

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO	TOTAL SHEETS
HAWAII	HAW.		1967	3	6

Revised: June 1965
Revised: August 1967

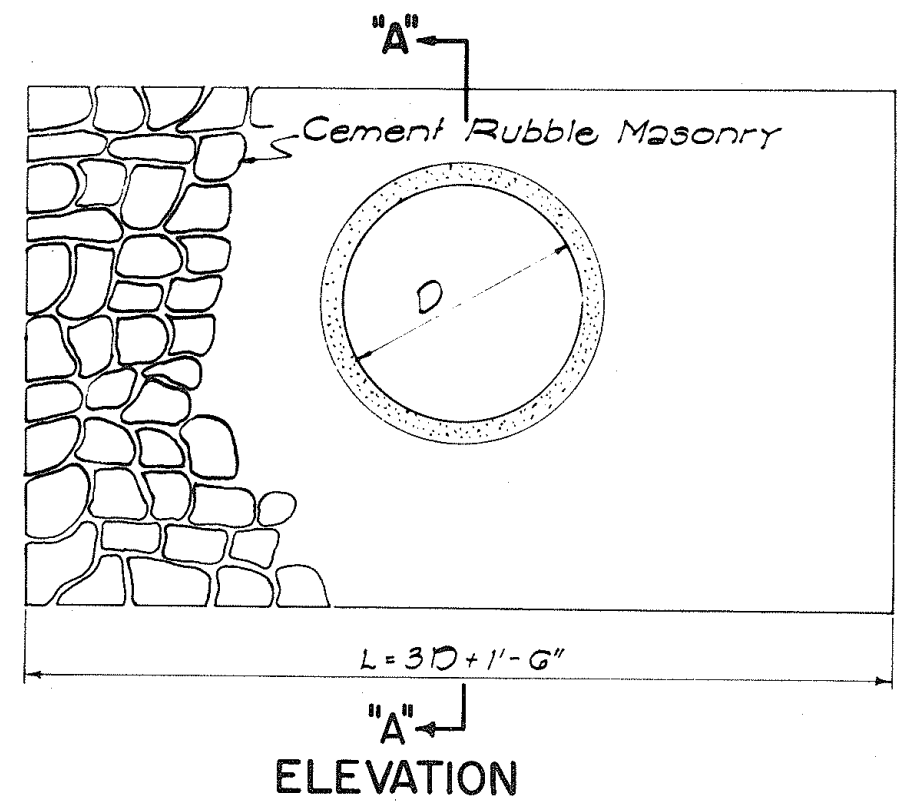
DATA FOR OUTLET DITCH				
D	W	H	T=H+H	
18"	24"	2'-0"	4'-0"	
24"	30"	2'-0"	4'-6"	
30"	30"	2'-6"	5'-0"	
36"	36"	3'-0"	6'-0"	

DETAIL OF OUTLET DITCH
Scale: 1/2" = 1'-0"

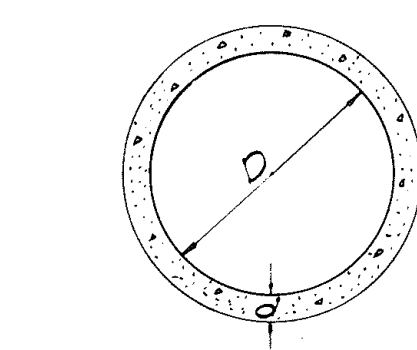
DATA FOR MASONRY DROP INTAKE					Where Variables Equal
D	D	L=D+G	Cu Yds.		
23"	18"	2'-5"	3.02	4'-6"	
30"	24"	3'-0"	3.61	5'-0"	
37"	30"	3'-7"	4.21	5'-6"	
44"	36"	4'-2"	4.85	6'-0"	

NOTE: Dimension "X" is assumed as 2'-4" in figuring the above quantities.

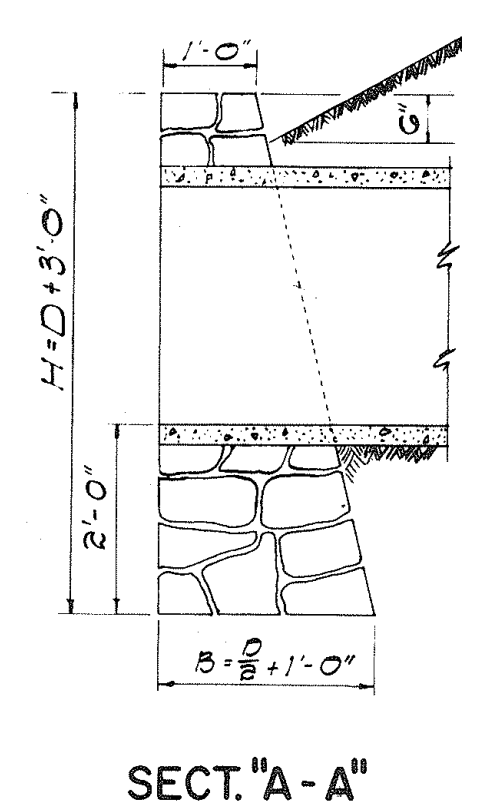
DATA - MASONRY HEADWALL					CRM For RCCP	CRM For CGMP
D	H	B	L	Cu Yds.		
18"	4'-6"	1'-0"	6'-0"	1.24	1.20	
24"	5'-0"	2'-0"	7'-6"	1.83	1.98	
30"	5'-6"	2'-6"	9'-0"	2.56	2.70	
36"	6'-0"	3'-0"	10'-6"	3.45	3.66	



DETAIL OF MASONRY HEADWALL
Scale: 1/2" = 1'-0"

