

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING  
SLOPE 1 TO 1. ROADWAY OF ANY WIDTH

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	0
1	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	1
2	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	2
3	3.00	3.10	3.20	3.30	3.40	3.50	3.60	3.70	3.80	3.90	3
4	4.00	4.10	4.20	4.30	4.40	4.50	4.60	4.70	4.80	4.90	4
5	5.00	5.10	5.20	5.30	5.40	5.50	5.60	5.70	5.80	5.90	5
6	6.00	6.10	6.20	6.30	6.40	6.50	6.60	6.70	6.80	6.90	6
7	7.00	7.10	7.20	7.30	7.40	7.50	7.60	7.70	7.80	7.90	7
8	8.00	8.10	8.20	8.30	8.40	8.50	8.60	8.70	8.80	8.90	8
9	9.00	9.10	9.20	9.30	9.40	9.50	9.60	9.70	9.80	9.90	9
10	10.00	10.10	10.20	10.30	10.40	10.50	10.60	10.70	10.80	10.90	10
11	11.00	11.10	11.20	11.30	11.40	11.50	11.60	11.70	11.80	11.90	11
12	12.00	12.10	12.20	12.30	12.40	12.50	12.60	12.70	12.80	12.90	12
13	13.00	13.10	13.20	13.30	13.40	13.50	13.60	13.70	13.80	13.90	13
14	14.00	14.10	14.20	14.30	14.40	14.50	14.60	14.70	14.80	14.90	14
15	15.00	15.10	15.20	15.30	15.40	15.50	15.60	15.70	15.80	15.90	15
16	16.00	16.10	16.20	16.30	16.40	16.50	16.60	16.70	16.80	16.90	16
17	17.00	17.10	17.20	17.30	17.40	17.50	17.60	17.70	17.80	17.90	17
18	18.00	18.10	18.20	18.30	18.40	18.50	18.60	18.70	18.80	18.90	18
19	19.00	19.10	19.20	19.30	19.40	19.50	19.60	19.70	19.80	19.90	19
20	20.00	20.10	20.20	20.30	20.40	20.50	20.60	20.70	20.80	20.90	20
21	21.00	21.10	21.20	21.30	21.40	21.50	21.60	21.70	21.80	21.90	21
22	22.00	22.10	22.20	22.30	22.40	22.50	22.60	22.70	22.80	22.90	22
23	23.00	23.10	23.20	23.30	23.40	23.50	23.60	23.70	23.80	23.90	23
24	24.00	24.10	24.20	24.30	24.40	24.50	24.60	24.70	24.80	24.90	24
25	25.00	25.10	25.20	25.30	25.40	25.50	25.60	25.70	25.80	25.90	25
26	26.00	26.10	26.20	26.30	26.40	26.50	26.60	26.70	26.80	26.90	26
27	27.00	27.10	27.20	27.30	27.40	27.50	27.60	27.70	27.80	27.90	27
28	28.00	28.10	28.20	28.30	28.40	28.50	28.60	28.70	28.80	28.90	28
29	29.00	29.10	29.20	29.30	29.40	29.50	29.60	29.70	29.80	29.90	29
30	30.00	30.10	30.20	30.30	30.40	30.50	30.60	30.70	30.80	30.90	30
31	31.00	31.10	31.20	31.30	31.40	31.50	31.60	31.70	31.80	31.90	31
32	32.00	32.10	32.20	32.30	32.40	32.50	32.60	32.70	32.80	32.90	32
33	33.00	33.10	33.20	33.30	33.40	33.50	33.60	33.70	33.80	33.90	33
34	34.00	34.10	34.20	34.30	34.40	34.50	34.60	34.70	34.80	34.90	34
35	35.00	35.10	35.20	35.30	35.40	35.50	35.60	35.70	35.80	35.90	35
36	36.00	36.10	36.20	36.30	36.40	36.50	36.60	36.70	36.80	36.90	36
37	37.00	37.10	37.20	37.30	37.40	37.50	37.60	37.70	37.80	37.90	37
38	38.00	38.10	38.20	38.30	38.40	38.50	38.60	38.70	38.80	38.90	38
39	39.00	39.10	39.20	39.30	39.40	39.50	39.60	39.70	39.80	39.90	39
40	40.00	40.10	40.20	40.30	40.40	40.50	40.60	40.70	40.80	40.90	40
41	41.00	41.10	41.20	41.30	41.40	41.50	41.60	41.70	41.80	41.90	41
42	42.00	42.10	42.20	42.30	42.40	42.50	42.60	42.70	42.80	42.90	42
43	43.00	43.10	43.20	43.30	43.40	43.50	43.60	43.70	43.80	43.90	43
44	44.00	44.10	44.20	44.30	44.40	44.50	44.60	44.70	44.80	44.90	44
45	45.00	45.10	45.20	45.30	45.40	45.50	45.60	45.70	45.80	45.90	45
46	46.00	46.10	46.20	46.30	46.40	46.50	46.60	46.70	46.80	46.90	46
47	47.00	47.10	47.20	47.30	47.40	47.50	47.60	47.70	47.80	47.90	47
48	48.00	48.10	48.20	48.30	48.40	48.50	48.60	48.70	48.80	48.90	48
49	49.00	49.10	49.20	49.30	49.40	49.50	49.60	49.70	49.80	49.90	49
50	50.00	50.10	50.20	50.30	50.40	50.50	50.60	50.70	50.80	50.90	50

Distance of slope stake from side or shoulder stake for any width roadway, slope 1 to 1. If ground is nearly level, the cut or fill at side stake is located by the double entry method in left column and top row. The number in body of table in same row and column gives distance from side stake to slope stake. If ground is not level estimate the difference in elevation between the side stake and slope stake, lower target by this amount if cut, elevate if fill. Add this amount to cut or fill and find distance in table. Set up rod at this point, and line of sight should cut target. If it does not make the slight adjustment necessary.

Please Return to  
City of San Diego Water Dept.  
Room 903 Civic Center



TABLE XIII—CORRECTIONS FOR TANGENTS AND EXTERNALS

These corrections are to be added to the approximate values, found by dividing the tangent, or external, for a 1° curve (Table VIII) by the degree of curve, in order to obtain the true tangents, or externals. Intermediate values may be obtained by interpolation.

FOR TANGENTS ADD

Central Angle	DEGREE OF CURVE													
	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
10°	.03	.06	.09	.13	.16	.19	.22	.25	.28	.31	.34	.38	.42	.46
15°	.04	.10	.14	.19	.24	.29	.34	.39	.45	.51	.53	.58	.63	.68
20°	.06	.13	.19	.26	.32	.39	.45	.51	.58	.65	.72	.79	.84	.90
25°	.08	.16	.24	.33	.40	.49	.58	.67	.75	.83	.90	.99	1.06	1.14
30°	.10	.19	.29	.39	.49	.59	.69	.79	.89	.99	1.09	1.20	1.29	1.39
35°	.11	.22	.34	.47	.58	.69	.79	.81	.92	1.04	1.29	1.42	1.54	1.66
40°	.13	.26	.40	.53	.67	.80	.93	1.06	1.20	1.34	1.49	1.64	1.79	1.94
45°	.15	.30	.44	.60	.76	.91	1.06	1.21	1.37	1.52	1.70	1.87	2.04	2.21
50°	.17	.34	.51	.68	.85	1.02	1.19	1.36	1.54	1.72	1.91	2.10	2.29	2.48
55°	.19	.38	.57	.76	.95	1.14	1.32	1.52	1.72	1.92	2.14	2.35	2.56	2.77
60°	.21	.42	.63	.84	1.05	1.27	1.49	1.71	1.94	2.17	2.38	2.60	2.83	3.07
65°	.23	.46	.69	.93	1.16	1.40	1.64	1.88	2.13	2.38	2.63	2.88	3.13	3.39
70°	.25	.51	.76	1.02	1.28	1.54	1.80	2.06	2.33	2.60	2.88	3.16	3.44	3.72
75°	.27	.56	.83	1.12	1.40	1.69	1.98	2.27	2.57	2.87	3.16	3.47	3.78	4.09
80°	.30	.61	.91	1.22	1.53	1.84	2.15	2.46	2.78	3.10	3.44	3.78	4.12	4.46
85°	.33	.66	1.00	1.33	1.68	2.02	2.36	2.70	3.05	3.40	3.77	4.14	4.55	4.89
90°	.36	.72	1.09	1.45	1.83	2.20	2.57	2.94	3.32	3.70	4.10	4.50	4.91	5.32
95°	.39	.79	1.19	1.55	2.00	2.40	2.80	3.20	3.61	4.02	4.40	4.98	5.38	5.83
100°	.43	.86	1.30	1.74	2.18	2.62	3.06	3.50	3.95	4.40	4.88	5.37	5.85	6.34
110°	.51	1.03	1.56	2.08	2.61	3.14	3.67	4.21	4.76	5.31	5.86	6.43	7.01	7.60
120°	.62	1.25	1.93	2.52	3.16	3.81	4.45	5.11	5.77	6.44	7.12	7.80	8.50	9.22

FOR EXTERNALS ADD

Central Angle	DEGREE OF CURVE													
	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
10°	.001	.003	.004	.006	.007	.008	.009	.011	.012	.014	.015	.017	.018	.020
15°	.003	.007	.010	.014	.018	.023	.027	.029	.032	.035	.039	.043	.047	.051
20°	.006	.011	.017	.022	.028	.034	.038	.045	.051	.057	.063	.070	.076	.083
25°	.009	.018	.027	.036	.046	.056	.065	.074	.083	.093	.106	.120	.127	.135
30°	.013	.025	.038	.051	.065	.078	.090	.103	.116	.129	.149	.170	.179	.188
35°	.018	.035	.054	.072	.086	.109	.131	.153	.175	.197	.213	.230	.247	.264
40°	.023	.046	.070	.093	.117	.141	.172	.203	.234	.265	.277	.290	.315	.341
45°	.030	.060	.093	.119	.153	.184	.216	.254	.289	.325	.351	.378	.411	.445
50°	.037	.075	.116	.151	.189	.227	.266	.305	.345	.384	.425	.467	.508	.550
55°	.046	.093	.142	.188	.236	.283	.332	.381	.420	.479	.530	.582	.641	.700
60°	.056	.112	.168	.225	.283	.340	.398	.457	.516	.575	.636	.697	.774	.851
65°	.067	.135	.204	.273	.343	.412	.483	.554	.625	.697	.711	.845	.922	1.01
70°	.080	.159	.240	.321	.403	.485	.568	.652	.735	.819	.906	.994	1.08	1.17
75°	.095	.182	.286	.383	.480	.578	.678	.777	.877	.977	1.07	1.18	1.29	1.39
80°	.110	.220	.332	.445	.558	.671	.787	.903	1.02	1.13	1.25	1.38	1.50	1.62
85°	.128	.259	.391	.524	.657	.790	.926	1.06	1.20	1.34	1.47	1.62	1.76	1.91
90°	.149	.299	.450	.603	.756	.910	1.07	1.22	1.38	1.54	1.70	1.87	2.03	2.20
95°	.174	.350	.522	.706	.885	1.06	1.25	1.43	1.62	1.80	1.99	2.18	2.38	2.58
100°	.200	.401	.604	.809	1.01	1.22	1.43	1.64	1.85	2.06	2.28	2.50	2.73	2.96
110°	.268	.536	.806	1.08	1.35	1.63	1.91	2.20	2.48	2.76	3.05	3.35	3.66	3.96
120°	.360	.721	1.08	1.45	1.82	2.19	2.57	2.95	3.33	3.72	4.11	4.50	4.91	5.32

INDEX.

BLACK CANYON TUNNEL.

X-SECTIONS, STA. 172+34.8 TO 163+65 INCLUSIVE,  
INCLUDING PILES #1 TO #29, WITH REMARKS ON  
CONDITION OF GROUND.



FEB. 21, '53. D. LEONARD.

1.

NOTE: ALL SECTIONS TAKEN LOOKING NORTH,  
OPPOSITE DIRECTION FROM STATIONING.

LEFT TOE IS ON WEST SIDE, RIGHT TOE ON EAST.

DEGREE READINGS ARE CLOCKWISE, WITH ZERO  
AT TOP CENTER. SPRINGLINE = 90° AND 270°.

READINGS ON RIBS ARE TO INNER FACE OF RIB.

ALL DISTANCES ARE RADIAL FROM C. OF TUNNEL,  
EXCEPT "TOE OF RIB" MEASUREMENTS.

MATERIAL IS DECOMPOSED GRANITE AND Boulders.

STATION:	DEG.	DIST.	DEG.	DIST.	DEG.	DIST.
172+34.3'	0°	4.20'	35°	3.75'	90°	3.64'
RIB <sup>51</sup>	RIGHT TOE	3.30'	LEFT TOE	3.17'	270°	3.50'
1.	315°	3.57'	335°	3.65'	45°	3.71'
GROUNDLINE:	0°	OPEN	90°	4.25'	RT. TOE	4.40'
	LT. TOE	4.6'	270°	5.05'	315°	4.95'
172+29.2	0°	4.13	35°	3.67'	90°	3.58
RIB <sup>22</sup>	RIGHT TOE	3.25'	LEFT TOE	3.15'	270°	3.43
2.	315°	3.58'	335°	3.64'		
GROUND.	0°	4.8'	35°	4.5'	60°	4.25'
"	90°	4.2'	120°	4.5'	180°	3.35
	240°	4.4'	270°	4.55	315°	4.35
	340°	4.4'	350°	4.3'		
172+24.2	0°	3.67 <sup>.11</sup>	35°	3.40 <sup>.10</sup>	90°	3.52
RIB <sup>52</sup>	RIGHT TOE	3.30'	LEFT TOE	3.27 <sup>.09</sup>	270°	3.42 <sup>.08</sup>
"	315°	3.42 <sup>.08</sup>	335°	3.38 <sup>.12</sup>		
GROUND.	0°	4.6'	45°	4.0'	70°	4.0
"	90°	4.2	125°	4.7	180°	3.45
	235°	4.6	290°	3.95	320°	4.3'



STATION	DEG.	DIST.	DEG.	DIST.	DEG.	DIST.
172+19.2	0°	3.65 <sup>.15</sup> '	30°	3.55 <sup>.15</sup> '	60°	3.42 <sup>.18</sup> '
RIP #4	90°	3.48 <sup>.12</sup> '	RT. TOE	3.50 <sup>.12</sup> '	LT. TOE	3.38 <sup>.17</sup> '
4.	270°	3.48 <sup>.12</sup> '	310°	3.38 <sup>.12</sup> '	335°	3.35 <sup>.17</sup> '
GROUND	0°	4.9'	35°	4.9'	70°	4.8'
	90°	4.8'	125°	4.5'	180°	3.5'
	245°	4.8'	270°	4.8'	315°	5.3'
	290°	5.25'	335°	5.2'	345°	5.0'
172+14.2	0°	3.78'	30°	3.55'	60°	3.52'
RIP #5	90°	3.52'	RT. TOE	3.55'	LT. TOE	3.45'
5.	270°	3.58'	300°	3.52'	335°	3.46'
GROUND	0°	5.15'	35°	4.8'	65°	4.3'
	90°	4.2'	110°	4.5'	180°	3.55'
	245°	5.15'	275°	4.5'	310°	5.1
	330°	4.9'	335°	POINT 3.75'	355°	4.6'
172+12	60°	POINT 3.52'				
172+09.2	0°	3.75'	30°	3.47'	60°	3.48'
RIP #6	90°	3.46'	RT. TOE	3.30'	LT. TOE	3.36'
6.	270°	3.54'	300°	3.48'	330°	3.45'



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LEONARD.

