

1916

Flood



MINING  
TRANSIT BOOK  
422

W82

RETURN TO CITY ENGINEER'S OFFICE  
CITY HALL, SAN DIEGO, CAL.

MICROFILMED  
JAN 7 1965

EUGENE DIETZGEN CO.

Drawing Materials and Surveying Instruments  
NEW YORK. CHICAGO. SAN FRANCISCO

TABLES FOR EXCAVATIONS AND EMBANKMENTS.  
DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.  
ROADWAY 20 FEET WIDE. SIDE SLOPES 1 TO 1.  
FOR SINGLE TRACK EXCAVATION.

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	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	0
1	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	1
2	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	2
3	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	3
4	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	4
5	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	5
6	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	6
7	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	7
8	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	8
9	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	9
10	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	10
11	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	11
12	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	12
13	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	13
14	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	14
15	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	15
16	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	16
17	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	17
18	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	18
19	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	19
20	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	20
21	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	21
22	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	22
23	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	23
24	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	24
25	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	25
26	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	26
27	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	27
28	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	28
29	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	29
30	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	30
31	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	31
32	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	32
33	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	33
34	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	34
35	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	35
36	46.0	46.1	46.2	46.3	46.4	46.5	46.6	46.7	46.8	46.9	36
37	47.0	47.1	47.2	47.3	47.4	47.5	47.6	47.7	47.8	47.9	37
38	48.0	48.1	48.2	48.3	48.4	48.5	48.6	48.7	48.8	48.9	38
39	49.0	49.1	49.2	49.3	49.4	49.5	49.6	49.7	49.8	49.9	39
40	50.0	50.1	50.2	50.3	50.4	50.5	50.6	50.7	50.8	50.9	40

Calculated by F. E. Paradis, C. E.

Included:

	X Sections	Page
5 San Vicente Creek above Foster		1
7 San Diego River - Mission Canyon		8
4 San Dieguito River - above D. H. Har		18
6 San Diego River - above Cape Horn		25
8 Sweetwater River - foot Jamacha Valley		30
3 Santa Ysabel Creek - Head Inu Pasqual		36
9 Sweetwater River - above D. H. Har		42
1 San Luis Rey River - at Leeside		47
2 San Luis Rey River - Monserate Mt.		52
10 Pine Creek - Head of Pine Valley		59
10 Cottonwood Creek - Below Barrett		65
11 Pine Creek - above Barrett		70

5 SAN VICENTE AREA OF WATERSHED 75.72 Sq. Mi.

7 SAN DIEGO RIVER	"	"	"	378.70	"	"
4 SAN DIEGUITO	"	"	"	307.20	"	"
6 SAN DIEGO	"	"	"	190.40	"	"
8 SWEETWATER	"	"	"	177.34	"	"
3 SANTA YSABEL	"	"	"	171.67	"	"
9 SWEETWATER	"	"	"	125.06	"	"
1 SAN LUIS REY	"	"	"	568.00	"	"
2	"	"	"	474.81	"	"
10 PINE CREEK	"	"	"	38.41	"	"
10 COTTONWOOD	"	"	"	131.76	"	"
11 PINE CREEK	"	"	"	95.30	"	"

San Vicente Creek - 6-16-16 Clear

Sta	+ 1 <sup>st</sup> Cross Section	-	π Section	Elev	
10	0.30	0.30	100.30	100.0	✓
4+26		1.2		99.1	✓
5+27		3.6		96.7	✓
4+45		4.9		95.4	✓
5+57		6.9		93.4	✓
6+63		10.9		89.4	✓
T.P. 1+71	7.13	12.39	95.04	87.91	B.M.
4+85		10.2		84.8	✓
4+86		11.1		83.9	✓
2+91		11.6		83.4	✓
4+98		11.3		83.7	✓
1+07		9.9		85.1	✓
13+39		11.1		83.9	✓
12+55		10.2		84.8	✓
5+62		11.4		83.6	✓
10+68		9.0		86.0	
0+74		9.6		85.4	
8+77		8.0		87.0	
0+83		12.9	100.30	87.4	
2+91		9.2		91.1	
52+00		7.5		92.8	
2+71		0.3		100.0	

First Cross Section  
See topog. map for location  
about 7/16/16

Earle W.  
Bates, Red  
Bou. ch.

H. Water Mark - East Bank - Elev.  
assumed = 100.0

Marked Boulder

H. W. Mark West Bank

2 San Vicente Creek - Traverse

Sta	+	-	$\pi$	Elev.	
0		11.6	95.04	83.4	-
1		10.4		84.6	✓
2		7.0		88.0	✓
3		9.7		85.3	✓
4		7.5		87.5	✓
5		5.5		89.5	✓
6		4.8		90.2	✓
7		4.3		90.7	✓
8		4.1		90.9	✓
T.P.	11.49	4.13	102.40	90.91	
9		10.7		91.7	✓
10		10.4		92.0	✓
11		9.6		92.8	✓
12		9.2		93.2	✓
13		9.1		93.3	✓
14		8.4		94.0	✓
15		7.6		94.8	✓
16		6.4		96.0	✓
T.P.	11.67	5.53	108.54	96.87	✓
17		12.1		96.4	✓
18		11.2		97.3	✓
19		10.9		97.6	✓
20		10.6		97.9	✓
21		9.6		98.9	✓
T.P.	10.72	8.17	111.09	100.37	
22		10.6		100.5	✓

3. Traverse + 2<sup>nd</sup> X Sec.

Sta	+	-	$\Sigma$	Elev
23		9.2	111.09	101.9
24		8.9		102.2
25		8.6		102.5
26		8.1		103.0
27		7.7		103.4
28		7.1		104.0
29		7.0		104.1
T.P.	6.87	5.23	112.73	105.86
30		8.1		104.6
31		7.7		105.0
32		7.0		105.7
33		6.4		106.3
34		6.0		106.7
35		5.6		107.1
36		4.9		107.8
37		4.5		108.2
38		4.0		108.7
B.M.		2.78		109.95

Second Cross Section

10+17 ✓		8.5	112.73	104.2
20+80 ✓		8.7		104.0
1400 ✓		8.9		103.8
1+88 ✓		8.6		104.1
T.P.	9.73	1.52	120.94	111.21
0+00 ✓		4.6		116.3 ✓
2+07		4.6		116.3

Sta 34+25 = Sta 1400 2<sup>nd</sup> X Sec. line

Top of marked boulder by submerged barrel - E. Bank Sta. 38

N. W. mark - East Bank  
 " " " - West "

Traversi line - cont'd				
Sta	+	-	$\pi$	Elev.
	12.11		122.06	109.95 B.M.
39		12.8		109.3
40		12.1		110.0
41		11.6		110.5
42		11.2		110.9
43		10.3		111.8
44		9.7		112.4
45		9.0		113.1
46		8.2		113.9
47		7.5		114.6
48		7.0		115.1
49		6.7		115.4
T.P.	12.17	5.41	128.82	116.65
50		12.7		116.1
51		12.1		116.7
52		11.6		117.2
53		10.9		117.9
54		10.2		118.6
55		9.5		119.3
56		8.9		119.9
57		8.1		120.7
58		7.4		121.4
59		6.5		122.3
60		5.9		122.9
T.P.	11.85	5.66	135.01	123.16
61		11.4		123.6

S. Traverse line - cont'd

Sta	+	-	$\Sigma$	Elev.
62		10.7	135.01	124.3
63		10.2		124.8
64		9.5		125.5
65		8.8		126.2
66		8.0		127.0
67		7.2		127.8
68		6.7		128.3
69		6.0		129.0
70		5.2		129.8
T.P.	10.32	4.61	140.72	130.40
71		10.1		130.6
72		9.7		131.0
73		8.9		131.8
74		8.4		132.3
75		7.7		133.0
76		7.3		133.4
77		6.7		134.0
78		6.4		134.3
79		5.9		134.8
80		5.5		135.2
81		4.7		136.0
82		4.1		136.6
B.M.		4.12		136.60

Third X Acc. Next page

Sta 82 + 00 = Sta 0 + 60 - X Sec. line  
 Top of Boulder (Marked) Sta 82 - Right



Sta	3 <sup>d</sup> x Abs-line	Traverse	Elv
	+	-	π
30+40 ✓		4.1	140.72
41+60 ✓		3.8	136.6
T.P.	12.29	1.61	151.40
51+77 ✓		7.6	139.11
62+20 ✓		6.0	143.8
72+27 ✓		0.5	145.4
20+26 ✓		3.6	150.9
10+00 ✓		0.3	147.8
			151.1

H. Water - West Bank

H. Water - East Bank

### Traverse

B.M.	12.71	149.31	136.60	Sta. 82
83	12.0		139.3	
84	11.3		138.0	
85	10.6		138.7	
86	9.9		139.4	
87	9.2		140.1	
88	8.3		141.0	
89	7.3		142.0	
90	6.9		142.4	
91	6.5		142.8	
92	5.9		143.4	
93	5.3		144.0	

End upstream

See next page - downstream  
from Sta 0+00

Sta	Traverse		K	Elev
	+	-		
B.M.	1.12		88.03	87.91 - Pts 0
- 1		5.2		82.8
- 2		5.8		82.2
- 3		6.2		81.8
- 4		6.2		81.8
- 5		6.6		81.4
- 6		7.8		80.2
- 7		8.0		80.0
- 8		9.0		79.0
- 9		9.8		78.2
T.P.	1.28	11.41	77.90	76.62
- 10		0.5		77.4
- 11		2.1		75.8
- 12		2.9		75.0
- 13		3.8		74.1
- 14		4.7		73.2
- 15		5.8		72.1
- 16		5.9		72.0
- 17		6.1		71.8
- 18		6.3		71.6
- 19		6.9		71.0
- 20		7.9		70.0

there are no pools, shoals  
now cross currents, slope  
and direction is uniform  
use  $N = .050$

Value for  $N_1$

The channel is straight but stream  
with boulders and small stones,  
some trees in channel, cross  
sections are not uniform,

Sta	+	-	Σ	Elev
0+00	4.82	4.82	104.82	100.0
0+26		4.82		100.0
0+17		11.8		93.0
T.P.	0.74	12.64	91.44	92.18
<sup>B.M.</sup> T.P.	4.39	12.86	82.97	78.58
0+14		11.4		71.6
0+60		11.4		71.6
0+00		11.3		71.7

Traverse

0		11.4	82.97	71.6
1		8.9		73.1
2		8.5		73.5
3		8.3		73.7
4		7.7		74.3
5		7.3		74.7
6		7.0		75.0
7		6.5		75.5
T.P.	11.69	1.03	93.63	81.94
8		12.9		80.7
9		6.1		87.5
10		4.2		89.4
11		4.0		89.6
12		3.4		90.2
13		3.1		90.5
14		1.5		92.1

San Diego River in Old Mission  
canyon - See topog map for location

High Water N. Bank - Elev. assumed 100.0

" " S. "

