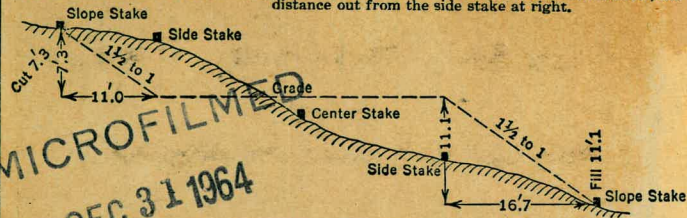


2065

**DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING**  
**Roadway of any Width. Side Slopes 1/2 to 1.**

In the figure below: opposite 7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



MICROFILMED  
 DEC 31 1964

SEWAGE TREATMENT PLANT

Reconstruction & Enlargement

November - 1949

# 2065

Cut or Fill	Distance out from Side or Shoulder Stake										Cut or Fill
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59.7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

KEUFFEL & ESSER CO., N. Y.  
 For Curve Tables see end of book

The paper in this book No. 360  
 is made of 100% high grade rag stock  
 with a WATER RESISTING surface sizing.

Page

Index

1. check 2x4 27" Air Exhaust
- 2 Air Exhaust 24"
- 3 Irrigation pipe 1 1/2"
- 4 Location 12" Vit Pipe
- 5 " 8" Pipe
- 6 Fiber Duct
- 7 24" & 27" Vit Pipe
- 10-11 Sewer Outfall
- 12 Elevt Sludge Line
- 13 Sewer Outfall
- 14 " " Location of Pile
- 15 & 16 " " "
- 17 1 1/2" Water Line
- 18 Conduit Main Bldg to Detritor
- 19 8" Super Nalent. to MHC
- 20 3/4" Water Line
- 21 Fiber Duct W Tank Elevt #2 to venting
- 22 1 1/2" Steel Pipe from 4" Pipe to River  
W Tank Elevt #2
- 23 4" & 6" Back Flow & Fresh Water
- 24 M.H. at Out Fall
- 25 2" Water Line 4" Fiber Duct
- 26 1 1/2" Water Line to Fountain
- 27 8" Drain Elevt #2 East Tank
- 28 3" Water Pick up
- 29 8" Wash Line

In t  
fromCut  
or  
Fill0  
1  
2  
3  
4  
5  
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7  
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29

- 30 2" Pipes Between Main  
Bldg & Detritor Bldg  
including 2 Fuel Lines
- 31 12" Vit Drain
- 32 Conduit Main & Detritor
- 33 Back Flow Unit
- 34 1" & 1 1/2" from Back Flow Unit  
to Venturi & Unit # <sup>Elev</sup> E Tank
- 35 8" CI Pipe from Digest Control  
to Dig # 1 ?

Moore  
Begg  
Crawford check on 27" Vit. Air Exhaust  
lines as laid 11-14-49

FLY line 24" to 21"

1999-58  
-59  
-69

B.M.	2.68	14.68	12.00	
0100	Top Pipe	10.27		
01134	Δ 45° R	9.96	4.72	TOP
01177	"Toe"	9.82	4.86	" 24"
1.7	LT. of 0117.7 = 15"	11.65	3.03	(Inv. 15")
01202	x 5° R	9.79	4.89	TOP 21"
01338		9.78		" "

WLY Line 27" Line

0100		10.03		TOP 27"
01161		9.86	4.82	" "

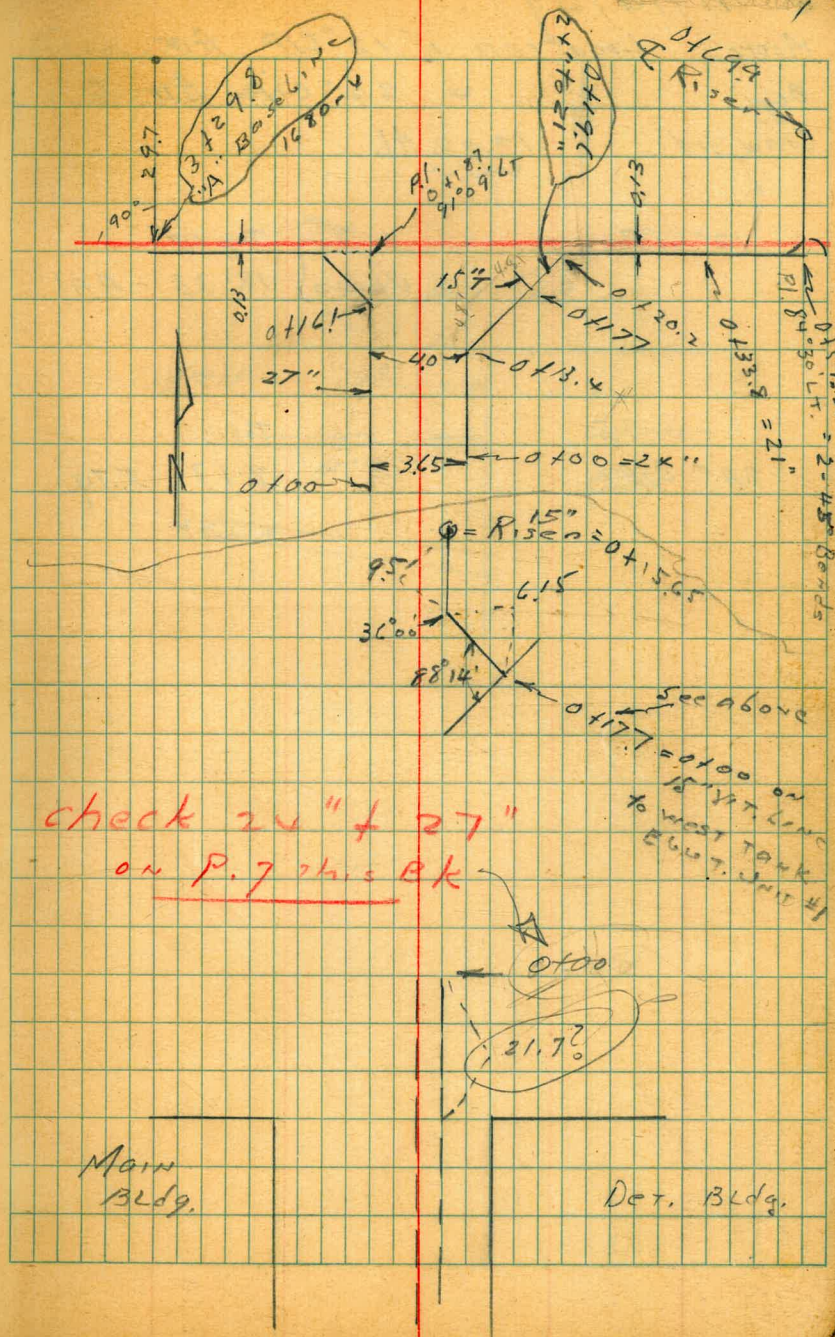
11-16-49 FLY LINE

B.M.	5.51	14.77	9.26	
0146	TOP 24" VIT	9.72		
0157	" " "	9.76	1.0	
0169	" " "	9.76		

15" Vit Line

14.77

010615	36° 00' R	10.37		TOP
011265		10.24	4.51	"
011565	E Riser			
W. TANK ELUT UNIT A1				

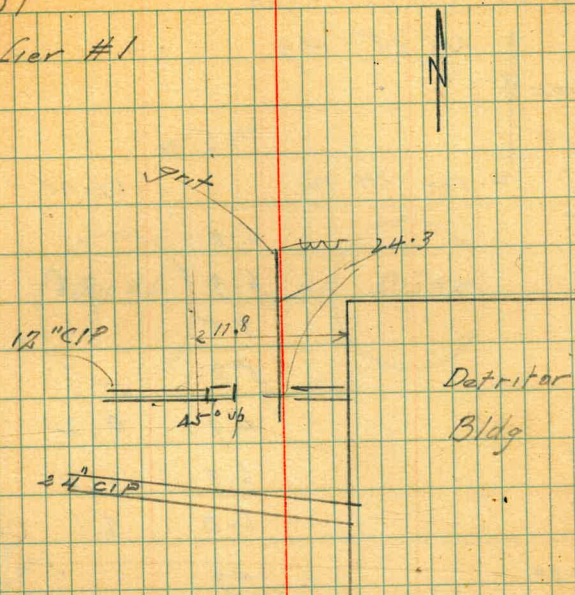


11/14/49  
 Moore Location of 12" CIP Air  
 Begg & 24" CIP Air to  
 Crawford 13.92 ft.  
 when

12" CIP 11.84 Top CIP  
 boot 6.49 } 18.33 - 4.41

24" CIP Top of  
 8.13 5.79

Exhaust  
 Clarifier #1



1 1/2" Irrigation Pipe

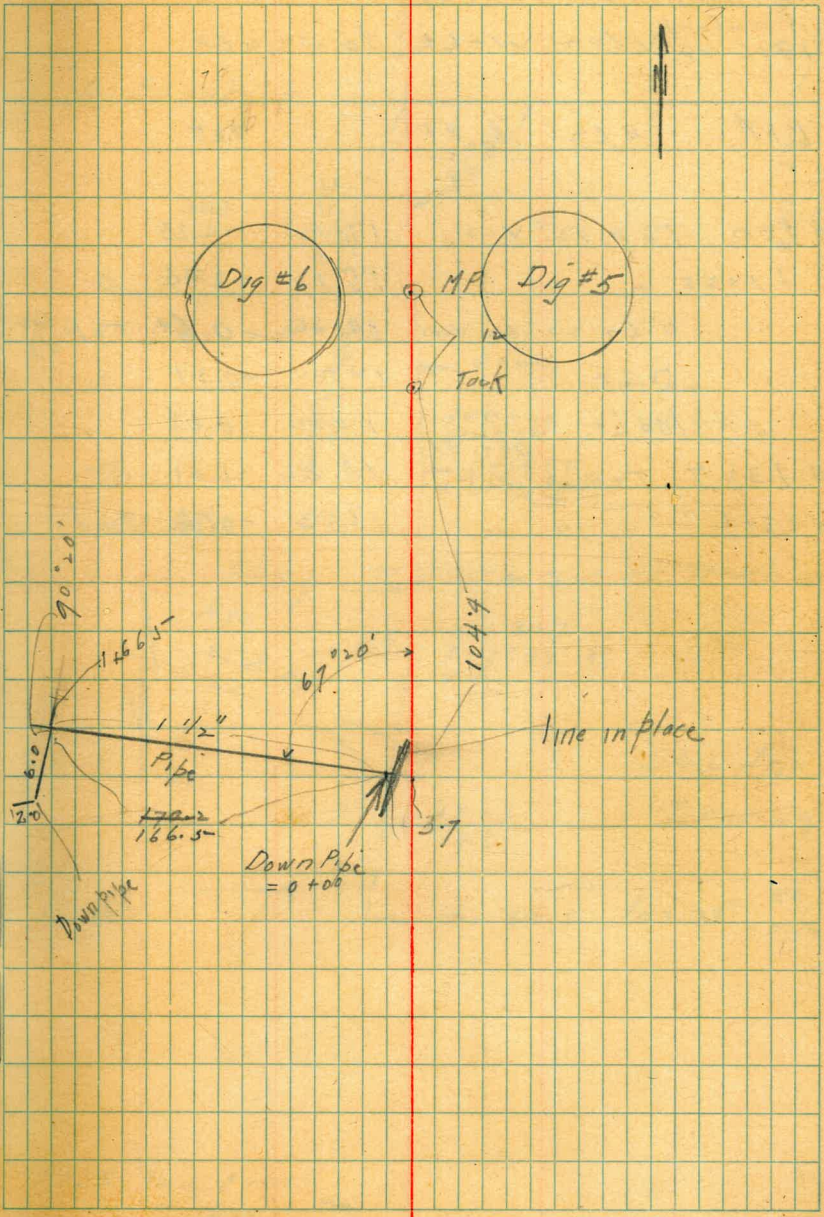
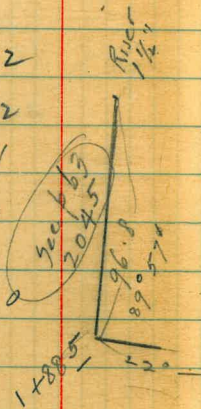
Beag 11/15/49

Sherman

Crowford

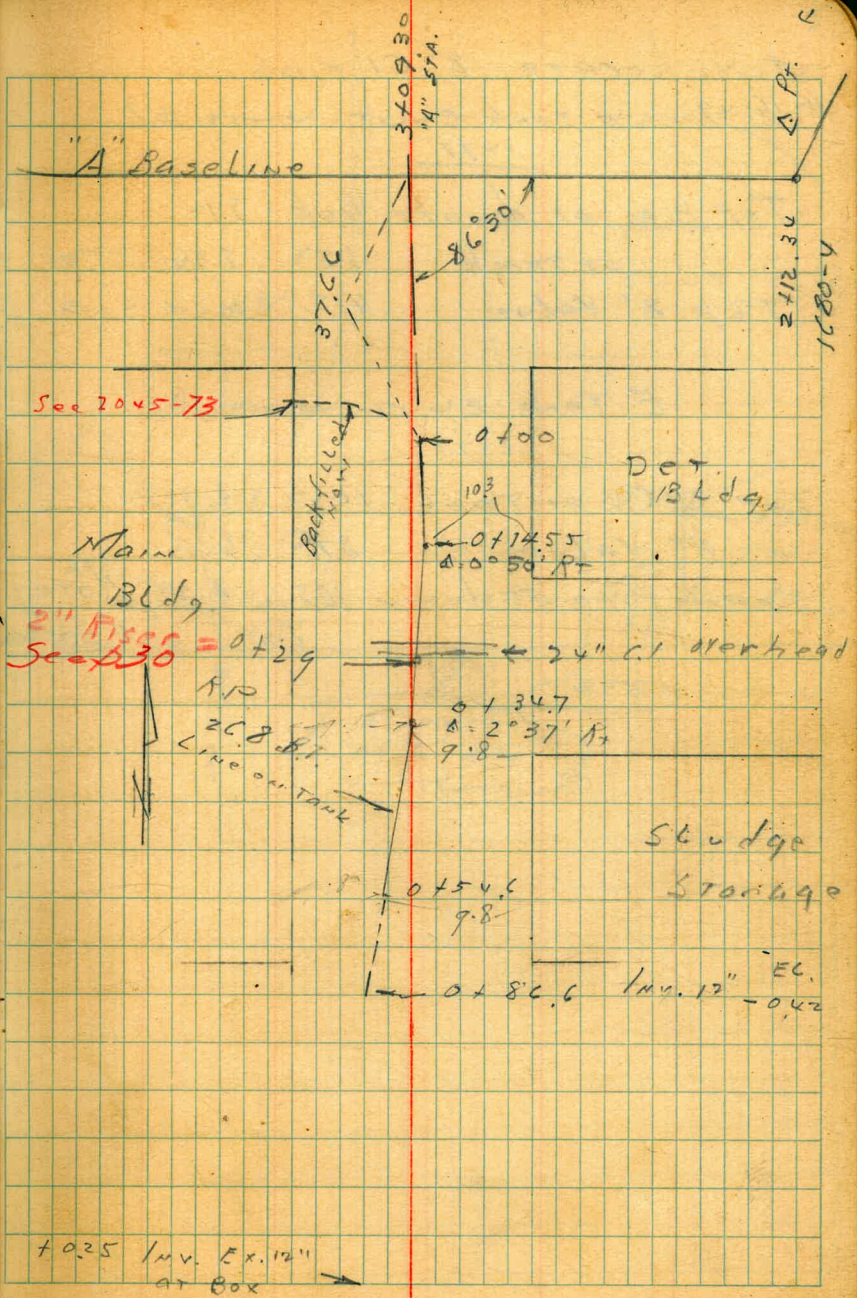
Top of Pipe

	2.12	14.12	12.00
0+00.5		6.8	
0+00		6.3	7.8
+66		5.5	
1+32		5.8	
1+66.5		4.9	9.2
1 88.5		6.9	7.2
2+85.3		6.0	8.1
1+66=00		4.9	
1+66+06		4.6	
0+08		5.1	9.0



Moore  
Begg  
Sherman LOCATE 12" VIT. LINE  
Crawford  
4-16-49 WET WELL TO STACK

B.M.	4.62	13.87	925	
0100	Top 12" VIT.	17.02	-4.23	INV.
0114.55	" " "	15.73	-2.94	Δ ✓
"	4' 6" 22° 30' Vert.	14.46	-0.49	TOP 12" C.I.
"	53 LT	14.24	-0.37	"
"	103 LT. outside wall Det. Bldg.	14.30	-0.43	"
0134.7	TOP 12" VIT	13.80	-1.01	
0154.6	" " "	13.53	-0.74	END



1035 Inv. Ex. 12"  
at Box



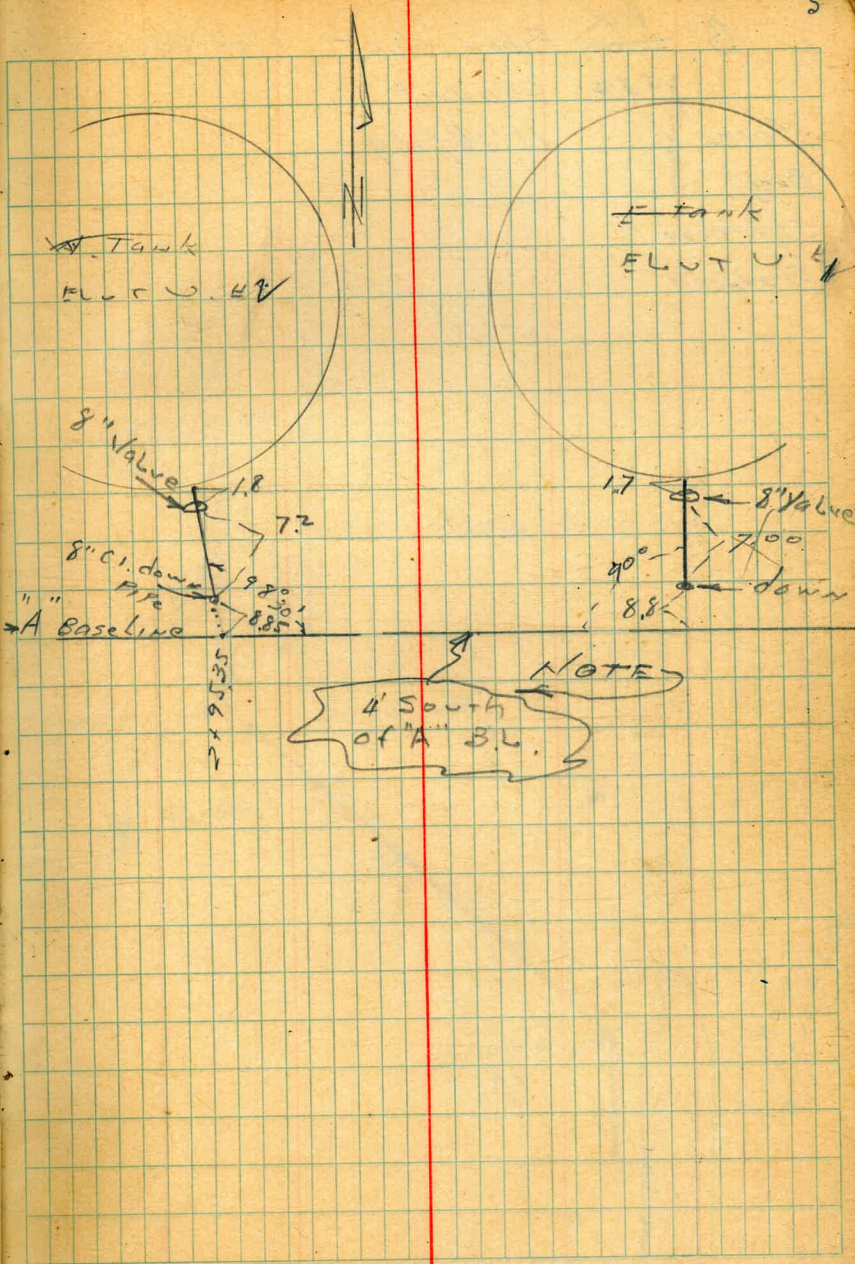
Locate 8" CI Pipe  
 11-16-49. W. Tank ELUT. UNIT #2  
 1477

Top Pipe at down	6.05	8.7
" " at tank	5.83	8.94
Top 8" Valve	4.15	10.67

E. Tank ELUT UNIT #1  
 1477

Top 8" CI. at Tank	10.27	4.3
" 8" Valve	8.72	6.05
Top 8" Pipe at down	10.51	4.27

Notes  
 4' South  
 of "A"



2248  
 20/22  
 20/21

3" ~~Ice~~ Fiber duct Sludge

4 3/4" Conduit

Moore

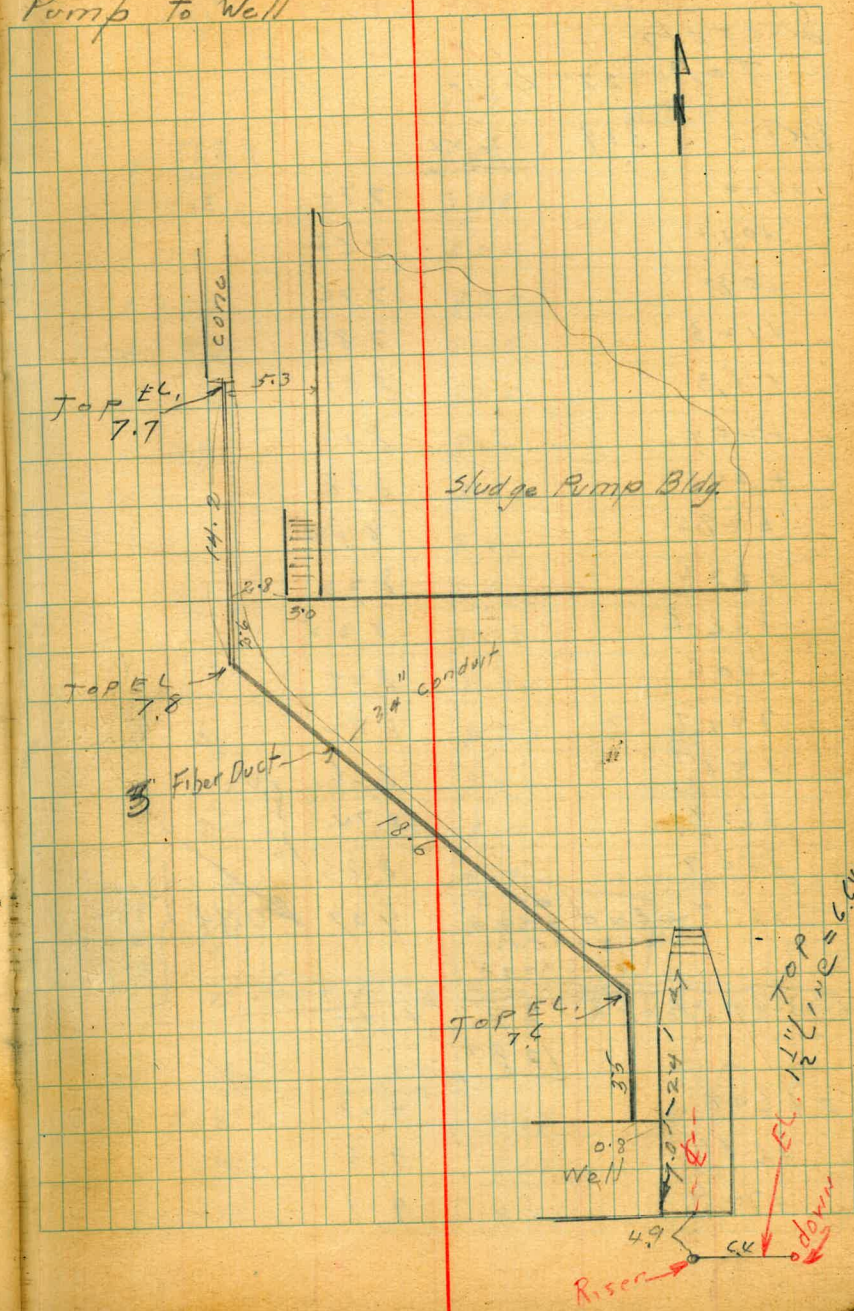
11/16/49

Begg

Sherman

Crawford

Pump to Well



check 24" + 27" V.I.T.  
Sketch From P1  
TOP 27" Line

B.M.	319	12.44	9.25	Inv.
0100			7.70	2131
+04.1			7.68	
+08.4			7.70	
+12.3			7.83	
+16.3			8.01	
+20.4			8.10	
+24.5			8.18	
+28.5			8.24	
+32.0			8.24	
+36.0			8.35	
+40.0			8.45	
+44.7			8.52	
+48.7			8.66	
+52.8			8.74	
+56.9			8.80	
+61.4			9.07	

End of S.  
24" C.I.  
overhead

filled  
EL. TOP 11-23-49  
2.52  
Inv. 119

Level Pipe  
Should Be  
+1.10

11-23-47 check 27" V.I.T.  
12.84

B.M.	357	12.84	9.25	Inv.	Design
01648			9.23	1.16	1.10
+689			9.15	1.24	
+729			9.17	1.22	

Top  
check 24" V.I.T.

B.M.	357	12.44	9.25	Inv.
0100			7.77	2150
+34			7.84	
+75			7.98	
+110			8.06	
+157			8.20	
+198			8.25	
+239			8.30	
+279			8.45	
+324			8.49	
+361			8.51	
+401			8.60	
+442			8.68	
+483			8.80	
+524			8.89	3.58 1.38
+564 =	shear		9.01	1.26
+585 =	2.04976		9.10	1.17
+626	24" C.I.		9.07	1.20
+670			9.04	1.23

Level Pipe  
Should Be  
+1.16

check 24" 11-23-49

B.M.	357	12.84	9.25	Inv.
01707			9.47	1.18
+727			9.45	1.20
+787			9.40	1.19

24" V.T.  
12.82

		INW	Design
0+828	9.45 <sup>3.37</sup>	1.20	1.16
0+868	9.40	1.15	
0+909	9.22	1.23	
0+95 <sup>x</sup> end 11-23-49	9.44	1.21	

Begg Sherman Crawford 11/25/49  
404 13.29 9.25

		INW	Design
0+99	9.90	3.39	
1+03 <sup>1</sup>	9.87		
1+07 <sup>2</sup>	9.93		
1+11 <sup>3</sup>	9.96		
1+15 <sup>3</sup>	9.97		
1+19 <sup>4</sup>	9.97		
1+23 <sup>5</sup>	10.00		
1+27 <sup>6</sup>	9.97		
1+31 <sup>7</sup>	9.88		
TP 1.65 <sup>5.47</sup> <del>1.65</del>	9.47	3.82	TP on 3 1/2' at 144
1+35 <sup>8</sup>	8.05	3.42	
1+39 <sup>9</sup>	8.05		
1+44 <sup>0</sup>	8.07		
1+48 <sup>0</sup>	8.06		

Contd. 2045-78

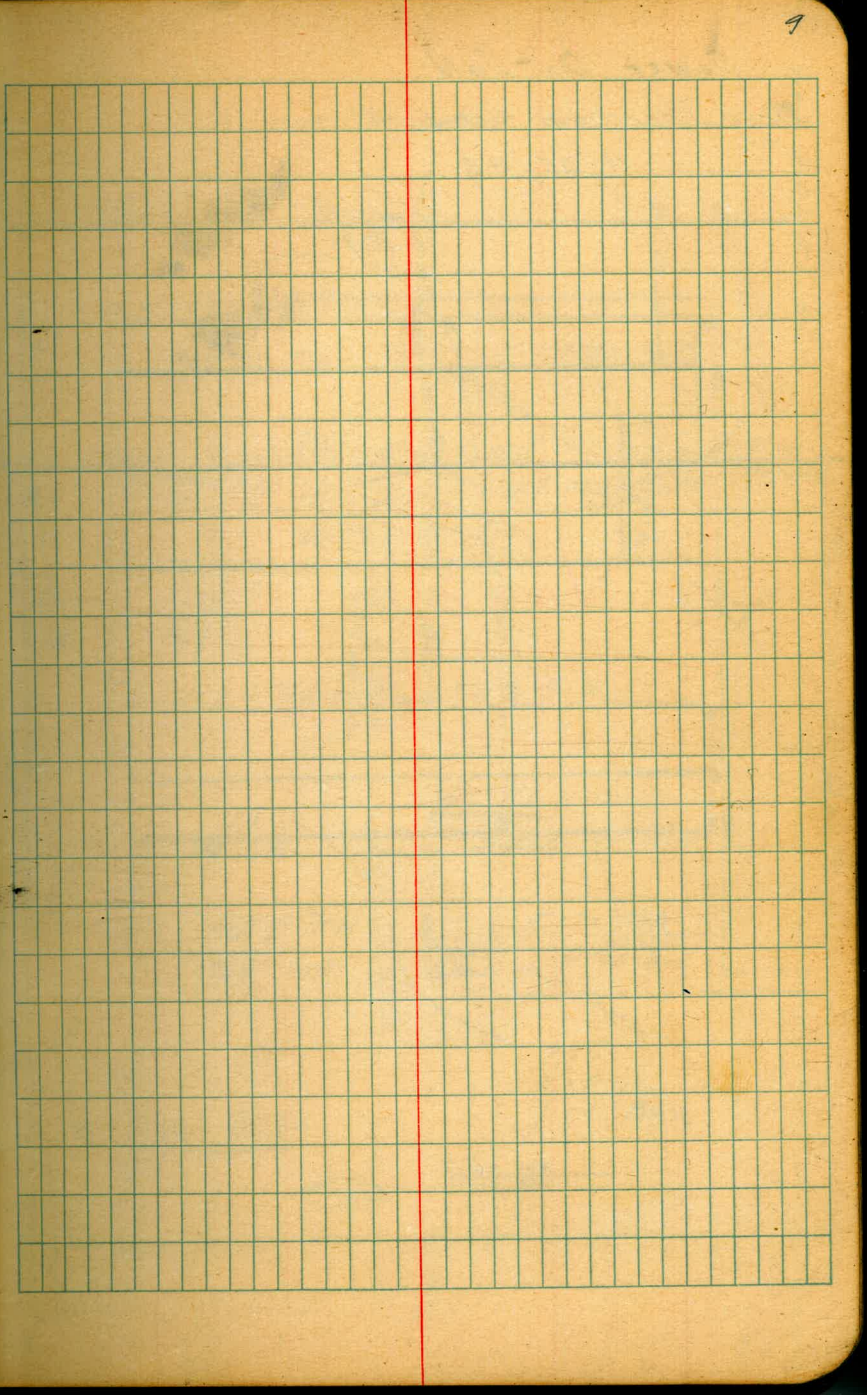
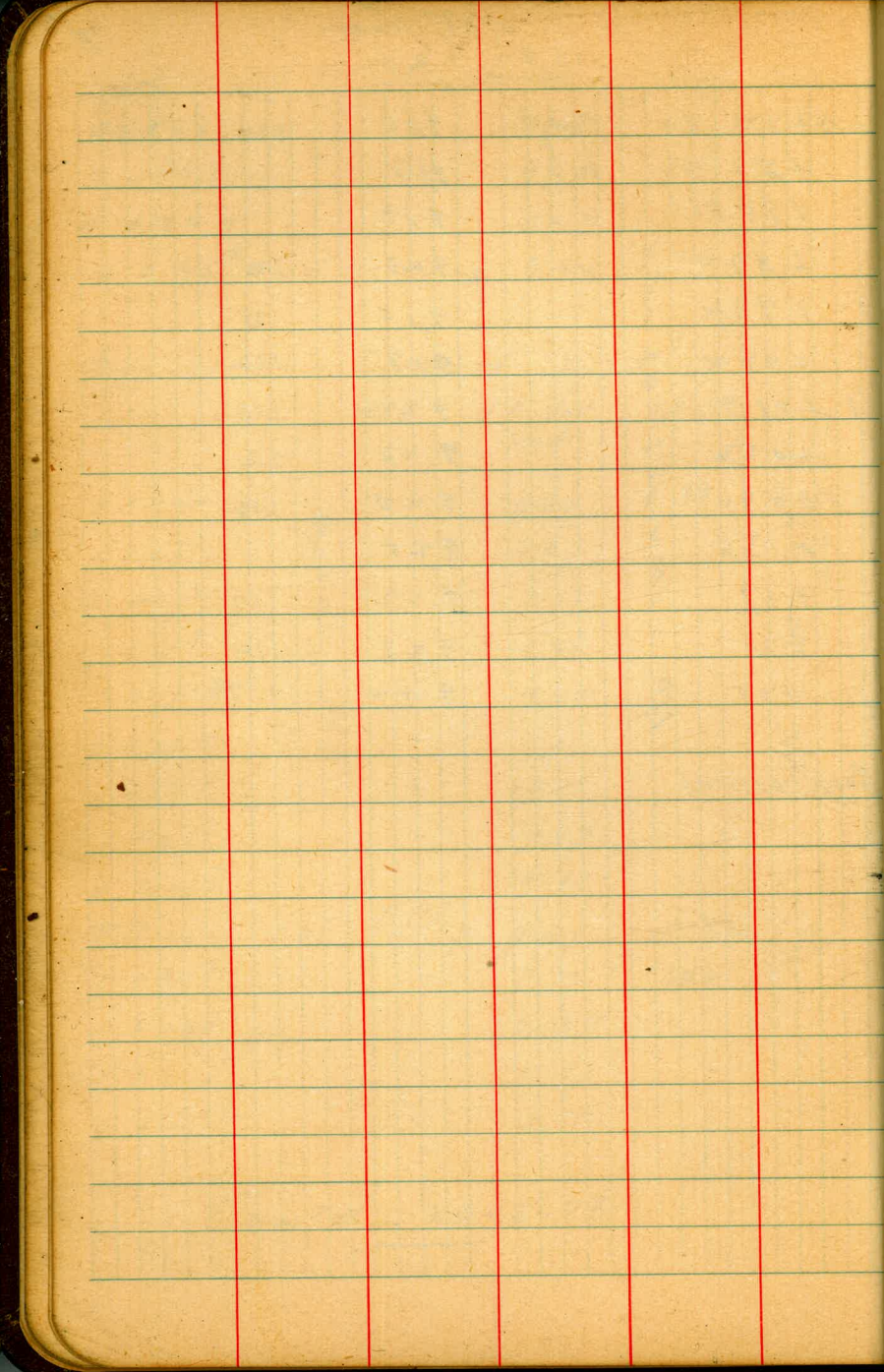
27" V.T.