3.

D.G. AND BOULDERS.

STATION	DEG.	DIST.	DEG.	DIST.	DEG.	DIST.
172+09 GRD.	0°	4.5'	90°	4.6'	60°	4.4'
GROUND,	90°	4.6'	115°	4.7'	180°	3.65'
6 CONT'D.	245°	4.7'	270°	4.75'	290°	4.5'
	310°	4.3'	330°	4.75'	340°	4.55'

172+04.2'	0°	3.76'	30°	3.85'	60°	3.84'
PIR. # 7.	90°	3.85'	RT. TOE	3.18'	LT. TOE	3.52'
7.	270°	3.63'	300°	3.59'	330°	3.50'

D.G. AND BOULDERS.

GROUND	0°	5.0'	30°	4.6'	60°	4.35'
	90°	4.65'	115°	4.90'	180°	3.75'
	240°	4.80'	270°	4.15'	300°	4.5'
	315°	5.15'	330°	5.45'	350°	5.1'

171+99.2	0°	3.76'	30°	3.82'	60°	3.30'
PIR # 8.	90°	3.28'	RT. TOE	3.10'	LT. TOE	3.50'
8.	270°	3.65'	300°	3.64'	330°	3.56'

D.G. AND BOULDERS.

GROUND.	0°	4.7'	30°	4.65'	60°	4.30'
	90°	3.8'	110°	4.35'	180°	3.85'
	240°	4.95'	270°	4.15'	300°	4.2'
	330°	4.4'	350°	4.6'		



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LEONARD.

4.

STATION	DEG.	DIST.	DEG.	DIST.	DEG.	DIST.
171+94.2	0°	3.79'	30°	3.46'	60°	3.50'
PIR #9.	90°	3.48'	RT. TOE	3.27'	LT. TOE	3.40'
10.	270°	3.54'	300°	3.53'	330°	3.54'
GROUND	0°	4.70'	30°	5.0'	60°	4.9'
	90°	4.2'	125°	4.6'	180°	3.8'
	240°	5.0'	270°	4.4'	300°	4.35'
	320°	4.55'	340°	4.6'		
171+96 HOLE.	45°	5.6'	0°	5.4'	90°	4.1'
171+92	0°	4.15'	30°	3.85'	70°	4.6'
"	90°	4.4'	120°	4.55'	270°	3.9'
"	300°	4.8'	325°	4.35'	340°	4.4'
171+89.2	0°	3.88'	30°	3.56'	60°	3.46'
PIR #10.	90°	3.45'	RT. TOE	3.28'	LT. TOE	3.21'
11.	270°	3.48'	300°	3.54'	330°	3.58'
GROUND.	0°	4.76'	30°	4.1'	60°	4.8'
	90°	3.85'	125°	5.15'	180°	4.0'
	235°	5.2'	270°	4.0'	300°	4.8'
	310°	4.6'	330°	4.45'	345°	4.65'

D.G. AND BOULDERS.

BOULDER FELL OUT ON UPPER RT. SIDE.  
EXTRA SECTION.

D.G. &amp; BOULDERS.



FEB. 21, 53.

LEONARD.

5.

D.G. &amp; BOULDERS.

D.G. &amp; BOULDERS.

STATION	DEG.	DIST.	DEG.	DIST.	DEG.	DIST.
171+84.2	0°	3.82'	30°	3.55'	60°	3.52'
PIR #11.	90°	3.51'	PT. TOE	3.32'	LT. TOE	3.30'
12.	270°	3.52'	300°	3.47'	330°	3.51'
GROUND.	0°	5.1'	30°	6.1'	60°	4.1'
	75°	5.5'	90°	5.4'	110°	5.0'
	125°	5.15'	180°	3.85'	230°	5.1'
	270°	3.9'	300°	4.4'	330°	5.4'
171+82 GROUND.	0°	5.5'	30°	5.0'	50°	5.0'
13.						
EXTRA SECTION TO	65°	4.4'	80°	4.4'	90°	4.95'
SNOW OVERBREAK.	120°	5.35'	150°	3.9'	225°	4.85'
	250°	4.5'	265°	3.15'	280°	4.75'
	300°	5.35'	320°	5.0'	345°	5.05'

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LEONARD.

D.G. &amp; BOULDERS.

171+79.2	0°	3.76'	30°	3.52'	60°	3.57'
PIR #12.	90°	3.56'	PT. TOE	3.35'	LT. TOE	3.33'
14.	270°	3.50'	300°	3.58'	330°	3.51'
GROUND.	0°	5.2'	30°	5.0'	60°	5.0'
	90°	5.05'	125°	5.6'	180°	3.95'
	235°	4.8'	270°	3.95'	300°	4.2'
	330°	4.55'	340°	5.0'		



D.G. & BOULDERS.

SPAD IN ROOF AT STA. 171+68.55

D.G. - GOOD SECTION.

D.G. AND BOULDERS ON RT. SIDE.

171+74.2	0°	3.50	30°	3.56'	60°	3.57'
PIT # 13. 15.	90°	3.56'	RT. TOE	3.38'	LT. TOE	3.39'
	270°	3.55'	300°	3.58'	330°	3.56'
	GROUND.	0°	4.5'	30°	4.7'	60°
	90°	4.6	125°	5.5'	180°	3.95'
	235°	5.25'	270°	4.05'	315°	4.2'
171+69.2	0°	3.91	30°	3.61'	60°	3.57'
PIT # 14 16.	90°	3.51'	RT. TOE	3.30'	LT. TOE	3.42'
	270°	3.58	300°	3.64'	330°	3.67'
	GROUND.	0°	4.35	30°	4.2	60°
	90°	4.40'	125°	5.5'	180°	3.9'
	230°	4.9'	270°	3.95'	315°	4.15'
STA. 171+64.2'	0°	3.87'	30°	3.55'	60°	3.58'
PIT # 15 17.	90°	3.45'	RT. TOE	3.28'	LT. TOE	3.27'
	270°	3.56'	300°	3.58'	330°	3.59'
	GROUND.	0°	4.55	40°	4.7'	60°
	90°	4.5'	130°	4.85	180°	3.85'
	230°	5.1'	270°	4.5'	295°	4.2'
	320°	4.2'	335°	4.55'	345°	4.35'



FEB 22, '53

LEONARD.

7.

171+59.2	0°	3.78	30°	3.57	60°	3.59'
PIR #16.	90°	3.57'	RT. TOE	3.36'	LT. TOE	3.32'
18.	270°	3.48 <sup>.02</sup>	300°	3.51'	330°	3.50'
GROUND.	0°	4.95'	30°	4.7'	60°	4.9'
	90°	4.6'	130°	5.1'	180°	3.85
	240°	4.7'	270°	4.8'	295°	4.0'
	315°	4.3'	330°	4.1'	350°	4.5'
171+54.2	0°	3.87'	30°	3.58'	60°	3.57'
PIR #17.	90°	3.52'	RT. TOE	3.32'	LT. TOE	3.36'
19.	270°	3.51'	300°	3.54'	330°	3.54'
GROUND.	0°	4.5'	30°	4.9	60°	4.6
	90°	4.3	125°	5.2'	150°	3.8'
	245°	4.65'	270°	4.35'	300°	4.9
	320°	4.95'	335°	5.8'	350°	4.8'
171+49.2'	0°	3.71'	30°	3.52'	60°	3.58'
PIR #18.	90°	3.51'	RT. TOE	3.31'	LT. TOE	3.39'
20.	270°	3.52'	300°	3.50'	330°	3.50'
GROUND.	0°	5.1'	30°	4.0	60°	4.1
	90°	3.9'	115°	5.0	180°	3.8
	235°	5.1'	270°	4.65	300°	4.7'
	320°	5.35'	340°	4.5'	350°	5.0'

D.G.

D.G. &amp; BOULDERS.

D.G. &amp; BOULDERS.



FEB. 22, '53

LEONARD.

8.

171+44.1	0°	3.88	30°	3.62'	60°	3.66'
Pir #19.	90°	3.51'	HT. TOE	3.28'	LT. TOE	3.36'
21.	270°	3.50	300°	3.58'	330°	3.60'
GROUND.	0	4.6'	30°	4.2'	60°	4.4'
	90°	4.3'	115°	4.7'	180°	3.7'
	240°	4.95'	253°	4.4'	270°	5.8'
	295°	6.1'	300°	4.4'	330°	4.9

D.G. &amp; BOULDERS.

171+42. GROUND	0°	5.25	30°	4.6'	55°	4.2'
22.	75°	4.9'	90°	5.15'	110°	5.25'
	180°	8.6'	240°	5.0'	260°	5.6'
	270°	6.2'	285°	5.8'	300°	5.9'
	315°	5.2'	330°	5.0'	340°	6.3'

171+39.1 Pir #20.	0°	3.88'	30°	3.55'	60°	3.54'
23.	90°	3.47'	HT. TOE	3.27'	LT. TOE	3.40'
	270°	3.56'	300°	3.61'	330°	3.64'
GROUND	0°	4.8'	35°	5.0'	65°	5.2'
	90°	5.7	110°	4.8'	180°	3.6'
	240°	5.7'	270°	5.5'	300°	5.9'
	315°	5.9'	335°	5.7'	350°	5.0'

D.G. &amp; BOULDERS.



FEB. 25, 53.

LEONARD.

9.

171+34.1

RIP<sup>#</sup> 21.  
24.

GROUND.

0°	3.91'	30°	3.64'	60°	3.62'
90°	3.51'	RT. TOE	3.38'	LT. TOE	3.44'
270°	3.53'	300°	3.57'	330°	3.61'
0°	5.1'	30°	5.0'	60°	5.6'
90°	4.6'	125°	4.65'	255°	5.05'
270°	4.9'	305°	5.6'	325°	6.1
340°	5.8'	350°	4.8'	180°	3.55'

171+29.1

RIP<sup>#</sup> 22.  
25.

GROUND

0°	3.94'	30°	3.65'	60°	3.57'
90°	3.51'	RT. TOE	3.38'	LT. TOE	3.35'
270°	3.48'	300°	3.55'	330°	3.59'
0°	4.5'	30°	4.15'	60°	4.1'
90°	4.4'	110°	4.5'	190°	3.4'
255°	4.9'	270°	4.5'	305°	4.4'
335°	4.9'	345°	5.0'		

171+26.6 GROUND.

EXTRA SECTION,  
26.

0°	4.3'	30°	4.15'	60°	4.05'
90°	4.1'	115°	4.45'	180°	3.35'
260°	6.15'	270°	4.8'	285°	4.6'
295°	4.8'	310°	4.2'	330°	4.05'
345°	4.1'				

19.8.

19.8.

19.8.



FEB. 25, 53

LEONARD.

10.

171+24.1	0°	3.92'	30°	3.60'	60°	3.59'
RIR # 23.	90°	3.55'	RT TOE	3.36'	LT TOE	3.26'
27.	270°	3.51'	300°	3.58'	330°	3.68'
GROUND	0°	4.6'	30°	4.4'	60°	4.05'
	90°	4.0'	120°	4.7'	180°	3.8'
	245°	4.9'	270°	4.45'	300°	4.35'
	320°	4.25'	345°	4.5'	330°	4.15'
171+19.1'	0°	3.92'	30°	3.67'	60°	3.65'
RIR # 24.	90°	3.55'	RT TOE	3.48'	LT TOE	3.29'
28.	270°	3.45'	300°	3.50'	330°	3.58'
GROUND	0°	5.1'	30°	4.8'	60°	4.2'
	90°	4.2'	120°	4.6'	180°	3.8'
	240°	4.5'	270°	3.95'	300°	4.2'
	325°	4.25'	340°	4.65'	355°	4.85'
171+16 GROUND	0°	4.55'	10°	4.95'	35°	4.55'
EXTRA SECTION	60°	3.85'	68°	4.0'	90°	POINT 3.12
29.	100°	3.55'	125°	4.2'	180°	3.2'
	245°	4.5'	255°	4.7'	270°	3.95'
	280°	POINT 3.42	295°	4.2'	310°	4.85'
	325°	4.8'	345°	4.8'	355°	4.65'

B.H. &amp; BOULDERS ON LEFT SIDE.

GRANITE BOULDERS ON BOTH SIDES.



FEB. 25, 58 LEONARD.

11.

SPAD IN ROOF AT STA. 171+13.92

171+14.1	0°	3.83'	35°	3.54'	60°	3.34'
RIP #25. 30.	90°	3.52'	LT. TOE	3.33'	LT. TOE	3.35'
	270°	3.52'	300°	3.58'	300°	3.58'
	GROUND	0°	5.45'	35°	5.65'	65°
	90°	4.2'	130°	5.2'	180°	3.2'
	225°	5.0'	270°	3.95'	305°	4.25'
	330°	5.1'	345°	5.5'	355°	5.35'

B.A.

MARCH 7th. START.

171+09.1	0°	3.98'	80°	3.58'	60°	3.50'
RIP #26. 31.	90°	0.13 3.37	RT. TOE	0.12 3.19	LT. TOE	3.48'
	270°	3.60	300°	3.68	330°	3.74
	GROUND	0°	6.1'	35°	4.65'	55°
	80°	4.2	90°	3.9'	125°	4.5'
	240°	5.0'	270°	5.8'	285°	4.75'
	300°	4.8'	325°	5.75'	340°	5.8'

B.A.

171+04	0°	3.90'	30°	3.57'	60°	3.52'
RIP #27. 32.	90°	0.07 3.48'	RT. TOE	0.06 3.25	LT. TOE	3.41
	270°	3.56'	300°	3.59'	300°	3.68'
	GROUND.	5°	5.5'	30°	4.85'	60°
	90°	4.05'	120°	4.2'	240°	4.70'
	270°	4.45'	300°	4.6'	330°	5.1

B.A.



MARCH 7, 53

LEONARD,

12.