Top of Old Mission aqueduct - Now  
washed out

Top of marked Boulder

Sta	+	-	$\pi$	Elev.
15		1.3	93.63	92.3
T.P.	9.67	1.45	101.85	92.18
16		10.1		91.7
17		9.4		92.4
18		9.1		92.7
19		8.6		93.2
20		8.1		93.7
21		7.6		94.2
22		7.0		94.8
23		6.3		95.5
24		4.2		97.6
25		3.0		98.8
26		2.6		99.2
T.P.	9.78	0.53	111.10	101.32
27		13.0		98.1
28		12.5		98.6
29		11.8		99.3
30		5.9		105.2
31		3.0		108.1
B.M.		0.22		110.88
Second X Sec. line				
40+32		13.0	111.10	98.1
30+58		13.0		98.1
51+00		12.8		98.3
51+40		6.7		104.4
61+47		9.6		103.5

Sta 27 = 0+58 - 2<sup>nd</sup> X Sec. line

Top of Marked Boulder left of 31

0+58 = Sta 27 traverse line

Sta	+	-	K	Elev
T.P.	<del>11.07</del>	0.13	111.10	110.97
	11.07		122.04	
T.P.	8.00	1.01	117.96	109.96
42+56		4.9		113.1
42+40		12.2		105.8
40+00		2.1		115.9
Franciscan line				
B.M.	13.02		143.90	110.88
32		10.5		113.4
33		2.3		121.6
T.P.	12.53	0.94	135.49	122.96
34		11.3		124.2
35		9.7		125.8
36		8.6		126.7
37		8.2		127.3
38		8.0		127.5
39		4.9		130.6
40		3.4		132.1
41		2.7		132.8
42		2.2		133.3
T.P.	8.37	0.55	143.31	134.94
43		9.4		133.9
44		8.9		134.4
45		8.6		134.7
46		8.0		135.3
47		7.6		135.7

High Water North Bank

Top Old Mission Aqueduct - Line

High Water South Bank

Sta	+	-	π	Elw.	
48		7.1	143.31	136.2	
49		6.7		136.6	
50		6.2		137.1	
51		5.7		137.6	
52		5.1		138.2	
53		4.5		138.8	
54		3.8		139.5	
T.P. <sup>B.M.</sup>	7.54	0.23	150.62	143.08	B.M.
55		11.5		139.1	
56		10.7		139.9	
	3d	X Rec. line			
0+41	✓	11.7	150.62	138.9	↓
1+00	✓	11.5		139.1	↓
1+11	✓	11.5		139.1	↓
1+50	✓	11.0		139.6	↓
0+23	✓	0.5		150.1	↓
2+00	✓	6.2		144.4	↓
T.P.	12.23	0.70	162.15	149.92	
2+54	✓	4.3		157.9	* ↓
0+15	✓	0.1		162.1	↓
T.P.	9.57	2.21	169.51	159.94	
0+00	✓	1.4		168.1	* ↓

Traverse cont'd next page

Top of marked Boulder - R. Bank Sta 55  
 Sta 55+00 = Sta 1+11 on 3d X Rec line

Top Old Mission Aqueduct

High Water - South Bank

High Water - North Bank

<u>12</u> Sta	+	-	$\pi$	Elev	
	8.36		151.44	143.08	B.M.
57		11.3		140.1	
58		10.8		140.6	
59		10.3		141.1	
60		10.1		141.3	
61		9.9		141.5	
62		9.7		141.7	
63		9.5		141.9	
64		9.3		142.1	
65		9.1		142.3	
66		8.8		142.6	
67		8.5		142.9	
T.P.	7.91	7.82	150.53	143.62	
68		7.5		143.0	
69		6.6		143.9	
70		6.2		144.3	
71		5.8		144.7	
72		5.6		144.9	
73		5.3		145.2	
74		4.9		145.6	
75		4.8		145.7	
76		4.5		146.0	
T.P.	8.51	4.13	154.91	146.40	
77		8.7		146.2	
78		8.3		146.6	
79		8.0		146.9	

Sta	+	-	$\pi$	Elev
80		7.7	154.91	147.2
81		7.7		147.2
82		7.4		147.5
83		7.2		147.7
84		7.1		147.8
85		7.0		147.9
86		6.8		148.1
87		6.6		148.3
T.P	8.84	7.24	156.51	147.67
88		7.8		148.7
89		7.6		148.9
90		7.0		149.5
91		6.6		149.9
B.M.		6.11		150.40

4th x Sec line

30+13	✓	6.4	156.51	150.1	↓
41+05	✓	6.0		150.5	✓
T.P	12.42	0.24	168.69	156.27	
51+32	✓	8.1		160.6	↓
61+86	✓	7.5		161.2	↓
70+07	✓	0.5		168.2	↓
T.P.	12.36	0.47	180.58	168.22	
80+00	↓	1.4		179.2	↓
92+04	✓	1.7		178.9	

Transverse line cont'd - next page

Top of marked Boulder - S. Bk. Sta 92+00

Sta 92+00 = 0+80 x Sec. line

High Water South Bank

" " North "



$\frac{14}{Sta}$	+	-	$\pi$	Elev.	B.M.
	8.52		158.92	150.40	B.M.
92		8.7		150.2	
93		8.4		150.5	
94		8.0		150.9	
95		7.7		151.2	
96		7.1		151.8	
97		6.8		152.1	
98		6.3		152.6	
99		5.9		153.0	
100		5.5		153.4	
101		4.9		154.0	
T.P.	9.13	4.68	163.37	154.24	
102		9.2		154.2	
103		8.9		154.5	
104		8.3		155.1	
105		8.1		155.3	
106		7.6		155.8	
107		7.3		156.1	
108		7.0		156.4	
109		6.7		156.7	
110		6.4		157.0	

Traverse line cont'd next page

<u>15</u>					
Sta	+	-	$\pi$	Elev.	
	1.25		79.83	78.58	B.M.
- 1		8.8		71.0	
- 2		9.0		70.8	
- 3		9.8		70.0	
- 4		10.6		69.2	
T.P.	0.48	12.81	67.50	67.02	
- 5		1.1		66.4	
- 6		2.7		64.8	
- 7		3.5		64.0	
- 8		4.3		63.2	
- 9		5.1		62.4	
- 10		6.0		61.5	
- 11		6.7		60.8	
- 12		9.2		58.3	
- 13		11.1		56.4	
T.P.	0.74	11.83	56.41	55.67	
- 14		1.8		54.6	
- 15		2.9		53.5	
- 16		3.6		52.8	
- 17		4.4		52.0	
- 18		5.1		51.3	
- 19		6.0		50.4	
- 20		7.6		48.8	
- 21		9.5		46.9	
- 22		10.7		45.7	
- 23		12.1		44.3	

<u>16.</u>					
Sta	+	-	$\pi$	Elev	
T.P.		12.47	56.41	43.94	
	1.28		45.22		
- 24		1.4		43.8	
- 25		2.0		43.2	
- 26		2.4		42.8	
- 27		3.2		42.0	
B.M.		1.26		43.96	
5th X Sec line					
20+26	✓	3.1	45.22	42.1	✓
20+84	✓	2.9		42.3	✓
T.P.	12.67	0.31	57.58	44.91	
21+13	✓	5.2		52.4	✓
T.P.	12.89	0.26	70.21	57.32	
21+28	✓	3.0		67.2	✓
20+22	✓	6.2		64.0	✓
T.P.	8.46	1.37	77.30	68.84	
10+00	✓	5.2		72.1	
21+68	✓	5.1		72.2	✓ X
Transverse line Contd					
	1.36		45.32	43.96	B.M.
- 28		3.6		41.7	
- 29		4.5		40.8	
- 30		5.7		39.6	
- 31		6.3		39.0	
- 32		7.4		37.9	

Top of Marked Boulder - South Bank Sta 27

High W. of Burnt  
 " " " "

<u>17</u> Sta	+	-	$\pi$	Elev.
-33		8.3	45.3 $\checkmark$	37.0
-34		9.0		36.3
-35		9.6		35.7
-36		10.3		35.0
-37		11.2		34.1
-38		12.1		33.4
-39		12.9		32.4
-40		13.7		31.6
-41		14.3		31.0

Value for  $N$ .

Channel is slightly winding  
with some few pools and  
shoals and strewn with  
boulders, cross sections and  
slope uniform, no vegetation  
nor trees, rock bed throughout  
entire.

use  $N = .040$

18 San Dieguito River June 19-16  
Sta + -  $\pi$  Elev clear

See Topog. map for location - 1<sup>st</sup> canyon east of Del Rio

Sta	+	-	$\pi$	Elev	
10+00	✓	1.90		101.90	✓
03+00			10.1	91.8	✓
03+60			0.1	101.8	✓
T.P.	0.20	12.93	89.17	88.97	
02+78			1.4	87.8	✓
02+47			1.6	87.6	✓
02+38	✓		8.1	81.1	✓
02+23	✓		3.7	85.5	✓
02+19	✓		5.6	83.6	✓
02+10	✓		6.4	82.8	✓
02+04	✓		10.1	79.1	✓
01+70	✓		11.7	77.5	✓
01+35	✓		10.9	78.3	✓
01+09	✓		9.7	79.5	✓
00+91	✓		11.2	78.0	✓
00+59	✓		4.2	85.0	✓
00+19	✓		4.2	85.0	✓
T.P.	9.15	11.21	87.11	77.96	B.M.
01+24	✓		12.8	74.3	✓
01+40	✓		14.2	72.9	✓
01+57	✓		14.2	72.9	✓

High Water N. Bank. Elev. assumed = 100.4

High Water E. Bank

Top of Black Boulder (marked) 25' to right of center of stream and 30' up stream from fall

19.

