

W40

42

Sou. Calif. Mt. Water Co.

H. S. CROCKER COMPANY

DRAWING MATERIALS AND
SURVEYING INSTRUMENTS

SAN FRANCISCO

TABLES FOR EXCAVATIONS AND EMBANKMENTS

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING

Roadway 18 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	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	0
1	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	1
2	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	2
3	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	3
4	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	4
5	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	5
6	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	6
7	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	7
8	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	8
9	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	9
10	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	10
11	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	11
12	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	12
13	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	13
14	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	14
15	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	15
16	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	16
17	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	17
18	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	18
19	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	19
20	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	20
21	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	21
22	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	22
23	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	23
24	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	24
25	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	25
26	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	26
27	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	27
28	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	28
29	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	29
30	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	30
31	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	31
32	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	32
33	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	33
34	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	34
35	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	35
36	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	36

Calculated by Julien A. Hall, M. Am. Soc. C. E.

Testing hubs in front of Commissary
Barrett.
4-23-08
South hub 5291
North hub 5336 diff 0.025

Tunnel Bench Marks

1N cut in roof opp 300' plug + 6.33'
 1S do do 400 + 6.70'
 3N do do 400 + 6.59'
 3S do do 600 + 9.16'
 4N do do 500 + 6.53'
 4S do do 600 + 8.73'
 6 shaft piece of steel in south bank + 38.40'
 6 shaft cut in roof opp ctr + 7.78'
 4N cut in roof opp 700' plug + 7.54'
 4S " " " 800' " + 8.10'
 3S ctr plug + 9.95' + 7.34'

LORING & CO., AGENTS.

762 FIFTH STREET,

SAN DIEGO, CALIFORNIA.

Dulzura Conduit

INDEX. cont.

25' Bottom Grades Tunnel SS to	37-56
25 foot Bottom Grades Tunnel #4-5	69-70
25' Bottom Grades Tunnel 2S-3N	57-59
Change in line Tunnel 1 ³ / ₄	66
April Ditch Estimate notes	66-67
Grades N #5 ¹ / ₈ 5-7-01	65
25' Bottom Grades Tunnel ¹ / ₂	60-61
Final Grades Pine Creek Bridge	63-64
Grades Ferguson cut	65
Grade 1 ¹ / ₂ #3S Tunnel	68
Misc Tunnel Grades	71-75
Grade in Shaft #6 Tunnel	75
Length of Cottonwood Cable	80

Index.

Fitting NW ¹ / ₄ of SE ¹ / ₄ Sec 12 T18S R2E	
To Ground	1-2
50' Bottom Grades 214-75-182+50	3-10
" " " 133+50-177+01	11-20
" " " 182+00-177+55	21
" " " 133+50-129+75	22
109' Bottom Grades just South Tunnel 1 ¹ / ₂	
12 ¹ / ₂ Bottom Grades in Tunnel 1 ¹ / ₄	23
Tunnel 3 ³ / ₄	76
Tunnel 1 ¹ / ₂	77
25' Finishing hubs Tunnel 5	78-79
Ditch lengths	24
Tunnel lengths	62, 26, 25
Levels INTAKE to SCOURING CHAMBER	27-28
PINE CREEK	
Piers at Indian Camp Creek	29-31
Piers at Wilson Creek	32-34
Heights of Piers Pine Creek Crossing	35-36

1.
Sta Dist Lt Rt Cal to Mag 2

Co of Machine Bar 8817

N 113 W

26+68

19+93 675

18+69 124

16+44 225

13+20 324

11+21 199

8+63 258

3+82 481

3+15 67

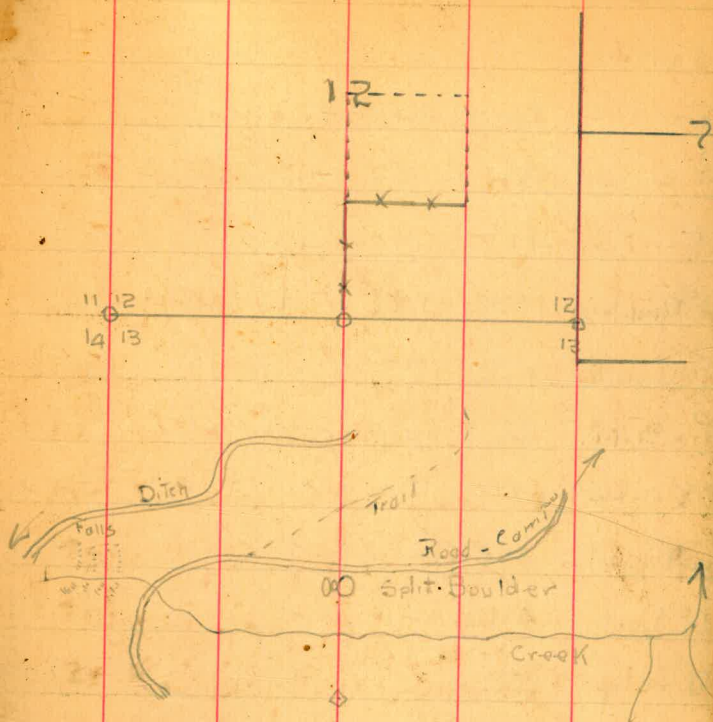
1+98 117

1/4 Corbett's B 198

90°00

N 6 W

South Boundary NW 1/4 2 SE 1/4 12 T 18 S R 2



Sec Cor

N 1/4 E

921

Flag on Telegraph
Divide

11, 2, 3, 14.

E. Stads Ridings from 14 + 44					
Sta	Dist	Stads	UWL	Wij Ele	Elev
CP in Ditch	389	460	+2303		11527H
CP on Ditch	370	443	+2356		13803H
CP on Road	130	152	+2152		13314H
CP on Road	411	414	+409		7902H
CP Thunbeijer	1029	1056	+906		5332H
Road at water	678	678	+016		4954H
CP on Ditch	996	1024	+925		2101H
CP on Ditch	1181	1206	+810		1500H
CP on Road at water	574	574	—		3240H
CP Road	411	411	—		513H
CP Ditch	1153	1178	+821		923H

3
50 Finishing Hubs in Bottom
Ar. Line Measurement

BM 32	009		
	123	124	
214+25			6.12
214+75			10.16
214+25			10.12
213+75			10.08
213+25			10.04
o	533	1004	
212+75			5.29
212+25			5.25

of Ditch - Tunnel 2N towards Dam
Limiting Middle Ordinate 6" 3-20-'08
Pm Bdr at 211+60 new 25' ↑
Unsettled
So Run
Hill

(copy 25' Bench Hubs)

Ditch grade

Concrete Bm at 214+52
4025-4045

4

o

7.79

525

211 + 75

7.75

211 + 25

7.71

210 + 75

7.67

210 + 50

7.65

209 + 64

7.58

209 + 25

7.55

208 + 75

7.51

208 + 25

7.47

Fluvium Endo

Fluvium begins

con. net. BM 5141 208+96
9.76 - 3.78

5

207 + 75

743

207 + 25

739

o 1032

739

206 + 75

1028

206 + 25

1024

205 + 75

1020

205 + 25

1016

204 + 75

1012

6.13

o 1033

1012

204 + 15

1028

203 + 75

1025

Bryan 204 + 15

3-21-38

Wueste
Sierra
Hill

870-374

Concrete BM at 204 + 26
Trail cross bench
ditch not excavated

203 + 25

10.21

202 + 75

10.17

202 + 25

10.13

201 + 75

10.09

201 + 25

10.05

200 + 75

10.01

0

914

1001

200 + 25

9.10

199 + 75

9.06

199 + 25

9.02

Concili Bal of 199+94
8935 - 3915

7

198 + 75

198 + 25

197 + 75

197 + 35

o 10.03.