171+02	0°	5.2'	35°	3.55'	60°	3.76'
EXTRA SECT.	90°	4.0'	120°	4.15'	180°	3.0'
33.	240°	4.2'	270°	4.05'	300°	4.4'
	310°	4.8'	325°	5.1'	340°	5.2'
170+99	0°	3.90'	30°	3.60'	60°	3.58'
R.R. #28	90°	3.53'	RT Toe:	3.34'	LT Toe	3.40'
34.	270°	3.51'	300°	3.56'	330°	3.62'
GROUND.	0°	4.55'	30°	4.5'	60°	4.25'
	90°	4.0'	130°	5.1'	180°	3.2'
	240°	4.8'	270°	4.45'	300°	4.85'
	330°	5.0'	345°	5.0'	255°	4.45'
170+95 GROUND.	0°	5.25'	15°	4.6'	40°	4.6'
35.	48°	4.6'	80°	6.3'	90°	5.9'
	120°	6.1'	180°	3.2'	240°	4.8'
	270°	4.15'	300°	4.85'	340°	6.3'
170+90 GROUND.	0°	5.55'	20°	5.25'	40°	5.8'
36.	60°	5.3'	90°	5.8'	120°	6.2'
	180°	3.2'	245°	4.6'	270°	4.95'
	290°	4.3'	320°	4.4'	335°	5.0'
	350°	5.05'	355°	5.7'		

P. 6.

CAR PASS HOLE STARTS ON RIGHT SIDE.



MARCH 7, 58

LEONARD.

18.

END OF CAR PASSER HOLE ON RT. SIDE.

D.B. IN TOP, GRANITE ROCK AT BOTTOM.

170+87600. 37.	0°	5.2'	20°	4.9'	40°	4.65'
	75°	5.1'	90°	4.35'	110°	5.4'
	135°	4.2'	180°	3.1'	235°	4.8'
	265°	5.45'	290°	5.65'	330°	5.4'

SOLID GRANITE ON SIDES, D.B. OVERHEAD.

170+85600. 38.	0°	5.6'	20°	4.9'	40°	4.05'
	67°	3.65'	76°	3.05'	90°	4.05'
	116°	4.5'	135°	4.3'	180°	3.15'
	230°	4.85'	260°	5.3'	280°	5.2'
	295°	5.45'	315°	5.3'	340°	6.0'

" " " " " "

170+82600. 39.	0°	6.4'	15°	5.5'	40°	3.25'
	85°	3.8'	96°	3.55'	130°	4.1'
	180°	3.2'	235°	4.4'	257°	5.15'
	270°	4.8'	305°	5.45'	320°	4.65'
	330°	5.80'	345°	6.5'		

BOULDER FROM 310° TO 330° WITH POINT AT 320°

170+79	0°	4.05'	45°	3.72'	96°	3.55'
RT. P18 #29, TOE		3.35'	LT. TOE	3.32'	270°	3.50'
GROUND. 40.	0°	4.95'	15°	5.1'	40°	4.6'
	60°	4.15'	90°	4.3'	130°	5.0'
	180°	3.2'	230°	5.0'	270°	4.2'
	300°	4.65'	325°	4.1'	345°	4.7'

POINT OF BOULDER AT 325°



MARCH 7, '53

LEONARD.

14.

GRANITE ROCK.

170+75

41.

0°	5.1	10°	4.05'	18°	4.18'
45°	4.65	55°	4.95'	60°	4.2'
75°	3.8'	85°	3.9	95°	4.8'
110°	4.15'	125°	4.7	180°	3.2'
235°	4.15	250°	3.7'	270°	3.65'
300°	3.85'	330°	4.45	340°	5.65'
355°	4.6'	345°	5.0'		

170+70

42.

0°	4.8'	20°	4.3'	45°	5.05'
70°	4.7	90°	4.4'	125°	5.0'
180°	3.15'	225°	4.0'	270°	4.35'
300°	3.5'	330°	3.8'	350°	4.1

170+65

43.

0°	4.8'	10°	4.2'	20°	4.1
30°	4.0'	45°	4.75	55°	5.3'
75°	5.1	90°	4.7'	105°	5.45'
125°	4.4'	180°	3.2'	235°	4.4'
270°	4.3'	300°	3.70	330°	3.55

170+62

44.

0°	4.55'	15°	4.95'	50°	4.3
70°	4.55'	90°	4.5'	125°	4.4'
230°	4.4'	270°	4.25'	300°	3.95'
325°	3.4'	335°	3.55'	350°	4.2'



MARCH 26, '53

LEONARD,

15.

HARD GRANITE - DRY

170+60

45.

NOTE: 0.5' ADDED TO ACTUAL READINGS ON  
180° TO ALLOW FOR FILLED IN BOTTOM BETWEEN  
RAILS, WHICH IS USUALLY WITHIN 0.1' OF TOP  
OF STEEL RAILS. RAILS AND TIE = 0.6' IN DEPTH.

HARD GRANITE:

170+55

46.

0°	4.45	15°	4.7	40°	4.55'
70°	4.8'	90°	4.8'	110°	4.4'
125°	4.4'	180°	4.7'	230°	4.5'
250°	4.65'	275°	4.45	300°	4.1'
320°	4.05'	340°	4.0'		

0°	5.0'	15°	4.95'	40°	4.6'
60°	4.6	75°	5.25'	90°	5.0'
110°	5.0	130°	4.65	180°	3.5'
235°	4.6	250°	4.65	270°	4.75'
285°	4.9'	295°	3.8'	315°	4.8'
330°	4.45'	340°	4.3	345°	4.1'

170+50

47.

0°	5.2	15°	4.8'	40°	4.5'
75°	5.05'	90°	4.8	100°	4.5
105°	5.2'	120°	5.2'	180°	3.65
235°	4.65	250	5.7'	270°	5.3'
300	5.4	317°	4.15'	350°	4.65

EXTRA SECTION TO SHOW POINTS IN ROOF;  
ROCK IS LOOSE <sup>IN TOP</sup> AND SHOULD BE REMOVED.

170+48.5

48.

0°	3.95'	15°	4.05'	20°	4.8
50°	5.1'	90°	4.45	345°	3.75'
270°	4.75	305°	5.6'	325°	3.9



MARCH 26, 53.

LEONARD.

16,

170+45

79.

0°	5.3'	15°	4.9'	40°	4.9
65°	4.7°	90°	4.2'	120°	5.0
180°	3.65'	240°	4.9'	270°	4.65
300°	4.1'	318°	4.3'	330°	5.2'
340°	4.8'	350°	4.75'	255°	4.95'

170+42.5

50.

0'	3.95'	12°	4.15'	37°	4.55'
45°	4.85'	78°	3.45'	90°	4.4'
130°	4.8'	180°	3.7'	240°	5.05'
270°	4.45'	310°	4.2'	335°	4.4'

170+40

51.

0°	3.75'	10°	3.7'	40°	4.1'
45°	4.35'	67°	3.65'	82°	4.7'
90°	4.25'	110°	4.4'	130°	4.6
180°	3.65'	230°	5.0	270°	4.8'
300°	4.45	320°	4.1'	345°	4.1

170+35

52.

0°	3.7'	10°	3.85'	35°	4.0'
60°	3.8'	90°	3.7'	120°	4.6
180°	3.65'	230°	4.35'	270°	4.3'
276°	4.1'	305°	5.8'	320°	3.9'
330°	3.85'	340°	3.8'	350°	3.85



MARCH 26, '55

LEONARD.

17.

HARD GRANITE - DRY.

170+30

53.

0°	4.15'	10°	4.20'	35°	4.3'
50°	3.75'	70°	3.65'	90°	3.55'
110°	3.85'	130°	4.55'	180°	3.65'
240°	4.95'	<del>270°</del> 250°	4.1'	290°	4.85'
298°	4.2'	305°	4.9'	320°	4.15'
335°	4.45'	345°	4.3'	316°	4.7'

HARD GRANITE - DRY.

170+25

54.

0°	4.5'	10°	4.45'	30°	4.15'
60°	3.9'	85°	4.1'	90°	4.0'
115°	4.05'	138°	4.6'	180°	3.65'
240°	4.8'	270°	4.65'	278°	4.15'
300°	4.65'	313°	5.2'	340°	4.55'
345°	4.90'	350°	5.0'	336°	4.9'

D.B. OVERHEAD FROM 330° TO 25°+ HARD

170+20

55.

GRANITE ON SIDES. D.B. IS DAMP, BUT NOT

DRIPPING.

0°	5.35'	5°	5.2'	<del>250°</del> 250°	5.25'
35°	5.4'	50°	4.8'	60°	5.05'
75°	4.85'	90°	4.5'	110°	4.8'
130°	4.9'	180°	3.65'	235°	4.4'
270°	4.1'	300°	4.55'	330°	5.0'
315°	5.2'	340°	5.4'	350°	5.6'



MARCH 26, 53. LEONARD.

18.

D.G. OVERHEAD, HARD GRANITE ON SIDES, DAMP.

170+15  
56.

0°	5.5'	25°	4.95'	50°	4.35'
60°	5.7'	75°	5.6'	90°	5.9'
110°	4.5'	115°	4.25'	125°	4.8'
180°	3.65'	240°	5.1'	250°	4.55'
260°	4.85'	270°	5.2'	292°	6.75'
310°	6.1'	320°	6.4'	330°	6.5'
340°	6.1'	350°	5.95'		

170+12.5  
57.

0°	5.6'	30°	4.8'	40°	4.9'
60°	4.25'	75°	4.8'	90°	4.6'
120°	4.7'	180°	3.65'	245°	4.7'
270°	4.7'	290°	5.3'	310°	6.1'
320°	5.85'	330°	5.75'	340°	5.8'

MARCH 28, 53.

LEONARD - MEASURE  
D. BROWN - NOTES

D.G. over head Hard Granite rt. side Dry

170+10  
58.

0°	4.9'	30°	4.55'	60°	4.7'
70°	5.05'	90°	5.05'	105°	5.0'
115°	4.3'	130°	4.4'	180°	3.55'
235°	4.7'	270°	4.25'	290°	4.8'
320°	5.0'	340°	5.25'	342°	4.75'

D.G. Dry

170+05  
59.

0°	4.65'	10°	4.75'	33°	5.1'
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March 28, 1953

D. Leonard 19.

D. Brown - Notes

170+05 cont'd.	70°	4.75'	90°	5.05'	120°	5.8'
	180°	3.65'	230°	4.2'	250°	3.65'
	270°	3.85'	300°	3.85'	320°	4.6"
	333°	4.15'	345°	4.55'	352°	4.25'

170+00	0°	4.75'	15°	4.8'	35°	4.9'
#60	60°	5.05'	90°	5.8'	120°	6.1'
	180°	3.7'	235°	4.3'	255°	4.8'
	270°	4.25'	300°	4.7'	330°	4.85'

169+95	0°	5.0'	20°	4.75'	45°	4.95'
#61	70°	5.05'	90°	5.45'	120°	6.0'
	180°	3.5'	235°	5.0'	260°	4.95'
	270°	4.95'	295°	5.2'	315°	6.0'
	340°	5.6'	350°	5.1'	300°	5.2'

169+90	0°	4.8'	20°	4.55'	45°	5.2'
#62	70°	4.6'	90°	4.35'	120°	4.9'
	180°	3.45'	235°	5.0'	260°	5.35'
	220°	5.7'	290°	5.6'	310°	5.6'
	320°	4.95'	335°	5.2'	350°	5.6°

Hard D.G. Dry

Hard D.G. Dry

Hard D.G. Damp



March 28, 1953

D. Leonard 20.

D. Brown - Notes

D.G. Over head + rt. side Hard Granite  
Left Side

169+85	0°	5.4'	26°	5.25'	40°	5.2'
#63	70°	4.8'	90°	4.55'	120°	4.75'
	180°	3.5'	235°	4.35'	255°	4.35'
	270°	4.0'	300°	4.1'	315°	4.0'
	335°	5.15'	350°	5.25'		

Hard Granite Left side + Over head  
D.G. 25° to toe on rt side

169+80	0°	4.95'	20°	4.8'	40°	4.7'
#64	70°	5.0'	90°	5.0'	110°	5.2'
	130°	4.45'	180°	3.55'	230°	4.8'
	245°	4.4'	270°	4.15'	285°	4.5'
	295°	4.2'	312°	4.5'	330°	4.35'
	340°	4.05'	350°	4.15'	355°	4.4'

Hard Granite All sides D.G. RT. Side  
runs out at  
169+77

169+75	0°	4.5'	20°	4.35'	40°	4.75'
#65	60°	5.15'	90°	5.1'	105°	5.0'
	125°	4.9'	180°	3.6'	230°	4.3'
	250°	4.3'	270°	4.25'	300°	4.65'
	330°	4.4'	344°	4.3'	352°	5.0'



March 28, 1953

D. Leonard

D. Brown - Notes

Hard Granite 4 in streak of D.G.  
1 in overheat at 169+72

169+70

#66.

0°	4.25'	15°	4.2'	20°	3.7'
45°	4.4'	70°	4.1'	90°	4.3'
105°	4.5'	125°	4.55'	180°	3.6'
240°	4.6'	255°	4.4'	270°	4.2'
300°	4.4'	320°	4.4'	335°	3.55'
350°	3.85'	355°	4.25'		

Hard Granite Damp

169+65

#67.

0°	4.35'	15°	4.8'	35°	4.4'
60°	4.0'	90°	4.55'	110°	4.5'
125°	4.55'	180°	3.55'	230°	4.7'
250°	4.7'	275°	4.15'	295°	4.4'
325°	4.1'	340°	4.1'	350°	4.25'

Hard Granite Damp

169+61

#68.

0°	5.25'	10°	5.0'	30°	5.0'
40°	4.2'	70°	4.3'	90°	4.1'
120°	4.8'	180°	3.5'	235°	4.4'
255°	4.6'	270°	4.5'	295°	4.55'
320°	4.4'	335°	4.0'	350°	4.25'

Hard Granite Damp

169+60

#69.

0°	4.5'	10°	4.3'	35°	4.0'
60°	3.95'	90°	3.85'	120°	4.7'
180°	3.5'	230°	4.5'	250°	4.5'



March 28, 1953

D. Leonard

D. Brown-Notes

169+60 cont.	270°	4.2'	290°	4.5'	315°	4.25'
	330°	4.25'	345°	4.45'	355°	4.45'

Hard Granite Wet

169+55	0°	4.4'	10°	4.25'	35°	3.85'
#70.	65°	3.60'	75°	3.95'	90°	4.1'
	120°	4.45'	180°	3.5'	240°	4.4'
	270°	4.5'	300°	4.3'	310°	4.55'
	<del>330°</del>					
	<del>335°</del>	4.35'	340°	4.0'	350°	4.15'

Hard Granite Wet

169+52.5	0°	4.7'	15°	4.7'	35°	4.25'
#71.	60°	3.95'	75°	4.3'	90°	4.25'
	125°	4.45'	180°	3.6'	235°	4.2'
	255°	4.4'	270°	4.65'	285°	4.3'
	295°	4.6'	320°	4.3'	340°	4.35'

Hard Granite Ridge Wet

169+49.5	0°	3.8'	10°	3.65'	35°	3.9'
#72.	40°	3.65'	65°	3.6'	70°	3.3'
	85°	3.65'	125°	4.35'	180°	3.6'
	235°	4.2'	270°	3.5'	290°	4.0'
	324°	3.45'	340°	3.55'	350°	3.70'



March 28, 1953

P. Leonard

D. Brown - Notes

Solid Granite Ramp

169+45

75.

