

REFERENCE DRAWINGS
WATER PLAN & PROFILE
SEWER PLAN & PROFILE
ELECTRICAL PLAN & PROFILE (FT. SHAFTER)
TELEPHONE DUCT LINE (FT. SHAFTER)

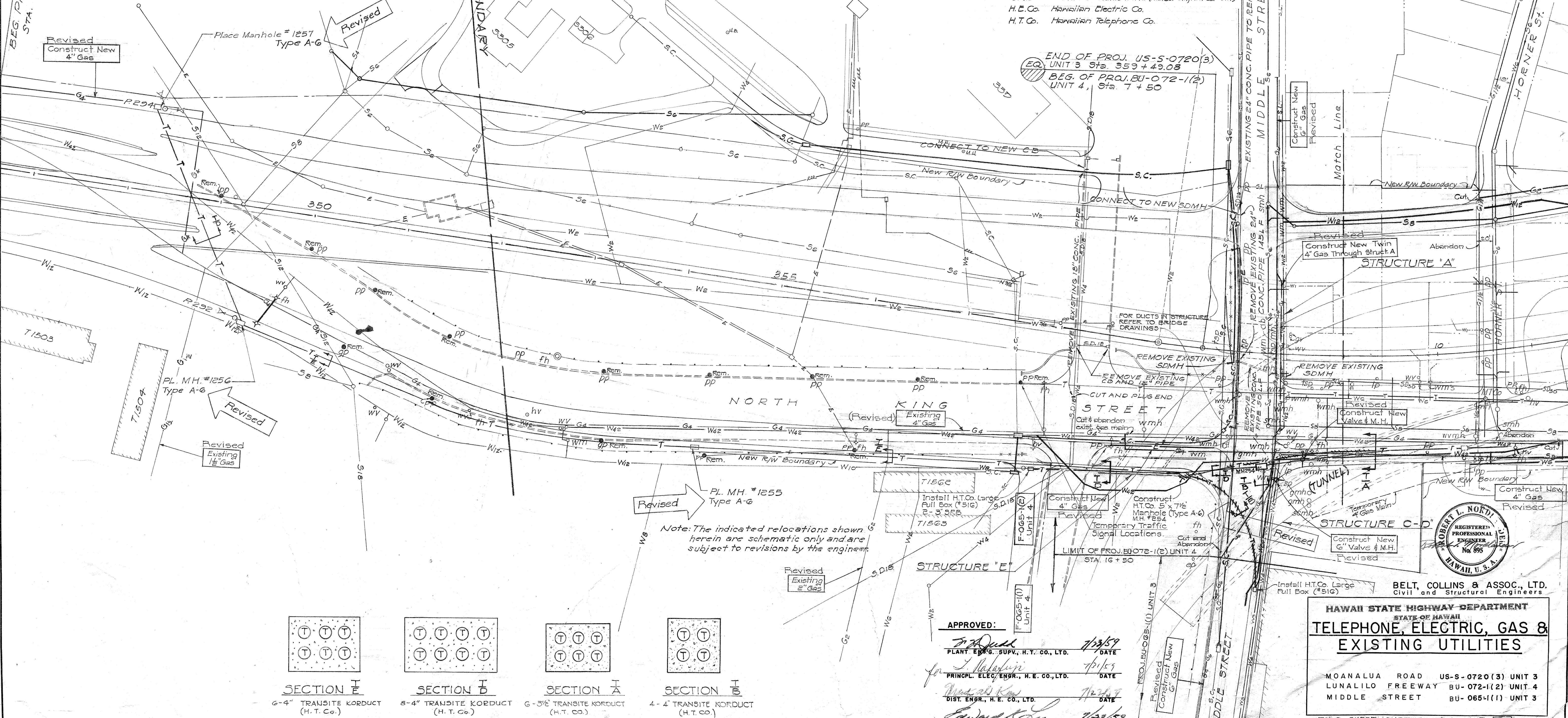
- GENERAL NOTES:
1. W_6 indicates existing 6" Water Line and W_6 (thicker lines) indicates new 6" Water Line or major work to be done on existing Line.
 2. Existing Overhead Electric Lines other than those for U.S. Army are not shown.
 3. Electrical Lines for Hawaiian Electric Co. to be carried by structures are shown but no connections to existing system are shown.
 4. Telephone lines for Hawaiian Telephone Co. to be carried by structures are shown but connections to existing system are shown only where there are underground lines.
 5. The Utility Lines shown on these plans are located from the best sources available. The contractor shall check and verify the exact location and depth of same.
 6. For details of duct, water & gas lines on structures, see Structural Drawing.
 7. Removal of existing power poles will be done by others.

- Legend:
- W_6 6" Water Line
 - S_6 6" Sewer Line
 - $S.D. 30$ 30" Storm Drain Line
 - G_4 4" Gas Line
 - T New Telephone Duct
 - $S.C.$ Signal Corps Line
 - $S.L.$ Street Lighting Line
 - E New Electric Duct
 - E Primary Overhead Electric Line
 - E Primary Underground Electric Line
 - E Secondary Overhead Electric Line
 - E Secondary Underground Electric Line
 - PP Existing Power Pole
 - PP New Power Pole (length as noted)
 - ANCHOR
 - REM Remove
 - ON ANCHOR Sidewalk Anchor
 - LRB Long Radius Bend (H.E.Co.-G.I., H.T.Co.-C.I.)
 - SRB Standard Radius Bend (H.E.Co.-G.I., H.T.Co.-C.I.)
 - H.E.Co. Hawaiian Electric Co.
 - H.T.Co. Hawaiian Telephone Co.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	055-0720(3)	1960	33A	79
		BU-072-1(2)	1960	52A	118
		BU-065-1(1)	1960	50A	115

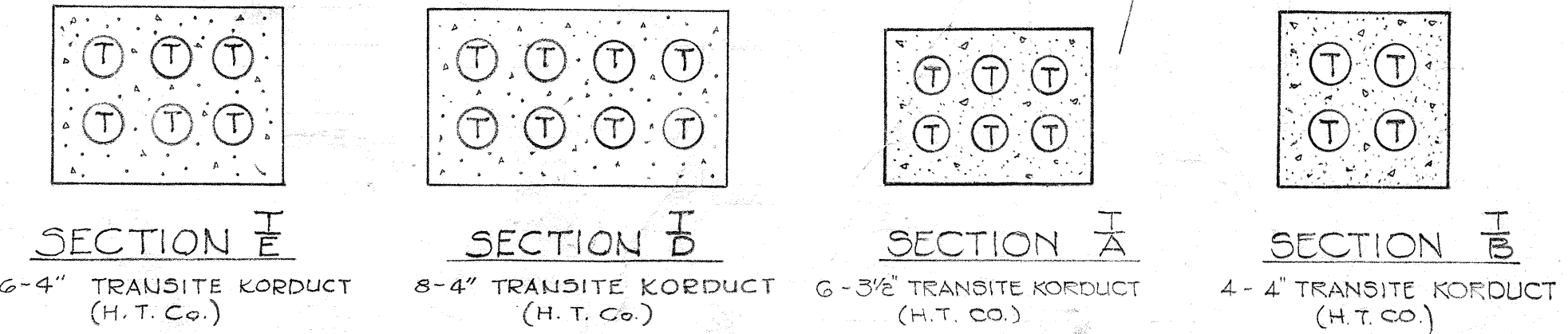
Revised Jan. 16, 1961

BEG. PROJ. US-S-0720(3)
STA. 346 + 50



Note: The indicated relocations shown herein are schematic only and are subject to revisions by the engineer.

SURVEY PLOTTED BY	DATE
ORIGINAL PLAN	1/25/59
TRACED BY	1/25/59
DRAWN BY	1/25/59
QUANTITIES CHECKED BY	1/25/59
NOTE BOOK NO.	2, 57



APPROVED:

[Signature]
PLANT ENGR. SUPV., H.T. CO., LTD. 1/25/59 DATE

[Signature]
PRINCP. ELEC. ENGR., H.E. CO., LTD. 1/25/59 DATE

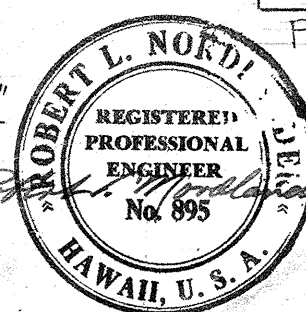
[Signature]
DIST. ENGR., H.E. CO., LTD. 1/25/59 DATE

[Signature]
ENGR. HON. GAS CO., LTD. 1/25/59 DATE

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII
TELEPHONE, ELECTRIC, GAS &
EXISTING UTILITIES

MOANALUA ROAD US-S-0720(3) UNIT 3
LUNALILO FREEWAY BU-072-1(2) UNIT 4
MIDDLE STREET BU-065-1(1) UNIT 3

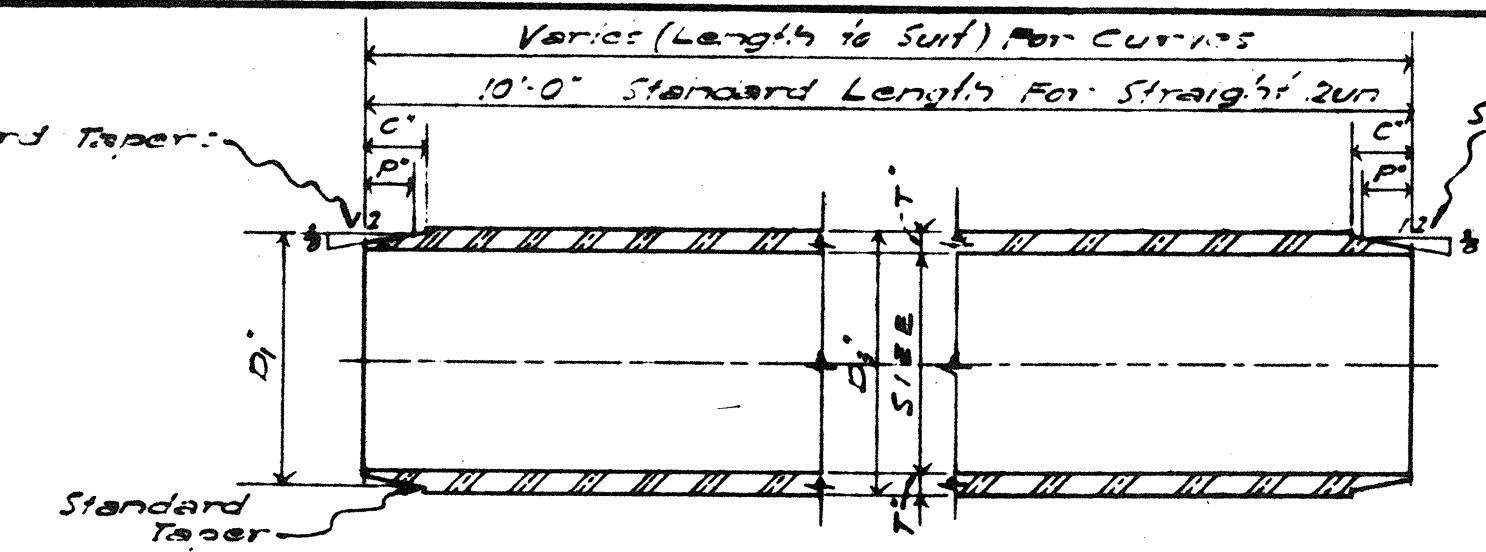
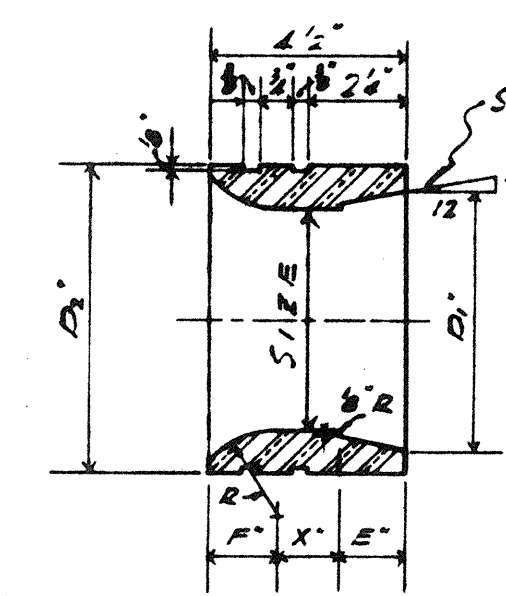
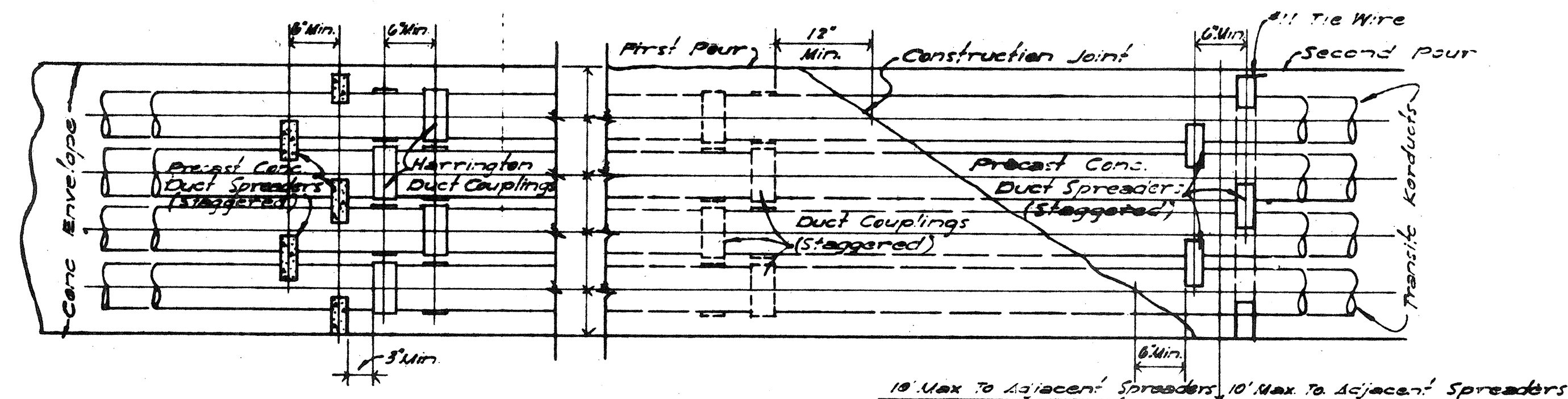
THIS SHEET SUPERCEDES SHT. 32
SHEET NO. 1 OF 4 SHEETS



BELT, COLLINS & ASSOC., LTD.
Civil and Structural Engineers

\$526.33A \$174.52A \$161.50A 82A

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
10 MAHAWI	MAHAWI	US-0720(3) UNIT 3	1960	34	79
10 SPERS		BU-0065(1) UNIT 3	1960	53	118
		BU-0767(2) UNIT 4	1960	55	118



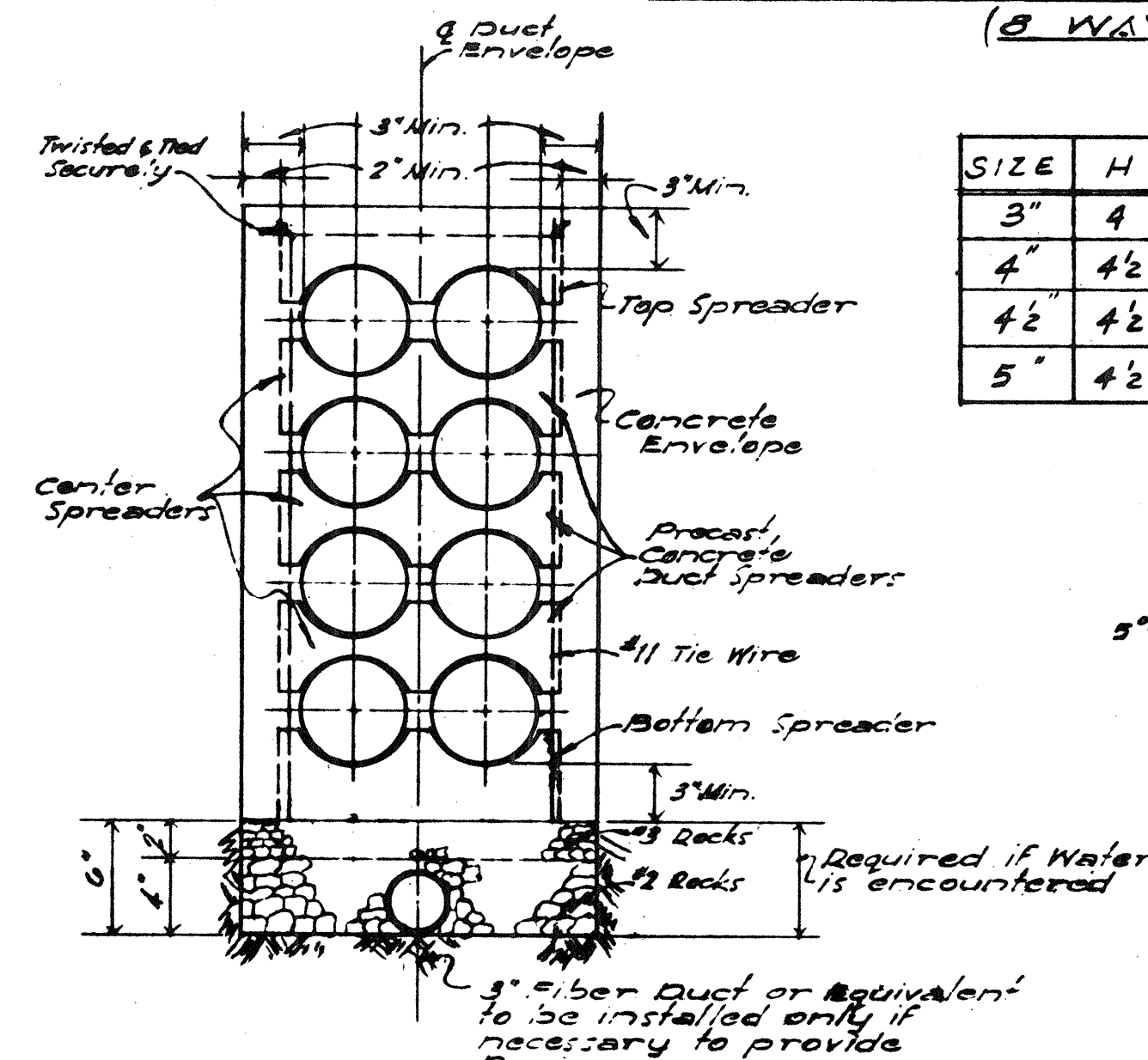
TRANSITE KORDUCT
3" x 3" x 3"

