

BOOK 1

1953 - 54

K&E

CROSS-SECTION BOOK

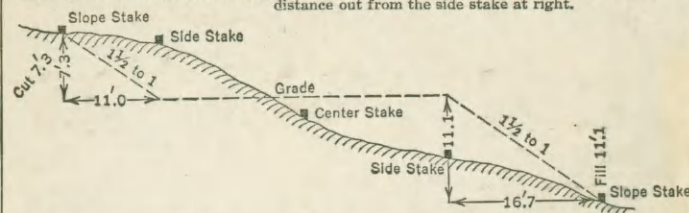
F 375-8 A



DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

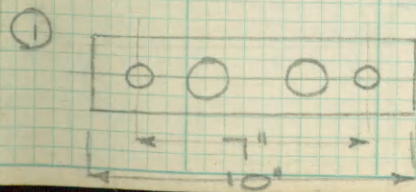
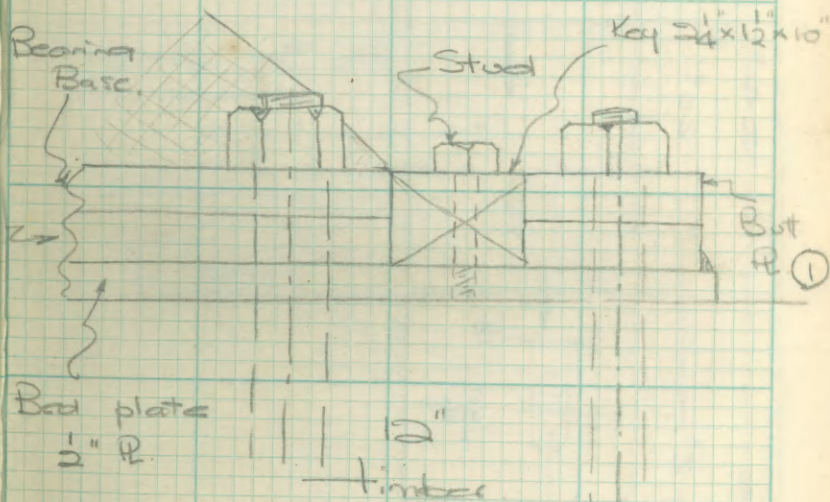
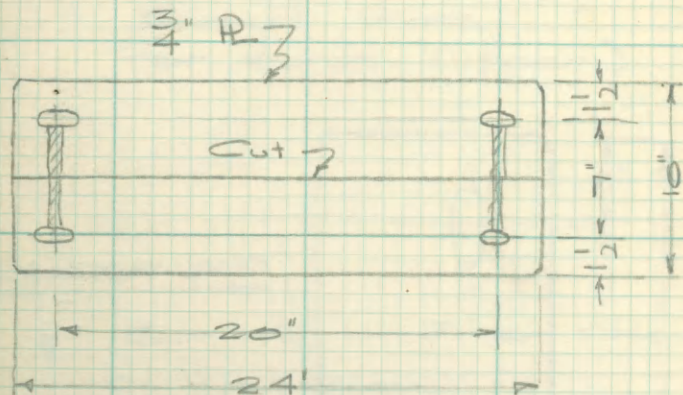
Roadway of any Width. Side Slopes $1\frac{1}{2}$ to 1.

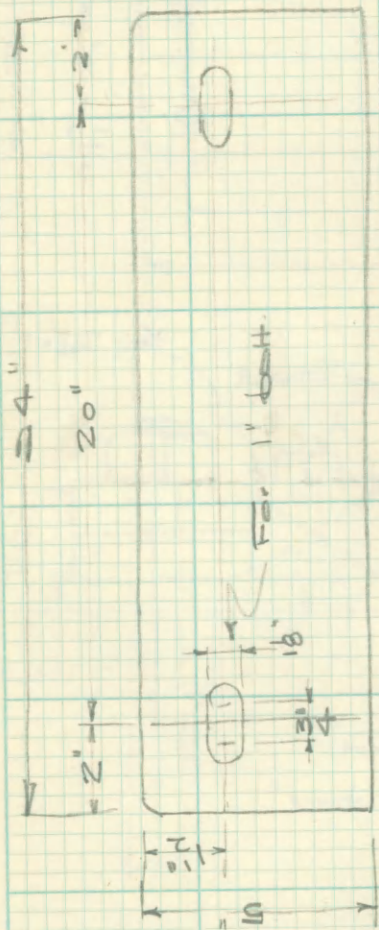
In the figure below: opposite 7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



Cut or Fill	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	Cut or Fill
	Distance out from Side or Shoulder Stake										
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

Screen Drive Bearing Shims





DREDGE # 6

15" Gusset Plate
for Screen (upper)

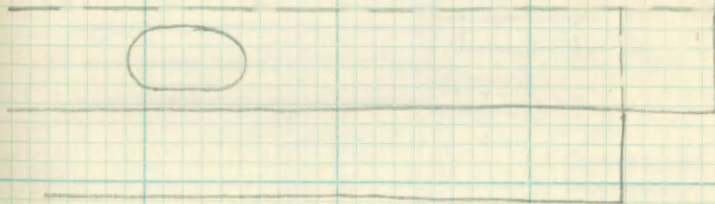
DREDGE NO 10

$\frac{1}{2}$ " Shim (2) for Thrust rollers
on Main Screen.

Dredge No 6

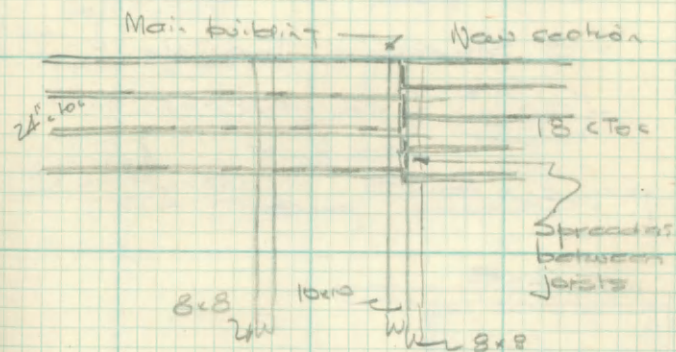
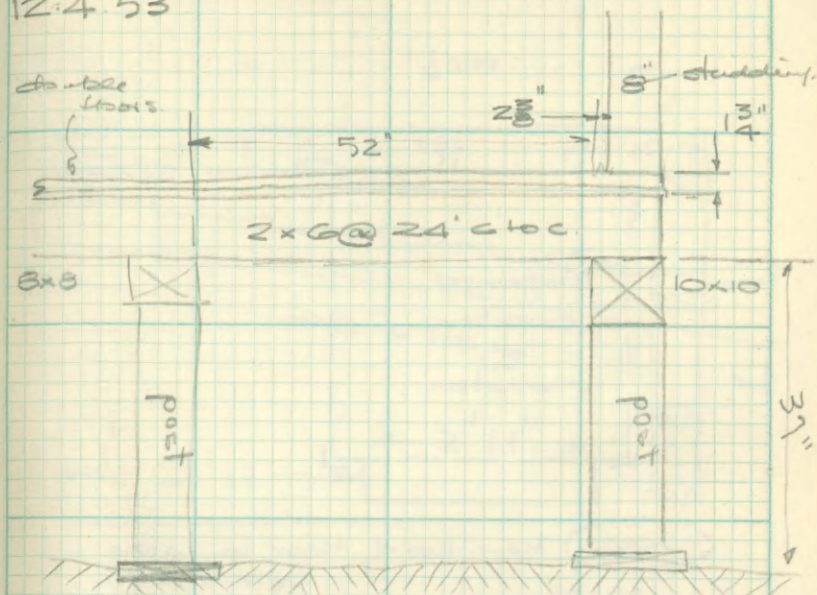
Portions

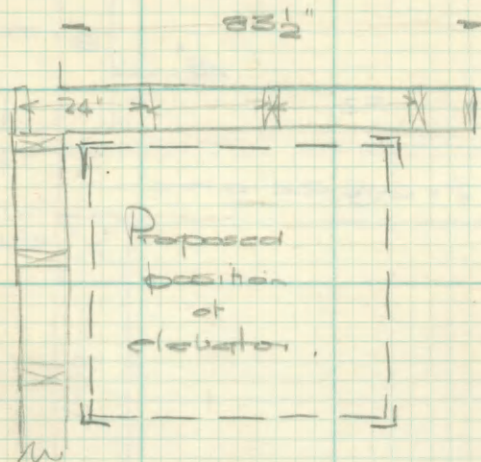
short end of
narrow edge inboard



Warm Storage Elevator

12.4 53





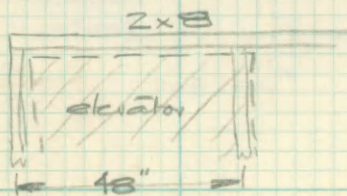
94" from top of floor to inside ceiling.

- Single pking on ceiling.

- 8" Staircase throughout - 24" elev.

90 1/2' floor to ceiling top floor.

- Ceiling joists - 48"



16'-2"

= 8 1/2'

94

90 1/2

8

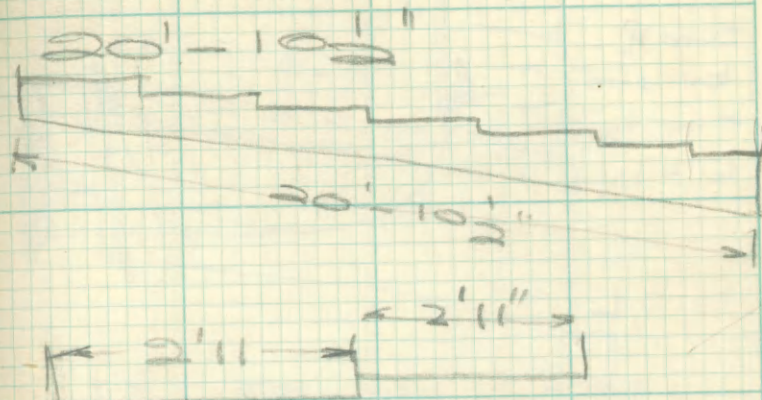
2

192 1/2

12

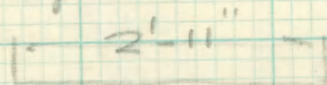
16'-9'

No 8 DREDGE



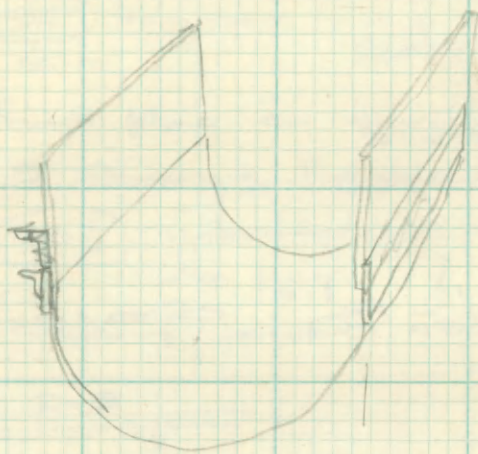
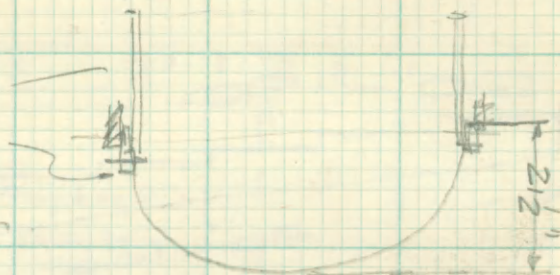
lower table

top table

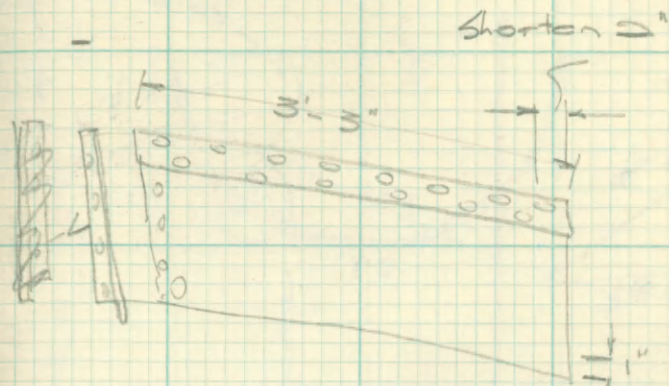


20'-8 1/2" drawing.

Side R
bolt onto
it on top
to L iron



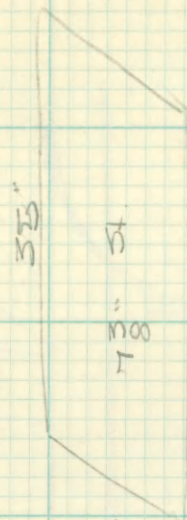
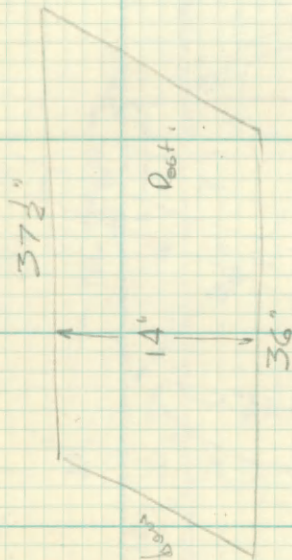
NOG Dredge - Dump box



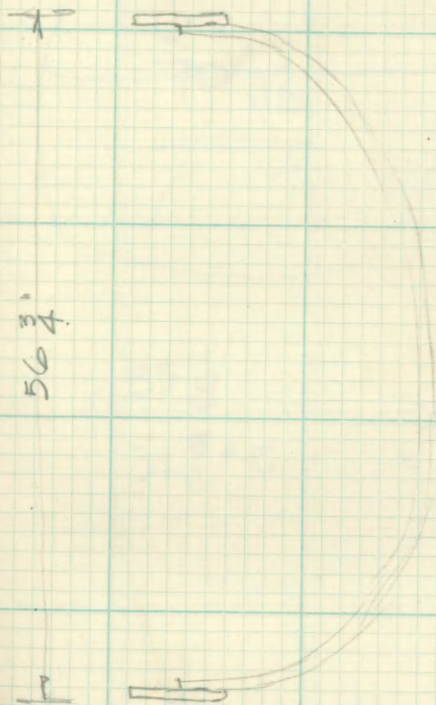
Put 1" less slope on scoop

↳ bolted to scoop & bent to fit.

Wants a cover on the
Scoop

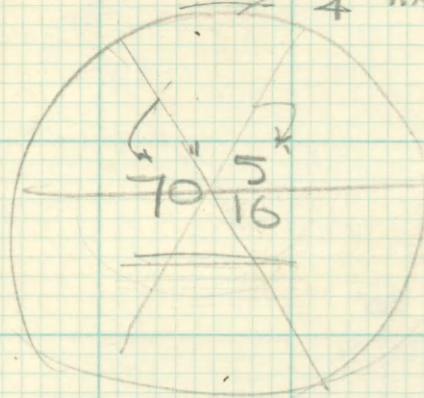


$75\frac{1}{4}"$ long. land out



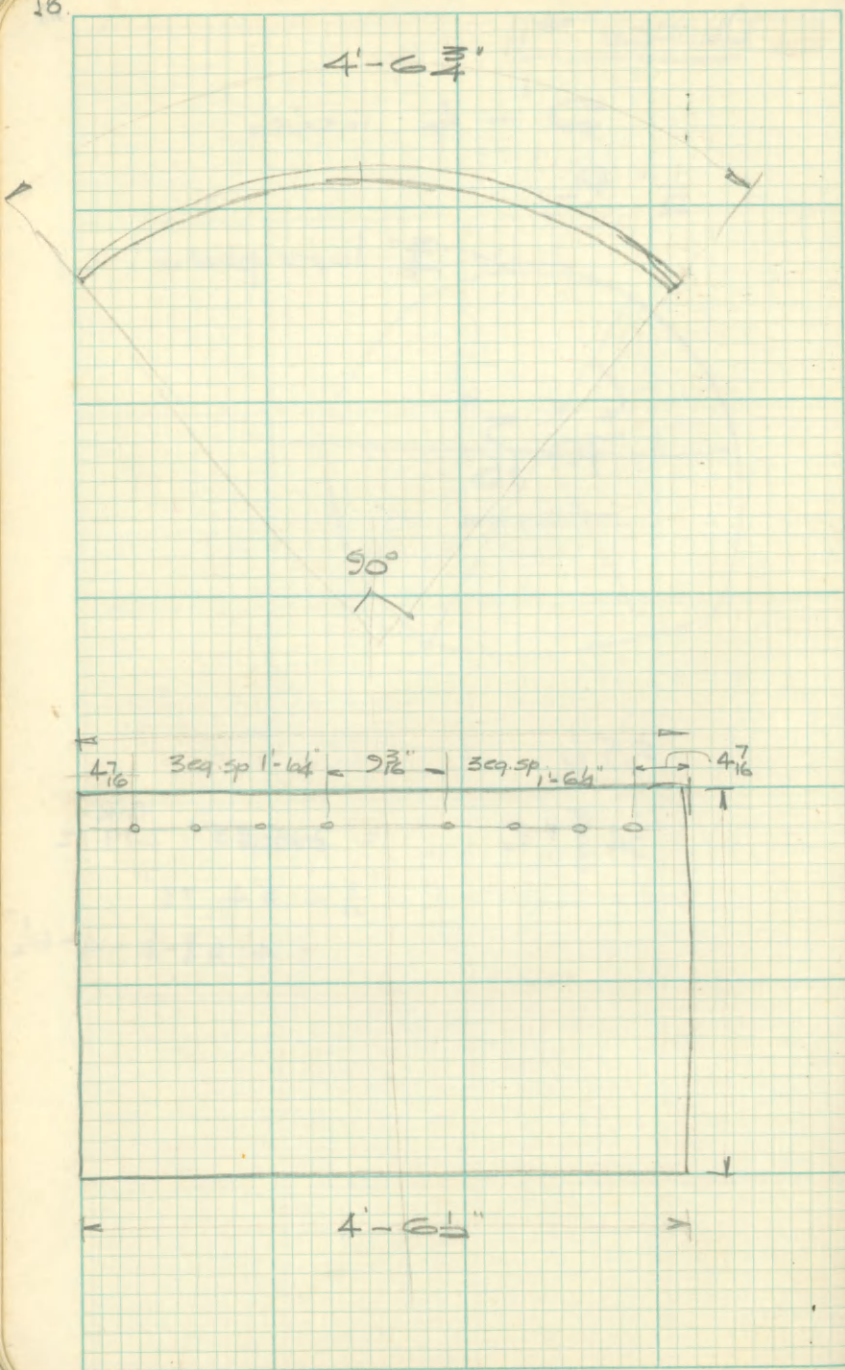
DREDGE #11

2' - 4' inside.

 $\frac{1}{2}$ " PL. $\frac{3}{4}$ " liner plate

35' 8"

34' $\frac{5}{8}$ " R= ~~217.55~~ ^{G.R.} 219.12 $\frac{1}{4}$ " = 54.78"= 4' - 6 $\frac{3}{4}$ - $\frac{1}{4}$ = 4' - 6 $\frac{1}{2}$ "

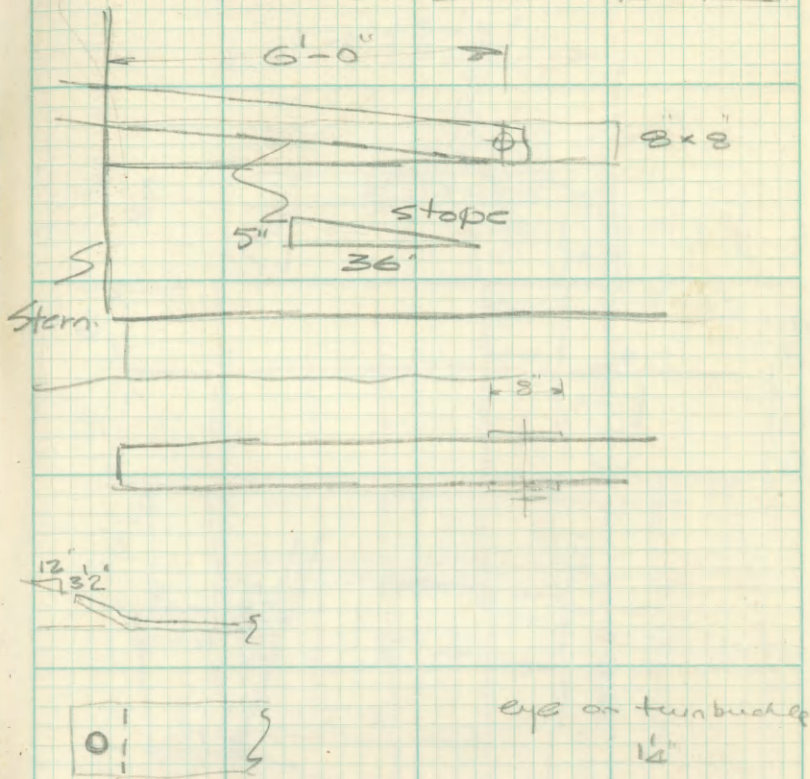


27" x 17"

