43° 35'

City Engr #1541

N 1° 30' E

3° 37'

Our Leather Bound Engineers Note Books are carried in the following rulings:

No. 380 LEVEL BOOK. Left and Right Hand Page the same as Left Hand Page of this Book.

No. 382 FIELD BOOK. Left Hand Page as in this Book, Right Hand Page 4 x 4 to the inch, Center Line Red.

No. 384 MINING TRANSIT BOOK. Left Hand Page as in this Book, Right Hand Page 8x8 to the inch, Center Line Red.

No. 385 FIELD BOOK. Left Hand Page as in this Book, Right Hand Page 8 vertical and 4 horizontal lines to the inch, Center Line Red.

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THE FREDERICK POST CO.

ENGINEERING and DRAFTING SUPPLIES

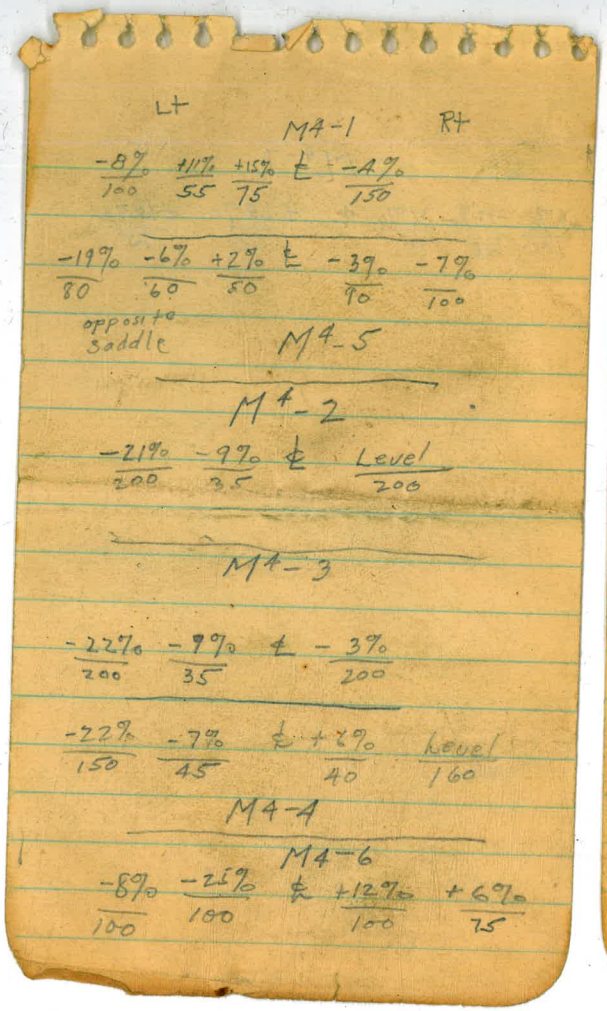
IRVING PARK STATION

CHICAGO, ILL.

Index (cont.)

1541

Index



Lt M4-1 Rt

-8% / 100 +11% / 55 +15% / 75 ℄ -4% / 150

-19% / 80 -6% / 60 +2% / 50 ℄ -3% / 90 -7% / 100

opposite Saddle M4-5

M4-2

-21% / 200 -9% / 35 ℄ Level / 200

M4-3

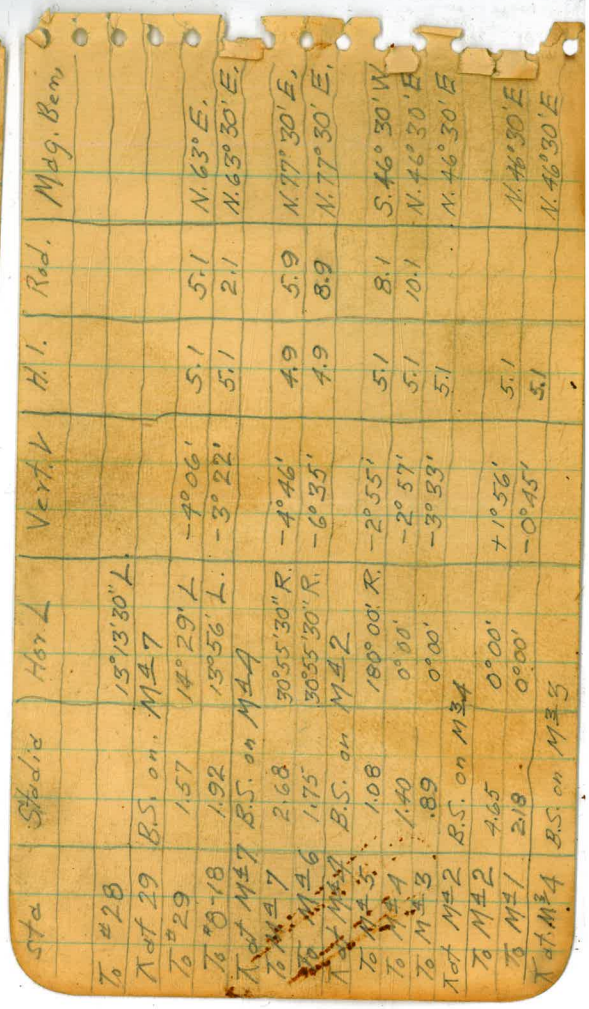
-22% / 200 -9% / 35 ℄ -3% / 200

-22% / 150 -7% / 45 ℄ +8% / 40 Level / 160

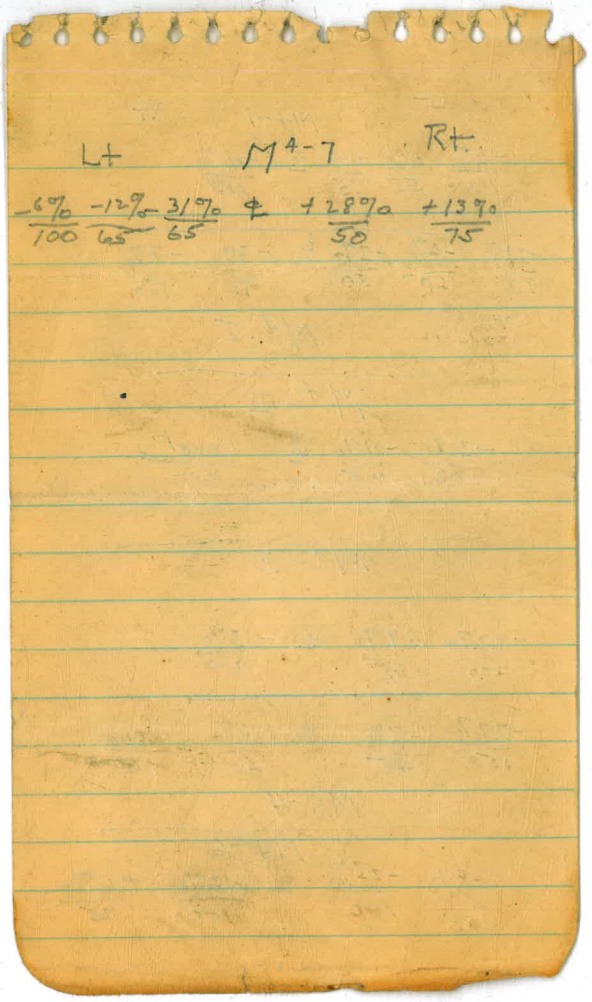
M4-4

M4-6

-8% / 100 -25% / 100 ℄ +12% / 100 +6% / 75



Sta	Saddle	Hor. ∠	Vert. ∠	H.I.	Rod.	Mag. Bem.
To #28		13°13'30" L.				
Tot #29	B.S. on M47					
To #29	1.57	14°29' L.	-4°06'	5.1	5.1	N. 63° E.
To #8-18	1.92	13°56' L.	-3°22'	5.1	2.1	N. 63°30' E.
Tot M#7	B.S. on M44					
To M#7	2.68	30°55'30" R.	-4°46'	4.9	5.9	N. 77°30' E.
To M#6	1.75	30°55'30" R.	-6°35'	4.9	8.9	N. 77°30' E.
Tot M#6	B.S. on M42					
To M#5	1.08	180°00' R.	-2°55'	5.1	8.1	S. 46°30' W.
To M#4	1.40	0°00'	-2°57'	5.1	10.1	N. 46°30' E.
To M#3	.89	0°00'	-3°53'	5.1		N. 46°30' E.
Tot M#2	B.S. on M34					
To M#2	4.65	0°00'	+1°56'	5.1		N. 46°30' E.
To M#1	2.18	0°00'	-0°45"	5.1		N. 46°30' E.
Tot M#4	B.S. on M35					


Lt
M4-7
Rt.
-6%
100
-12%
65
31%
65
℄
+28%
50
+13%
75

Lower Otay Res. 150' Contours

				El. water Res. Gage
	11.60	150.93	139.33	Aug. 31, 37
T.P. "ix6" Rw.		0.93	150.00	

R.S. # 358

El. check of water at 433+00

U.S.G.S. spike in Fence Post

0.36	497.31		496.95
El. of Lake Aug. 31-37		11.47	485.89
Set B.M.		4.40	492.91

10' Lt. of ℄ of Rd. approx. 633+00

Set B.M. Ely. Cor. of conc. base of Garbage Stand, approx. 50' SWly of above B.M.

Contour check levels from Res. Guage Aug. 31-37

				Res. Gs.
	16.35	155.68	139.33	Aug. 31-37
# 294	Hub 2x2 C.T.		2.98	152.70
# 295	" " "		2.95	152.73
# 292	" " " no good		2.37	153.31 (?)
# 289	Top of Hub rotted away		2.85	152.83
# 288	Hub 2x2. C.T.		3.11	152.57

Check U.S.G.S to 150' Contour @ # 358

					USGS spike in fence post
B.M. USGS	5.66	502.61		496.95	10' Lt of 633+00
T.P.	10.38	507.81	5.18	497.43	
on old 2x2 Hub # 358			7.15	500.66	

Otay Lake 150' Contour Ties
to R.S. #558.

Contour Δ pts #292 and #293

NOTE!

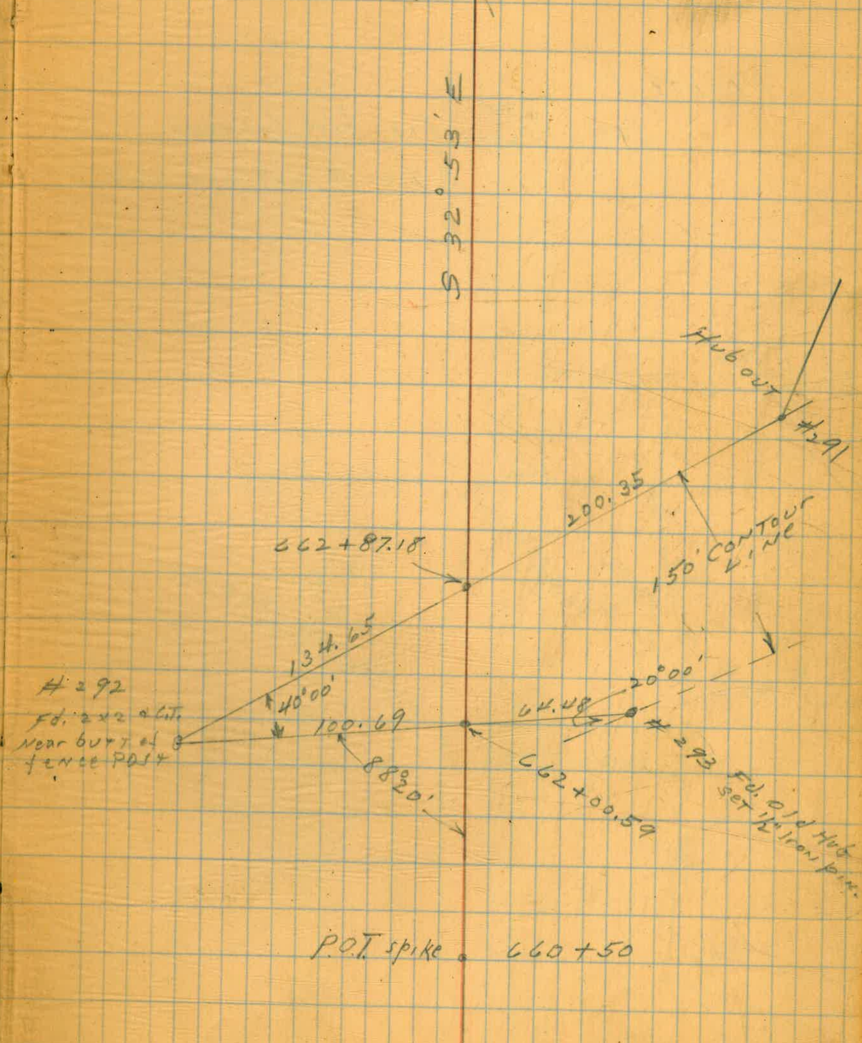
See County Books 685/223-7 for other ties

" " " 726/234-13 " " "

" " " Bk 717 p.5 for xsec.

℄ R.S. #558
Otay Res.

Williams
Moore
Sisson
Northern
8-31-37



Otay Lake 150' Contour Ties
to P.S. #558

Note!
See $\frac{685}{223-7}$ P.13 for Contour
Ties # 227 and 228

℄ P.S. #558

S 79°23' E

See Co. Bk. $\frac{685}{223-7}$ P.8

698+32.27 E.C.

Spike

237

173.65

39°58'

694+98.91 P.C.

1900.17'
R=1000
T=146.24

Fd. Hub
238

150 Contour

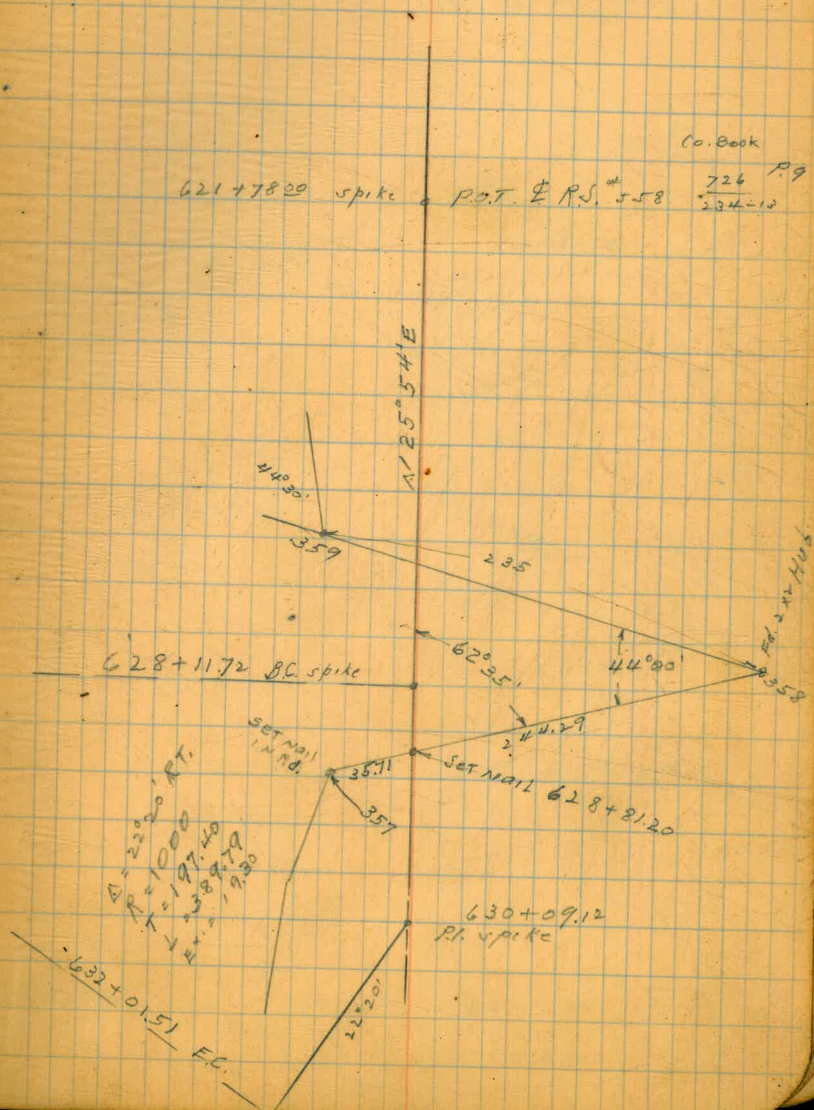
330

239

240

Otay Lake 150 Contour Ties
to. ℄ R.S. #558

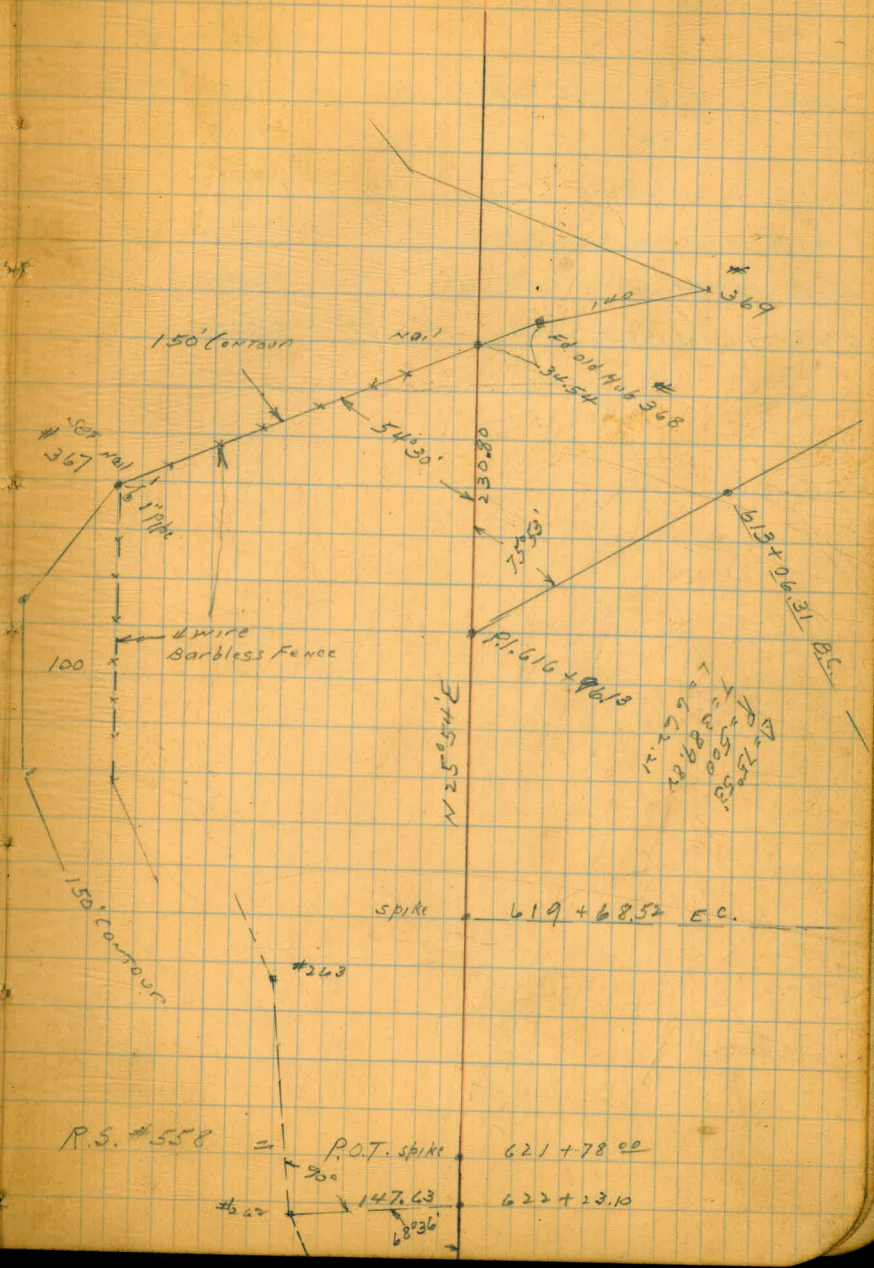
Contour △ pts. 357 & 358



150'