STANDARD TAPERS

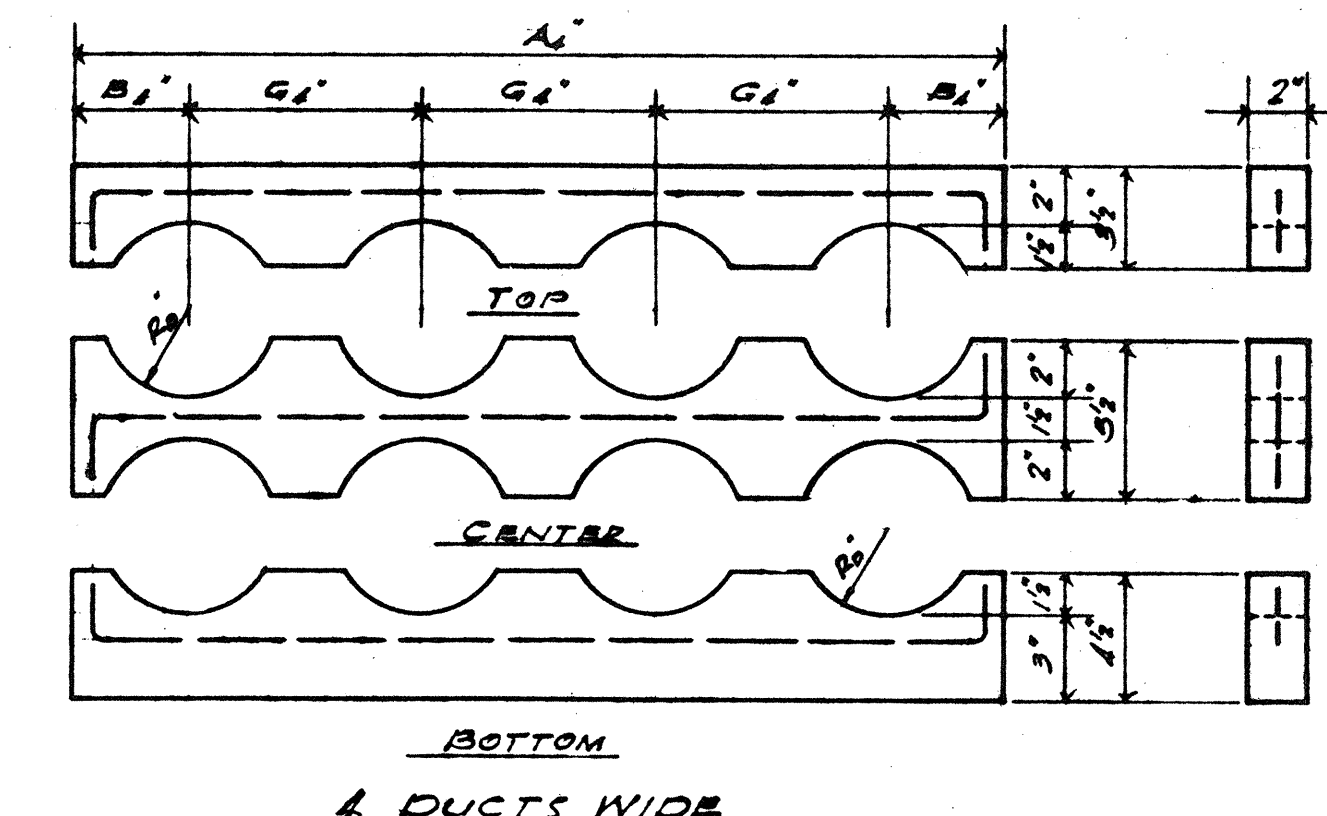
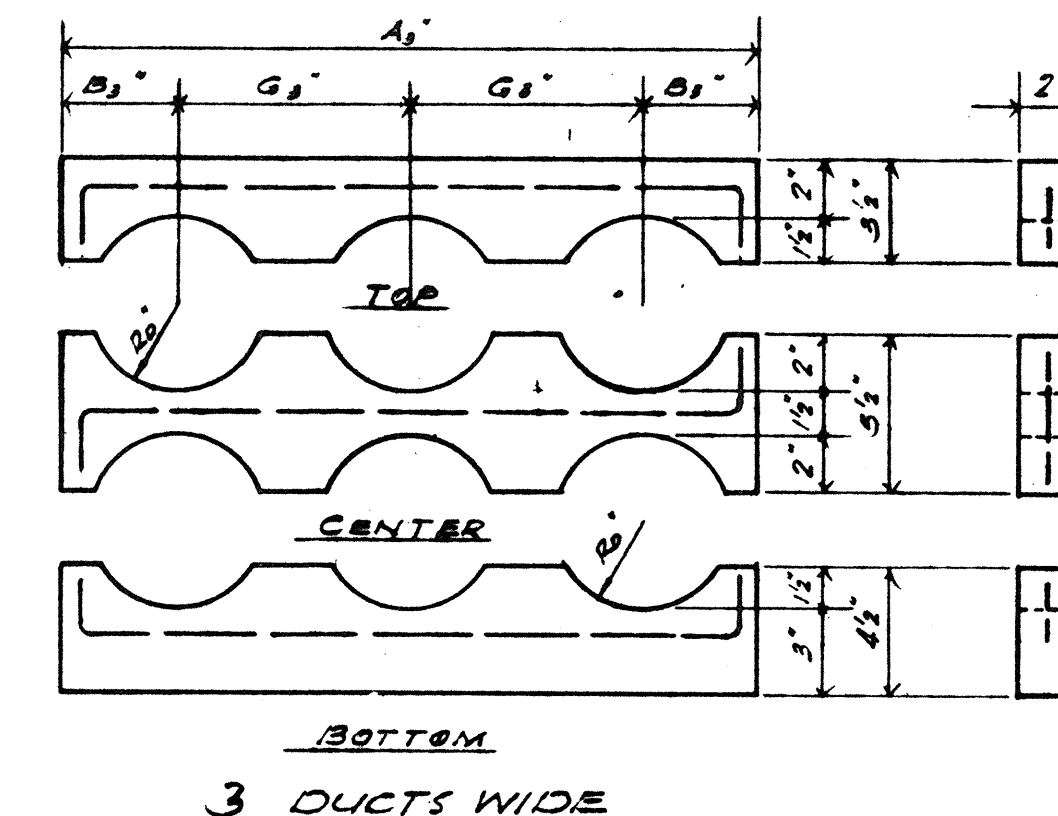
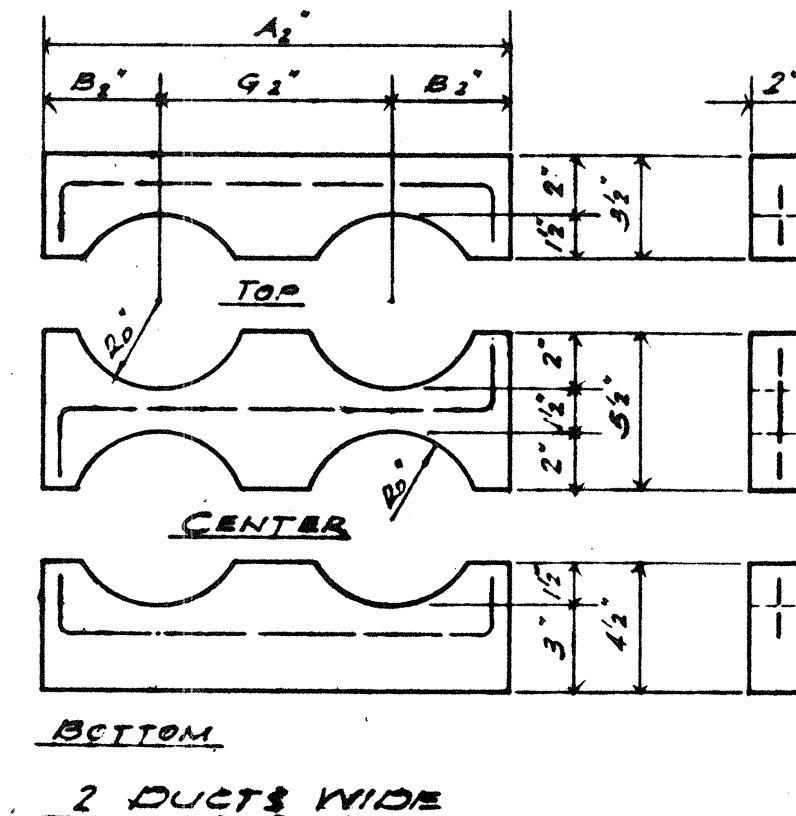
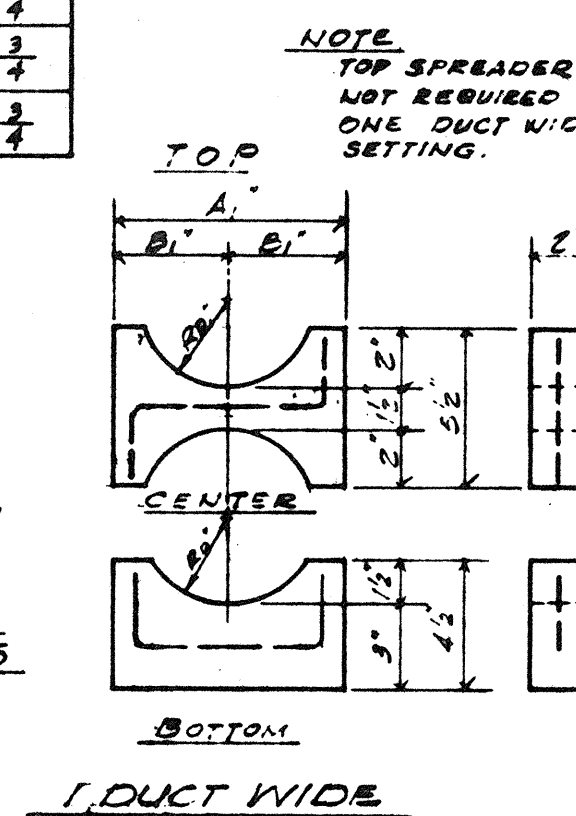
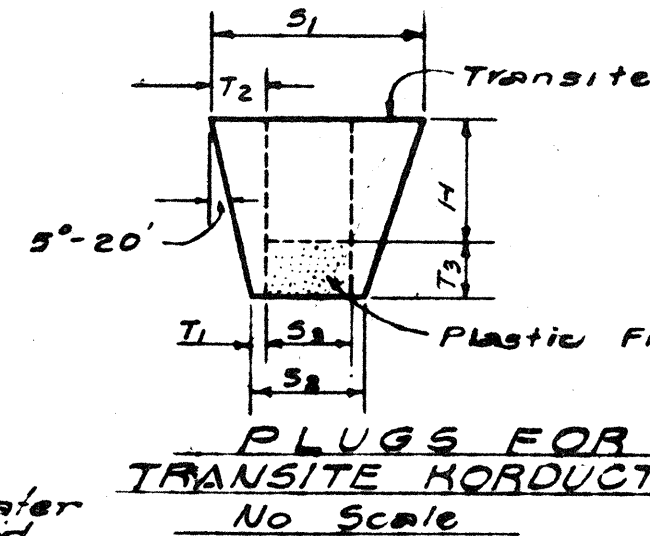
SIZE	D ₁ "	D ₂ "	C"	P"	T"
3"	5 5/8	3 5/8	1 1/2	7/8	17/32
4"	1 1/2	1 1/8	1 1/2	1	1/2
4 1/2"	1 1/2	5/8	1 1/2	1	1/2
5"	5 5/8	5 5/8	1 1/2	1 1/8	1/2

HARRINGTON
COUPLINGS
3" - 1'-6"

SIZE	D ₁	D ₂	L
3"	3 ⁵ / ₈	4 ¹ / ₄	2 ¹ / ₄
1	1 ¹ / ₂	5 ¹ / ₈	2 ¹ / ₂
4 ¹ / ₂ "	1 ¹ / ₂	5 ⁵ / ₈	2 ¹ / ₂
5"	5 ¹ / ₈	6 ¹ / ₈	2 ³ / ₄



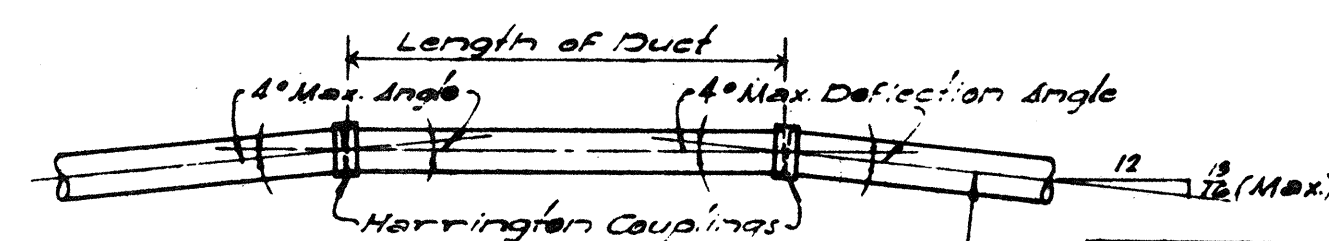
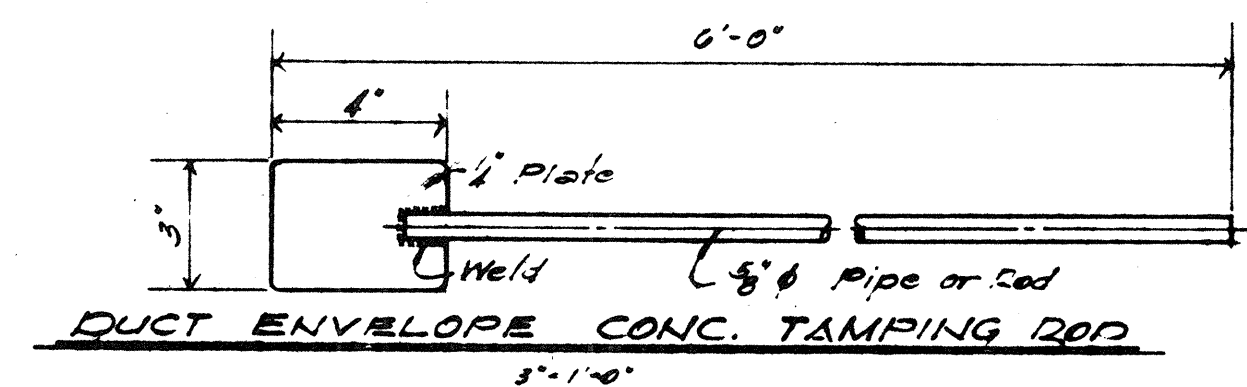
SIZE	H	S ₁	S ₂	S ₃	T ₁	T ₂	T ₃
3"	4	3 $\frac{8}{8}$	2 $\frac{6}{8}$	2	$\frac{5}{8}$	$\frac{11}{16}$	$\frac{2}{4}$
4"	4 $\frac{1}{2}$	4 $\frac{27}{32}$	3 $\frac{37}{64}$	2 $\frac{3}{4}$	$\frac{13}{32}$	$\frac{27}{32}$	$\frac{3}{4}$
4 $\frac{1}{2}$ "	4 $\frac{1}{2}$	4 $\frac{29}{32}$	4 $\frac{1}{8}$	3	$\frac{3}{8}$	$\frac{31}{32}$	$\frac{3}{4}$
5"	4 $\frac{1}{2}$	5 $\frac{57}{64}$	4 $\frac{37}{64}$	3 $\frac{1}{2}$	$\frac{8}{16}$	$\frac{31}{32}$	$\frac{3}{4}$