Sta	Transverse line			Elev.
	+	-	$\pi$	
0		14.2	87.11	72.9
1		10.2		76.9
2		9.1		78.0
3		8.7		78.4
4		8.6		78.5
5		8.2		78.9
6		7.8		79.3
7		7.5		79.6
8		7.3		79.8
9		7.0		80.1
10		6.4		80.7
T.P.	7.67	4.30	90.48	82.81
11		8.3		82.2
12		8.4		82.1
13		8.1		82.4
14		6.9		83.6
15		7.0		83.5
16		6.3		84.2
17		6.4		84.1
18		6.8		83.7
19		6.2		84.3
20		5.7		84.8
21		5.0		85.5
T.P.	9.47	2.61	97.34	87.87
22		11.0		86.3
23		10.8		86.5

Sta. 0+00 = Sta 1+40 X sec. line

Sta	+	-	$\pi$	Elev
24		10.6	97.34	86.7
25		10.4		87.0
26		10.2		87.2
27		9.3		88.1
28		8.8		88.6
29		8.4		89.0
30		8.3		89.1
31		8.0		89.4
32		7.8		89.6
T.P.	11.14	7.23	101.25	90.11
33		11.4		89.9
34		11.3		90.0
35		10.2		91.1
36		9.3		92.0
37		9.1		92.2
38		8.9		92.4
39		8.6		92.7
40		8.1		93.2

Second Cross Sec. line

2+90		8.1	101.25	93.2	✓
2+41	✓	10.6		90.7	✓
1+91	✓	11.1		90.2	✓
01+74	✓	7.2		94.1	✓
0+72	✓	4.6		96.7	✓
0+53	✓	10.5		90.8	✓
0+36	✓	11.0		90.3	✓

Sta 2+90 = Sta 40+00 Inverse line

Sta	+	-	Σ	Elev
0425		6.9	101.25	94.4
T.P.	12.80	0.94	113.11	100.31
0400		0.1		113.0
3493		6.4		106.7
4420		0.2		112.9

Transverse line - Centre

		12.86	113.11	100.25
	1.16		101.41	
41		7.8		93.6
42		7.4		94.0
43		6.7		94.7
44		6.7		94.7
45		6.6		94.9
46		6.4		95.0
47		5.0		96.4
48		4.6		96.8
49		4.4		97.0
50		4.1		97.3
51		4.0		97.4
52		3.8		97.6
53		3.3		98.1

Transverse line downstream  
from 1<sup>st</sup> cross sec. next page

High Water Mark West Bank

" " " East "



$\frac{v}{v}$ Sta	+	-	$\pi$	Elev	
	3.55		81.51	77.96	0.22
-1		8.3		73.2	
-2		8.7		72.8	
-3		9.0		72.5	
-4		9.0		72.5	
-5		9.7		71.8	
-6		10.0		71.5	
-7		10.2		71.3	
-8		10.5		71.0	
-9		10.8		70.7	
-10		11.3		70.2	
T.P.	6.50	9.80	78.21	71.71	
-11		8.1		70.1	
-12		9.1		69.1	
-13		10.3		67.9	
-14		11.8		66.4	
-15		12.1		66.1	
-16		12.4		65.8	
-17		12.6		65.6	
-18		12.8		65.4	
-19		13.4		64.8	
-20		13.9		64.3	
T.P.	5.30	12.40	71.11	65.81	
-21		7.1		64.0	
-22		7.2		63.9	
-23		7.6		63.5	

Sta	+	-	$\pi$	Elev
-24		7.6	71.11	63.5
-25		8.0		63.1
-26		8.4		62.7
-27		8.7		62.4
-28		8.8		62.3
-29		9.0		62.1
-30		9.3		61.8
-31		9.7		61.4
-32		9.9		61.2
T.P.	4.31	9.51	65.91	61.60
-33		4.9		61.0
-34		5.0		60.9
-35		5.5		60.4
-36		5.6		60.3
-37		5.6		60.3
-38		5.9		60.0
-39		6.2		59.7
-40		6.3		59.6
-41		6.6		59.3
-42		6.7		59.2
-43		6.8		59.1
-44		7.4		58.5
-45		7.6		58.3
T.P.	10.01	6.85	69.07	59.06
-46		10.9		58.2
-47		10.8		58.3

Sta	+	-	$\bar{x}$	Elev.
-48		11.2	69.07	57.9
-49		11.4		57.7
-50		11.5		57.6
-51		11.6		57.5
-52		11.9		57.2
-53		12.0		57.1
-54		12.3		56.8
-55		12.4		56.7
-56		12.5		56.6
-57		12.7		56.4

3<sup>d</sup> Cross Section line

31+12	✓	8.5	69.07	60.6	✓
41+23	✓	11.9		57.2	✓
52+76	✓	12.1		57.0	✓
62+93	✓	6.7		62.4	✓
T.P.		10.15	79.05	68.90	
T.P.		5.84	83.66	77.82	
73+10		1.3		82.4	
80+11	✓	11.5		72.2	✓
90+00	✓	3.3		80.4	✓

= Sta 1+23 of 3<sup>d</sup> x Rec line

= Sta 52 of traverse line

High Water Mark West Bank

High " " East "

Value for N.

The channel is slightly winding with some fair pools and stream in places with small boulders.

Use  $N = .040$

25 San Diego River June 20-1916

approx 1/2 mile above Cape Horn Sec. stoping map for location

Sta	+	-	$\pi$	Elv.
0400	11.77		101.77	100.0
0437		7.5		94.3
0458		1.8		100.0
T.P.	1.29	12.53	90.53	89.24
0484		10.5		80.0
0435	✓	10.3		80.2
0413	✓	10.4		80.1
0490	✓	8.8		91.7
0467	✓	4.8		95.7

N. Water A. Bank Elv. assumed 100.0

H. " " "

= 0400 Traverse line

Traverse line

= Sta 1413 X Sec line

0		10.3	90.53	80.2
1		9.8		80.7
2		9.2		81.3
3		8.6		81.9
4		8.0		82.5
5		7.6		82.9
T.P.	7.31	6.68	91.16	83.85
6		7.6		83.6
7		7.1		84.1
8		6.4		84.8
9		6.4		84.8
10		5.7		85.5
11		4.8		86.4
12		4.4		86.8
13		3.8		87.4
14		3.3		87.9

Sta	+	-	$\pi$	Elev.
15		2.7		88.5
16		2.7		88.5
T.P.	6.90	0.67	97.39	90.49
17		7.1		90.3
18		6.7		90.7
19		6.5		90.9
20		6.0		91.4
21		5.4		92.0
22		5.0		92.4
23		4.4		93.0
24		4.0		93.4
25		3.5		93.9
26		2.9		94.5
27		2.4		95.0
T.P.	7.00	1.21	103.18	96.18
28		7.8		95.4
29		7.2		96.0
30		6.6		96.6
31		6.2		97.0
32		5.9		97.3
33		4.9		98.3
34		4.7		98.5
35		4.1		99.1
36		4.0		99.2
37		3.7		99.5
38		2.8		100.4
B.M.		1.49		101.69

= 1450 - ~~2~~ x Acc. line

Top of Boulder N. BK. Sta 39

27

Sta	$\frac{+ \text{incl}}{2 \text{ incl}} \times \text{sec. line}$	$\pi$	Elev.
40473 ✓	1.7	103.18	101.5
51431 ✓	4.6		98.6
62435 ✓	4.5		98.7
T.P.	12.53	115.25	102.72
93400 ✓	9.00		106.3
63422 ✓	5.6		109.7
83428 ✓	0.8		114.5
30457 ✓	9.9		105.4
0451 ✓	4.6		110.7
10400 ✓	0.4		114.9

This X Sec at lower E.L. Capitani  
Damsite or Anderson Site

N.W. Mark North Bank

" " South "

Traverse line

	7.22	108.91	101.69	D.M.
39	8.3		100.6	
40	7.7		101.7	
41	7.3		101.6	
42	6.5		102.4	
43	6.3		102.6	
44	5.9		103.0	
45	5.0		103.9	
46	4.5		104.4	
47	4.1		104.8	
48	3.6		105.3	
49	3.4		105.5	
T.P.	6.11	113.22	107.11	
50	6.9	0.0	106.3	

Sta	+	-	$\pi$	Elev.
51		6.6	113.22	106.6
52		6.4		106.8
53		5.8		107.4
54		5.1		108.1
55		4.6		108.6
56		4.2		109.0
57		3.9		109.3
58		3.1		110.1
59		2.7		110.5
T.P.	12.26	2.23	123.25	110.99
60		12.5		110.8
61		11.9		111.3
62		10.8		112.5
63		10.3		113.0
64		10.3		113.0
65		9.7		113.6
66		9.2		114.1
67		9.0		114.3
68		8.4		114.9
69		7.8		115.5
70		7.4		115.9

= El. Capitan Dunesite

3d x Sec. line

60+69	↓	9.6	123.25	113.7
61+64	↓	9.7		113.6
12+59	↓	9.7		113.6
T.P.	9.88	2.27	129.96	120.98

Sta	+	-	$\pi$	Elev	
42+73		3.3	129.86	126.6	
42+97		0.2		129.7	N.W. Mark South Bank
40+53	✓	6.3		123.6	
30+31	1	5.7		124.2	
40+30	1	4.7		125.2	" " North "
40+00	1	1.2		128.7	

Value for  $N$ .

The channel is slightly winding with some pools and shoals, cross sections and slope is uniform, some few stumps, no trees nor vegetation

$$\text{Use } N = .035$$

//



30

June 22-1916

Sta	+ First	Section	Σ	Elev.	
0+00	3.13	3.13	103.13	100.00	N.W.
2+23		11.6		91.5	
2+25		10.3		92.8	
2+85		5.0		98.1	
2+88		3.8		99.3	
B.M. T.P.	2.86	14.63	93.36	90.50	B.M.
1+70	↓	4.1		89.3	
1+65	↓	6.0		87.4	
0+87	↓	9.2		84.2	
0+25	↓	9.3		84.1	

Traverse line

0		9.2	93.36	84.2	
1		9.2		84.2	
2		9.8		83.6	
3		10.5		82.9	
4		11.0		82.4	
5		11.4		82.0	
6		11.7		81.7	
T.P.	8.78	11.60	90.54	81.76	
7		9.2		81.3	
8		9.7		80.8	
9		11.1		79.4	
10		11.5		79.0	
11		11.9		78.6	
12		12.6		77.9	
13		12.9		77.6	

Sweetwater River - Canyon above dam  
See topog sheet for location - Foot of Jamaica  
Valley  
High water mark, South Bank - Elev. assumed = 100.00

High Water mark - North Bank

= Sta 0+00 Traverse line.

= Sta 0+87 - First x Sec. line

31.

Sta.	+	-	$\pi$	Elev
14		13.6	90.54	76.9
T.P.	3.30	11.32	82.52	79.22
15		6.1		76.4
16		6.2		76.3
17		7.1		75.4
18		7.5		75.0
19		8.2		74.3
20		9.0		73.5
21		9.4		73.1
22		10.0		72.5
23		10.1		72.4
24		10.6		71.9
25		11.1		71.4
26		11.7		70.8
27		12.1		70.4
T.P.	9.64	11.41	80.75	71.11
28		10.1		70.7
29		11.1		69.7
30		11.7		69.1
31		12.0		68.8
32		12.5		68.3
33		12.6		68.2
34		13.2		67.6
35		13.6		67.2
36		14.1		66.6
B.M		12.78		67.97

= Sta 0+80 second cross section

Top of marked Boulder - So. Bank Sta 36.

