

2

297

*Clayton B. ...*

*Tunnel #2 Construction*

W297

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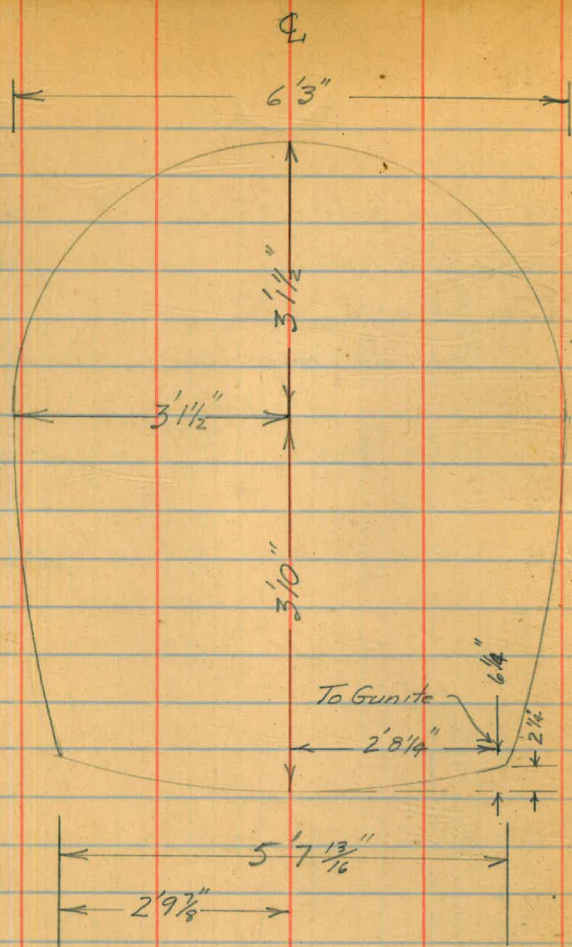
**MICROFILMED**

JAN 14 1965

Otay Reservoir to San Diego 2nd  
Main Pipeline Tunnel #2 Constr.

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Neat lines of untimbered tunnel.

Alignment Over Top.

See Olay Res. to San Diego 2nd Main  
Pipe Line Reference point Book,

April 15, 1930 Tunnel #2

Elliott Notes  
Simpson &  
Bailey + Remmen

Cross sections at Entrance

B.M. #37			396.90
	2.00	398.90	
T.P.		8.25	390.65
	4.61	395.26	
		389.22	
Lit.		6.09 Grade Rod RT	
172+03	$\frac{14}{40}$	Cut $\frac{14}{4}$	$\frac{14}{40}$
172+06 <sup>5</sup>	$\frac{60}{40}$	Cut $\frac{60}{4}$	$\frac{60}{40}$
172+09 <sup>5</sup> Portal	$\frac{82}{40}$	Cut $\frac{82}{4}$	$\frac{82}{40}$

Note: above cuts to Tunnel Grade

April 22 1930

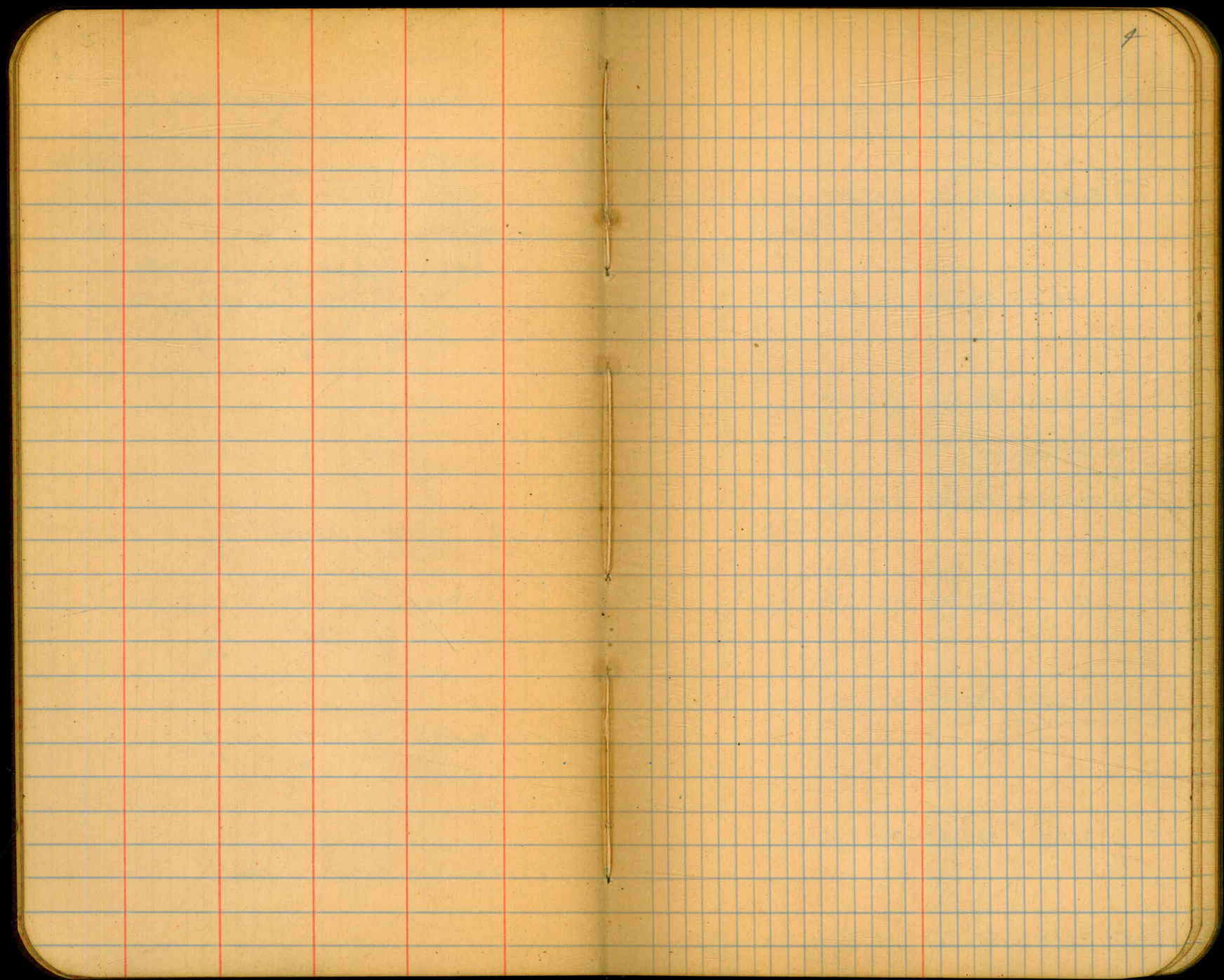
Elliott, Simpson  
Bailey, Remmen

3

Cross Sections at Exit

B.M. #39			395.41
	104	396.45	
Set B.M. T.P.		5.69	390.81
	2.57	393.38	
		387.20	
Lit.		6.18 Grade rod RT	
192+31 <sup>5</sup>	$\frac{14}{40}$	Cut $\frac{14}{4}$	$\frac{14}{40}$
192+25 <sup>5</sup>	$\frac{20}{40}$	Cut $\frac{20}{4}$	$\frac{20}{40}$
192+24 <sup>5</sup>	$\frac{42}{40}$	Cut $\frac{26}{4}$	$\frac{26}{40}$
192+20	$\frac{51}{40}$	Cut $\frac{51}{4}$	$\frac{51}{40}$
192+17 <sup>5</sup> Portal	$\frac{72}{40}$	Cut $\frac{79}{4}$	$\frac{72}{40}$