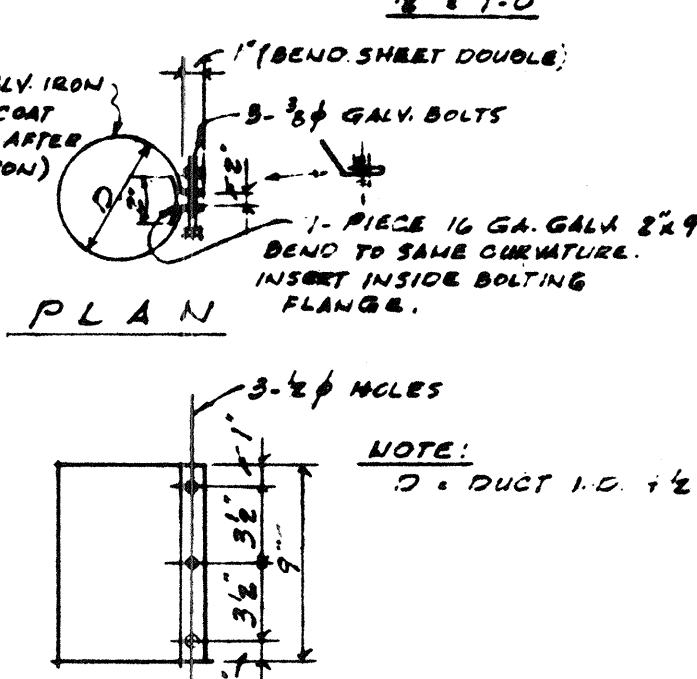
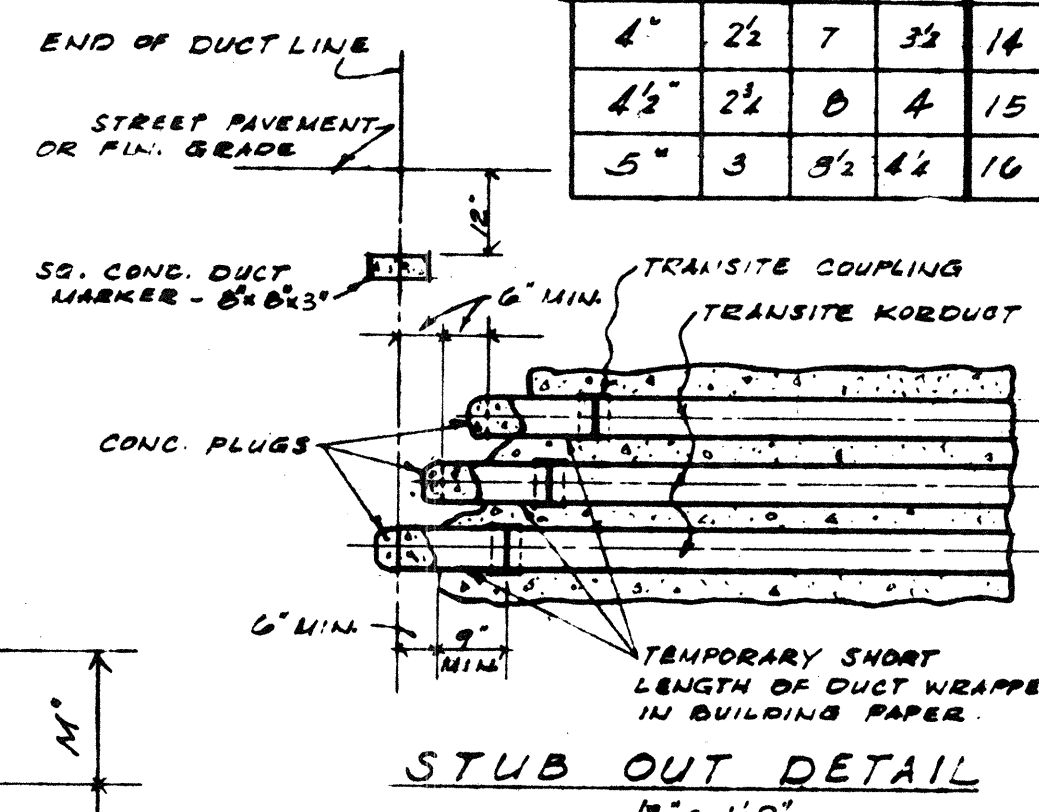
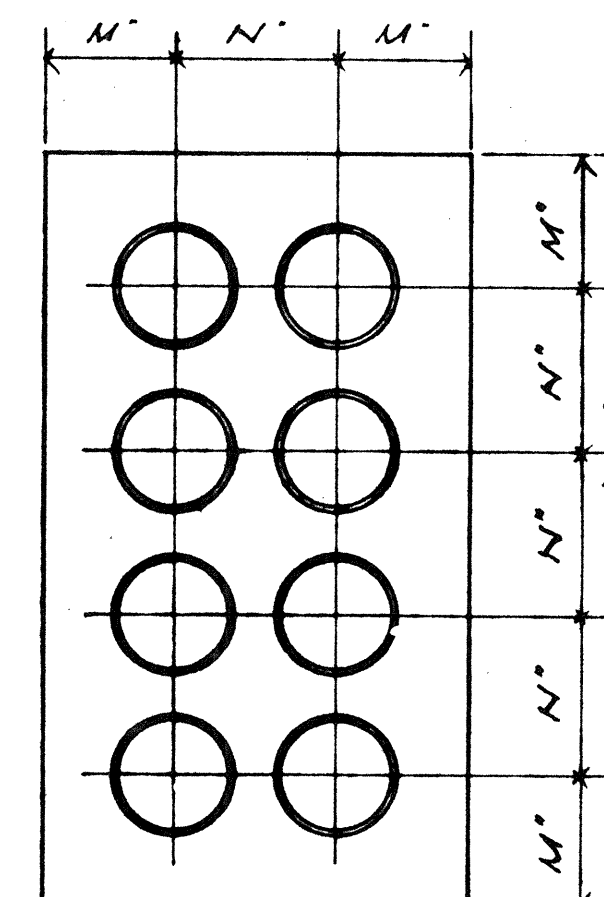
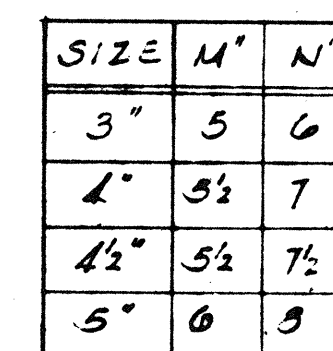
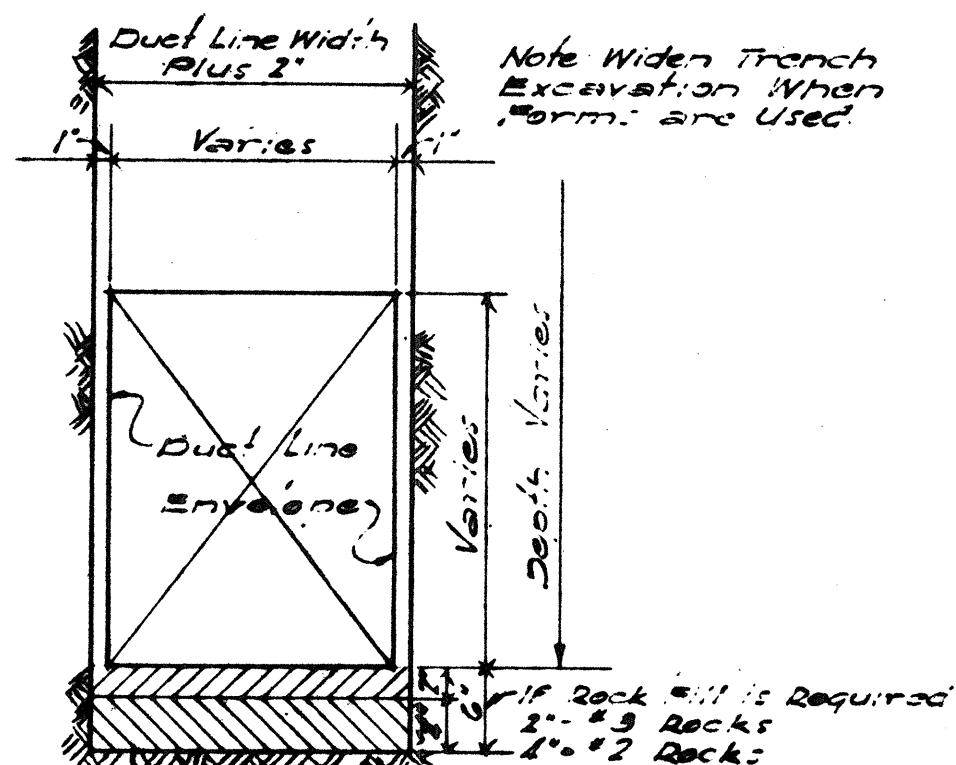
PRECAST CONCRETE DUCT SPREADER DETAILS																
2'-1'-0"																
		1 DUCT WIDE			2 DUCTS WIDE			3 DUCTS WIDE			4 DUCTS WIDE					
SIZE	RO	A ₁ "	B ₁ "	A ₂ "	B ₂	G ₂	A ₃ "	B ₃ "	G ₃	A ₄ "	B ₄ "	G ₄ "				
3"	2	6	3	12	3½	5½	17½	3½	5½	23	3½	5½				
4"	2½	7	3½	14	3¾	6	20½	3¾	6½	27	3¾	6½				
4½"	2½	8	4	15	4	7	22	4	7	29	4	7				
5"	3	9½	4½	16	4½	7½	23½	4½	7½	31	4½	7½				

NOTES: DUCT SPREADERS

Reinforcing
1- $\frac{1}{4}$ " ϕ Bar each Spreader
Concrete Mix
One Part Cement.
Two Parts Beach Sand.
Two Parts Gravel $\frac{1}{4}$ (Fine).
Measurements by Weight.



MIN. RAD.	
16.00 DUTY	MIN. RAD. 30
1'-0"	14'-4"
1'-6"	21'-0"
2'-0"	28'-8"
2'-6"	35'-10"
3'-0"	42'-11"
3'-6"	50'-1"
4'-0"	57'-3"
4'-6"	64'-5"
5'-0"	71'-7"
5'-6"	78'-9"
6'-0"	85'-11"
6'-6"	93'-1"
7'-0"	100'-3"
7'-6"	107'-5"
8'-0"	114'-7"
8'-6"	121'-9"
9'-0"	128'-10"
9'-6"	136'-0"
10'-0"	143'-2"



**REDUCED PLANS
SCALES REDUCED
ACCORDINGLY**

No	Date	Revision	By	Scale: 1" = 400'	Date
1	5-2-56	ADDED 5" DUCT, CENTER SPREADER	R	Drawn: JP	Checked: W. M. M.
2	1-9-57	RE-READ DEFLECTION INSS & 5" to 8"	R. V.	Approved:	
				W. M. M.	
				Signature: J. J. Miller	

HAWAIIAN STATE HIGHWAY DEPARTMENT
STATE OF HAWAII
HAWAIIAN ELECTRIC CO.
STANDARD DETAILS
MOANALUA ROAD U5-5-0720(3) UNIT 3
LUNALILO FREEWAY BU-072-1 (2) UNIT 4
MIDDLE STREET BU-065-1 (1) UNIT 3
Scale: As Noted Feb. 28, 1948

SHEET No. 1 OF 6 SHEETS

CONSTRUCTION STANDARDS
TRANSITE KORODUCTS
UNDERGROUND DUCTLINES

Engineering Department
The Hawaiian Electric Company, Ltd.
Honolulu, H. I.

U-1874

8526.34

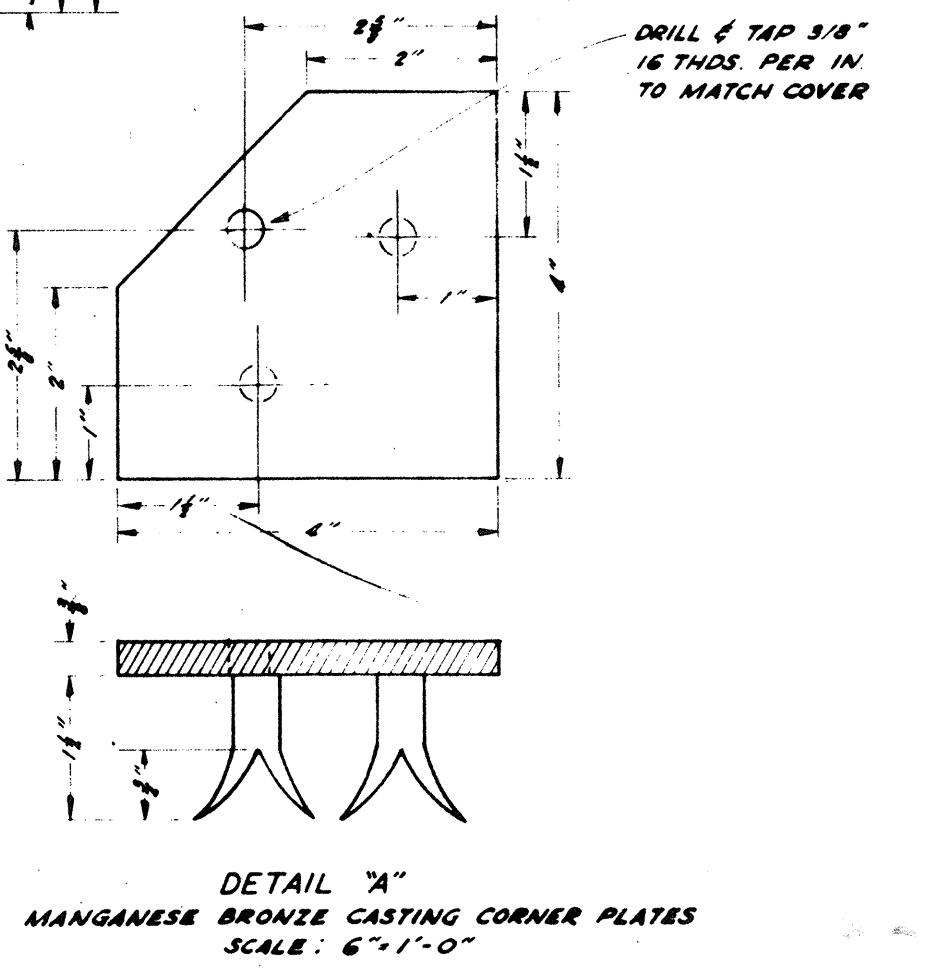
§ 1741.5

Honolulu, H.H.

36

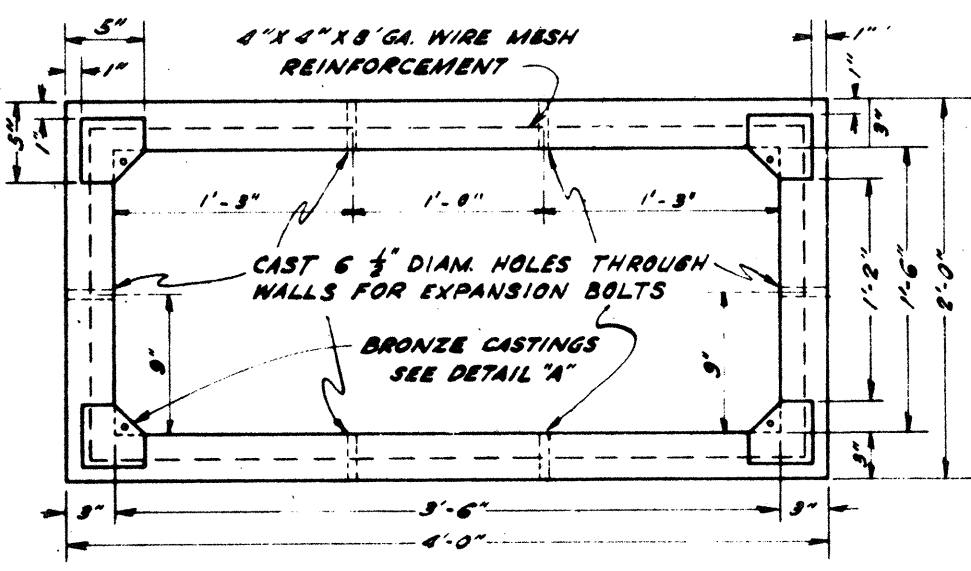
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	US-0720(3) UNIT 3	1960	55	79
		BU-065-1(1) UNIT 3	1960	54	115
		BU-072-1(1) UNIT 3	1960	57	118

NOTE:
CHECKERED PLATE COVER SHALL BE 1/4" THICK AT SIDEWALK AREAS AND 3/8" THICK AT DRIVEWAYS.

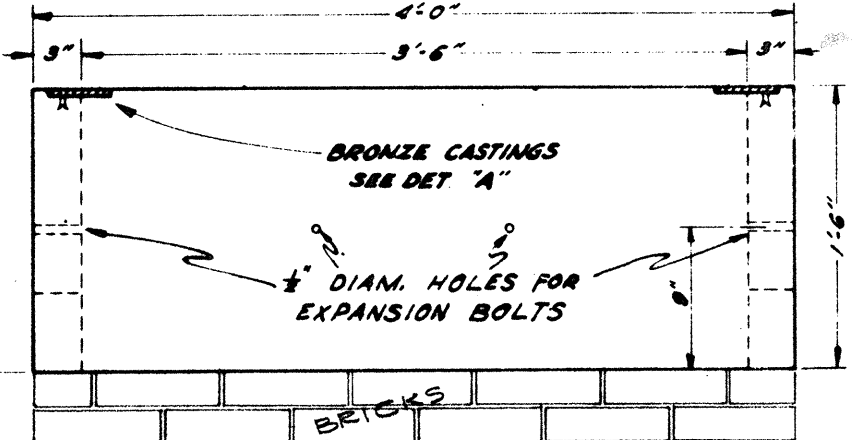
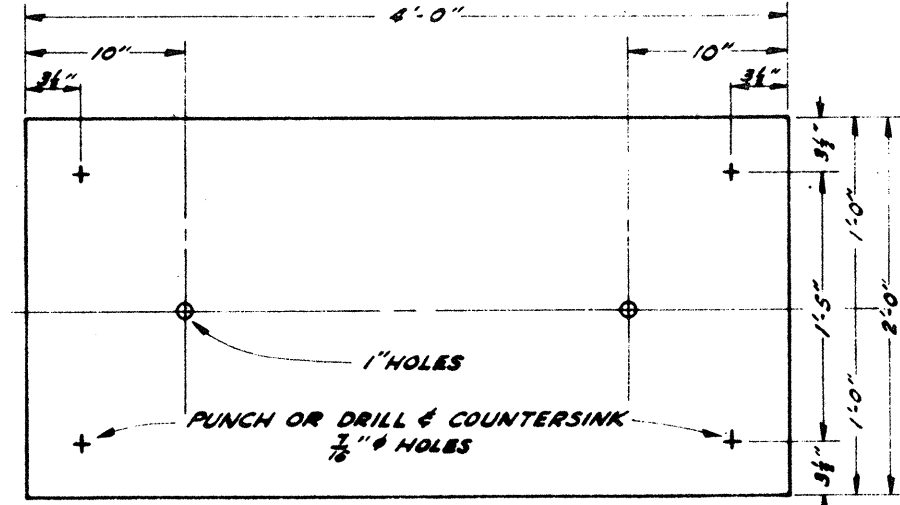


DETAIL "A"
MANGANESE BRONZE CASTING CORNER PLATES
SCALE: 6"=1'-0"

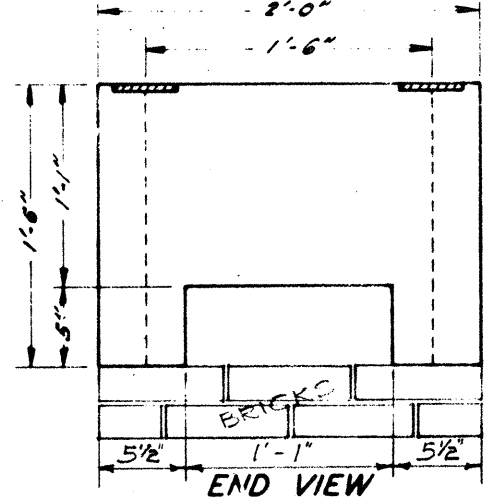
SCALE: 1"=1'-0"



TOP VIEW



FRONT VIEW



END VIEW

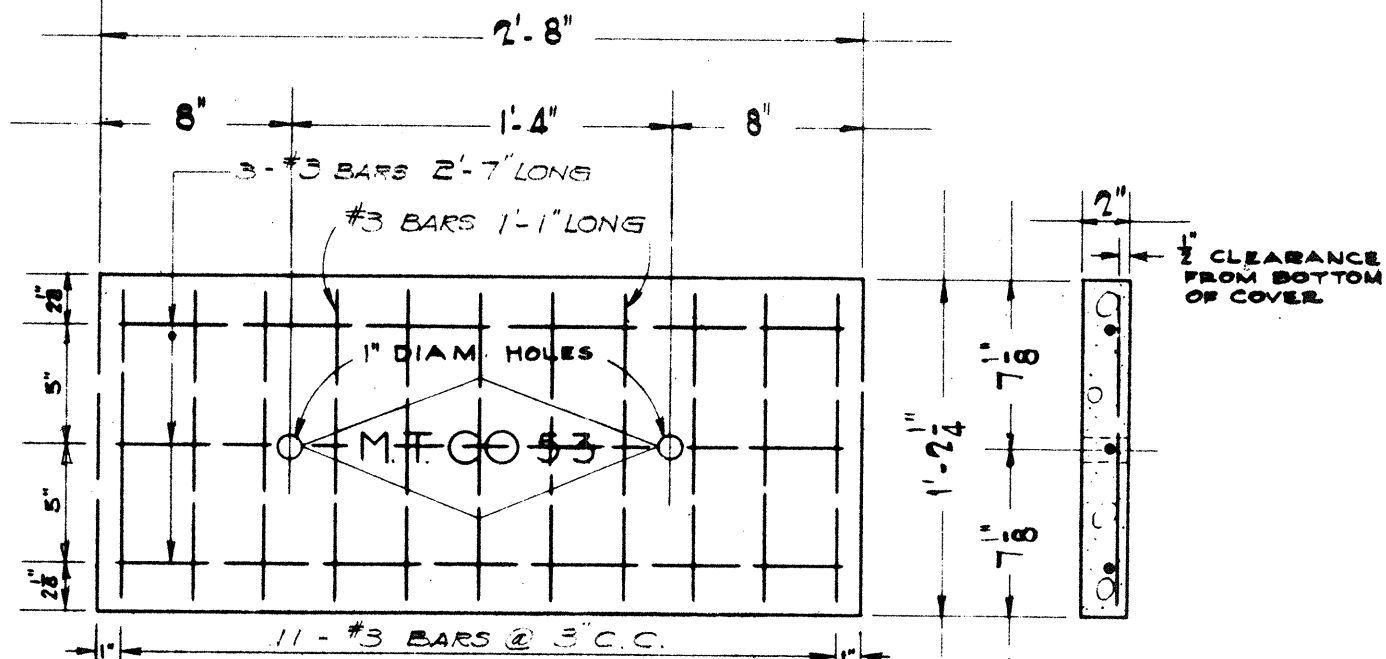
H.E. CO. PULLBOX No U1-103-L
H.T. CO. PULLBOX No 516

NOTE:

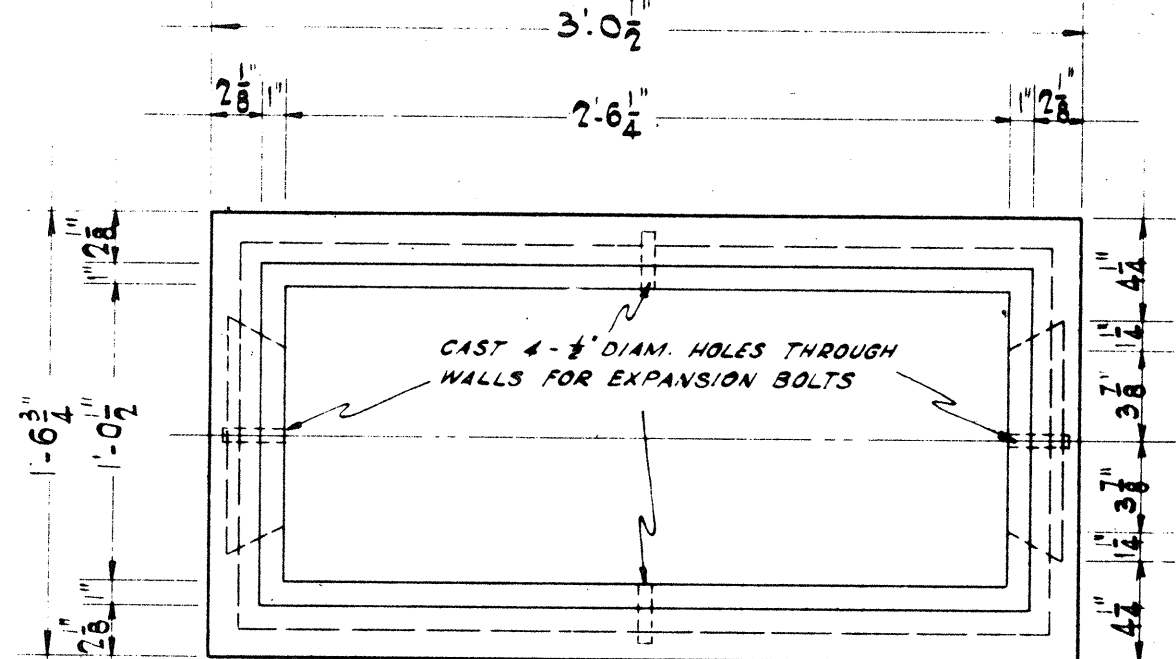
1. THE PULL BOXES SHOWN ON THIS SHEET ARE TO BE USED BY BOTH THE HAWAIIAN TELEPHONE CO. AND THE HAWAIIAN ELECTRIC CO.
2. PULL BOXES TO BE FURNISHED BY THE UTILITY COMPANIES.
3. CONTRACTOR TO FURNISH BRICKS AND CONSTRUCT WALLS (INCIDENTAL TO ITEM OF "INSTALLING PRECAST CONCRETE PULL BOXES")
4. BRICKS TO BE PLACED UNDER BOX TO BRING TOP OF BOX TO GRADE.

