P-14

BM Budge Spike Mend Santa Fe Budge FB 1507-38 = 0.44
Approx Station 35+50 at lower

		6.28 +
		6.72 +
		6.28 -
		TR on BM 1504 4
+ 6.47		6.45 +
		Bliss = 6.89 +
		Isbill =
+ 4.69	20' Lt	
5.91	20' Rt	
+ 9.73	"	Check level's P-30
+ 10.22	"	
+ 10.56	"	
+ 10.57	"	
+ 10.16	"	
+ 10.06	"	
+ 10.00	"	
+ 9.50	"	
+ 9.58	"	
		at end of line
+ 9.70	"	
+ 9.70	"	
+ 9.56	"	

Walker
8/38
Isbell
4-1-41

Construction Grades
for Storm Drains INVERTED SYPHON
at 28th St. And Harbor Drive

See Drawing # D Sheet #6
2.050 7.065 5.015
Elev 810"
Harbor
Elev. Storm Dr.
Elev. Stake Floor Line

Station			
"A"	5.790	1.275	-11.60
"B"	5.830	1.235	-11.60

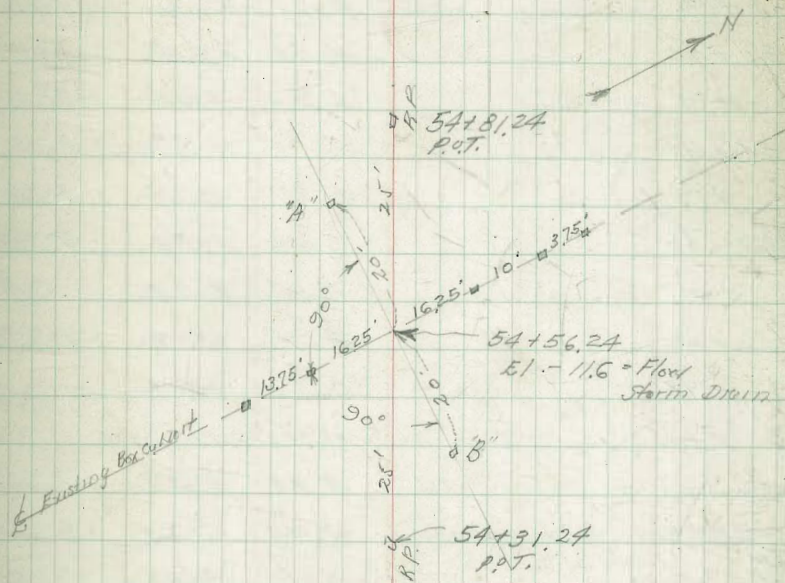
Note: Ties to A Drain are ok, but the
sewer was inverted to go under the
existing box culvert, New Grades P-29
Also see FB. 1587-41 for line change
in Interceptor Sewer.

Indexed
(Signature)

FB. 1587-38
Spike in Pole 3' East
Cuts offsets.
+ 12.87 20' West
+ 12.83 20' East

25' E. E.L. 28th
of Wars Base line No. 13

60" Interceptor



CONSTRUCTION GRADES

Walker
Bliss
Isbell
4-3-41

60" Interceptor Line Sewer
Between Chollas Creek
And 28th St. in Hurbit Drive

See Drawing # D Sheet 405
Check Levels P-27

Station	Elev Stakes	Elev Flow
36+50 = MH #9	4.42	2.45 - 8.43
36+72.80	4.75	2.12 - 8.41
= 36+82.80		
37+00	5.24	1.63 - 8.39
+50	4.21	1.96 - 8.34
38+00	4.96	1.91 - 8.29
+60	4.71	2.16 - 8.23
+50		
39+00	4.53	2.34 - 8.19
+50	4.33	1.94 - 8.14
40+00	5.35	1.52 - 8.09
+50	5.27	1.60 - 8.04
41+00	5.44	1.43 - 7.99
+50	5.30	1.57 - 7.94
42+00	4.95	1.92 - 7.89
+39.27	5.16	1.71 - 7.85
= +39.95		
43+00	7.34	4.86 2.48 - 7.79
+50	4.74	2.60 - 7.74
44+00	4.46	2.88 - 7.69
+50	4.55	2.79 - 7.64

Cont P-15

Indexed
B

Bridge
B.M. Spike W. ex. Santa Fe
F.B. 1597-38

Cuts offsets

+10.88	20' RT
+10.53	20' RT
+10.03	20' RT
+10.31	20' RT
+10.20	20' RT
+10.39	20' RT
+10.53	20' RT
+10.08	20' RT
+9.61	20' RT
+9.64	20' RT
+9.42	20' RT
+9.51	20' RT
+9.81	20' RT
+9.56	20' RT
+10.27	20' RT
+10.34	20' RT
+10.57	20' RT
+10.43	20' RT

R.P.S. to MH
See P-83

Chk. E.T. 43413.09
F.B. 1597-38

No Correction X

Line change

New Cuts P-12

R.P.S. P-84

*OK (Highline notes from station)
42+39.95 to 48+00
See P-22

T.P.

0.44
6.43
6.87
5.16
1.71
3.63
7.34 X
4.15
3.19
3.185
0.005

60" Interceptor Sewer.
Cont from P-14

Station	T 7.34 P-14	#1. Stakes	#1. Flow Line	Cuts	offsets
45+00		4.75	2.59	-7.59	+10/8 ✓ 20" Rk
+50		4.82	2.52	-7.54	+10.06 ✓ " "
46+00		4.90	2.44	-7.49	+9.93 ✓ " "
+50		4.89	2.45	-7.44	+9.89 ✓ " "
47+00		5.23	2.11	-7.39	+9.50 ✓ " "
+50		5.17	2.17	-7.34	+9.51 ✓ " "
48+00 = 211001130" LT 211001130" LT	Sec P-19	5.07	2.27	-7.29	+9.56 ✓ " "
+50		5.45	1.89	-7.24	+9.13 ✓ " "
49+00	7.20	5.33	1.87	-7.19	+9.06 ✓ " "
+50		5.28	1.92	-7.14	+9.06 ✓ " "
50+00		5.10	2.10	-7.09	+9.19 ✓ " "
+50		5.09	2.11	-7.04	+9.15 ✓ " "
51+00		5.06	2.14	-6.99	+9.13 ✓ " "
+50		4.97	2.23	-6.94	+9.17 ✓ " "
52+00		5.03	2.17	-6.89	+9.06 ✓ " "
+50		5.82	2.18	-6.84	+9.02 ✓ " "
52+90 = 211001130" LT 211001130" LT		5.30	1.90	-6.80	+8.69 ✓ " "

T from P-14 = 7.34 T

5.45 -
TP-1.89

5.31 T

7.20 T

3.17

chk spk in Pole
3' E of WOTs Bull Line
Mon 25' E. E. L. 28" W

5.03

5.015 - ELEV

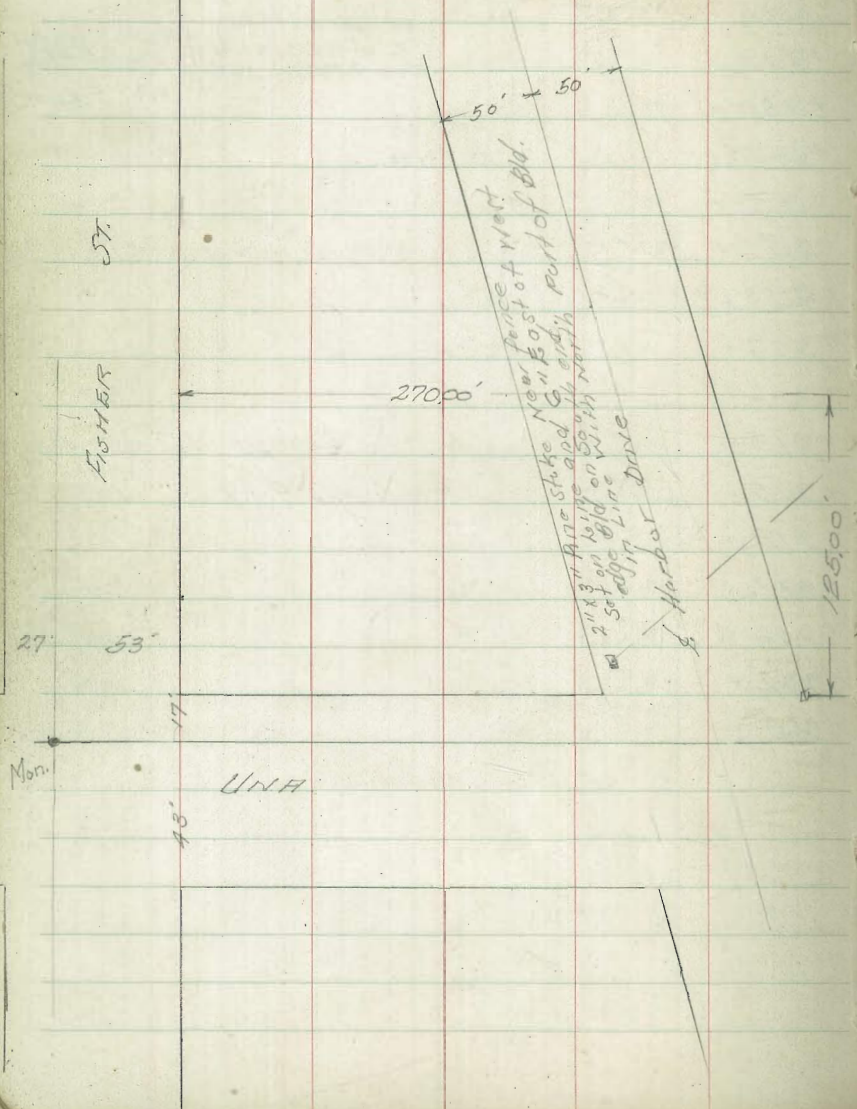
0.015 Error

Line of
to 48+00

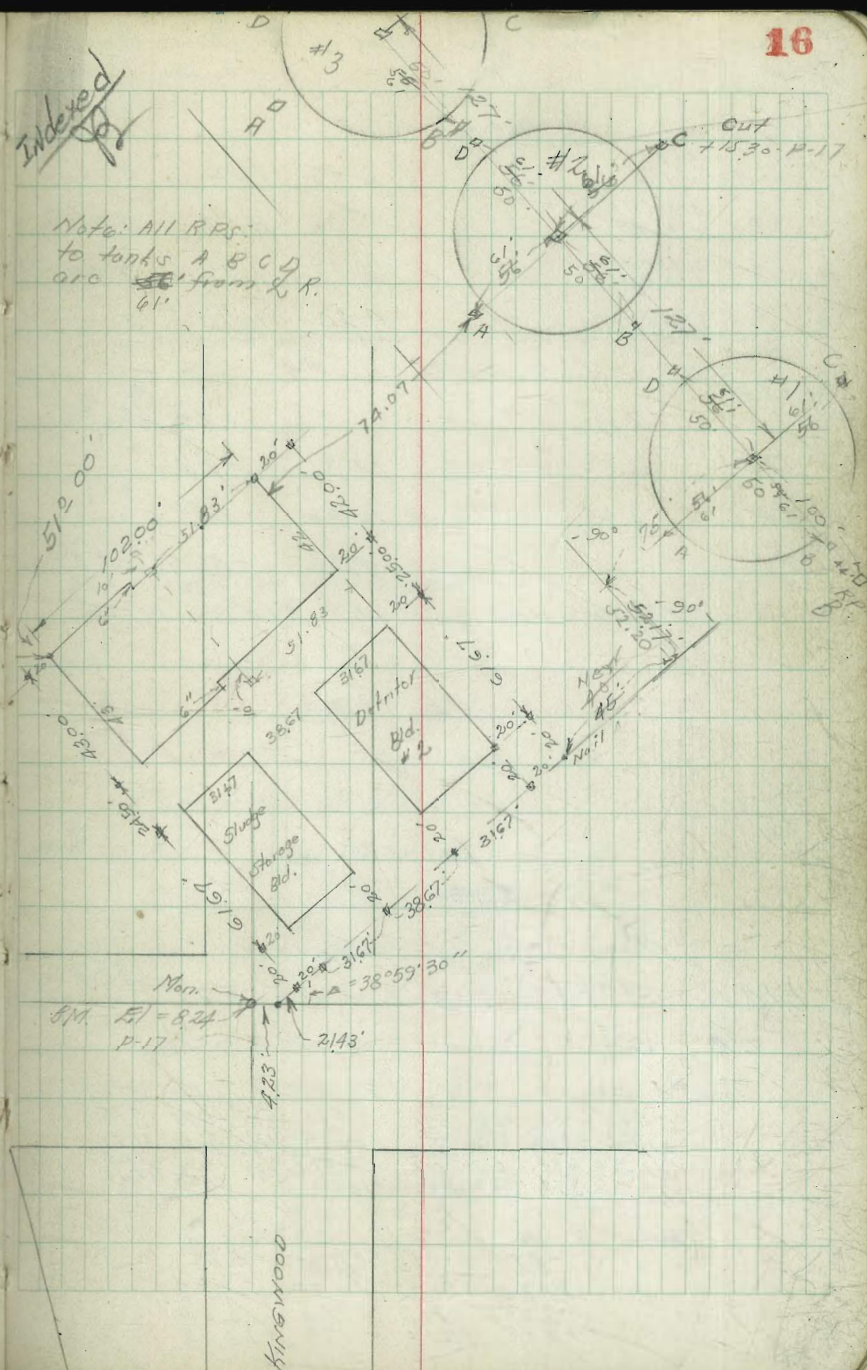
Line change from Sta 48+00
West
New Cuts P-19

Walker
Bliss
Isbell
4-7-41

LAYOUT FOR TREATMENT PLANT UNAH HARBOR DRIVE. GRADES FOR FLOOR Page 17



Note: All R.P.S. to tanks A B C D are ~~56'~~ 61' from S.R.



Bliss = T
- 1660/1-21

Levels for floor Elevations Pump House

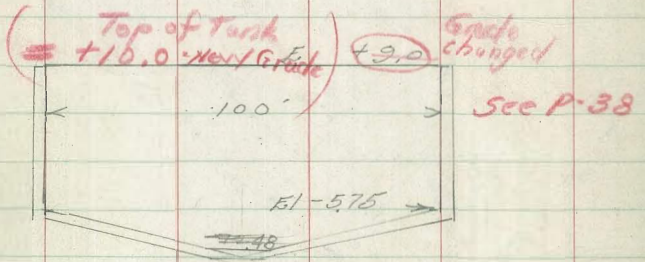
Elev. floor Elev. floor

	14.32				
Stake #1	26 R.P.N. of NW Cor	6.90	7.92	9.00	F 1.08
" #2	51.82 S of NW Cor + 6' offset	5.35	8.97	9.00	F 0.03
" #3	51.82 S of NE Cor 10' East	6.37	7.95	9.00	F 1.05
" #4	20' N of NE Cor	4.20	10.12	9.00	+ 1.12

Locals For Clarifier #2

6-27-41	7.86	16.10		8.24	8.71 Mon. 13' Mon. Una & Kingwood
TP	3.83	7.07	12.86	3.24	
TP	3.05	-0.76	10.88	-3.81	
			4.99	-5.75	-5.75

LEVELS FOR CLARIFIER TANKS.



Next Cuts For Tanks in New location

B.M.	4.95	13.19		8.24	13' Mon. 13' Mon. Una & Kingwood
T.P.	5.46	15.62	3.03	10.16	

Tank #1

A	B	C	D
-5.75	-5.75	-5.75	-5.75
21.37	21.32	21.32	21.32
1.62	6.34	5.12	5.16
+17.75	+14.98	+16.20	+15.86

Tank #2

A	B	C	D
-5.75	-5.75	-5.75	-5.75
21.32	21.32	21.32	21.32
5.50	6.87	6.07	7.15
+14.43	+15.87	+15.25	+19.17

New cuts see P-18

TANK #3

A	B	C	D
-5.75	-5.75	-5.75	-5.75
21.32	21.32	21.32	21.32
8.20	7.13	7.33	8.24
+13.12	+14.13	+13.99	+13.08

B.M. Mon. Una & Fisher

	5.82
	7.56
	13.38
	5.13
	8.25 TP
	6.07 +
	14.32 T
	5.68 -
	8.74
	4.51 +
	13.15
	7.315 -
	5.835
	5.82
	5.075
	5.52
	7.315 +
	13.135
	4.895
	8.24
	5.85 +
	14.09 T

Temporary Grades Above Finish Floor = -3.75

-0.76 T

-1.76

-2.57 TP

12.76 T

10.44 T

3.82 -

96.2 = TP

6.39 +

16.01 T

7.77

8.24 ch B.M. Mon. Una & Kingwood

13' Mon Kingwood Una

3M

14.03 3.00 9.00 9.00 9.00

TANK #2 Stakes P-16

A	B	C	D
-5.75	-5.75	-5.75	-5.75
19.84	19.84	19.84	19.84
5.35	4.71	4.54	5.53
+14.49	+15.13	+15.30	+14.25

Re Staked

TANK #3

A	B	C	D
-5.75	-5.75	-5.75	-5.75
19.84	19.84	19.84	19.84
6.34	5.61	5.60	6.74
+13.30	+14.17	+14.24	+13.10

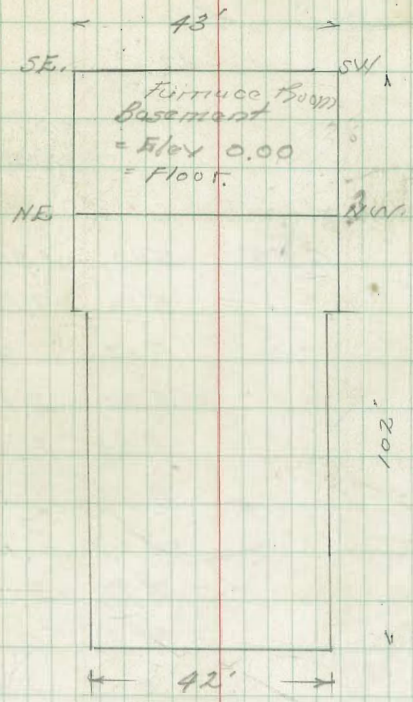
Next Grades on level left page

ATTENMENT CHANGE in 60' Sewer

Next Cuts Page 19

Elev Basement Furnace Room

	1409 P-17	Elev. Spikes	Elev. Floor	Cuts
S.E. Cor	8.09	6.00	0.00	+6.00
N.E. "	8.09	6.00	0.00	+6.00
N.W. "	8.09	6.00	0.00	+6.00
S.W. "	8.09	6.00	0.00	+6.00



5-2-4) Additional Ender Furnace Room Basement.
 4.95 13.19 8.24 13' line Under Kingwood.