8

		INW	Design
0+77	9.15	1.24	1.10
+81	9.15		
+85.1	9.15		
+89.2	9.13	1.26	
+93.2	9.15	1.24	
+97.2	9.17	1.22	
1+01.3	9.21	1.18	
+05.4	9.23	1.16	
+09.4	9.25	1.14	
+13.5	9.25		
+17	9.22	1.17	
+21	9.25	1.14	
+25	9.22	1.17	

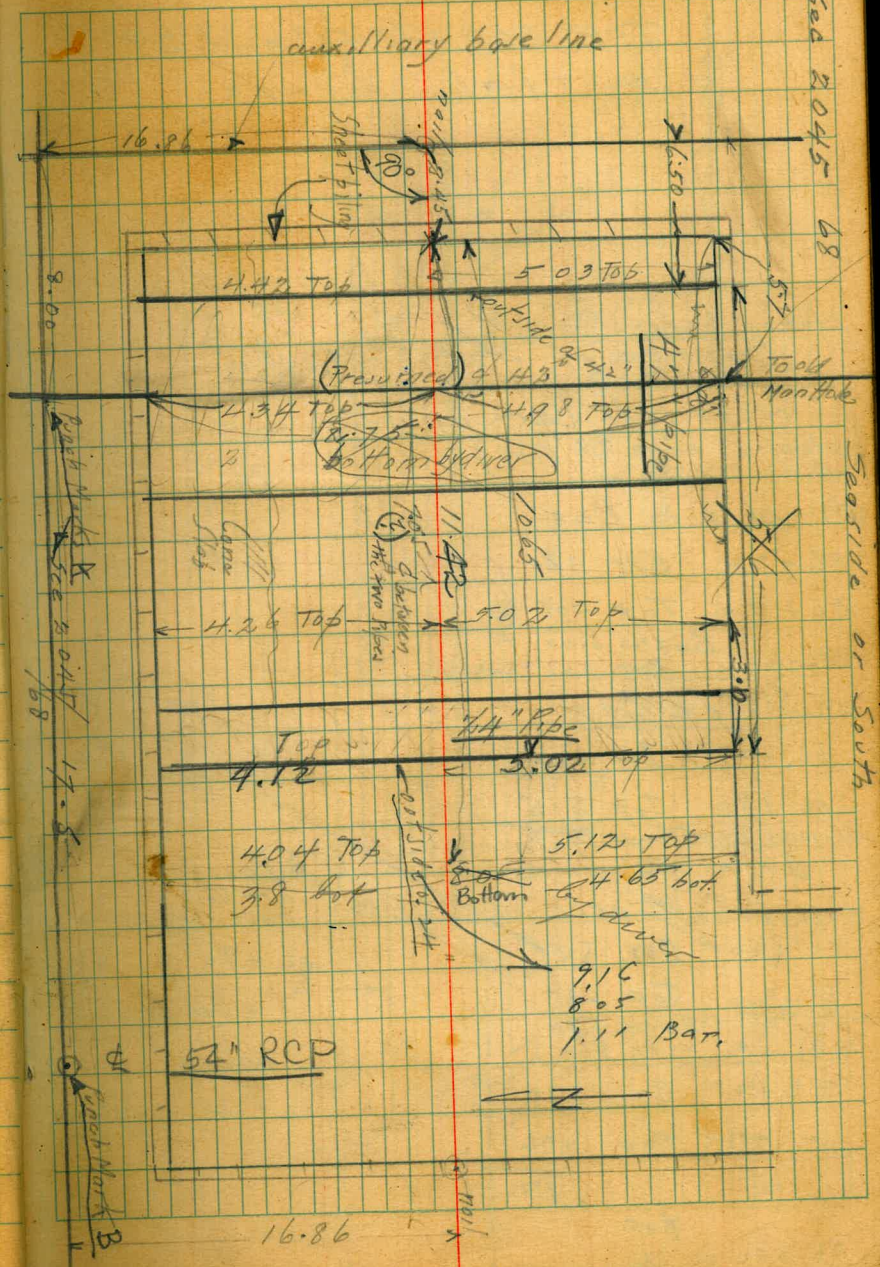
27" V.T.  
110 = INW 27" at 144

Begg Sherman



Sewer Outfall  
 Begg Sherman Crawford  
 11/25/49

Void  
sec P 11



Location of Box and  
Top EL. of 42" and 24"  
outfall lines

See 2023-62

" 2045-68

Notes to determine  
Batter of Sheet Piling

West side Box or 11.5' from East Piling  
(Near edge 24" pipe)

(A) N. side Box

EL - 2.2 Bot. 3.80 "C" <sup>Sheet</sup> to Piling

EL + 9.0 Top 4.07

EL - 16.62 Bot. 3.67 <sup>Batter 0.27</sup> computed

(B) S. side Box

EL - 2.2 Bot. 4.65 " " " "

EL + 9.0 Top 5.15 " " " "

EL - 16.62 Bot. 4.41 <sup>Batter 0.50</sup> computed

Over 42" Line

Should  
be 4.8  
in  
Top

BASELINE

(C) N. side Box acct. of <sup>Cons. slab</sup>

Sheet Piling  
at E  
Taken from 8'

EL + 2.0 Bot. 5.18 " " " "

EL + 9.0 Top 2.45

EL + 9.0 Top 4.35 " " " "

+ 1.0 Bot. 2.81

(D) S. side Box

Batter 0.36

EL + 2.0 Bot. 5.80 " " " "

(EL - 16.62 3.20  
COMPUTED)

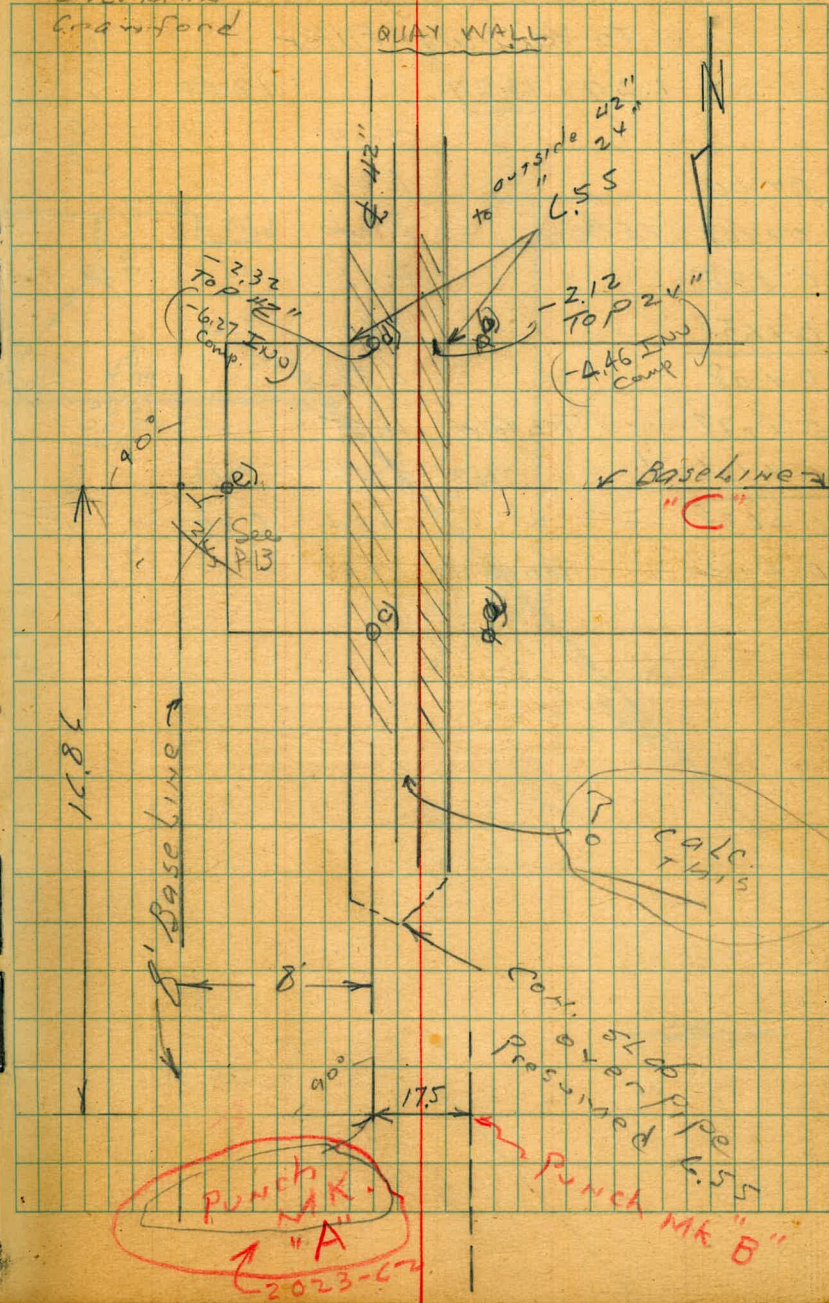
" + 9.0 Top. 4.96 " " " "

BAT. 0.84

EL - 16.62 Bot. 3.20 <sup>Batter 0.84</sup> computed

Moore  
Begg  
streaman  
Granford  
11-28-49

11



Punch  
MARK  
"A"  
2023-62

Cons. slab  
over pipe  
Presumed 6.55  
Punch MARK "B"

Calc.  
7.175

8"  
Electrified Sludge Lines  
to Vacuum Filter

x 1.29 13.29 12.00

Top 8"

6.45

6.64

6.61

6.60

6.31

4.55

6.26

6.34

4.60

12.00

6.65

6.69

7.13

6.95

6.95

Main Bldg

45° Bend  
E L 6.95  
18.2

11/30/49 Begg Sherman Crawford

12

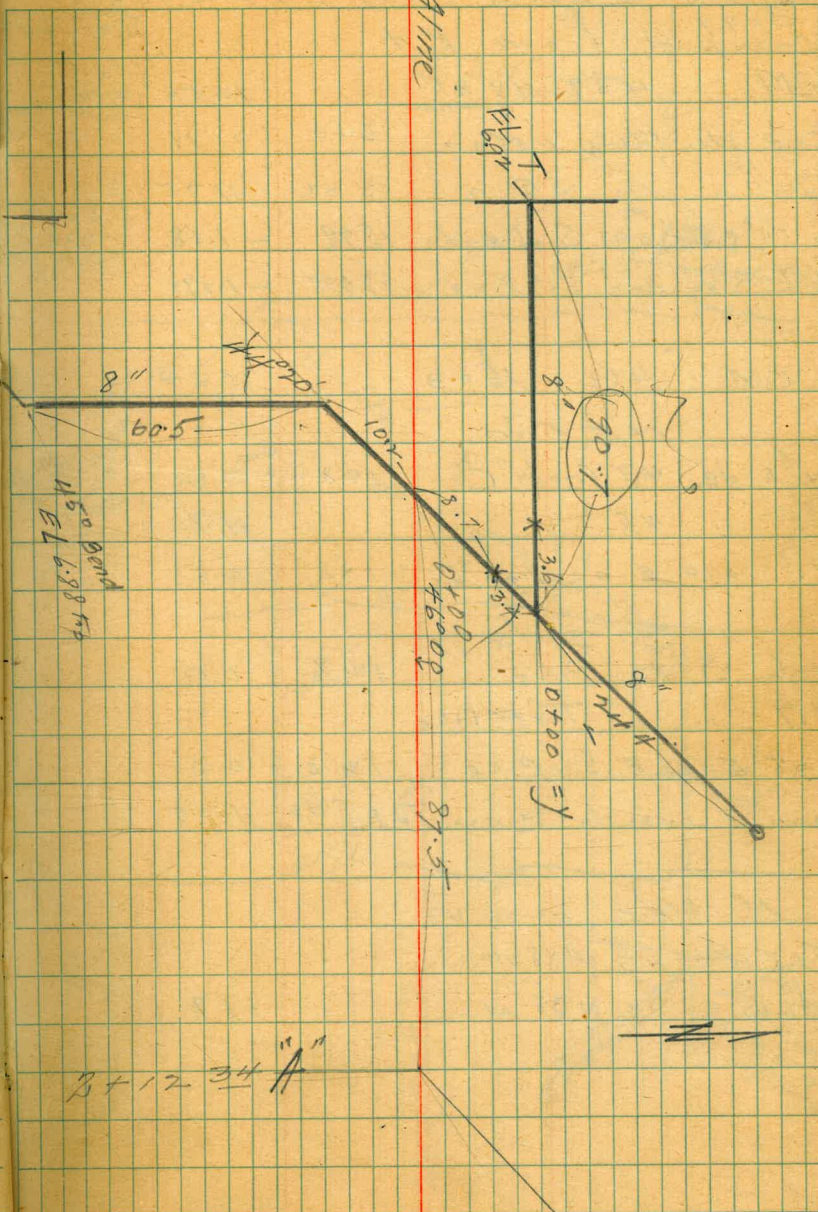
Southerly  
0+00  
0+102 45 Bend  
0+135  
0+653  
0+08  
0+087  
0+121  
0+035  
0+036  
Westerly  
NE

45 Bend

Top Valve

Top 8"

Top of Valve



3+12 34 8"



11-29-49

9°

2045-6870

Cross on Iron Cleat

13

Moose Extra Meas. on Levels

Begg Crawford from P. 11

BM	4.39	14.81	10.42	
Top sh. Piling N.E. Co.	3.10	11.71		
" " " SE "	3.06	11.75		
" 54" pipe 0.95 S. of end	15.99	-1.18		(INV -6.20 Coop)
4" S of end 54" pipe	15.995	-1.175		

BM	4.01	15.03	10.42	
N.E. Co.				
N. side	4.7	from "C"	14.8	0.0
" "	4.5	" "	11.7	
E.S. 0.10 E of TOP sh.	14.8	0.0		

S side

4.6	S to Pile	14.8	0.0
4.9	" " Top Pile		
0.05	E of E.S. Pile	14.8	0.0
	on E. inside Box Top Pile	11.75	

N. side over 42"

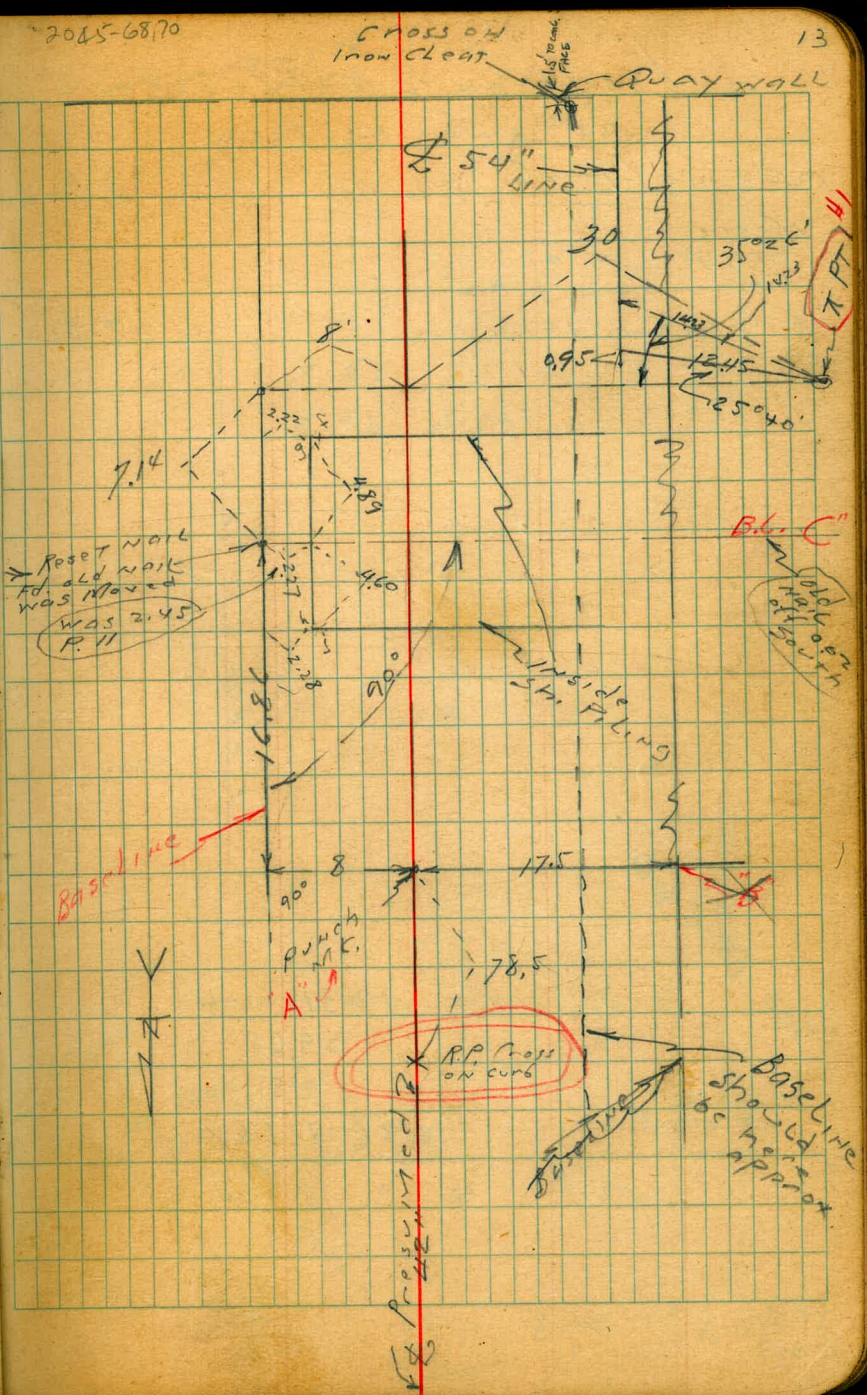
Top Piling	4.45	N		Toe
Below	4.35	N	4.18	"

USC. and Co.

(INV -6.20 Coop)

This work was done 11-28-49

Toe



Location of Floats  
at Sewer Outfall

12-5-49

PIC

Moore

Boag

Sherman

Crawford

π #1

π #2

π #2

π #1

422

E. edge pier

Inspection

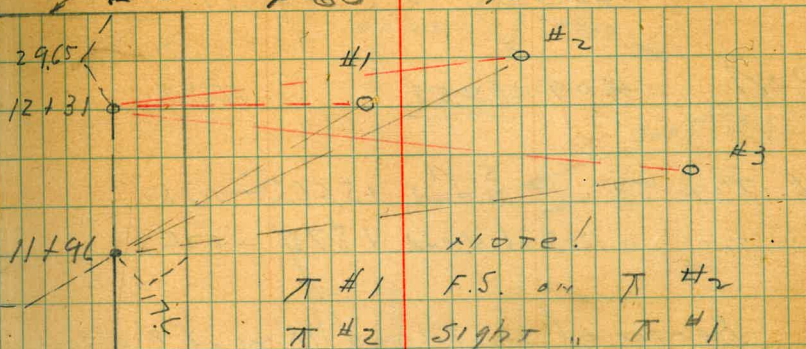
says NOT needed

SEE PAGE 60

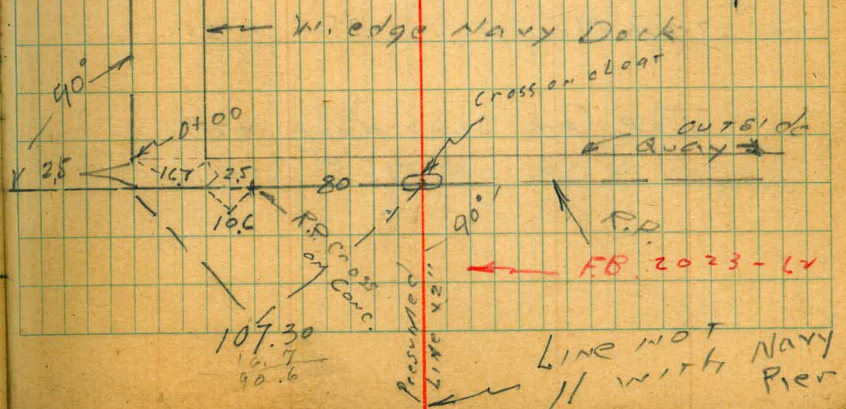
1231  
29.65  
2.5  
1263.15

End Pier 12462.26  
P-60

Floats



Baseline



Add notes at  
away & outfall

B.M. 409 14.51 10.42

EL. Top 54" 1/2 S. of N. end 15.66 - 1.15

" " " 12" S of N. end 15.75 - 1.26

Batter of Sh. Piling 18' w of 8' offset  
line

North side

EL. Bot. Pile 33 N of "C" 15.00 10.5

" Top 4.0 " " " 4.50 10.0

Batter Sh Pile

S. side

EL. Bot. Pile 51 15.0 10.5

" Top 5.2  
Whale 4.50 10.0

"C" Line at E side

EL. Bot. Pile 257 from 8' line 15.0

" Top Sh Pile 227 " 2.95 11.56

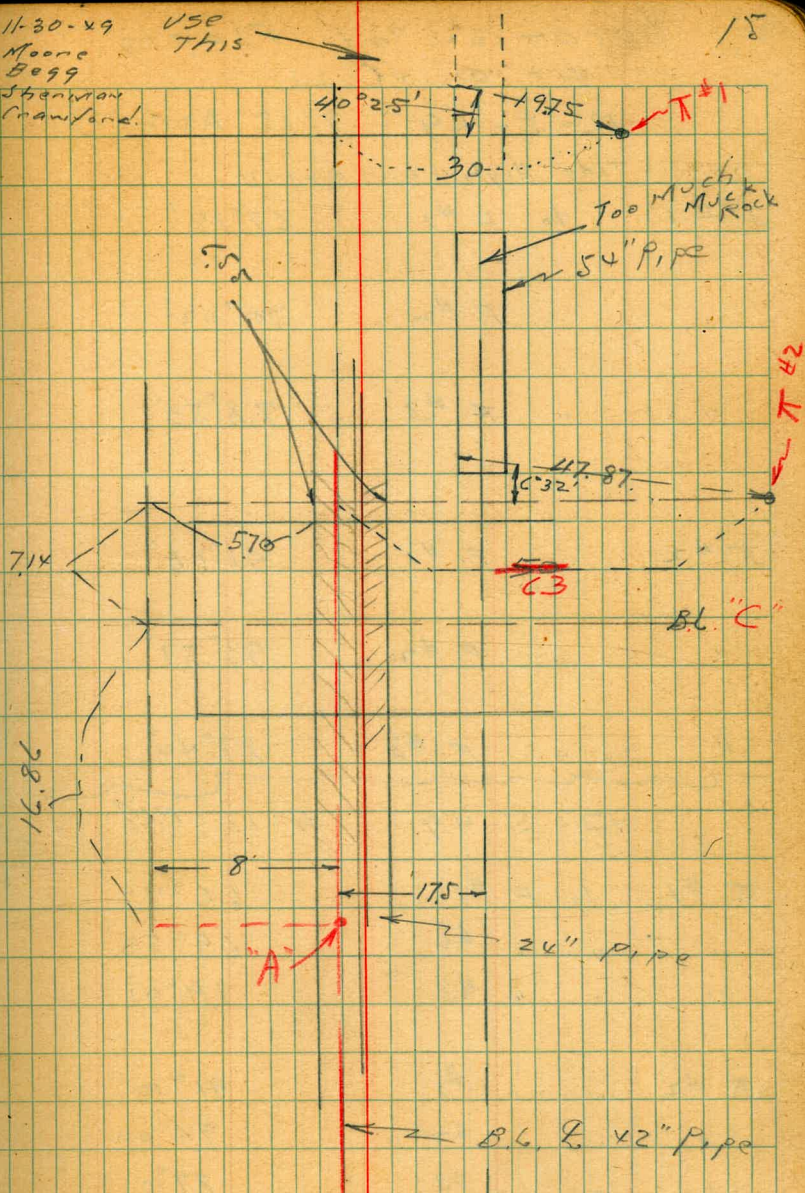
Top Con. Slab over 42"

15.5 11.0

11-30-49  
Moore  
Begg  
Stenison  
Crawford.