196 + 75

196 + 25

195 + 75

195 + 25

194 + 75

898 - 499

894

890

887

887

887

887

886

882

Bottom

4 low

10 low

10 low

0.	9.02	9.82	
194 + 25			898
193 + 75			894
193 + 25			890
192 + 75			886
192 + 25			882
191 + 75			878
0	899	878	
191 + 25			894
190 + 75			890

493

Bottom

Grade

General Bm at 194+43
882 - 3.84

23 low

25 low

9

190 + 25

986

Bottom

189 + 75

982

concrete BM at 189+64

(+50)

4815

892-391

189 + 15

977

Bed dipped into ditch
at 189+25

188 + 75

974

o

984

874

188 + 25

980

Grade

187 + 75

976

187 + 25

972

Spike

(187)

572

186 + 95

969

Exit $\frac{3}{4}$ Tunnel

(186+98 new = 187 old)

10 Measurements carried down

from 182+50 (Cape 25' Bench Holly)

Bottom

6.125

6.815

185 + 45

= Cape's Mark $1\frac{3}{4}$ N

185

8.85

184 + 50

8.81

20 high

Concrete Dam at 184+15
9.0 - 4.07

184

8.77

Spike

183 + 50

8.73

183

8.69

30 low

182 + 50

8.65

466

3 low

0

8.65

11 50 Bottom Finishing Hubs

4.82

133 + 50

8.66

134

8.70

134 + 50

8.74

135

8.78

135 + 50

8.82

4.82

136

8.86

0

863

886

136 + 50

8.67

137

8.71

137 + 50

8.75

Center-line Measurement.

Sta 135 + 50 (copy 25' Bench Hubs) 3-23-08

Sta 134 + 50 used as
initial chaining Sta

West
to Pine
Hill

12
138

138 + 50

139

o 923

887

139 + 50

140

140 + 50

141

141 + 50

o 848

943

142

879

893

887

927

931

935

939

943

852

B

142 + 25

854

End Ditch

142 + 50

143

} Not Set.
Blacksmith
shop

+35

863

Ditch begins

o

940

863

143 + 50

941

542

144

945

144 + 50

949

144 + 90

952

Flume begins

146 + 62.5

Stadia Dist
130' = long chord
curved flume

147 + 20

971

Tunnel 1/2 S

Sta 149+50 used as new initial chain sta.

14

147 + 50

o

966

973

973

148

970

148 + 50

974

~

149

978

149 + 50

982

584

150

986

150 + 50

990

594

151

994

o

987

994

151 + 50

991

Began 151 + 50

3-24-'08

Wrights
Salem
Hill

15

152

152 + 50

153 ~

153 + 50

154

154 + 50

155

155 + 50

o

156

878

1023

995

999

1003

1007

1011

1015

1019

1023

992

6025

6035

494

496

16

156 +50

8.86

157

8.90

5.02

157 +50

8.94

158

8.98

158 +50

9.02

0

8.975

9.02

159

9.02

5.165

159 +50

9.06

Compute BM at 159 + 71
8825 - 3645

160

9.10

160 +50

9.14

17

161

9.175

o 9.91

9.75

161 + 50

9.95

5.115

162

9.99

5.13

162 + 50

9.03

163

9.07

163 + 50

9.11

o 9.50

9.11

164

9.54

164 + 55

9.58

165 + 05

9.12

Reverse Column

Concrete Bm at 165+14

9.25 4.25

18
165 + 50

165 + 95

o

1052

970

166 + 50

966

Mark on rock

Across
Rocky
chute

167

970

665

167 + 50

o

1037

1064

1056

at side of Ditch

168

1060

168 + 50

1064

169

1041

169 + 50

1045

1049

1053

concrete Bench seat

169 + 95

19			
170	859	1057	1057
170 + 50			863
171	890	867	867
171 + 50			894
172			898
172 + 50			902
173			906
173 + 50			910
0	1018	9.10	
174			1022

Baton

3-26-08

Winn
San Rm
Hill
(Rain)

20 low

23 low

30 low

23 low

20

174+50

1026

Bottom

4 low

175

1030

15 low

969

1030

175+50

873

2 low

concrete bench at 175+47

176+05

877

4 high

176+50

881

176+90

874

o

884

177+01

top of MK Tunnel 1/2 ft

See page 77

	8855			
192			8815	
191+50			8775	
191			8735	
190+50			8695	
0	893	8695		471
190			869	
179+50			885	
179			881	
178+65			878	
0	903	878		
177+55		872		

Supp. 77

Bottom

Slow

slow

blip

slow

slow

= Sta 173+50

Concrete Bm at 179+16.5
886-3.98

Sta 176+30 (Dist 245.5 of 270)
+ 5' 1/2 Trunnel

Lauterbach canon

old
Hubs

3-25-09

Wrestle
Zakur
Nico

Sta 133+50 913

133 909

132+50 905

132 901

131+50 897

131 755 897

130 751

130+50 747

130+32 345

130 4355

129+75 4335

3.675

+69
11.9
+94
122

+123
130

449

= East stake in ditch

Flume ends marked bench top

73' curved Flume to stake rd +96 begins

23

109' of Bottom Grades
Just South Tunnel $1\frac{1}{2}$

179+50 913

179 909

178+35 904

178 901

177+56 897.5

= Bottom of ditch of Exit face.

Tunnel $1\frac{1}{4}$

147+50 494

147+20 492.5

147+12.5 491

147 490

146+87.5 489

146+75 488

146+62.5 487

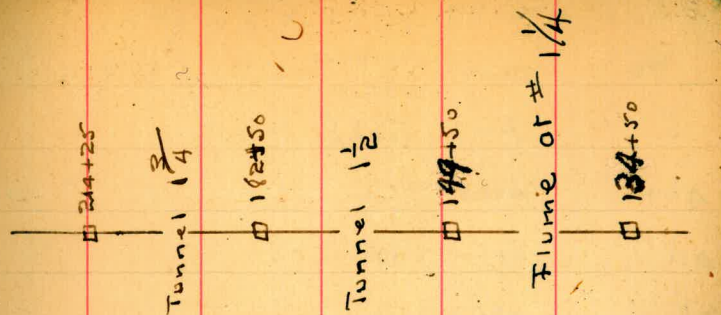
3-30-08

Wald

1 Foreman

Rattlesnake Creek - Tunnel 2

Ent. # 2 To rocky gulley		
214+85.5 To 210+46	439.5	
Rocky gulley To trail-crossing		
209+715 to 204+685	503.0	
Trail-crossing to 1 ^{3/4}		
204+18 to 186+765	1741.5	
1 ^{3/4} To 1 ^{1/2}		
185+45 To 177+555	789.5	
1 ^{1/2} To flume under Boulder		
177+01 to 165+88	1113.0	
Flume under Boulder To flume at 1 ^{1/4}		
165+50 To 146+54	1849.5	
Flume at 1 ^{1/4} To trail-crossing		
144+90 to 143+32.5	157.5	
Trail-crossing to end work	3-31-'08	
142+57.5 To 130+48.5	1209.0	
	139+95 final	
	7802.5	



		Wueste ctr. lin Stas		
Tunnel 1 ^{3/4}	179'	186+85-185+45	140	39
Tunnel 1 ^{1/2}	84.5'	177+55-177+01	54	30.5
Flume	(180.')	146+54-144+90	164	16
		without grade		85.5

3-31-'08

S 1 ^{1/4}	147+14	
S 1 ^{1/2}	177+55.5	84'
S 1 ^{3/4}	186+76.5	(186+72.5)

Wuest
Cooper

No	Tunnel length		Depth	Combined depth 4-30-09	Dip to go	Gain	Depth	Depth	Depth
	Depth	Combined depth 3-31-09					5-20-09	5-26-09	6-1-09
5	—	552.5	—						
4S	400.5		511.			110	577	595	614.5
4N	301.0	709.5	370	881	1219	69	423	442	460.5
3S	485.0		527			42	577	594	613
3N	388.5	873.5	432	959	931	43	448	455	461
3/4S	—						57	57	57
3/4N	77.0	77.0					92	97	101.5
1/2	66.0	66.0							
1S	272.0		364			92	414	428	442
1N	292.0	564.0	315	679	521	23	330	334.5	340
5/8	45.0	45.0							
1/2S	261.0								
1/2N	185.5	446.5							
6S	Sta Maloney's Mark	564+59	39				52	55	59
	From 569								
6N	Sta Groceries	554+76	51	90			118	123	128
	From 561.50								
Shaft #6							below frame		14'

26.