Otay Lake Contour Ties
to R.S. #558

Ties to Δ pts #367 & 368



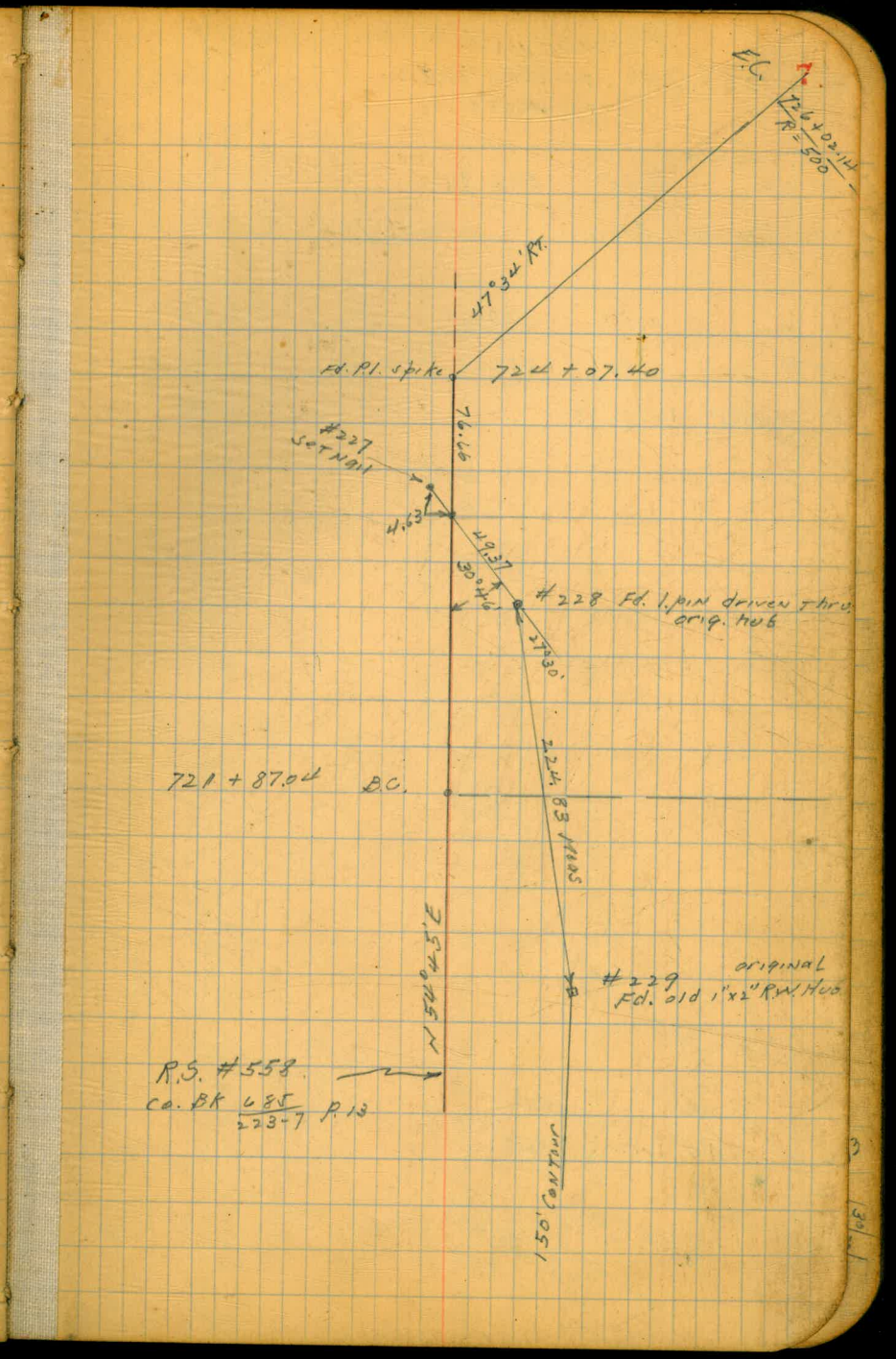
Check Levels U.S.G.S. to 150' Contour
Δ pts. # 228 + 229

28' Lt. of				U.S.G.S.	OK.	
716+50	5.80	513.15		507.35	B.M.	Iron pin U.S.G.S. see Co. Bk. $\frac{456}{324-12}$ p 58
T.P.	2.90	503.87	12.18	500.97		
# 229 on old 1"x2" Hub			4.26	499.61		
# 228 " 1/2" pin driven in Hub			4.14	499.73		
on 2x2 RW Hub. Iron concave Tack			2.42	501.45		Used by Judson as # 227 — Not Original Hub. Do not check this. see page 7 for Tie
El. Otay Lake Sept. 2-37			17.85	486.07		

Otay Lake 150' Contour Ties

228 & 229 to R.S. 558

See $\frac{685}{223-7}$ p 13 for ties to #227 which Rancho Line has been changed from original.

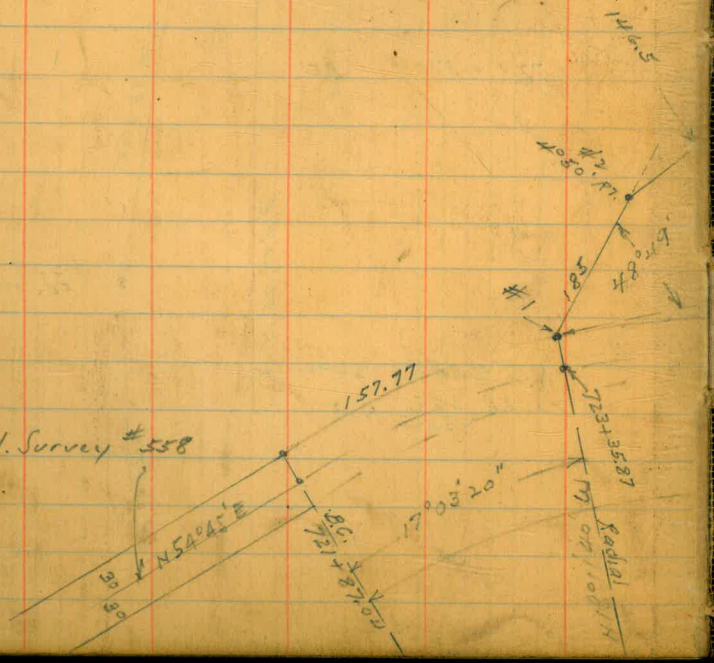


Estuary Ties & Survey

℄ Sta. 723+35.87 To 728+16.20 Co. R.B. 685 223-7 P13

R.S. #558

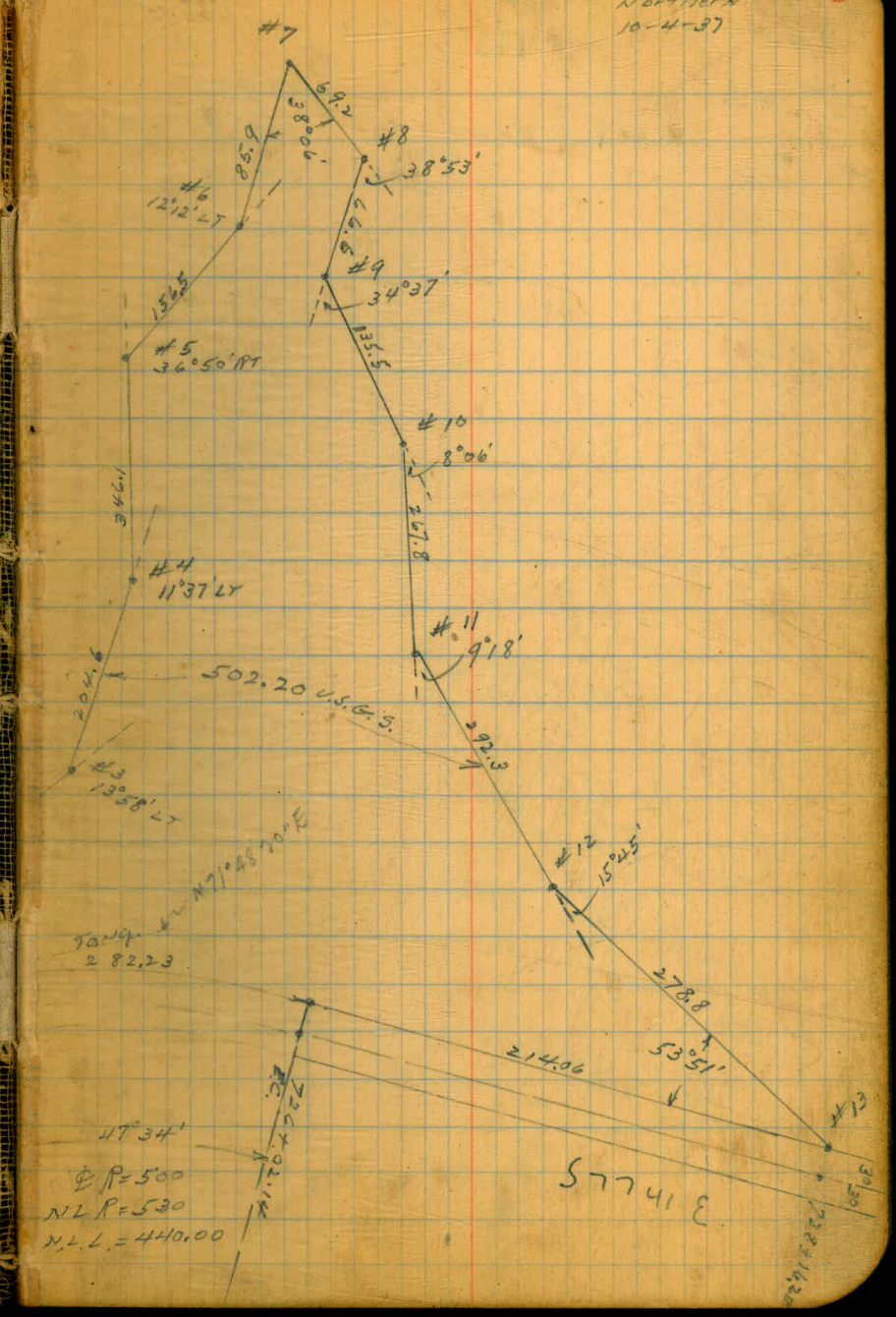
				U.S.G.S.
B.M. 2×2 Hub Iron Concave Tack				
See p 6	5.45	506.90		501.45
New Contour Elev.			4.70	502.20
	0.59	502.04		501.45
T.P.	12.30	491.68	12.66	489.38
El. Water Oct 5-37			7.08	484.60



Savage Dam.

Moore
Division
Northern
10-4-37

8



Estuary Ties & Survey
Savage Dam.

Co. Level Book

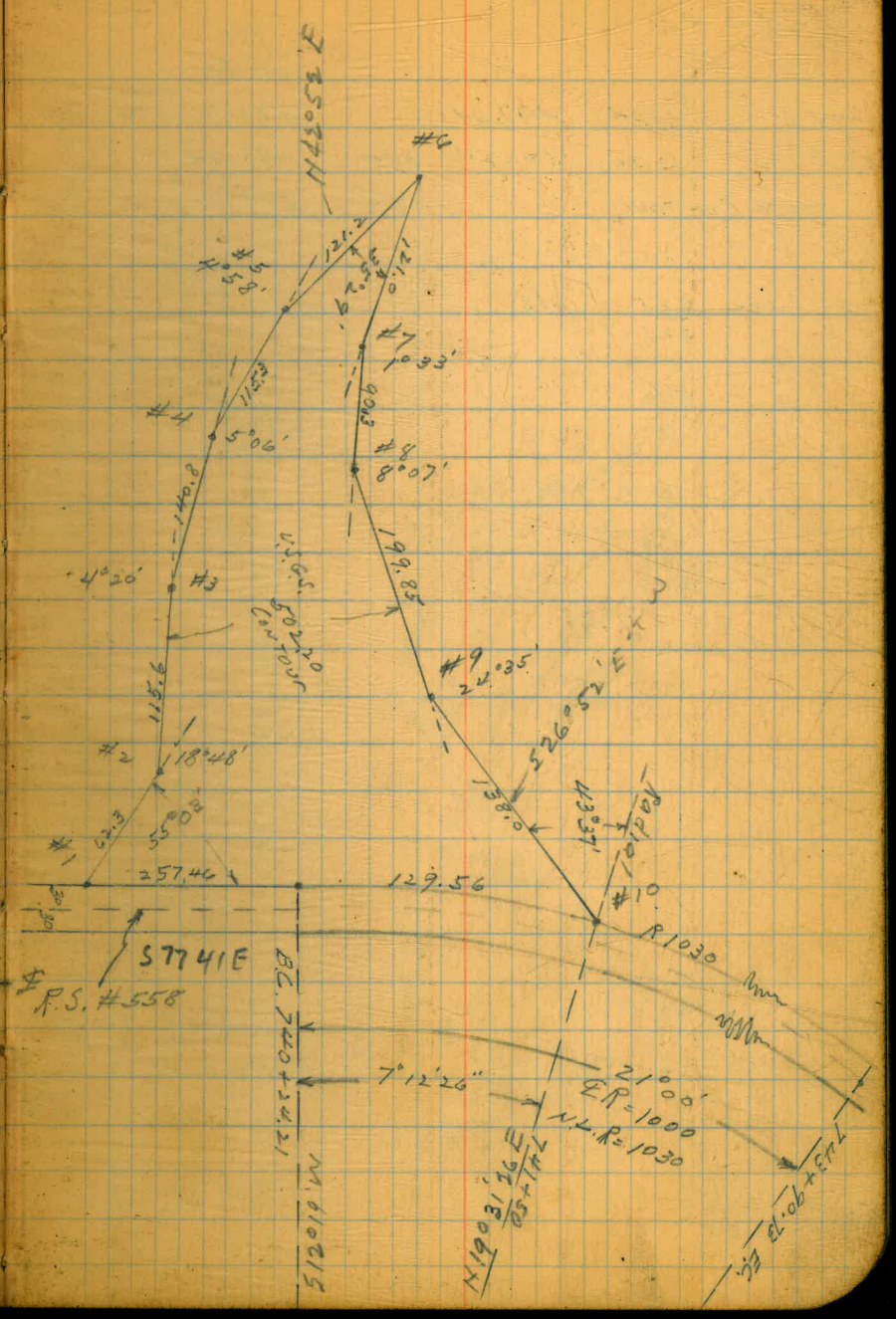
R.S. #558

685/223-7 P. 15

654/224-12

654/224-17 P. 63

	4.80	508.47	U.S.G.S. 503.67	BM iron P.in
T.P. on #1 Hub		4.27	502.20	



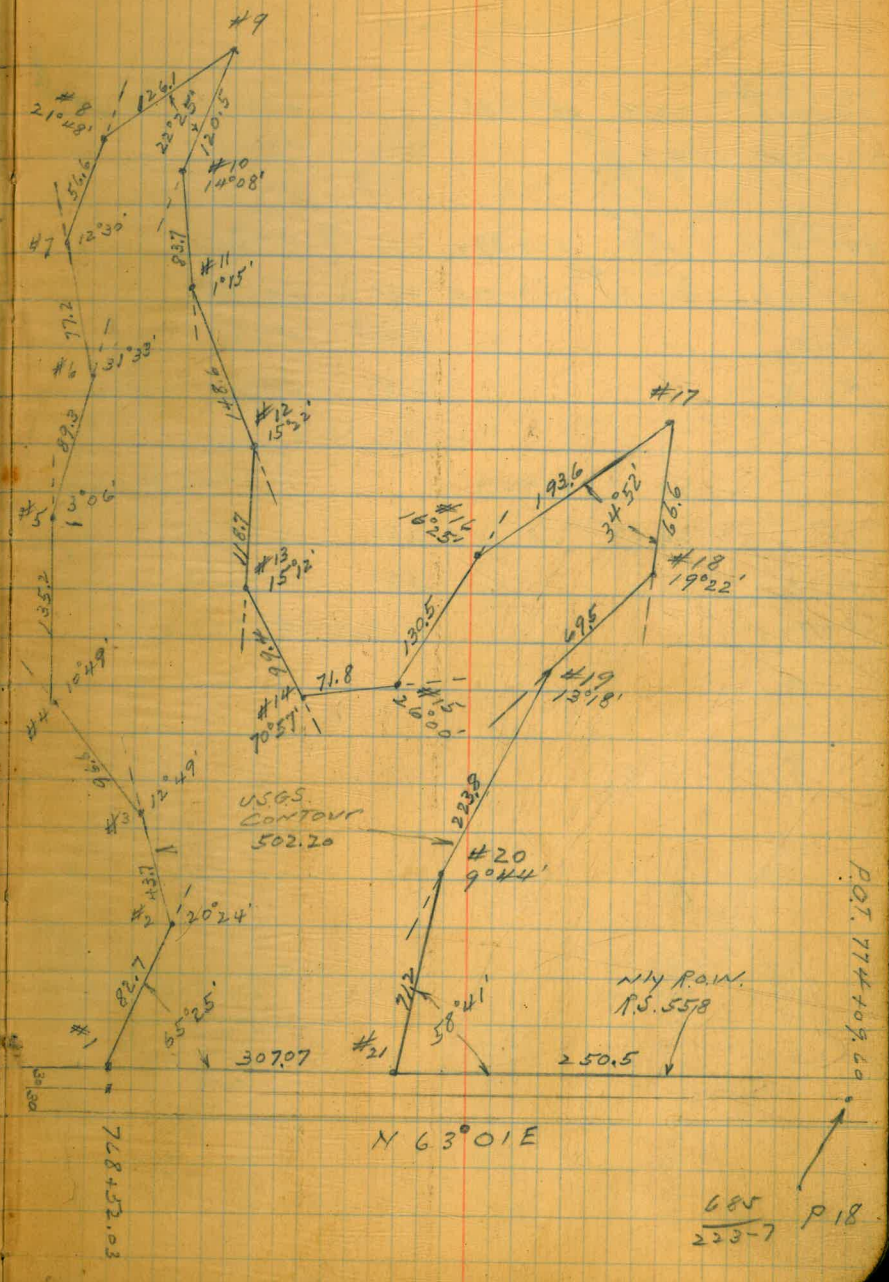
Estuary Ties + Survey Moore 10-5-37

Otay Lake (Savage Dam)

R.S. #558

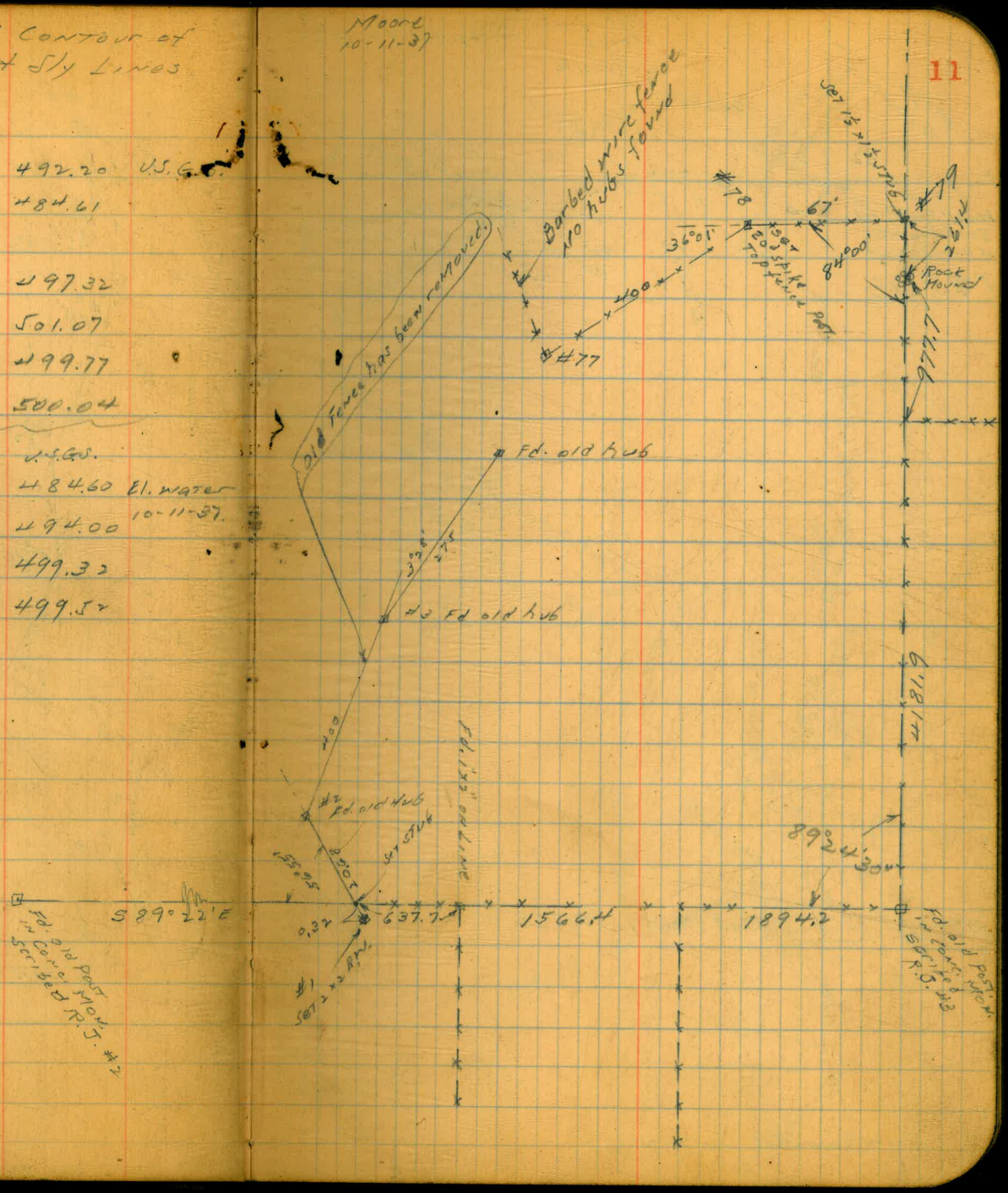
				USGS	El. water
See p 8	13.04	#97.64		484.60	Oct. 5, 37
T.P.	12.30	506.24	3.70	493.94	
New Contour			4.04	502.20	