32

Sta.	Second cross	section	Elev.
1+13	12.5	80.75	68.3
0+29	12.7		68.1
T.P.	12.84	93.28	80.44
1+22	4.0		89.3
1+31	1.5		91.8
0+00	1.4		91.9
	Traverse line cont'd		
B.W.	4.71	72.68	67.97
37	6.5		66.2
38	7.1		65.6
39	7.8		64.9
40	8.4		64.3
41	8.5		64.2
42	9.1		63.6
43	10.3		62.4
44	10.8		61.9
45	10.9		61.8
46	11.1		61.6
47	11.3		61.4
48	12.1		60.6
T.P.	2.70	64.87	62.17
49	4.4		60.5
50	4.8		60.1
51	5.0		59.9
52	5.6		59.3
53	6.1		58.8

0+80 = Sta 32+00 Traverse line

High Water Mark. South Bank  
" " " North "

33

Sta.	+	-	$\pi$	Elev
54		6.6	64.87	58.3
55		7.3		57.6
56		7.6		57.3
57		8.0		56.9
58		8.2		56.7
59		8.3		56.6
60		9.8		55.1
T.P.	12.89	7.87	69.89	57.00

3<sup>d</sup> cross section

3+71		0.9	69.89	69.0
0+00	✓	5.3		64.6
T.P.	4.31	9.24	64.96	60.65
0+30	✓	10.0		55.0
1+00		10.1		54.9
2+00		10.0		55.0
3+00		10.2		54.8
3+41		10.0		55.0

Traverse line - cont'd.

61		10.2	64.96	54.8
62		10.6		54.4
63		11.1		53.9
64		11.6		53.4
65		12.1		52.9
66		12.5		52.5
67		12.7		52.3
68		13.0		52.0

- Sta 2+47.34 X Sec line

High Water South Bank  
" " north "

Sta	+	-	$\pi$	Elev
T.P.		12.83	64.96	52.13
	1.16		53.29	
69		1.7		51.6
70		2.1		51.4
71		2.4		50.9
72		2.5		50.8
73		2.7		50.6
74		3.0		50.3
75		3.2		50.1
76		3.9		49.4
77		4.6		48.7
78		5.1		48.2
79		5.7		47.6
80		6.3		47.0

Traverse upstream from Sta 0

B.M.	0.21	90.71	90.50	B.M.
-1		6.0		84.7
-2		5.4		85.3
-3		4.7		86.0
-4		4.1		86.6
-5		3.7		87.0
-6		3.3		87.4
-7		2.9		87.8
-8		2.2		88.5
-9		1.8		88.9
-10		1.5		89.2

35

Sta	+	-	$\pi$	Elev
T.P.		1.26	90.71	89.45
	10.28		99.73	
- 11		10.0		89.7
- 12		9.4		90.3
- 13		8.9		90.8
- 14		8.3		91.4
- 15		7.7		92.0
- 16		7.3		92.4
- 17		6.8		92.9
- 18		6.2		93.5
- 19		5.7		94.0
- 20		5.3		94.4

Value for  $N$ .

Channel is straight with straight banks, no riffles nor pools, cross sections and slope uniform but some stones and vegetation  
use  $N = .030$

36:

Sta

+

-

K

Elev.

June 26 1916

Santa Ynez River Canyon above Deer  
Reserve Valley - See topog. sheet for location1<sup>st</sup> Cross Section line

0 + 00	0.91	0.91	100.91	100.0	
1 + 21		0.8		100.1	
T.P.	0.41	12.95	88.37	87.96	B.M.
20 + 60		11.6		76.8	
31 + 16		11.9		76.5	

H. Water mark - D. Bank, Elev assumed = 100.0

" " " - 76 "

## Traverse line

0		11.6	88.37	76.8	
1		8.9		79.5	
T.P.	12.26	3.85	96.78	84.5	✓
2		13.6		83.2	
3		11.2		85.6	
4		5.5		91.3	
5		4.7		92.1	
6		3.8		93.0	
T.P.	11.87	0.63	108.02	96.15	
7		13.8		94.2	
8		12.4		95.6	
9		10.9		97.1	
10		10.7		97.3	
11		9.8		98.2	
12		8.7		99.3	
T.P.	13.03	0.07	120.98	107.95	
13		12.4		108.6	
T.P.	14.90	0.12	133.76	120.86	
14		10.7		123.1	

= Sta 1400 X Sec. line

37.

Sta	+	-	Σ	Elev.
15		4.2	133.76	129.6
T.P.	12.91	0.51	146.16	133.25
16		12.9		133.3
17		10.4		135.8
18		9.1		137.1
T.P.	12.70	0.57	158.29	145.59
19		8.4		149.9
20		8.7		149.6
21		2.7		155.6
B.M.		0.07		158.22
Second error section				
20+93		8.7	158.29	149.6
20+22		3.5		154.8
21+43		8.8		149.5
21+62		3.8		154.5
T.P.	10.52	0.03	168.78	158.26
21+63		9.6		159.2
T.P.	6.50	0.46	174.82	168.32
21+81		0.6		174.2
20+00		0.3		174.5
Traverse cont'd June 27-1916				
B.M.	13.03		171.25	158.22
22		8.5		162.8
23		3.4		167.9
T.P.	12.88	0.81	183.32	170.44
24		11.2		172.1

= 1+20 X Sec. line

Top of Kukul Boulder S. Bank Sta 21

High Water South Bank  
" " North "



Sta	+	-	$\pi$	Elev
38.				
25		9.3	183.32	174.0
26		5.8		177.5
27		4.2		179.1
T.P.	10.84	0.60	193.56	182.72
28		13.0		180.6
29		13.2		180.4
30		11.9		181.7
T.P.	12.89	0.61	205.84	192.95
31	No reading			—
32		11.7		194.1
33		11.2		194.6
34		10.4		195.4
35		9.7		196.1
T.P.	12.70	3.41	215.13	202.23
36		5.9		209.2
T.P.	12.60	0.07	227.66	215.06
37		12.8		214.9
38		12.7		215.0
39		10.8		216.9
40		9.4		218.3
41		2.2		225.5
T.P.	12.88	0.25	240.29	227.41
42		9.1		231.2
43		6.0		234.3
44		3.5		236.8
T.P.	12.63	0.17	252.75	240.12

39. Sta	+	-	$\pi$	Elev
45		14.5	252.75	238.3
46		12.8		240.0
47		10.2		242.6
48		8.8		244.0
49		8.6		244.2
50		6.7		246.1
51		3.2		249.6
B.M. T.P.	9.50	0.57	261.68	252.18 B.M.
3 <sup>d</sup> Cross Section				
1 0442		12.0	261.88	249.7 ✓
2 0475		14.6		247.1 ✓
4 1400		11.7		250.0 ✓
5 1437		4.6		257.1 ✓
T.P.	12.14	0.43	273.39	261.25
T.P.	9.02	0.98	281.43	272.41
6 1469		2.4		279.0
10400		3.4		278.0 ✓
Traverse cont'd				
B.M.	8.26		260.44	252.18 B.M.
52		9.0		251.4
53		7.2		253.2
54		4.3		256.1
55		3.0		259.4
56		1.4		259.0
57		0.2		260.2
T.P.	11.87	0.32	271.99	260.12

Top of Boulder A. Bank Sta 51

= Sta. 50+50 traverse line

High Water South Bank  
" " North "

40. Sta	+	-	$\pi$	Elev.
58		10.1	271.99	261.9
59		6.3		265.7
60		4.1		267.9
61		2.0		270.0
62		0.4		271.6
T.P.	12.16	0.53	283.62	271.46
63		10.4		273.2
64		6.2		277.4
65		4.1		279.5
66		2.5		281.1
67		1.1		282.5
T.P.	12.48	0.27	295.83	283.35
68		11.9		283.9
69		10.2		285.6
70		9.0		286.8
71		7.4		288.4
72		5.1		290.7
73		3.5		292.3
74		1.0		294.8

Traverse downstream from Sta 0

B.M.	1.24		89.20	87.96
T.P.	0.47	12.13	77.54	77.07
-1		3.4		74.1
-2		5.5		72.0
-3		7.2		70.3
-4		9.0		68.5

41. Sta	+	-	$\pi$	Elev.
- 5		11.3	77.54	66.2
T.P	0.49	12.17	65.96	65.37
- 6		1.8		64.1
- 7		4.7		61.2
- 8		6.9		59.0
- 9		8.1		57.8
- 10		10.9		55.0
- 11		12.5		53.4

Ends.

Value for  $N$ .

Channel is very cracked with sharp bends both to right and left, channel is strewn with large boulders, some as large as 30' x 50' (entire bed is of large boulders). Trees and brush grow in stream bed, has deep pools, rifts, cross-currents and waterfalls. Cross sections are not uniform nor is the slope nor direction.

This survey is of little value to compute flow of water use 0.15 or greater for  $N$ .

42

June 29-1916

Sweetwater River - above Schem  
See topog. map for locationSta + -  $\pi$  Elev

10+00 0.40 0.4 100.40 100.0

10+10 10.6 89.8

10+72 12.7 87.7

12+01 11.1 89.3

12+29 5.1 95.3

12+48 6.3 94.1

12+81 5.9 94.5

13+10 3.6 96.8

13+95 3.9 96.5

15+90 0.1 100.3

B.M. 12.21  
Traveler line 88.19

0 12.7 100.40 87.7

1 11.4 89.0

2 10.7 89.7

3 9.5 90.9

4 8.9 91.5

5 7.8 92.6

T.P. 7.68 4.35 103.73 96.05

6 10.2 93.5

7 10.0 93.7

8 9.6 94.1

9 8.8 94.9

10 8.2 95.5

11 7.5 96.2

12 7.2 96.5

13 6.7 97.0

High Water Mark - North Bank. Elev. reduced <sup>100.00</sup>High Water Mark South Bank  
Top of Boulder left Bank Sta 0+00

Sta 0+72 - X Acc line

○

○

○

○

○

○

○

○

11

43.

Sta	+	-	$\pi$	Elev
14		6.1	103.73	97.6
15		5.7		98.0
16		5.2		98.5
17		4.8		98.9
T.P.	7.98	3.58	108.13	100.15
18		8.7		99.4
19		8.2		99.9
20		7.6		100.5
21		7.5		100.6
22		7.1		101.0
23		6.5		101.6
24		5.9		102.2
25		5.4		102.7
26		5.1		103.0
27		4.8		103.3
T.P.	9.33	0.18	117.28	107.95
28		13.6		103.7
29		13.3		104.0
30		13.0		104.3
31		12.3		105.0
32		11.4		105.9
33		11.6		105.7
Second Creek Sec. line				
10400		0.02	117.28	117.3
10418		12.9		104.4
10447		13.0		104.3

= ~~2nd~~ Cross Section Sta 10447

High Water North Bank

= Sta 30 - Transverse line.