Tunnel Sample

Continued page 62

No.	6-6	6-10	6-15	6-20	6-25	7-1	7-7	7-11	7-20	7-25
1 N					229 ^s	^{grad plug 173} 235	243 ^s	X	X	X
S				92	268	285	298 ^s	X	X	X
3/16 N				37 ^s	50 ^s	60	66 ^s	72	78	85
S				46 ^s	64	71 ^s	79	83 ^s	92 ^s	112
N				15 ^s		15 ^s	15 ^s	15 ^s	15 ^s	15 ^s
S			056-16	72	76	—	89	90	95	100
1 N	346 ^s	350 ^s	356 ^s	360	366	371	378	383	392	399
S	455 ^s	466	381	489	495 ^s	502	508	514	523	527
1/2 N	103 ^s	107 ^s		177 ^s		X	X	X	X	X
S	57	57		<u>177^s</u> see page 66		X	X	X	X	X
3 N	468	472	480 ^s	487	493	499	508 ^s	511 ^s	520	523
S	626 ^s	633	646	673	699	704	716 ^s	725	756	773
4 N	480	492	514 ^s	527 ^s	545	571	582 ^s	592 ^s	624	641
S	629 ^s	637	656	675	695	713	718	731	754	766
6 N		133 ^s		154	160	166	181	186	189	193
S		61		68 ^s	73	76	82	84	89	93
shaft N		27dup			12	6	16	18	20	25
S						15	29	39	40	51

27 LEVELS INTAKE TO SCOURING

CHAMBER PINE CREEK 4-4-68

185 1528.44 1526.59

= Bm above intake ^{8.3065} 1517.90 ^{Wrest} Sauterboch

30 + 60 10.54

1517.90 = grade of intake

+ 40⁷⁰

30 + 40 10.58

17.86

29 + 80 10.70

17.74

29 + 50 10.76

17.69

29 + 25 10.81

17.63

29 10.86

17.58

28 + 75 10.91

17.53

28 + 50 10.96

17.48

28 + 25 11.01

17.43

9.83 1527.26 11.01 1517.43

0.22%

27 LEVELS INTAKE TO SCOURING

CHAMBER PINE CREEK

4-4-08

Wheat

Santa Fe

185 1528.44 1526.59

= Bm above intake

8030265

1517.90

30+60

10.54

1517.90

= grade of intake

+40

30+40

10.58

17.86

29+80

10.70

17.74

29+50

10.76

17.68

29+25

10.81

17.63

29

10.86

17.58

28+75

10.91

17.53

28+50

10.96

17.48

28+25

11.01

17.43

0

9.83 1527.26

11.01

1517.43

0.02%

28

1527.26

28

9.88

1517.38

27 + 75

9.93

17.33

27 + 50

9.98

17.28

27 + 25

10.03

17.23

2

27 + 10A

10.05

17.21

= old grade hub at
Sand-trap.

27

10.07

17.19

26 + 75

10.11

17.15

26 + 75

10.15

17.11

0.20
-

0.175
-

30 + 60
27 + 10.4
3149.6

29 Piers for Flume across

36+50				4575
37+50	4475	inf. 48 104475	100.00	
37+60				447
37+64				561
37+68				694
37+72				1064
37+76				1165
37+80				1233
37+84				1196
o	0295	93.01 93.005	11765	9271
37+88				318
37+92				306
37+96				366
38				445
38+04				485
38+08				500
38+12				556
38+16				564
	4677		11765	

Indian Camp Creek

Earth (ground)	Grade (Bench Hubs)		44-08 Wulste R. D. Santibach
= Assumed Grade Sta 37+50			
100.01	95.50		In line beyond
98.87	95.51		rad. 3.4
97.54	95.52		Half width
		1.68	.28
			3.68
		2.73	.45
			3.85
		3.38	.56
			3.96
		3.02	.50
			3.90
			on RR Ground Below
		5.71	.95
			4.35
		5.60	.93
			4.33
		6.20	1.03
			4.43
		6.99	1.16
			4.56
		7.39	1.23
			4.63
		7.55	1.26
			4.66
		8.11	1.35
			1.75
		8.20	1.37
			4.77

93.01

93.005

38 +20				5.75	97.26	95.57				
38 +24				6.18	86.83	95.58				
38 +28				6.51	86.50	95.58				
38 +32				7.00	86.01	95.59				
38 +36				7.41	85.60	95.59	-10.0			
38 +40				7.80	85.21	95.60	-10.39			
38 +48				8.65	84.36	95.60	-11.24			
38 +56				9.29	83.72	95.60	-11.88			
38 +64				10.10	82.91	95.61	-12.70			
38 +72				10.43	82.58	95.62	-13.04			
38 +80				11.04	81.97	95.63	-13.66			
38 +88				11.42	81.59	95.64	-14.05			
38 +96				12.27	80.74	95.65	-14.91			
39 +04				13.05	79.96	95.65	-15.69			
0	1.72	81.675	13.05	79.955						
39 +20				3.71	77.97	95.67	-17.70			
39 +36	1.72		13.05	9.48	73.20	95.69	-22.49			

add
3.4

3.25

8.31	1.40		
	4.44		
8.75	1.46		
	4.86		
9.08	1.51		
	4.91		
9.58	1.60		
	4.98		
	1.01		
	5.07	4x6 knots up to line	
		5.11	
		4.98	
		5.27	
		5.12	
		5.38	
		5.23	
		5.51	
		5.36	
		5.57	
		5.42	
		5.68	
		5.55	
		5.74	
		5.61	
		5.88	
		5.73	
		6.01	
		5.86	
		6.35	
		6.46	
		7.15	
		7.00	

91675

39 + 44

9.9 71.8 = Bottom

39 + 52

6.62 75.06 95.70 - 20.64 3.44

6.84
6.67 on RH

39 + 60

0.44 81.24 95.71 - 14.47 2.41

5.81
5.66

o 11.66 92.995 0.44 81.235

39 + 68
+ 72

7.17 85.73 95.72 - 10.01 1.66 5.11

39 + 76

2.68 90.22 95.73

39 + 80

0.55 92.05 95.73

o 9.02 101.08 0.85 92.045

39 + 84

6.915 94.26 + 95.74

39 + 88

5.48 95.60 ↓ 95.74

39 + 92

4.505 96.27 95.75

Flume ends

39 + 98

0.515 100.565 = OS Bench No 43 + 50

37 + 50 1.10 99.98

Length flume 232'

$\frac{39+92}{37+60} = \text{length of flume}$
 $\frac{23}{23} = 1$

Grade should be 0.23%

28.695

239

32 Piers for Flume across
Wilson Creek

57				541
57 + 50				540
58	532	105.32	100.00	532
58 + ?				531
58 + 34				995
58 + 38				1015
58 + 42				1098
58 + 46				1180
58 + 50				1276
no	062	93.18	1276	9256
58 + 54				148
58 + 58				218
58 + 62				295
58 + 66				372
58 + 70				449
58 + 74				514
58 + 78				587
58 + 82				653

594

1276

4-13-08
Must
Sautubach
On Barrera

Grade

91.70 + 0.2%
↓

9557
9558
9559
9560
9561
9561
9562
9563
9564
9565
9565
9566
9567

bench hubs

Flume begins

9318

58 + 86	6.78
58 + 90	7.44
58 + 94	8.16
58 + 98	8.73
59 + 02	9.16
59 + 06	9.74
59 + 10	9.98
59 + 14	10.13
59 + 18	10.58
59 + 26	12.40