See 685/223-7 p 18



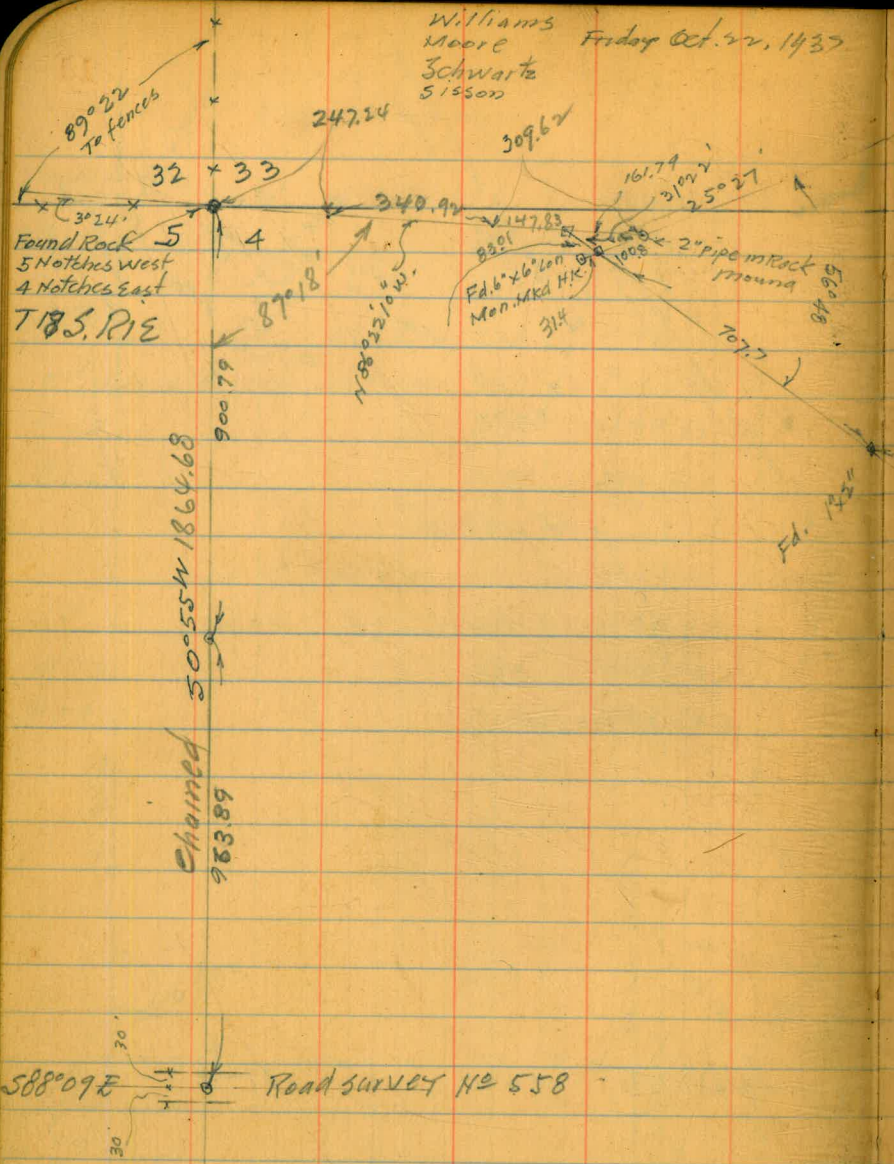
Ties to Original 150' Contour of Otay Lake and Ely & Sly Lines of Rancho Janal

Top of Roadway on Dam	12.75	504.95		492.20	U.S.G.S.
El. water Oct. 11, 37			20.34	484.61	
T.P.	10.25	507.57	7.63	497.32	
	Jan. 1917				
#1 of Lower Otay Res 150' Contour			6.50	501.07	
#2			7.80	499.77	
#3			7.53	500.04	
				U.S.G.S.	
	12.11	496.71		484.60	El. water 10-11-37.
T.P.	10.67	504.67	3.71	494.00	
#78			5.30	499.32	
#79			5.10	499.57	

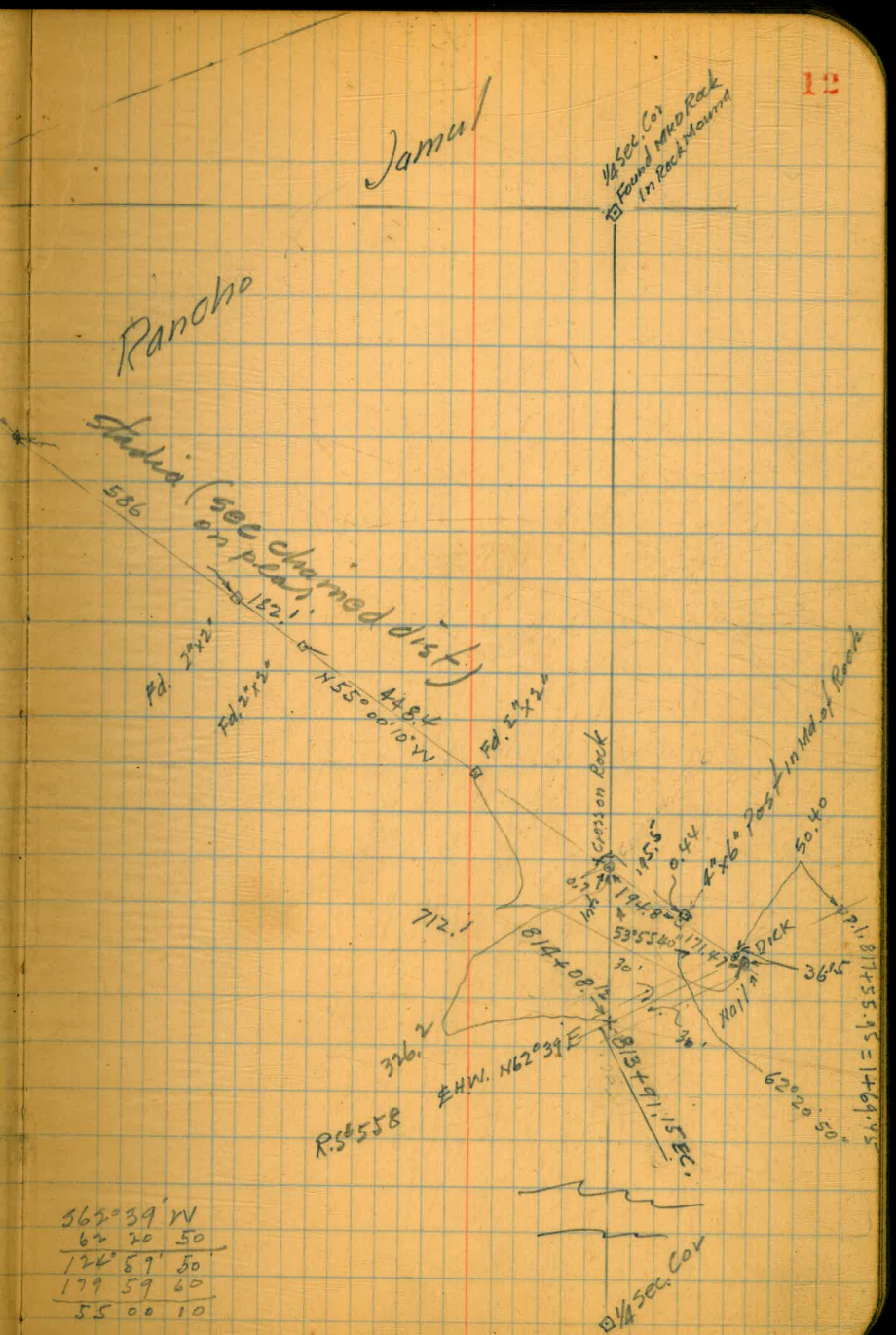


Williams
Moore
Schwartz
Sisson

Friday Oct. 22, 1937



(H.K. = H. Kumstead Surveyor)



563°	39'	W
62	20	50
126°	59'	50"
179	59	60
53	00	10

Levels on Upper Otay Dam for Res. Cont 72.4

Nov 18 1937 William JW
Moore Chas.
Sisson A.
Northern Geo.
Schwartz

	+	−	El.	BM
4.91	82.11			77.2
		7.99		
		9.90	72.21	
		9.71	72.40	
4.85	77.25	4.85	72.40	
5.25	77.65	3.80		

Rod Rod Rod
Top Dam W.E. 4.88 Center 4.91 E End 4.94

Lowest of 3 Notches in Dam 7.99 W 7.82 7.93 E

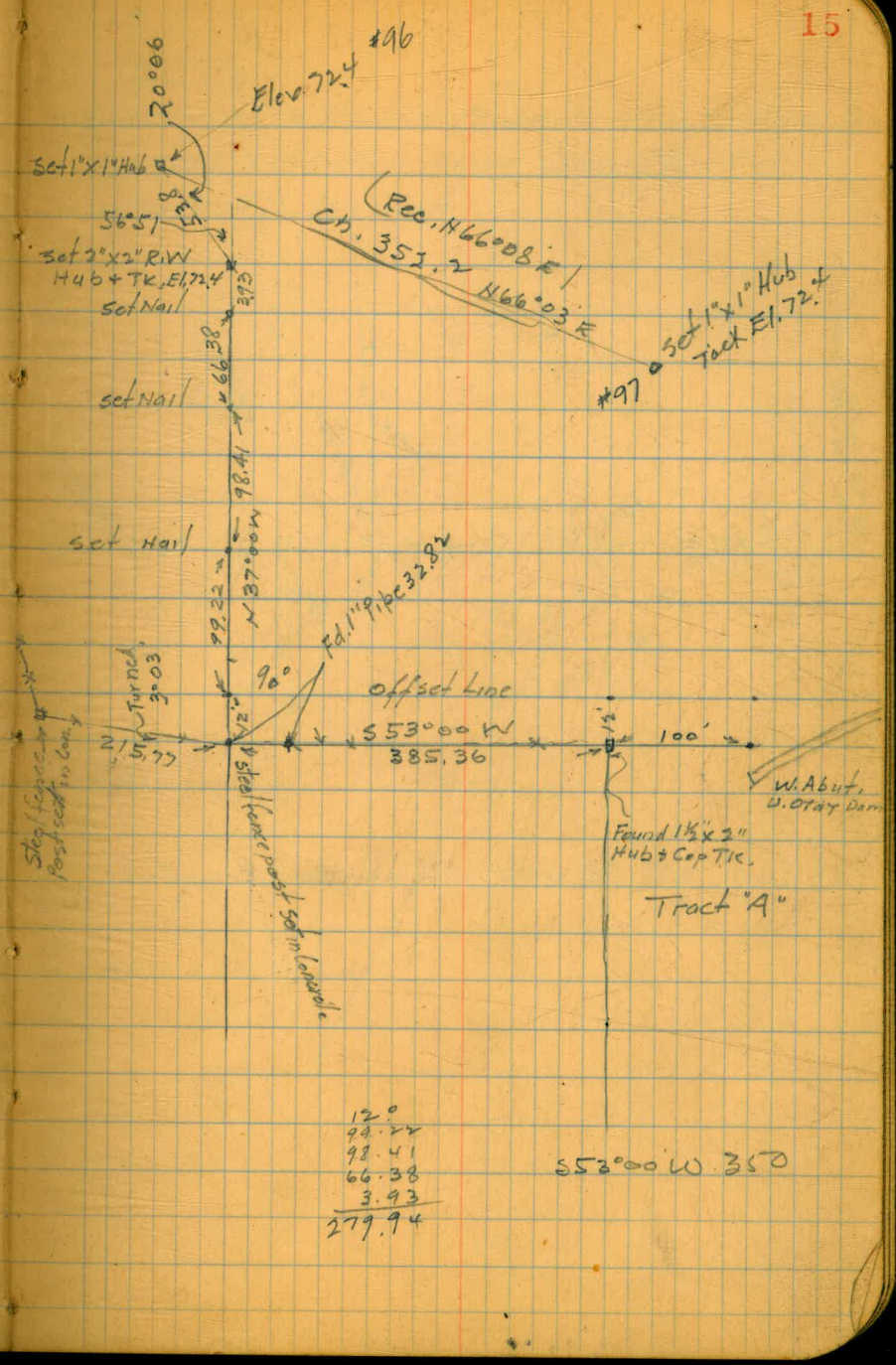
2 1/2 p of New Spillway East end Dam

Set Hub.

Williams 2nd.
Moore Chas. Ch Party
Sisson A. Inst.
Northern Geo. Ch.

R.A. Schwartz
11-18-37

Survey of Ties from Tract "A"
Upper Otay Dam to Res. Cont. 724



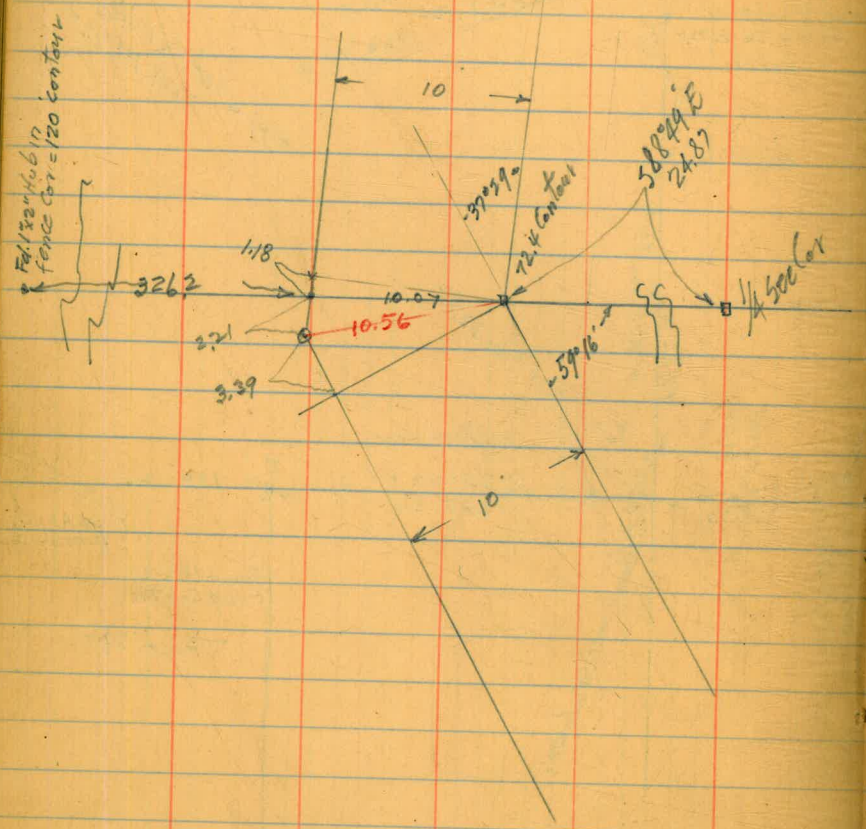
Williams
Moore
Sisson
Northern
Schwartz

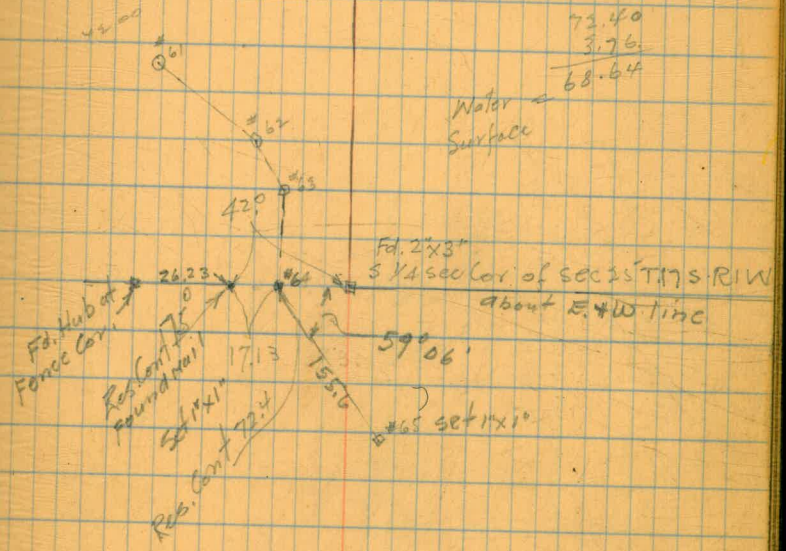
11-18-37

Survey of M. Haubert Property & Ties to 1/4 sec. Cor
Sec. 25, T17S. R1W. SBBM Upper Otay Res
also 72.4 ft. Res. Cont.