USE  
THIS

15



Location of Floats  
at outfall

12-5-49 9:15 AM

Tide High outgoing

T #1 to F #1 67°15'

" " F #2 70°02'

" " F #3 78°53'

T #2 " F #1 91°18'

" " F #2 93°57'

" " F #3 87°40'

12-5-49 4:13 PM

T #1 to F #1 66°52'

" " " #2 69°53'

" " " #3 79°01'

T #2 " " #1 91°10'

" " " #2 94°00'

" " " #3 87°01'

Note! #3 has blown over  
Took sight on  
bobbing float

No wind

10: AM. 12-5-49  
all checked at 0.00 or less

SEE Pg 60

Water choppy

10 Mile wly wind

1 1/2" Water Line

3/4" galv

Moore Begg Sherman Crawford

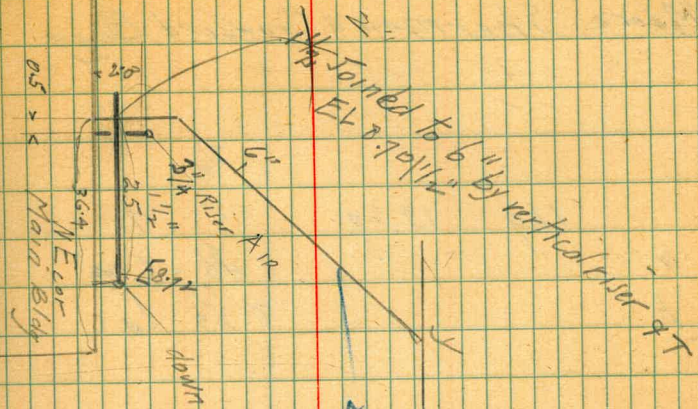
17/1/49

1.45 13.45 18.00

Top of 1 1/2 4.75 8.70

4.73 8.72

3/4 5.78 7.67



2" Joints to 6" by vertical riser & T  
 EL 7.70 1/2

2045 / 58

Conduit Power between

12/1/49

Moore Sherman & Crawford Begg

1.45 13.25

169 13.69

a

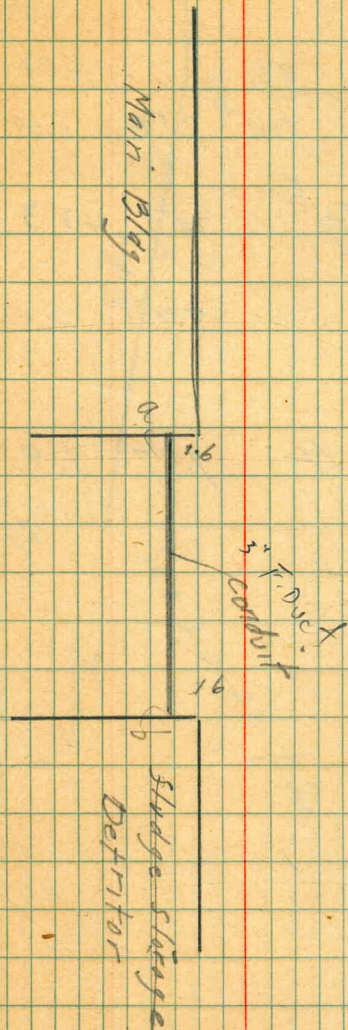
8.40 5.29

b

8.23 5.46

Main Bldg & Sludge Storage <sup>DETRICTOR</sup>

18



8" Super potent to MHC

Moore Bagg Sherman Crawford

12/1/49

7.56 11.82 9.86

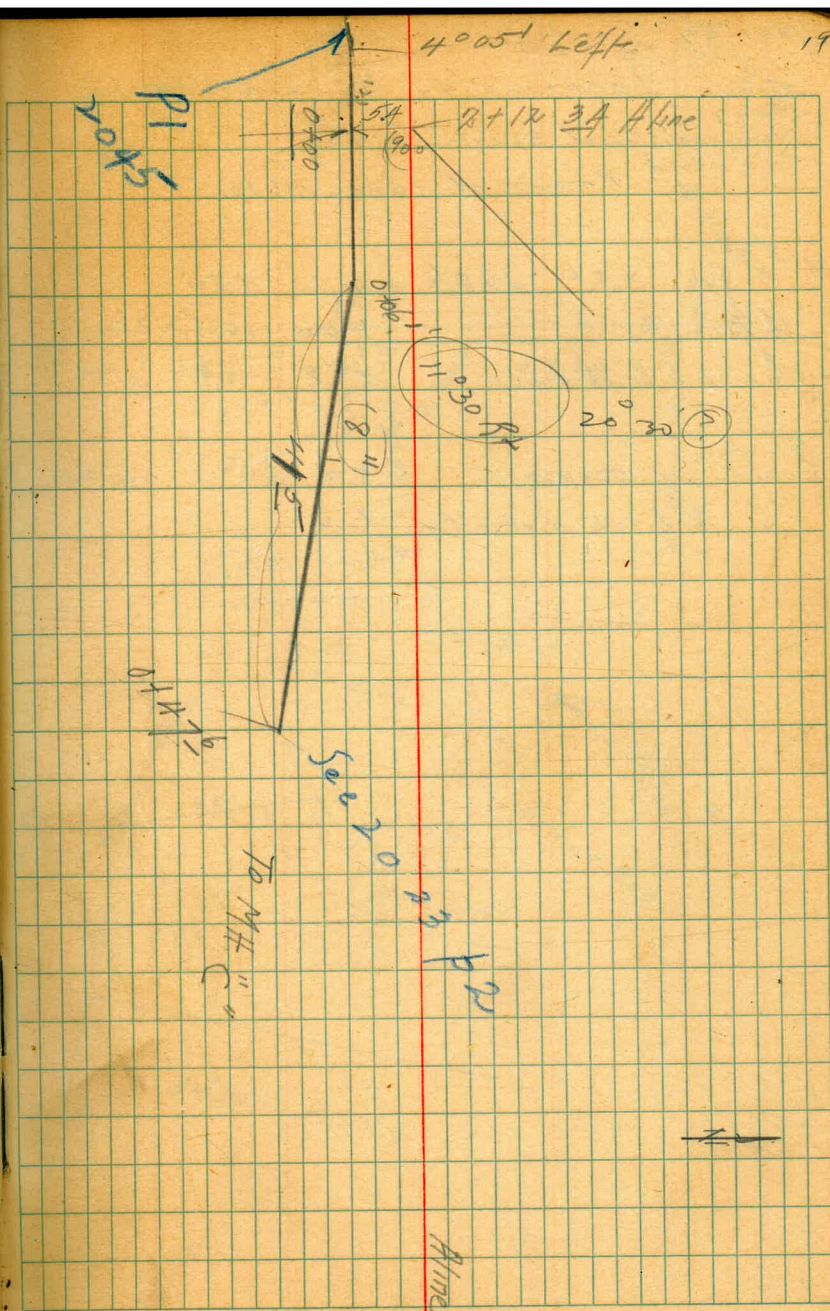
0+00 top 7.53 4.29 +5.6

0+06! 11°30' PA " 7.59 4.23 +3.5

0+47.6 " 8.75 3.07 +2.4

0+00 to west

-0-12 4°05' Lt 7.37 4.45 +3.7

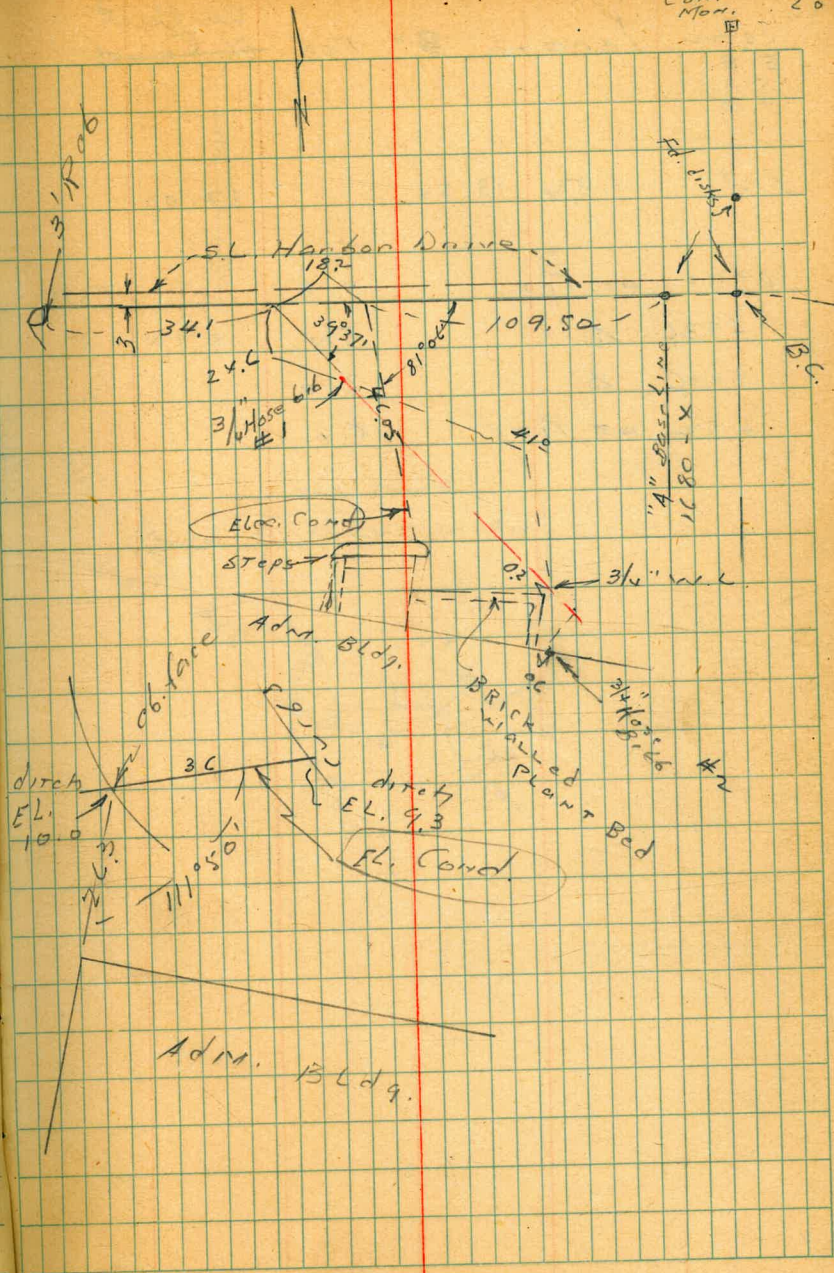


12-1-49.

Moore Location of 3/4" water pipe  
 3099  
 Sherman and Elect. Cond.  
 Crawford FRONT of Adm. Bldg.

BM. 3'cb.	x.56	16.06	11.50
H.B.6 #1		5.60	10.5
At Cor of Brick wall		5.18	10.9

Elec. Cond. at Steps	5.2	on 2 pipes
" in ditch Nudge Pav	6.4	





12-1-49

air duct

Locate B" Feb. fl. Card

E.B.  
E.S.  
J.C.

B.M. 1.54 13.54 12.00

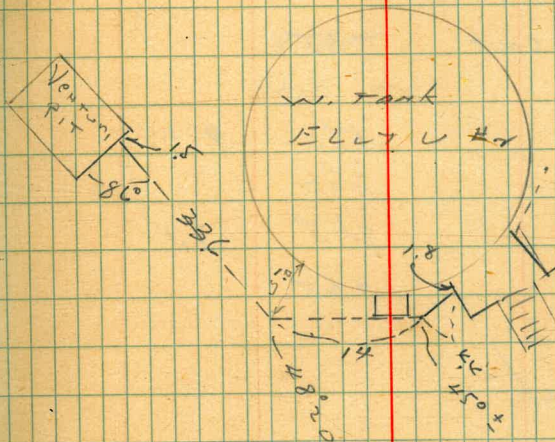
0+00 at Pit 4.8 Top

+336 Δ 5.4 8.14 "

+476 Δ 6.0 "

+52 at Pit 6.1 "

21



1 1/2" Steel Pipe  
 W Tank Elevator #2  
 Begg Sherman Crawford  
 12/1/49

Completed 12/22/49  
 same party

14.71

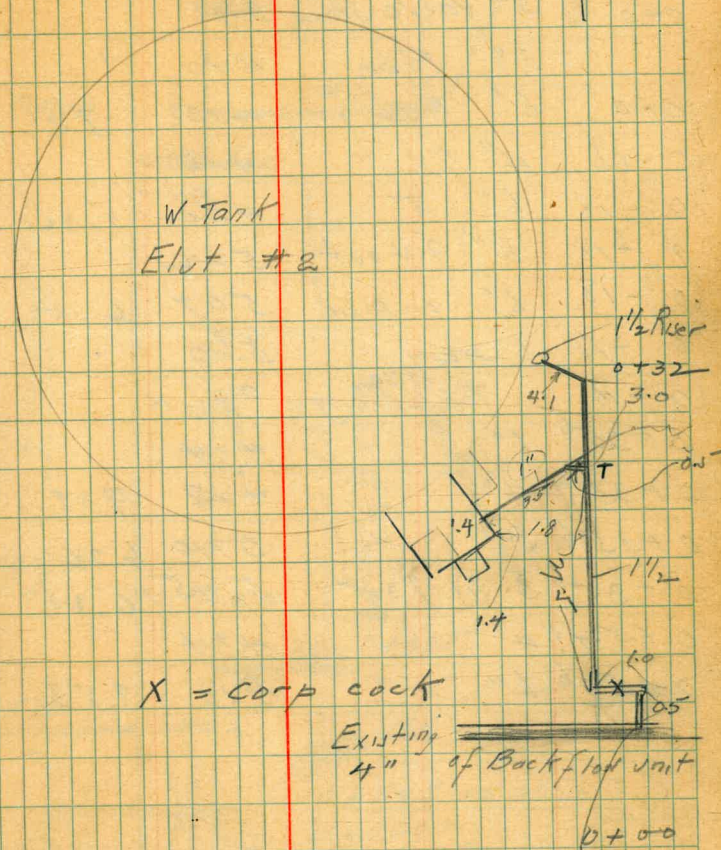
Top of corp cock 7.35

Rim of Pit 560 9.1

205

0+29 T 7.65 7.1

0+32 7.65

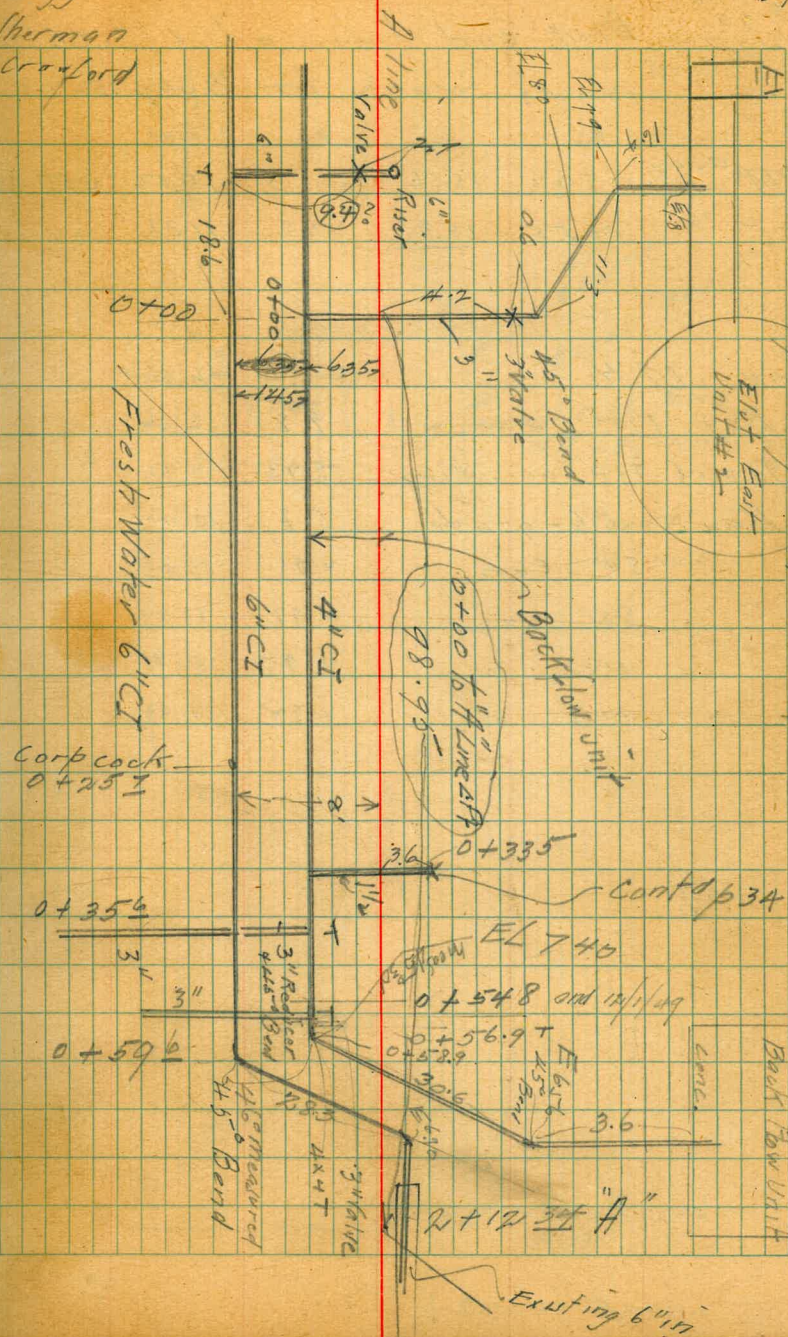


11/30/49  
4" CI Backflow Unit  
6" CI Freshwater Line

	241	<u>1166</u>	925
0+0	4" T	443	7.23
0+0	3" Valve Stem	340	
	3" Pipe	440	
0+0	6" Pipe	415	7.51
0-18	4"	446	
0-18	6" T	430	7.36
0-18	6" 9.4 out	522	
0-18	6" on pipe	507	6.59
0-18	6" stem	360	
0-8	Top of Flange	236	
0+35	6"	414	
0+35	4"	428	7.38
0+35	3"	540	6.26
0+35	3" 21.7 out	545	6.21
0+54	4"	434	
0+59	6"	413	7.53

Begg  
Sherman  
Crowford

23



Moore  
Boggs  
Stearns  
Crawford

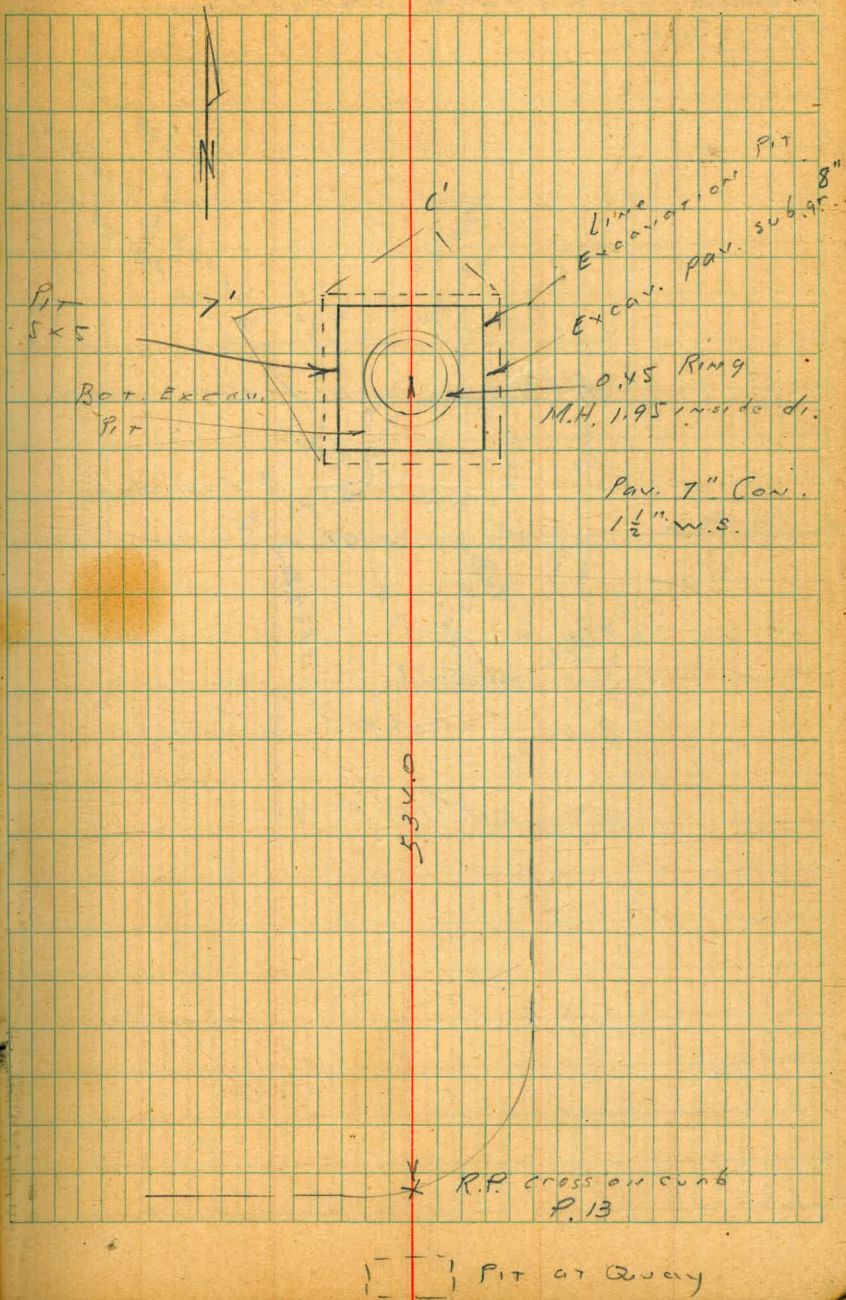
12-6-49.

Dist. and Inv. of 1st M.H.

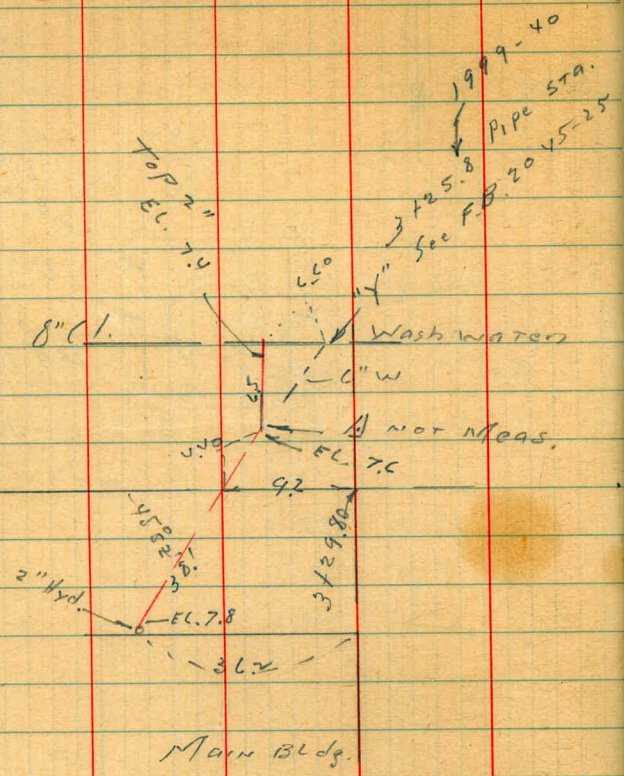
N. of work at Quay site

	BS.	HI	FS.	ELEV	
PM. <sup>Quay</sup> wall	5.24	15.66		10.42	USC+G
+P.	4.55	15.86	4.35	11.31	

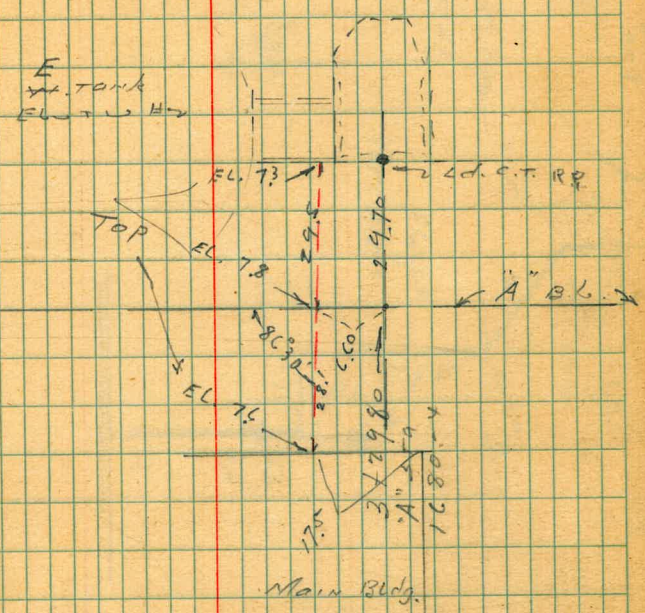
Inv. M.H.		20.71	-4.85
BOT. PIT EXCAV.		9.8	6.06
Top of Top Conc. Ring		5.93	9.93
Pav sub-grade		5.8	10.06
" SE Cor		4.91	10.95
" SW "		4.97	10.89
" NW "		4.95	10.91
" NE "		4.92	10.94



Moore 12-7-49  
 1899  
 Sheeman Locate 2" Water Line  
 Crawford



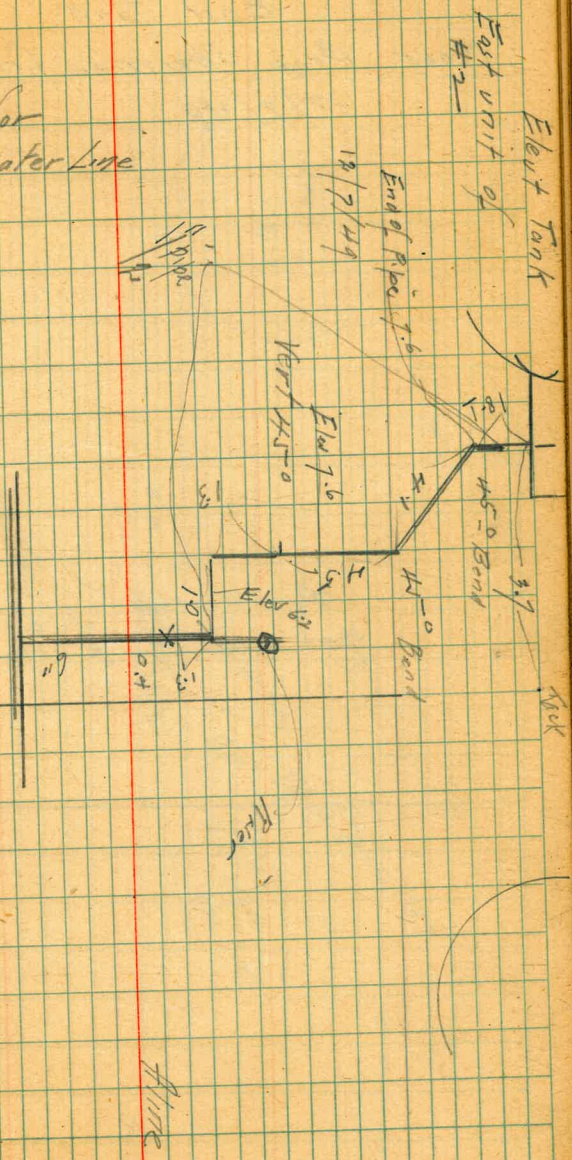
Locate 3" Fab. EL. duct



Locate 1/2" line Water  
 Fresh Water Line  
 for drinking Fountain  
 Moore Begg Sherman & Crawford  
 12/7/49

see p 23 for  
 6" Fresh water line

3+29.8  
 100ft



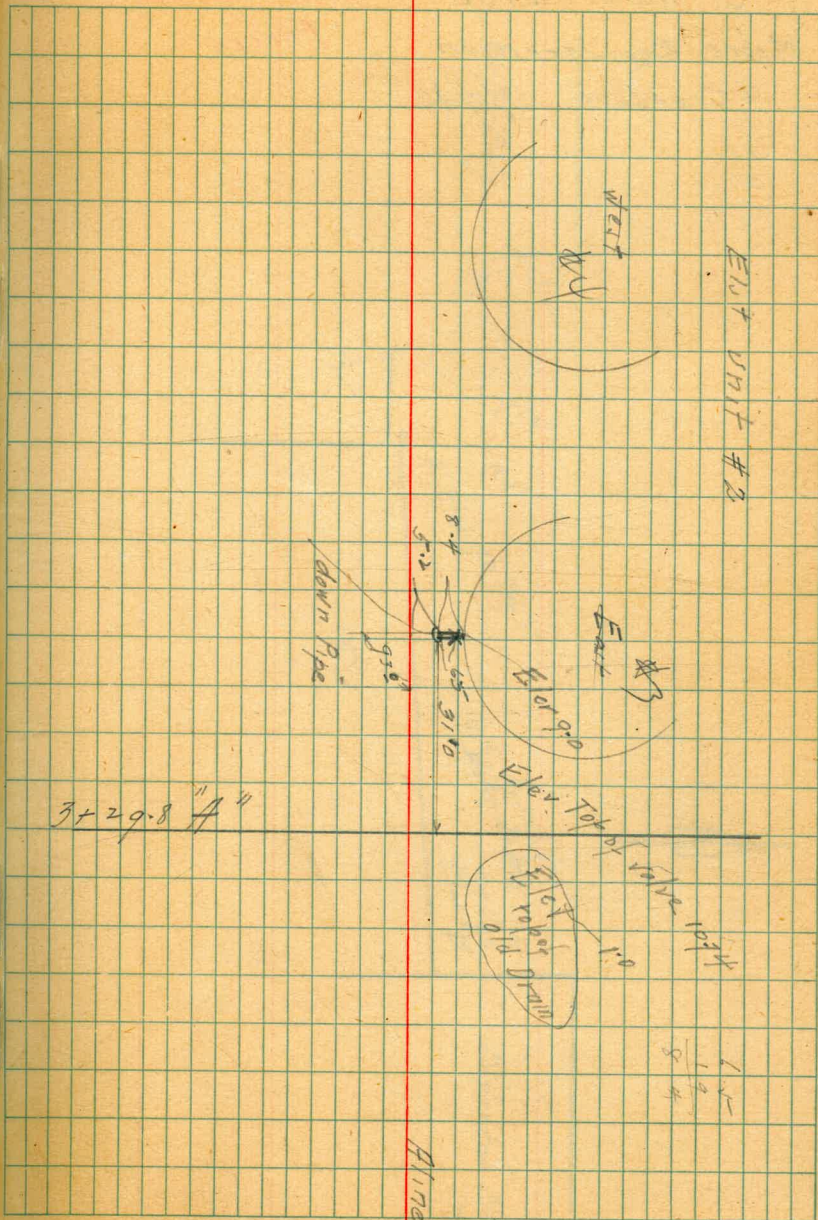
1/16

8" Drain for Eleut Unit #2

East Tank

Moore Begg Sherman Crawford

12/7/49



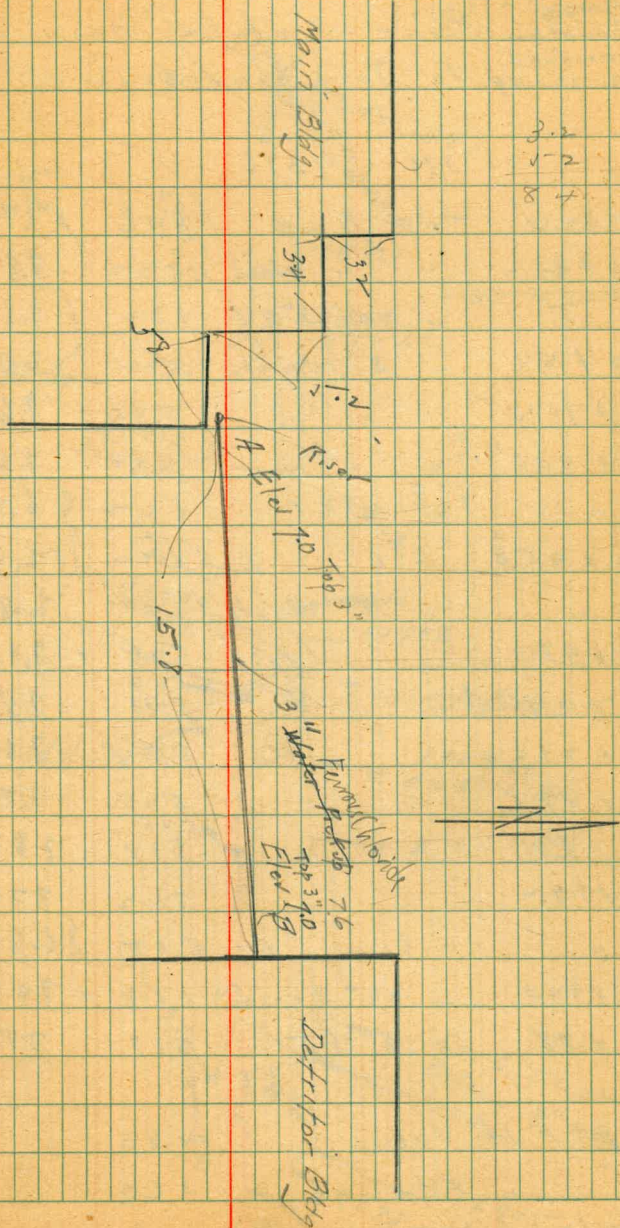
ELI UNIT #2

1.5
1.2
8.4

Ferrous Chloride  
 3" Water Pickup

Put in by City  
 Forces

Moore Begg Sherman  
 & Crawford 12/7/49

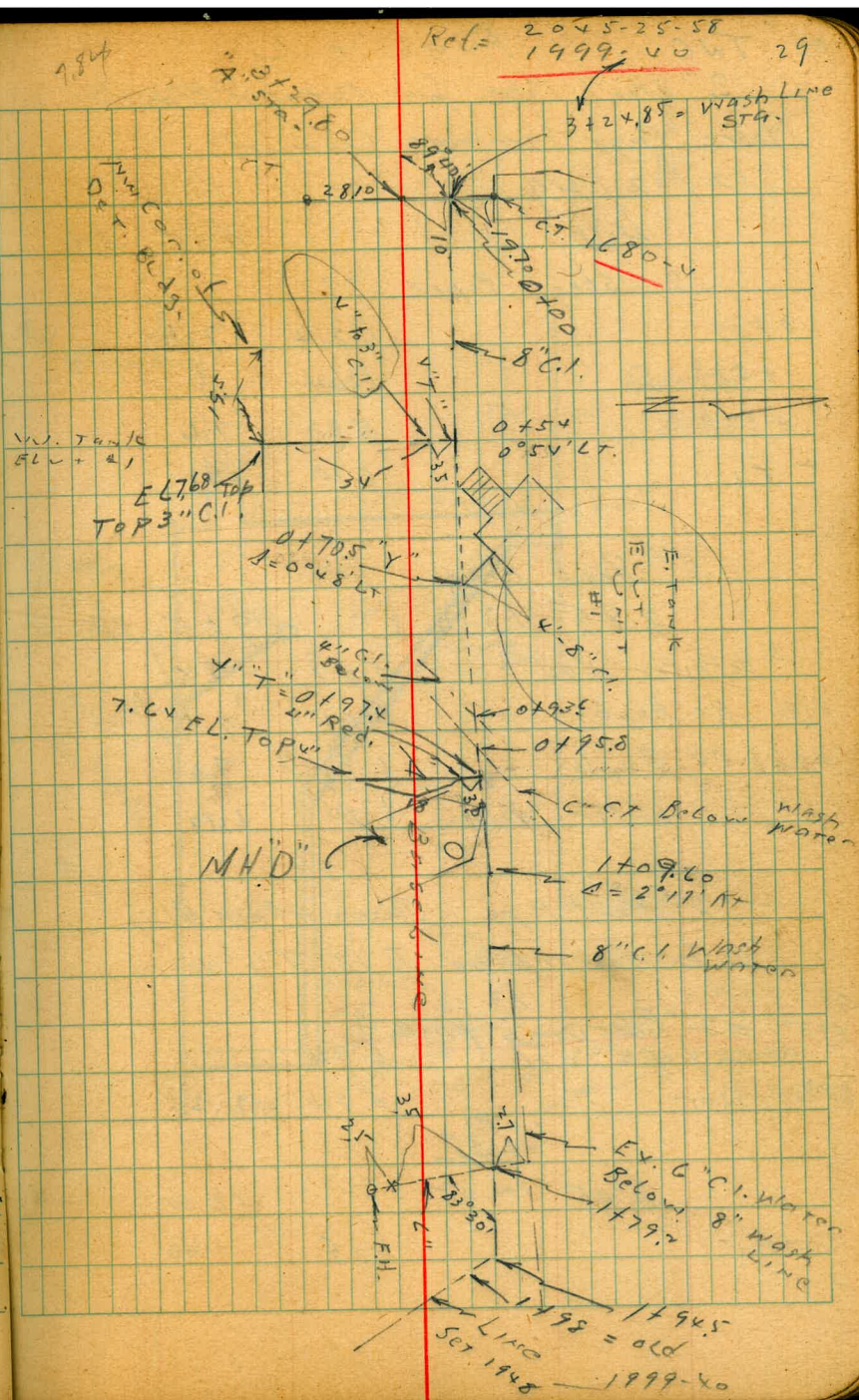


2.0  
 1.2  
 1.8



Moore check 8" C.I. Wash Line at  
 8099  
 Beacon Point N. of Ex. Main Ely  
 Crawford  
 12-12-49 to Join line from Cl. #1