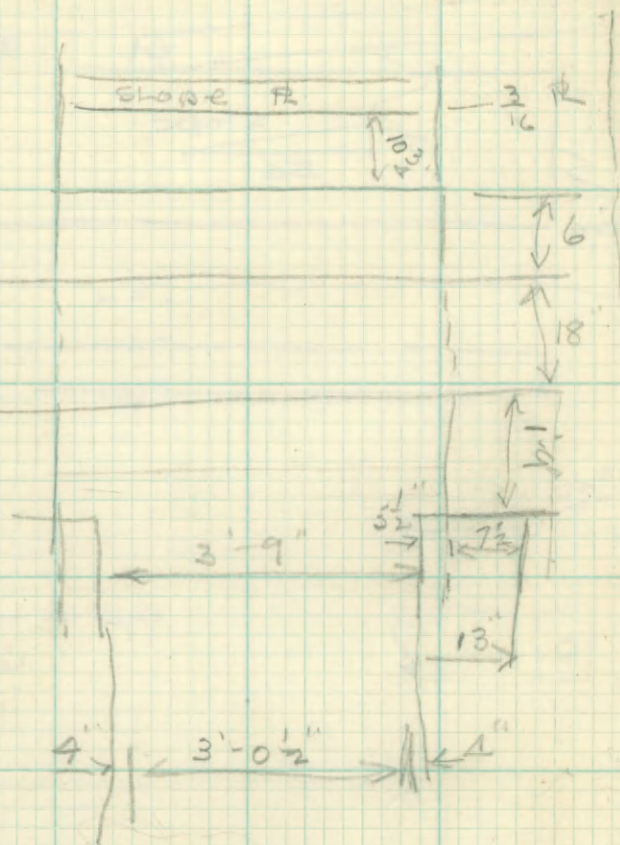
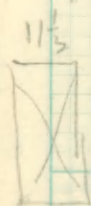
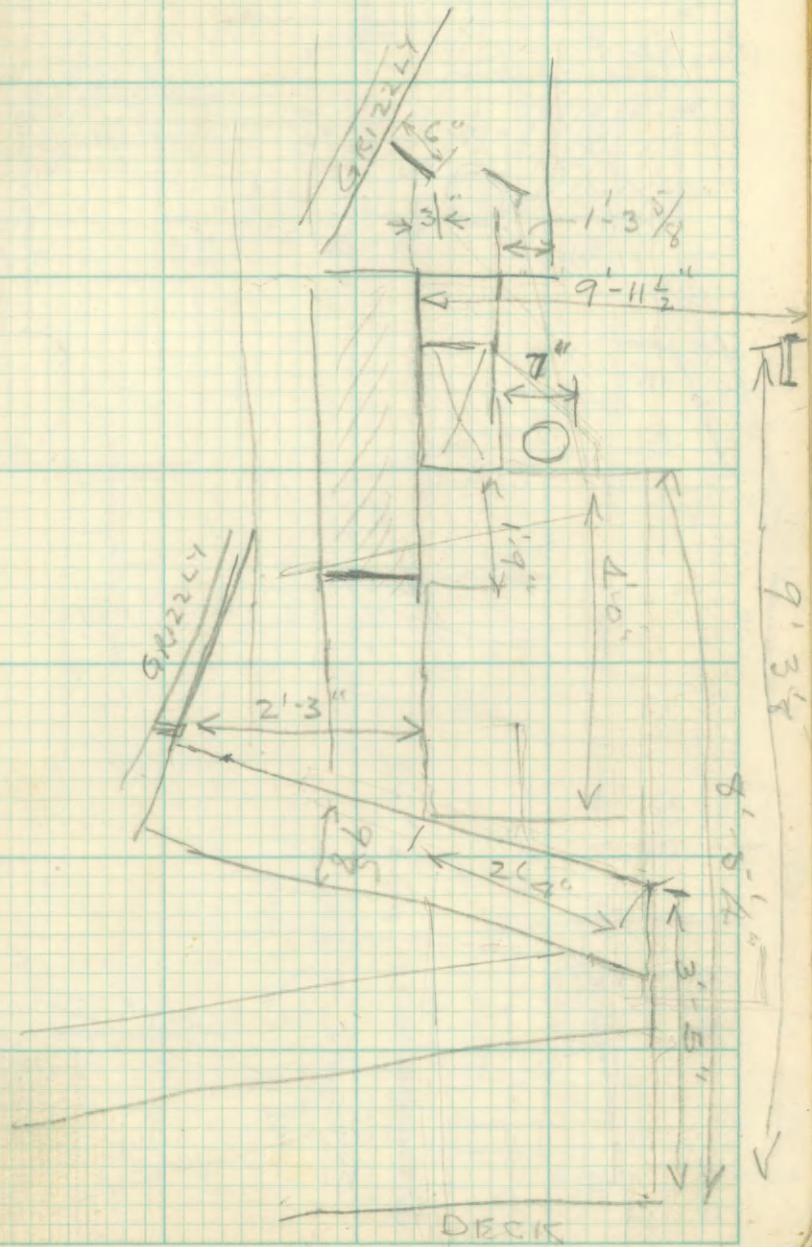
2 H.P.

PREEDGE No 6

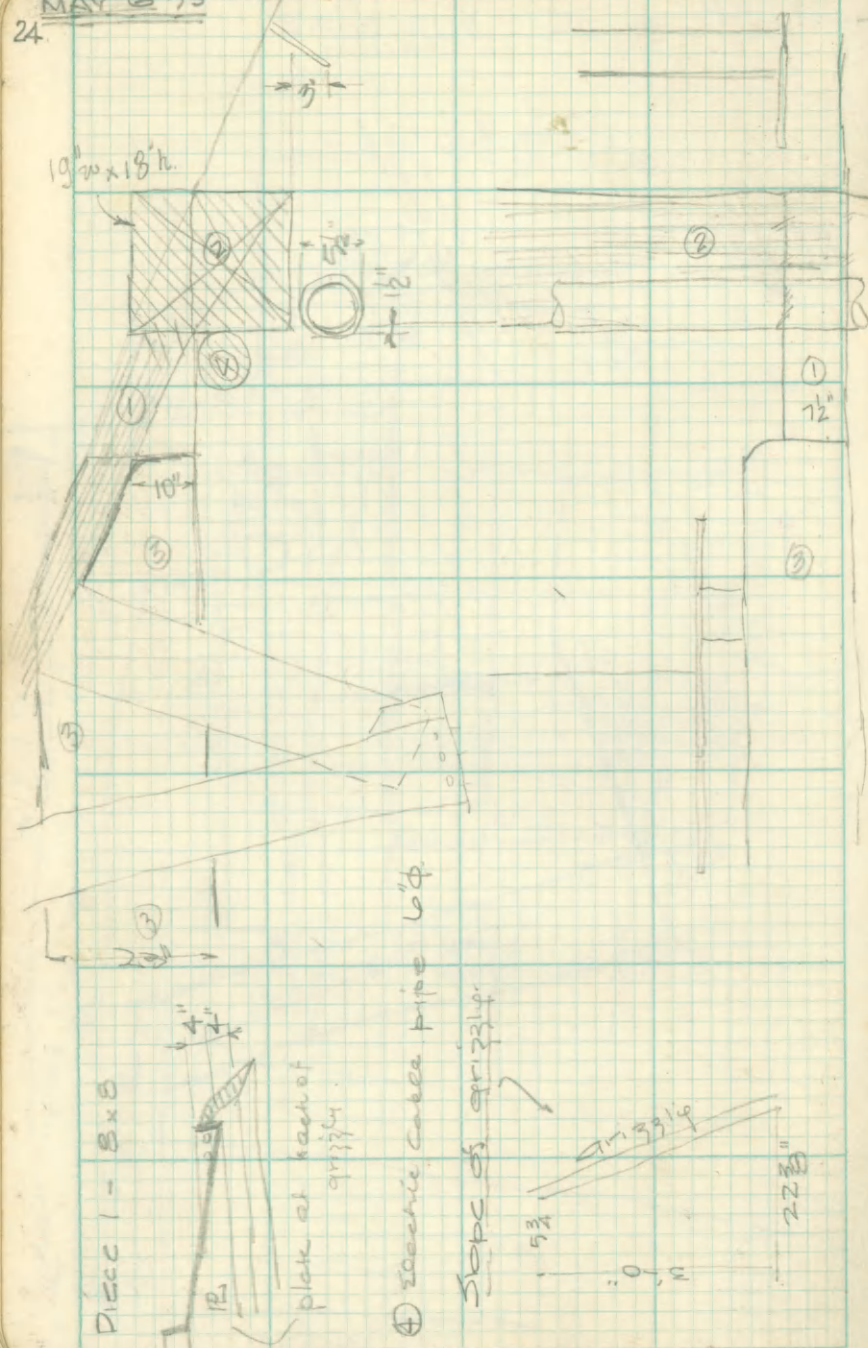
Starter - Sibal. Siding Rigging



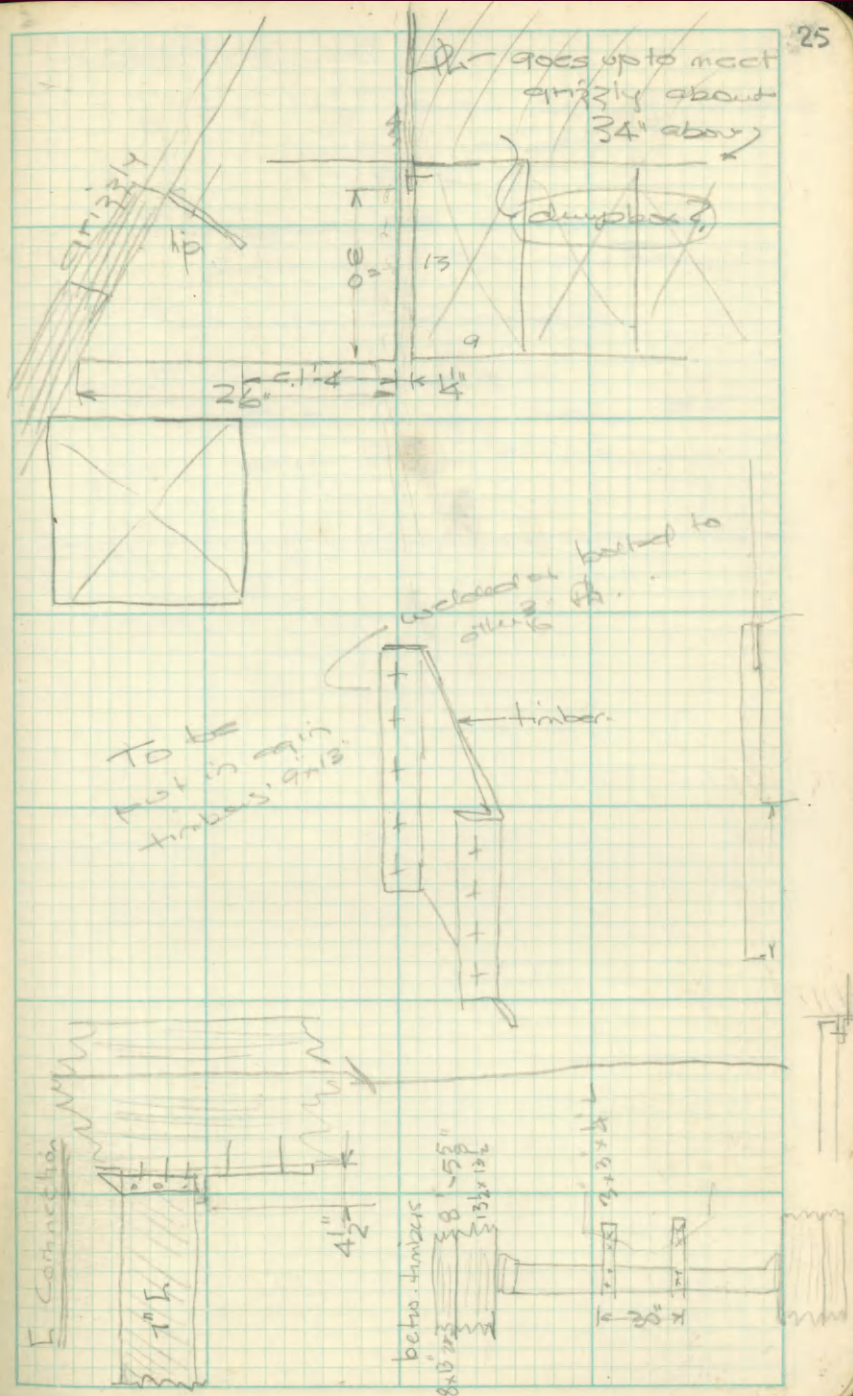
SAVE ALL DR 11°6

← 4'-8 $\frac{1}{8}$ " ONT. →3-10 1/4
A-7

24



25



DREDGE NO 6.

$\frac{5}{8}$ " ϕ - $1\frac{1}{2}$ " long - Spring washers
+ nut

12 -

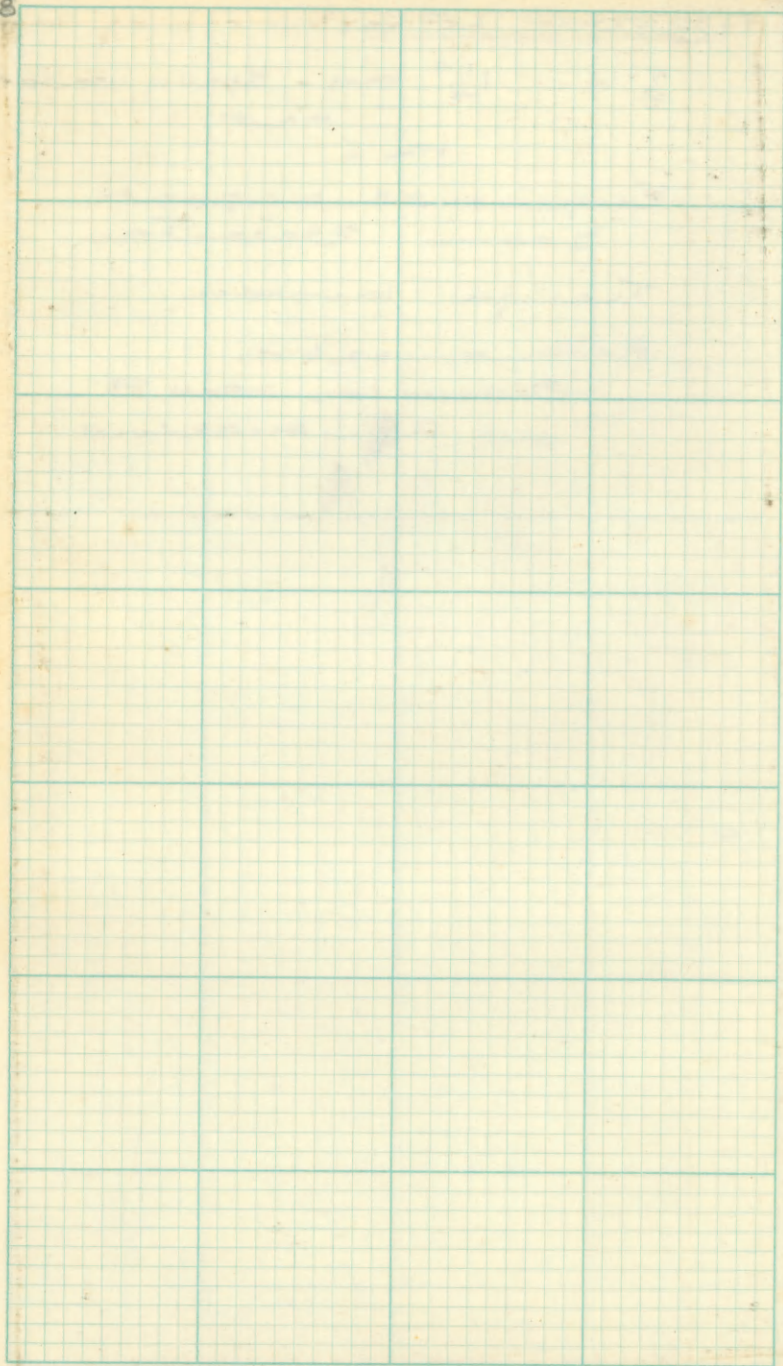
Engine re support
beam Elevator.

Transfer ladder,

Motor supports -

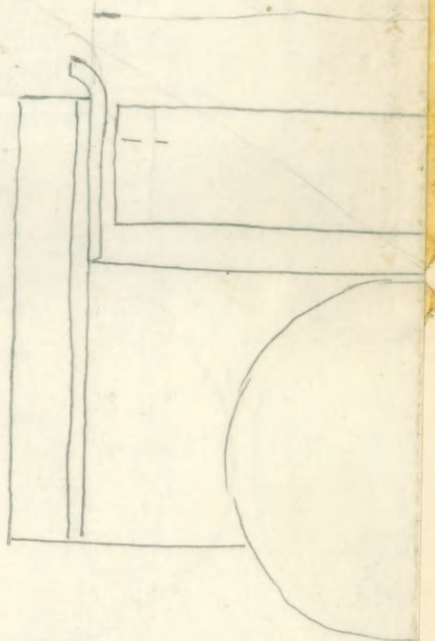
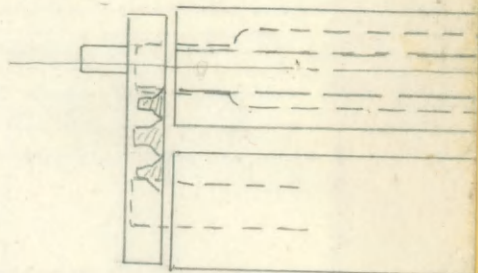
Elevator room 8"

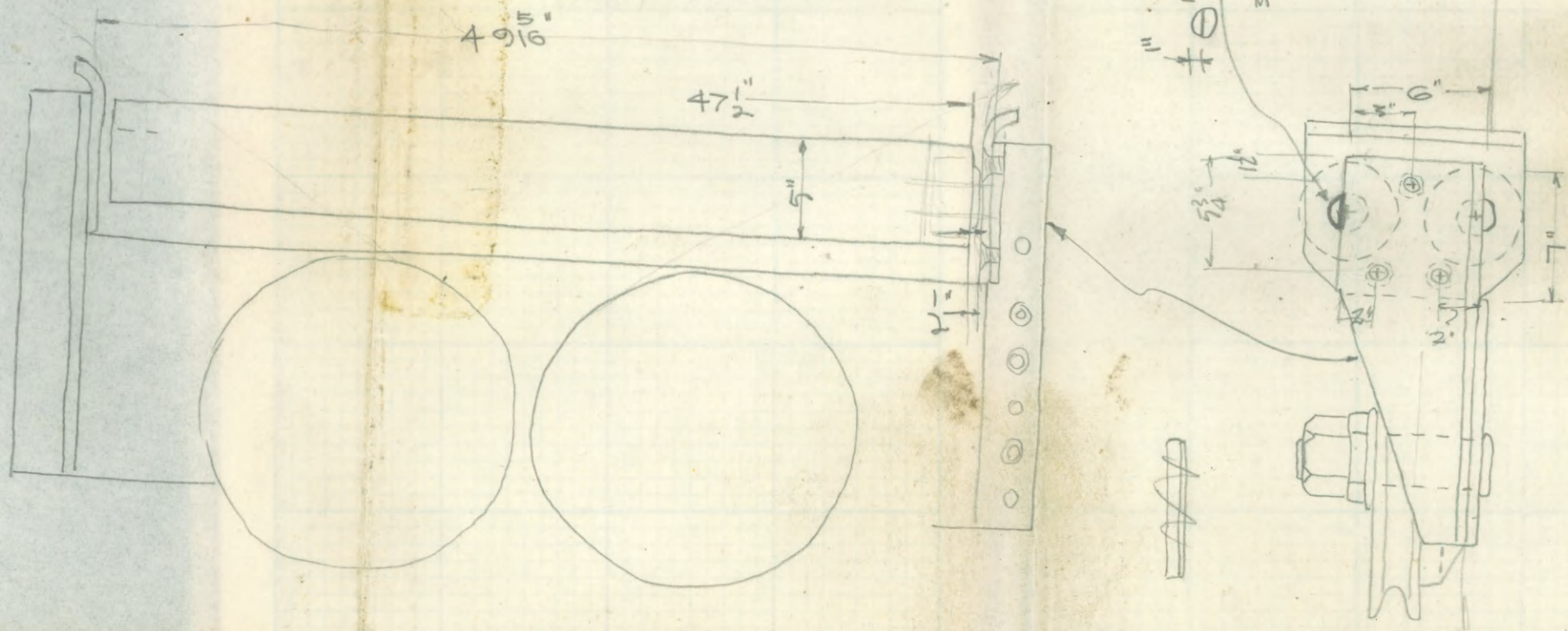
and fire bucket



DREDGE N°6

Deck. Sheaves.

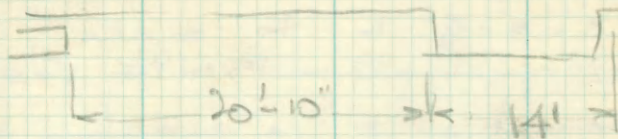




DREDGE No 6.

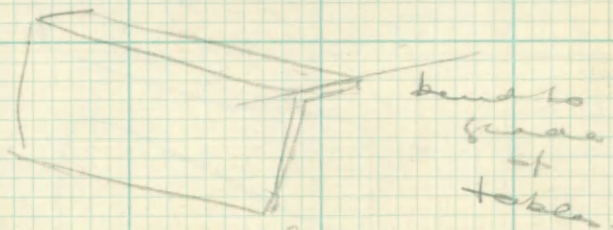
① - 19 feet beam.

3' - 6" + 2' - 10" = 5' 8" - 27' 4" of beam.
 2' - 9" + 4' - 1" = 6' 8" to landing from
 beam.



- find 4' section - 129.

② 7 pieces - table supports
 $\frac{1}{4} \times 12 \times 37\frac{1}{2}$ - 2 $\frac{1}{2}$ " flange.



Wile up from square.

③ How far up to place logs
in elevator lining
2 x 4" piers.

④ black plate in Samsco.
Not out.