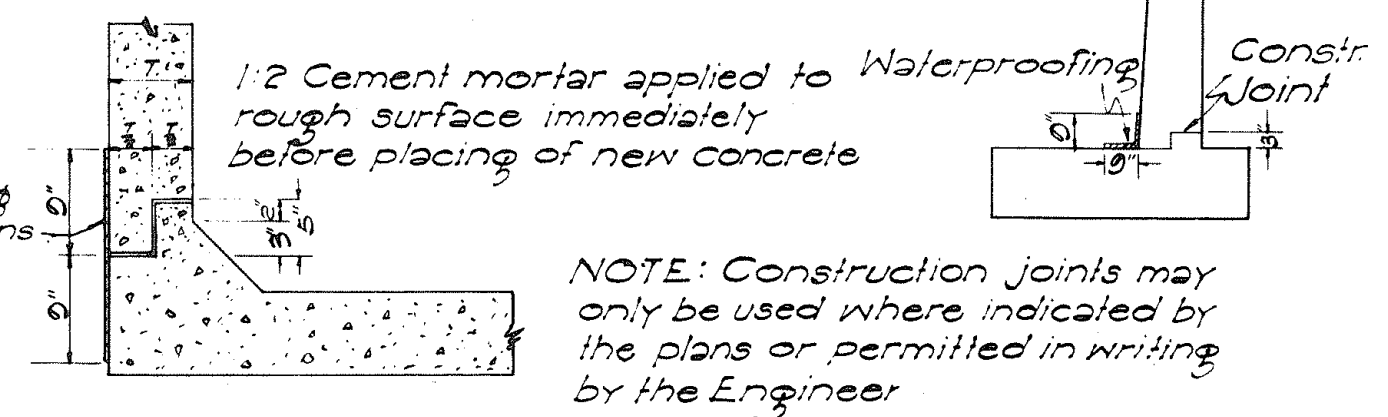


SECTION
CONC. PIPE CULVERT

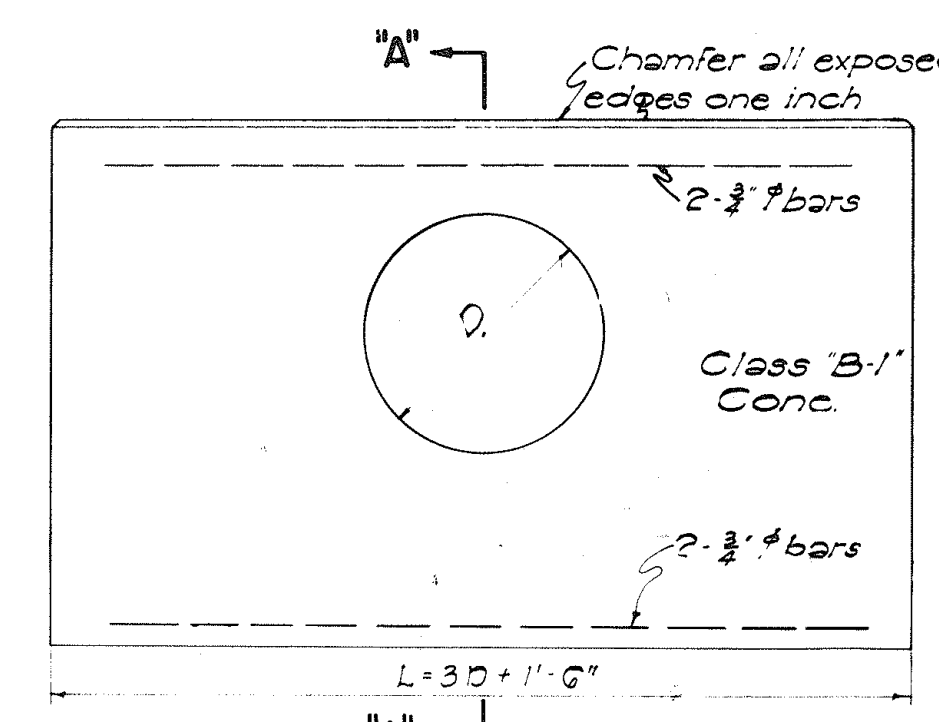


SECT. "A-A"

DETAIL OF MASONRY DROP INTAKE
Scale: 3/8" = 1'-0"