0°	4.6'	10°	4.65'	35°	4.25'
50°	4.1'	70°	3.45'	90°	3.55'
125°	4.3'	180°	3.7'	225°	4.05'
250°	3.75'	270°	3.45'	310°	3.35'
330°	4.15'	340°	4.1'	350°	4.25'

Solid Granite Ramp

169+40

74.

0°	4.9'	30°	4.0'	45°	3.75'
70°	3.9'	90°	4.1'	110°	4.2'
130°	4.3'	180°	3.75'	220°	4.1'
245°	3.8'	270°	3.45'	290°	3.4'
320°	4.2'	335°	3.85'	350°	4.2'

Hard Granite Dripping Wet

169+35

75.

0°	4.6'	30°	4.0'	45°	3.55'
<del>65°</del> 60°	3.85'	90°	3.55'	110°	3.85'
135°	4.3'	180°	3.75'	225°	4.2'
270°	3.1'	310°	3.9'	340°	4.8'

Hard Granite Dripping Wet

169+30

76.

0°	4.1'	30°	4.15'	60°	4.1'
90°	<del>3.45'</del> 3.45'	115°	3.4'	133°	4.35'
180°	3.65'	225°	4.35'	250°	4.15'
270°	3.9'	300°	3.75'	330°	3.8'



March 28, 1953

D. Leonard

D. Brown - Notes

Start Car-pass Hole, rt. Side  
Hard Granite Damp

169+27 #77	0° 4.3'	30° 4.5'	60° 4.3'
	75° 4.0'	90° 3.45'	103° 4.25'
	120° 4.45'	130° 4.6'	180° 3.7'
	230° 4.25'	250° 4.1'	270° 3.95'
	300° 3.85'	<del>323°</del> 325° 4.55'	340° 3.6'

Hard Granite Dry

169+25 #78	0° 4.35'	35° 5.1'	55° 4.35'
	75° 4.7'	90° 5.25'	105° 6.0'
	115° 2.0'	180° 3.8'	225° 4.2'
	240° 4.4'	262° 4.35'	270° 4.15'
	300° 4.0'	320° 4.15'	340° 4.4'

Hard Granite Dry

169+23 #79	0° 4.9'	10° 5.0'	35° 5.05'
	55° 4.6'	60° 5.3'	75° 6.2'
	90° 6.3'	115° 7.1'	180° 3.75'
	225° 4.3'	250° 4.35'	270° 4.2'
	305° 4.6'	325° 4.45'	345° 4.75'

Hard Granite Dry

169+20 #80	0° 5.1'	15° 4.5'	45° 4.3'
	65° 5.3'	80° 5.8'	90° 6.2'
	105° 6.3'	110° 7.4'	180° 3.7'
	228° 4.5'	255° 3.5'	270° 3.5'
	295° 4.1'	330° 4.3'	345° 4.95'



March 28, 1953

D. Leonard

D. Brown - Notes

Hard Granite Dry  
End of Car-pass Hole

169+17  
281.

0°	4.4'	10°	4.2'	35°	3.95'
50°	3.95'	60°	4.5'	75°	5.35'
90°	5.4'	117°	6.4'	180°	3.8'
225°	4.4'	255°	4.0'	270°	3.8'
300°	3.75'	320°	3.8'	340°	4.1'

Hard Granite Damp on left side

169+15  
282.

0°	4.55'	10°	4.15'	35°	4.2'
65°	3.8'	90°	3.55'	110°	3.85'
135°	4.1'	180°	3.7'	225°	4.3'
240°	4.25'	270°	3.95'	300°	3.9'
320°	3.7'	335°	3.7'	350°	4.1'

Hard Granite Dry

169+10  
283.

0°	4.35'	10°	4.25'	40°	3.55'
58°	3.8'	75°	3.7'	90°	3.6'
140°	4.05'	135°	4.45'	180°	3.65'
225°	4.4'	250°	3.95'	270°	4.05'
300°	4.0'	310°	3.75'	322°	4.25'
350°	4.55'	236°	4.5'	263°	3.75'

Hard Granite Dry

169+05  
284.

0°	4.0'	10°	3.85'	40°	3.55'
60°	3.35'	90°	3.4'	110°	3.7'
132°	4.55'	180°	3.65'	230°	4.6'
255°	3.65'	270°	3.6'	300°	3.85'



March 28, 1953

P. Leonard  
D. Brown - Notes

Hard Granite Dry

169+05. cont'd.	320°	4.0'	340°	3.85'	350°	4.0'
169+00	0°	4.15'	15°	4.0'	40°	4.05'
#85.	50°	4.25'	60°	3.85'	90°	3.9'
	110°	4.25'	130°	4.8'	180°	3.6'
	220°	3.95'	<del>238°</del> 240°	4.2'	260°	3.9'
	275°	3.65'	305°	4.0'	325°	3.55'
	340°	3.65'	350°	3.75'	300°	3.65'

Hard Granite Damp

168+95	0°	3.9'	20°	3.9'	45°	4.1'
#86.	55°	3.75'	90°	3.75'	110°	4.1'
	130°	4.4'	180°	3.65'	225°	4.5'
	245°	3.9'	270°	3.6'	300°	3.9'
	310°	3.8'	330°	3.55'	350°	3.95'

SPTD #9 = 168+92.58 C P. 56

" #10 = 168+88.8 C P. 06

Hard Granite Damp

NOTE: ON READINGS FOR 150°, 180° AND 210°, 0.6'

IS ADDED TO ACTUAL READINGS TAKEN ON SURFACE

AT TOP OF RAILS, TO ALLOW FOR LOOSE MUCK

IN BOTTOM OF TUNNEL, TOE DISTANCES ADJUSTED

TO ALLOW FOR SLOUGHED MATERIAL.

APRIL 4, 1953

LEONARD - MEASUREMENTS,  
DAN BROWN - NOTES.

168+90	0°	3.6'	20°	4.0'	45°	4.15'
#87.	55°	3.6'	75°	3.65'	90°	3.55'
	110°	4.0'	130°	4.55'	150°	3.6'
	180°	3.65'	210°	3.6'	238°	4.25'
	250°	3.9'	270°	3.45'	300°	3.4'
	315°	3.55'	335°	3.2'	350°	3.55'



April 4, 1953

D. Leonard

D. Brown - Notes

Hard Granite Damp

168+85

#88.

0°	4.05'	15°	4.1'	30°	4.5'
40°	4.0'	45°	3.85'	53°	3.35'
73°	3.1'	70°	3.6'	85°	3.6'
95°	3.7'	120°	4.65'	<sup>115°</sup> <del>115°</del>	3.55'
180°	3.65'	210°	3.55'	230°	4.3'
250°	4.0'	275°	3.65'	295°	3.65'
325°	3.75'	340°	3.8'	350°	3.85'

Hard Granite Damp

168+80

#89.

0°	4.75'	15°	4.75'	40°	3.95'
65°	4.15'	90°	3.9'	<sup>125°</sup> <del>115°</del>	4.4'
150°	3.6'	180°	3.65'	210°	3.5'
235°	4.6'	245°	4.7'	260°	4.2'
275°	3.75'	300°	4.0'	325°	4.75'
345°	4.6'	355°	4.9'		

Hard Granite Damp

168+75

#90.

0°	4.3'	10°	4.0'	40°	4.1'
45°	4.2'	55°	3.75'	70°	4.1'
90°	4.05'	112°	4.4'	123°	4.4'
150°	3.5'	180°	3.6'	210°	3.55'
240°	4.3'	250°	4.4'	270°	4.15'
290°	4.1'	315°	4.55'	335°	4.45'



April 4, 1953

D. Leonard

D. Brown - Notes

Hard Granite Damp

168+70

291.

0°	4.15'	10°	4.0'	35°	3.85'
45°	4.25'	70°	4.1'	90°	4.1'
105°	4.5'	120°	4.7'	150°	3.45'
180°	3.55'	215°	3.65'	240°	3.95'
255°	4.5'	270°	4.3'	300°	4.4'
307°	4.7'	320°	4.2'	353°	4.75'

Hard Granite Damp

168+65

292.

0°	4.3'	10°	4.0'	35°	3.65'
40°	3.75'	60°	3.6'	66°	4.0'
90°	4.1'	115°	4.65'	140°	3.75'
180°	3.55'	210°	3.45'	250°	4.4'
270°	4.05'	282°	4.05'	290°	3.45'
297°	3.55'	300°	3.85'	310°	4.15'
325°	3.95'	340°	3.85'	350°	4.2'

Hard Granite Damp

168+60

293.

0°	3.9'	10°	3.75'	35°	3.3'
50°	3.5'	65°	4.0'	89°	3.1'
96°	3.95'	125°	4.25'	140°	3.7'
215°	3.6'	235°	3.85'	270°	3.6'
280°	3.55'	295°	3.35'	325°	4.05'
340°	4.1'	350°	4.2'	180°	3.5'



April 4, 1953

D. Leonard

D. Brown - Notes

Hard Granite Damp

168+55

294.

0°	4.3'	10°	4.1'	35°	3.45'
57°	4.1'	80°	3.4'	90°	3.25'
130°	3.8'	150°	3.4'	180°	3.55'
210°	3.5'	240°	4.0'	250°	3.9'
270°	3.7'	290°	3.6'	310°	3.8'
335°	4.4'	345°	4.1'	352°	4.55'

Hard Granite Damp

168+50

295.

0°	4.2'	10°	4.0'	35°	4.15'
45°	4.45'	50°	4.4'	60°	3.55'
90°	3.15'	135°	3.95'	150°	3.5'
180°	3.55'	210°	3.45'	240°	4.0'
270°	3.15'	300°	3.55'	315°	3.85'
330°	4.15'	340°	4.05'	350°	4.35'

Hard Granite Damp

168+45

296.

0°	4.6'	12°	4.7'	37°	4.65'
45°	5.0'	80°	3.6'	90°	3.5'
115°	3.75'	135°	4.05'	150°	3.5'
180°	3.65'	210°	3.55'	237°	4.15'
235°	4.05'	270°	3.65'	295°	3.7'
313°	4.1'	326°	3.7'	340°	4.35'



April 4, 1953

D. Leonard  
D. Brown - Notes

Hard Granite Damp

168+40 297.	0° 4.55'	15° 4.25'	40° 4.2'
	70° 4.5'	90° 3.9'	110° 3.85'
	125° 4.45'	150° 3.55'	180° 3.7'
	210° 3.45'	230° 3.95'	270° 3.9'
	285° 3.85'	307° 3.8'	333° 4.6'
	343° 4.5'	355° 4.8'	

Hard Granite Damp

168+35 298.	0° 4.8'	6° 5.1'	15° 4.25'
	40° 4.55'	62° 4.8'	68° 4.35'
	90° 4.05'	125° 4.7'	140° 4.1'
	180° 3.75'	210° 3.5'	230° 3.8'
	270° 3.0'	<del>285°</del> 285° 3.1'	297° 3.7'
	320° 3.8'	340° 4.25'	350° 4.5'

Hard Granite Wet

168+33 299.	0° 4.5'	15° 4.9'	25° 5.1'
	40° 4.85'	54° 5.15'	70° 4.5'
	90° 3.95'	105° 4.1'	125° 4.65'
	140° 4.05'	180° 3.65'	205° 3.3'
	215° 3.45'	250° 2.55'	270° 2.9'
	285° 3.1'	315° 3.45'	340° 3.75'



2  
Hard Granite wet

April 4, 1953

D. Leonard

D. Brown - Notes

168+30

100

0° 4.3' 10° 4.25' 40° 4.9'

47° 4.1' 60° 3.75' 66° 4.25'

85° 4.35' 90° 4.1' 115° 4.4'

130° 4.5' 145° 3.9' 180° 3.45'

215° 3.5' 240° 3.05' 270° 3.0'

295° 3.85' 307° 3.95' 320° 3.45'

330° 3.8' 350° 3.9'

Hard Granite Dripping wet

4" to 6" seam of white quartz

sloping upward at 40° slope

168+25

101.

0° 4.4' 8° 4.35' 25° 4.6'

35° 4.0' 60° 3.6' 90° 3.75'

115° 4.1' 135° 4.3' 150° 3.6'

180° 3.65' 220° 3.85' 247° 3.7'

265° 3.3' 270° 3.7' 300° 4.35'

325° 4.75' 340° 4.4' 345° 4.55'

Hard Granite Dripping wet

168+20

102.

0° 4.2' 35° 3.75' 50° 3.6'

77° 3.3' 85° 3.8' 105° 3.8'

115° 4.2' 130° 4.4' 150° 3.7'

180° 3.75' 210° 3.55' 225° 3.9'

240° 4.0' 255° 4.2' 270° 4.0'

290° 4.25' 320° 4.85' 340° 4.5'



April 4, 1953

D. Leonard

D. Brown - Notes

Hard Granite Dripping wet

168+15  
108.

0°	4.4'	15°	4.5'	30°	4.0'
35°	4.15'	50°	3.65'	80°	3.65'
90°	3.55'	110°	3.85'	125°	4.45'
135°	4.35'	150°	3.6'	180°	3.8'
210°	3.65'	223°	4.05'	245°	4.25'
270°	4.1'	290°	4.25'	320°	4.45'
335°	4.2'	347°	4.35'	353°	4.25'

Hard Granite Dripping wet

168+10  
104.

0°	4.4'	27°	3.95'	40°	4.0'
55°	3.5'	85°	3.9'	95°	3.45'
110°	4.05'	125°	4.7'	140°	4.15'
180°	3.8'	225°	4.25'	255°	4.7'
275°	3.9'	287°	4.1'	296°	4.15'
325°	4.95'	345°	5.25'	350°	4.8'

Hard Granite Dripping wet

168+05  
105.

0°	4.05'	25°	3.6'	50°	3.15'
70°	3.26'	90°	3.3'	110°	3.8'
125°	4.7'	145°	3.8'	180°	3.75'
210°	3.8'	225°	4.25'	242°	4.5'
270°	4.1'	300°	4.15'	320°	4.2'
330°	4.15'	335°	4.45'	352°	4.1'



April 4, 1953

D. Leonard

D. Brown - Notes

Hard Granite Dripping Wet

168+00  
106.

355°	4.55'	5°	3.7'	25°	3.25'
45°	3.15'	70°	3.15'	90°	3.4'
110°	3.7'	135°	4.25'	150°	3.75'
180°	3.85'	210°	3.85'	225°	4.25'
240°	4.5'	270°	3.85'	300°	3.85'
325°	4.2'	335°	4.2'	345°	4.4'

Hard Granite Dripping Wet

White quartz <sup>YEIN</sup> ~~line~~ 1 foot wide,  
Sloping upward a 40°

167+95  
107.