5.97
2.26
3.76

72.40
3.76
68.64



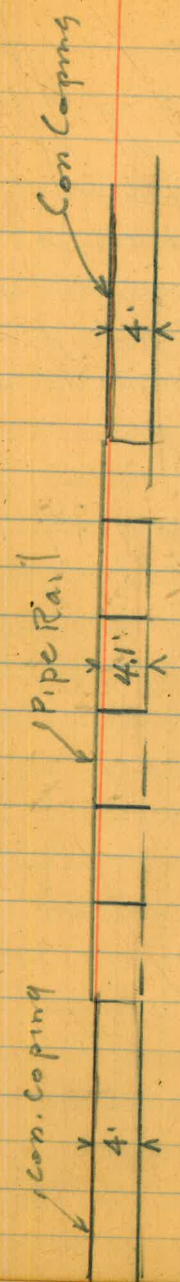


Distance to Water Surface from Sta. #64. Horiz. 22'

Elev Lake 68.9

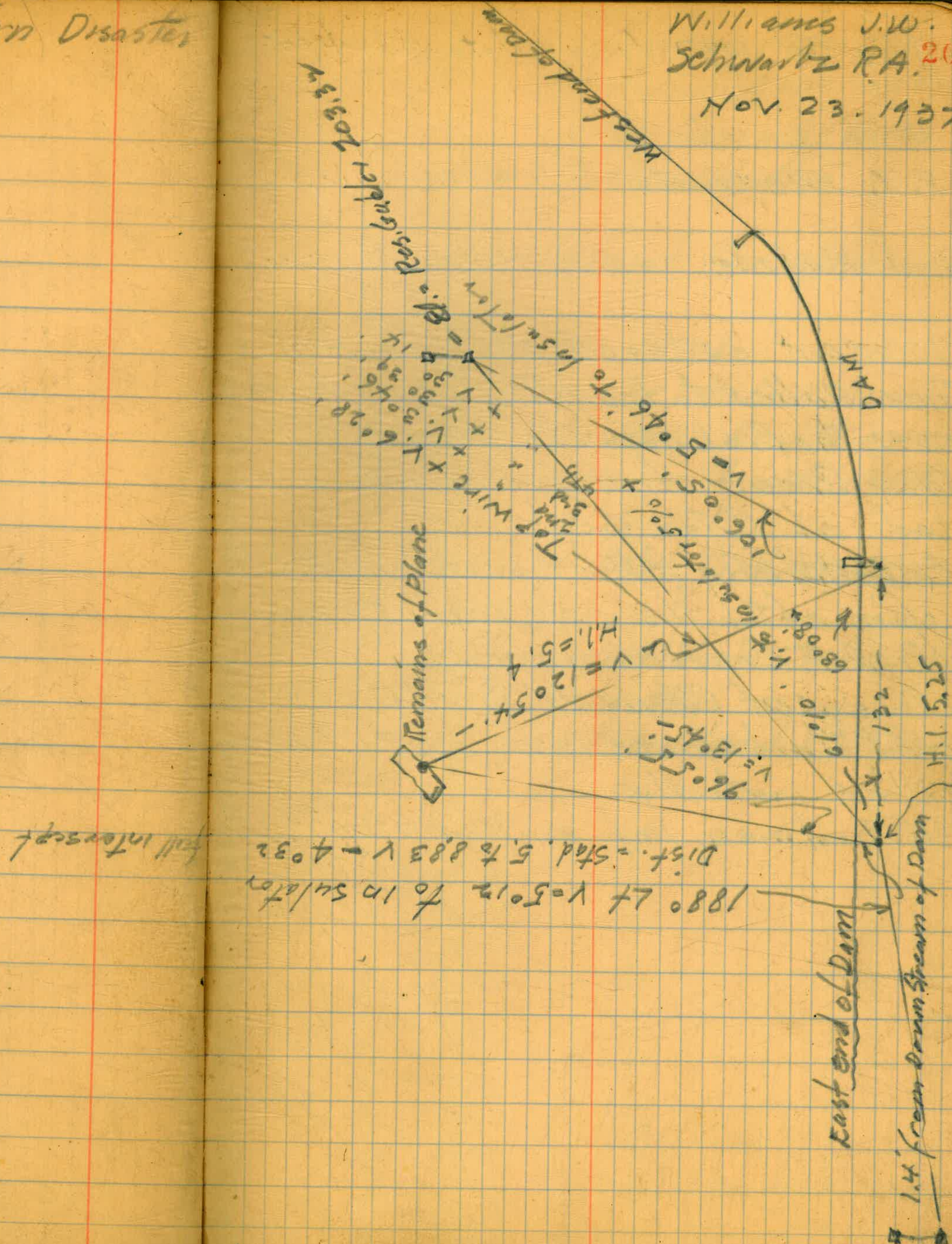
Res. Gd. 68.70 Sat Nov. 19. 1938
B.M. 68.74 " " . 1

Lower Otay Plain Disaster



Williams J.W.
Schwartz R.A.

Nov. 23. 1937



Nov. 30. 1937 Visibility perfect

F. L. McGrath S.D. Naval Airport

E. J. Holzle S.D. Naval Airport

accident occured at 11.45 A.M.
They called to I. D. Miller assistant
how the fishing was. then headed
Otay Creek and flew into wire
bed of Otay Geek
Mr Bottelburg filter operator at LO
plain after the accident then I. D.
Mr A.F. Crowell notified R.G. Wues
McCausland at Chula Vista who arrived
Naval Hospital Ambulance last one to arrive
killed instantly
F.H. Eastman. Inf on Nov. 23. 1937.

Sun shining. Flying too low 21
just cleared railingon
Dam flew into Wires
Riding Died immediatly
Pilot Died about 1hr. afterward

Saturday Nov. 30. 1937
Keeper on the lake asked him
down over the dam south over
he saw them fall into rocky

was first to reach the wrecked
Miller next.
te immediatly and then called Dr
in about 30 minutes
2nd man was then dead 1st man

Line from first saddle to Foster

6/3/38 Williams Hill Osborne Isbell

Sta.	Cor Dist.	Hor. ∆	Vert. ∆	H.I.	Elev.	Mag. B.
3 to 5	572.0 (573)	10°23'L	-3°26'	5.0	-34.3 884.4	S 13°00'E
3 to 4 (not a transit pt.)	412.6 (413)	10°35'L	-3°26'	4.9	-24.7 918.7	S 13°00 E
2 to 3	168.4 (168)	1°54'L	-3°26'	5.2	-10.1 943.1	S 3°00'E
1 to 2	387.8 (388)	25°02'L	-3°26'	5.2	-23.3 953.1	S 1°00'E
0 to "1	1057.5 (1060)	13°07'R	-3°26'	5.0H 16.0 L	-73.4 976.6	S 23°00'W

Side Slopes

L. R.

0 Point on saddle Elev. 1050 (Aneroid)

Note Called grade for 6% survey 1040' making 10' cut in saddle

See Page 47 for N Line

Sta.	Cor. dist.	Hor Δ	Vert Δ	H.I.	Elev.	Mag. B.

cont. in book "289

					-5.1	
7 to 8	84.7 (84')	21°39' L	-3°26'	5.1	878.1 ~~873.8~~	S 7°00' W
					-12.0	
6 to 7	198.3 (198')	16°24' R	-3°26'	5.1	883.2 ~~879.9~~	S 71°00' W
					-13.8	
5 to 6	230.2 (230')	27°33' R	-3°26'	5.2	875.1 ~~870.7~~	S 14°00' W

June 7. 1938

0+00 to 4400 + 3½" /0

B Line 5%

Station	Cor. dist.	Hor. Δ	Vert. Δ	H.I.	Elev.	Mag. B
0	(165')		-2°52	5.1		S. 60°30' W

Abandoned

6/9/38
cool

Williams
Hill
Osborne
Isbell
Leakey

6/9/38

C Line – 6% From saddle about 1 mile S.E. of Apiary

Station	Cor. dist	Hor. Δ	Vert. Δ	H.I.	Diff. Elev.	Mag. B.			Elev.	
7 to 8	97.6 (97')	15°20'R	-3°26'	10.0	-15.8	S 87°30'W (grade)	-38% 125'	-50% 60'	+34% 150'	sta. 8
5 to 7	271.0 (271')	52°55'L	-3°26'	5.0	-11.0	S 71°W (e 5.0)	-40% 150'	-39% 90'	+24% 125'	sta. 7
5 to 6	125.5 (125')	3°6'7L	-3°26'	5.0 H.I. 15.0 rd	-17.5	(F. 5.0)	-17% 125'		+38% 100'	sta. 6
						on line from 5 to 7 →	-44% 70'		+23% 65'	
4 to 5	86.7 (86')	25°16'R	-3°26'	5.0 H.I. 0.0 rd	.0	N 55°30'W (e. 5.0)	-99% 70'		+40% 125'	sta. 5
3 to 4	143.5 (143')	43°51'R	-3°26'	5.0	-8.6	N 80°W	-8% 90'	-58% 70'	+45% 125'	sta. 4
								-47% 150'	+33% 100'	sta. 3
2 to 3	65.8 (65')	14°55'R	-3°26'	4.5	-3.9	S 55°30'W			"C" 2 El. 11687	
							+15% 150'	+34% 100'	-46% 125'	sta. 2
1 to 2	389.7 (390')	10°12'L	-3°26'	5.0	-23.3	S 10°30'W	-49% 125' +21% 160'	+12% 30'	-12% 50' -29% 65'	+31% 50' +22% 100' +18% 150' -13% 155' ft. #1 to #1A
							+27% 100	-1% 125'	+20% 90'	-22% 90' +19% 65' +14% 100' sta. 1
									+31% 125'	+2% 35' +10% 75' sta. 0
0 to 1	284.0 (285')	T	-3°26'	5.0	-17.1	S. 50°W	Pt. 0 = saddle S.E. of bee man's place. Aneroid 1175.			

C Line (cont.)

Sta.	Cor dist	Hor. ∆	Vert ∆	H.I.	Elev.	Mag. B.
15 to 16	66' (68')	137°08'R	+11°08'		1108.9	(Cut 10.0)
14 to 15	210.3 (210')	29°21'L	-3°26'	4.7	1096.9	S. 83° W
12 to 14	170.1 (170')	29°07'L	-3°26'	4.9		N 77° W
12 to 13	109.6 (109')	22°08'L	-3°26'	4.9		
10 to 12	289.0 (289')	5°26'L	-3°26'	12.5		N 18 W (grade)
10 to 11	226.2 (226')	7°40'R	-3°26'	12.5		(grade)
9 to 10	222.2 (222')	13°56'R	0.0	Rod 10.9 HI. 5.00	-5.9	N 13° 30 W (C. 7.5)
8 to 9	118.6 (118')	37°18'R	-3°26'	5.0	-7.1	N. 5-7° W

Revised - see page 61

$\frac{-26\%}{60'}$ $\frac{-44\%}{50'}$. $\frac{+41\%}{70'}$ $\frac{+34\%}{75'}$ std. 9

C Line (cont.)

Sta.	Cor. dist.	Hor. ∆	Vert. ∆	H.I.	Elev.	Mag. B.
22 on C" line 21 to pt. X	(137')	116°17'R	+8°09'	5.0		

Note tie below to pt. on revised c line

See page 5-1

26 on N line 20 to 21	686.6 (687')	17°28'R	-2°13'	5.0	1066.4	S. 18°W
19 to 20	296.2 (295')	110°18'	+3°02'	5.0	1089.0	S 1°W
15 to 19	374.7 (375')	29°01'R	-3°26'	5.0	1073.4	N. 68°30'W
15 to 18	333.9 (334')	50°13'R	-3°26'	5.0	1070.6	(grade)
15 to 17	214.3 (214')	56°15'R	-3°26'	1.3	1083.0	(C. 3.7)

Williams
Hill
Osborne
Isbell
Leakey

6/10/38
Drizzling rain

S Line +2.5%

Sta.	Cor. dist.	Hor. Δ	Vert Δ	H.I.	Elev.	Mag. B.
7 to 8	88.0 (87')	5°55'R	+1°26'	4.9	+2.2	S. 26°30'E
6 to 7	76.0 (75')	1°40'R	+1°26'	5.0	+1.9	S 32°30'E
5 to 6	98.9 (98')	5°37'L	+1°26'	5.0	+2.4	S 34°30'E
4 to 5	108.9 (108')	14°01'R	+1°26'	5.0	+2.7	S 29°E
3 to 4	167.9 (167')	0°11'R	+1°26'	5.0	+4.2	S. 48°E
2 to 3	164.9 (164')	20°18'L	+1°26'	5.0	+4.1	S. 45°E
1 to 2	93.9 (93')	0°13'R	+1°26'	5.0	+2.3	S. 23°E
0 to 1	215.0 (214')	5°06'L	-0°24'	5.0	-1.5	S. 24°E

Dist. bet. transit pts on this page = 1013.5'

Pt. 0 = sta 192 ± on State Hwy pave.

Elev. pt. 0 = 1295 ± 2

Highway to "0" = N 1°59'W

Pt. 0 = P.I. of Hwy curve 100 ± N. of 15' concr. culv.

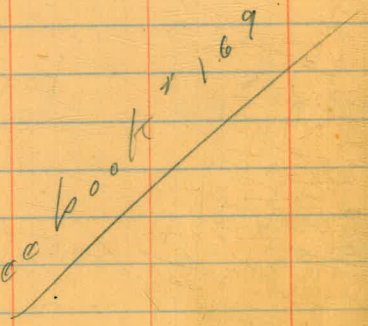
S Line (cont.)

Sta.	Cor. dist	Hor. ∠	Vert ∠	H.I.	Elev.	Mag. B.
15 to 16	128.0 (127)	19° 06' L	+1° 26'	4.6	+3.2	S. 59° E
14 to 15	96.0 (95')	19° 10' R	+1° 26'	4.5	+2.4	S. 40° 30' E.
13 to 14	69.0 (68)	17° 01' L	+1° 26'	4.9	+1.7	S. 60° E
11 to 13	133.0 (132)	56° 04' L	+1° 26'	4.9	+3.3	S. 42° E.
11 to 12	94.0 (93)	3° 53' R	+1° 26'	4.9	+2.3	S 17° 30' W.
10 to 11	57.0 (56')	29° 09' R	+1° 26'	4.7	+1.4	S. 13° W
9 to 10	33.0 (32')	21° 41' R	+1° 26'	5.0	+.8	S 15° 30' E
8 to 9	81.0 (80')	11° 10' L	+1° 26'	4.2	+2.0	S. 37° 30' E.

Dist. bet. transit pts. on this page = 691.0'

S. line (cont.)

sta.	Cor. dist	Hor. Δ	Vert. Δ	H.I.	Elev.	Mag. B.
17 to 18	91.0 (90')	10° 22' R	+1° 26	5.4	+2.3	5.47 E.
16 to 17	63.0 (62)	2° 25' R	+1° 26'	4.7	+1.5	5.57° E.



Meridian Saddle Line
(marked "Mon stakes)

Williams
Hill
Osborne
Isbell
Leakey

6/11/38
Cloudy & cool

Sta.	Cor. dist	Hor. Δ	Vert. Δ	H.I.	Elev.	Mag. B.
3 to 8	558.0 (558)	2°41'R	0.0	4.0	00	Rod 4.0 Cut 6.6
3 to 7	504.0 (503')	18°38'R	-0°34'			-5.0
3 to 6	467.0 466.0 (466')	29°00'R	-0°34'	4.9		-4.7
3 to 5	367.0 (366')	36°45'R	-0°34'	4.9		-3.7
3 to 4	267.0 (266')	39°56'R	-0°34'	4.9	-	-2.7
2 to 3	50.9 (50')	35°20'R	-2°27'	5.0	-7.7	N. 74°W.
1 to 2	989.1 (990')	1°33'R	-2°27'	5.0	-42.4	S 72°W.
0 to 1	541.1 (541').		-2°27	5.0	-23.7	S. 70°30'W.
0					Aneroid 1500.0	

Pf. 0 = high point in saddle
S.E. of wire gate

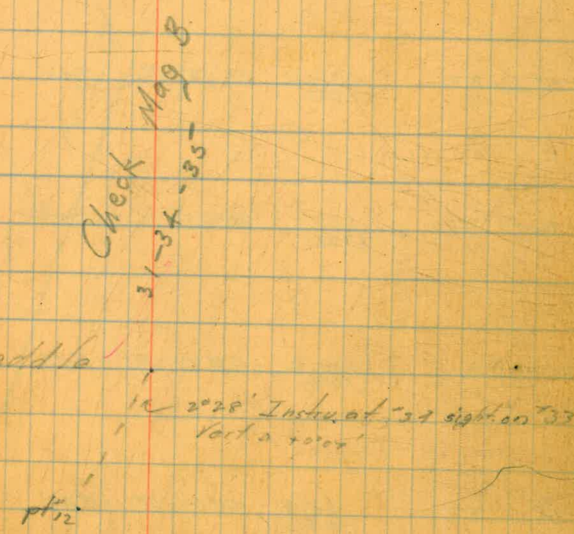
Sta.	Cor.dist.	Hor.Δ	Vert.Δ	H.I.	Elev.	Mag B.
12 to 15	435.6 (435.4)	70°00'L	-1°43'	4.8	-13.0	
12 to 14	314.7 (314.4)	70°25'L	-1°43'	4.8	-9.40	
12 to 13	187.8 187	48°20'L	-1°43'	4.8	-18.6	(6/13/38)
10 to 12	364.7 (364.4)	~~9°57'R~~ 10°68'R 7/11/38	-1°43'	5.0	-10.9	N50°W (6/11/38)
10 to 11	230.7 (230.4)	152°57'R	+2°11'	5.0	+8.8	Note for lee line run from #7 to #11
9 to 10	334.4 (334.1)	23°45'R	+2°29'	4.9	+14.5	N. 59° W. #10 Saddle control pt.
3 to 9	75.7.0 (75.6')	10°11'L	0.0	4.9	Same as 3	N. 83°30'W (C. 7.6)

Sta.	Cor.dist.	Hor.∆	Vert.∆	H.I.	Elev.	Mag.B
21 to 23	354.7 (354')	19°21'R	-1°43'	5.0	-10.6'	
21 to 22	221.8 (221')	32°21'R	-1°43'	5.0	-6.6	
18 to 21	570.5 (570')	37°23'L	-1°43'	5.0	-17.1	S 2° E
18 to 20	327.7 (327')	7°13'L	-1°43'	5.0	-9.7	
18 to 19	190.8 (190')	8°16'R	-1°43'	5.0	-5.7	
17 to 18	290.7 (290')	1°33'R	-1°43'	4.8	-8.7	S 33°30'W
12 to 17	912.2 (912')	~~8°13'L~~ ~~8°30'L~~	-1°43'	4.8	-27.3	S 33°30'W S 33° W
12 to 16	660.4 (660')	8°20'L	-1°43'	4.8	-19.8	

Sta.	Cor. dist	Hor. ∆	Vert. ∆	H.I.	Diff Elev.	Mag. B.
30 to 31	114.9 ✓ (114')	4°21'R	-1°43'	5.0	-3.4	S 41° W
29 to 30	226.8 ✓ 226'	15°43'R	-1°43'	4.8	-6.7	S. 37° W
28 to 29	101.9 ✓ (101')	21°28'R	-1°43'	4.9	-3.0	S 20° 30' W
27 to 28	51.0 ✓ (50')	22°49'R	-1°43'	4.8	-1.5	S 5° E
26 to 27	372.7 ✓ (372')	2°30'R	-1°43'	5.0	-11.2	S 28° E
25 to 26	115.9 ✓ (115')	9°09'R	-1°43'	5.0	-3.4	
21 to 25	488.6 ✓ (488')	29°11'L	-1°43'	5.0	-14.6	S 30° E
21 to 24	365.7 ✓ (365')	26°33'L	-1°43'	5.0	-10.9	

Sta.	Cor. dist	Hor. ∆	Vert. ∆	H.I.	Elev.		
~~31 to 35~~	(15-20')	~~11°44'L~~	~~-5°03'~~	~~5.0~~		S. 7° E	To saddle
33 to 34	145.3 (145')	P.O.T.	+4°01'	6.7 (H.I. [illegible])	+10.1		
31 to 33	441.7 (450')	32°14'L	+10°19'	4.7	+ 80.3	S 8°30' W	
31 to 32	160.9 (160')	24°38'L	-1°13'	4.7	-4.8	S 17° W	Aneroid 1320 at pt. 32

See page 40



6/11/38 warm

Hill
Isbell
Leakey
Brooks

Sta.	Cor. dist	Hor. ∠	Vert. ∠	H.I.	Elev.	Mag. B.
37 to 40	(605)	17°53'-R.	-1°43'	4.8		
37 to 39	(420)	18°49-R.	-1°43'	4.8		
37 to 38	135.9 (135)	37°52'-R.	-1°43'	4.8		S. 24° W.
36 to 37	305.7 (305)	30°33'-R.	-1°43'	4.8		S. 15° E.
35 to 36	100.9 (100)	29°37'-R.	-1°43	4.7		S. 48° E.
34 to 35	125.9 (125)	34°27'-R.	-1°43'	4.4		S. 77°30' E.
33 to 34	300.7 (300)	8°36'-L.	-1°43'	4.4		N. 69°30' E.
32 to 33	450.6 (450)	117°06'-L.	-1°43'	5.0		N-77°30'-E

Abandoned

Sta.	Cor. Dist.	Hor. ∠	Vert. ∠	H. I.	Elev.	Mag. Ber.
42 to 46	(1015)	15°57'-L.	-1°43'	4.7		S. 28° E.
42 to 45	(690)	13°43'-L.	-1°43	4.7		
42 to 44	(625)	11°31'-R.	-1°43'	4.7		S. 0°30' E.
42 to 44 Saddle	(750)	15°01'-R.	+0°59'	4.7		S. 2° W. in Saddle
42 to 43	(502)	20°40'30"-R.	-1°43'	4.7		S. 8° W.
37 to 42	(820)	2°53'-R.	-1°43'	4.8		S. 12° E.
37 to 41	(660)	8°02'-R.	-1°43'	4.8		

Abandoned

Sta.	Cor. Dist.	Hor. ∠	Vert. ∠	H. I.	Elev.	Mag. Bear.
47 to 51	(737)	101°50'-L.	-1°30	4.9		S. 22° E.
47 to 50	(392)	88°43'-L.	-1°30'	4.9		
47 to 49	(310)	33°05'-L.	-1°30'	4.9		
47 to 48	(486)	25°58'-R.	-3°44'	4.9		
46 to 47	(124)	6°24'-R.	-1°30'	4.9		S. 82° W.
45 to 46	(123)	53°20'-R	-1°30'	4.6		S. 76°30' W.
Saddle 44 to 45	(206)	20°42'-R.	-1°30'	4.8		S. 22° W.