Note: above cuts to Tunnel grade



Tunnel #2 Length 2008.0

Sta.	Tunnel Grade	Pipe Grade	Bottom	Top
------	--------------	------------	--------	-----

Entrance				
172+09 <sup>50</sup>	389.213	396.171	390.296	

+50	389.171	396.129	390.254	
-----	---------	---------	---------	--

173	389.121	396.079	390.209	
-----	---------	---------	---------	--

+50	389.071	396.029	390.154	
-----	---------	---------	---------	--

174	389.021	395.979	390.104	
-----	---------	---------	---------	--

+50	388.971	395.929	390.054	
-----	---------	---------	---------	--

175	388.921	395.879	390.004	
-----	---------	---------	---------	--

+50	388.871	395.829	389.954	
-----	---------	---------	---------	--

-0.10%

Entrance Portal

Timbered

172+19

No Timber

Coarse Cemented Sand and Pba Gravel  
(Very Hard)

Bore started April 17, 1930

April 30, 1930  
Bore to 173+08

Iron pipe 174+50<sup>00</sup>  
B.M. Top of pipe El. 388.81  
Checked 6-6-30

May 26 - 3:PM.  
Bore 175+65

5  
Set April 27  
B.M. Top pin in bank  
Lts. of 171+60 El. 392.71

6-6-30  
Set April 27  
B.M. Top of Pin El. 389.59  
Iron Pin 171+98.72 (Stationing Ahead)



Sta	Tunnel Bottom	Grade Top	Pipe Gr.
176	388.821	395.779	389.904
+50	388.771	395.729	389.854
177	388.721	395.679	389.804
+50	388.671	395.629	389.754
178	388.621	395.579	389.704
+50	388.571	395.529	389.654
179	388.521	395.479	389.604
+50	388.471	395.429	389.554

0.10%

Not timbered

Cemented Coarse Sand & Bag Gravel  
(Very hard)

(Set 6-6-30)  
Iron pipe 176+50.98  
B.M. top pipe 388.30  
(6-20, 30)

177+90 Rock encountered  
on floor inclined upwards

178+13!

Timbered

Hard Shattered Rock

Tunnel Grade Pipe Gr.  
bta Bottom Top.

180 388.421 395.379 389.504

+50 388.371 395.329 389.454

181 388.321 395.279 389.404

+50 388.271 395.229 389.354

182 388.221 395.179 389.304

+50 388.171 395.129 389.254

183 388.121 395.079 389.204

+50 388.071 395.029 389.154

- 0.10%

#60 spike in sill  
(179+81<sup>83</sup>, E1, 388.67)

#60 spike in sill  
(181+10<sup>51</sup> E1, 388.41)

Timbered

Mixture small rocks,  
Decomposed rock, Fills Earth  
(Very soft)

gradually running to  
shatter very loose

Rock encountered  
183+39 in roof

Encountered rock

Sta	Tunnel Bottom	Grade Top	Pipe Gr.
184	388.021	394.979	389.104

+50	387.971	394.929	389.054
-----	---------	---------	---------

185	387.921	394.879	389.004
-----	---------	---------	---------

+50	387.871	394.829	388.954
-----	---------	---------	---------

186	387.821	394.779	388.904
-----	---------	---------	---------

+50	387.771	394.729	388.854
-----	---------	---------	---------

187	387.721	394.679	388.804
-----	---------	---------	---------

+50	387.671	394.629	388.754
-----	---------	---------	---------

0.10%

183+97

184+10

Timbered

Discomposed Rock  
and Sandy Fuller  
earth (Soft)

Not timbered

Coarse Hard Cemented Sand

B.M. E.I. 387.98  
Iron Pipe 183+99.84  
Set July 28, 1930

B.M. Eley 387.56  
Iron Pipe 187+01.65  
Set July 29, 1930

Tunnel Grade Pipe Gr.  
Sta Bottom Top

188 387.621 394.579 388.709

+50 387.571 394.529 388.659

189 387.521 394.479 388.609

+50 387.471 394.429 388.559

190 387.421 394.379 388.509

+50 387.371 394.329 388.459

191 387.321 394.279 388.409

+50 387.271 394.229 388.359

Y  
- 0.10%  
Y

Not timbered

Hard Coarse Cemented Sand

o Iron Pipe 189+6196  
B.M. top pipe 386.94



May 26 at 3: P.M.  
Bole 190+25

Sta	Tunnel Grade		Pipe Gr
	Bottom	Top	

192+00	387.221	394.179	388.304
--------	---------	---------	---------

Exit 192+175 <sup>50</sup>			
192+20 <sup>50</sup>	387.203	394.161	388.286

-0.10%

191+99<sup>2</sup> ✕  
 Timbered  
 192+175 ✕  
 Exit Portal

Bore started May 6  
 (Set May 15) - 6-7-30  
 Iron pin 192+199<sup>5</sup>  
 B.M. Top of pin E1 387.03

Set April 22, 1930  
 Hub 193+55 76

Set April 22, 1930  
 B.M. Fin. Lt. 192+64  
 Elev. 390.81

April 22, 1930

Elliott Notes  
Simpson T  
Barley  
Remmen

11

Entrance

B.M.

392.71

Iron pin Lt of 171+60

2.13 394.84

Set B.M.

5.24 389.60

Iron & pin 171+98<sup>72</sup>

4.61 390.23

Grade

389.21

Grade hub at Portal marked cut 1<sup>o</sup> (check)

Entrance

April 28, 1930

Elliott Notes

Simpson T

Barley H.Ch.

Remmen R.Ch.

B.M.