	116	1316		12.00	
0+24	Top Pipe	546		7.70	
0+32	" " Wash	537		7.84	
"	" N45 8" C.I.	432		7.84	drain
0+54	" 8" Wash	537		7.84	"
0+70.5	" " "	555		7.61	450
0+93.5	" " "	531		7.84	
"	" 4" C.I.	642		6.74	below
0+95.8	" 6" "	620		6.96	"
"	" 8" Wash	531		7.85	
0+97.4	" " "	526		7.90	"T" to 50.
1+09.6	" " "	531		7.85	
1+29.6	" " "	554		7.62	Coupling
1+49.6	" " "	545		7.71	
1+64	" " "	534		7.82	Coupling
1+79.2	" " "	542		7.74	
"	" Lower 6" "	635		6.81	
1+94.5	" 45° Bend	568		7.48	
1+98	" 8" C.T.	569		7.47	old 1948
Top F.H. Valve		4.83			
" " Flange		3.67			
2.7 Lt of 1+79.2		6.71	6.45		TOPC



TWO Fuel o.i.l.  
 2" Steel Pipe from Detritor Bldg.  
 Moore Begg Sherman Crawford  
 12/12/49  
 4.11 13.36 9.25 BM

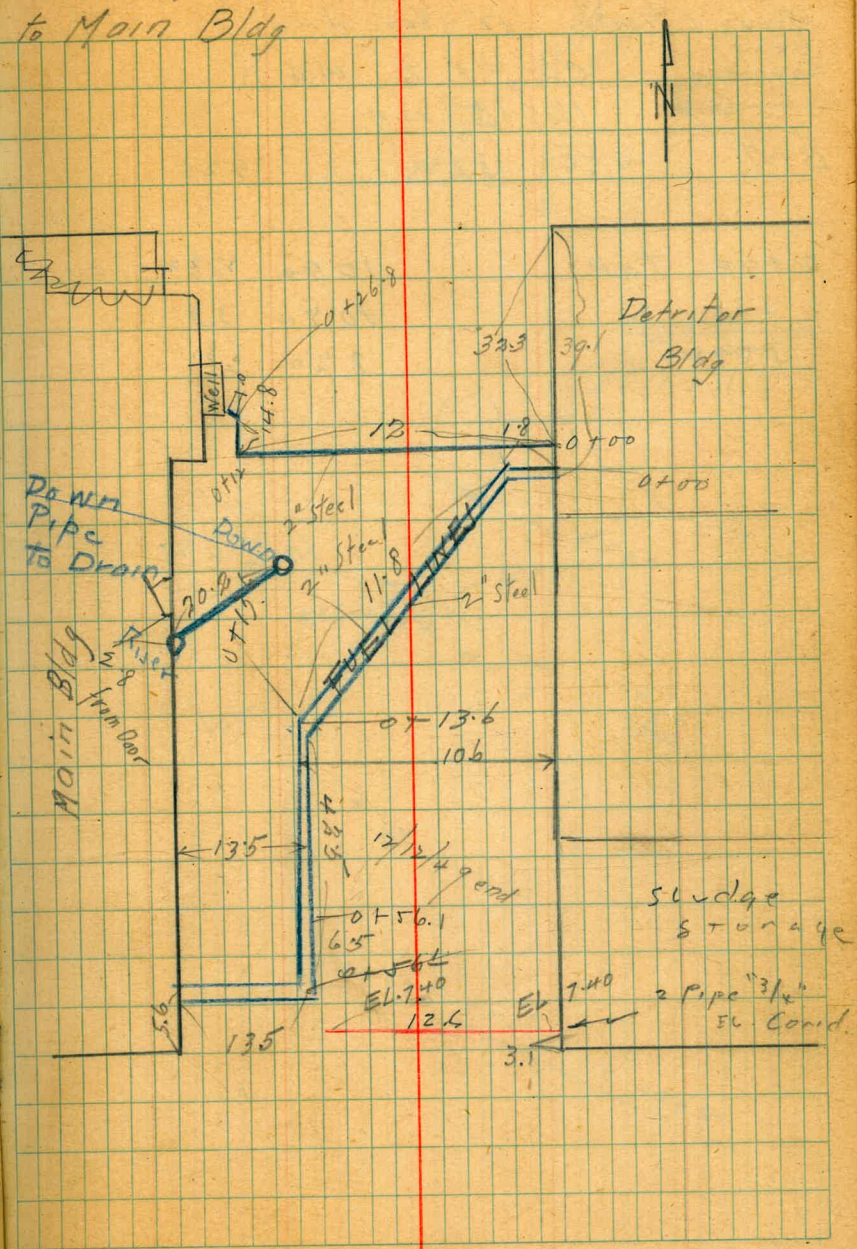
2 Steel Pipes 2"  
 0+40 6.24 7.1  
 +018 6.24  
 +13.6 5.80 7.6  
 +56.1 6.10 7.3

2" Steel pipe  
 3.85 13.10 9.25 BM  
 at detritor wall 5.58 7.5  
 +10 RT Angle 6.05 7.1  
 +268 RT Angle 6.10 7.0  
 +27.8 enters well 6.70 6.40

2" Steel Pipe from Main Bldg  
 to down pipe to 12" tile drain

13.10  
 0+00 = 2" riser 5.94  
 down pipe  
 20-24 riser 5.94 7.2  
 4.1  
 11.25

2.05 14.05 12.00  
 Conduit 6.65 7.40



Moore Check 12" VIT. DRAIN  
 B 999  
 Sheppard CL #1 to MH D  
 Crawford 12/14/49

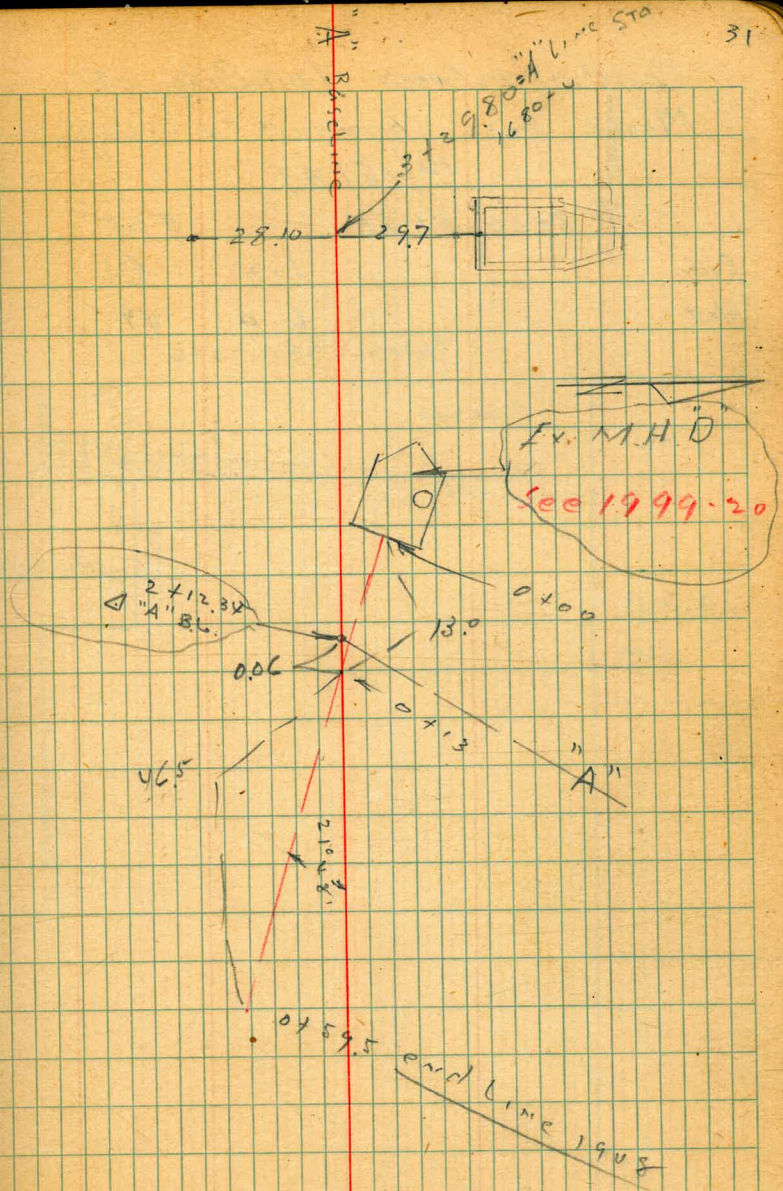
B.M. 4.56 13.84 9.26

I.W.

0+00 Top 10.90 2.92 +1.87

0+13 " 10.50 3.3

+595 " 8.50 3.3



Conduit between Main Bldg &

Moore Begg Sherman & Crawford

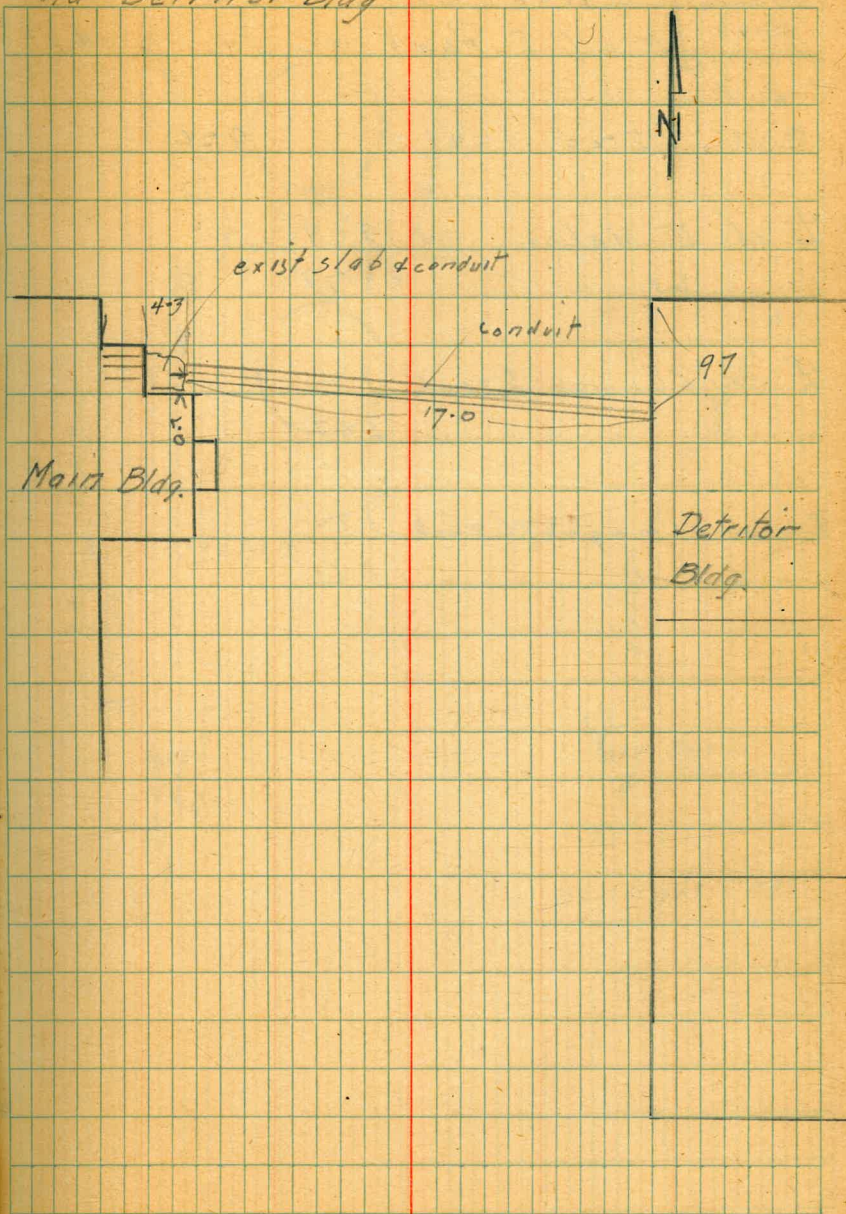
12/15/49

R+00 11.25 9.25

East 6.2 5.1

West 6.4 4.9

old Detritor Bldg



12-15-49

Moose Locate Backflow Unit  
 Begg E of E Tank (E.W.T. #1)  
 Sherman  
 Crawford

B.M. 520 1446 926

E of E Valve 3.19

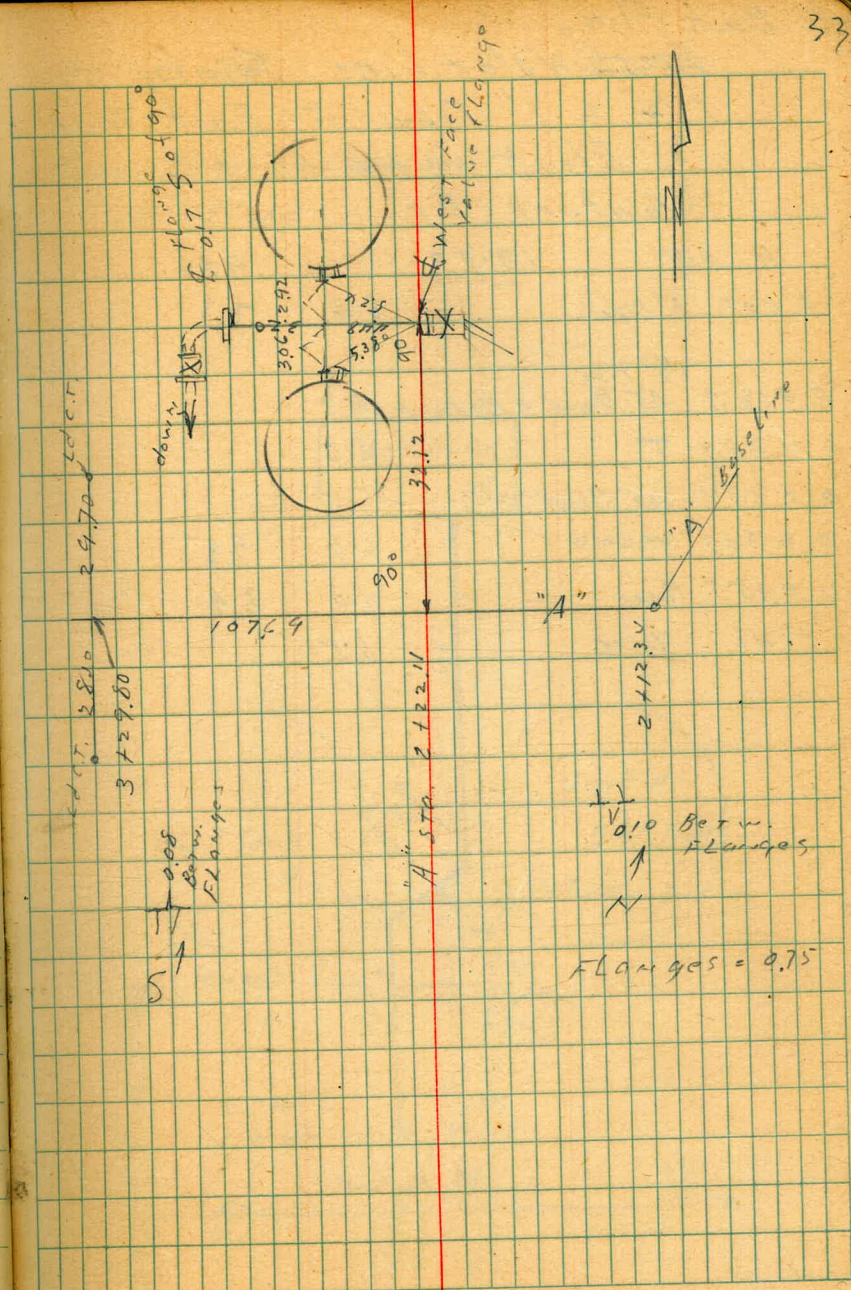
" " W " 3.73

E W. Flange S tank 3.72

" E " " " 3.67

E W. Flange N Tank 3.72

E " " " 3.65



Back Flow?

~~Fresh~~ Water Line Joining  
 1 1/2" & 1" Pipe to East Tank  
 of Elemt unit #1 &  
 Venturi Pit

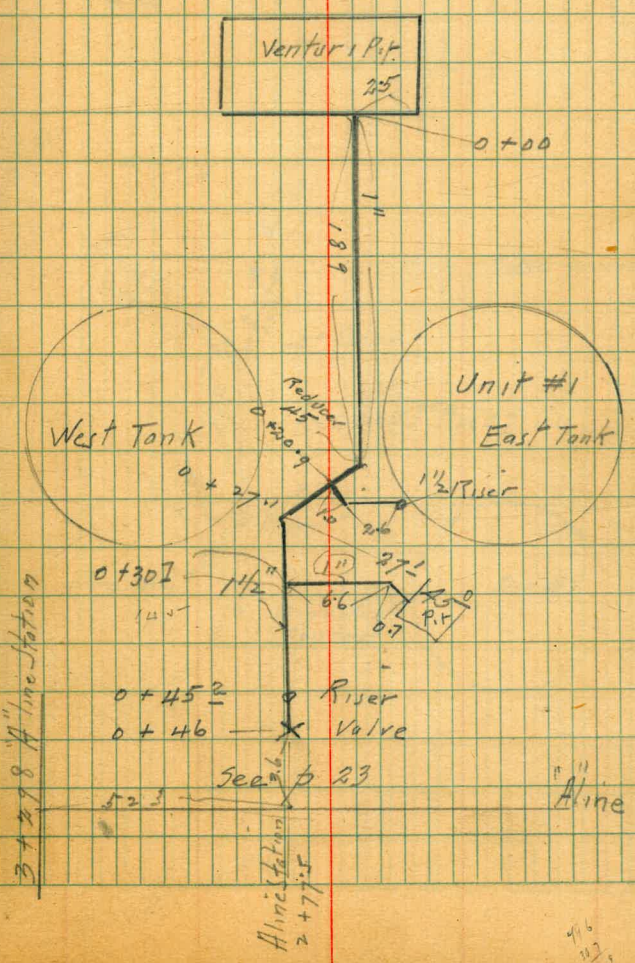
4 64	13.90	9.26	
0+00 1" Pipe	6.6	7.3	
0+18.9 1 1/2" Pipe			
45 Bend & Reducer	6.7		
0+20.9 T	6.6		
0+27.1 45 Bend	6.5		
0+30.7 T	6.6	7.3	
0+45 <sup>2</sup> River	7.0	2.9	18.6
0+46 Valve	6.5		33.5
			51.1

3 + 29  
 5  
 13  
 17.5

See p 23

Begg Sherman Crawford  
 12/21/49

3v



8" Sludge Line

8" CI Line

Digester

to Control Bldg from #3 Digester  
Begg Sherman + Crawford

12/21/49

261 1461

1200

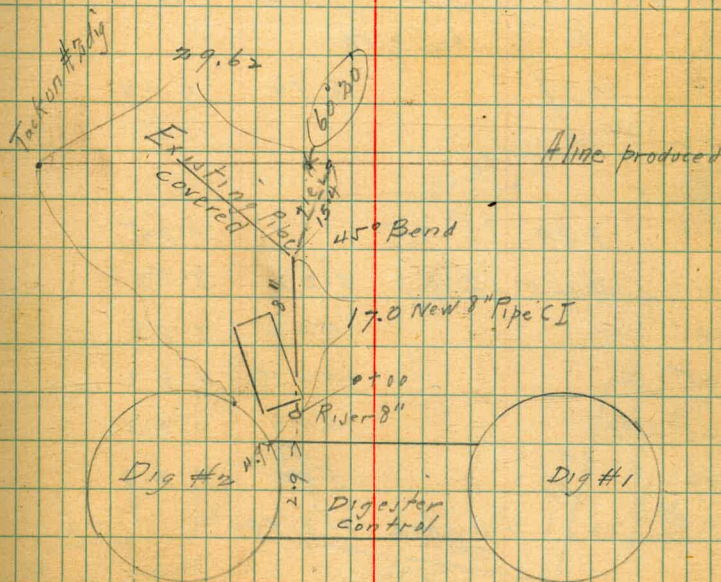
Level at Top of Pipe

441

127

0+17

241



4" & 2 1/2" Steam Lines Digester

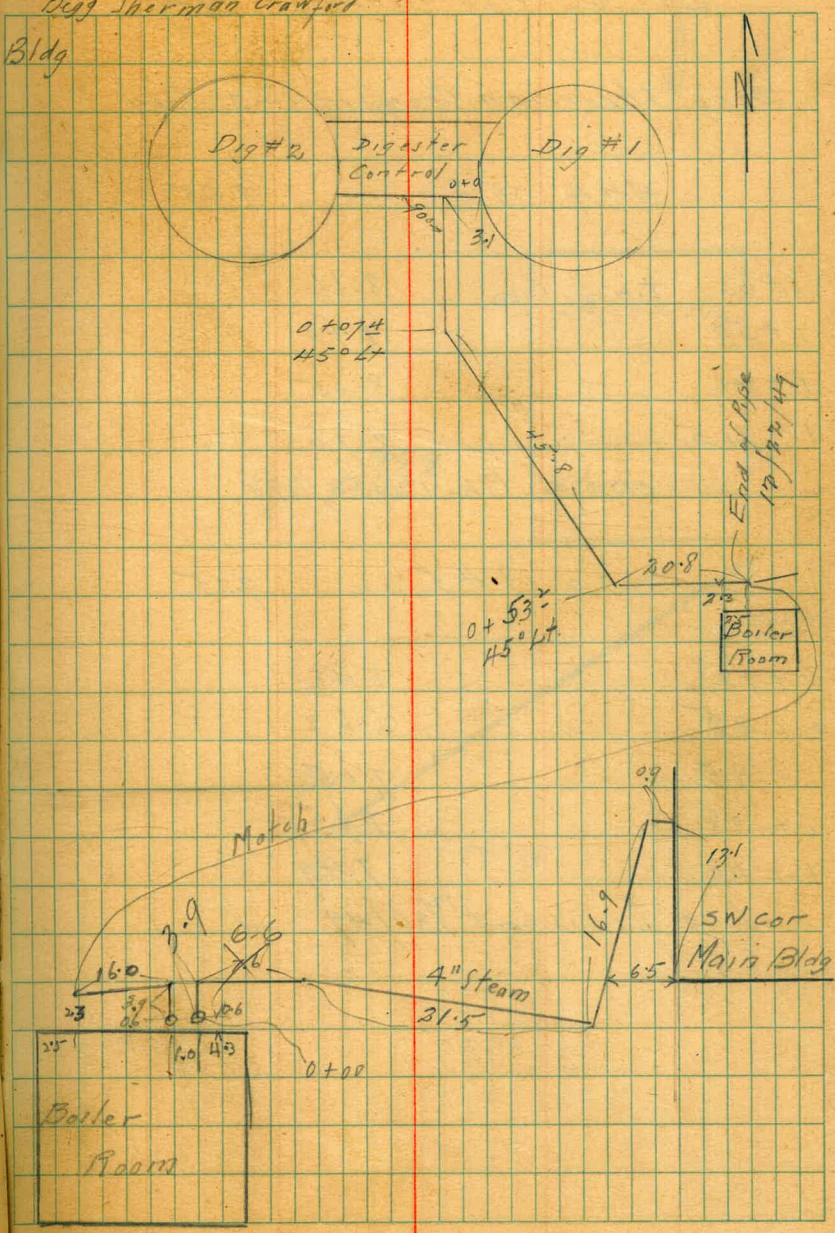
Control to Boiler Room to Main

	2.61	14.61	12.00	BM
2 1/2"	3.70	15.36	2.95	11.66
0+00			10.10	5.26
0+07 1/2 LPT			10.06	5.30
0+30			9.92	5.24
0+53 2 LPT			9.72	5.64
0+74 0			9.42	5.74
16	HI finished 1/3/50			
0+90	12.97		6.70	6.27

4" Line

	3.50	12.75		9.25
	4.45	12.97	4.23	8.52
0+039			5.42	7.55
0+105			5.45	7.52
0+320 LPT			5.46	7.51
0+489			5.51	7.46
	finished 1/3/50			

Big Sherman Crawford Bldg





AIR EXHAUST  
24" VC Pipe Detritor Bldg

Begg Sherman Crawford 12/22/49

444 13.69 9.25

1+60 Tip of Pipe 8.66

1+50 " 8.40

1+40 " 8.05

1+315 " 7.76

end of Pipe 12/22/49

420 13.45 9.25

0+77.8 6.48

0+85 6.68

+95 7.05

1+08 7.35

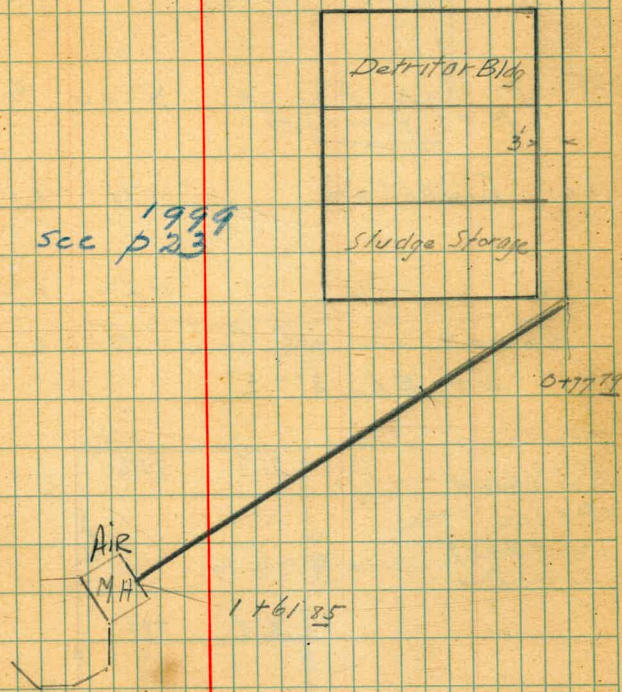
1+20 7.49

line finished 12/30/49

to Stack

37

1999  
see p 23



12-23-49 location of M.H.