Abandoned

M. Line (cont.) from page 36

6/15/38 Hot

Williams
Hill
Isbell
Leekey
Brooks

Sta.	Cor. dist.	Hor. ∆	Vert. ∆	H.I.	Elev.	Mag. B.
41 to 42	80.8 ✓ (80')	86°23' L	-2°52'	5.1		
39 to 41	356.1 ✓ (356')	17°05' 8/1/38 17°40' R	-2°52'	4.9		N 43°30' W
39 to 40	216.5 ✓ (216')	25°40' R	-2°52'	4.9		N 37° W
38 to 39	63.8 ✓ (63')	21°15' R	-2°52'	4.9		N 61° W
37 to 38	135.7 ✓ (135')	43°45' R	-2°52	5.0		N 87°30' W
36 to 37	60.8 ✓ (60')	28°00' R	-2°52'	4.9		S 52°30' W
35 to 36	340.2 ✓ (340')	32°19' R	-2°52'	5.0		S 25° W
34 to 35	72.7 ✓ (72')	11°44' L	-3°47'	5.0	-4.8	S 8°00' E

Back sight on # 33

See Book 239 — Pg 29 for Revision

Sta	Cor.dist	Hor.∠	Vert.∠	H.I.	Elev.	Mag.B.
49 to 50	118.7 (118')	29°20'R	-2°52'	4.8		S 19 E
48 to 49	153.6 (153')	9°32'R	-2°52'	4.8		S 47°30'E
44 to 48	467.9 (460')	48°03'L	-2°52'	4.8		S. 56°30'E
41 to 47	355.1 (355')	46°30'L	-2°52'	4.8		
44 to 46	266.4 (266')	39°41'L	-2°52'	4.8		
41 to 45	132.7 (132')	22°47'L	-2°52'	4.8		
41 to 44	435.9 (436')	146°36'L	-2°52'	5.1		S 10°E
41 to 43	218.8 (218')	144°26'L	-2°52'	5.1		S. 6°E.

Sta.	Cor. dist	Hor. ∠	Vert. ∠	H.I.	Diff Elev.	Mag. B.
56 to 58	237.5 (237')	7°06'L	-2°52'	5.0	-11.8	
56 to 57	184.6 (184')	24°00'L	-2°52'	5.0	-9.2	
55 to 56	112.8 (112')	2°12'R	-2°52'	5.0	-5.6	1.56° E Should be (117)
54 to 55	135.7 (135')	18°40' 19°12'R	-1°01	4.9		S 5°30'E
51 to 54	362.1 (362')	31°11'L	-2°52'	4.7		S 21°30'E
51 to 53	171.6 (171')	POT.	-2°52'	4.7		
51 to 52	105.6 ~~110.7~~ (110')	POT	-12°18'	4.7		
50 to 51	78.8 (78')	24°53'R	-2°52'	4.6		S 5°30'W

Sta.	Cor.dist.	Hor.Δ	Vert.Δ	H.I.	Diff Elev.	Mag.B.
65 to 66	157.6 (156.7)	14°14'L	-2°52'	4.7	-7.8	
64 to 65	254.4 (254.4)	1°43'L	-2°52'	4.8	-12.7	S 22°30'E
63 to 64	252.4 (252.2)	0°05'L	-2°52'	4.8	-12.6	S 19°E
62 to 63	196.5 (196')	6°40'R	-2°52'	4.7	-9.8	S 18°30'E
61 to 62	166.6 (166')	1°22'L	-2°52'	4.8	-8.2	S 20°E (should be 176)
60 to 61	161.6 (161')	21°57'L	-2°52'	5.0	-8.0	S 23°30'E
59 to 60	194.5 (194')	5°07'R	-2°52'	5.0	-9.7	S 1°E
58 to 59	305.3 (305')	2°29'L	-2°52	5.0	-15.2	S 7°30'E

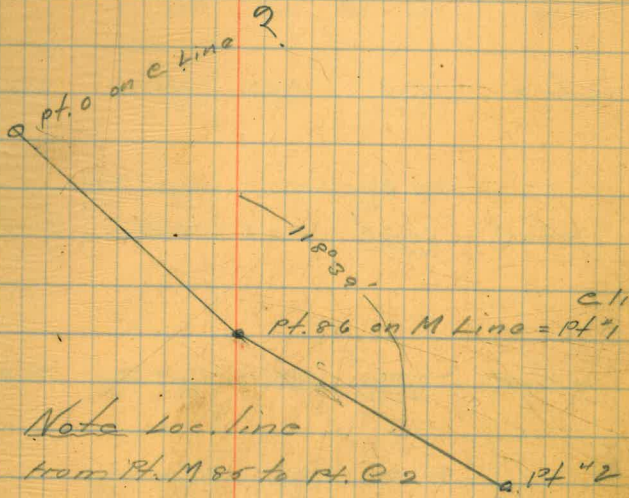
Sta.	Cor dist.	Hor. ∠	Vert. ∠	H.I.	Elev.	Mag. B.	
73 to 74	30.5 / 30.9 / 30	P.O.T.	-7°03'	4.8	-3.7		Pt. 73 about intersec of 3% grade from E. side
72 to 73	(67.6 / 67) ✓	83°01'R	-2°52'	5.0	-8.3	S 81°30'W	
71 to 72	105.7 ✓ (105')	29°09'R	-2°52'	4.9	-5.2	S 4°30'E	
70 to 71	146.6 ✓ (146')	9°38'L	-2°52'	4.9	-7.3	S 31°E	
69 to 70	121.7 ✓ (121')	8°22'L	-2°52'	4.8	-6.1	S 21°E	
68 to 69	407.0 ✓ (407')	11°38'R	-2°52'	4.7	-20.3	S 11°E	
68 to 68	270.3 ✓ (270')	10°54'R	-2°52'	4.7	-13.5		
68 to 67	190.5 ✓ (190')	1°31'R	-2°52'	4.7	-9.5		

Sta	Cor. dist	Hor. ∠	Vert. ∠	H.I.	Diff Elev.	Mag. B.	
79 to 82	265.1 ✓ (265')	33°55'L	+2°52'	5.0	+13.3		Rocky pt.
79 to 81	170.6 ✓ (170')	19°21'L	+2°52'	5.0	+8.5		
79 to 80	109.7 ✓ (109')	6°27'R	+2°52'	5.0	+5.2		
78 to 79	215.5 ✓ (215')	15°14'R	+2°52'	Rod 12.1 HI 4.7	+3.3	S 14°W (grade)	
76 to 78	295.1 ✓ (296')	83°59'L	+4°18'	4.7	+22.2	S 2°E (C.T.A.)	
76 to 77	127.7 ✓ (127')	76°35'L	-2°52'	4.7	-6.4		
73 to 76	141.6 (141')	POT	0.0	4.8	0		
73 to 75	~~82.8~~ 78.5 (82')	POT	-11°47'	4.8	-16.6		

Sta.	Cor dist.	Hor. ∠	Verts	H.I.	Dif Elev	Mag. B.
C1 86 to C2 Backsight on 85		118°39'R	-3°26'			S 41° W
85 to 86	253.1 (254)	40°41'L	-5°06'	4.8		S 77°36'E
84 to 85	115.1 (115)	P.O.T.	-5°05'	4.7	-10.2	
83 to 84	84.1 (84)	7°35'L	+5°04'	4.9	+7.4	S 36°30'E (C.33)
79 to 83	449.9 (450)	43°09'L	+2°52	5.0	+22.5	S 30°E

See Page 26 for continuation of ℄ line

See Rev. Book 239 P28



(Oat Hill) North) N. Line - From first saddle north of Foster to ℄ Line

Sta.	Cor. dist.	Hor. ∠	Verts.	H.I.	Rod	Elev.	Mag. B.
6 to 8	201.0 (210')	P.O.T.	-12°31'	5.0	5.0	-44.6	
6 to 7	102.9 (106')	P.O.T.	-11°16'	5.0	5.0	-20.5	
1 to 6	101.4 (104')	P.O.T.	-4°14'	5.0	5.0	1038.7 1072.9 -7.7	
1 to 5	53.0 (52')	26°-7½	-0°31'	5.0	5.0	-.5	N. 50° W
0 to 4	540.7 (540')	P.O.T.	+1°20'	4.9	2.5	1046.4 1060.6 +15.0	
0 to 3	435.8 (435')	P.O.T.	+1°20'	4.9	5.5	+6.5	
0 to 2	270.8 (270')	P.O.T.	+1°20'	4.9	18.7	+7.5	
0 to 1	68.0 (67')	47°33½	+1°20'	4.9	3.9	+2.6	N. 24° W

+51% / 150' . -74% / 60' -28% / 50' -16% / 80' sta. 8 in draw 90° to line

+41% / 150' . -40% / 150' sta. 7

+35% / 100 +26% / 35' . -18% / 25' -28% / 90' sta. 6

C. 23.7

+55% / 100' +20% / 50' . -12% / 20' -25% / 125' sta. 5

+34% / 65' +23% / 45' . -16% / 125 sta. 4

C 30.4

+36% / 100 -29% / 125' sta. 3

+26% / 90' +32% / 40' . -27% / 150' sta. 2

-7% / 125' +4% / 40' . -20% / 125' sta. 1

+5% / 175' . +10% / 100' +35% / 100' sta. 0

1065.6 El Pt. "0" - Grade for pt. 0 = 1065.6 / 1021.4
1091.4

Sta.	Cor dist	Hor Δ	Vert Δ	H.I.	Rod	Elev.	Mag. B					
15 to 16	128.0 (127')	37°41'L	0°	5.0	5.0	1022.1 1026.4		100° to back Tan.	+27% 125'	-29% 125'	-25% 100'	sta 16 in draw 90° to back tan.
14 to 15	367.0 (366')	1°21'L	-0°34'	4.9	4.9	1022.1 1051.7	-3.6 N. 70°30' W		+26% 150	-25% 50'	-40% 50'	-62% 100' sta. 15
13 to 14	186.0 (185')	2°33'L	-0°34'	5.0	16.0	1025.7 1060.1	-12.8 N 62°30 W	+31% 150'	+43% 50' C 19.6	-40% 125'	-57% 100'	sta. 14
12 to 13	108.0 (107')	P.O.T.	-0°46'	5.0	5.0	1038.5 1072.9	-1.4		+40% 150' C 30.6	-48% 75'	-53% 125'	sta. 13
10 to 12	216.8 (217')	P.O.T.	+1°06'	4.9	4.9	1039.9 1074.3	+17.7	+36% 100'	+54% 75' C 30.9	-45% 35'	-69% 150'	sta. 12
10 to 11	59.0 (62')	P.O.T.	-14°36'	4.9	4.9	-15.4		+48% 100'	+50% 65'	-67% 60'	-54% 150'	98° to line sta. 11 in draw
6 to 10	330.2 (330')	P.O.T.	-2°53'	5.0	5.0	1022.2 1056.6	-16.6		+43% 150' C 10.7	-25% 100'	-47% 150'	sta. 10
6 to 9	282.9 (283')	P.O.T.	-3°30'	5.0	5.0	-17.2			+45% 150'	-25% 60'	-64% 150'	sta. 9

Sta.	Cor. dist.	Hor. Δ	Vert. Δ	H.I.	Rod	Elev.	Mag. B.
22 to 25	321.0 (320')	26°09'R	0°	5.1	5.1	1022.1 ~~1056.4~~	
22 to 24	240.0 (239')	9°42'R	0°	5.1	5.1	1022.1 ~~1056.4~~	
22 to 23	108.0 (107')	12°09'R	0°	5.1	5.1	1022.1 ~~1056.4~~	
20 to 22	638.0 (637')	25°47'L	0°	4.8	4.8	1022.1 ~~1056.4~~	N49°30'W
20 to 21	249.0 (248')	To observed pt. 29°39'L	0°	4.8	12.9	1014.0	-8.1
19 to 20	221.0 (220')	35°11'R	0°	4.9	4.9	1022.1 ~~1056.4~~	N21°W
17 to 19	831.0 (830')	12°34'R	0°	5.5	5.5	1022.1 ~~1056.4~~	N58°30'W
15 to 17	334.0 (333')	2°50'L	0°	5.0	5.0	1022.1 ~~1056.4~~	N72°30'W

sta. 25: +15% 150' · −25% 50' −18% 75'
Draw: +17% 150' · −30% 40' −26% 50' −6% 100'

sta. 24: +41% 100' +26% 50' +28% 50' · −35% 65' in draw +60% 35' Level 50'

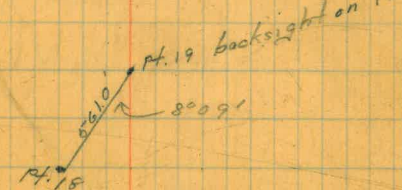
6/20/58

sta. 23: +36% 100' +25% 35' · −28% 90' −8% 90'

sta. 22: +26% 100' +16% 35' · −22% 100 −8% 100'

grade pt. El. 1056.4 — 58' — observed pt. (90°)

sta. 21: +24% 125' +13% 25' · −19% 75' −68% 50'



Pt. 20 ~~sta. 19~~: +15% 70' +28% 100' · −65% 150'

sta. 18: +27% 125' · −48% 150'

sta. 17: +17% 100' +36% 100' · −60% 75' −44% 60' −30% 100'

Sta.	Cor. dist.	Hor. ∠	Vert. ∠	H.I.	Rod	Elev.	Mag. B.	
22 to 26	430.0 (429')	34°26'R	0	5.0	5.0	1022.1 ~~1056.4~~	N 16° W	+13% / 125' +8% / 75' −21% / 100' −14% / 60' to Wash. — Std. N. 26, " C. 27

See hookup to ℄ Line Pg.

C Line Revision - cont from page "27"

Sta.	Cor. dist.	Hor. ∠	Vert ∠	H.I.	Rod	Elev.	Mag. B.	Notes
16 to 17	130.7 ✓ (136)	P.O.T.	-12°28'	5.0	5.0	-28.9	-28.9	sta. 17 — to wash -22% / 70' . +18% / 150' in draw; F 5.6
15 to 16	133.2 ✓ (134)	P.O.T.	-6°42'	5.1	5.1	1110.5	-15.6 ✓	sta. 16 — -21% / 125' -17% / 80' 6% . +16% / 40' +27% / 150'; C. 13.8
13 to 15	218.9 ✓ (218)	P.O.T.	-1°00'	5.0	5.0	1126.1	-3.8 ✓	sta. 15 — -19% / 70' -47% / 70' 6% . +34% / 150'; C. 21.3
13 to 14	110.7 ✓ (111')	35°17' L	-6°18'	5.0	5.0	-12.2	N 78°30' W	sta. 14 — -17% / 90' -39% / 40' . +55% / 75' +48% / 75'; P.I.
10 to 13	298.0 ✓ (298')	P.O.T.	-3°26'	5.0	0.5	-13.5 1129.9	6% C. 12.0	sta. 13 — -30% / 150' . +49% / 75' +46% / 75'; 90° 32' . pt. 13; 90°
13 to 12	108.5 ✓ (113')	on back tang. POT	-12°49'	5.0	5.0	-24.7	✓	sta. 12 — -13 / 150' . +30% / 125' in draw
10 to 11	98.7 ✓ (98')	P.O.T.	-3°26'	5.0	12.5	-13.4 ✓		sta. 11 — -3% / 125' -21% / 65' . +29% / 125'; grade
10	pt. on intermediate saddle cut 7.5					1143.3		sta. 10 — -12% / 125' . +21% / 20' +40% / 125'

(cont.)

Sta.	Cor dist	Hor. ∠	Vert. ∠	H.I.	Rod	Elev.	Mag. B.
23 to 25	251.0 ✓ (254')	P.O.T.	-7°15'	5.0	10.0	-31.9	to wash $\frac{-15\%}{120'}$ Level $\frac{}{50'}$ $\frac{-4\%}{60'}$ $\frac{+3\%}{100'}$ sta. 25
23 to 24	144.1 ✓ (149')	33°19' L	-11°23'	5.0	5.0	-29.0	S 7°30' W $\frac{-18\%}{125'}$ $\frac{-8\%}{75'}$ $\frac{+4\%}{125'}$ sta. 24
22 to 23	131.4 ✓ (131')	P.O.T.	-3°50'	5.0	5.0	-8.8 1087.9	$\frac{-17\%}{150'}$ $\frac{+25\%}{100'}$ sta. 23
18 to 22	356.0 ✓ (356')	P.O.T.	+3°08'	5.0	5.0	+19.5 1096.7	$\frac{-26\%}{100'}$ $\frac{-15\%}{75'}$ $\frac{+24\%}{125'}$ sta. 22
18 to 21	230.6 ✓ (230')	P.O.T.	-2°24'	5.0	5.0	-9.6	$\frac{-14\%}{150'}$ $\frac{+10\%}{150'}$ sta. 21
18 to 20	136.2 ✓ (137')	P.O.T.	-6°35'	5.0	5.0	-15.6	to wash $\frac{-16\%}{60'}$ $\frac{-8\%}{60'}$ $\frac{+8\%}{150'}$ sta. 20
18 to 19	68.7 ✓ (77')	61°14' L	-20°16'	5.0	5.0	-25.3	S 41°30' W $\frac{-4\%}{150'}$ $\frac{+4\%}{150'}$ in draw sta. 19
							$\frac{+25\%}{125'}$ on tch. Pro. E. from 19
							$\frac{-25\%}{60'}$ $\frac{+10\%}{125'}$ on split of angle sta. 18
1C to 18	217.9 ✓ (222')	P.O.T.	-8°41'	5.0	5.0	-33.3 1077.2	F.C.O. Pt. about 30± ahead from back tang.

