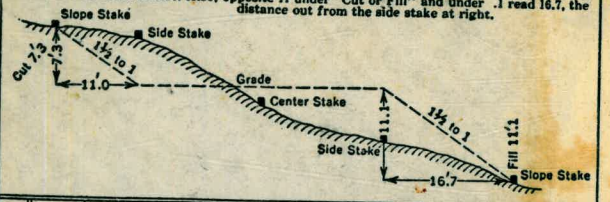
DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width. Side Slopes 1½ to 1.

In the figure below: opposite 7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



Cut or Fill	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	Cut or Fill
	Distance out from Side or Shoulder Stake										
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59.7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

KEUFFEL & ESSER CO., N. Y.

The paper in this book **No. F370A** is made of **50%** high grade rag stock with a **WATER RESISTING** surface sizing.

10,892-2. y, cc, ys. cM.

Intersection Elmonte &

El Capitan pipe lines 17

INDEX

Profile → ℄ El Monte P.L. King - Otten - 12-30-43

		H.I		Elev.	Grade	Cut
B.M.	0.04	443.51		443.47		
55			00	43.5	35.2	8.3
℄			0.1	43.4		
+50			0.1	43.4	35.1	8.3
℄			0.2	43.3		
56			0.0	43.5	35.0	8.5
℄			0.1	43.4		
+50			0.6	42.9	34.9	8.0
℄			0.5	43.0		
57			1.7	41.8	33.1	7.7
℄			1.5	42.0		
+50			2.6	40.9	31.3	8.6
℄			2.8	40.7		
58			4.5	39.0	29.5	9.5
℄			4.7	38.8		
+50			7.0	36.5	27.7	8.8
℄			7.4	36.1		

		443.51				
59			8.9	34.6	25.9	8.7
℄			9.2	34.3		
+50			10.6	32.9	24.8	8.1
℄			10.5	33.0		
B.C. 60			11.5	32.0	23.7	8.3
℄			11.5	32.0		
+50			12.5	31.0	22.6	8.4
℄			11.6	31.9		
P.R.C. +77.97			12.7	30.8	22.0	8.8
℄			13.2	30.3		
T.P.	0.47	431.31	12.67	430.84		
61			0.9	30.4	21.5	8.9
℄			1.2	30.1		
E.C. 61+54.94			2.3	29.0	20.0	9.0
℄			2.7	28.6		
62			3.8	27.5	18.6	8.9
℄			4.2	27.1		

		431.31				
62+50			5.7	25.6	16.8	8.8
℄			6.2	25.1		
63			7.7	23.6	14.9	8.7
℄			8.0	23.3		
+50			9.1	22.2	13.1	9.1
℄			9.4	21.9		
64			10.4	20.9	11.3	9.6
℄			10.5	20.8		
+50			12.3	19.0	09.5	9.5
℄			12.7	18.6		
T.P.	0.95	419.20	12.96	418.35		
65			2.9	16.3	07.7	8.6
℄			3.4	15.8		
+50			5.4	13.8	05.8	8.0
℄			5.9	13.3		
66			7.3	11.9	04.0	7.9
℄			7.7	11.5		

		419.20									
+50			8.9	10.3	02.2	8.1					
C			9.3	09.9							
67			9.8	09.4	400.4	9.0					
C			10.3	08.9							
+50			10.6	08.6	99.8	8.8					
C			11.0	08.2							
68			11.4	07.8	99.2	8.6					
C			11.8	07.4							
+50			12.2	07.0	98.6	8.4					
C			12.5	06.7							
69			12.6	06.6	98.0	8.6					
C			13.0	06.2							
T.P.[69]	1.72	408.29	12.63	406.57							
+50			2.3	06.0	97.4	8.6					
C			3.1	05.2							
70			3.2	05.1	96.8	8.3					
C			3.7	04.6							

		408.29									
75			7.3	01.0	92.6	8.4					
℄			7.9	00.4						Elev. Gr.	
+50			7.7	00.6	92.3	8.3		75+75		00.5	92.2
+75→								℄			
℄			8.2	00.1						00.0	
76			7.9	00.4	91.8	8.6					
℄			8.3	00.0							
T.P.	5.48	405.90	7.87	400.42			ON GINNEY STA. 76+00				
+50			5.7	00.2	91.1	9.1					
℄			6.1	99.8							
77			6.1	99.8	90.4	9.4					
℄			6.4	99.5							
B.M.			7.70	398.20	404.34	6.14 D.F.G. 6.12	County B.M. N. IN P.P. Lt. Sta. 77				
+50			6.0	99.9	91.1	8.8					
℄			6.2	99.7							
78			5.6	00.3	91.7	8.6					
℄			5.7	00.2							
+50			4.5	01.4	92.4	9.0					
℄			5.0	00.9							

		405.90				
79			1.7	04.2	95.5	8.7
℄			2.2	03.7		
T.P.	11.91	417.66	0.15	405.75		
+50			10.3	07.4	98.6	8.8
℄			10.6	07.1		
80			7.6	10.1	401.8	8.3
℄			7.8	09.9		
+50			5.4	12.3	04.9	7.4
℄			5.8	11.9		
81			3.6	14.1	06.1	8.0
℄			3.1	14.6		
+50			2.0	15.7	07.3	8.4
℄			2.2	15.5		
82			0.9	16.8	08.5	8.3
℄			0.5	17.2		
T.P	11.03	427.76	0.93	416.73		

		427.76				Cut		c	℄		
82+50			10.0	17.8	09.7	8.1					
℄			10.1	17.7		+2.3/10	+2.0/5	00/2.5	+0.1/10		
△ 83			8.5	19.3	10.6	8.7					
℄			8.8	19.0		+2.6/10	+2.0/5	00/7	+0.3/10		
+50			6.9	20.9	12.2	8.7					
℄			7.1	20.7		+2.0/10	+1.9/3.5	00/1	+0.2/10		
84			5.6	22.2	13.4	8.8					
℄			6.4	21.4		+3.0/10	2.4/3		+0.8/10		
+50			4.9	23.0	14.3	8.7			℄		
℄			4.4	23.4			+1.6/10	+1.4/2	-1.0/1	-0.4/10	
△ 85			4.1	23.7	15.2	8.5	+1.0/10	+0.4/2	-1.0/2	-0.6/10	
℄			3.5	24.3							
+50			3.2	24.6	16.0	8.6					
℄			2.6	25.2			+1.2/10	+0.9/2	-2.1/1.5	-0.6/10	
86			2.8	25.0	16.9	8.1					
℄			2.0	25.8			+1.7/10	+0.9/1	-1.5/1	-0.8/10	
+50			2.5	25.3	17.2	8.1					
℄			1.8	26.0			+1.5/10	+1.0/1	-1.2/1	-0.7/10	

		427.76								
87			2.0	25.8	17.5	8.3				
℄			1.7	26.1			+2.5/10'	+1.5/3'	-1.7/3'	+0.3/10'
+50			1.9	25.9	17.8	8.1				
℞			1.1	26.7			+1.6/10'	+1.1/1.5'	-1.0/3'	-0.8/10'
88			1.5	26.3	18.1	8.2				
℄			0.7	27.1			+0.6/10'	+0.6/2'	-1.0/4'	-0.8/10'
+50			0.9	26.9	18.4	8.5				
℄			0.5	27.3				+0.4/10'	-0.4/10'	
T.P.	0.66	427.51	0.91	426.85						
89			1.9	25.6	17.3	8.3				
℄			1.8	25.7			+1.8/10'	+1.5/2.5'	-0.1/10'	
+50			3.1	24.4	16.1	8.3				
℄			2.9	24.6			+2.3/10'	+2.0/1'	-0.3/4'	-0.2/10'
90			3.8	23.7	15.0	8.7				
℄			4.0	23.5			+2.2/10'	+2.2/2'	-0.7/10'	
+50			4.7	22.8	13.8	9.0				
℄			4.9	22.6			+2.2/10	+2.0/2'	-0.2/10'	

		427.51								
91			5.7	21.8	12.7	9.1		℄		
℄			5.9	21.6			+2.0/10'	+2.1/2'	+0.2/10'	
+50			6.8	20.7	11.6	9.1				
℄			7.3	20.2			+2.0/10'	+2.4/2.5'	+0.5/10'	
92			8.5	19.0	10.4	8.6				
℄			8.8	18.7			+2.0/10'	+2.0/2'	−0.8/1	−0.3/10'
+50			10.3	17.2	09.0	8.2				
℄			10.7	16.8			+2.2/10'	+2.4/3'	+0.4/10'	
93			11.9	15.6	07.6	8.0				
℄			11.6	15.9						
T.P.	2.24	416.91	12.84	414.67						
+50			2.6	14.3	06.2	8.1		℄		
℄			2.7	14.2						
94			3.5	13.4	04.8	8.6				
℄			3.7	13.2						
+50			4.1	12.8	03.4	9.4				
℄			4.6	12.3						