Sta	+	-	⌈	Elev.	
01+33		13.3	117.28	104.0	✓
01+49		5.7		111.6	✓
04+15		7.0		110.3	✓
24+59		8.3		109.0	✓
85+41		9.6		107.7	✓
95+90		9.5		107.8	✓
06+10		5.0		112.3	
06+87		0.3		117.0	

Traverse line cont'd

34		11.1	117.28	106.2	
T.P.	12.79	10.85	119.22	106.43	
35		12.4		106.8	
36		11.8		107.4	
37		11.5		107.7	
38		11.2		108.0	
39		10.4		108.8	
40		9.5		109.7	
41		9.1		110.1	
42		8.5		110.7	
43		7.8		111.4	
44		7.2		112.0	
45		6.7		112.5	
T.P.	11.46	6.31	124.37	112.91	
46		11.4		113.0	
47		11.1		113.3	
48		10.7		113.7	

High Water South Bank

Sta	+	-	$\pi$	Elev.
49		10.0	124.37	114.4
50		9.5		114.9
51		9.0		115.4
52		8.4		116.0
53		7.8		116.6
54		7.1		117.3
55		6.4		118.0

Third Cross Section

0+28		0.4	124.37	124.0	✓
0+62		6.3		118.1	✓
3+58		6.5		117.9	✓
3+80		3.6		120.8	✓
3+92		2.4		122.0	✓
B.M.		6.21		118.16	
T.P.	10.81	2.16	133.02	122.21	
4+15		11.0		122.0	✓
5+20		2.8		130.2	
0+00		2.6		130.4	

Traverse Cont'd

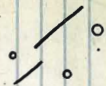
B.M.	12.71		130.87	118.16
56		12.5		118.4
57		12.1		118.8
58		11.7		119.2
59		11.3		119.6
60		10.8		120.1
61		10.1		120.8

= 1+20 of 3<sup>rd</sup> cross section

Top of unworked Boulder South Bank

High Water South Bank

" " North "





46.

Sta.	+	-	$\Sigma$	Elev
62		9.4	130.87	121.5
63		9.0		121.9
64		8.2		122.7
65		7.8		123.1
66		7.2		123.7
67		6.7		124.2
68		6.2		124.7

Inverse downstream from Sta 0

B.M.	1.26		89.45	88.19
- 1		2.3		87.2
- 2		2.7		86.8
- 3		3.1		86.4
- 4		3.7		85.8
- 5		4.2		85.3
- 6		4.8		84.7
- 7		5.5		84.0
- 8		6.0		83.5
- 9		6.7		82.8
- 10		7.5		82.0
T.P.	2.43	7.26	84.62	82.19
- 11		3.2		81.4
- 12		3.6		81.0
- 13		4.3		80.3
- 14		4.8		79.8
- 15		5.1		79.5
- 16		5.6		79.0

End -

Value for  $N$ .

Channel is winding with pools & shoals, cross currents, no stones or boulders but considerable vegetation including large growth of trees catching debris etc. Slope is uniform but cross section is not. River rather sluggish in places with eddies.

Use  $N = .065$

47.  
Sta + -  $\pi$  Elev. June 30 1916

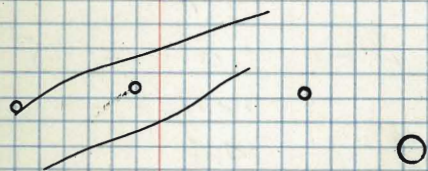
Sta	+	-	$\pi$	Elev.
0+00	0.51	0.51	100.51	100.0
0+19		12.9		87.6
4+58		13.2		87.3
4+74		2.9		97.6
✓4+97		2.6		97.9
5+19		7.7		92.8
6+08		7.4		93.1
6+30		0.1		100.4
B.M.		11.48		89.03

## Traverse Line

0		13.2	100.51	87.3
1		13.0		87.5
2		12.9		87.6
3		12.6		87.9
4		12.4		88.1
5		11.9		88.6
6		11.6		88.9
T.P.	3.98	5.40	99.09	95.11
7		10.0		89.1
8		9.4		89.7
9		9.0		90.1
10		8.6		90.5
11		8.0		91.1
12		7.6		91.5
13		7.3		91.8
14		7.2		91.9

San Luis Rey River at Casamonde - see  
topog. map for location

High Water North Bank - Elev. assumed 100.00



High Water South Bank

Spikes in bridge piers S. Bent Harep. Bridge

Sta 3+50 Cross Section pier

The beach near mouth of river is strewn with debris including pine trees similar to those in the vicinity of Palomar Mt. One tree on the river bank about 50 yards from the ocean has been sawed off five feet above the roots and is 4 ft 4 1/2 inches in diameter and has 427 annular rings. There are several other trees in the vicinity or along the beach of equal size.

48.

Sta	+	-	$\pi$	Elev
15		7.0	99.09	92.1
16		6.9		92.2
17		6.7		92.4
T.P.	4.00	1.11	101.98	97.98
18		10.4		91.6
19		9.8		92.2
20		9.4		92.6
21		9.3		92.7
22		9.2		92.8
23		9.1		92.9
24		9.0		93.0
25		9.0		93.0
26		9.0		93.0
27		9.0		93.0
28		9.0		93.0
29		8.9		93.1
T.P.	6.31	3.75	104.54	98.23
30		11.5		93.0
31		11.2		93.3
32		10.9		93.6
33		10.7		93.8
34		10.6		93.9
35		10.5		94.0 ✓
36		9.9		94.6
T.P.	10.52	9.34	105.72	95.20
37		10.7		95.0

Sta	+	-	$\pi$	Elev
38		10.7	105.72	95.0
39		10.5		95.2
40		10.6		95.1
41		10.4		95.3
42		10.1		95.6
43		9.8		95.9
44		9.7		96.0
45		9.7		96.0
46		9.3		96.4
47		9.2		96.5
T.P	12.46	9.57	108.67	96.21
48		12.0		96.7
49		12.0		96.7
50		11.4		97.3
51		11.2		97.5
52		11.0		97.7
53		10.8		97.9

Second Cross Section

0+40		0.7	108.67	108.0
0+53		10.6		98.1
4+76		10.8		97.9
5+09		11.6		109.1
T.P.	8.26	2.24	114.69	106.43
5+52		5.4		109.3
5+63		6.5		108.2
0+00		6.3		108.4

= Sta 1 + 90 - road x Sec line

High Water North Bank  
 " " South "

50. Sta	+	Instrument - cont'd -	$\pi$	Elev
T.P.		12.10	114.69	102.59
	3.16		105.75	
54		7.6		98.2
55		7.4		98.4
56		7.2		98.6
57		6.9		98.9
58		6.6		99.2
59		6.1		99.7
60		5.9		99.9
61		5.6		100.2
62		5.5		100.3
63		5.3		100.5
64		5.1		100.7
65		4.8		101.0

Third Cross Section

0+71		4.5	105.75	101.3
4+18		4.1		101.7
T.P.	12.27	4.14	117.88	105.61 B.M.
4+32		8.3		109.6
4+76		7.5		110.4
5+20		4.9		113.0
5+32		0.6		117.3
0+00		1.1		116.8

Instrument Cont'd

B.M.	6.24		111.85	105.61
66		10.6		101.3

Sta 2+10-34 X Sec

High Water North Bank  
" " South "

Sta	+	-	$\pi$	Elev
67		10.4	111.85	101.5
68		10.2		101.7
69		10.0		101.9
70		9.7		102.2
71		9.4		102.5
72		9.5		102.4
73		9.3		102.6
74		9.2		102.7
75		9.0		102.9

Traverse downstream from Sta 0.

B.M.	2.61	91.64	89.03
-1		2.9	88.7
-2		3.2	88.4
-3		3.5	88.1
-4		3.8	87.8
-5		4.0	87.6
-6		4.1	87.5
-7		4.4	87.2
-8		4.7	86.9
-9		4.8	86.8
-10		5.1	86.5

Value for  $n$ .

The channel is straight with straight banks, of uniform cross section and slope, is free from stones, weeds & vegetation, has no riffs nor deep pools

use  $N = .025$

July 6-1916

San Luis Rey River at Monument  
See topog sheet for location

Sta	+ First	x Sec.	line	Elev.
0+00	3.42	3.42	103.42	100.00
0+12		5.2		98.2
0+24		6.6		96.8
T.P.	2.39	4.98	100.83	98.44
T.P.	4.29	2.27	102.45	98.56
4+90		6.00		96.9
5+06		12.9		90.0
8+30		14.3		88.6
8+48		1.8		101.1

High Water North Bank - Elev assumed 100.00

High Water South Bank.

Transverse line

0		13.4	102.85	89.5
1		12.9		90.0
2		12.4		90.5
3		11.8		91.1
4		11.3		91.6
5		10.6		92.3
6		10.0		92.9
7		9.8		93.1
8		9.5		93.4
T.P.	9.82	7.10	105.57	95.75
9		11.9		93.7
10		11.6		94.0
11		11.2		94.4
12		11.2		94.4
13		10.7		94.9
14		9.4		96.2

= Sta 7+50 Cross Sec. line

<u>53</u> Sta	+	-	$\pi$	Elev.
15		8.9	105.57	96.7
16		8.7		96.9
17		8.5		97.1
18		8.0		97.6
19		7.7		97.9
20		7.1		98.5
21		6.8		98.8
22		6.6		99.0
T.P.	9.07	5.70	108.94	99.87
23		9.0		99.9
24		8.7		100.2
25		8.3		100.6
26		8.2		100.7
27		7.4		101.5
28		7.2		101.7
29		6.9		102.0
30		6.6		102.3
31		5.9		103.0
32		5.6		103.3
33		5.4		103.5
34		5.1		103.8
T.P.	7.73	3.07	113.50	105.87
35		9.4		104.1
36		9.2		104.3
37		8.6		104.9
38		8.4		105.1



<u>Sta.</u>	+	-	$\pi$	Elev.
39		8.0	113.50	105.5
40		7.4		106.1
41		6.8		106.7
42		6.3		107.2
43		5.8		107.7
44		5.3		108.2
45		4.9		108.6
46		4.6		108.9
T.P.	8.15	3.78	117.87	109.72
47		8.6		109.3
48		8.1		109.8
49		7.7		110.2
50		7.3		110.6
51		7.1		110.8
52		6.7		111.2
53		6.5		111.4
54		6.1		111.8
55		5.7		112.2
56		5.3		112.6
57		4.9		113.0
58		4.7		113.2
59		4.2		113.7
60		3.9		114.0
61		3.5		114.4
62		2.8		115.1
63		2.3		115.6

55

Sta	+	-	$\pi$	Elv.
64		2.0	117.87	115.9
T.P.	8.26	1.01	125.12	116.86
65		8.7		116.4
66		8.2		116.9
67		7.8		117.3
68		7.6		117.5
69		7.0		118.1
70		6.8		118.3
71		6.5		118.6
72		5.7		119.4
73		5.3		119.8
74		5.0		120.1
75		4.6		120.5
76		4.2		120.9
77		3.8		121.3
78		3.3		121.8
79		2.9		122.2
T.P.	11.80	0.82	136.10	124.30
80		13.4		122.7
81		13.0		123.1
B.M.		11.75		124.35
Second Cross Sec. line				
0+00		0.1	136.10	136.0
0+40		6.0		130.1
0+82		13.0		123.1
1		12.9		123.2

= Sta 3+10 Cross Sec line

Top marked Boulder S. BK. Sta 81

H. Water Mark South Bank

56  
Sta      +      -       $\pi$       Elev

2		13.0	136.10	123.1
3		13.0		123.1
4		12.9		123.2
5		13.1		123.0
5+40		13.0		123.1
6+15		4.7		131.4
6+48		0.1	$\checkmark$	136.0

Inverse line cont'd

B.M.	10.47		134.82	124.35
82		11.3		123.5
83		10.9		123.9
84		10.4		124.4
85		9.9		124.9
86		9.6		125.2
87		9.1		125.7
88		8.8		126.0
89		8.4		126.4
90		8.1		126.7
91		7.6		127.2
T.P.	11.32	7.21	134.93	127.61
92		11.3		127.6
93		10.6		128.3
94		10.4		128.5
95		10.3		128.6
96		9.9		129.0
97		9.4		129.5

49/5  
2/5

○

○

○

Sta	+	-	$\pi$	Elev
98		9.0	138.93	129.9
99		8.3		130.6
100		7.9		131.0
101		7.5		131.4
T.P	10.11	7.14	141.90	131.79
102		10.0		131.9
103	v	9.5		132.4
104		9.3		132.6
105		9.1		132.8
106		8.7		133.2
107		8.2		133.7
108		7.7		134.2
109		7.3		134.6
110		6.8		135.1
111		6.3		135.6

Third X Sec.