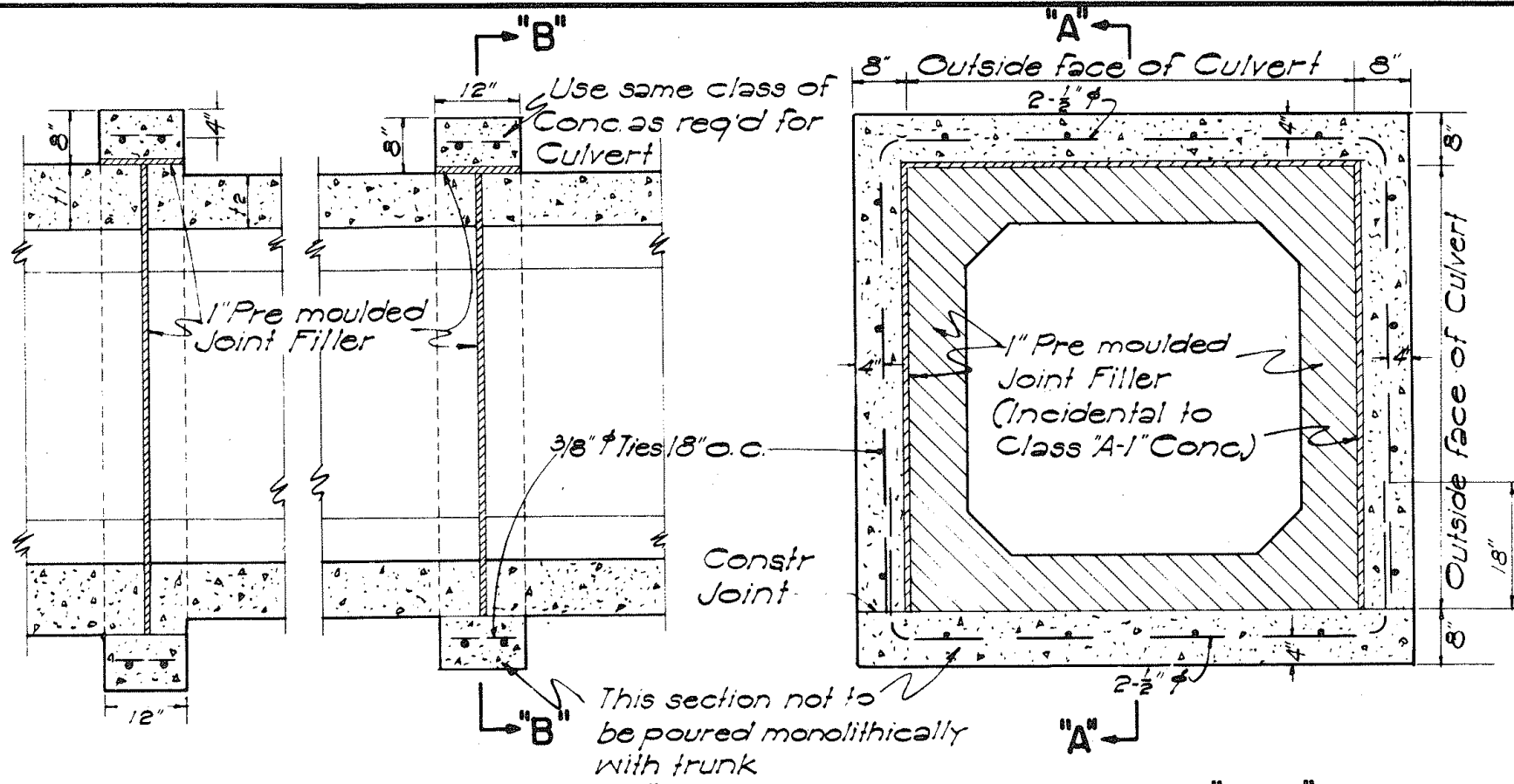
CONSTR. JOINT DETAILS



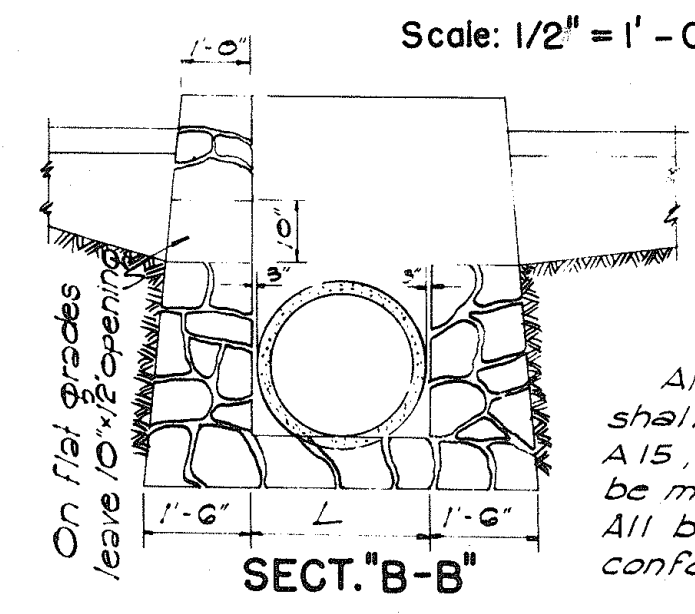
ELEVATION

DATA FOR CONC. HEADWALL					Class 'B-1' Conc For RCCP	Class 'B-1' Conc For CGMP	Steel For One Headwall
D	B	L	H	Cu Yds.			No. of Bars Size Length Lbs.
18"	1'-6"	6'-0"	4'-6"	1.12	1.17		4 #4 7'-0" 23
24"	1'-6"	7'-6"	5'-0"	1.52	1.60		4 #4 7'-0" 42
30"	2'-0"	9'-0"	5'-6"	2.36	2.49		4 #4 8'-6" 51
36"	2'-0"	10'-6"	6'-0"	2.94	3.13		4 #4 10'-0" 60
42"	2'-6"	12'-0"	6'-6"	4.10	4.47		4 #4 11'-6" 69
48"	2'-6"	13'-6"	7'-0"	5.01	5.36		4 #4 13'-0" 78

DETAIL OF CONCRETE HEADWALL
Scale: 1/2" = 1'-0"



SECTION "A-A" SECTION "B-B"
CONC. COLLAR FOR CONC. BOX CULVERT
Scale: 1/2" = 1'-0"

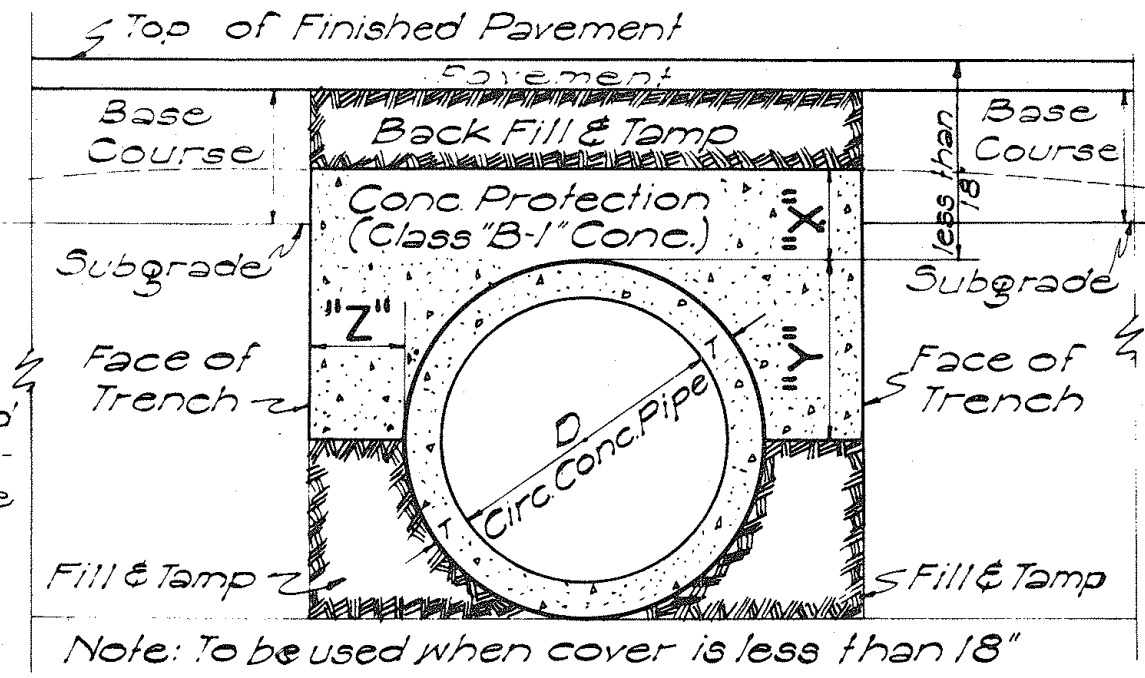


SECT. "A-A"

SECT. "B-B"

REINFORCING BARS
All reinforcing bars for concrete shall be Billet Steel bars, ASTM A15, intermediate grade. Steel shall be made by the open-hearth process. All bars shall be deformed type conforming to ASTM A-305.