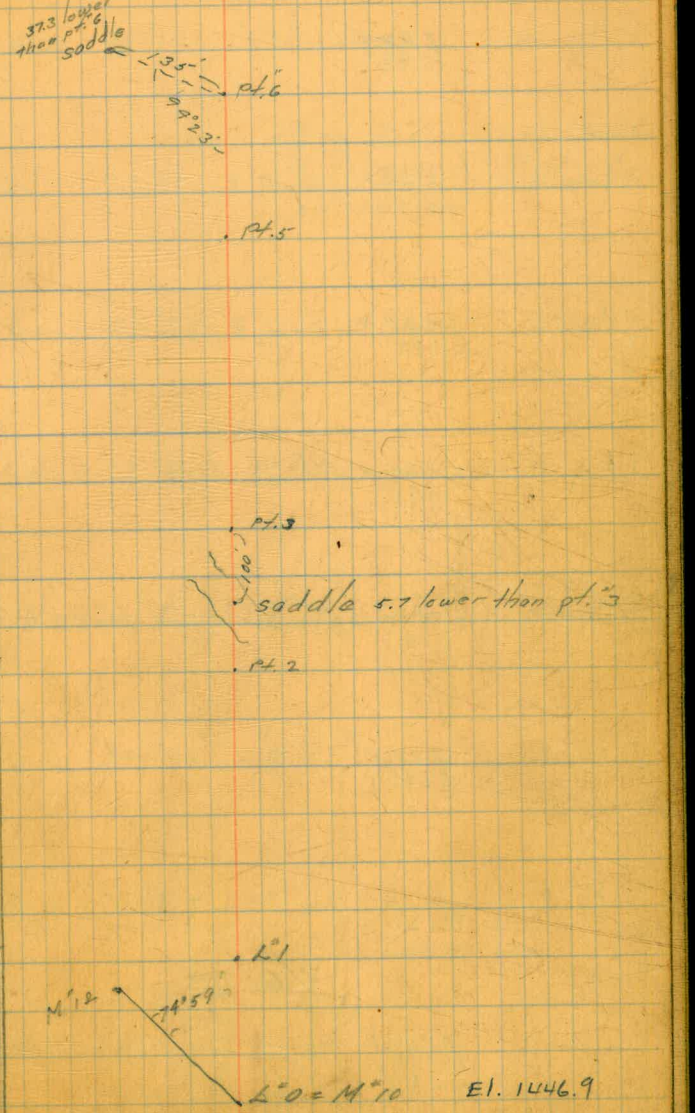
See hookup to N Line

Sta.	Cor. dist.	Hor. ∠	Vert. ∠	H.I.	Rod	Elev.	Mag. B.	
C27 to N25	(120')	1°28' L		4.8	4.8	1056.4	S 6° W	
C27 to N22		24°00' L				1056.4	S. 11°30' E	
N26 = 23 to 27	579.4 (580')	1° O.T.	-3°07'	5.0	5.0	-31.5 1056.4		
23 to 26	408.6 (415')	P.O.T.	-7°45'	5.0	5.0	-55.6		to wash -4% / 150' · +4% / 150' in draw

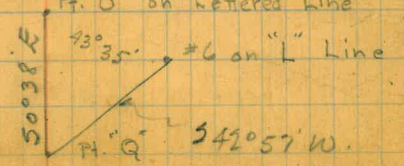
7/5/38 clear
Williams
Hill
Osborne
Isbell
Leckey
Brookes

"L" Line - From Pt. M"10 to State Hwy.

Sta.	Cor. dist.	Hor. ∆	Vert. ∆	H.I.	Rod	Elev.	Mag. B
Letterline 6. to Q ot.	1098.0 (1100')	13°11'L	-3°02'	5.0	5.0	-58.1	N 26°30'E
5 to 6	1126.0 (1125')	P.O.T.	+0°16'	5.0	5.0	+4.8	
4 to 5	1018.5 (1020')	26°07'R	-2°53'	5.0	5.0	-51.2	N 70° E
3 to 4	88.9 (88')	P.O.T.	-1°38'	5.1	6.1	-3.0	
2 to 3	630.1 (630')	7°02'R	+2°11'	4.9	8.0	+24.0	N 19°30 E
1 to 2	745.3 (750')	19°12'L	+5°06'	5.0	9.0	+66.5	N 7°30'E
0 to 1	549.6 (550')	74°59'R Foresight on M"2	+6°12'	5.0	9.0	+59.7	N. 26°E
0 = M"10							



Sta.	Cor. dist	Hor. ∠	Vert. ∠	H.I.	Rod	Elev.	Mag. B.		
13 to 14	288.8 (288')	10° 58' L	-1° 35'	5.5	5.5	-7.9	N. 16° 30 E	cut 9.7	on ridge
9 to 13	574.1 (575')	12° 17' R	-3° 27'	5.3	5.3	-34.6	N. 26° E		Note Recommended location is to more pt. "8" about 50' east and run to pt. "13"
9 to 12	429.5 430	8° 38' R	-3° 27'	5.3	5.3	-25.9		plotting shot - point of ridge	
9 to 11	424.6 (425')	17° 53' L	-3° 27'	5.3	5.3	-25.6		plotting shot bottom of wash	
9 to 10	188.1 (188')	33° 58 L	-3° 27'	5.3	5.3	-11.3		Plotting shot (Begin. of 4% grade)	
8 to 9	295.8 (295')	13° 10' R	+1° 39'	5.2	5.2	+8.5	N. 14° 30 E		
7 to 8	2119.1 (2126')	26° 32' L	-3° 37'	5.1	5.1	-132.9	N. 1° 30' E		
		7/6/38							
6 to 7	2360.8 (2360')	12° 35' L	-0° 45'	5.0	5.0	-30.9	N 27° E	N 42° 18' E	



Sta.	Cor. dist.	Hor. ∆	Vert. ∆	H. I.	Rod	Elev.	Mag. B.	
tang. of pave. 21 to forward	201.0 (200')	5°21'R	+0°23'	5.3	5.3		N 47° W	N 31° 42' W Highway
P.I. Hwy pave. curve 19 to 21	316.9 (316')	P.O.T.	-1°01'	4.9	4.9	-5.6	N 47° W	#21. Note P.I. of hwy = 175'± N. of culv. C. M1. 4.03
19 to 20	86.4 (85')	19°06'L	-4°47'	4.9	4.9	-7.2		Plotting shot
18 to 19	155.7 (155')	25°05'L	-2°45'	4.7	4.7	-7.5	N. 34° W.	
17 to 18	131.7 (140')	8°27'R	-14°58'	5.0	5.0	-35.2	N. 7° W.	Fill 4.7' ~~Cut 2.4'~~ — Note In plotting alignment run from 16A to #18
16 to 17	268.4 (270')	8°44'L	-5°49'	5.3 38.3	8.3	-30.3	N. 16°30' W	cut. 22.0' ~~24.0~~ — #16 59.5' = 16-A, 116°; to grade 33.7 ~~38.3~~' Lower.
14 to 16	401.0 (400')	23°45'L	-0°35' ~~0°0'~~	~~4.8~~ ~~14.5~~ 4.7	~~5.5~~ 9.7	~~8.0~~ -9.1	N. 7°30' W.	Cut. 24.6 ~~33.0~~ to 6% — #14
14 to 15	105.6 (105')	7°58'L	-3°27'	4.8 14.5	14.5'	(-16.1) -6.3	grade	plotting

Section Line ties near Foster

Sta.	Angle	Mag B.	C.C.
26+39.8 (659.4)	P.O.T.		
19+80.4 (303.4)	P.O.T. ⊙		
16+77 (916)	P.O.T. ⊙		
7+61 (760)	P.O.T. ⊙		
1+21	P.O.T.		
		N 74°30' W	
0			

Williams
Hill
Osborne
Isbell
Leekey
Brookes

7/9/38
hot

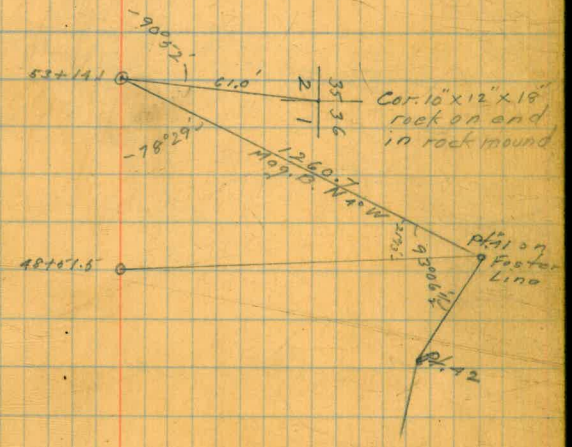
26+56.5
30.5 Set 12" x 12" x 8" stone on edge in rock mound
16.5
26+40 ⊙ 1/4 cor. not found

State Hwy. 1+21

90°
Concr. Mon. ⊙
SW. cor. of N.W. 1/4 S. 31

S. E. cor Tws. 14 S.
R. 1 W. & N. E. cor.
of Rancho El Cajon

Sta.	Angle	Mag. B.
53+14.1 (162.6)	90°52' R	Tie to cor.
48+51.5 (1310.6)	P.O.T. @	
35+40.9 (1560.3)	P.O.T. @	

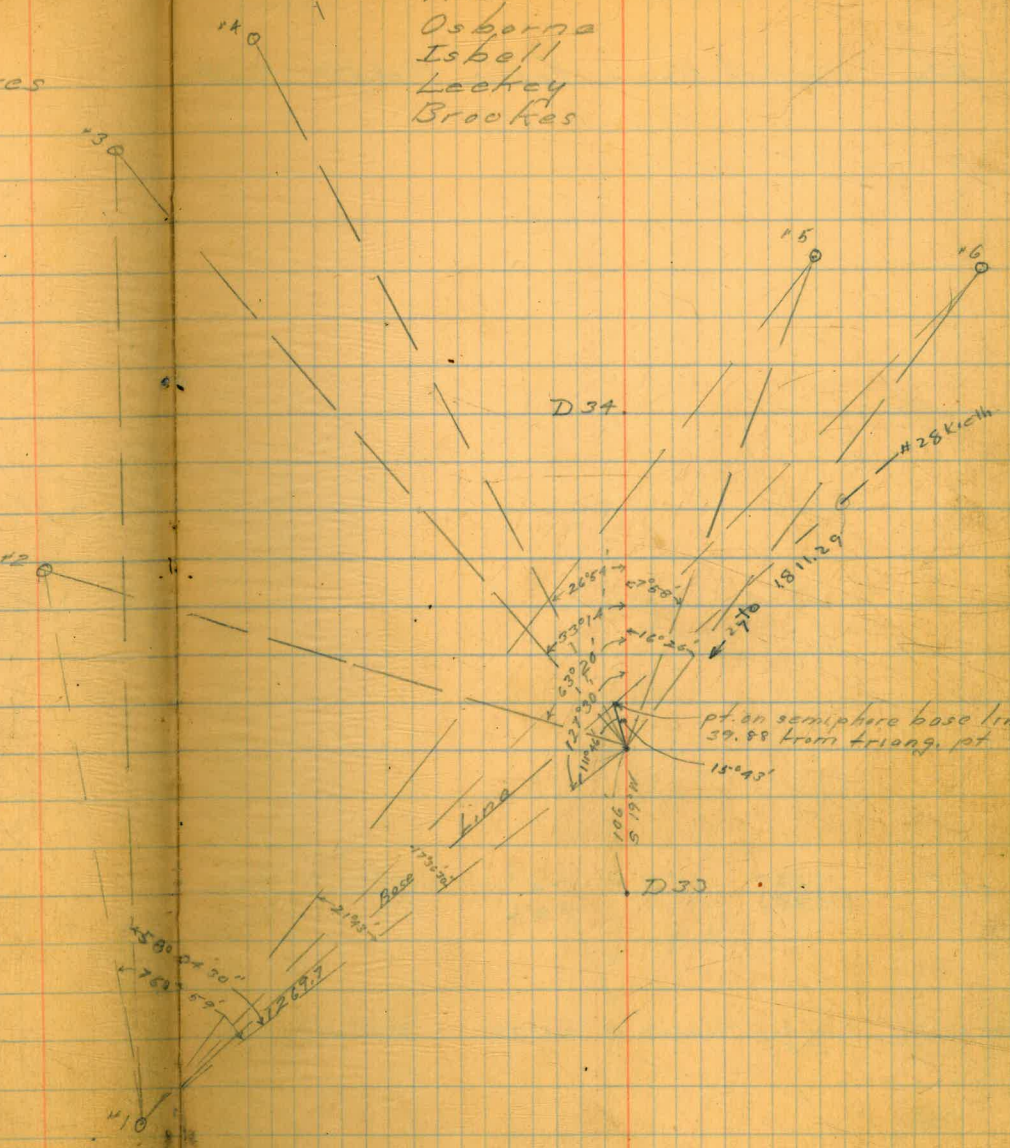


7/9/38

(Keith)

Triangulation to semipheres
from D Line.

Williams
Hill
Osborne
Isbell
Leckey
Brookes

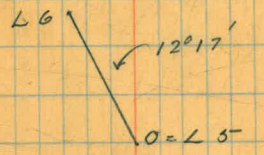


7/11/38
Hill
Leakey

R' Line

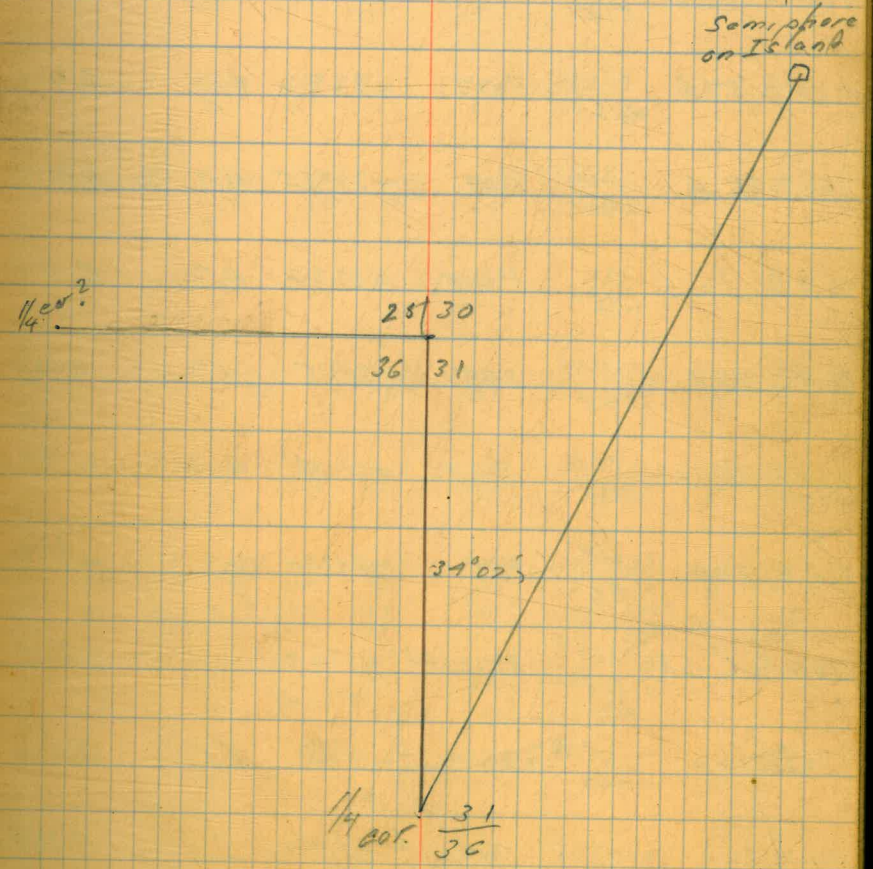
Sta.	Cor. dist.	Hor. Δ	Vert. Δ	H.I.	Rod	Elev.	Mag. B.
1 to 2	1030.5 (1035)	30°21'R	-4°10'	5.1	5.1		N 83°15'E
0 to 1	218.8 (218)	12°17'R	-1°39'	5.1	10.1		N 51°30'E

∠5 = R'0



Tie from Sec. cor $\frac{25|30}{36|31}$ to 1/4 cor 1/2 mile west and tie from 1/4 cor $\frac{31}{36}$ (dam axis) to Island

8/3/38



"M" Line Alternate from M 71

Sta.	Dist.	Horiz ∠	Vert ∠	H.I.	Rod
73A to Dw. Str.	397.5 455'	29°37' Lt	−21°00'	4.7	4.7
73A to Up Str. FS. to C."0"	(375) 420'	23°23' Rt	−19°22	4.7	4.7
73A to 78 A	(428.0) 460'	P.O.T.	−15°30	4.7	4.7
73A to 79 A	(500.9) 515'	P.O.T.	−9°55	4.7	4.7
73A to 77A	(350.5) 412'	P.O.T.	−32°12	4.7	4.7
73A to 76 A	(260.1) 290'	P.O.T.	−21°55'	4.7	4.7
73A to 80 A	(686) 685'	P.O.T.	+0°22	4.7	4.7
73A to 75 A	126.1 144	P.O.T.	−21°15	4.7	4.7
73A to 81 A	730.9 730	P.O.T.	+0°48'	4.7	4.7
73A to 74A	(44.6) 53'	P.O.T.	−24°44	4.7	4.7
73A to "C" 0+82A	(825.7) 825'	33°00 Rt	+1°09	4.7	4.7
73A to 73 A	147.8 147	35°40' Lt	−2°18	5.1	5.1
71A to 72 A FS. "M" 71	(224.7) 224	74°02 Lt	−2°18'	5.0	5.0

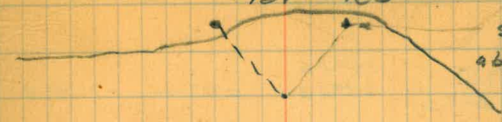
74°02

Williams
Osborn
Isbell
Leeker
Brooks

Sept. 28. 1938

−152.5

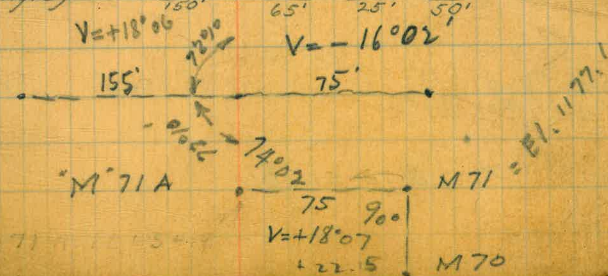
−143.9



−118.7	M81A	+31% / 75'	+17% / 35'	−19% / 40'	−42% / 40'	+25% / 45'	+5% / 100'				
−87.5	M80A	+38 / 100'	−17% / 25'	−37% / 60'	−1% / 40'	−17% / 100'					
−144.4	M79A	−24% / 50'	+5% / 55'	+25% / 25'	−13% / 65'	−37% / 75'					
−100.8	M78A	−31% / 65	−4% / 60'	+14% / 85'	−1% / 55'	−22% / 100'					
+4.4	M77A.	< Creek 1% Grade - - - -									
−49.08	M76A	−20% / 100'	−10% / 50'	+1% / 25'	−8% / 20'	−29% / 50'	+52% / 20'	+18% / 30'	−12% / 40'	−47% / 50'	
+10.2	M75A	−9% / 100'	−15% / 40'	−30% / 70'	−17% / 35'	+55% / 35'	+30% / 30'	−66% to Bot. Draw			
−20.5	M74A	−38% / 100'	+15% / 40'	+42% / 40'	−37% / 55'	−24% / 60'	+38% / 55'	level / 20'	−70% to Bot. Draw		
	M73A 90° to back tan.	+22% / 50'	+59% / 80'	−54% / 55'	−39% / 90'	+30% / 50'	level / 20	−70% to Bot. Draw			
+16.6	M72A split of angle	+34% / 150'	−30% / 65'	Level / 25'	+6% / 50'	M72A					

−5.9
S 50° E

−9.0



Atchison Toll Road Loc.