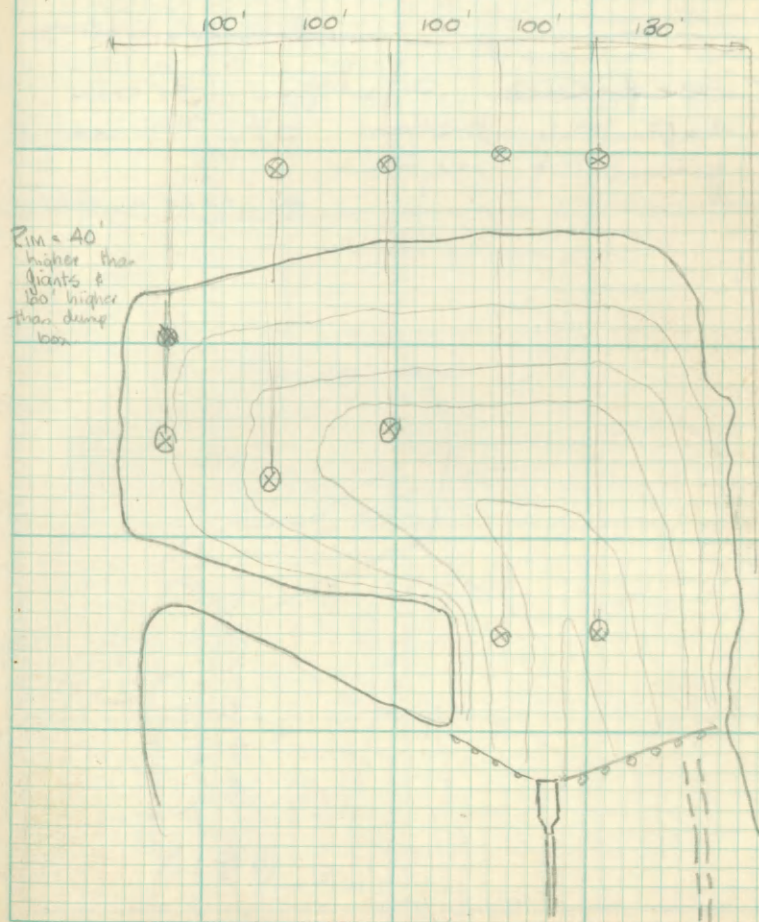
⑤ - 3 x 3 x $\frac{3}{8}$ " L to brace
to Samsco. - 150116 feet.
Send out a plan to
Fred See during.

May 18

Paradise Hill

Tell Eastman to see Harry
Bogatin re water measurements.

Find out when all are
out and they would be
ready for pumping - McDonald
will come over when required.
Tomorrow?



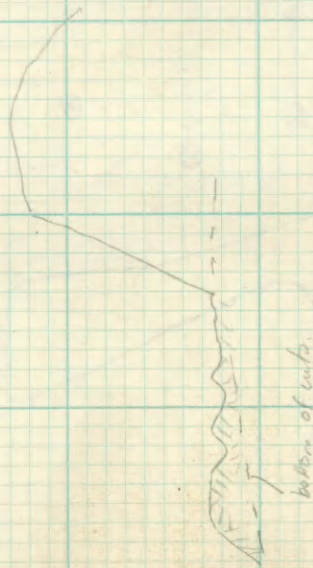
Roll cup grease
20 lb.

10 - 2 x ¹⁰/₈ Joseph
15'

2 gauge pipe 3 x 16"
+ gaskets 6.

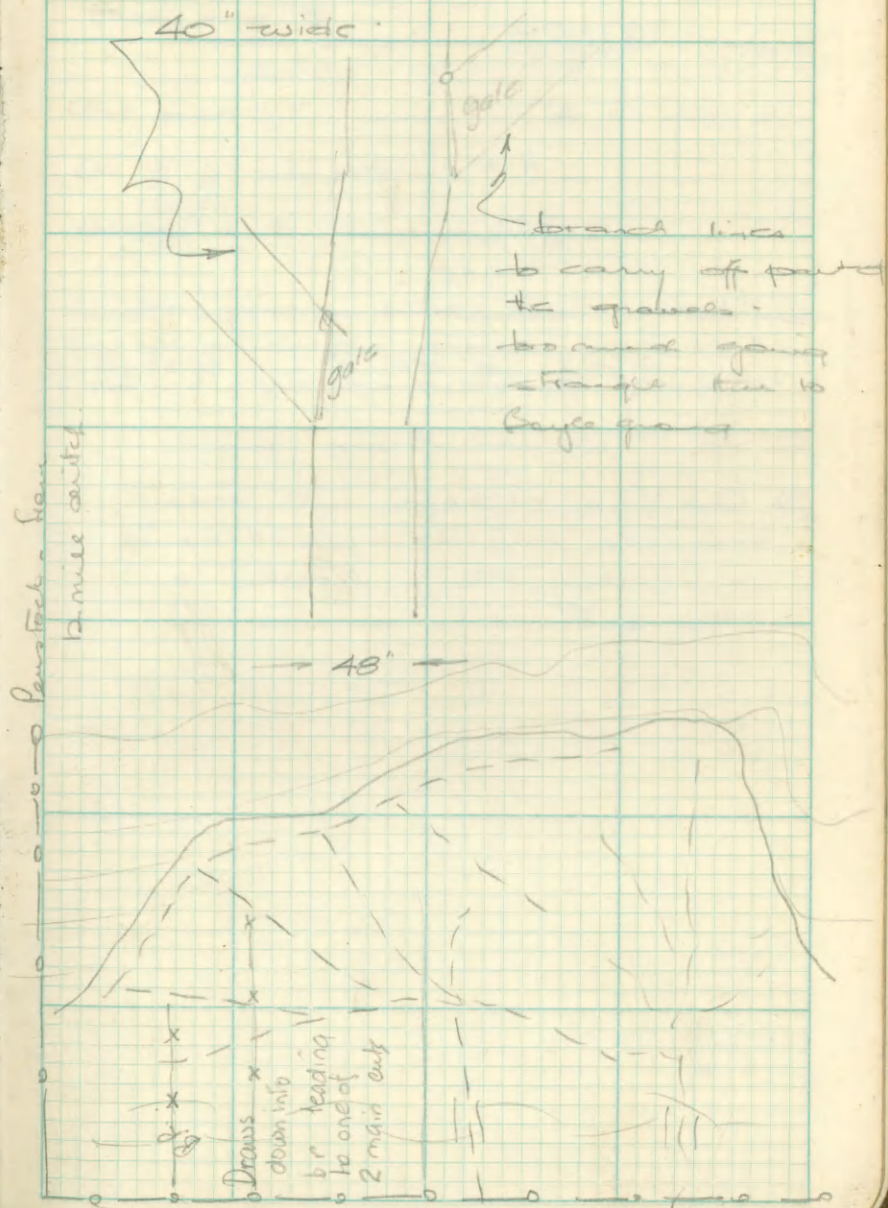
rod -

Telephone system from
top to bottom of Paradise
pumping system.
a bee system



bottom of shaft

JACKSON HYDRAULIC CUT.



- ① Main Dive Card down the
hill and along scumming ahead
to make final sand bank 20' li
- ② Main cuts put through run.
- ③ Cut from centre of cut working
back as cone from puts & opening
up shallow banks leading to
main cut.

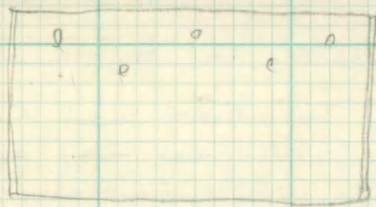
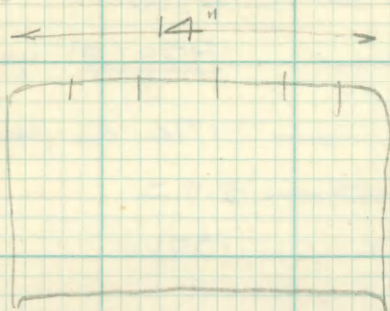
Digging	5000 yds/day
Over tables	2500
Over first 3	
table, other	1250 (3) yds/day
side	<u>7</u>

dot per min. — 74 cu yds/min

A+ B:1 conc. ratio — 5.92

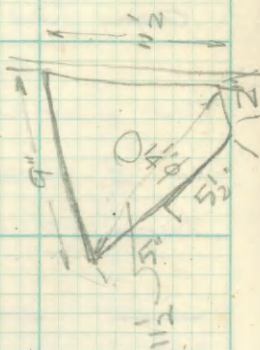
Area x S_n table - (35)

$t_{top} = 2 \text{ hrs} + 10 \text{ min}$



5 - 3"
Must load
2" 1/2" long

Buckets now at
36" spacing.



1 1/2 or 3/4
8

Pipe for elevator water
exchange

2 lengths 2" pipe - union 2
elbow 3
 nipples 2

2 1/2" coupler in outside
basin - 30 1/2" wide
service

Pumps - rows about 4"
pump for #3 cleavage.

10 g plate - for

Send uranium glass out
to Rich at #6.

ORDER N° 6

- 9 buckets as per 5195
- constant head tank.
- Drain pipe on elevator boat
 - 2 x 4' ? - 12" long. - threaded one end + butterfly cap
- water spray in elevator discharge - 2 lengths 2' pipe
 - 2 unions 2"
 - 2 nipples 2"
 - 3 elbows 2"
 - 1 valve 2"
- May require another pump, for 200 g.p.m.
- P1 - 4' - 3" x 6" for elev. feed launder - 12 spungs.
- P2 - 12' x 4'

Design + Order.

- Riffles + mercury boards - mats etc. + clip ls for riffles to be feed down creek.

Order

- pipe for pump to tank + tank to hutels.
- Spray pipe or hose into jig conc. launders.

Elevator.

- chain pipes in.
- more buckets on
- load + motor connected
- spray pipe in
- feed launder installed

Jig

- Constant head tank + feed discharge lines connected up.
- cone launder + sluice box in place.
- riffles, boards + mats set up.
- tail launder in place.
- motor on + connected up.
- water spray at bottom of jig -

Batch Process.

- Once every $\frac{1}{2}$ hour. strain the lot of sands + pass over table - 5 cwt.

Monday - June 8

- Measure for 4" pipe
3" pipe
3" hose for flow
for constant head water.
- Measure for clip angles
and 1x4" blocking for
rifle etc.
- water box for concentrate
washing.
- Set the sluice up to side
somewhere - work on batch
process somehow.
- Check for all details to get
going -
when to put the sluice
water rig
samples
paving.
bucket etc.
- Cut down back plate to 9" for
a start.
- ~~put~~ Check spray pipes on
table again.

Dredge #6 - Water Water

2 - 6" nipples.

Supply.~~these~~

rifle -

90 elbow.

4 tee

4" + 2 1/2" tee.

2 - 2 1/2" sleeve

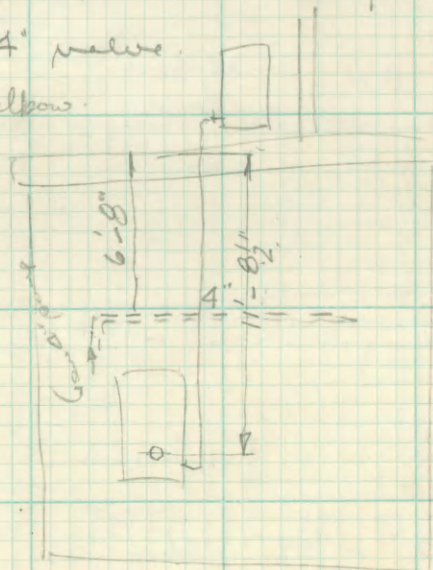
2 - 2 1/2" unions

2 x (2 nipples + union = 24")

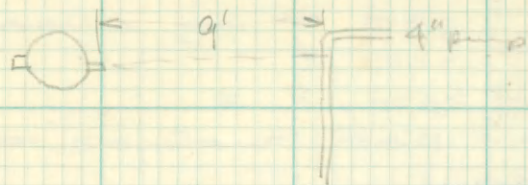
4" nipple 6'-12" long.

4" valve

4 elbow.

3" - sleeve
nipple
elbow12" pipe
2 elbow union
6 pipe 2 nipples

Came down 2' below floor.



3" elbow.

6 $\frac{1}{2}$ ' - 3" pipe.

3' union

3' nipple

3' elbow.

2 $\frac{1}{2}$ ' threaded

4' threaded

valve.

4"

- 4' pipe - elbow
elbow

7' pipe - elbow

Pipe string material - 2' long

- 6 -

3 $\frac{3}{16}$ x $\frac{1}{2}$ " strap.

2 - 2" - 45° elbow

2 nipples.

- 25 Mud head bolts.

- 2 doz 1 $\frac{1}{2}$ - 2" bolts.

- Spray pipe for table.

Friday

- water pipe to jig + tank.

- elevator buckets

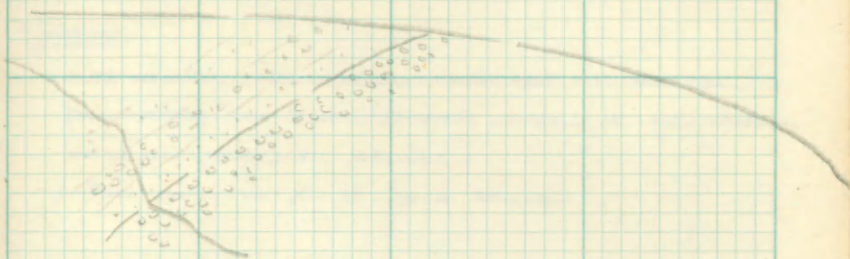
- elevator motor + hood

- elev. feed launder.

- excess water drains.

- sheets made up.

- Sampling devices made up.



Make plan + cross section of cut +
 survey for gravel must line on cut.
 plot and follow it up to check
 for existence of old structure.

NOV 7 FU

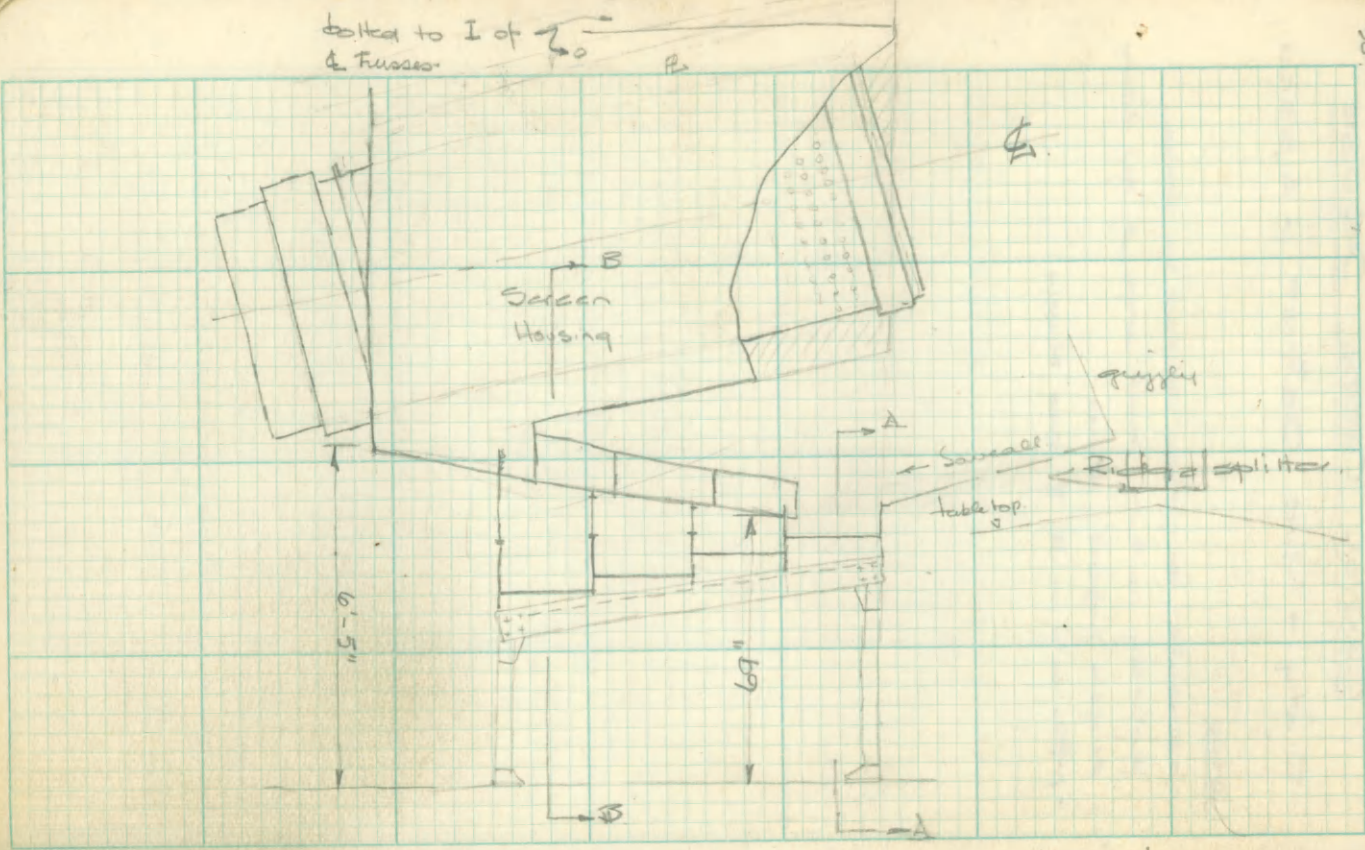
$$\begin{array}{r} 8 \\ 114 \\ \hline 14 \\ 17 \\ 15 \\ 17 \\ 12 \\ 19 \\ 2 \\ 11 \end{array} = 14.2$$

CANYON CREEK DREDGE

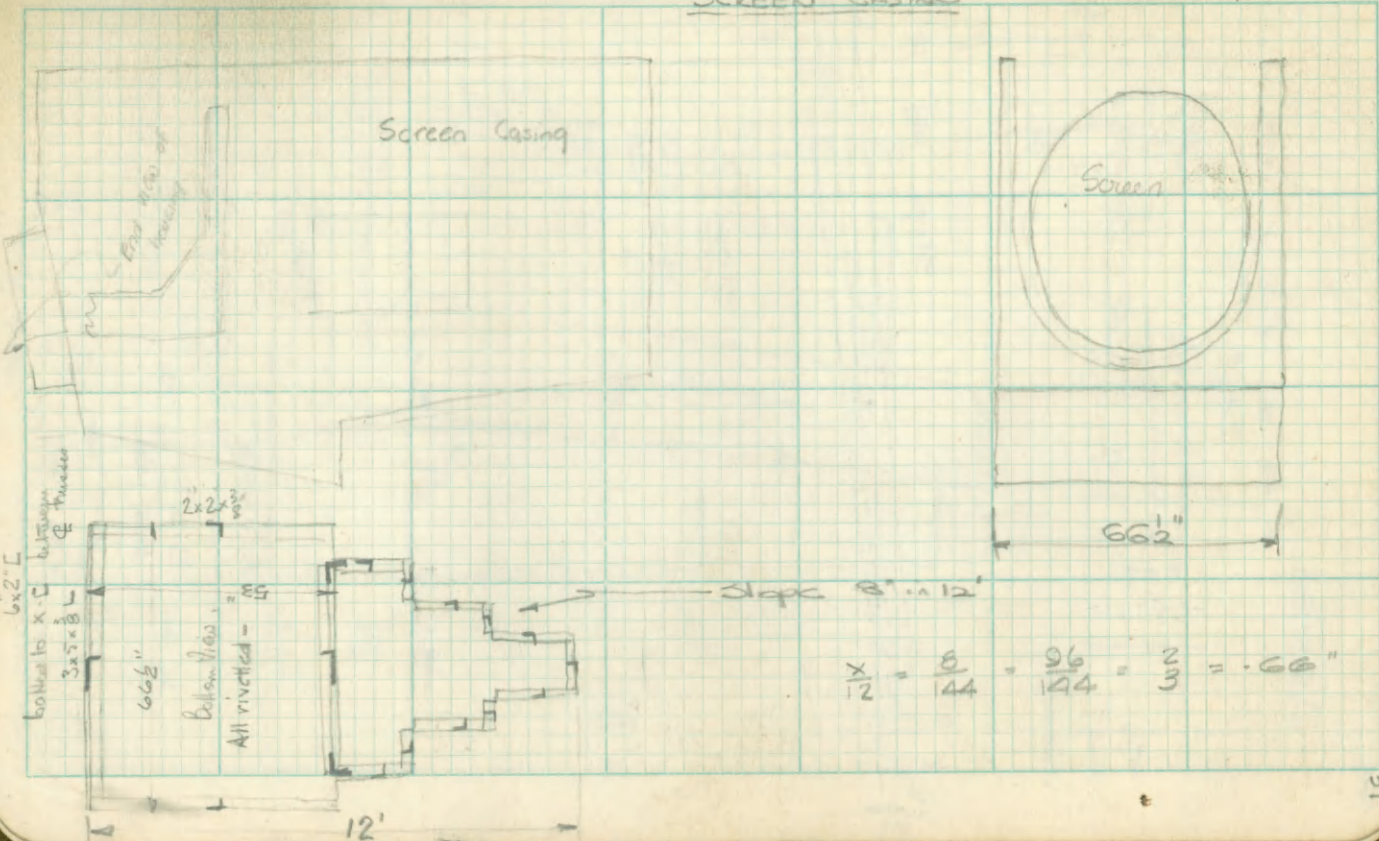
Sixty - Mile District - Alaska

Notes

- all water for later added in screen, probably so that mud would get down screen ripcord device.
- riffles only in X & long sluice

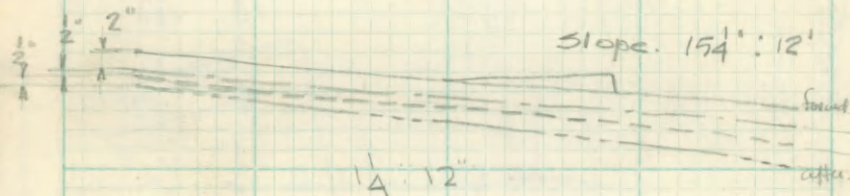
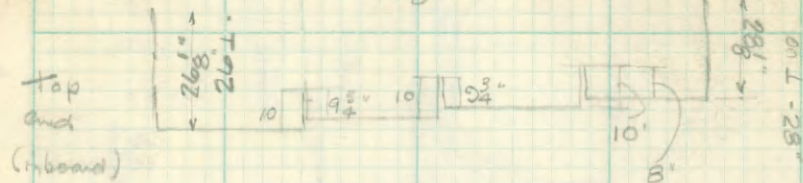