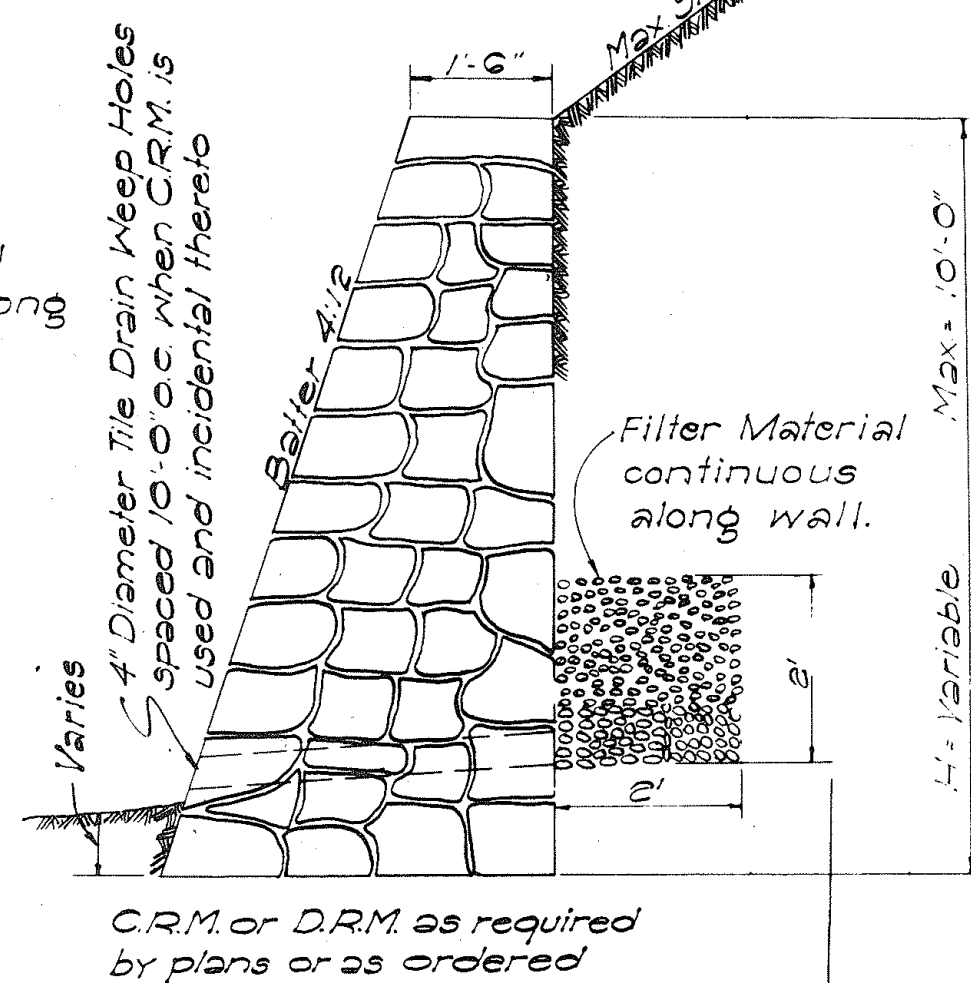
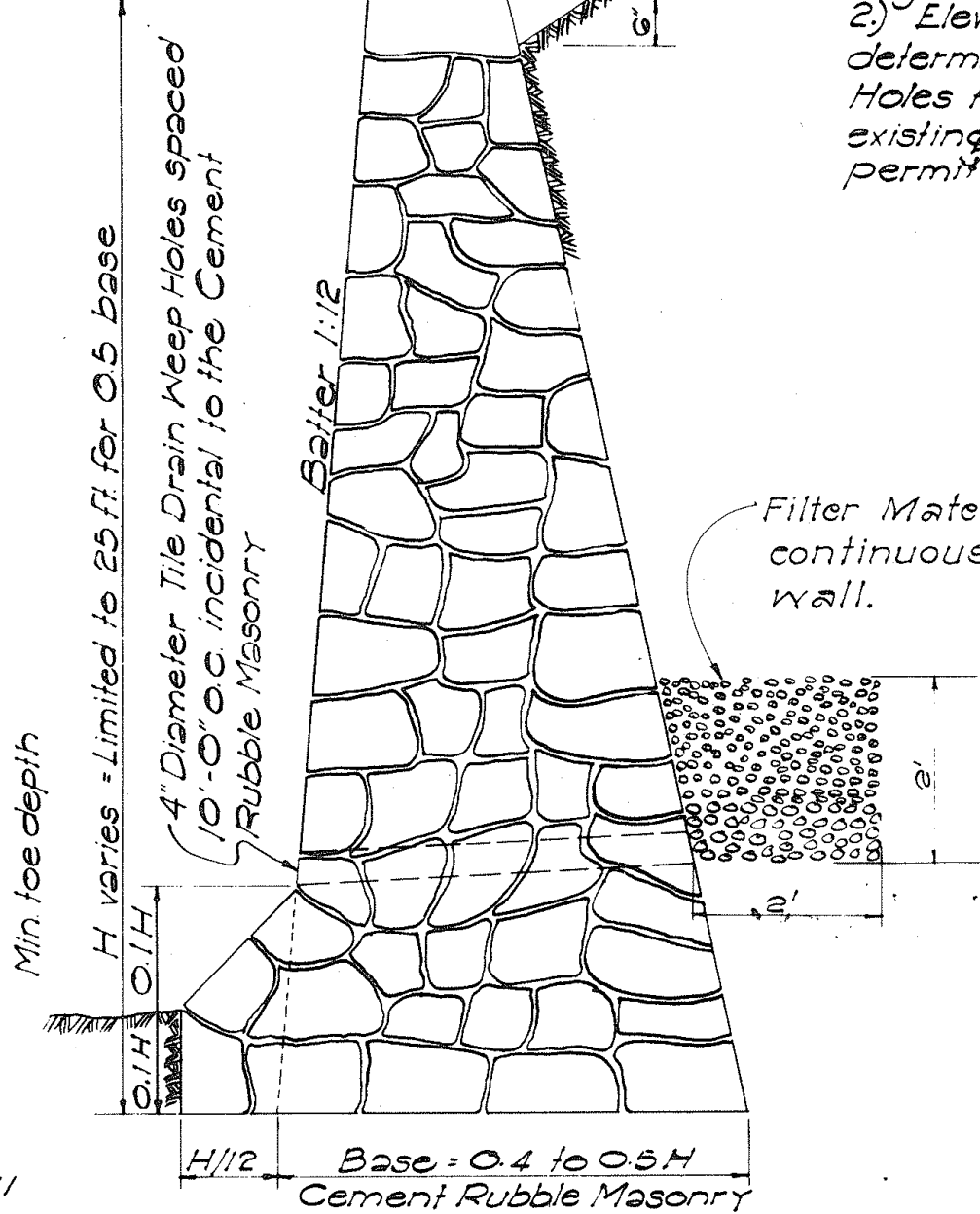
SECTION OF HIGH CEMENT RUBBLE MASONRY RETAINING WALL OR SEAWALL



