



#8

FIELD BOOK

No. 8

1004

1004

KEUFFEL & ESSER CO.

DRAWING MATERIALS AND SURVEYING INSTRUMENTS. NEW YORK.

CHICAGO. ST. LOUIS. SAN FRANCISCO. MONTREAL.

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.

"Copyright, 1895, by Keuffel & Esser Co."

	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.

For Keith's Railroad Curve Tables see end of book.

1004

Eugene Schaub
Logan Utah

Please return

Sept 19, 1916

No Smithfield City
notes in this book

Border Co. Lumber
for cement on N side Bldg.

4.11

Melville H₂O

Works

Slope from Church
Cov and one block S
-1°16
-1°39 to ground.

Going one block S of Church
Cov look N +1°22
slope of ground

Water Pressure

Hyman Hulre Barn
Hydrant with 1 c/s
discharging thru
a 2" pipe or cov
he had 25#

at Grifford's 25#
bad hydrant fair flow
Barn hydrant 4 gal per min
pressure 23#

9/20/16

0233000
1398000

Carry Melson's 26#
flow good or fair by house

#

Milville H₂O
discharge meter

Name	Q	time	L of 1/2"	L of 3/4"	Hydrot
9	12	10 ^{9 1/2} "	23	26-6	75
1	#1	12	15 1/2	57	26
1	#2	12	14 1/2	"	75 #
2	#1	12	18 1/2	112	"
2	#2	12	19	112	"
3	#1	12	22 1/2	168	"
3	#2	12	23	168	"
4	#1	12	26	224	"
4	#2	12	26		"
5	#1	12	11		70 1/2
5	#2	12	10 1/2		
5	#1	12	12 1/2		70 1/2
5	#2	12	13		70 1/2
1	#1	12	20	57	57
1	#2	12	20	57	57
6	#1	12	11		120 1/2
6	#2	12	11		120 1/2

Two

168
56
224

Remark
E flow at Burn 3 90° 3/4" turns

at 1 square

T to Hyd.

a 90° turn (west)

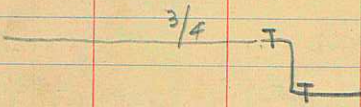
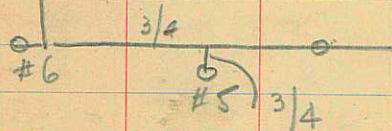
(1/2) from 3/4 curb

investigation on 3/4 from curb can see over

} both 1 + 5 open

#80

#70



Hyd #	Q	Time	Loj 1/2	Loj 3/4	H. 75"
4	12	13		181	
7	12	13		181	
8		18 1/2		242	
8		19		242	

62
3
186

this Hyd. open
press. on # 7 = # 40

#8 press at 6 = 46

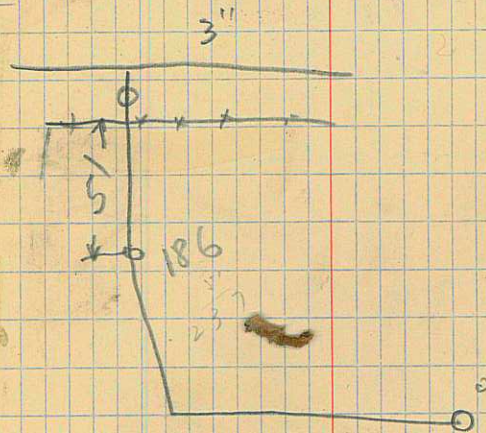
#8 " at 5 = 52 257

#4 open 3 = 30 #

" " 2 = 45 #

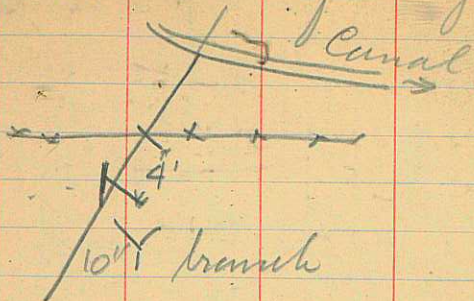
" " 1 = 56 #

9/26/15 At Besjensen
12 qt 26 1/2 186



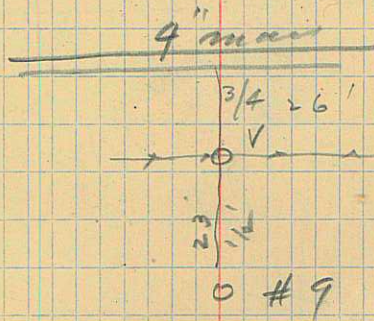
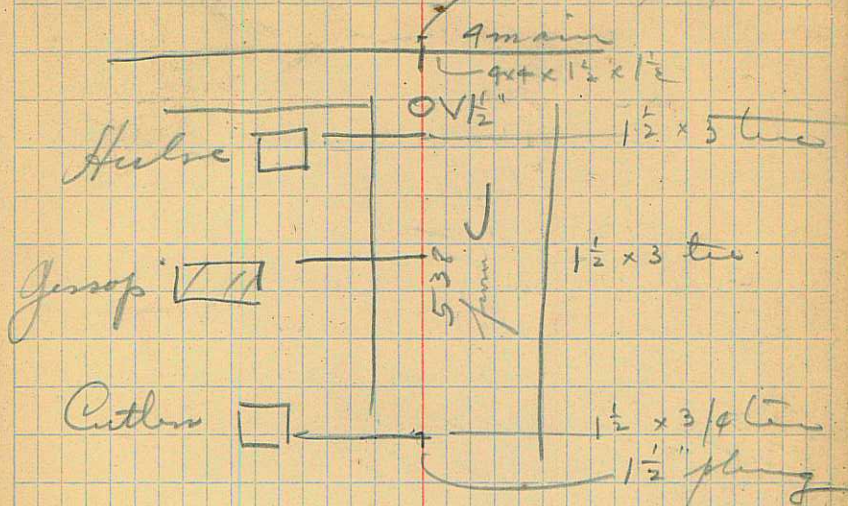
12

Notes on fittings



13

Extension on #864 well
(plug here) is plugged



O #9

Melville H₂O
 pit at Trolsen.

Hydro St. press at 62[#]

#	Q	time
9	12	12 $\frac{1}{2}$
8	12	17 $\frac{1}{2}$
4	12	29 $\frac{1}{2}$
3		25
7		15 $\frac{1}{2}$
6		13
2		21 $\frac{1}{2}$
5		12
1		16

1	12	24 $\frac{1}{2}$	on $\frac{1}{2}$ "
5		25 $\frac{1}{2}$	$\frac{3}{4}$ "
2		17 $\frac{1}{2}$	$\frac{1}{2}$ "
6		28	$\frac{3}{4}$ "
7		18 $\frac{1}{4}$	$\frac{3}{4}$ "
3		21	$\frac{1}{2}$ "
8		34 $\frac{1}{2}$	$\frac{1}{2}$ "
4		23 $\frac{1}{2}$	$\frac{3}{4}$ "
		39 $\frac{1}{2}$	

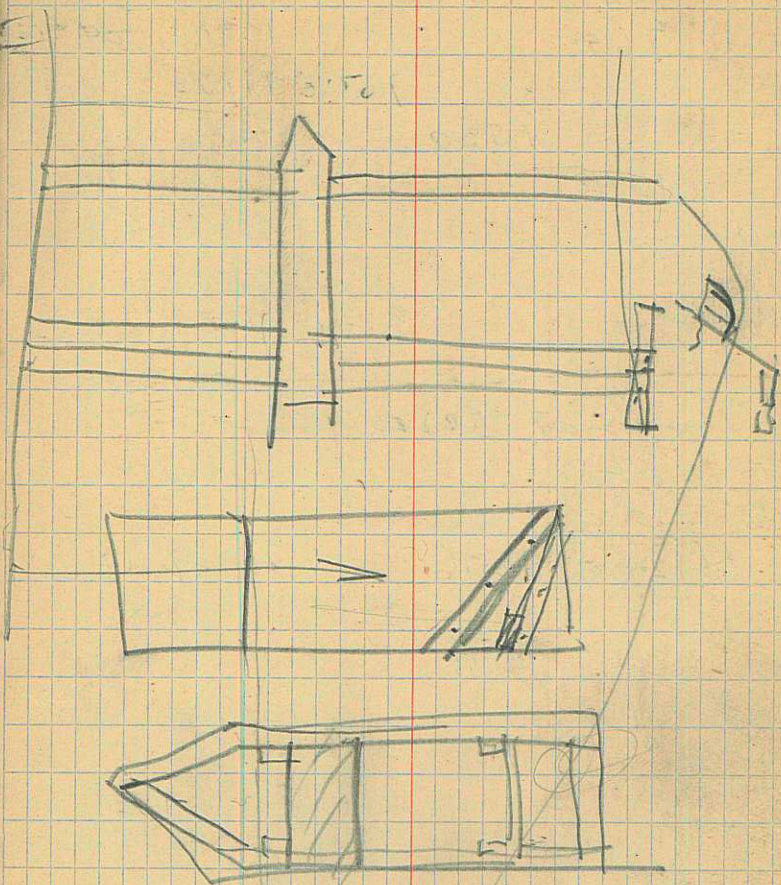
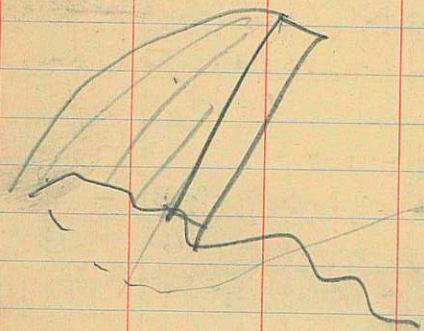
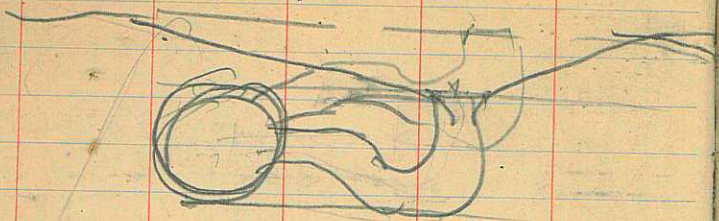
With 62[#] a Trolsen

water wash at
 end of Hemmer lane
 tub full in 9" - 20 gal

9/60⁴
 6.4
 20
 128.0 gal min

#4 open per #3 = 25[#]
 #7 " " 6 = 35[#]
 40[#] Hydro

7/78



18^{10/5/16}

BS	FS	IM	Ele	WT
7.64			197.16	204.80
		7.500	197.30	
10.08	1.530		203.27	213.35
	4.62		208.74	

Bm b

8.200 205.16 213.36

Levels at Reservoir

Bm A	8.41		193.67	202.08
Bm B		8.26		
+	2.08	12.76	189.32	191.40
		3.91		
x	1.90		189.31	191.27
		4.11	187.10	191.21
35' E of inside wall on stake		3.12	188.10	
35' E	1.36			189.46
	0.31	11.51	177.95	178.26
	0.21	11.22	167.04	167.25
reservoir		4.37	162.88	
end of wall		11.00	156.25	
east corner		4.05	163.20	

197.20

204.80
- 7.50

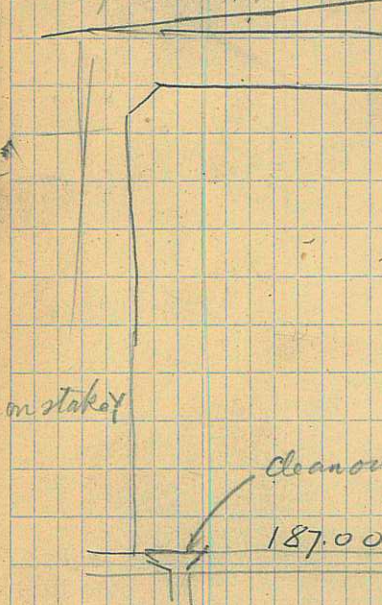
197.30

213.36
- 4.62

208.74

on crest
top of overflow low basin

on spill upper chamber



cleanout = 187.10

187.00

Distance from fence
22' - 2 1/2'

197.16
- 7.64

204.80
- 1.53

203.27
- 10.08

213.35
- 4.62

208.73

193.67
- 8.20

202.07

3.91
- 2.08

1.83
- 1.70

3.73

202.07
- 12.76

189.31

189.31
- 1.90

191.21
- 187.10

4.11

189.31
- 2.08

191.39

1/2 3.25

11.62

208.74
- 130

5

2095.4
- 2871.4

224.0

191.39
456
186.83

197.30
10.66
186.64

208.74
209.74
187.30
22.44

104
69
35
187.30

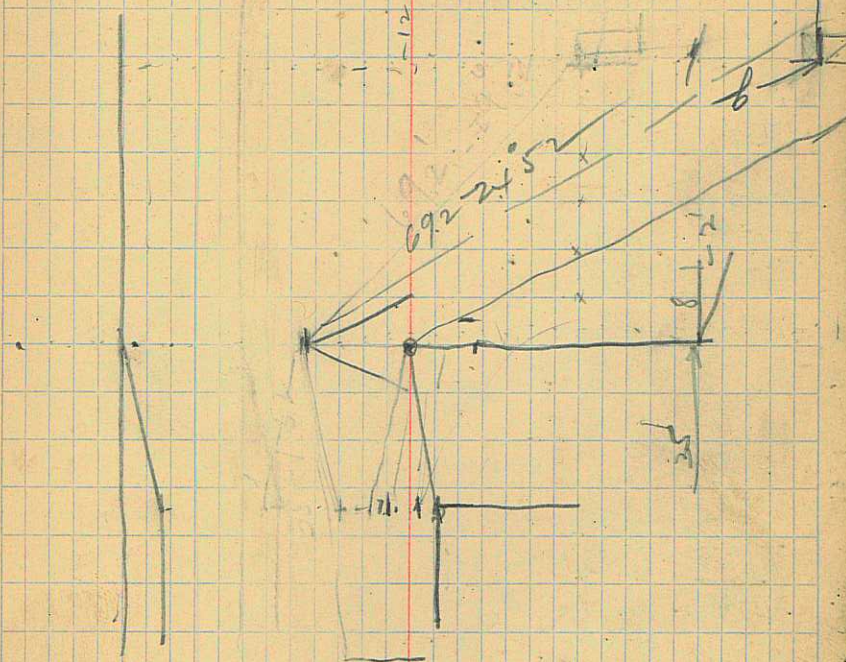
187.30
20
207.30

82
69
43
56.58

0.0349
35
1745
1047
1.2211

69
35

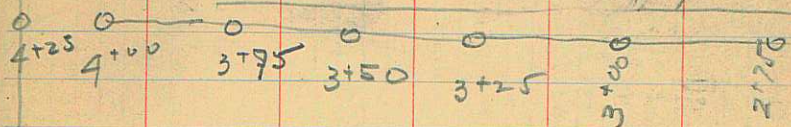
42
69
378
252
2898



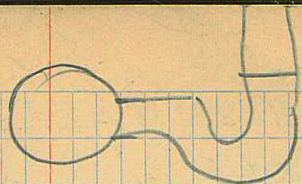
27

Borden
Co. Sewer grade

← 10.4490/6 to



275
250
21

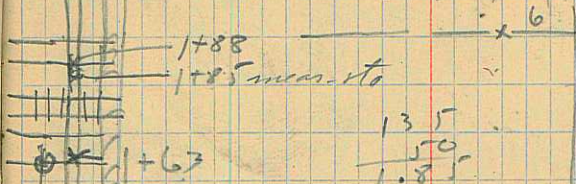


185	185
26	26
211	230

1+53

2+54

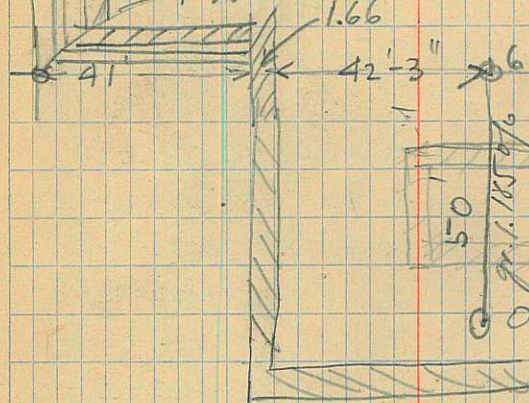
Landmark
Porch



235
19
254

422

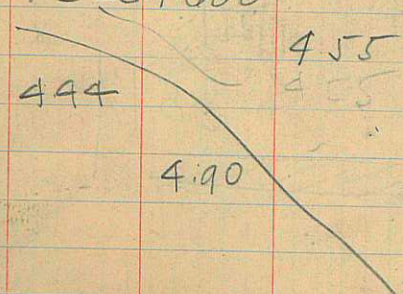
Toilet
1+35



50
42.25
1.66
41
135.91
28
163
135
50

24

Sta	Bs	Fs	IM	Ele	HI
4+25	8.65			100.00	108.65
4+00			2.75	105.90	
3+75			3.06	105.59	
3+50			3.39	105.26	
3+25			3.21	105.44	
3+00			3.41	105.24	
2+75			4.05	104.60	
2+54			4.25	104.40	
2+30			1.31	107.34	
2+11			1.18	107.47	
2+00			4.77	103.88	
1+88			1.21	107.44	
1+77			5.24	103.41	
1+63			1.24	107.41	
b	4.760	1.270		107.38	112.14
			4.600	107.54	
a	4.520	4.600		107.54	
			4.55		
a	4.44			104.54	111.98
0+73		4.90		107.08	
0				105.04	
b	3.27		6.85	107.38	110.65
1+59				103.80	
1+35		4.70		106.25	



Borden Co
Logan

188
211
77

211
188
23
77

1+53 to 0
= 2 1/2 of 0

grd Ele	Cut.
100.000	
112	
100.112	5'-9 1/2"
112	
100.224	5'-4 1/2"
112	
100.336	4'-11"
112	
100.449	5'-00"
112	
100.561	4'-8 1/4"
112	
100.673	3'-11 1/8"
108	
100.767	3'-7 1/2"
108	
100.875	6'-5 1/2"
108	
100.960	6'-6 1/8"
105	
101.025	2'-7 1/2"
105	
101.079	6'-4 1/2"
108	
101.110	2'-3 5/8"
107	
101.186	6'-3 1/8"

on the main track
on flat form
on the N side track
on flat form

on mark in building
On new floor 100'

(Change of gr)
cut 1+53.

