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FIELD BOOK.

360 N.

F.B.42

Return to City Engineers Office
City Hall, San Diego, Cal.

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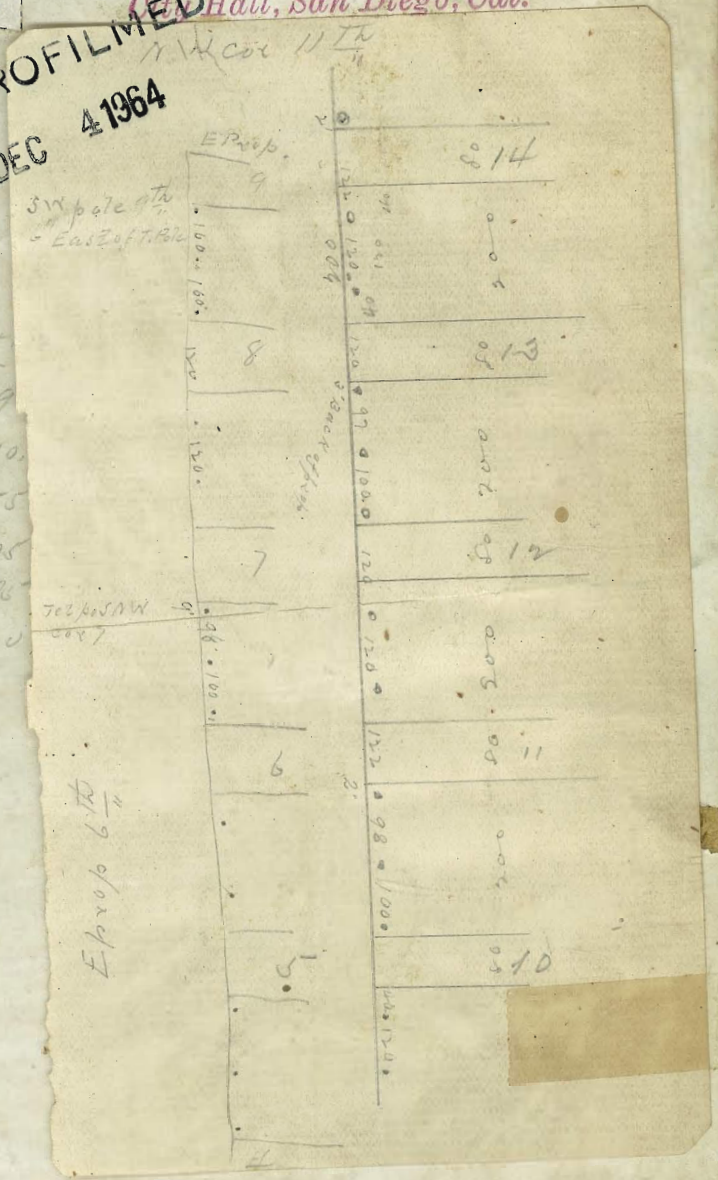

42

Return to City Engineers Office
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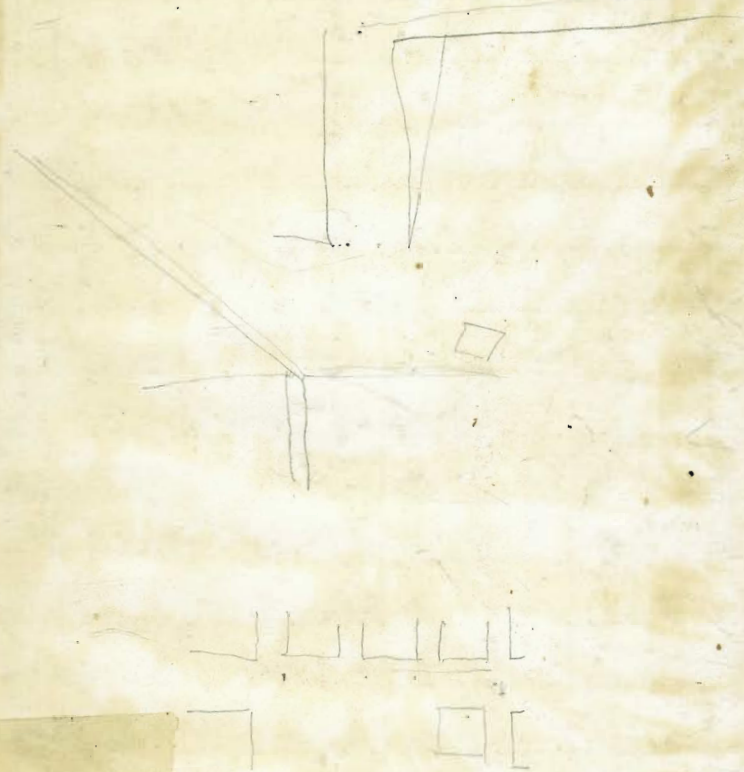

2

1

Point Loma water pipe line
Book 42

Wells at Pumping Station 42

Point Loma Pipe Line

				101.63		B.M. Near 5th St. Spike in ground.		
91	10.4 L	112.07	8.5	103.6	102.0	1.6		5
90+61.6			7.1	105.0	103.9			
90+50			6.5	105.6	104.5		95.7	
90+25			4.9	107.2	105.7		4.4	
90			3.5	108.6	107.0	1.6 ×		
89+75			1.7	110.4	108.8			
89+50			+0.1	112.2	110.7			
89				115.8				
				101.63				
98	2.6 L	104.27	3.7	100.5	97.0	3.5 ×		
93 L			5.4	98.9	96.8	2.6 L		
94			6.3	98.0	95.7	2.3 L		
95			7.7	96.6	95.0	1.6 ×		95.5
96			10.62	93.65	91.8 L	2.3		
97	1.05	94.70	4.4	90.3	87.7	2.6		
98			9.7	85.0	84.0	1.0 ×		
99			6.8	87.9	86.0 L	1.9		
100			4.7	90.0	89.0 L	1.0		
101			4.3	90.4	90.0 L	0.4		
102			1.85	92.95	92.0			

Point Loma Pipe Line

				92.95		
103	9.95	102.90	5.1	97.8	94.0	3.8 × ×
104			1.1	101.8	101.	0.8
#			1.13	101.77		
105	11.91	113.68	2.7	111.0	108.0	3.0
#			0.40	113.28		
106	11.48	124.76	9.0	115.7	115.0	0.7
107			0.30	124.46	122.0	2.2 ×
#	11.85	136.31	0.0	136.31		
108	11.75	148.06	4.6	143.5	141.0	2.5 ×
#			0.0	148.06		
109	11.21	159.27	6.2	153.1	151.5	1.6
#			0.0	159.27		
110	11.39	170.66	6.5	164.1	162.0	2.1 ×
+ 94.7 B.C			2.4	68.3	163.0	5.3
+ 50			1.1	69.5	163.5	6.0
#			1.13	169.53		
+ 75	6.85	176.38	5.0	71.4	164.2	7.2
111			2.5	74.1	165.0	9.1 ×
+ 25			7.8	68.6	163.2	5.4

Point Loma Pipe Line

111+50		176.38	10.5	165.9	161.2	4.5	
+60.2 E.C.			11.85	164.53	160.7	3.8	
112	0.53	165.06	5.1	160.0	157.7	2.3	
#			11.42	153.64			
113	0.52	154.16	3.2	151.0	150.5	0.5	
114			8.1	146.1	143.2	2.9	
#			11.21	142.95			
115	3.68	146.63	8.1	38.5	136.0	2.1	X
116			7.0	39.6	136.0	3.6	
#			9.72	136.91			
116+70.9	2.45	139.36	1.4	138.0	136.0	2.0	X
117			2.8	136.5	134.3	2.3	X
+25			4.6	134.7	133.5	1.2	
+49.7			5.9	133.4	132.65	0.8	
118			6.6	32.7	131	1.7	X
+50			5.5	33.8	132.4	1.4	
119			3.6	35.7	133.8	1.9	X
#			1.38	137.98			
120	10.29	148.27	7.7	40.6	139.4	1.2	
13,M.			7.82	140.45			

on B.M. next 52a 120

140.45 R.
140.37 H.
.08 Diff.

Point Loma Pipe Line

121		148.27	0.98	147.29	145	2.29	
122	10.87	157.66	7.3	150.4	148.0	2.4	
+90			4.9	152.8	151	1.8	
124			2.7	155.0	154	1.0	
#			0.62	157.04			
+125+03.6 B.C.	9.35	166.39	9.6	156.8	155.7	1.1	
+25			7.9	158.5	156.1	2.4	
+50			7.4	159.0	156.5	2.5	
+75			7.5	158.9	156.9	2.0	
126+04.1 E.C.			7.2	159.2	157.3	1.9	
127			4.5	161.9	157.5	4.4	157.5
128			6.3	160.1	157.7	2.4	
129			7.6	158.8	158.0	0.8	158.0
129+28.8 B.C.			6.6	159.8	158.5	1.3	
+50			2.8	163.6	159.5	4.1	
#			3.88	162.5			
+75	9.65	172.15	6.5	165.6	160.7	4.9	
130			7.3	164.8	162.0	2.8	
+20.5 E.C.			7.2	164.9		2.9	
131			6.7	165.4	162.0	3.4	