DATA FOR CONCRETE PROTECTION OVER CULVERTS		
X	Y	Z
6" for 18"D		Z must be from pipe to face of trench
7" " 24"D		
8" " 30"D		
9" " 36"D		
10" " 42"D		
11" " 48"D		
12" " 54"D		

SECT. OF CULVERT WITH CONC. PROTECTION
Scale: 1" = 1'-0"

Note: To Resident Engineer
1) Consider economy of reinf. conc for high retaining walls which did not originate on plan layout.
2) Elevation of weep holes to be determined by Resident Engineer. Holes to be placed as close to the existing ground line as local conditions permit.

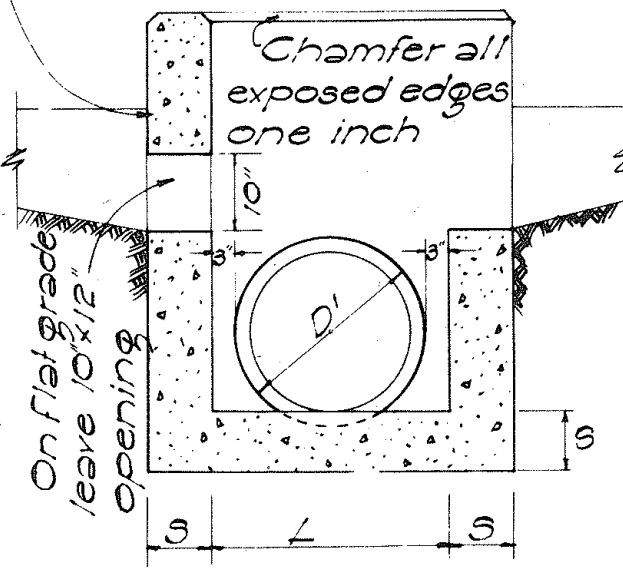


SECTION OF LOW MASONRY RETAINING WALL OR SEAWALL

DATA - CONC. DROP INTAKE					Where Variables Equal
D	D	L=D+G	Cu Yds.		
23"	18"	2'-5"	1.41	4'-6"	
30"	24"	3'-0"	1.72	5'-0"	
37"	30"	3'-7"	2.32	5'-6"	
44"	36"	4'-2"	2.73	6'-0"	
51"	42"	4'-9"	3.54	6'-6"	
58"	48"	5'-4"	4.01	7'-0"	

Note: Dimension "X" is assumed as 2'-4" in figuring the above quantities.

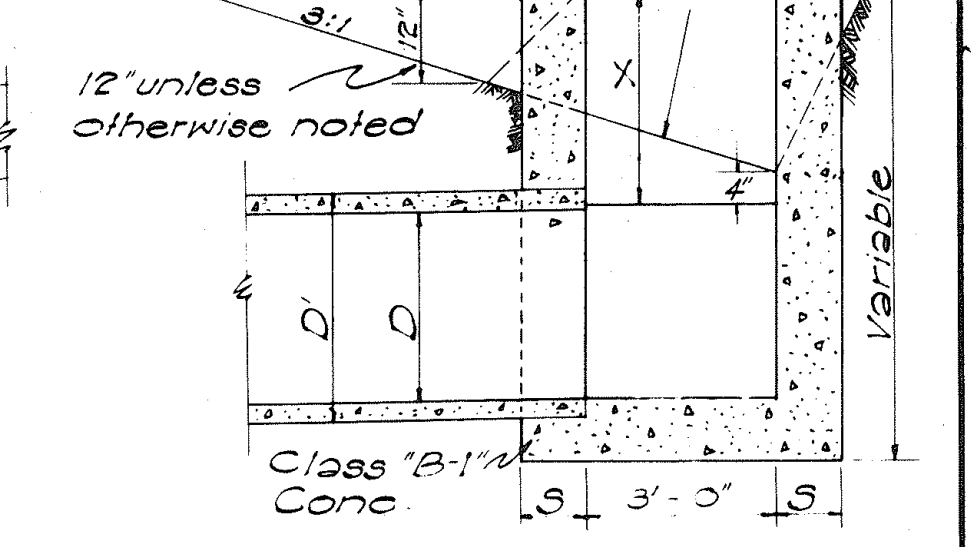
Note: This type of structure shall also be used for the Drop Intakes of Syphons connected with Irrigation Ditches or Flumes with appropriate changes to dimensions. In this case all joints must be made water tight.



SECTION "B-B"

Where drainage comes from both sides lower this wall to same elevation as shown for opposite wall.

Excavate recess in roadway excavation slope for inlet to dimensions and form designated by Engineer. This is 'Unclassified' Excavation.