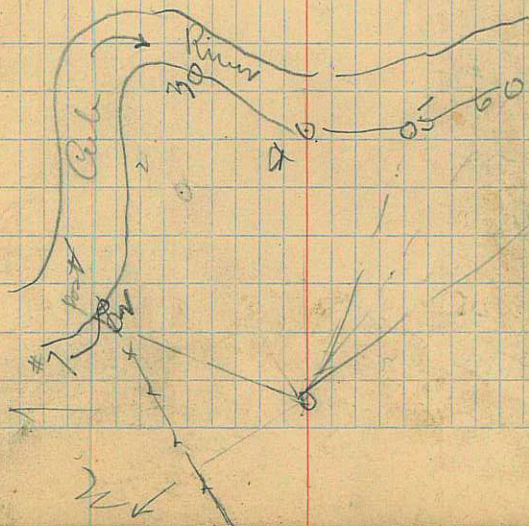
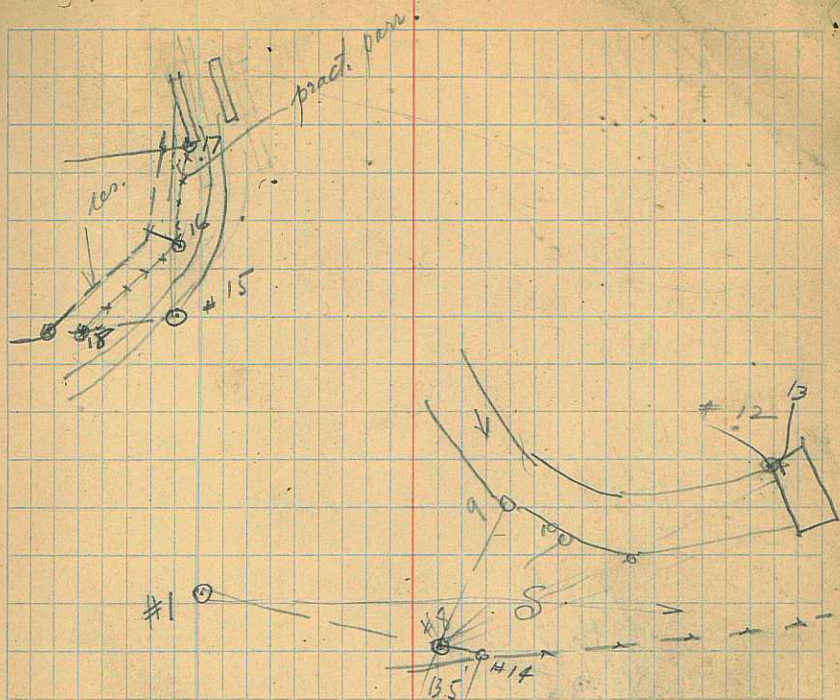
103.22	3'-10 1/2"
101.19	2.61 = 2'-7 1/2"
101.22	at 1+53
101.67	4'-7"

on the so side track

26
 Survey for Old Merrill
 at Cal River mill

8453	19	168°57'	Vert L			
373	14	168°57'		U	C	L
47	18					
274	17	270°25'		105'		
79	16	270°07'				
	12	270°04'				
15-						
	15	348°57'				
14						
13.5	14	8°36'				
	13	314°02'	-2°55'	13.00		7.47
	12	313°50'				7.4
	11	312°30'	-5°48'	13.00		10.10
	10	294°30'	-6°15'	13.00		10.50
	9	278°30'	-7°30'	13.00		10.70
8-						
	8	8°36'	check this 8°26'			
	7	236°54'				
	6	335°30'	-5°20'	13.00		10.000
	5	319°05'	-7°25'	13.00		10.75
	4	305°	-10°40'	13.00		10.02
n 4 cm	22	266°20'		13.00		10.02
	3	272°54'	-9°45'	13.00		11.28
	2	237°01'	-14°14'	13.00		10.73

10/7/16



Dist^g 28
T

2

Vert L

C1

C

L

4.60
39.12
6.24

206
123.6
76.4

75' 123°01' to SE cor Lewis est.
21-

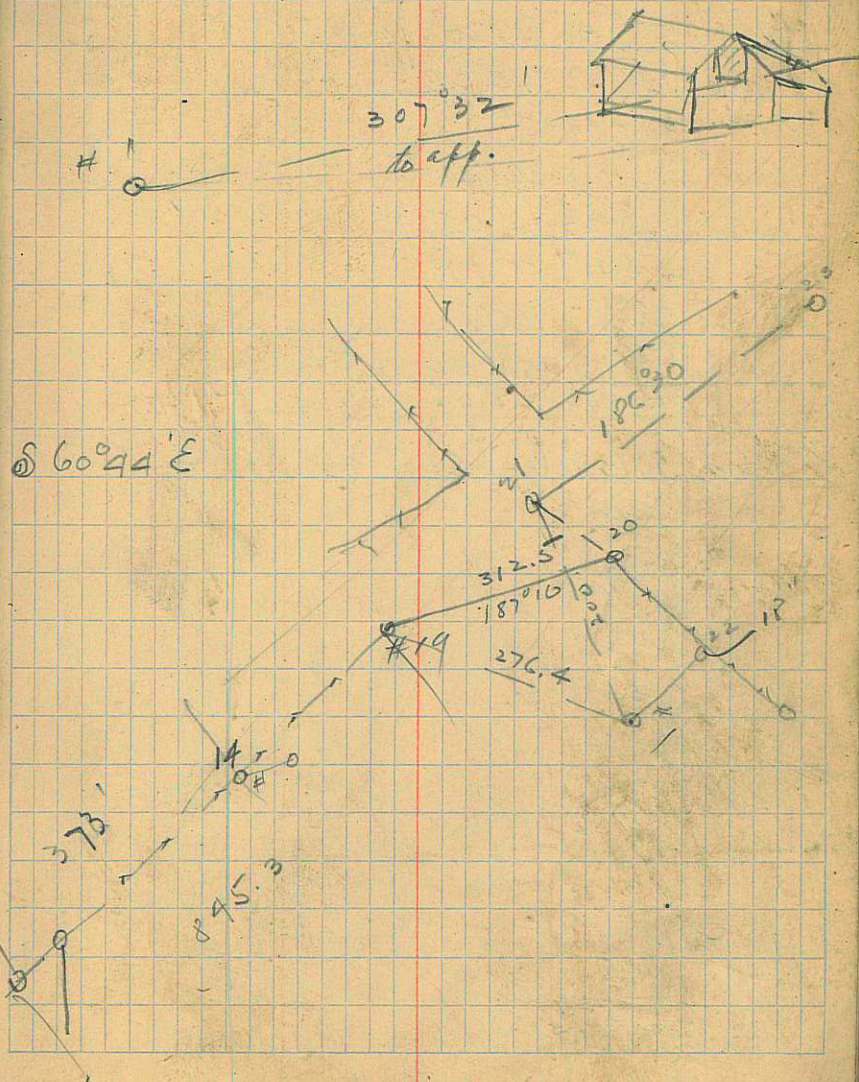
23-	299°16'	✓
2000	23 186°30'	✓
23' 20	249°10'	

21- 7 268°24'

22	133	22	145°09'
2006	21	21	120°07'

1-	1	223°25'
	20	187°10'

19-



30

HHH Sat Oct 7-16

HHH

Ob

	Long	Vert	
hbrct	57°10'	23°20'	3:45 P

brvnt	58°03'	22°36'
-------	--------	--------

mcom	57°36'30"	22°58'
------	-----------	--------

hbrct	57°47'	22°51'
-------	--------	--------

brvnt	58°43'	22°05'
-------	--------	--------

	58°15'	22°28'
--	--------	--------

hbrct	58°25'	22°22'
-------	--------	--------

brvnt	59°13'	21°42'	3:52 P OK
-------	--------	--------	-----------

	58°49'	22°02'	err fact = 2
--	--------	--------	--------------

Zoncom	58°33'30"	(22°29'20" err fact = 22°27')
--------	-----------	-------------------------------

$$Z = 8960 - 2227 = 67^{\circ}33'$$

3.22 miles south of the
state line.

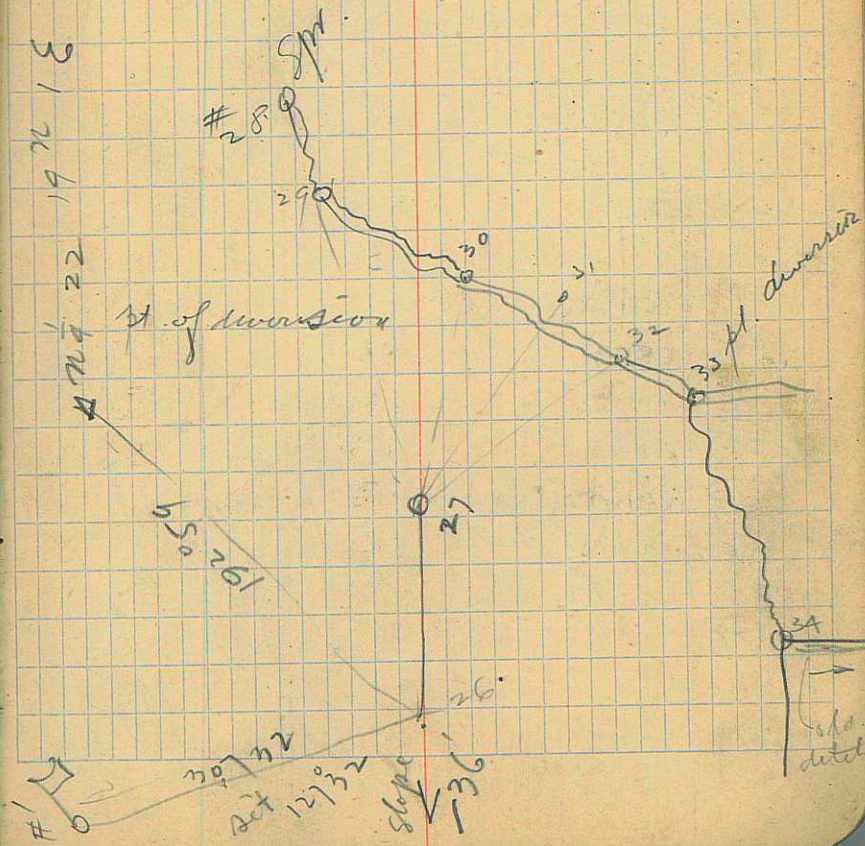
$$\phi = 41^{\circ}57'$$

$$\text{Long} = 111^{\circ}50'$$

Add 49' to
all ϕ .

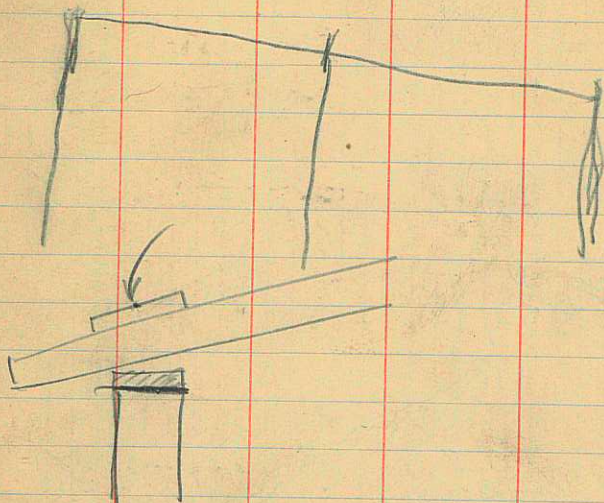
\bar{A} Pr $\frac{1}{2}$ Vert U C L

34	50°37'	5	7.30
33	306°16'	13	8.19
32	295°25'	13	7.05
31	276°30'	13	6.10
30	270°47'	13	5.65
29	260°30'	13.	8.70
28	260°45'	13.00	7.20
27-			
27	270°16'	+2°12'	7.00
26	192°59'		3.16



9/16 & 1 1/16

RIR
125



↑
ding wall 3 1/2" over 8"

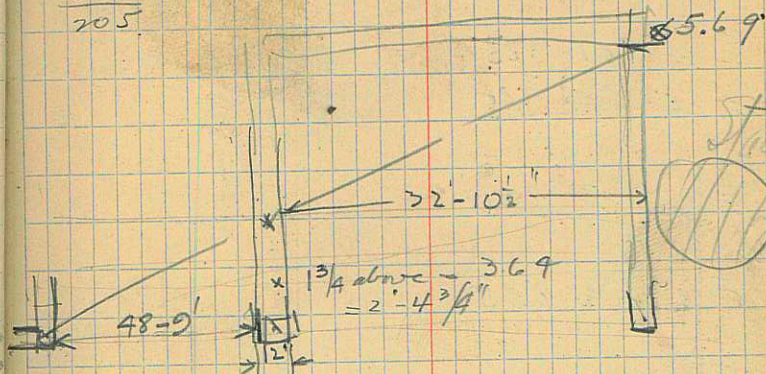
$$\begin{array}{r} 5.7 \\ 3.78 \\ \hline 1.78 \end{array}$$

$$\begin{array}{r} 3.64 \\ 1.25 \\ \hline 2.39 \end{array}$$

2 - 4 3/4

$$\begin{array}{r} 5.67 \\ 1.25 \\ \hline 4.42 \end{array}$$

$$\begin{array}{r} 5.69 \\ 3.64 \\ \hline 2.05 \end{array}$$



$$\begin{array}{r} 49-9 \\ 32-10 \\ \hline 82-7 \end{array}$$

$$\begin{array}{r} 82.58 \\ 4.44 \\ \hline \end{array}$$

$$\begin{array}{r} 49.75 \\ \hline \end{array}$$

$$\begin{array}{r} 49.75 \\ 4.44 \\ \hline \end{array}$$

$$\begin{array}{r} 19900 \\ 19900 \\ \hline \end{array}$$

$$\begin{array}{r} 19900 \\ 22089.00 \\ \hline 1652 \end{array}$$

$$\begin{array}{r} 5569 \\ 4956 \\ \hline 61302 \end{array}$$

$$\begin{array}{r} 61302 \\ 578 \\ \hline \end{array}$$

$$\begin{array}{r} 82.60 \\ 2.67 \\ \hline \end{array}$$

$$\begin{array}{r} 1.25 \\ 2.67 \\ \hline \end{array}$$

$$\begin{array}{r} 3.92 \\ 3.64 \\ \hline \end{array}$$

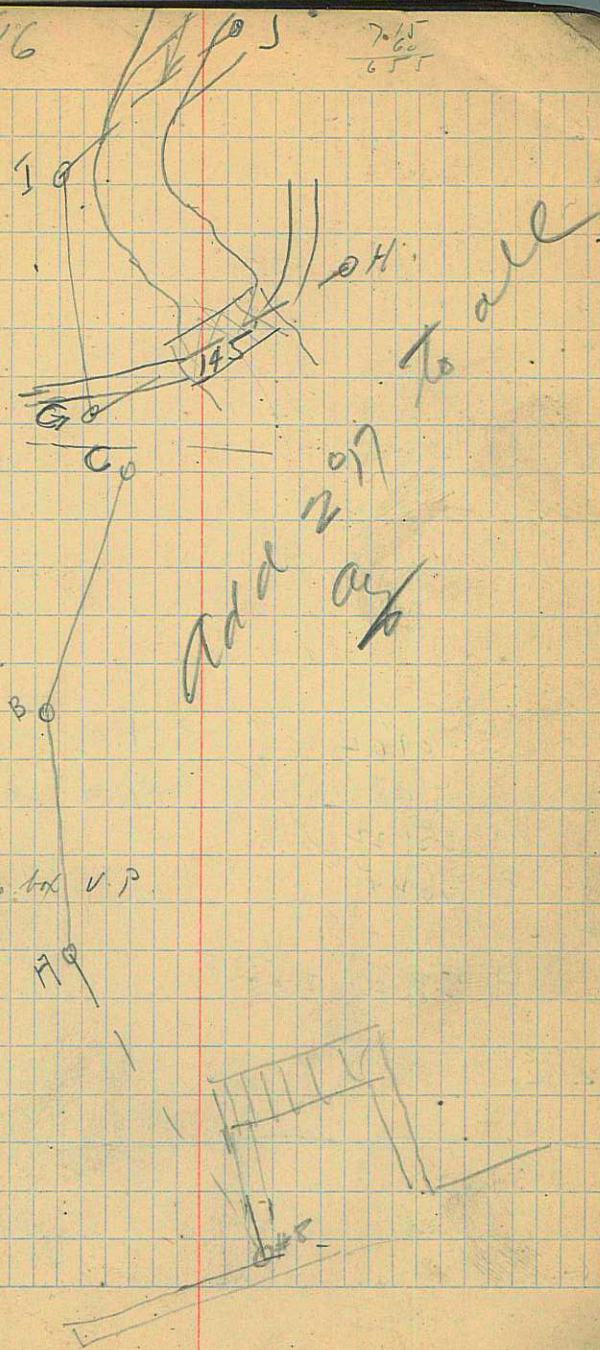
$$\begin{array}{r} 3.64 \\ 2.38 \\ \hline \end{array}$$

Topo. for State Pond

L-	53°14'	282°05'	to miller U.P. station & corner spot
K-	Pe	Dist	
	L	26219	325'
		K236°22'	258'
	J	26955'	x
I			
	I	22901	325'
	H	282°42'	145'
G			
	G	241°05'	320'
F			
	F	276°04'	655'
E-			
	E	276°04'	60'
D-			
	D	246°52'	250.00
		251°49'	
C-			
	C	211°26'	200'
	A	34522'	200'
B-			
	B		200
	#8		
	*8		208.5
A-			

10/17/16

7.15
6.55



38

Stama

309°4

1.0

4.09

1°48

7.0

4.91

#8 351°22'

B 166°44' ✓

A

A 231°30' 204.5^{-22°15'}

4 -

289°

43.6

G

20.0
156.4
93.6E end Dam Wall
west end ^{#54} con. Wall of dam

H S meri.