Point Loma Pipe Line

132		172.15	8.1	164.0	162.0	2.0 x		
133			4.2	167.9	166.0	1.9 x		
#			0.99	171.16	166			
134	6.96	178.12	8.6	169.5	166.5	3.0		
135			10.0	168.1	167.0	1.1		
136			8.1	170.0	167.5	2.5 x		
137			4.4	173.7	172.7	1.0		
#			0.80	177.32				
138	8.35	185.67	5.3	180.4	176.0	2.4 x	176.0	x
139			8.6	177.1	176.5	0.6 x	176.5	x
140			2.7	183.0	179.0	4.0 x	179.0	x
#			0.80	184.87				
141	11.18	196.05	4.8	191.2	189	2.2 x		
+ 57.5 B.C.			2.6	193.4	191.3	2.1		
+ 95			2.0	194.0	192.0	2.0		
+ 95.5 E.C.			1.59	194.46	192.7	1.7		
142	11.53	205.99	11.5	94.5	193	1.5 x		
143			9.5	96.5	195	1.5		
144			7.2	98.8	197	1.8	OK	
145			4.8	200.2	199.0	1.2 x	X	

146		205.99	7.7	198.3	197.0	1.3	1.3	x	Raise .5 = Grade 197.5
147			5.6	200.6	199.2	1.4	2.0		
148			4.1	201.9	200.5	1.4	2.9	x	x O.K.
149			1.82	204.17	202.5	1.6	4.1	x	< Raise grade to 202.50
150	11.13	215.30	8.0	207.3	206.0		1.3	x	x O.K.
151			5.9	209.4	208.0		1.4		
152			3.2	212.1	210.0		2.1	x	
#			1.51	214.29					
153	11.86	226.13	7.6	218.5	217.5		1.0		
+66.4 B.C			1.55	224.98	222.6				
154	9.91	234.89	9.2	225.5	223.1				
155			7.8	226.9	225.0		1.9	x	
Abandoned			7.2	227.6	225.7		1.9		
156			6.5	228.2	226.5		1.7		
+77.6 E.C.			6.0	228.7	227.2		1.5		
157			5.3	229.4	228.0		1.4		
#			4.13	230.56					
158	10.35	240.91	8.2	232.7	231.0		1.7		
159			5.2	235.7	234		1.7	x	x O.K.

Pozne Loma Pipeline

Elev

#		240.91	4.15	236.76					
158	8.99	245.75	7.9	237.8	235.0	2.8			
159			6.12	239.63	236.0	3.6	on Hub sta 159		239.67 A 239.63 P. 04 Diff
160			6.4	239.3	237.0	2.3		160 (P)	
161			5.4	240.3	238.0	2.3	true grade Hub sta 157 to 161 × O.K.		
162			3.51	242.24	240.0	2.2			
163	11.68	253.92	10.0	243.9	242.0	1.9			
164			8.6	245.3	244.0	1.3			
165			6.5	247.4	246.0	1.4			
166			4.2	249.7	248.0	1.7			
167 #	9.88	262.08	1.72	252.20	250.0	2.2	on hub sta 167.		
168			7.90	254.18	252.0				
169			6.85	255.23	254.0				
170			4.60	257.48	256.0	1.48			
171			3.68	258.40					
172			2.56	259.52					
173 #	2.37	262.55	1.90	260.18					
174			2.55	260.00					
175			3.64	258.91					

Sta	+	HI	−	Elev	Grade	Cut		
175+87		262.55	4.77	257.78			B.C.	
176			4.92	257.63	156.00	1.63		X
176+12			5.00	257.55			E.C.	
177			5.61	256.94	156.00	0.94		
178			5.23	257.32	156.00	1.32		
179			4.91	257.64	156.00	1.64		
180 #	4.76	263.90	3.41	259.14	157.75	1.39		X
181			2.89	261.01	259.50	1.51		
182			4.82	259.08	257.70	1.38		X
183			9.76	254.14	253.25	0.89		
#	1.90	254.20	11.60	252.30				
184			3.87	250.33	248.80	1.53		X
185			5.11	249.09	148.10	0.99		
186			5.30	248.90	147.40	1.50		X
187 #	9.83	252.78	11.28	242.95	241.50	1.45		X
188			11.27	241.51	240.0	1.51		X
189			10.82	241.96	241.0	0.96		
190			8.20	244.58	243.00	1.58		X
191			3.46	249.32	248.15	1.17		
#	11.98	264.11	0.65	252.13				

Sta	+	HI	−	Elev	Grade	cut
192		264.11	9.25	254.86	253.30	1.56
193			6.56	257.55	256.00	1.55
194			4.23	259.88	258.00	1.88
195			2.28	261.83	260.00	1.83
#	8.80	271.65	1.26	262.85		
196			8.70	262.95	261.25	1.70
197			7.13	264.52	262.50	2.02
198			7.20	264.45	263.75	0.70
199			5.04	266.61	265.00	1.61
200 #	11.88	282.30	1.23	270.42	268.38	2.04
201			7.88	274.42	271.75	1.67
202			4.80	277.50	275.12	2.38
203 #	12.28	292.35	2.23	280.07	278.50	1.57
204			7.38	284.97	283.33	1.64
205			1.85	290.50	288.17	2.33
#	10.15	302.04	0.46	291.89		
206			7.60	294.44	253.00	1.44
~~206 + 80.3~~			~~5.29~~	~~296.75~~		
~~207~~			~~4.97~~	~~297.07~~		

abandoned

B.C.

Sta	+	HI	−	Elev	Grade	cut
207+25		302.04	4.78	297.26		
207+50 #	4.30	301.58	4.76	297.28		
207+75			4.46	297.12		
208			4.89	296.69		
+ 25			5.97	295.61		
+ 50			9.20	292.38		
+ 69.1			10.50	291.08		E.C.
#			5.86	295.72		
206	8.03	302.47		294.44	293.00	1.44 ✓
207			5.37	297.10	294.75	2.35 ✓
208			4.52	297.95	296.50	1.45 ✓
209 ✓			4.24	298.23	296.55	1.68 ✓
210 ✓			4.40	298.07	296.60	1.47 ✓
211 # ✓	5.78	303.94	4.31	298.16	296.55	1.61 ✓
212			6.09	297.85	296.53	1.32 ✓
213 ✓			5.68	298.26	296.50	1.76 ✓
214			5.93	298.01	296.50	1.61 ✓
215			3.26	300.68	298.90	1.78 ✓
#	7.00	309.43	1.51	302.43		

Abandoned

Sta	+	H.I.	−	Elev		
216		309.43	6.55	302.88	201.80	1.58
217			4.20	305.23	303.70	1.53
B.M.			1.08	308.35		

top of Post cor of fence = 80'
East of

217+12.5 to S.W. Cor 143
216+49 to S.E. Cor 144

Levels over change of line from Sta 149.94 to 176.0

Sta	+	HI	−	Elev		Cut	
B.M. Sta 149.0	12.10	216.27		204.17			
149+94 = 150+15.5			8.9	207.4	205.0	2.4	S.C. 30°C to L I 17°40
+25			8.8	207.5			
+50			8.4	207.9			
+74.3			8.0	208.3	205.3		S.C.
151			8.3	208.0	205.4	2.6	
152			8.3	208.0	205.7	2.3	
153			8.1	208.2	206.0	2.2	×
#	11.83	227.25	0.85	215.42			
154			12.5	212.8	211.0	1.8	×
155 #	11.80	232.95	6.10	221.15	219.0	2.1	×
156			9.1	223.8	222.0	1.8	
157			5.4	226.5	225	1.5	
#	10.73	241.11	2.57	230.38			
158			11.6	229.5	228.0	1.5	
159			8.8	232.3	231.0	1.3	×
160			8.1	233.0	231.0	2.0	× End of 6" Pipe
161			8.3	232.8	231.0	1.8	×
162			6.2	234.9	233.0	1.9	

Sta	+	HO	−	Elev			
163		241.11	4.3	236.8	235.0	1.8	
164 #	12.15	251.12	2.14	238.97	237.0	2.0	×
165			8.9	242.2	240.5	1.7	
166			5.5	245.6	244.0	1.6	×
167			2.4	248.7	246.8	1.9	
#	9.15	260.37	0.0	251.12			
168			9.5	250.9	249.5	1.4	×
169			7.5	252.9	251.3	1.6	
170			5.9	254.5	253.0	1.5	×
171			4.5	255.9	254.5	1.4	
172			3.0	257.4	256.0	1.4	×
173			1.6	258.8	257.0	1.8	
#	5.39	263.63	2.13	258.24			
174			4.2	259.4	258.0	1.4	×
175			4.9	258.7	257.0	1.7	
176			5.9	257.73	256.0	1.7	

Levels from Sta 0
Point Loma Pipe Line

Sta	+	H.I.	−	Elev.	Elev.
					277.0
B.M.	4.43	276.43	5.55	270.88	
0			10.12	266.31	260.4
+50	0.78	267.09	1.4	265.7	259.5
1			2.6	64.5	258.5
+50 ✓			5.1	62.0	257.5
2 ✓			8.1	59.0	256.5
+50 ✓			10.1	57.0	55.5
3 ✓			8.1	59.0	53.0
+50 ✓			6.9	60.2	51.5
4 ✓			8.9	58.2	54.0
+50 ✓			11.30	255.79	53.5
5 ✓	4.08	259.87	5.2	54.7	53.0
+50			6.0	53.9	51.6
6 ✓			7.7	52.2	50.25
+50 ✓			9.1	50.8	48.9
7 ✓			10.2	49.7	47.5
+50 ✓			9.5	50.4	47.42
8			8.5	51.4	47.33

Stand Pipe at Old Town to the
12" Gate at Reservoir Tunnel

West Bracket for Ladder on stand pipe
on Top of fence post Left of Sta 0. (Cor post)