Elev. Stake	Floor Elev.	Cuts
1319	0.00	0.00
1319	0.00	0.00
1319	0.00	0.00
1319	0.00	0.00

Check Levels on Cut Stakes for Classifier Tanks #1 #2 #3

1438 = π Page 17

8.24 BM. 13' line Under Kingwood
 2.86 16.10 π

BM. 13' line Under Kingwood 8.24

Tank #	A	B	C	D	B-rest	D-rest
1	-575	-575	-575	-575	-575	-575
	2013	2013	2013	2013	2185	2185
	537	509	387	520	697	581
	+1976	+1504	+1626	+1593	+1538	+1604
2	-575	-575	-575	-575	-575	-575
	2013	2013	2013	2013	2185	2207
	563	425	481	589	520	494
	+11450	+1588	+1532	+1624	+1590	+1713
3	-575	-575	-575	-575	-575	-575
	2013	2013	2013	2013	2185	2185
	634	592	608	698	698	698
	+1319	+1421	+1805	+1315		

Grades for Floor OVER Basement of Furnace Room
 BM Mon = 8.24
 5.70 +
 13.94 π

BM Elev Stake B tank #1 = 9.63
 6.69
 -16.32 π

Tank #2 Elev Stake 6-30-41
 3.84 π
 11.42 -
 -7.58 T.P.
 5.44 +
 -2.14 = π

8.24 -
 15.17
 5.88 -
 7.29 T.P.
 5.09 +
 14.38 π
 3.65 -
 1073.7 P.
 378 +
 1451
 628
 +823
 824 BM.
 777 -
 1501 π
 1277 -
 324 T.P.
 260 +
 3.84 π

Walker
Bliss
labell
1-12-41

New Cuts for Changed Alignment
in 60" Interceptor Sewer
from Station 48+00 P-18
FB. 1537-40-42

Station	Elev Stakes	Elev. Flow Pipe	Cuts	Offsets
48+00 = Δ 2°00' Lt.			-7.29	
+50	6.98	5.01	1.97	-7.24
49+00		5.10	1.88	-7.19
+50		5.07	1.91	-7.14
50+00		4.80	2.18	-7.09
+50		4.88	2.10	-7.04
51+00		4.78	2.20	-6.99
+50		4.69	2.29	-6.94
52+00		4.67	2.31	-6.89
+50		4.84	2.14	-6.84
53+00		5.04	1.94	-6.79
+50		5.19	1.79	-6.74
54+00		5.34	1.64	-6.69
+2243 Δ 4°44' Lt.		5.59	1.39	-6.67
+2443 12°33' Lt.		6.19	0.79	-6.60
55+50				
56+00				
+50				
57+00				
+50				
58+00				

B.M. Elev Stake
48+00 P-18 = 2.27
4.71 +
6.98 +
5.59 -
TP = 13.9
6.92 -
8.31 +
3.29 =
5.015 - spt
0.005 Error

chk spk in hole P-18

Cuts P-29
from Near Levels
see P-29

7.39 P-29

GRADES for 60" Interceptor Sewer
 Cont. from P-19

Station	Elev. Stakes	Elev. Flow line	Cuts	offsets
58+50				
59+00				
7.58		120.30 ft.		
59+50 } 59+80.14 } = 59+81.72 }				

MH Lt. 9°24'20"
 Equation
 0 FB 1597-12

Walker
Wells
D. Farrow
8-28-91

New Grades for change in Line
of 60" Interceptor Sewer
Between Box "B" at Detroit Bld.
and Station 5+10.
(Hypline Page 46)

Station	El. Stakes	Elav. Flow line	Cuts	offsets
0+00 = 0+21.84' Inside edge Box "B" p. 32		-12.00		
1+25	4.02'	9.46' -11.95	+21.41'	12' BT
1+66.22 = B.G.H.	4.38'	9.10' -11.905	+21.00'	" "
1+71.15 of 2	4.34'	9.14' -11.900	+21.04'	" "
+76.08	5' 53.26'	-11.895		
+81.01	8' 49.89'	-11.890	+21.42'	" "
+85.94	11' 46.52'	-11.885		
+90.88	14' 43.15'	-11.880	+19.97'	" "
+95.81	17' 39.78'	-11.875		
2+00.74	20' 36.41'	-11.870	+20.00'	" "
+05.68	23' 33.04'	-11.865		
+10.61	26' 29.67'	-11.860	+19.21'	" "
+15.55	29' 26.30'	-11.855		
+20.48	32' 22.93'	-11.850	+19.49'	" "
+25.42	35' 19.56'	-11.845		
+30.35	39' 16.19'	-11.840	+19.56'	" "
+35.29	42' 12.82'	-11.835		
2+40.21 = F.S. 44' 09.5'	4.76'	8.72' -11.830	+20.55'	" "
3+00	4.70'	8.78' -11.77	+20.55'	" "
+50	5.02'	8.46' -11.72	+20.18'	" "
4+00	6.10'	7.38' -11.67	+19.05'	" "
+75		-11.62		
5+10 = Δ MH		-11.56		

819 13' Man Una + Kingwood

→ 8.24
5.24.7
13.487
-24.76

Check Floor
concrete
Detroit Bld. plus
-11.25
0.03 Low

Walker
 ISBELL
 Eastern
 Furrow
 5-19-41

GRADES - for Highline
 60" Sewer from station 42+39.95
 to station 48+00

Station	Est. Stakes	El. Above Line	Cuts	offsets.
42+39.95 = MH #10	3.87	3.15	-7.85	+11.00
43+00	3.81	3.21	-7.79	+11.00
+50	3.76	3.26	-7.74	+11.00
44+00	3.71	3.31	-7.69	+11.00
+50	3.66	3.36	-7.64	+11.00
44+98.5	3.61	3.41	-7.59	+11.00
45+52	3.56	3.46	-7.54	+11.00
46+00	3.51	3.51	-7.49	+11.00
+49.3	3.46	3.56	-7.44	+11.00
47+00	3.41	3.61	-7.39	+11.00
+48	3.36	3.66	-7.34	+11.00
48+00 = MH #11	3.31	3.71	-7.29	+11.00

Reset stakes Above line, ^{on account} settlement.
 7.50

Walker
 ISbell
 Eastern
 Furrow
 5-23-41

42+39.95	4.35	3.15	-7.85	+11.00
43+00				
+50				
44+00				
+50				
44+98.5	4.09	3.41	-7.59	
45+52	4.04	3.46	-7.54	
46+00				
+49.3			-7.29	+11.00
48+00				

Reset

Bibber
 All points
 11.0 Above Flag

B.M. on cut stake 42+39.95 P-12 = 1.71

chk cut stake
 48+00 P-15

5.31 +
 7.02 =
 4.76
 2.26
 2.27
 0.01 Error

B.M. Bridge Spike W end Juntu Fe

Bridge P-14 = 0.44

opp. station 42+00
 Set B.M. B.P. on N.C.B. = 3.02 TP
 3.83
 6.85

B.M. Above offset 42+39.95 = 1.71
 3.73
 7.50

48100 Δ 2°4'

48100
2°4'

3.83 6.85
Stake "A"

511

B.M. BP
3.02 El. Stake El. Flare
1.74 -7.885

$\Delta = 10\% \quad 42 + 39.95$
Equation $42 + 25.57$
- Elev
+ 9.625 Above Flare
Stake "A"
to Stake from
to Station 48100

N cb Line

P-22
B.M. BP
El. 3.02

Walker
Tebell
Easterly
6-17-41

Check Levels on top of
60" Interceptor Sewer.
from Station 42+39.25, West.
To Test line for settlement.

	4.39	7.41		3.02 Top Pipe	3.22 Flow line	
42+39.95 on top Pipe			9.72	-2.31	-7.85	+5.54
42+75 " " "			9.75	-2.34	-7.82	+5.48
43+00 " " "			9.72	-2.31	-7.79	
+25 " " "			9.74	-2.33	-7.765	
+43			9.69	-2.28		

Walker
Bliss
15x11x
3-8-41

Check Levels on Cut Stakes
60" Interceptor Page 8
From 5+10 to E 32ND - 1514084

Cut Stakes on P-8	El. Stake this line	El. Stakes P-8	Mean Elev
5.17 10.99	5.82		
44 2+91 63 58 1897-27	3.06 7.93	7.93	
5+10	5.26 5.73	5.73	5.73
+50	5.44 5.55	5.56	5.555
6+00	5.58 5.41	5.42	5.415
+50	5.45 5.54	5.56	5.55
7+00	5.66 5.33	5.34	5.335
9+00	6.16 4.83	4.85	4.84
+29.25	6.38 4.61	4.62	4.615
9+50			
T.P. 3.89 9.14	5.74 5.25	5.25	5.25
10+00	3.81 5.33	5.34	5.335
+50	4.61 4.53	4.55	4.54
11+00	4.15 4.99	5.00	4.995
+50	4.92 4.22	4.23	4.225
12+00	5.68 3.46	3.47	3.465
+50	3.39 5.75	5.76	5.755
13+00	2.80 6.34	6.35	6.345
T.P. 5.44 11.42	3.16 5.98		
13+50	5.05 6.37	6.38	6.375
14+00	inaccessible		
14+50	4.29 7.13	7.15	7.14
15+00	8.03 3.39	3.42	
128.78 = 15140.84 on Tuck	1.9. 1507 P-28 → 1.92	1.94	1.93
23.7 N on Tuck	9.29 2.13	2.17	

Note: In line with of E 32ND
Use E Tuck MH#5 El = 1.93

Mean Elev

5.73
5.555
5.415
5.55
5.335
4.84
4.615
5.25
5.335
4.54
4.995
4.225
3.465
5.755
6.345
6.375

Line changed

from 9+29.25 see check levels
to E 32ND P-26

7.14

Flow

Mark on last line breaks

Use 3.39 - 10.57 + 13.96

1.93 = Mean El. of E 32ND 15140.84
offset
2.13 - 10.54 112.67 23.70 N on E 32ND

Check levels 60" Served
 Then to 32ND

	^x		El. Stake	El. Stake
	5.410	10.025	4.615	9.2975 P-10
9+50		4.730	5.235	5.285
10+00		4.660	5.365	5.355
+50		5.380	4.645	4.645
11+00		4.910	5.115	5.110
+50		5.810	4.215	4.205
12+00		6.880	3.145	3.135
+50		4.320	5.705	5.695
13+00		3.360	6.665	6.660
TP	5.280	11.265	4.040	5.985
13+50		4.800	6.465	6.460
14+00				
+50		4.160	7.105	7.110
15+00		8.240	3.025	3.030
+36.32 = MH# 5		2.125	2.140	2.15

26

El. stakes
 Mean Elev.

5.29

5.36

4.645

5.112

4.21

3.14

5.70

6.662

6.462

7.107

3.027

2.145 = Copper Disk 1357 Ft. on E 32ND

Walker
Bliss-X
Isbell-Rod.
4-3-41

~ Check levels ~
60" Interceptor Sewer.

from 36+50 to 52+90

Construction Grades \rightarrow P-14-15
 El. Stake this line
 El. Stake P-14
 El. Stake W. end of Bridge P-14

Station	Mean Elev.	Flow Pipe	Cuts						
P-14 36+50	6.26	6.70	6.44	2.445	2.445				
36+72.80 = 36+82.80				4.26	2.44	2.45	2.445		
37+00 +50				4.57	2.13	2.12	2.125		
38+00 +60				5.05	1.65	1.63	1.64	-839	+10.03
39+00 +50				4.72	1.98	1.96	1.97	-834	+10.31
40+00 +50				4.78	1.92	1.91	1.915		
41+00 +50				4.53	2.17	2.16	2.165		
42+00 +50				4.35	2.35	2.34	2.345		
43+00 +50				4.76	1.94	1.94	1.94		
44+00 +50				5.17	1.53	1.52	1.525		
45+00 +50				5.09	1.61	1.60	1.605		
46+00 +50				5.27	1.43	1.43	1.43		
47+00 +50				5.13	1.57	1.57	1.57		
48+00 +50				4.78	1.92	1.92	1.92		
49+00 +50				4.985	1.715	1.710	1.7125		
50+00 +50				5.640	7.355	4.985	1.715		
51+00 +50				4.160	3.195				
52+00 +50									
53+00 +50									
54+00 +50									
55+00 +50									
56+00 +50									
57+00 +50									
58+00 +50									
59+00 +50									
60+00 +50									

Mean Elev. Flow Pipe Cuts

Station	Mean Elev.	Flow Pipe	Cuts
36+50	6.26	6.70	6.44
36+72.80			
37+00			
38+00			
39+00			
40+00			
41+00			
42+00			
43+00			
44+00			
45+00			
46+00			
47+00			
48+00			
49+00			
50+00			
51+00			
52+00			
53+00			
54+00			
55+00			
56+00			
57+00			
58+00			
59+00			
60+00			

Equation
MH #10

TP
43+19.9 P.
chk B.M. ct. on Seb.

Corrected
3.185 - B.M.
3.19 P-14

	7.35		Elev Stakes	Elev Stakes P-14-15	Mean Elev.	
44+00			446	2.89	2.88	2.885
+50			456	2.79	2.79	2.79
45+00			475	2.60	2.59	2.595
+50			483	2.52	2.52	2.52
46+00			490	2.45	2.44	2.445
+50			489	2.46	2.45	2.455
47+00			523	2.12	2.11	2.115
+50			518	2.17	2.17	2.170
48+00	MH #11	Angle Point November 1907	5.08	2.27	2.27	2.27
T.P.	4.91	7.18	5.08	2.27		
+50			530	1.88	1.89	1.885
49+00			532	1.86	1.87	1.865
+50			527	1.91	1.92	1.915
50+00			509	2.09	2.10	2.095
+50			508	2.10	2.11	2.105
51+00			505	2.13	2.14	2.135
+50			496	2.22	2.23	2.225
52+00			502	2.16	2.17	2.165
+50			501	2.17	2.18	2.175
+90	MH #12		530	1.88	1.90	1.890

Line Change
 New Cuts P-19
 " Check levels P-29

Check **GRADES** 60" Jewel.
 Levels Cont from P-28

6.94

Station	Δ	Elev. Stakes	Elev. Stake P-19	Mean Elev	Elev. Flow	Cuts	offsets
48+00	2°00' Lt						
+50		4.97	1.97	1.97	-7.24	+9.21	20' H.T
49+00		5.06	1.88	1.88	-7.19	+9.07	"
+50		5.03	1.91	1.91	-7.14	+9.05	"
50+00		4.75	2.19	2.18	-7.09	+9.27	"
+50		4.83	2.11	2.10	-7.04	+9.14	"
51+00		4.73	2.21	2.20	-6.99	+9.19	"
+50		4.63	2.31	2.29	-6.94	+9.25	"
52+00		4.61	2.33	2.31	-6.89	+9.22	"
+50		4.78	2.16	2.14	-6.84	+9.00	"
53+00		4.98	1.96	1.94	-6.79	+8.75	"
+50		5.14	1.80	1.79	-6.74	+8.54	"
54+00		5.29	1.65	1.64	-6.69	+8.34	"
+22 ^{#3}	East end Siphon FB. 1537 Δ 4°44' Lt Page 41 This etc.	5.50	1.40	1.39	-6.67	+8.07	"
+34 ^{#3}	W end Siphon Δ 12°33' Lt	6.14	0.80	0.79	-6.60	+7.39	"

Walker, Isbell, Foster 5-23-41

Elevations of Existing 10' Box Culvert over Above Siphon at 28th

	Elev. Rod.	BM. Spike in Pile P-15
E edge top Box	7.00	-0.02
" " Bottom Box	12.90	-5.92
W " Top "	6.97	0.01
" " Bottom "	12.82	-5.84

Extreme Bottom Concrete

BM Stake 48+00 P-15 = 2.27
 2.67
 6.94

Station	Δ	Elev. Flow	Cuts	offsets
48+00				
+50		-7.24	+9.21	20' H.T
49+00		-7.19	+9.07	"
+50		-7.14	+9.05	"
50+00		-7.09	+9.27	"
+50		-7.04	+9.14	"
51+00		-6.99	+9.19	"
+50		-6.94	+9.25	"
52+00		-6.89	+9.22	"
+50		-6.84	+9.00	"
53+00		-6.79	+8.75	"
+50		-6.74	+8.54	"
54+00		-6.69	+8.34	"
+22 ^{#3}		-6.67	+8.07	"
+34 ^{#3}		-6.60	+7.39	"

checked 6-9-41

East end siphon 54+22.23 = -6.92 by OK

W " " 54+34.13 = -6.74 "

Muller
Bliss - Rod
Tobell - R.
Kochaly
Nov. 10 - 1941

Check levels
for New location 60" Interceptor Sewer
from Station 32+77.93 Page 12
to " 42+25.57 } " 12
-42+29.35 }

Station	4.48	4.92	0.44	El. stake	El. stake
East end Siphon.					
32+77.93 = Δ 10° 02' 30" Lt.		7.24	-2.32	-2.33	
Wood Siphon					
35+56.93 = Δ 12° 11' 45" Lt.					
36+10		7.47	-2.55	-2.56	
+75		4.17	0.75	0.75	
37+00		3.08	1.84	1.84	
+50		2.69	2.23	2.23	
38+00		2.63	2.29	2.29	
+50		2.98	1.94	1.93	
T.P.	4.58	6.52	2.98	1.94	
39+00		4.63	1.89	1.88	
+50		4.64	1.88	1.87	
40+00		5.09	1.43	1.42	
+50		4.97	1.55	1.55	
41+50		4.75	1.77	1.77	
42+00		4.70	1.82	1.82	
Egation		4.80	1.72	1.71	

Mean Elev	Elev Flow	Cuts.	offsets.
-2.335	-8.80	6.47	20' ft.
2.555	-8.47	+5.91	"
0.75	-8.435	+9.13	"
1.84	-8.38	+10.22	"
2.23	-8.33	+10.56	"
2.29	-8.28	+10.57	"
1.935	-8.23	+10.16	"
+1.885	-8.18	+10.06	"
+1.875	-8.13	+10.00	"
+1.425	-8.08	+9.50	"
+1.55	-8.03	+9.58	"
+1.77	-7.93	+9.70	"
+1.82	-7.88	+9.70	"
+1.75	-7.85	+9.56	"

Walker
Isbell
Feb 17-41

60" Interceptor T&W.R.
GRADES for High line
from station 5+10 = MH#3
to " 5+29.25 = MH#4

TP	K = Walker		Elev Stake	Tot. Elev	BM. Cor Mon Dip + 15' high wood	Flow line Curbs	offsets
	4.00 4.27	12.24 11.64					
5+11 = 1' W of MH			6.20	5.44	-11.56	+17.00	L
742.7			6.17	5.47	-11.53	+17.00	L
+75.1			6.14	5.50	-11.50	+17.00	L
6+07.5			6.10	5.54	-11.46	+17.00	L
+740.1			6.07	5.57	-11.43	+17.00	L
772.6			6.04	5.60	-11.40	+17.00	L
7+05.1			6.00	5.64	-11.36	+17.00	L
+738.1	0.10 0.00		5.97	5.67	-11.33	+17.00	L
+770.5			5.94	5.70	-11.30	+17.00	L
8+08.5			5.90	5.74	-11.26	+17.00	L
+730.5			5.88	5.76	-11.24	+17.00	L
+760.4 367			5.85	5.79	-11.21	+17.00	L
897.1 21.6			5.81	5.83	-11.17	+17.00	L
9+28.9			5.78	5.86	-11.14		

check levels over above line

K = Isbell

8.24
Above BM
on Mon.

Walker
18 bell
Eastern
5-17-41
Sat. afternoon

in check levels ~
over Highline Interceptor Sewer
Cont. from P-31

32

	+	K-Jobell	-	Elev:	
B.M.	4.21	12.45			8.24
5+11 =					
T.P.	6.06	11.49	7.02	5.43	
+42.7			6.62	5.47	
+75.1			5.99	5.50	
6+07.5			5.96	5.53	
6+40.1			5.94	5.55 ²	
+72.6			5.90	5.59 ¹	
7+05.1			5.87	5.62 ²	
+38.1			5.83	5.66	
+70.5			5.81	5.68	
8+08.5			5.76	5.73	
+30.5			5.74	5.76	
+60.4			5.71	5.78	
+97.1			5.67	5.82	
9+28.9			5.64	5.86	

INTERCEPTOR SEWER

Re set stakes

	π	Elev. Stake	Elev. Floor Line	Cuts.
7+70.5	11.60	5.90	5.70	-11.30
8+08.5		^{5.87} 5.86	5.74	-11.26
+30.5		^{5.86} 5.85	5.76	-11.24
+60.4		5.81	5.79	-11.21
+97.1		5.77	5.83	-11.17
9+29.25 = Δ		5.74	5.86	-11.14

Walker Isbell Easton 6-7-91 Highline Grader Interceptor Sewer

Station	π	Elev. Stake	Elev. Floor	Cuts.
9+29.25	11.86	6.00	5.86	-11.14
+45.8	9.86	3.98	5.88	-11.12
+85.8		3.94	5.92	-11.08
10+25.8		3.90	5.96	-11.04
+67.8		3.86	6.00	-11.00
11+07.7		3.82	6.04	-10.96
+47.8		3.78	6.08	-10.92
+86.0		3.74	6.12	-10.88

Walker Isbell Easton 6-12-91 Restake Highline Grader Interceptor Sewer from 9+29.25 to 11+86

Station	π	Elev. Stake	Elev. Floor	Cuts.
9+29.25	9.95	4.09	5.86	-11.14
+45.8		4.07	5.88	-11.12

Cont. p-34

Elev. Highline Stake 8+97.1 Page 31 5.83 4.35

B.M. 13' Mon Una + Kingwood = 8.24
 4.89 +
 13.13 π
 7.61 -
 T.P. on Highline Stake 6+07.5 P-31 → 5.52
 6.08 /
 11.60 π
 5.99
 ckt stake 7+38.1 5.61

B.M. Kingwood & Una 13' Mon = 8.24
 4.11 +
 12.35
 4.81
 7.54 TP
 4.32 +
 11.86 π
 6.02 -
 TP = 5.84
 4.02 +
 9.86 π
 5.83
 T.P. PI Stake = 4.03
 P-82

Above P.I. stake = 4.03 - stake
 5.92 -
 9.95 π

Re-staked, see cuts below

Highline Interceptor

Re-stake cont. from p. 33 plus

	π	Books	from PI Stake	33 Plus	Cuts	offsets
9+85.8	9.95	4.03	5.92	-11.08	+17.00	L
10+25.8		3.99	5.96	-11.04	+17.00	L
+67.8		3.95	6.00	-11.00	+17.00	"
11+07.7		3.91	6.04	-10.96	+17.00	"
+47.8		3.87	6.08	-10.92	+17.00	"
11+86		3.83	6.12	-10.88		

BK1
 P.I. Stake D-34 = 4.03
 6.32+
 10.357

Walker Sat. 6-11-41
 Ar 8:00 AM Re-stake Highline

10+25.8	10.35	4.39	5.96	-11.04		
+67.8		4.33	5.92		+16.92	
11+07.7		4.35	6.00	-11.00	+16.98	
+47.8		4.33	6.02			
11+86		4.31	6.04	-10.96	+17.00	
		4.27	6.08	-10.92	+16.98	
		4.25	6.10			
		4.23	6.12	-10.88		

6-17-41

Re-stake Highline

10+67.8	9.97	3.97	6.00	-11.00	+17.00	
11+07.7		3.93	6.04	-10.96	+17.00	
+47.8		3.89	6.08	-10.92	+17.00	
11+86		3.85	6.12	-10.88	+17.00	

Above BM = 4.03
 5.94+
 9.97

Re-stake Highline

10+67.8	9.71	3.71	6.00	-11.00	+17.00	
11+07.7		3.67	6.04	-10.96	+17.00	
+47.8		3.63	6.08	-10.92	+17.00	
+86		3.59	6.12	-10.88		

Above BM = 4.03
 5.68+
 9.71

Cont. on Page 36

60" Interceptor Sewer
Highline Grades

Station 0+00 to 5+10

Station	π	Rods	El. Stakes	Elev. Flow Line
0+00 = 0+72.61				-12.00

0.10 %

3+62	π 13.12	4.85	8.27	-11.71
4+09.7	π 13.12	4.78	8.34	-11.66
4+29.7		4.76	8.36	-11.64
4+62.7		4.72	8.40	-11.60
5+09.4		4.68	8.44	-11.56
5+10=A				-11.56

Cuts. offsets.