355°	4.15'	25°	3.5'	30°	3.1'
55°	3.7'	65°	3.25'	77°	3.85'
100°	3.6'	107°	4.05'	132°	4.25'
150°	3.7'	180°	3.85'	210°	3.7'
230°	4.5'	242°	4.4'	270°	3.55'
282°	3.45'	290°	3.8'	300°	3.8'
310°	4.2'	330°	4.45'	345°	4.65'

Hard Granite Wet

162+90  
108.

0°	3.95'	25°	3.95'	60°	3.65'
70°	3.25'	90°	3.6'	102°	4.05'
125°	3.85'	140°	4.1'	180°	3.8'
220°	4.0'	237°	4.4'	270°	3.65'
295°	3.65'	320°	4.2'	345°	3.9'



April 11, 1953

D. Leonard

D. Brown - Notes

Hard Granite Damp

167+85	0°	4.2'	25°	4.0'	50°	3.65'
109	70°	3.4'	90°	3.65'	110°	3.95'
	140°	4.3'	180°	3.8'	210°	3.8'
	230°	4.5'	250°	4.55'	275°	3.8'
	300°	3.95'	320°	4.1'	342°	3.75'

Hard Granite Wet

167+80	0°	4.3'	25°	3.9'	40°	3.9'
110	65°	3.85'	90°	3.7'	105°	4.0'
	120°	4.25'	140°	3.95'	180°	3.8'
	225°	4.3'	245°	4.15'	270°	3.9'
	290°	3.6'	296°	3.9'	310°	4.0'
	325°	4.4'	340°	4.4'	355°	4.5'

Hard Granite Wet

167+75	0°	4.9'	30°	4.45'	55°	3.55'
111	75°	3.2'	90°	3.5'	115°	4.35'
	130°	4.6'	150°	3.6'	180°	3.7'
	210°	3.7'	225°	4.3'	250°	4.1'
	270°	4.0'	300°	4.25'	330°	4.55'
	340°	4.5'	352°	5.25'		



April 11, 1953

D. Leonard

D. Brown - Notes

Hard Granite wet  
1 in quartz layer at bottom

167+70

112

0°	4.65'	25°	4.1'	40°	4.2'
55°	3.7'	75°	3.55'	90°	3.6'
115°	4.35'	<del>150°</del> <sup>145°</sup>	3.7'	180°	3.65'
210°	3.6'	225°	4.2'	255°	3.7'
270°	3.6'	287°	4.0'	305°	4.5'
315°	4.65'	325°	4.4'	337°	4.7'
343°	4.55'	350°	4.85'	356°	4.85'

Hard Granite wet

167+65'

113

0°	4.55'	25°	3.9'	43°	4.1'
65°	3.7'	80°	3.6'	90°	3.55'
105°	3.75'	130°	4.5'	150°	3.65'
180°	3.7'	210°	3.5'	225°	4.05'
250°	3.65'	270°	3.6'	290°	3.9'
310°	4.0'	330°	3.75'	350°	4.55'

Hard Granite wet

167+60

114

0°	4.6'	25°	3.8'	40°	3.8'
60°	3.5'	80°	3.35'	90°	3.35'
115°	3.5'	120°	3.6'	122°	4.05'
130°	4.4'	150°	3.55'	180°	3.65'
210°	3.5'	225°	3.9'	255°	3.55'
270°	3.6'	290°	3.6'	310°	3.9'
330°	4.2'	342°	4.6'	350°	4.55'



April 11, 1953

D. Leonard  
D. Brown - Notes

Hard Granite Wet

167+55 115	0°	43'	30°	3.85'	40°	40'
	60°	3.6'	75°	3.3'	90°	3.35'
	100°	3.15'	135°	4.2'	150°	3.6'
	180°	3.65'	210°	3.6'	230°	4.4'
	245°	3.9'	270°	4.15'	300°	3.9'
	320°	3.55'	340°	3.8'	350°	<del>4.05'</del> 3.85'

Hard Granite Wet

Begin Carpass Hole

167+50 116	0°	4.6'	15°	4.35'	38°	4.7'
	45°	4.1'	57°	3.95'	65°	4.7'
	80°	3.9'	90°	4.1'	105°	3.85'
	130°	5.0'	150°	3.75'	180°	3.7'
	210°	3.6'	222°	3.95'	240°	3.85'
	270°	3.15'	290°	3.6'	310°	3.8'
	325°	3.95'	337°	4.25'	355°	4.4'

Hard Granite Wet

Extra Section

167+47.5 117	0°	4.4'	10°	4.6'	40°	4.55'
	45°	4.5'	65°	6.4'	90°	5.6'
	110°	5.9'	115°	6.9'	150°	3.95'
	180°	3.75'	210°	3.65'	225°	4.15'
	245°	3.6'	270°	3.55'	290°	3.6'
	310°	3.95'	335°	4.0'	350°	4.15'



April 11, 1953

D. Leonard  
D. Brown - Notes

Hard Granite Wet

167+45

118

0°	3.85'	10°	4.0'	30°	4.0'
45°	4.65'	70°	4.85'	75°	6.0'
90°	6.3	100°	3.9'	<sup>120°</sup> <del>125°</del>	6.3'
150°	4.0'	180°	3.85'	210°	3.7'
225°	4.2'	240°	3.7'	270°	3.55'
295°	4.05'	315°	4.1'	340°	4.15'

Hard Granite Wet Extra Section  
End of Car-pass Hole

167+41

119

0°	4.2'	12°	4.3	40°	4.1'
55°	5.3'	73°	4.7'	77°	5.4'
90°	6.0'	105°	6.2'	120°	6.3'
150°	3.75'	180°	3.85'	210°	3.6'
225°	4.15'	240°	4.45'	270°	3.65'
300°	3.65'	330°	4.35'	350°	4.05'

Hard Granite Wet

167+40

120

0°	4.4'	10°	4.15'	40°	4.2'
60°	3.9'	90°	4.05'	105°	4.2'
127°	5.2'	140°	3.7'	180°	3.75'
210°	3.7'	225°	4.1'	240°	4.35'
270°	3.65'	300°	4.0'	325°	4.4'
340°	4.25'	350°	4.35'	66°	3.4'



April 11, 1953

D. Leonard

D. Brown - Notes

Hard Granite Wet

167+35

121

0°	4.05'	15°	3.95'	40°	3.9'
60°	3.95'	77°	3.45'	90°	3.55'
105°	4.0'	130°	4.25'	150°	3.7'
180°	3.7'	210°	3.55'	223°	4.0'
250°	3.55'	270°	3.5'	295°	4.05'
325°	4.05'	338°	4.1'	350°	4.1'
300°					

Hard Granite Wet

167+30

122

0°	4.2'	15°	3.95'	40°	3.75'
50°	3.9'	65°	3.65'	80°	3.0'
90°	3.4'	105°	3.95'	130°	4.45'
150°	3.6'	180°	3.65'	210°	3.55'
227°	4.15'	240°	3.75'	260°	3.4'
275°	3.25'	310°	4.05'	335°	4.15'
345°	4.25'	300°	3.5'	355°	4.1'

Hard Granite Dry Overhead  
Wet on Sides

167+25

123

0°	4.35'	10°	3.8'	45°	4.45'
65°	4.0'	90°	4.25'	105°	4.20'
130°	4.6'	150°	3.7'	180°	3.6'
210°	3.55'	220°	3.8'	235°	3.8'
250°	3.5'	275°	3.5'	293°	3.4'
305°	3.15'	330°	3.55'	337°	3.85'
346°	4.35'	353°	4.55'		



April 11, 1953

D. Leonard

D. Brown - Notes

Hard Granite Dry Overhead  
Wet on sides

167+20  
124

0°	4.2'	20°	4.15'	45°	3.85'
60°	3.85'	80°	4.5'	90°	4.25'
130°	4.8'	150°	3.75'	180°	3.7'
210°	3.55'	230°	3.8'	250°	3.4'
270°	2.9'	300°	3.35'	320°	3.85'
335°	4.1'	350°	4.25'		

Hard Granite Dry Overhead  
Wet on sides

167+15  
125

0°	3.9'	20°	3.75'	50°	3.65'
70°	4.15'	90°	4.05'	110°	4.55'
130°	4.75'	150°	3.8'	180°	3.75'
210°	3.5'	230°	3.7'	250°	3.25'
270°	3.45'	295°	3.45'	310°	3.5'
330°	3.4'	340°	3.4'	350°	3.45'

Hard Granite Dry in top Half

167+10  
126

0°	4.55'	20°	4.5'	45°	4.15'
70°	4.0'	90°	4.15'	110°	4.4'
125°	4.8'	150°	3.8'	170°	3.65'
210°	3.5'	230°	4.2'	250°	3.6'
270°	3.5'	290°	3.15'	320°	3.4'
310°	3.1'	340°	3.9'	350°	4.2'



April 11, 1953

D. Leonard

D. Brown - Notes

Hard Granite Dry, top + sides

167+05  
127

0°	5.6'	20°	4.9'	45°	4.3'
60°	4.25'	75°	4.6'	90°	4.6'
110°	4.6'	125°	5.0'	145°	4.0'
180°	3.65'	210°	3.5'	230°	4.4'
255°	4.0'	270°	3.85'	295°	3.45'
315°	3.15'	335°	3.8'	350°	4.6'

Hard Granite Dry, Sides + top  
Extra section

167+03  
128

0°	4.25'	70°	4.25'	75°	4.3'
65°	4.6'	90°	4.4'	110°	4.55'
125°	5.0'	145°	3.8'	180°	3.6'
210°	3.45'	225°	4.2'	250°	3.4'
270°	3.15'	295°	3.3'	320°	3.9'
340°	4.1'	350°	4.1'	10°	4.2'

Hard Granite Dry, top + sides

167+00  
129

0°	4.3'	10°	4.8'	20°	4.55'
40°	4.6'	60°	4.45'	90°	4.0'
110°	4.1'	130°	4.5'	150°	3.7'
180°	3.55'	210°	3.4'	225°	4.2'
250°	3.55'	270°	3.45'	300°	3.25'
325°	3.55'	340°	3.7'	350°	3.85'



April 11, 1953

D. Leonard

D. Brown Notes

Hard Granite Damp  
Extra Section

166+97

130

0°	5.15'	10°	5.1'	20°	4.5'
40°	4.3'	60°	4.25'	75°	4.05'
90°	4.25'	110°	4.5'	125°	4.8'
150°	3.7'	180°	3.5'	210°	3.5'
230°	4.3'	245°	4.25'	250°	3.85'
260°	4.35'	270°	4.25'	285°	4.55'
300°	4.35'	308°	3.85'	320°	4.45'
330°	4.55'	340°	4.45'	350°	4.85'

Hard Granite Damp

166+95

131

0°	4.75'	8°	4.95'	16°	4.7'
40°	4.45'	55°	4.55'	75°	4.2'
90°	4.35'	110°	4.55'	125°	4.75'
150°	3.6'	180°	3.45'	210°	3.45'
230°	4.3'	250°	3.9'	270°	3.8'
300°	3.95'	315°	4.35'	335°	4.7'
345°	4.65'	355°	4.8'		

Hard Granite Dry Over head  
Damp Sides Extra Section

166+92

132

0°	5.05'	20°	4.6'	40°	3.85'
50°	3.9'	70°	4.95'	90°	4.6'
110°	4.8'	125°	5.0'	150°	3.6'
180°	3.55'	210°	3.5'	230°	4.4'
240°	4.6'	255°	4.1'	270°	3.75'



April 11, 1953.

D. Leonard

D. Brown - Notes

Hard Granite Dry Over head, Wet  
on Sides

166+92 cont.	300°	335'	320°	375'	330°	415'
	340°	405'	345°	485'	355°	48'
166+90	0°	5.2'	5°	5.65'	15°	5.4'
	35°	4.25'	60°	4.0'	90°	3.75'
	110°	4.2'	130°	4.6'	150°	3.6'
	180°	3.55'	210°	3.5'	230°	4.5'
	250°	4.3'	270°	3.7'	285°	3.55'
	305°	3.75'	315°	4.15'	330°	4.4'
	340°	4.5'	350°	4.55'	355°	4.95'

Hard Granite wet.

166+85	0°	4.8'	5°	5.1'	15°	4.8'
	35°	4.4'	50°	4.6'	70°	3.75'
	90°	3.65'	110°	4.1'	130°	4.55'
	150°	3.6'	180°	3.5'	210°	3.5'
	240°	4.7'	270°	4.3'	275°	4.15'
	285°	3.9'	307°	4.5'	323°	4.05'
	335°	4.15'	345°	4.3'	355°	4.55'



April 11, 1953

D. Leonard

D. Brown - Notes

Hard Granite wet, Dripping

166+80

135

0°	3.05'	10°	5.35'	15°	4.55'
35°	3.8'	48°	3.8'	60°	3.45'
70°	3.4'	90°	3.75'	110°	3.75'
130°	4.5'	150°	3.55'	180°	3.5'
210°	3.5'	230°	4.3'	245°	3.95'
270°	3.45'	275°	3.8'	312°	3.3'
322°	3.6'	330°	3.85'	340°	4.1'
355°	4.45'	357°	4.9'		

Hard Granite Dry Overhead,  
Wet on Sides

166+75

136

0°	4.1'	10°	4.3'	35°	4.15'
40°	4.3'	50°	4.05'	60°	4.25'
85°	4.1'	90°	3.7'	110°	4.55'
118°	4.95'	125°	4.9'	150°	3.6'
180°	3.5'	210°	3.6'	230°	4.25'
250°	3.65'	270°	3.6'	280°	3.7'
290°	3.4'	305°	3.7'	325°	3.8'
340°	3.95'	350°	3.9'	355°	4.0'



April 11, 1953

D. Leonard

D. Brown - Notes

Hard Granite Dry on top,  
Damp on Sides

16670  
137

0°	4.8'	10°	4.6'	20°	3.8'
35°	3.8'	65°	3.55'	75°	3.6'
80°	3.9'	90°	4.0'	110°	4.05'
130°	4.4'	150°	3.6'	180°	3.55'
210°	3.5'	230°	4.2'	245°	3.8'
270°	3.75'	295°	3.25'	305°	4.05'
320°	4.25'	337°	4.35'	340°	4.6'
350°	4.75'	298°	3.75'		

Hard Granite Dry on top, Damp  
on Sides

166765  
138

0°	4.65'	8°	4.65'	25°	3.7'
38°	4.0'	45°	3.7'	75°	3.55'
65°	3.3'	82°	4.2'	90°	4.1'
110°	4.35'	130°	4.8'	150°	3.5'
180°	3.6'	210°	3.55'	230°	4.25'
245°	4.15'	270°	3.95'	287°	4.45'
300°	4.35'	315°	4.65'	<del>330°</del>	4.55'
340°	4.6'	350°	4.6'	355°	4.65'



April 11, 1953

D. Leonard

D. Brown - Notes

Hard Granite Dry on top, wet  
on sides. Extra section

166+62 139	0°	5.1'	6°	4.1'	15°	4.2'
	3.5°	3.75'	43°	3.55'	40°	3.7'
	80°	3.85'	90°	4.1'	110°	4.25'
	130°	4.5'	150°	3.6'	180°	3.55'
	210°	3.5'	230°	4.4'	250°	4.4'
	270°	4.3'	285°	4.3'	300°	4.0'
	320°	4.55'	330°	4.4'	345°	4.2'
	350°	5.0'	355°	5.25'		

April 18, 1953

D. Leonard

D. Brown - Notes

Hard Granite Wet

1st. Plane

NOTE: READINGS CHANGED TO NEAREST .05 IN.