Co. designation #8

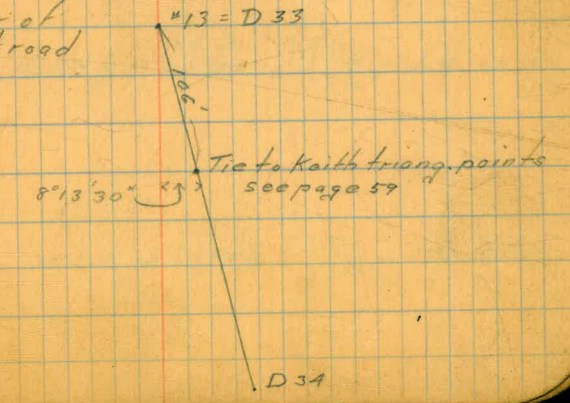
10/11/38
Hill
Isbell
Leakey
Brookes

Sta.	Dist.	Hor. Δ	Vert. Δ	H.I.	Rod Elev.	Mag B.
3 to 5	317 (317')	46°06' 23°03' L	−0°45'	5.3	5.3	N 34° E − 4.1
3 to 4	176.0 (174')	43°31', 21°45' L	−0°42'	5.3	5.3	N 34°30' E − 2.1
2 to 3	235.9 (235')	18°23', 9°12' L	−1°18'	5.2	6.2	N 58° E − 5.3
#1 to 2	174.8 (174')	11°12', 5°36' L	−2°05'	5.1	5.1	N 67°30' E − 6.3
#8.0 to #1	256.9 (256')	130°47'30" 65°23'30" R	−0°55'	5.0	5.0	N 73°30' E − 4.1
M-0 to #8-0 backsight on M3	37.0 (31')	201°28'30 100°42' L	−1°42'	5.0	5.0	− 1.0
M 3 →	S 70°51' E					

Sta	Dist.	Hor.∠	Vert.∠	H.I.	Rod.H.	Mag.B.	
10 to 11	80.0 (79')	35°48'R	-0°57'	5.2	5.2		-1.3
9 to 10	241.0 (240')	41°19'30" 20°39'30"R	-0°20'	5.0	5.0		N21°30'E -1.4
7 to 9	337.8 (337')	21°47' 10°53'R	-1°23'	5.1	5.1		N3°30'E -8.1
7 to 8	227.9 (228')	14°38'R	-1°10'	5.2	5.2		-4.6
6 to 7	251.0 (250')	52°50'30" 26°25'30"L	-0°46'	5.0	5.0		N7°W -3.3
5 to 6	168.0 (168')	31°33' 15°46'30"L	-0°49'	5.1	5.1		N.18°E -2.4 #6 W.edge of present road

33 53

Sta.	Dist.	Hor. Δ	Vert. Δ	H.I.	Rod. El.	Mag. B.	
16 to 17	132.8 (133')	38°28' 19°14 R	-5°37'	5.0	5.0	N 25° E -13.0	
15 to 16	209.7 (209')	33°52'30" 16°56' L	+2°00'	5.0	5.0	N 8° E +7.32	
13 to 15	631 (630')	34°38' 17°19 L	+0°06'	5.1	5.1	N 25° E +1.1	#16 25' W. of present road
13 to 14	357 (357')	12°48' L	-0°41'	5.1	5.1	-4.3	#14 W. edge of present road
12 to 13	181 (180')	46°53' 23°27 L	-0°39'	5.2	5.2	N 43° E -2.1	#13 center of present road
10 to 12	269.0 (268')	82°18'30" 41°09 R	-0°03'	5.0	5.0	N. 66° E -0.2	



Sta.	Dist.	Hor. ∆	Vert. ∆	H.I.	Rod = Elev	Mag. B.	
22 to 23	281.0 (280')	11°22', 5°41' L	-0°48'	5.1	5.1	N5-7°E	-3.9
20 to 22	385.9 (385')	9°40'30", 4°50' L	-1°05'	4.7	4.7	N62°E	-7.3 +22 center of present road
20 to 21	215.9 (215')	0°40'30" R	-1°02'	4.8	4.8		-3.9
19 to 20	276 (275')	48°50', 24°25' R	-0°35'	4.8	4.8	N61°E	-2.8 +20 N. edge of present road
18 to 19	285.2 (287')	37°06', 18°33' R	-4°38'	4.6	4.6	N42°30'E	-23.0 +19 N. edge of present road
17 to 18	102.0 (103')	7°20' 3°40'30" L	-8°06'	5.0	5.0	N23°30'E	-14.5 +18 S. edge of present road

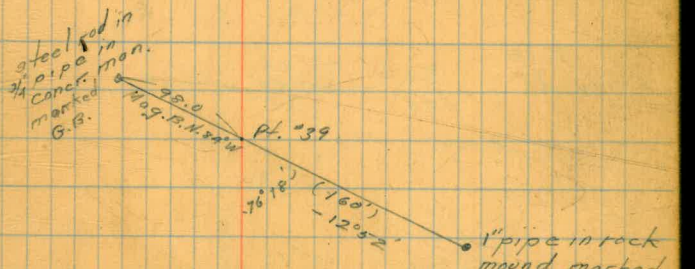
Sta.	Dist.	Hor. Δ	Vert Δ	H.I.	Rod or Elev.	Mag. B.	
28 to 30	367 (367')	0°05' 0°02'30" L	+0°39'	5.1	5.1	N 18° W	-4.2
28 to 29	224.0 (223')	6°36' L	+0°41'	5.1	5.1		+2.7
27 to 28	161.0 (160')	95°55' 47°57' L	+0°56'	5.0	5.0	N 17°30' W	+2.6 +28 W. edge present road
26 to 27	136.0 (136')	59°52'30" 29°56'30" L	-0°42'	5.1	5.1	N 30° E	-1.7 +27 center of present road
25 to 26	445 (444')	3°49' 1°54' R	-0°35'	5.0	5.0	N 60°30' E	-4.5
23 to 25	566.9 (567')	P.O.T.	-0°41'	5.0	5.0		-6.7
23 to 24	184.0 (183')	4°28'30" 2°14' R	-0°21'	5.0	5.0	N 7° E	-1.1

Sta.	Dist.	Hor. ∠	Vert. ∠	H.I.	Rod Elev.	Mag. B.
33 to 37	595.4 (595')	15°2'57'30" 76°26'R	-3°05'	5.0	5.0	N57°E -32.1
33 to 36	480 (480')	75°15'R	-2°49'	5.0	10.0	-23.6
33 to 35	296.0 (297')	78°44'R	-4°47'	5.0	5.0	-24.6
33 to 34	148.0 (148')	73°11'30"R	-4°48'	5.0	5.0	-12.3
32 to 33	84.0 (86')	39°23' 19°41'30"R	-8°13'	5.0	5.0	N20°W -12.8
31 to 32	138.5 (139')	54°58', 27°29'L	-6°07'	5.1	5.1	N39°30'W -14.8
30 to 31	93.0 (92')	11°54'30" 5°57'R	+0°26'	4.8	4.8	N12°W +0.7

M37 center at present road

10/13/38

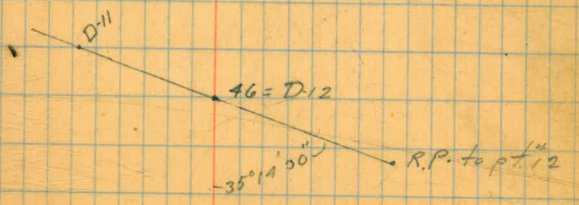
Sta.	Dist.	Hor.∠	Vert.∠	H.I.	Rod EL	Mag. B.
41 to 43	190.8 (191')	67° 56' 33° 58 R	-1° 55'	4.2	4.2	N 20° 30' E -6.4
41 to 42	69.4 (69')	50° 05' 30" R	-5° 11'	4.2	4.2	- -6.3
40 to 41	140.5 (142')	16° 24' 30" 8° 12' 30" L	-6° 09'	4.5	4.5	N 13° W -15.0
39 to 40	298.7 (303')	2° 51' 30" 1° 25' 30" R	-8° 05'	5.0	5.0	N 6° 30' W -47.3
38 to 39	246.1 (248')	28° 25' 30" 14° 13' L	-6° 12'	5.2	5.2	N 8° W -26.7
37 to 38	156.5 (156')	99° 45' 49° 52' 30" L	-3° 21'	5.1	5.1	N 6° 30' E -9.1



#38 center of present road

3514 30

Sta.	Dist.	Hor. Δ	Vert Δ	H.I.	Rod or El.	Mag. B	
45 to 48	291.9 (291')	P.O.T.	-1°14'	5.1	5.1	-6.3	Center state Hwy. (part)
45 to 47	216.8 (217')	12°58'L	-1°48'	5.1	5.1	-6.8	"47 = center at present road
45 to D12 = 46	36.0 (35')	47°26' 23°43'L	+0°35'	5.1	5.1	+3.6	
43 to 45	304.7 (304')	14°19' 7°09'30"R	+1°50'	5.0	5.0	+9.7 N27°30'E	"45 = center present road
43 to 44	124.6 (124')	11°53'L	+3°22'	5.0	5.0	+7.3	"44 = Center of present road



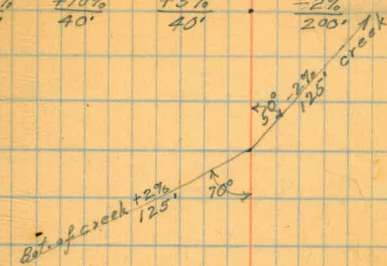
Inter. of "D"A" line & "D" on split of angle

on E. & W. center 1/4 sec. line

Hill
Isbell
Leekay
Brooks

10-24-38

West				℄	East			
+38% / 30'	+10% / 40'	+5% / 40'		·	-2% / 200'			
								D18A
	-5% / 60'	-26% / 100'		·	+22% / 100'	-4% / 60'		Approx. 100' fr. 19A
	-32% / 80'	-34% / 100'		·	+14% / 25'	-20% / 100'		D19A
	-5% / 100'	-22% / 100'		·	+20% / 50'	Level / 25'	-10% / 100'	Approx 100' from 19A
	-3% / 100'	-15% / 60'		·	+18% / 50'	+45% / 80'		



Add. topog. over M'line from pt. 0, Meridian saddle, to pt. #3

#3 1630.9
#2 1495.8
S 70°51' E

Sta.	Dist	Hor. Δ	Vert. Δ	H.I.	Rod = Elev				
Note For topog. on pts. 1, 2 & 3 see M'line pt. 0 to pt. 8									
1 to 1⁴	457.5 (458')		-1°30'	5.2	5.2	-14.6	small island ↓ -23% 75'	+17% 75'	+23% 30'	+30% 15-0'
1 to 1³	305.7 (305')		-1°16'	5.2	5.2	-9.4	-10% 70'	-30% 60'	+20% 50	+9% 100'
1 to 1²	210.1 (210')	P.O.T.	-3°30'	5.2	13.2	-22.1	-3% 80'	-7% 90	+18% 15-0'	
P+1 to 1'	71.9 (71')	P.O.T.	-1°40'	5.2	5.2	-2.1	-14% 15-0'	-28% 60'	+27% 15-0	
0 to 0³	408 (408')	P.O.T.	-0.02	5.1	12.1	-7.1		-12% 150	+16% 75'	+25% 100
0 to 0²	331 (330')	P.O.T.	-0°18'	5.1	5.1	-1.7	-13% 100	-30% 25'	+36% 60'	+10% 125'
0 to 0'	87.8 (87')	P.O.T.	-2°33'	5.1	5.1	-3.9	+20% 200	+6% 30	Hol.	+9% 50	+22% 50'	+7% 100

Alternate line from M'3 to [15/3]   10/31/38

D 33.

Sta.	Dist.	Hor. ∠	Vert. ∠	H.I.	Rod Elev.		Slopes
M²0 to 7	808.8 (808')	P.O.T.	+1°05'	5.2	12.2	+8.3	+37%/75' +11%/30' +17%/60' Pt.7 −24%/25' −15%/100' +8%/125
M²0 to 6	720.8 (720')	P.O.T.	+0°56'	5.2	5.2	+11.7 ✓	+30%/125' +16%/35' Pt.6 −15%/40' +8%/40' −27%/80
M²0 to 5	645.9 (645')	P.O.T.	+0°45'	5.2	8.2	+5.3 ✓	+40%/100' +25%/35' Pt.5 −16%/150
M²0 to 4	545.8 (545')	P.O.T.	+1°08'	5.2	5.2	−10.8 +10.!	+25%/100' +51%/75' +22%/25' Pt.4 −22%/35' −1°%/80' −28%/100'
M²0 to 3	382.6 (382')	P.O.T.	−2°16'	5.2	15.2	−21.1 V5.!	+43%/200' +4%/30' Pt.3 −6%/200'
M²0 to 2	263.7 (263')	P.O.T.	−2°07'	5.2	14.2	−18.7 ✓	+41%/200' +27%/30' Pt.2 −21%/40' −10%/150
M²0 to 1	160.8 (160')	61°20', 30°40' L	−2°18'	5.2	5.2	−6.5 ✓ N78°E	+35%/150 +22%/50' Pt.1 −22%/80' −10%/100'

M 3 = M²0 → S 70° 48 E

Backsight on M'8

Sta.	Dist.	Hor. ∠	Vert. ∠	H.I.	Rod @ Ver						
12 to 13	725.6 (725')	45°18' R 22°38'30"	−1°20'	5.2	5.2	−14.9 ✓ N 86°30' E	+12% / 100'	+2% / 200'	Pt 13	+2% / 200'	
11 to 12	173.9 (173)	22°38'30" R. 45°11'	−1°33'	5.2	5.2	−4.7 ✓ N 64°0 E.	+22% / 100'	+6% / 90'	Pt. 12	+8% / 125'	+25% / 75'
10 to 11	307.3 (307)	4°11' L. 8°21'30"	−2°46	5.2	5.2	−14.8 ✓ N 4°0 E.		+8% / 200'	Pt. 11	+7% / 100'	+25% / 70'
7 to 10	562.5 (562.5')	P.O.T.	−1°35'	5.1	5.1	−45.1 ✓	+7% / 150'	−4% / 45'	Pt. 10	+9% / 200'	
7 to 9	402.3 (401)	P.O.T.	−1°13'	5.1	10.1	−38.7 ✓	+20% / 50'	+5% / 85'	Pt. 9	+4% / 100'	+17% / 100'
M 7 to 8	266.0 (266')	64°56' 32°28' L	−5°02'	5.1	5.1	−23.2 ✓ N. 45° E		+12% / 125'	Pt. 8	−7% / 70'	+6% / 100'	+9% / 100'

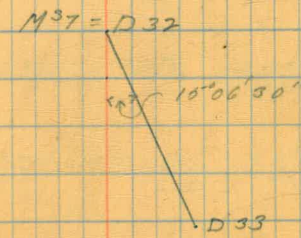
Sta.	Dist.	Hor. ∆	Vert ∆	H.I.	Rod & Elev.		
15 to D32		38°30' 19°15' L				N 25° E	
13 to 15 (D33 = 15)	551.0 (550')	84°09' 12°04'30" Lt	−0°05'	5.2	5.2	→ 0.8 N. 41° E	+7% / 150; −1% / 100; −5% / 150; level
13 to 14	356.0 (355)	POT	+0°31'	5.2	5.2	+3.2 ✓ N 44° E	+9% / 150'; "14; −5% / 35'; level / 100

Alternate from M²-11 to 32/31 10/31/38

Sta.	Dist.	Hor. ∠	Vert. ∠	H.I.	Rod Elev.							
4 to 5	340.9 (340)	92°40' 16°19'30" R.	-1°02'	5.2	5.2	S.87°E. -6.1	+20% 75'	+8% 75'	Level 100'	Pt 5	+4% 70'	+27% 100'
3 to 4	516.0 (515')	37°01' 18°30'30" R	-0°19'	5.1	5.1	N46°E -2.8		+17% 100'	level 150'		+18° 100'	
2 to 3	356.9 (356')	28°18'30" 14°09'30" L	-1°03'	5.2	5.2	N.28°E -6.5		+3% 200	Pt 3		+9% 100	-7° 100 level
M²11 to M³2	364.0 (363')	P.O.T.	-0°36'	5.2	5.2	N42°E -3.8		+2% 150'	Pt 2		-6% 25	+5% 100
M²11 to M³1 backsight on pt. 10	234 (233')	2°01'15" 1°00'30" R	-0°36'	5.2	5.2	N42°E +2.4		+26% 125'	Pt 1		-9% 670	-2% 100

Sta.	Dist.	Hor. ∠	Vert. ∠	H.I.	Rod. & Elev.	Mag.	
6 to 7 (D 32 = 7)	201.0 (200')	103°55' 51°57'30"L	+0°57'	5.1	5.1	+3.1 N. 41°E	+11% / 100 ; +17% / 75' ; −8% / 25' ; level / 200
4 to 6	610.8 (610)	P.O.T.	−1°06'	5.2	5.2	−11.7	+25% / 100' ; +4% / 80' ; level / 200'

Note An apparently improved location can be made by setting a point 250' perp. on the north to line between pt. 4 & 5 and 240' distant from #4. This line to hook up with pt. 31 or 30 of D line. See page 78



Alt. line from explanatory note page 77

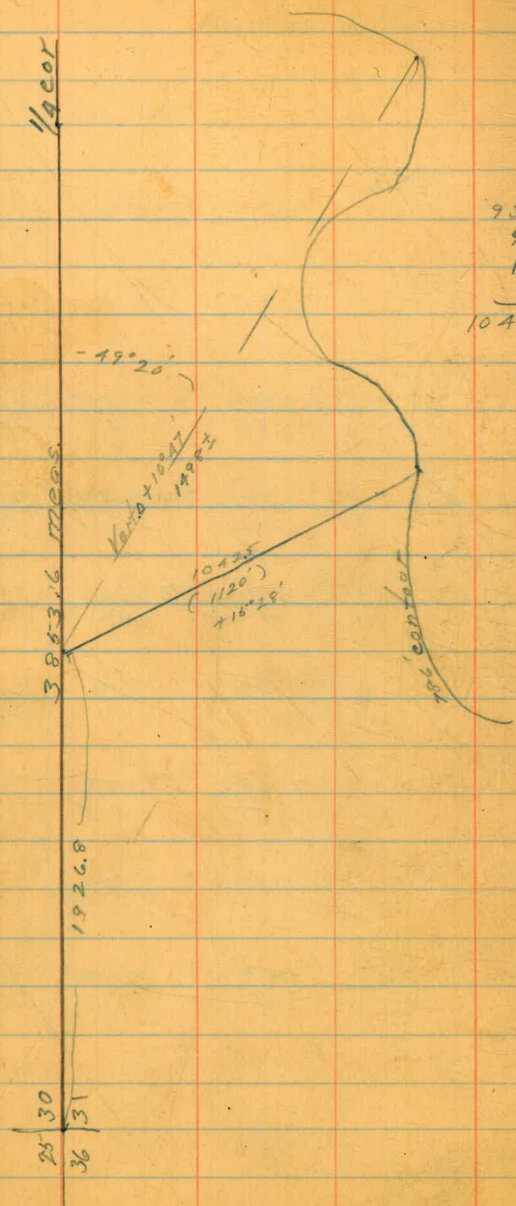
Sta.	Dist.	Hor. ∠	Vert ∠	H.I.	Rod & Elev.	Mag.	L	∠	✓
D29 to D28		13°13'30"							
7 to D29	157.2 (157')	14°29'L	-4°06'	5.1	5.1	N 63°E	1435.3		
7 to 8	192.3 (192')	13°56'L	-3°22'	5.1	2.1	N 63°30E	1438.1		
4 to 7	267.2 (268')	P.O.T.	-4°46'	4.9	5.9		1446.4		
4 to 6	173.8 (175')	30°53'30"R	-6°35'	4.9	8.9	N 77°30E	1445.7		
4 to 5	108.7 (108)	180°00'R	-2°55'	5.1	8.1	S 46°30 W	1461.3		
2 to 4	140.7 (140')	P.O.T.	-2°57'	5.1	10.1		1469.7		
2 to 3	89.7 (89')	P.O.T.	-3°33'	5.1	5.1		1476.4		
4 to 21	466.0 (465)	P.O.T.	+1°56'	5.1	5.1		1481.9		
4 to 1	219.0 (218)	P.O.T.	-0°45'	5.1	5.1	N 46°30E	1463.4		

Pt. M³4 page 76
backsight on #3

El Sta "4" - 1466.2

Tie to 786' contour on W. line of N.E. 1/4 of N.W. 1/4 of sec. 31

257
25.7
5.1
.3
288.1
2.6
285.5



930
93
18.6
.9
1042.5

S 76°30'E

Instru. at 36 F.S. on 37

S 74°06' W
67°01' L
S 7°05' W
21 48 R
S 28°53' W
18 11
S 25°16' W

N 35° 30' W

761
916
303
1980

127°30

36 | 36
2 | 1
35 | 36

1 2

+5°40'
-2°50'
+8°43'

1270

999.0
269.7
1268.7

126 41 30
63°20
33°14
66°28
26°53'30"
53 48
26°14
21°43'
43 26
17°36'30"
35 13'

7°68'
10°56
16°25'
74°58'30"
153 58 30
153 59 53 47
76 59 30
58°04'30"
116 09

-4.07
5.00
-9.07
24.0
C-14.9
9.7
C 24.6

Bench Mark U.S.G.S. Lower Otay Dam

Lower Otay Dam, 33 feet S.E. of E. End of Sec. 18. T 18. S. R 1 E 70' E. of Int. of filled road with dam on N.W. face of Bldr. 4'x3'x2' bronze tablet stamped 486 – S.D. El. 486.569

460.0 Elev. ground at W. dam San Vicente
470.0 bot at W. end
455.0 " " mid pt.
451.0 " " E. end

IMPROVED TABLES AND INFORMATION

Table X.