Moore AT Quay

Boyer  
Shepherd

See P11

Crawford

USC 16

B.M. 4.48 14.90

10.42

Top 1 x 4 Form 5.00 9.90  
NOT FINISH

" " " 11.73 3.17 WEST

" " " 11.62 3.28 EAST

LOCATION of CON. SLAB

AT EL. 3.00 ±

Moore  
Boyer  
Crawford  
Chavez  
12-28-49

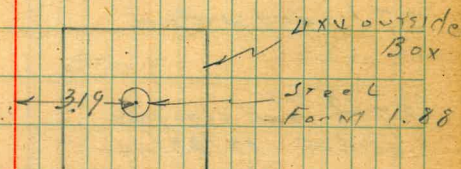


NOTE! See Inspector's

drawings (Incomplete)



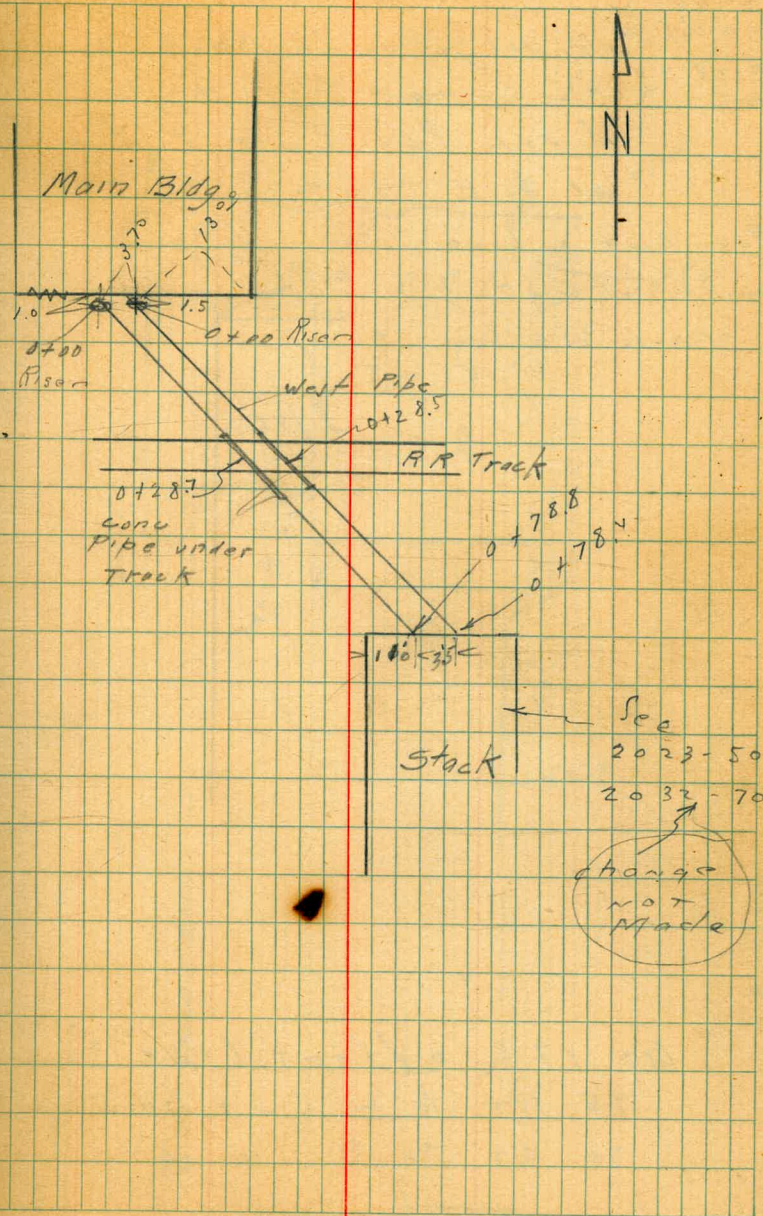
away



punch MK "A"  
P11 THIS SK.  
2023-62

8-15" Vit Air Exhaust  
Main Bld to Stack  
Morse Begg Sherman Crawford.  
12/23/49

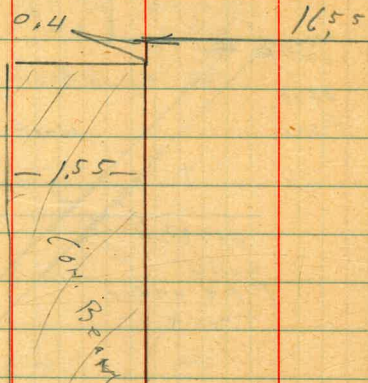
	#1		gentry
	4.25	13.50	9.75 BM.
0+0 Top	East Pipe	West Pipe	7.1
	6.40	6.24	
0+10	6.40	6.30	
0+21 <sup>2</sup> beg conc pipe	—	6.41	
0+21 <sup>5</sup> " "	6.38	—	
d Track	6.42	6.40	
37.1 end conc pipe	—	6.35	
37.3 end conc pipe end of 12/23/49	6.38	—	
at MH stubs	5.94	5.85	
Track 12-	East	West	
BM	4.28	13.53	9.25 = B
0+48	West	6.26	6.26
	6.2.6		
0+58	6.14	6.20	



Moore  
1899 Cut thru Con. Wall  
Granville  
AT Nly Crane Rail  
12-28-49

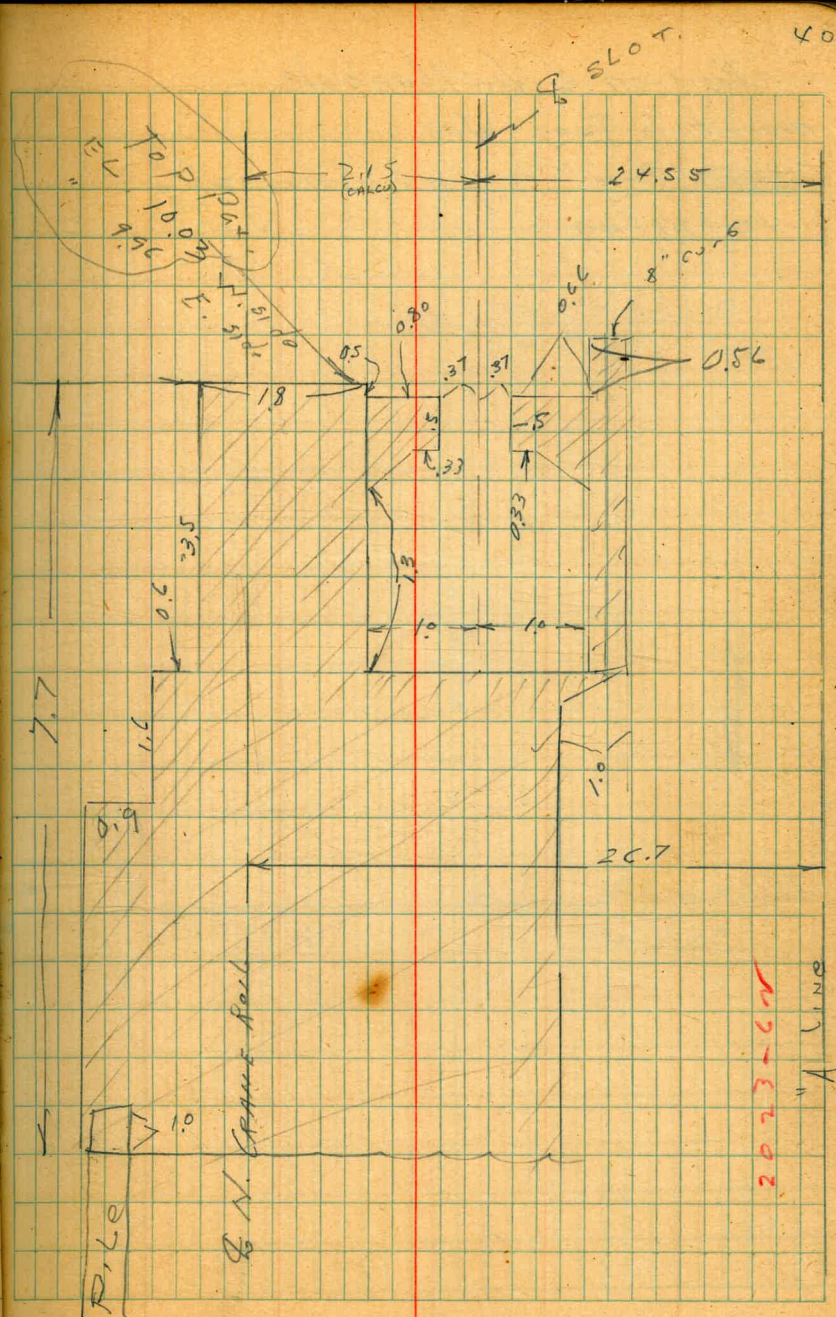
Width Pav Cut  
W to E 16.2

Pav. cut on line  
with W. cut  
Main Wall

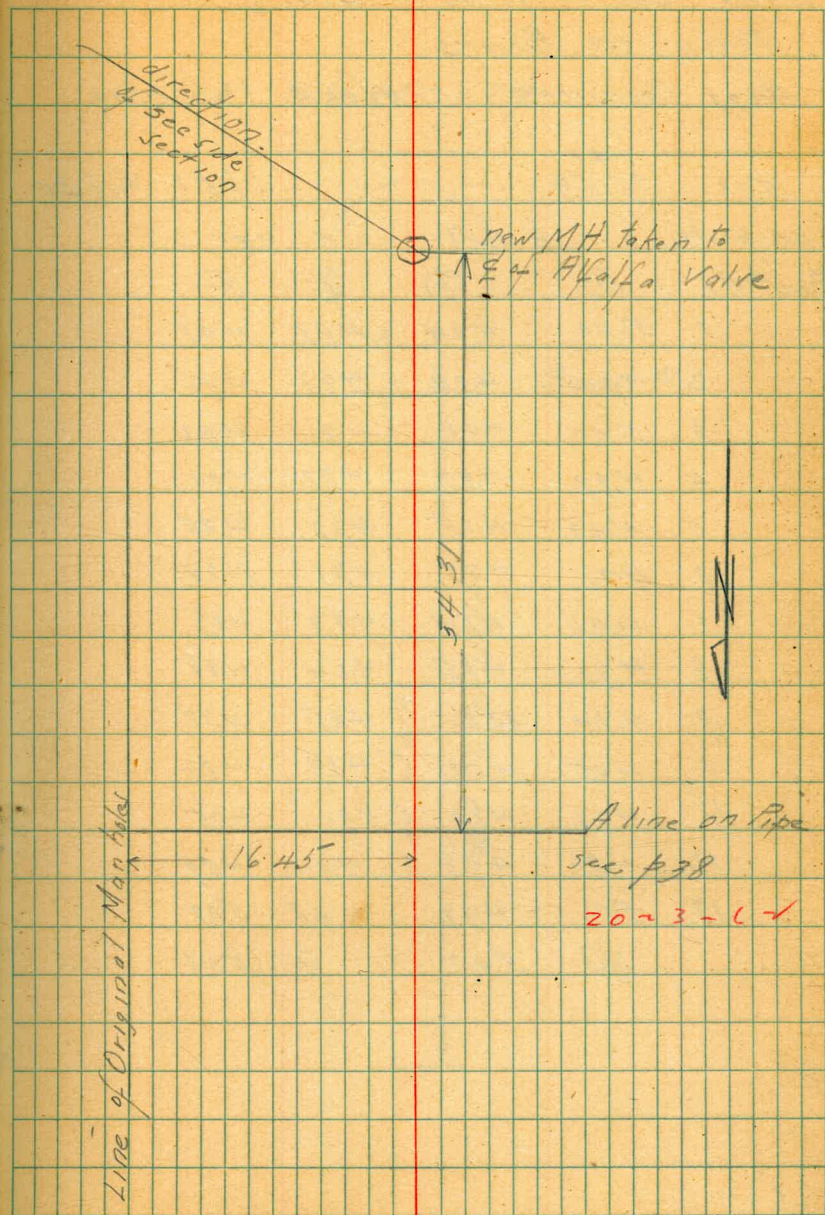


AT 17.5 offset line

7.5 RT to W cut thru wall  
7.0 LT to E " " "



Position of New Manhole  
nearest to Quay Wall  
~~near~~ Begg Crawford Channel  
12/28/49



Elev Catwalk #1 Clarif

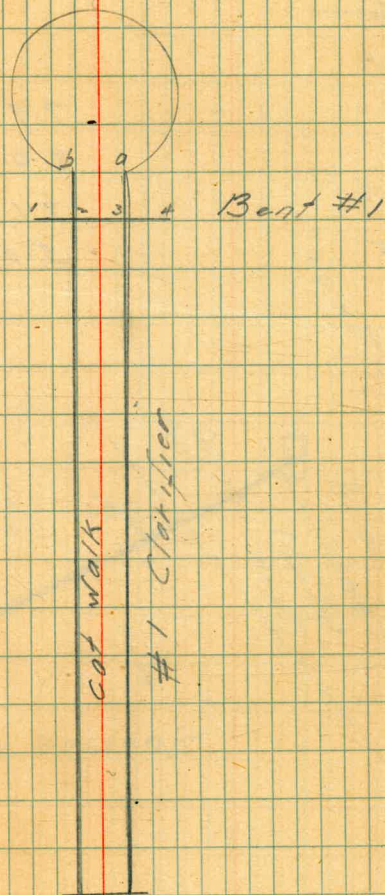
taken on Bents

Begg Sherman Crawford 12/29/49

	#1			
5.03	31.54	2651 West BM.		
on plates	6 4.98	9 4.97		
Bent # x	(1)	(2)	(3)	(4)
1	5.00	4.94	4.93	4.98
2	4.99	4.94	4.93	4.96
3	5.00	4.93	4.91	4.93
4	4.99	4.90	4.87	4.91
5	4.93	4.85	4.82	4.85
6	4.90	4.83	4.81	4.84
7	4.91	4.84	4.83	4.86
8	4.91	4.85	4.84	4.88
9	4.92	4.86	4.85	4.88
10	4.95	4.88	4.87	4.90
11	4.93	4.89	4.90	4.95
12	4.96	4.93	4.94	4.99
13	5.01	4.97	4.98	5.03
	(d) 5.03	(e) 5.03		

Without Piping

See 2032 / 79



Fiber Duct from Pull box to

Begg Sherman Crawford

12/30/49

482 14.08 9.26

Top of duct

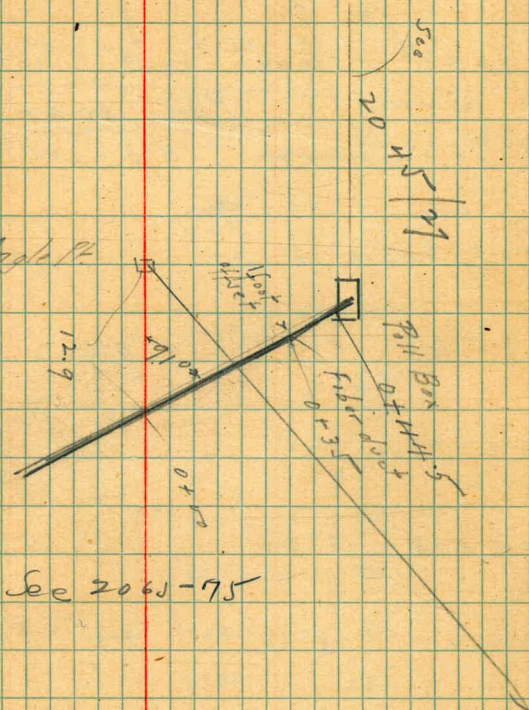
0 + 00	7.9
0 + 13	8.0
0 + 35	7.1
0 + 44.5	5.0

Metering Box

LINE

43

At line L. Pt  
2 + 12 34 Angle Pt



517 14.43

926

Pav 99x 10.31 10.46 10.62 10.88 10.9x  
 23 53 33 39 13

BC 10.27 ✓ 10.64 ✓ 10.79 ✓ 10.95 ✓ 11.21 ✓ 11.27 ✓  
 BC 80' 600'

Pav. grades

BC = 00 = 1000 ft 983 ✓  
 1000 938  
 0409 3°35' 804  
 972

0+18 7°10' 9.62 ✓

0+29.5 11°40' 949 ✓

0+39.8 15°50' 937 ✓

0+50 19°56' 944 ✓ 925

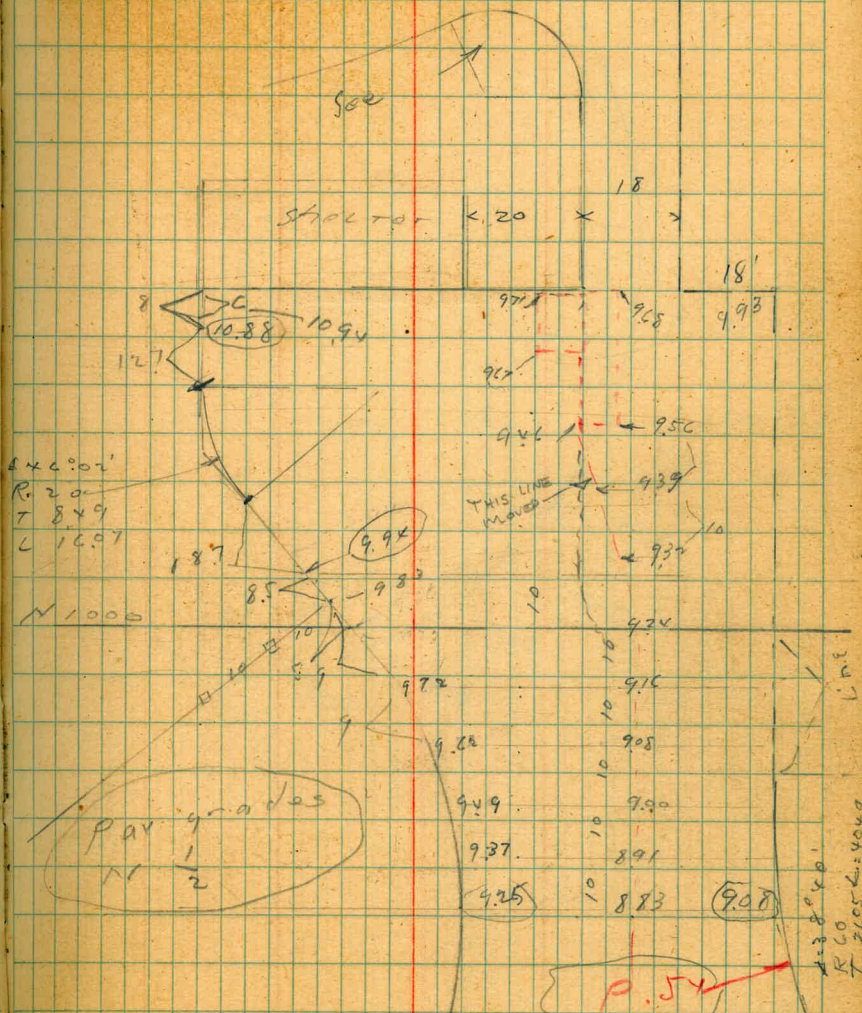
1/2 of Curve  
 P.45

Moore  
 3099

Pav. Grades

V4

Shepherd  
 Crawford  
 1-3-50



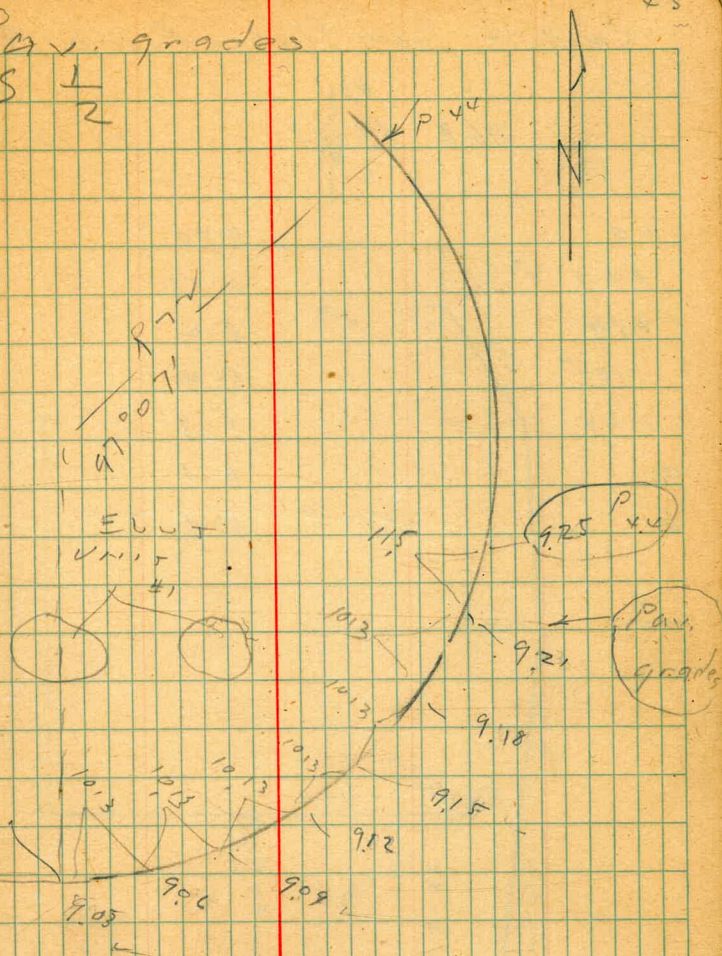
GRADES AS DESIGNED - NOT NECESSARILY  
 LAID AS SUCH. 1-17-50



Part. grades

S L  
2

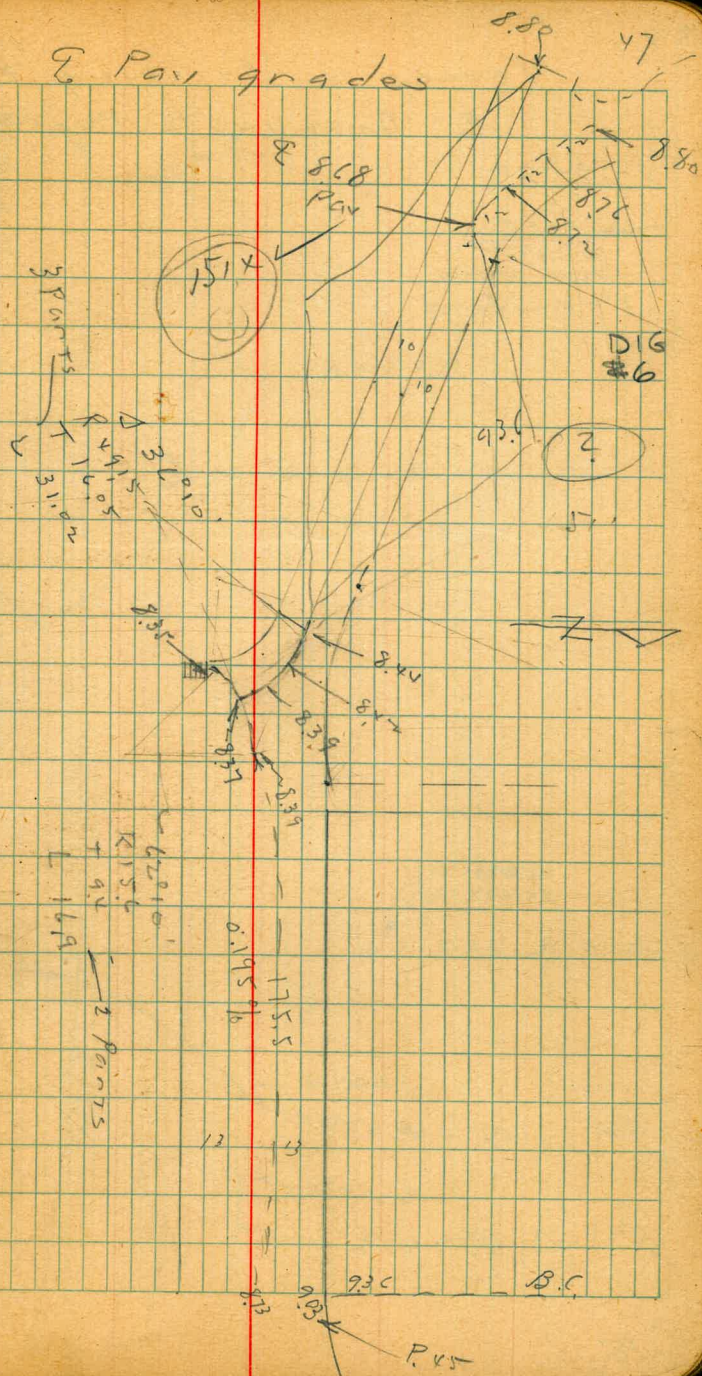
25





1-C-50  
Moore  
Beeg  
Crawford

2 Pav grades

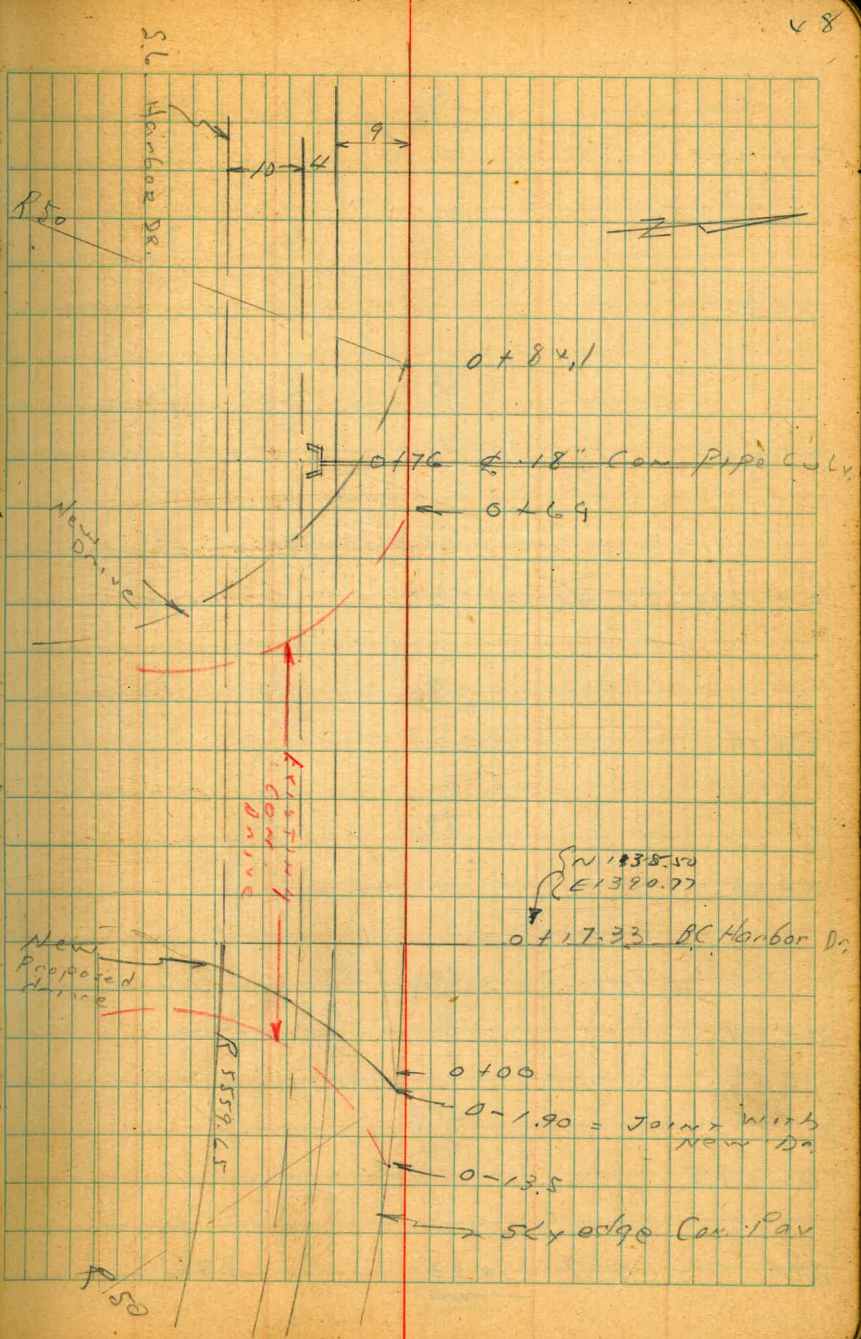


Levels on Existing Pav.

E Drive in to Plant

1-9-50

Moore  
Begg  
Shawman  
Crawford



0 + 40

0 + 30

0 + 20

0 + 17.33 BC Harbor Dr.

0 + 10

0 + 00

0 - 1.9

0 - 13.5

BM

5.27

11.53

9.26

948

5.10

13

947

5.06

13

949

5.04

13

949

5.02

13

954

4.99

13

942

5.11

9

943

5.10

9

947

5.06

9

947

5.06

9

949

5.04

9

953

5.00

9

Cont.  
edge

961

4.92

6.5

Cont.  
edge

1003

4.50

997

4.56

989

4.64

985

4.68

979

4.73

977

4.74

978

4.75

976

4.77

14.53

0 + 801

0 + 69

0 + 60

0 + 54.1

0 + 52.7

0 + 50

62

5  
edge = start  
fav.

50

10<sup>31</sup>  
4.22

New  
Join

10<sup>22</sup>  
4.37

997  
4.50  
3.5

10<sup>19</sup>  
4.32

edge  
cont.  
fav.

5.10  
9

10<sup>13</sup>  
4.40

edge  
cont.  
fav.