166+60 140	0°	4.25'	8°	4.15'	20°	3.6'
	35°	3.5'	50°	3.60'	65°	3.475
	75°	3.75'	90°	3.75'	100°	3.8'
	110°	4.15'	125°	4.4'	150°	4.0'
	180°	3.6'	210°	3.7'	230°	4.2'
	250°	4.15'	270°	4.3'	285°	3.75'
	300°	3.9	320°	4.05'	330°	4.4'
	340°	4.35'	350°	4.45'		



April 18, 1953

D. Leonard  
P. Brown - Notes

Hard Granite Wet

166+55	0°	4.2'	10°	3.9'	25°	3.3'
141	40°	3.35'	65°	3.6'	90°	3.4'
	115°	4.0'	130°	4.1'	150°	3.5'
	180°	3.5'	210°	3.5'	230°	4.4'
	245°	4.05'	270°	4.75'	272°	4.05'
	285°	3.9'	300°	4.15'	320°	5.0'
	340°	4.2'	350°	4.25'		

Hard Granite Wet

166+50'	0°	4.15'	15°	3.9'	45°	3.4'
142	60°	3.5'	75°	3.6'	90°	3.7'
	110°	4.15'	125°	4.3'	150°	3.5'
	180°	3.45'	210°	3.5'	235°	4.1'
	250°	3.75'	270°	4.0'	285°	4.35'
	295°	3.8'	305°	3.6'	320°	4.05'
	340°	3.85'	353°	4.1'		

Hard Granite top Dry, sides Damp

166+45	0°	4.3'	10°	4.55'	20°	4.35'
143	45°	4.0'	55°	4.15'	65°	3.8
	90°	3.85'	110°	4.25'	125°	4.5'
	150°	3.5'	180°	3.4'	210°	3.4'
	230°	4.2'	250°	3.9'	270°	3.45'
	295°	3.9'	310°	4.05'	325°	3.9'



April 18, 1953

D. Leonard  
D. Brown - Notes

		166+45 Cont.	340°	4.15'	350°	4.1'		
Hard Granite top Dry, sides Damp		166+40	0°	4.6'	15°	4.6'	25°	4.5'
		144	45°	4.6'	55°	4.2'	75°	4.0'
			90°	4.0'	110°	4.3'	125°	4.7'
			150°	3.5'	180°	3.5'	210°	3.4'
			230°	4.35'	250°	4.35'	270°	4.1'
			290°	4.0'	300°	3.55'	320°	4.4'
			335°	4.55'	345°	4.55'	355°	4.65'
	Hard Granite Dry on top + Right Side. Damp on left side		166+35	0°	4.75'	15°	4.95'	25°
		146	45°	4.5'	60°	4.55'	75°	4.4'
			90°	4.6'	110°	4.75'	125°	5.0'
			150°	3.45'	180°	3.4'	210°	3.3'
			235°	4.65'	250°	4.1'	270°	3.75'
			<del>290°</del> 300°	3.9'	305°	4.45'	320°	4.4'
			335°	4.4'	345°	4.35'		



April 18, 1953

D. Leonard

D. Brown - Notes

Hard Granite Dry, top + Rt. side  
Damp on left side. Extra Section

166+32

146

0°	5.2'	10°	5.25'	20°	5.2'
35°	4.2'	45°	4.3'	55°	4.55'
70°	4.75'	90°	4.85'	110°	5.3'
120°	5.4'	150°	3.5'	180°	3.5'
210°	3.4'	240°	4.7'	235°	4.5'
265°	4.75'	280°	4.3'	290°	4.75'
305°	4.4'	315°	4.65'	335°	5.0'
350°	5.2'				

Hard Granite Damp Soft Spot  
on Lower left side

166+30

147

0°	5.5'	10°	5.6'	20°	4.8'
25°	4.55'	45°	4.3'	50°	4.5'
60°	3.95'	65°	4.05'	90°	3.7'
110°	3.95'	125°	4.5'	150°	3.35'
180°	3.45'	210°	3.7'	235°	4.8'
260°	5.1'	270°	5.5'	290°	4.7'
300°	4.85'	310°	4.55'	330°	5.4'
340°	5.05'	345°	5.4'	355°	5.3'



April 18, 1953

D. Leonard

D. Brown - Notes

Hard Granite Wet

166+25

148

0°	5.2'	20°	4.9'	30°	4.5'
40°	4.4'	55°	4.4'	65°	4.1'
70°	4.25'	90°	4.45'	110°	4.7'
125°	4.8'	150°	3.4'	180°	3.4'
210°	3.4'	230°	4.3'	255°	4.05'
270°	4.1'	285°	4.3'	300°	4.6'
310°	4.5'	315°	4.3'	330°	4.9'
340°	5.55'	348°	5.1'	355°	5.5'

Hard Granite Dripping Wet

166+20

149

Soft Spot Lower Rt. Side

0°	4.5'	15°	4.15'	40°	4.1'
65°	4.6'	75°	4.4'	90°	4.45'
110°	4.35'	125°	4.5'	150°	3.5'
180°	3.5'	210°	3.4'	230°	4.3'
250°	4.3'	270°	4.1'	285°	3.85'
305°	4.1'	325°	4.2'	340°	4.6'

Hard Granite Dripping Wet

166+15

150

0°	4.65'	10°	5.1'	30°	4.5'
40°	4.3'	60°	3.45'	75°	3.75'
90°	4.1'	110°	4.3'	125°	4.8'
150°	3.5'	180°	3.45'	210°	3.4'
230°	4.45'	255°	3.8'	270°	4.0'
290°	3.35'	300°	3.85'	315°	4.15'



April 18, 1953

D. Leonard

D. Brown - Notes

Hard Granite Dripping wet

166+15 cont.	330°	4.8'	340°	4.9'	350°	4.55'
166+10	0°	<del>4.95'</del> 5.05'	12°	4.5'	20°	4.6'
	40°	4.4'	55°	4.6'	65°	4.1'
	80°	4.45'	90°	4.3'	110°	4.2'
	130°	4.4'	150°	3.4'	180°	3.5'
	210°	3.4'	230°	4.3'	250°	4.45'
	270°	3.85'	290°	3.4'	310°	4.0'
	325°	4.5'	340°	4.5'	350°	4.7'

151

Hard Granite Dripping wet

166+05	0°	4.65'	10°	4.3'	15°	3.8'
	35°	4.35'	45°	4.35'	60°	4.0'
	75°	4.0'	90°	4.05'	110°	4.55'
	125°	4.8'	150°	<del>4.4'</del> 3.4'	180°	3.5'
	210°	3.3'	237°	4.6'	270°	5.0'
	273°	4.35'	285°	4.0'	298°	4.6'
	305°	4.45'	313°	4.6'	328°	4.65'
	340°	4.85'	350°	4.65'		

152



April 18, 1953

D. Leonard

D. Brown - Notes

Hard Granite Dripping Wet

166+00 153	0° 4.9'	15° 4.25'	25° 3.95'
	40° 4.0'	47° 3.6'	60° 3.35'
	75° 3.3'	90° 3.5'	110° 3.9'
	130° 4.6'	150° 3.5'	180° 3.3'
	210° 3.3'	240° 4.65'	243° 4.5'
	250° 4.7'	270° 4.25'	285° 4.9'
	290° 4.65'	300° 5.15'	310° 5.5'
	325° 5.35'	340° 5.3'	350° 5.2'

Hard Granite Dripping Wet  
Extra Section Start Car-Pass Hole  
Left side

165+97 154	0° 4.55'	15° 4.9'	40° 4.05'
	70° 3.75'	90° 3.35'	110° 4.0'
	130° 4.2'	150° 3.4'	180° 3.4'
	210° 3.35'	235° 4.65'	260° 4.6'
	280° 5.5'	297° 5.35'	305° 5.4'
	320° 4.8'	337° 4.55'	350° 4.4'

Hard Granite Dripping Wet

165+95 155	0° 5.15'	10° 5.15'	18° 4.35'
	37° 3.95'	50° 3.5'	60° 3.6'
	70° 3.15'	90° 3.6'	105° 4.15'
	130° 4.3'	150° 3.4'	180° 3.25'
	210° 3.5'	225° 4.55'	240° 6.0'
	260° 6.0'	270° 5.9'	280° 5.65'



April 18, 1953

D. Leonard

• D. Brown - Notes

165+95 Cont. 295° 6.4' 305° 5.95' 325° 5.25'

345° 5.05' 350° 5.05'

Hard Granite Dripping Wet  
Extra Station

165+92.5 0° 5.15' 10° 4.75' 20° 4.2'

156

35° 3.55' 50° 3.6' 67° 4.05'

80° 4.35' 90° 3.9' 110° 4.0'

130° 4.05' 150° 3.5' 180° 3.3'

210° 3.5' 230° 4.7' 240° 6.5'

255° 6.2' 260° 6.4' 270° 7.6'

280° 7.7' 290° 7.2' 298° 6.2'

305° 5.8' 315° 5.7' 320° 5.75'

330° 5.9' 340° 5.9' 350° 5.65'

Hard Granite Dripping Wet

165+90

157

0° 4.55' 10° 4.4' 20° 3.8'

35° 3.65' 40° 3.45' 52° 4.35'

80° 3.3' 90° 3.6' 93° 4.15'

105° 3.8' 125° 4.45' 145° 3.5'

180° 3.4' 210° 3.4' 235° 5.15'

242° 6.3' 270° 6.3' 280° 6.0'

290° 5.9' 300° 6.0' 305° 5.4'

315° 5.35' 325° 5.45' 330° 4.9'

345° 4.5' 350° 4.9'



April 18, 1953

D. Leonard

D. Brown - Notes

Hard Granite Dripping wet.  
End of Car-pass Extra Section

165+97	0°	4.5'	10°	4.35'	35°	<del>4.3'</del>
158	50°	4.35'	65°	4.15'	75°	3.75'
	90°	4.55'	95°	5.0'	125°	5.0'
	150°	3.4'	180°	3.3'	210°	3.3'
	230°	4.4'	245°	5.55'	270°	5.55'
	285°	5.4'	300°	5.55'	305°	5.8'
	310°	5.6'	318°	5.2'	330°	5.4'
	337°	5.5'	340°	4.8'	350°	4.7'
	355°	4.25'				

Hard Granite Dripping wet

165+85	0°	4.25'	10°	4.15'	20°	4.0'
159	40°	4.15'	60°	4.3'	68°	3.85'
	75°	4.3'	87°	4.75'	105°	4.65'
	125°	4.9'	150°	3.3'	180°	3.4'
	210°	3.2'	240°	4.65'	255°	4.45'
	270°	4.75'	280°	4.5'	290°	4.95'
	300°	4.85'	320°	5.6'	335°	4.9'
	340°	4.9'	346°	4.4'	350°	4.55'



April 18, 1953

D. Leonard

D. Brown - Notes

Hard Granite Dripping wet  
Spring on Rt. side  
(Wettest Place in tunnel)

165+80 160	0°	4.4'	10°	4.55'	20°	4.6'
	35°	4.45'	50°	4.2'	70°	4.0'
	80°	5.0'	90°	4.35'	110°	4.25'
	127°	4.3'	150°	3.6'	180°	3.4'
	210°	3.2'	235°	4.8'	250°	4.2'
	270°	3.95'	290°	4.05'	305°	4.2'
	315°	4.6'	335°	4.8'	345°	5.0'
	355°	4.6'				

Hard Granite Dripping wet  
Extra Section

165+78 161	0°	5.05'	10°	4.8'	20°	4.8'
	35°	4.15'	50°	3.65'	55°	3.65'
	85°	6.2'	93°	4.8'	105°	4.8'
	115°	4.15'	125°	4.3'	150°	3.35'
	180°	3.4'	210°	3.3'	240°	4.2'
	270°	3.8'	290°	3.65'	295°	3.95'
	305°	3.8'	320°	4.25'	335°	5.2'
	350°	5.7'				



April 18, 1953

D. Leonard

D. Brown - Notes

Hard Granite Dripping wet

165775

162

0°	4.9'	10°	4.85'	15°	4.7'
35°	4.5'	55°	4.3'	75°	4.35'
90°	4.2'	105°	4.15'	125°	4.35'
150°	3.3'	180°	3.4'	210°	3.3'
235°	3.9'	255°	4.1'	270°	4.05'
295°	3.4'	300°	3.95'	305°	4.25'
320°	4.9'	335°	4.95'	350°	4.75'

Hard Granite Dripping wet

165770

163

0°	4.6'	15°	4.6'	35°	4.6'
50°	4.4'	70°	4.1'	90°	3.9'
105°	4.2'	120°	4.6'	150°	3.3'
180°	3.35'	210°	3.1'	230°	3.6'
250°	3.2'	270°	2.9'	300°	3.45'
320°	3.65'	340°	4.5'	350°	4.1'

Hard Granite Dripping wet

165765

164

0°	4.65'	15°	5.35'	35°	4.3'
50°	3.95'	70°	3.8'	90°	3.9'
110°	4.0'	125°	4.0'	150°	3.3'
180°	3.4'	210°	3.2'	235°	3.9'
255°	4.4'	270°	4.2'	300°	3.7'
315°	4.05'	335°	4.35'	350°	4.25'



April 18, 1953

D. Leonard

D. Brown-Notes

Hard Granite Dripping wet

165+60

165

0°	4.9'	10°	4.95'	20°	4.9'
35°	4.35'	50°	3.95'	65°	4.3'
75°	4.35'	85°	4.1'	90°	3.9'
105°	4.2'	125°	4.1'	150°	3.3'
180°	3.4'	210°	3.1'	230°	3.55'
262°	3.1'	275°	3.9'	290°	3.8'
305°	4.0'	320°	4.4'	335°	4.25'
350°	4.6'	357°	4.95'		

Hard Granite wet

165+55

166

0°	4.5'	10°	4.25'	20°	4.5'
35°	4.6'	45°	4.55'	60°	4.1'
75°	4.0'	90°	4.0'	105°	4.15'
125°	4.3'	150°	3.2'	180°	3.3'
210°	3.2'	235°	4.2'	245°	4.2'
270°	3.75'	300°	3.5'	315°	3.7'
325°	3.95'	340°	5.3'	350°	5.25'
353°	4.75'				