Set on #4. H.S. Hat de applic. survey
sect 229°35' F5 to #9

to mid (down stream) post

40

Levels State Dam

	BS	FS	in	Ele	HT
	2.1100			73.875	75.975
(a)	6.395	10.590	8.690	67.285	
				65.385	171.780
			5.105	66.675	
			2.345	69.435	
u	4.770			65.385	70.155
	11.840	0.940		69.215	81.055
	10.730	0.880		80.175	90.905
			12.11	78.795	
	8.070	1.405		89.500	91.570
			10.75	96.82	
	11.055	1.41		96.160	107.215
	8.700	0.45		106.765	115.465
			4.770	110.695	
			4.710	110.755	
(b)			17.175	108.290	115.465
(c)		6.600		108.865	
(b)	4.35			108.29	112.64
			12.61		100.00
			12.69		12.64 = m
			12.63		
			14.045		98.595

10/17/16

4

$$\begin{array}{r} 5.105 \\ 2.76 \\ \hline 2.345 \end{array}$$

$$\begin{array}{r} 9.695 \\ 4.35 \\ \hline 14.045 \end{array}$$

on red mark L + M Canal gage low
on hook L + M. nyo gage

on hook staff at 6.00 Gort Sta.
zero of gage 60.675

on hook staff at 3:00 zero = 75.795
Station just below H.F.C. plant
about 1' over control
gage read 1.32
on ^{left} side of road to L-M intake
near gage house below confluence of
Run at tail race

end post E side of dam
second from end
on nail used for gage marked BM 100

on nail BM called 100
east side crest
middle
west end crest at 4:15 PM

42

	B S	I S	cm	Ele	HT
(c)	4.840	0		108.865	113.705
	3.580	0.950		112.755	116.335
			10.21	106.025	
			11.47	104.865	
	7.600	1.250		115.085	122.685
	1.775	12.650		110.035	111.810
			4.770	107.040	
			12.270	99.54	
	3.370	0.610		111.200	114.570
			10.18	104.39	
	5.600	1.680		112.890	118.990
			✓ 11.02	107.47	✓
(d)			✓ 2.73	115.760	
			✓ 8.34	110.15	
			✓ 3.925	114.565	✓
			✓ 10.19	108.30	✓

Check levels back

d	2.730	
	2.160	5.250
	10.120	3.485
	0.550	8.160
	7.010	6.430
	22.570	6.720
		30.045

OK

on ^{side} ~~side~~ ^{of} ~~of~~ ^{the} ~~the ^{Right} ~~Right~~ ^{upstream} ~~upstream~~ ^{cor} ~~cor~~
 the ^{flung} ~~flung~~ ^{of} ~~of~~ ^{cross} ~~cross ^I ~~I~~ ^{beam} ~~beam~~~~~~

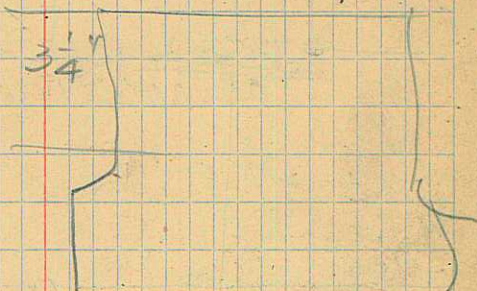
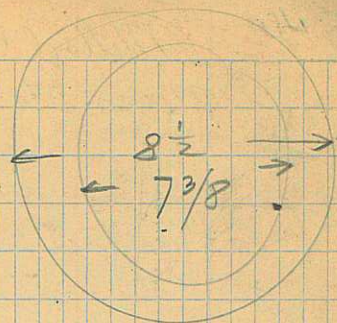
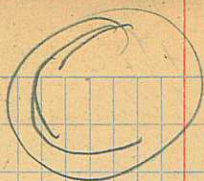
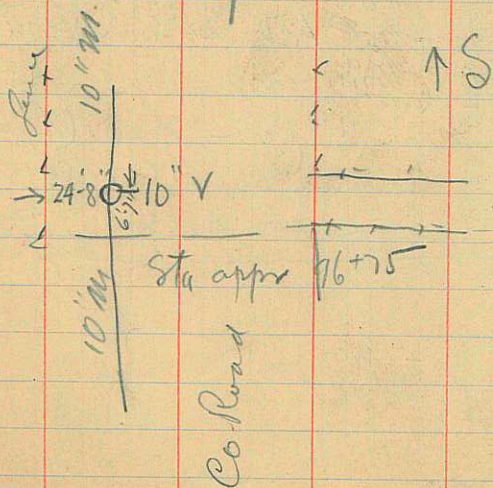
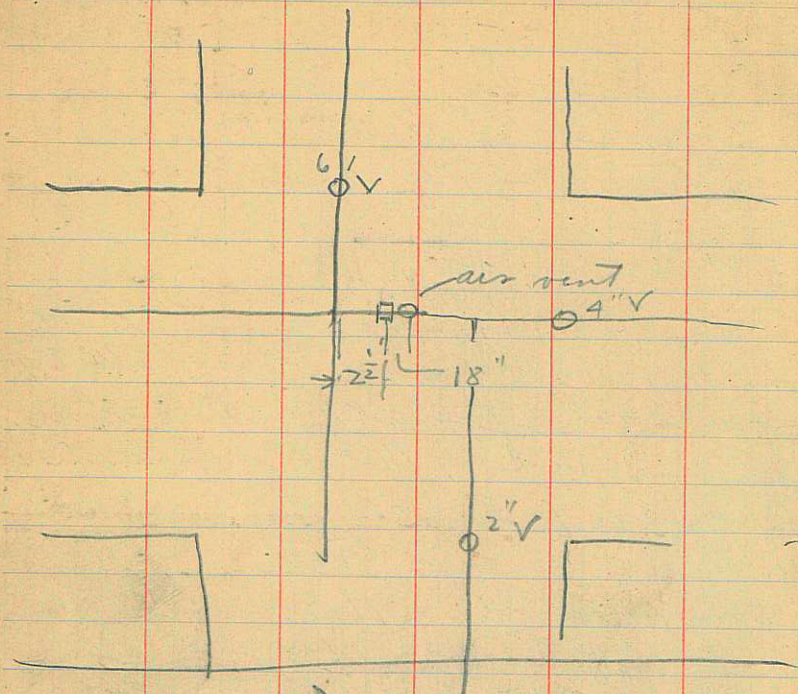
on large nail in pole #663. marked ^{height} ~~height~~ ^{E₁} ~~E₁ 15.00
 } 3: on zero of scale hook read 2.17
 } shiftery bed. Water 1' deep on run.
 } on hook first sta. below confluence
 } of gage. 1.03
 } when set on hook staff read as 1.00
 } on hook back Riv. U.P. staff 3 at zero.
 } gage read 1.37 at 5:05 PM
 } on U.P. Bm. lead plug near SE cor. of
 } ^{zero = 108.15} ~~zero = 108.15~~ U.P. Race hook. (hook read 1.37)
 } on Bm. nail in large hole of U.P. Race gage
 } U.P. Race contra & crest~~

on nail at dam gage marked 100

10/27/16

40

Melballe H₂O fittings

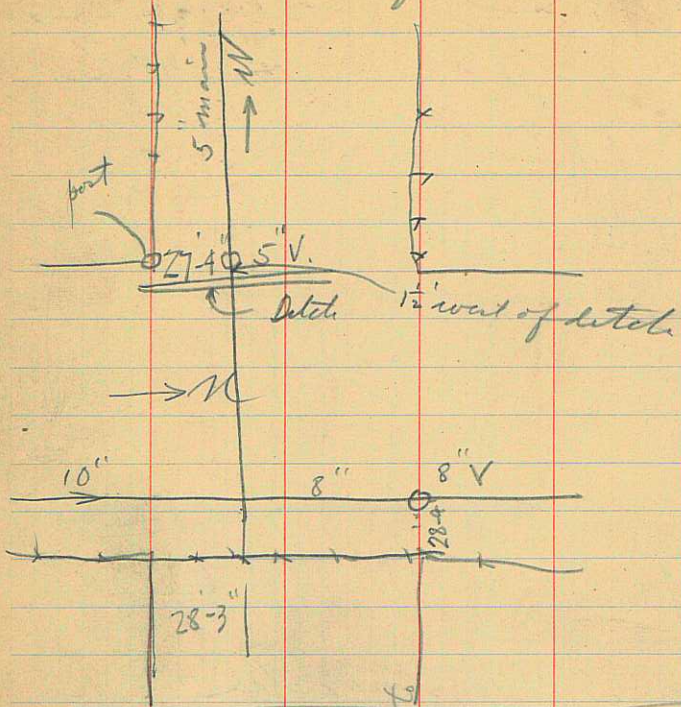


700	934
400	16
260	
2604	

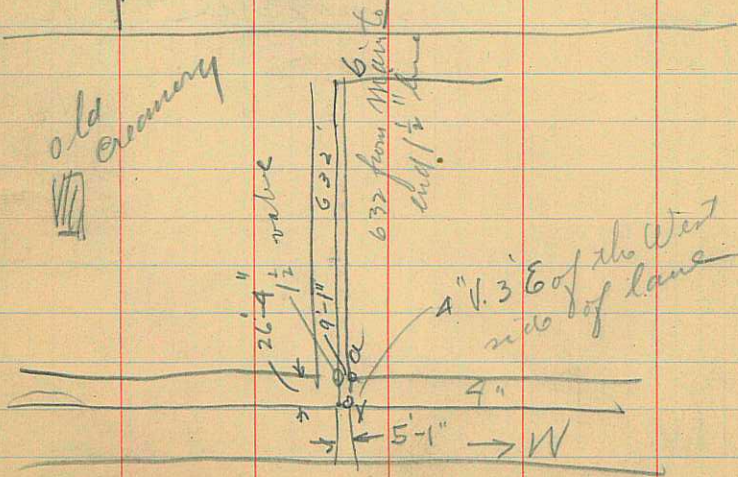
10/27/16

Pressure at Bis Roche's = 70⁴

46 Mullocke H20, 10/22/16
 meas to following



old
 runway

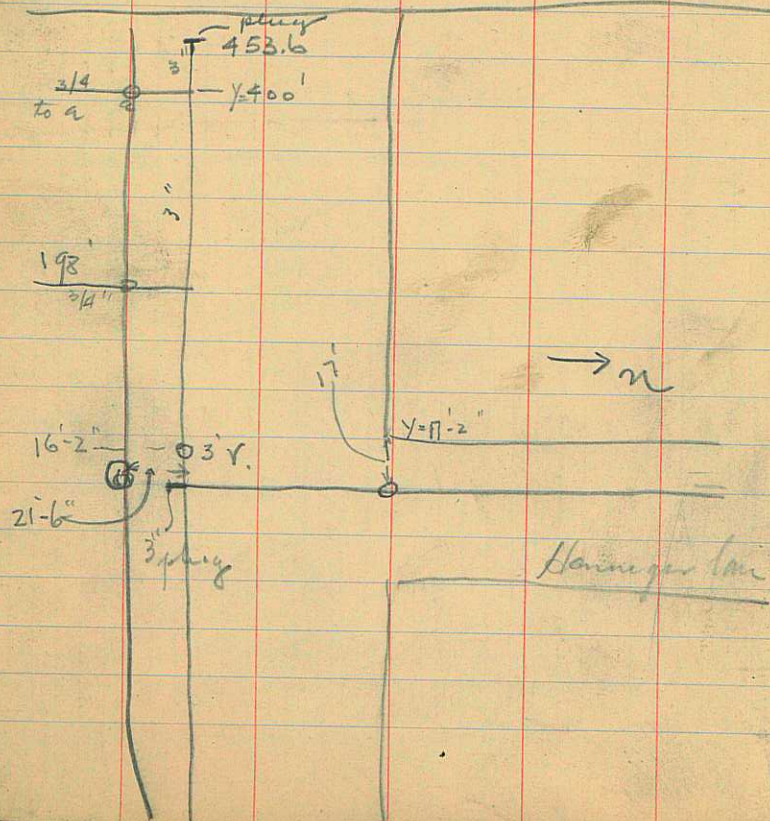
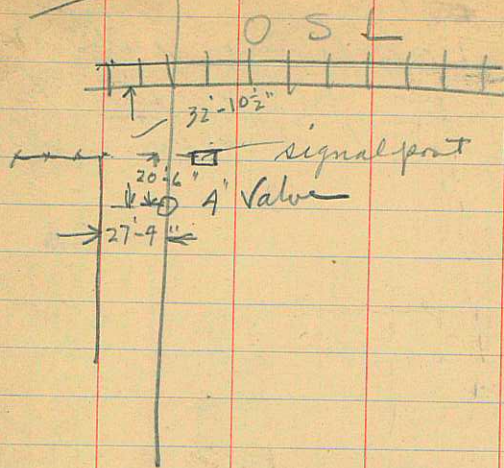


Notes as

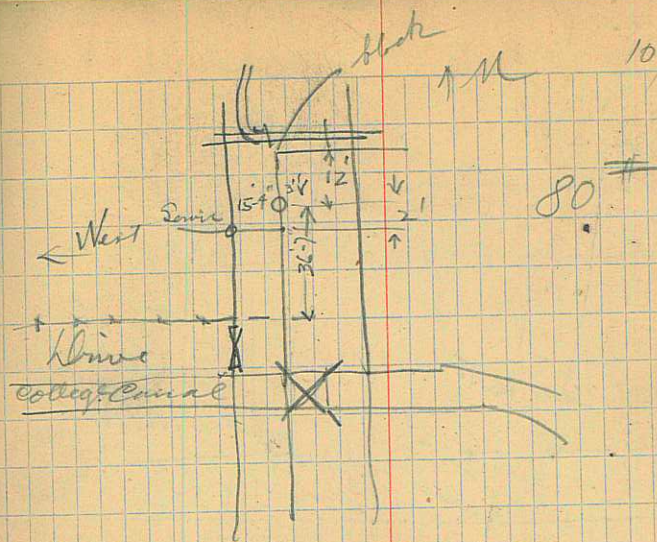
10/22/16

end of 1 1/2 pipe in (years) lane
 must have a 1 1/2 x 1 1/2 x 3/4 bar
 and in all as there now

48

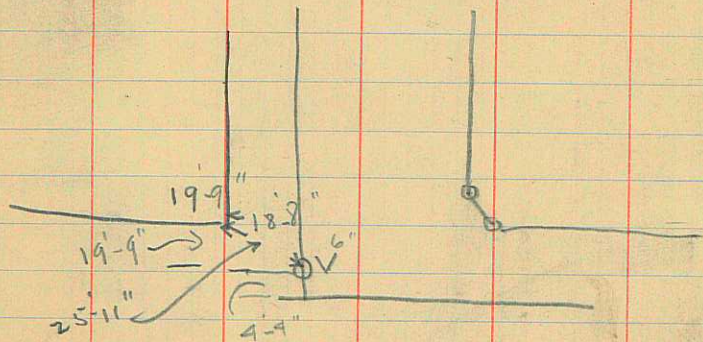
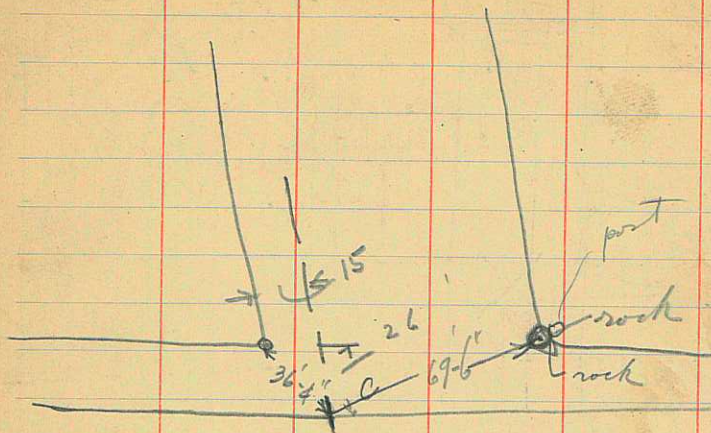


10/23/16

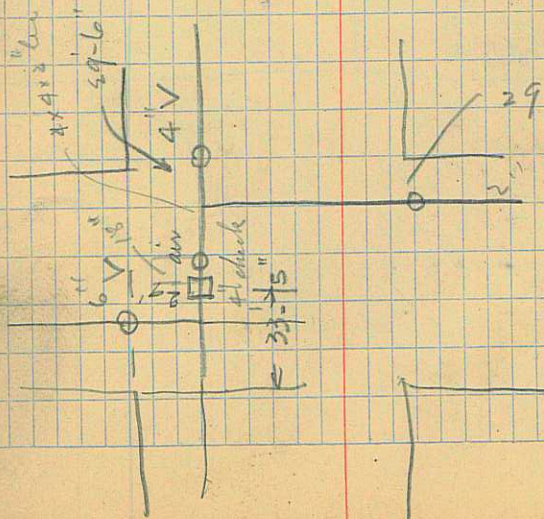
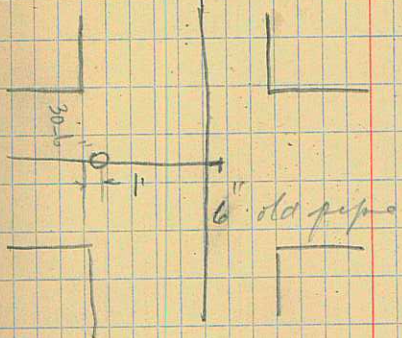
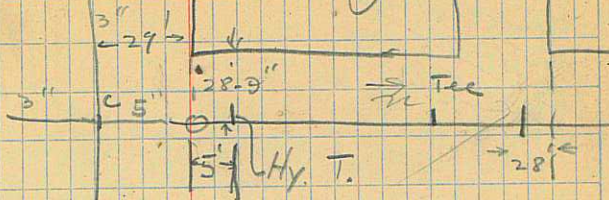


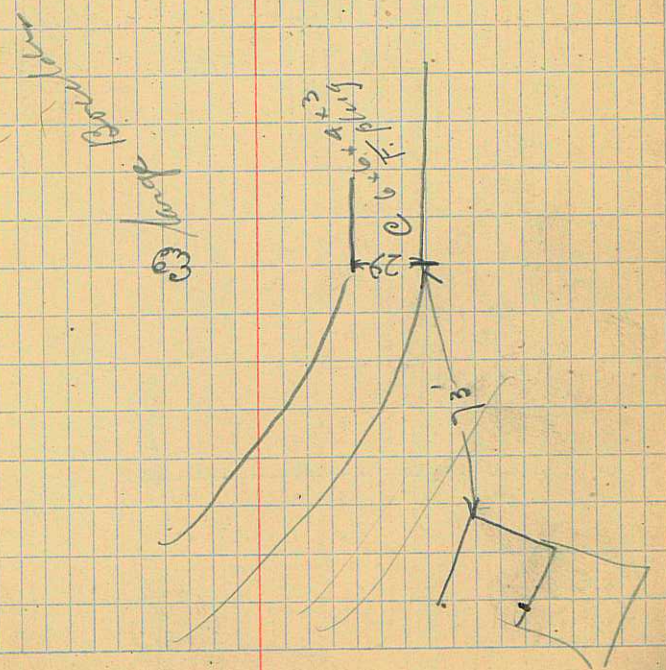
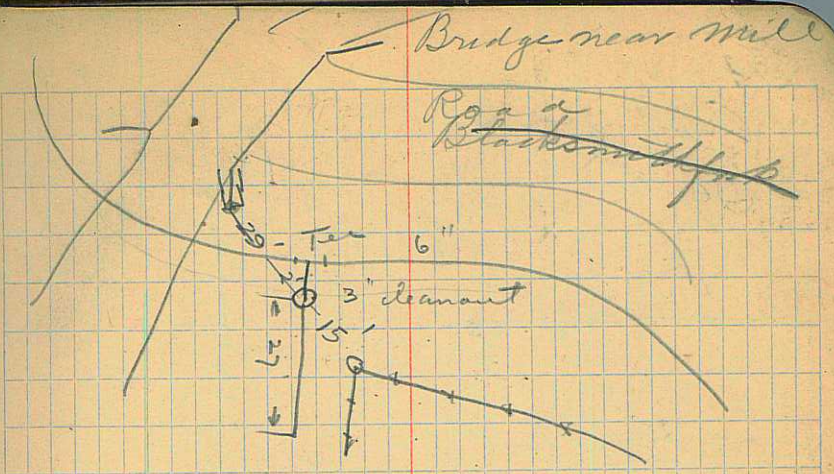
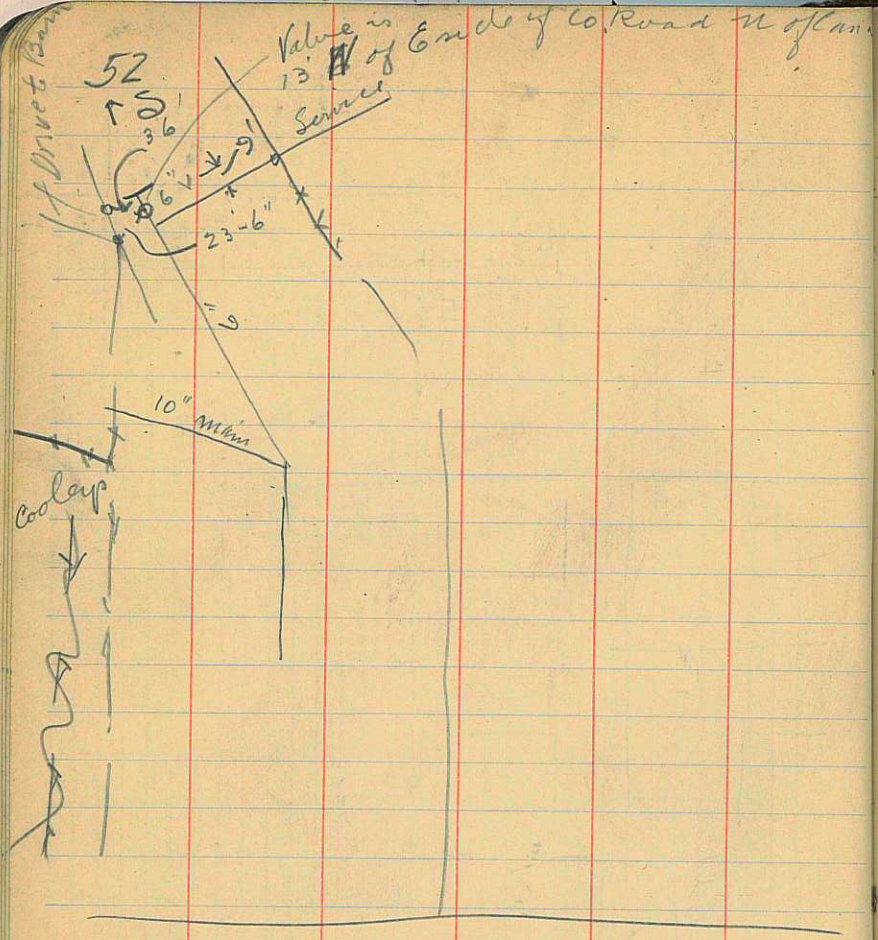
at Alma Larsons 77 #
 3 gal in 24 1/2 sec. at Barr
 at home 3 gal in 18"