0+48		2.8	141.90	139.1
05+10		3.6		138.3
05+19		6.3		135.6
08+42		6.5		135.4
T.P.	7.26	1.26	147.90	140.64
09+38		3.7		144.2
0+00		4.1		143.8

Traverse Cont'd

112		11.9	147.90	136.0
113		11.6		136.3

High Water North Bank  
" " South "

Sta	+	-	$\Sigma$	Elev
114		11.2	147.90	136.7
115		10.9		137.0
116		10.7		137.2
117		10.5		137.4
T.P.	8.21	5.48	150.63	147.42
118		12.6		138.0
119		12.3		138.3
120		12.1		138.5
121		11.6		139.0
122		11.2		139.4
123		10.9		139.7
124		10.6		140.0
125		10.3		140.3
126		9.9		140.7
127		9.7		140.9
128		9.3		141.3

Value for N.

The channel is straight, banks are straight, cross sections and slope is uniform, channel is free from stones, weeds and vegetation, there are no riffs, deep pools nor cross currents.

Use  $N = 0.25$

59

Sta

+<sup>o</sup>

o

⋈

Elev.

July 12-1916

Head of Pine Valley - Pine Creek - see  
topog map for location

0+00 2.00 7.00 102.00 100.0

0+07 7.7 94.3

0+24 12.3 89.7

0+54 15.0 87.0

0+70 14.6 87.4

0+87 13.6 88.4

0+90 9.6 94.4

1+05 2.00 100.0

T.P. &amp; B.M. 0.80 12.17 90.63 89.83 B.M.

Traverse line

1 2.5 90.63 88.1

2 3.9 86.7

3 5.3 85.3

4 7.1 83.5

5 7.8 82.8

6 10.0 80.6

7 11.1 79.5

8 12.1 78.5

T.P. 0.26 12.20 78.69 78.43

9 3.9 74.5

10 4.8 73.9

11 5.5 73.2

12 7.0 71.7

13 7.5 71.2

14 8.9 69.8

15 10.1 68.6

High Water So. Bank - Elev. assumed 100<sup>ft</sup>

High Water North Bank

Top of marked Boulder S. BK. Sta 0

<u>60</u> Sta	+	-	$\pi$	Elev
16		11.2	78.69	67.5
17		11.9		66.8
T.P.	0.70	12.36	67.03	66.33
18		2.5		64.5
19		3.0		64.0
20		4.1		62.9
21		5.2		61.8
22		5.8		61.2
23		6.4		60.6
24		7.0		60.0
25		8.1		58.9
26		9.3		57.7
27		9.5		57.5
28		11.3		55.7
29		12.0		55.0
30		13.1		53.9
T.P.	0.02	12.03	55.02	55.00
31		2.3		52.7
32		4.0		51.0
33		4.4		50.6
34		5.9		49.1
35		6.3		48.7
36		7.9		47.1
37		9.9		45.1

Second x Rec with page

= Sta 0 + 75 x Sec line

bl Sta	+	-	$\pi$	Elev
0+20		8.2	55.02	46.8
10+30		7.8		47.2
20+32		6.5		48.5
30+54		7.3		47.7
50+66		7.8		47.2
60+86		7.8		47.2
70+90		6.4		48.6
40+98		5.4		49.6
91+00		2.7		52.3
T.P.	8.32	1.62	61.72	53.40
01+19		4.1		57.6
00+00		0.4		61.3
T.P.	0.36	12.48	49.60	49.24
38		4.8		44.8
39		6.0		43.6
40		7.4		42.2
41		8.4		41.2
42		9.6		40.0
43		10.7		38.9
44		11.7		37.9
45		13.0		36.6
T.P.	0.43	12.68	37.35	36.92
46		1.9		35.5
47		2.4		35.0
48		3.3		34.1
49		4.5		32.9

High Water North Bank  
 " " South "



Sta	+	-	$\pi$	Elev.
50		5.3	37.35	32.1
51		6.2		31.2
52		7.1		30.3
53		8.0		29.4
54		9.1		28.3
55		9.8		27.6
56		10.6		26.8
57		11.4		26.0
58		12.6		24.8
T.P.	0.62	12.71	25.26	24.64
59		1.3		24.0
60		2.3		23.0
61		3.3		22.0
62		4.1		21.2
63		5.2		20.1
64		5.9		19.4
65		7.1		18.2

Third X Sec. line

20+10		5.1	25.26	20.2
20+15		7.1		18.2
20+80		7.1		18.2
T.P.	12.61	4.86	33.01	20.40
1+01		5.0		28.0
1+22		1.4		31.6
10+00		1.2		31.8

Traverse cont'd next page

= Sta 0+55 Third X Sec line

High Water North Bank  
" " South "

63

Sta	+	-	$\pi$	Elev.
T.P.		12.41	33.01	20.60
	11.2		21.72	
66		4.6		17.1
67		5.6		16.1
68		6.5		15.2
69		7.4		14.3
70		8.2		13.5
71		9.1		12.6
72		10.5		11.2
T.P.	1.14	11.61	11.25	10.11
73		0.7		10.6
74		1.9		9.4
75		3.1		8.2
76		3.9		7.4
77		5.0		6.3
78		5.9		5.4
79		7.0		4.3
80		8.1		3.2
81		9.1		2.2
82		10.3		1.0

Traverse upstream from Sta. 0

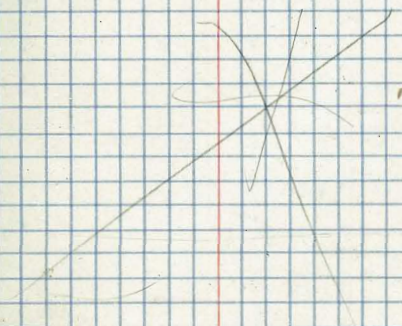
B.M.	14.21		102.04	89.83	B.M.
-1		11.3		90.7	
-2		10.2		91.8	
-3		9.0		93.1	
-4		7.8		94.2	

Sta	+	-	Th	Elev
-5		6.4	102.04	95.6
-6		5.0		97.0
-7		3.9		98.1
-8		3.0		99.0
-9		2.2		99.8
-10		1.2		100.8
-11		0.1		101.9
T.P.	12.21	0.36	113.89	101.68
-12		10.9		103.0
-13		9.8		104.1
-14		8.9		105.0
-15		7.7		106.2
-16		6.6		107.3
+17		5.9		108.0
-18		4.8		109.1
-19		3.7		110.2
-20		2.9		111.0
-21		1.8		112.1
-22		0.9		113.0

### Value for H.

Channel slightly winding, some few shoals and pools and strewn with boulders, but no vegetation, cross section & slope uniform, channel bed is rock or firm gravel throughout

the 17 = 0.40



65

July 13-1916

Sta	+ 1st. X Sec	π	Elev.
0+00	1.97	1.97	101.97
0+49		10.9	91.1
0+56		11.7	100.3
B.M. T.P.	1.63	10.02	93.58
0+11		6.2	87.4
0+71		7.0	86.6
0+83		6.6	87.0

Inverse line

0		7.0	93.58	86.6
1		8.5		85.1
2		8.2		85.4
3		8.9		84.7
4		9.8		83.8
5		10.4		83.2
6		11.2		82.4
7		11.9		81.7
T.P.	1.43	11.76	83.25	81.82
8		2.1		81.2
9		2.5		80.8
10		3.2		80.1
11		3.9		79.4
12		4.5		78.8
13		5.0		78.3
14		6.3		77.0
15		8.0		75.3
16		9.1		74.2

Cottamwood Creek - below Barrett  
dam site - see topog sheet for location

High Water West Bank Elev. assumed 100

" " East "

Top marked Boulder East Bank

Sta 1+20 X Sec line

<u>66</u> Sta	+	-	∩	Elev	
17		9.8	83.25	73.5	
18		10.7		72.6	
19		11.3		72.0	
T.P.	1.49	11.18	73.56	72.07	
20		4.3		69.3	
21		5.7		67.9	
22		9.0		64.6	
23		9.6		64.0	
24		10.5		63.1	
25		11.1		62.5	
26		12.0		61.6	
T.P. B.M.	9.20	10.45	72.31	63.11	B.M.
	Second X Rec. line				
30+56		10.5		61.8	
30+04		1.3		71.0	
31+20		10.5		61.8	
31+25		7.7		64.6	
31+77		5.5		66.8	
31+84		1.7		70.6	
*T.P.	8.91	1.26	79.96	71.05	
32+37		1.0		79.0	
30+00		1.7		78.3	
	Inverse cont'd				
B.M.	2.77		65.88	63.11	
27		4.3		61.6	
28		4.5		61.4	

After 0+70 X Rec line

High Water West Bank  
 " " East "

67

Sta	+	-	$\pi$	Elev
29		5.5	65.88	60.4
30		6.0		59.9
31		6.6		59.3
32		7.3		58.6
33		7.8		58.1
34		8.4		57.5
35		8.7		57.2
36		9.3		56.6
T.P.	1105	8.23	58.70	57.65
37		2.5		56.2
38		3.1		55.6
39		3.8		54.9
40		4.4		54.3
41		4.9		53.8
42		5.4		53.3
43		6.0		52.7
44		6.5		52.2
45		7.1		51.6
46		7.5		51.2
47		7.8		50.9
48		8.5		50.2
49		8.7		50.0