NOTE
REINFORCING BARS TO BE OF INTERMEDIATE GRADE & FREE OF SCALE AND OIL

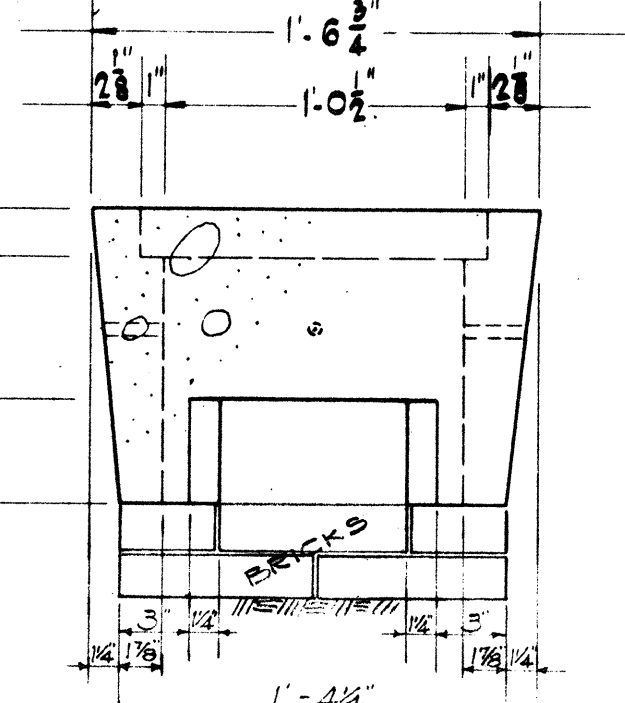
VARIES,
(to be determined
in the field)



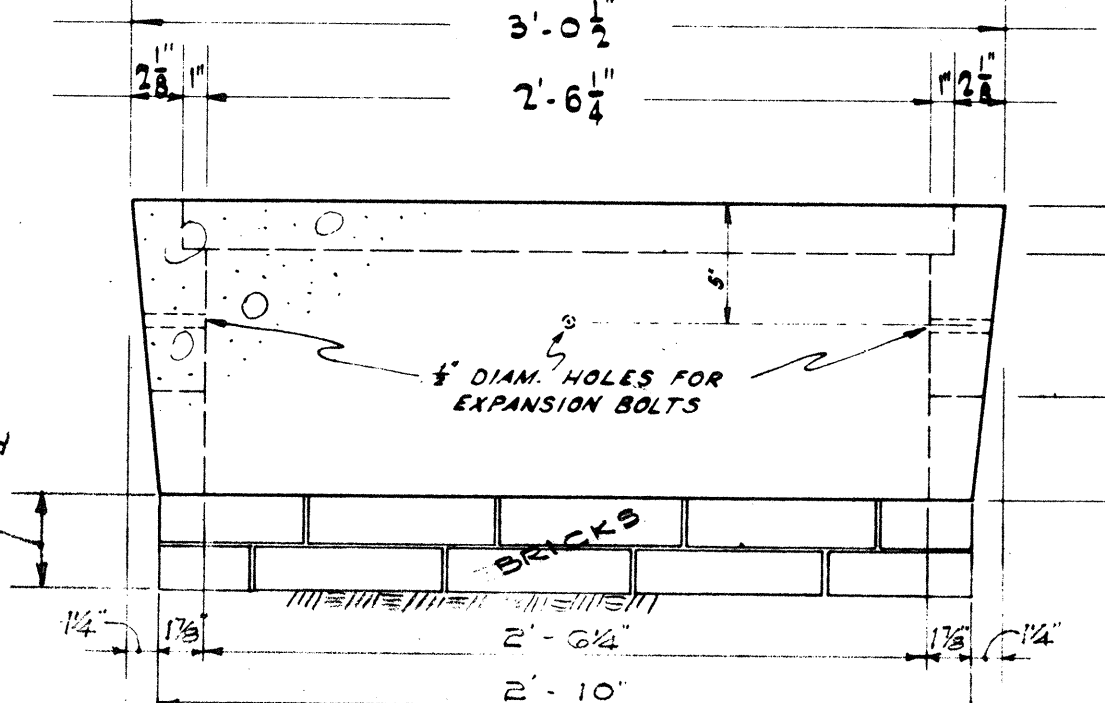
PLAN OF COVER
SCALE 1/8"=1"



PLAN
SCALE 1/8"=1"



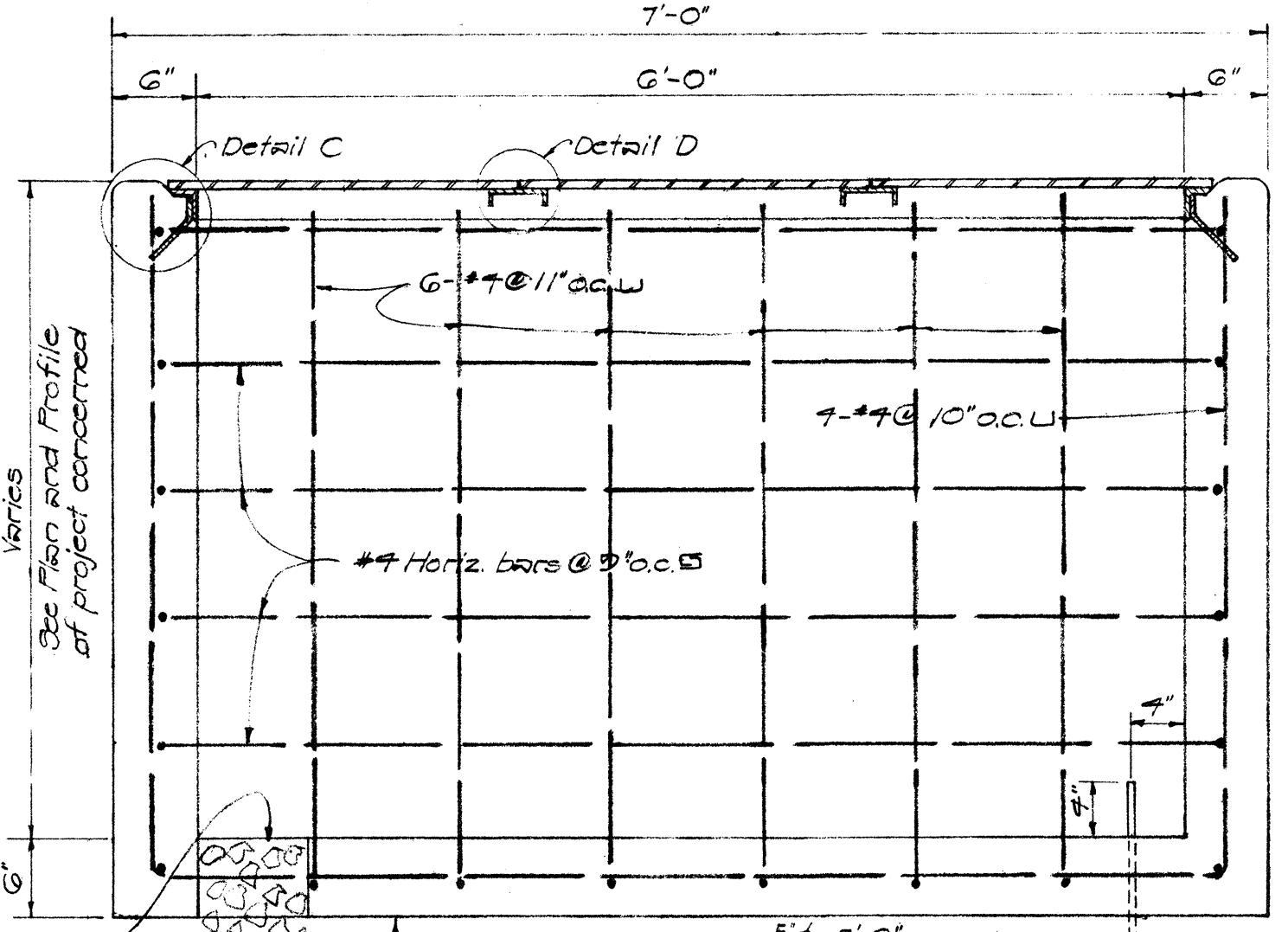
END ELEVATION
SCALE 1/8"=1"



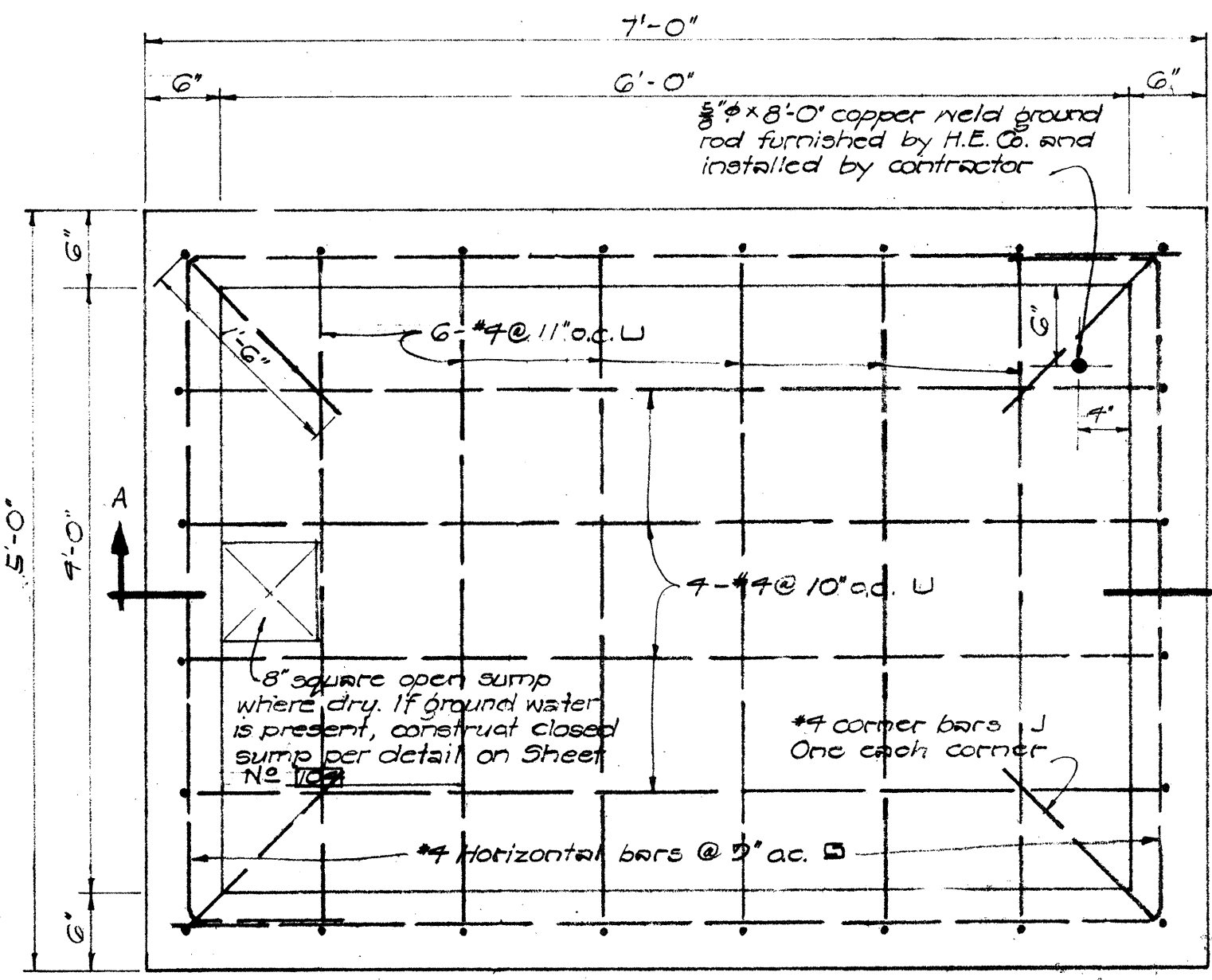
SIDE ELEVATION
SCALE 1/8"=1"

H.E. CO. PULLBOX No U1-103-S
H.T. CO. PULLBOX No 515

NOTE: For Detail C & Detail D
see Sht. No 107

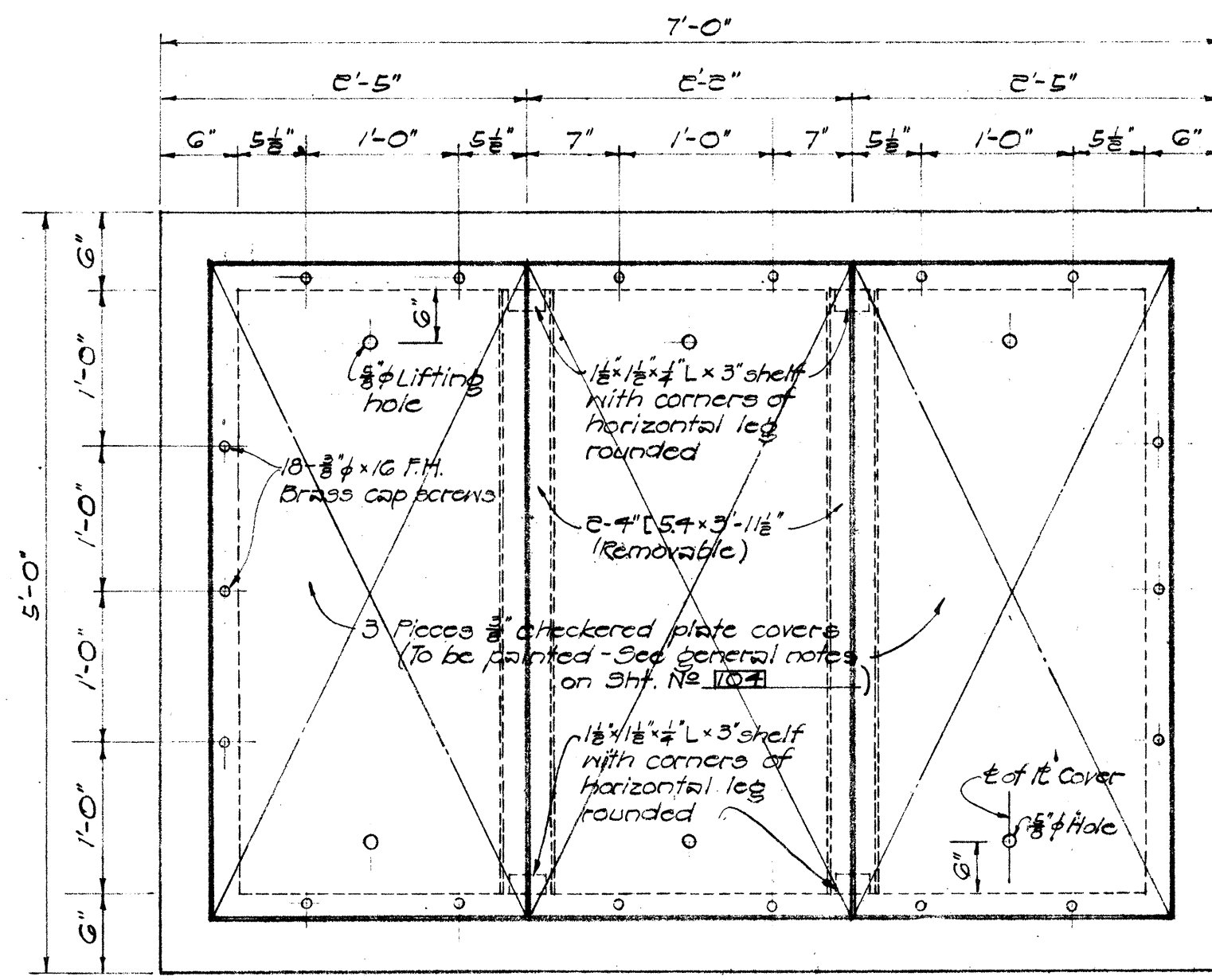


SECTION A-A



SECTIONAL PLAN

H. E. CO. HANDHOLE TYPE #3
(4'-0" x 6'-0" INSIDE)
Scale: 1"=1'-0"



PLAN

APPROVED:
HAWAIIAN ELECTRIC CO., LTD.
DATE 1/13/59
HAWAIIAN TELEPHONE CO., LTD.
DATE 1/13/59
PLANT ENG'G. SUPV., H. T. CO., LTD.
DATE 1-13-59

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII
DETAIL OF HAWAIIAN ELECTRIC CO.
HANDHOLE, & HAWAIIAN ELECTRIC CO.
& HAWAIIAN TELEPHONE CO. PULLBOXES.
MOANALUA ROAD US-0720(3) UNIT 3
LUNALILO FREEWAY BU-072-1(2) UNIT 4
MIDDLE STREET BU-065-1(1) UNIT 3
SCALE: AS SHOWN
SEPT. 1957