50



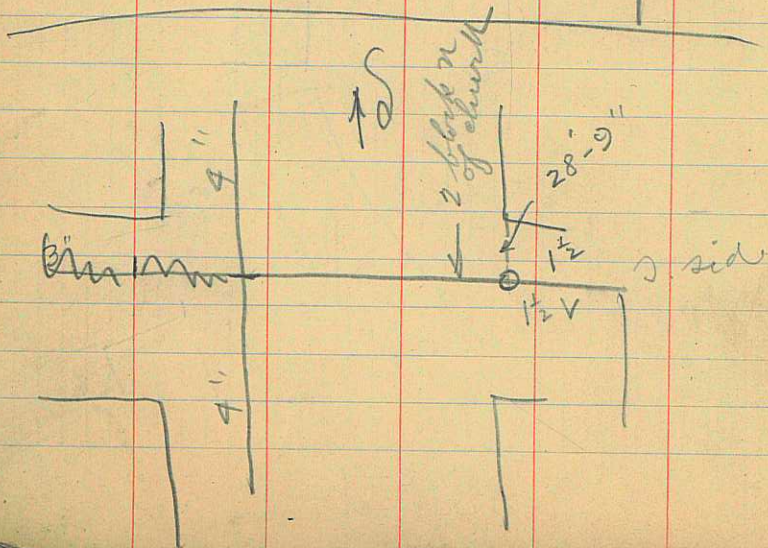
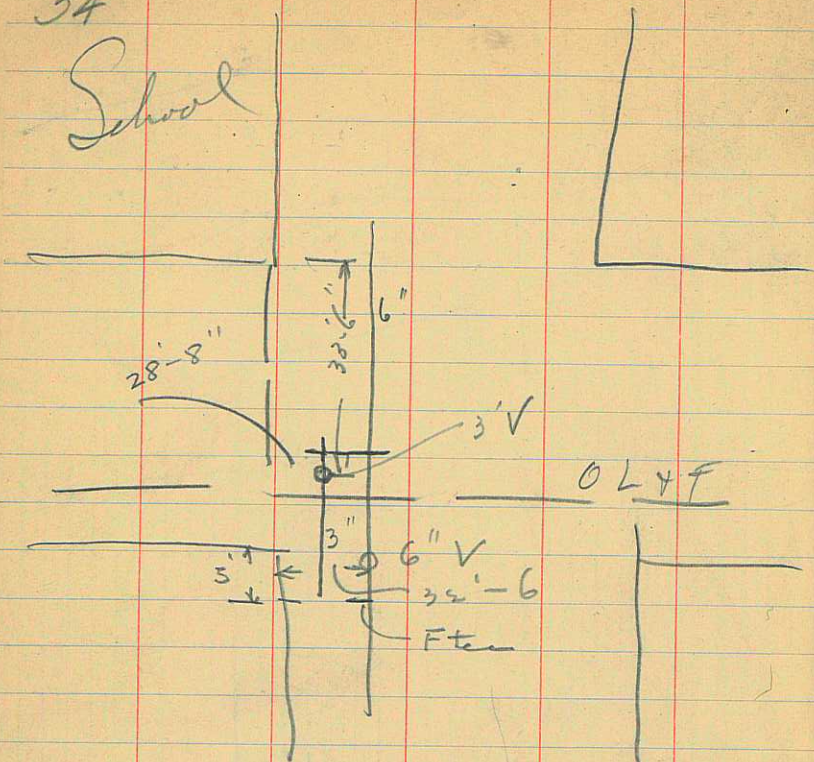
Bas Jensen





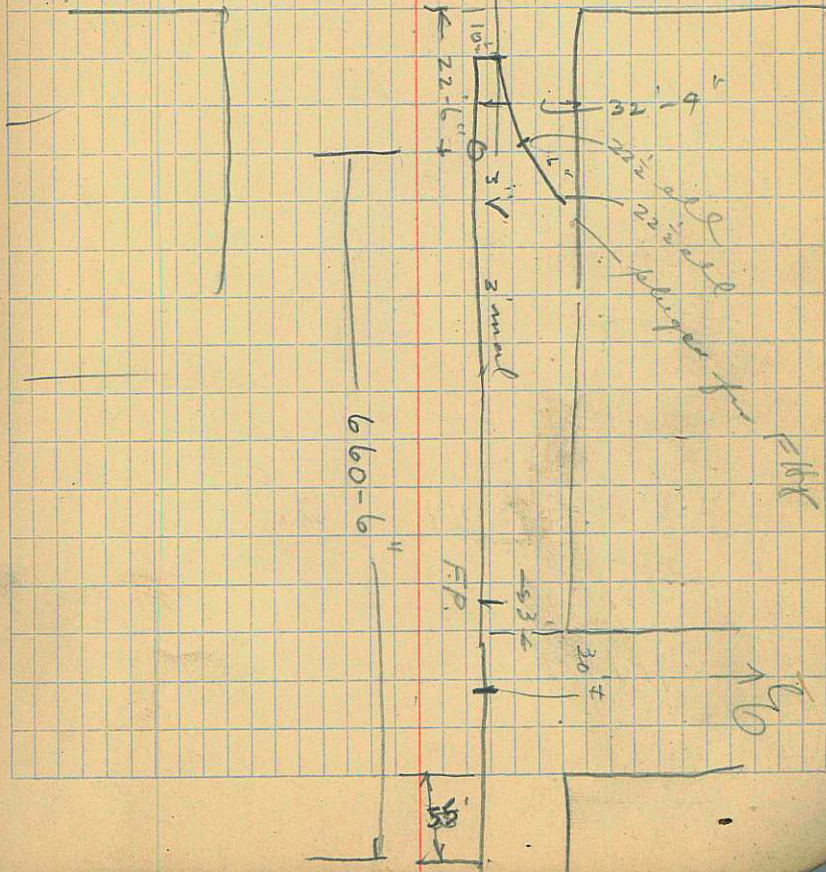
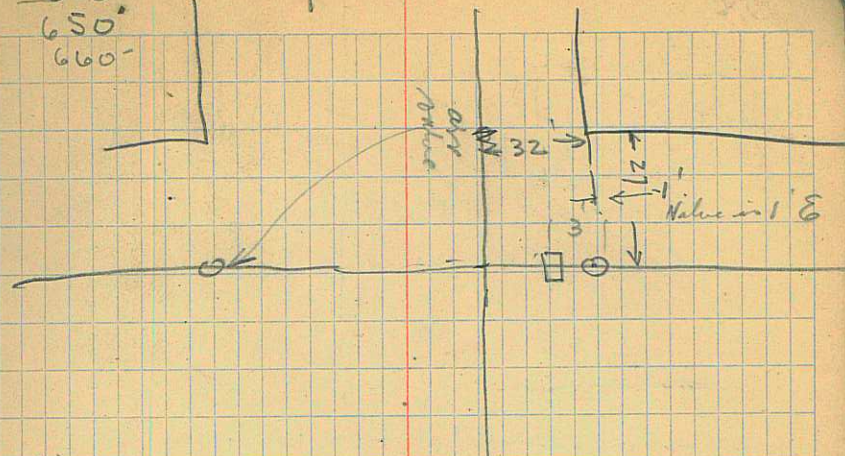
54

School

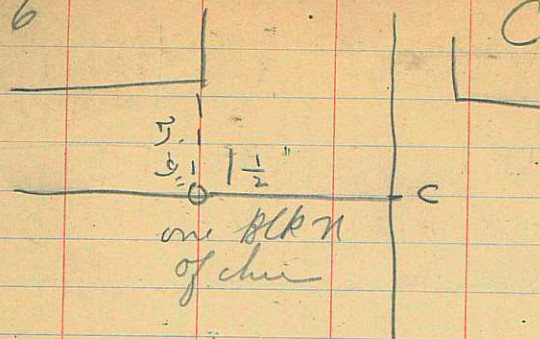


600
650
660

↑ N



56



Clifford's

Gal iron

$1\frac{1}{2}$ #6 foot

sheet # 17 #
20 1/2 ft.

Black 6 per #

58

Levels at Wallville

Runway 11/4/16

	RS	FS	m	El	HI
H	10.88			193.67	204.55
	13.09	5.02		199.53	212.62
			3.08	209.54	
			3.14		
			3.14		
			2.98 [±]		

$$\begin{array}{r} 193.67 \\ 10.88 \\ \hline 204.55 \\ 5.02 \\ \hline 199.53 \\ 13.09 \\ \hline 212.62 \\ 3.08 \\ \hline 209.54 \end{array}$$

199

$$\begin{array}{r} 208.74 \\ 16 \\ \hline 209.34 \end{array}$$

$$\begin{array}{r} 212.62 \\ 1.98 \\ \hline 209.54 \end{array}$$

NE cor
 NW cor top wall
 SW cor

Car deck at

60 Levels at State
Dam 2/1/17

B5 F5 am Ele HT

3.66

~~3.63~~

3.63 110.755

6.12

6.43 107.96

8.90

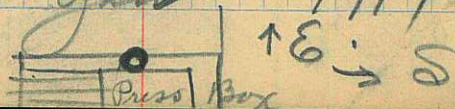
A.C. student on road
Level Schaub

top of extreme east iron post
second post west from east side
on nail (assumed as 100.00
during investigation 9-2 to 10-17
1916.

(a) on standard Brass tablet
about 8' W of crest and
on west side marked
1 - elevation 107.96
~~on~~ in center of paint mark
west side dam. A compromise
pt between State + Utah
Power. Spoken of in the report
by Schaub West and Peers
as elevation 105.63

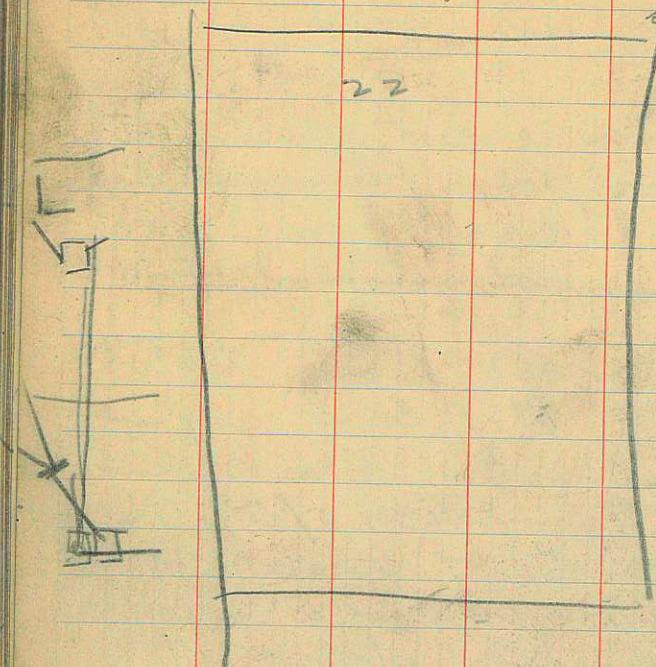
(c) This tablet was set
in lead jam 1917

Flow



62

One auto motor con.
 ~ 20V - 60 ~ style 754519



Circuit breaker
 W-H. Oil C Breaker
 type # 50 amp 600V
 style # 199433

3

Drum —

$$\left(\frac{3\frac{3}{8}}{2} + 10\frac{1}{2} \right) 2$$

28 grooves for 1/2 cable

$$\text{cable} = (21'' \times 3.14) 48$$

Worm gear

$$\text{dia } = \left(\frac{3\frac{3}{8}}{2} + 8 \right) 2$$

40 teeth - 7/8 d p

64

sliding shoe, double
 $(\frac{2 \frac{1}{2} \times 16 + 10 \frac{1}{2}}{2}) \times 2$
gave

one 38" shoe spec hole
one 3-6" " pin solenoid
4g one 3-8" shoe app. solenoid
✓

✓ 2 6" L₅ @ 3/8W 10'-6" long ✓
2 6" L₅ @ 3/8W 6 feet to get them

Top cross L₅ of age steel
is of no value to contract.

14' 3/8" cable
12 " " "
0 " " "

✓ 4 1/2 x 1 3/8 x 8' iron

✓ 3 rail guide
1 1" conduit 7 1/2

✓ one solenoid brake coil
one friction bush
✓ one split control drum
coupl.