943  
5.10  
13

944  
5.09  
9

10<sup>13</sup>  
4.40

944  
5.09  
13

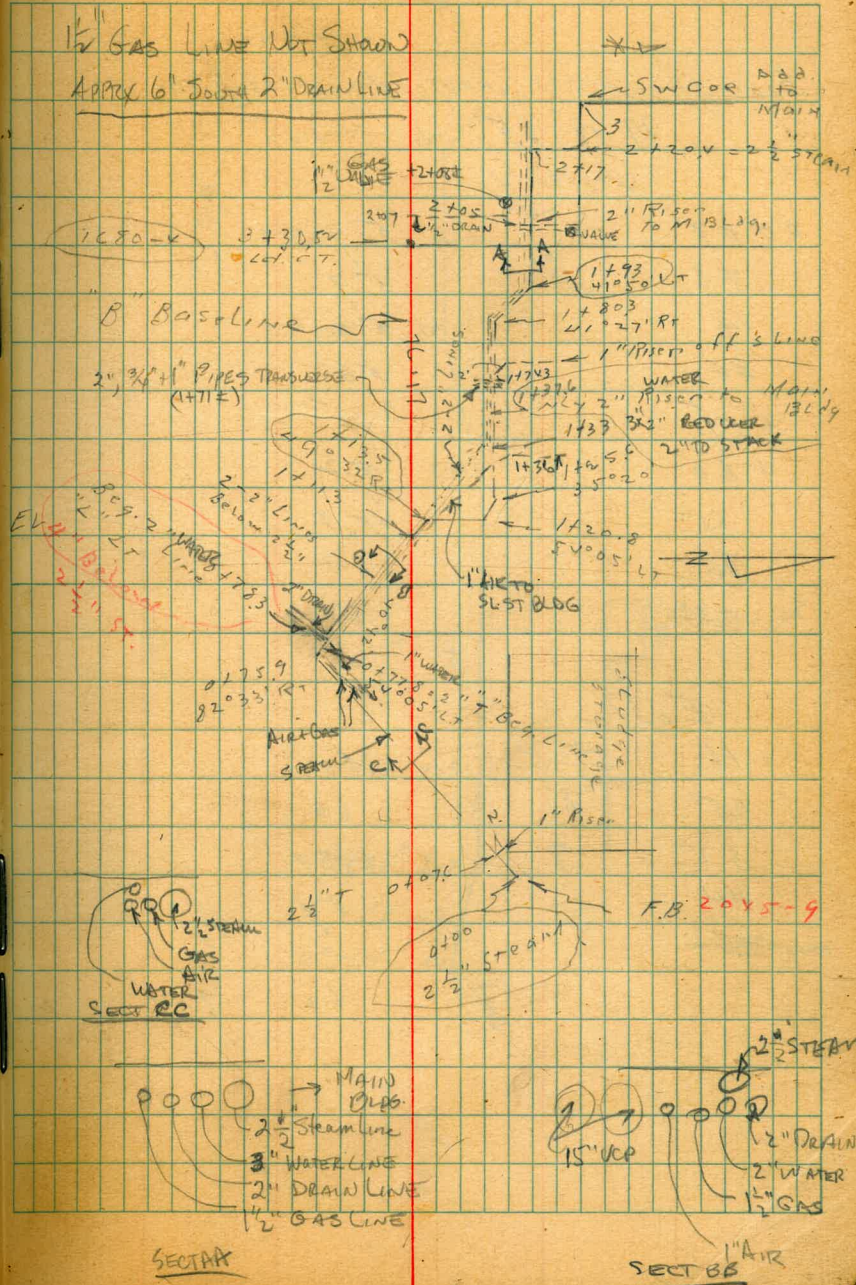
942  
5.11  
9

10<sup>11</sup>  
4.42

14.53

1-11-50  
 Moore levels on 2 1/2" steam line  
 Stationary also 2-2" lines below  
 Crawford

BM	3.94	1319	92.5
0+00 Top 2 1/2" Steam	5.5	7.7	
0+38	5.6		
0+75.9 Δ	5.3	7.9	
1+135 Δ	5.7	7.5	
1+20.8 Δ	5.8	7.4	
1+250 Δ	5.8		
1+376 Steam	5.9		
" Top 2" Riser Middle 5.6			
1+803 Steam	5.9	7.3	
1+93 "	6.1	7.1	
2+17 "	6.1		
2+204 at Bldg	6.1	7.1	



# Conduit North of Aliae

Begg Spermans Crawford 1/12/50

H1 13 H5

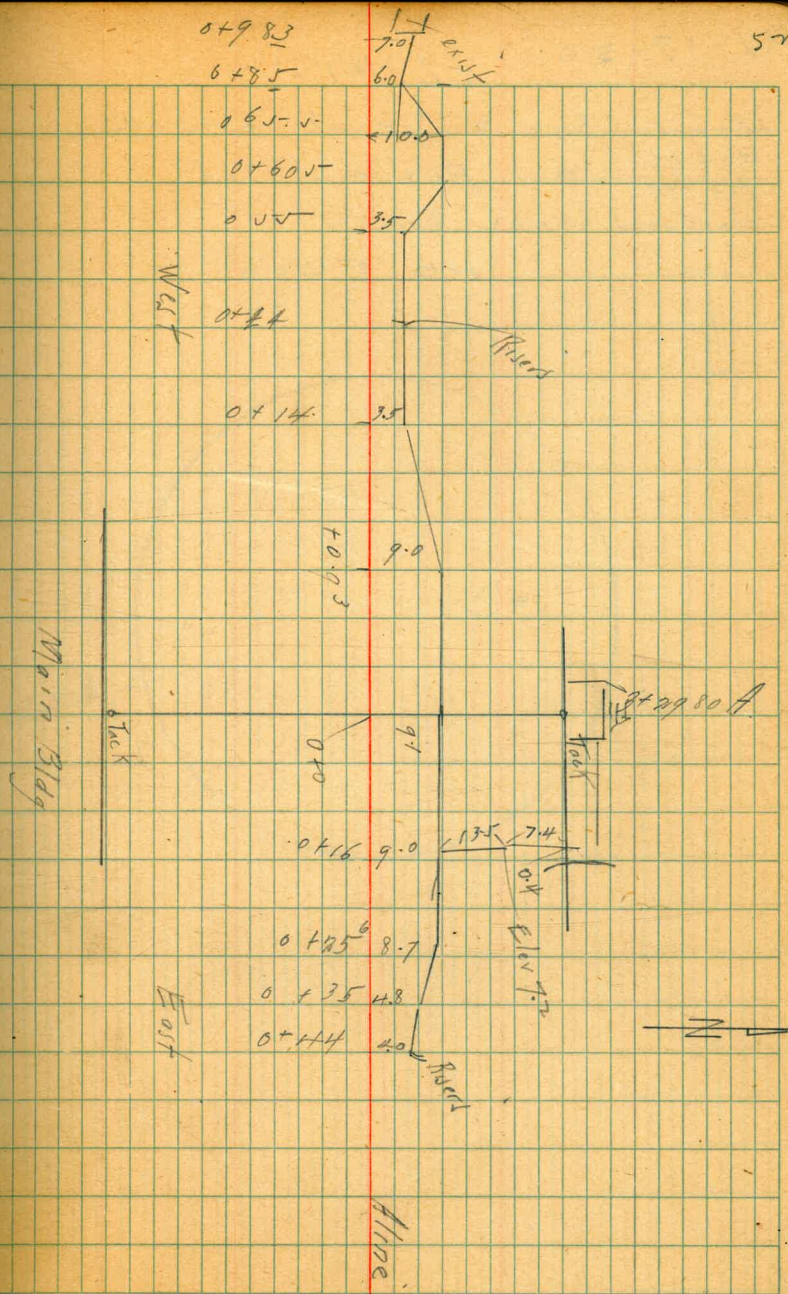
Westerly

0+00	5.9
93	5.9
14	5.9
44	5.6
+55	5.5
+60	5.2
65	5.3
85	6.1
983	6.1

Easterly

+16	6.0
25	6.0
35	5.7
44	5.7
	6.2
	7.2

57



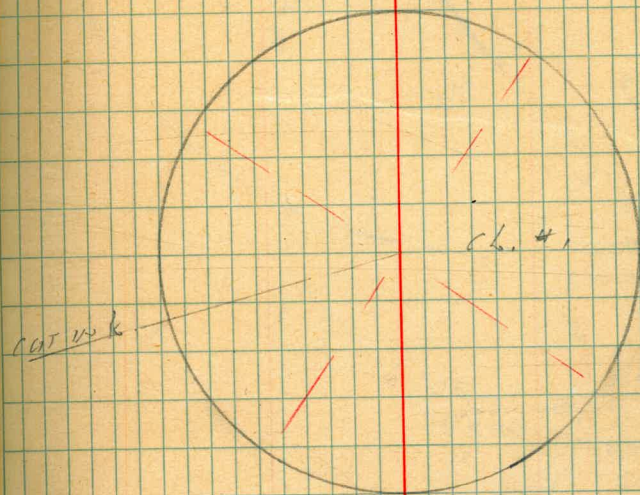


1-17-50

CL. #1

Maple Set & Level Marks  
Begg or Position of  
Shenna  
Coated Steel Arms  
NO Elev.

53



7-18-50 Pav. Grades

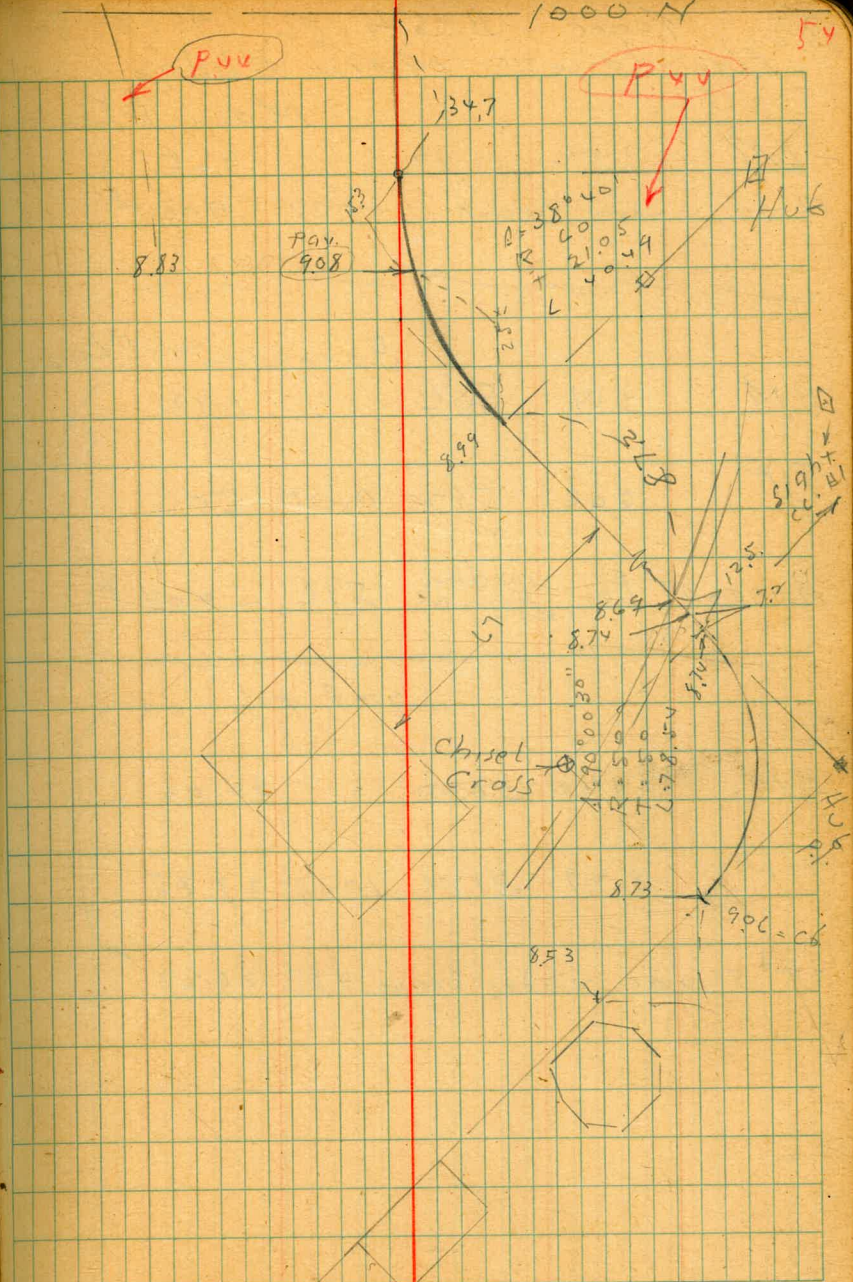
Moore  
Beag  
Sherman  
Crawford

P.V.U. 9.25

97°07'  
R 72

1000 N

54



Moore - B-54 - Cr. 9-18-50

55

Floor levels Main Bldg

Main Floor

B.M.	3.52	12.77	9.25
Floor under Beam	3.77	9.00	

Basement Floor

B.M.	3.14	5.06	1.92
T.P.	0.06	5.12	0.00 5.06

Basement Fl. under Beam 5.16 - 0.04

2nd Floor

B.M.	4.20	38.20	34.00
T.P.	3.27	31.14	10.35 27.85

2nd Floor, under Beam 4.85 26.27

1-25-50 locate 2" w. line chlorine  
 14000  
 8099  
 STROOKMAN  
 Cranford

B.M. 106 1306 1200

0+00 Top 2" line 6.20 6.9

" Top 3x3 Box 3.94 7.12

0+51.4 Top 2" line 5.94 7.1

check contd. 2-24-50

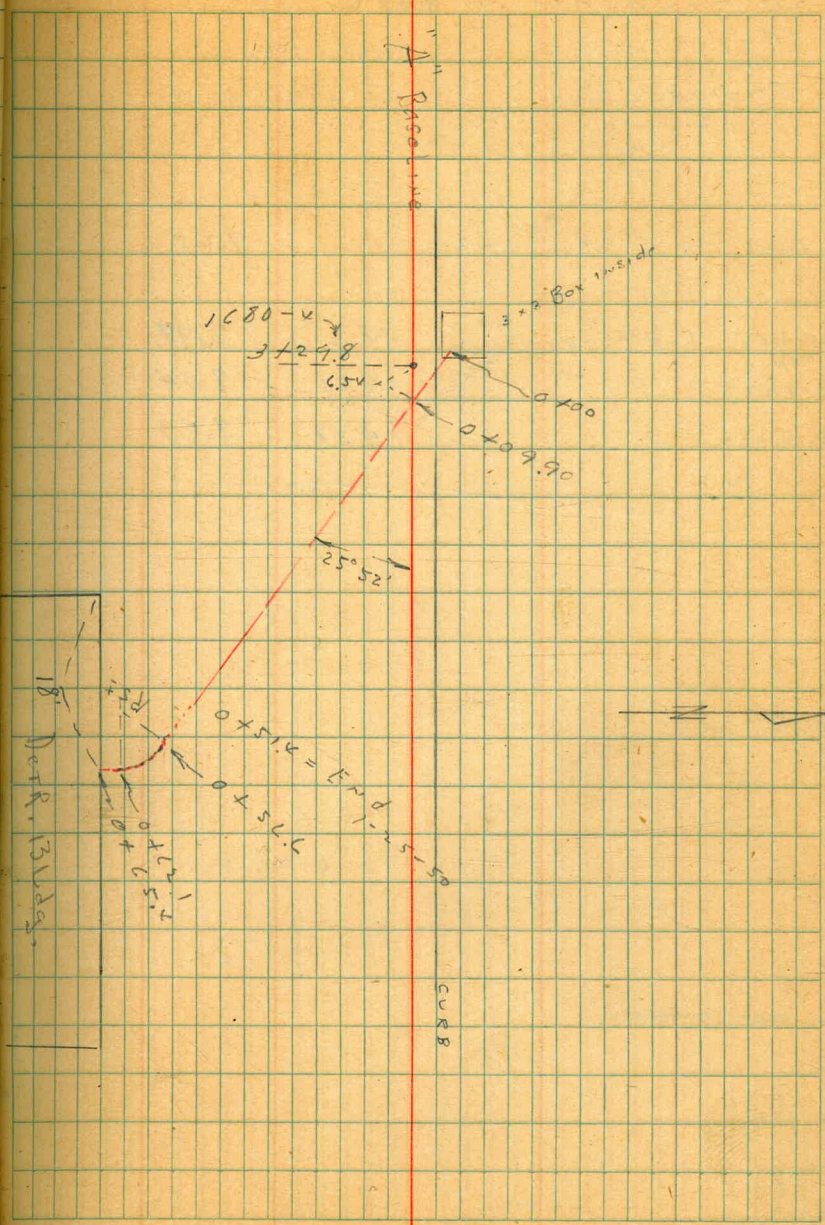
14.57 H.I. P71

0+56.6 BC Top Pipe 7.50 7.1

0+62.1 EC " " 7.65 6.9

0+65.4 AT Bldg " " 7.80 6.8

52



1-25-50 LOCATE 4" GAS LINE

Moore  
1599  
SHERMAN  
Crawford

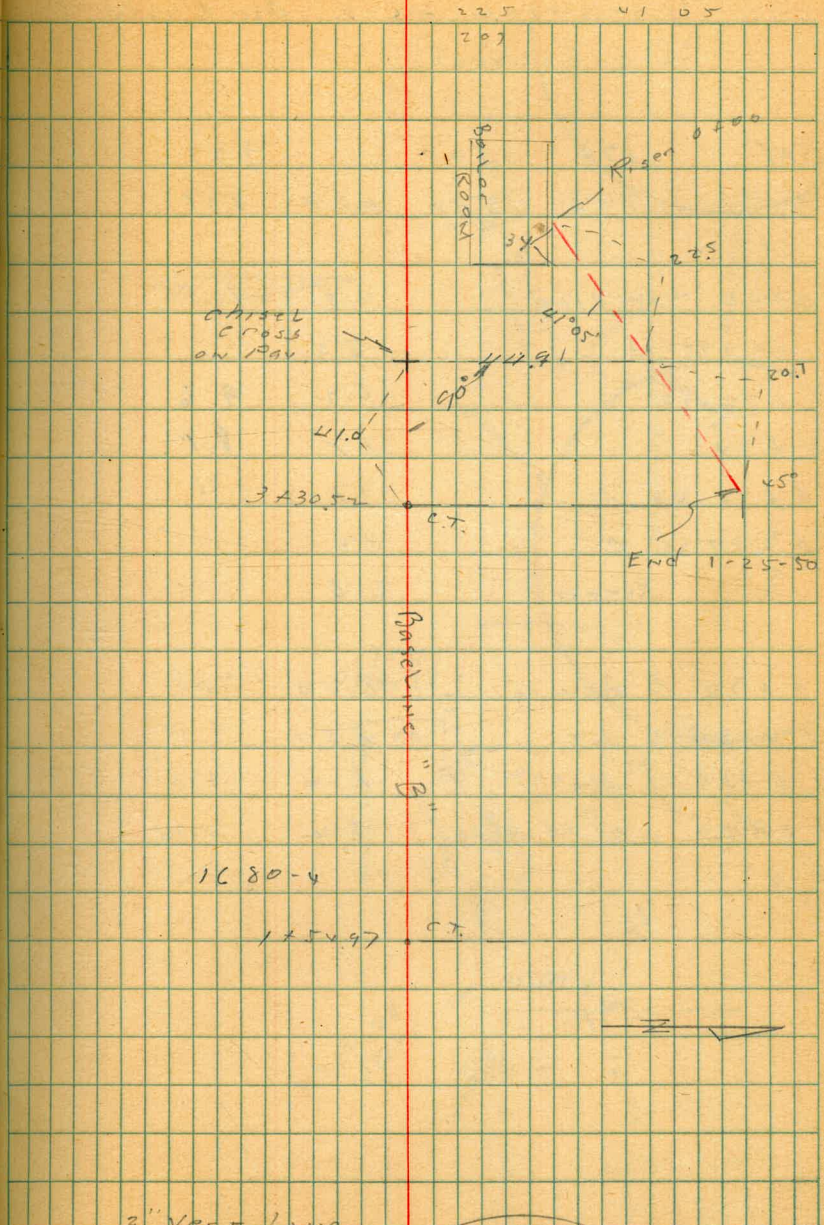
Barber Road  
to Main Bldg.

BND, 3.00 1227 9.25

0+00 Top Pipe AT Riser 4.3 7.97

0+22.5 4.53 7.74

0+43.2 4.38 7.89



1C 80-4

1 x 54.97 C.T.

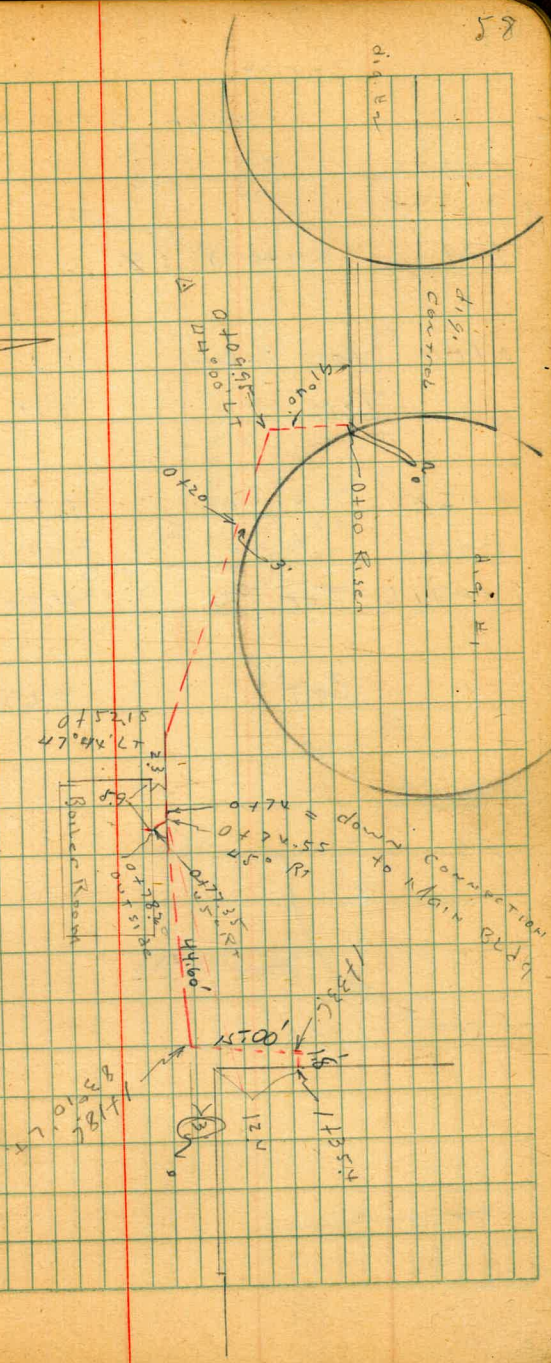
2" Vent Line  
chiseled  
2" below top

C.L. 41

Location of 1" Air Line  
Dig. Control

B.M.	376	1301		9.25
T.P.	747	<u>1584</u>	4.6x	8.37

0+00 Tap Pipe	4.8	11.04
+0995 Δ	5.3	
+52.15	6.2	9.6
0+74	7.7	8.1
0+74.55 Δ	7.7	9.14
0+77.35 Δ	7.7	
" Riser	6.8	
<hr/>		
0+74 Δ down	8.00	7.84
1+18.5 Δ LT	8.50	7.34
1+33.6 Δ Rt	8.14	7.70
1+35.4 Δ T M Bldg.	8.14	7.70



Locate Elec Conduit  
Near Stack

BM, 4.43 13.68 9.25

0700 Bot. P.B. 5.91

" Top " 4.71 8.97

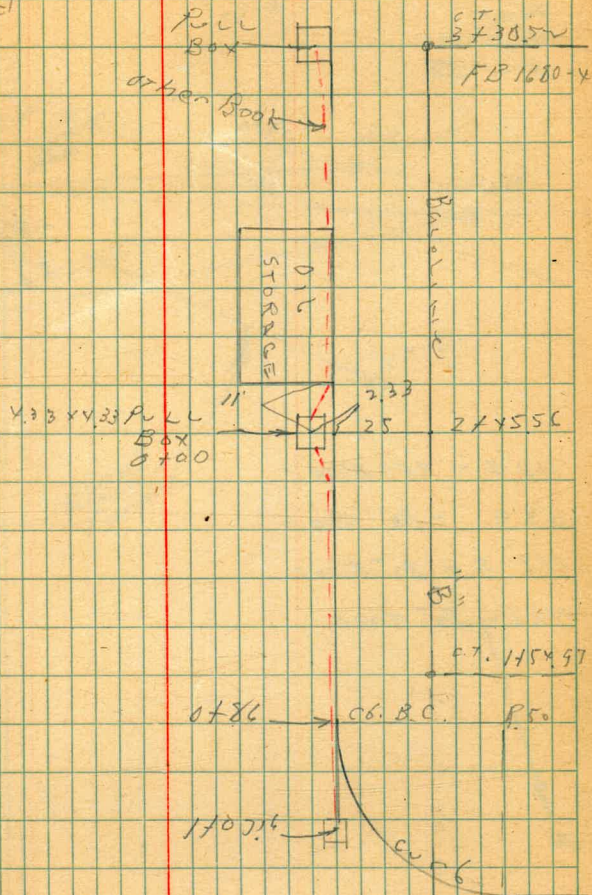
2458 Top Con. 6.5 7.2

170716 Top P.B. 4.50 9.18

" Bot " 5.65

Moore  
Begg  
Sheridan  
Crawford  
3-6-50

59



Location Existing Outfall Floats  
as ~~to~~ shown on P-14.16 This Buck

60

Walker  
Pope  
Hoffman  
5-15-52

- No 4 = 24" Riser
- No 3 = 30" Riser
- No 2 = 30" Riser
- No 1 = 30" Riser

Wooden  
Bulkhead

Set  
Hoist in Bulkhead.  
1246226

Set 41 Disc  
12431  
#2

Set 41 Disc  
11496  
#1

103°15'  
Turned

NAVY PIER

See base P. 14

79°30'  
Turned

N#1

N#2

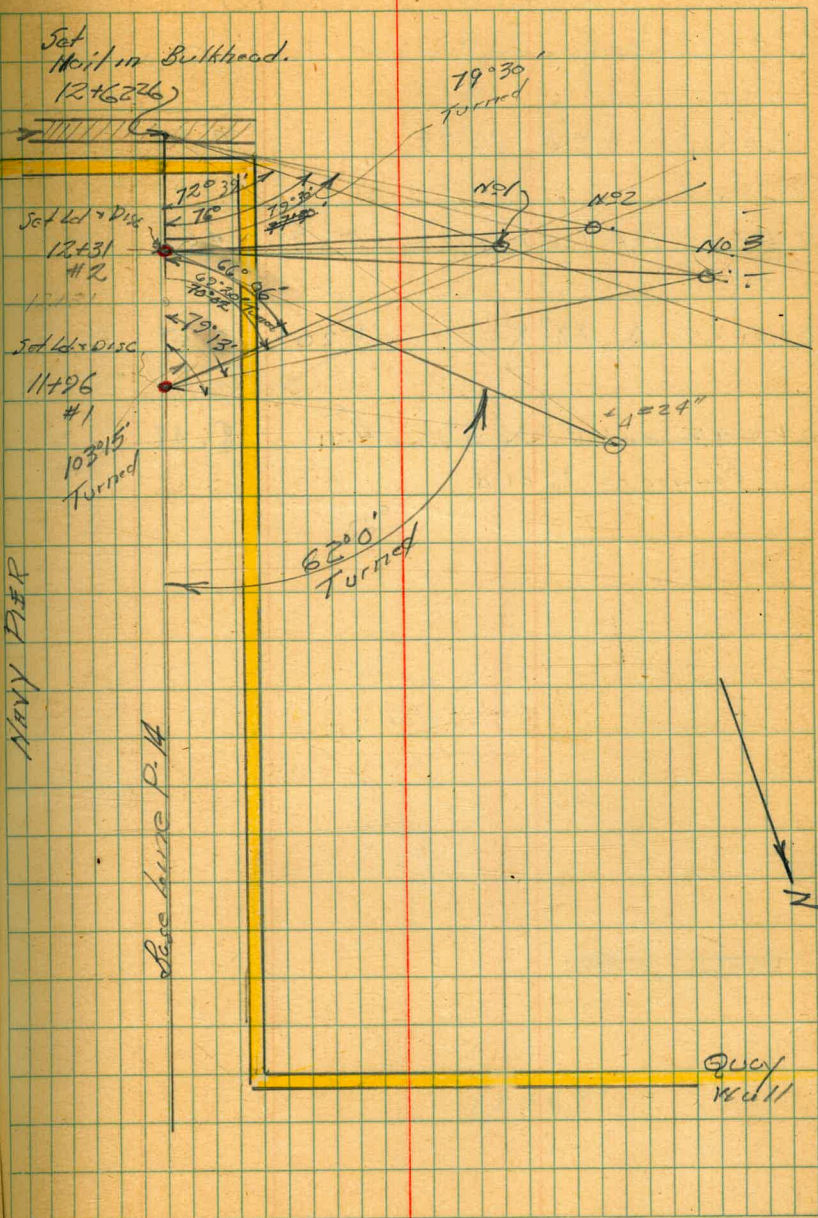
No 3

41 = 24"

62°0'  
Turned

N

Quay  
Well





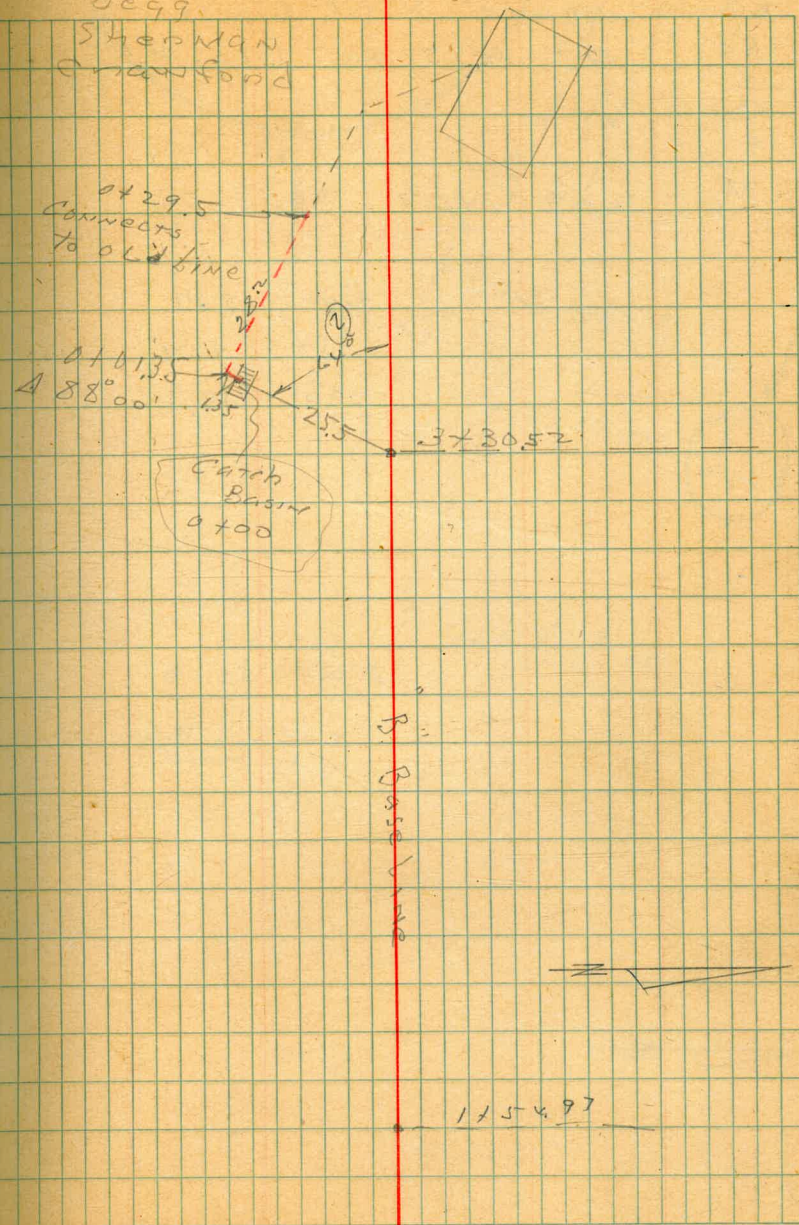
Locate 3" drain  
Boiler Room to C.B.