	416.91					
95		4.8	12.1	03.4		8.7
℞		5.1	11.8			
+50		5.5	11.6	03.3		8.3
℄		5.6	11.3			
96		5.5	11.4	03.3		8.1
℄		5.8	11.1			
+50		5.5	11.4	03.2		8.2
℄		6.0	10.9			
97		5.1	11.8	03.2		8.6
℞		5.8	11.1			
+50		4.3	12.6	03.1		9.5
℄		4.6	12.3			
98		3.9	13.0	03.1		9.9
℄		3.6	13.3			
+50		3.7	13.2	03.0		10.2
℄		3.3	13.6			

		416.91							℄	
99			4.2	12.7	03.0	9.7				
℄			4.4	12.5						
+50			5.1	11.8	02.9	8.9				
℄			5.6	11.3						
T.P.	3.64	415.41	5.14	411.77						
+68 ℄			4.05	11.36		Edge of Pav				
+94 ℄			4.69	10.72		" " "				
100			4.8	10.6	400.5	10.1				
℄			5.0	10.4						
B.M.	0.20	410.57 ~~409.57~~	5.04	410.37 ~~409.37~~	County B.M. 416.51 6.14 D.66 -6.12 City Datum	N. in P.P. # 175459 - Rt. 100+45 -				
+20 ℄			4.8	05.8						
~~+45 ℄~~			4.3	06.3						
+50			3.9	06.7	398.2	8.5			℄	
℄			6.3	04.3		-0.6 / 15'	+0.4 / 10'	+1.0 / 7	-2.7 / 9	-2.9 / 15
100+65.47 = S.91 H. 100+60.08			3.4	07.2	397.5	9.7				
W.6.N			7.4	03.2	397.5	5.7				
℄			3.3	07.3			-4.1 / 15'	-3.0 / 7	+3.7 / 8	+0.7 / 15'

X Section line Ahead - 100+60.08

		410.57 ~~409.57~~								
101			8.4	02.2	397.2	5.0				
℄			5.3	05.3			-3.1/15'	-2.2/4'	+5.2/10'	+4.9/15'
+50			9.0	01.6	96.7	4.9				
℄			5.5	05.1			-3.5/15'	-3.2/5'	+4.3/8'	+1.8/16'
102			8.8	01.8	96.3	5.5				
℄			5.3	05.3			-3.5/15'	-4.1/8	+0.4/15'	
+50			7.8	02.8	95.9	6.9				
℄			6.0	04.6			-0.3/15'		-2.5/5'	-1.8/15'
103			8.0	02.6	95.5	7.1				
℄			6.9	03.7			+0.5/15'		-1.0/3	-1.1/15'
+50			8.4	02.2	95.0	7.2				
℄			7.6	03.0						
104			8.5	02.1	94.6	7.5				
℄			8.1	02.5						
+50			9.0	01.6	94.2	7.4				
℄			8.6	02.0						
105			8.8	01.8	93.8	8.0				

		410.57 ~~409.57~~									
℄			8.8	01.8							
T.P.	5.48	407.23 ~~406.23~~	8.82	401.75 ~~400.75~~							
105+50			6.1	01.2	93.3	7.9					
℄			6.0	01.2							
106			6.6	00.6	92.9	7.7					
℄			6.7	00.5							
+50			7.1	00.1	92.9	7.2					
℄			7.1	00.1							
107			7.3	99.9	92.8	7.1					
℄			6.4	01.8							
+50			5.3	01.9	92.8	9.1					
℄			6.0	01.2							
GIN.-15' Rt. B.C. 108+01.20			5.4	01.8	92.7	9.1					
℄			6.4	00.8							
108 E.C. 74+28			5.8	01.4	92.7	8.7					
℄			6.7	00.5							

		407.23 ~~406.23~~				
109			6.3	00.9	92.6	8.3
℄			7.0	00.2		
B.C 109+45.78			6.4	00.8	92.6	8.2
℄			6.8	00.4		
110			6.1	01.1	92.6	8.5
℄			6.9	00.3		
+50			5.7	01.5	92.5	9.0
℄			6.2	01.0		
C.C. 110+98.76			5.1	02.1	92.5	9.6
℄			5.7	01.5		
111+50			3.7	03.5	92.4	11.1
℄			3.8	03.8		
T.P.	3.94	406.52 ~~405.52~~	4.65	402.58 ~~401.58~~		
△ 111+60.20	E.GIN		2.5	04.0	92.4	11.6
	N.GIN		2.7	03.8	92.4	11.4
℄			3.2	03.3		

		406.52 ~~405.52~~				
112			3.7	02.8	92.4	10.4
℄			4.1	02.4		
112+34.13 = 112+35.31	Back Ahead		4.9	01.6	91.8	9.8
℄			6.1	00.4		
			5.6	00.9		10' offset San Vicente Pk.
B.M			3.79	402.73 ~~401.73~~	co. 6.18 D 6.12	
		= 8				
	1A3	404.17		402.79		B.M. Nail in power pole NE Cor. Woodside & River sts.
112+76.13			4.3	99.9	91.1	8.8
℄			5.1	99.1		
113+08.13			4.6	99.6	90.8	8.8 End of Pipe - 3-1-44
℄			5.5			
113+16.6			6.0	98.2		End of Excav. for Pipe

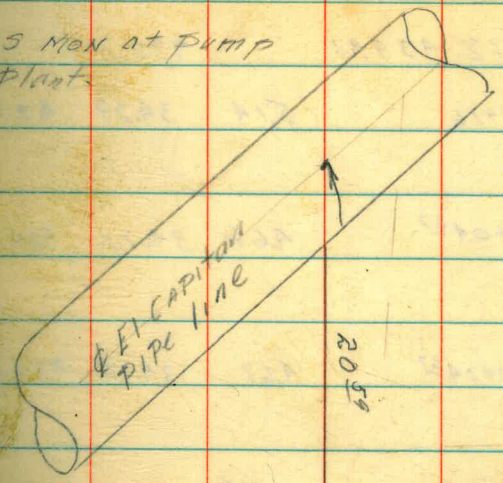
Intersection El Monte & El Capitan pipe lines

	5.20	437.91		432.71
0+18.06 PAV.	Top of pipe		8.21	29.70
L side PAV.	6' off.		3.01	34.90
R side	6' off		3.40	34.51
0+~~24~~ 12 PAV			2.99	34.92
L.H. side PAV	6' off		2.99	34.92
R side	6' off	N. Edge HWY PAV.	3.13	34.78
0+~~30~~ 06			2.90	35.01
L side	6' off		2.87	35.04
R side	6' off		2.84	35.07
~~0+38~~ 0+02.5 65 grd	Top pipe		7.98	29.93
L. side grd.	6' off		2.95	34.96
R. side	6' off		2.72	35.19

17.

Hill
Byler
King
Otten
Stevens
3-16-94

USGS Mon at pump plant



Inner pipe @ STA. 0+18.06

End El Monte pipe line

Top pipe

This line 30° Δ from pl. M.H.

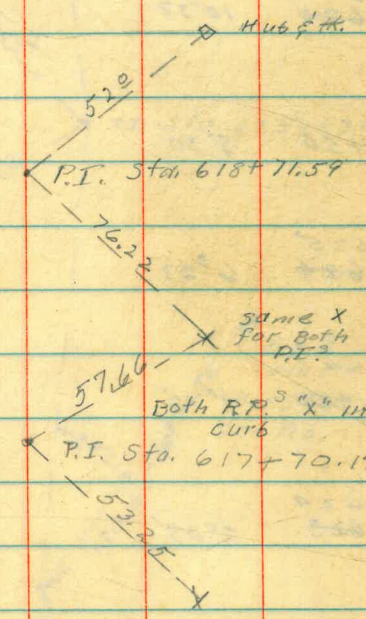
This line 31° ∠ off pl.