April 18, 1953

D. Leonard  
D. Brown - Notes

Hard Granite Wet

165+50  
167

0°	4.8'	15°	4.1'	40°	4.0'
50°	4.1'	60°	4.15'	75°	4.2'
90°	4.25'	110°	4.55'	125°	4.7'
150°	3.3'	180°	3.4'	210°	3.2'
230°	4.0'	250°	4.3'	262°	4.3'
270°	3.8'	300°	3.75'	320°	4.0'
340°	4.85'	350°	4.65'		

Hard Granite Dry

165+45  
168

0°	4.45'	20°	4.3'	40°	4.6'
60°	4.25'	75°	4.2'	90°	4.9'
105°	4.5'	125°	5.0'	150°	3.3'
180°	3.4'	210°	3.4'	225°	3.8'
250°	4.0'	270°	3.9'	300°	3.85'
325°	4.05'	340°	4.2'	350°	4.5'

Hard Granite Dry

165+40  
169

0°	4.25'	20°	4.55'	40°	4.3'
65°	4.35'	80°	4.05'	90°	4.1'
105°	4.25'	125°	4.4'	150°	3.9'
180°	3.45'	210°	3.3'	230°	3.9'
260°	4.85'	270°	4.8'	280°	4.4'
285°	4.85'	305°	4.95'	320°	4.45'
325°	4.65'	340°	4.4'	350°	4.3'



April 18, 1953

D. Leonard

D. Brown-Notes

Hard Granite Dry

165+35

170

0°	4.6'	10°	4.35'	12°	4.65'
20°	4.6'	40°	4.65'	60°	4.85'
70°	5.05'	80°	5.45'	90°	4.95'
105°	4.6'	120°	4.8'	150°	3.3'
180°	3.5'	210°	3.4'	235°	4.5'
255°	4.6'	270°	4.35'	300°	4.15'
325°	4.4'	335°	4.3'	340°	4.75'
350°	4.55'				

Hard Granite Dry

165+30

171

0°	4.45'	20°	4.5'	35°	4.65'
45°	4.4'	60°	4.0'	80°	4.3'
85°	4.05'	95°	4.5'	110°	4.45'
125°	4.5'	150°	3.4'	180°	3.5'
210°	3.4'	225°	3.7'	245°	4.1'
270°	3.8'	300°	3.4'	307°	4.1'
325°	4.3'	340°	4.5'	350°	4.55'

Hard Granite Dry

165+25

172

0°	5.1'	10°	4.95'	20°	4.85'
35°	4.7'	50°	4.0'	70°	3.9'
90°	4.2'	100°	4.6'	110°	4.6'
125°	4.8'	150°	3.4'	180°	3.5'
210°	3.4'	230°	4.2'	245°	4.2'



April 18, 1953

D. Leonard

D. Brown - Notes

165+25 cont.	270° 4.0'	290° 3.55'	310° 3.7'
	325° 4.3'	335° 4.55'	350° 4.95'

APRIL 25, 1953

D. LEONARD

D. BROWN - NOTES

HARD GRANITE DAMP

165+20	0° 5.25'	10° 4.9'	20° 4.8'
170	30° 4.2'	40° 4.2'	50° 3.65'
	80° 3.85'	90° 3.95'	110° 4.2'
	130° 4.5'	150° 3.4'	180° 3.45'
	210° 3.4'	230° 4.4'	245° 4.4'
	270° 4.35'	275° 4.4'	280° 4.15'
	300° 4.35'	310° 4.55'	325° 4.85'
	335° 5.0'	345° 5.0'	355° 5.05'

HARD GRANITE WET

165+15	0° 4.8'	10° 4.55'	20° 4.4'
174	35° 3.75'	50° 3.4'	60° 3.65'
	75° 3.45'	90° 3.6'	110° 3.9'
	130° 4.25'	150° 3.4'	180° 3.5'
	210° 3.4'	230° 4.5'	250° 4.35'
	270° 4.15'	300° 4.6'	320° 4.7'
	330° 5.0'	340° 4.75'	350° 4.75'



APRIL 25, 1953.

D. LEONARD

D. BROWN - NOTES

HARD GRANITE WET

165110

175

0°	4.65'	10°	4.7'	20°	4.3'
35°	3.75'	50°	3.3'	65°	3.3'
90°	2.7'	100°	2.8'	105°	3.45'
115°	3.4'	132°	4.4'	150°	3.5'
180°	3.5'	210°	3.5'	235°	4.6'
245°	4.4'	270°	3.9'	272°	3.5'
278°	3.75'	285°	3.55'	300°	3.6'
325°	4.3'	340°	4.4'	350°	4.7'

HARD GRANITE WET

EXTRA SECTION

165107

176

0°	5.15'	10°	4.85'	20°	4.7'
35°	4.0'	50°	3.65'	70°	3.2'
90°	2.7'	105°	3.0'	120°	3.6'
135°	4.0'	150°	3.4'	180°	3.5'
210°	3.4'	235°	4.4'	250°	4.2'
270°	3.7'	295°	3.65'	310°	3.75'
330°	4.4'	340°	4.9'	345°	4.55'
355°	5.2'				



APRIL 25, 1953

D. LEONARD

D. BROWN - NOTES

HARD GRANITE WET

165+05

177

0°	4.35'	15°	4.35'	25°	4.0'
35°	3.75'	55°	3.65'	63°	3.2'
90°	2.8'	115°	3.0'	120°	3.65'
135°	4.05'	150°	3.3'	180°	3.5'
210°	3.4'	230°	4.05'	240°	4.1'
260°	3.25'	270°	3.35'	295°	3.4'
315°	3.55'	325°	3.7'	330°	4.05'
340°	4.25'	350°	4.4'		

HARD GRANITE DAMP

165+02.5

178

0°	5.05'	10°	4.8'	20°	4.6'
30°	4.5'	40°	4.0'	55°	4.1'
75°	3.55'	90°	3.25'	100°	3.0'
110°	3.3'	125°	3.5'	135°	3.9'
150°	3.4'	180°	3.5'	210°	3.4'
230°	4.2'	255°	3.75'	270°	3.5'
285°	3.4'	300°	3.65'	320°	3.95'
325°	4.0'	335°	4.4'	340°	4.7'
350°	4.8'				



APRIL 25, 1953

D. LEONARD

D. BROWN-NOTES

HARD GRANITE DAMP

165+00

179

0°	4.35'	15°	4.55'	30°	4.2'
40°	4.3'	55°	4.1'	75°	3.85'
90°	3.7'	105°	3.45'	110°	3.65'
137°	4.0'	150°	3.5'	180°	3.5'
210°	3.4'	225°	4.1'	245°	3.7'
270°	3.5'	285°	3.2'	300°	3.75'
325°	3.9'	340°	4.35'	350°	4.1'

HARD GRANITE DRY OVERHEAD  
DAMP ON SIDES (SQUARE  
CORNER ON ROCK LEFT SIDE)

164+95

180

0°	4.5'	15°	4.5'	25°	4.3'
40°	4.05'	60°	3.85'	75°	3.7'
90°	3.45'	105°	4.1'	120°	4.45'
132°	4.35'	150°	<del>4.1'</del> 3.4'	180°	3.45'
210°	3.3'	228°	4.1'	240°	4.15'
250°	3.7'	265°	3.9'	280°	3.85'
300°	3.35'	330°	4.3'	340°	4.35'
350°	4.35'				

HARD GRANITE DAMP  
EXTRA SECTION

164+92.5

181

0°	4.85'	10°	5.15'	20°	4.9'
37°	4.05'	50°	3.85'	70°	3.75'
90°	3.9'	105°	4.2'	112°	4.15'
127°	4.8'	150°	3.5'	180°	3.45'
210°	3.4'	230°	4.2'	240°	4.2'



APRIL 25, 1953

D. LEONARD

D. BROWN - NOTES

164792.5	250°	3.95'	270°	4.25'	290°	3.7'
CONT.	300°	3.95'	315°	4.1'	330°	4.6'
	340°	4.25'	350°	4.85'		

HARD GRANITE DAMP

164790	0°	4.15'	15°	4.0'	40°	3.65'
182	65°	4.0'	90°	4.0'	110°	4.45'
	130°	4.6'	150°	3.5'	180°	3.4'
	210°	3.4'	230°	4.4'	250°	3.95'
	266°	4.6'	280°	4.05'	295°	4.15'
	312°	3.7'	325°	4.05'	340°	4.0'
	350°	4.05'				

HARD GRANITE DRY OVERHEAD  
DAMP ON SIDES

164785'	0°	5.2'	10°	5.2'	20°	5.3'
183	35°	4.5'	65°	4.25'	70°	4.0'
	90°	3.85'	110°	4.5'	125°	4.6'
	150°	3.5'	180°	3.4'	210°	3.4'
	235°	4.15'	250°	4.25'	270°	4.2'
	285°	3.75'	300°	3.95'	310°	4.1'
	317°	4.6'	330°	4.5'	340°	4.6'
	350°	4.85'				



APRIL 25, 1953

D. LEONARD

D. BROWN - NOTES

HARD GRANITE DRY TOP HALF  
 START CAR-PASS HOLE #5  
 LEFT SIDE

164480	0°	4.95'	10°	4.3'	20°	4.2'
184	35°	4.1'	50°	3.7'	70°	3.9'
	90°	3.75'	110°	4.45'	125°	4.7'
	150°	3.5'	180°	3.4'	210°	3.7'
	235°	6.0'	255°	4.9'	270°	4.3'
	300°	4.0'	320°	4.3'	330°	4.5'
	335°	4.95'	345°	4.25'		

HARD GRANITE DRY TOP HALF

164475'

186

0°	4.75'	10°	4.5'	20°	4.3'
35°	4.1'	65°	3.85'	80°	3.5'
90°	3.7'	110°	4.1'	128°	4.4'
150°	3.6'	180°	3.4'	210°	3.5'
235°	4.85'	240°	5.7'	270°	5.7'
285°	5.45'	300°	4.9'	365°	4.95'
315°	4.5'	330°	4.8'	340°	4.85'
350°	4.8'				

HARD GRANITE DRY TOP HALF  
 EXTRA SECTION

164471.5'

186

0°	5.25'	12°	5.05'	35°	4.4'
55°	4.1'	90°	4.15'	90°	3.95'
100°	3.9'	110°	4.2'	125°	4.6'
150°	3.8'	180°	3.45'	210°	3.6'
230°	4.6'	240°	6.0'	260°	5.75'



APRIL 25, 1953

D. LEONARD  
D. BROWN - NOTES

164+71.5	282°	6.0'	290°	5.5'	296°	5.4'
CONT.	305°	4.5'	315°	4.35'	330°	5.05'
	340°	5.05'	350°	5.15'		

HARD GRANITE DRY TOP HALF

164+70

187

0°	4.05'	12°	4.15'	37°	3.5'
55°	3.95'	75°	3.3'	90°	3.85'
110°	3.95'	128°	4.3'	150°	3.8'
180°	3.9'	210°	3.8'	240°	5.6'
270°	4.9'	300°	4.65'	305°	4.1'
320°	3.8'	330°	4.15'	340°	4.15'
350°	4.2'				

HARD GRANITE DRY OVERHEAD

164+68

188

DAMP ONSIDES QUARTZ VEIN

10 TO 20 INCHES THICK STARTS AT

BOTTOM ON RT. SIDE SLOPES UPWARD

AT 40° ANGLE EXTRA SECTION

END OF CAR-PASS HOLE LEFT SIDE

0°	4.1'	15°	4.3'	37°	3.75'
50°	3.55'	70°	3.5'	90°	3.8'
110°	3.85'	125°	4.5'	150°	3.8'
180°	3.4'	210°	3.7'	235°	4.9'
270°	3.9'	300°	3.75'	315°	4.0'
330°	3.9'	340°	3.95'	350°	4.15'



APRIL 25, 1953

D. LEONARD

D. BROWN - NOTES

HARD GRANITE WET

164465

0° 4.65' 15° 4.35' 40° 3.6'

QUARTZ VEIN 20 INCHES THICK

189

65° 3.8' 90° 3.8' 110° 3.9'

STARTS AT BOTTOM LEFT SIDE

130° 4.55' 150° 3.8' 180° 3.4'

210° 3.7' 235° 4.5' 270° 3.9'

300° 3.85' 310° 4.0' 325° 4.2'

340° 4.6' 350° 4.85'

HARD GRANITE WET EXTRA SECTION

164463

0° 4.1' 15° 4.1' 40° 3.55'

190

55° 3.35' 70° 3.65' 80° 4.3'

90° 4.1' 110° 4.0' 130° 4.35'

150° 3.8' 180° 3.35' 210° 3.8'

230° 4.2' 250° 3.95' 270° 3.9'

290° 3.9' 305° 3.95' 325° 3.6'

335° 4.0' 345° 3.75' 355° 4.3'

DRIPPING  
HARD GRANITE WET 20 INCH

164460

0° 4.55' 15° 4.25' 40° 4.35'

QUARTZ VEIN AT TOP

191

60° 4.15' 75° 3.8' 90° 3.8'

100° 4.25' 115° 4.35' 130° 4.5'

150° 3.8' 180° 3.4' 210° 3.7'

230° 4.4' 240° 4.2' 255° 4.9'

270° 4.2' 295° 4.25' 305° 3.8'

325° 4.3' 340° 4.85' 350° 4.7'



APRIL 25, 1953

D. LEONARD

D. BROWN - NOTES

HARD GRANITE DRIPPING WET SPRING UPPER LEFT SIDE QUARTZ VEIN 8 INCHES THICK BOTTOM RT. SIDE	164+55	0°	5.0'	15°	4.8'	35°	5.05'
	192	50°	5.1'	65°	4.6'	75°	4.6'
		90°	4.7'	110°	4.7'	125°	4.9'
		150°	3.9'	180°	3.5'	210°	3.75'
		225°	3.55'	250°	3.6'	270°	3.95'
		290°	3.8'	305°	4.4'	330°	5.0'
		340°	4.85'	350°	5.2'		
HARD GRANITE DRIPPING, WET QUARTZ VEIN 7 INCHES THICK AT 45° VEIN STARTS BOTTOM LEFT	164+50	0°	5.05'	15°	5.1'	35°	4.8'
	193	45°	4.35'	70°	4.25'	85°	5.0'
		90°	4.8'	100°	4.95'	115°	4.9'
		125°	4.9'	150°	3.8'	180°	3.5'
		210°	3.7'	225°	3.7'	240°	3.85'
		260°	3.1'	270°	3.3'	290°	3.65'
		310°	4.15'	330°	4.55'	340°	4.9'
		350°	5.05'				
HARD GRANITE DRIPPING WET QUARTZ VEIN 9 INCHES THICK AT TOP	164+45	0°	4.75'	15°	4.65'	35°	3.95'
	194	55°	4.0'	75°	4.05'	90°	3.7'
		107°	3.7'	110°	4.15'	120°	4.45'
		130°	4.4'	150°	3.8'	180°	3.5'
		210°	3.6'	220°	3.65'	240°	3.7'



APRIL 25, 1953

D. LEONARD

D. BROWN - NOTES

164+45 CONT.	260°	3.25'	270°	3.2'	290°	3.5'
	305°	4.25'	315°	3.95'	330°	4.55'
	340°	4.6'	350°	4.8'		