SECTION "A-A"

DETAIL OF CONCRETE DROP INTAKE
Scale: 1/2" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
DROP INTAKES, RETAINING WALLS,
HEADWALLS, CONSTRUCTION JOINTS
SCALES AS NOTED

DETAIL OF WATERTIGHT BAND COUPLER
NOT TO SCALE

Not to Scale

INSET
Not to Scale

NOTE:

1. Reverse Plan View when flow is in direction opposite to that shown.
2. All Conc. to be checked.

BAND DETAIL

END VIEW

SECTION "G-G"

ELONGATED AND
WIRE STRUTTED

SIDE VIEW

DETAIL OF STANDARD BAND COUPLER
NOT TO SCALE

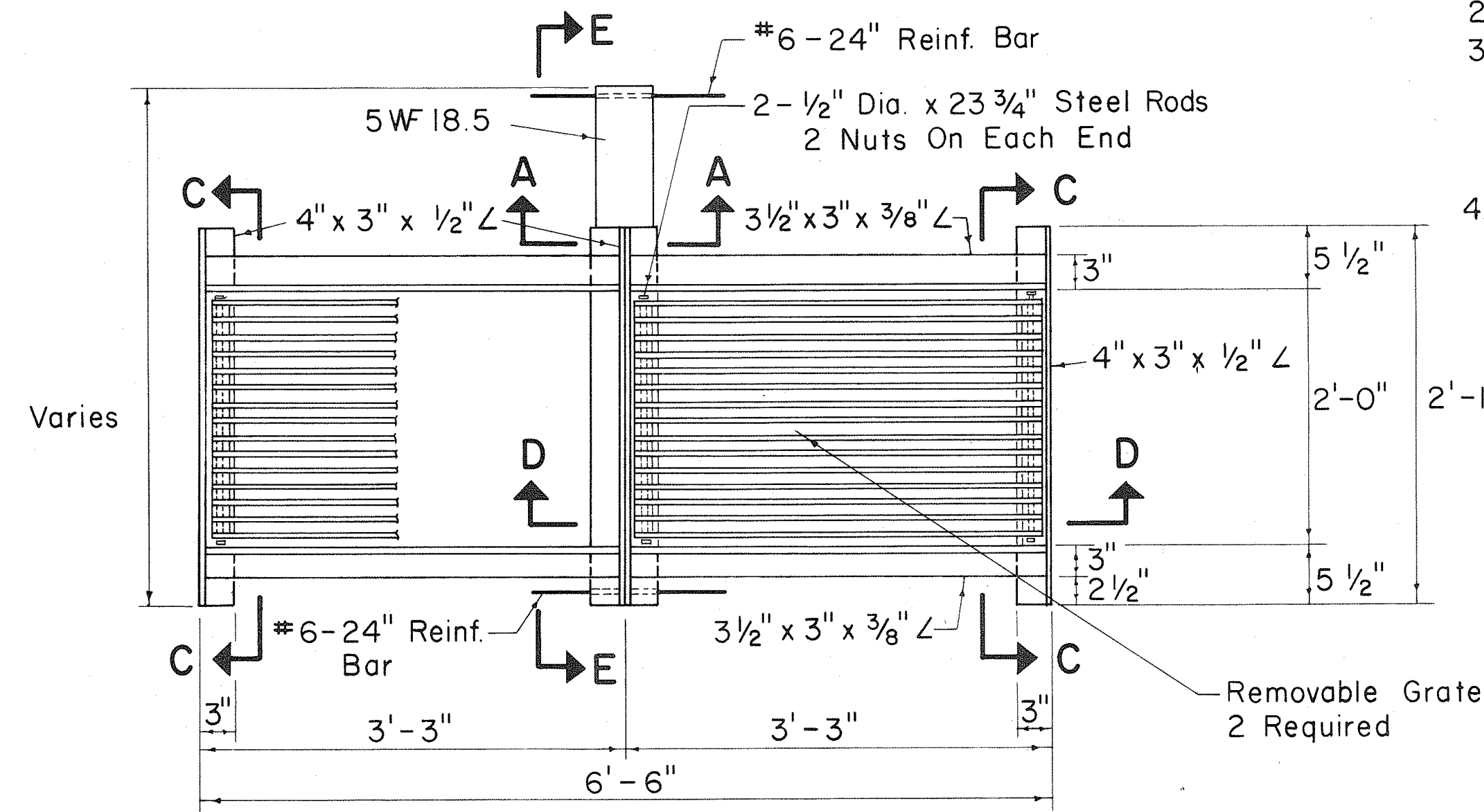
SIDE VIEW

NOTE:
All Concrete
to be Class "B-1"