+19.98	2 Stake
+20.00	█
+20.00	"
+20.00	"

B.M. 13' Mon
Uruy Kingwood = 8.24
4.23 +
13.12 π

Highline 60" Sewer

Cont. from P-34

Station	π 9.71 from P-34	Est. Stake	Est. Flow line	Cuts	offsets
12+21.7	3.56	6.15	-10.85	+17.00	✓
+66.7	3.52	6.19	-10.81	+17.00	"
+96.9	3.49	6.22	-10.78	+17.00	"
13+33	2.45	7.26	-10.74	+18.00	"

Walker
Footery
Furness
8-6-41

Re-stake Highline 60" Interceptor

from station 12+21.7

11+85.7	13.08	6.96	6.12	-10.88	+17.00	"
12+21.7		6.93	6.15	-10.85	+17.00	"
+66.7		6.89	6.19	-10.81	+17.00	"
+96.9		6.86	6.22	-10.78	+17.00 = East	"
		5.86	7.22	-10.78	+18.00 = West	"
13+33		5.82	7.26	-10.74	+18.00	"
13+51		5.80	7.28	-10.72	+18.00	"
13+91		5.76	7.32	-10.68	+18.00	"
14+34		5.72	7.36	-10.64	+18.00	"
14+66		5.68	7.40	-10.60	+18.00	"
15+00		10.81	2.47	-10.57	+13.04	Spike oak in dirt walk

Walker
8-15-41

Re-stake Highline 60" Interceptor

12+98	13.39	6.17	7.22	-10.78	+18.00	
13+33		6.13	7.26	-10.74	+18.00	
+51		6.11	7.28	-10.72	+18.00	
+91		6.07	7.32	-10.68	+18.00	
14+34		6.03	7.36	-10.64	+18.00	} Reset P-37
+66		5.99	7.40	-10.60	+18.00	

Cont. P-63

9.71
7.58
2.13
2.15
0.02 Error

15+36.32
chk. copper disk
13.57 ft. of P-10

9.71
6.70
3.01
3.03
0.02 Error

B.M. P.I. Stake P-33 = 4.03
2.05
13.08

Above
B.M. P.I. = 4.03
9.36
13.39

Wulker
Isbell
Easterly
6-17-41

Highline Grades.
60" Interceptor Sewer.

From 42+39.95, West.

7.41

chk. stake "A" p-23 5.66 1.75 1.74 Stake 001

PAIRED

47+00 p-22 7.32 372 3.60
47+48
chk 7.32 3.69 3.63 3.66 003 Low

11-8-41

Highline Grade restaked.

from station 13+91 to 14+66

Station	7.68	El. Stakes	El. Flow Line	Cuts.	
13+91		0.36	7.32	-10.68	+18.00
14+34		0.32	7.36	-10.64	+18.00
14+66		0.28	7.40	-10.60	+18.00

8 M. B.P. P.M. = 3.02

4.39 +

7.41 +

4.84 -

2.57 T.P.

4.75 +

7.32 =

Baked cuts = 11.00 Above Flow

13.57 Hl. of 15+36.32
B.M. Cop. Dist

- 2.15

5.53

7.68 +

Walker
12b.11
Easterly
D. Farrel
7-10-41

Next Grades For Tank #3
cuts are to Finish Concrete = Elev. -5.75

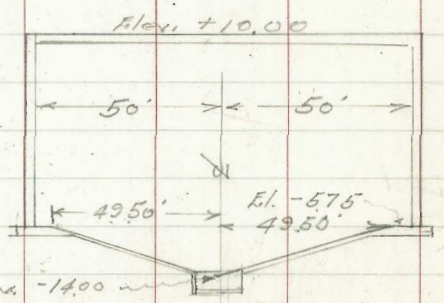
TANK #3	A	B	C	D
13.01-T	-5.75	-5.75	-5.75	-5.75
	18.76	18.76	18.76	18.76
	448	534	399	567
	+14.28	+13.22	+14.77	+13.09

Walker
Easterly
Furrow
8-1-41

Additional Grades Tank #3 Clarifier
B.M. Conc. Man
Unit Kingwood

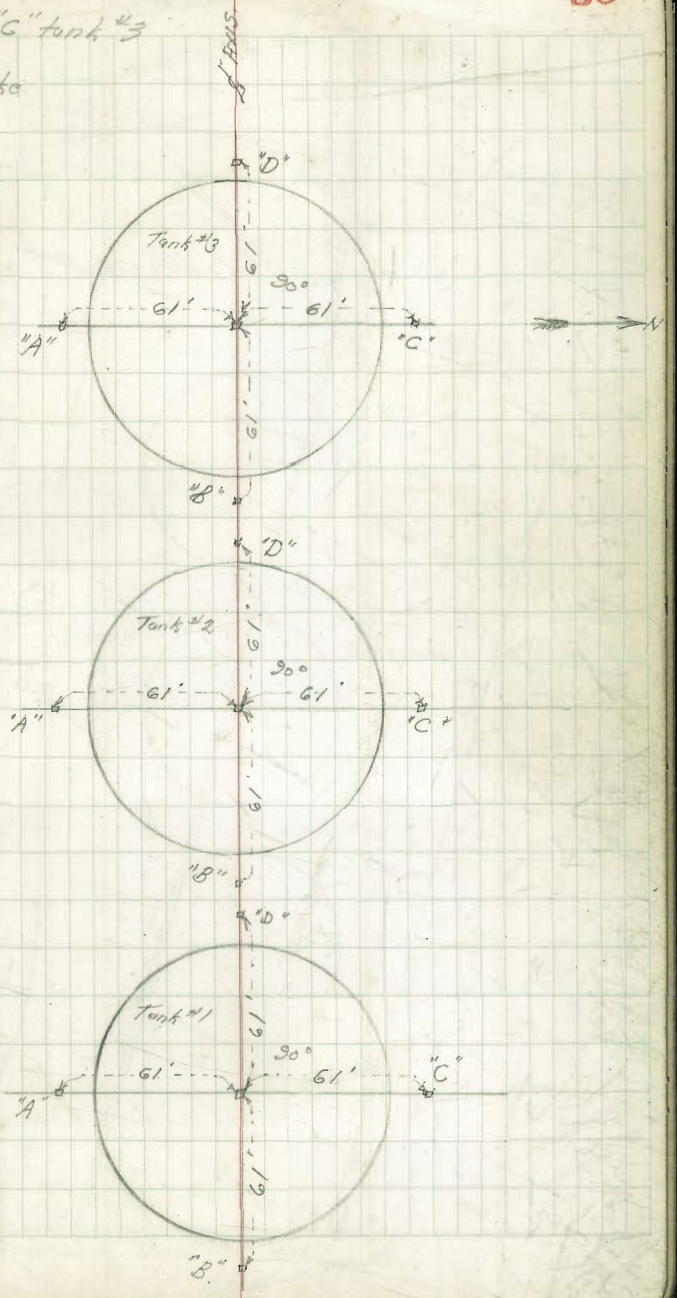
	4.79	13.03	Rot.	8.24
TP	0.88	7.54	6.37	6.66
TP	5.44	1.51	11.47	-3.93
			4.26	-2.75 = 3' Above Finish Conc.
TP	12.19	11.91	1.79	-0.28
TP	7.73	13.70	5.94	5.97
chk. starting B.M.		5.45	8.25	
			8.24 - B.M.	
			0.01 = Error	

Other Grades for #3 Clarifier, see P-44



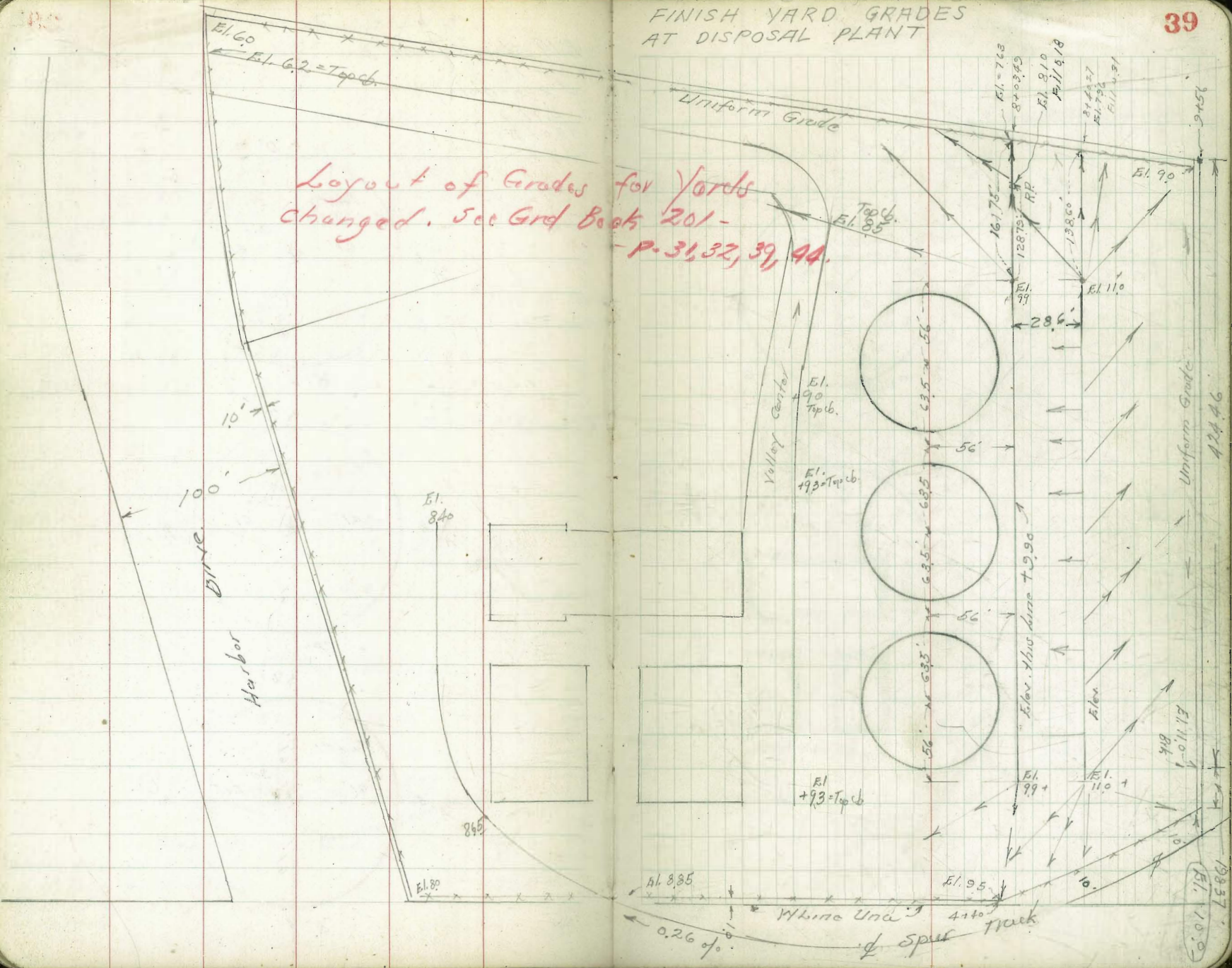
Note: Elev. 14.00 is at
E of Tank and is on
Rate of slope of Finish
Concrete.

B.M. Stake "C" tank #3
Page 18
= 8.30 - Stake
4.71 +
13.01 T



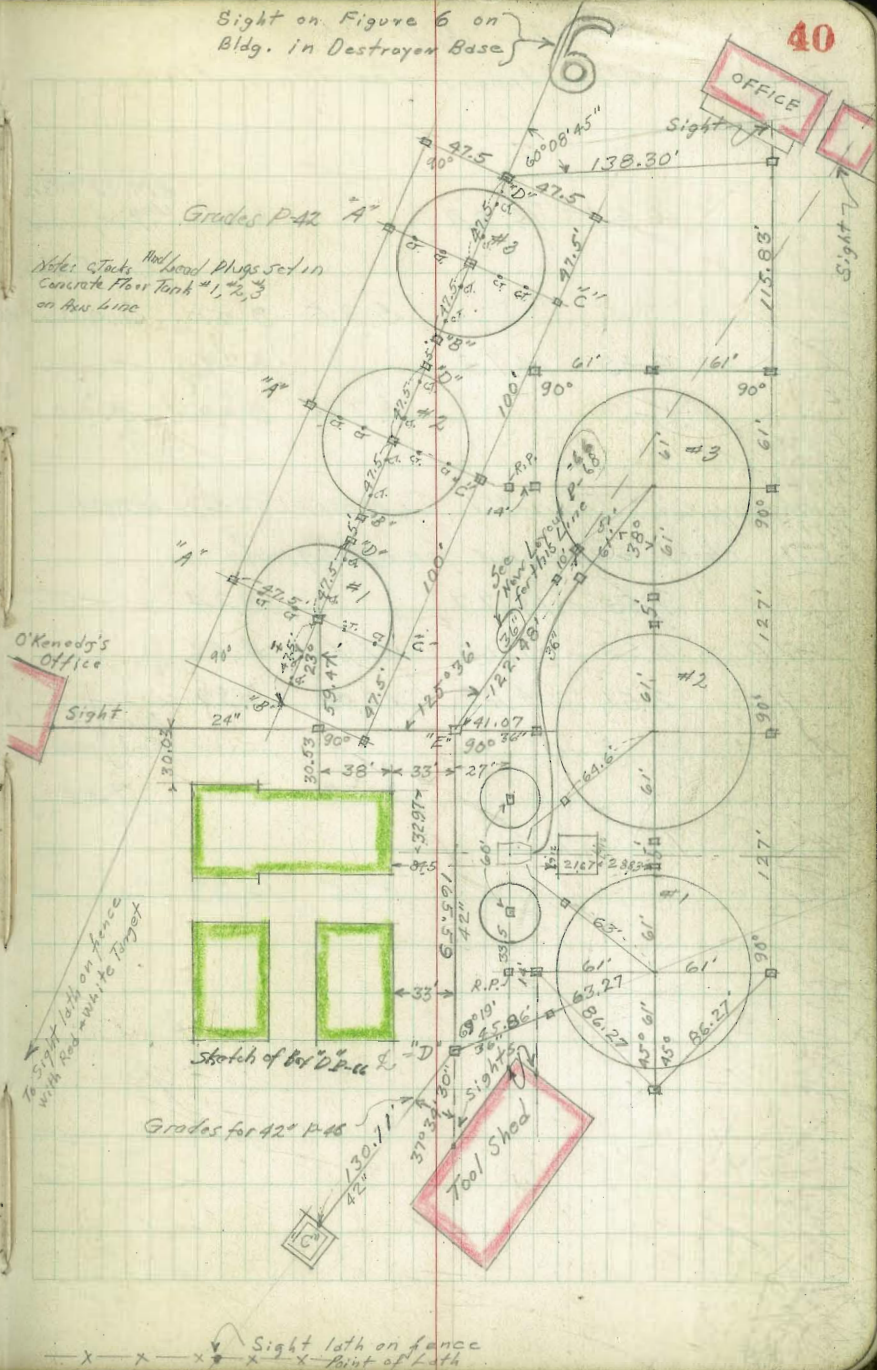
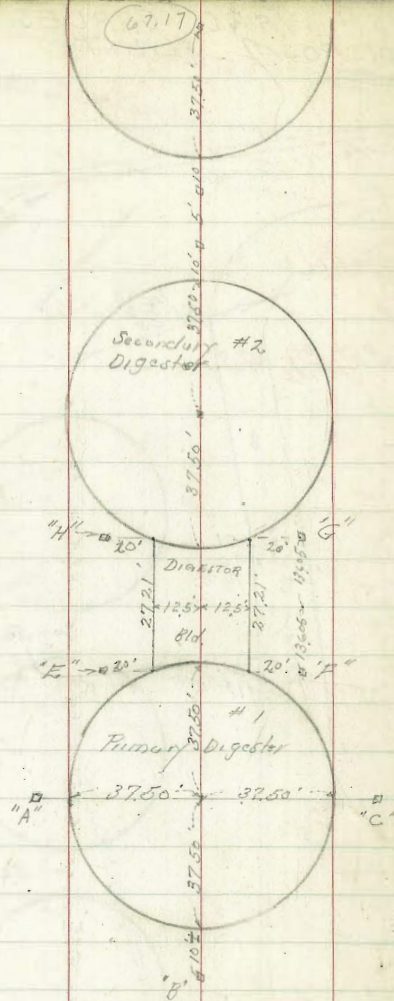
FINISH YARD GRADES
AT DISPOSAL PLANT

LAYOUT OF GRADES FOR YARDS
CHANGED. SEE GRID BOOK 201-
-P. 31, 32, 39, 44.



Reference Points

Digestor Bld.
Grades Page 43



Note: Jacks
Concrete Floor Tank #1, #2, #3
on Bus Line

O'Kennedy's Office

To Sight lath on fence
with Red white Target

Grades for 42 P-42

Tool Shed

OFFICE

Sight lath on fence
Point of Lath

Walker
Easterly
D. Farrow
8-1-41

Detritor Bld. #2
Elevations For Main Floor

6.61	14.85	8.24	8.14.13 Mon Wm Kingwood.
			El. Floor
		5.85	9.00 9.00
6.49	14.73	8.24	
		5.73	9.00 9.00

Walker
Bliss
Easterly
Sommerey
Farrow
8-5-41

TANK #1 CLARIFLOCCULATOR
check GRADES for Subgrade

	7.53	15.77	8.24
TP	0.63	5.09	11.31 4.46
TP	2.51	-4.48	12.08 -6.99
			Elv. Subgrade
		2.52	-7.00 -7.00
		8.75	-13.23

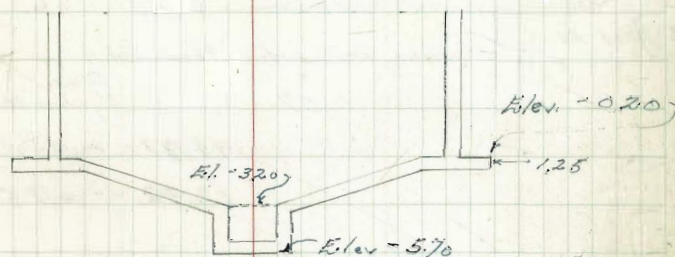
Walker
Easterly
& Formel
8-5-41

Bliss
Sommerhoff

GRADES, PRIMARY DIAMETER
TANK #3 Sketch P-40

	7		BM. Mon.	
473	12.97		8.24	Sho Kingwood
				Elev. Finish Concrete
"A"	6.78	6.19	-0.20	+6.39
"B"	6.29	6.68	-0.20	+6.88
"C"	6.35	6.62	-0.20	+6.82
"D"	6.46	6.51	-0.20	+6.71

Cuts.



Cuts.

0.00

9-11-41

GRADES For Highline Above Tank #3

4.99	13.23		8.24 = BM. Mon.	
TP	0.99	3.84	10.38	2.85
				Elev. Finish Nails Concrete
			4.04	-0.20
				-0.20
TP	9.61	12.47	0.98	2.86
chk stake "F" P-43		4.45	8.02	
			8.03	
			0.01 Error	

10-7-41. Grade for Radius Tank #3

	π		
Sta.	2.66 P-48		El. Stake
± Radius		6.33	-3.67

Walker
Wells
11-28-41

Finish Grades DIAMETER #3

			Mon.	
4.59	12.83		8.24 = B.M.	
TP	2.44	12.83	0.00	
			0.00	
			2.64	-0.20
				-0.20
				Elev. Conc.

Walker Wells
Footings 8-15-41
FURLOW

GRADES Secondary DIGESTOR

Tank # 2 sketch P-40

Station	π	Elev. Stakes	Elev. Base Finish Concrete	Cuts
"A"	12.06	5.97	6.09 - 0.20	+6.29
"B"	12.06	4.82	7.24 - 0.20	+7.44
"C"	12.06	4.42	7.64 - 0.20	+7.84
"D"	12.06	5.37	6.69 - 0.20	+6.89

10-1-41

Highline Grades for Above Tank

π	Elev. Highline Mud	Elev. Finish Conc.
11.57	11.77	- 0.20
	12.32	- 0.75 = 1/2 stub

Walker Wells
9-11-41

Sketch P-40
GRADES PRIMARY DIGESTOR #1

Station	π	Elev. Stakes	Elev. Base Finish Conc.	Cuts	offsets
"A"	12.89	5.74	7.15 - 0.20	+7.35'	47.5' from R. Radius
"B"		4.25	8.64 - 0.20	+8.84'	✓
"C"		4.43	8.46 - 0.20	+8.66'	✓
"D"			- 0.20	out	✓

9-11-41.