392.71

2.19 394.90

172+55

+ 1.22 396.12

Check on previous work

+ 70

+ 1.19 396.09

Rd. Hd. to line + grade

+ 80

+ 1.18 396.08

"

+ 90

<sup>6.76</sup>  
+ 1.17 396.07

Top

Not Set

172+90

- 5.79

Bottom

Pin to grade

May 2 1930  
Rain

Elliott  
Bailey  
Chase

12

Entrance

B.M.			392.71	
	1.96	394.67		
172+80		+ 1.43	396.10	Top
172+90		+ 1.42	396.09	"
173+00		+ 1.41	396.08	"
173+10		+ 1.40	396.07	"
173+17		+ 1.39 <sup>696</sup>	396.06	"
4		- 5.57		Bottom
B.M.			392.71	
	2.37	395.08		
172+09E		+ 1.09	396.17	"
172+20		+ 1.08	396.16	"

Check on previous work

Set Rd. Hd. to line + grade

"

"

"

"

"

May 6 1930  
Cloudy-Cool

Elliott & Notes

Exit

Bailey

B.M. #39	2.19	397.60	395.41	
T.P.		6.15	391.45	
Check B.M.	2.01	393.46	2.64	390.82
192+1750		- 6.26	387.20	Bottom
11		+ 0.70	394.16	Top

390.81

Bottom

Top

May 9 1930

Elliott  
Bailey

13

Entrance

B.M.

	4.73	394.33	389.60		
173+10		+ 1.74	396.07	Top	Check on previous work
+20		+ 1.73	396.06	"	" " "
+60		+ 1.69	396.02	"	" " "
		- 5.27	389.06	Bottom	Set pin to line + grade
+70		+ 1.68	396.01	Top	" " " "

Bore 173+70 ±

Same Day

Exit

Same Crew

B.M.

			390.81		
	1.88	392.69			
192+15		- 5.49	387.20	Bottom	Set Pin to line + grade
192+05		- 5.48	387.21	"	"
191+95		- 5.47	387.22	"	"

Bore 191+92 ±



May 13, 1930

Elliott  
Bailey  
Jacobson

14

Entrance

B.M.			389.60	
	4.84	394.44		
173+70		+1.57	396.01	Top
+80		-.5.40	389.04	Bottom
+90		-.5.41	389.03	"
174+05		+1.59		Top
174+00		-5.42	389.02	Bottom
+10		-5.43	389.01	"

Check on previous work

Bore 174+15 ±

Same day

Exit

Same Party

B.M.			390.81	
	1.96	392.27		
192+05		-5.05	387.22	Bottom
191+90		-5.04	387.23	"
+80		-5.03 <sup>96</sup>	387.24	"
+80		1.98		Top
+70		-5.02	387.25	Bottom
+70		+1.94		Top
+60		+1.95 <sup>96</sup>	394.22	"
+60		-5.01		

Check on previous work

Pin set to line and grade

Pin to line + grade

Pin to line + grade

Pin to line + grade (roof 1' high)

Bore to 191+50 ±

May 14, 1930

Elliott  
Bailey  
Jacobson

15

Entrance

B.M.			389.60		
	4.81	394.91			
173+10		+ 1.66	396.07	Top	Check
117		+ 1.65	396.06	"	Check
130		+ 1.64	396.05	"	Set pin to grade + line
140		+ 1.63	396.04	"	"
+ 50		+ 1.62	396.03	"	"
+ 60		+ 1.61	396.02	"	"
+ 70		+ 1.60	396.01	"	In (check)
185		+ 1.59	396.00	"	Set Bal to grade + line
170					
174+02		+ 1.57	395.98	"	In (check)
+ 10		+ 1.56	395.97	"	Set pin to line & grade
					Bora to 174 + 15 +

Exit

B.M.			390.81		
	1.44	392.25			
Set B.M.		5.23	387.02		Pipe 192 + 1993

May 15, 1930

Elliott  
Bailey  
Jacobson

16

Exit

B.M. 390.81

1.97 392.78

191+80 +1.42 394.20

+70 +1.43 394.21

+60 +1.44 394.22

+50 +1.45 394.23

+40 +1.46 394.24

<sup>6.96</sup>  
-5.50

In Check

In Ch

Set Pinta Line + grade

"

"

Bore to 191+33 ±

May 16

Entrance

Same Crew

B.M. 389.60

4.89 394.49

174+20 +1.47 395.96

+30 +1.46 395.95

+40 +1.45 395.94

Check on previous work

Set Rd. Hd to line and grade

"

"

May 16 1930

Exit

Same Crew

B.M. 1.98 392.79 390.81

191+40 +1.45 394.24

191+30 +1.46 394.25

-5.50

Check on previous work

0.5 Low Not Set

0.7 High Not Set

Bore 191+71

May 19, 1980

Elliott  
Bailey  
Jacobszon

17

Entr

B.M. 4.74 394.34 389.60

174+90 +1.60 395.94 Top

Check on previous work

+50 +1.59 395.93 "

Set Right. to line and grade

+60 +1.58 395.92 "

" " "

+70 +1.57 395.91 "

" " "

Bore 174+80

Same day Exit Same Crew

B.M. 5.54 392.56 387.02

191+90 +1.68 394.24

Check

+30 +1.69 394.25

Set line + grade

+20 +1.70 394.26

" "

+10 +1.71 394.27

" "

191+00 +1.72 394.28

" "

Bore 190+93 ±

May 20 1930

Elliott  
Bailey  
Jacobszon

18

Entr.

B.M.			392.71	Iron pin Lt. 171+60
	2.10	394.81		
B.M.		5.22	389.59	Moved Iron pipe 171+98 <sup>72</sup>
	3.98	393.57		
Set B.M. T.P.		4.76	388.81	Iron pipe 174+
	4.73	393.54		
T.P.		4.44	389.10	
	4.67	393.77		
174+60		+ 2.15	395.92	Check
+70		+ 2.14	395.91	Check
+80		+ 2.13	395.90	Set Rd. Hd to line + grade

May 22 1930

Exit

Same Crew

Bore 174+90 ±

B.M.	5.67	392.69	387.02	
191+00		+ 1.59	394.28	Check on previous work
190+90		+ 1.60	394.29	Set Rd. Hd to line + grade
190+80		+ 1.61	394.30	
190+70		+ 1.62	394.31	
192+17		+ 1.47	394.16	
192+04		+ 1.99 <sup>6.96</sup>	394.18	
		- 5.47		

Bore 190+65



May 26, 1930

Entr.

Elliott  
Bailey  
Jacobszon

B.M.

388.81

5.10

393.91

175+10

+1.96 395.87

Check on previous work

+20

+1.95 395.86

Check

+30

+1.94 395.85

Set. Tsd. Hd to line + grade

+40

+1.93 395.84

"

+50

+1.92 395.83

"

+60

+1.91 395.82

"

Same Day

Exit

Same Crew

B.M.

5.59

392.61

387.02

190+50

+1.72 394.33

Check

+40

+1.73 394.34

Set

+30

+1.74 394.35

Set

5.02

May 29

Exit

B.M.