one reversible control
no part value to
contractor

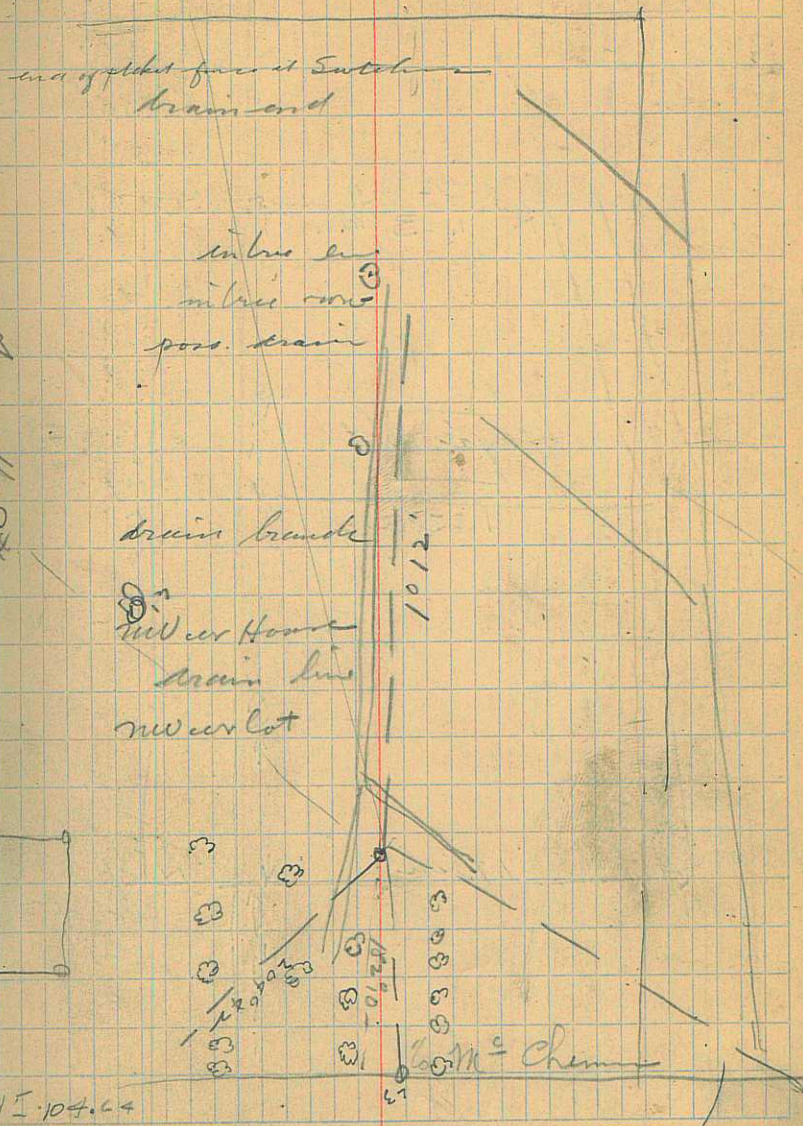
one 3-1/2" 302mm
rod 965-11 P

15-6 1/4 P. 220
one large valve

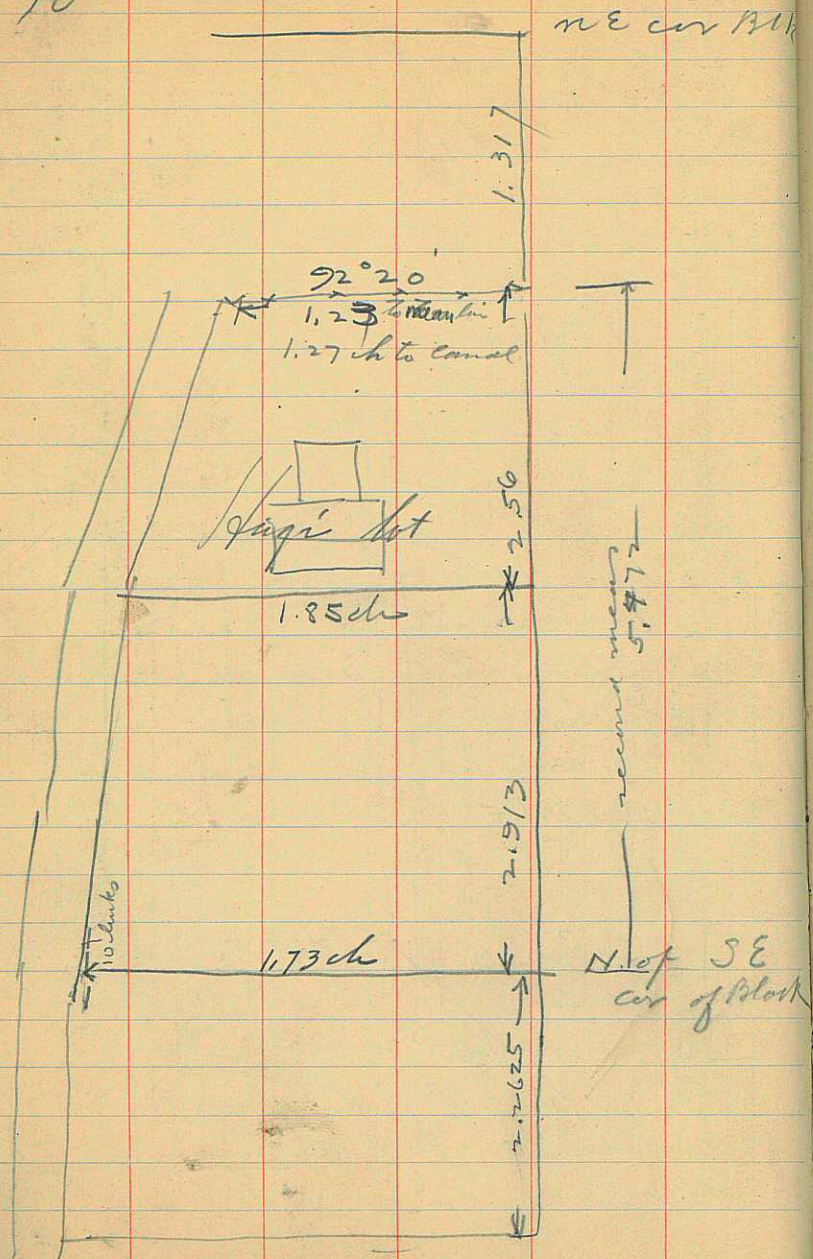
one operating car contact

68 Survey for drain
4/7/17 for G. Schuler lot

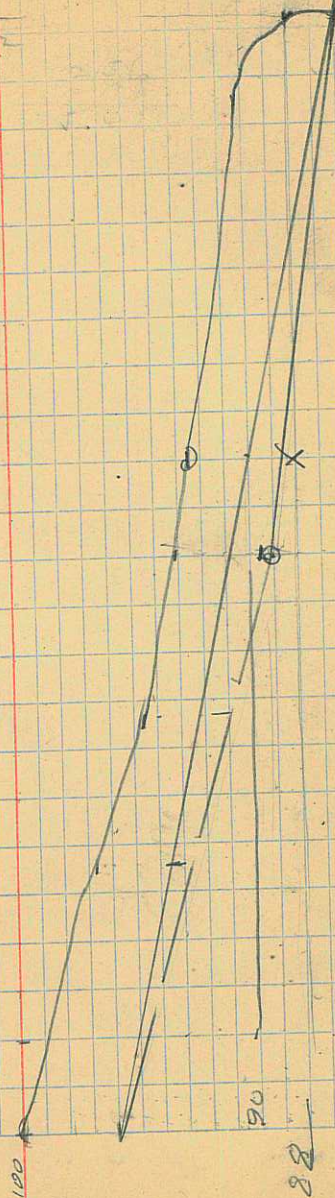
Station	Angle	Distance	Elevation	Remarks
23	177°	4.00	97.11	Stade
22	355°00'	2.00	109.5	4.94
21	346°04'	2.00	106.4	3.35
20	10°55'	3.00	107.5	5.10
19	13°12'	6.00	101.7	7.69
18	358°36'	2.50	105.3	4.12
17	352°38'	3.00	107.3	4.65
16	338°18'	2	110.4	3.70
15	334°46'	2.00	110.0	3.64
14	319°39'	2.00	110.7	3.26
13	316°47'	3.50	106.8	4.27
	209°	1.00	102.7	1.52
	249°39'	3.00	105.9	3.64
	224°12'	5.00	105.4	5.83
	204°42'	2.00	103.7	2.82
	159°32'	2.50	96.6	3.51
	118°50'	5	96.5	5.555
	118°50'	5	94.4	5.86
	118°50'	5.00	92.3	6.40
	118°50'	4		6.40
	117°30'	8.00	87.2	10.45
	118°50'	6.00	88.08	8.32
	328°22'	6	88.08	
			100.00	



70



Blain at E Schaub's house



72 BS FS un

		12.45	92.20		
0	11.26		93.39		
		} 12.10	92.55		
			9.00	95.65	
			6.9	97.75	
		6.50	98.15		
		2.35	102.30		
		4.40	100.25		
		9.77	94.88		
		5.55	99.10		
		7.15	97.50	on H ₂ O	
		4.65	100	104.65	

12.1	12.1	12.45	11.26	12	11.26	5.5
6.9	13.50	13.50	0.85	12	12.1	1.9
5.2	2.2	12.1	11.26	11.26	10.26	3.7
		1.0	1.19		4.94	

312 from test #1

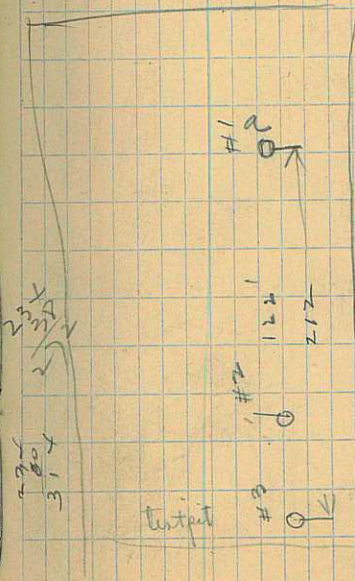
on top stake gr. in Str.
 on hard pan
 on H₂O
 on ground 2.26

#3

#1 in hole 3 in - lat
 on ground
 on H₂O

test #2 #

6.50	11.26
2.35	6.50
4.15	4.76

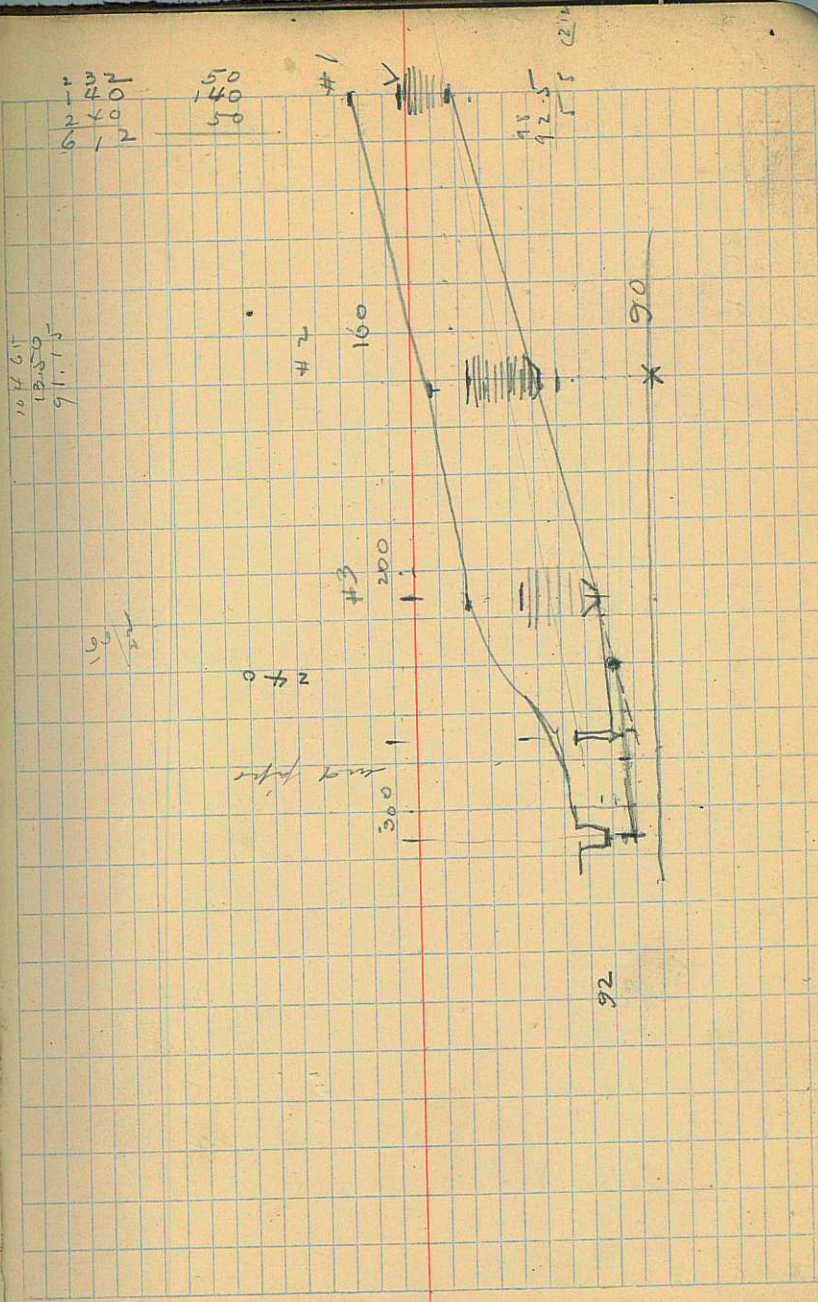


234 †
 & fume

272

314

74



76	Gr. elev + 10 0	Schauls FS	Ele	H
	10.26		6.16	110.26
	100.10		104.10	
	99.51		6.75	103.51
Y branch +25	98.25		7.90	102.36
D35	98.53	Cut 4.0	4.57	105.69
+45	97.67		8.33	101.93
+65	97.14		8.75	101.51
Y branch +85	96.61		9.13	101.13
1+05	96.08	2.28100 6.88350	5.27 2.40 9.70	105.04 107.86 109.56
1+25	95.55		10.47	99.79
Y 1+45	95.01	11.08	11.08	99.82
1+65	94.53		2.73	98.84
1+85	93.95		2.81	98.76
Y 2+05	93.42		3.05	98.52
2+36.5	92.83		3.66	97.91
2+42.5	92.04			
2+59	92.04		4.27	97.30
2+65	91.82		6.29	95.28
2+80	91.67		7.33	94.24
3+00	91.52		8.01	93.56
3+13	91.38		9.06	92.51
3+42	91.10		9.35	92.22
3+57			10.00	91.57
2+05	6.26			104.78
A 20			4.55	100.23
A 44			2.85	101.93
PRM			4.77	100.00

Cut 51.5

51.5
185
2365
21
1
236.5
22
2590

322
40
100
466
600
260
137
460
53
31
584

2425
185
97.5

90° turn

medial app. 5+2
in detail

MB

B100 = 4
B50 = 3'-10 1/2"
C50 = 4'-1"
C83 = 4'-0" ✓

4'-10" ✓
4'-0" ✓

4'-2" ✓
4'-0" ✓
4'-3" ✓
4'-4" ✓
4'-6" ✓
4'-3" ✓
4'-2" ✓
4'-4" ✓
4'-10" ✓
5'-1 1/4" ✓
5'-4" ✓
5'-3 1/2" ✓
3'-7" at 2+80
2'-9" ✓
2'-1 1/4" ✓
1'-5" ✓

D35
45°
C83
B100
B50
50°
50°
44' 55" ✓
A line
A

end

80

Sta	BS	FS	mm	Elev.	Gr. Elev.	HT	Gr. on file
P.M.	4.02			126.29			
0					126.37	130.39	
1					126.27		4.12
2							4.22 2.9
3							4.32 3.0
4							4.42 3.12
5							4.52 3.22
6					125.77	129.45	4.62 3.32
7	4.70	5.64		124.75			
8					125.67		3.78 2.98
8+80			8.6				3.88 2.53
8+98							3.98 2.68
10+00							4.08 2.78
11							4.18 2.88
12							4.28 2.98
13							4.38 3.08
14							4.48 3.18
15					124.87		4.58 3.28
15	5.13	5.13		124.31		130.24	
P.M.	4.02				126.37	130.39	
				126.29			

0212 - Cut + Fill

L (Cent)	R
42.3F	F 2.4
6.6	6.6
4.5	4.6 F17
F1.6	out 7.3
5.2	5.6
5.2	out 9.6
6.5	6.4
10 F3.3	F 3.2 out 10
6.7	6.6
10 F3.5	10.00 F3.5
6.2	7.35
10.8 F2.9	F 2.7
6.4	6.5
6.5	6.4
10.8 F3.9	10.8 F3.9
4.9 F2.3	5.15
9.4	F1.3
	9.4
4.8	5.30
2.7	F1.3
5.6 F2.8	5.15
9.4	9.4
6.3 F3.4	1.4
10.6	5.3 F2.4
8.3	5.7
F5.3	F 4.4
9.3	8.8
12.5 F6.3	F 4.4
7.1	7.3
10.4 F3.9	2.8
5.5	5.8
10.4	F1.2
	7.5
	F1.8

13

83 3 3
4.1 6 6
1.3 3
1.2 3
6.3 3

2
2
2

5.6 1' 4

30 020 W

100.05

old canal

Sta 0 of water
Sta 0 of pipe

R.P. 15 15 R.P.

P2

Sta BS FS .m Ele

Ele
gr

HT

RR

15+72

124.87
0.97
124.78

130.24

5.46

5.56

1

5

16+91.7

5.56

18

3.80

5.67

19

5.77

20

5.87

21

5.97

22

6.07

23

124.07

124.07

6.17

PM 11

3.70 4.10 4.10

126.14

129.84

3.97

5.80 124.04

15 5.93 5.13

121

cut on full

128.61
1278.7

5.77

130.24
5.67
124.57

130.24
126.1

4.47

in 70 + 5 ditch

4.47

C 1.11

on high ground

5.11

C 2.61

5.65

C 1

5.22

5.6

5.5

4.9

C 1.3

4.7

C 1.5

126.57
1.8
124.77

124.57

124.57

on stake by
post west in a c. line

10006

on batt. head
at 1/2 balling of gate
about 200 yds of
S + W side of runway

120.24
5.67
124.57
129.38
124.57
40

124.07

121

Time	BS	FS	MM	Elev	Elev pr	HT
				126.29		128.49
0					126.57	1.920
1						2.02
2						2.12
3						2.22
4						2.32
5						2.42
6						2.52
7						2.62
7+85	PI					2.705
8+19	PI					2.724
8+25						2.745
9+25						2.845
10+25						2.945
11+25						3.045
12+25	5.17	4.28		124.21	125.345	129.38
13+62	PI					4.035
14						4.126
15						4.210
16						4.31
17						4.41
18						4.51
19						4.61
20	2.05	2.82		126.56	124.57	128.61

End of fill

L	C	R	7.85	60	126.29
			1.78		128.49
2.4	2.55	2.75	3		1.92
9.6 F1.7	2.5	9.6 F2	1.7	1.5	2.72
3.0	3	3		9.4	3.00
9 F2.1	F0.9	9.0 F2.2	2.7	3.3	3.49
3.3	3.3	3.4		1.5	2.5
9 F2.4	F1.1	9.2 F2.5		2.2	
4.3	4.27	4.3		10.1	
10.1 F3.3	F2	10.1 F3.3		4.6	
4.8	4.7	4.6		7	
10.4 3.7	F2.3	10.4 F3.5		4.10	1.1
4.1	4	4.2		1.5	3.7
9.6 F2.9	F1.5	9.6 F3.0		2.3	5.6
4.6	4.5	5		2.2	3.7
10.2 F3.3	F2.2	10.3 F3.7	my blank	2.3	4.8
4.7	4.8	5.1		2.3	2.1
10.2 F3.3	F2.1	10 F3.7		5.9	
5.6	5.4			3.2	
5.6	F3.2	4.5		3.3	1.4
11.1 F4.2	F3	10 F3.1		6.3	5.1
7.5	7.9	5.7		6.1	5.1
13	5.1	11.4		6.4	5.1
8.2	8.00	5.5		6.4	5.1
13	F5	11 F2.9		6.4	5.1
6.2	6.4	5		6.4	5.1
11.5 F4.5	F3.4	10 F3.3		6.4	5.1
4.9	5.8	5.7		6.4	5.1
9 F2.2	F1.5	10 F3		6.4	5.1
4.9	4.85	5.2		6.4	5.1
9 F2.1	F0.7	9 F2.4		6.4	5.1
4.4	4	4.1		6.4	5.1
4	C.2	8 C.1		6.4	5.1
4	4.05	4.2		6.4	5.1
7.8	6.3	7.8 F1.2		6.4	5.1
4.5	F0.1	8.2 F1.4		6.4	5.1
3.2 F1.3	4.25	4.4		6.4	5.1
4.7	4.3	7.8 F1.7		6.4	5.1
7.8	4.8	4.9		6.4	5.1
8.3 F1.7	F.2	8.3 F1.6		6.4	5.1
2.1	4	4.1		6.4	5.1
2.4 F.1	C.7	7.4 F1.3		6.4	5.1
3.7	3.8	3.6		6.4	5.1
1 F.2	C.10	F.1		6.4	5.1

4220 W

Head of dam 12.4

58688
 20139 2.75
 2046 T.T.
 21
 22
 23 +HT PI
 24
 25
 26
 27
 28
 28500 PI
 29
 30
 31
 32
 33

Fs m
 Elev
 126.14
 124.524
 128.84
 4.870 30
 4.925
 5.070 5.7
 5.17 38
 5.32 40
 5.47 41
 15
 5.62
 5.77