SCREEN CASING



Tables

4 swivel each side
29 7/8" inside



Slope

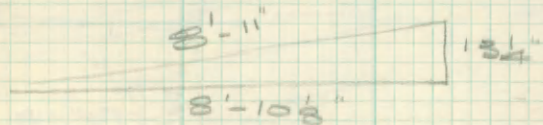
$$\frac{x}{12} = \frac{15.25}{144}$$

$$= \frac{183}{144}$$

1.3

1 1/4 to foot

Slope of Screen

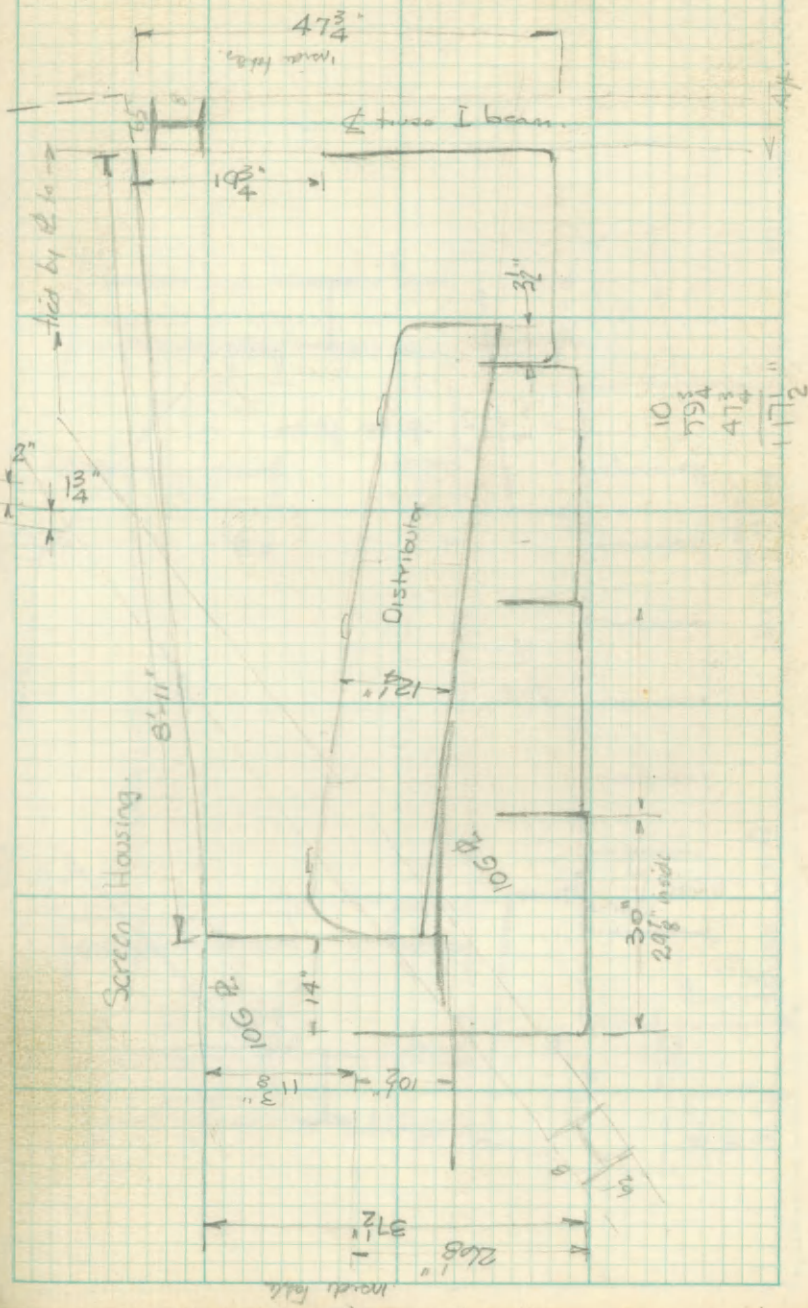


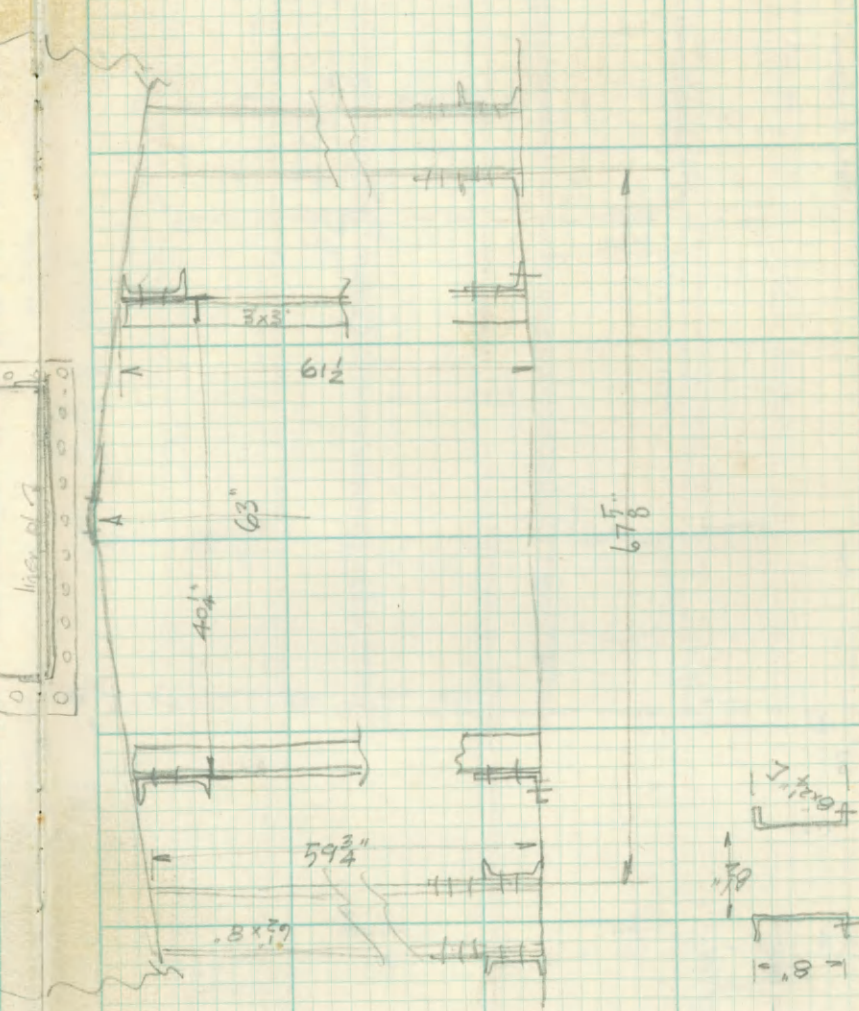
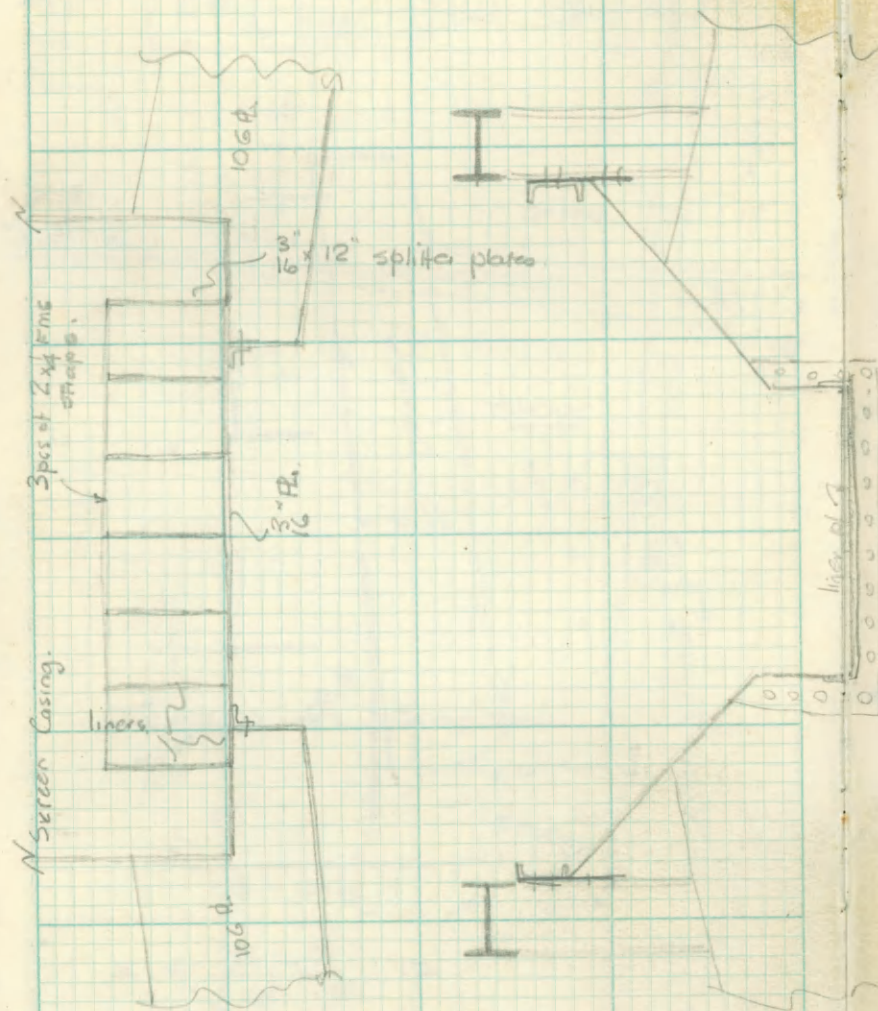
$$x = \frac{3.25}{106.18} \times 12$$

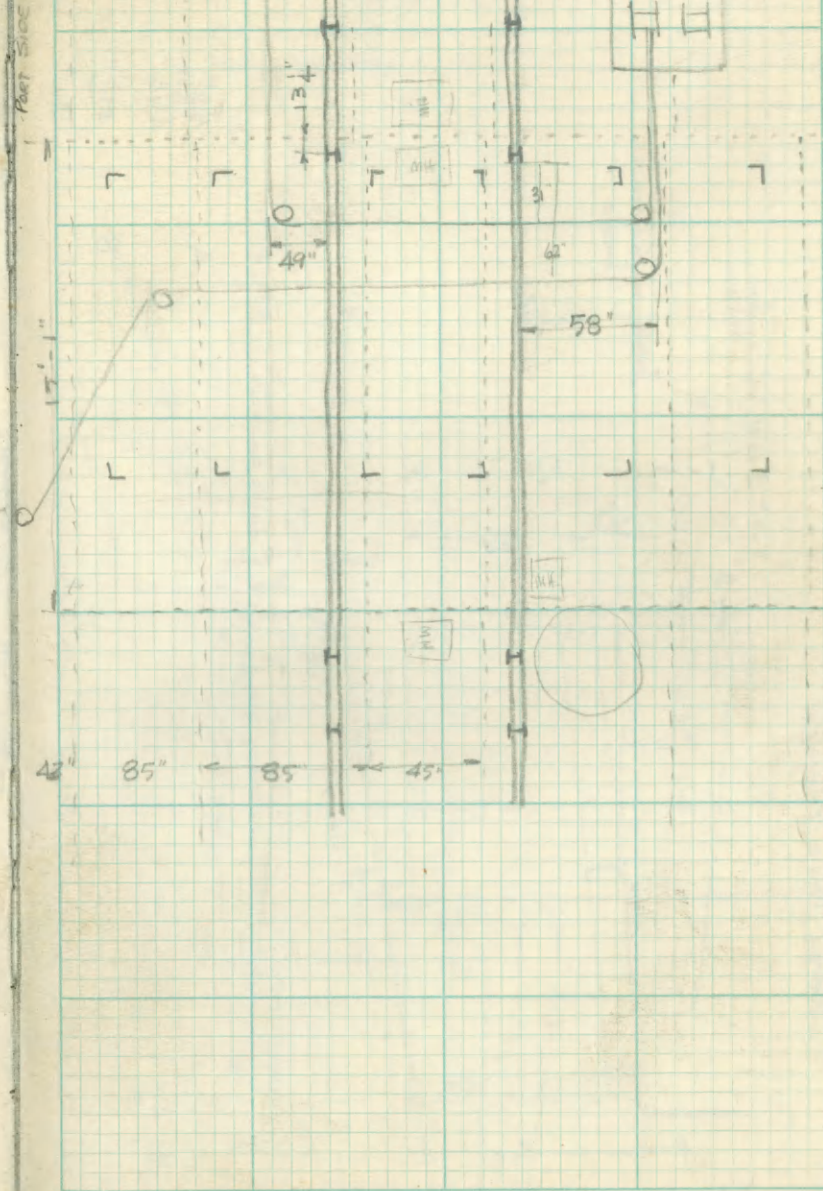
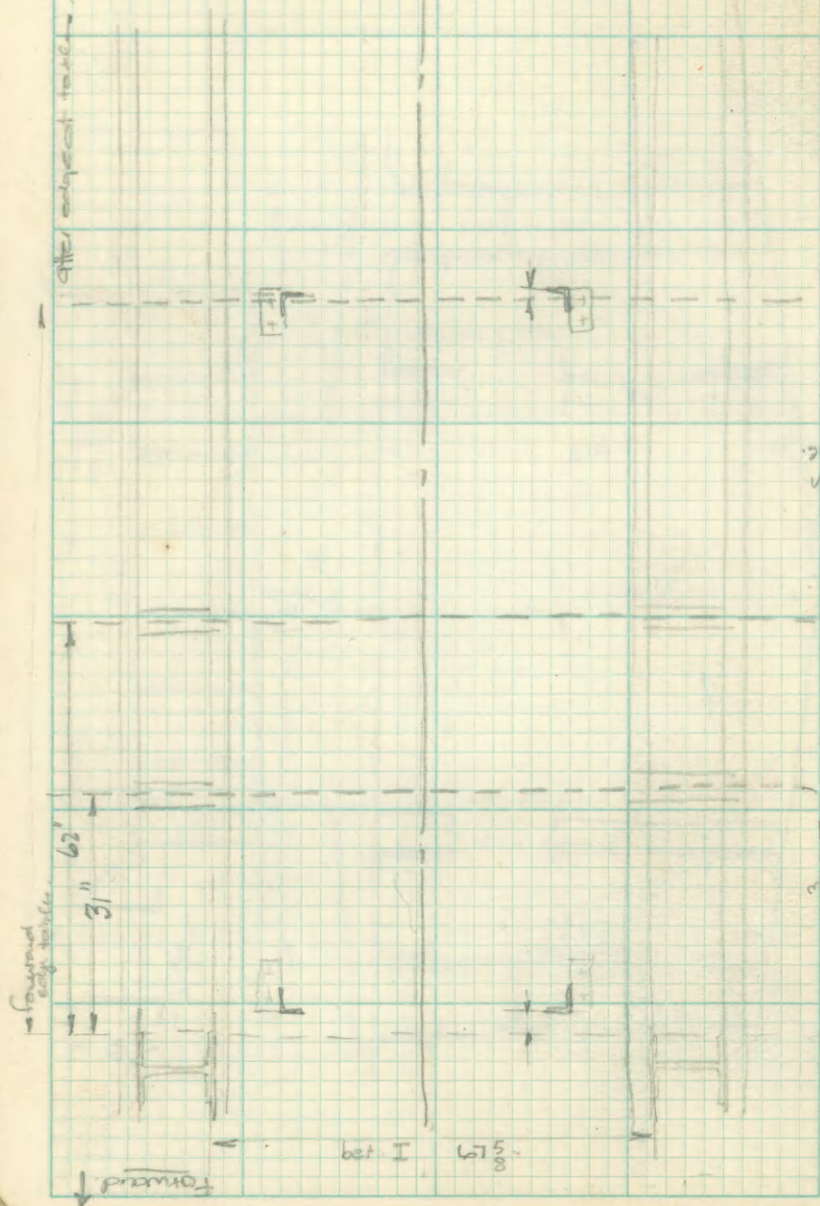
$$= 1.474$$

$$= 1.5$$

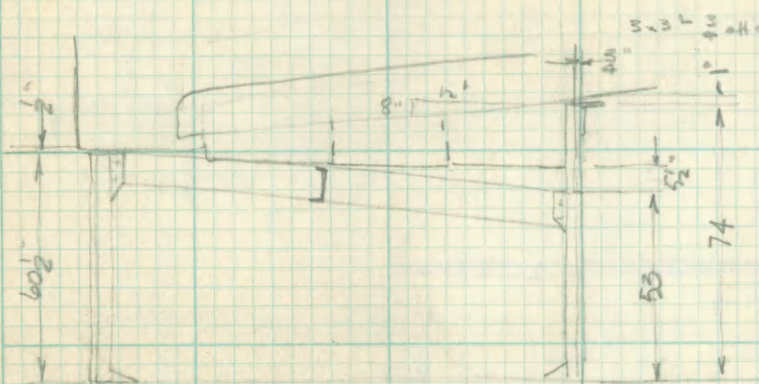
1 1/2" : 12"





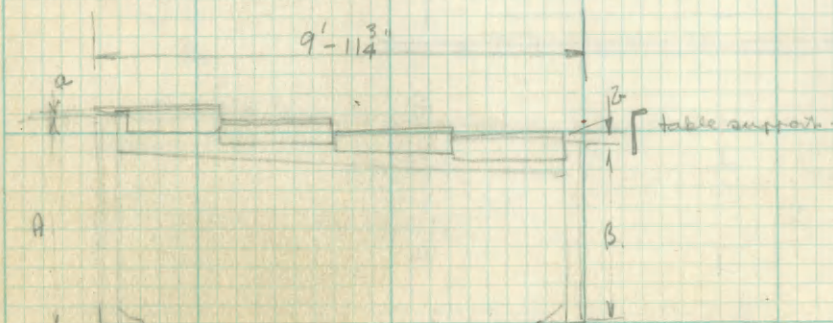


Transverse Table Supports

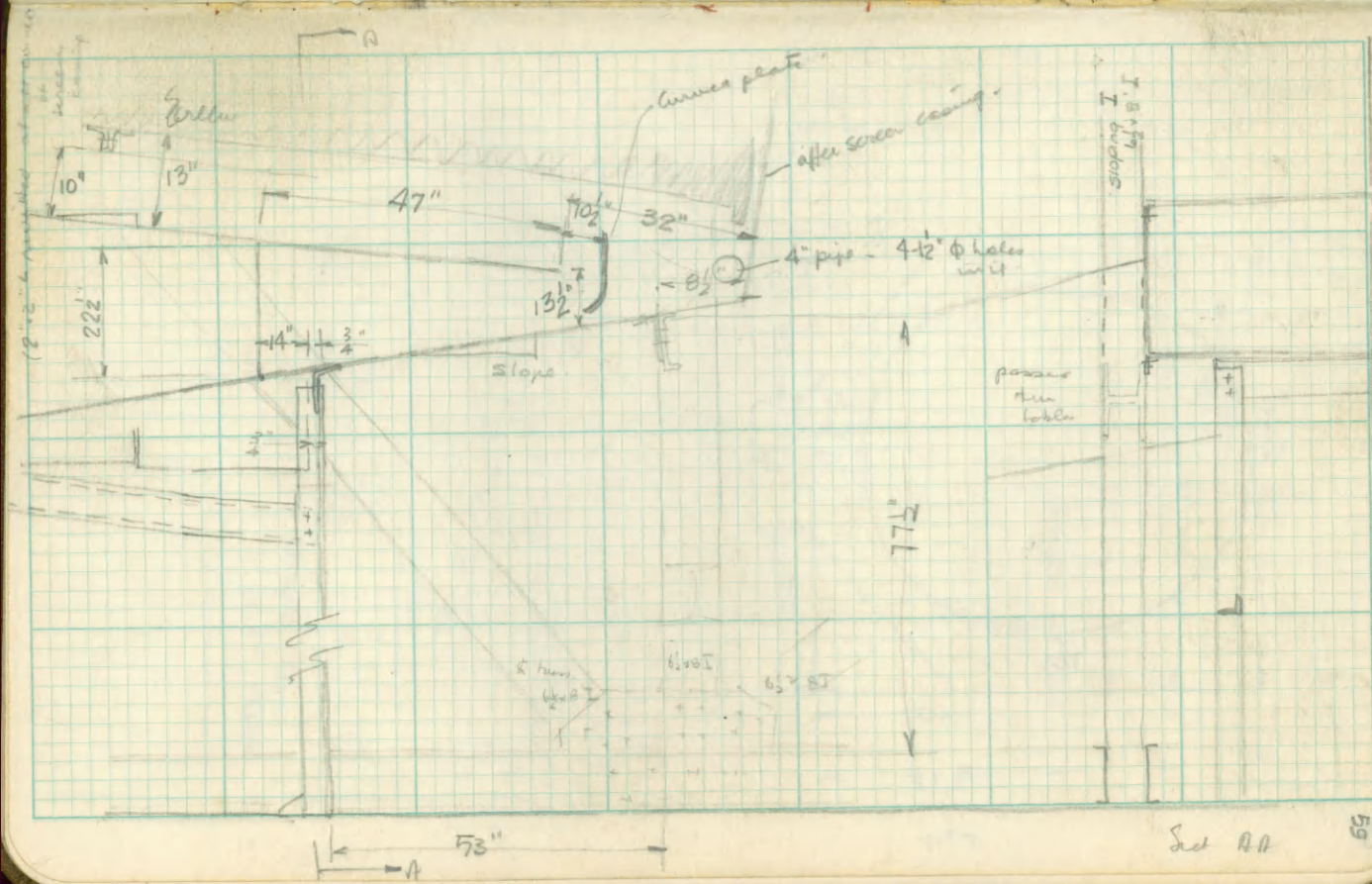


Tables supported as below.

First Inboard supports 20' from
center line.