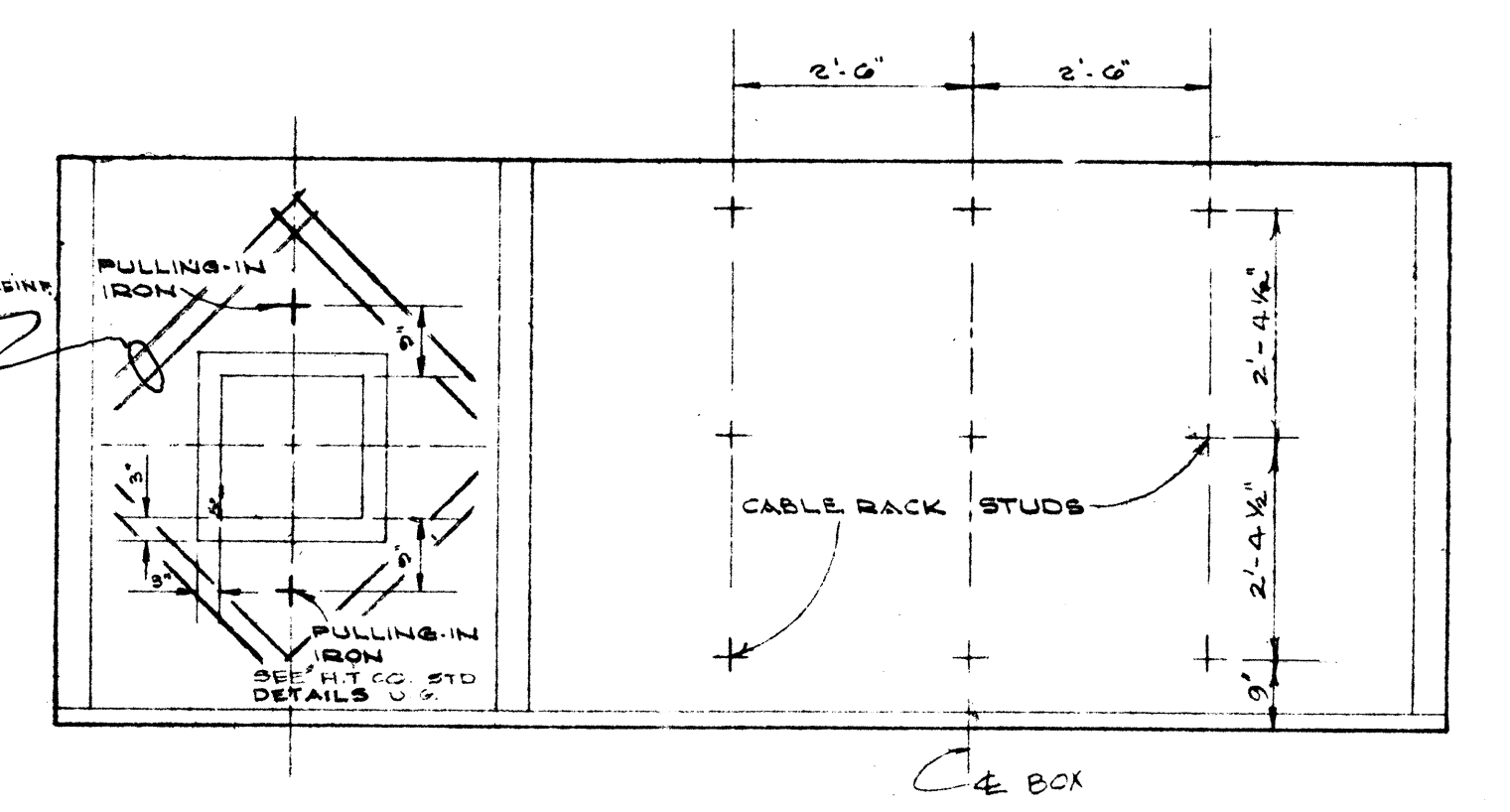
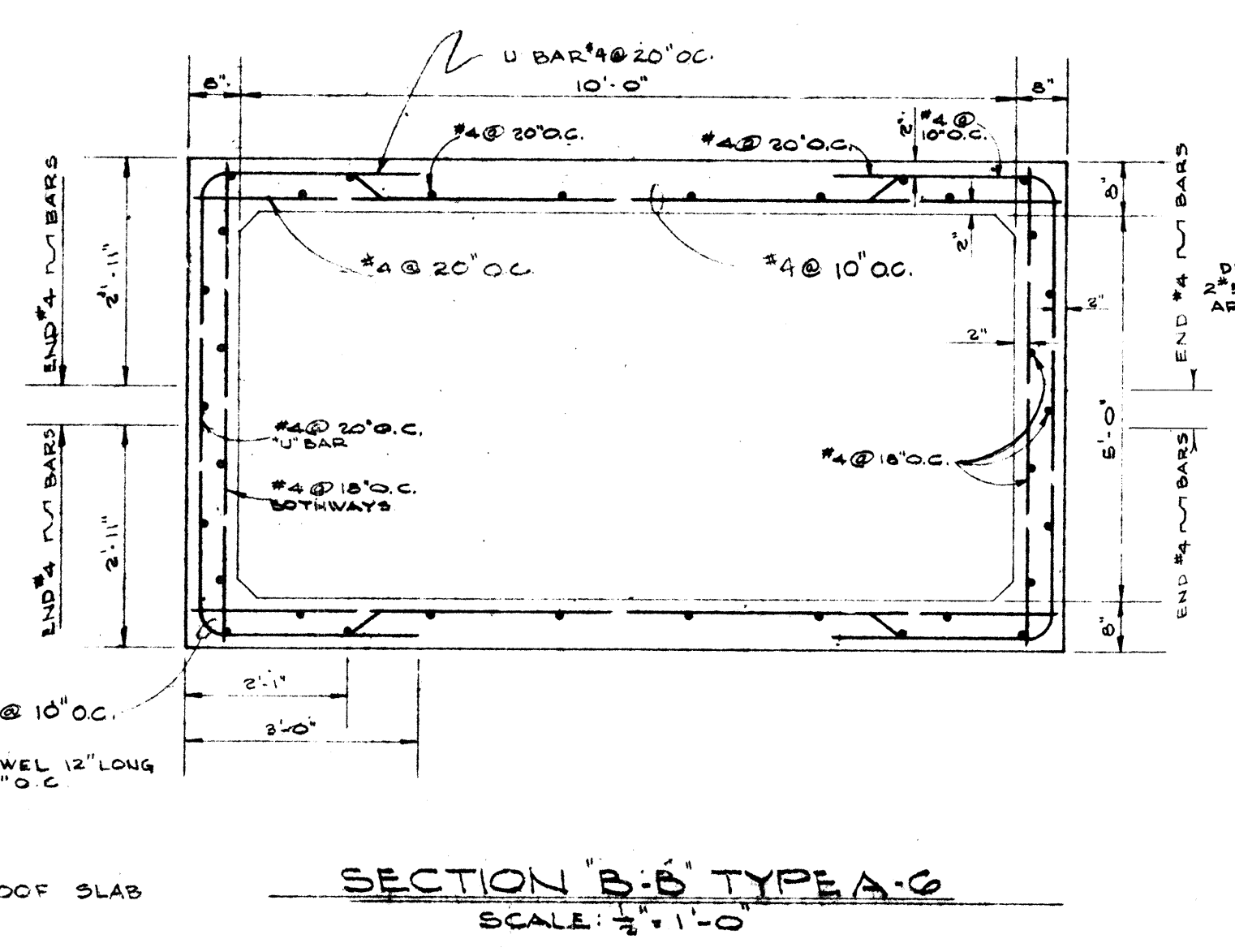
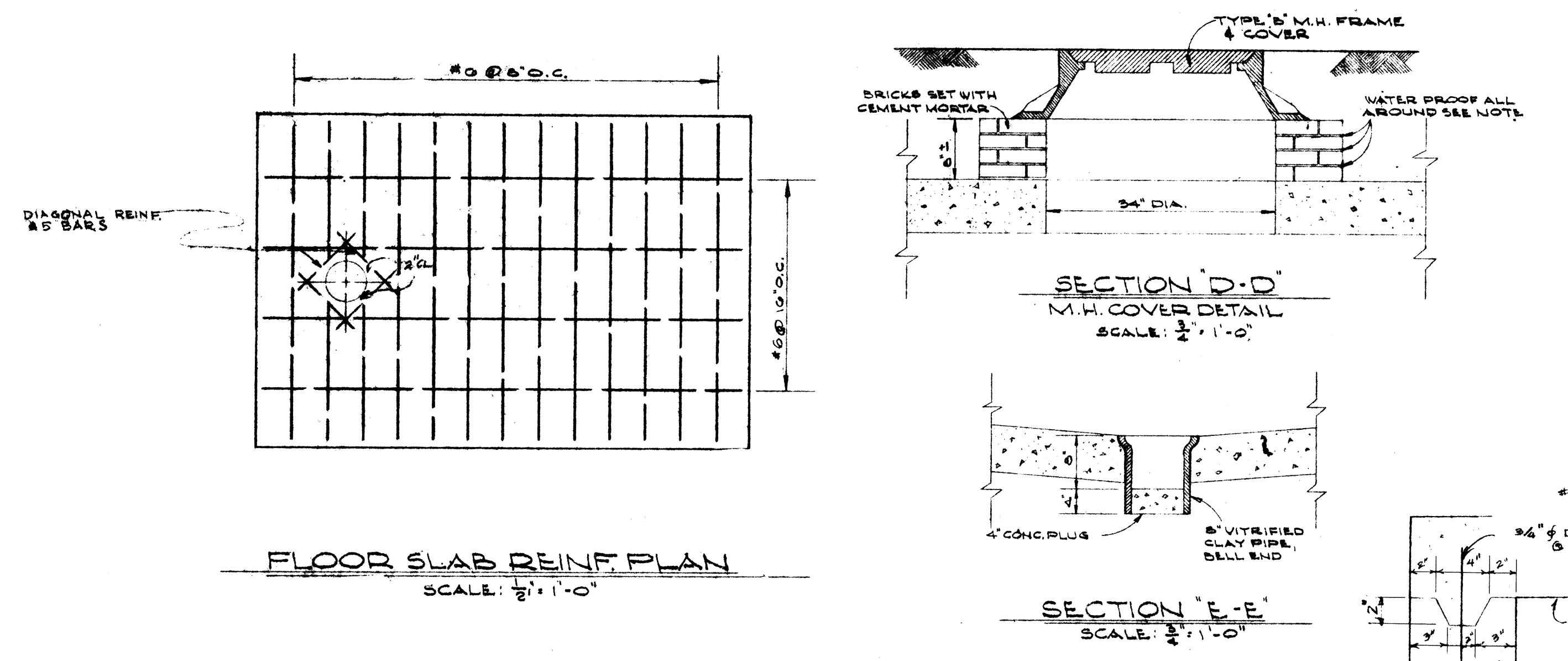
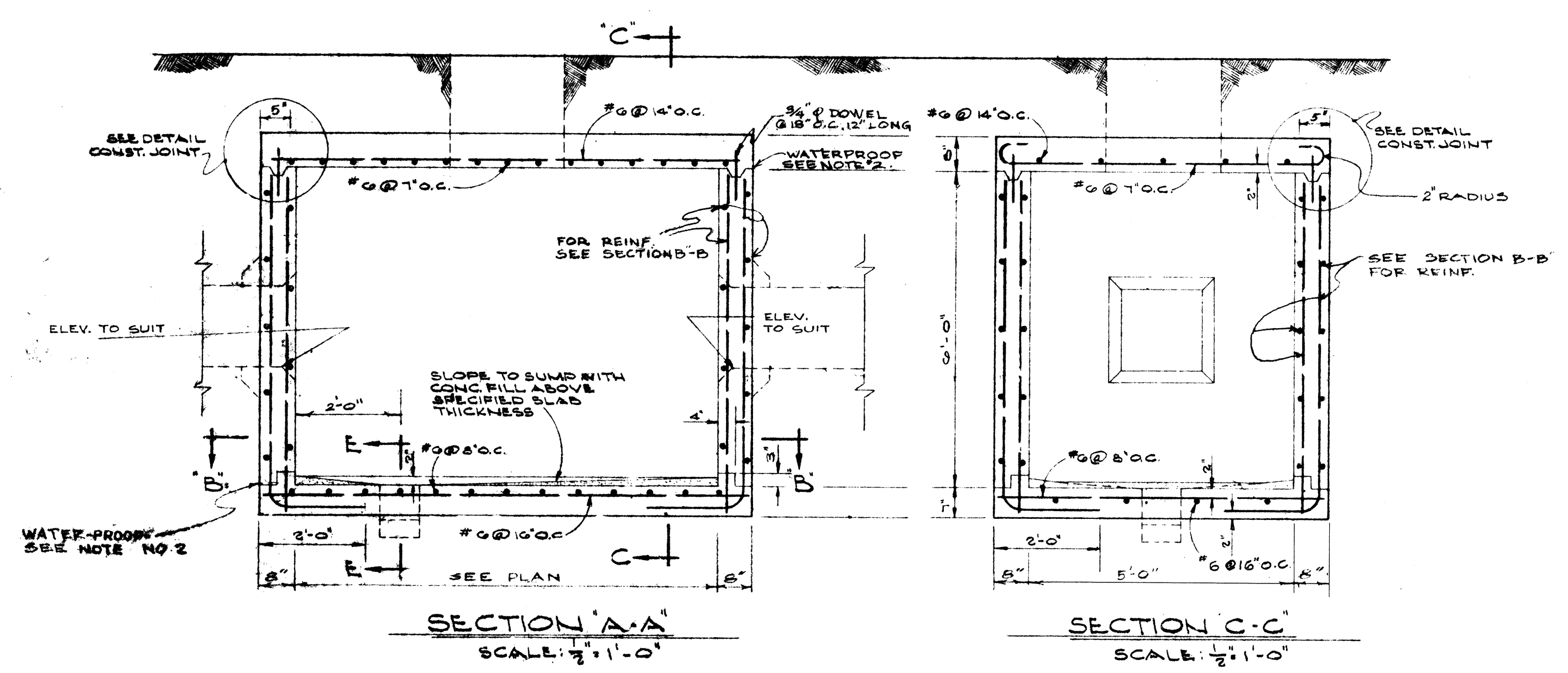
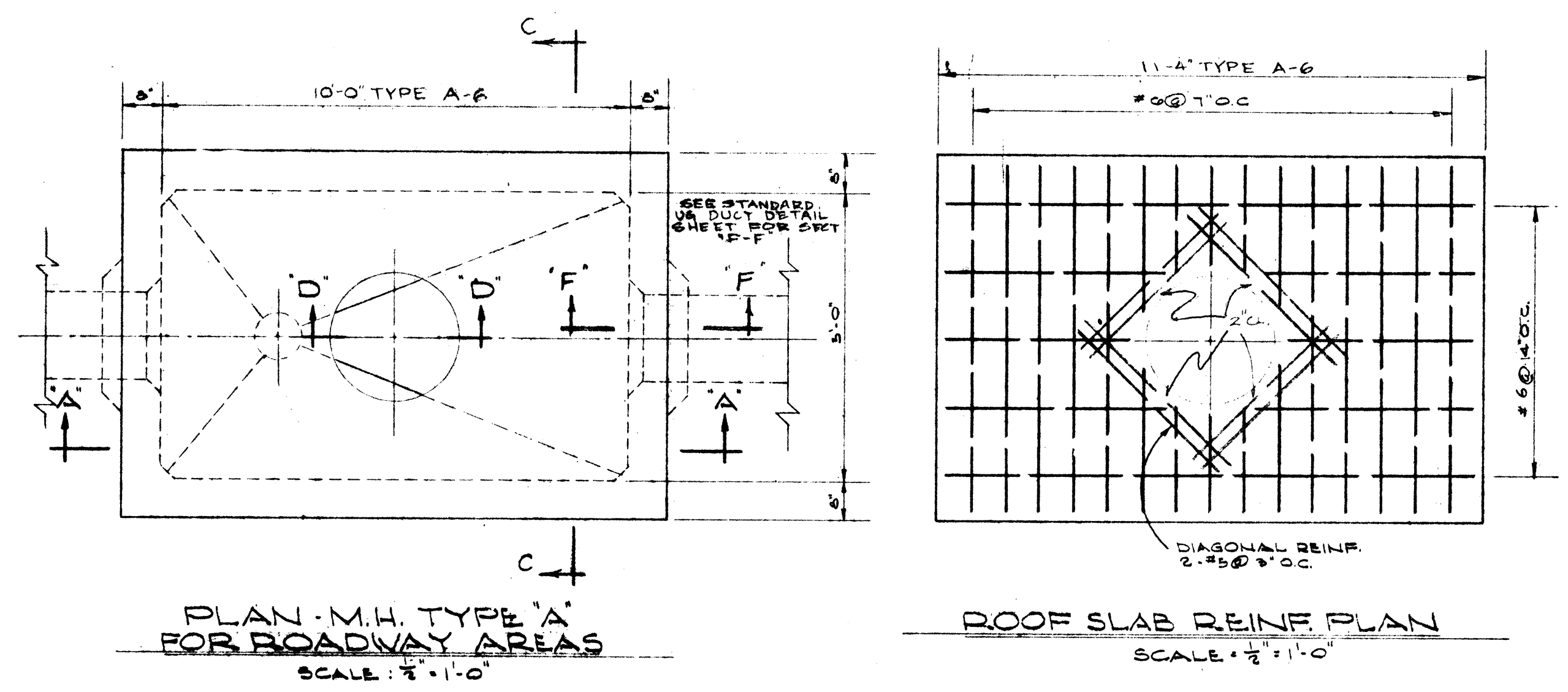
SHEET No. 3 OF 6 SHEETS

SURVEY PLOTTED BY	DATE
DESIGNED BY	
DRAWN BY	
CHECKED BY	
NOTE BOOK	
QUANTITIES CHECKED BY	
NO.	

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW.	US-5-07208 Unit 3 BU-065-10	1960	35A	79
		Unit 3	1960	35A	118

GENERAL NOTES:

- DESIGN DATA
F_s = 20,000 PSI
F_c = 3,000 PSI; F_c = 1,200 PSI
n = 10
W = EQUIV. FLUID PRESS. 30#/FT.²
- ALL CONSTRUCTION JOINTS SHALL BE WATERPROOFED WITH TWO APPLICATIONS OF THORO SEAL OR EQUAL.
- FOR DUCT WINDOW DETAILS SEE SECTION "F-F" STANDARD UNDERGROUND DETAIL SHEET.