HARD GRANITE WET

MUCH LOOSE ROCK BETWEEN 220°-260°

164+40

195

	0°	5.3'	15°	5.15'	20°	4.65'
	35°	4.35'	45°	4.1'	60°	4.2'
	70°	4.05'	80°	3.9'	90°	3.9'
	105°	3.7'	120°	3.8'	130°	4.1'
	150°	3.95'	180°	3.5'	210°	3.8'
	220°	3.6'	240°	3.6'	255°	4.1'
	270°	4.4'	285°	3.4'	305°	3.95'
	320°	3.85'	330°	4.2'	340°	4.55'
	350°	5.1'				

HARD GRANITE DAMP

EXTRA SECTION MUCH LOOSE

ROCK BETWEEN 220°-255°

164+37.5

196

	0°	4.05'	15°	4.05'	35°	3.75'
	45°	3.75'	60°	3.65'	75°	3.65'
	90°	3.7'	110°	3.9'	130°	4.35'
	150°	3.9'	180°	3.45'	210°	3.8'
	220°	3.5'	240°	3.6'	255°	3.95'
	270°	3.8'	275°	3.9'	285°	3.5'
	300°	3.45'	315°	3.75'	330°	4.5'
	340°	3.85'	350°	3.95'	355°	4.0'



APRIL 25, 1953

D. LEONARD

D. BROWN - NOTES

HARD GRANITE DAMP

LOOSE ROCK BETWEEN 220°-256°

164+35

197

0°	4.2'	15°	4.1'	45°	4.5'
45°	4.65'	50°	4.45'	60°	4.25'
70°	4.3'	90°	4.3'	110°	4.4'
130°	4.5'	150°	3.8'	180°	3.45'
210°	3.5'	220°	3.55'	240°	3.4'
255°	3.8'	270°	3.7'	285°	3.3'
300°	3.6'	310°	3.4'	325°	3.25'
335°	3.65'	345°	4.05'	350°	4.35'

HARD GRANITE DRY

MUCH LOOSE ROCK BETWEEN 220°-255°

164+30

198

0°	4.1'	15°	4.05'	30°	4.3'
40°	4.15'	45°	4.4'	57°	3.75'
60°	4.0'	70°	4.1'	80°	4.3'
90°	4.3'	110°	4.4'	130°	4.5'
150°	3.8'	180°	3.5'	210°	3.6'
220°	3.6'	245°	3.7'	255°	4.15'
270°	4.35'	290°	4.4'	305°	4.2'
310°	4.6'	322°	4.2'	327°	4.5'
335°	4.4'	345°	4.4'	350°	4.45'



APRIL 25, 1953

D. LEONARD

D. BROWN - NOTES

HARD GRANITE DRY OVERHEAD  
 DAMP ON LEFT SIDE  
 MUCH LOOSE ROCK BETWEEN 220°-265°

164+25'

199

0°	4.8'	17°	4.9'	35°	4.5'
45°	4.25'	55°	4.0'	70°	4.1'
80°	4.3'	90°	4.0'	105°	4.1'
115°	4.3'	130°	4.5'	150°	4.0'
180°	3.6'	210°	3.6'	220°	3.6'
240°	3.85'	265°	4.8'	270°	4.8'
280°	4.8'	290°	4.4'	300°	4.45'
310°	4.7'	320°	5.1'	330°	5.15'
340°	5.1'	347°	5.4'	355°	5.1'

HARD GRANITE TOP + LEFT DAMP, RT. DRY  
 EXTRA SECTION MUCH LOOSE ROCK  
 BETWEEN 220°-265°

164+22.5

200

0°	5.5'	10°	5.1'	20°	4.8'
30°	4.15'	45°	4.0'	60°	3.85'
75°	3.6'	90°	3.5'	105°	3.7'
115°	4.25'	130°	4.5'	150°	3.9'
180°	3.6'	210°	3.8'	220°	3.6'
240°	3.75'	265°	5.0'	270°	5.2'
290°	4.9'	300°	4.75'	315°	4.7'
330°	4.95'	335°	5.25'	345°	5.3'
350°	5.25'	355°	5.5'		



MAY 9, 1953

D. LEONARD

D. BROWN - NOTES

164+15 CONT	210°	3.9'	220°	4.0'	240°	3.25'
	250°	3.05'	270°	3.25'	285°	3.45'
	300°	3.55'	310°	3.45'	320°	3.45'
	330°	3.75'	340°	4.0'	350°	4.3'
	355°	4.55'				

HARD GRANITE DAMP

164+10

204

	0°	5.0'	10°	5.05'	20°	4.95'
	25°	5.1'	45°	4.8'	55°	4.55'
	70°	4.05'	80°	4.0'	90°	4.15'
	110°	4.35'	120°	4.45'	130°	4.4'
	150°	3.8'	180°	3.95'	210°	3.7'
	225°	4.0'	245°	3.25'	260°	3.3'
	270°	3.25'	300°	3.1'	305°	3.55'
	310°	3.6'	320°	3.8'	330°	4.55'
	340°	4.75'	350°	5.05'	355°	5.2'

HARD GRANITE DRY OVERHEAD

164+07.5

205

DAMP SIDES EXTRA SECTION

	0°	5.35'	10°	5.45'	20°	5.5'
	25°	5.45'	45°	5.05'	60°	4.55'
	70°	4.05'	90°	4.25'	110°	4.45'
	130°	4.5'	150°	3.9'	180°	3.5'
	210°	3.8'	230°	4.1'	250°	3.75'
	270°	3.55'	290°	3.6'	300°	3.75'



MAY 9, 1953

D. LEONARD

D. BROWN - NOTES

HARD GRANITE DRY OVER HEAD  
DAMP SIDES

164+07.5	310°	4.05'	320°	4.15'	330°	4.5'
CONT.	340°	4.9'	345°	5.1'	350°	5.05'
164+05	0°	4.85'	10°	4.9'	20°	4.8'
206.	40°	4.5'	50°	4.25'	70°	3.95'
	83°	3.7'	90°	3.8'	110°	4.2'
	130°	4.6'	150°	3.8'	180°	3.5'
	210°	3.6'	230°	4.0'	240°	3.85'
	255°	3.55'	270°	3.6'	285°	3.95'
	300°	4.2'	310°	4.8'	320°	4.65'
	335°	4.25'	340°	4.25'	350°	4.2'
	355°	4.5'				

HARD GRANITE DRY WET LEFT  
SIDE EXTRA SECTION  
SOFT SPOT LEFT SIDE

164+02	0°	5.3'	10°	4.9'	15°	4.9'
207.	35°	4.4'	50°	4.5'	65°	4.3'
	90°	4.05'	110°	4.25'	125°	4.75'
	150°	3.9'	180°	3.45'	210°	3.8'
	235°	3.65'	255°	3.75'	270°	4.0'
	285°	4.4'	300°	4.8'	310°	5.15'
	315°	5.3'	330°	5.3'	340°	5.5'
	350°	5.55'	355°	5.5'		



MAY 9, 1953

D. LEONARD

D. BROWN - NOTES

HARD GRANITE DRY DAMP LEFT  
SIDE

164+00	0°	4.7'	10°	4.9'	30°	4.05'
208	40°	3.95'	50°	3.8'	70°	3.6'
	90°	3.5'	110°	4.1'	130°	4.6
	150°	3.8'	180°	3.95'	210°	3.6'
	230°	3.9'	250°	4.0'	260°	4.15'
	270°	4.2'	280°	4.65'	290°	4.35'
	300°	4.35'	310°	4.4'	320°	4.45'
	335°	5.45'	340°	5.15'	350°	4.85'

HARD GRANITE DRY TOP HALF  
DAMP ON SIDES

163+95	0°	4.05'	5°	3.95'	30°	4.25'
209	50°	3.9	70°	3.6'	90°	3.7'
	110°	4.05'	130°	4.6'	150°	3.75'
	180°	3.5'	210°	3.7'	230°	4.0'
	250°	4.2'	260°	4.2'	270°	4.0'
	280°	3.85'	290°	3.6'	295°	3.8'
	300°	3.85'	310°	4.0'	320°	3.95'
	335°	4.0'	345°	4.15'	350°	4.15'

HARD GRANITE DRY OVER HEAD  
DAMP ON SIDES

163+90	0°	4.6'	25°	4.1'	35°	3.95'
210	45°	3.5'	60°	3.9'	75°	3.55'
	90°	3.8'	100°	4.1'	110°	4.15'
	125°	4.8'	150°	3.85'	180°	3.45'



MAY 7, 1953

D. LEONARD  
D. BROWN - NOTES

163+90	210°	3.65'	235°	3.8'	250°	3.8'
CONT.	270°	3.5'	290°	3.35'	300°	3.25'
	310°	3.9'	320°	3.95'	330°	4.3'
	340°	4.4'	350°	4.65'		

HARD GRANITE DRY OVERHEAD  
DAMP SIDES EXTRA SECTION

163+87	0°	4.65'	10°	4.4'	30°	3.85'
III	40°	3.7'	50°	3.9'	60°	3.85'
	80°	3.85'	90°	3.95'	110°	4.65'
	115°	4.8'	127°	4.65'	150°	3.9'
	180°	3.4'	210°	3.7'	230°	3.85'
	240°	3.85'	255°	3.6'	270°	3.1'
	285°	3.2'	295°	3.45'	305°	3.6'
	320°	3.95'	330°	4.7'	340°	4.55'
	347°	4.5'	354°	5.2'		

HARD GRANITE DRY OVERHEAD  
DAMP ON SIDES

163+85	0°	4.05'	10°	3.85'	35°	3.8'
PIE	45°	4.3'	53°	4.0'	60°	4.1'
	75°	4.1'	90°	4.1'	105°	4.65'
	115°	4.65'	130°	4.7'	150°	3.9'
	180°	3.45'	210°	3.7'	230°	4.05'
	245°	3.75'	265°	3.65'	270°	3.5'
	290°	3.4'	300°	3.55'	310°	3.7'



MAY 9, 1953

D. LEONARD.

D. BROWN-NOTES

HARD GRANITE DRY OVERHEAD  
DAMP ON SIDES

163+85 <sup>CONT.</sup>	325°	3.75'	335°	3.9'	350°	4.15'
163+80	0°	4.5'	10°	4.25'	20°	4.15'
213	45°	3.65'	60°	3.8'	75°	3.95'
	90°	4.05'	105°	4.3'	115°	4.35'
	130°	4.8'	150°	4.1'	180°	3.55'
	210°	3.8'	225°	3.8'	230°	3.85'
	250°	3.4'	270°	3.2'	285°	3.4'
	295°	3.7'	305°	3.75'	325°	3.65'
	335°	3.95'	340°	4.0'	350°	3.85'
	355°	4.05'				

HARD GRANITE DRY OVERHEAD  
DAMP ON SIDES EXTRA SECTION

163+77	0°	4.65'	5°	4.75'	15°	4.65'
214	25°	4.55'	35°	4.0'	45°	4.2'
	60°	4.45'	75°	4.55'	90°	4.55'
	105°	4.8'	125°	4.9'	150°	4.1'
	180°	3.6'	210°	3.8'	230°	3.65'
	250°	3.55'	270°	3.15'	285°	3.4'
	295°	3.3'	305°	3.35'	325°	3.2'
	335°	3.65'	340°	4.1'	350°	4.05'



MAY 9, 1953

D. LEONARD

D. BROWN - NOTES

HARD GRANITE DAM OVERHEAD  
WET ON SIDES

163775

215

0°	3.9	10°	4.2	25°	4.35'
30°	3.85'	45°	4.05'	60°	4.15'
75°	4.1	90°	4.65'	95°	4.5'
105°	4.85'	112°	4.65'	116°	5.0'
125°	5.0'	150°	4.05'	180°	3.55'
210°	3.8'	225°	3.6'	235°	3.45'
245°	2.9'	270°	<del>4.65'</del> <sup>2.90'</sup>	280°	3.0
295°	3.25'	305°	3.05'	320°	3.15'
330°	3.35'	340°	3.65'	345°	3.75'
350°	3.85'	355°	3.85'		

HARD GRANITE WET

163770

216.

0°	3.75'	10°	4.15'	25°	4.65'
50°	4.8'	65°	4.95'	80°	4.95'
90°	5.3'	95°	4.55'	105°	4.5'
110°	5.1'	125°	5.0'	150°	4.0'
180°	3.6'	210°	3.7'	220°	3.5'
245°	3.45'	260°	3.55'	270°	3.0'
290°	3.25'	305°	3.7'	320°	3.95'
330°	3.7'	333°	3.25'	340°	3.9'
350°	3.8'	355°	3.7'		



MAY 9, 1953

D. LEONARD

D. BROWN - NOTES

HARD GRANITE WET  
EXTRA SECTION

163+62

117.

0°	3.9'	10°	3.65'	25°	3.9'
50°	4.9'	60°	4.35'	70°	4.6'
80°	4.8'	90°	4.2'	110°	4.65'
125°	4.9'	150°	4.15'	180°	3.6'
210°	3.7'	235°	3.7'	250°	4.0'
270°	4.05'	293°	4.65'	305°	4.55'
317°	4.2'	320°	4.45'	328°	4.55'
335°	4.3'	345°	4.05'	355°	3.9'

HARD GRANITE WET

163+65

118.

0°	4.6'	15°	4.6'	25°	4.75'
40°	5.0'	50°	4.2'	55°	4.7'
67°	4.55'	72°	5.15'	<del>85°</del> <sup>86°</sup>	4.95'
90°	4.4'	105°	5.15'	125°	5.0'
150°	4.1'	180°	3.6'	210°	3.7'
230°	4.0'	255°	4.2'	270°	3.95'
306°	4.7'	323°	3.7'	330°	4.15'
340°	4.85'	350°	4.8'		

X-SECTIONS CONTINUED IN BOOK 850.

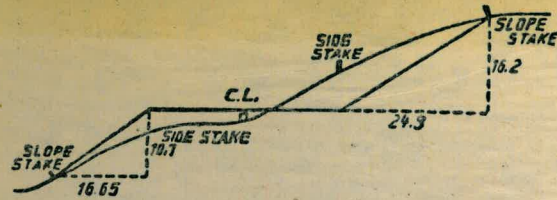
10/1



SPAD NO.	STATION	CUT TO E:
#9.	168+92.58	C 5.56
#10.	168+88.77	C 4.06
#11.	167+87.49	C 3.41 <sup>86</sup>
#12.	167+87.29	C 3.95
#13.	167+05.19	C 3.41 <sup>92</sup>
#14.	166+66.79	C 4.47
#15.	166+08.17	C 4.79
#16.	165+66.00	C 4.98
#17.	165+25.29	C 4.55
#18.	164+71.02	C 4.62



Please Return to  
 City of San Diego Water Dept.  
 Room 903 Civic Center



**DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING.**

SLOPE 1 1/2 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

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