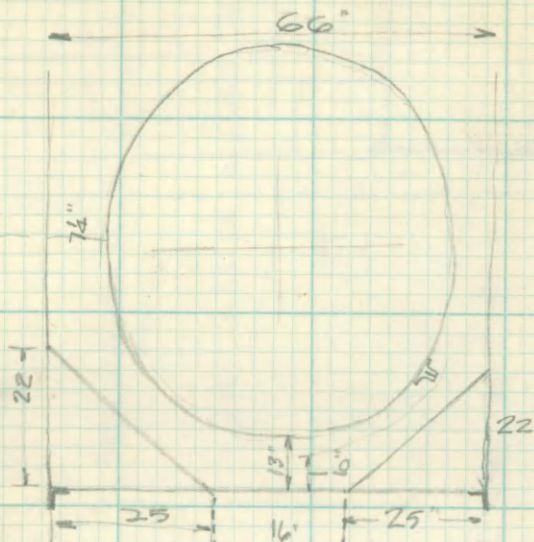


A	53 $\frac{3}{8}$ "	a	1"
	46 $\frac{3}{4}$ "		$\frac{1}{2}$
B	47 $\frac{3}{4}$ "	b	4"
	39"		2 $\frac{1}{2}$ "



4 1/2" L
(Vest)

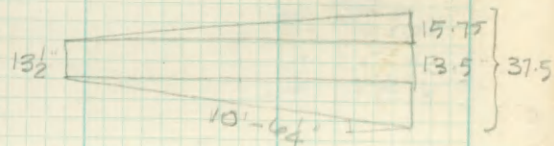
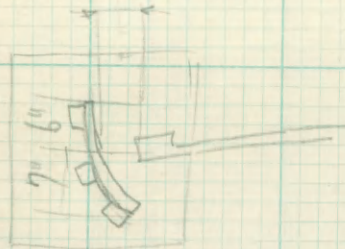
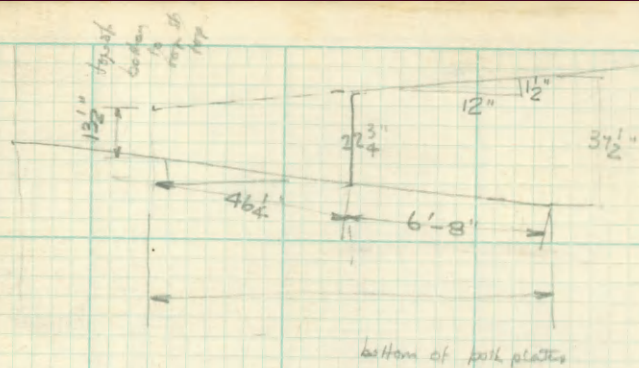
4 1/2"



Screen casing inside 16' long
on slope.

rough - starting even with casing
bottom - and going in about
6" - the dip as a reading and
and not to last wall ground to center of

rig distribution



$$\begin{array}{r} 10.5 \\ 1.5 \\ \hline 5.25 \end{array}$$

$$\begin{array}{r} 10.5 \\ 15.75 \\ 12.5 \\ \hline 29.25 \\ 37.5 \\ \hline 8.25 \end{array}$$

$$\frac{x}{12} = \frac{84}{10'6\frac{1}{4}} = \frac{99}{126} = \frac{3}{4} : 12"$$

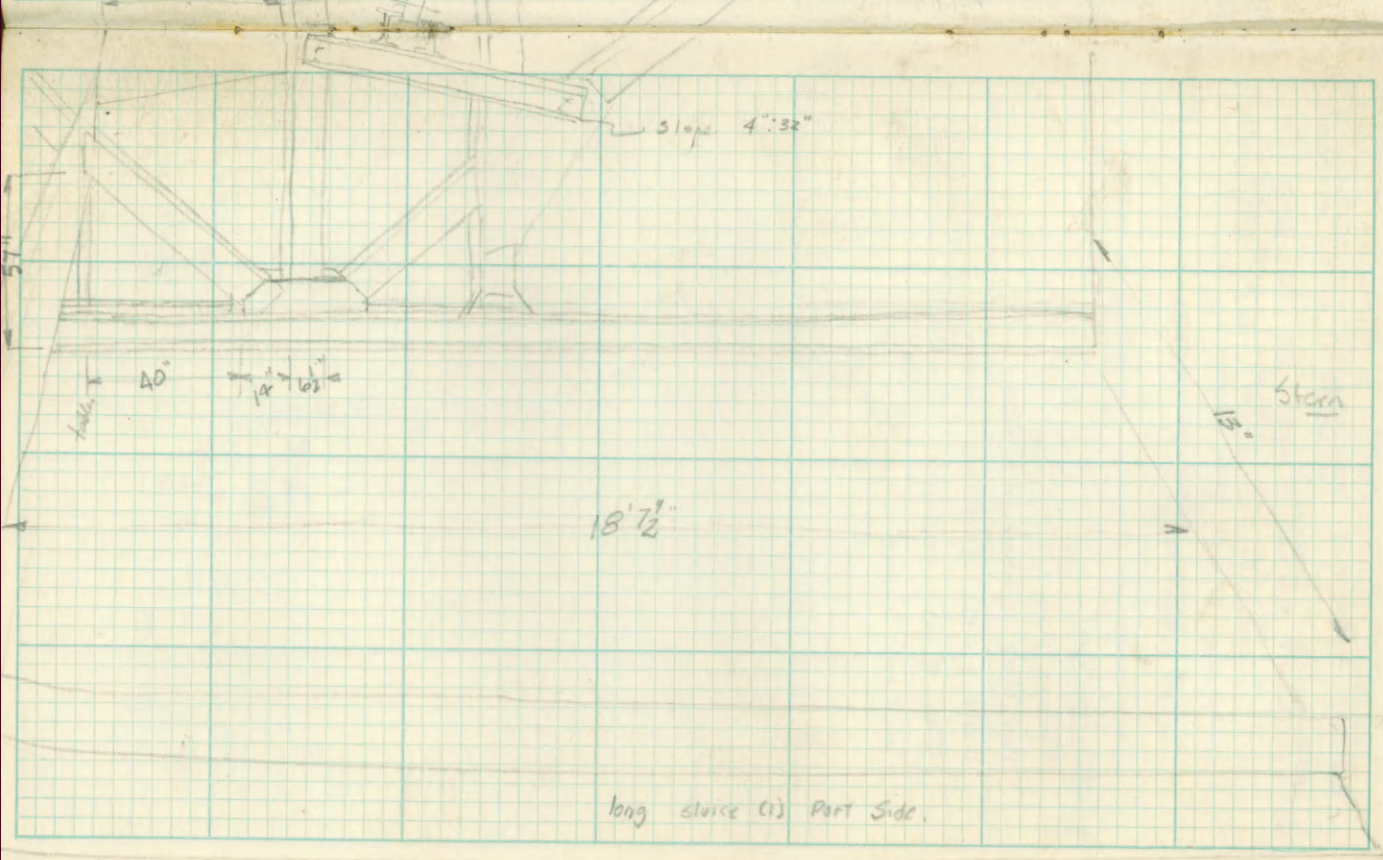
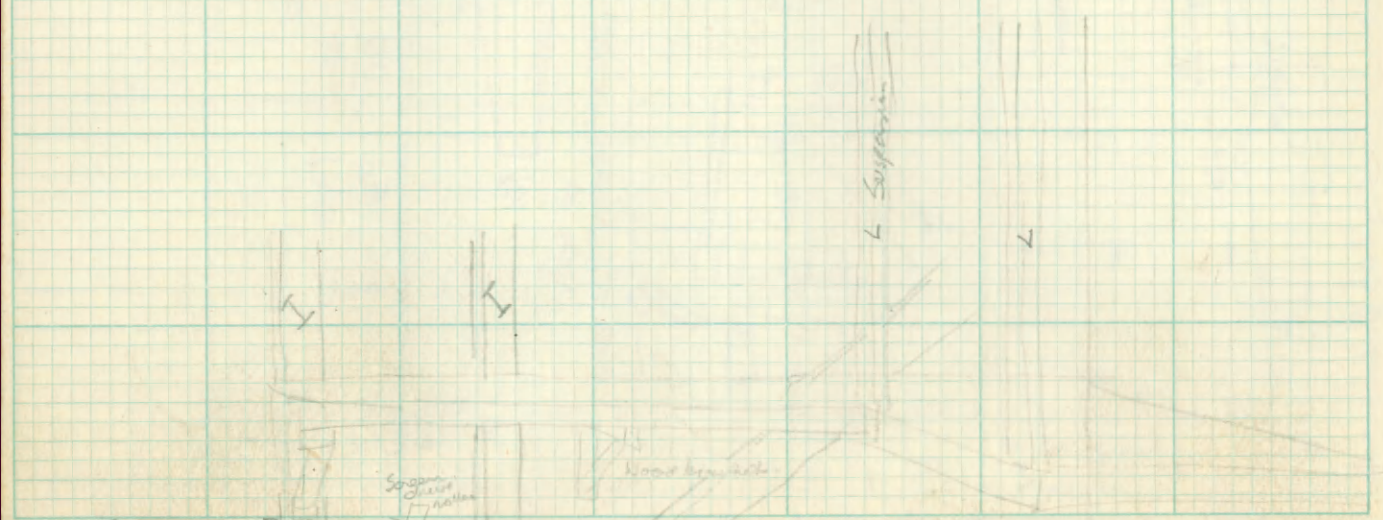
Slope of
dist table

$$\frac{x}{12} = \frac{4}{32}$$

$$x = \frac{48}{32}$$

$$x = 1\frac{1}{2}$$

Slope $1\frac{1}{2}' - 12"$ Screen



Check sand pumps in line of
elevators (drag)

- check elevation read for
pumping.
- = good sand pumping

Match marking.

Pontoon plan.

Main truss members & braces.

Sides & ends of dredge housing.

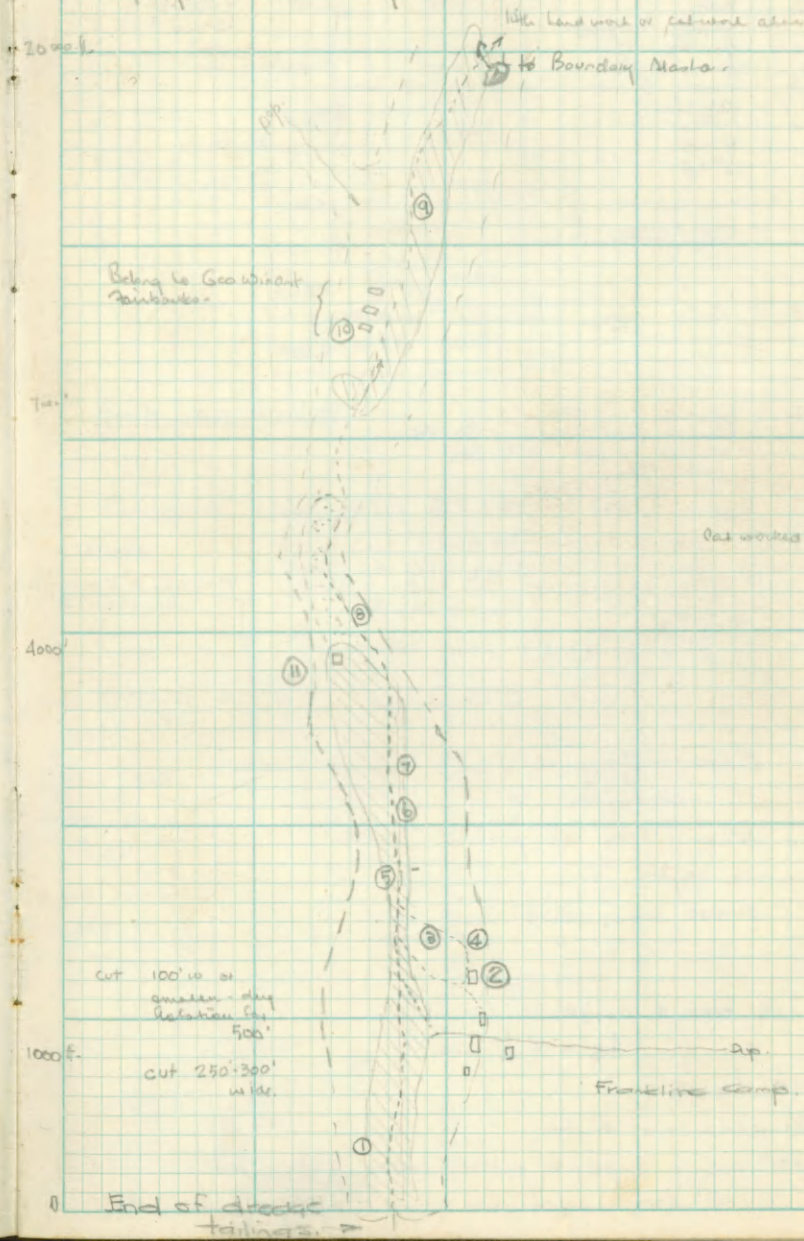
Roof of main housing.

Well hole housing.

THAWING & STRIPPING EQUIP

Canyon Creek, Alaska.

Inventory of all spare parts + thawing + stripping
equipment not by or on dredge.



1. Inboard ends of tubes - well protected -
As those around but have equal drops
& therefore are likely parallel down to
the long sluces

2. both
pump tubing
glands etc
stave bolts
away from furnace gas chamber
wheels
rattles
blocks
straps

V-beat
has built up
steel slugs
in area

Outside

Start ripples

3. New upper tumbler with keys
(4 keys)

4. Ladder rollers
bullet pins used - 30-40
bullet lips - 11 new.
jack - 5 ton
chrome wheels

Probable main dump

Pipe -

6" 115

15" 115

15' long

4' long

26-6" pipe - flange to ship point

24-6-3 1/2" red pipe with sleeves for
point

Ship point

12" length to pipe
approx 20'

117 length 3" p
128 16' long

3-400 points with low - turning handles

26 gate valves - 6"

No of 1000 for points to check

10 lengths

3-400 more points with low
good slugs

8-3 1/2" valves

10-2" valves

7-10

(2 with flanges
a 5x6")

See less 1 replacement

14 1/2" - 4 1/4" metal

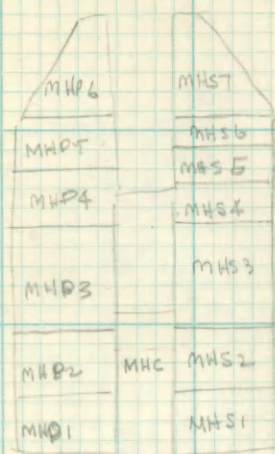
20 length

20 elbows - 4' long

30" pipes with 6" outlet valves

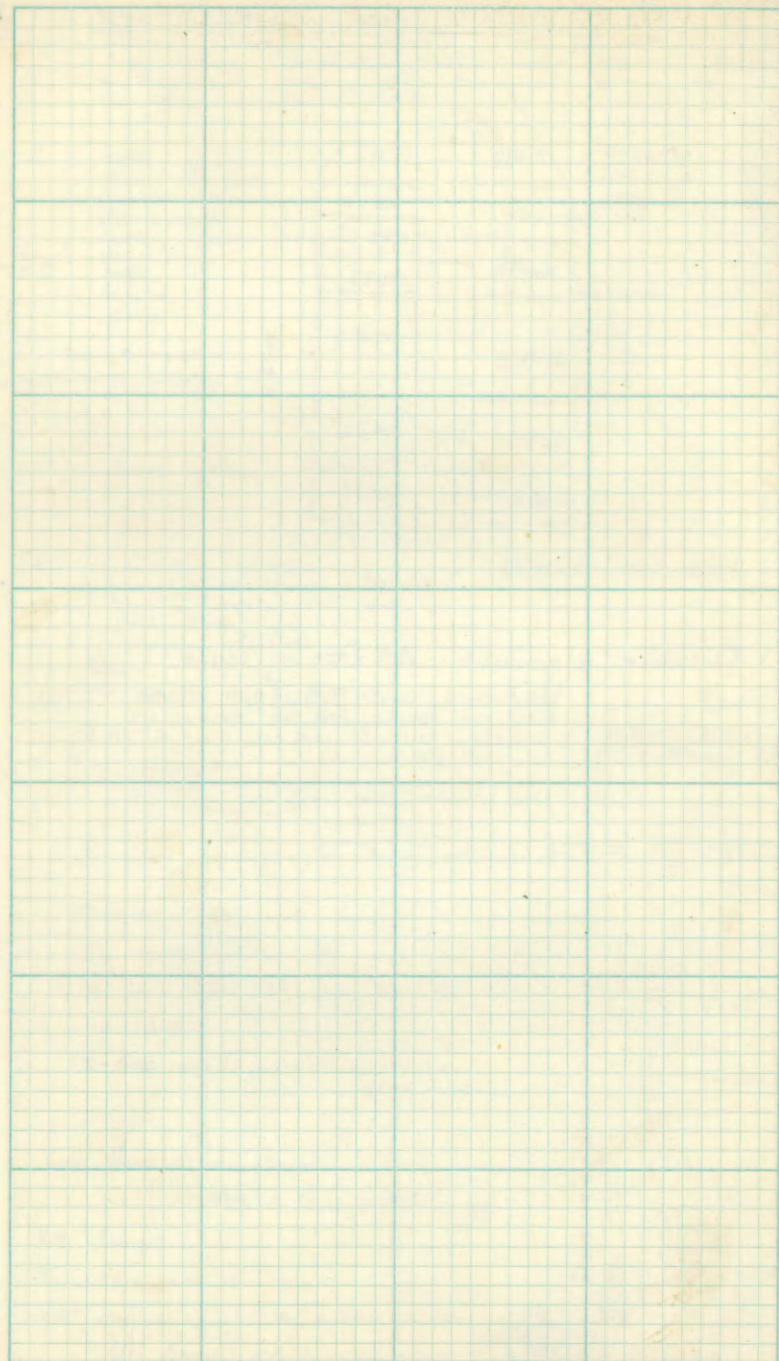
20' long with ship point - 12' long

MAIN HOUSING ROOF NON-CLATURE

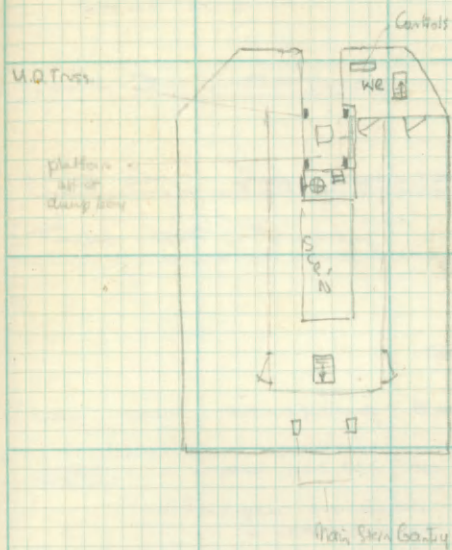


Dredge draught - 45 feet at least.

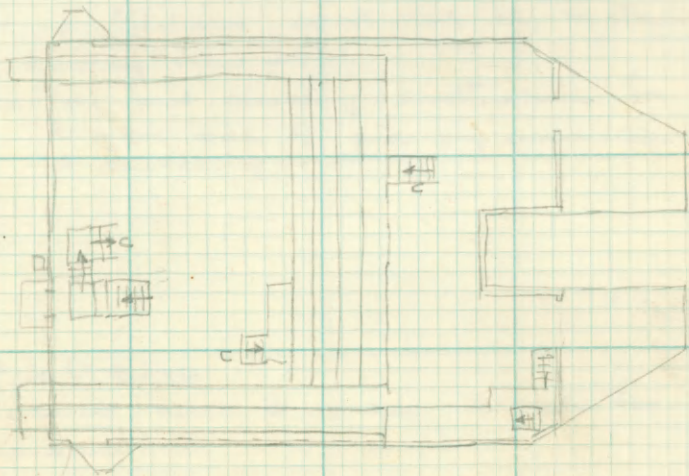
Pontoons are 5.5 feet deep.
Airt of gear to be removed
likely put it up same - 4' poss.



DECK PLAN



Main Deck



① Warm storage elevator.

- Hoisting mach. platform.
- check for whole thing when holds are in.

② North Fork Spillway.③ Nº6 Dr. - Jig installation.

Take out Friday - Mercury.

2 lengths 12' hose 50'
pump couplings +
nozzles.

Splitter plate.

lay out sampling devices & report sheets

Jobs. - add water to both corners in launder.

- larger holes in spray in elevator discharge.

- repair jig hitch discharge

- put Hg board + mercury in

- water added to jig discharge.

Line up 3 fellows, report sheets etc for starting on Monday June 29th.

Also lay out operating instructions for the men both for ordinary operation & sampling.

④ Nº12 Dredge.

- send over a small bucket for marking.

- Sketch portoon layout.
- Send note to Oscar re marking -
- Tie all loose small pins to their proper place
- or if too large mark & put with the closest pin to which it is associated.
- All loose pins that cannot be placed please stick together so they can be gone thru.
- Try and get all sections taken as the stand there.

Start Jig

Water to hatch

spray water to slow, catch

Start elevator

Open splitters.

Water to hatch discharge

Open hatches.

NOG Dredge - Jig Install

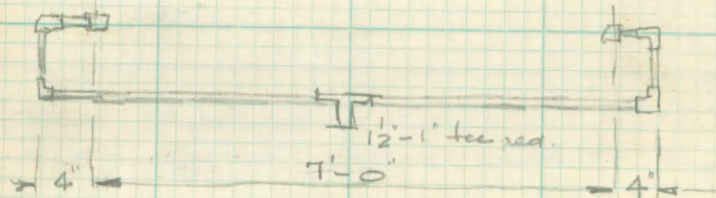
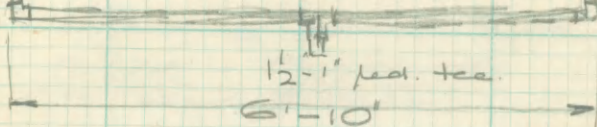
Rip Work

45° ell.

45° ell.

45° ell.

45° ell.



2 unions.

Operators Instructions

1. General operating - adjusting ^{water} as ^{low as} possible
2. Starting Instructions
3. Shutting down due to mechanical failure, hang ups etc in jig circuits
4. Shutting down due to dredge stopping
5. Cleaning up instructions

DREDGE N°6

Send to Dred

 $1\frac{1}{2}$ " gate valvesEric ~~Went~~ Warkaby

afternoon

Jack Bennett to 4.30.
gravelled

Engine is fine for the
slap - supposed to get
paid for moving.

Time + $\frac{1}{2}$ for 1-4 as far
as jig is concerned
for about 2 fellows.

Eli Sigovir

days

Report to Dred

- Men go on same rate as before.
- Start elevator and jig - record
the time.
- Mercury trap in sawmill trough

Take Gold pans to N°6 on
Thursday.
note.