5.9	Top of pipe from stand pipe back of Sta 0 262.1 Grade Bottom of pipe = 260.8 21.5' back of Sta. 0
6.2	
6.0	
4.5	
2.5	
× 1.5	
4.0	
5.7	
4.2	
2.3	
× 1.7	
2.3	
2.2	
1.9	
× 2.2	
3.0	
4.1	

Levels for pipe line

From Stand Pipe at Old Town to 12" Pipe at Reservoir

8+50		259.87	7.1	252.8	47.25	5.5
9			7.5	252.4	47.18	5.2
+50			8.0	51.9	47.09	4.8
10			9.99	249.88	47.0	on line 2.8
+17	0.6	250.52	1.3	49.2	247.0	x 2.2
+50			2.4	48.1	45.6	2.5
11			5.7	44.8	243.4	1.4
+50			8.4	42.1	241.2	0.9
12			10.0	40.5	239.0	x 1.5
+50			9.0	41.5	237.8	3.7
13			8.4	42.1	236.7	5.5
+50			11.63	238.89	235.5	3.4
+67	1.8	240.73	3.9	36.8	235.0	x 1.8
14			5.3	35.4	233.3	2.1
+50			8.8	31.9	230.6	1.3
15			11.97	228.76	228.0	0.8
+50	1.2	230.00	4.6	25.4	225.3	0.1
16			6.5	23.5	222.6	0.9
+50			7.4	22.6	220.8	x 2.6

17 ✓		230.00	7.7	222.3	219.0	x	3.3	
+17			7.8	22.2	218.7		3.5	
+50			7.4	22.6	218.0		4.6	
18			9.3	20.7	217.0	x	3.7	
#			10.85	219.15				
+50	2.29	221.44	10.90	210.54	210.5		0.0	
19 ✓	3.03	213.57	8.3	205.3	204.0	x	1.3	
+20						Waste 15' wide 10' Deep.		
+50 ✓			9.3	204.3	203.0	x	1.3	
20 ✓			8.9	204.7	203.0	x	1.7	
+50 ✓			4.27	209.30	205.33		4.0	
21 ✓	6.38	215.68	2.5	13.2	207.7		5.5	
+50 ✓			1.1	14.6	210.0	x	4.6	air valve
22 ✓			8.6	12.1	205.7		6.4	
+50 ✓			10.0	205.7	201.5		4.2	
#			11.85	203.83	20			
23 ✓	1.95	205.78	6.2	199.6	197.2		2.4	
+50			10.2	195.6	193.0	x	2.6	
24			11.0	194.8	191.5		3.3	

#		205.78	11.79	193.99		
24 +50	0.55	194.54	1.6	192.9	190.0	× 2.9
#			11.83	182.71		
25	0.50	183.21	2.0	181.2		
+50			11.97	171.24		
26	0.50	171.74	4.1	167.6		
+50			4.9	166.8		
27			9.4	162.3		
#			11.21	160.53		
+50	1.66	162.19	5.0	167.2		
28			8.5	153.7		
+50			10.0	152.2		
#			11.95	150.24		
29	2.22	152.46	4.0	148.4		
+11.6			12.12	140.34		Top of gate. Mouth of tunnel.

Abandoned

57	+	H.I.	−	Elev.		
				171.24		on hub 52 28+50 abandoned line
25				181.2	179.0	2.2
25+50	1.01	172.55	1.2	71.8	170.0	1.8
26 ✓			4.4	68.1	166.0	2.1
+50 ✓			4.4	68.1	165.	3.1
27 ✓			9.0.	63.5	161.0	2.5
#			11.93	160.62	[illegible]	[illegible]
+50	0.03	160.95	2.3	58.6	156.6	2.0
28 ✓			6.3	54.6	153.0	1.6
+50 ✓			6.8	54.1	150.5	3.6
29 #			10.54	150.41	144.5	5.9
+14	0.94	151.35	8.4	142.9		Top of box mouth of Tunnel.
+50.			8.1	143.2		
#			10.93	140.42		
30	0.38	140.80	6.8	134.0		
#			11.49	129.31		
#	0.40	129.71	11.81	117.90		
31	0.11	118.01	7.2	110.8		
#			11.30	106.71		
#	0.14	106.85	11.67	95.18		

57a	+	11.1	–	Elev
				95.18
32	0.12	95.30	8.5	86.8
~~#~~			11.12	84.18
	0.05	84.23	11.41	72.82
33	0.53	73.35	8.5	64.8
#			11.76	61.59
34	0.39	61.98	7.9	54.1
			11.83	50.15
	11.1	51.26	11.93	39.33
35	0.31	39.64	2.4	37.2
			11.24	28.40
36	0.25	28.65	7.3	21.3
			11.15	17.50
37	1.38	18.88	9.4	9.5
			11.15	7.73
38	4.10	11.84	6.2	5.6
39			5.5	6.3
40			7.1	4.7
41			6.3	5.5

BM Lyons cox

Sta	+	H.I.	−	Elev			
42		11.83	6.10	5.70			
43	5.74	11.44	5.4	6.0			
44 ✓			5.0	6.4			
45 ✓			5.2	6.2			
+71.5 ✓			4.59	6.85		on trans. point	
46	4.93	11.78	5.3	6.5			
47 ✓			5.7	6.1			
48 ✓			5.1	6.7			
49 ✓			5.1	6.7			
50 ✓			5.4	6.4			
51 ✓			5.8	6.0			
52 ✓			6.7	5.1			
+71			7.53	4.25	2.00	2.3 ✓	on trans. pt
53	7.23	11.48	7.1	4.4	2.00	2.4 ✓	
54			5.4	6.1	2.00	4.1 ✓	
55			6.1	5.4	2.00	3.4 ✓	
56 ✓			6.0	5.2	2.00	3.2 ✓	
57 ✓			7.2	4.3	2.00	2.3 ✓	
+20			6.8	4.7			

57+45		11.48	2.9	8.6		
+70			7.1	4.2		
58			3.8	7.7	1.7	6.0 ✓
+10			2.5	9.0		Top of Bank S.C. Ry.
+50			8.2	3.3		
+90			7.0	4.5		T.S. of P.B. Ry.
59			6.1	5.4	1.3	4.1 ✓
+15			2.6	8.9		Top of Bank P.B. Ry.
+35			7.6	3.9		T.S of " "
+ 59+69.4			6.13	5.35		on hub Sta 59+69.4
				1.95		Spike in fence Near center Riley & Pouncey
87+38	5.47	7.42	5.3	2.1		
84			5.9	1.5	-0.8	+ 2.3 ✓
81 ✓			5.3	2.1	-0.5	+ 2.6 ✓
80 ✓			5.6	1.8	-0.3	+ 2.1 ✓
79 ✓			4.6	2.8	0.5	2.4 ✓
78 ✓			5.0	2.4	0.0	2.4 ✓
77 ✓			4.7	2.7	0.0	2.7 ✓
76 #			4.65	2.77	0.0	2.7 ✓

Ha	+	H.I	−	Elev		
				2.77	0	
75	6.33	9.10	6.1	3.0	0.0	+ 3.0
74			5.8	3.3	0.0	+ 3.3
73			5.5	3.6	0.0	+ 3.6
72			5.1	4.0	0.0	+ 4.0
71			4.9	4.2	0.0	+ 4.2
70			4.70	4.40	0.0	+ 4.4
69	3.13	7.53	2.6	4.9	0.0	+ 4.9
68			3.2	4.1	0.0	+ 4.1
67			6.3	1.2	0.0	+ 1.2
66			5.5	2.0	0.0	+ 2.0
65			5.0	2.5	0.0	+ 2.5
64	6.78	9.35	4.97	2.57	0.0	+ 2.6
63	6.79	9.35	7.6	1.7	0.0	+ 1.7
62			4.8	4.5	0.3	+ 4.2
61			3.8	5.5	0.7	+ 4.8
60			3.8	5.5	1.00	+ 4.5
~~59~~ 69.4			4.07	5.28		+
B.M.			4.36	4.99		+ on Street Center

Location of a portion of P.P. Lemon water pipe line Transit notes

Sta	Def	Tang		
6				
5				
+ 60.5		17° 40'	⊙	E.C. 30° curve to left
+ 45	2° 20'			I 17° 40' Semitang
+ 30	2° 15'			29.7' length of
+ 15	2° 15'			curve 58.9'
+ 01.6	2° 0'	8° 50'	⊙	B.C. 60° curve to left
4				
3				
2				
1				
+ 70.5		21° 10'	⊙	E.C. 30° curve to left
+ 60	1° 35'			
+ 45	2° 15'			I 21° 10', Semi tang
+ 30	2° 15'			35.7 length of curve
+ 15	2° 15'			70.6
0	2° 15'	10° 35'	⊙	B.C. 30° curve to left
Sta 0 B.C.				

Sta	Defl	Tang	
18 + 36 = Sta 654 on 17 line			
17			
16			
15			
14			
+ 30		11° 0'	E.C. 30 curve to R. I 11° Tangent 16.4' length of curve 36.7
+ 15	2° 15'		
13	2° 15'		
+ 93.3	1° 0'	5° 30'	B.C. 30° curve to R
12			
11			
+ 19.2		24° 0'	E.C. 20° curve to Right I 24° 0' Tangent 60.9 length of curve 120'
10	1° 55'		
+ 75	2° 30'		
+ 50	2° 30		
+ 25	2° 30'		
+ 99.2	2° 35'	12° 0'	B.C. 20° curve to Right
8			
7			

Sta	+	HO	−	Elev			
54 = 18+36	0.3	98.1		97.8	96.0	+ 1.8	
18			0.5	97.6	95.2	+ 2.4	
17			3.2	94.9	93.0	+ 1.9	
16			8.4	89.7	87.5	+ 2.2	
#	0.50	87.0	11.60	86.5			
15			8.8	78.2	77.3	+ 1.9	
#	0.6	75.8	11.8	75.2			
14			6.6	69.2	67.0	+ 2.2	
#	0.4	64.7	11.5	64.3			
13 + 50			2.5	62.2	60.3	+ 1.9	EC
+ 15			3.8	60.9	58.9	+ 2.0	
13			5.1	59.6	57.5	+ 2.1	
12 + 53.3			5.5	59.2	56.5	+ 2.7	B.C.
#	0.1	53.1	11.6	53.1			
12			7.5	45.6	41.6	+ 4.0	
+ 90			12.9	42.2	40.00	+ 2.2	
#	0.30	41.7	11.7	41.4			
11			3.1	38.6	35.5	+ 3.1	
10 + 19.2			6.9	34.8	31.5	+ 3.3	E.C.