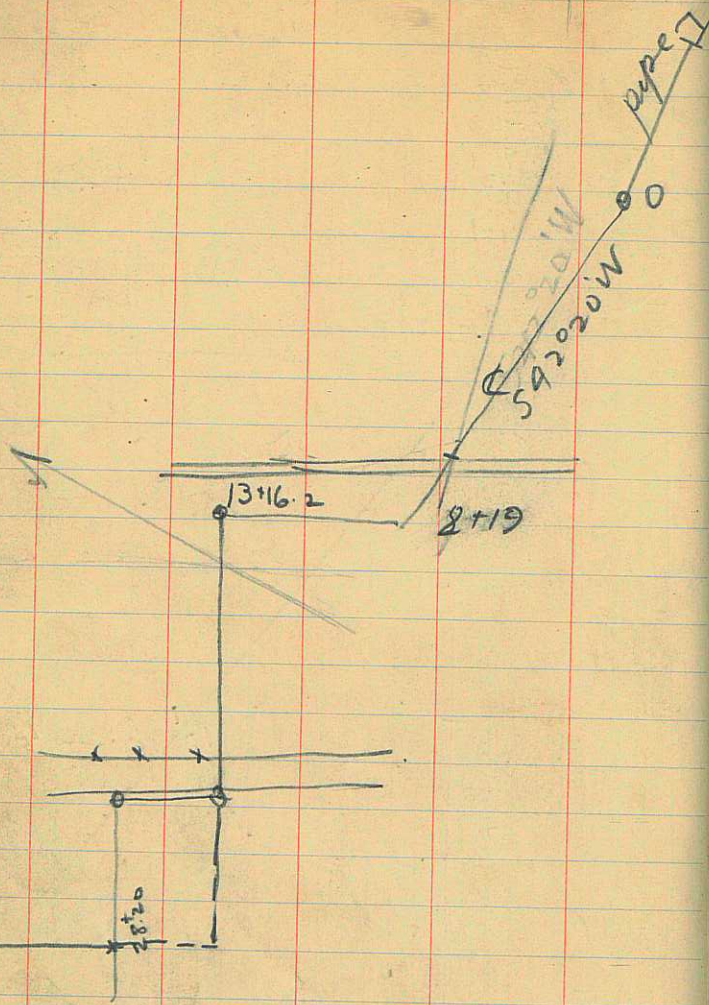
Cut in face
 R
 126.14
 2.75
 126.14
 2.15
 127.35
 126.56
 125.61
 124.57
 2.046
 2.286
 23.51
 2520
 124.26
 124.24
 10
 70
 2820
 20
 126.56
 129.28
 4.81
 128.61
 124.57
 9.07
 4.86
 123.61
 4.81
 123.85

dropped 5/10 line
 3.65
 4.5
 4.4
 4.3
 4.2
 4.1
 4.0
 3.9
 3.8
 3.7

N 45 W
 128.84
 124.57
 2.046
 2.286
 23.51
 2520

23.51
 2520
 10
 70

88



16000
15482
520
516

126.57
35
123.17

122.17
114
517

9.303
4.65
1.65

23.25
2790
26.5
76.725

125.16
2.17
2.25
125.16
4.37
5

4.87
55
5.02

Stn	BS	FS	m	6.0	6.0	HI	OK
20	2.75			126.14		128.89	
21						4.37	
22						.054	
23						4.424	
24						4.524	3.2
25						4.624	3.3
26						4.724	3.4
27						4.824	3.5
28						4.924	3.6
29						5.024	3.7
30						5.124	3.8
31						5.224	3.9
32						5.324	4.0
33						5.424	4.1
						5.524	4.2
						5.624	4.3

Stn	BS	FS	m	6.0	6.0	HI	OK
						126.14	
						2.75	
						128.89	
						124.52	
						4.37	
						127.15	
						1.23	
						3.7	
						0.7	
						4.9	
						F.4	
						0.5	
						F.1.3	
						3.6	
						4.1	
						3.5	
						4.9	
						2.1	
						5.6	
						F.5	
						5.9	
						F.8	
						8.9	
						2.0	
						4.5	
						C.7	
						F.3	
						6.2	
						2.2	
						6.4	
						F.2.3	
						6.3	
						9.2	
						6.3	
						2.1	
						6.8	
						1.3	
						9.4	
						F.2.5	

Grade
3.0.1%

OK
4/17/17

on BM key next
in Ballard Gate

33.46
20.14
12
124.52
125.25
125.27
128.89
5.62
123.27
128.54
123.49
3.05
1.4

92
4/5/17 Levels for
Roelandt Hydraulic
B S T S W Ele

6.035 7.5.50 101.535
5.27 96.26
3.530 98.00

7/1/17 Culvert on Co. Road
for Benson B. L. In
Stal 3.98 126.14 130.12

20 to
20
3.90 124.57

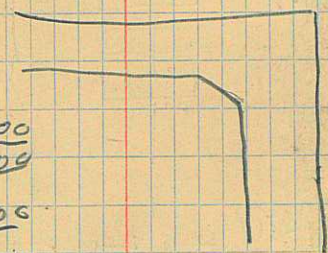
3.9 6.035
95.5
101.535
101.535
96.26
5.27
96.26
100
96.26
3.74

3'-8 7/8 on ground NW cor
to Ele 100 on stake
NE cor

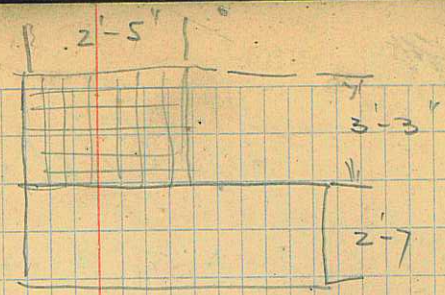
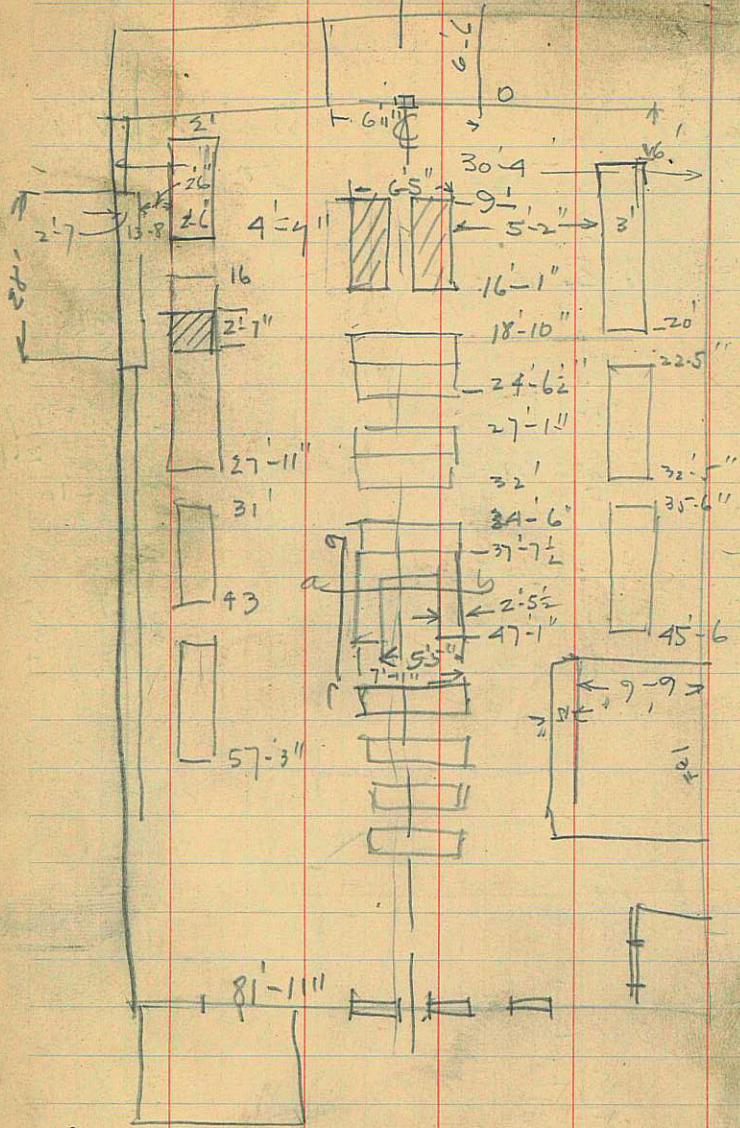
126.14 3.97
130.12
5.51
5.51
1.75
101.53
3.74
97.73
200.99
120
99.20
210

430
130
3.1215
3
3.75
in ground grade

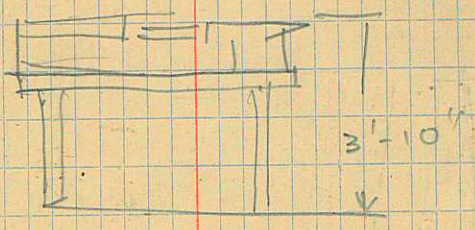
\$
forms 50.00
Cement 45.00
gravel 35.00
miser 10.00
sawm 25.00
165.00
76
181.00
\$180.00



94

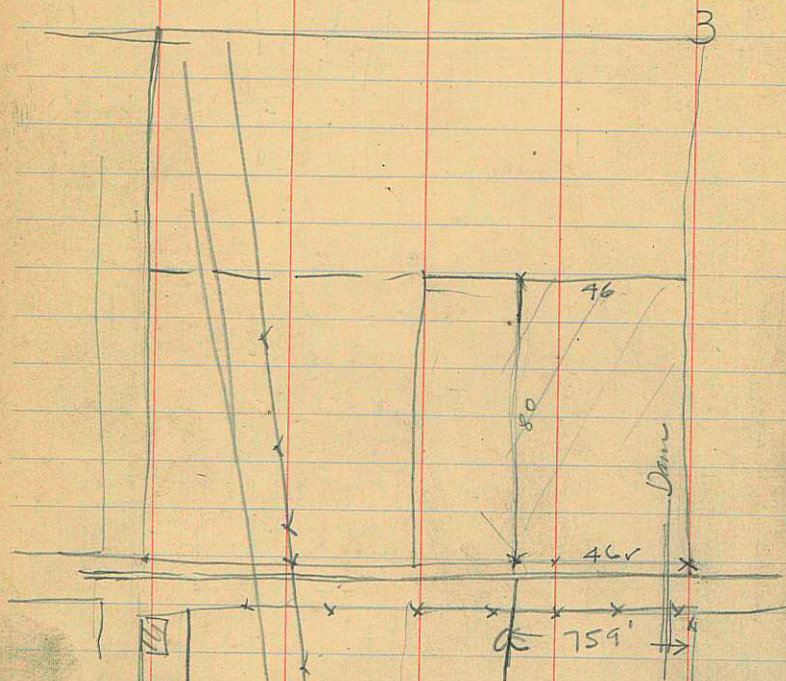


Ele b-c



96

West Cache Sugar Land Survey



from a

1373 East OSL Rfd

1420.8 to middle of Corn

1472 to W side OSL

1923 to nail RHW

$$\begin{array}{r} 1373 \\ 561 \\ \hline 812 \\ 825 \end{array}$$

165

5

$$\begin{array}{r} 561 \\ 16 \\ \hline 545 \end{array}$$

35

184

160

183

80

1373

545

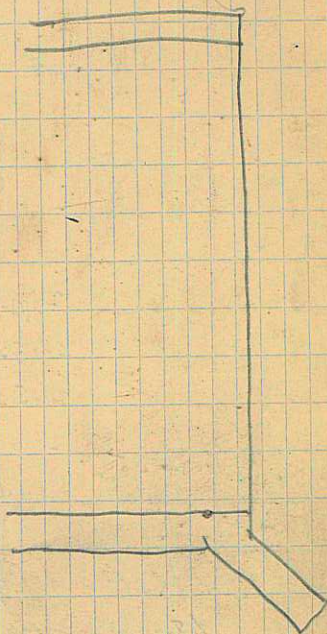
828

825

30

16.5

54



98
 A - Pt Any West

West Cache Sugar Land Survey

2714.4
 2683.3
 2653
 2600
 174°25
 1304

88°36 761.6
 485.36 759

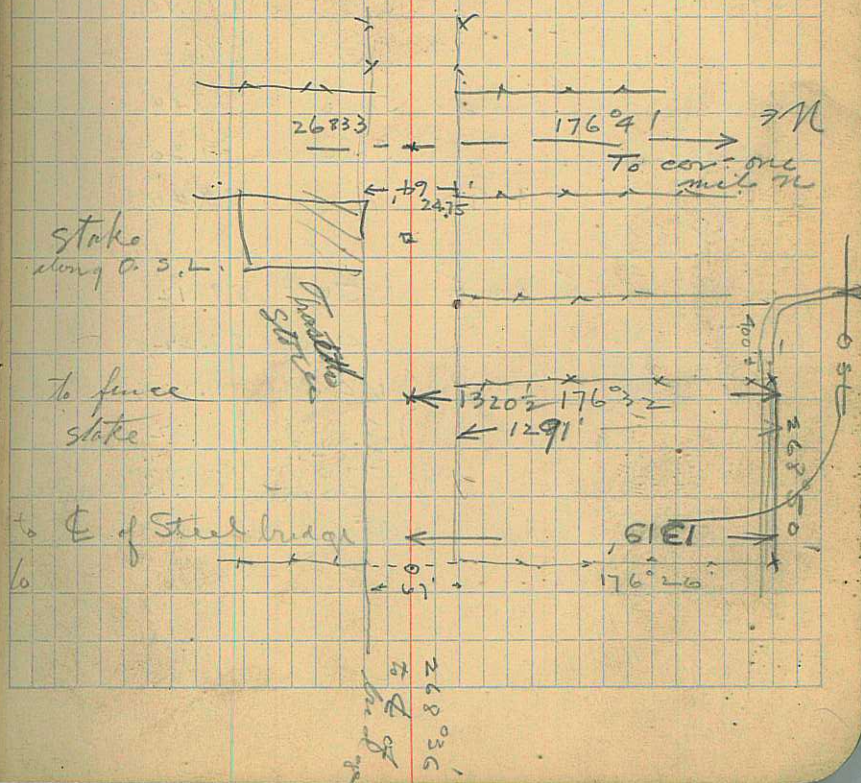
128°24

268°36

1- 268°06

2714.4	2714	1320	2710.4	105
2653	2700		2615.3	46
2683.7	2683.7		2161.4	990
	16.3		35.7	660
			30.7	759

2714.4
2683.3
2653
2600
174°25
1304



100 notes down
Levels for Alf Jensen

Cornish 4/23/17

Stg BS FS UM Ele
4.00 4489.200 - 92.30

5.10 87.20

9.7 82.60

2.80 89.50

9.00 83.30

759 W of road

5.2 87.10

5.3 89.00

5.00 87.20

5.00 87.30

4.90 89.40

1320

Y 8.22

95.62

7 E of rail -

130° 50'

6.50 89.12

8.40 87.22

{ 6.40 89.22

{ 8.00 87.62

5.50 - 1 89.82

5.70 89.92

8.50 m Detch 87.12

9#

8.5

c 160° 5'

1320
759
561

135

on BM

on ground near SE cor of SW#3

(?)

SE cor SW#3
on Canal bank 100 E of

bottom Drain above Canal bank

{ from a point 759 W of SE cor SW#3
ground slopes S. - 8'

NE cor Jensen corral

on ground S side Str. in front Jensen home
by his little gate

on str intersection at SW cor sec 3

in ditch

(lower 2.75) set on line 7 E of E rail O.S.L

in ditch

upper 15'

1/4 mile N W side O.S.L track

(see over)

102

Love

\bar{n} Pt BS FS m Ele HI

X-

c}

5.90 90.22 96.12
 9.00 87.12 13.6

d}

6.5 89.62
 10.8 85.32
 8.60 90.52

e}

8.75 88.37
 11.00 85.12

-3.22

4.85 6.05

⊗

92.40

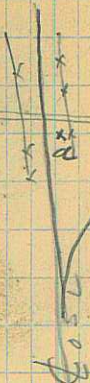
3.40

4488.30

V HI ⊗

* 95.62
 cor 96.125

1923
 175.9
 268.2



Old Western Shuttle

same HI as 2Y

on ground
 bottom pipe
 under R.R. grade
 bottom old cement culvert

on culvert gr.

from top of same

104 Ore. survey Station
 Beam ✓ c c Lute

2650 767
 2200 2.20
 2100 2.50
 2000 2.80
 1900 3.10
 1800 3.40
 1700 3.70
 1600 4.00
 1500 4.30
 1400 4.60
 1300 4.90
 1200 5.20
 1100 5.50
 1000 5.80
 900 6.10
 800 6.40
 700 6.70
 600 7.00
 500 7.30
 400 7.60
 300 7.90
 200 8.20
 100 8.50
 0 8.80

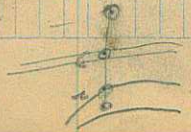
4-11-20
 -11-22

Directly west of
 Preston on
 Gen. Lewis bank

4 562 8 -508 El 266 ± av. (275)

4 566°30W 1.0 5.46
 3 170°30E 9 11.8
 2 N72°30E 4 11.9

+13°2' El 245 (249.5) HI = 254.5
 -18°38' (661) m West Cache Canal
 -11°42' cor = El. 0. on Lewis River
 HI 147.2 ✓ 155.7



106

 $R = 20'$

Grad.

7 N43°10'E -2.87
12-

9

8 S85°E

4

5.35

-20°15'

m West Cache

6

11.66

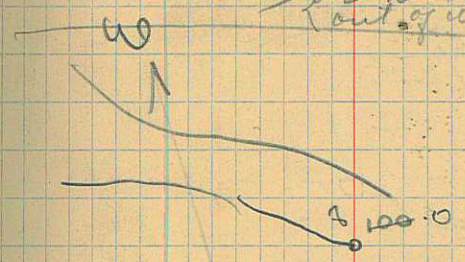
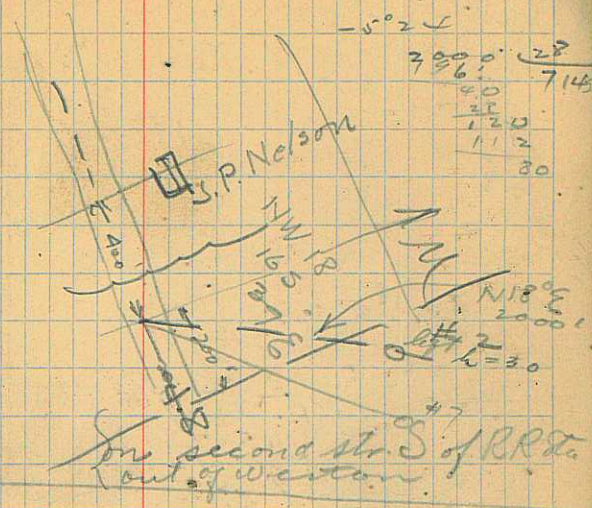
-524

7-

C
6 11.66

-5°24'

3000	28
60	7148
40	
30	
120	
112	
80	

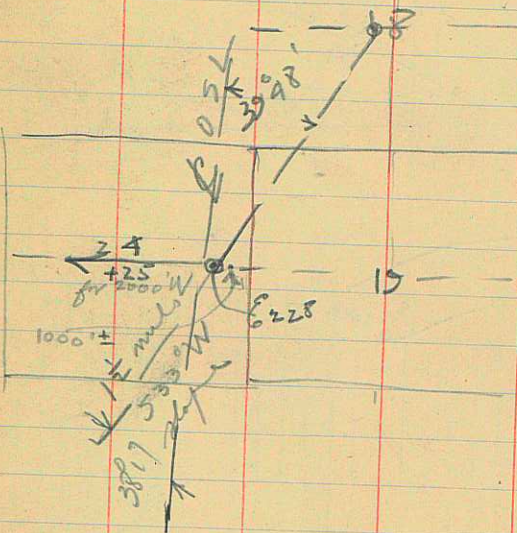


West Cache Elev (63)

1020 106.6 (HI = 111.6)

108

27
201
228



23
000

110
T Pt

4/27/16

Survey for Alma Cummings

by Skelton
d

B 269.26 39.79

A-

269°16' 80.95

80.94

80.92 ✓

(meas twice)