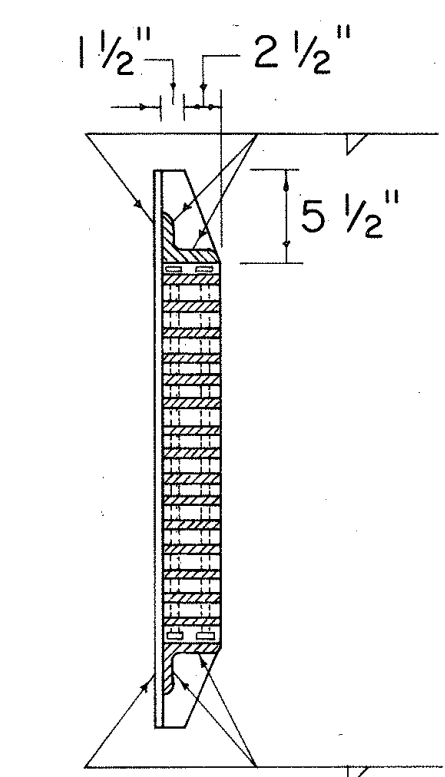
ELONGATED WITH
TIMBER STRUT

METHOD OF ELONGATING AND
STRUTTING CORRUGATED PIPE
NOT TO SCALE

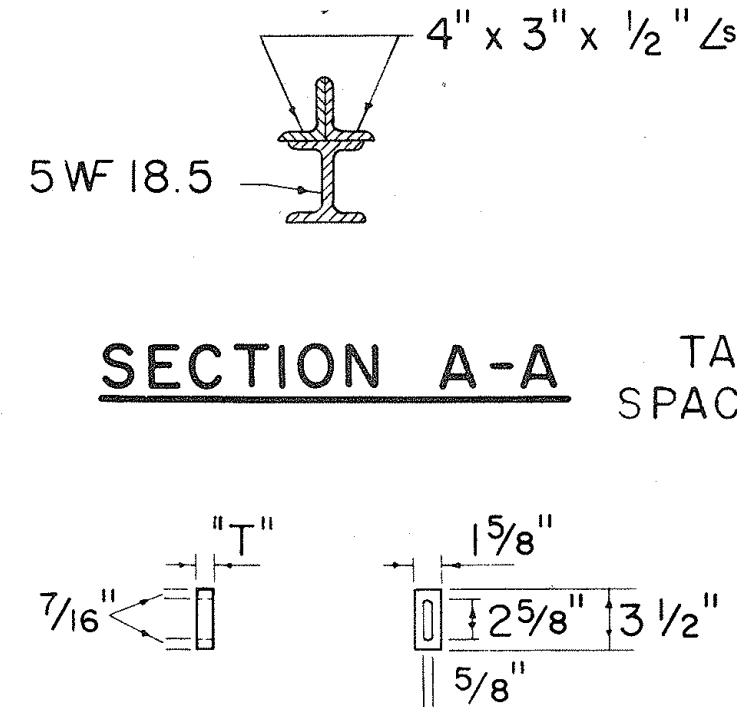
- NOTE:
- All welds $\frac{3}{8}$ " unless otherwise noted.
 - All steel shall be structural grade.
 - Grates and Frame shall be hot dip galvanized after fabrication in accordance with Section 44 (H) of the Standard Specifications.
 - Detail of Types "A-1" and "A-2" Steel Frame and Grates are identical except for the thickness of end spacers and number of grate bars. See Table of End Spacer Thickness.