ELEVATION OF INSIDE WALLS TYPES A-5, A-G
SCALE: 1/2" = 1'-0"

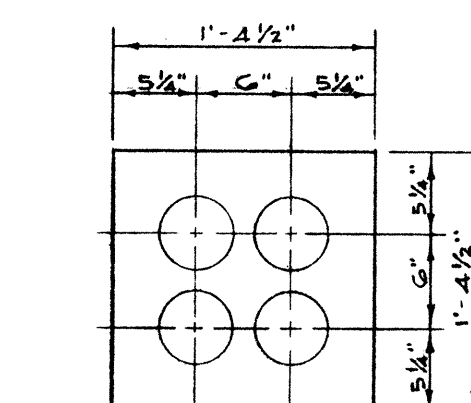
THIS SHEET SUPERCEDES SHT. 39

FILE	DR. R.S.	ENG. J. TAKAHASHI	TYPE 'A' MANHOLES FOR ROADWAY AREAS
APPROVED	CHK. J. TAKAHASHI	TEL. 1-5	
CONSTRUCTION	INDEX	APP'D. 2X	
MAINTENANCE			
ACTG.			
ENGR.			
TOTAL PRINTS			
HAWAIIAN TELEPHONE COMPANY HAWAII			DATE 5-31-60 SHEET 3 OF 4
HAWAII STATE HIGHWAY DEPARTMENT STATE OF HAWAII Moanalua Road Middle Street			977-400-1 D

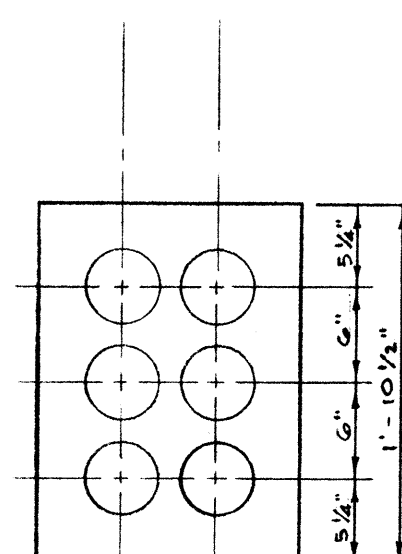
S 5 2 6 . 3 5 A

S 1 6 1 . 5 5 A

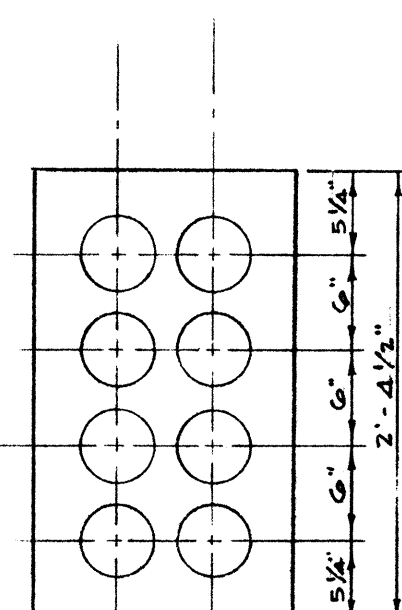
FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAUAI	HAW.	US-5-0720(3) Unit 3	1960	33B	79
		BU-0724(2) Unit 4	1960	57A	115
		BU-0655(1) Unit 3	1960	55B	118



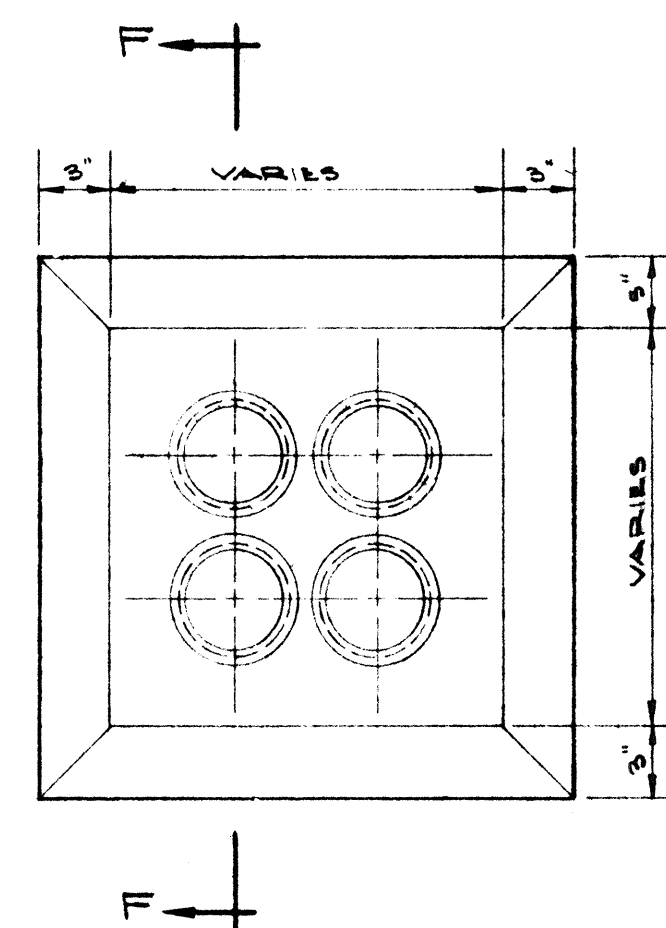
2 WIDE X 2 HIGH
4 DUCTS



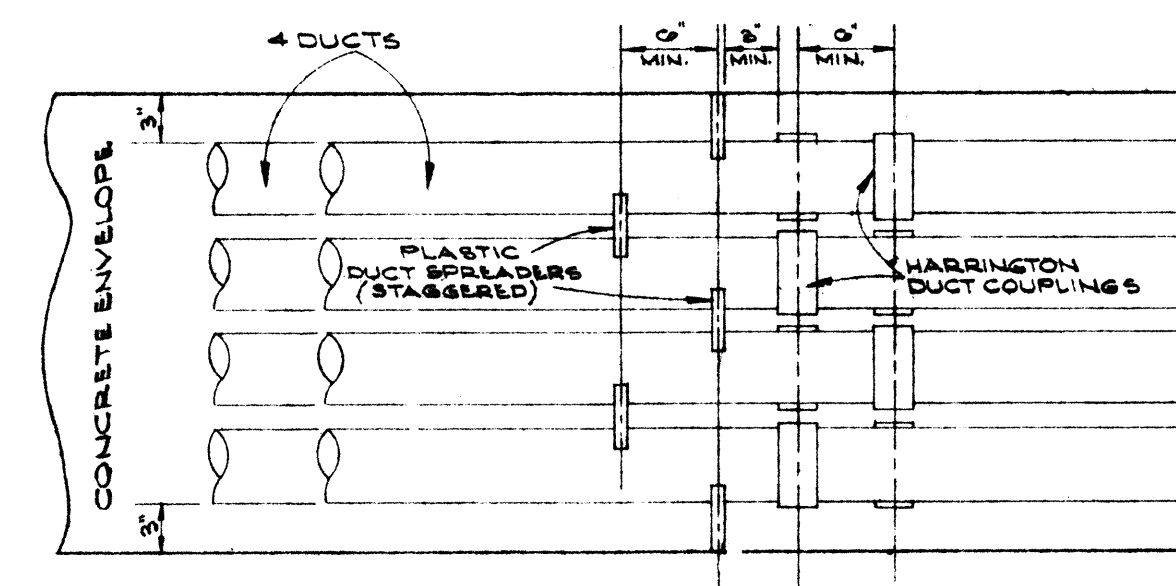
2 HIGH X 3 WIDE
6 DUCTS



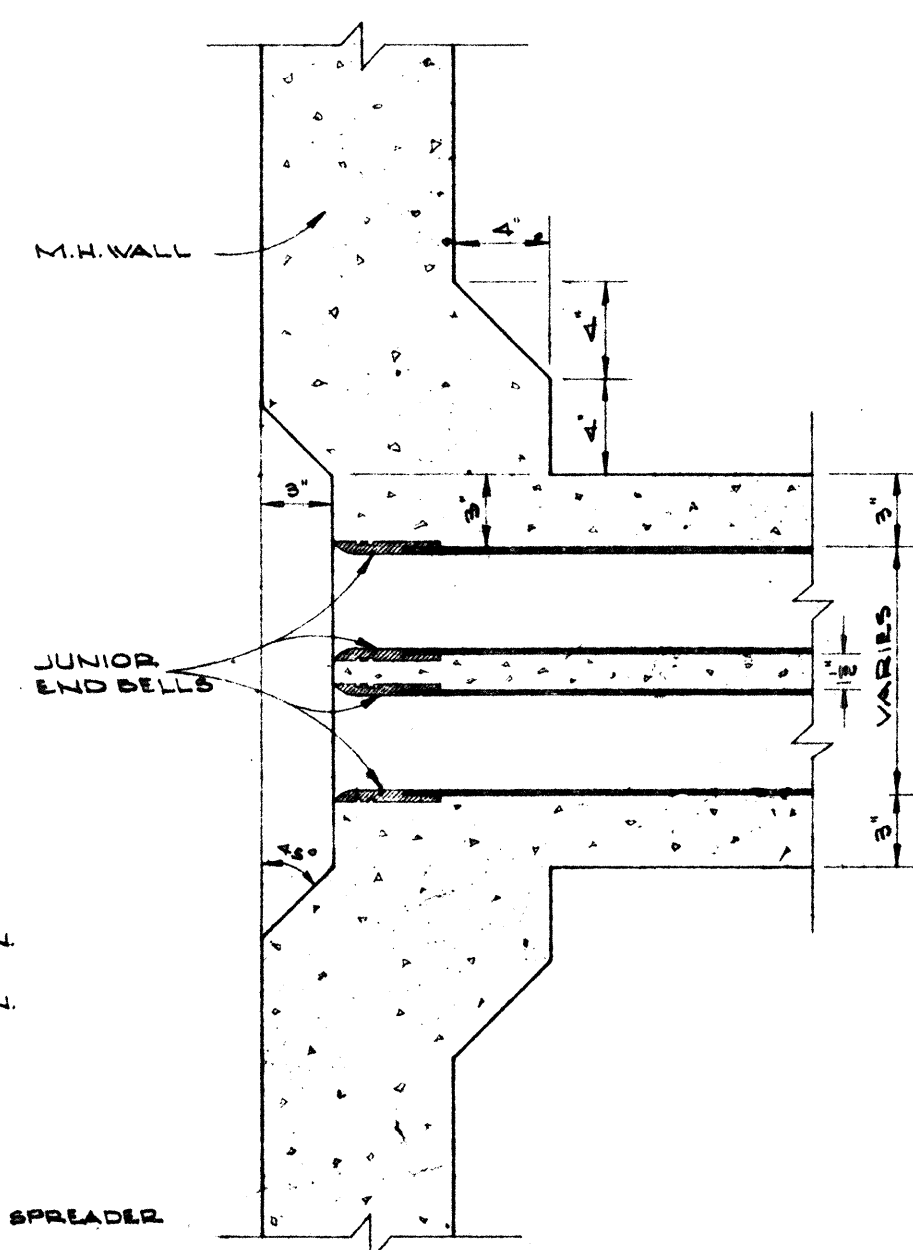
2 HIGH X 4 WIDE
8 DUCTS



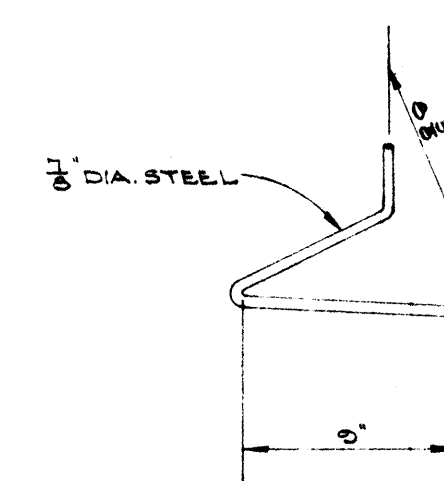
TYPICAL MANHOLE
DUCT WINDOW
SCALE 1/2" = 1'-0"



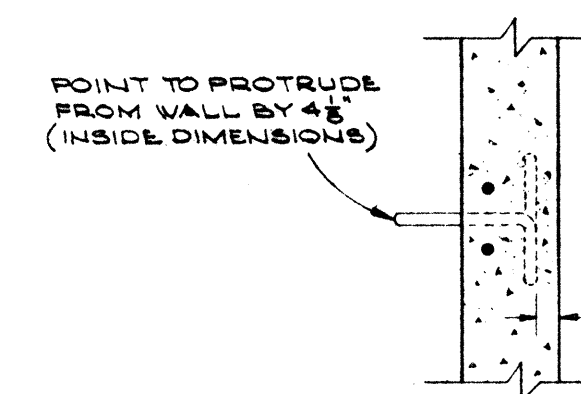
TYPICAL DUCT ENVELOPE ELEVATION
ARRANGEMENT OF COUPLING & PLASTIC SPACERS
SCALE 1"=1'-0"



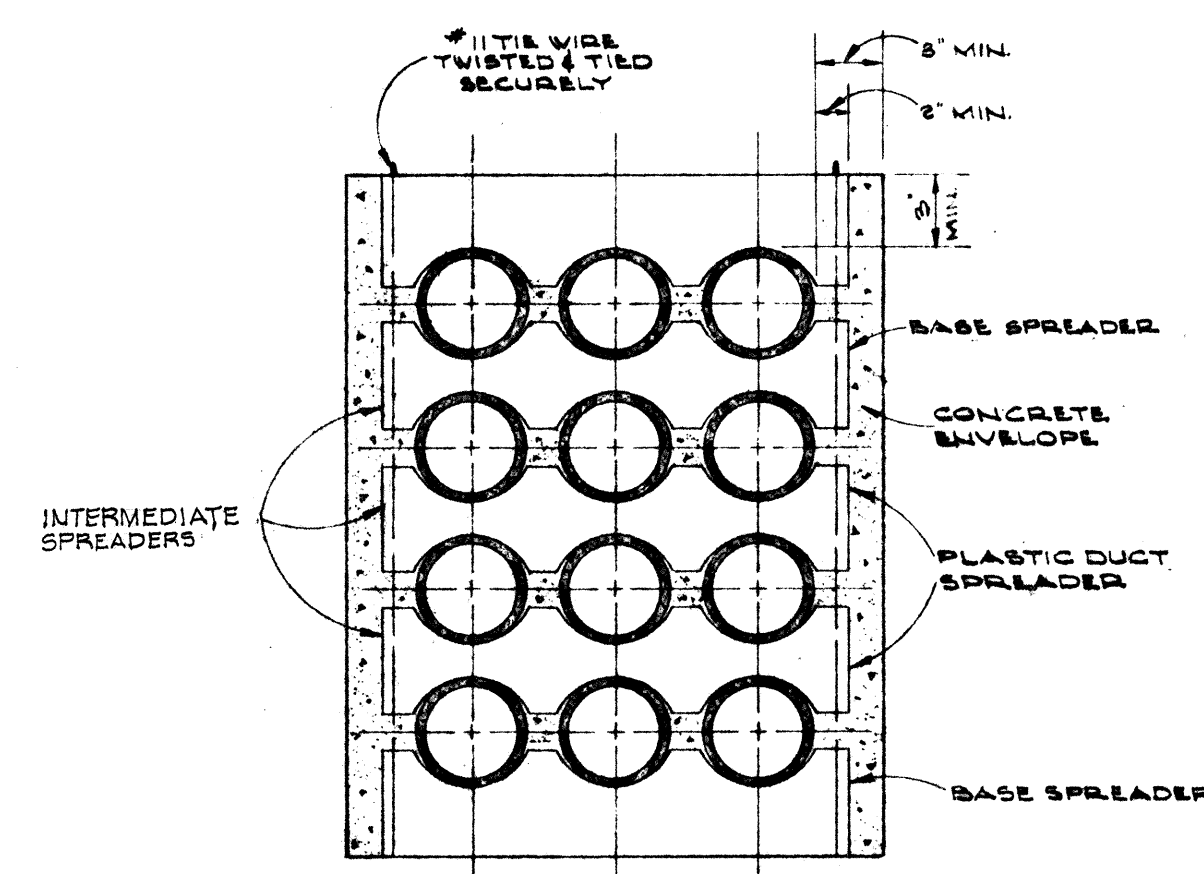
SECTION F-F
TYPICAL STUB OUT DETAIL
& JUNIOR END BELL
SCALE 1 1/2"=1'-0"



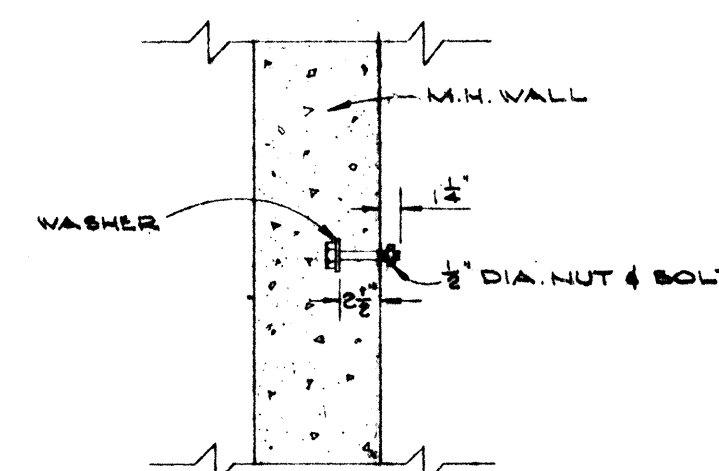
PULLING-IN IRON



SECTIONAL VIEW
OF PULLING-IN-IRON
SCALE $\frac{3}{4}'' = 1'-0''$



SECTION SHOWING SPACERS



CABLE RACK STUD
BOLT DETAIL
SCALE 1/2" = 1'-0"

STANDARD DUCT FORMATIONS

THIS SHEET IS ADDITIONAL TO SHT. 89A

FILE	3	DR. R.S.	ENG. J. TAKAHASHI	BU-0657(1)	Unit 3
ASSIGNMENT	3	CHK. <i>[Signature]</i>	TBL. 195	STANDARD DUCT FORMATION	
CONSTRUCTION	13	INDEX	APP'D. <i>[Signature]</i>	AND MANHOLE DETAILS	
MAINTENANCE		HAWAIIAN TELEPHONE COMPANY		DATE 5-31-60	977-400-1
ACCTG	1	HAWAII		SHEET 4 of 4	
ENGINE	71				
TOTAL PRINTS					