41.7
8.3
33.4

Sta	+	[illegible]	—	Elev	Grade	cut	
10 + 19.2	0.42	35.22		34.80	31.5	+ 3.3	E.C.
10			2.2	33.0	29.8	+ 3.2	
9 + 75			4.4	30.8	27.6	+ 3.2	
+ 50			7.0	28.2	25.5	+ 2.7	
+ 25			10.1	25.1	23.3	+ 1.8	
8 + 99.2 #	0.16	23.28	12.10	23.12	21.0	+ 2.1	B.C.
8			6.1	17.2	15.0	+ 2.2	
7			7.8	15.5	13.0	+ 2.5	
6			10.0	13.3	11.0	+ 2.3	
#	0.03	11.68	11.63	11.65			
5			2.7	9.0	6.5	+ 2.5	
4 + 60.5			2.1	9.6	5.5	+ 4.1	E.C.
+ 45			2.3	9.4	5.1	+ 4.3	
+ 30			2.1	9.6	4.7	+ 4.9	
+ 15			2.8	8.9	4.4	+ 4.5	
4 + 01.2			3.5	8.2	4.0	+ 4.2	B.C.
4			3.5	8.2	4.0	+ 4.2	
3			11.4	0.3	- 1.0	+ 1.3	
2 #	5.72	5.3	12.10	- 0.42	- 1.5	+ 1.0	

Sta	+	HO	−	Elev	Grade	Cut	
1		5.30	4.0	1.3	−1.5	+2.8	
0+70.5			2.9	2.4	−1.5	+3.9	E.C.
+60			2.9	2.9	−1.5	+4.4	
+45			1.3	4.0	−1.5	+5.5	
+30			1.9	3.4	−1.5	+4.9	
+15			2.0	3.3	−1.5	+4.8	
0 = Sta 117+88			3.0	2.3	−1.5	+3.8	
B.M.		5.56	5.83	−0.53	−0.27	.26 error	s/k W/ pole
116+99.6			4.8	0.8	−1.5	+2.3	E.C.
+75			4.1	1.5	−1.5	+3.0	
+50			3.7	1.9	−1.5	+3.4	B.C.
116			0.9	4.7	−1.5	+6.2	
#	4.45	5.34	4.67	0.89			
115			6.9	−1.6	−2.5	+0.9	
114			4.2	1.1	−1.5	+2.6	
113			4.5	0.8	−1.5	+2.3	
112			4.8	0.6	−1.5	+2.1	
111			4.8	0.6	−1.5	+2.1	
110			4.4	1.0	−1.5	+2.5	

Sta	+	HI	−	Elev	Grade	cut
109		5.34	4.2	1.1	−1.5	+2.6
108 #	5.6	6.6	4.34	1.00	−1.3	+2.3
B.M.			4.17	2.43		
107			5.4	1.2	−1.0	+2.2
106			5.5	1.1	−1.0	+2.0
105			5.3	1.3	−1.0	+2.3
104			5.0	1.6	−1.0	+2.6
103			5.5	1.1	−1.0	+2.1
102			4.8	1.8	−1.0	+2.8
101			5.1	1.5	−1.0	+2.5
100 #	5.20	6.25	5.55	1.05	−1.0	+2.0
99			5.2	1.0	−1.0	+2.0
98			4.7	1.5	−1.0	+2.5
97			4.9	1.3	−1.0	+2.3
96			4.8	1.4	−1.0	+2.4
95			4.9	1.3	−1.0	+2.3
94			5.1	1.1	−1.0	+2.1
93			5.2	1.0	−1.0	+2.0
92	5.05	6.30	5.0	1.25	−1.0	+2.3

4/6 in test

Sta	+	H.O	−	Elev	Grade	cut	
91		6.3	5.1	1.2	−1.0	+1.2	
90			5.5	0.8	−1.0	+1.8	
89			4.9	1.4	−1.0	+2.4	
88			5.1	1.2	−1.0	+2.2	
87			4.7	1.6	−1.0	+2.6	
86			5.0	1.3	−1.0	+2.3	
85			4.7	1.6	−1.0	+2.6	
84			4.6	1.7	−1.0	+2.7	
83+78.9			5.6	0.7	−1.0	+1.7	E.C.
+50			1.7	4.6	−1.0	+5.6	
+25			5.5	0.8	−1.0	+1.8	
83			4.7	1.6	−1.0	+2.6	
82+75			4.3	2.0	−0.9	+2.9	
+50			4.3	2.0	−0.8	+2.8	
+38			4.2	2.1	−0.8	+2.9	B.C.

Traverse Pt. Loma Pipe Line. For Platting

Dist		Course		Latitude N	Latitude S	Departure E	Departure W
2967'	1	S.35° 15' W.			2423.0'		1712.4'
3367.0'	2	S63° 38' W.	28°23' R		1495.2	540	3016.7'
149.0	3	S.53° 42' W.	9°56' L		88.2	175	120.1
396.5	4	S32° 32' W	21°10' L		334.3	387	213.2
529.3	5	S14° 52' W	17°40' L		511.6	318.5	1358
353.4'	6	S38° 52' W.	24°00' R		275.2	445.0	271.7
824.4	7	S 50° 0' W	11°08' R		594.2	197	708.1
1600.0	8	S46° 06' W	3°54' L		1109.4	68	1152.9
1000.0	9	S50° 23' W	4°17' R		637.7	75	770.3
615.0	10	S54° 14' W	3°51' R		359.5	67	499.0
2083.5	11	S89° 15' W	35°01' R		27.3	701.0	2082.4
612.0	12	S64° 08' W	25°07' L		267.0	469	550.8
844.5	13	S48° 23' W	15°45' L		560.8	282.0	631.3
420.0	14	S18° 14' W	30°09' L		398.9	581.	131.4
1200	15	S36° 34' W	18°20' R		963.8	331.0	715.0
870.0	16	S29° 34' W	7°00' L		764.1	123.0	429.3
6655.0	17	S11° 54' W	17°40' L		6511.9	318.5	1372.2

First course. From 2'S & 2' W of center of Webster & Riley.

Sta (2) 72.4' W of center of Riley & Old Town Line.

At a point 783.5 from Sta (8) on course (8) to (9) pile of Rocks 20' to Right probably cor.

On course (16) to (17) Dists from Sta (16) to Pueblo Cors (610' to stake 191, 197 11' Left) (732' to cor 15A). 1720 to Stake marked N.W. 190) (3970 to S.W. cor 189) (4631' to Stake S.W. 181) (5285 to Stake N.E. 144) (6667 to cor 143) (6604 to S.E. 144)

Levels for S.B. Water Co at Pumping Station at Old Town

Oct 27 1892

Hamilton Lovell
Shaw Asst.

Sta	+	HI	−	Elev	
B.M.	0.74	18.26		17.52	top of Plank to bottom of well
#	5.58	14.48	9.76	8.50	s/k top of guard post near Lyons ave.
#	5.31	19.56	0.23	14.25	
B.M.			7.56	12.00	Top of N.E. Pier of Lion bridge
#	8.67	16.23	12.00	7.56	
#	4.04	15.64	4.63	11.60	
B.M.	2.77	15.48	2.93	12.71	Tack in west end of sill of front doorway Pump house
Top of well (?)			4.65	10.83	21.0

21.0
− 10.2
− 3.8
6.4 below mean tide

Top of well No 2 — 3.65 — 11.83

33.5
− 21.7
3.8
17.9 — below mean tide

10.83
3.87
14.70

21
14.7
6.3

10.83
8.87
19.70
21
0

21
19.7
11.7

11.83
8.87
20.70

33.5
20.7
12.8

+ 24.0
− 21.7
+ 2.3

+ 12.0
− 10.2
+ 1.8

Point Loma water pipe line

(Levels from Sta 0 to gate at Reservoir at Old Town)

Sta	+	H.I.	−	Elev	Grade	cut
Bench M.	4.43	276.43			272.00	
#			5.55	270.88	*	
0			10.12	266.31	260.4	+ 5.9
+50 #	0.78	267.09	1.4	265.7	259.5	+ 6.2
1			2.6	264.5	258.5	+ 6.0
+50			5.1	262.0	257.5	+ 4.5
2			8.1	259.0	256.5	+ 2.5
+50			10.1	257.0	255.5	x + 1.5
3			8.1	259.0	255.0	+ 4.0
+50			6.9	260.2	254.5	+ 5.7
4			8.9	258.2	254.0	+ 4.2
+50			11.3	255.79	253.5	+ 2.3
5 #	4.08	259.87	5.2	254.7	253.0	x + 1.7
+50			6.0	253.9	251.6	+ 2.3
6			7.7	252.2	250.25	+ 2.2
+50			9.1	250.8	248.9	+ 1.9
7			10.2	249.7	247.5	x + 2.2
+50			9.5	250.4	247.42	+ 3.0
8			8.5	251.4	247.33	+ 4.1