B.M.	3.54	12.79	9.25
0+00	Top iron grate	5.23	7.56
0+01.35	$\Delta 88^\circ R+$	5.20	7.57 Top 3"
0+29.5	end New 3" Connects to old	4.71	8.08

Moore 2-6-50

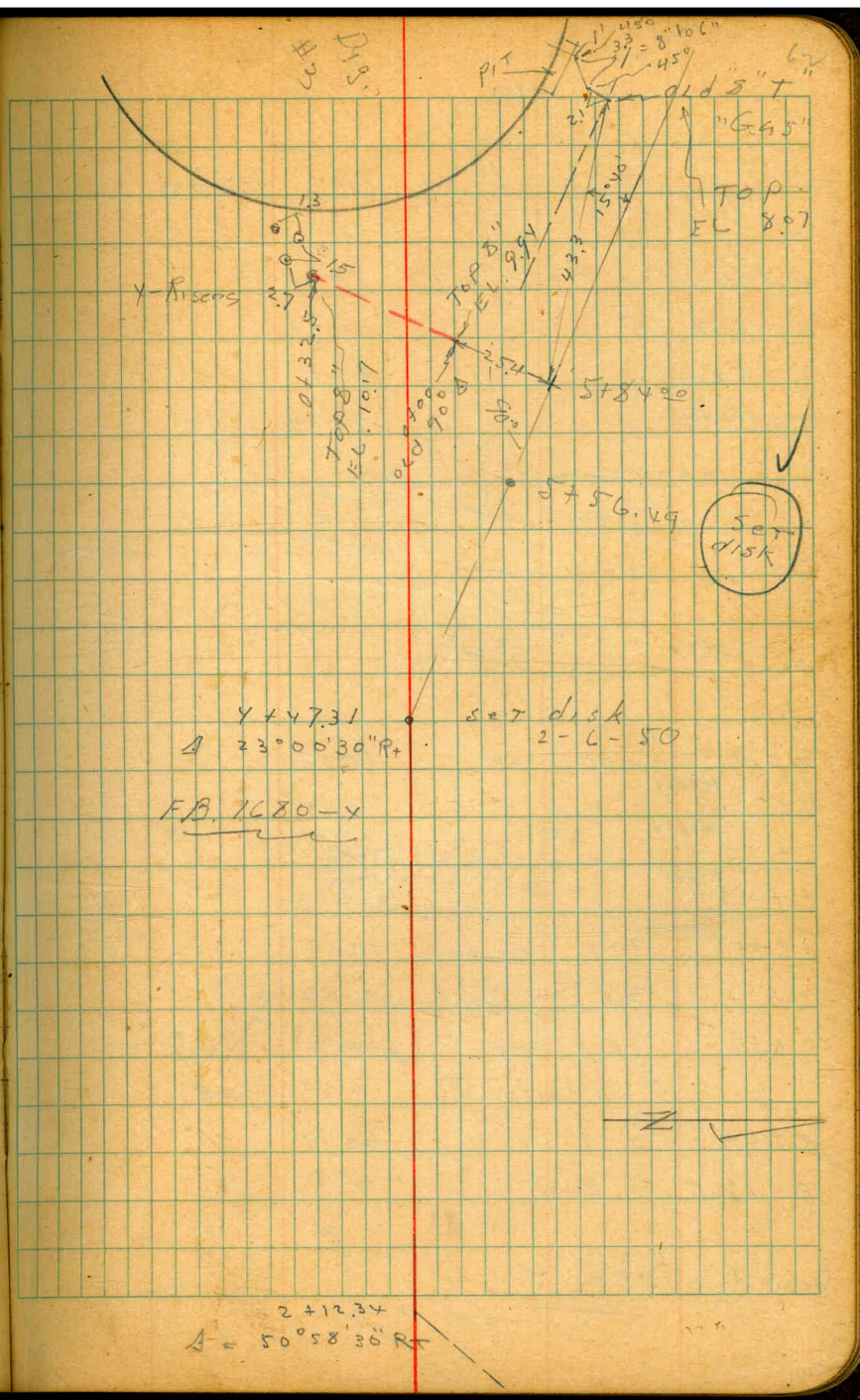
01

Beeg.  
SHERMAN  
Crawford



2-6-50  
 Mapped locate 8" C.I. Lines  
 B. AT N side Dig. #3  
 S  
 C

B.M.	2.07	<u>14.07</u>	12.00
		6.00	8.07
		4.13	9.94
		3.90	10.17



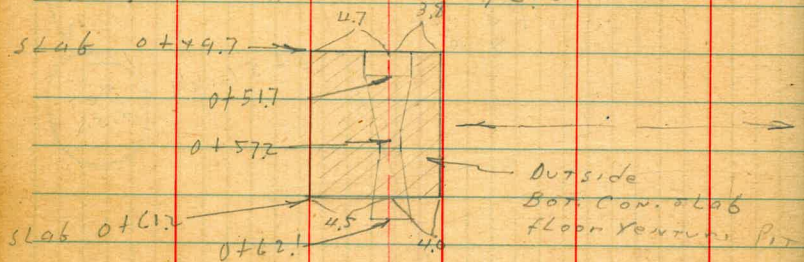
2 + 12.34  
 Δ = 50°58'30" R

Location of 36" C.I. Line  
as Laid 2-17-50

Moore Cl. #  
B 99  
Crawford

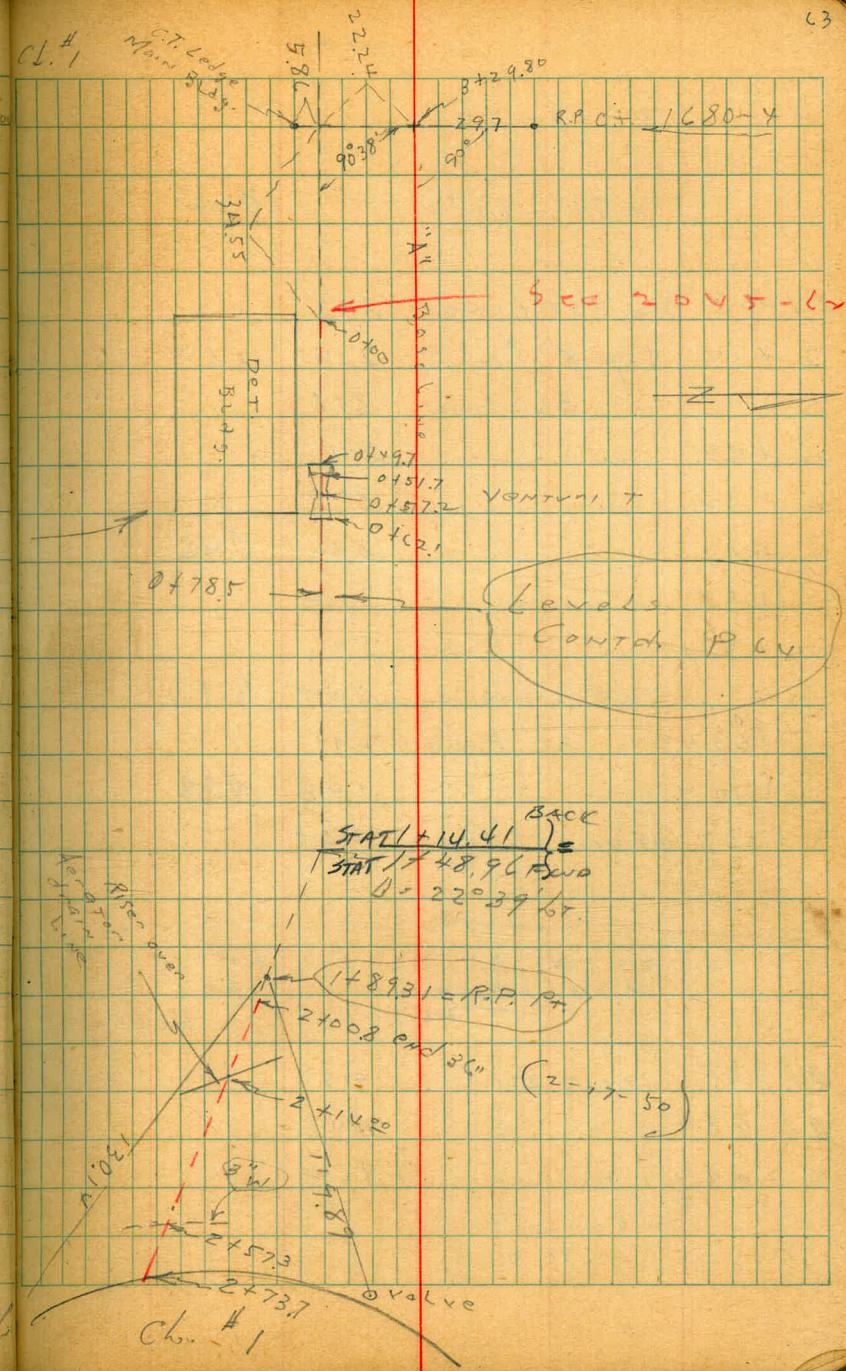
B.M. 3.50 15.50 12.00

0+00 Top Pipe <sup>old</sup> Bell 15.49  
0+03.2 " " 15.43  
0+08.9 " " 14.11  
0+14.10 " " 12.00



0+21.35 Top Pipe 10.58  
0+33.4 Heavy " " 10.75  
0+45.4 Heavy " " 10.72  
0+49.7 Heavy " " 10.69  
0+51.7 Top Iron band 10.35  
0+55.7 Top Con. Tube 11.06  
0+57.2 Top Flange 10.53 4.99  
" Top Con. Slab 14.96  
0+62.1 " Pipe 10.41  
0+78.5 " End 10.53

Contd. See P.C.V.



36" Sewage  
from Cl. #1

2-17-50

4.50 13.76 9.26

2+00.8	beg. top pipe	8.23	
2+14	Top 8" <sup>Acceptor</sup> drain	7.14	6.6 ✓ C.I. pipe
2+14	" 36" Pipe	8.18	"
2+16.9	" " "	8.11	"
2+32	" " "	8.23	"
2+47.5	" " "	8.30	5.46
2+53	" " "	7.12	"
2+57.3	" " "	5.41	"
"	Top 3" 1019. W.	5.05	8.71
463.3	" 36" Pipe	2.91	"
170.4		1.38	17.38
2+73.7	at WL. Cl. #1	1.39	"

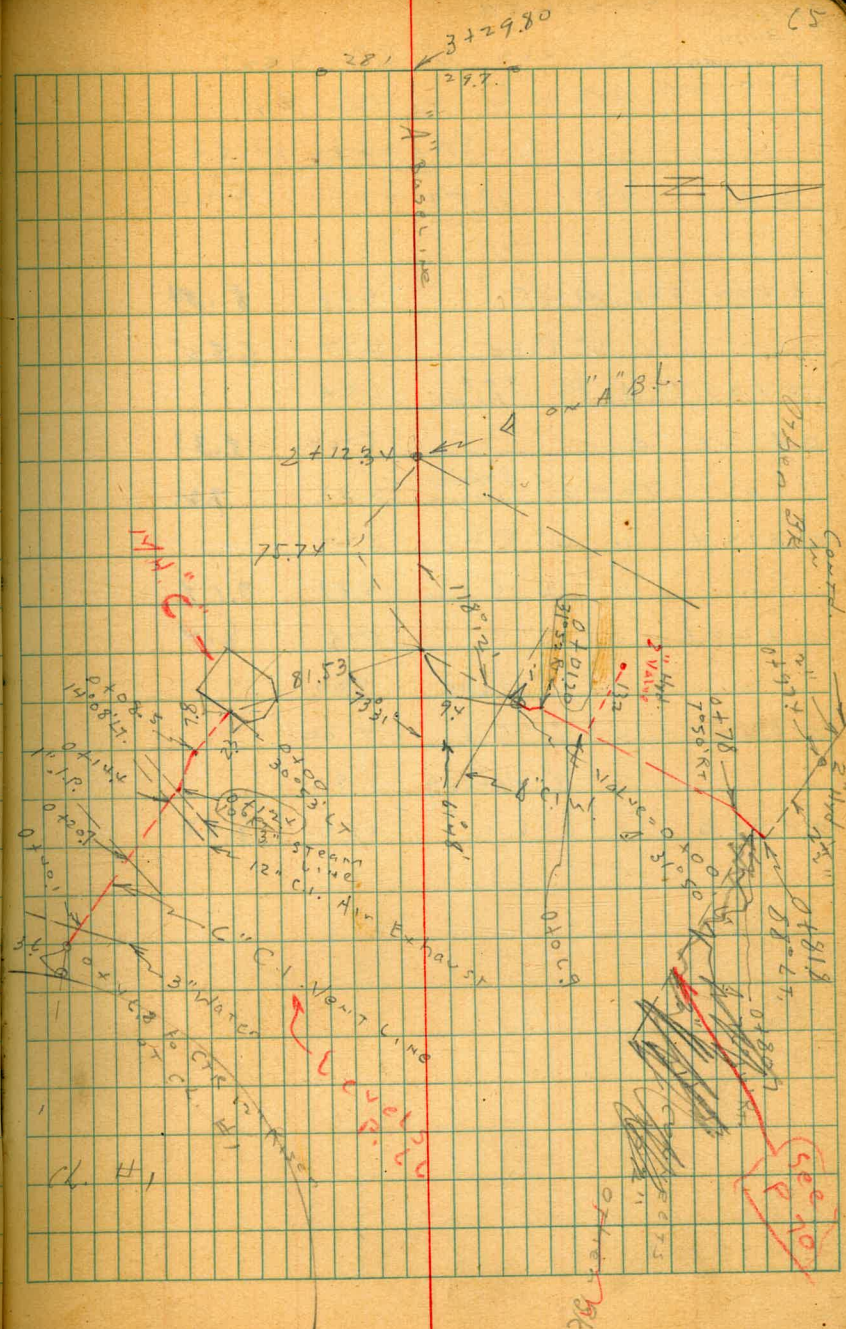
Levels Contd. on 36" C.I. from  
B.M. 4.84 14.10 9.26  
2-21-50

0+78.5	Top 36" C.I.	9.18
0+88.9	" " "	9.47
1+04.9	" " "	9.62

Connect  
to old  
36"

2-17-50 Location 2 1/2" Water line  
and ch. line drain  
Ch. #1 to M.H.  
Levels on Water

B.M.		<u>13.88</u>	926
0-1	Top 8" W. Water	647	7.41
0+00.2	at 3" Shut off V.	570	
"	3" line	671	7.17
0+01.2	at 31° 52' R.	596	7.92
0+06.9	"	575	8.13
"	and 13 1/2" LT Hyd	580	
0+14.0	top 3"	500	8.58
0+17.8	"	495	8.93
0+80.7	at 76° 14' R.	520	8.68
1+49.5	end old pipe	562	
0+81.8	at 88° LT	531	8.57
0+97.4	Top Line of Hyd	562	8.41



Moore 2-21-50

Beeg  
Shannon  
Crawford Levels 6" C.I. Vent. Line  
MHC to CL. #1

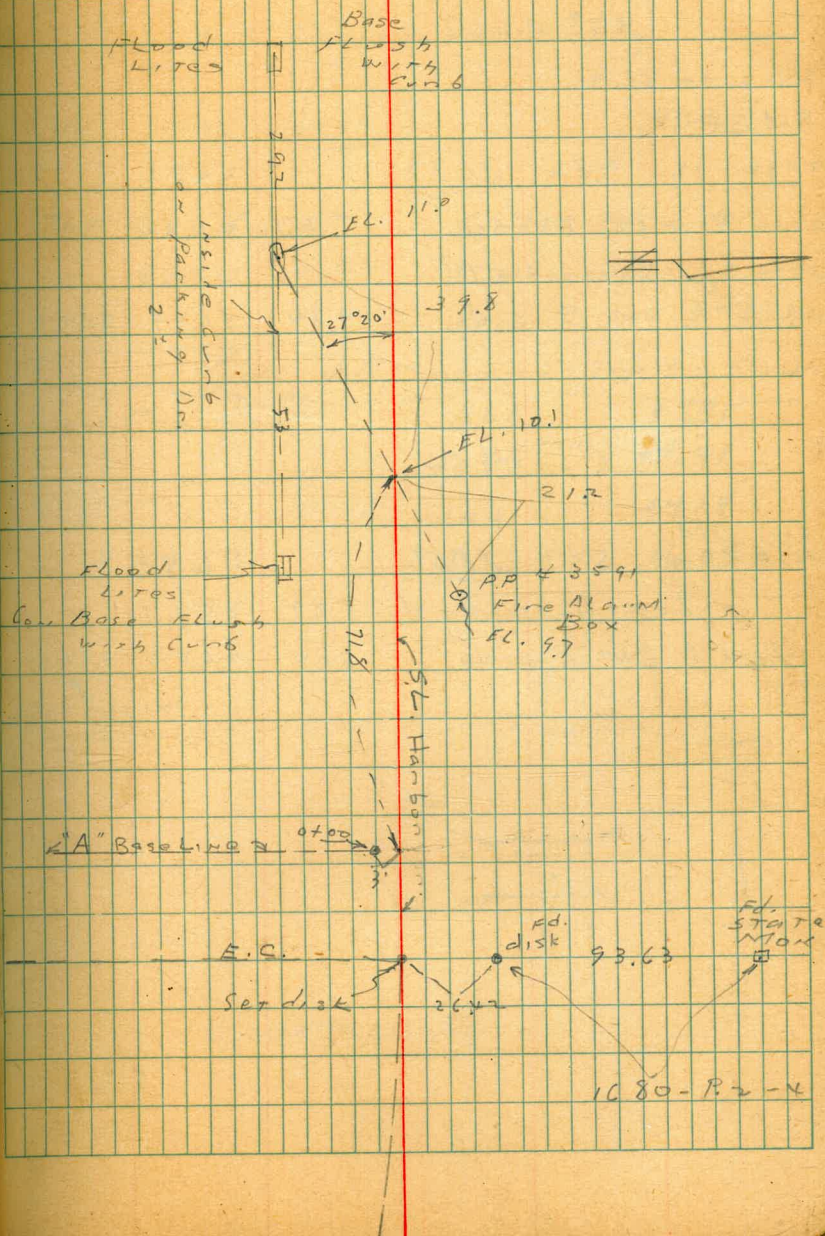
Sketch P 65

BM	v31	13.57	9.26
0+00	Top MHC	503	8.54
"	" 6" Pipe	6.72	6.85
0+08.5	Top Pipe	6.54	
0+12.4	"	5.20	8.33
"	Top 3" Steam Line	6.38	7.2
0+14.4	" 6" C.I.	5.22	
"	" 12" C.I.	5.89	7.68
0+20.1	" 6"	5.16	8.4
"	" 1" Pipe	5.00	
0+40.1	" 6" C.I.	4.80	
"	" 3" Water Pipe	3.92	
0+46.8	" 6" C.I.	4.65	8.92

2-21-50

Moore location of ELOCT, Concl.  
 Begg and Fire Alarm Box  
 Sherman  
 Crawford

BM	560	1x86	9.20
Concl.			5.16
			9.7
			4.76
			10.1
			3.86
			11.0



2-21-50

Moore  
Boyer  
SHERMAN

CL #1

Elev. of Top of 12" Flange  
45° ELL.

W. side CL #1

BM 13P

2032-72 4.82 31.33 26.51

Top 12" Flange 5.57 25.76

" Butterfly V. 5.40 25.93

check to BM S. side 4.84 26.49 26.49

CL #2

SLY BM.

CL #2 5.03 31.56 26.53

Top Butterfly V. 5.39 25.67

check to BM E side 5.04 26.52 26.52

2032-72

2-21-50

C8

Elev. TOP VENTURI PIT

36" Sewage Line

N.E. Cor. of Detn. Bldg.

BM. 5.33 14.59 9.26

Top 2x4 form 5.27 9.32 W. side

" " " 5.24 9.33 E side  
c6 elev.

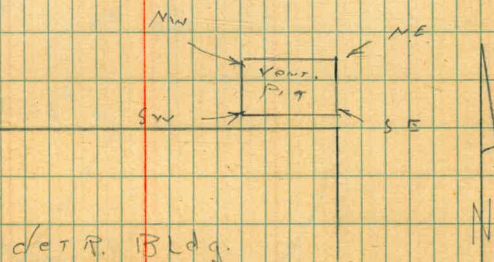
Pipe openings = Top Box Form:

NW Cor Pit 8.68 +5.91

SW " " 10.18 +4.41

SE " " 10.41 +4.18

NE " " 8.55 +6.04





2-21-50

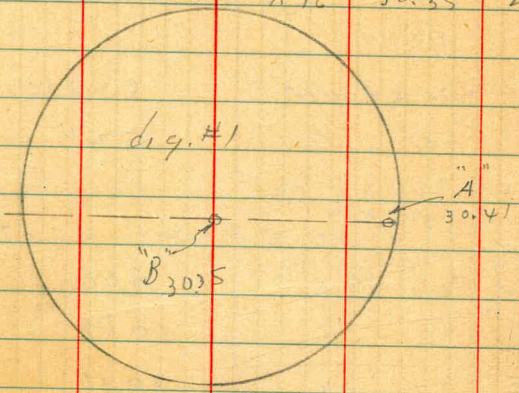
Moore  
Begg  
Sheridan

Elev. of top of  
8" Flanges dig. #1 and #3

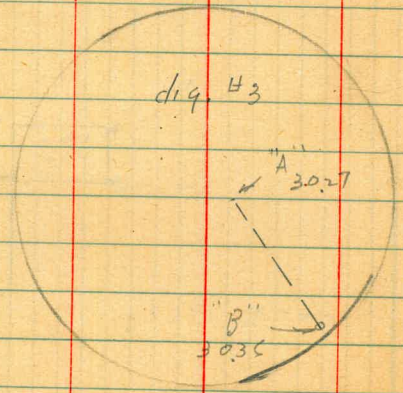
69

B.M. dig #	431	<u>3831</u>		3400	
"A"			7.90	30.41	29.58
"B"			7.96	30.35	29.52

± 8" 90° 00'



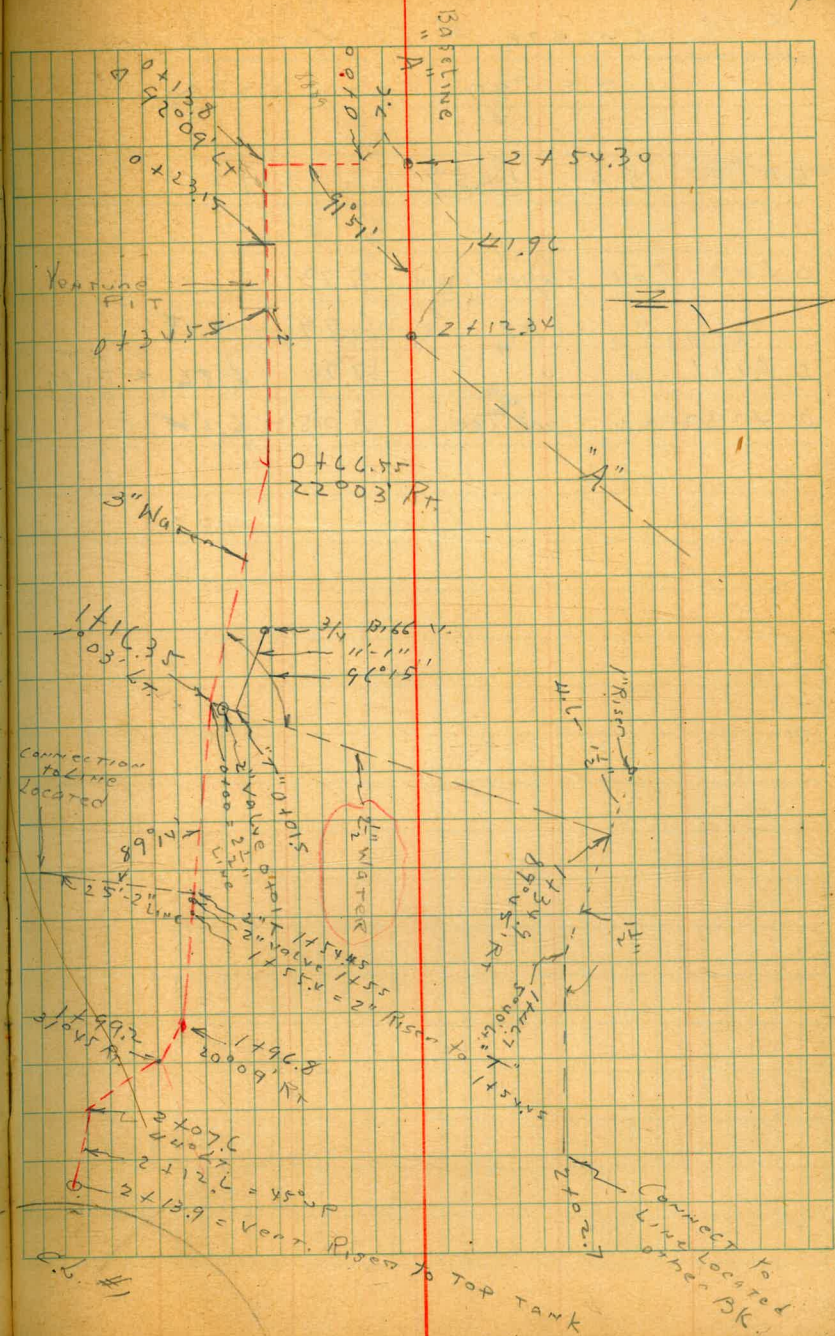
T.P.	347	<u>3849</u>	329	3502	
"A"			8.22	30.27	29.44
"B"			8.13	30.36	29.53



313 according  
to Plans

Moore 2074-50  
 5099  
 Sherman Location of 3" Water  
 Det. Bldg. to C.L. #1  
 14.57 4.1. 1991

0400	Top 3" Pipe	6.5	8.07
0413.8	Top Pipe	7.0	7.37
"	down	9.0	5.57
2231.5	Top pipe	8.9	
130.55	" "		
166.55	" "	8.0	6.17
1+16.35	Top 3" line	7.3	7.27
"	2" Riser	6.3	8.27
1+54.45	Top "T"	6.3	
1+55	" Valve	5.5	
1+55.4	Top Riser	6.3	
1+56	" 3" line	7.7	6.87
1+81	" " "	7.6	
1+96.8	" " "	7.2	7.37
1+99.2	" " "	5.2	9.37
1+07.6	" " "	4.4	10.17
2+12.6	" " "	4.4	
B.T.A. Levels on 2 1/2" Line			
0401	Top Valve	5.5	9.26
0401.5	TOP PIPE	6.4	9.14
150	"	6.1	
1	"	5.5	9.04
1+34.9	89°45' RT	5.5	
1+40.7	"	5.7	
2+02.7	"	6.3	8.25



Moore 2-24-50 Wash  
 Begg Locate 4" Cl. Water Line  
 Sheaman NE Cor. Detro. Bldg.

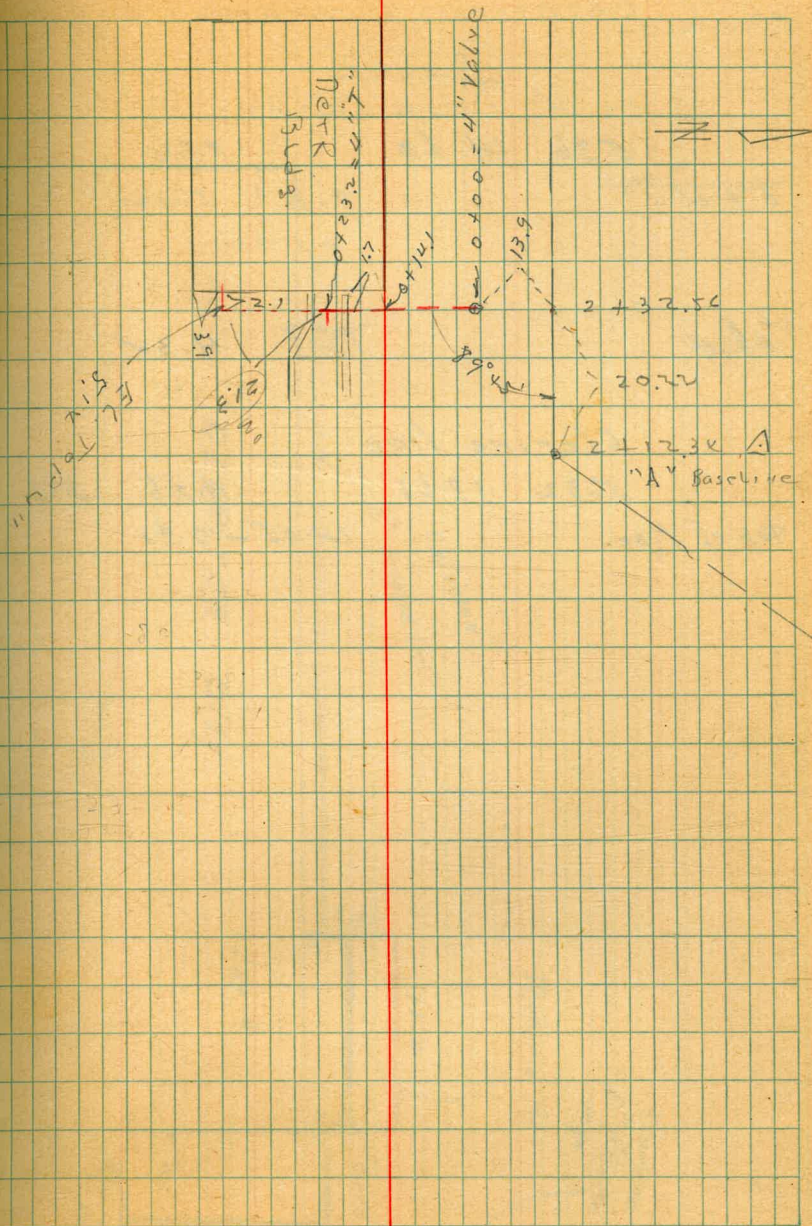
BM 5.31 ~~14.57~~ 9.26

0400 Top Valve Stem 5.73

" " Pipe 6.99 7.58

04141 " " 7.71 6.86 ← AT Bldg. COR

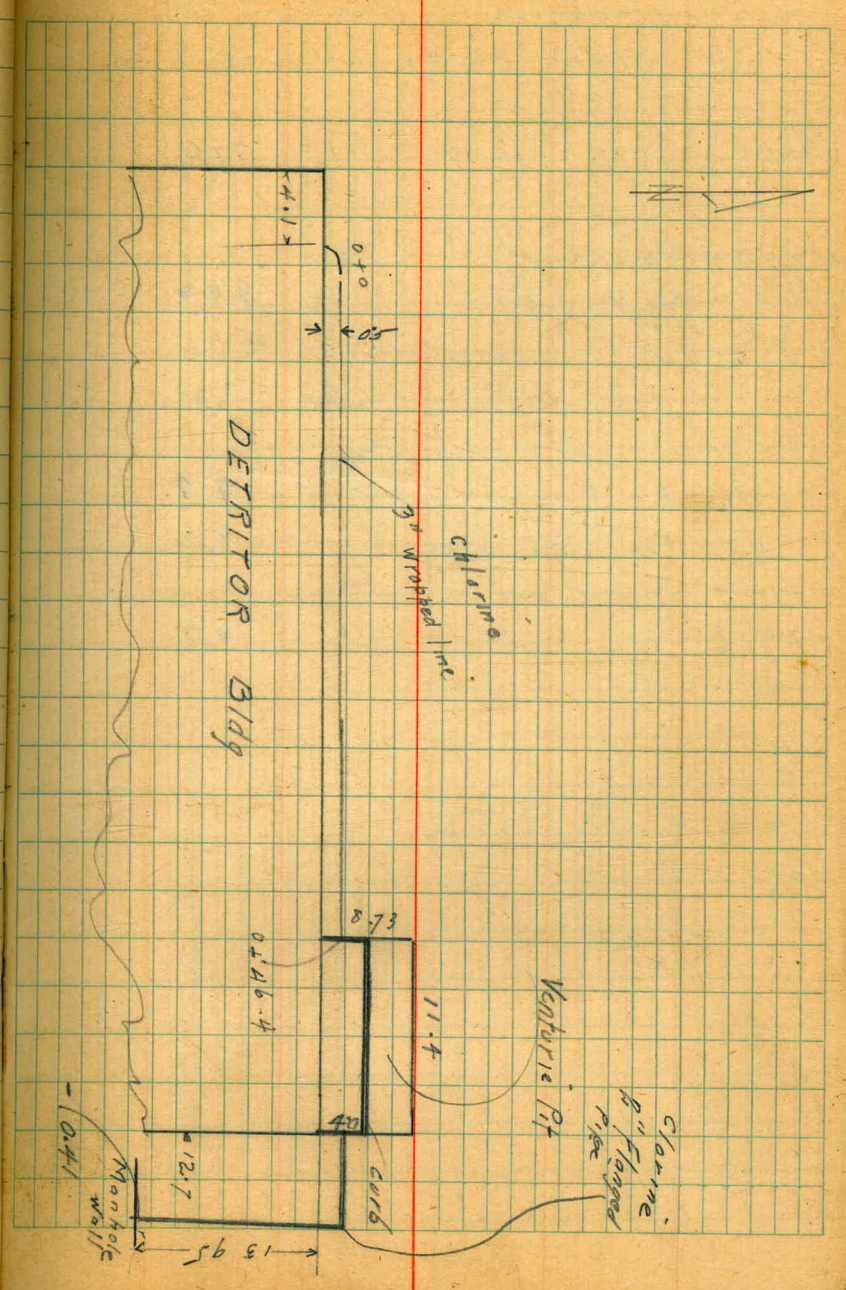
04232 " " "Tee" 8.05 6.52



Moore  
 Beeg  
 Sherman  
 Location 3" wrapped line  
 "Fe d/3"