Sketch P-40
GRADES DIGESTOR Bld.

Station	π	Elev. Stake	Elev. Finish Conc.	Cuts	offsets
"E"	12.89 Above	6.58	6.31 - 0.20	+6.51'	20' South
"F"		4.86	8.03 - 0.20	+8.23'	20' N
"G"		5.07	7.82 - 0.20	+8.02'	20' N
"H"		6.45	6.44 - 0.20	+6.64'	20' South

Elev. Stake "B" P-42 = 6.68

5.38 +
12.06 π
5.29 -
6.777 π
6.971
13.74 π
5.50 -
chk Mon \rightarrow 8.24 = 8M

Elev. Stake "A" Secondary Digestor = 6.09
5.48 +
11.57 π

000 - Finish Conc. Nuclei Around Tanks
this stake checked P-47

8M Men Unit Kumpud 8.24
4.65
12.89 π

Sketch P-40

Walker
Easterly
Ferry
8-6-81

Additional Grades
Clarifier Tank # 3

8 N. Mar.
Stake 47.5 from R

	5.28	13.52		8.24
TD	3.39	11.635	7.445	6.075
TD	0.29	-1.02	12.965	-1.330
Stake			11.44	-12.46

Walker
Wells
Ferry
8-3-91

Grades Tank # 3

Filer
Stake 47.5 from R

Station	2.07	-4.93		-7.00
to Bottom Hole subgrade		14.90		-19.83

Walker
Wells
Farrow
7-3-41

Treatment Plant
Grades for 42" Sewer, Sketch P-40
P-66

Stations

Inside edge Wall Box "C" P-40
= 0+00 14.50

Elev. Ft.
Stakes Floor Line

Cuts offsets

+48 = Bk	4.66	9.84	-6.00
+88.39	4.09	10.46	-4.50
+229.00			
+28.78 = East inside edge box "D" 3.47	11.03		-3.00

+15.84 5' RT
+14.96
+14.03

Walker
Wells
Farrow
7-22-41

Highline Grades for Above Sewer

Stations

14.05

Elev. Ft.
Highline Floor Line

Cuts

0+00	3.37	10.68	-9.32
+25	3.64	10.41	-7.59
+48 = Bk	2.05	12.00	-6.00
+89	0.52	13.53	-4.47

+20.00
+18.00
+18.00
+18.00

Grades

42" Line Cont.

+29 Above
+28.00 = East Inside Box "D" 15.56 -3.00

+36.11 = Δ Lt 37°34'30" in 2 Box D 11.12 -3.00

+33.72 = West inside edge Box "D" 4.44 11.12 -3.00

+50 14.74 3.51 11.13 -2.98

+2+00 4.07 10.67 -2.92

+50 4.93 9.81 -2.86

+93.70 = East inside edge Box "E" 5.79 8.95 -2.30

+95.70 = Δ Rt. 31°58' in Box "E"

+99.30 = West inside edge Box "E" 6.17 8.57 0.0

+73.82 = East inside Box Parshall Flume 0.0

Sketch P-66

Highline Grades P-46

Uma + Kingswood 45
B.M. Conc. Mon 824
6.25
14.50

Above BM 824
5.81 +
14.05 =

B.M. Mon = 824
7.32
15.56
4.44
11.12 TP
3.62 +
14.74 +
6.27
8.47
28.46
8.01 Error

chk stake "C" P-43
Primary Tank #1

+8.57 ""

Walker
Wells
Farrand
9-26-41

Highline Grades

60" Interceptor Sewer
Original cuts P-21

Station		El. Stakes	El. Flow
4+00	12.75	5.42	7.33 -11.67
3+76.5	12.75	5.44	7.31 -11.69

Highline for 42" Sewer

Cont. from P-45

Station	+ X	Rods -	El. Stakes	El. Flow Line	Cuts
1+33	16.40	4.40	12.00	-3.00	115.00
+52		4.38	12.02	-2.98	115.00
+68		4.36	12.04	-2.96	115.00
+84		4.34	12.06	-2.94	115.00
2+00		4.32	12.08	-2.92	115.00
+16	14.04	1.94	12.10	-2.90	
+32		1.93	12.11	-2.89	
+48		1.91	12.13	-2.87	
+64		1.90	12.14	-2.86	
+80				-2.83	

Elev. cut stake 4+00
Page 21

= 7.38
537.1
12.75

119.00

Uru + Kingwood
B.M. Mon = 8.24
8.16
16.40

H.F. Book 201 P. 14-14.04

Walker
Wells
D. Ferris
10-1-41

GRADES PRIMARY DIGESTER #1
Sketch Page 40
Excavation Grades P-43

Station	π	Red	Elev. Stake	Elev. Sub. Grade
	2.00	3.45	-1.45	-1.45

Rough Grading for Above layout found to be high and Elev. on Red Heads at

Finish Concrete were set as shown below

Station	π	Rods	Elev. Null	Elev. Finish Conc.
	2.00	2.20	-0.20	-0.20
TP	2.88	2.36	2.52	-0.52
Elev. Radius Hub			3.49	-3.13
chk. Red Hd. Finish Conc			2.56	-0.20

10-7-41 Stakes set for Finish Concrete

Station	π	Red	Elev. Stake	Elev. Finish Conc.
	3.19	3.39	-0.20	-0.20

C. Walker
Murch
Road
4-7-42

Excavations for Roof Support #1 Tank

Station	π	Red	Elev. Stake	Elev. Finish Floor
	3.51	3.21		-0.20

TP	13.07	40.04	23.66	26.97	Elev. 2.0' below Conc.
			9.24	30.80	30.80

TP	1.75	14.79	27.00	13.04
----	------	-------	-------	-------

chk. Finish Conc. Clarifloucc. Water #1

10.00
10.00
0.00 Error.

Area & Volume used 47
BM. Mon = 8.24

3.83 ✓
12.07 ✓
12.59 -
- 0.52 = TP
2.52 ✓
2.00 π
2.75 -
- 0.75 ✓

check of Stake Tank #2
P-43

20' Red Hds set, 18.0

Elev. Rd. Hds. Around Tank

Mon BM = 8.24

4.97 ✓
 π 13.21
13.04 -
TP 0.17
3.04 -
3.21 ✓
6.32

chk. Radius Hub = 3.11
= 3.13

B.M. → Used Radius Hub 3.13
6.32 +
3.19 π

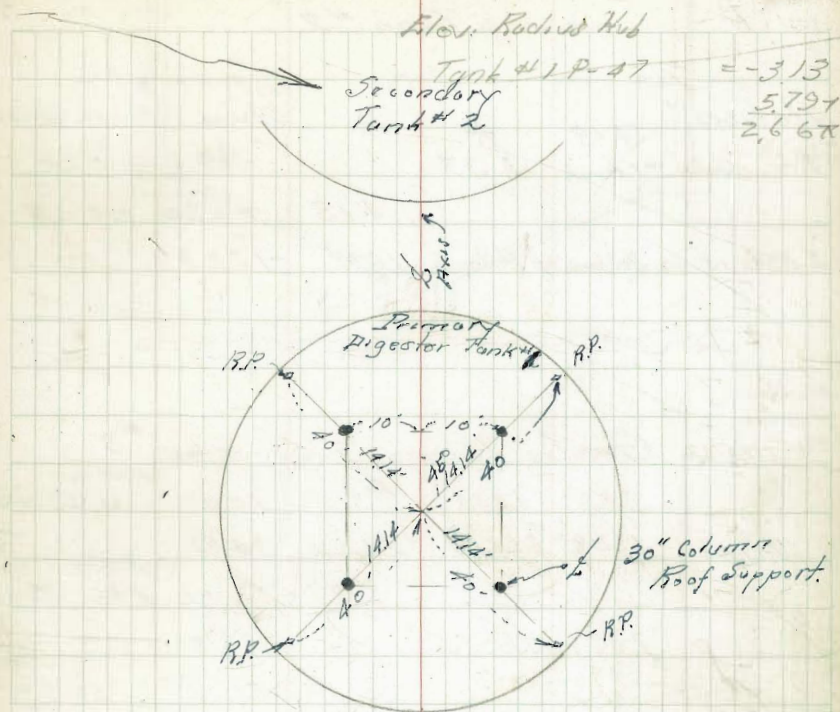
Walker, D.
L. Wells Farm
10-7-41

Additional Grades
Secondary Digester Tank #2

Station	X		Elev. Stake
L Radius Hub	2.66	9.06	-64.0

Additional Grades Secondary Digester #2

	4.51	14.51	Rad.	10.00	14.51
TP	17.08	31.58	0.00	14.51	
			13.26	18.30	

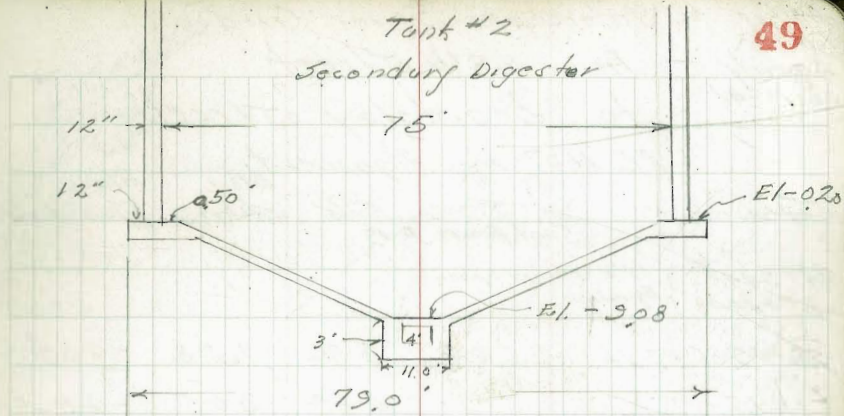


Walker
10-17-41
Finish Grades Secondary Digester
Tank #2

Station	413	π	Stakes	El.	Finish Conc.
Elev. Stake #1 tank	3.33			-0.20	-0.20
		413		-0.20	-0.20
Radius in Bottom of Hole	16.01			-12.98	

Walker
Hardin
Wirtz-28-42

Grades Primary Digester #3				B.M. on Conc. Classifier Tank #2	
	3.89	1382	Rod	10.00	
T.P.	1.28	36.17	+21.00	34.89	Bottom Roof Stub
			3.37	32.80	Elev. 32.80
	3.35	36.15		32.80	Bottom slab
			3.10	33.01	33.01 - Bed



Walker 60" Interceptor Sewer Grades.
 Isbell
 Kosterly.
 6-11-21

From 28th Street
 to Beardsley Street.

F.B. 1607 = New Alignment.

Station	Cent from P-19	Blv. Rods.	Blv. Stakes.	Elev. Flow line		
54+94.43 -55+43.98	1/2 of W and Siphon. Equation			-6.60		
55+49.85 B.C.L.		6.64	5.36	1.28	-6.59	
+75				4.59	2.05	-6.565
56+00				4.59	2.05	-6.54
+25						-6.515
+50				4.48	2.16	-6.49
+75						-6.465
57+00				4.37	2.27	-6.44
57+25 = E.C.				4.30	2.34	-6.42
+50				4.13	2.51	-6.39
58+00				3.81	2.83	-6.34
+50 = B.C.L.				3.55	3.09	-6.29
+75	3.75					-6.265
59+00				5.58	4.17	-6.24
+25						-6.215
+50				5.33	4.42	-6.19
+75						-6.165
60+00				5.57	4.18	-6.14
+25						-6.115
+50				5.87	3.88	-6.09
+75						-6.065

Indexed
 B

Cuts.	Stakes. offsets.	Notes Base Line S.M. Conc. Man 25' R.R.L. 29' L.	
			= 4.08 2.56 + 6.64 - 3.55 7.09
+7.87	15' Lt.		6.66 9.75 2.55
+8.59	" " 35' Lt.	chk Top. Hyd. P-51	7.20 7.85 - Hyd op 15 Error
+8.65	" " 32' Lt.		
+8.71	" " (31' Lt)	Note: for check barrels	
+8.76	" " (28' Lt)	from Sta. 55+49.85	} see Grade Book 201-13
+8.90	" " to	" 60+50	
+9.17	" "		
+9.38	" "		
+10.41	25' Lt.	Cross on Walk.	(36' Lt)
+10.61	25' Lt. on cb.	35' Lt. Cross on Walk.	
+10.32	15' Lt.	39' Lt. Cross on cb.	
+9.97	15' Lt.	35' Lt. Cross on Rail	

interceptor
Cont. from P-50

Station	x	Red	El. Stakes	El. Flowline
61+05 53-56				-6.035
+50				-5.99
62+00				-5.94
+50				-5.89
63+00				-5.84
+3379-B.C. R _H	8.66	4.90	3.76	-5.806
+50		4.82	3.84	-5.79
63+75				-5.765
64+00		4.73	3.93	-5.74
+25				-5.715
+50		4.57	4.09	-5.69
+75				-5.665
65+00		4.23	4.43	-5.64
+25				-5.615
+50		3.81	4.85	-5.59
65+70				-5.565
+75				-5.54
66+00		3.81	4.85	-5.54
+25				-5.515
+50	13.89	8.87	5.02	-5.49
+75				-5.465
67+00		8.77	5.12	-5.44
+25				-5.415
+50		8.46	5.43	-5.39
+75				-5.365

Note: Vertical Curve
Siphon Under Box Culvert
from Station 65+70
to 68+10
See New cuts P-63

Cuts	offsets
+9.57	6.5 ft
+9.63	" "
+9.67	" "
+9.78	" "
+10.07	" "
+10.44	" "
+10.39	" "
+10.51	" "
+10.56	" "
+10.82	" "

10-15-41
1st Hyd. Ht. of 28 1/2" on S side Harbor Drive
B.M. top Hyd. ^{FB} 1597-39 = 7.185
148-1
8.665
3.87-
Temp B.M. R.P. Cross in c.b.
25.50 South of 63+3379 El = 4.79
8.465
3.81-
4.857
9.04
13.89
8.33-
Temp B.M. S. c.b. 65+60 = 5.56

Check levels 63+3379 to 72+00
See Old book 201-4.5

Station	Interceptor Senior		E.L.	Flowline
	π	Reel		
68+00 68+10 +25	13.89			-5.34
+50		7.97	5.92	-5.29
+75				-5.265
69+00 +25		7.01	6.88	-5.24
+50		7.49	6.40	-5.19
+75				-5.165
70+00 +25		6.68	7.21	-5.14
+50				-5.115
+75	21.53			-5.09
71+00 +25		10.47	11.06	-5.04
+50				-5.015
+75		6.63	14.30	-4.99
72+00 +25		3.30	18.23	-4.94
+50	25.59			-4.915
+75				-4.89
72+82.51 = E. Schley St.				-4.865
72+90.56 = E.G.				-4.850
73+12.51 = E. Schley St.				-4.835
+75				-4.79
74+00				-4.74

Cont. P. 53

Cuts. Offsets.

out

+11.21 ✓ 6.5 RT

+12.12 ✓ " "

+11.59 ✓ " "

+12.35 ✓ " "

+13.88 ✓ " "

+16.10 ✓ " "

+19.89 ✓ " "

+23.17 ✓ on left by entrance

5 side Collar & Number 13.89 π P. 51
5.27
chk B.M. Hydr. 8.62
8.63
0.01 Error

Above BM = 8.63
5.27 +
Corrected π = 13.90 *

5.10
8.80 TP
12.73 +

21.53 T
3.30 -

18.23 TP
7.36 +

25.59 T
4.98

chk Cross in Box
P. 77
E. Schley
60' W of S Line
20.61
20.62
0.01 Error

Interceptor Sewer.
 Cont. from P. 52

Station	π	Red.	Bl. Stake	El. Hydraulic	Cuts.	Offsets
74+50				-4.69		
75+00				-4.64		
+50				-4.59		
76+00				-4.54		
+50				-4.49		
77+00				-4.44		
+50				-4.39		
78+00				-4.34		
+50				-4.29		
79+00				-4.24		
79+44.55 = NH # 15 = El. line Sward St.		4.55	19.02	-4.20	+23.22	9' 8 1/2
+50				-4.19		
+74.35 = MH # 19				-4.165 ✓		
80+00		4.34	19.23	-4.14	+23.37	" "
+50		4.58	18.29	-4.09	+23.08	" "
81+00		4.88	18.69	-4.04	+22.73	" "
+50		4.44	19.13	-3.99	+23.12	" "
82+00		4.32	19.25	-3.94	+23.19	" "
+50		3.95	19.62	-3.89	+23.51	" "
83+00		3.64	19.93	-3.84	+23.77	" "
+50	27.16	6.61	20.55	-3.79	+24.34	" "
84+00		6.61	20.55	-3.74	+24.29	" "
+50		6.67	20.49	-3.69	+24.18	" "
85+00		6.63	20.53	-3.64	+24.17	" "
+50		6.57	20.59	-3.59	+24.18	" "

Cont. P. 54

B.M. 56. Top Hyd.

Seward & Cotton P. 77 = 20.45

Walker + 3.12

Wills $\pi = 23.57$

Farrow 3.64

127-41 7P-19.93

7.23

 $\pi = 27.16$

Check Levels P. 62

Walker
 Lead
 For
 Wells - 8-12-41

Interceptor Sewer

Cont. from P-53

Station	X	Reds	El. Stake	El. Flow Line
	27.16 π P-53			
86+00				-3.54
86+04.56 = Future Simpson st.		6.34	20.82	-3.54
+34.58 = M.H. 16 Δ 0°44' 1/2" as for angle cut this point				-3.505 π
86+29.56 = M.H. 16 85+99.56 = M.H. Nord				
86+50	25.65	5.07	20.58	-3.49
87+00		5.35	20.30	-3.44
87+50		5.15	20.50	-3.39
88+00		5.87	20.28	-3.34
88+50		4.94	20.71	-3.29
89+00		5.00	20.65	-3.24
+50		5.34	20.31	-3.19
90+00		5.78	19.87	-3.14
90+50	25.37	5.51	19.86	-3.09
91+00		5.51	19.86	-3.04
91+50		5.73	19.64	-2.99
92+00		5.81	19.56	-2.94
+50		5.87	19.50	-2.89.0
+9540 M.H. 17	22.81	2.99	19.82	-2.845 π
93+50		4.12	18.69	-2.79
94+00		4.77	18.04	-2.74
+50		5.18	17.63	-2.69
95+00		5.49	17.32	-2.64
+50		5.50	17.31	-2.59
96+00		5.43	17.38	-2.54
+50		5.73	17.08	-2.49
97+00	22.66	6.03	16.63	-2.44

Cont. P-55

Cuts	Offsets	B.M.
		22.565
		3.085
		25.650 π
		5.78 -
+24.36	9' Lt	19.87 π
		5.50 +
		25.37 π
+24.07	6.5 Lt.	8.55 -
		19.82
+23.74	" "	
+23.89	" "	B.M. top Hyd. Dewey & Colton
+23.62	" "	20.39
+24.00	" "	B.M. Top Hyd. Evans & Colton
+23.89	" "	21.31
+23.50	" "	1.50 +
		22.81 π
		5.78 -
+23.01	" "	17.08 π
		5.58 +
+22.95	" "	22.66 π
		2.27
+22.90	" "	20.39 B.M. check
+22.63	" "	
+22.50	" "	From P-53
+22.39	" "	π 27.160
		check B.M. - 4.595
		SE Top Hyd. 22.565
		Sumpston - B.M. 22.565 P-77
		Colton - 0.000
22.66	M.H. E Evans	
21.48		
20.78		
20.32		
19.96		
19.90		
19.92		
19.57		
19.07		

Interceptor Sewer.
Cont. from P-54

Station	X	Feet	El. Stakes	Fl. Elev. base	Cuts	Offsets
97+50	22.66	5.49	17.17	-2.39	19.56	
98+00		5.49	17.17	-2.34	19.51	
+50		5.87	16.79	-2.29	19.08	
99+00		6.05	16.61	-2.24	18.85	
+5540 = MH #18	21.31	4.09	16.30	-2.185 ✓	+1848	
	20.39		16.02		+1940	6.5 Ft.
100+00		4.37	16.94	-2.14	+1816	" "
+50		4.97	15.42	-2.09	+1908	" "
101+00		5.17	16.14	-2.04	+1751	" "
+50		5.41	14.98	-1.99	+1845	" "
102+00		5.77	15.22	-1.94	+1726	" "
+50		5.49	14.90	-1.89	+1818	" "
103+00	19.80	5.53	14.86	-1.84	+1670	" "
+50	20.72	4.66	15.14	-1.79	+1762	" "
104+00		4.45	15.35	-1.74	+1693	" "
+50		4.39	16.27	-1.69	+1785	" "
105+00		4.59	15.41	-1.64	+1709	" "
+50		5.02	16.33	-1.59	+1801	" "
106+00		5.39	15.21	-1.54	+1710	" "
+116.82 = MH #19		5.15	16.13	-1.52 ✓	+1802	" "
+149.97 = F.C.		7.15	14.65	-1.49	+1695	" "
107+00		6.92		-1.44	+1777	" "
+50		6.23		-1.39	+1637	" "
108+00		6.31		-1.34	+1729	" "
+50		7.20		-1.29	+1595	" "
					+1687	" "
					+116.17	" "

Derry
Events + Col. Hor. P-77
B.M. N.E. top Hydt. = 21.31
FB. 1597-39) 0.00 +
21.31 +
3.53 -
20.39 TP 15.78
6.06 4.94 +
20.59 +
-5.63 20.25
14.86 TP 21.1
4.94 + 18.61
19.80
2.11
17.69 ch. U.S. Govt. B.M.