5.86

392.88

387.02

190+30

+1.47 394.35

Check on previous work

+20

+1.48 394.36

Set

+10

+1.49 394.37

Set

190

+1.50 394.38

Set

Bore 189+95

May 29, 1930      Entr.      Elliott  
Jacobson  
Bailey

B.M.    5.16    393.97      388.81

175+60                      +1.85    395.82

+70                            +1.84    395.81

+80                            +1.83    395.80

+90                            +1.82    395.79

Check on previous work  
Set Rd. Hd. to line + grade

"

"

Bore 175+00

June 2, 1930      Exit      Same Crew

B.M.    5.06    392.08      387.02

190+00                      +2.30    394.38

189+90                      +2.31    394.39

Check on previous work

Set Rd. Hd. to line + grade

Bore 189+80

Same Day      Entr.      Same Crew

B.M.    4.91    393.72      388.81

175+80                      +2.08    395.80

+90                            +2.07    395.79

176+00                      +2.06    395.78

+10                            +2.05    395.77

+20                            +2.04    395.76

+30                            +2.03    395.75

+40                            +2.02    395.74

+50                            +2.01    395.73

Check on previous work

Set Rd. Hd. to line and grade

"

"

"

"

"

"

Bore 176+53



June 5, 1930	Exit	Same Crew	
B.M.		387.02	
4.70	391.72		
189+90	+2.67	394.39	
+80	+2.68	394.40	
+70	+2.69	394.41	
+60	+2.70	394.42	
+50	+2.71	394.43	
Same Day	Entrance	Same Crew	
B.M.	4.99	393.80	388.81
176+90	+1.94	395.74	Top
+50	+1.93	395.73	"
+60	+1.92	395.72	"
+70	+1.91	395.71	"
+80	+1.90	395.70	"
June 6 1930	Entrance	Same Crew	
B.M.		392.71	
2.41	395.12		
Check B.M.	5.53	Use 389.59	Previous 389.59
3.98	393.07		
Check B.M.	4.26	388.81	Previous 388.81
4.22	393.03		
Set B.M.	4.70	388.33	

Check on previous work  
Set Red. Hd. to line + grade

"

"

"

Bore 189+99

Check on previous work

"

Set Red. Hd. to line + grade

"

"

Bore 176+91

Top of pin let of 171+60

Top of pipe & 171+98.72

Top of pipe & 174+50

Top of pipe & 176+

June 6, 1930 Entr Elliott  
 B.M. Jacobszon  
 Bailey  
 388.81

4.30 393.11  
 176+80 +2.59 395.70  
 +90 +2.58 395.69  
 177+00 +2.57 395.68

Check on previous work  
 Set  
 Bore 177+05

Same Day Exit Same Crew

B.M. 5.30 392.32 387.02  
 189+50 +2.11 394.43  
 189+60 +2.10 394.42

Set  
 Check

June 9, 1930 Entr Same Crew

B.M. 4.96 393.77 388.81  
 177+00 +1.91 395.68  
 +10 +1.90 395.67  
 +20 +1.89 395.66  
 +30 +1.88 395.65

Check on previous work  
 Bore 177+37 176+50

Same Day Exit Same Crew

B.M. 2.05 392.86 390.81  
 Check B.M. 5.83 387.03 <sup>Use</sup> 387.02 <sup>Previous</sup>  
 5.37 392.40  
 Set B.M. 5.46 386.94

Top of pin 192+64  
 Top of pipe 192+19.2  
 Top of pipe 189+61.26

Elliott  
Jacobson  
Bailey

June 9, 1930

Exit

B.M.	5.46	392.40	386.94
T.P.		4.87	387.53
	4.68	392.21	
189+50		+2.22	394.43
+40		+2.23	394.44
+30		+2.24	394.45
+20		+2.25	394.46
+10		+2.26	394.47

Check on previous work  
 Set Rd. Hd. to line + grade  
 "  
 "  
 "

Bore 189+06

June 12

Entr

Same Crew

B.M.	4.81	393.62	388.81
177+30		+2.03	395.65
+40		+2.02	395.64
+50		+2.01	395.63
+60		+2.00	395.62
+70		+1.99	395.61

Check on previous work  
 Set Rd. Hd. to line + grade

Bore 177+76 ±

Same Day

Exit

Same Crew

B.M.	5.56	392.59	387.03
189+10		+1.88	394.47
189+00		+1.89	394.48
188+90		+1.90	394.49
+80		+1.91	394.50

Check on previous work  
 Set Rd. Hd. to line + grade  
 "

Not set 0.7' low

Bore 188+69

June 16, 1930		Entr	Elliott Jacobszon Bailey	
B.M.	4.88	393.69	388.81	
177+60		+1.93	395.62	Roof
+70		+1.92	395.61	"
+85		+1.91	395.60	"
+95		+1.90	395.59	"
178+00		+1.89	395.58	"

Check on previous work  
 Set Rd. Hd. to line + grade  
 "  
 "  
 "

Bore 178+03

June 16, 1930		Exit	Same Crew	
B.M.	5.37	392.40	387.03	
188+90		+2.09	394.49	Roof
+80		+2.10	394.50	"
+70		+2.11	394.51	"
+60		+2.12	394.52	"
+50		+2.13	394.53	"
+42		+2.14	394.54	"

Check on previous  
 Set Rd. Hd. to line + grade (Not Set)  
 "  
 "  
 "  
 "  
 Bore 188+41 "

June 20, 1930		Entr	Same Crew	
B.M.			388.81	
	5.03	393.84		
B.M.T.P.		5.54	388.30	
	5.54	393.84		
T.P.		5.09	388.75	
	4.88	393.63		

Top pipe 174+50

Top pipe 176+50

over to page 76

393.63  
 177+85 +1.96 395.59  
 +95 +1.95 395.58  
 178+03 +1.94 395.57

Check on previous work

Reset.

Bore 178+03 (Set 1<sup>o</sup> cut on face)

June 20, 1930 Exit Same Crew

B.M. 5.80 392.74 386.94  
 188+40 +1.80 394.54  
 +30 +1.81 394.55  
 +20 +1.82 394.56

Check on previous work

Set pin (0<sup>o</sup> low)

" (.02 low)

Bore 188+12

June 23 1930

Entr.

Elliott Note  
 Jacobson +  
 Bailey Rod

B.M. 5.75 394.05 388.30  
 177+85 +1.54 395.59  
 178+00 +1.53 395.58  
 +10 +1.52 395.57

Check on previous work

Set pin to line + grade

"

Bore 178+20 (Set 1<sup>o</sup> cut on face)

Same Day Exit Same Crew

B.M. 5.60 392.54 386.94  
 188+20 +2.02 394.56  
 +10 +2.03 394.57  
 188+00 +2.04 394.58  
 187+90 +2.05 394.59

Check on previous

(Not set)

Set Rd. Hd. to line + grade

(Not set)

187+87 (Marked 1<sup>o</sup> cut on face)

Elliott  
Bailey  
Soper

June 26, 1930 Exit

B.M.	5.81	392.75	386.94
188+00		+1.83	394.58
187+90		+1.84	394.59
+80		+1.85	394.60
+70		+1.86	394.61
+60		+1.87	394.62
188+10		+1.82	394.57

Check

Set Rd. Hd. to line + grade 2 Low

"

0.5 Low

"

0.1 Low

Not set

1.0 Low

Bore 187+53

192+13

5 2x12

192+08.5

June 28, 1930 Exit

Same Crew

B.M.	5.76	392.70	386.94
187+70		+1.91	394.61
+60		+1.92	394.62
+50		+1.93	394.63
+40		+1.94	394.64
+30		+1.95	394.65

Check on previous work

Not set

Set Rd. Hd. to line + grade (.01 Low)

Not set

Set Rd. Hd. to line + grade

Bore 187+28 1/2

June 30, 1930 Entr.