\# west bracket of ladder of Stand pipe

* top of fence post left of Sta 0

Point Loma water pipe line (Levels from Sta 0 to Reservoir) 44
at Old Town

Sta	+	HI	—	Elev	Grade	cut	
8+50		259.87	7.1	252.8	247.25	+ 5.5	
9			7.5	252.4	247.18	+ 5.2	
+50			8.0	251.9	247.09	+ 4.8	
10	0.64	250.52	9.99	249.88	247.00	+ 2.8	on hub
+17 △	0.64	250.52	1.3	249.2	247.0	X + 2.2	
+50			2.4	248.1	245.6	+ 2.5	
11			5.7	244.8	243.4	+ 1.4	
+50			8.4	242.1	241.2	+ 0.9	
12			10.0	240.5	239.0	X + 1.5	
+50			9.0	241.5	237.8	+ 3.7	
13			8.4	242.1	236.7	+ 5.5	
+50 #	1.84	240.73	11.63	238.89	235.5	+ 3.4	
+67 △			3.9	236.8	235.0	X + 1.8	
14			5.3	235.4	233.3	+ 2.1	
+50			8.8	231.9	230.6	+ 1.3	
15 #	1.24	230.00	11.97	228.76	228.00	+ 0.8	
+50			4.6	225.4	225.3	+ 0.1	
16			6.5	223.5	222.6	+ 0.1	
+50			7.4	222.6	220.0	X + 2.6	

Point Loma water pipe line

Levels from Sta 0 to Reservoir of Old Town

Sta	+	HI	—	Elev	Grade		Cut
17		230.00	7.7	222.3	219.0	x	3.3
+17			7.8	222.2	218.7		3.5
+50			7.4	222.6	218.0		4.6
18			9.3	220.7	217.0	x	3.7
#	2.29	221.44	10.85	219.15			
+50 #	3.03	213.57	10.90	210.54	210.5		0.0
19			8.3	205.3	204.0	x	1.3
+20							Wash 15' Wide 15' Deep
+50			9.3	204.3	203.0	x	1.3
20			8.4	204.7	203.0	x	1.7
+50 #	6.38	215.68	4.27	209.30	205.33		4.0
21			2.5	213.2	207.7		5.5
+50			1.1	214.6	210.0	x	3.6
22			3.6	212.1	205.7		6.4
+50			10.0	205.7	201.5		4.2
#	1.95	205.78	11.85	203.83			
23			6.2	199.6	197.2		2.4
+50			10.2	195.6	193.0	x	2.6
24			11.0	194.8	191.5		3.3

Point Loma water pipe line

Levels from Sta 0 to Reservoir 46 at Old Town.

Sta	+	H.I.	–	Elev	Grade	cut
		205.78				
#	0.55	194.54	11.79	193.99		
24+50			1.6	192.9	190.0	+ 2.9
#	0.50	183.21	11.83	182.71		
25			2.0	181.2	179.0	2.2
#	0.50	183.21	11.83	182.71		
+50	1.31	172.55	11.97	171.24	170.0	1.8
26			4.4	168.1	166.0	2.1
+50			4.4	168.1	165.0	3.1
27			9.0	163.5	161.0	2.5
#	0.33	160.95	11.93	160.62		
+50			2.3	158.6	156.6	2.0
28			6.3	154.6	153.0	1.6
+50			6.8	154.1	150.5	3.6
29 #	0.94	151.35	10.54	150.41	144.5	5.9
+12			8.4	142.9		Top of box mouth of tunnel
+50			8.1	143.2		
#	0.38	140.80	10.93	140.42		
30			6.8	134.0		

Point Loma water pipe line

Sta	+	HI	−	Elev	Grade	Rod
1		140.80				
#	0.40	129.71	11.49	129.31		
#	0.11	118.01	11.81	117.9		
31			7.2	110.8		
#	0.14	106.85	11.30	106.71		
#	0.12	95.30	11.67	95.18		
32			8.5	86.8		
#	0.05	84.23	11.12	84.18		
#	0.53	73.35	11.41	72.82		
33			8.5	64.8		
#	0.39	61.98	11.76	61.59		
34			7.9	54.1		
#	11.1	51.26	11.83	50.15		
#	0.31	39.64	11.93	39.33		
35			2.4	37.2		
#	0.25	28.65	11.24	28.40		
36			7.3	21.3		
# B.M.	1.38	18.88	11.15	17.50		top of Post at Lyon's corner.
37			9.4	9.5		
#	4.10	11.83	11.15	7.73		

Point Loma water pipe line

Sta	+	HI	−	Elev	Grade	cut	
		11.83					
38			6.2	5.6			
39			5.5	6.3			
40			7.1	4.7			
41			6.3	5.5			
42 #	5.74	11.44	6.13	5.70			
43			5.4	6.0			
44			5.0	6.4			
45			5.2	6.2			
+71.5	4.93	11.78	4.59	6.85		on transit point	
47			5.7	6.1			
48			5.1	6.7			
49			5.1	6.7			
50			5.4	6.4			
51			5.8	6.0			
52			6.7	5.1			
+71	7.23	11.48	7.53	4.25	2.0	2.3	Center of Riley & Webster. 8½
53			7.1	4.4	2.0	2.4	
54			5.4	6.1	2.0	4.1	

Point Tomw water pipe line

Sta	+	HI	–	Elev	Grade	cut
55		11.48	6.1	5.4	2.0	3.4
56			6.3	5.2	2.0	3.2
57			7.2	4.3	2.0	2.3
+20			6.8	4.7		
+45			2.9	8.6		
+70			7.1	4.4		
58			3.8	7.7	1.7	6.0
+10			2.5	9.0		
+50			8.2	3.3		
+90			7.0	4.5		
59			6.1	5.4	1.3	4.1
+15			2.6	8.9		
+35			7.6	3.9		
+69.4			6.13	5.35		
B.M.	4.36	9.35		4.99		On Street Center
60			3.8	5.6	1.0	+ 4.5
61			3.8	5.5	0.7	4.8
62			4.8	4.5	0.3	4.2
63			7.6	1.7	0.0	1.7

Point down water pipe line

Sta	+	HI 9.35	–	Elev	Grade	cut
64 #	4.97	7.53	6.79	2.56	0.0	2.6
65			5.0	2.5	0.0	2.5
66			5.5	2.0	0.0	2.0
67			6.3	1.2	0.0	1.2
68			3.4	4.1	0.0	4.1
69			2.6	4.9	0.0	4.9
70 #	4.70	9.10	3.73	4.40	0.0	4.4
71			4.9	4.2	0.0	4.2
72			5.1	4.0	0.0	4.0
73			5.5	3.6	0.0	3.6
74			5.8	3.3	0.0	3.3
75			6.1	3.0	0.0	3.0
76 #	4.65	7.42	6.33	2.77	0.0	2.8
77			4.7	2.7	0.0	2.7
78			5.0	2.4	0.0	2.4
79			4.6	2.8	0.0	x 2.8
80			5.6	1.8	-0.3	2.1
81			5.3	2.1	-0.6	2.7

Point Loma water pipe line

Sta	+	HI	—	Elev	Grade	+Cut	
82		7.42	5.9	1.5	-0.8	2.3	
+38			5.3	2.1			Center of Riley & Boundary lines B.C.
B.M. #	4.35	6.30	5.47	1.95			spk in fence post.
+50			4.3	2.0	-0.8	2.8	
+75			4.3	2.0	-0.9	2.9	
83			4.7	1.6	-1.0	2.6	
+25			5.5	0.8	-1.0	1.8	
+50			1.7	4.6	-1.0	5.6	
+79.9			5.6	0.7	-1.0	1.7	E.C.
84			4.6	1.7	-1.0	2.7	
85			4.7	1.6	-1.0	2.6	
86			5.0	1.3	-1.0	2.3	
87			4.7	1.6	-1.0	2.6	
88			5.1	1.2	-1.0	2.2	
89			4.9	1.4	-1.0	2.4	
90			5.5	0.8	-1.0	1.8	
91			5.1	1.2	-1.0	2.2	
92	5.00	6.25	5.05	1.25	-1.0	2.2	
93			5.2	1.0	-1.0	2.0	

Point Loma water pipe line

Sta	+	HI	—	Elev	Grade	cut
94		6.25	5.1	1.1	-1.0	2.1
95			4.9	1.3	-1.0	2.3
96			4.8	1.4	-1.0	2.4
97			4.9	1.3	-1.0	2.3
98			4.7	1.5	-1.0	2.5
99			5.2	1.0	-1.0	2.0
100 #	5.55	6.60	5.20	1.05	-1.0	2.0
101			5.1	1.5	-1.0	2.5
102			4.8	1.8	-1.0	2.8
103			5.5	1.1	-1.0	2.1
104			5.0	1.6	-1.0	2.6
105			5.3	1.3	-1.0	2.3
106			5.5	1.1	-1.0	2.1
107			5.4	1.2	-1.0	2.2
BM			4.17	2.43		Spike in post
108	4.34	5.34	5.6	1.00	-1.3	2.3
109			4.2	1.1	-1.5	2.6
110			4.4	1.0	-1.5	2.5
111			4.8	0.6	-1.5	2.1