337	86.15	12.40	80.78
-----	-------	-------	-------

59 + 42	10.73
59 + 58	10.26
59 + 74	6.99
59 + 90	4.21
60 + 06	4.75

11.09	97.22	0.02	86.13
16.46		12.42	

Grade Fill 3.45-

95.68							
85.74	95.69	-9.95					
85.02	95.69	-10.67	1.78	5.03	ser		
84.45	95.70	-11.25	1.87	5.12			
84.02	95.71	-11.69	1.95	5.20	ser		
83.44	95.72	-12.28	2.05	5.30			
83.20	95.73	-12.53	2.09	5.34	ser		
83.05	95.73	-12.68	2.11	5.36			
82.60	95.74	-13.14	2.19	5.44	ser		
80.78	95.76	-14.98	2.49	5.74	ser large pier		
75.42	95.79	-20.37	3.39	6.64	ser large pier		
75.89	95.82	-19.93	3.32	6.57	ser large pier cast pier only ser		
79.16	95.86	-16.70	2.78	6.03	ser large pier cast pier only ser		
81.94	95.89	-13.95	2.32	5.57	ser large pier		
81.40	95.91	-14.51	2.42	5.67	ser large pier		

60 + 51 = 87.13 - 2.42 = 84.71

97.22

65 + 00	9.44	106.03	063	96.59	543
65 + 50					539
66 + 00					534
<u>58</u>			6.00	100.03 ✓	

Grade fall

100.60	
100.64	

OS bench hubs

50
100
↓

Distance bet OS bench hubs 58+00 & 65+50
310' making grade .00207

Length flume 217'



Additional Piers on loose dump 4-21-08

60 + 22	492	8632		8140	809
+ 30					537
+ 38	1114	9209	537	80.95	497
+ 42					228
+ 46	1150	101.31	228	89.81	871
65 + 50.5 OS bench hubs			072	100.59 ✓	531

3.45
+

78.23	95.94	17.71	2.95	6.40 ✓
80.95	95.97	15.02	2.50	5.95
87.12	95.98	8.86		
89.81	95.99	6.18		
92.60	95.99	3.39		
96.00				

35 Heights of Piers across Pine Creek

Sta	Pier	Top of concrete	STO	Pier Set Bolts	Outside Width	Designations R & L ^t as the water flows	
						GRADE 4-13-08	
88		1515.95	380			1511.45	
88 + 50		1516.00	375			1511.50	
89		1516.06	369			1511.56	
Pier #1 R ^t	89+35 = Center	1509.83	992	89+46	1055	13.0	1511.68 ✓ 1.85 } = .18 feet 1.67
Pier #1 L ^t	"	1509.81	994	89+89			1511.68 ✓ 1.86 } = .19 feet 1.67
Pier #2 R ^t	89+78 Center	1510.03	972	89+89			1511.81 } = .07 feet 1.67 } <u>Length of foot</u> ing for Mark on forms
Pier #2 L ^t	"						1511.81
Pier #3 R ^t	90+21	1510.24	951	90+74.2	1070	13.0	1511.96 ✓ 1.70 } = .05 feet 1.67
Pier #3 L ^t	"	1510.22	953				1511.96 ✓ 1.74 } = .07 feet 1.67 } <u>Length of foot</u>
Pier #4 R ^t	90+38	1505.35	388	90+89.51	1180	13.1	1512.01 6.55 } 3'4"
Pier #4 L ^t	"	1505.33	390		954		1512.01 1.63
Pier #5 R ^t	90+52	1506.68	256	91+05.36	1172	13.0	1512.06 5.20 } 2'2"
Pier #5 L ^t	"	1506.74	249		937		1512.06 1.74
Pier #6 R ^t	90+68	1506.71	252	91+21.36	1169	13.0	1512.12 5.30 } 2'3"
Pier #6 L ^t	"	1506.73	250		943		1512.12 1.67

Deduct R.W. Brnds 2" } above
 Cell 6" }
 Stumper 12" }
 Granite Cap 8" }
 32" = 40" = 3'4"

		1509.23	TOP OF CONCRETE PIER	STO.	Dist bet Bolts	Outside Width	GRADE	Height of Post		
Pier # 7 P+	90+54	Center	1504.75	1504.87	448	91+37.46 1512	1168 9.43 1.72	13.0	1512.17	7.30
Pier # 7 k+	"	"	1504.72	1504.87	451				1512.17	
Pier # 8 P+	91+00	"	1504.50	1504.68	473	91+53.31 11.16	1168 7.33 1.65	13.0	1512.22	7.60
Pier # 8 k+	"	"	1504.51	1504.68	472				1512.22	
Pier # 9 P+	91+16	"	1504.28	1504.46	495	91+69.47 15.5	1160 8.49 1.51	13.1	1512.28	7.90
Pier # 9 k+	"	"	1504.30	1504.46	493				1512.28	
Pier # 10 P+	91+31	"	1506.84	1506.95	239	91+85.0		13.2	1512.33	5.40
Pier # 10 k+	"	"	1506.85	1506.95	239				1512.33	
o	11.84	1518.69	238	1506.85						
Pinebrook 10+00	91+50	(center)	1516.90		79	92+18.0			1512.40	
0+25			1516.95		74					
0+50										
0+75										
1+00			1517.09		1.60					
1+25			1517.12		1.57					
OS sta 89		2.63	1516.06							

5-7-08

Reading on high point on shear of Pier # 2

6.32

Reading on Iron Rk 50' P+ of Pier # 1

1.825

diff 4495

37 25' Ctr. line Bottom Grades

Tunnel #55 to

F 298 +75	519		
F 299			521
F +26			523
F +50			525
F 0	491	525	
F +75			493
F 300			495
F +25			497
F +50			499
F +75			501
F 301			503
F +25			505
F 0	844	505	
F +50			846
F +75			848
F 302			850
F +25			852

4-27-08

in Tunnel #5

Wuest
Santibach
M. Barrera

102

300 +29 old

302 +50

+75

303

+25

+50

+75

304

+25

+50

+75

305

+25

o

9.35

8.76

+50

+66

306 +93

+25

852

856

858

860

862

864

866

868

870

872

874

876

937

939

941

943

1/2

Flume begins dist ends

Flume ends dist begin

39

306 +50

945

+75

947

307

949

+25

951

+50

953

+75

955

308

957

+25

959

+50

961

0

925

961

+75

927

309

929

+25

931

+50

933

+75

935

310

937

+25

939

Beginn 308+75

4-28-08.

Wuest
Sautsdach
in Barrera

40

310 + 50

+ 75

0

915

943

311

+ 25

+ 50

+ 75

312

+ 25

+ 50

+ 75

313

0

998

933

+ 25

+ 50

+ 75

314

941

943

917

919

921

923

925

927

929

931

933

900

902

904

906

20' low

535

41

314 +25

0

1048

908

+50

+75

315

+25

+50

+75

316

+25

+50

0

954

1066

+75

317

+25

+50

+75

Bench hubs

507

908

1050

1052

1054

1056

1058

1060

1062

1064

1066

954

958

960

962

964

12 314 +24 010

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

42

318

+25

+50

+75

319

+25

o. 887

+50

+75

320

+25

+50

+75

321

+25

+50

+75

966

968

970

972

974

976

976

889

891

893

895

897

899

901

903

905

907

43

322

0 1064

+25

+50

+75

323

+25

+50

+75

324

+25

+50

+75

325

0 885

+25

+50

909

1088

909

1066

1068

1070

1072

1074

1076

1078

1080

1082

1084

1086

1088

887

889

671

= 323 + 43 old

3

44

325+75

326

+25

+50

+75

327

+25

+50

0

893

9.05

+75

328

+25

+50

+75

329

+25

+50

891

893

895

897

899

901

903

905

895

897

899

901

903

905

907

900

Began 327+75

5-4-08.