Same Crew

B.M.	5.53	393.83	388.30
178+10		+1.74	395.57
178+39		+1.71	395.54

Check on previous work

On face

June 30, 1930 Exit Elliott  
Bailey  
Zoper

B.M. 6.08 393.02 386.94  
187+35 +1.62 394.64  
+25 +1.63 394.65  
+15 +1.64 394.66

Check on previous work 88+50  
Set Rd. Hd. to line + grade  
"  
Bore 187+07

July 3, 1930 Exit Same Crew

B.M. 6.03 392.97 386.94  
187+16 +1.69 394.66  
187+00 +1.71 394.68  
186+90 +1.72 394.69  
+80 +1.73 394.70

Check on previous work  
Set Rel. Hd. to line + grade  
"  
"

Bore 186+75

Same Day Entr Same Crew

B.M. 5.77 394.07 388.30  
178+0 +1.50 395.57 Roof  
178+90 -5.48 388.59 Floor  
+50 +1.46 395.53 Roof  
6.92

Check on previous work  
Set Pin to grade  
Marked  
Bore 178+50 ±

177+50

July 7 1930 Entr Same Crew

B.M. 5.70 394.00 388.30  
178+10 +1.57 395.57  
178+13 +5.39 395.57  
+18 +5.40 395.56  
+30 -5.41  
+40 +1.54 395.54  
+65 +1.52 395.52

Check

Set pin to grade  
Check.

On Face (Marked line + grade on face)

Elliott's notes  
Bailey  
Soper

July 7, 1930		Exit	
B.M.	5.90	392.84	386.94
186+90		+1.85	394.69
+80		+1.86	394.70
+70		+1.87	394.71
+60		+1.88	394.72
+50		+1.89	394.73

Check on previous  
 Set Rd. Hd. to line + grade  
 "  
 "  
 (Not set)

July 10 1930		Exit	Same Crew
B.M.	5.57	392.51	386.94
186+60		+2.21	394.72 Roof
+50		+2.22	394.73
+45		+2.23	394.74
+30		+2.24	394.75
+15		+2.25	394.76
+10		+2.26	394.77

Bore 186+45  
 Check on previous work  
 (02 low) Set Rd. Hd.  
 (07 low) Set Rd. Hd.  
 Set Rd. Hd.  
 (08 low) Set Rd. Hd. to line + grade  
 (09 low) (Set Rd. Hd. to line + grade)  
 Bore 186+04

July 10, 1930		Entr	Same Crew
B.M.	5.85	394.15	388.30
178+10		+1.42	395.57 Roof
178+13		+1.41	395.56 "
+24		+1.40	395.55 "
+35		-5.57	388.58 Floor
+50		-5.58	388.57 "
+76		+1.35	395.50 Roof

Check on previous work  
 Set Rd. Hd. to line + gr.  
 "  
 " Set grade on sill + line on cap.  
 Bore 178+76 (Marked grade on face)



July 13, 1930 Entr. Elliott Bailey Soper  
 B.M. 5.43 393.73 388.30  
 178+29 +1.82 1/2 395.55 1/2 Roof Check  
 135 +1.81 395.54 " Check  
 146 +1.80 395.53 " Set line + grade on roof  
 157<sup>6.96</sup> +1.79 395.52 " " " " "  
 157 -5.17 Floor

Same Day Exit Same Crew  
 Set line + grade at 185+80

July 16, 1930 Entr. Same Crew  
 B.M. 5.18 393.48 388.30 Roof Check  
 178+57<sup>5</sup> +2.04 395.52 " Set Rd. Hd. to line + gr.  
 166<sup>5</sup> +2.03 1/2 395.51 1/2 " "  
 178+72 +2.03 395.51 " "  
 178 -4.94 388.54 Floor "

185+60  
 78.44  
 6 70

Same Day Exit Same Crew  
 B.M. 5.12 392.06 386.94  
 185+80 +2.74 394.80 Check on previous work  
 185+40 +2.78 394.84

189.4 187

July 18, 1930

Entr.

B.M.	5.17	393.47	388.30
178+78		+2.03	395.50
179+35		+2.08	395.45

Check on previous work  
(Marked line & grade on face)

Same day

Exit

Same Crew

185+50	-201	
185+08		+2.02
		Exit

Pickup  
Set on  
Bore 185+00

2.02
<u>1.98</u>
.54

July 22.

B.M.	5.05	391.99	386.94
185+10		+2.34	394.87
184+50		+2.94	394.93

Check (Set 6 1/2" low)  
Set Rd. Hd. to line & grade  
Bore 184+00

Entr

B.M.	5.42	393.72	388.30
------	------	--------	--------

178+72	+1.79	395.51	Roof
178+83	+1.78	395.50	"
179+27	+1.73	395.45	"
+31	-5.23	388.49	Floor
179+77	+1.68	395.40	

Check  
Set Rd. Hd. to line + gr  
"  
"  
(Marked 10 up on face)

Elliott  
Soper  
Bailey

July 29, 1930

Entr.

B.M.	5.12	393.42	388.30
179+33		-4.93	388.49
+44		-4.94 1/2	388.47 1/2
180+00		+1.96	395.38

Check on previous work  
Set Pin to grade (0.02 High)  
Bore (Marked 10 up on face)

Same Day

Exit

Same Crew

185+40	-2.32	392.52	394.84
184+50		+2.41	394.93
184+15		+2.44	394.96

Pickup  
Check  
Set  
Bore 184+03

Entr

179+27	-1.64	393.78	395.45 Roof
179+44		-5.32 1/2	388.46 1/2 Floor
179+49		-5.31	388.47 "
		+1.60	395.38 Roof

Bore 180+00

Exit

184+15	-1.57	393.39	394.96
183+93		+1.59	394.98

Pickup  
Set line + gr.  
Bore 183+82

Elliott's Notes  
Bailey  
Super.

July 28, 1930

Entr

B.M. 4.82

393.12

388.30

179+27

+2.33

395.45

Roof

Check on previous work

179+49

+2.31

395.43

"

Set Rd. Hd to grade

180+00

-4.70

388.42

Floor

Set Pin to grade

Same Day

Exit

Same Crew

B.M. 4.67

391.61

386.94

Pipe 189+61<sup>96</sup> 188+30

Set B.M.

4.05

387.56

Pipe 187+00

4.75<sup>1</sup>/<sub>2</sub>392.31<sup>1</sup>/<sub>2</sub>

185+50

Set B.M.