JIG OPERATION TEST

Mon

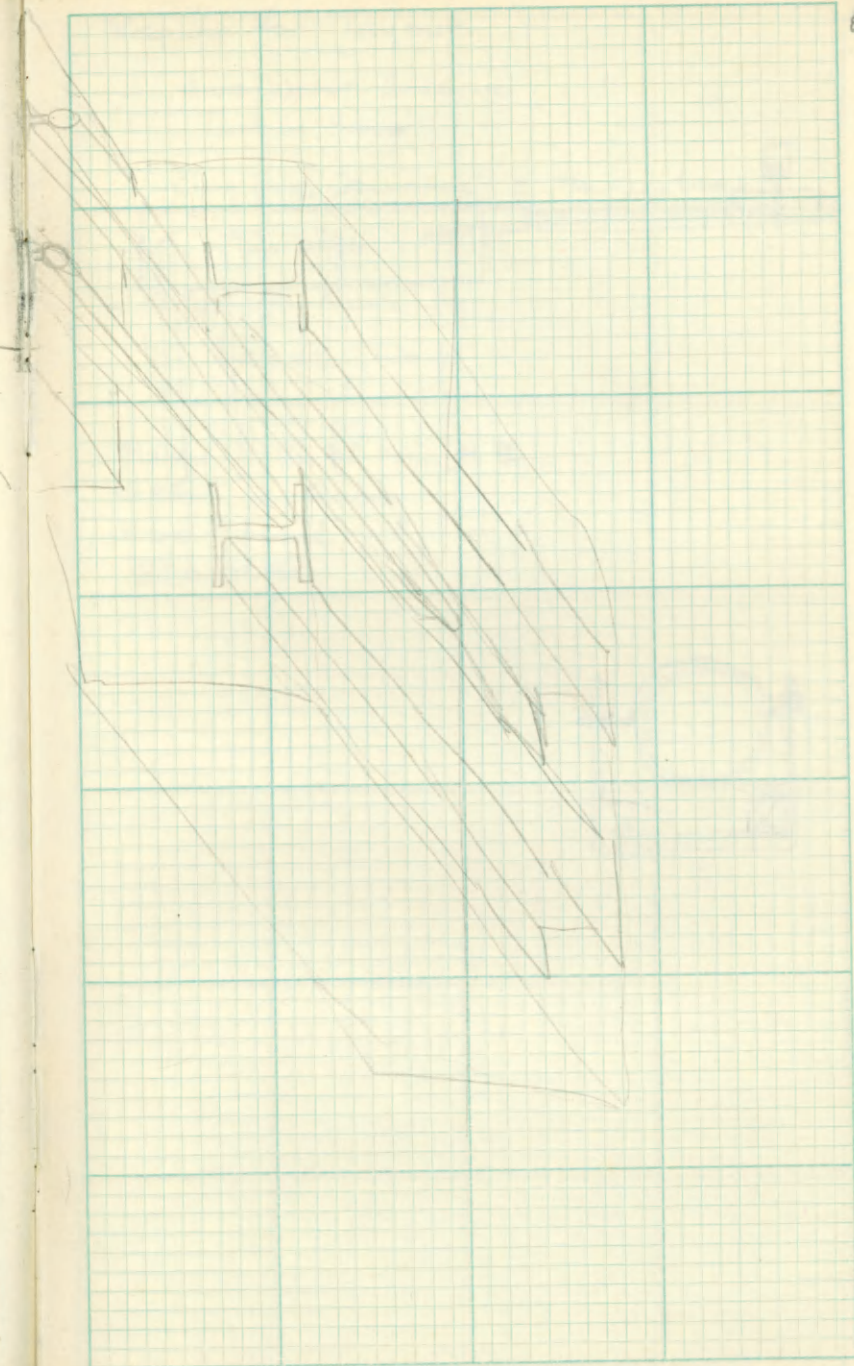
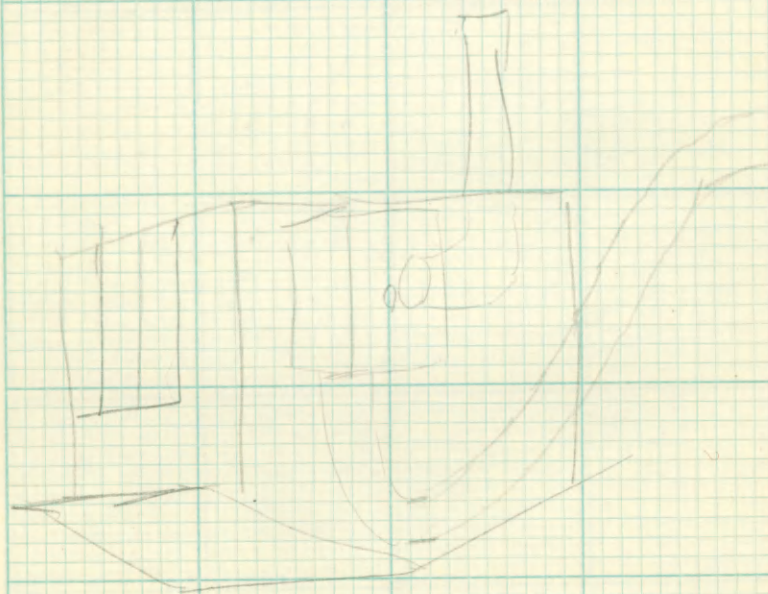
1730 — Started up after gen.
cleanup.

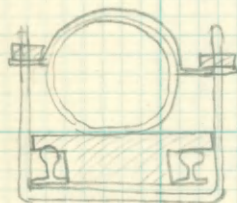
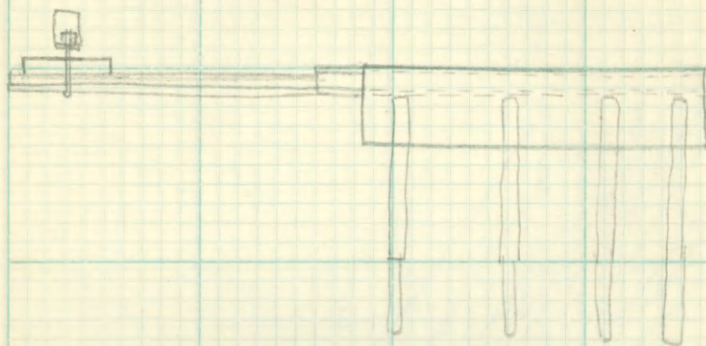
2 splitters open

2100 — Closed down due to
mech. failure of elevator.
Something jammed &
broke shear pin.

Tues

0745 — Fred phoned to tell me
that elevator broke down





Require for layout.

Auto Water Balance

Turbine Pump

Kingsport, Tennessee & Machine Works

Oswego NY.

Peter Machinery Co

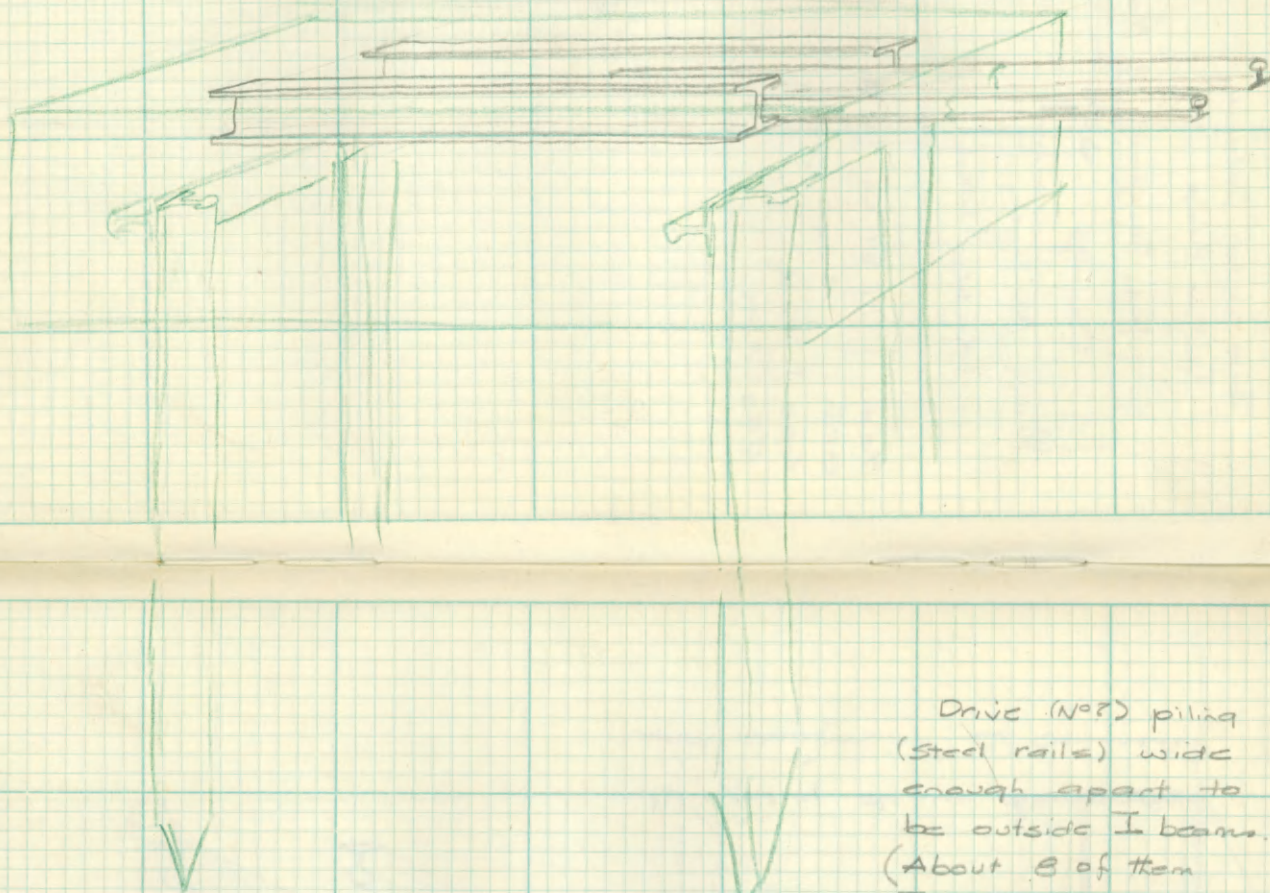
Seattle Wash

Model M 21 or M 31

GPM 6000

600' head

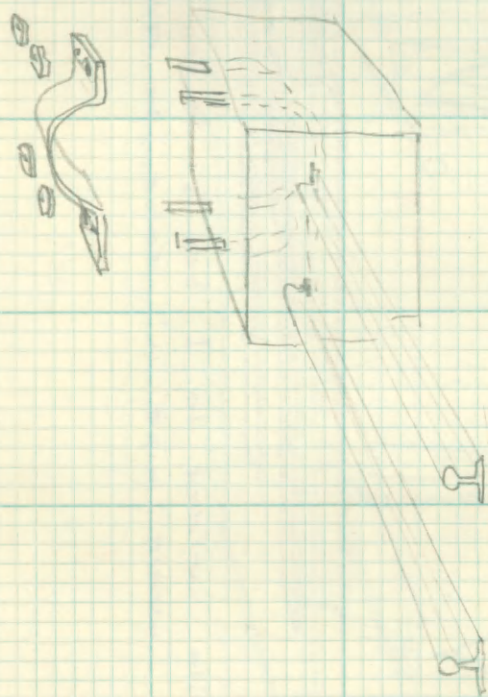
880 RPM



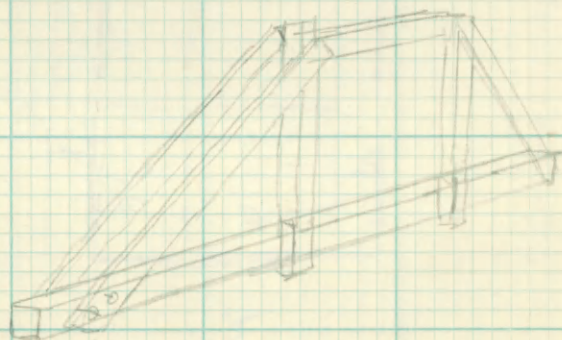
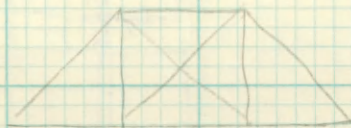
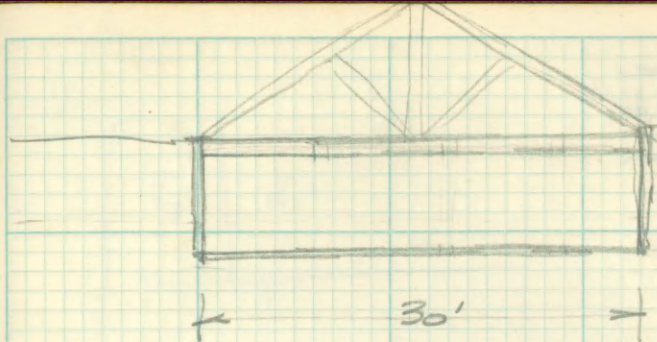
Drive (No?) piling
(Steel rails) wide
enough apart to
be outside I beams.
(About 8 of them
Then weld cross
rails on levelled so
that I beams can
sit (be welded?)
onto these rails & be level.

Rails welded to I beams lower flange, sticking out
to where pipe will come to ground

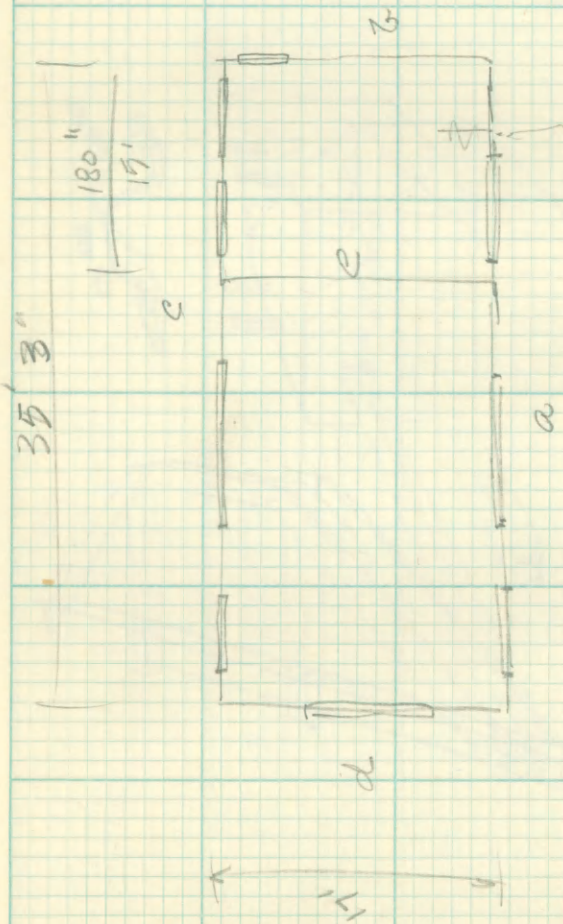
Shaped to fit
curve of pipe.



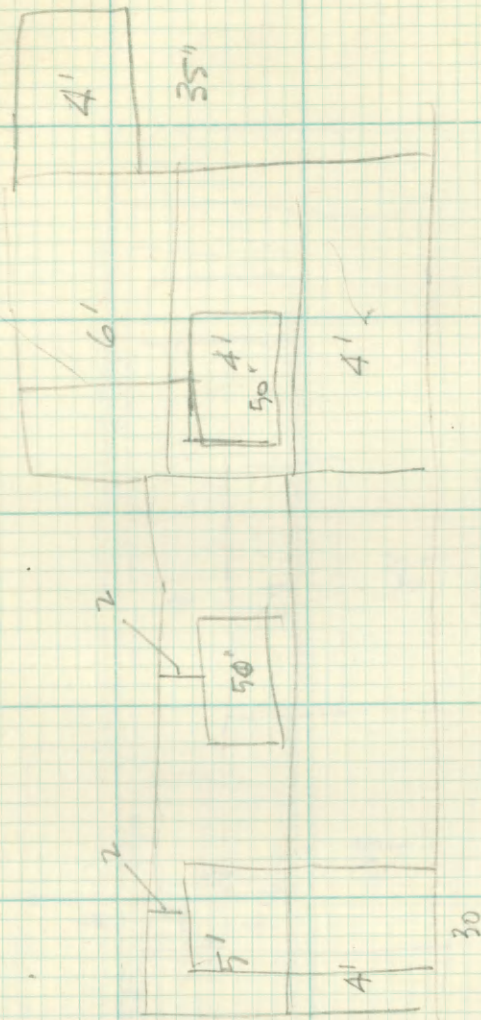
Now piling driven down here
with reinforcing in concrete.

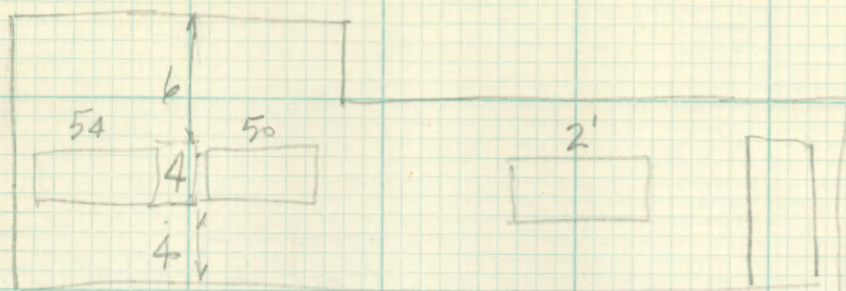
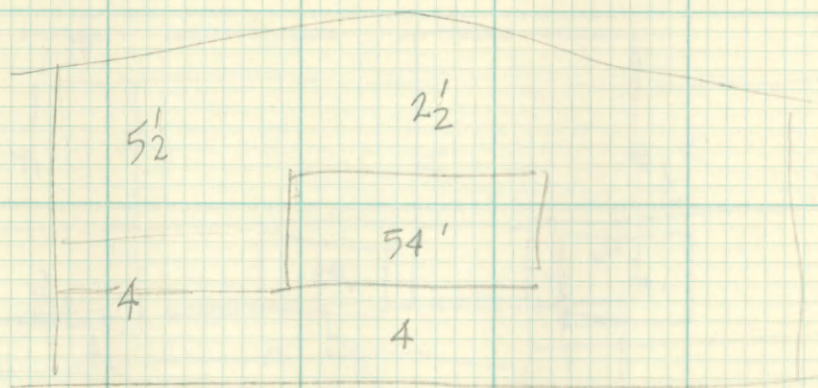


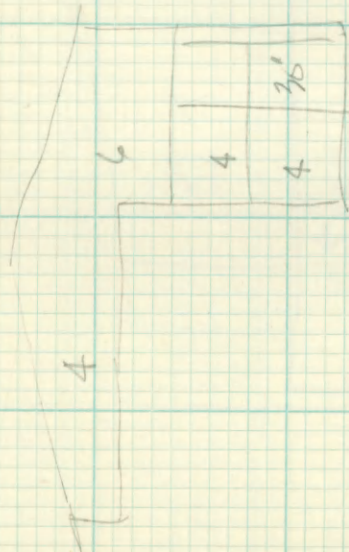
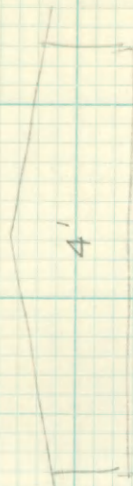
trailer
pump
motor



One set 4' - 5' for screen room







4" Wood Set Saw
#12.

3" "
16

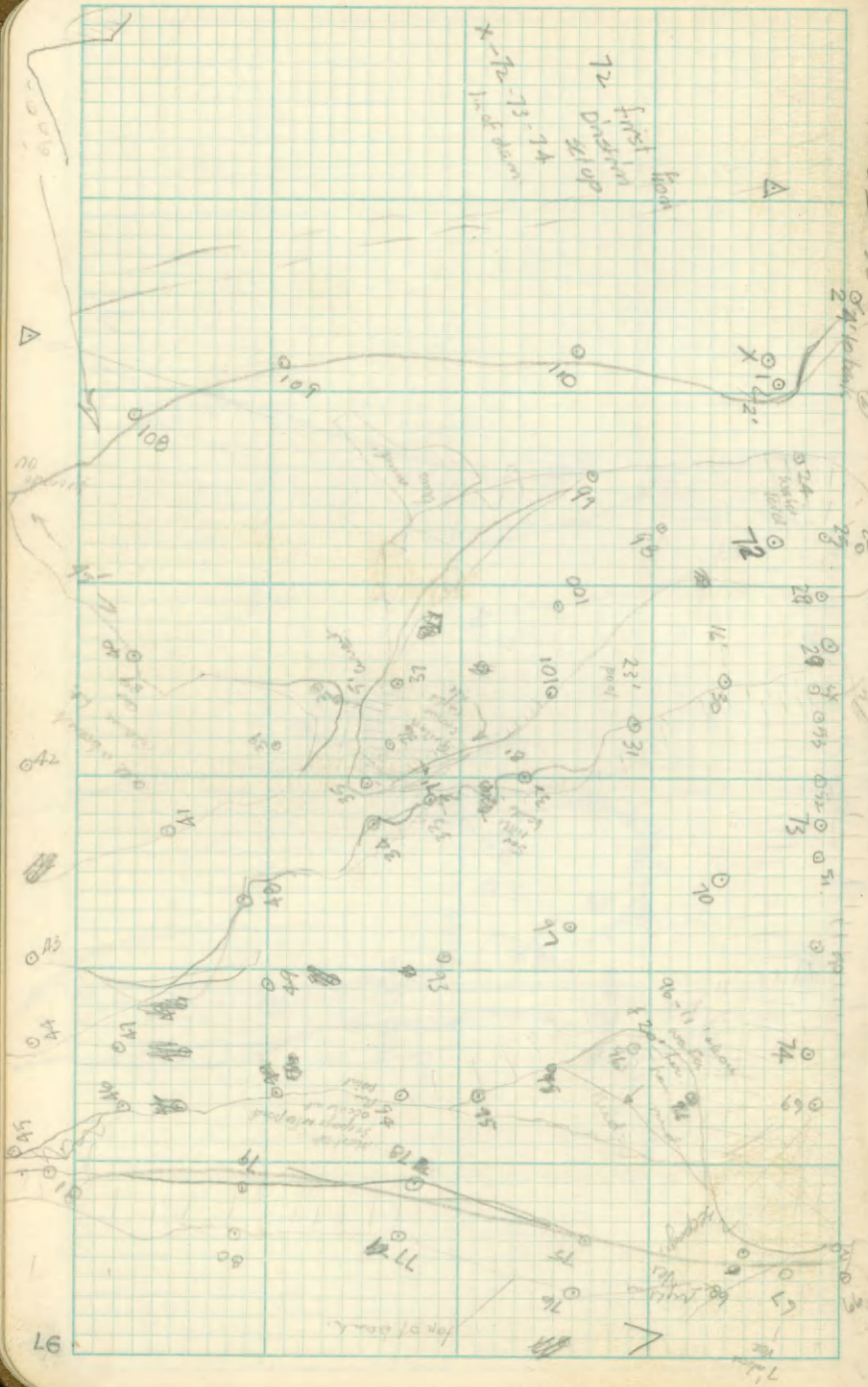
1126.4

av depth avg 18.4.