## Third Cross Section

30+20	8.4	58.70	50.3
40+50	9.2		49.5
42+05	8.7		50.0

= Sta 7+05 x Ave. line

68

Sta	+	-	$\pi$	Elev.
2+10		6.2	58.70	52.5
T.P.	9.55	0.38	67.87	58.32
3+37		7.2		60.7
3+70		9.1		58.8
3+95		9.1		58.8
4+10		5.1		62.8
4+13		5.6		62.3
4+00		2.6		65.3

Traverse cont'd

T.P.		12.32	67.87	55.55
	1.21		56.76	
50		7.3		49.5
51		7.4		49.4
52		8.1		48.7
53		8.6		48.2
54		9.1		47.7
55		9.7		47.1
56		10.0		46.8
57		10.4		46.4
58		10.8		46.0
59		11.1		45.7
60		11.8		45.0
61		12.3		44.5
62		12.7		44.1

Traverse upstream from Sta 0  
next page

High Water East Bank

" " West "

69

Sta	f	-	$\pi$	Elev
B.M.	4.26		96.21	91.95 B.M.
- 1		8.9		87.3
- 2		8.2		88.0
- 3		7.6		88.6
- 4		7.3		88.9
- 5		6.4		89.8
- 6		5.7		90.5
- 7		5.0		91.2
- 8		4.2		92.0
- 9		3.8		92.4
- 10		3.3		92.9
- 11		2.7		93.5
T.P.	8.76	2.18	102.79	94.03
- 12		8.7		94.1
- 13		8.0		94.8
- 14		7.6		95.2
- 15		7.3		95.5
- 16		6.5		96.3
- 17		6.0		96.8
- 18		5.0		97.8
- 19		4.6		98.2
- 20		3.8		99.0

Value for  $N_1$   
 Same as noted on page 64.



Sta	+	-	July 14-1916 K	Elev.
0+00	1.21	1.21	101.21	100.0
0+16		6.2		95.0
0+81		1.2		100.0
0+67		5.1		96.1
0+64		10.3		90.9
0+59		12.2		89.0
T.P. & B.M.	2.72	12.76	91.17	88.45
0+31		4.8		86.4
0+67		4.2		87.0

Traverse line

0		4.2	91.17	87.0
1		4.6		86.6
2		5.1		86.1
3		6.2		85.0
4		7.5		83.7
5		8.2		83.0
6		9.7		81.5
7		10.6		80.6
8		11.3		79.9
9		13.4		77.8
T.P.	1.41	12.76	79.82	78.41
10		2.8		77.0
11		3.5		76.3
12		4.5		75.3
13		5.0		74.8
14		6.4		73.4

Pine Creek - above Barrett dam site. See  
Topog. map for location

High Water - East Bank

" " - West "

Top of Boulder (marked) E. Bank. Sta 0

13.2/4  
6

//

Sta	+	-	$\pi$	Elev
15		7.9	79.82	71.9
16		8.9		70.9
17		9.6		70.2
18		11.2		68.6
19		11.8		68.0
T.P.	1.23	12.12	68.93	67.70
20		2.8		66.1
21		4.0		64.9
22		6.0		62.9
23		6.6		62.3
24		7.3		61.6
25		8.2		60.7
26		9.2		59.7
27		9.3		59.6
28		10.3		58.6
29		11.2		57.7
30		12.0		56.9
31		12.9		56.0

Second X Section

70+64	12.9	68.93	56.0
41+68	12.9		56.0
20+18	8.5		60.4
40+00	0.5		68.4
51+78	0.5		68.4

Traverse cont'd next page

= Sta 0+70 of cross section

High Water East Bank  
" " West "

//



Sta	+	-	$\pi$	Elev
T.P.		12.54	68.93	56.39
	0.32		56.71	
32		1.9		54.8
33		2.3		54.4
34		3.4		53.3
35		3.8		52.9
36		4.8		51.9
37		6.0		50.7
38		6.5		50.2
39		7.4		49.3
40		8.5		48.2
41		9.2		47.5
T.P.	1.24	10.11	47.84	46.60
42		1.1		46.7
43		2.0		45.8
44		2.7		45.1
45		3.7		44.1
46		4.4		43.4
47		4.9		42.9
48		5.6		42.2
49		6.4		41.4
50		7.0		40.8
51		7.5		40.3
T.P.	0.21	8.01	40.04	39.83
52		0.5		39.5
53		1.2		38.8

<u>73</u> Sta	+	-	$\pi$	Elev.
54		2.0	40.04	38.0
55		2.6		37.4
56		3.2		36.8
57		3.8		36.2

= Sta 1+10 of X. Sec. line

3<sup>rd</sup> Cross Section

00+48		4.0	40.04	36.0
01+31		2.9		37.1
01+60		3.8		36.2
T.P.	11.21	0.42	50.83	39.62
01+68		10.6		40.2
01+87		3.7		47.1
02+20		0.7		50.1
00+40		9.2		41.6
00+31		5.5		45.3
00+00		0.8		50.0

High Water W. Bank

High Water E. Bank

Traverse cont'd.

T.P.	1.27	12.81	39.29	38.02
58		3.9		35.4
59		4.4		34.9
60		5.3		34.0
61		6.0		33.3
62		6.6		32.7
63		7.3		32.0
64		7.9		31.4
65		8.6		30.7
66		9.3		30.0

13.15  
8

0.7  
2.4  
1.3

74

Sta.

+

-

π

Elev.

Francis upstream from Sta 0100

B.M.	17.37		100.82	88.45	B.M.	at Sta 0
- 1		11.8		89.0		
- 2		10.9		89.9		
- 3		9.9		90.9		
- 4		9.2		91.6		
- 5		8.1		92.7		
- 6		7.0		93.8		
- 7		6.1		94.7		
- 8		5.3		95.5		
- 9		4.7		96.1		
- 10		4.0		96.8		
T.P.	11.46	3.27	109.01	97.55		
- 11		11.3		97.7		
- 12		10.4		98.6		
- 13		9.5		99.5		
- 14		8.9		100.1		
- 15		8.1		100.9		
- 16		7.2		101.8		
- 17		6.6		102.4		
- 18		5.5		103.5		
- 19		4.8		104.2		
- 20		4.0		105.0		

Value for N.

Same as noted on page 64

Sta	+	-	$\pi$	Elev
75	ap 4-16	Earl K Schuier 1	clear	
B.M.	0.15		100.15	100.00
1895 High Water	2.95		97.20	See Note A
<u>First Cross Section line</u>				
0+00	0.04		100.04	100.00 <sup>1916</sup> H.W. S.B.K.
0+20	2.8		97.2	<sup>1895</sup> H.W. S.B.K.
0+30	4.7		95.3	
1	6.3		93.7	
1+82	7.2		92.8	
1+91	11.6		88.4	
2	11.6		88.4	
3	11.8		88.2	
4	10.5		89.5	
5	10.4		89.6	
B.M.	9.47		90.57	
6	11.0		89.0	
7	10.9		89.1	
8	10.6		89.4	
9	10.5		89.5	
10	9.7		90.3	
T.P.	9.70	8.99	100.75	91.05
11	9.4		91.4	
11+24	11.3		89.5	
12	11.1		89.7	
12+31	11.2		89.6	
13	8.5		92.3	
14	6.9		93.9	

San Diego River at City of San Diego's pump station near Old Town

H.W. mark on Bank near Pump No. Elev. assumed 100.00

B.M. = High Water mark on partition in pump house near Old Town labeled "High Water

1-27-16" Elev. assumed 100.00

Note A. Elev. of High Water 1895 on corrugated iron well casing over Well No. 1 labeled "High Water 1895"

Top of stake at Sta 5+00

<u>76</u> Sta.	+	-	π	Elw
15		5.8	100.75	95.0
16		6.7		94.1
17		7.6		93.2
17+29		10.7		90.1
17+69		12.0		88.8
17+96		10.1		90.7
18		9.7		91.1
18+54		9.1		91.7
18+78		3.6		97.2
18+88		0.68		100.07

1895  
H.W.N.B.K.  
1916  
H.W.N.B.K.

### Traverse Line

B.M.	5.40	95.97	90.57
0		6.4	89.6
1		5.1	90.9
2		5.0	91.0
3		5.1	90.9
4		5.1	90.9
5		4.9	91.1
6		5.3	90.7
7		5.1	90.9
8		5.0	91.0
9		4.9	91.1
10		4.9	91.1
11		4.9	91.1
T.P.	4.61	4.36	96.22

Top of stake cross Sec. Sta. 3400

Sta.	+	-	$\pi$	Elv.
12		5.3	96.22	90.9
13		5.5		90.7
14		5.4		90.3
15		5.6		90.6
16		5.5		90.7
17		5.5		90.7
18		5.4		90.8
19		5.5		90.7
20		4.7		91.5
21		4.1		92.1
T.P.	9.55	3.57	102.20	92.65
22		13.2		89.0

= Sta 0+00 2<sup>nd</sup> cross section line

Second Cross Section line

0	13.2	102.20	89.0
N 1	13.2		89.0
N 1+25	9.1		93.1
N 2	8.9		93.3
N 3	8.7		93.5
N 4	8.4		93.8
B.M.	6.18		96.02
50+92	13.4		88.8
5 1	7.0		95.2
5 2	7.0		95.2
5 3	9.7		92.5
5 4	7.8		94.4

Top of stake at Sta. N 4+00



Sta	+	-	$\pi$	Elw	
78					
54440		10.4	102.20	91.8	
55		7.4		94.8	
T.P.	5.14	5.40	101.94	96.80	
56		6.8		95.1	
H.W. 1916	Note A	0.42		101.52	
H.W. 1895	" B	2.0		99.0	
56463		2.0		99.0	1895 H.W.S.BK
57403		0.4		101.5	1916 H.W.S.BK
B.M.	6.08		102.10	96.02	
N. 5		7.7		94.4	
N. 6		7.6		94.5	
N. 7		7.2		94.9	
N. 8		7.6		94.5	
N. 9		7.5		94.6	
N. 10		7.5		94.6	
N. 11		7.4		94.7	
N. 12		6.9		95.2	
N. 13		7.1		95.0	
N. 14		7.8		94.3	
N. 14440		8.3		93.8	
N 14450		5.7		96.4	
N 14456		3.1		99.0	1895 H.W.N.BK
N 14465		0.6		101.5	1916 H.W.N.BK

Note A. Sawed mark on Eucalyptus tree 7.9 feet in circumference placed by Mr. E. J. Bernard of Mission Valley Nursery at High Water level on Jan 27, 1916

Note B. Sawed mark on same tree placed by above Mr E. J. Bernard at High water level in Jan. 1895