5.12

393.10

4.33<sup>1</sup>/<sub>2</sub>

387.98

Pipe 183+00

184+00

+1.88

394.98

Check

183+63

+1.92

395.02

Set Rd. Hd to line + grade

183+52

+1.93

395.03

"

July 30

Exit

Same Crew

Bore 183+32

B.M.

5.69

393.67

387.98

189+61<sup>96</sup>2+60<sup>31</sup>187+01<sup>65</sup>3+01<sup>81</sup>

183+99.84

183+63

+1.35

395.02

Check on previous work

183+52

+1.36

395.03

"

+47

+1.36<sup>1</sup>/<sub>2</sub>

+39

-5.59

388.08

+22

-5.57

388.10

Elliott H  
Barley  
Soper

July 30, 1930		Entr.	
B.M.	4.64½	392.94½	388.30
Set T.P.		4.17	388.77½
T.P.		4.08½	388.86
18	4.72	393.58	
180+00		5.16	388.42
180+22		5.18	388.40

Check on previous work  
Set Pin to grade

Aug 1, 1930		Exit	
B.M.	5.19	393.17	387.98
183+25		-5.07	388.10
183+10		-5.06	388.11
182+90		+1.92	395.09.

Bore 180+52

Check

Set

(Marked 12 up on face)

		Entr	
T.P.	4.52½	393.30	388.77½
180+22		-4.90	388.40
180+04		+2.08	395.38
180+15		+2.06	395.36
180+40		-4.92	388.38
		+2.01	395.31

Check on previous

Set line 9 gr.

"

Set Pin to gr.

Bore 180+72 (Marked 12 up on face)

Aug 4, 1930 Exit

B.M.	5.20	393.18	387.98
183+47		+1.85	395.03
183+14		+1.88	395.06
182+97		+1.90	395.08
182+64		+1.93	395.11

Check  
 Set Rd. Hd  
 "  
 Bore (Marked line + 10 up on face)

Same Day Entr.

T.P.	4.64	393.91	388.77 1/2
179+50		-4.94	388.47 Floor
+75		-4.96	388.45 "
180+26		+1.94	395.35 Roof
180+80		-5.07	388.34 Flr.
180+96		+1.87	395.28 T Roof

Check  
 Set Pintogr  
 set line + gr.  
 Set Pint to grade  
 (Marked line + grade on face)

Entr.

T.P.	4.51 1/2	393.29	388.77 1/2
180+80		-4.95	388.34 Flr.
+83		+2.00	395.29 Roof
+94		+1.99	395.28 "
181+05		+1.98	395.27 "
+28		+1.97	395.25 "

Check on previous  
 Set Rd. Hd. to line + gr  
 "  
 "  
 Bore (Marked line + grade on face)

Aug 6  
 B.M. 4.50 392.48 387.98  
 182+97 + 2.60 395.08 Roof  
 +86 + 2.61 395.09 "  
 +75 + 2.62 395.10 "  
 182+67 - 4.33 388.15 Flr.  
 183+64 + 2.54 395.02 Roof,  
 183+80 - 4.44 388.04 Flr.

Check.

2.68  
 4.28  
 6.96

+ 2.65 395.13

Face 182+47

Aug 8, 1930

B.M. 5.21 393.19 387.98

182+75 + 1.91 395.10 Roof  
 182+64 + 1.92 395.11 "  
 182+67 + 5.04 388.15 Flr.  
 182+45 - 5.02 388.17 Flr.  
 + 1.97 395.16

Check

Check

Set

Bore 182+23





Aug 11, 1930 Exit

B.M.	5.78	393.76	387.98	
182+45		- 5.58	388.18	Flr.
+53		+ 1.37	395.13	Roof
+42		+ 1.38	395.14	"
+31		+ 1.39	395.15	"
+20		- 5.56	388.20	Flr
182+00		+ 1.42	395.18	

Check

Set Rd. Hd. to line + grade

"

"

Set pin to grade

Entr.

B.M.	4.59	392.57	387.98	
T.P.		4.16 1/2	388.40 1/2	
	4.06	392.46 1/2		
Check T.P.		3.78	Exit El. 388.68 1/2	Entr. El. 388.67

183+99.8

Nail 181+10

Nail 179+82

Aug 14, 1930

T.P.	3.70	392.38	388.68	
180+72		+ 2.93	395.31	Roof
180+55		- 4.01	388.37	Flr.

Check

Set pin to grade

T.P.	4.12	392.52	388.40	
181+38		+ 2.72	395.24	
181+60		+ 2.70	395.22	
+71		+ 2.69	395.21	
+82		+ 2.68	395.20	
+93		+ 2.67	395.19	
182+10		+ 2.65	395.17	

Check

Set Rd. Hd. to line + grade

"

"

"

Check

Elliott  
Soper  
Bailey

29

Aug 19, 1930

B.M.	5.03	393.01	387.98		
183+47		+2.02	395.03	Root	Check
+36		+2.03	395.04	"	Set Rd. Hd. to line + grade
125		+2.04	395.05	"	"
183+14		+2.05	395.06	"	Check

Aug 16, 1930

B.M.	3.44 1/2	392.12	388.67 1/2		
178+13		-2.99	389.13	Finish Floor	Set Rd. Hd. to grade each side.
124		-3.00 1/2	389.11 1/2		
135		-3.02	389.10		
146		-3.03	389.09		
157		-3.04	389.08		
168		-3.05	389.07		
178		-3.06	389.06		
189		-3.07	389.05		
179+00		-3.08	389.04		
111		-3.09	389.03		
122		-3.10	389.02		
133		-3.11	389.01		
144		-3.12	389.00		
155		-3.13	388.99		
166		-3.14 1/2	388.97 1/2		
177		-3.16	388.96		
179+87		-3.17	388.95		

Aug 16, 1930

392.12

179+98		<sup>6.22</sup> -3.18	388.94
B.M.	3.70	3.26	387.98
183+63		-3.10	388.58
+52		-3.09	388.59
+41		-3.08	388.60
+30		-3.07	388.61
+19		-3.06	388.62
183+08		-3.05	388.63
182+97		-3.04	388.64
+81		-3.03	388.65
+70		-3.02	388.66
+59		-3.00½	388.67½
+48		-2.99	388.69
+37		-2.98	388.70
+26		-2.97	388.71
+15		-2.96	388.72
182+04		-2.95	388.73
181+93		-2.94	388.74
+82		-2.93	388.75
+71		-2.92	388.76
+60		-2.91	388.77

Get Rd. Hd to grade each side

388.07  
52  
388.59

388.12  
52  
388.64

388.17  
52  
388.69





	4.61	392.91	388.30 = B.M. 176+50 <sup>81</sup>
176+00			3.57 389.34
176+20			3.59 389.32 Finish Floor
+40			3.61 389.30
B.M.			.61 388.30
176+60			3.63 389.28
+80			3.65 389.26
177+00			3.67 389.24
+20			3.69 389.22
+40			3.71 389.20
+60			3.73 389.18
+80			3.75 389.16
178+00			3.77 389.14
B.M.			388.67