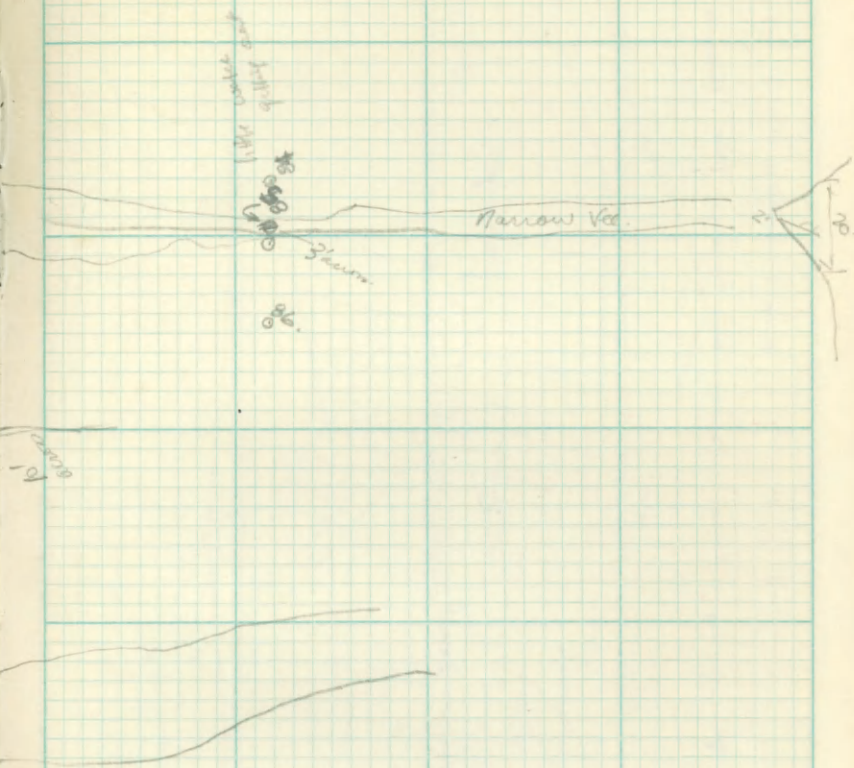
1108

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46



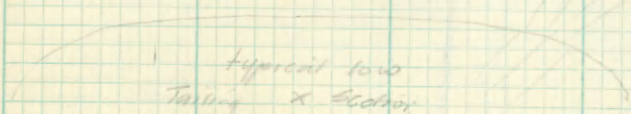
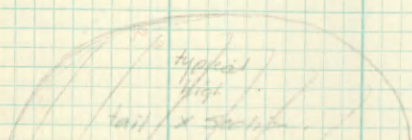
During it

series across south of planning and power law before the dam
 build in

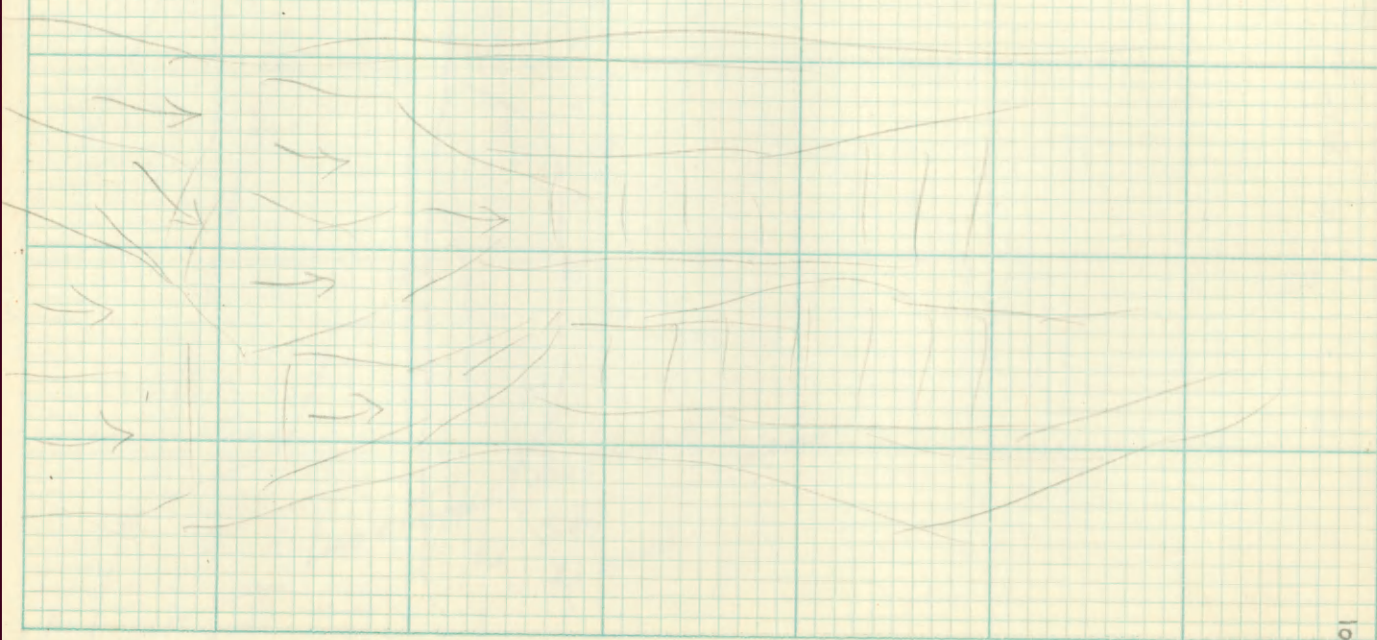
Trail drive up same cut work

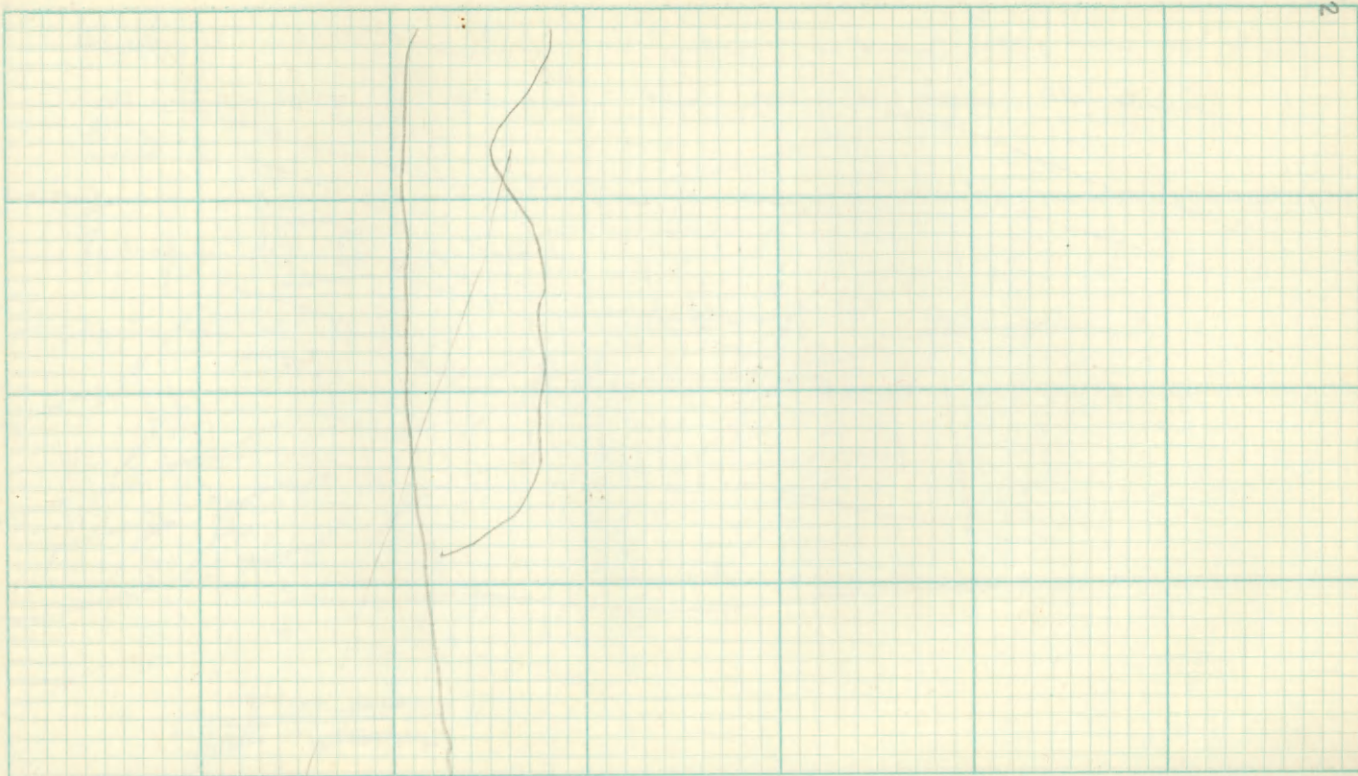
Construction of Spillway

bulldoze in bottom gravel



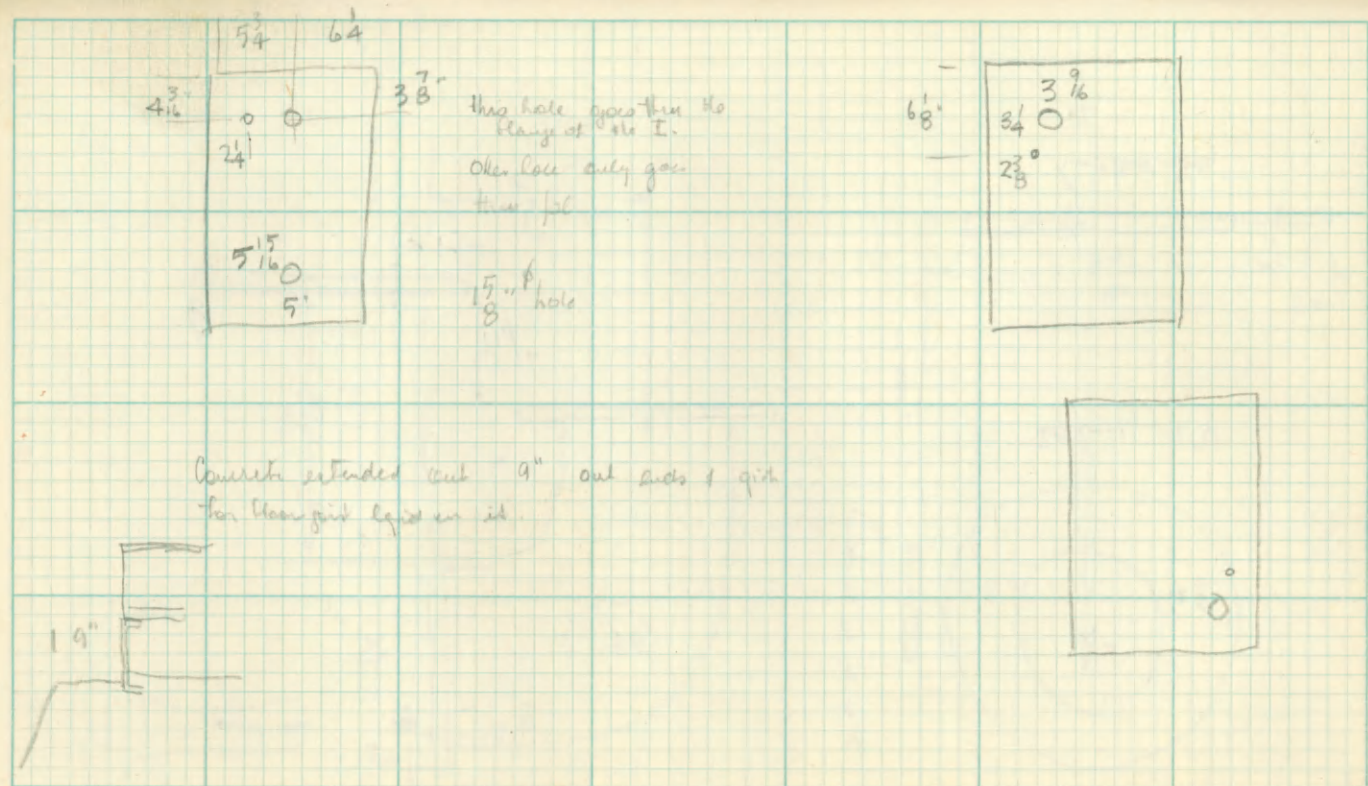
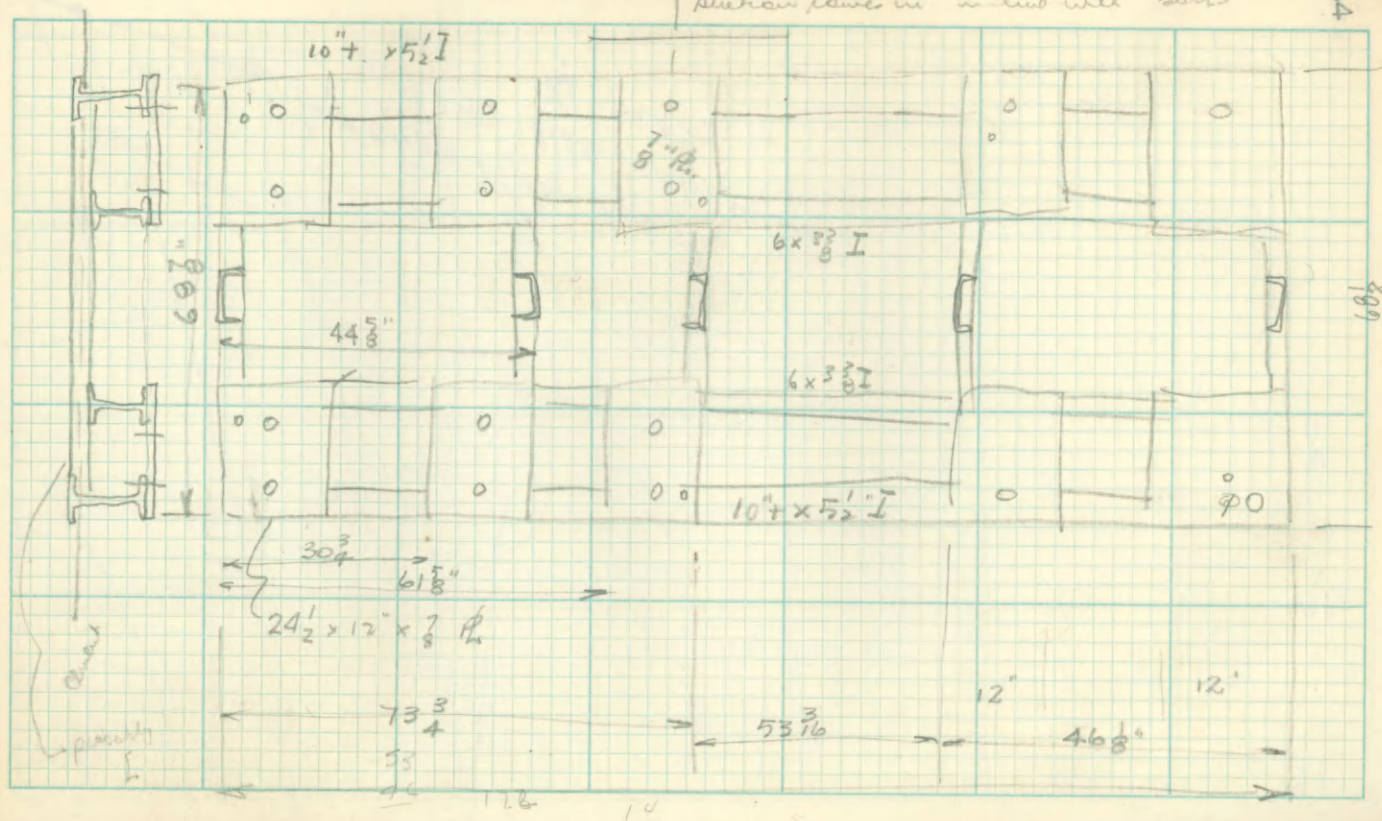
Boat Movements



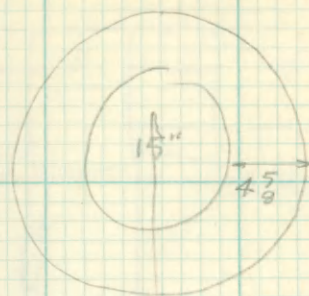
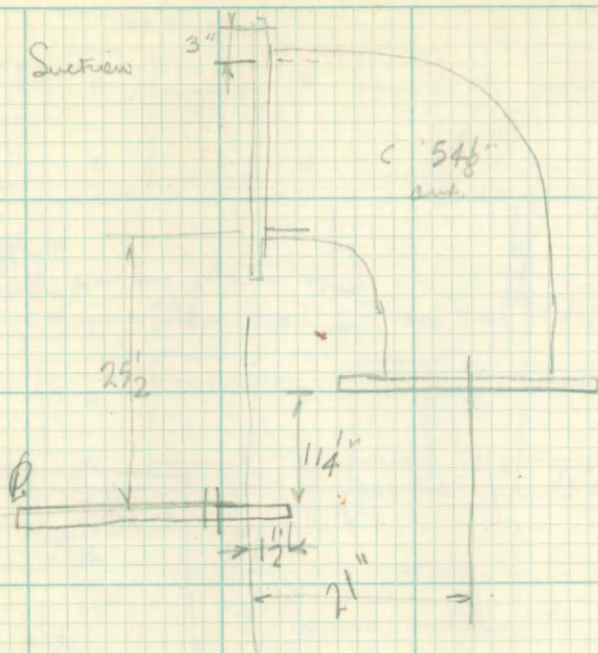


W-18-20
W-20-21

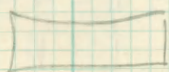
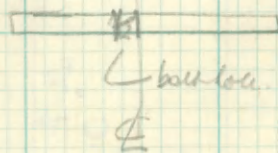
Line straight for hub on
the hill. not below
the road.



Suction



20 bolt 1"φ

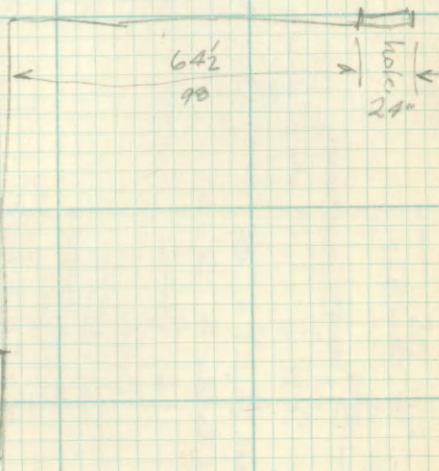


2

3' - 8"

End of end fl

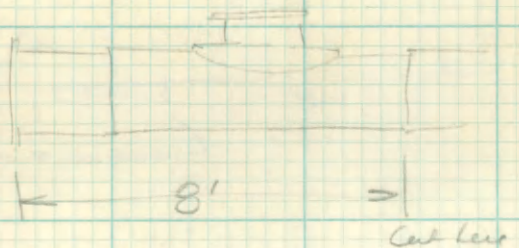
10 1/2"



Pipe - 6' sections

15 lengths already exp.
15 " to exp joint

✓ Exp. Joint - 6'
Klub Valve - 2'-6"



30 - by rule

14 to road | 30 passed road

16 - (2-5s of these 16. all rest 6' (N° 274))

5 - 5'

4 - 6'

5 - 5'

4 - 6'

1 - 5'

2 - 6'

1 - 5'

8 - 6'

1 - 5'

2 - 6'

6 - 5'

16 - 6'

3500

6

(20 - 6' - 3' 1/16" H)

107 1-5' on ground broken

(3-6'

1-5'

17-5' ft. section

4-5'

(2-6'

1-5'

12-4-6'

835

5-5'

(12-6'

10-5' 8-3/16" H

5-5'

(4-6'

20-5' 3/16" H

1 Expansion joint c. 6'

(4-6'

23-5'

12-5' 5'-5' of to side

21-5'

2-5'

- 2 lengths 8" H - 5'

(3-6'

1-5'

by pump house

1-25' bend

2-5'

(2-6'

1 Exp. Joint c. 4'

110

4-5'

9-6'

5-5'

9-6'

4-5'

4-6'

first bend

5-5'

3-6'

1-5'

4-6'

4-5'

1-6'

4-5'

2-6'

8-5'

Expansion Joint 5'

5-5'

1 Inserter - 4-7'

18"-22" 1/4" thick

20-5'

15-5' (including one ft. sect 5'-7')

105

(2-6'

11-5'

(2-6'

17-5'

(2-6'