Unsettled
Santibach
Barren

45

329 + 75

330

o

880

913

+ 25

+ 50

+ 75

331

+ 25

+ 50

+ 75

332

+ 25

+ 50

+ 75

333

+ 25

o

923

906

911

913

882

884

886

888

890

892

894

896

898

900

902

904

906

46

333 +50

+75

334

+25

+50

+75

0

889

935

335

+25

+50

+75

336

+25

+50

+75

337

+26

0

936

909

925

927

929

931

933

935

891

893

895

897

899

901

903

905

907

909

1/2 low

47

337+34

337+50

+60

+75

+91

338

+25

+50

+75

+80

+87

o

351

948

942

944

946

948

948

339

+25

+50

+75

340

453

455

457

459

461

Good BM spike

537

= 337+25 old

Flume begins

31 not set (in gutter)

Flume ends

old stake "flume begins"
on Bonne
ditch ends & flume begins

1 foot sub-grade

Flume across disinte-
grated slip



Measurements
made in 3 courses.

17

340 +25

+50

+75

+79

+83

341

+25

+50

+75

342

+25

+50

+75

343

+25

+50

463

465

467

369

371

373

894

896

898

900

902

904

906

908

1' Sub-grade

Spike

End ditch = 340 + 75

Flame ends cope

892

373

49

343 +75

344

+25

o

1126

9.14

+50

+75

345

+25

+50

+75

346

+25

+50

+75

347

+25

+50

o

933

1152

910

912

914

1128

1130

1132

1134

1136

1138

1140

1142

1144

1146

1148

1150

1152

Spill

50

347 +75

348

+25

+50

+75

349

+25

o

975

947

+50

+75

350

+25

+50

+75

351

o

880

989

+25

Began 347+50

5-5-58 P.M.

Wm
Santibach
Barra

930

935

938

941

943

945

947

949

951

953

955

957

959

961

963

965

51

+50

+75

352

+25

+50

+75

353

+25

+50

0

838

9.00

+75

+97

354

+25

+50

+75

355

+25

✓ 105

✓

✓

✓

✓

✓

✓

✓

✓

446

✓ 2354 copy

✓

✓

✓

✓

✓

52

355+50

0

1056

854

+75

356

+25

+50

+75

357+01

+25

+50

0

1084

1072

+75

358

+25

+50

+75

359

Began 357+50

5-6-08

must
Dental
Barra

854

1058

1060

1062

1064

1066

1068

1070

1072

1083

1085

1087

1089

1091

1093

858

53

359 +25

+50

+75

0

958

1099

360

+25

+50

+75

361

+25

+38

+50

0

362

572

+75

362

+25

+50

+75

1095

1097

1099

960

962

964

966

968

970

572

364

366

368

370

372

End Ditch

in Jap end

end

54

363

+25

+50

+75

+77

364

0 478

+25

+50

+54

+71

365

0 907

+25

+50

+75

366

374

376

378

380

782

480

482

484

486

909

911

913

915

yes and
289' unquainted

Ditch begins

0.86

364 +50 copies

35

366 +25

0 +50

+75

367

+25

+50

+75

368

0

+25

+50

+75

369

+25

+50

+75

370

+25

0

889

9.17

9.17

891

893

895

897

899

901

903

903

892

894

896

898

900

902

904

906

908

495

890

9.03

854

9.08

56

370+50
+75

371
+25
+50
+75

372
+25
+50
+75

373
+25
+50
+71
+75

376+144

1030

870

1083

856

858

860

862

864

866

868

870

1032

1034

1036

1038

1040

1042

1044

1046

1048

1050

16 low

= old location hub

= "Pran Rk Mked" 41 below

373+75

Spike

End ditch Spg Kiel MK

57

25' Arhim Bottom hubs

Tunnel 25-3N

214+75 468

494

217+91

218 924

494

+25

926

+50

928

+67

+75

930

219

531

+25

932

+50

934

+75

936

0

971

938

938

220

970

+25

975

+50

977

old hubs

4-29-08

Wuest
Sautter
Barnes

= probable in 2

= 218+75 Old

58

220 75

221

+ 25

+ 49

+ 75

222

0

883

989

+ 25

+ 50

+ 75

223

+ 25

+ 50

+ 75

0

889

897

224

+ 25

979

981

983

985

987

989

885

887

889

891

893

895

897

891

893

59

224+50

+62

+75

+83

908

907

995

997

498 ✓

224+75 0.0

Average end ditch

Spinnel hub L+ Side (best)

RT side (rotted)

60. 75 Bolton Grades Tunnel $\frac{1}{2}$

	382	103.82		100.00	
14 + 16.5					383
+ 25					385
+ 50					
0	400	104.00	382	100.00	
+ 75					405
15					407
+ 25					410
+ 50					412
+ 75					414
0	414	104.14	400	100.00	
16					430
+ 25					433
+ 50					435
0	390	103.90	414	100.00	
0 + 75	365	103.44	411	99.79	
+ 75					367

5-16-08

Wuest
Sautsbach
1 1/2 Saborous
= assumed Postal grade

= copies button

99.99

99.97

Tunnel 562.5 long

99.95

99.93

99.90

99.88

99.86

99.84

99.81

99.79

continued 5-18-08

99.77

Wuest
Sautsbach
Barren

61

10344

17

+25

+50

+75

18

+25

+50

+75

19

+25

+50

+81

0

393

10343

394

9950

opp + 81

393

9950 ✓

369

372

374

376

378

381

383

385

387

390

392

394

9975

9972

9970

9968

9966

9963

9961

9959

9957

9954

9952

9950

Copes north mark

to
Cote's north mark

173'

Riser ver

Cote's hubs

150

Cote's south mark

to
Copes south mark

241.5

564.5

" Tunnel hub at S Potol

62 Continued from page 26
 Water man
 Whitehead

	8-1	8-11	8-20	8-25
3 1/2 N	97			
3 S	44			
1/4 N	15			
S	105			
1 N	406	412	418	428
S	533	539	543	557
3 N	529	533	537	547
S	794	815	830	865
4 N	666	687	704	739
S	787	804	811	828
5 1/2 N	—	—	—	—
S	11	18	25	29
6 N	195	196	202	218
S	99	103	107	116
Shaft N	32	37	45	57
S	62	69	75	90
				93

	9-1	9-10	9-15	9-25	10-1
			waterman		
			waterman		
			Angier		
			Wineate		
					528 Wineate 10-20-09
	444	453	461	477	490
	577	589	599	618	624
	559	566	570	580	588
	922	961	983	1032	1067
	788	827	844	891	914
	861	883	901	930	953
	—	—	—	—	—
	48	78			
	245	256	263		286
	127	135	140		160
	71	82	89		110
	97	104	106		125
					295
					168
					120
					130

80-01-01

80-8-01

63 Final Grades for Pine Creek Bridge

Elevs tops
of
stringers

Grade (-67)

5-18-08

Wrest
Sauterbach

P 0+00	035	1517.25	1516.90				
Pier 10 Lt			576	1511.49	+ .17	1511.66	
Rt			579	11.46	+ .20		
Pier 9 Lt			572	11.53	+ .08	1161	
Rt			575	11.50	+ .11		
Pier 8 Lt			585	11.40	+ .15	1155	
Rt			586	11.40	+ .15		
Pier 7 Lt			594	11.31	+ .19	1150	
Rt			590	11.35	+ .15		
Pier 6 Lt			588	11.37	+ .08	1145	
Rt			591	11.34	+ .11		
Pier 5 Lt			595	11.27	+ .12	1139	
Rt			603	11.22	+ .17		
Pier 4 Lt			601	11.24	+ .10	1134	
Rt			601	11.24	+ .10		
Pier 3 Lt			605	11.20	+ .09	1129	
Rt			605	11.20	+ .09		

64

1517.25

Pier 11H

R

Pier 11H

R

89

1.18 1516.07 ✓

Shel Tops
Stringers

Grade (-67)