B.M. at Sta N 4400

79				
Sta.	+	-	$\pi$	Elev.
B.M.	2.20		102.20	100.00
0		6.9		95.3
1		6.1		96.1
2		5.5		96.7
3		5.9		96.3
4		5.9		96.3
5		5.7		96.5
6		5.3		96.9
7		4.0		98.2
T.P.	9.51	3.73	107.98	98.47
8		9.1		98.9
9		8.6		99.4
10		8.2		99.8
10+30		6.1		101.9
11+50 approx		7.9		100.1

Levels across Hwy Bridge and to end of Dike on north side of bridge

0+00		6.1	107.98	101.9
		4.4		103.6
		8.4		99.6
0+32		4.4		103.6
1		4.4		103.6
2		4.4		103.6
3		4.4		103.6
4		4.4		103.6
4+60		4.4		103.6
5		5.3		102.7

Line of levels from first cross section line at Old Town Pump Station to Hwy Bridge across river near Old Town along Hwy on south side of River  
B.M. = N.W. mark in Pump House

= Top of Dike at South Side of River

= Sta 10+30 on Hwy line

= Floor of Old concrete Hwy Bridge - Part <sup>remaining</sup>  
= N.W. mark on W. side of cover Hwy Bridge  
= S. End of New Pile Bridge = Floor elevation

River bed = 18' below bridge floor

Sta.	+	-	$\pi$	Elev
6		8.4	107.98	99.6
T.P	3.75	7.88	103.85	100.10
6+40		5.1		98.8
7		5.7		98.2
8		6.4		97.5
9		6.5		97.4
10		6.5		97.4
11		5.9		98.0
12		5.6		97.3
12+75		5.2		98.7
13		5.1		98.8
14		5.5		98.4
15		5.5		98.4
16		5.4		98.5
17		5.4		98.5
T.P	5.03	5.21	103.67	98.64
H.W.M.K. Tel. Pole		4.1		99.6
18		5.2		98.5
H.W.M.K. Tel. Pole		4.1		99.6
19		5.2		98.5
20		5.2		98.5
21		5.1		98.6
22		5.1		98.6
23		5.2		98.5
H.W.M.K. Tel. Pole		4.1		99.6
24		4.0		99.7
H.W.M.K. N. Bank		4.1		99.6

N. End of Bridge, beginning of Dike road

Let. of new and old dike road. Sta 6+40 to sta 12+75 = new dike replacing old dike washed out on Jan 27, 1916 - Sta. 12+75 to end = old dike not washed out.

30' E. Sta 17

30' E. Sta 18

30' E. Sta 23.

N. End of Dike = Sta 24+00  
75' East of Sta 24+50

INCHES IN DECIMALS OF A FOOT.

1-16	3-32	1/4	3-16	1/4	5-16	3/8	1/2	5/8	3/4	7/8
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729
1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

SLOPE REDUCTIONS

Note. — In following table the column, "Feet per 100 ft.," gives the amount by which a measured slope distance of 100 feet must be reduced to obtain the true horizontal distance. Sufficiently accurate results are usually possible by mental calculations, while a slide rule will give exact results. The feature of the method lies in dealing with small quantities:—

Examples: V. A. M. D. H. D. (calculated by logs)

a)	8° 15'	298.48	298.00
b)	2° 35'	319.42	319.10
c)	11° 30'	237.19	232.43

a) For each 100 feet deduct .161 feet. for 298.48 (say 300) we must deduct  $3 \times .161 = .48$  (This is done mentally).

b) 319.42 may be taken as 3.2.

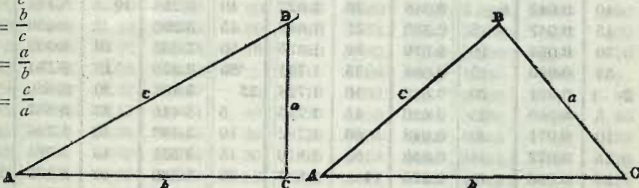
In table opposite 2° 35', is .102. Call this .10 to counterbalance the excess in our other factor (which should be 3.19) and multiply:  $3.2 \times .10 = .32$ .

c) By slide rule:  $2.008 \times 2.37 = 4.76$ .

$237.19 - 4.76 = 232.43$ .

1. sin.  $A = \frac{a}{c}$
2. cos.  $A = \frac{b}{c}$
3. tan.  $A = \frac{a}{b}$
4. cosec.  $A = \frac{c}{a}$
5. sec.  $A = \frac{c}{b}$
6. cot.  $A = \frac{b}{a}$

Trigonometrical Formulae.



Given.	Sought.	Formulae. [Right triangles].
7 a, c	A, B, b	$\sin. A = \frac{a}{c}, \cos. B = \frac{a}{c}, b = \sqrt{(c+a)(c-a)}$
8 a, b	A, B, c	$\tan. A = \frac{a}{b}, \cot. B = \frac{a}{b}, c = \sqrt{a^2 + b^2}$
9 A, a	B, b, c	$B = 90^\circ - A, b = a \cot. A, c = \frac{a}{\sin. A}$
10 A, b	B, a, c	$B = 90^\circ - A, a = b \tan. A, c = \frac{b}{\cos. A}$
11 A, c	B, a, b	$B = 90^\circ - A, a = c \sin. A, c = c \cos. A$
Given.	Sought.	Formulae. [Oblique triangles].
12 A, B, a	b	$b = \frac{a \sin. B}{\sin. A}$
13 A, a, b	B	$\sin. B = \frac{b \sin. A}{a}$
14 a, b, C	A - B	$\tan. \frac{1}{2}(A - B) = \frac{(a-b) \tan. \frac{1}{2}(A+B)}{a+b}$
15 a, b, c	A	$\text{If } s = \frac{1}{2}(a+b+c), \sin. \frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{bc}}$
		$\cos. \frac{1}{2}A = \sqrt{\frac{s(s-a)}{bc}}, \tan. \frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{s(s-a)}}$
		$\sin. A = \frac{2 \sqrt{(s-a)(s-b)(s-c)}}{bc}$
16 A, B, C, a	area	$\text{area} = \frac{a^2 \sin. B \sin. C}{2 \sin. A}$
17 A, b, c	area	$\text{area} = \frac{1}{2} b c \sin. A$
18 a, b, c	area	$s = \frac{1}{2}(a+b+c), \text{area} = \sqrt{s(s-a)(s-b)(s-c)}$

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING

ROADWAY 16 FEET WIDE. SIDE SLOPES 1½ TO 1.

FOR SINGLE TRACK EMBANKMENT.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	8.0	8.2	8.3	8.5	8.6	8.8	8.9	9.1	9.2	9.4	0
1	9.5	9.7	9.8	10.0	10.1	10.3	10.4	10.6	10.7	10.9	1
2	11.0	11.2	11.3	11.5	11.6	11.8	11.9	12.1	12.2	12.4	2
3	12.5	12.7	12.8	13.0	13.1	13.3	13.4	13.6	13.7	13.9	3
4	14.0	14.2	14.3	14.5	14.6	14.8	14.9	15.1	15.2	15.4	4
5	15.5	15.7	15.8	16.0	16.1	16.3	16.4	16.6	16.7	16.9	5
6	17.0	17.2	17.3	17.5	17.6	17.8	17.9	18.1	18.2	18.4	6
7	18.5	18.7	18.8	19.0	19.1	19.3	19.4	19.6	19.7	19.9	7
8	20.0	20.2	20.3	20.5	20.6	20.8	20.9	21.1	21.2	21.4	8
9	21.5	21.7	21.8	22.0	22.1	22.3	22.4	22.6	22.7	22.9	9
10	23.0	23.2	23.3	23.5	23.6	23.8	23.9	24.1	24.2	24.4	10
11	24.5	24.7	24.8	25.0	25.1	25.3	25.4	25.6	25.7	25.9	11
12	26.0	26.2	26.3	26.5	26.6	26.8	26.9	27.1	27.2	27.4	12
13	27.5	27.7	27.8	28.0	28.1	28.3	28.4	28.6	28.7	28.9	13
14	29.0	29.2	29.3	29.5	29.6	29.8	29.9	30.1	30.2	30.4	14
15	30.5	30.7	30.8	31.0	31.1	31.3	31.4	31.6	31.7	31.9	15
16	32.0	32.2	32.3	32.5	32.6	32.8	32.9	33.1	33.2	33.4	16
17	33.5	33.7	33.8	34.0	34.1	34.3	34.4	34.6	34.7	34.9	17
18	35.0	35.2	35.3	35.5	35.6	35.8	35.9	36.1	36.2	36.4	18
19	36.5	36.7	36.8	37.0	37.1	37.3	37.4	37.6	37.7	37.9	19
20	38.0	38.2	38.3	38.5	38.6	38.8	38.9	39.1	39.2	39.4	20
21	39.5	39.7	39.8	40.0	40.1	40.3	40.4	40.6	40.7	40.9	21
22	41.0	41.2	41.3	41.5	41.6	41.8	41.9	42.1	42.2	42.4	22
23	42.5	42.7	42.8	43.0	43.1	43.3	43.4	43.6	43.7	43.9	23
24	44.0	44.2	44.3	44.5	44.6	44.8	44.9	45.1	45.2	45.4	24
25	45.5	45.7	45.8	46.0	46.1	46.3	46.4	46.6	46.7	46.9	25
26	47.0	47.2	47.3	47.5	47.6	47.8	47.9	48.1	48.2	48.4	26
27	48.5	48.7	48.8	49.0	49.1	49.3	49.4	49.6	49.7	49.9	27
28	50.0	50.2	50.3	50.5	50.6	50.8	50.9	51.1	51.2	51.4	28
29	51.5	51.7	51.8	52.0	52.1	52.3	52.4	52.6	52.7	52.9	29
30	53.0	53.2	53.3	53.5	53.6	53.8	53.9	54.1	54.2	54.4	30
31	54.5	54.7	54.8	55.0	55.1	55.3	55.4	55.6	55.7	55.9	31
32	56.0	56.2	56.3	56.5	56.6	56.8	56.9	57.1	57.2	57.4	32
33	57.5	57.7	57.8	58.0	58.1	58.3	58.4	58.6	58.7	58.9	33
34	59.0	59.2	59.3	59.5	59.6	59.8	59.9	60.1	60.2	60.4	34
35	60.5	60.7	60.8	61.0	61.1	61.3	61.4	61.6	61.7	61.9	35
36	62.0	62.2	62.3	62.5	62.6	62.8	62.9	63.1	63.2	63.4	36
37	63.5	63.7	63.8	64.0	64.1	64.3	64.4	64.6	64.7	64.9	37
38	65.0	65.2	65.3	65.5	65.6	65.8	65.9	66.1	66.2	66.4	38
39	66.5	66.7	66.8	67.0	67.1	67.3	67.4	67.6	67.7	67.9	39
40	68.0	68.2	68.3	68.5	68.6	68.8	68.9	69.1	69.2	69.4	40

Calculated by F. E. Paradis, C. E.

RETURN TO CITY ENGINEER'S OFFICE,  
CITY HALL, SAN DIEGO, CAL.