Point loma water pipe line

Sta	+	HI	−	Elev	Grade	cut	
112		5.34	4.8	0.6	−1.5	2.1	
113			4.5	0.8	−1.5	2.3	
114			4.2	1.1	−1.5	2.6	
115			6.9	−1.6	−2.5	0.9	
#	4.56	5.56	4.45	0.89			
116			0.9	4.7	−1.5	6.2	
+50			3.7	1.9	−1.5	2.3	B.C.
+75			4.1	1.5	−1.5	3.0	
+99.6			4.8	0.8	−1.5	2.3	E.C.
117+88 = 0			3.0	2.3	−1.5	3.8	(117+88 = Sta 0 where line was begun near Hebrew Cemetery.
Did not check by 3' at this point.							
B.M.	5.57	5.30			−0.27		spk in tel pole
0 = 117+88			3.0	2.3	−1.5	3.8	B.C. 30° curve to left
+15			2.0	3.3	−1.5	4.8	I 21°10' tange 35.7'
+30			1.9	3.4	−1.5	4.9	Length of curve 70.6'
+45			1.3	4.0	−1.5	5.5	
+60			2.4	2.9	−1.5	4.4	
0+70.5			2.9	2.4	−1.5	3.9	E.C. 30° curve to left

Point Loma Water pipe line

Sta	+	HI	—	Elev	Grade	Bat	
1		5.30	4.0	1.3	-1.5	2.8	
2 #	12.10	11.68	5.72	-0.42	-1.5	1.0	
3			11.4	0.3	-1.0	1.3	
4			3.5	8.2	4.0	4.2	
+01.6			3.5	8.2	4.0	4.2	B.C. 30° curve to Left
+15			2.8	8.9	4.4	4.5	I 17°40'
+30			2.1	9.6	4.7	4.9	Semi tangt 29.7
+45			2.3	9.4	5.1	4.3	Length of curve 58.9'
+60.5			2.1	9.6	5.5	4.1	E.C. 30° curve to Left
5			2.7	9.0	6.5	2.5	
#	11.63	23.28	0.03	11.65			
6			10.0	13.3	11.0	2.3	
7			7.8	15.5	13.0	2.5	
8			6.1	17.2	15.0	2.2	
+99.2 #	12.10	35.22	0.16	23.12	21.0	2.1	B.C. 30° curve to Right
9 + 25			10.1	25.1	23.3	1.8	I 24° Semitangt 60.9
+50			7.0	28.2	25.5	2.7	Length of curve 120'
+75			4.4	30.8	27.6	3.2	
10			2.2	33.0	29.8	3.2	

Point Loma Water pipe line

Sta	+	HI	−	Elev.	Grade	Rod.	
#	6.9	41.7	0.42	34.80			
10 + 19.2			6.9	34.8	31.5	3.3	E.C. 30° curve to Right
11			3.1	38.6	35.5	3.1	
#	11.7	53.1	0.30	41.4			
+ 90			10.9	42.2	40.0	2.2	
12			7.5	45.6	41.6	4.0	
#	11.6	64.7	0.1	53.1			
+ 93.3			5.5	59.2	56.5	1.9	B.C. 30° curve to Right
13			5.1	59.6	57.5	2.0	I 11° Semitangent 18.4
+ 15			3.8	60.9	58.9	2.1	Leng th of curve 36.7
+ 30			2.5	62.2	60.3	2.7	E.C. 30° curve to Right
#	11.5	75.8	0.4	64.3			
14			6.6	69.2	67.0	2.2	
#	11.8	87.0	0.6	75.2			
15			8.8	78.2	76.3	8.9	
#	11.6	98.1	0.5	86.5			
16			8.4	89.7	87.5	2.2	
17			3.2	94.9	93.0	1.9	
18			0.5	97.6	95.2	2.4	
+ 36 = 54			0.3	97.8	96.0	1.8	Sta 18 + 36 = 54. on Preliminary line from Riley & Boundary

Point Loma Water pipe line

Sta	+	HI	−	Elev	Grade	cut
54.0		101.26	3.5	97.8	96.0	1.8 See book 26 Page 28 Preliminary
55			0.0	101.3	99.75	1.5 any levels taken for final
#	11.70	112.91	0.05	101.21		
56			7.5	105.4	103.5	1.9
57			3.2	109.7	107.3	2.4
#	3.66	116.16	0.41	112.5		
58			3.0	113.2	111.0	2.2
59			4.5	111.7	111.6	0.1
60			1.6	114.6	112.3	2.3
+20			3.0	113.2		
+65			16.0	100.2		Bottom of ravine
61			1.3	114.9	113.0	1.9
#	11.60	127.16	0.60	116.56		
+20			8.5	118.7		
62			3.3	123.9	121.5	2.4
B.M. #	11.93	138.91	0.18	126.98		stk in ground near Sta 62 with
63			6.7	132.2	130.0	2.2 witness along side
64			2.4	136.5	133.3	3.2
#	11.88	150.50	0.29	138.62		

Point Loma water pipe line

Sta	+	H.I.	−	Elev	Grad	cut
64		150.50				
+86			10.2	140.3	137.3	3.0
65			10.1	140.4	136.7	3.7
66			9.0	141.5	140.0	1.5
67			11.2	139.3	138.5	0.8
68			11.9	138.6	137.0	1.6
69			7.0	143.5	143.2	0.3
70			0.0	150.5	149.5	1.0
#	12.08	162.29	0.29	150.21		
71			5.6	156.7	155.8	
#	10.23	172.48	0.04	162.25		
72			8.7	163.8	162.0	
73			7.0	165.5	162.5	
74			5.1	167.4	163.5	
75			6.5	166.0	163.5	
76			6.1	166.4	164.0	
77			6.0	166.5	164.5	
78			4.9	167.6	165.0	
79			4.7	167.8	165.5	

Point Loma water pipe line

Sta	+	HI	—	Elev	Grade	cut
80		172.48	6.1	166.4	166.0	
B.M. #	2.25	168.60	6.13	166.35		Spk in ground near Sta 80 with
81			4.0	164.6		witness along side
82			6.4	162.2		
83			7.1	161.5		
84			10.9	157.7	156	
B.M. #	0.63	158.29	10.94	157.66		Spike in ground near Sta 84
#	0.17	146.73	11.73	146.56		with witness along side
85			1.5	145.2	144.0	
86			9.4	137.3	136.6	
#	0.07	135.37	11.43	135.30		
87			4.8	130.6	129.2	
88			10.6	124.8		
#	1.18	124.85	11.70	123.67		
89			9.1	115.8		
#	0.17	113.24	11.68	113.17		
90			4.0	109.2	107.0	
+15			4.9	108.3		
91			9.7	103.5	102.0	1.5

Point Loma water pipe line

Sta	+	HI	−	Elev	Grade	cut	
BM		113.24	11.61	101.63			Spike in ground near Sta 92
92			3.0	99.3	97.0	2.3	92 witness along side
93			3.5	98.8	96.3	2.5	
94			4.4	97.9	95.7	2.2	
95			5.8	96.5	95.0	1.5	
96			8.7	93.6	91.3	2.3	
97			12.0	90.3	87.7	2.6	
#	7.10	97.68	11.76	90.58			
98			13.0	84.7	84.0	0.7	
99			10.0	87.7	86.0	1.7	
100			7.7	90.0	88.0	2.0	
101			7.3	90.4	90.0	0.4	
102			4.9	92.8	92.0	0.8	
103			0.0	97.7	94.0	3.7	
#	11.87	108.81	0.74	96.94			
104			7.4	101.41	101.0	+0.4	
B.M. #	11.98	119.89	0.90	107.91			On scarf. stake marked Higo (?)
105			9.2	110.7	108.0	2.7	St near Sta 105
106			4.1	115.8	115.0	0.8	
#	11.50	130.72	0.67	129.22			

Point Loma water pipe line

Sta	+	H.I.	−	Elev	Grade	cut
107		130.72	6.4	124.3	122.0	2.3
#	10.70	140.70	0.72	130.00		
#	11.58	151.43	0.85	139.85		
108			8.1	143.3	141.0	2.3
#	11.89	162.65	0.67	150.76		
109.0			9.5	153.1	151.5	1.6
#	11.39	170.66	3.38	159.27		
110			6.5	164.1	162.0	2.1
+34.7 B.C.			2.4	168.3	163.0	5.3
+50			1.1	169.5	163.5	6.0
#	6.85	176.38	1.13	169.53		
+75			5.0	171.4	164.2	7.2
111			2.3	174.1	165.0	9.1
+25			7.8	168.6	163.2	5.4
+50			10.5	165.9	161.4	4.5
+60.2 E.C. #	0.53	165.06	11.85	164.53	160.7	3.8
112			5.1	160.0	157.7	2.3
#	0.52	154.16	11.42	153.64		
113			3.2	151.0	150.5	0.5

Point Lomas water pipe line

Sta	+	H.I.	–	Elev	Grade	cut	
114		154.16	8.1	146.1	143.2	2.9	
#	3.68	146.63	11.21	142.95			
115			8.1	138.5	136.0	2.5	
116			7.0	139.6	136.0	3.6	
#	2.45	139.36	9.72	136.91			
+70.9 B.C.			1.4	138.0	136.0	2.0	
117			2.8	136.5	134.3	2.3	
+25			4.6	134.7	133.5	1.2	
+49.7 E.C.			5.9	133.4	132.65	0.8	
118			6.6	132.7	131.0	1.7	
+50			5.5	133.8	132.4	1.4	
119			3.6	135.7	133.8	1.9	
#	10.29	148.27	1.38	137.98			
120			7.7	140.6	139.4	1.2	
B.M.			7.82	140.45			Spk near Sta 120
121 #	10.37	157.66	0.98	147.29	145.0	2.2	
122			7.3	150.4	148.0	2.4	
+90			4.9	152.8	151.0	1.8	
124			2.7	155.0	154.0	1.0	