624 11.01 +.13 1511.14

621 11.04 +.10

640 10.85 +.15 11.00

643 10.92 +.18

65 Grades for Ferguson Cut 5-8-08

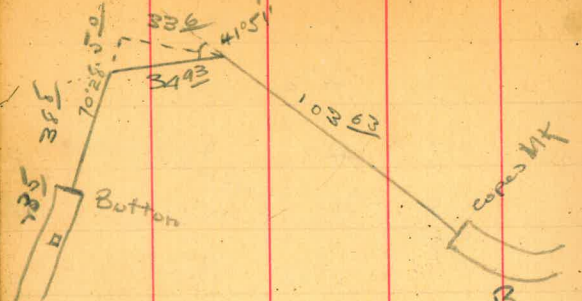
499 + 75	287	
+ 50		285
+ 25		283
499		281
498 + 75		279
+ 50		277
+ 29		275
0	3.77	275
498		375
497 + 75	SpK	370
+ 50	SpK	371
+ 22	MK on PK	369
497		367
496 + 75		365
+ 50		363
+ 35		361
495 + 95	4.27	359
0		405
+ 75		470
+ 50		471
+ 25		419
47 1/2		587

494 + 95 = 494 + 23 + 10

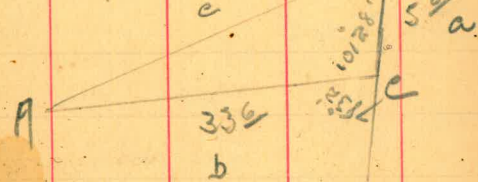
Grades N 85 5-7-08

Grade of BM 711	033	10412	10450
	357	10438	402
hub			10081
			150
			998
			367
			10071
hub outside	273	10444	552
			99.92
Grade of hub of Pot at 45	415	10415	100.00
			355
			10060
hub	376	10436	424
			100.12
	433	10445	374
			100.61
	372	10433	431
			10002
			#
173 in	238	10467	107.05
hub in side			0.99
at 500			110368
Reaching on rail at 500			338
574 deep 5-19-08			382
Reaching at 550 on rail			107.29
			100.68
			+ 61
			107.43
			100.70
			+ 63

66 Change Mine Tunnel



Trig. Solution



36
11
17

$1\frac{3}{4}$
10363
3493
388
7736
172

Notes for April Ditch Estimate

Dulzura Section 5-2-08

Station intervals designate e/v line measurements of each section referred to some bench hub as an initial point

409+65 End ditch

412+00 End ditch

Referred to 412 Waste

35 fms ————

413+79 End ditch

414+13 = 413

419+59 = 419

432+02 End ditch

Referred to 431+50 Waste

Tunnel 52 ————

437+00

438+10

Referred to 438 Waste

—————

67 43' Flume

464+97

End ditch

468+07

= 465 West

468+25

very sharp bend

472+51

End ditch

Referred to 472+25 West

70' Flume

473+47

End ditch

481+94

End ditch

Referred to 481+75 Copie

58' unfinished ditch of flume

482+69

End ditch

487+25

Roll in bottom

487+65

Roll in bottom

488+75

Rock projects
bottom unfinished

491+94

End ditch

Referred to 491 Copie

232' Rock work

495+19

Augment cut

= 494+23 Copie

500+25

End ditch

502+29

= 502 Copie

507+55

507+95

} unfinished Rock work

514+25

= 514 Copie

528+79

Ditch Ends

Referred to 527+25 Copie

146' Bench not yet to grade

134' Flume

Ditch ends

Bee-com
flume
529+42

531+88

Ditch ends

536+61

Actual bottom grade knob internal

Probable Ditch in Solid

539+80

554+78

Actual bottom grade knob internal
and east ditch referred to
551+50

68 Grade Tunnel 1 1/2 5-1-08

7/100 5/0

Wueste
Sauterbrook

176+50 426

177 429

177+25 433

177+50 436

Grade 3 S

A-29-08

513 105.13 100.00

Wuest
Sauterbrook
Barren

519 105.70 462

100.51

464 105.63 471

100.99

499 105.62 480

100.82

Track grade

Fr Sol'in

500 100.82

463 105.55

490 100.92

556 99.99 ✓

Grade 4 N

5-1-08

Wuest
Barren

444 104.44

100.00 assumed
Tunnel grade

0 391 100.53

370 104.23

0 393 100.30

386 104.16

0

grade

Reading on Paul 370 in

418 99.98 100.12 1/2 bond

389 100.17

411 104.38

383 100.55

362 100.17

415 99.99 ✓

69

25 Bottom Grades
Tunnel A-5

294+50		
293+50	501	
293+25		
o	506	499
293		
292+75		
292+485		
292+25		
292		
291+75		
291+50		
291+25		
291		
o	997	488
290+75		
290+50		
290+25		

Ctr. Line Measurements.

4-27-'08

West
Sault-Ste
Barbara

509

499

504

502

500

498

496

494

492

490

488

995

993

991

} Inside
Tunnel #5

70

290

289 + 75

289 + 50

289 + 56

289 + 25

289

288 + 75

o 9.06

o 4.93

o 4.27

9.99

9.22

4.96 ✓

4.74

9.89

9.87

9.86

9.82

9.81

9.79

= 293 + 75 old

o 293 + 50

o 298 + 75

288 + 32 = End ditch 5-6-88

(previously 288 + 67 [for April estimate])

71

Tunnel 1 N

3.78 103.78

100.00

292.5

402

290.

292

Tunnel 5/S

438 104.38

100.00

46' in

434

Surface measurement 8 ft.

Tunnel 8 N

426 104.26

100.00

402 104.86 342

100.84

496

298.5 Deep

4-8-08
wuest
Sauterbach

Bottom 3" low 99.76 = plug of 292.5

(106.76) 1" low 106.70 Reading on Gr 290 in

4-8-08

100.04 plug inside tunnel

4-8-08
wuest
Sauterbach99.90 = grade plug in hole
P+side

72

Tunnel 3N

471 104.71 100.00

444 104.39 476 99.95

4.71

1.48

464 104.79 474 100.15

479 ✓

Tunnel 1S

492 104.92 100.00

516 105.27 481 100.11

503

4.87

1.38

505 105.19 513 100.14

520 ✓

423 511-08

419 at 350.5

401.5 Deep

Assumed Grade at Porta 39.55

10" Low

99.68

hub 3935' In
Rt. Side

(106.68) 105.87

= Reading on Cr.
3955' in

Cr 305290' in

assumed tunnel grade

100.74

plug at 291.5
Average ground 6" low

(100.62) 7" low 100.50

Reading on rail

(107.24) 7" low 106.65

302' deep

4-7-08

Wright
Barrera
Santibach

4-8-08

Wright
Santibach

73

Tunnel AN

540 105.40 100.00

483 105.32 491 100.49

300 + 11

Tunnel BS

549 105.44 100.00

543 105.82 510 100.39

489 105.51 514 100.68

477 105.63 471 100.86

477 105.35 505 100.58

539 ✓

501' Deep

= assumed grade Copesho near part

4-7-08

231

106.75
107.63 Dr. weering $\frac{1}{4}$ " at Borrera

597

99.75
99.35 on floor of tree Lauterbach

Solid rock 0.3' lower

575

99.82 (100.40) "Low on top 5" block

109

106.66 ft 496 in at low 47-08

74

Tunnel 4N

525 105.25 100.00

475 105.25 475 100.50

388 105.05 408 101.17

506

592

Tunnel 4S

424.0 deep cr set at 418.5 from

hub near portal and range pt across cañon

143 105.62 107.05

530

410 104.68 534 100.29

307

1.14

283 + 25
also 25' bench marks

4-6-08

Went
Barren
Santibach
316.5 deep

= assumed grade of tunnel hub

99.33 = Top left Rail 302' in

99.76 + 42 = (100.18) computed track grade
10" low

Tunnel hub

4-7-08

Went
Barren
Santibach

= assumed elev of cut in roof 173' in

computed

100.20

100.32

Reading on Bottom at face
of work

computed

107.20

108.69

Reading on ceiling point at 185'

103.54

75 grade in shaft #6 Tunnel

B.M. 191 140.31 138.40

354 136.77

000 136.77

3500 101.77

368 105.45

B.M. = 234 107.79 inverted rod

cut in rod 6" left of drop plug in shaft north

plug in shaft 11" above grade 4.53 100.92

206 105.73

402 101.71

35.10 136.81

000 136.81

309 139.90

1st B.M.