Chack Levels
P-60

East of E.L. Crosby
8th. SD & Santa Fe
p/son Crosby & Col. Hor.
21.5, Govt. B.M.
17.69
3.58

Void.

Cont. D-56 57

Interceptor Sewer.

Cont. from P-55

Station.

Station	π from P-55	
109+00	7.69	-1.24
+50	8.21	-1.19
110+00 <small>T.P. on stake 110+00</small>	7.99	-1.14
+50		-1.09
111+00		-1.04
+50		-0.99
112+00		-0.94
+50		-0.89
+77.6		

} Void.

plumber
15611
Eastcut
6-12-41

Cont. from P. 55

	*	Reals	El. Stake	El. Floor	Cuts	offsets.
106+05	2.117	7.30	13.87	-1.485	+15.35	10' South.
107+05		6.29	14.94	-1.485	+16.37	" "
+55		6.03	15.14	-1.385	+16.52	" "
108+05		6.28	14.89	-1.335	+16.22	" "
+55		7.12	14.05	-1.285	+15.33	" "
109+05		7.69	13.48	-1.235	+14.71	" "
+55		8.09	13.08	-1.185	+14.26	" "
110+05	18.63	5.70	12.93	-1.135	+14.06	" "
+55		5.95	12.68	-1.085	+13.76	" "
111+05		6.20	12.43	-1.035	+13.46	" "
+55		6.65	11.98	-0.985	+12.96	" "

for check levels see P. 61

Cont. Grd. Book 205. P. 2

57

Crosby & Cotton BM #
U.S. Geol. BM

= 17.69
3.48
21.17
8.09
13.08
5.55
18.63
5.37
13.26
13.27
0.01 Error

chk BM #2
F.B. 1897-39

Kulker
Isbell
Eustarky
6-17-41

Highline Grades
Interceptor Sewer.
Between Beardsley & Crosby.

Station	17.25 x P-61 Roll.	El. Stake	El. Elev.
111+64	4.225	13.025	-0.975
111+49	4.24	13.01	-0.99
TP	4.97	17.890	4.33

111+05	3.925	13.965	-1.035
110+55	3.975	13.915	-1.085
110+05	4.025	13.865	-1.135
109+55	4.075	13.815	-1.185

+14.00

+15.00

+15.10

+15.00

+15.00

Marks on
Iron stakes
8' N of E ditch

Additional Grades Highline

6-17-41	17.08	4.08	13.00	-1.00
111+34		4.10	12.98	-1.02
+17		4.12	12.96	-1.04
110+97		3.12	13.96	-1.84
110+97		3.14	13.94	-1.06

Cuts

offsets

+14.00

+14.00

+14.00

+15.00

B.M.
El. Stake 111+55-P-57 = 11.98

51.0
17.087

B.M. Above stake = 11.98

53.17
17.297

Additional Grades Highline

6-18-41	17.29	3.375	13.915	-1.085
110+57		3.39	13.90	-1.10
+38		4.12	13.88	-1.12
+18	18.00			
110+01		4.14	13.86	-1.14
109+85		4.155	13.845	-1.155
109+69		4.34		-1.17
+69		4.17	13.83	-1.17

+15.00

+15.00

+15.00

+15.00

+15.00

+14.83

+15.00

side stake for diggers

B.M. El. stake 111+55 = 11.98

6.02
18.00

Sta.	CHECK LEVELS			SEWER	
	+	κ	-	Elev. Sta.	Elev. F.L.
B.M.	1.77	23.08		21.31	
92+95.40			3.27	19.81	
93+50			4.90	18.68	
94			5.05	18.03	
+50			5.46	17.62	
95			5.77	17.31	
+50			5.78	17.30	
96			5.71	17.37	
+50			6.00	17.08	
TP	5.72	22.80	6.00	17.08	
97			6.17	16.63	
+50			5.62	17.18	
98			5.62	17.18	
+50			6.01	16.79	
99			6.19	16.61	
B.M.			2.41	20.39	20.39

Cuts. offsets

Top Hyd. Evans & Colton

Top Hyd. Dewey & Colton

Mulker
18611 T
Eastwick
D. Farney
6-18-41

Check Levels 60" Interceptor Sewer
Between Dewey & Crosby
on Colton St. original levels P. 57

60

Station

	0.42	20.81		20.39	RTM. top St. P-56
99+55.40			4.51	16.30	16.30
100+00			4.78	16.03	16.02
+50			5.38	15.43	15.42
101+00			5.58	15.23	15.22
+50			5.82	14.99	14.98
102+00			6.18	14.63	14.62
+50			5.90	14.91	14.90
103+00			5.93	14.88	14.86
+50			5.65	15.16	15.14
TP	4.06	19.22	5.65	15.16	
104+00			3.84	15.38	15.35
+50			3.79	15.43	15.41
105+00			3.99	15.23	15.21
+50			4.42	14.80	14.78
106+00			4.79	14.43	14.41
+16.82			4.55	14.67	14.65
			1.50	17.72	
				17.62	
				0.09 diff	

H/dt. N.E. Dewey & Colton.
Main Elev.

Walker
Isbell
Eustachy
6-17-41

CHECK LEVELS
Interceptor Sewer

106+55 to Station 111+55

Station		19.86	5.75	14.11	13.87
			5.75	14.11	13.87
106+55			5.75	14.11	13.87
106+55			6.00	13.86	13.87
107+05			4.93	14.93	14.94
+55			4.73	15.13	15.14
108+05			4.97	14.89	14.89
+55			5.81	14.05	14.05
109+05			6.38	13.48	13.48
+55			6.78	13.08	13.08
110+05			6.94	12.92	12.93
T.P.	4.33	17.25	6.94	12.92	
110+55			4.58	12.67	12.68
111+05			4.83	12.42	12.43
+55			5.28	11.97	11.98

F1

Near Elev. Elev. Elev. Near
cuts Crosby + Cotton
U.S. Govt. B.M. 17.69
2.17
19.867

check levels
Interceptor Sewer

Station	2.935	25.500	22.565	SE Top Hyd. Sampers & Colters
8650			4.93	20.57
87+00			5.21	20.29
+50			5.01	20.49
88+00			5.22	20.28
+50			4.86	20.70
89+00			4.85	20.65
+50			5.19	20.31
90+00			5.64	19.86
T.P.	5.98	25.34	5.64	19.86
90+50			5.49	19.85
91+00			5.49	19.85
91+50			5.71	19.63
92+00			5.79	19.55
+50			5.85	19.49
+95.40			5.54	19.80

Walker. CHECK LEVELS
Wells 8-27-41 60" Interceptor Sewer
Turood
from Sicard to Sampson

Station	Page 53	3.14	23.59	Blk. Stakes	DM SE Hyd. Sicard Colters
79+42.35 MH #15				4.57	19.02'
80+00				4.36	19.23'
+50				4.60	18.99'
81+00				4.91	18.68 18.69 P-53
+50				4.46	19.13'
82+00				4.33	19.26 19.25 P-53
+50				3.97	19.62'
T.P.					
83+00	7.16	27.09	3.66	19.93'	
+50				6.54	20.35'
84+00				6.54	20.55'
+50				6.61	20.48 20.49 P-53
85+00				6.56	20.53'
+50				6.50	20.59'
86+04.50 MH #16				6.26	20.83 20.82 P-54
check B.M. Hyd. Sampers & Colters			4.525	22.565	✓
					22.565
			27.09		
86+30					
87+00				6.62	20.47
+50				6.49	20.60

Highline Grades
 60" Interceptor.

Cont. from P-36

Station	Elev. Highline	Elev. Flow Line
15+00		-10.57

Cuts.

Reset see P-37

 Walker
 Wells
 D. Furrer
 10-22-41

F.B. 1607 = Alignment Book

GRADES for 60" Interceptor Siphon

Under Box Culvert on Harbor & Cotton.

Station	Def A	Elev. Station	Elev. Flow
63+33.79	P.C. RT & R=1780		

Cont. from P-51

Station	Def A	Elev. Station	Elev. Flow
65+70	BVC 3°48'08"	5.43	4.91 - 5.57
70	0.4k 4°07'39"	5.43	4.91 - 5.66
66+10	EVC 4°26.7'	5.40	4.94 - 5.95
70	4°46.01'	5.33	5.01 - 6.35
750	5°05.32'	5.34	5.00 - 6.75
770	BVC 5°24.63'	5.35	4.99 - 7.15
790	0.4k 5°43.94'	5.20	5.14 - 7.34
67+10	EVC 6°03.24'	5.14	5.20 - 7.11
730	6°22.55'	5.01	5.33 - 6.67
750	6°41.86'	4.93	5.41 - 6.23
770	BVC 7°01.17'	4.75	5.59 - 5.79
790	0.4k 7°20.48'	4.71	5.63 - 5.45
68+10	EVC 7°39.78'	4.70	5.64 - 5.33
68+50	8°18.15'		
69+00	9°06.73'		

Cont. P. 65

Cuts. offsets.

 579 top Fire Hyd
 S side Harbor & Cotton - 863

 171
 10.34
 440
 534
 10.34
 540
 4.86
 4.85
 0.01
chk 65+50
P-52chk 65+50
P-51

Walker
 188 1/2
 D. Farrow 3-20-41
 Highline Grades
 60" Interceptor Sewer

Station	π	Elav. Stakes	Elav. Floor Line	Cuts
78+95	23.57	5.81	17.76	-4.24 +22.00
79+13		5.79	17.78	-4.22 +22.00
79+33		5.78	17.79	-4.21 +22.00
79+51		5.76	17.81	-4.19 +22.00
79+69		5.74	17.83	-4.17 +22.00
79+87		5.72	17.85	-4.15 +22.00
80+07		5.69	17.88	-4.13 +22.00
80+25		5.68	17.89	-4.11 +22.00
80+45		5.66	17.91	-4.09 +22.00
78+57	9-24-41 Not in order but ok	5.85	17.72	-4.28 +22.00
78+77		5.83	17.74	-4.26 +22.00
78+37	23.79	6.09	17.70	-4.90 +22.00
78+19		6.11	17.68	-4.32 +22.00
77+99	9-26-41 25.40	7.74	17.66	-4.34 +22.00
77+81		7.76	17.64	-4.36 +22.00

Original Grades P-53

Sicard & Cotton
 B.M. Top. Hyd. P-53 = 20.45
 + 3.12
 $\pi = 23.57$

Above B.M. = 20.45
 3.34
 23.79
 Above B.M. = 20.45
 4.35
 25.40 π

Grades for Tunnel at Simpson

Station	π	Elav. Stake	Elav. Floor Line	Cuts
85+98.5 E. side Tunnel	25.33	29.59	-4.26	-3.54 -0.72
86+80.14 " " } Simpson St.		29.74	-4.41	-3.46 -0.95
85+18 W. side Truck Tunnel		5.95	19.38	-3.62 +23.00 Highline stake
84+72 E. " " "		29.60	-4.27	-3.67 -0.60

B.M. Simpson & Cotton
 S.E. Top Hyd. = 22.565
 2.765
 $\pi = 25.330$

10-22-41

60" Interceptor Sewer
Cont. from P. 63

Station def A

69+50 9°55.0'

70+00 10°43.29'

+0481 = 10°47.93' *Mainline
AT&SF Tracks*

70+50 11°31.57'

71+00 12°20.05'

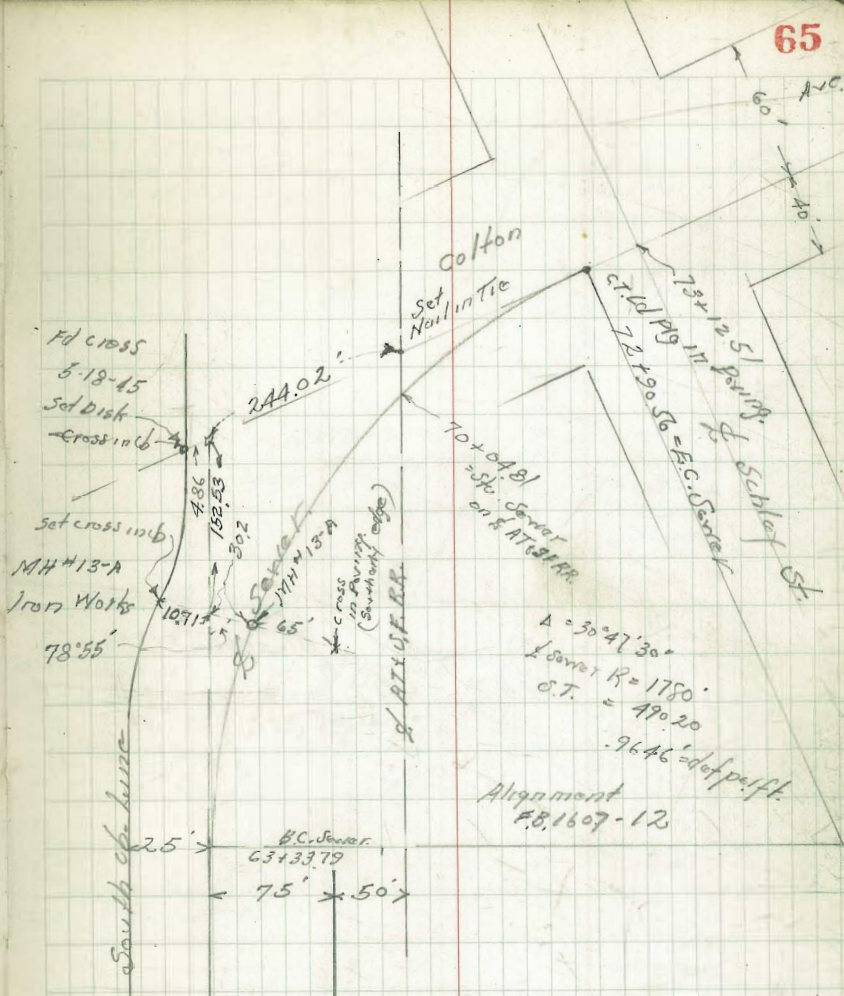
+50 13°08.33'

72+00 13°56.61'

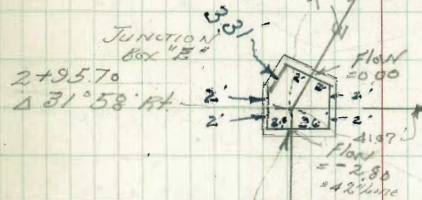
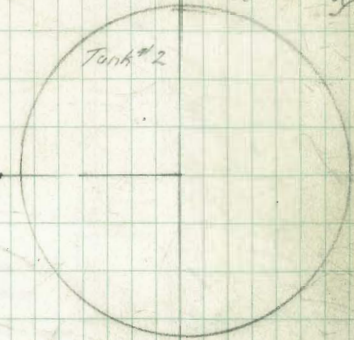
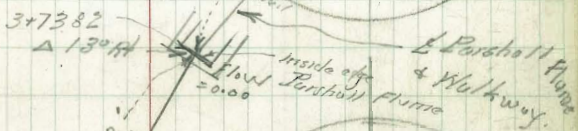
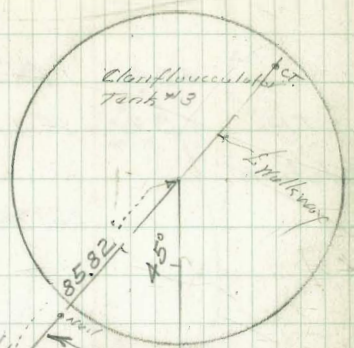
+50 14°44.89'

+9056 = E.C. 15°23.56'

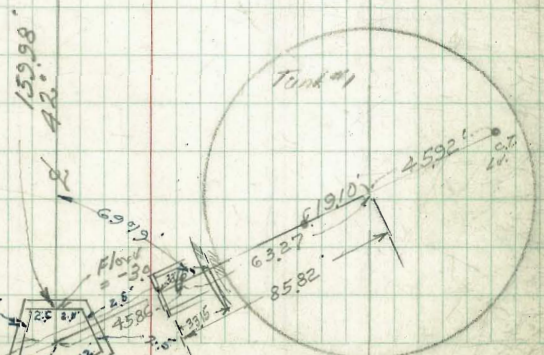
located this
for Sewer Dept.
for connection National
May 18-1945
Walker
Hogard
Hardin



Note: All Parshall Flumes are 85.82' from E. Tanks #1, 2, 3 to inside wall at end of flume which is at Elev. 0.00



Grades P. 45
P. 46



Cuts: offsets
12.00 L. Hyphline

JUNCTION
Box "D"
1+30.1
 $\Delta 11.373430$

Grades P. 45-46

PARSHALL FLUME GRADES TANK #2

Stations	X	Rod	Elev. Stake	Eli. Floor	Cuts.
	14.47	4.47	10.00	0.00	11.00

PARSHALL FLUME GRADES TANK #1

Station	Junction	X	Rod	Elev. Stake	Flow line
	7.42	15.73		8.24	R.N. Main
			3.73	12.00	0.00
	TD	4.20	14.47	5.46	10.27
			15.33	10.00	10.00 - Top Flume
			5.39	10.00	10.00 - Top Flume

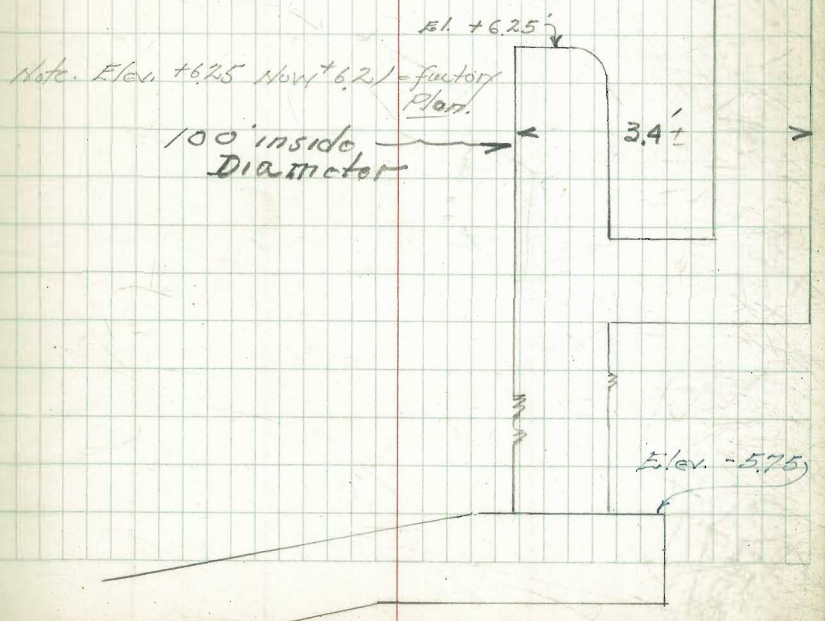
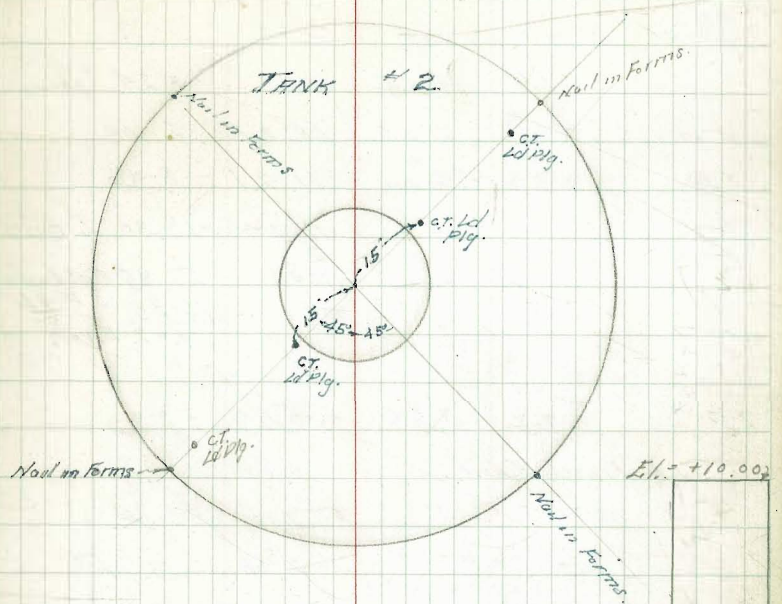
Top Elev. Box
+ 8.70

Walker
Wells
D. F. F. F.