Point Loma water pipe line

Sta	+	H.I.	—	Elev	Grade	Rod
1		157.66				
#	9.35	166.39	0.62	157.04		
125+03.6 B.C.			9.6	156.8	155.7	1.1
+25			7.9	158.5	156.1	2.4
+50			7.4	159.0	156.5	2.5
+75			7.5	158.9	156.9	2.0
126+04.1 E.C.			7.2	159.2	157.3	1.9
127			4.5	161.9	157.5	4.4
128			6.3	160.1	157.7	2.4
129			7.6	158.8	158.0	0.8
+28.5 B.C.			6.6	159.8	158.5	1.3
+50			2.8	163.6	159.5	4.1
#	9.64	172.15	3.88	162.50		
+75			6.5	165.6	160.7	4.9
130			7.3	164.8	162.0	2.8
+20.5 E.C.			7.2	164.9	162.0	2.9
131			6.7	165.4	162.0	3.4
132			8.1	164.0	162.0	2.0
133			4.2	167.9	166.0	1.9
#	6.96	178.12	0.99	171.16		

Point Loma water pipe line

Sta	+	HI	—	Elev	Grade	cut
134		178.12	8.6	169.5	166.5	3.0
135			10.0	168.1	167.0	1.1
136			8.1	170.0	167.5	2.5
137			4.4	173.7	172.7	1.0
#	8.35	185.67	0.80	177.32		
138			5.3	180.4	176.0	4.4
139			8.6	177.1	176.5	0.6
140			2.7	183.0	179.0	4.0
#	11.18	196.05	0.80	184.87		
141			4.8	191.2	189.0	2.2
+ 57.5 B.C.			2.6	193.4	191.3	2.1
+ 75			2.0	194.0	192.0	2.0
+ 92.5 E.C. #	11.53	205.99	1.59	194.46	192.7	1.7
142			11.5	194.5	193.0	1.5
143			9.5	196.5	195.0	1.5
144			7.2	198.8	197.0	1.8
145			4.8	200.2	199.0	1.2
146			7.7	198.3	197.0	1.3
147			5.4	200.6	199.2	2.0

Point Loma water pipe line

Sta	+	HI	–	Elev	Grade	cut	
148		205.99	4.1	201.9	199.2	1.4	
149			1.8	204.2	202.5	1.7	
#	12.10	216.27	1.82	204.17			
+94 = 150 +15.5; B.C			8.9	207.4	205.0	2.4	149+94 = 150+15.5 on corrected line from Sta 176; backed up to 150+15.5
150 + 25			8.8	207.5			
+50			8.4	207.9			
+74.3 E.C.			8.0	208.3			
151			8.3	208.0	205.4	2.6	
152			8.8	208.0	205.7	2.3	
153			8.1	208.2	206.0	2.2	
#	11.83	227.25	0.85	215.42			
154			12.5	212.8	211.0	1.8	
155 #	11.80	232.95	6.10	221.15	219.0	2.2	
156			9.1	223.8	222.0	1.8	
157			5.4	226.5	225.0	1.5	
#	10.73	241.11	2.57	230.38			
158			11.6	229.5	228.0	1.5	
159			8.8	232.3	231.0	1.3	
160			8.1	233.0	231.0	2.0	

Point Loma water pipe line

Sta	+	HI	–	Elev	Grade	cut
161		241.11	8.3	232.8	231.0	1.8
162			6.2	234.9	233.0	1.9
163			4.3	236.8	235.0	1.8
164 #	12.15	251.12	2.14	238.97	237.0	2.0
165			8.9	242.2	240.5	1.7
166			5.5	245.6	244.0	1.6
167			2.4	248.7	246.8	1.9
#	9.15	260.87	0.0	251.12		
168			9.5	250.9	249.5	1.4
169			7.5	252.9	251.3	1.6
170			5.9	254.5	253.0	1.5
171			4.5	255.9	254.5	1.4
172			3.0	257.4	256.0	1.4
173			1.6	258.8	257.0	1.8
#	5.39	263.63	2.13	258.24		
174			4.2	259.4	258.0	1.4
175			4.9	258.7	257.0	1.7
176			5.9	257.73	256.0	1.7
#	4.92	262.55	6.00	257.63		

Point Loma water pipe line

Sta	+	HI	−	Elev	Grade	Rock
177		262.55	5.61	256.94	156.0	0.9
178			5.23	257.32	156.0	1.3
179			4.91	257.64	156.0	1.3
180 #	4.76	263.9	3.41	259.14	157.75	1.4
181			2.87	261.01	259.5	1.5
182			4.82	259.08	257.7	1.4
183			9.76	254.14	253.25	0.9
#	1.90	254.20	11.60	252.30		
184			3.87	250.33	248.80	1.5
185			5.11	249.09	148.10	0.9
186			5.30	248.90	147.40	1.5
187 #	9.83	252.78	11.25	242.95	241.5	1.5
188			11.27	241.51	240.0	1.5
189			10.82	241.96	241.0	1.0
190			8.20	244.58	243.0	1.6
191			3.46	249.32	248.15	1.2
#	11.98	264.11	0.65	252.13		
192			9.25	254.86	253.30	1.6
193			6.56	257.55	256.0	1.6

Point Loma water pipe line

Sta	+	HI	−	Elev.	Grade	cut
194		264.11	4.23	259.88	258.0	1.9
195			2.28	261.83	260.0	1.8
#	8.80	271.65	1.26	262.85		
196			8.70	262.95	261.25	1.7
197			7.13	264.52	262.50	2.0
198			7.20	264.45	263.75	0.7
199			5.04	266.61	265.00	1.6
200 #	11.88	282.30	1.23	270.42	268.38	2.0
201			7.88	274.42	271.75	1.7
202			4.80	277.50	275.12	2.4
203 #	12.28	292.35	2.23	280.07	278.50	1.6
204			7.38	284.97	283.33	1.6
205			1.85	290.50	288.17	2.3
#	10.15	302.04	0.46	291.89		
206			7.60	294.44	293.0	1.4
#	8.03	302.47	7.60	294.44		
207			5.37	297.10	294.75	2.4
208			4.52	297.95	296.5	1.5
209			4.24	298.23	296.55	1.6

Point Loma water pipe line

Sta	+	H I	−	Elev	Grade	cut
210		302.47	4.40	298.07	296.6	1.5
211 #	5.78	303.94	4.31	298.16	296.5	1.7
212			6.09	297.85	296.53	1.3
213			5.68	298.26	296.50	1.6
214			5.93	298.01	296.50	1.6
215			3.26	300.68	298.90	1.8
#	7.00	309.43	1.51	302.43		
216			6.55	302.88	201.30	1.6
217			4.20	306.23	303.70	1.5
B.M.			1.08	308.35		

Top of Post cor of fence 30 east of. (?)

217+12.5 SW. cor. of 143

216+49 S.E. cor of 144

Pipe Line to Point Loma

62		
61		
60		
+69.4	Tang. △ = 23+68 ℄ Line	△ 2' South of cent of Juan & Riley
59		
58		
57		
56		
55		
54		
53		
+71	⊙ 89°57' L S22° W	⊙ 2' South & 2' West Cent of Webster and Riley
52		
51		
50		
49		
48		
47		
46		
45+71.5	⊙ 0° 38' R	⊙ 2' South & 2' west of center of Webster & Scott

82+08 △ 2' South of Sta 0 on A Line

80

79

78

77

76

75 △ Tang.

74

73

72

71

70

69

68

67

66

65

64

63

Sta	Deflection	Tang.
+ 38		
95		
94		
93		
92		
91		
90		
89		
88		
87		
86		
85		
84		
+ 79.9		28° 23'
+ 50	2° 59'	
+ 25	2° 30'	
83	2° 30'	
+ 75	2° 30'	
+ 50	2° 30'	
82 + 38	1° 12'	14° 11'

S 60° 54' W Tangent

P.C. 20° curve to Right
I 28° 23'
Semi tang 72.4
Length of curve 141.9

P.C. 20° to R

115
114
113
112
111
110
109
108
107
106
105
104
103
102
101
100
99
98
97
96

+88 = Sta 0

117

+99.6		8° 55'
+75	2° 28'	
+50	2° 30'	4° 50'

116

E.C. 20° curve to Left
I 9° 56' Length of curve
49.6 Sum tang 24.8
B.C. 20° curve to Left

55,45
266.31
271.76
963
262,13

150+17 B.C. 30° curve buffs
150+25 after dust
150+50 I 17°40 26.8
+70 E.C. 30°

150+12 1°57 B.C. 30° curve
+25 3°45
+50 3°09
+71 41 I 17°40'
EC 30° curve

150+15.5 1°25' B.C.
+25 3°45
150+50 3°39' 17°40
+74.8 E.C. 28.8

7 109
2
14 218
180
170 38 — off

1390
10.33
2.67

707
667
40

8.29

12.7

24.
.02
18.00

156
8.3
7.3
1.1
15 1

3.32
50
325
687
667
20
J

17.52

B.M. Lyons

ork.

	.8500
	.8667
	.8333
	.9000
	.9167
	.9333
	.9500
	.9667
	.9833
	1.0000

	%
	.0729

	11
	.9167

	Def. for 1 Foot
	2.10'
	2.20
	2.25
	2.30
	2.40
	2.50
	2.55
	2.60
	2.70
	2.80
	2.85
	2.90
	3.00
	3.15
	3.30
	3.45
	3.60
	3.75
	3.90
	4.05
	4.20
	4.35
	4.50
	4.65
	4.80
	4.95
	5.10
	5.40
	5.70
	6.00
	6.30
	6.60
	6.90
	7.20
	7.50
	7.80
	8.10
	8.40
	8.70
	9.00

Return to City Engineers Office
City Hall, San Diego, Cal.