at Det R Bldg  
 536 14 62 9.26  
 0+0 9.2 5.42  
 0+ 46.4 10.7 4.32

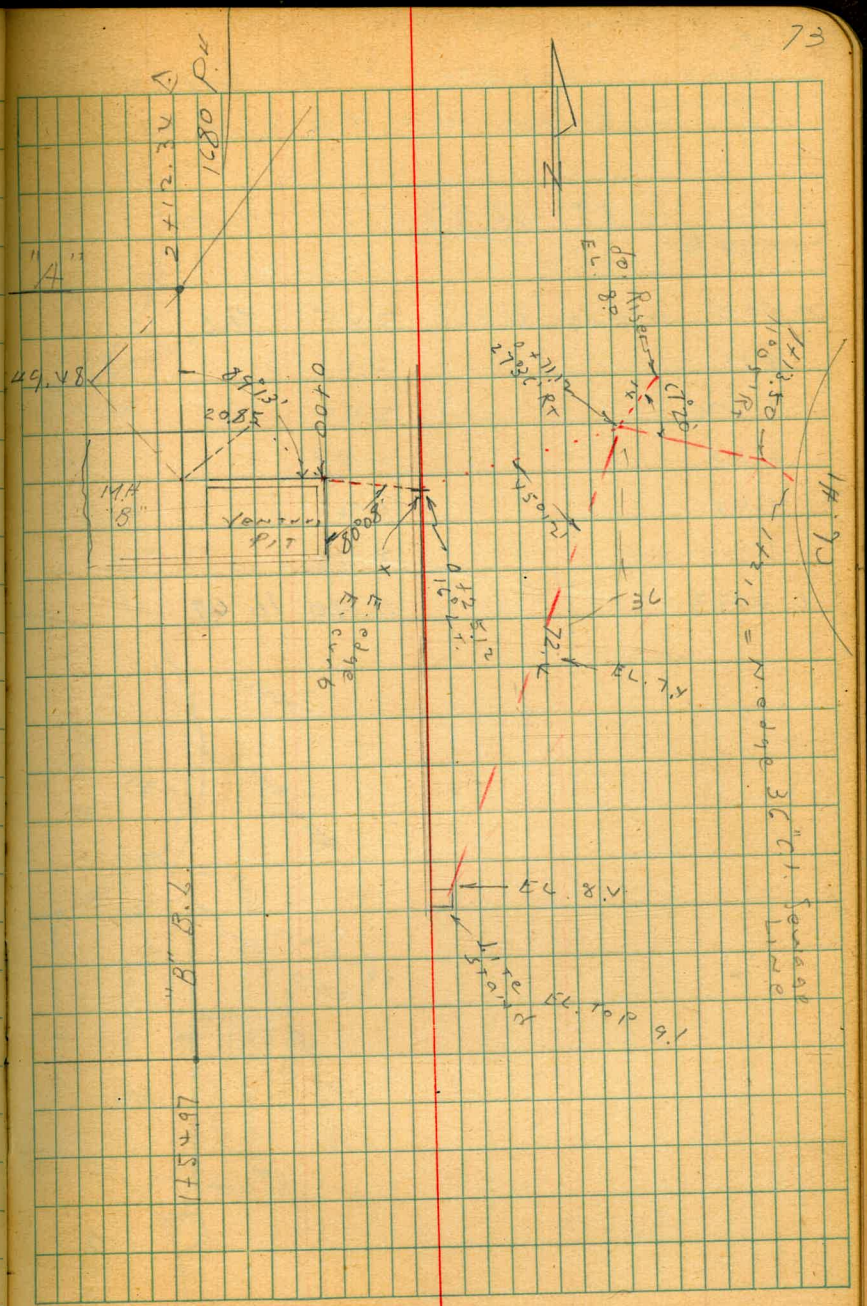
Chlorine line  
 5.32 13.61 9.26 BM  
 Top of Pipe 14.05 - 0.41



2-27-50

Moore  
Boggs  
Sherman  
Grantford  
Location of Elect. Conch  
Betw. CL #1 and Detr. Bldg.

B.M.	551	1477	926
0+00	end as Const.	2-27-50	7.3
"	Top Venturi Pit	5.85	8.92
0+25.12	Top curb	5.54	
"	Top Coll.	7.8	7.0
0+50		6.6	
0+71.12	Δ Conc.	7.1	9.7
1+05	Conc. under spur	6.6	8.2
1+13.5	Δ Conc.	5.3	
1+21.6	Conc.	5.1	9.7

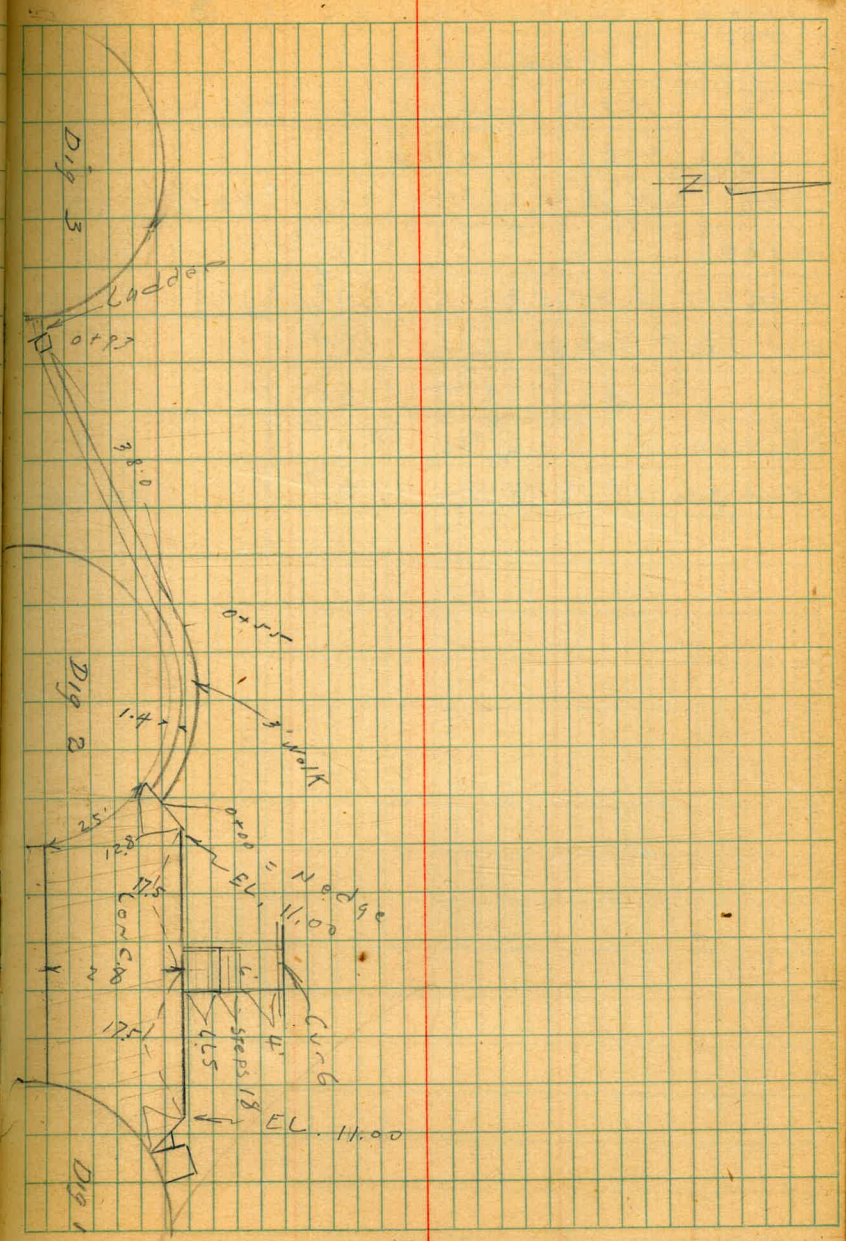


Moore 2-27-50  
Begg

locate 3' Cor. Walk  
Sherridan  
Crawford Betw. dig. #2 and #3

BM	1.57	<u>13.57</u>	12.00
0+00	Nudge Walk	2.45	11.1
+11		2.43	
+22		2.42	
+33		2.37	
+44		2.26	
+55 EC		2.17	
0+93		1.90	11.67

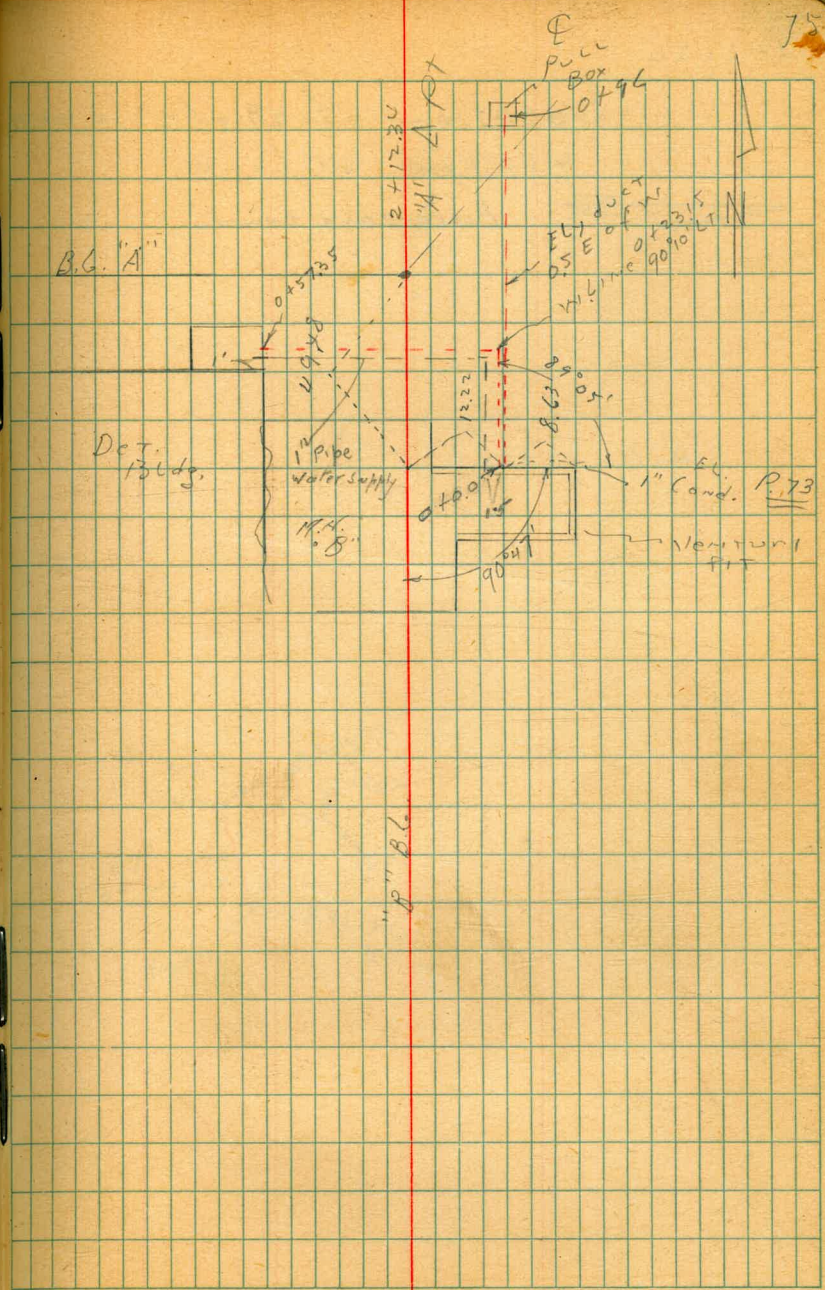
74



3-1-50 Location 1" Water Line  
 Moore Location of 2-3"  
 Begg Fibre ducts  
 Crawford MH<sup>13</sup> and Venturi Pit NLU

Wly 4" duct

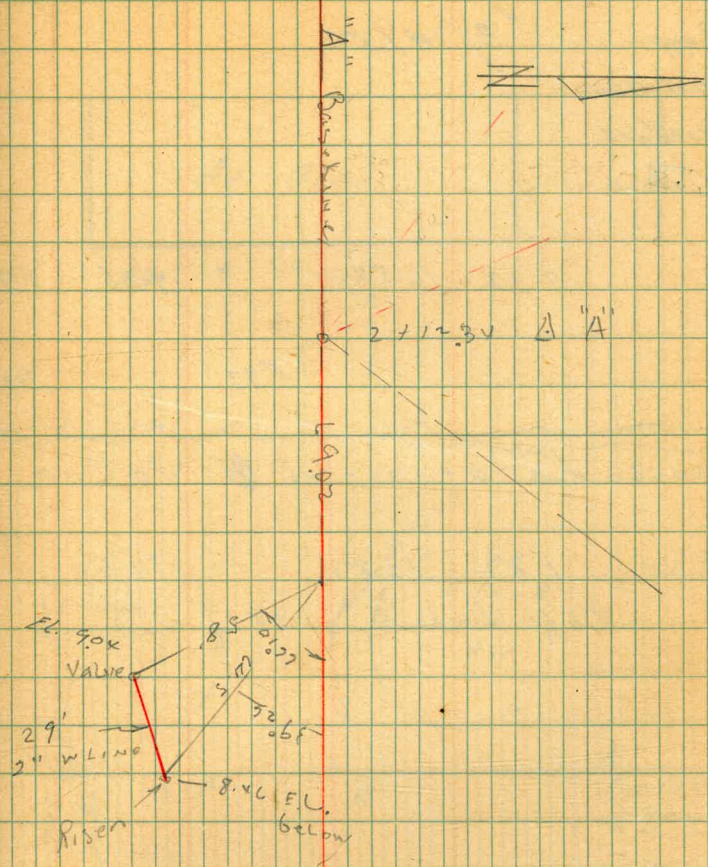
B.M.	4.35	13.61	9.26	
0100			C.O	Conn.
012315	Δ 90° 10' LT		6.1	"
015735	Top 4" duct		6.5	
FLY duct				
0700	CON.		6.0	
0796	Top duct		4.5	AT P.B.



3-1-50

LOCATION of 29' of 2" C. WATER  
wrapped w. line  
EMERGENCY conn.

76





Location of gas line  
entering Administration Bldg

Begg 3/14/50

Sherman

Crawford

Moore

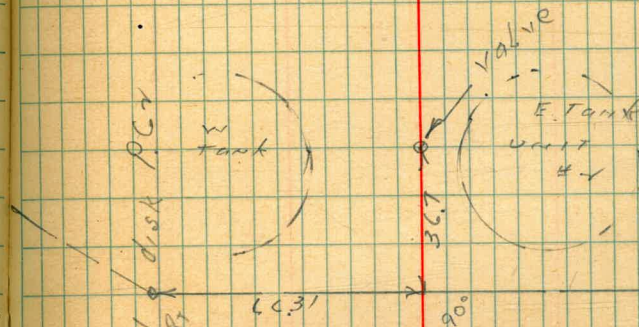
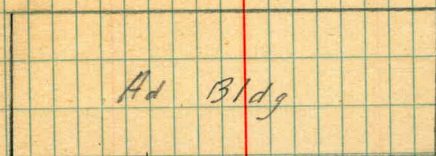
7.32 16.58 9.26 BM

5.97 Top of Pipe

3-14-50 Location of 6" Valve

BM 1.82 13.82 12.00

Top Valve 12.17



4247.81 disk PC  
4237.00 20R

"A"  
Base line  
1680

This page features a grid of green horizontal lines spaced evenly down the page. Four vertical red lines are drawn, creating five columns of varying widths. The columns are roughly equal in width, with the outermost columns being slightly narrower than the three inner columns.

This page features a grid of green horizontal and vertical lines, forming a standard graph paper pattern. A single vertical red line is drawn near the right edge of the page, creating a narrow column on the right side. The rest of the page is filled with a uniform grid of small squares.

# CURVE TABLES.

Published by KEUFFEL & ESSER CO.

## HOW TO USE CURVE TABLES.

Table I. contains Tangents and Externals to a 1° curve. Tan. and Ext. to any other radius may be found nearly enough, by dividing the Tan. or Ext. opposite the given Central Angle by the given degree of curve.

To find Deg. of Curve, having the Central Angle and Tangent: Divide Tan. opposite the given Central Angle by the given Tangent.

To find Deg. of Curve, having the Central Angle and External: Divide Ext. opposite the given Central Angle by the given External.

To find Nat. Tan. and Nat. Ex. Sec. for any angle by Table I.: Tan. or Ext. of twice the given angle divided by the radius of a 1° curve will be the Nat. Tan. or Nat. Ex. Sec.

### 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.

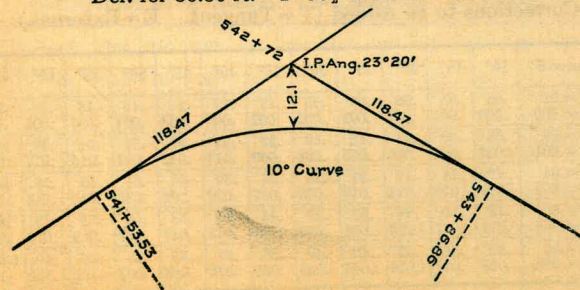
Ext. in Tab. I opposite 23° 20' = 120.87  
 $120.87 \div 12 = 10.07$ . Say a 10° Curve.

Tan. in Tab. I opp. 23° 20' = 1183.1  
 $1183.1 \div 10 = 118.31$ .

Correction for A. 23° 20' for a 10° Cur. = 0.16  
 $118.31 + 0.16 = 118.47 = \text{corrected Tangent.}$

(If corrected Ext. is required find in same way)  
 Ang. 23° 20' = 23.33°  $\div 10 = 2.3333 = \text{L. C.}$

2° 19½' = def. for sta.	542	I. P. = sta.	542+72
4° 49½' = " " "	+50	Tan. =	118.47
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		
$100 - 53.53 = 46.47 \times 3' (\text{def. for 1 ft. of } 10^\circ \text{ Cur.}) = 139.41' =$			
$2^\circ 19\frac{1}{2}' = \text{def. for sta. } 542.$			
Def. for 50 ft. = 2° 30' for a 10° Curve.			
Def. for 36.86 ft. = 1° 50½' for a 10° Curve.			



Natural Trigonometrical Functions

Angle. Sin. Tan. Sec. Cosec. Cotg. Cosin.

32	.5299	.6249	1.1792	1.887	1.600	.84805	58
10	.5324	.6289	1.1813	1.878	1.590	.84650	50
20	.5348	.6330	1.1835	1.870	1.580	.84495	40
30	.5373	.6371	1.1857	1.861	1.570	.84339	30
40	.5398	.6412	1.1879	1.853	1.560	.84182	20
50	.5422	.6453	1.1901	1.844	1.550	.84025	10
33	.5446	.6494	1.1924	1.836	1.540	.83867	57
10	.5471	.6536	1.1946	1.828	1.530	.83708	50
20	.5495	.6577	1.1969	1.820	1.520	.83549	40
30	.5519	.6619	1.1992	1.812	1.511	.83389	30
40	.5544	.6661	1.2015	1.804	1.501	.83228	20
50	.5568	.6703	1.2039	1.796	1.492	.83066	10
34	.5592	.6745	1.2062	1.788	1.483	.82904	56
10	.5616	.6787	1.2086	1.781	1.473	.82741	50
20	.5640	.6830	1.2110	1.773	1.464	.82577	40
30	.5664	.6873	1.2134	1.766	1.455	.82413	30
40	.5688	.6916	1.2158	1.758	1.446	.82248	20
50	.5712	.6959	1.2183	1.751	1.437	.82082	10
35	.5736	.7002	1.2208	1.743	1.428	.81915	55
10	.5760	.7046	1.2233	1.736	1.419	.81748	50
20	.5783	.7089	1.2258	1.729	1.411	.81580	40
30	.5807	.7133	1.2283	1.722	1.402	.81412	30
40	.5831	.7177	1.2309	1.715	1.393	.81242	20
50	.5854	.7221	1.2335	1.708	1.385	.81072	10
36	.5878	.7265	1.2361	1.701	1.376	.80902	54
10	.5901	.7310	1.2387	1.695	1.368	.80730	50
20	.5925	.7355	1.2413	1.688	1.360	.80558	40
30	.5948	.7400	1.2440	1.681	1.351	.80386	30
40	.5972	.7445	1.2466	1.675	1.343	.80212	20
50	.5995	.7490	1.2494	1.668	1.335	.80038	10
37	.6018	.7536	1.2521	1.662	1.327	.79864	53
10	.6041	.7581	1.2549	1.655	1.319	.79688	50
20	.6065	.7627	1.2577	1.649	1.311	.79512	40
30	.6088	.7673	1.2605	1.643	1.303	.79335	30
40	.6111	.7720	1.2633	1.636	1.295	.79158	20
50	.6134	.7766	1.2661	1.630	1.288	.78980	10
38	.6157	.7813	1.2690	1.624	1.280	.78801	52
10	.6180	.7860	1.2719	1.618	1.272	.78622	50
20	.6202	.7907	1.2748	1.612	1.265	.78442	40
30	.6225	.7954	1.2778	1.606	1.257	.78261	30
40	.6248	.8002	1.2808	1.601	1.250	.78079	20
50	.6271	.8050	1.2838	1.595	1.242	.77897	10

Cosin. Cotg. Cosec. Sec. Tan. Sin. Angle

Angle. Sin. Tan. Sec. Cosec. Cotg. Cosin.

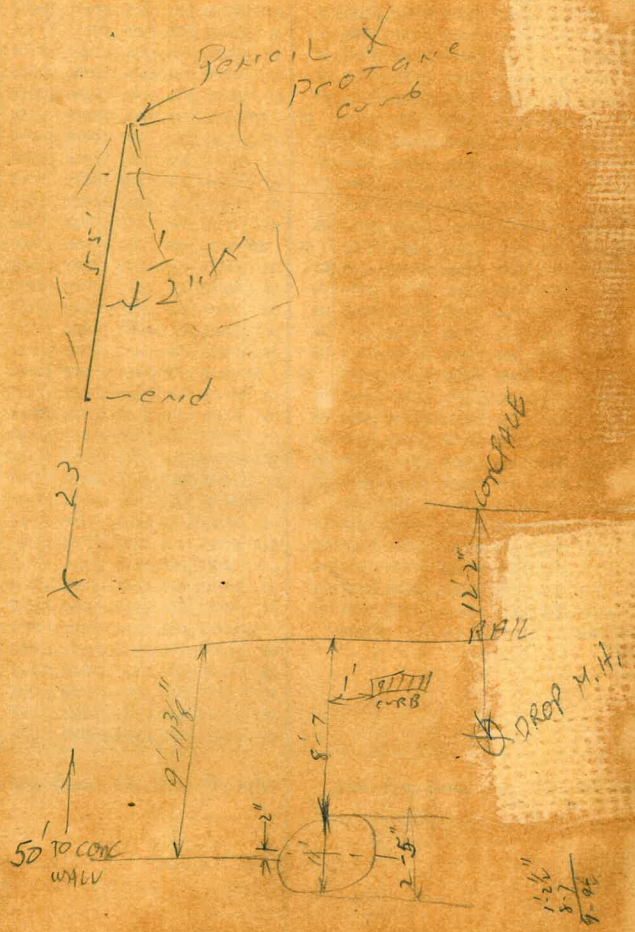
39	.6293	.8098	1.2868	1.589	1.235	.77715	51
10	.6316	.8146	1.2898	1.583	1.228	.77531	50
20	.6338	.8195	1.2929	1.578	1.220	.77347	40
30	.6361	.8243	1.2959	1.572	1.213	.77162	30
40	.6383	.8292	1.2991	1.567	1.206	.76977	20
50	.6406	.8342	1.3022	1.561	1.199	.76791	10
40	.6428	.8391	1.3054	1.556	1.192	.76604	50
10	.6450	.8441	1.3086	1.550	1.185	.76417	50
20	.6472	.8491	1.3118	1.545	1.178	.76229	40
30	.6494	.8541	1.3151	1.540	1.171	.76041	30
40	.6517	.8591	1.3184	1.535	1.164	.75851	20
50	.6539	.8642	1.3217	1.529	1.157	.75661	10
41	.6561	.8693	1.3251	1.524	1.150	.75471	49
10	.6583	.8744	1.3284	1.519	1.144	.75280	50
20	.6604	.8796	1.3318	1.514	1.137	.75088	40
30	.6626	.8847	1.3352	1.509	1.130	.74896	30
40	.6648	.8899	1.3386	1.504	1.124	.74703	20
50	.6670	.8952	1.3421	1.499	1.117	.74509	10
42	.6691	.9004	1.3456	1.494	1.111	.74314	48
10	.6713	.9057	1.3492	1.490	1.104	.74120	50
20	.6734	.9110	1.3527	1.485	1.098	.73924	40
30	.6756	.9163	1.3563	1.480	1.091	.73728	30
40	.6777	.9217	1.3600	1.476	1.085	.73531	20
50	.6799	.9271	1.3636	1.471	1.079	.73333	10
43	.6820	.9325	1.3673	1.466	1.072	.73135	47
10	.6841	.9380	1.3711	1.462	1.066	.72937	50
20	.6862	.9435	1.3748	1.457	1.060	.72737	40
30	.6884	.9490	1.3786	1.453	1.054	.72537	30
40	.6905	.9545	1.3824	1.448	1.048	.72337	20
50	.6926	.9601	1.3863	1.444	1.042	.72136	10
44	.6947	.9657	1.3902	1.440	1.036	.71934	46
10	.6967	.9713	1.3941	1.435	1.030	.71732	50
20	.6988	.9770	1.3980	1.431	1.024	.71529	40
30	.7009	.9827	1.4020	1.427	1.018	.71325	30
40	.7030	.9884	1.4061	1.422	1.012	.71121	20
50	.7050	.9942	1.4101	1.418	1.006	.70916	10
	.7071	1.	1.414	1.414	1.	.70711	45

Cosin. Cotg. Cosec. Sec. Tan. Sin. Angle

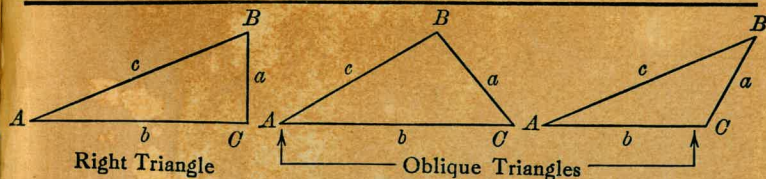
RH Riddle Truck Walker  
Truss, Bld. 182 P.W.D  
U.S.N.

Crane Serv.

1.86.2 in. stand  
 1.86.1



TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

For Angle A.  $\sin = \frac{a}{c}$ ,  $\cos = \frac{b}{c}$ ,  $\tan = \frac{a}{b}$ ,  $\cot = \frac{b}{a}$ ,  $\sec = \frac{c}{b}$ ,  $\operatorname{cosec} = \frac{c}{a}$

Given	Required	Formula
a, b	A, B, c	$\tan A = \frac{a}{b} = \cot B$ , $c = \sqrt{a^2 + b^2} = a \sqrt{1 + \frac{b^2}{a^2}}$
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B$ , $b = \sqrt{(c+a)(c-a)} = c \sqrt{1 - \frac{a^2}{c^2}}$
A, a	B, b, c	$B = 90^\circ - A$ , $b = a \cot A$ , $c = \frac{a}{\sin A}$
A, b	B, a, c	$B = 90^\circ - A$ , $a = b \tan A$ , $c = \frac{b}{\cos A}$
A, c	B, a, b	$B = 90^\circ - A$ , $a = c \sin A$ , $b = c \cos A$

Solution of Oblique Triangles

Given	Required	Formula
A, B, a	b, c, C	$b = \frac{a \sin B}{\sin A}$ , $C = 180^\circ - (A + B)$ , $c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a}$ , $C = 180^\circ - (A + B)$ , $c = \frac{a \sin C}{\sin A}$
a, b, C	A, B, c	$A + B = 180^\circ - C$ , $\tan \frac{1}{2}(A - B) = \frac{(a - b) \tan \frac{1}{2}(A + B)}{a + b}$ $c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$s = \frac{a + b + c}{2}$ , $\sin \frac{1}{2}A = \sqrt{\frac{(s - b)(s - c)}{bc}}$ $\sin \frac{1}{2}B = \sqrt{\frac{(s - a)(s - c)}{ac}}$ , $C = 180^\circ - (A + B)$
a, b, c	Area	$s = \frac{a + b + c}{2}$ , $\text{area} = \sqrt{s(s - a)(s - b)(s - c)}$
A, b, c	Area	$\text{area} = \frac{bc \sin A}{2}$
A, B, C, a	Area	$\text{area} = \frac{a^2 \sin B \sin C}{2 \sin A}$

REDUCTION TO HORIZONTAL



Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle =  $5^\circ 10'$ . From Table, Page IX,  $\cos 5^\circ 10' = .9959$ . Horizontal distance =  $319.4 \times .9959 = 318.09$  ft. Horizontal distance also = Slope distance minus slope distance times (1 - cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained. Cosine  $5^\circ 10' = .9959$ .  $1 - .9959 = .0041$ .  $319.4 \times .0041 = 1.31$ .  $319.4 - 1.31 = 318.09$  ft.

When the rise is known, the horizontal distance is approximately: - the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft. slope distance = 302.6 ft. Horizontal distance =  $302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$  ft.