GRADES for Clariflocculator # 2
Inside Wall

Station					
	4.94	13.18	8.24		8.24
					8.24
TR	4.92	14.11	3.99	9.13	
					8.24
			7.86	6.25	6.25

North 67



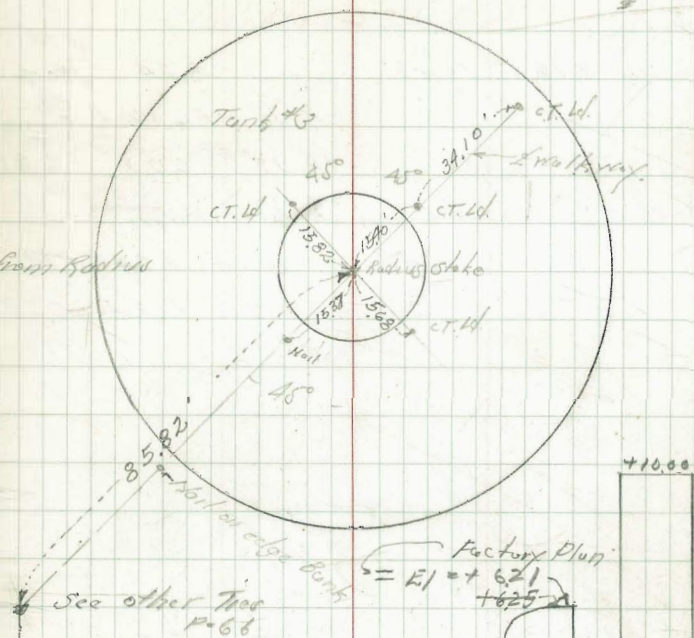
Walker
Wells
Furrow
7-22-91

Clariflucculator #3
Grade for Radius Point
bottom of Hole

	6.11	14.35	8.24	-8.19 Door
TP	0.14	2.22	12.27	2.08
TP	0.59	-8.40	11.21	-8.99
		11.40	-19.80	1/2 Radius
		11.45	-19.85	old stake approx 1/2 from Radius
			-19.83	P-44
				0.02 Error

TP	5.33	-3.66	-0.59	-8.99
chk finish conc.			2.10	-5.76
"	"	"	2.08	-5.74
"	"	"	2.08	-5.74

} -5.75 = plan



GRADES for Inside Wall.

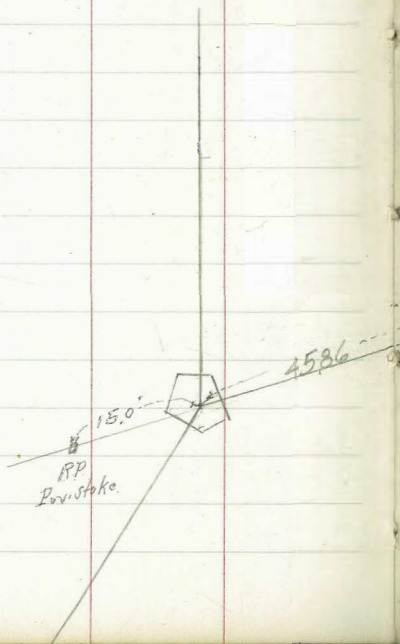
Clariflocculator Tank #1

11-30-41

8.16	16.40	8.24	BM	
			Mark	
			El. Concrete	
		10.19	6.21	6.21

12-9-41

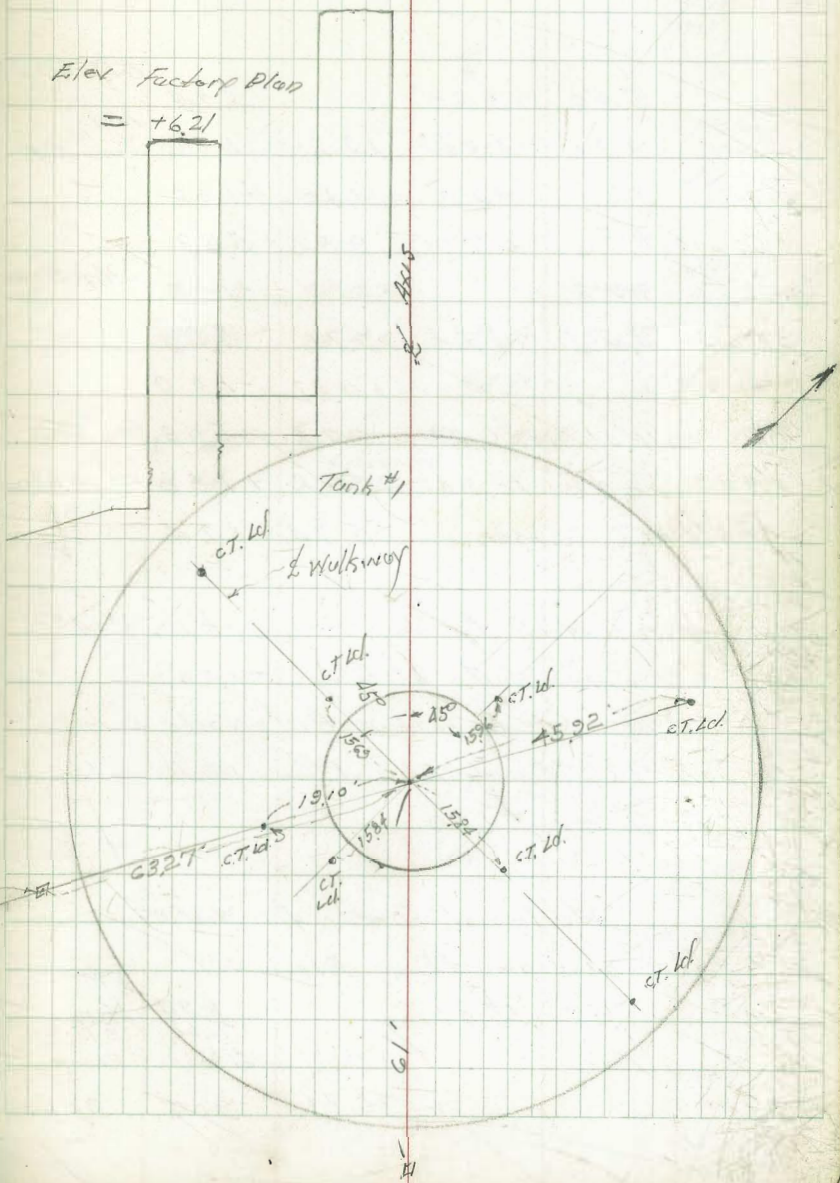
Re-set Grades		outside	Form	
8.19	16.43	8.24	BM	
		10.22	6.21	6.21



Reference Ties for Tank #1

Clariflocculator

9-18-41



Walker
DBELL
EASELY
FARRON
5-15-41

TREATMENT PLANT

LEVELS for Footings

Sketch of Bldg P-16

	5.56	13.80		8.24	BM. Conc. Mon.
TP	3.30	4.30	12.80	1.00	Note! North end Bldg.
TP	3.29	4.29	3.30	1.00	
TP	2.76	-2.27	9.32	-5.03	
	3.21		+1.27	-1.00	= High side
TP	3.21	-1.82	2.76	-5.03	
			+0.82	-1.00	
TP	11.31	6.28	3.21	-5.03	
TP	12.98	13.98	5.28	+1.00	= High side
chk BM. Conc. Mon.		5.74	8.24		

Note: Motor Room = Nails set in 4"x4"
on side Walls of Elev. -1.00
Elev. for Deflector Bld = Nails set
in 1"x6" Boards Around four Walls of
Elev. = +1.00

Walker
EASELY
FARRON
7-7-41

Additional Grades for West Mill

Grades are Floor Elev.

	7.57	15.81		8.24	BM. North Fl.
			6.81	9.00	9.00

Elevations for Floor Pump Bld

4.95 13.19 ^π
8.24 = Unit Elev.
Elev. Floor.
4.19 + 9.00 =

GRADES for Main Floor
PUMP Bld.

Walker
Wells
FARRON
10-14-41

	4.83	13.07		8.24	BM. Conc. Mon.
TP	4.78	14.45	3.40	9.67	Fl. Floor.
			5.45		9.00
chk Main Floor Furnace Room 5.44					9.00
	5.44	14.44			9.00 = Furnace Room Floor
			5.44		9.00

1st Well
Foster
D. Foster
7-7-41

GRADES FOR 36" LINE
FROM CENTER TANK #2

Sta.	+	x	-	El. Stake	El. Fl.
B.M.	1.89	-5.12		-7.00	
0+00 = 1.6' from C. Tank			9.19	-14.31	-18.81
0+20			6.23	-11.35	-15.71
0+40			2.52	-7.64	-12.60
TP	12.25	+6.91	0.22	-5.34	
TP	10.26	+15.99	1.18	+5.73	
0+60			6.56	+9.43	-9.50
0+81.6			6.39	+9.60	-6.15
B.M.			7.75	+8.24	
0+80.83 - 2 ft. 36" dia. 1537 x P-75			5.45	9.22	-6.15
0+89.83 - inside edge Yucca Box			5.26	10.11	-4.75

(Sketch OK)
Note: Restaked See P-76

Walker
1st Well
Foster
D. Foster

GRADES for 8" C.I. Sludge Line

	+	x	-	El. Stake	El. Fl.
B.M.	3.62	-3.38		-7.00	
0+00 = 42' from Point "A"			9.74	-13.12	-17.50
+20			7.69	-11.07	-14.17
+40			4.33	-7.71	-10.84
TP	8.85	+5.13	0.34	-3.72	
TP	12.48	+16.02	1.59	+3.54	
0+60			6.66	+9.36	-7.50
B.M.			7.78	+8.24	+8.24
0+54 = 8 1/2'					-8.50
0+65 = 8 1/2'					-0.70
+74.83 = 18" East of Wall inside of wall					-0.58

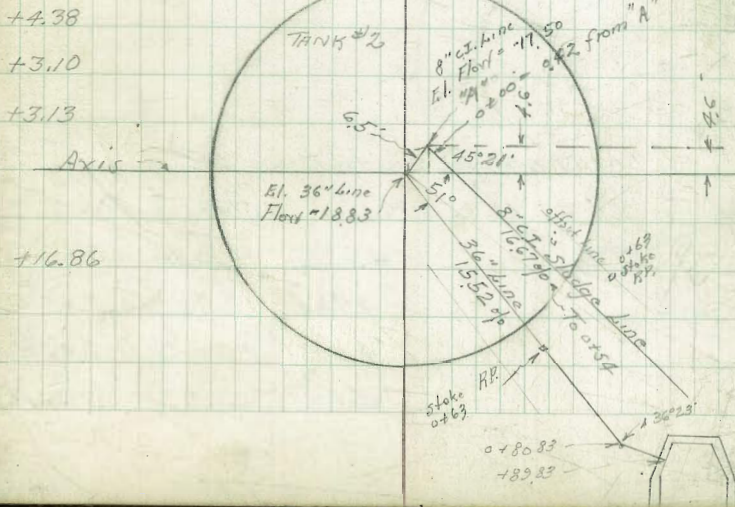
Cuts

Cuts					
+4.50	6' RT.				
+4.36	"				
+4.96	"				
+18.93	6' RT.				
+15.75	18' RT.				
B.M. 13' Mon. Und. Kingwood					
+16.07	5' RT.				
+14.86	5' RT.				

Tank #2 = 36" Line
Highline for 0+80.83

11.86 7 P-75
3.97 7.85 6.15 +14.00
El. Stake El. Fl. Cut.

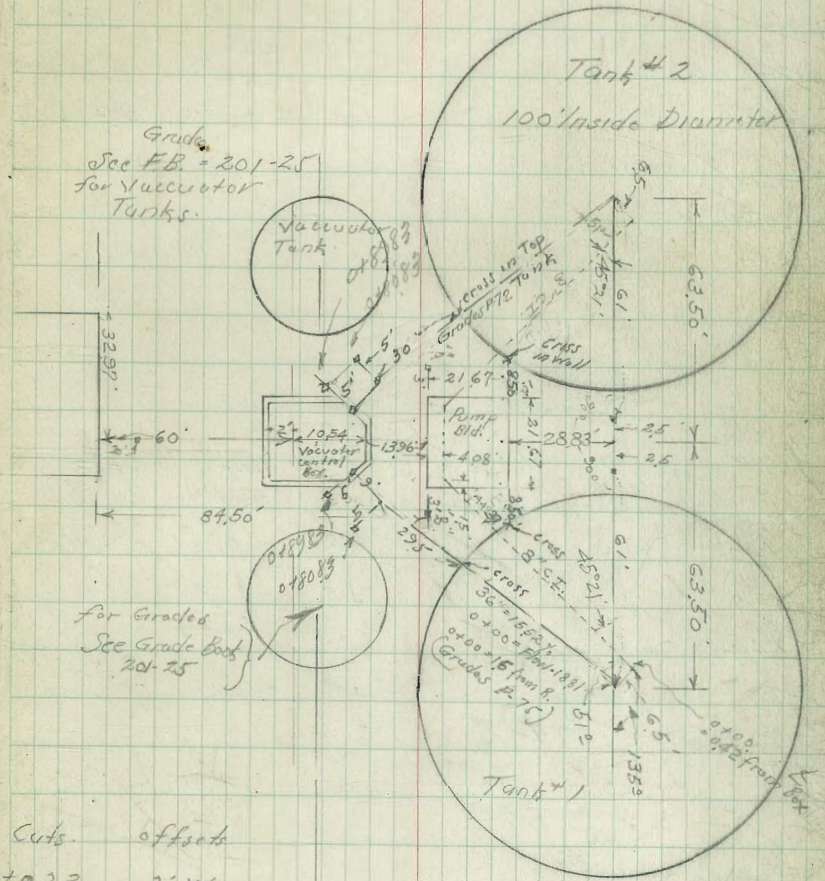
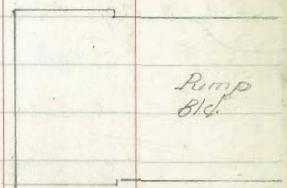
Cuts affects



GRADES FERRIC CHLORIDE STORAGE ROOM.

	4.85	13.09	8.24	81"
TP	3.64	12.81	3.92	3.17
			12.23	0.58
				0.58 =

High Point of Floor.



1/6, 1/601
E. Estell
8-9-41

GRADES For Sludge Pump Bld.

Station	14.65 P76	Elev. Stakes	Elev. Floor	Cuts	offsets
"A"		4.625	9.955	9.625	+0.33 3' W
"B"		4.125	10.525	9.625	+0.90 3' E
"C"		4.05	10.60	9.625	+0.98 2' E
"D"		5.27	9.38	9.625	-0.24 1' W on Spike

Walker
Isbell
Eastley
D. Farroy
3-16-41

Elev. offsets stakes.
Treatment Plant.

	5.67	13.91	8.24	B.M. Man 13' line Unit Kingwood
SE Pump Room dirt	5.6	8.3		
SW " " "	6.1	7.8		Bottom Board.
NW " " "	4.2	9.7		
NW Detritor	3.1	10.8		
NE " " "	3.3	10.6		
NW Motor Bld	4.6	9.3		
on 4" Pipe	3.1	10.8		
11.2 " "	3.4	10.5		

Note: Made all stakes Around Bld.

at elev 11.0 and chained distances over stakes

With spring-balances

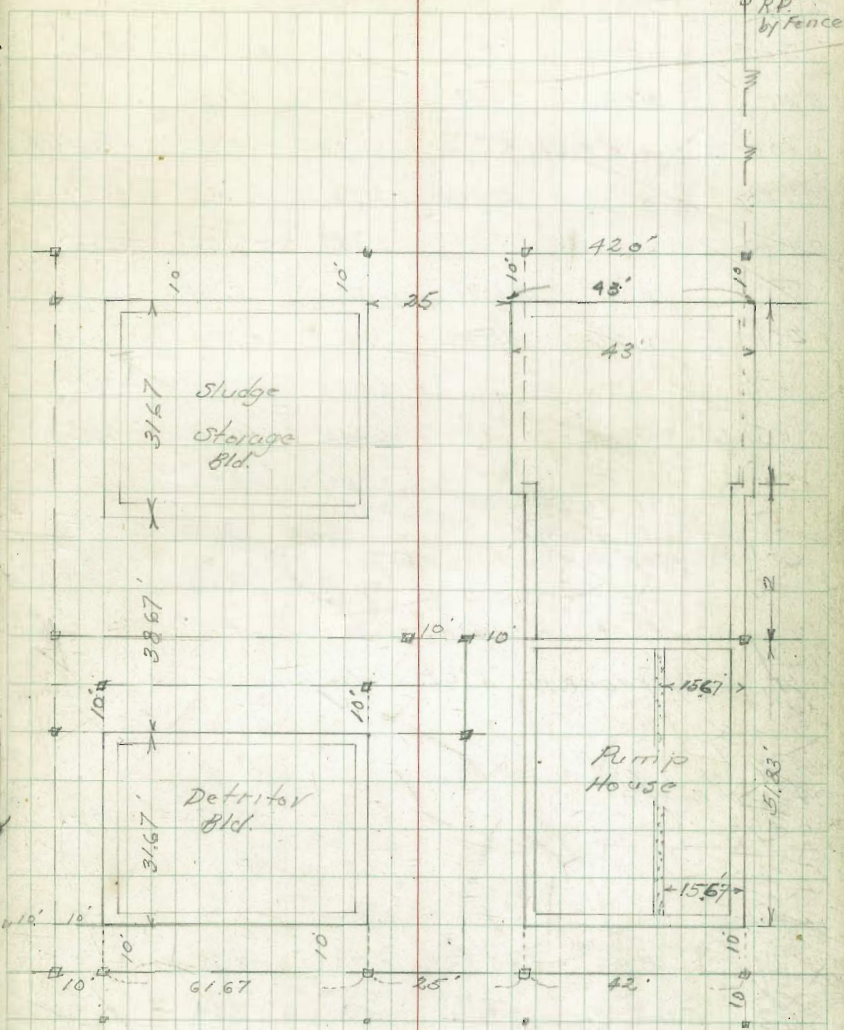
6-14-41 Elevations for Detritor Bld.

Walker
Isbell
Eastley

	6.17	14.41	8.24	B.M. Curve Man 13' line Unit Kingwood
	2.70	-1.34	18.45	-4.04
		5.00	-7.00	Red Heads Around Bld.
T.P.	4.11	-9.56	12.33	-13.67
		+2.56	-7.00	
		+1.06	-8.50	Curve N.E. Cor.

Elev. For Floor Pump House

	4.96	13.20	8.24	B.M. Man
T.P.	1.51	4.36	10.85	2.85
TP	5.17	-0.33	9.86	-5.50
		5.17	-5.50	-4.50



Fill
-1.00 = Top of slab.
-1.00 = " " " } Note: Bottom of slab
= Elev - 5.50

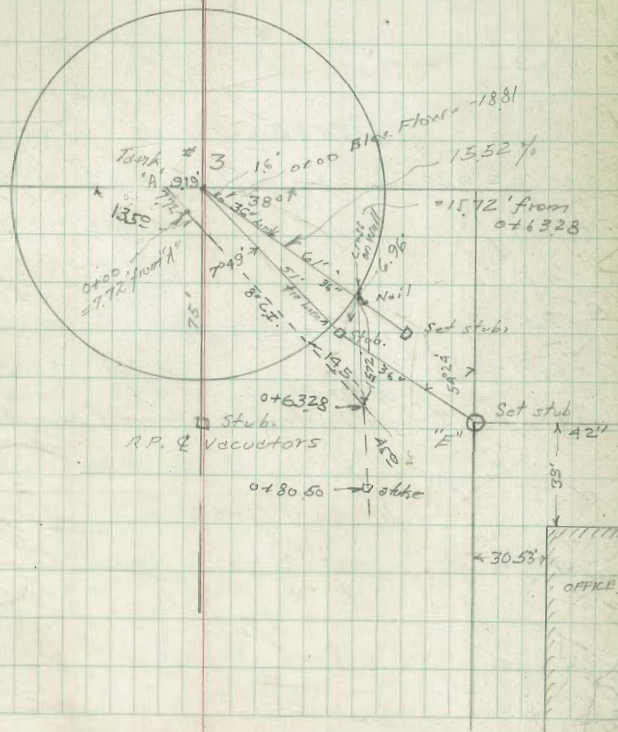
TANK #3
GRADES for 8" C.I. pipe

Station	x	Elev. Stakes	Elev. Flow Line	Cuts.	offsets.	
7.72' from "A" =0+00	-4.93	8.09	-13.12	-17.50	+4.98	6' ft.
+20		5.91	-10.84	-14.17	+3.33	" "
+40		2.82	-7.75	-10.84	+3.09	" "
+48.5		2.07	-7.00	-9.43	+2.43	" "
+48.78 - Inside edge Tank. 14.5' of 63.28 = A				-6.95		

TANK #3 36" C.I. from Sewer.