146 138.44

7-15-08
Went to
Watson

265
dur

Tunnel 4 N

3-12-08

311
= 6
Went
to Ben
Hill

grade hub
near portal

543 105.43

100.00 assumed
grade

495 100.48

471 105.19

260.5 in

540 99.79 L+side

468 100.51

also 105.41

541 100.00 ✓

Tunnel 3 N

3-12-08

grade hub
at portal

490 104.90

100.00 assumed
grade

350.0 in

518 99.72 R+side

1 in hole 4 ft up at 300 in

356 dur

Tunnel $\frac{13}{4}$

length

+81.41	= Dist bet hub of RK & 1 st surface hub
+51.91	= Dist bet 1 st surface hub & 1 st L point
+33.60	= Dist bet L points
+67.36	= Dist bet 2 nd L point & hub in ditch
-23.5	bet hub in ditch & proposed exit face
-34.19	bet hub of RK & 1 st ceiling point
+45	bet 1 st ceiling point & Cape's Mark
<hr/>	
238.72	57.69
+191.03	

Notes

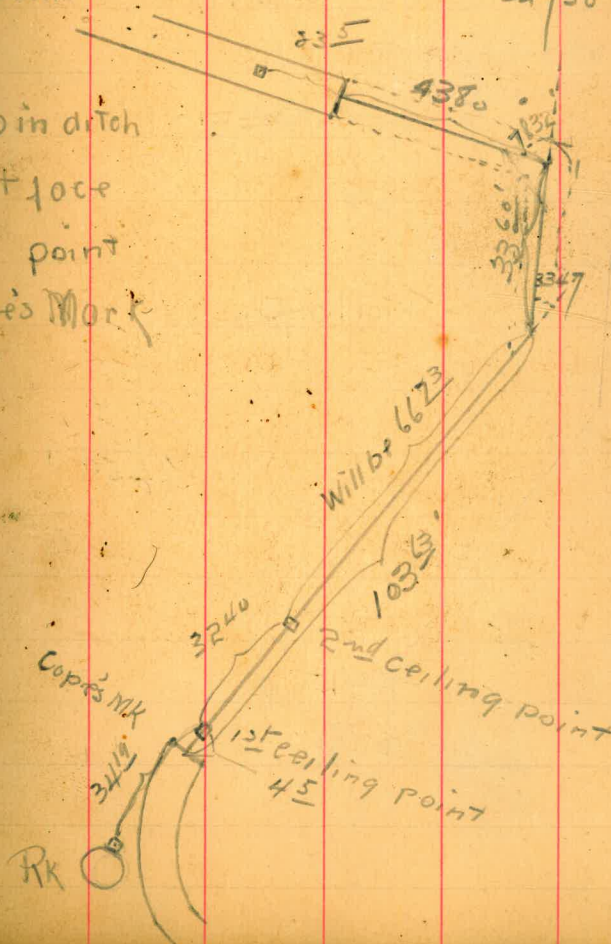
Sto	Dist	Average Chain	2 Readings Vert L	Det L	
2 nd Angle pt	652.4	99.42	49.29	783.24	To Hub in ditch
1 st Angle pt	33.60	33.99	7.25	334.74	
1 st hub above	51.91	54.45	19.09	—	
Hub at RK	81.41	99.15	34.49	—	

3-30-08

See page 66
for change of lineWmest
1 Foreman

99.94

-47.38'



77.

Tunnel 1 1/2

Dist. allowed for grade 54'

However, 0.02' grade to spare
at this point.

See pages 20-21

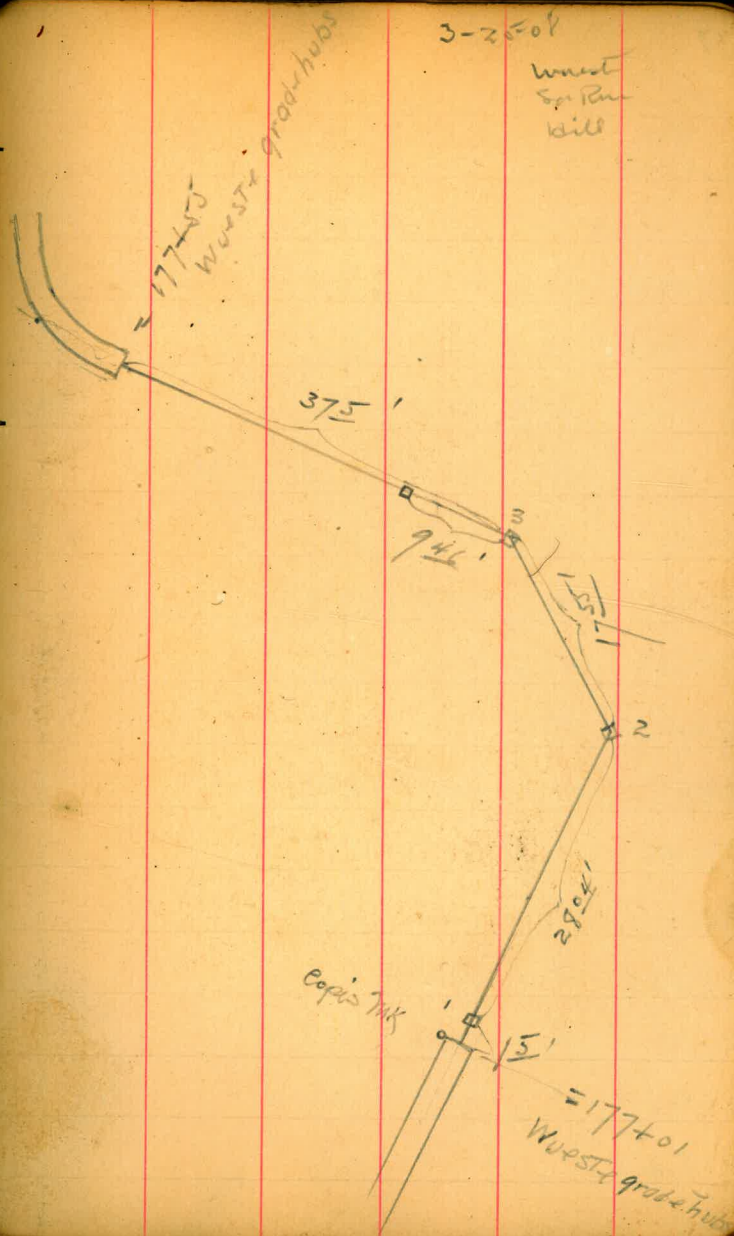
Total length

37.5
17.55
28.04
15

84.59

Sta 3	37.5	39.00 ft
Sta 2	17.55	53.00 ft
Sta 1	28.04	

3-25-08

West
Spring
hill

78	25' Finishina	Hubs	Tunnel 5
	514	10514	100.00
0	495	101.44	965 9649
299			530
298+75			528
298+50			526
298+25			524
0	489	101.39	495 9649
298			516
297+75			514
297+50			512
297+25			510
297			508
296+75			506
296+50			504
296+25			502
296			500
295+75			498
295+50			496

3-27-08
 = Sta 300+75 (Copies 25' Bench Hubs) West
 Sa Ruc Hill
 = 4' South of Copier mark (298+96 after OS) Spk in hub