MIDDLE ORDINATES OF RAILS

Length of Rail (feet)

C ° ′	R Feet	30 Inch	28 Inch	26 Inch	24 Inch	22 Inch	20 Inch	C °	R Feet	30 Inch	28 Inch	26 Inch	24 Inch	22 Inch	20 Inch
0–20	17189	.08	.07	.06	.05	.04	.03	8	716.8	1.88	1.64	1.42	1.20	1.01	.84
0–40	8594	.16	.14	.12	.10	.08	.07	9	637.3	2.12	1.84	1.60	1.35	1.14	.94
1–0	5730	.24	.20	.18	.15	.13	.10	10	573.7	2.36	2.05	1.78	1.50	1.27	1.04
1–20	4297	.31	.27	.23	.20	.17	.13	11	521.7	2.59	2.26	1.95	1.65	1.39	1.15
1–40	3438	.39	.34	.29	.25	.21	.17	12	478.3	3.83	2.47	2.15	1.81	1.54	1.26
2–0	2865	.47	.41	.35	.30	.25	.20	13	441.7	3.05	2.66	2.30	1.96	1.66	1.36
2–20	2456	.55	.48	.41	.35	.29	.23	14	410.3	3.30	2.87	2.48	2.10	1.78	1.46
2–40	2149	.63	.55	.47	.40	.33	.27	15	383.1	3.54	3.08	2.68	2.26	1.91	1.57
3–0	1910	.71	.62	.53	.45	.38	.31	16	359.3	3.76	3.28	2.83	2.40	2.04	1.67
3–20	1719	.78	.68	.59	.50	.42	.35	17	338.3	4.00	3.48	3.02	2.57	2.16	1.78
3–40	1563	.86	.75	.65	.55	.46	.38	18	319.6	4.21	3.67	3.18	2.70	2.28	1.87
4–0	1433	.94	.82	.71	.60	.50	.42	19	302.9	4.45	3.89	3.36	2.86	2.41	1.98
4–20	1323	1.02	.89	.77	.65	.55	.45	20	287.9	4.70	4.09	3.55	3.00	2.54	2.09
4–40	1228	1.10	.96	.83	.70	.59	.48	22	262.0	5.16	4.44	3.84	3.30	2.80	2.29
5	1146	1.18	1.03	.89	.75	.63	.52	24	240.5	5.64	4.92	4.20	3.59	3.04	2.50
6	955.3	1.41	1.23	1.06	.90	.76	.62	26	222.3	6.07	5.29	4.58	3.88	3.29	2.70
7	819.0	1.65	1.44	1.24	1.05	.89	.73								

Table XI.

SHORT RADIUS CURVES

Radius Feet	Chord Feet	Central Angle	Deflection Angle	Deflection for 1 Foot
35	10	16-26	8-13	49.3
45	10	12-46	6-23	38.3
50	15	17-16	8-38	34.5
60	15	14-22	7-11	28.8
75	15	11-30	5-45	23.0
100	20	11-30	5-45	17.3
120	20	9-34	4-47	14.3
150	20	7-39	3-49	11.5
190	25	7-32	3-46	9.15
200	25	7-10	3-35	8.6
225	25	6-25	3-12	7.7
240	25	5-58	2-59	7.2
250	25	5-44	2-52	6.9
275	25	5-12	2-36	6.2
288	50	9-58	4-59	6.0
300	50	9-32	4-46	5.7
350	50	8-12	4-06	4.9
376	50	7-40	3-50	4.6
400	50	7-10	3-35	4.3
410	50	7-00	3-30	4.2

To find length of curve divide angle from P. C. to P. T. by central angle of chord, and multiply by length of chord.

Table XII.

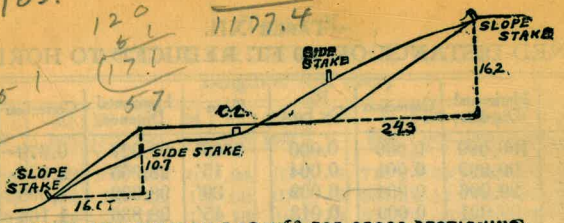
INCLINED DISTANCE OF 100 FT. REDUCED TO HORIZONTAL

Slope	Horizontal Distance	Correction	Rise Per Foot	Slope	Horizontal Distance	Correction	Rise Per Foot
0°00′	100.000	0.000	0.000	8°00′	99.027	0.973	0.139
15′	99.999	0.001	0.004	15′	98.965	1.035	0.143
30′	99.996	0.004	0.009	30′	98.902	1.098	0.148
45′	99.991	0.009	0.013	45′	98.836	1.164	0.152
1 00	99.985	0.015	0.017	9 00	98.769	1.231	0.156
15	99.976	0.024	0.022	15	98.700	1.300	0.161
30	99.966	0.034	0.026	30	98.629	1.371	0.165
45	99.953	0.047	0.031	45	98.556	1.444	0.169
2 00	99.939	0.061	0.035	10 00	98.481	1.519	0.174
15	99.923	0.077	0.039	15	98.404	1.596	0.178
30	99.905	0.095	0.044	30	98.325	1.675	0.182
45	99.885	0.115	0.048	45	98.245	1.755	0.187
3 00	99.863	0.137	0.052	11 00	98.163	1.837	0.191
15	99.839	0.161	0.057	15	98.079	1.921	0.195
30	99.813	0.187	0.061	30	97.992	2.008	0.199
45	99.786	0.214	0.065	45	97.905	2.095	0.204
4 00	99.756	0.244	0.070	12 00	97.815	2.185	0.208
15	99.725	0.275	0.074	15	97.723	2.277	0.212
30	99.692	0.308	0.078	30	97.630	2.370	0.216
45	99.657	0.343	0.083	45	97.534	2.466	0.221
5 00	99.619	0.381	0.087	13 00	97.437	2.563	0.225
15	99.580	0.420	0.092	15	97.338	2.662	0.229
30	99.540	0.460	0.096	30	97.237	2.763	0.233
45	99.497	0.503	0.100	45	97.134	2.866	0.238
6 00	99.452	0.548	0.105	14 00	97.030	2.970	0.242
15	99.406	0.594	0.109	15	96.923	3.077	0.246
30	99.357	0.643	0.113	30	96.815	3.185	0.250
45	99.307	0.693	0.118	45	96.705	3.295	0.255
7 00	99.255	0.745	0.122	15 00	96.593	3.407	0.259
15	99.200	0.800	0.126	15	96.479	3.521	0.263
30	99.144	0.856	0.131	30	96.363	3.637	0.267
45	99.087	0.913	0.135	45	96.246	3.754	0.271

Table XIII.

MINUTES IN DECIMALS OF A DEGREE.

0 30″	.00833	10′ 30″	.17500	20′ 30″	.34167	30′ 10″	.50833	40′ 30″	.67500	50′ 10″	.84167
1 00	.01667	11 00	.18333	21 00	.35000	31 00	.51667	41 00	.68333	51 00	.85000
30	.02500	30	.19167	30	.35833	30	.52500	30	.69167	30	.85833
2 00	.03333	12 00	.20000	22 00	.36667	32 00	.53333	42 00	.70000	52 00	.86667
30	.04167	30	.20833	30	.37500	30	.54167	30	.70833	30	.87500
3 00	.05000	13 00	.21667	23 00	.38333	33 00	.55000	43 00	.71667	53 00	.88333
30	.05833	30	.22500	30	.39167	30	.55833	30	.72500	30	.89167
4 00	.06667	14 00	.23333	24 00	.40000	34 00	.56667	44 00	.73333	54 00	.90000
30	.07500	30	.24167	30	.40833	30	.57500	30	.74167	30	.90833
5 00	.08333	15 00	.25000	25 00	.41667	35 00	.58333	45 00	.75000	55 00	.91667
30	.09167	30	.25833	30	.42500	30	.59167	30	.75833	30	.92500
6 00	.10000	16 00	.26667	26 00	.43333	36 00	.60000	46 00	.76667	56 00	.93333
30	.10833	30	.27500	30	.44167	30	.60833	30	.77500	30	.94167
7 00	.11667	17 00	.28333	27 00	.45000	37 00	.61667	47 00	.78333	57 00	.95000
30	.12500	30	.29167	30	.45833	30	.62500	30	.79167	30	.95833
8 00	.13333	18 00	.30000	28 00	.46667	38 00	.63333	48 00	.80000	58 00	.96667
30	.14167	30	.30833	30	.47500	30	.64167	30	.80833	30	.97500
9 00	.15000	19 00	.31667	29 00	.48333	39 00	.65000	49 00	.81667	59 00	.98333
30	.15833	30	.32500	30	.49167	30	.65833	30	.82500	30	.99167
10 00	.16667	20 00	.33333	30 00	.50000	40 00	.66667	50 00	.83333	60 00	1.00000



DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING.

SLOPE 1½ TO 1. ROADWAY OF ANY WIDTH.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0 00	0 15	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	0
1	1.50	1 65	1 80	1.95	2.10	2.25	2.40	2.55	2.70	2.85	1
2	3.00	3.15	3.30	3 45	3.60	3 75	3.90	4.05	4.20	4 35	2
3	4.50	4 65	4.80	4.95	5 10	5 25	5 40	5.55	5.70	5.85	3
4	6.00	6 15	6.30	6.45	6.60	6.75	6.90	7.05	7.20	7.35	4
5	7 50	7.65	7.80	7.95	8.10	8.25	8.40	8.55	8.70	8.85	5
6	9 00	9 15	9.30	9.45	9.60	9.75	9.90	10.05	10.20	10.35	6
7	10.50	10 65	10.80	10.95	11.10	11.25	11.40	11.55	11 70	11.85	7
8	12.00	12 15	12.30	12.45	12.60	12.75	12.90	13.05	13.20	13.35	8
9	13 50	13.65	13 80	13 95	14.10	14.25	14.40	14 55	14.70	14.85	9
10	15.00	15 15	15 30	15 45	15.60	15.75	15.90	16.05	16.20	16 35	10
11	16 50	16 65	16 80	16.95	17 10	17.25	17.40	17.55	17.70	17.85	11
12	18 00	18.15	18.30	18 45	18.60	18 75	18.90	19.05	19.20	19 35	12
13	19 50	19 65	19.80	19.95	20.10	20.25	20 40	20.55	20.70	20.85	13
14	21.00	21 15	21.30	21.45	21 60	21.75	21.90	22 05	22 20	22 35	14
15	22 50	22 65	22 80	22 95	23.10	23.25	23.40	23.55	23.70	23.85	15
16	24.00	24 15	24 30	24 45	24.60	24.75	24 90	25 05	25.20	25.35	16
17	25.50	25 65	25.80	25 95	26.10	26 25	26 40	26.55	26.70	26.85	17
18	27.00	27 15	27.30	27 45	27.60	27.75	27.90	28.05	28 20	28.35	18
19	28 50	28 65	28 80	28.95	29.10	29.25	29.40	29.55	29.70	29.85	19
20	30 00	30 15	30.30	30.45	30.60	30.75	30.90	31.05	31.20	31.35	20
21	31 50	31 65	31.80	31.95	32 10	32 25	32.40	32.55	32 70	32 85	21
22	33 00	33 15	33 30	33 45	33.60	33 75	33.90	34.05	34.20	34.35	22
23	34 50	34 65	34.80	34.95	35.10	35 25	35 40	35.55	35.70	35 85	23
24	36.00	36 15	36.30	36 45	36.60	36.75	36.90	37.05	37 20	37.35	24
25	37.50	37.65	37 80	37.95	38.10	38.25	38.40	38.55	38.70	38.85	25
26	39 00	39 15	39.30	39 45	39 60	39.75	39.90	40.05	40.20	40.35	26
27	40 50	40 65	40 80	40.95	41.10	41.25	41 40	41.55	41.70	41.85	27
28	42 00	42 15	42.30	42.45	42.60	42 75	42.90	43.05	43.20	43.35	28
29	43 50	43 65	43.80	43 95	44.10	44 25	44 40	44.55	44.70	44 85	29
30	45 00	45 15	45.30	45 45	45.60	45.75	45 90	46.05	46 20	46.35	30
31	46.50	46.65	46.80	46 95	47.10	47.25	47.40	47.55	47.70	47.85	31
32	48 00	48.15	48.30	48 45	48.60	48 75	48.90	49.05	49 20	49.35	32
33	49.50	49 65	49.80	49.95	50.10	50.25	50.40	50.55	50 70	50.85	33
34	51 00	51.15	51.30	51.45	51.60	51.75	51.90	52.05	52.20	52.35	34
35	52 50	52.65	52.80	52.95	53.10	53.25	53.40	53.55	53.70	53.85	35
36	54 00	54 15	54.30	54 45	54.60	54.75	54.90	55.05	55.20	55.35	36
37	55 50	55 65	55.80	55 95	56.10	56.25	56.40	56.55	56.70	56.85	37
38	57.00	57.15	57 30	57 45	57.60	57 75	57.90	58.05	58.20	58 35	38
39	58 50	58.65	58 80	58 95	59.10	59 25	59.40	59 55	59.70	59.85	39
40	60 00	60 15	60 30	60 45	60 60	60.75	60 90	61.05	61 20	61.35	40
41	61.50	61 65	61 80	61 95	62 10	62 25	62.40	62 55	62 70	62.85	41
42	63 00	63.15	63 30	63 45	63 60	63 75	63 90	64 05	64 20	64.35	42
43	64.50	64 65	64 80	64.95	65.10	65 25	65 40	65.55	65.70	65.85	43
44	66 00	66 15	66 30	66.45	66.60	66 75	66.90	67.05	67.20	67.35	44
45	67 50	67 65	67 80	67 95	68.10	68.25	68.40	68.55	68.70	68.85	45
46	69 00	69 15	69 30	69.45	69.60	69 75	69.90	70.05	70.20	70.35	46
47	70 50	70 65	70 80	70 95	71.10	71.25	71 40	71.55	71.70	71.85	47
48	72.00	72 15	72.30	72.45	72.60	72.75	72.90	73 05	73.20	73 35	48
49	73 50	73 65	73.80	73.95	74.10	74.25	74.40	74.55	74.70	74.85	49
50	75.00	75.15	75.30	75.45	75.60	75.75	75.90	76.05	76.20	76.35	50

Computed by L. Leland Locke.

+	⊼	−	120.00
0.145	120.145		
2nd Hub. T.P.		0.43 / 12.80	119.72 / 107.35
0.285	107.635	12.725	94.910
0.07	94.98		
0.685	82.615	13.05 / 10.015 / 12.73	81.93 / 72.60 / 69.885
	76.310	7.37	68.94

Hub. 424

199+69.3 = El. 1171.9
1 05.7
19 8+63.6

10.9

x10.6/10/55
1425

.5918
500
2959000

9.7 N 13°47′E
1 032
N 12°44′E
S W

4.7

−0°35′

3 Blocks north of Newport 5.16
4830½ Cape May

80.16
72.40
7.76

5.16
2.60
7.76

72.4
3.5
68.9

89-60
17-50
72 10

105 6.6
17.7
107 4.3

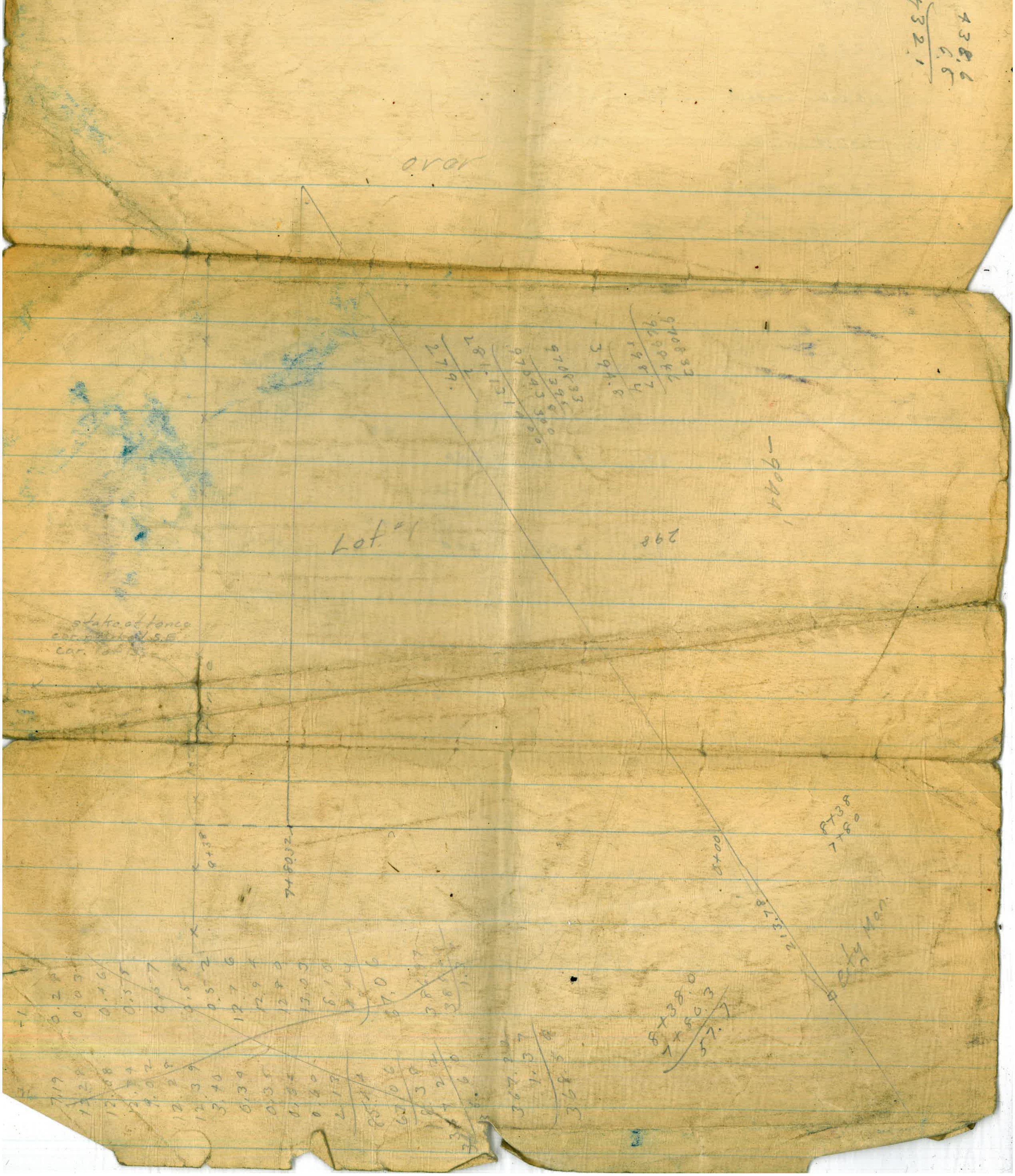
22.21

3540
17°50

306

171°46′

2+42.4
1 50.0
3+92.4
16.8
4+09.2



over
Lot #1
298
City Man.
0+00
213.78
8+38
7+80
8 x 38.0
7 x 80.3
57.7
438.6
6.5
432.1

Sta	Elev.	H.I.	Hor.∆	Vert.∆	Dist.	Rod + Elev.	Vert.∆	Dist	Rod + Elev
0+00	428.9								
+50	433.9								
1	438.6	4.8 443.4	90°	-2°00'	187	4.8			
+50	443.4								
2	447.5	5.1 452.6	90°	-2°32'	102	5.1	-1°59'	388	11.1
+50	449.0	5.0 454.0	90°	-2°23'	297	11.0	-1°30'	480	5.0
[illegible]	[illegible]	5.2 [illegible]			[illegible]	8.2	-0°25'	570	[illegible]
+50	442.2								
4	437.8	5.2 443.0	90°	[illegible]	202	5.2	+0°22'	570	5.2
+50	433.5								
5	426.7	5.0 431.7	90°	+1°24'	440	8.0			
+50	424.6								
6	421.1	4.9 426.0	90°	+0°06'	200	4.9	+1°22'	560	7.9
+60	419.1								
7	418.3								
+50	418.2								
+8[illegible]22	416.6	5.0 421.6	90°	-1°30'	182	5.0	+0°31'	660	5.0
8+38	414.2								

(over)

16.10
3.60

449.0
12.6
436.4

448.8
13
435.7

432.8
2.9
429.9

421.1
13.8
437

416.6
5.8
[illegible]

448.8
3.7
442.1

432.8
3.6
436.4

421.1
13.4
34.8

416.6
8.8
423.1