Station	x	Elev. Stakes	Elev. Flow Line	Cuts.	
1.6' from A =0+00	-4.93	8.88	-13.81	-18.81	+5.00
+20		6.39	-11.32	-15.71	+4.39
+40		3.01	-7.94	-12.60	+4.66
+50		2.02	-6.95	-11.05	+4.10

475' from L
Elev. Subgrade stake - 7.00
2.07
- 4.93



Walker
Eastbury
FarrowGRADES - 36" Jawer - Sketch P-73
Clarifloculator #1

8-9-41

Station	π	El. Stake	Flow Line	Cuts	offsets.	BM. Elev. Stake P-41 = -13.23
0+00 = 1.6' from Tank	-4.56	8.81	-13.37	-18.81	+5.44	8.67
0+20		6.49	-11.05	-15.71	+4.66	-4.56 π
0+40		3.30	-7.86	-12.60	+4.74	8.67
0+50		2.46	-7.02	-11.05	+4.03	TP-13.23
0+60			-9.50			12.06 π
0+61.4	14.65 π 71	3.70	10.95	-9.28	+20.23	-1.17 π
0+81.6			-6.15			11.94
0+80.83	Sketch P-73 1537 1-36° 31' RT	5.10	10.27	-6.15	+16.42	8" c. line CHK. 0700 P-72
0+89.83	Inside edge Vacuumator Box 527	10.10	-4.75		+14.85	P-72 = -13.12 0.01 Error
	Highline Above Line		8.17			Elev. Top Tank Wall Grid Book 201-15
	1.87	11.82 π	1	10.75 = El. Stake B Grid 205-26		1-19-42 1177.05 = 997
0+80.83		5.97	5.85	-6.15	+12.00	540 15.89 π

8-9-41

Tank #1

GRADES For 8" c. Iron Sludge Line

Station	π	El. Stake	Flow Line	Cuts	offsets.	Note: for check π see Notes Above.
0+00 = 0.42' from Box	-4.56	8.12	-12.68	-17.50	+4.82	
+20		6.44	-11.00	-14.17	+3.17	
+40		3.25	-7.81	-10.84	+3.03	
+50		2.57	-7.13	-9.17	+2.04	
+54 = Bk.			-8.50			0+54 inaccessible
+61.97 = Bk.	14.65 π 76	4.24	+10.41	-0.70	+11.11	
	2 45° Elbow	4.49	10.16			
0+71.30	18" from Inside of Wall toward Pump ent.		-0.58		+10.74	
	Highline Grades Above 8" Line					
	11.82 π Above	El. Stake	El. Floor			
0+66.3		6.08	5.74	-0.63	+6.37	2 Spike

Walker
Easton
Farrish
8-9-41

Re-stake 8" C.I. Sludge Line
Clariflocculator Tank #2
Original notes p-72

Station	π	Elev. Stakes	El. Flow Line	Cuts	Offsets	
0+00 = 0.92 from #1 p-72	-1.17 p-75	11.94	-13.11	-17.50	+4.39	6' Lt.
+20		9.92	-11.09	-14.17	+3.08	" "
+40		6.68	-7.85	-10.84	+2.99	" "
+50		5.77	-6.94	-9.17	+2.23	" "
+54 = Bk.				-8.50		+54 inaccessible
+61.47 = Bk.	14.65	5.14	2.51	-0.70	+10.21	6' Lt.
+71.30 = 18" inside Tank Wall - 45° elbow	4.71	9.94	-0.58		+10.52	" "
cb Walker 3-10-42						
		Highline Grades Above Line				
	11.82 = π p-75	El. Stake	El. Floor			
0+63.3		6.75	5.07	-0.66	+3.73	to spike

Cuts	Offsets
+4.39	6' Lt.
+3.08	" "
+2.99	" "
+2.23	" "
	+54 inaccessible
+10.21	6' Lt.
+10.52	" "
+3.73	to spike

P-75 $\pi = -1.17$
 $\frac{0.02}{-}$
 TP = -1.19
 12.62
 $\pi = 11.43$
 0.81
 TP 10.62
 4.054
 π 14.677
 5.22
 36" sewer
 check ot 60 p-72
 9.45
 0+60 = 9.43
 0.02 Error
 Above
 0+60 9.43
 5.22
 Corrected $\pi = 14.65$
 ch. Floor Elev
 5.65
 Marks p-41
 Detector 814
 9.00

BENCH MARKS
for 60" INTERCEPTOR SEWER
from Treatment Plant on UNA St.
to Colton & Crosby Sts.

Copied from FB 1597-38

2.145 B.M. Top
8.642 B.M.
4.255 B.M.
8.642 B.M.
4.255 B.M.
4.145 B.M.
0.440 B.M.
3.185 Neun Elev
4.08 B.M.
3.02 B.M. B.P.
8.63 B.M.
20.62 B.M.
20.45 B.M.
22.565 B.M.
21.31 B.M.
17.69 B.M.
13.27 B.M.
20.39 B.M.

77
of Copper Disk 13.57 North of 1543696 - aka Harbor Drive
over ~~back~~ ^(road on back)
Conc. Man BAY FRONT & HARBOR on East 204' from
1172

Copper ^{over} Jack Conc. Man on N.W. Harbor Dr. 1144182 = EC
Conc. Man BAY FRONT & Harbor on East 204' from
1172

Copper Disk Conc. Man on N.W. Harbor 0+00
= Bridge Spike, West end Santa Fe Bridge Mtd. USN B.M.
Elev 942

CT 43+13.09 on S.C.B.

Conc. Man W.M.S. Base Line 25'E E.L. 2875 Bot. Santa Fe
on N.C.B. 42+00 5504

top Fire Hyd. south side Harbor & Colton.

cross in Pavi & Schley 60' N of S.L. Colton.

Sta Top Hyd. Tizard & Colton

" " " Sampson " "

NE " " Evans " Bot SD & A & AT 1515

US. Govt Crosby & Colton (SD & A)

Conc. Man 17'E of W.L. Sec 10 W 20' N N.L. Colton

NE. Top Hyd. Dorsey & Colton.

Walker
Wells
Furrow
9-16-41

GRADES for Siphon Boxes
Cholla Creek Siphon

Sketch of Boxes & Tie outs see p-80

Station		Elev. Stake	Elev. Flow Line
WEST CHAMBER			
35+56.23 = W end Siphon			- 8.52
"A"	0.93	4.78	- 3.85 - 8.52
"B"		4.71	- 3.78 - 8.52
"C"		4.83	- 3.90 - 8.52
"D"		5.04	- 4.11 - 8.52

Station		Elev. Stake	Elev. Flow Line
EAST CHAMBER			
"A"	6.73	2.15	- 2.42 - 8.80
"B"		3.33	3.40 - 8.80
"C"		9.28	- 2.55 - 8.80
"D"		10.38	- 3.65 - 8.80

See sketch p-80
East Chamber Restaked 1-5-42

"A"	7.32-x	8.50	- 1.18 - 8.80
"B"		6.45	9.83 - 8.80
"C"		7.75	- 9.17 - 8.80
"D"		8.65	- 1.33 - 8.80

32+83.43 Equation.
32+59.93

West Chamber.
Highline Grades Above Box.

	7		- 8.30
	3.58		- 8.52

Elev. Nails	Top Box
0.95	+ 3.13 + 4.82

B.M. Bridge Spike P-77 78

		= 0.44
		0.49 +
		0.93 - x
		4.26
Cuts.	offsets.	- 3.83
		35+56.23
		p-12
		- 3.83
		0.00

+ 4.67	8' South	
+ 4.74	8' "	
+ 4.62	8' North	
+ 4.41	8' "	

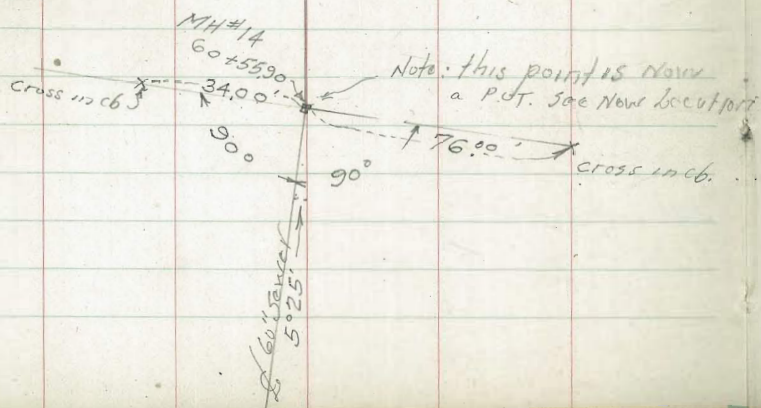
Cuts.	offsets.	Above BM = 0.44
+ 6.38	8' South	6.29 +
+ 12.20	8' "	6.73 x
+ 6.25	8' North	
+ 5.15	8' "	

		Above BM = 0.44
+ 7.62	8' South	3.14 +
+ 9.63	" "	3.58 x
+ 7.33 + 8.33	8' N	
+ 7.47	8' N	

Note: Grades for flow are at east edge box only
- 8.80. West end is lower

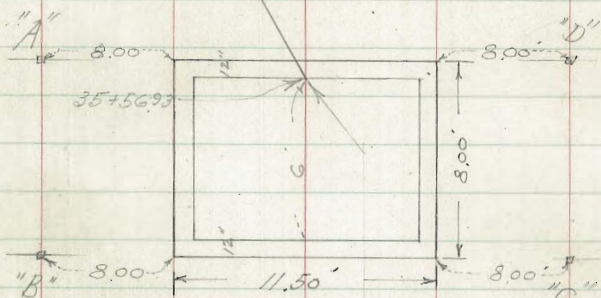
		0.44 - BM
		6.88 +
		7.32 x
Fill to top Box.		
- 1.63		

Wulker, 60" Interceptor Senior
 Isbell 17 Harbor Drive
 Easton
 FORTY
 5-14-41
 Detail of Ties at M. Holes.
 And 2 Points.

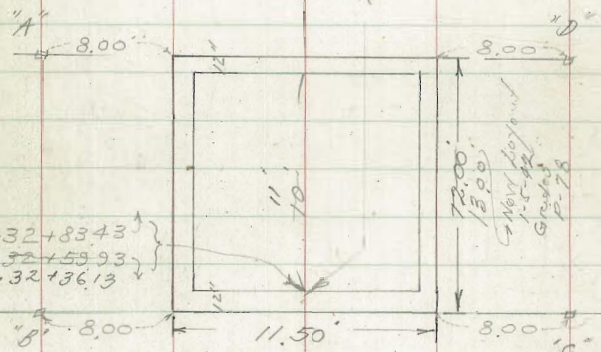


Walker
Wells
Farrow
9-16-41

CHOLLA CREEK DITCH
Enlarged Sketch
Grades P-78

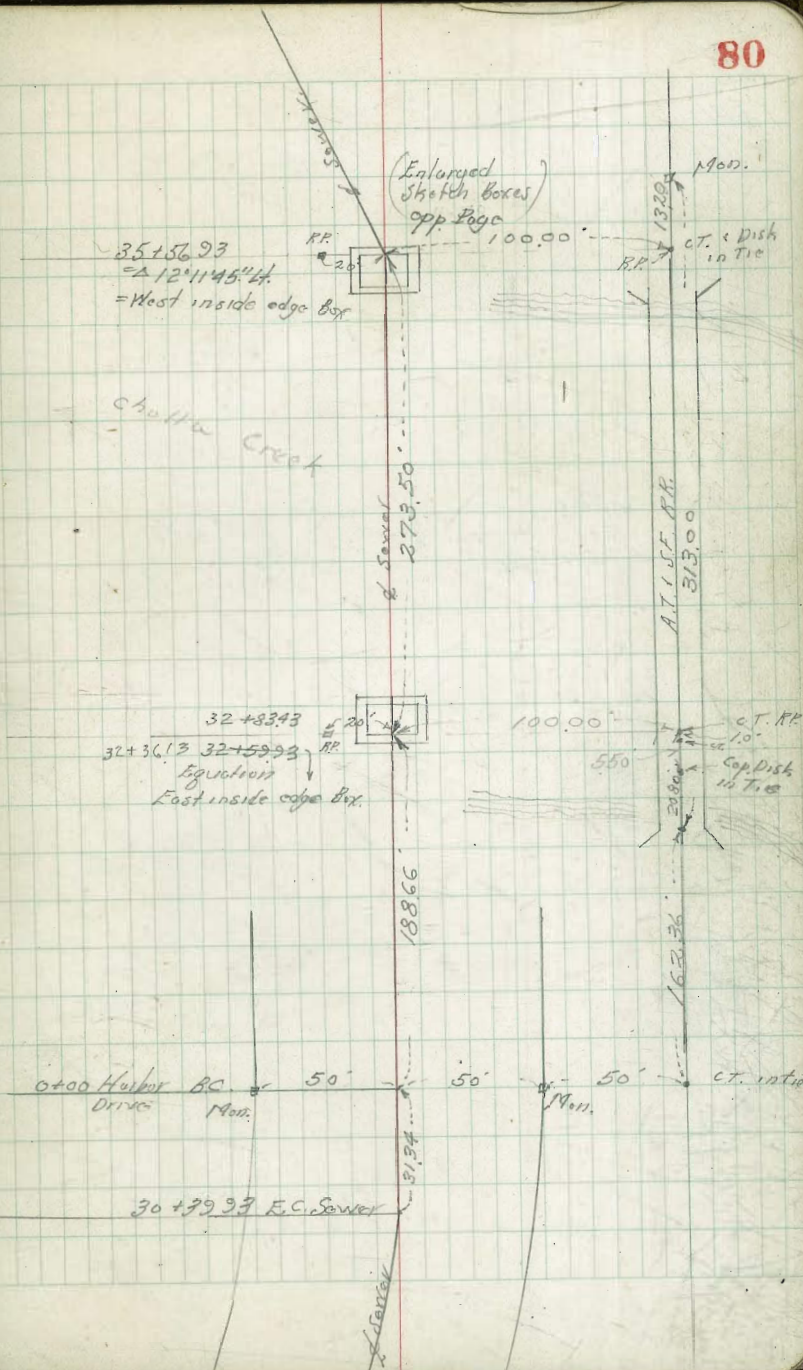


273.50'



Equation } 32+83.43
D } 32+59.93
FB } 32+36.13
(167)

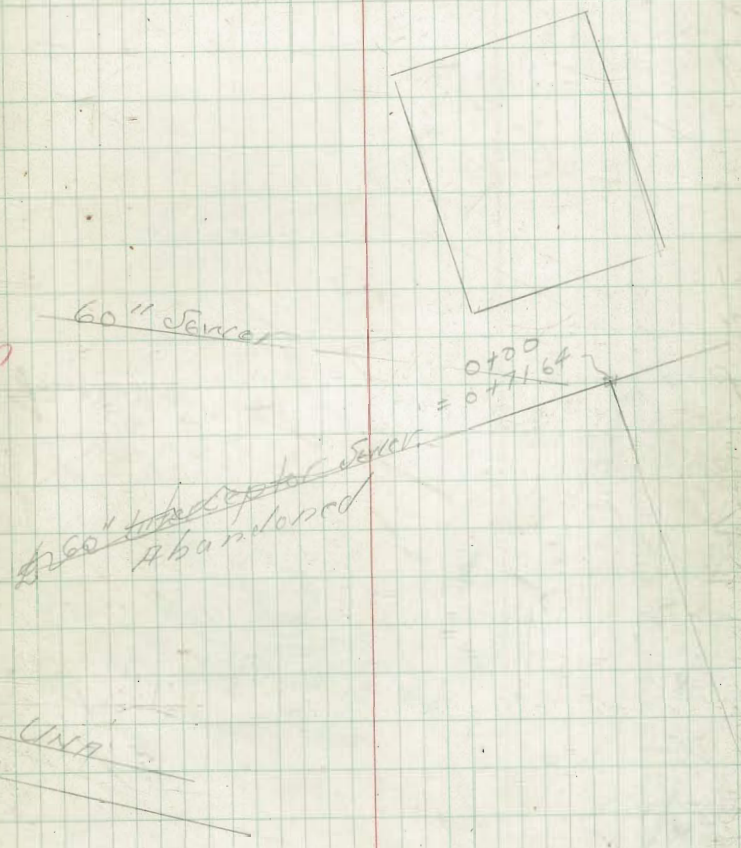
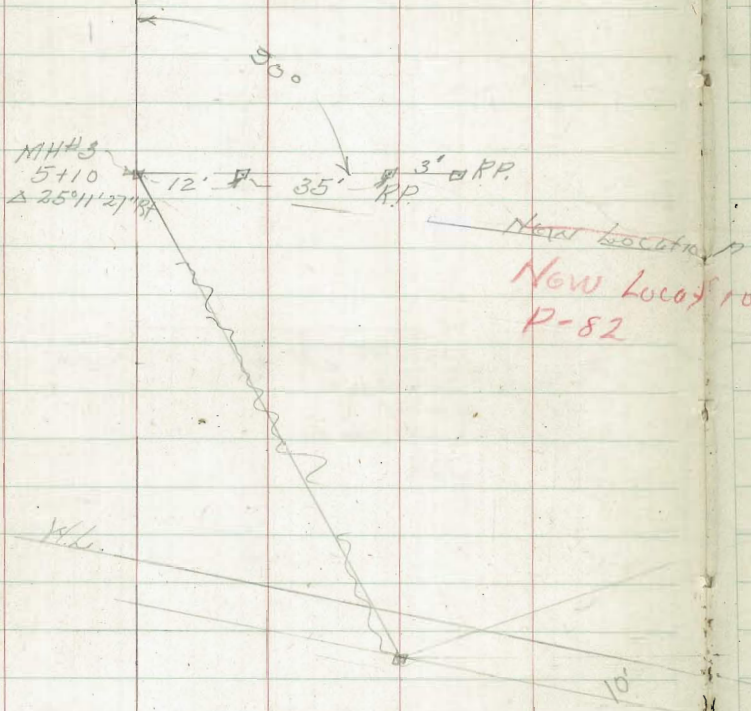
← Line change
from East end chamber
to E 32nd
F.B. 1607-23-26



Mulker
Bliss
Isbell
3-7-41

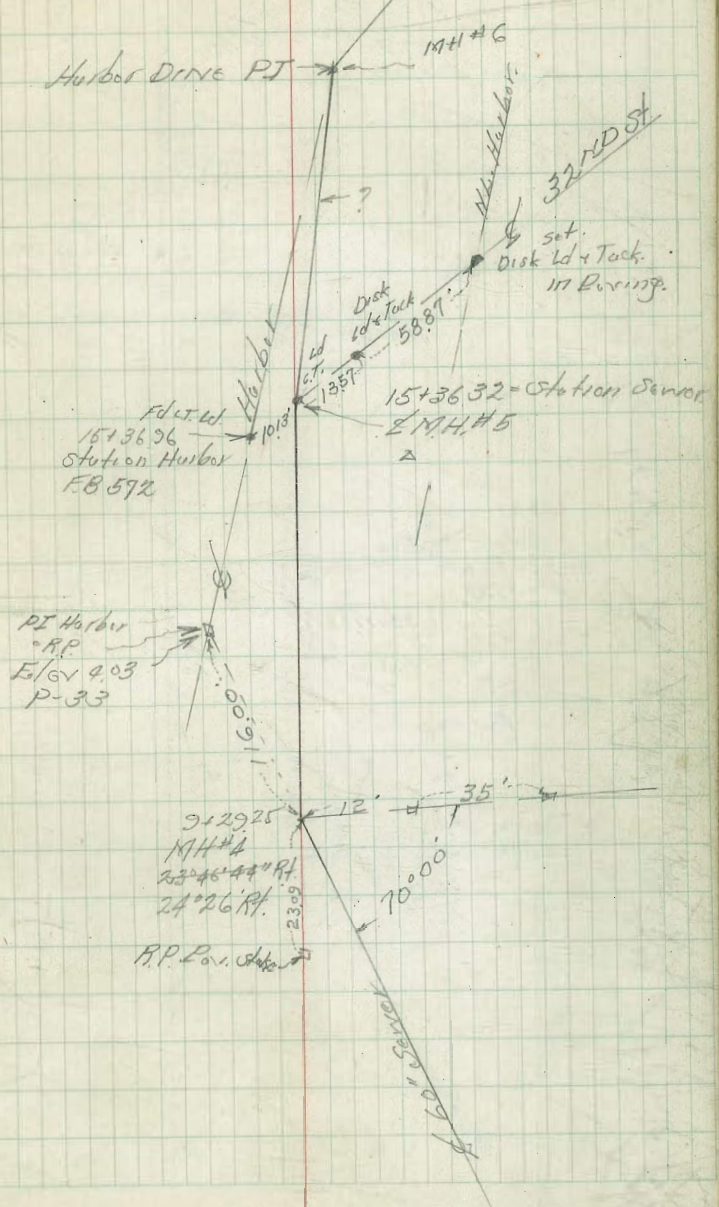
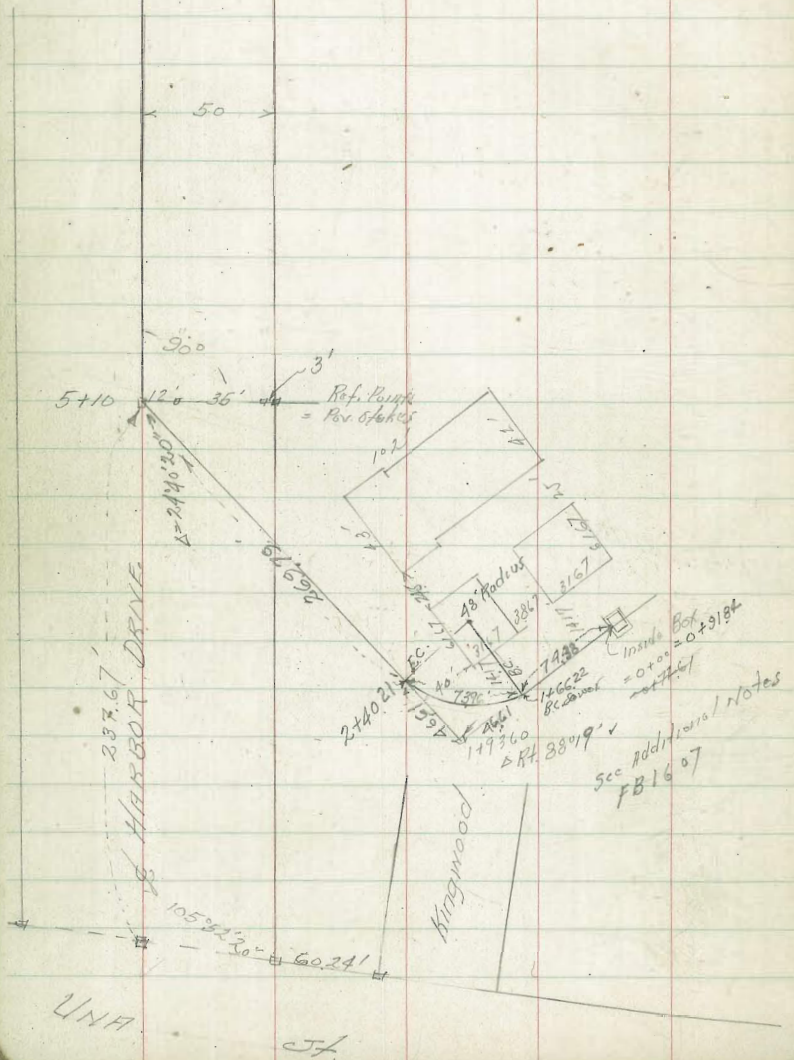
60" Interceptor Sewer
Construction Ties +
to 2
Grades P-3