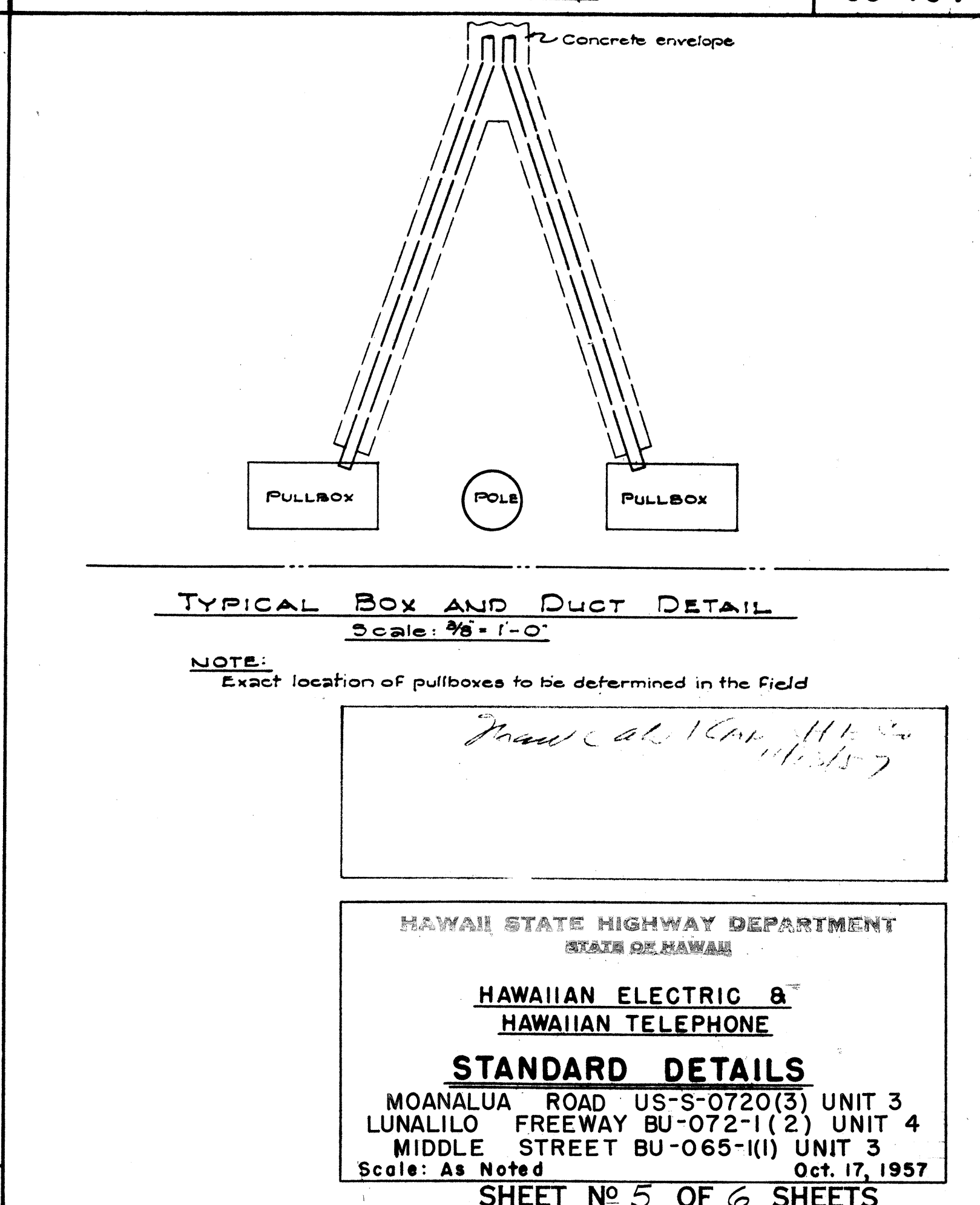
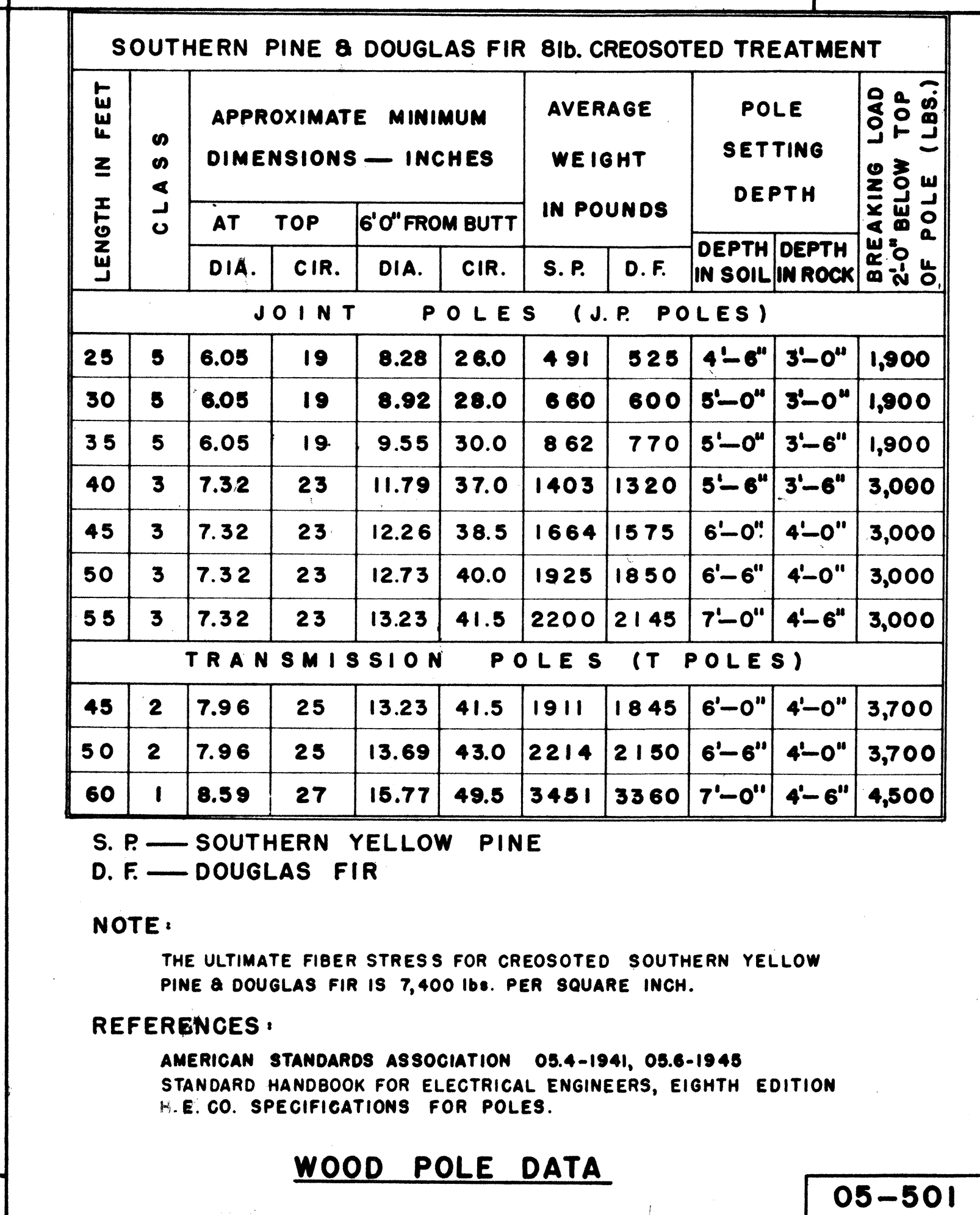
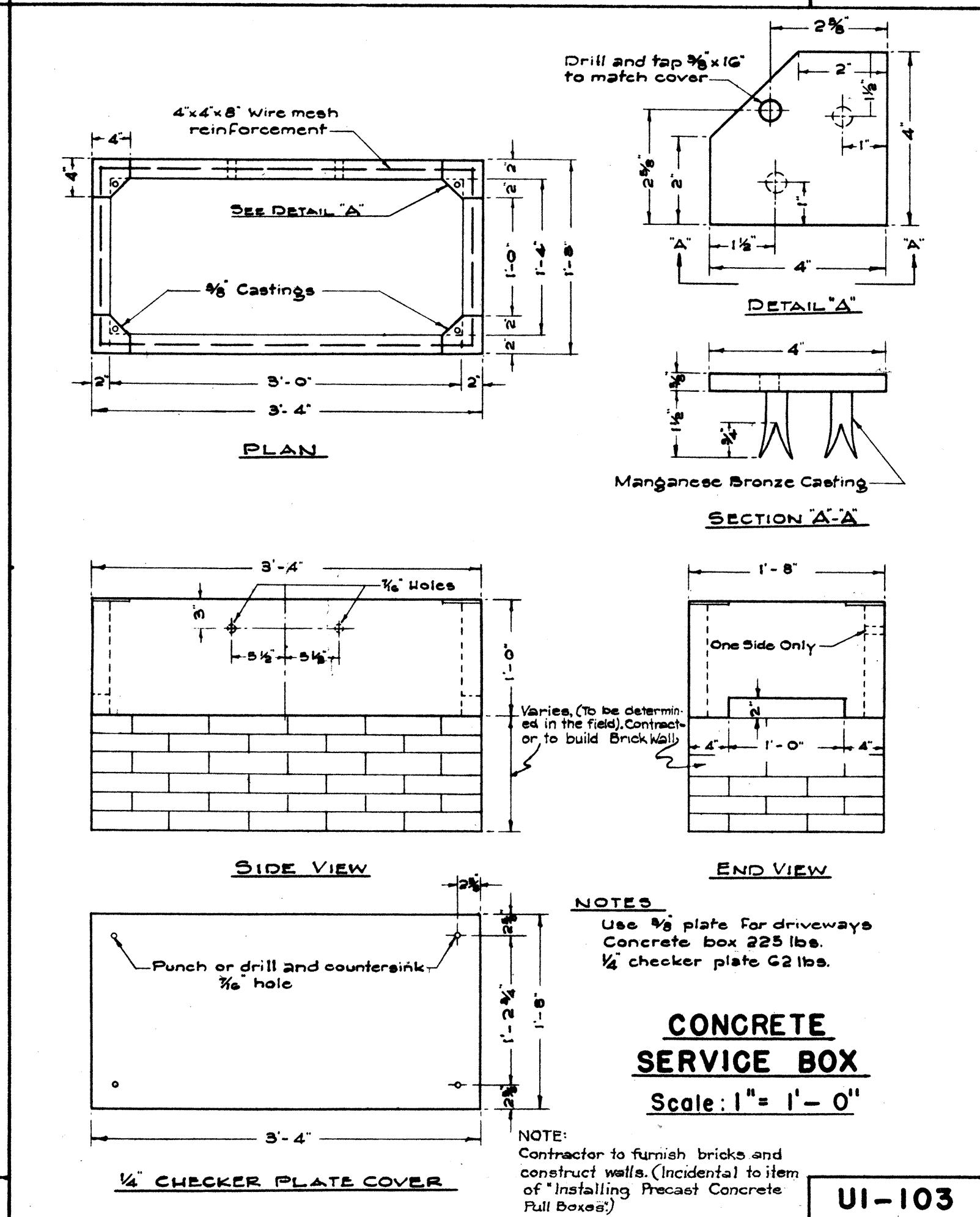
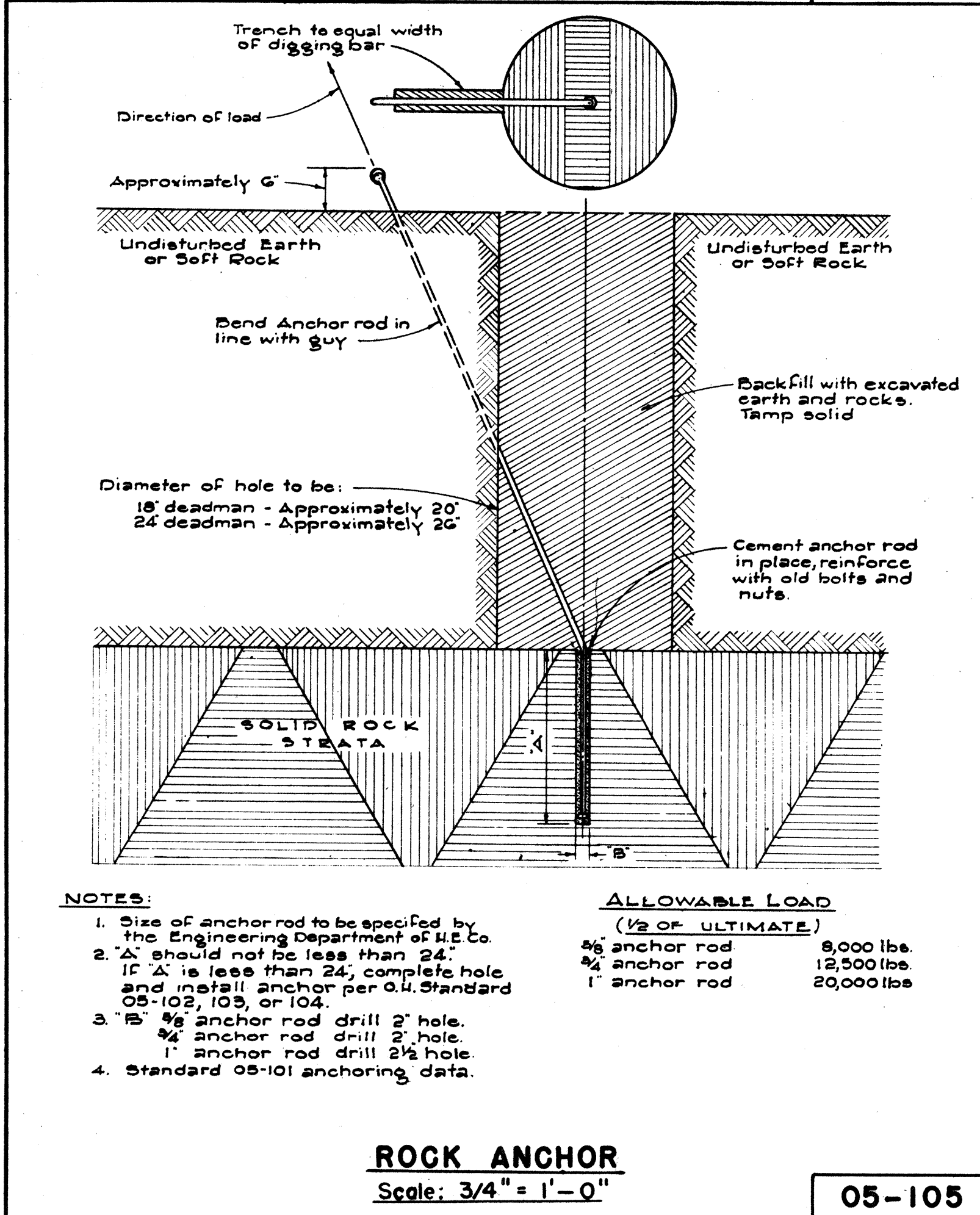
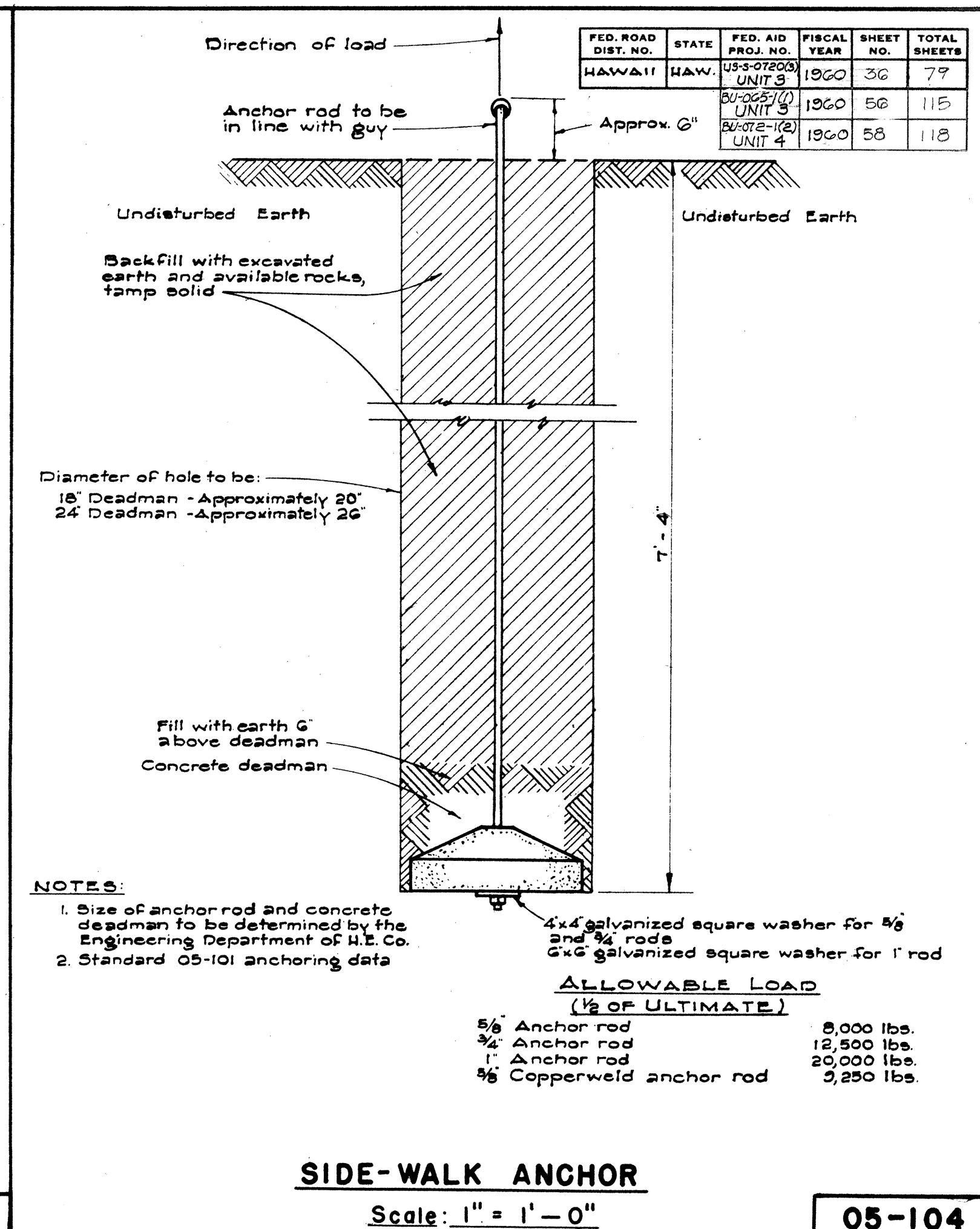
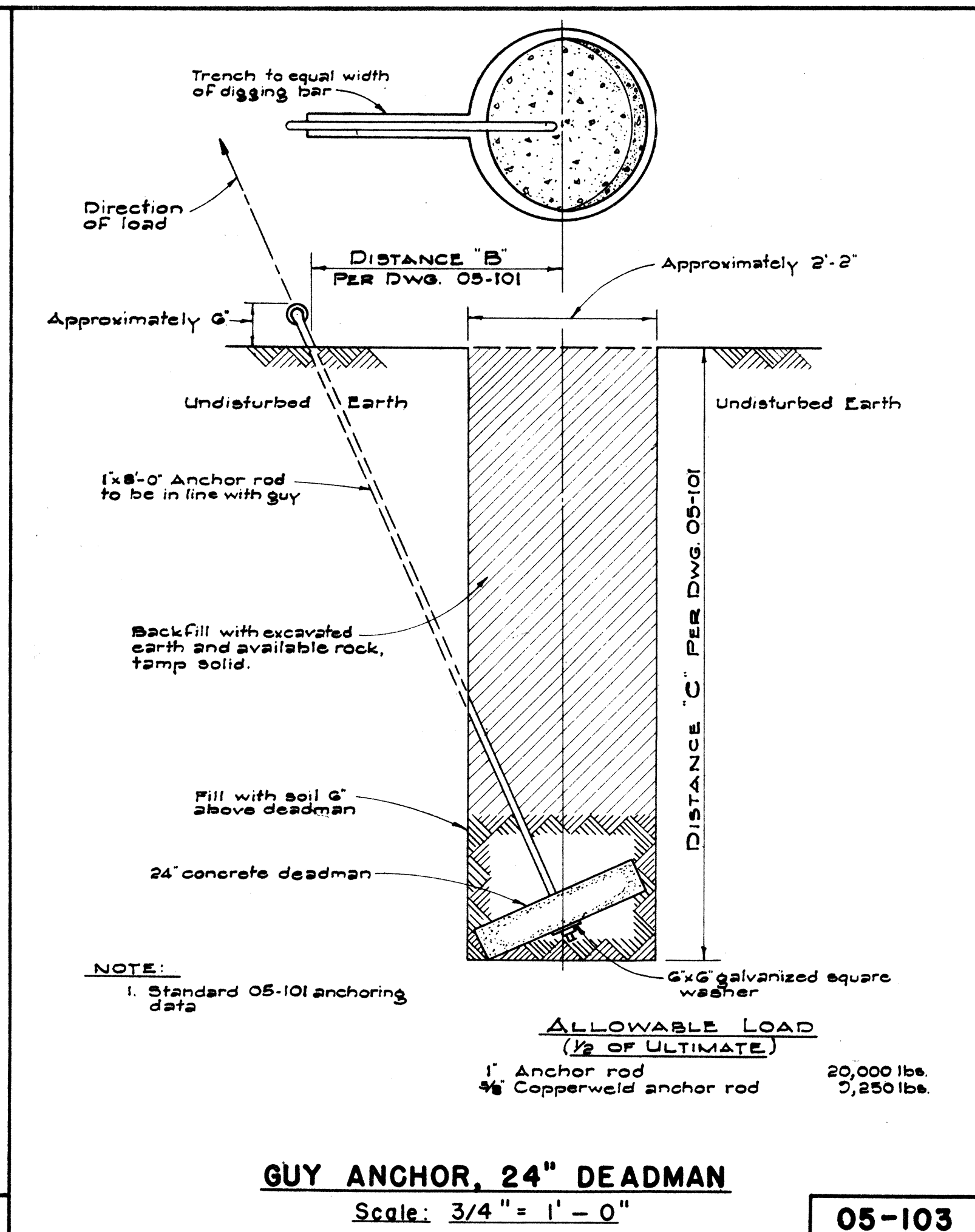
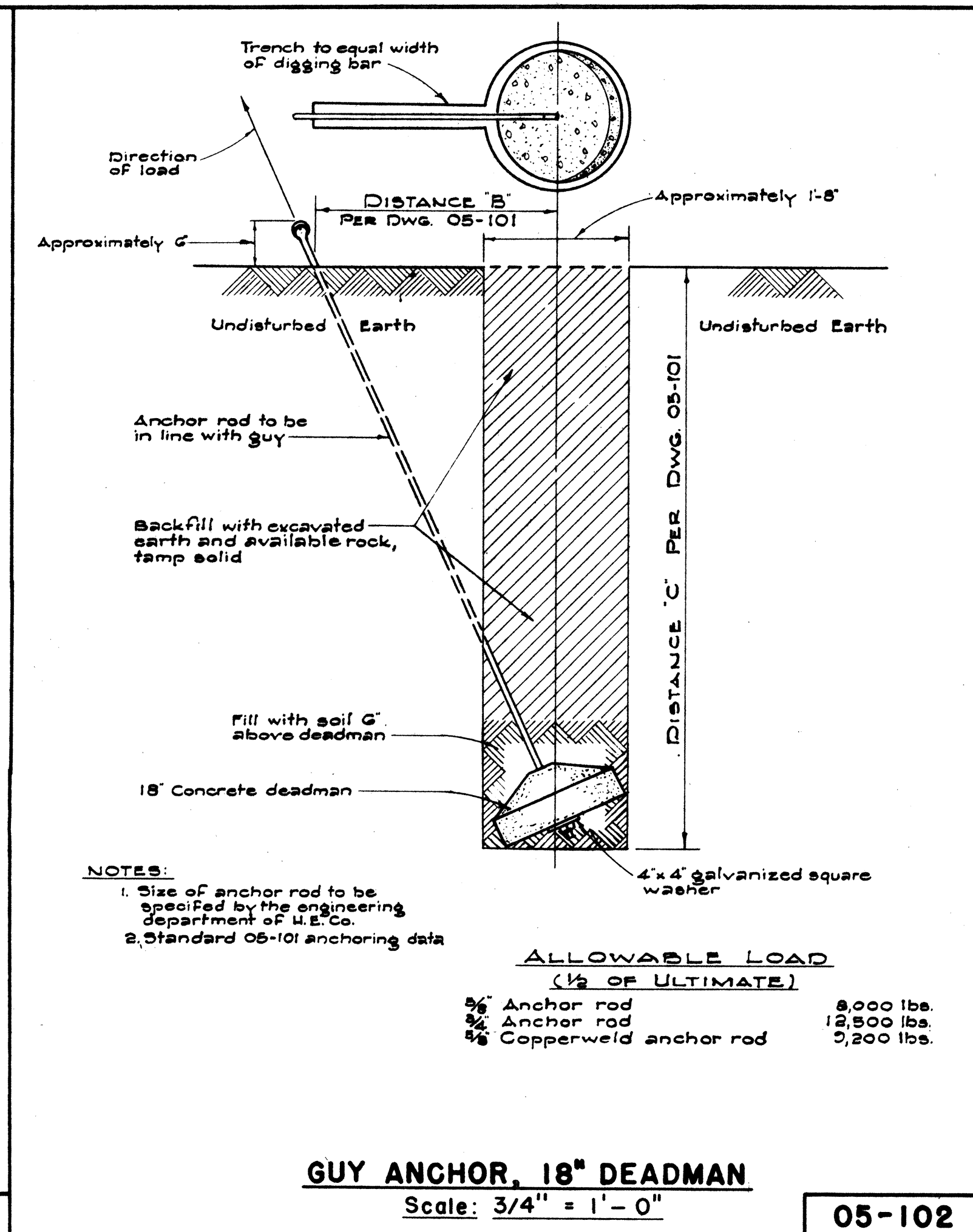
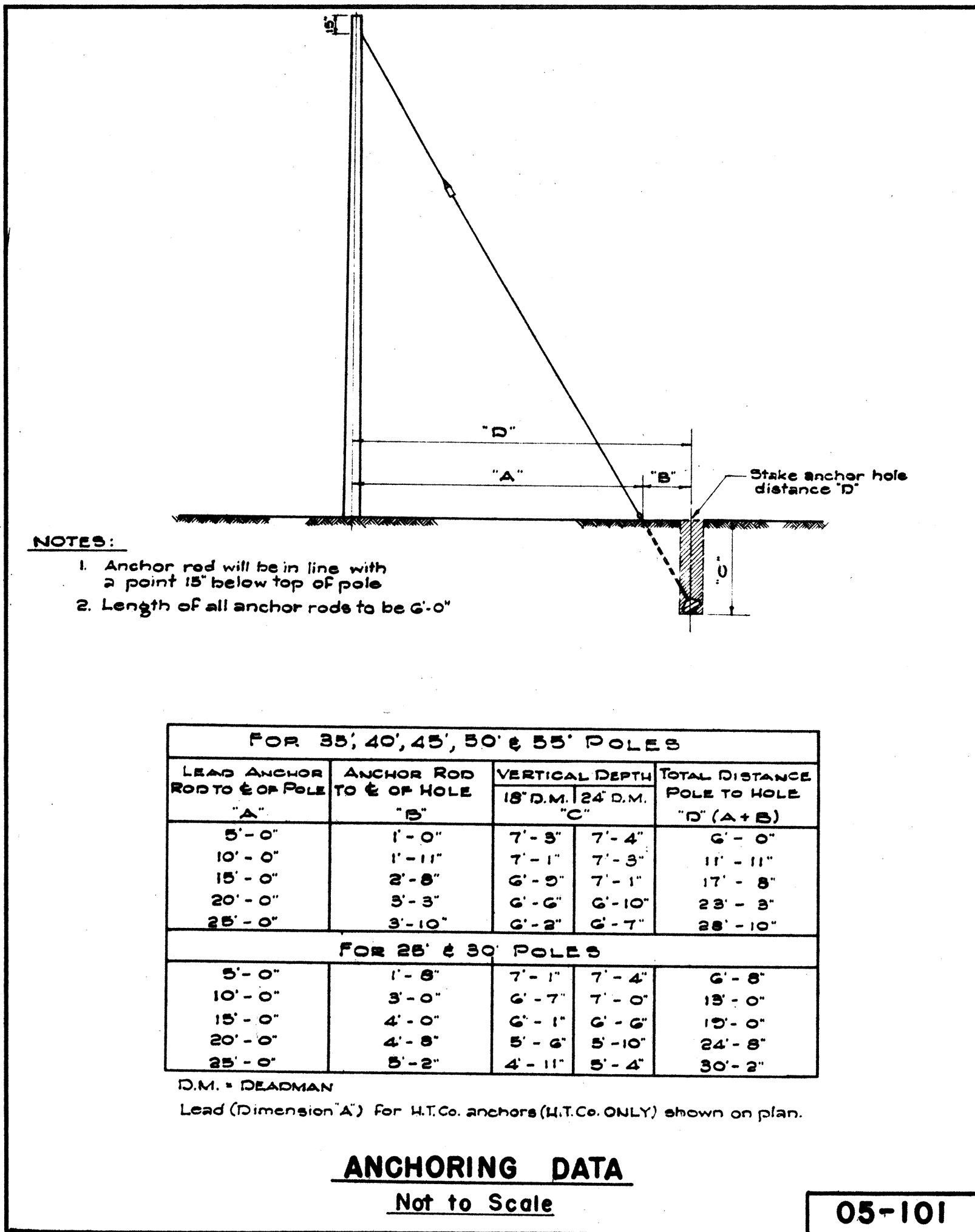
\$ 526.3513