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City Hall, San Diego, Cal.

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TABLE I.—Minutes in Decimals of a Degree.

1′	.0167	**11′**	.1833	**21′**	.3500	**31′**	.5167	**41′**	.6833	**51′**	.8500
2	.0333	**12**	.2000	**22**	.3667	**32**	.5333	**42**	.7000	**52**	.8667
3	0500	**13**	.2167	**23**	.3833	**33**	.5500	**43**	.7167	**53**	.8333
4	.0667	**14**	.2333	**24**	.4000	**34**	.5667	**44**	.7333	**54**	.9000
5	.0833	**15**	.2500	**25**	.4167	**35**	.5833	**45**	.7500	**55**	.9167
6	.1000	**16**	.2667	**26**	.4333	**36**	.6000	**46**	7667	**56**	.9333
7	.1167	**17**	.2833	**27**	.4500	**37**	.6167	**47**	.7833	**57**	.9500
8	.1333	**18**	.3000	**28**	.4667	**38**	.6333	**48**	.8000	**58**	.9667
9	.1500	**19**	.3167	**29**	.4833	**39**	.6500	**49**	.8167	**59**	.9833
10	.1667	**20**	.3333	**30**	.5000	**40**	.6667	**50**	.8333	**60**	1.0000

TABLE II.—Inches in Decimals of a Foot.

1-16	3-32	⅛	3-16	¼	5-16	⅜	½	⅝	¾	⅞
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729

1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

TABLE III.—Radii, Ordinates and Deflections.

Deg.	Radius	Mid. Ord.	Tan. Def.	Chd. Def.	Def. for 1 Foot	Deg.	Radius	Mid. Ord.	Tan. Def.	Chd. Def.	Def. for 1 Foot
0°10′	34377.	.036	.145	.291	0.05′	**7°**	819.0	1.528	6.105	12.21	2.10′
20	17189.	.073	.291	.582	0.10	20′	781.8	1.600	6.395	12.79	2.20
30	11459.	.109	.436	.873	0.15	30	764.5	1.637	6.540	13 08	2.25
40	8594.4	.145	.582	1.164	0.20	40	747 9	1.673	6.685	13.37	2.30
50	6875.5	.182	.727	1.454	0.25	**8**	716.8	1.746	6.976	13.95	2.40
1	5729.6	.218	.873	1.745	0.30	20	688.2	1.819	7.266	14.53	2.50
10	4911.2	.255	1.018	2.036	0.35	30	674.7	1.855	7.411	14.82	2.55
20	4297.3	.291	1.164	2.327	0.40	40	661.7	1.892	7.556	15.11	2.60
30	3819.8	.327	1.309	2.618	0.45	**9**	637.3	1.965	7.846	15.69	2.70
40	3437.9	.364	1.454	2.909	0.50	20	614.6	2.037	8.136	16.27	2.80
50	3125.4	.400	1.600	3.200	0 55	30	603.8	2.074	8.281	16.56	2.85
2	2364.9	.436	1.745	3.490	0.60	40	593.4	2.110	8.426	16.85	2.90
10	2644.6	.473	1.891	3.781	0.65	**10**	573.7	2.183	8.716	17.43	3.00
20	2455.7	.509	2.036	4.072	0.70	30	546.4	2.292	9.150	18.30	3.15
30	2292.0	.545	2.181	4.363	0.75	**11**	521.7	2.402	9.585	19.16	3.30
40	2148.8	.582	2.327	4.654	0.80	30	499.1	2.511	10.02	20.04	3 45
50	2022.4	.618	2.472	4.945	0.85	**12**	478.3	2.620	10.45	20.91	3.60
3	1910.1	.655	2.618	5.235	0 90	30	459.3	2.730	10.89	21.77	3.75
10	1809.6	.691	2.763	5.526	0.95	**13**	441.7	2.839	11.32	22.64	3.90
20	1719.1	.727	2.908	5.817	1 00	30	425.4	2.949	11.75	23.51	4.05
30	1637.3	.764	3.054	6.108	1.05	**14**	410.3	3.058	12.18	24.37	4.20
40	1562.9	.800	3.199	6.398	1.10	30	396.2	3.168	12.62	25.24	4.35
50	1495.0	.836	3.345	6.689	1.15	**15**	383.1	3.277	13.05	26.11	4.50
4	1432.7	.873	3.490	6.980	1.20	30	370.8	3 387	13.49	26.97	4.65
10	1375.4	.909	3.635	7.271	1.25	**16**	359.3	3.496	13.92	27.84	4.80
20	1322.5	.945	3 718	7.561	1.30	30	348.5	3.606	14.35	28.70	4.95
30	1273.6	.982	3.926	7.852	1.35	**17**	338.3	3.716	14.78	29.56	5.10
40	1228.1	1.018	4.071	8.143	1.40	**18**	319.6	3 935	15.64	31.29	5.40
50	1185.8	1.055	4.217	8.433	1 45	**19**	302.9	4.155	16.51	33.01	5.70
5	1146.3	1.091	4.362	8.724	1 50	**20**	287.9	4.374	17.37	34.73	6.00
10	1109.3	1.127	4.507	9.014	1 55	**21**	274.4	4.594	18.22	36.44	6.30
20	1074.7	1.164	4.653	9.305	1.60	**22**	262.0	4 814	19.08	38.16	6.60
30	1042.1	1.200	4.798	9.596	1.65	**23**	250.8	5.035	19.94	39.87	6.90
40	1011.5	1.237	4.943	9.886	1.70	**24**	240.5	5.255	20.79	41.58	7.20
50	982.6	1.273	5.088	10.18	1.75	**25**	231.0	5.476	21.64	43.28	7.50
6	955.4	1.309	5.234	10.47	1 80	**26**	222.3	5.697	22.50	44.99	7.80
10	929.6	1.346	5.379	10.76	1.85	**27**	214 2	5.918	23.35	46.69	8.10
20	905.1	1.382	5.524	11.05	1.90	**28**	206.7	6.139	24.19	48.38	8.40
30	881.9	1.418	5.669	11.34	1.95	**29**	199.7	6.360	25.04	50 07	8.70
40	859.9	1.455	5.814	11.63	2.00	**30**	193.2	6 583	25.88	51.76	9.00

TABLE V.—Middle Ordinates for Rails.

Deg. of Curve	LENGTH OF RAILS. 32	30	28	26	24	22	20	Deg. of Curve	LENGTH OF RAILS. 32	30	28	26	24	22	20
1°	.022	.020	.017	.015	.013	.011	.009	**16°**	.356	.313	.273	.236	.200	.170	.139
2	.045	.039	.034	.030	.025	.021	.017	**17**	.378	.333	.290	.252	.213	.180	.148
3	.067	.059	.051	.044	.038	.032	.026	**18**	.400	.351	.306	.265	.225	.190	.156
4	.089	.079	.068	.059	.050	.042	.035	**19**	.423	.371	.324	.280	.238	.201	.165
5	.112	.098	.086	.074	.063	.053	.044	**20**	.445	.392	.341	.296	.250	.212	.174
6	.134	.118	.103	.088	.075	.063	.052	**21**	.466	.410	.357	.309	.262	.222	.182
7	.156	.137	.120	.103	.088	.074	.061	**22**	.487	.430	.375	.325	.275	.233	.191
8	.179	.157	.137	.118	.100	.084	.070	**23**	.509	.450	.390	.338	.287	.243	.199
9	.201	.177	.154	.133	.113	.095	.078	**24**	.531	.469	.408	.354	.299	.253	.208
10	.223	.196	.171	.147	.126	.105	.087	**25**	.552	.486	.424	.367	.311	.263	.216
11	.245	.216	.188	.162	.138	.116	.096	**26**	.573	.506	.441	.382	.323	.274	.225
12	.268	.235	.205	.177	.151	.127	.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

CURVE FORMULÆ.

$T = R \tan. \frac{1}{2} I$

$T = \frac{50 \tan. \frac{1}{2} I}{\text{Sin. } D}$

$\text{Sin. } D = \frac{50}{R}$

$\text{Sin. } D = \frac{50 \tan. \frac{1}{2} I}{T}$

$R = T \cot. \frac{1}{2} I$

$R = \frac{50}{\text{Sin. } D}$

$E = R \text{ ex. sec. } \frac{1}{2} I$

$E = T \tan. \frac{1}{4} I$

$\text{Chord def.} = \frac{\text{chord}^2}{R}$

$\text{No. chords} = \frac{\frac{1}{2} I}{D}$

$\text{Tan. def.} = \frac{1}{2} \text{ chord def}$

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

Table IV. contains Tangents and Externals to a 1° curve. Tan. and Ext. to any other radius may be found, nearly enough, by dividing the Tan. or Ext. opposite the given central angle by the given degree of curve.

To find Deg. of Curve, having the Central Angle and Tangent: Divide Tan. opposite the given Central Angle by the given Tangent.

To find Deg. of Curve, having the Central Angle and External: Divide Ext. opposite the given Central Angle by the given External.

To find Nat. Tan. and Nat. Ex. Sec. for any angle by Table IV.: Tan. or Ext. of twice the given angle divided by the radius of a 1° curve will be the Nat. Tan. or Nat. Ex. Sec.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.), and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance: Multiply the angle by .01745, and the product by the distance.

RIGHT ANGLE TRIANGLES.—Square the altitude, divide by twice the base. Add quotient to base for hypothenuse.

Given Base 100, Alt. 10. $10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. 25. $25^2 \div 200 = 3.125$. $100 - 3.125 = 96.875$ = Base.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.