Reference Points

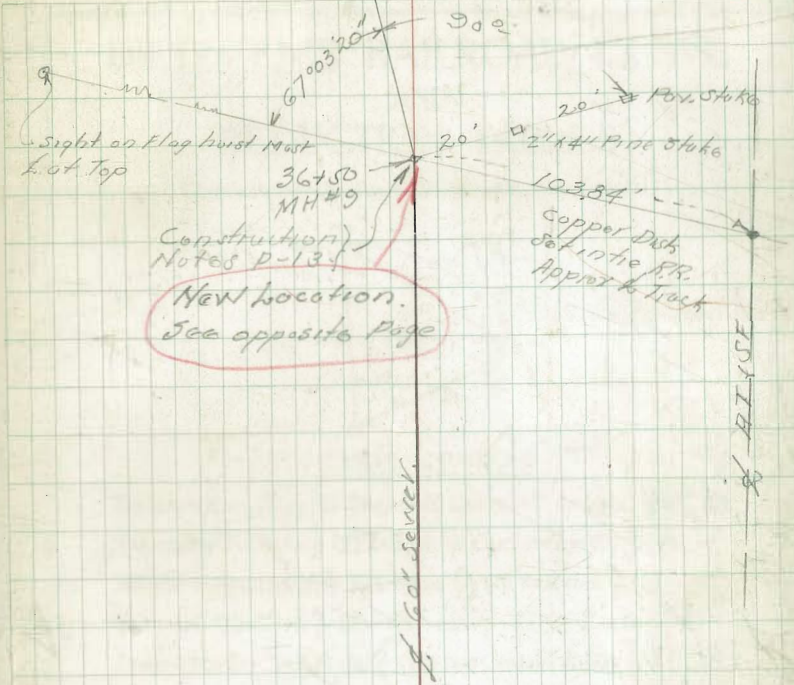
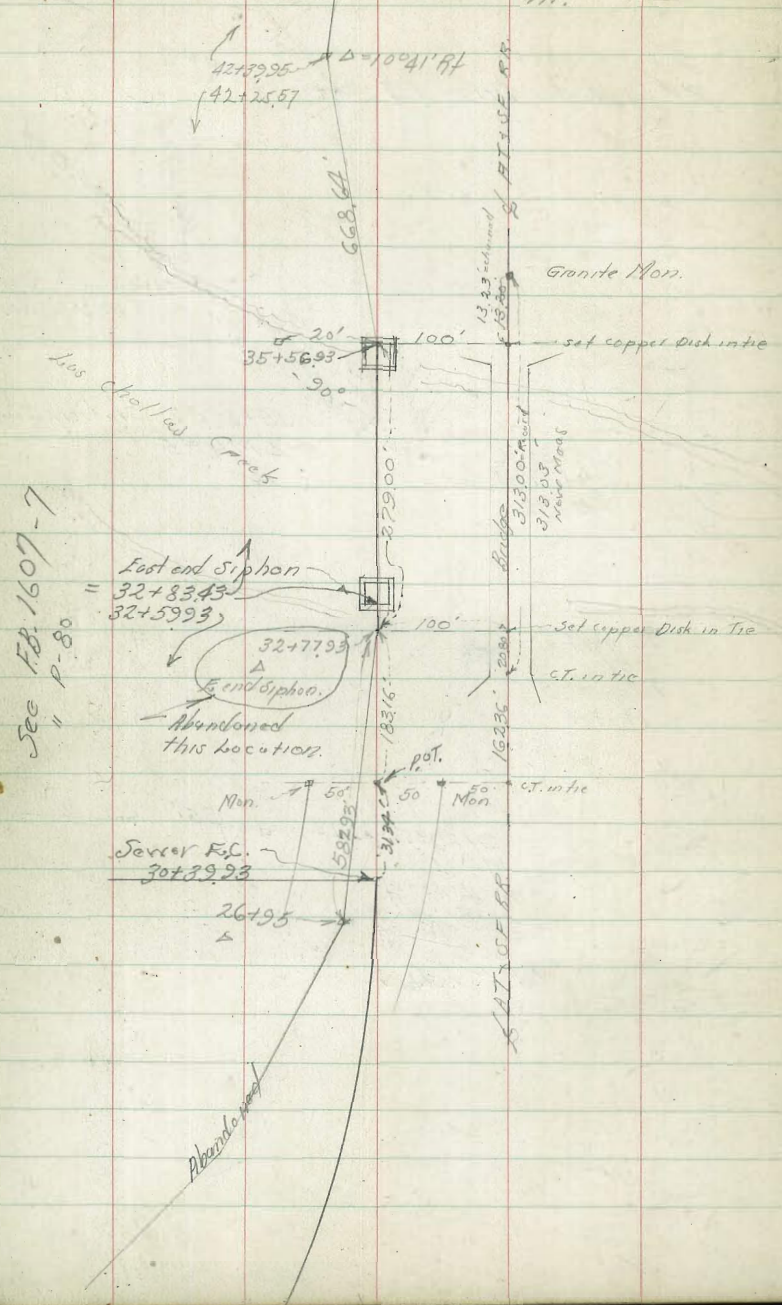


Walker
Isbr//
8-21-41

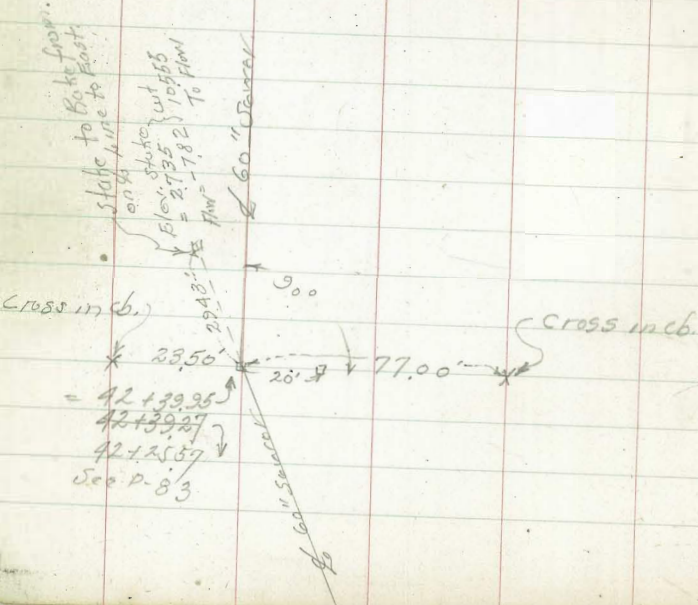
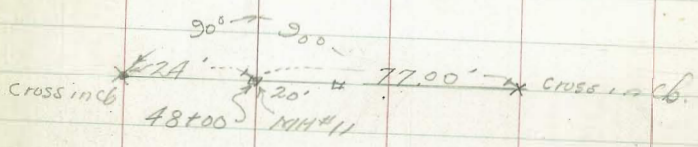
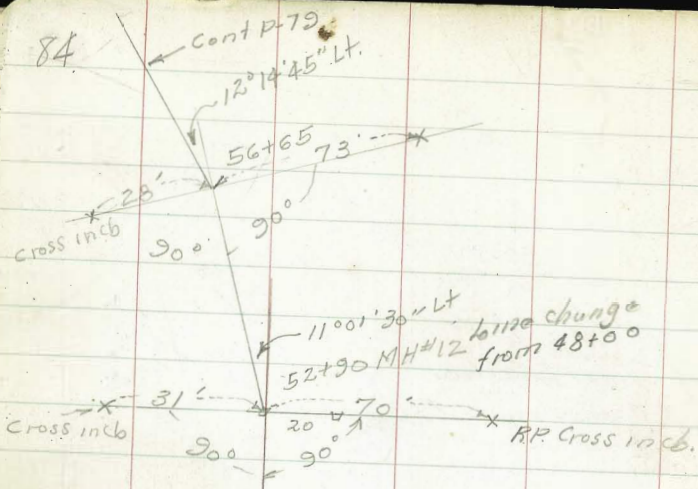
60" Interceptor Sewer
M.H. References.
Grades P. 21



60' Interceptor Sewer
Cont.

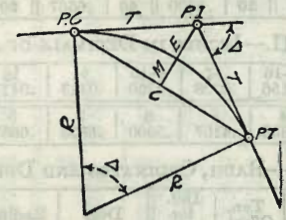


84



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) $\Delta =$ 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° 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 $\div 42=5.5$ or $D=5^\circ 30'$.

TABLE I.—MINUTES IN DECIMALS OF A DEGREE.

Table with 12 columns representing minutes from 1' to 12' and 10 rows representing decimal equivalents from .0167 to 1.0000.

TABLE II.—INCHES IN DECIMALS OF A FOOT.

Table with 11 columns representing inch fractions from 1-16 to 7/8 and 11 rows representing decimal equivalents from .0052 to .9167.

TABLE III.—RADI, ORDINATES AND DEFLECTIONS.

Large table with 11 columns: Deg., Radius, Mid. Ord., Tan. Offset, Def. for 1 Foot, and then repeated for angles 7° through 30°. Contains radius, ordinate, and deflection values.

Note. Chord Deflection=2 times tangent deflection.

Handwritten notes: 1491 - 134, 128, 160, 294.

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

Table with 9 columns: Central Angle, Tangent, External, and then repeated for angles 11° through 30°. Contains tangent and external distance values.

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
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	.01	.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	20 196.90	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	1.83	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	2.28	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

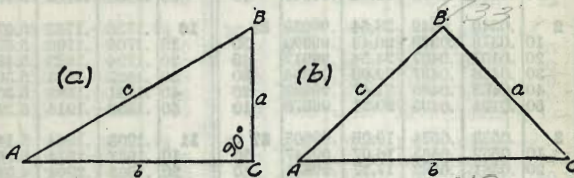
SLOPE REDUCTIONS.

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.

See fig. (a).

TRIGONOMETRICAL FORMULAS.

- 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 | $\tan. \frac{1}{2}(A-B) = \frac{(a-b) \tan. \frac{1}{2}(A+B)}{a+b}$ |
| c, b, c | A | $\left\{ \begin{array}{l} \text{If } s = \frac{1}{2}(a+b+c), \sin. \frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{bc}} \\ \cos. \frac{1}{2}A = \sqrt{\frac{s(s-a)}{bc}}, \tan. \frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{s(s-a)}} \\ \sin. A = \frac{2\sqrt{(s-a)(s-b)(s-c)s}}{bc} \end{array} \right.$ |
| 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.	
°						°					
32	.5209	.6249	1.600	.84805	58	30	.6225	.7954	1.257	.78261	30
10	.5324	.6289	1.590	.84650	50	40	.6248	.8002	1.250	.78079	20
20	.5348	.6330	1.580	.84495	40	50	.6271	.8050	1.242	.77897	10
30	.5373	.6371	1.570	.84339	30						
40	.5398	.6412	1.560	.84182	20	39	.6293	.8098	1.235	.77751	51
50	.5422	.6453	1.550	.84025	10	10	.6316	.8146	1.228	.77531	50
						20	.6338	.8195	1.220	.77347	40
33	.5446	.6494	1.540	.83867	57	30	.6361	.8243	1.213	.77162	30
10	.5471	.6536	1.530	.83708	50	40	.6383	.8292	1.206	.76977	20
20	.5495	.6577	1.520	.83549	40	50	.6406	.8342	1.199	.76791	10
30	.5519	.6619	1.510	.83389	30						
40	.5544	.6661	1.501	.83228	20	40	.6428	.8391	1.192	.76604	50
50	.5568	.6703	1.492	.83066	10	10	.6450	.8441	1.185	.76417	50
						20	.6472	.8491	1.178	.76229	40
34	.5592	.6745	1.483	.82904	56	30	.6494	.8541	1.171	.76041	30
10	.5616	.6787	1.473	.82741	50	40	.6517	.8591	1.164	.75851	20
20	.5640	.6830	1.464	.82577	40	50	.6539	.8642	1.157	.75661	10
30	.5664	.6873	1.455	.82413	30						
40	.5688	.6916	1.446	.82248	20	41	.6561	.8693	1.150	.75471	49
50	.5712	.6959	1.437	.82082	10	10	.6583	.8744	1.144	.75280	50
						20	.6604	.8796	1.137	.75088	40
35	.5736	.7002	1.428	.81915	55	30	.6626	.8847	1.130	.74896	30
10	.5760	.7046	1.419	.81748	50	40	.6648	.8899	1.124	.74703	20
20	.5783	.7089	1.411	.81580	40	50	.6670	.8952	1.117	.74509	10
30	.5807	.7133	1.402	.81412	30						
40	.5831	.7177	1.393	.81242	20	42	.6691	.9004	1.111	.74314	48
50	.5854	.7221	1.385	.81072	10	10	.6713	.9057	1.104	.74120	50
						20	.6734	.9110	1.098	.73924	40
36	.5878	.7265	1.376	.80902	54	30	.6756	.9163	1.091	.73728	30
10	.5901	.7310	1.368	.80730	50	40	.6777	.9217	1.085	.73531	20
20	.5925	.7355	1.360	.80558	40	50	.6799	.9271	1.079	.73333	10
30	.5948	.7400	1.351	.80386	30						
40	.5972	.7445	1.343	.80212	20	43	.6820	.9325	1.072	.73135	47
50	.5995	.7490	1.335	.80038	10	10	.6841	.9380	1.066	.72937	50
						20	.6862	.9435	1.060	.72737	40
37	.6018	.7536	1.327	.79864	53	30	.6884	.9490	1.054	.72537	30
10	.6041	.7581	1.319	.79688	50	40	.6905	.9545	1.048	.72337	20
20	.6065	.7627	1.311	.79512	40	50	.6926	.9601	1.042	.72136	10
30	.6088	.7673	1.303	.79335	30						
40	.6111	.7720	1.295	.79158	20	44	.6947	.9657	1.036	.71934	46
50	.6134	.7766	1.288	.78980	10	10	.6967	.9713	1.030	.71732	50
						20	.6988	.9770	1.024	.71529	40
38	.6157	.7813	1.280	.78801	52	30	.7009	.9827	1.018	.71325	30
10	.6180	.7860	1.272	.78622	50	40	.7030	.9884	1.012	.71121	20
20	.6202	.7907	1.265	.78442	40	50	.7050	.9942	1.006	.70916	10
							.7071	1.	1.	.70711	45
	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	1.00	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.

95993	100.00	94.25
92925	5.75	92.3
30.68	94.25	1.91

2397
<u> .6</u>
24.62
<u> .17</u>
24.45

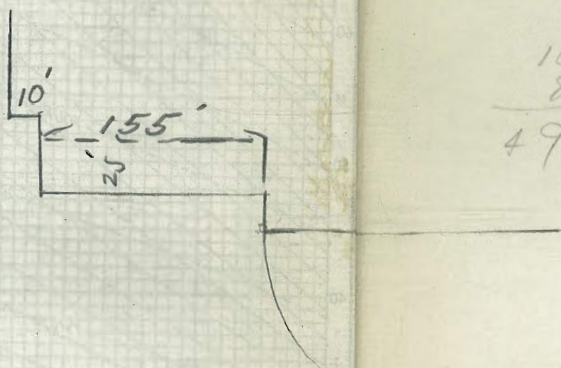
92.34
<u>15.54</u>
107.88
<u>105.75</u>
2.13 South.

82 ✓ - BM
4.71

1296K
<u>900</u>
396
112477

5183
<u>4167</u>
1016

1800
<u> 0</u>
36



27 1/2
<u>10</u>
12-3 1/2
12.29

608 π
<u>635</u>
0.63 E.
<u>11.56</u>
-10.93

16.01
<u>-5.75</u>
21.76
<u>4.64</u>
+17.12

29-75
29-9"
1
10-11
<u> 8</u>
49.8

2-7 5/8
6-0 3/4
7-1 5/8
7-1 5/8
6-0 3/4
4-1 1/2
6-0 3/4
7-9 3/8

1538
<u>358</u>
+1.80
<u> 7</u>
+2.50

-180
<u> 15</u>
-125

723 - H. - Flori. - Blk. M

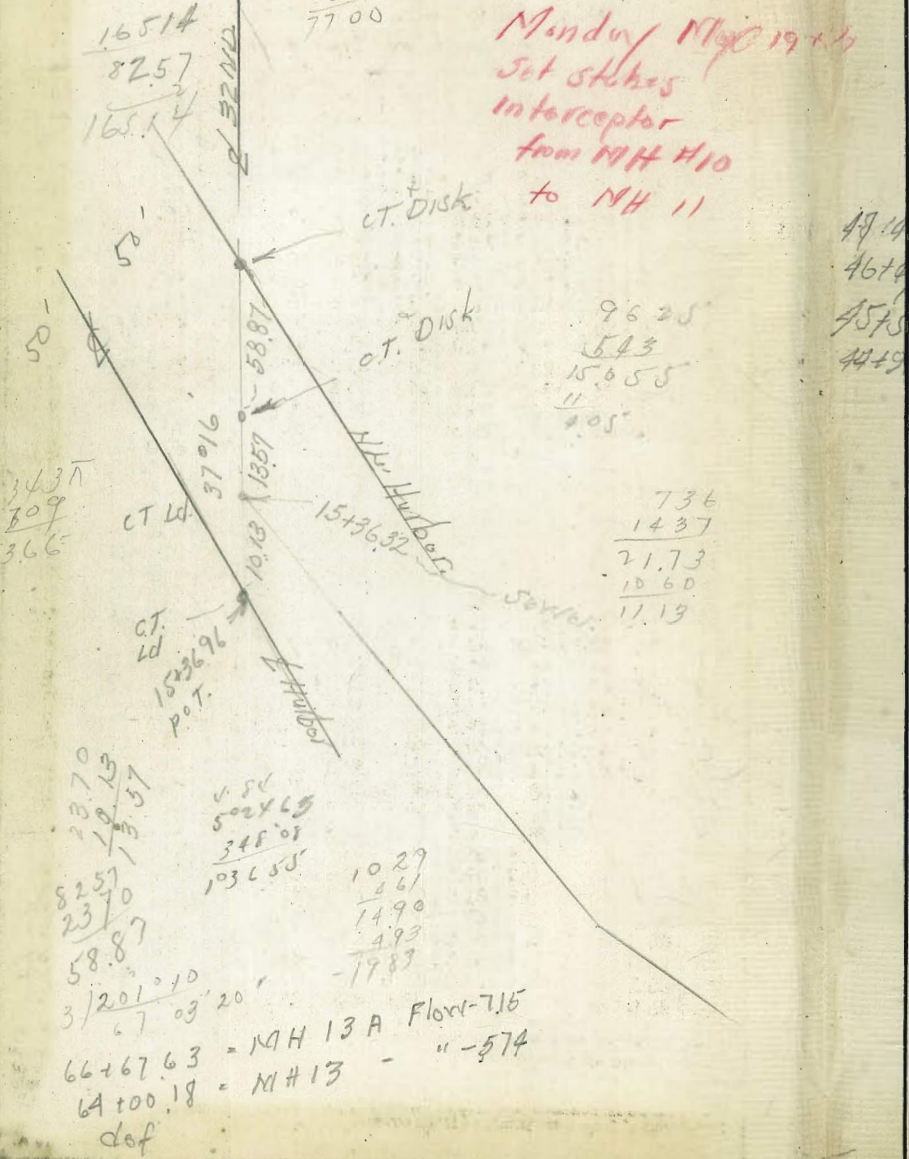
792 - South "

331
123

5183
1517
7700

89° 59' 60
24 11 20
66° 48' 50

Munday May 19 1914
Set stakes
interceptor
from MH #10
to MH #11



1200 409 174 717
72 543 302
337 717 415

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

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

1774
90
8.73

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.

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