\$ 174.55

HAWAII SHEET 4 OF 4

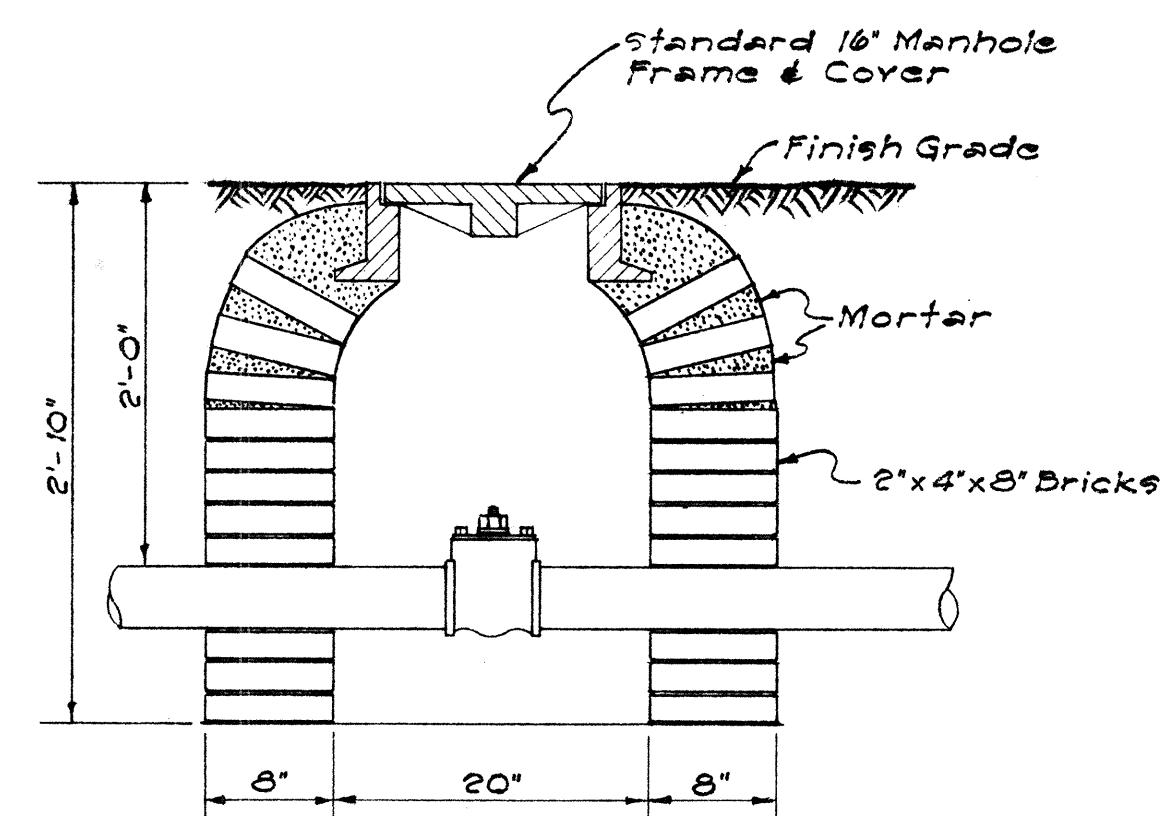
\$ 161.55

89

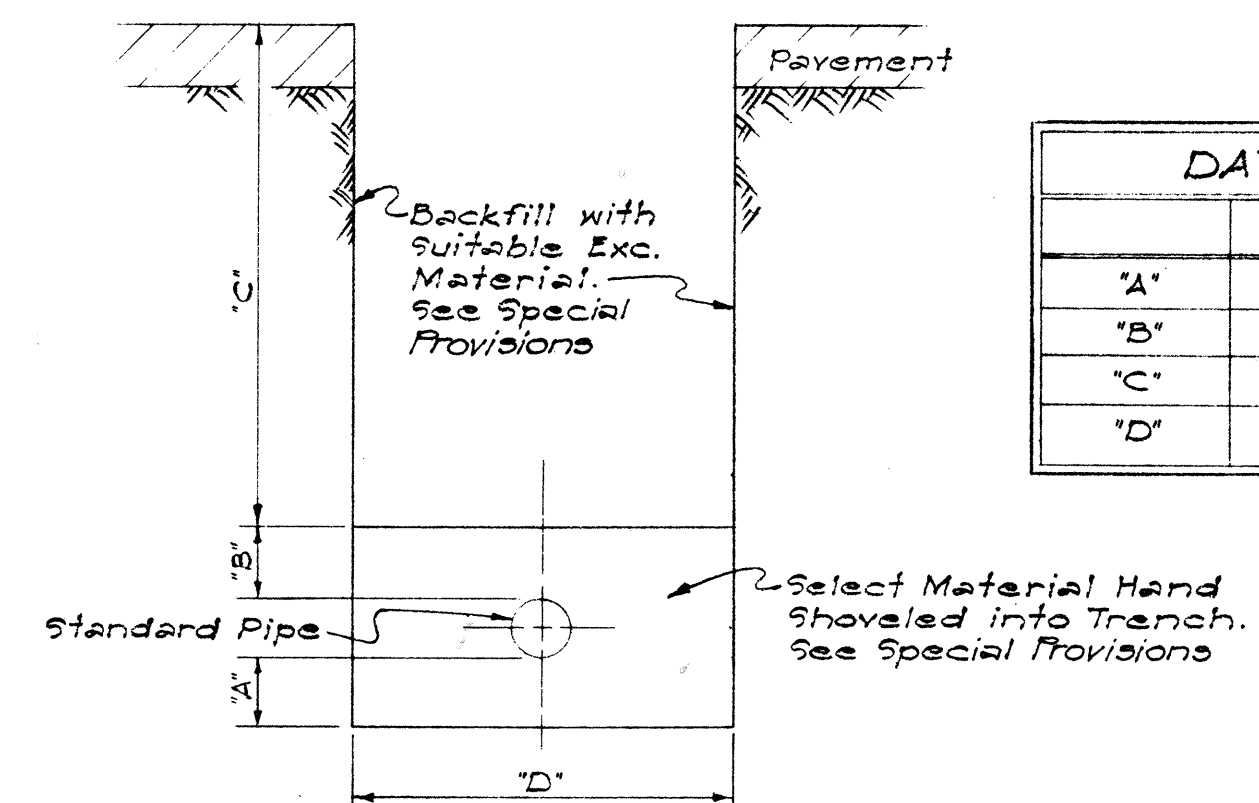


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	US-0720(3) UNIT 3	1960	37A	79
		BU-072-1(2) UNIT 4	1960	59A	118
		BU-065-1(1) UNIT 3	1960	57A	115

Revised
Jan. 16, 1961

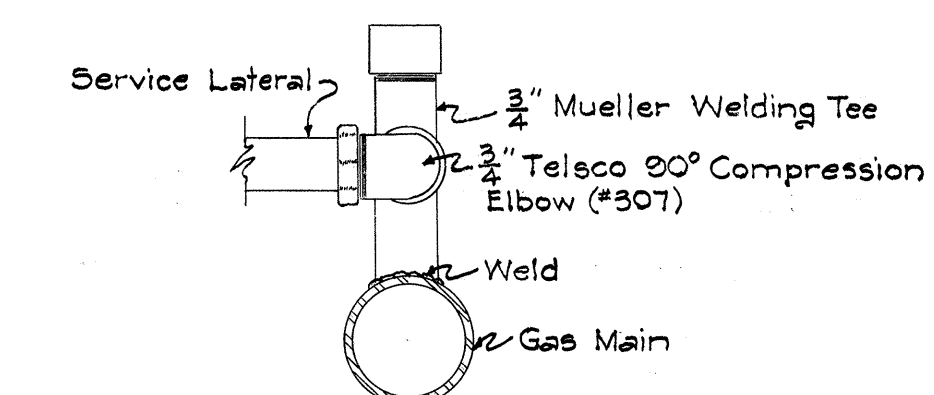


TYPICAL 16" GAS MANHOLE
Scale: 1" = 1'-0"

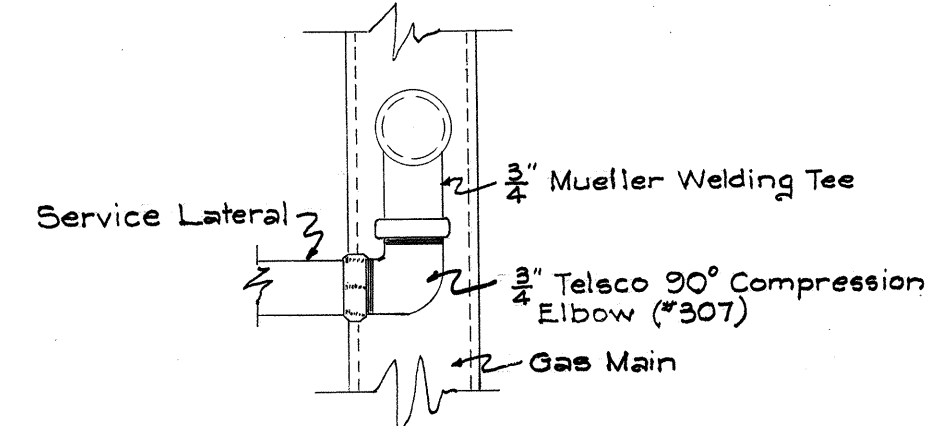


METHOD OF BACKFILL
Not to Scale

	4" Pipe	2" Pipe	1" Pipe
"A"	3"	3"	2"
"B"	3"	3"	2"
"C"	21"	21"	16"
"D"	24"	12"	12"



SIDE VIEW



TOP VIEW

TYPE SERVICE CONNECTION
Scale: 1/4" = 1"

NOTE: ABOVE DETAILS FOR GAS
LINE WORK BY HON. GAS CO., LTD.

APPROVED: *[Signature]*
ENGR. HON. GAS CO., LTD.
DATE: 1/16/59

THIS SHEET SUPERCEDES SHT. 21

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII
HONOLULU GAS CO. DETAILS
MOANALUA ROAD US-S-0720(3) UNIT 3
LUNALILO FREEWAY BU-072-1(2) UNIT 4
MIDDLE STREET BU-065-1(1) UNIT 3
Scale: As Noted Oct. 1958

SHEET NO. 6 OF 6 SHEETS

ORIGINAL PLAN	DATE
DESIGNED BY	
TRACED BY	
QUANTITIES BY	
NOTE BOOK	
CHECKED BY	
NO.	