A

40.475

40.00

37°09

269°37 ✓

69°23 ✓

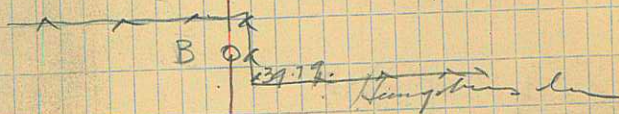
180°

1-

N line 3+

269°42 ✓

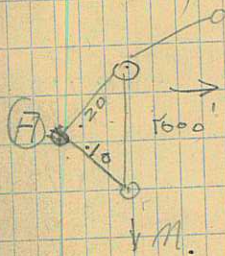
269 16
37
-153
26.20



to fence S

(by along fence to hill) to pt. 002 E of Stone
to fence E+W
stake

see sketch above stake) this is .008 too far E.



to pt on Wellville line
between points of A
along fence
to Wellville Tab tower
along fence near high
SW cor see 23
11m E

112

4/28/7

Drain levels for

cut

Sta	BS	FS	in	RR mgs	RR rock
8.85					
		10.0			
		11.1			

8.85

++

10.0

11.1

in bottom 8' pipe. Man hole
in bluffs proposed outlet
at first diversion 300 west

Sta

0

9.500 ✓

.170

9.67

.234

6.33

1

9.674

.170

3.340

6'-4" ✓

2

9.848

.170

3.80

6'-5/8" ✓

3

10.022

.170

4.07

5'-11 1/2" ✓

4

10.196

.170

6.12

4'-1" ✓

5

10.370

.170

4.89

5'-5 3/4" ✓

PI 5+24.5

6

10.412

.170

4.75

5'-8" ✓

7

10.718

.170

6.43

4'-3 1/2" ✓

8

10.892

.170

7.03

3'-10 1/2" ✓

9

11.066

.170

7.76

3'-2 3/4" ✓

9+65.5

9+75

11.179

.170

8.10

3'-1" ✓

10.70

9.85
3.8
2.05
10.07
4.07
5.95

10.70

.208

10.37

5.48

10.51

5.66

10.54

4.97

10.71

6.13

4.29

10.89

3.86

11.92

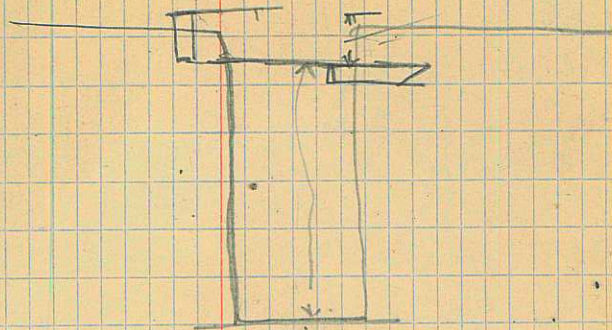
3.31

16.18

3.08

Catch

114



116

Levels for
Wellsville cemeterySta 135 FS in E
a 11.88 111.88

12.82

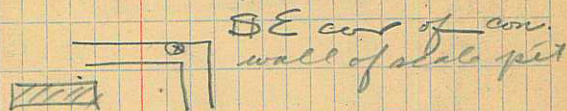
12.25

A	✓	6.45	105.43	4.3.93
B	✓	2.27	109.61	8.11
C	✓	3.35	108.53	7.03
D	✓	5.00	106.88	5.38

111.9	111.83	111.6	111.8
10.5	109.38	109.28	25
	104.5	6.62	

86.25
10
96.25

99
96.25
3.75

old
on rail in front of pit

on rail about 150 S of a

3'-11 1/4"	NE stakes
8'-1 1/4"	NW "
7'-1/2"	SW stakes
5'-4 3/8"	

116
20

116.175

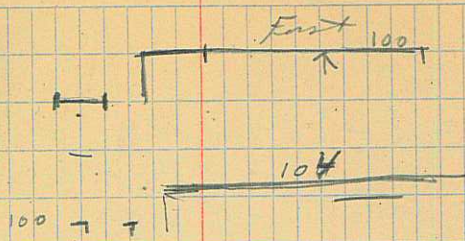
Cut figure to
elevation 101.5
which includes
6" concrete floor

100
6 inch

101	107

	101.5

118



120

Levels at Cornish

5/5/17

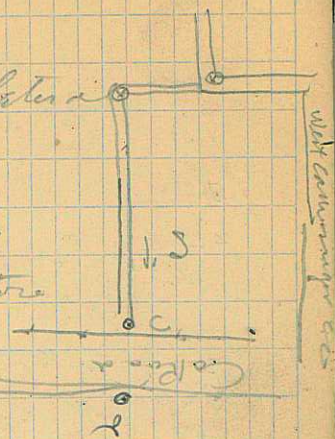
Pt	BS	FS	in
	4.42		
			5.65
c			5.60
d			5.70
e			5.00
f			4.70
g			4.70

Turn of Putwin Lane

in Jennens field
south of Jones store



← back
↑ M



with Cunningham's etc

122 BS FS m

continued over

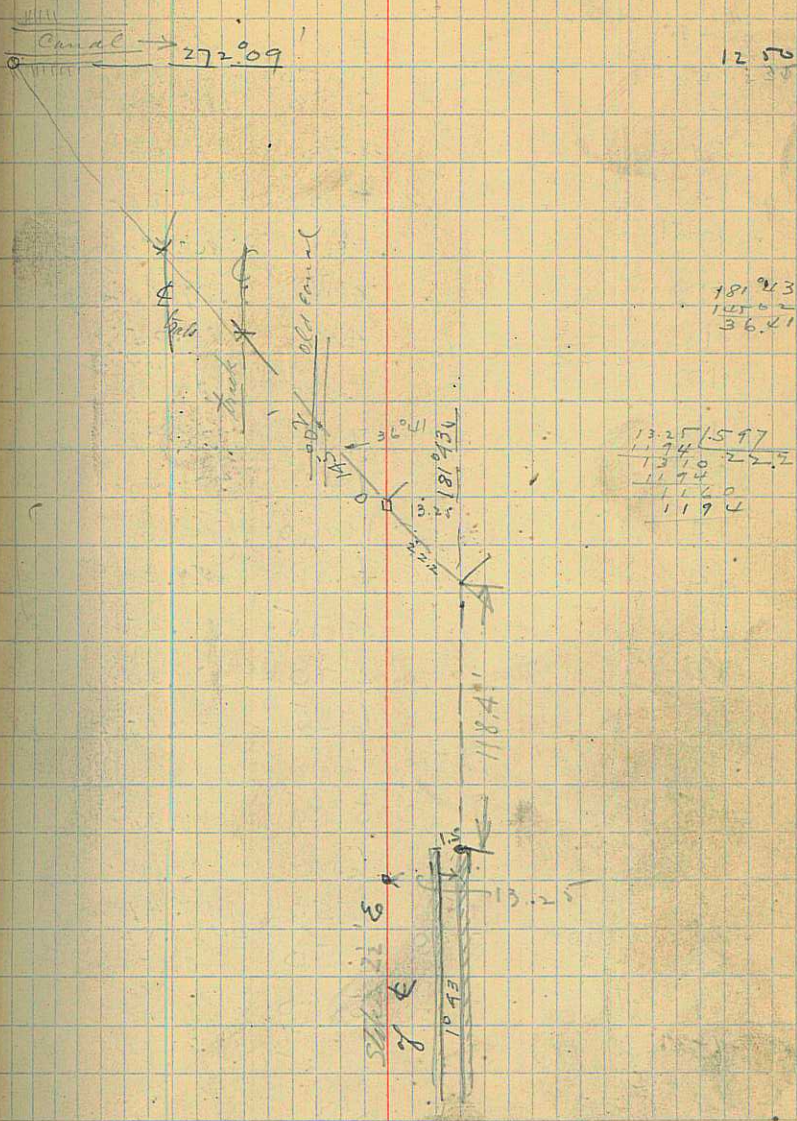
π - 6 ⁺²²	3.00	90.02	-
6 ⁺⁰⁰	4.20	88.82	-
5 ⁰⁰	5.00	88.02	-
4 ⁰⁰	4.70	88.32	✓
3 ^{+26.2}	3.80	89.22	✓
3 ⁰⁰	4.55	88.47	-
2 ⁺⁰¹	3.95	89.07	✓
2 ⁺⁰⁰			
1 ⁺⁵⁵			
1 ⁺⁰⁰	4.90 ✓	88.12	
0-	4.35	88.67	

(F) 4.15

(up)

4488.87 4493.07

Welford Thomas
Plan Survey Thomas



124 BS FS in

Sta

22+98

BS

22

21

20

19+51

19

18

17

16

15

14+61

14

13

12+24.75

12

11

10+40

10

9

8

7

6+29

632

BS

FS

in

+

4.650

4489.935

5.20

87.40

4.70

87.90

5.00

87.60

4.10

88.50

4.90

89.70

4.25

88.35

4.44

5.85

6.10

89.90

4488.14 4492.58

7.5

86.50

6.60

87.40

10.00

84.00

6.80

87.20

6.75

87.25

4.70

89.30

6.35

87.65

out

5.70

88.30

6.00

87.99

6.50

87.49

6.170

5.20

5.50

87.82

44193.4

5.40

87.62

5.35

87.67

Wopp

Plowea
Hansen

BM on stake by 8 feet

Canal

N

Drum

12+24.75

12+24.75

160076

126 BS FS m

~~40⁺⁰⁰ 5.00 4509.83 ✓~~

~~PT 39⁺⁸³ 5.42 4509.41 ✓~~

~~39⁺⁵¹ 6.60 4508.23 ✓~~

39⁺⁴⁷ 9.400 0.43 4505.43 4514.33

39 0.85 4465.01

38 3.80 4502.06 -

37 4.80 4501.06 -

36 6.30 4499.56

35 7.60 4498.26 ✓

34 9.80 0.650 9.00 4496.86 4505.86

33 1.00 4496.06 4570 ✓

32 2.20 9450 =

31 3.10 93.60 =

30⁺⁷⁵

30 4.30 92.40 -

29 5.50 91.20 =

28 6.4 90.30 ✓

27 6.80 89.90 ✓

26 7.300 3.17 4499.41 4496.71

25 3.20 89.40

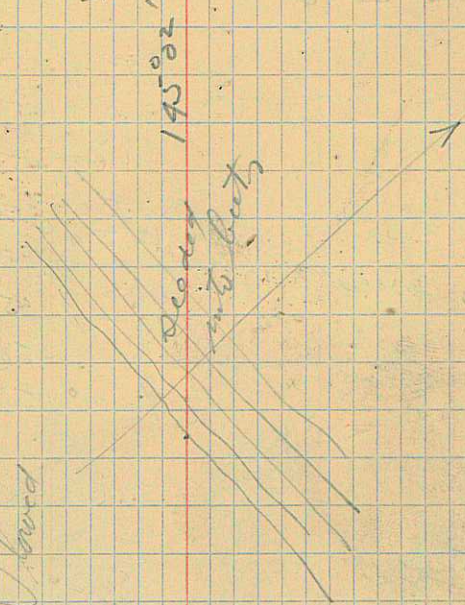
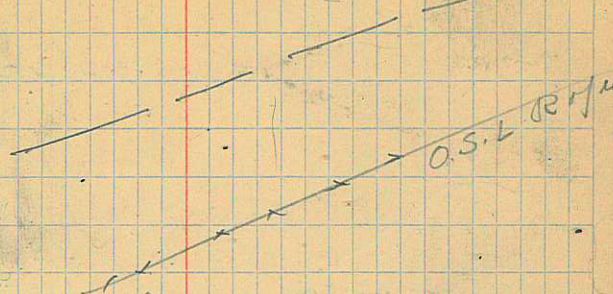
25 3.30 89.30 -

24 3.85 88.75

23 4.40 88.20

5/7/17

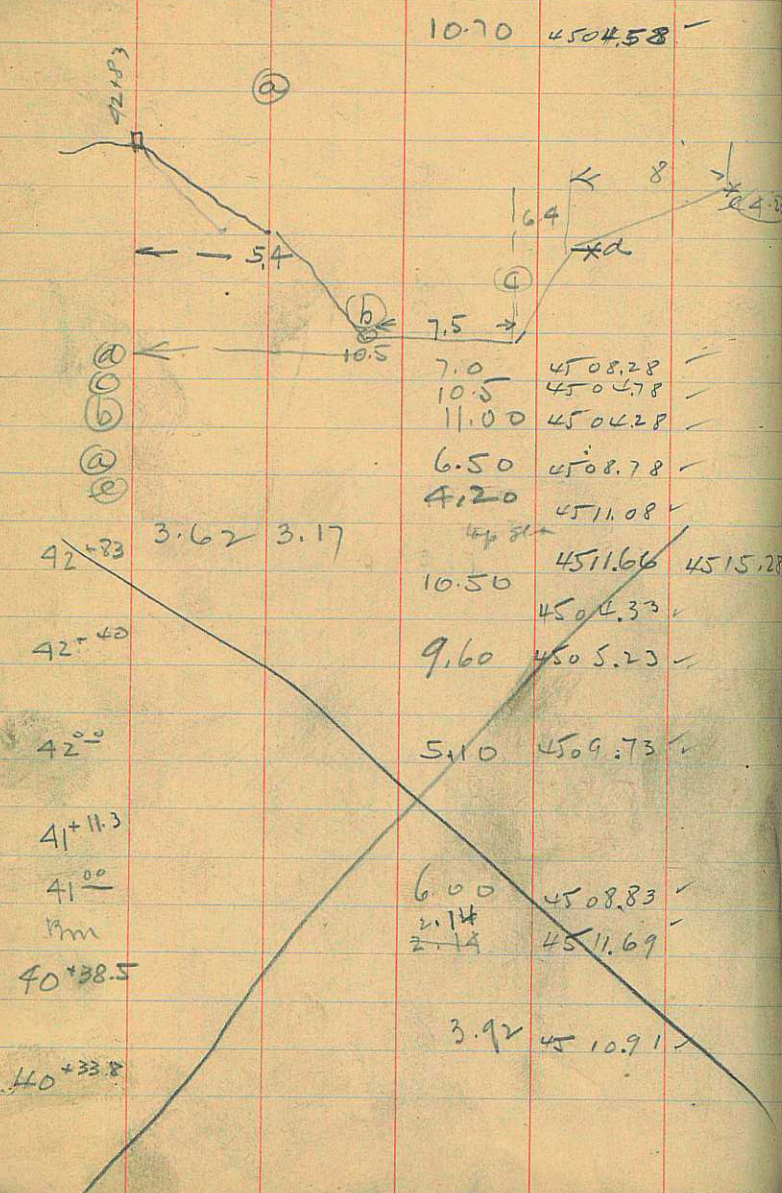
3297



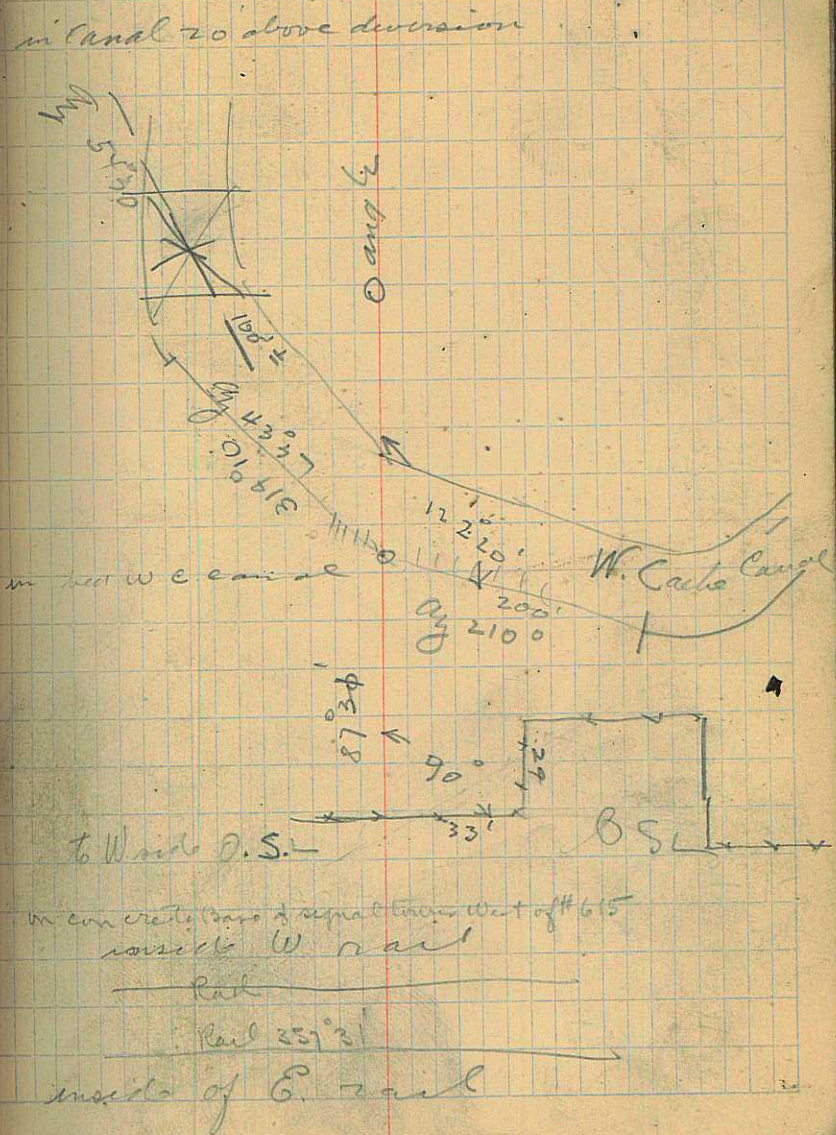
195° 02'

Decay into parts

128 Bs FS m



10.0
875
773
8731
270



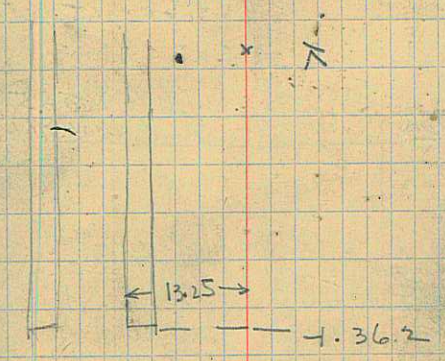
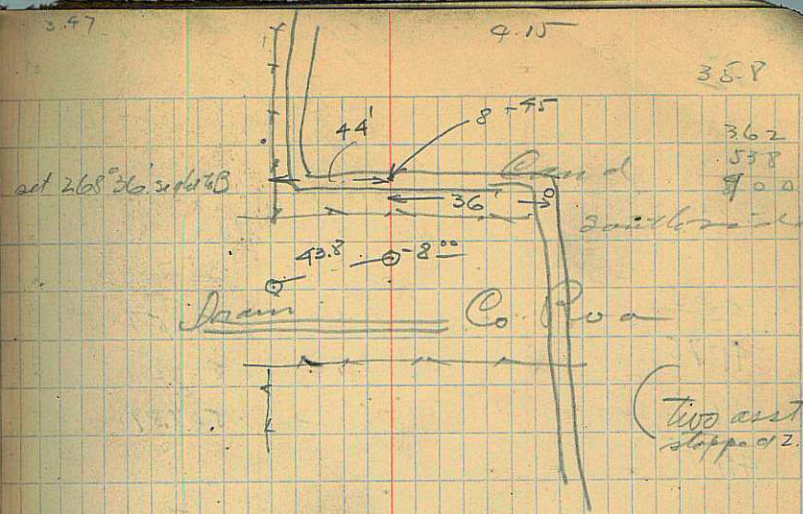
BM 4488²⁰ 3.970³ FS in E. 411 3.97
 178°38' along parallel with but not
 411