8/27/30  
 Simpson  
 super  
 Jacobszoon  
 Remmer

Pipe 176+50 <sup>88</sup>

388.72  
 52  
 389.24

Spike in E. of sill 179+81 <sup>83</sup>

Elliott  
Bailey  
Soper

44

Aug 22, 1930

1	B.M.	4.85	391.88	387.03	Finish Elev	Top of pipe 192+19 <sup>73</sup>
	192+17 <sup>E</sup>			-4.16	387.72	Set Rd. Hd. to grade
2	192+08			-4.15	387.73	"
1	191+99			-4.14	387.74	"
	+80			-4.12	387.76	Set pin to grade
1	+60			-4.10	387.78	"
	+40			-4.08	387.80	"
	+20			-4.06	387.82	"
	191+00			-4.04	387.84	"
	190+80			-4.02	387.86	"
1	+60			-4.00	387.88	"
	+40			-3.98	387.90	"
	+20			-3.96	387.92	"
	190+00			-3.94	387.94	"
	189+80			-3.92	387.96	"
	B.M.	4.94	391.88	-4.94	386.94	Record Pipe 189+61 <sup>26</sup>
	+60			-3.90	387.98	Set Pin to grade
	+40			-3.88	388.00	"
	+20			-3.86	388.02	"
	189+00			-3.84	388.04	"
	188+80			-3.82	388.06	"
	+60			-3.80	388.08	"
	+40			-3.78	388.10	"

Aug 22, 1930

Elliott  
Soper  
Barley

391.88

188+20			-3.76	388.12	Finish P	Set pin to grade
188+00			-3.74	388.14		"
187+80			-3.72	388.16		"
+60			-3.70	388.18		"
+50			3.69	388.19		"
+30			3.67	388.21		"
+20			-3.66	388.22		"
B.M.	4.49	392.05	-4.33	387.55	Record	Top of pipe 187+01 <sup>65</sup>
				387.56		Set pin to grade
187+00			-3.81	388.24		"
186+80			-3.79	388.26		"
+60			-3.77	388.28		"
+40			-3.75	388.30		"
+20			-3.73	388.32		"
186+00			-3.71	388.34		"
B.M.	4.60	392.16		387.56		
185+80			-3.80	388.36		"
+60			-3.78	388.38		"
+40			-3.76	388.40		"
+20			-3.74	388.42		"
185+00			-3.72	388.44		"
184+80			-3.70	388.46		"
+60				388.48		
+40				388.50		
+20				388.52		
183+97				388.55		
B.M.				Record		Top of pipe 183+99 <sup>84</sup>

45

387.72  
52  
388.24

1.84  
3.73  
2.71

388.02  
.52  
388.54



183 + 86	388.56
+ 75	388.57
183 + 64	388.58

(Set-Check)

Aug 23, 1930

B.M. 4.61	392.17	387.56	Top Gr.
-----------	--------	--------	---------

185 + 80	+2.63	394.80
+ 60	+2.65	394.82
+ 40	+2.67	394.84
+ 20	+2.69	394.86
185 + 00	-2.71	394.88
184 + 80	-2.73	394.90
+ 60	-2.75	394.92

Check  
 Set Rd. Hd. to line + grade  
 Check  
 Set Rd. Hd. to line + grade  
 "  
 "  
 "