Grades for Valve Box Intersection

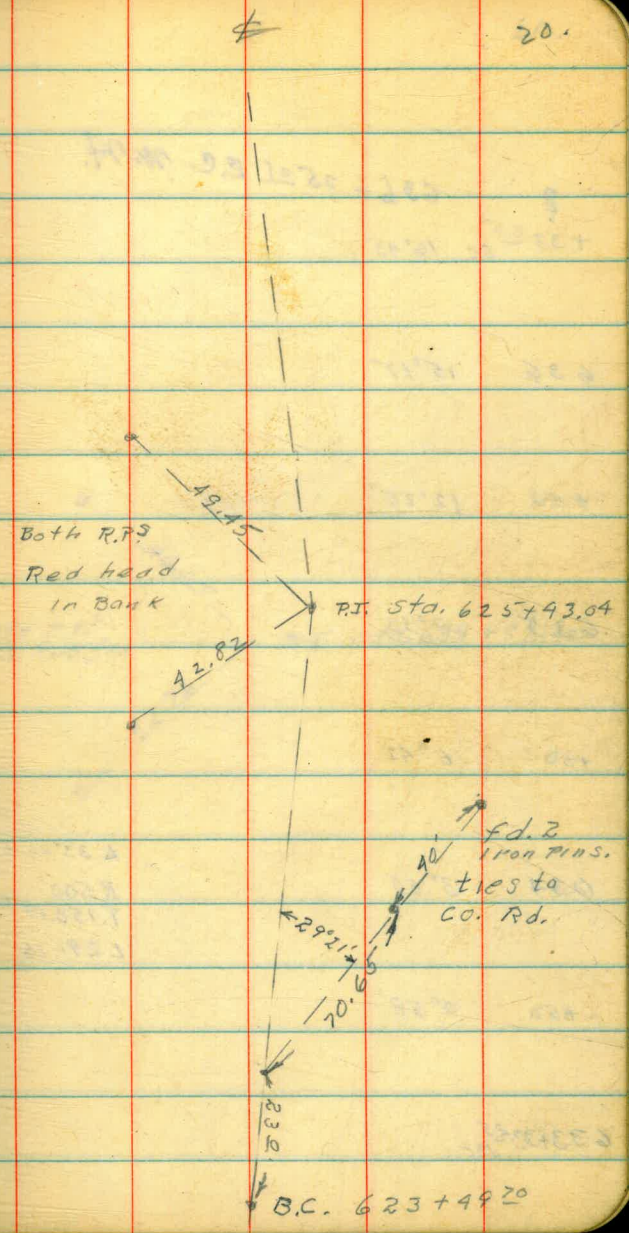
El Monte ℄						Cut
	6.72	439.43		432.71		
2' off S.E. cor	0+16		5.14	34.29	424.0	10.29
2' off N.E. cor	0+04.67		4.66	34.77	424.0	10.77
7' off N.W. cor	0+04.67		4.68	34.75	424.0	10.75
7' off S.W. cor	0+16		4.85	34.58	424.0	10.58

Re-alignment El Monte Pipe-line through Mission Gorge
(Cont) from F.B. 580 Page 78

+05 86 E.C.	3°56'	
		7°52' Lt.
		R 500'
		T 34.38'
619	3°36'	L 68.65'
+50	0°44'	
618+37 21 B.C.		
+39.64 E.C.	7°26'	
		Δ 14°52' Rt.
618	5°27'	R 500'
		T 65.24'
		L. 129.79'
+50	2°35'	
617+04 90 B.C.		



+26.29 E.C.	15°59'	
627 ~~626~~	14°52	
+50	12°45	
626 ~~625~~	10°37	
+50	8°30'	
625 ~~624~~	6°23	
+50	4°15	Δ 31°58' Lt. R 675' T 193.34' L 376.59'
624 ~~623~~	2°08'	
623 ~~622~~ +49.70 B.C.		



636 + 25.01 E.C. W.A.

? +33.25 EC. 16°43'

636 15°17'

+50 12°25'

635 9°33'

+50 6°42'

634 3°50 Δ 33°26' Lt. ✓ W.A.
R 500'
T 150.17'
L 291.76'

+50 0°58'

633+33.25 BC.

46.05

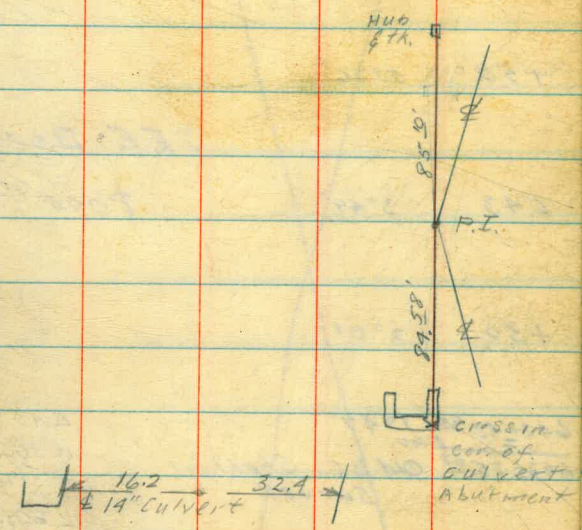
Both R.P.s
1x2 Hub & tk.

P.I. Sta. 634 + 83.42

43.76

See Bk. 598 pg. 1

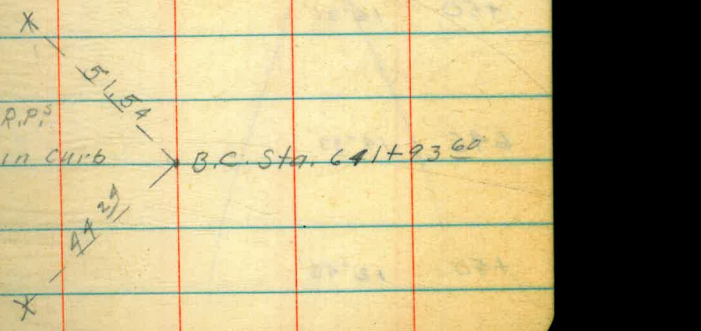
+68 61 E.C.	16°07'30"	
+50	15°04'	
640	12°12'	
+50	9°20'	
639	6°28'	A 32°15' Rt. R 500' T 144.56' L 281.43'
+50	3°36'	
638	0°44'	
637+87 18 B.C.		



645	10°58'
+50	9°11'
644	7°24'
+50	5°36'
643	3°49'
+50	2°01'
642+43.60 = EQU.	1°47'
642+25.60	Old B.C. Shelton Survey
642	0°14'
641+93.60	B.C.

SEE BOOK 598
Page II

Δ 43°34' Lt.
R 800'
T 319.71'
L 608.31'



~~See Bk 630 Pg. 11~~

SEE Book 598 Page 11

648+01 21'	E.C. 21°47'
+50	19°56'
647	18°08'
+50	16°21'
646	14°33'
+50	12°46'

Profile ℄ of realignment
El Monte pipe-line

Byler
King
Otten
Stevens
5-29-44 ℄

B.M. E.C. 501+44.72 Shelton Survey
Book 629 Page 50

	12.59	296.79		284.20		
497+29.74			2.0	294.8		
+50			1.8	295.0	PIPE 16.5	
498			4.3	292.5	PIPE 13.0	
+50			5.8	291.0	PIPE 15	
498+95.50 EC						
499			7.4	289.4	PIPE 17	
+50			8.9	287.9	PIPE 18	
500			10.2	286.6	PIPE 18	
+50			11.3	285.5	PIPE 18	

							502+94 ℄		
501.			12.0	284.8			PIPE 17		
TP			12.59	284.20					
	4.16	288.66							
+50			4.5	284.2			PIPE 17		
+81.21	B.C.								
502			5.7	283.6			PIPE 15		
+50			5.1	283.6			PIPE 13		
			9.05	279.61		El. line 18" culvert - 18' Lt			
502+94			11.36	277.30		El. line 18" culvert - 24' Rt			
			5.09	283.57		B.M. X center of headwall lt. of ℄			
503			5.0	283.7			PIPE 13		
+30.41	B.C.								
+50			4.9	283.8			PIPE 17		
+73.23	B.C.								
504			4.6	284.1			PIPE 17		

+50			4.1	284.6				PIPE 18		
505			3.9	284.8				PIPE 19		
+12 51	E.C.									
+50			4.0	284.7				PIPE 18		
506			4.2	284.5				PIPE 17		
+50			4.0	284.7				PIPE 15		
507			3.9	284.8				PIPE 15		
+50			3.7	285.0				PIPE 15		
508			3.0	285.7				PIPE 15		
+50			2.2	286.5				PIPE 17		

TP			5.68	293.57	
	12.65	306.22			
+50			13.0	293.2	
517			11.5	294.7	
+01.77	E.C.				
+50			10.0	296.2	
518			9.8	296.4	
+41.70	B.C.				
+50			9.7	296.5	
519			8.9	297.3	
+50			7.6	298.6	
+68.96	E.C.				
520			5.5	300.7	

℄

B.M. Marked U.S. 299.6 on Abutment

	PIPE 26
	PIPE 18
	PIPE 16
	PIPE 15
Culvert ?	
	PIPE 15
	PIPE 14
	PIPE 13
	PIPE 14

+50			3.0	303.2 ✓			PIPE 18		
521			0.4	305.8 ✓			PIPE 19		
+24 71 E.C.									
TP			0.39	305.83 ✓✓					
	862	314.45 ✓							
+50			6.2	308.3 ✓			PIPE 16		
522			4.6	309.9 ✓			PIPE 18		
+50			4.4	310.1 ✓			PIPE 24		
523			4.7	309.8 ✓			PIPE 31		
+50			5.5	309.0 ✓			PIPE 26		
524			6.0	308.5 ✓			PIPE 19		
+25 25 B.C.									