-8°			
-8°	93°20'	43.8'	
8+37			4.15 in canal 87.62 ✓
8+00		4.30	87.47 ✓
7+82		9.90	81.87 ✓
7+72.5		4.60	87.17 ✓
7°		4.40	87.37 ✓
-6°		4.90	86.87 ✓
-5°		5.30	86.47 ✓
-4°		4.65	87.12 ✓
-3°		3.70	88.07 ✓
-2°		3.30	88.47 ✓

(Levels down)

-1° 4.00 89.77

(A) 4.15 2.900 4488.87 4493.07



00

132

BS

West Cache Survey
FS in Ele HI

42+91

10.70 4503.41 ✓
3.40 4510.71 ✓

42°0

41+75

11.60 4502.51 ✓

6.70 4507.41 ✓

41

6.30 4507.81 ✓

40+75

40+22.6

40+76

4.92 @ O.S. on tie

4509.69 ✓

40

7.60 4506.51 ✓

87°31

39+43

2.42

7.6 4506.51 ✓
level up 4511.69 4514.11 ✓

#2 176.54 851.0'

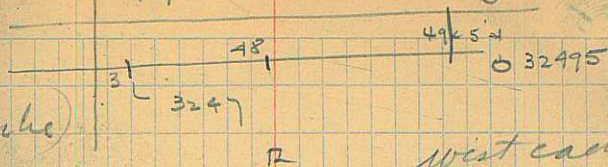
176°54'

1-

#1 172°47' 534.3

42+83

C. pipe stake line



(West Cache)

R

West Cache Bank

(Used this line)

W. rail 0 SL

W. rail 0

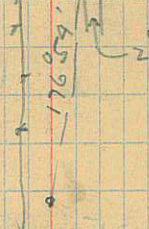
3 | Encl 10.5 L

RR Sta 3247

57
615

on concrete base by signal

Stone MW corner



set 87°31

134

BS

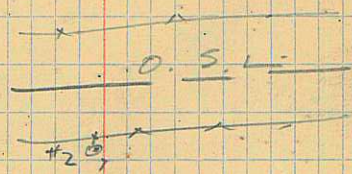
FS

West Cache Suga

Vert. Elev. 11

4	274°	1.50	3.50		
3		3.08	4.10		
2	90°45'	<u>3.10</u>	3.10	7.50	0
	4.75	4.75			

22493-



+2.6

23

22+73

89.18

88.58

89.58

on form by part G of Sta 23

(5) Canal

04 high ground

136

135
9
4

FS

m

e

9-

9 88°30' 9.65 1.36 4.65

8 6.00

7 92°05' 7.65 9.75

6 268°30' 1.85 5.40

-5 88°30'
180°4' 6.65 8.35 0°

4.75

12+24.75 4.75

89.40 ✓

88.30
67.91

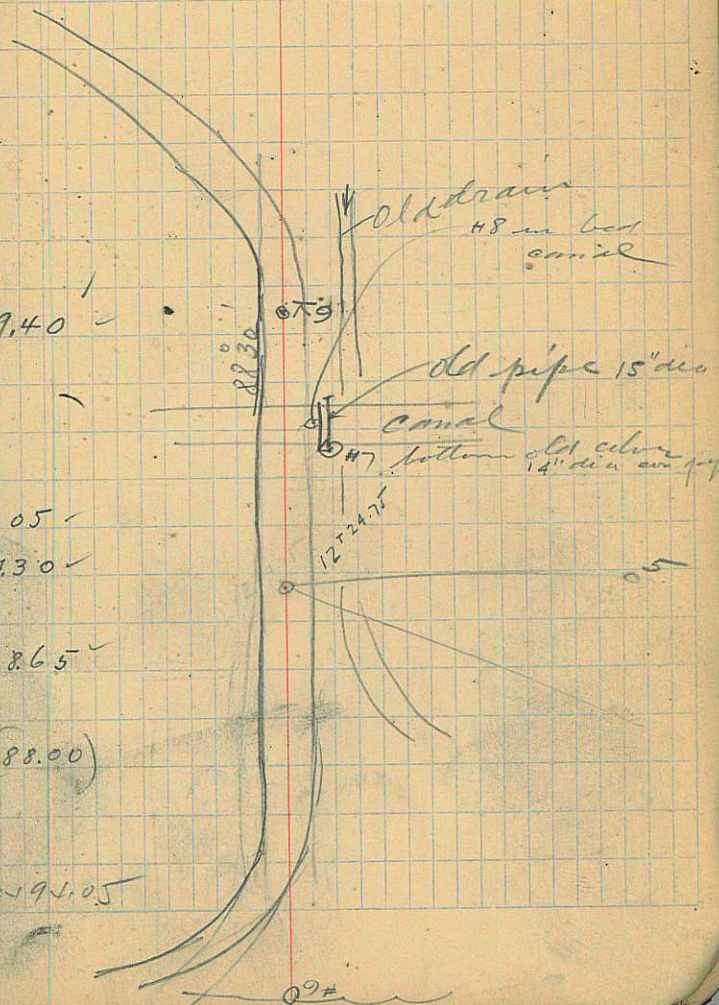
88.05 ✓

84.30 ✓

88.65 ✓

(88.00)

4.75 12+24.75



138

BS

FS

WU

L

C

Vale, HI

culvert 8

92°40

8.76 10.96

16.49

(C)

3.72

13.73

97.45

92°30

5.25 7.5

92°30'

~~10.60~~~~8.4~~
~~10.6~~ 10.6

10.32

12.54

87.12
near RR culvert
24.90
bottom paper

12-

12

(C)

3.71

5.87

#11

7.85 10.28

-9

10.20
268.19

5.80 10.20

10-

(9')

13.73

97.45

on P.C.

19.40

0 Vert L

99.60



2.4' top

1.2' bottom

culvert 3

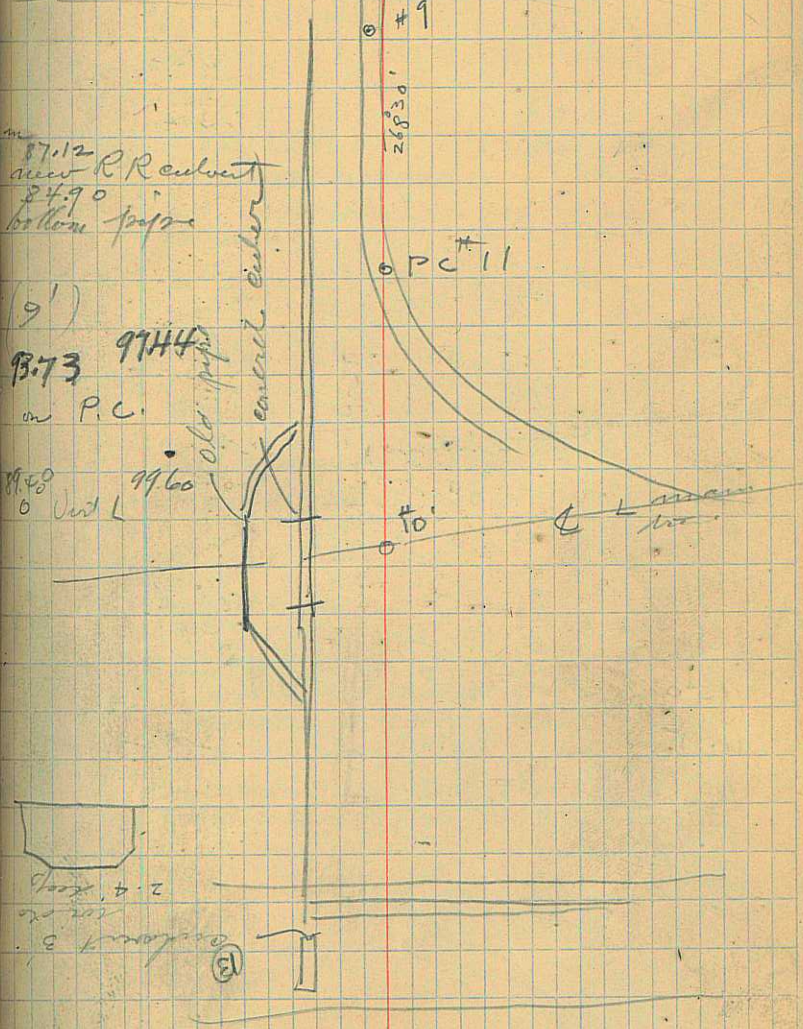
(B)

S. 1/4 Sec. 11

26830' #9

P.C. #11

#10



140

$$\begin{array}{r} 128.89 \\ 122.1 \\ \hline 6.79 \end{array}$$

$$\begin{array}{r} 128.9 \\ 6.9 \\ \hline 122.1 \end{array}$$

$$\begin{array}{r} 15 \\ 2.5 \\ \hline 1.25 \end{array}$$

$$\begin{array}{r} 12889 \\ 162 \\ \hline 123.27 \\ 1.5 \\ \hline 124.77 \end{array}$$

3

$$\begin{array}{r} 347 \\ 415 \\ 617 \\ 444 \\ 730 \\ 980 \\ 940 \\ 4473 \\ 2870 \\ 16.03 \\ 10 \\ \hline 1050 \\ 2870 \\ 16.03 \\ 10 \\ \hline 320 \end{array}$$

 13.2 feet

$$\begin{array}{r} 9 \\ 1050 \\ 1150 \\ 1.00 \\ 12.50 \\ 5.42 \\ 7.08 \\ \hline 12.50 \\ 6.6 \\ 5.9 \\ \hline 3.92 \end{array}$$

$$\begin{array}{r} 4283 \\ 545 \\ \hline 5128 \end{array}$$

$$\begin{array}{r} 4283 \\ 3978 \\ \hline 305 \end{array}$$

$$\begin{array}{r} 12.2 \\ 4 \\ \hline 8.2 \end{array}$$

KEITH'S RAILROAD CURVE TABLES.

Published by KEUFFEL & ESSER CO., New York.

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HOW TO USE KEITH'S TABLES. EXAMPLE.

Wanted a Curve with an Ext. of about 12 ft. Angle
 of Intersection or I. P.=23° 20' to the R. at Station
 542+72.

Ext. in Tab. IV opposite 23° 20'=120.87
 120.87+12=132.87. Say a 10° Curve.

Tan. in Tab. IV opp. 23° 20'=1183.1
 1183.1+10=1193.1.

Tab. V, correction for A. 23° 20' for a 10° Cur.=0.16
 1193.1+0.16=1193.26=corrected Tangent.

(If corrected Ext. is required find in same way)
 Ang. 23° 20'=23.33°+10=33.33=L. C.

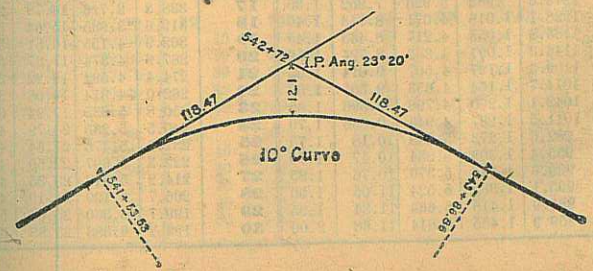
2° 19½'	=def. for sta.	542	I. P.=sta.	542+72
4° 49½'	" " "	+50	Tan.=	1.18.47
7° 19½'	" " "	543	B. C.=sta.	541+53.53
9° 49½'	" " "	+50	L. C.=	2.33.33
11° 40'	" " "	543+	E. C.=sta.	543+86.86
		86.86		

100-53.53=46.47×3'(def. for 1 ft. of 10° Cur.)=139.41'=
 2° 19½' def. for sta. 542.

Def. for 50 ft.=2° 30' for a 10° Curve.

Def. for 36.86 ft.=1° 50½' for a 10° Curve

(These tables are published in Field Books of
 KEUFFEL & ESSER Co., New York, N. Y.)



Natural Tangents

deg.	0'	10'	20'	30'	40'	50'	60'	70'	80'	90'
0	0000	0029	0058	0087	0116	0145	0174	0203	0232	0261
1	0175	0204	0233	0262	0291	0320	0349	0378	0407	0436
2	0349	0378	0407	0436	0465	0494	0523	0552	0581	0610
3	0524	0553	0582	0611	0640	0669	0698	0727	0756	0785
4	0699	0728	0757	0786	0815	0844	0873	0902	0931	0960
5	0875	0904	0933	0962	0991	1020	1049	1078	1107	1136
6	1051	1080	1109	1138	1167	1196	1225	1254	1283	1312
7	1228	1257	1286	1315	1344	1373	1402	1431	1460	1489
8	1405	1434	1463	1492	1521	1550	1579	1608	1637	1666
9	1584	1613	1642	1671	1700	1729	1758	1787	1816	1845
10	1763	1792	1821	1850	1879	1908	1937	1966	1995	2024
11	1944	1973	2002	2031	2060	2089	2118	2147	2176	2205
12	2126	2155	2184	2213	2242	2271	2300	2329	2358	2387
13	2309	2338	2367	2396	2425	2454	2483	2512	2541	2570
14	2493	2522	2551	2580	2609	2638	2667	2696	2725	2754
15	2679	2708	2737	2766	2795	2824	2853	2882	2911	2940
16	2867	2896	2925	2954	2983	3012	3041	3070	3099	3128
17	3057	3086	3115	3144	3173	3202	3231	3260	3289	3318
18	3249	3278	3307	3336	3365	3394	3423	3452	3481	3510
19	3443	3472	3501	3530	3559	3588	3617	3646	3675	3704
20	3640	3669	3698	3727	3756	3785	3814	3843	3872	3901
21	3839	3868	3897	3926	3955	3984	4013	4042	4071	4100
22	4040	4069	4098	4127	4156	4185	4214	4243	4272	4301
23	4245	4274	4303	4332	4361	4390	4419	4448	4477	4506
24	4452	4481	4510	4539	4568	4597	4626	4655	4684	4713
25	4663	4692	4721	4750	4779	4808	4837	4866	4895	4924
26	4877	4906	4935	4964	4993	5022	5051	5080	5109	5138
27	5095	5124	5153	5182	5211	5240	5269	5298	5327	5356
28	5317	5346	5375	5404	5433	5462	5491	5520	5549	5578
29	5543	5572	5601	5630	5659	5688	5717	5746	5775	5804
30	5774	5803	5832	5861	5890	5919	5948	5977	6006	6035
31	6009	6038	6067	6096	6125	6154	6183	6212	6241	6270
32	6249	6278	6307	6336	6365	6394	6423	6452	6481	6510
33	6494	6523	6552	6581	6610	6639	6668	6697	6726	6755
34	6745	6774	6803	6832	6861	6890	6919	6948	6977	7006
35	7002	7031	7060	7089	7118	7147	7176	7205	7234	7263
36	7265	7294	7323	7352	7381	7410	7439	7468	7497	7526
37	7536	7565	7594	7623	7652	7681	7710	7739	7768	7797
38	7813	7842	7871	7900	7929	7958	7987	8016	8045	8074
39	8098	8127	8156	8185	8214	8243	8272	8301	8330	8359

deg.	60'	50'	40'	30'	20'	10'	0'
80	5.6713	5.7694	5.8708	5.9758	6.0844	6.1970	6.3138
81	6.3138	6.4348	6.5606	6.6912	6.8269	6.9682	7.1154
82	7.1154	7.2687	7.4287	7.5958	7.7704	7.9530	8.1443
83	8.1443	8.3450	8.5555	8.7769	9.0098	9.2553	9.5144
84	9.5144	9.7882	10.078	10.385	10.711	11.059	11.430
85	11.430	11.826	12.250	12.706	13.197	13.724	14.300
86	14.300	14.924	15.605	16.350	17.169	18.075	19.081
87	19.081	20.206	21.470	22.903	24.542	26.432	28.636
88	28.636	31.242	34.368	38.189	42.904	49.104	57.290
89	57.290	68.750	85.940	114.588	171.885	343.770	

Natural Cotangents

Handwritten calculations:

$$\begin{array}{r} 43 \\ 129 \\ \hline 34554 \\ 21 \\ \hline 112 \\ 212 \end{array}$$

Handwritten calculations:

$$\begin{array}{r} 124.57 \\ 22 \\ \hline 122.37 \end{array}$$

Handwritten calculations:

$$\begin{array}{r} 123.57 \\ 11 \\ \hline 122.47 \end{array}$$

Handwritten calculations:

$$\begin{array}{r} 123.77 \\ 101 \\ \hline 122.76 \end{array}$$

Handwritten calculations:

$$\begin{array}{r} 123.77 \\ 101 \\ \hline 122.76 \end{array}$$

Handwritten calculations:

$$\begin{array}{r} 123.77 \\ 101 \\ \hline 122.76 \end{array}$$

Handwritten calculations:

$$\begin{array}{r} 00.155 \\ 2 \\ \hline 0.77 \end{array}$$

Handwritten calculations:

$$\begin{array}{r} 23.5 \\ 03 \\ \hline 23.5 \end{array}$$

Handwritten calculations:

$$\begin{array}{r} 0.020 \\ 04 \\ \hline 0.020 \end{array}$$

Handwritten calculations:

$$\begin{array}{r} 00200 \\ 16223 \\ \hline 400 \end{array}$$

$$\begin{array}{r} 1188 \\ 22 \\ \hline 10968 \\ 116 \\ \hline 10973 \\ 6.3 \end{array}$$

$$\begin{array}{r} 979 \\ 979 \\ \hline 8811 \\ 6853 \\ \hline 8811 \\ 958 \\ \hline \end{array}$$

$$\begin{array}{r} .96 \\ 7.4 \\ \hline 38 \\ 672 \\ \hline 710.4 \end{array}$$

$$\begin{array}{r} 20710 \\ 20710 \\ \hline 14497 \\ 149.0 \\ \hline \end{array}$$

$$\begin{array}{r} 26 \\ 156 \\ \hline \end{array}$$

$$\begin{array}{r} 2.6 \\ 120 \\ 156 \\ \hline \end{array}$$

$$\begin{array}{r} 120 \\ 156 \\ \hline \end{array}$$

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.
 ROADWAY 14 FEET WIDE. SIDE SLOPES 1 1/2 TO 1.
 FOR SINGLE TRACK EMBANKMENT.

	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.

MADE IN GERMANY.