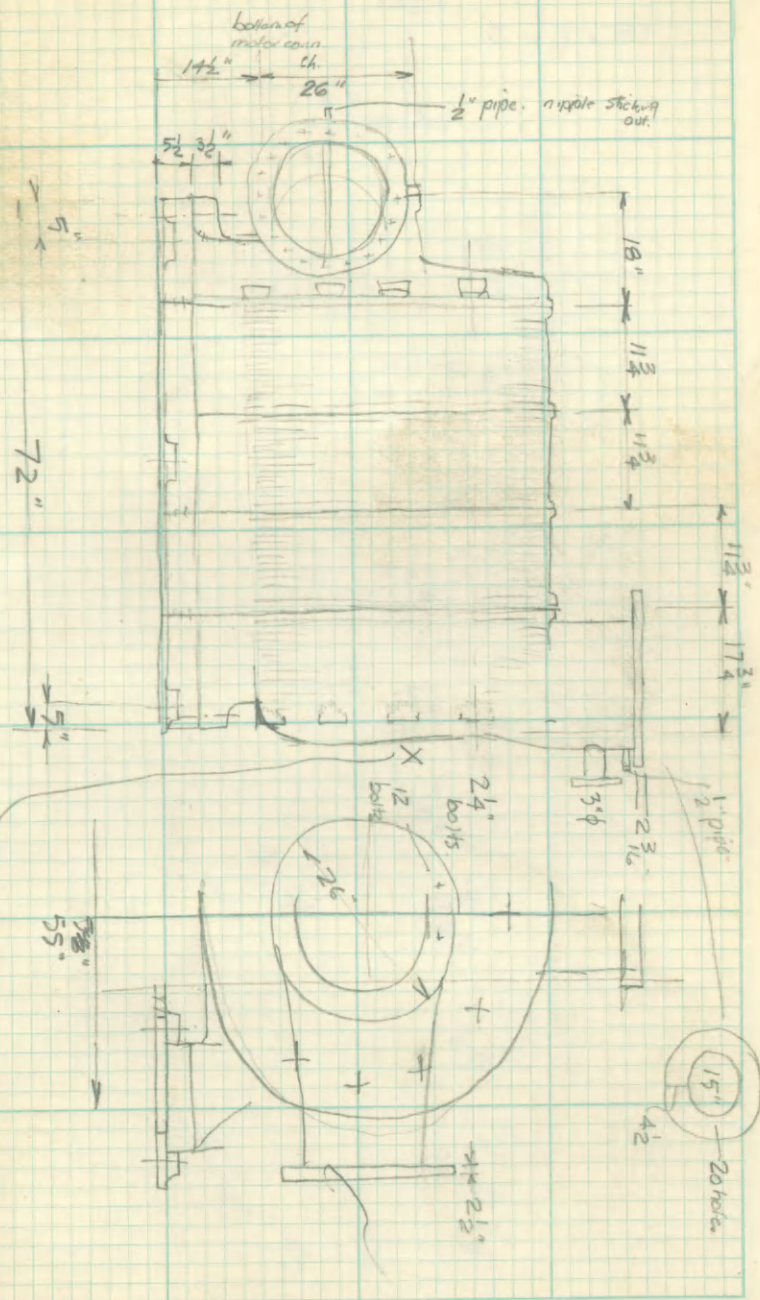
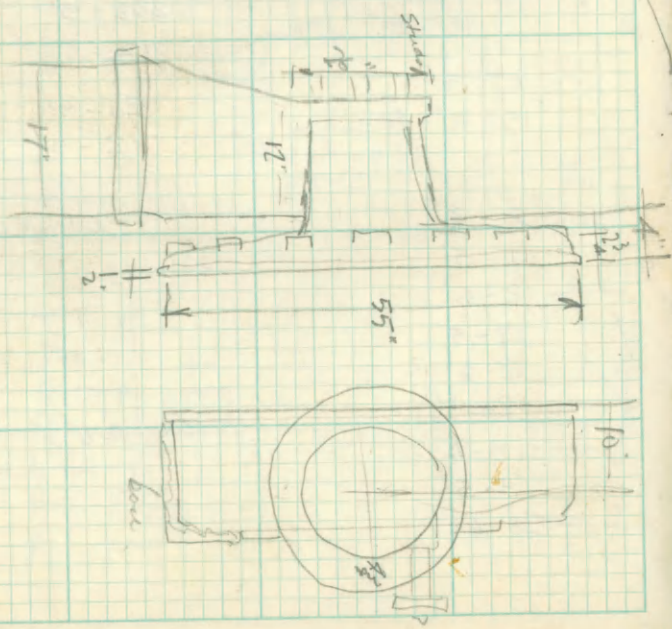
20-5'

(18-6'

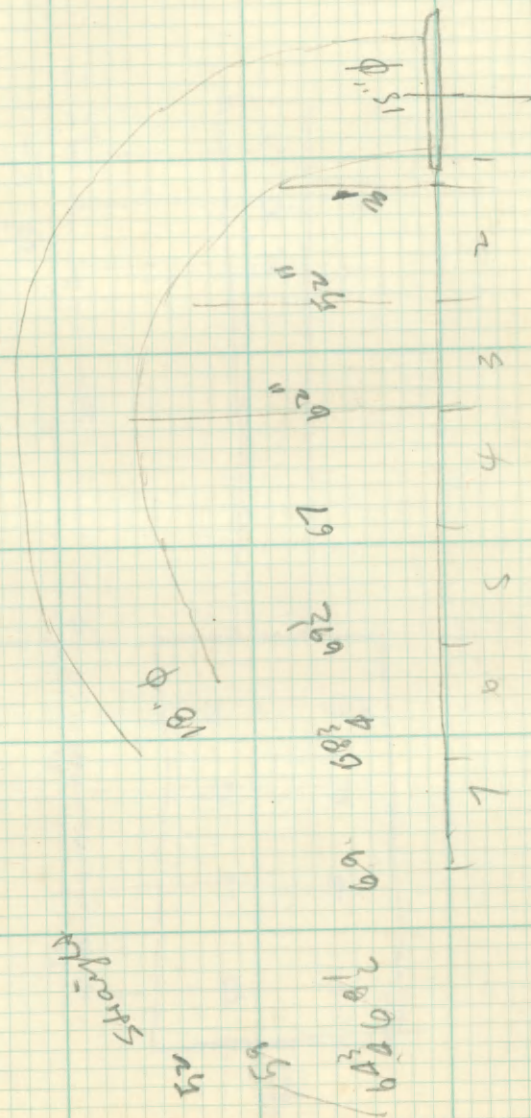
5-5'

(20-6'

bottom line

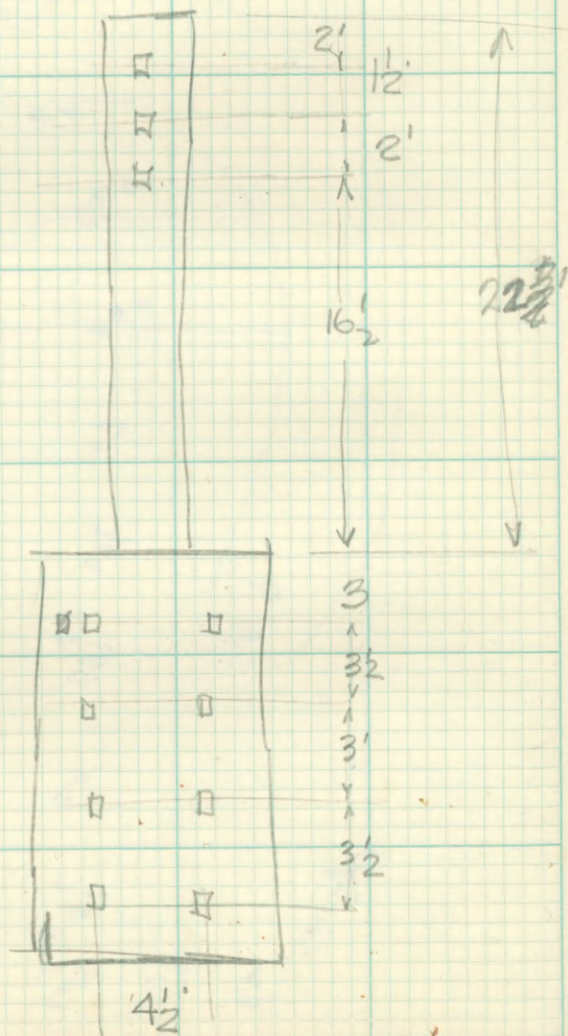


18 x 7 x 3

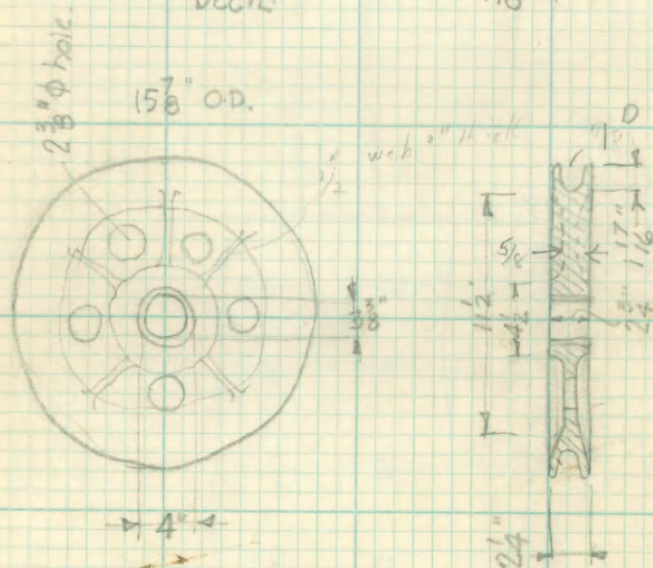
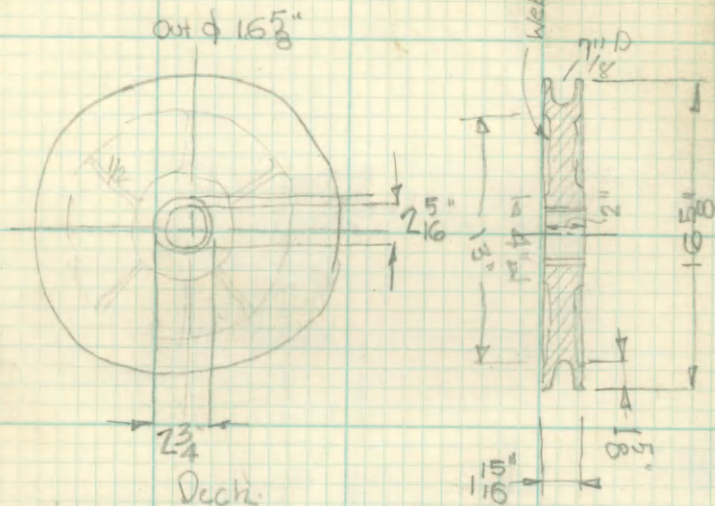


Rail Road

30 - 17' road

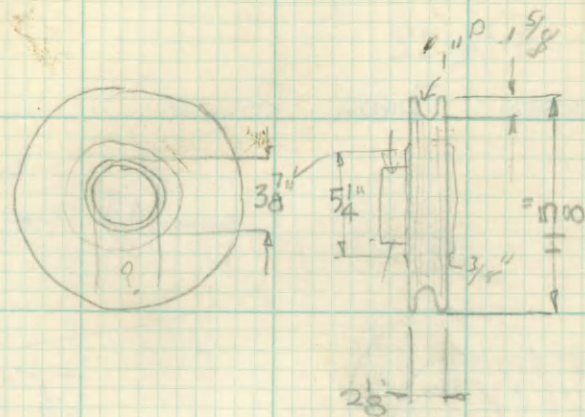


Deck Sheaves

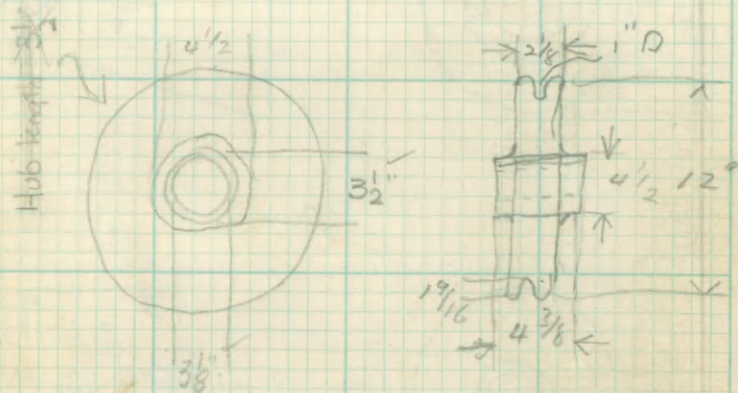


Stern Sheave

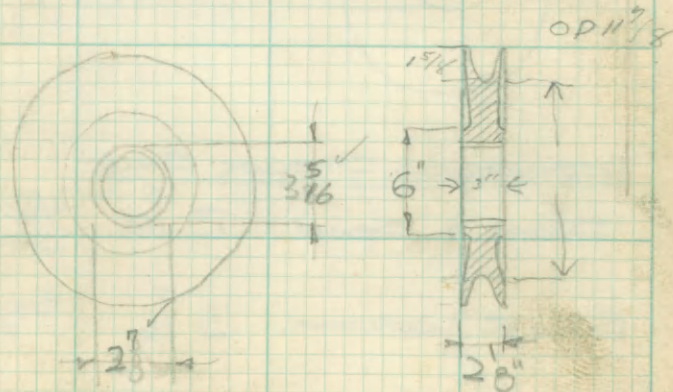
A



B

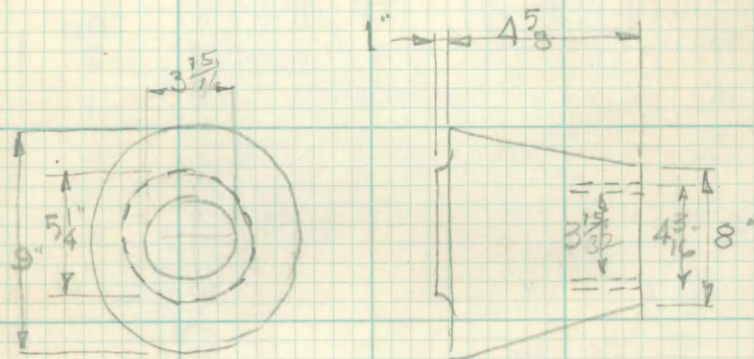


D

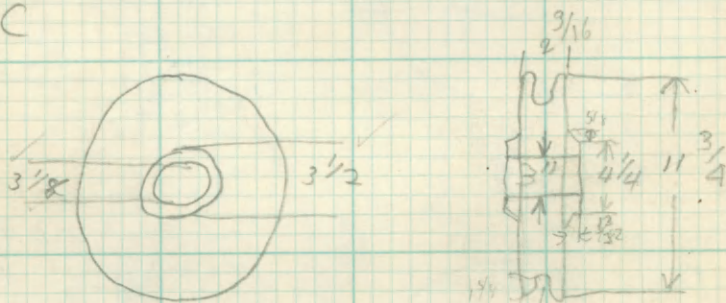


De 12

SCREEN THROST ROLLER



C

Depression Sheave Shaft 1" D

Stern & Spud. $2 \frac{15}{16}$ After two shafts

Bow & Ladder $3 \frac{7}{16}$ Forward shaft

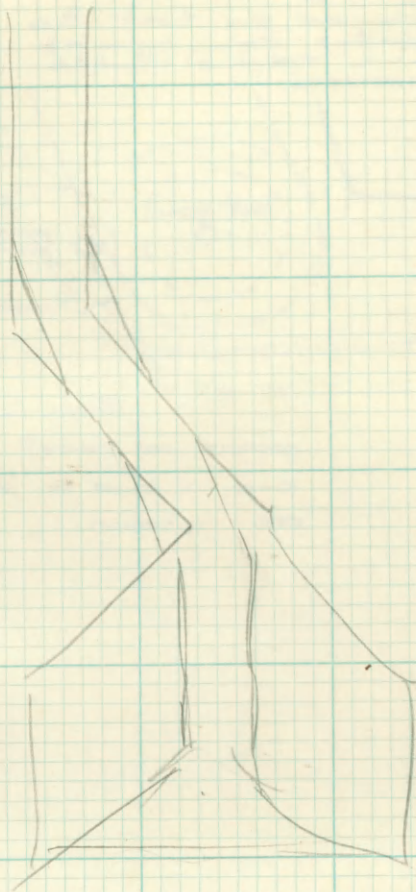
PAGE

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De 12

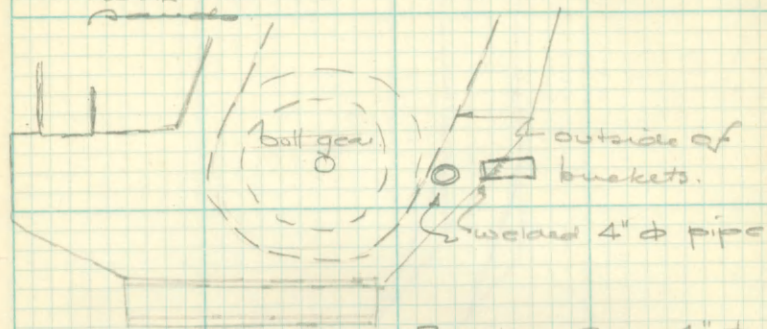
Sheaves + rollers

Most of this is
Par Hill
back.



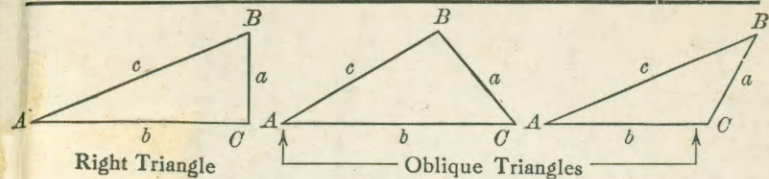
Position of run of ble
in rear of elevator -

Placed so that the
water can run off
with none of the
sand.



Require 2 - 4" ϕ
pipes at least 12" long.
one in end & one in side.
as shown.

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

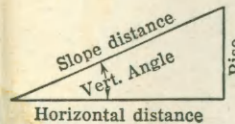
For Angle A . $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\operatorname{cosec} = \frac{c}{a}$

Given a, b	Required 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

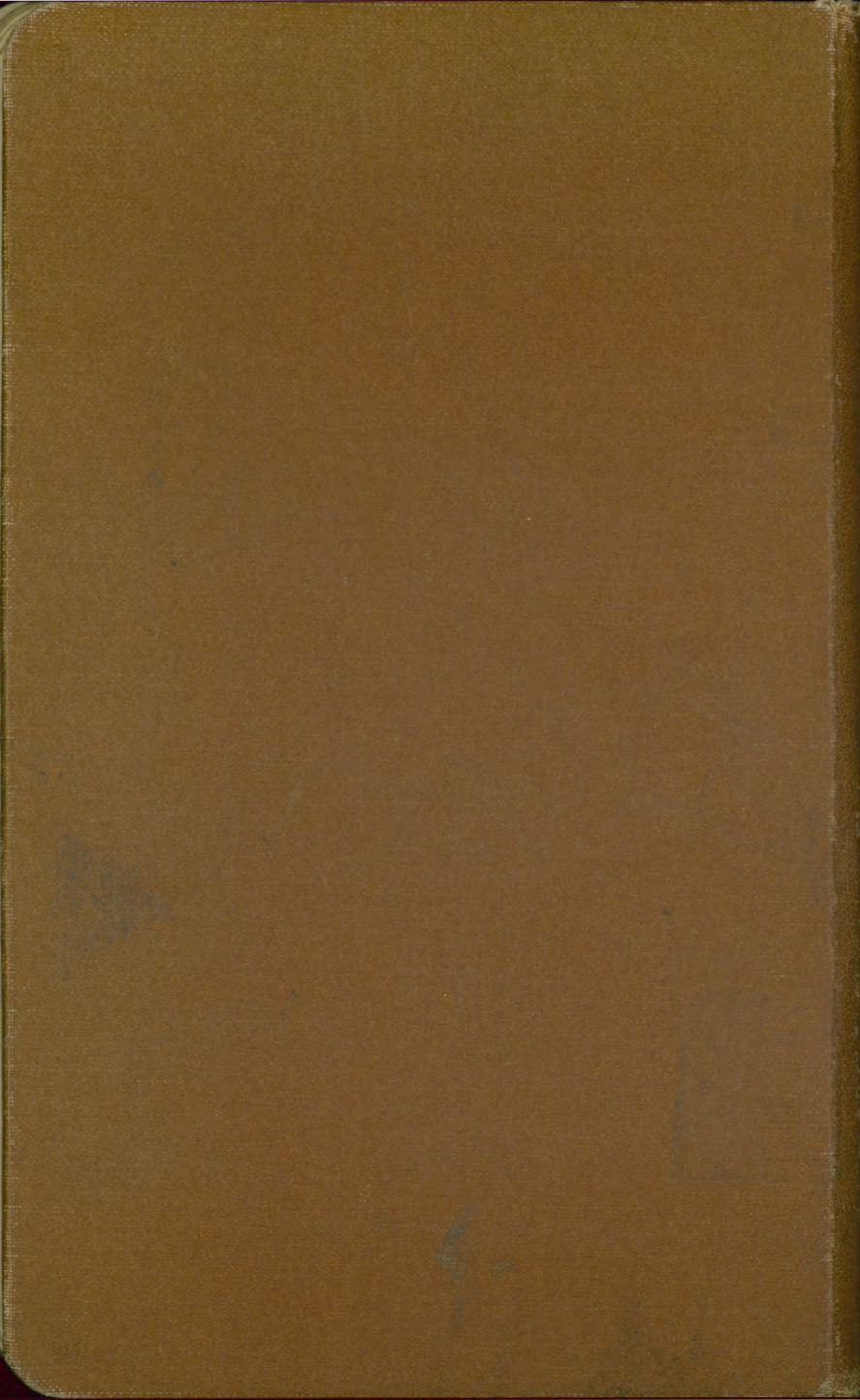
Given A, B, a	Required b, c, C	$b = \frac{a \sin B}{\sin A}$, $C = 180^\circ - (A + B)$, $c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a}$, $C = 180^\circ - (A + B)$, $c = \frac{a \sin C}{\sin A}$
a, b, C	A, B, c	$A + B = 180^\circ - C$, $\tan \frac{1}{2}(A - B) = \frac{(a - b) \tan \frac{1}{2}(A + B)}{a + b}$, $c = \frac{a \sin C}{\sin A}$
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	$s = \frac{a + b + c}{2}$, area = $\sqrt{s(s - a)(s - b)(s - c)}$
A, b, c	Area	area = $\frac{bc \sin A}{2}$
A, B, C, a	Area	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. $\cos 5^\circ 10' = .9959$. $1 - .9959 = .0041$. $319.4 \times .0041 = 1.31$. $319.4 - 1.31 = 318.09$ 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.





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