+50			6.1	308.4	✓
525			7.6	306.9	✓
+50			9.6	304.9	✓
+40.8' EG.					
TP 526			13.00	301.45	✓✓
	0.10	301.55	✓✓		
+50			2.4	299.2	✓
527			4.4	297.2	✓
+50			6.2	295.4	✓
528			7.8	293.8	✓

+25	PIPE ℄ / 16
	PIPE / 11
+85	PIPE / 10.3
	PIPE / 10.5
+25	PIPE / 10.5
+39	PIPE / 11
	PIPE / 11.0
	PIPE / 14.5
+28.01	PIPE / 14.8
+80.9	PIPE / 11.2
	PIPE / 10.5

+50			9.9	291.7 ✓			PIPE 8.4	
529			12.2	289.4 ✓			PIPE 9.2	
						+23	PIPE 11.1	
TP			12.99	288.56 ✓✓				
	0.10	288.66 ✓✓						
+50			2.2	286.5 ✓			PIPE 12.5	
530			5.1	283.6 ✓			PIPE 13.0	
+50			8.7	280.0 ✓				
						+57	PIPE 14.3	
	B.C.		9.2	279.5 ✓				
TP 531			12.67	275.99 ✓✓			PIPE 14	
	0.87	276.86 ✓✓						

+50			4.7	272.2 ✓			PIPE 13.3			
532			7.5	269.4 ✓			PIPE 13.2			
532+44.6	E.C.		9.5	267.4 ✓			PIPE 12.7			
+50			9.8	267.1 ✓						
533			12.2	264.7 ✓			PIPE 13.3			
TP			12.70	264.16 ✓✓						
	4.13	268.29 ✓✓								
+50			5.6	262.7 ✓			PIPE 14.7			
534			6.6	261.7 ✓			PIPE 14.3			
+50			6.8	261.5 ✓			PIPE 12.6			

		268.29 ✓									
534+18			6.24	262.05 ✓		top B.O. #47 Box ?					
496.98	E.C.		6.8	261.5 ✓				PIPE 10.8			
535+23			8.76 11.90	259.53 ✓ 256.39 ✓		Fl. line Fl. line	18" Culvert				
+50			6.8	261.5 ✓				PIPE 11.5			
536			6.7	261.6 ✓				PIPE 13.5			
+50			7.0	261.3 ✓				PIPE 13.5			
537			6.8	261.5 ✓				PIPE 13.1			
+50			6.3	262.0 ✓				PIPE 10.5			
538+00.69	E.C.		5.7	262.6 ✓				PIPE 9.5			

		268.29					℄		
538+21.2	B.C.		5.5	262.8			PIPE 9.4		
+50			5.3	263.0					
539			5.1	263.2			PIPE 11.9		
+50			4.5	263.8			PIPE 12.7		
540			4.3	264.0					
+11.80	E.C.		4.2	264.1			PIPE 16.2		
+13.81	B.C.		4.2	264.1					
+50			4.0	264.3			PIPE 15.1		
541			3.8	264.5			PIPE 11		

		268.29	✓							
+49.39 EC.			4.2	264.1	✓			PIPE 11		
			6.93	261.36	✓	Fl. line				
+63			10.30	257.99	✓	Fl. line 18" culvert				
			2.49	265.80	✓✓	B.M. = X in center headwall L. of ℄				
542			4.6	263.7	✓			PIPE 11		
TP +50			5.87	262.42	✓✓			PIPE 11.8		
	0.19	262.61	✓✓							
L +83.45			1.2	261.4	✓			PIPE 12.1		
543			1.6	261.0	✓					
+50			3.0	259.6	✓			PIPE 14.8		
544			4.0	258.6	✓			PIPE 13.7		
+50			4.5	258.1	✓					

		262.61 ✓								
544+62	B.C.		4.7	257.9 ✓			PIPE 13.0			
545			5.2	257.4 ✓			PIPE 13.5			
+50			6.2	256.4 ✓			PIPE 16.8			
546			7.3	255.3 ✓			PIPE 18.7			
+21.12	B.C.		7.8	254.8 ✓						
+50			8.1	254.5 ✓			PIPE 16.9			
547			8.5	254.1 ✓			PIPE 13.5			
+50			8.9	253.7 ✓			PIPE 10.7			
L: +80.05 ?			9.3	253.3 ✓			PIPE 9.3			

		262.61 ✓									
548			9.3	253.3 ✓			PIPE 9.3				
+24			11.63 13.75	250.98 ✓ 248.86 ✓	Fl. line Fl. line	18" Culvert					
+50			9.3	253.3 ✓			PIPE 9.3				
549			9.6	253.0 ✓			PIPE 9.3				
TP +50			9.63	252.98 ✓			PIPE 9.3				
	4.45	257.43 ✓									
∠ +62.12			4.3	253.1 ✓							
550			4.3	253.1 ✓			PIPE 11.4				
+50			4.6	252.8 ✓			PIPE 13.6				
551			4.8	252.6 ✓			PIPE 17.7				
+50			5.4	252.0 ✓			PIPE 20				

		257.43 ✓								
552			5.0	252.4 ✓						
L +20.0			4.7	252.7 ✓			Pipe 19.7			
+50			4.1	253.3 ✓			Pipe 20.8			
553			4.3	253.1 ✓			Pipe 22			
+50			4.3	253.1 ✓			Pipe 17.6			
554			5.1	252.3 ✓			Pipe 13.4			
L +50.12			5.7	251.7 ✓			Pipe 10.8			
			4.56	252.87 ✓✓	B.M. Marked U.S. 258.9 on Abutment					
+62			9.14 11.98	248.29 ✓ 245.45 ✓	Fl. line Fl. line	18" culvert				

		257.43 ✓								
555			5.5	251.9 ✓			PIPE 10			
+50			4.6	252.8 ✓			PIPE 11.1			
556			3.7	253.7 ✓			PIPE 13.7			
+58 10	B.C.		1.9	255.5 ✓			PIPE 13.3			
TP +75			1.32	256.11 ✓✓			PIPE 12.1			
	1.69	257.80 ✓✓								
557			0.7	257.1 ✓			PIPE 12			
						+25	PIPE 11.9			
+52 57	E.C.		2.0	255.8 ✓			PIPE 11.2			
557+63			2.88	254.92 ✓		TOP A.V. 42 & 43	BOX			
558			3.5	254.3 ✓			PIPE 12			

		257.80	✓								
+50			4.7	253.1	✓			Pipe 10.7			
+85.90	B.C.		5.2	252.6	✓			Pipe 10.3			
559			5.2	252.6	✓			Pipe 10.3			
+32			8.60 9.99	249.20 247.81	✓ ✓	Fl. line Fl. line	18" Culvert				
+50			5.7	252.1	✓			Pipe 11.2			
560			5.7	252.1	✓			Pipe 14.8			
+04.29	E.C.		5.7	252.1	✓						
+50			5.6	252.2	✓			Pipe 16			
561			4.9	252.9	✓						