9614	0.6 ft	of Ctr	Spk in hub
9616	1.6 ft	of Ctr	Spk in hub
9618	1.6 ft	of Ctr	hub
9620	2.5 ft	of Ctr	hub
9622	2.4 ft	of Ctr	Spk
9624	2.2 ft	of Ctr	hub
9626	1.9 ft	of Ctr	hub
9628	1.9 ft	of Ctr	hub
9630	2.0 ft	of Ctr	hub
9632	2.7 ft	of Ctr	hub
9634	2.1 ft	of Ctr	hub
9636	2.1 ft	of Ctr	hub
9638	2.6 ft	of Ctr	hub
9640	2.3 ft	of Ctr	hub
9642	2.2 ft	of Ctr	hub

79

	101.38			
0	4.80	101.29	4.89	96.49
295+25				4.85
295				4.83
294+75				4.81
294+50				4.79
294+25				4.77
294				4.75
293+75				4.73
293+50				4.71

0	10.20	106.80	4.69	96.60
			6.07	100.73

+235 = exp. mks at entrance

∴ Dist bet Copo mks = 552.5'

4' mo sign. to dist tunnel 5

9644	1.5L+	9 CTR	hub
9646	2.2L+	9 CTR	plug
9648	1.9L+	9 CTR	nail in plug
9650	2.0L+	9 CTR	nail in plug
9652	1.9L+	9 CTR	plug
9654	1.5L+	9 CTR	plug
9656	0.7L+	9 CTR	plug
9658		on CTR	hub

Sta 285+50 (compute grade 100.75)

Time 3:30 3-29-08

Wrote
Contractor Dowling

79 to Length of Cottonwood Cable

ABC	8811	17623	8812	17626	8812 1/4
BCA	9045	16129	9045	16129	8644

Trig Solution

$$D = \frac{a \sin B}{\sin A} = \frac{292.62 \sin 8812 \frac{1}{4}}{\sin 11'03 \frac{1}{4}}$$

292.62
 199.51

 292.62
 14630
 263358
 263358

 263358

.19174 | 2924766162 | 15253 = D

100736
 95870

Then CB (trump V)
 = D ÷ cos 20°42'

also
 AX (trump V) = 48666
 38349

 103181
 95870

 73116
 51522

CF sine
 16306
 35861

 16306
 97836
 48918
 81530
 49918

 576596166

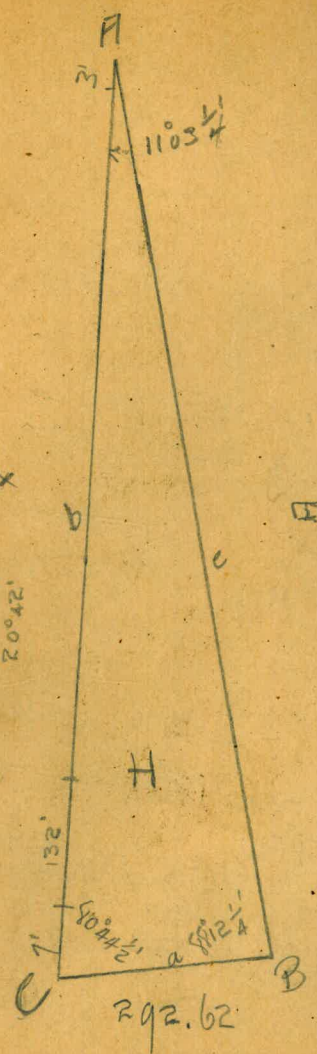
93539 | 15253 | 1630.6
 93539

 589910
 561234

 296766
 290617

 614300

AC = 1630.6 (trump V)



AX = 5765



Angles 16 Tunnel



Handwritten notes and calculations on the left page:

- 107
- 21
- 10
- 405
- 15405
- 132
- 147
- 791
- 1086
- 1149
- 153
- 1019
- 362
- 10043
- 703
- 10272
- 701

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

FOR SINGLE TRACK EMBANKMENT.

ROADWAY 14 FEET WIDE. SIDE SLOPES 1 1/2 TO 1.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	7.0	7.2	7.3	7.5	7.6	7.8	7.9	8.1	8.2	8.4	0
1	8.5	8.7	8.8	9.0	9.1	9.3	9.4	9.6	9.7	9.9	1
2	10.0	10.2	10.3	10.5	10.6	10.8	10.9	11.1	11.2	11.4	2
3	11.5	11.7	11.8	12.0	12.1	12.3	12.4	12.6	12.7	12.9	3
4	13.0	13.2	13.3	13.5	13.6	13.8	13.9	14.1	14.2	14.4	4
5	14.5	14.7	14.8	15.0	15.1	15.3	15.4	15.6	15.7	15.9	5
6	16.0	16.2	16.3	16.5	16.6	16.8	16.9	17.1	17.2	17.4	6
7	17.5	17.7	17.8	18.0	18.1	18.3	18.4	18.6	18.7	18.9	7
8	19.0	19.2	19.3	19.5	19.6	19.8	19.9	20.1	20.2	20.4	8
9	20.5	20.7	20.8	21.0	21.1	21.3	21.4	21.6	21.7	21.9	9
10	22.0	22.2	22.3	22.5	22.6	22.8	22.9	23.1	23.2	23.4	10
11	23.5	23.7	23.8	24.0	24.1	24.3	24.4	24.6	24.7	24.9	11
12	25.0	25.2	25.3	25.5	25.6	25.8	25.9	26.1	26.2	26.4	12
13	26.5	26.7	26.8	27.0	27.1	27.3	27.4	27.6	27.7	27.9	13
14	28.0	28.2	28.3	28.5	28.6	28.8	28.9	29.1	29.2	29.4	14
15	29.5	29.7	29.8	30.0	30.1	30.3	30.4	30.6	30.7	30.9	15
16	31.0	31.2	31.3	31.5	31.6	31.8	31.9	32.1	32.2	32.4	16
17	32.5	32.7	32.8	33.0	33.1	33.3	33.4	33.6	33.7	33.9	17
18	34.0	34.2	34.3	34.5	34.6	34.8	34.9	35.1	35.2	35.4	18
19	35.5	35.7	35.8	36.0	36.1	36.3	36.4	36.6	36.7	36.9	19
20	37.0	37.2	37.3	37.5	37.6	37.8	37.9	38.1	38.2	38.4	20
21	38.5	38.7	38.8	39.0	39.1	39.3	39.4	39.6	39.7	39.9	21
22	40.0	40.2	40.3	40.5	40.6	40.8	40.9	41.1	41.2	41.4	22
23	41.5	41.7	41.8	42.0	42.1	42.3	42.4	42.6	42.7	42.9	23
24	43.0	43.2	43.3	43.5	43.6	43.8	43.9	44.1	44.2	44.4	24
25	44.5	44.7	44.8	45.0	45.1	45.3	45.4	45.6	45.7	45.9	25
26	46.0	46.2	46.3	46.5	46.6	46.8	46.9	47.1	47.2	47.4	26
27	47.5	47.7	47.8	48.0	48.1	48.3	48.4	48.6	48.7	48.9	27
28	49.0	49.2	49.3	49.5	49.6	49.8	49.9	50.1	50.2	50.4	28
29	50.5	50.7	50.8	51.0	51.1	51.3	51.4	51.6	51.7	51.9	29
30	52.0	52.2	52.3	52.5	52.6	52.8	52.9	53.1	53.2	53.4	30
31	53.5	53.7	53.8	54.0	54.1	54.3	54.4	54.6	54.7	54.9	31
32	55.0	55.2	55.3	55.5	55.6	55.8	55.9	56.1	56.2	56.4	32
33	56.5	56.7	56.8	57.0	57.1	57.3	57.4	57.6	57.7	57.9	33
34	58.0	58.2	58.3	58.5	58.6	58.8	58.9	59.1	59.2	59.4	34
35	59.5	59.7	59.8	60.0	60.1	60.3	60.4	60.6	60.7	60.9	35
36	61.0	61.2	61.3	61.5	61.6	61.8	61.9	62.1	62.2	62.4	36

Calculated by Julien A. Hall, M. Am. Soc. C. E.