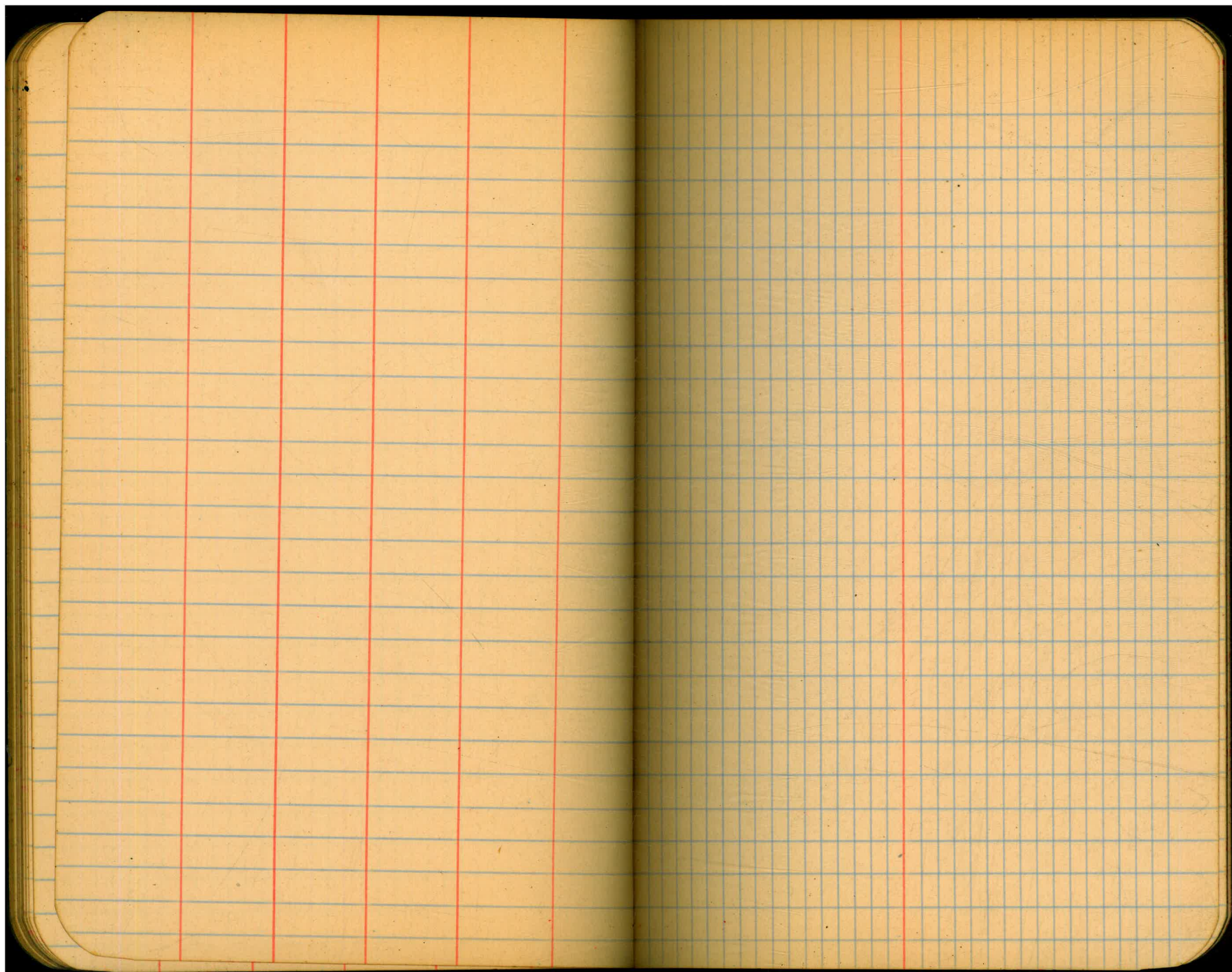






54





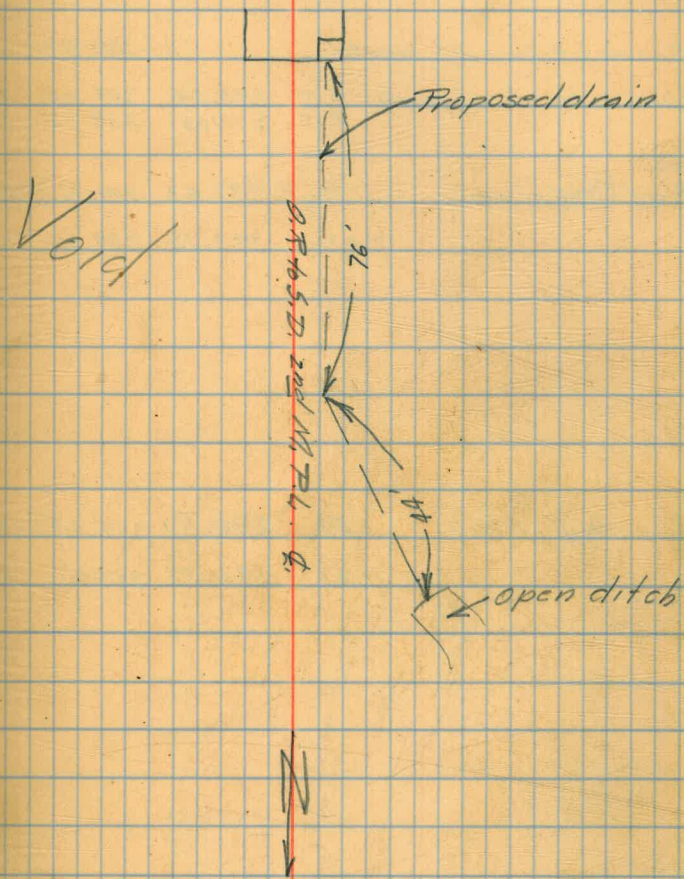


76  
76

Spotted Aug 20, by Converse

77

Exit Drain Not Staked



Aug 11, 1930

Elliott  
Soper  
Bailey

78

Entrance Well

B.M. 4.56 394.15 389.59

Tunnel Floor at portal 389.21

Well subgrade at portal 4.10 390.05 389.05 Cut 10  
4.10 390.05 389.05 Cut 10

North Wall of well 1.72 392.43 389.06 Cut 3.37 <sup>3' 4 1/2"</sup>  
2.03 392.12 389.06 Cut 3.06 <sup>3' 3/4"</sup>

172+09<sup>50</sup> Portal

172+04<sup>5</sup>

Cut 3' 3/4" 10

← 10 → Cut 3' 3/4"

South Wall of Well 1.44 392.71 389.07 Cut 3.64 <sup>3' 7 1/2"</sup>  
1.57 392.58 389.07 Cut 3.51 <sup>3' 6"</sup>

171+95<sup>50</sup>

Cut 3' 7/8" 30

o 171+98<sup>72</sup> 30 □ Cut 3' 6"

171+98<sup>72</sup>  
171+95<sup>50</sup>  
3.22

Exit Well

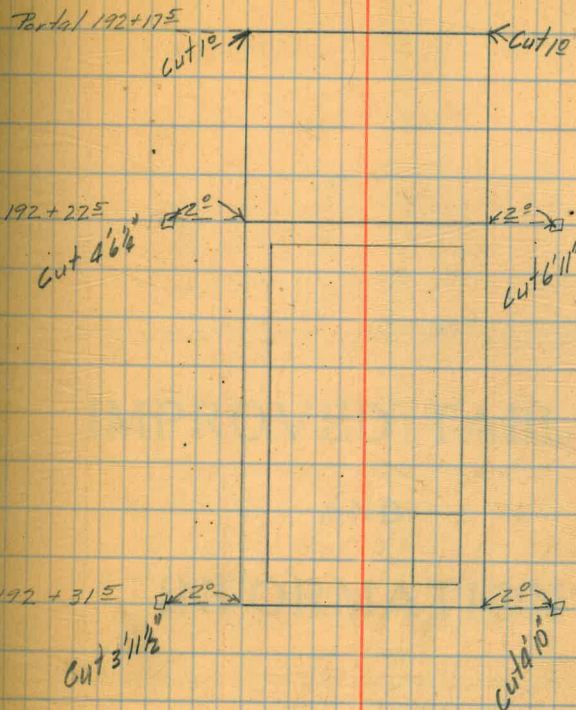
B.M. 5.32 392.35 387.03  
 Tunnel floor at portal 387.20  
 Well subgrade at Portal 4.31 388.04  $\frac{.16}{.16}$  387.04 Cut 1.0

Well subgrade at S.W. Cor.  $\frac{7.160}{7.160}$  393.95 387.03 Cut 6.92  $\frac{6.11''}{6.11''}$

Well subgrade at S.E. Cor.  $\frac{4.610}{4.610}$  391.55 387.03 Cut 4.52  $\frac{4.610}{4.610}$

Well subgrade at N.W. Cor. (Sump)  $\frac{0.57}{0.57}$  391.78 386.95 Cut 4.83  $\frac{4.10''}{4.10''}$

Well subgrade at N.E. Cor.  $\frac{1.94}{1.94}$  390.91 386.99 Cut 3.95  $\frac{3.11\frac{1}{2}''}{3.11\frac{1}{2}''}$



Pin 192+1923  
 192+1750  
 2.43  
 192+22.50  
 192+19.93  
 2.57  
 192+31.50  
 192+19.23  
 11.57



DIRECTIONS FOR USE OF TABLES

TABLE No. 1.

Distance of slope stake from side or shoulder  
for any width roadway slope 1 to 1  
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

192+20  
21+81  
2+58  
189+62  
1+29  
188+33

IMPROVED TABLES

AND

INFORMATION

TABLE No. 2.

To find Tangent and Extent for curve of  
any other degree, divide by degree of curve and  
add constant found in column of constants.  
Length of curve with a given  $L$  may be found  
by dividing tangent (or extent), opposite  $L$  by  
given tangent (or extent).  
The distance from a point on the tangent to  
the curve is very nearly the square of the tangent  
length divided by twice the radius.

181 + 00.00  
176 + 50.98  
4 = 49.52

171 + 98.72  
2 + 51.28

177 + 50.00  
2 00.48

176 + 50.48

3 + 30.90

179 + 81.38

192 + 19.93

- 2 + 57.97

189 + 61.76

5.26

172 + 18.51

171 + 17.71

177.9

51.28

177

.6 96

5 63

192 + 22.50

19.93

2.57

2.33

4.31

.84

6.96

5.15

1.81

102

182.78

192 + 19.93