		257.80 ✓								
+06.00	B.C.		4.8	253.0 ✓				PIPE 15.4		
+50			4.8	253.0 ✓				PIPE 13		
562			6.2	251.6 ✓				PIPE 12		
+55.08	E.C.		9.2	248.6 ✓				PIPE 15		
TP 563			11.64	246.16 ✓ ✓				PIPE 15		
	0.05	246.21 ✓ ✓								
+50			3.5	242.7 ✓						
+51			6.62 8.12	239.59 ✓ 238.09 ✓	Fl. line Fl. line		18" culvert			
+95.28	B.C.		6.1	240.1 ✓				PIPE 10.3		

		246.21 ✓						℄	
564			6.4	239.8 ✓					
+50			9.8	236.4 ✓				PIPE 10.5	
565			11.9	234.3 ✓				PIPE 10.3	
TP. +22 5/5			12.80	233.41 ✓✓	Top B.O.# 29 Box				
	5.30	238.71 ✓✓							
+50 26	E.C.		5.7	233.0 ✓				PIPE 10.4	
566			6.8	231.9 ✓				PIPE 14.6	
			8.60	230.11 ✓	Fl. line				
+52			10.41	228.30 ✓	Fl. line	18" culvert			
			5.26	233.45 ✓	B.M. = X center of headwall L of ℄				
+56 53/53	B.C.		7.1	231.6 ✓				PIPE 21	
567			6.8	231.9 ✓				22.8	

		238.71								
+50			6.0	232.7				PIPE 17		
568			5.5	233.2				PIPE 15		
+33.5	E.C.		5.3	233.4						
+50			5.2	233.5				PIPE 14.8		
569			4.4	234.3				PIPE 14		
+50			3.5	235.2				PIPE 14.3		
570			2.3	236.4				PIPE 13.3		
+30			4.25 6.22	234.46 232.49		Fl. line Fl. line	Pair 18" culverts			
TP +50			0.89	237.82				PIPE 10.6		

				237.82	✓✓					
	12.11	249.93 ✓✓								
571			9.9	240.0	✓					
+06 50	B.C.		9.5	240.4	✓		PIPE 11			
+50			7.1	242.8	✓		PIPE 11.2			
572			4.7	245.2	✓		PIPE 14			
+50			1.7	248.2	✓					
+72 50	E.C.		0.4	249.5	✓		PIPE 17.5			
TP			0.23	249.70	✓✓					
	3.84	253.54 ✓✓								
573			3.2	250.3	✓					

		253.54 ✓						℄			
+33.8'	B.F.		2.3	251.2 ✓				PIPE 19.4			
+50			2.3	251.2 ✓							
579			4.5	249.0 ✓				PIPE 30			
+50			6.7	246.8 ✓							
575			7.8	245.7 ✓				PIPE 2.8			
+27			10.41 13.70	243.13 ✓ 239.84 ✓	Fl. line Fl. line	18" culvert					
+50			8.5	245.0 ✓				PIPE 18.9			
+70 59	E.C.		8.6	244.9 ✓							
576+00 29	B.C.		8.8	244.7 ✓				PIPE 13.5			

		253.54							
+50			10.3	243.2			PIPE 8.1		
577			11.3	242.2			PIPE 11		
TP			11.70	241.84		Top B.O. 30 Bot 577 +62			
	5.46	247.30							
+99			9.72	237.58		Fl. line			
			15.80	231.50		Fl. line 18" Culvert			
			5.46	241.84		B.M. = X on center of head wall L of ℄			
+50			15.1	242.2			PIPE 14.9		
+91.01	E.C.		4.3	243.0			PIPE 15.7		
578			4.1	243.2					
L +50			2.1	245.2			PIPE 12.3		
TP			1.65	245.65					
	8.26	253.91							

		253.91 ✓	✓				℄			
579			6.3	247.6 ✓			PIPE 13			
+50			4.3	249.6 ✓						
+68.31 B.C.			4.0	249.9 ✓			PIPE 20			
580			4.1	249.8 ✓			PIPE 25.7			
+50			4.7	249.2 ✓			PIPE 26			
581			4.9	249.0 ✓			PIPE 21			
+50			5.4	248.5 ✓			PIPE 16.3			
+64.00 E.C.			5.6	248.3 ✓			PIPE 16			
582			5.9	248.0 ✓			PIPE 13.4			

		253.91						℄
+38°			6.4	247.5				
+50			6.5	247.4				pipe 11
583			7.1	246.8				pipe 9.6
+50			7.6	246.3				
+57.20	EF.		7.8	246.1				pipe 17.7
TP			8.27	245.64				
	7.67	253.31						
			10.90	242.41	Fl. line			
583+81			13.34	239.97	Fl. line	18" culvert.		
584			7.98	245.33	TP B.C. #34	DOX		
584			7.7	245.6				pipe 19.7

		253.31							
+50			7.6	245.7			PIPE 21.7		
585			7.6	245.7			PIPE 22.4		
+50			6.7	246.6			PIPE 22.3		
586			5.7	247.6			PIPE 22		
+50			4.7	248.6			PIPE 23.5		
+70			6.66 9.02	246.65 244.29	Fl. line Fl. line	18" culvert			Fd. 4/25/55 BEATTY
			3.41	249.90	B.M. = X on N.E. Cor. headwall L of ℄				
587			3.7	249.6			PIPE 22.5		
+50			2.9	250.4			PIPE 16.7		
+81.06	B.C.		2.3	251.0					

		253.31 ✓						℄		
588			2.0	251.3 ✓			PIPE 9.7			
+50			1.1	252.2 ✓			PIPE 16.6			
+63 $\frac{24}{}$ E.C.			0.9	252.4 ✓			PIPE 18.7			
TP 589			0.62	252.69 ✓✓			PIPE 29			
	10.73	263.42 ✓✓								
+40			9.18	254.24 ✓	TOP A.V. #46 BOX			Ely Cor of AV. Box CKS. 254.25 4/25/55		
+50			9.3	254.1 ✓			PIPE 0			
+70			17.30	246.12 ✓	Fl. line				Pipe line crosses ℄ leaves pavement	
			Could not locate outfall			18" culvert				
590			7.0	256.4 ✓						
+50			5.4	258.0 ✓						

249.90 BM.
7.78
257.68 KL
-11.1
246.58 E 18" CMP.
-3.43
254.25
-1.43
256.25 TP
13.05
269.30 KL
0.00
269.30 TP
11.12
280.42 KL
0.72
279.72 TP
12.65
292.37 KL
.02
292.35 TP

292.35 TP
11.64
303.99 KL
.34
303.65 TP
11.82
315.47 KL
1.09
314.38 TP
10.26
324.64 KL
0.41
324.23 TP
6.13
330.36 KL
2.45
327.91 TP

903
810

93

		263.42			
591			3.3	260.1	
+50			1.2	262.2	
TP			?0.09	263.51	Assumed to be + foresight A.R.
	12.46	275.97			
592			11.4	264.6	
+50			9.2	266.8	
593			7.5	268.5	
+50			5.7	270.3	
594			4.1	271.9	
+50			2.7	273.3	

		275.97			
594+60.2	B.C.		2.4	273.6	
595			1.4	274.6	
TP +50			0.10	275.87	
	11.57	287.44			
+91.29			10.9	276.5	
596			10.8	276.6	
+50			99	277.5	
597			8.7	278.7	
+50			7.5	279.9	
598			6.1	281.3	

		287.44			
+50			3.8	283.6	
599			1.8	285.6	
TP +50			0.01	287.43	
	12.88	300.31			
600			11.0	289.3	
+50			9.0	291.3	
601			6.9	293.4	
+50			4.6	295.7	
602			2.4	297.9	
TP +50			0.32	299.99	

				299.99
	12.23	312.22		
603			10.0	302.22
+50			7.8	304.4
∠ +58 60			7.3	304.9
604			5.5	306.7
+50			3.4	308.8
605			1.2	311.0
TP			0.02	312.20
	11.78	323.98		
+50			10.6	313.4
—			9.3	314.7

on Shaltons 605+50 El. 314.3

		323.98						
606			8.2	315.8			PIPE 27	Pipe line comes back to pavement
+50			5.9	318.1			PIPE 18	
607			2.2	321.8			PIPE 17	
TP			0.36	323.62				
	7.58	331.20						
+50			7.8	323.4			PIPE 12.9	
608			6.1	325.1				
608			5.34	325.86	U.S.G.S. MON. Marked 332 El.			1' Right of ℄
						+06	PIPE 10	
+20.60	B.C.		6.1	325.1			PIPE 11	
+37			4.14	327.06	Top M.H. for A.V.# 48			8' Right ℄

		331.20 ✓							
+50			5.8	325.4 ✓				PIPE 10	
609			7.3	323.9 ✓				PIPE 11.4	
+50			9.7	321.5 ✓				PIPE 14	
610			11.9	319.3 ✓				PIPE 18	
+50			13.1	318.1 ✓				PIPE 23	
TP			12.93	318.27 ✓✓					
	4.20	322.47 ✓							
611			7.6	314.9 ✓				PIPE 25	
+50			9.4	313.1 ✓				PIPE 23	
612			11.5	311.0 ✓				PIPE 16	
+32'12	EC.		12.5	310.0 ✓					

		322.47 ✓						℄	
612+45.7	B.C.		11.9	310.6 ✓				PIPE 12	
+50									
613			15.8	306.7 ✓				PIPE 13	
TP			12.95	309.52 ✓✓					
	0.76	310.28 ✓✓						PIPE 15	
+50			5.4	304.9 ✓					
614			8.6	301.7 ✓				PIPE 15	
+50			10.3	300.0 ✓				PIPE 15.5	
615			13.0	297.3 ✓				PIPE 15	
+51.72	E.C.		14.5	295.8 ✓				PIPE 15	

		310.28 ✓				
616			14.6	295.7 ✓		PIPE 13
TP			12.35	297.93 ✓✓		
	1.30	299.23 ✓✓				
+50			4.6	294.6 ✓		PIPE 11.4
			4.02	295.21 ✓✓	B.M. = Top stone gutter painted yellow R. side & near sta. 616+50	
617						
+04 90	B.C.		7.2	292.0 ✓		PIPE 11.5
+50			9.7	289.5 ✓		PIPE 11.5
618			9.5	289.7 ✓		PIPE 17
+34 61	E.C.		11.1	288.1 ✓		PIPE 30
						PIPE line leaves
+37 21	B.C.		11.2	288.0 ✓		

		299.23			
+50			11.6	287.6	
619			13.0	286.2	
+05 86	E.C.		13.1	286.1	
TP			12.65	286.58	
	3.82	290.40			
			4.8	285.6	on E.C. 619+11.4 Shelton El. 285.6
+50			4.7	285.7	
6 ~~5~~20			5.2	285.2	
+50			5.2	285.2	
6 ~~5~~21			5.2	285.2	

		290.40			
+50			5.1	285.3	
622			4.7	285.7	
+50			4.4	286.0	
623			4.0	286.4	
4920	B.C.		3.7	286.7	
624			3.0	287.4	
+50			2.1	288.3	
625			1.0	289.4	
TP			0.47	289.93	

				289.93	✓
	9.58	299.51	✓		
+50			8.9	290.6	✓
626			8.1	291.4	✓
+50			7.7	291.8	✓
627			7.3	292.2	✓
+26 29 E.C.			7.2	292.3	✓
+50			7.0	292.5	✓
628			6.1	293.4	✓
+50			5.4	294.1	✓

		299.51	✓		
629			4.7	294.8	✓
+50			4.2	295.3	✓
6.30			4.1	295.4	✓
+50			3.5	296.0	✓
631			2.9	296.6	✓
+50			2.5	297.0	✓
632			2.0	297.5	✓
+50			1.6	297.9	✓
6.33			1.1	298.4	✓

		299.51			
TP 633+33.25			0.51	299.0	
	12.58	311.58			
+50			12.2	299.4	
634			11.0	300.6	
+50			8.8	302.8	
635			6.5	305.1	
+50			3.8	307.8	
636			1.1	310.5	
TP			0.08	311.50	
	12.04	323.54			
+33.25	E.C.		11.4	312.1	

		323.54			
636+50			9.6	313.9	
637			5.4	318.1	
+50			1.4	322.1	
TP			0.40	323.14	
	12.38	335.52			
637+87.5 B.C.			10.4	325.1	
638			9.5	326.0	
~~+30 ± 46 ±~~					Culvert ?
+50			6.1	329.4	
639			2.8	332.7	
TP			0.63	334.89	

				334.89	✓				℄		
	12.17	347.06 ✓✓									
639+50			10.6	336.5	✓						
640			6.9	340.2	✓						
+50			3.4	343.7	✓		+5.3 / 13	toe −0.2 / 7	−0.2 / 6		
+68.61	E.C.		2.4	344.7	✓	+7.7 / 20	+7.7 / 14	toe 0 / 5.0	+0.5 / 6	on pav.	
TP			0.62	346.44	✓						
	12.50	358.94 ✓✓									
641			12.4	346.5	✓	+12.0 / 22	+10.2 / 15	−0.2 / 45	0.0 / 4	on pav.	
+50			9.4	349.5	✓		+14.0 / 22	+12.6 / 14	0.0 / 8	on pav.	
641+93.6	B.C.		2.8	356.1	✓		+8.2 / 15	+7.2 / 9	−4.6 / 6	−4.0 / 12	on pav.

See BK 598 Page 6

(see Bk. 598 Pg. 6)

		358.94 ✓							
642+18.60			+ 4.0	362.9 ✓					
642+43.60			+ 2.2	361.1 ✓					
			3.32	355.62 ✓					
			0.60	358.34 ✓					

℄

+1.0 / 15	−9.6 / 11	−9 / 17	on pav	
+4.0 / 14	+1.5 / 9	−0.5 / 6	−7.7 / 13	−7.0 / 20

O.M. gimmey 8' off. Shelton Sta. 642+50
El. 355.64

B.M. set on headwall L.H. side H.W.Y. 100' ± Ahead B.C.

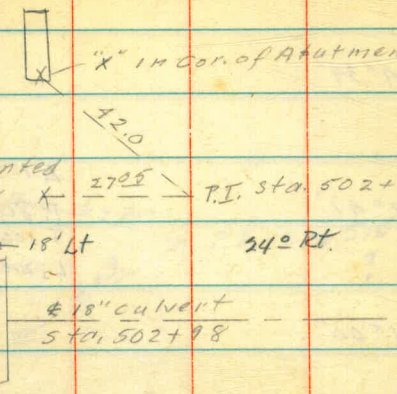
Revision from Sta. 497+29.34 to Sta.

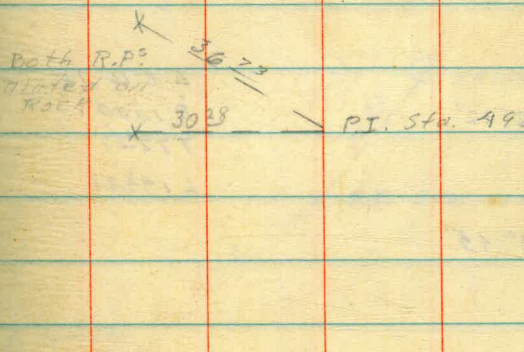
See Book 580 Page 56-64

+30.41	10°41'	
503	8°30'	
+50	4°56'	
		Δ 21°22' Lt.
		R 400
		T 75.46
502	1°21'	L 149.17
501+81.24 B.C.		
+95.50 E.C.	11°54'	
+50	8°37'	
		Δ 23°48' Lt.
498	5°02'	R 400
		T 84.29
		L 166.16
+50	1°27'	
497+29.34 B.C.		

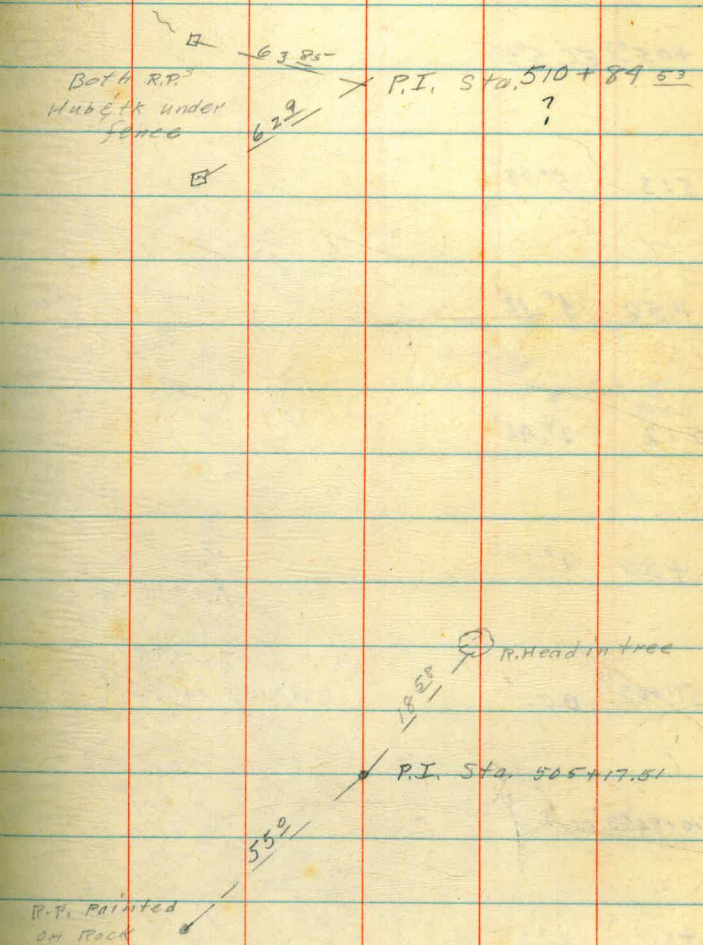
6-2-44

Byler
King
Otten
Stevens





510	4°34'	
+50	2°47'	Δ 15°12' Rt. R 800 T 106.74 L 212.23
509	1°00'	
508+72.30 B.C.		
+17.51 E.C.	4°08'	
505	3°38'	
+50	2°12'	Δ 8°16' Lt. R 1000 T 72.27 L 144.28
504	0°45'	
503+73.23 B.C.		



+05 03 E.C. 5°47'

513 5°38'

+50 4° 12'

512 2° 46'

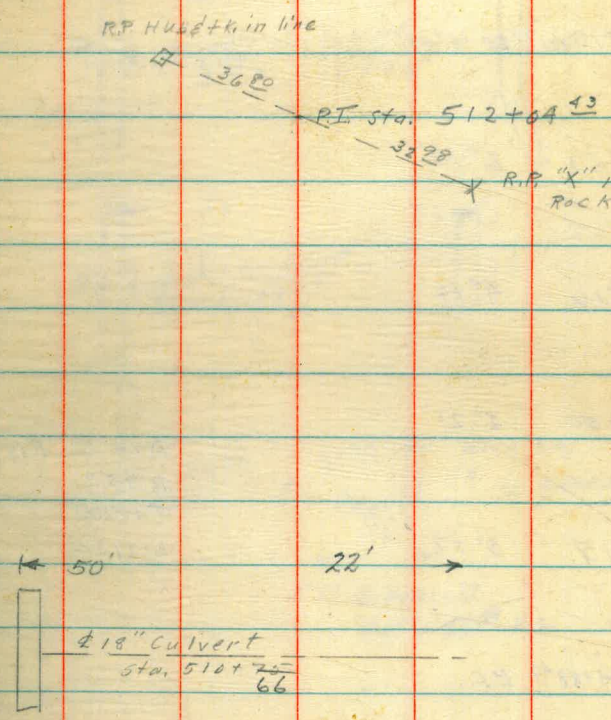
+50 1° 20'

Δ 11°34' Lt.
R 1000'
T 101.28'
L 201.88

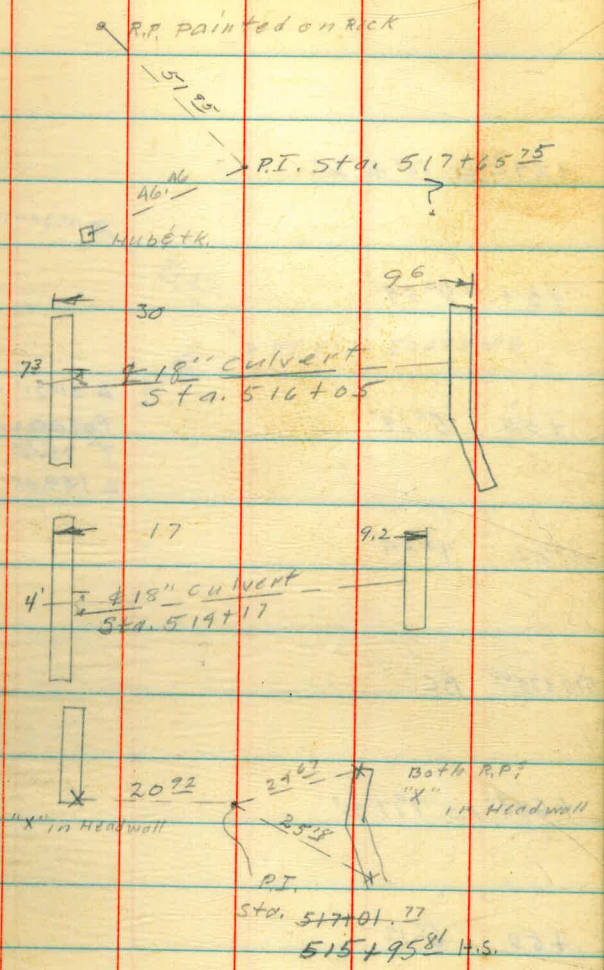
511+03 15 B.C.

510+84 53 E.C. 7° 36'

+50 6° 21'



			Δ 14° 35'	Lt
			R 500'	
			T 63.98	
+50	0° 29'		L 127.26	
518+41.70 B.C.				
517+01.77 E.C. 8° 09'				
+50	6° 10'			
516	4° 16'			
+50	2° 21'		Δ 16° 18'	Rt.
			R 750'	
			T 107.41	
515	0° 27'		L 213.37	
514+88.40 B.C.				



+24.21 E.C. 10° 40' 30"

521 8° 54'

+50 5° 19'

520 1° 44'

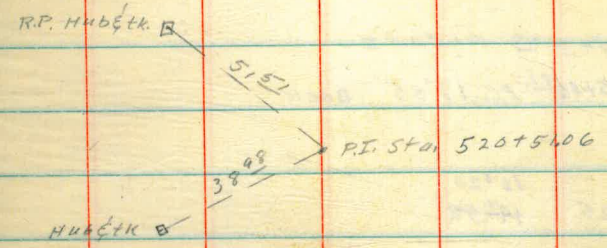
519+75.66 B.C.

+68.96 E.C. 7° 7' 30"

+50 6° 12'

519 3° 20'

Δ 21°21' Lt.
R 400
T 75.40'
L 149.05



524+25.00
1 5.56
4 0 81

Continued Book 580 Page 65

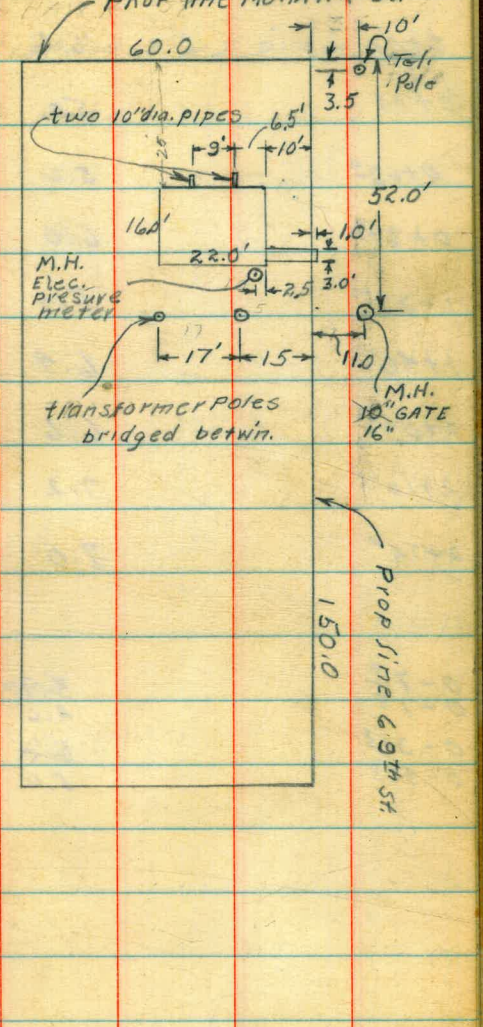
~~525+39.22 Ahead =~~

525+40.81 E.C. 18°55' Back

+25	16°20' ~~14°52'~~		
525	12°15 ~~11°41'~~		
+75	8°08' ~~8°30'~~	Δ 37°50 R 175' T 59.97 L 115.56	R.P. Painted on Rock P.I. Sta. 524+85.27
+50	4°04' ~~5°19'~~		R.P. Painted on Rock
~~+25~~	~~2°58'~~		
524+25.75 B.C.			

LOCATION of BULDING & OTHER PARTS COR. 69th & MOHAWK ST.'S

BYLER 1-18-44
KING.
OTTEN



8-29-44
Byler-King
Otten-Stephens

76

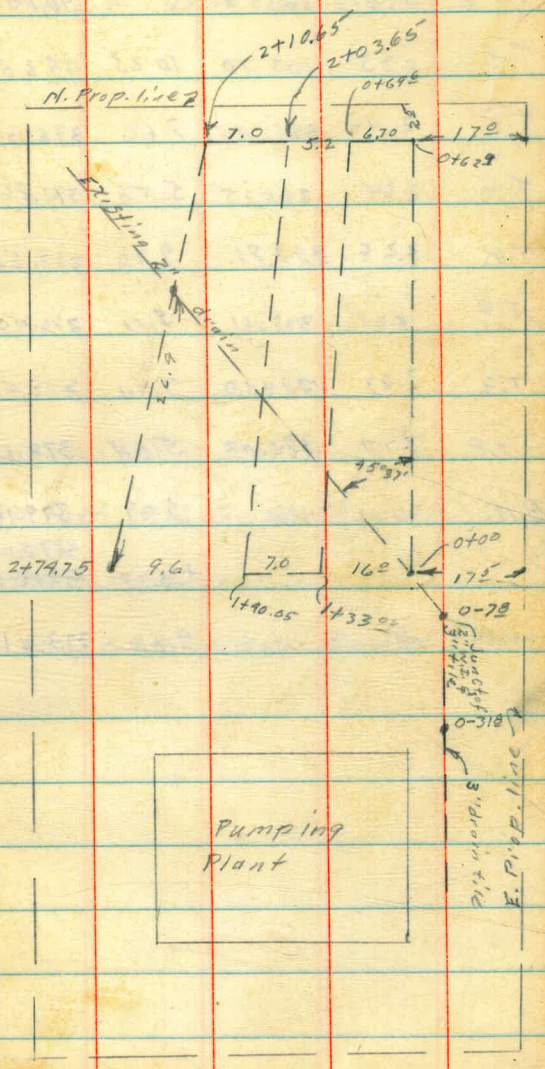
	Layout +	Grades for Drain H.I.	tile 69th & Mohawk -	El.	Grade	See page 77 for offset Cuts Cut or fill				
	4.90	404.90		400.00		Assumed Datum B.M. nail in W. trans. pole				
0+00			6.1	398.8		fl. line of existing 2" W.I. Drain				
0+00			5.0	399.9		grnd. el. over pipe				
0+62.9			5.2	399.7	398.60	1.1				
0+69.9			6.0	398.9	397.80	1.1				
1+33.05			5.9	399.0	397.6	1.4				
1+40.05			6.4	398.5	397.4	1.1				
2+03.65			6.6	398.3	397.2	1.1				
2+16.65			7.2	397.7	396.6	1.1				
2+74.4			7.0	397.9	396.4	1.5				
0-7.8			5.7	399.2		Top of 2" W.I. Pipe				
0-7.8			4.6	400.3		grd. El.				
0-31.8			6.1 ~~0~~	398.8 ~~9~~		Top of 3" drain tile				
0-31.8			5.0	399.9		Grd. El.				

Grades for drain tile
69th & Mohawk Sts.

					Grade	Cut
	4.87	404.87		400.00		
0+00			4.7	400.2	398.8	1.4
+31.5			4.7	400.2	398.7	1.5
+62.9			5.2	399.7	398.6	1.1
+69.6			5.9	399.0	397.8	1.2
1+00			5.7	399.2	397.7	1.5
+33.05			5.7	399.2	397.6	1.6
+40.05			6.1	398.8	397.4	1.4
+70			6.2	398.7	397.3	1.4
2+03.65			6.4	398.5	397.2	1.3
2+10.65			7.2	397.7	396.6	1.1
+42			7.0	397.9	396.5	1.4
+74.35			6.7	398.2	396.9	1.8

8-29-44
Byler
King
Otten
Stephens

Location of Drain Tile
69th & Mohawk Sts.



Levels - Lakeside - Riverview P.R.

B.M.	0.57	409.58		409.01	
T.P.	4.35	403.70	10.23	99.35	
T.P.	2.40	398.44	7.66	396.04	
T.P.	2.39	395.25	5.58	392.86	
T.P.	3.26	388.81	9.70	385.55	
T.P.	4.21	387.61	5.41	383.40	
T.P.	3.83	384.30	7.14	380.47	
T.P.	3.77	382.43	5.64	378.66	
B.M.			3.29	379.14	
				383.20	
			+ 0.77	~~381.66~~	382.17
			9.02	373.41	

KING-otten
1-6-44

N. IN P.R. #72615 - USGS. River + Woodside

Top Bolt N.W. Cor. Valve Chamber

N. IN Booster Pump House

Top Pipe - El Capitan + Pipe from Booster P. House

B.M.	4.66	384.69		380.03
T.P.	8.34	389.56	3.47	381.22
T.P.	10.96	396.63	3.89	385.67
T.P.	7.50	401.70	2.43	394.20
	12.05	411.42	2.35	399.37
			1.58	409.84
B.M.	1.58	410.59		409.01
T.P.	2.60	403.19	10.0	400.59
T.P.	4.47	401.35	6.31	396.88
T.P.	1.86	397.56	5.65	95.70
T.P.	0.59	393.45	4.70	392.86
T.P.	3.85	388.65	8.65	384.80
T.P.	4.06	387.24	5.47	383.18
T.P.	3.57	384.20	6.61	380.63
T.P.	3.77	382.51	5.46	378.74
			3.34	379.17

110315
20188
1305.03

58.86
19.64
3922

5184170
12336
468.96

6234970
19334
59304

5037323
14428
51751

4977293.4
8129
1363

2.10733
400
84.293200

8124
7546
502.5670

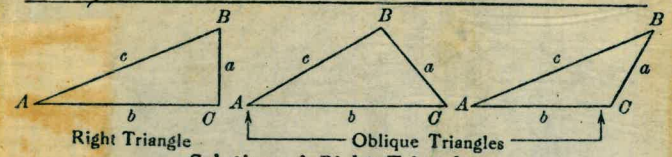
519475.66
14905
21.29.71

514+8840
21337
517.6177

1335
54
8200
8250
8250

403.17
1.32
401.9
92.4
9.5

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\operatorname{cosec} = \frac{c}{a}$

Given	Required	
a, b	A, B, c	$\tan A = \frac{a}{b} = \cot B,\ c = \sqrt{a^2+b^2} = a\sqrt{1+\frac{b^2}{a^2}}$
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B,\ b = \sqrt{(c+a)(c-a)} = c\sqrt{1-\frac{a^2}{c^2}}$
A, a	B, b, c	$B = 90° - A,\ b = a \cot A,\ c = \frac{a}{\sin A}.$
A, b	B, a, c	$B = 90° - A,\ a = b \tan A,\ c = \frac{b}{\cos A}.$
A, c	B, a, b	$B = 90° - A,\ a = c \sin A,\ b = c \cos A,$

Solution of Oblique Triangles

Given	Required	
A, B, a	b, c, C	$b = \frac{a \sin B}{\sin A},\ C = 180° - (A+B),\ c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a},\ C = 180° - (A+B),\ c = \frac{a \sin C}{\sin A}$
a, b, C	A, B, c	$A + B = 180° - C,\ \tan \frac{1}{2}(A-B) = \frac{(a-b)\tan\frac{1}{2}(A+B)}{a+b},$ $c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$s = \frac{a+b+c}{2},\ \sin\frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{bc}},$ $\sin\frac{1}{2}B = \sqrt{\frac{(s-a)(s-c)}{ac}},\ C = 180° - (A+B)$
a, b, c	Area	$s = \frac{a+b+c}{2},\ \text{area} = \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	$\text{area} = \frac{b\,c \sin A}{2}$
A, B, C, a	Area	$\text{area} = \frac{a^2 \sin B \sin C}{2 \sin A}$

REDUCTION TO HORIZONTAL

Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle = 5° 10′. From Table, Page IX. cos 5° 10′ = .9959. Horizontal distance = 319.4×.9959=318.09 ft.

Horizontal distance also = Slope distance minus slope distance times (1—cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained. Cosine 5° 10′ = .9959. 1 — .9959 = .0041. 319.4×.0041=1.31. 319.4—1.31=318.09 ft.

When the rise is known, the horizontal distance is approximately:—the slope distance less the square of the rise divided by twice the slope distance. Thus: rise=14 ft., slope distance=302.6 ft. Horizontal distance $= 302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$ ft.