PLAN



SECTION C-C

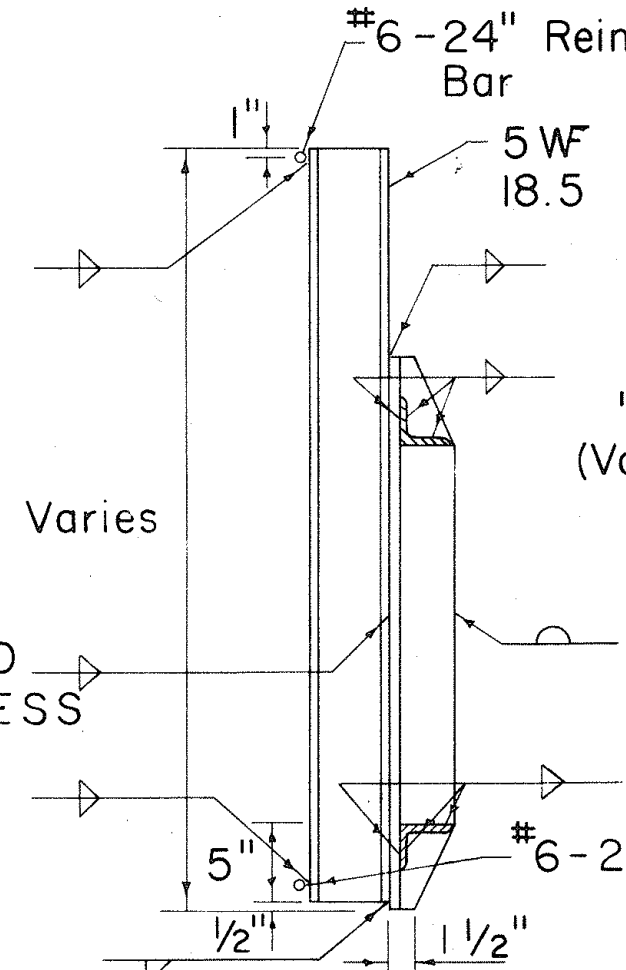


SECTION A-A

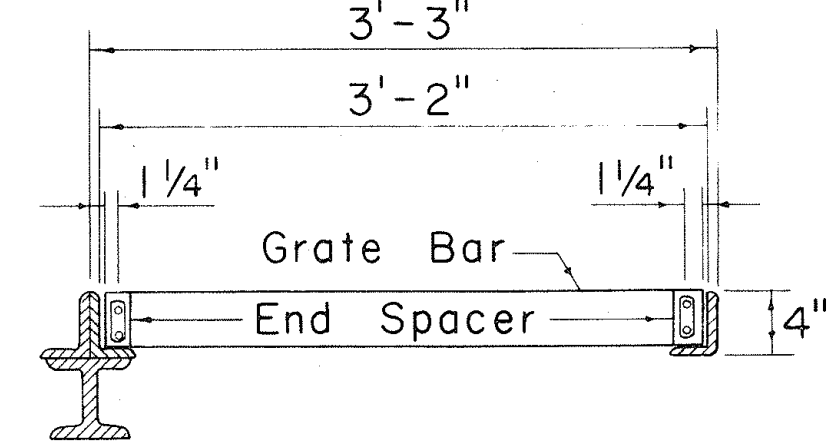
TABLE OF END SPACER THICKNESS

TYPE FRAME & GRATES	"T" (in.)
A-1	1
A-2	1 3/8

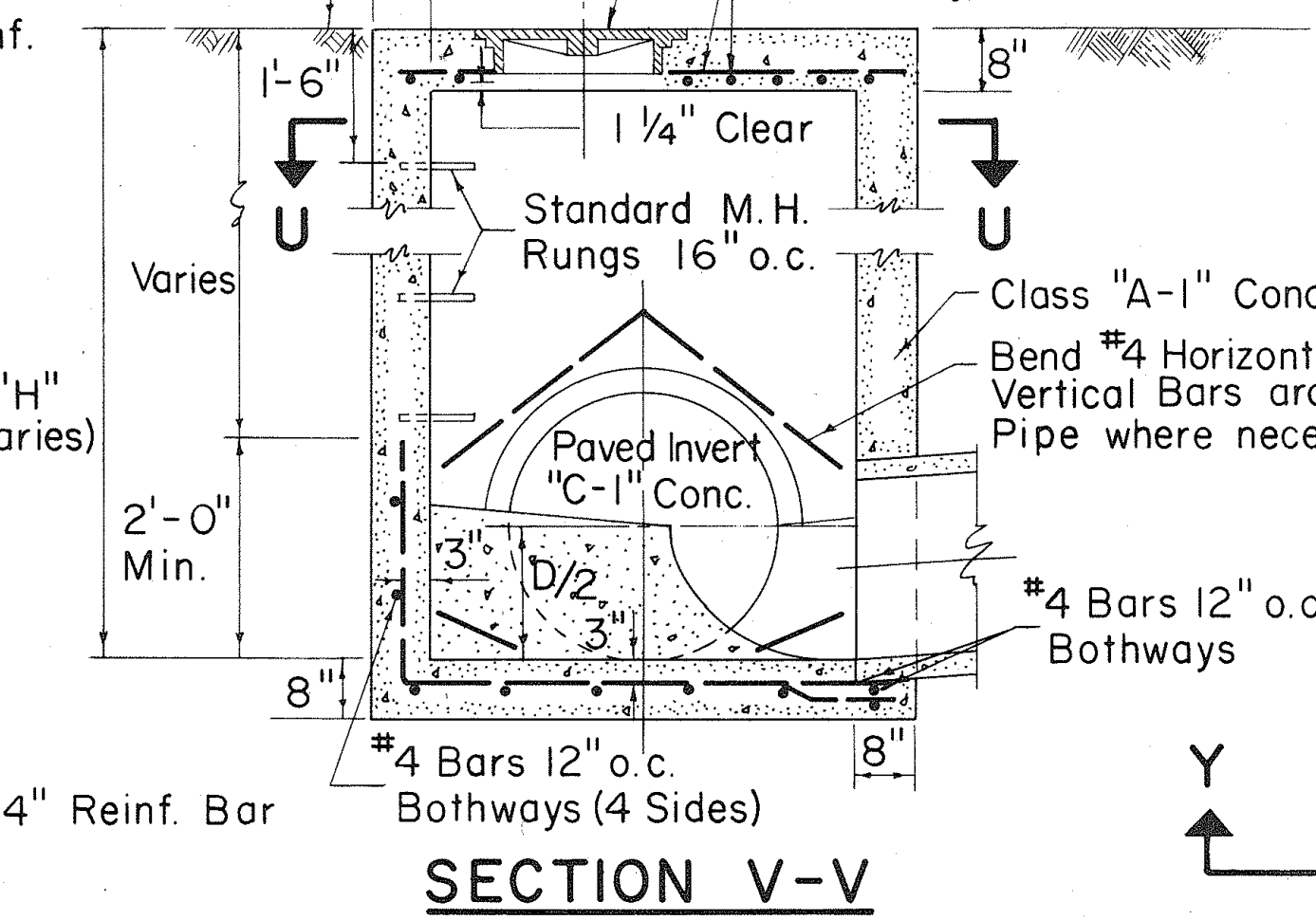
END SPACER



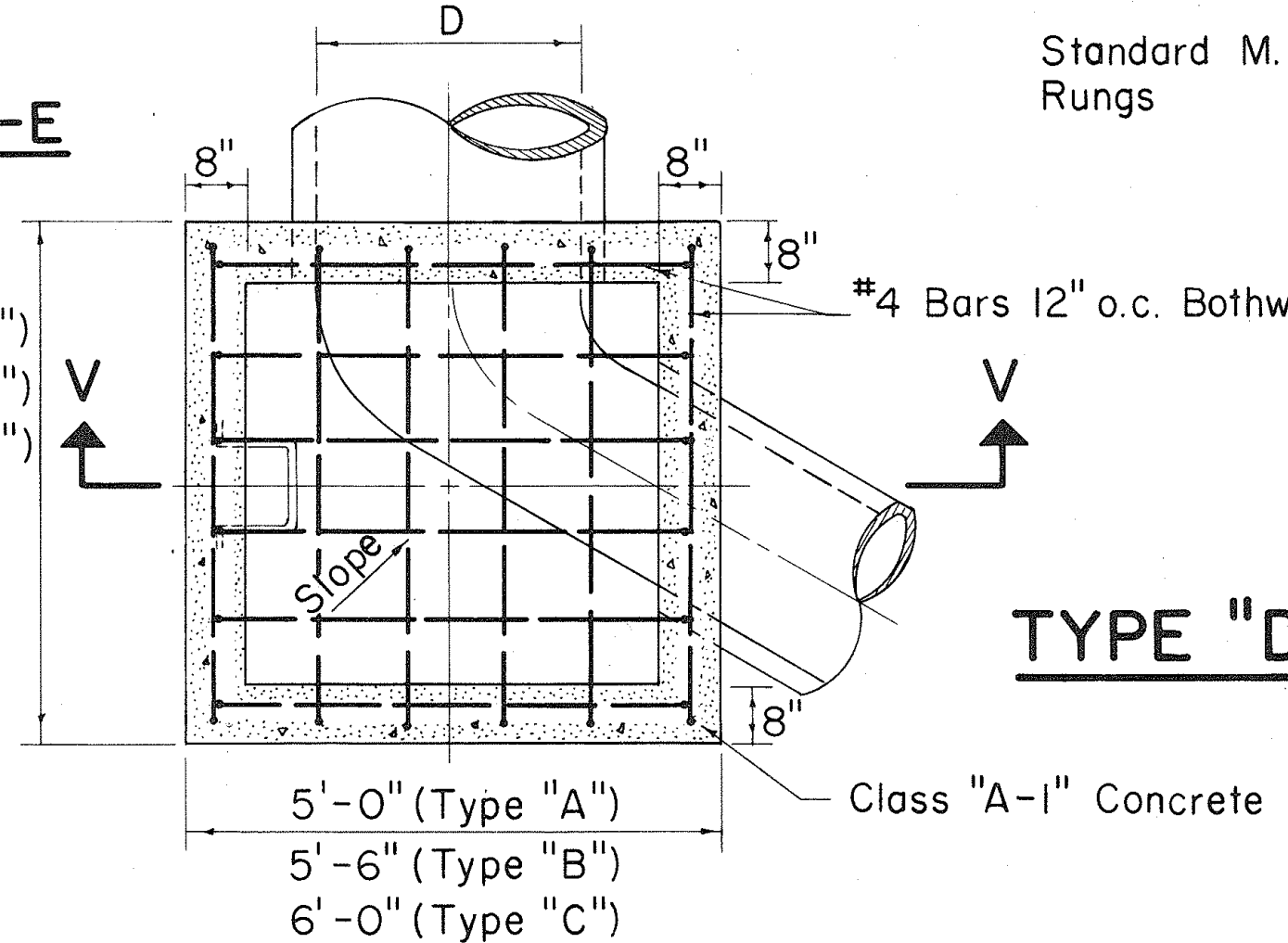
SECTION E-E



SECTION D-D



SECTION V-V

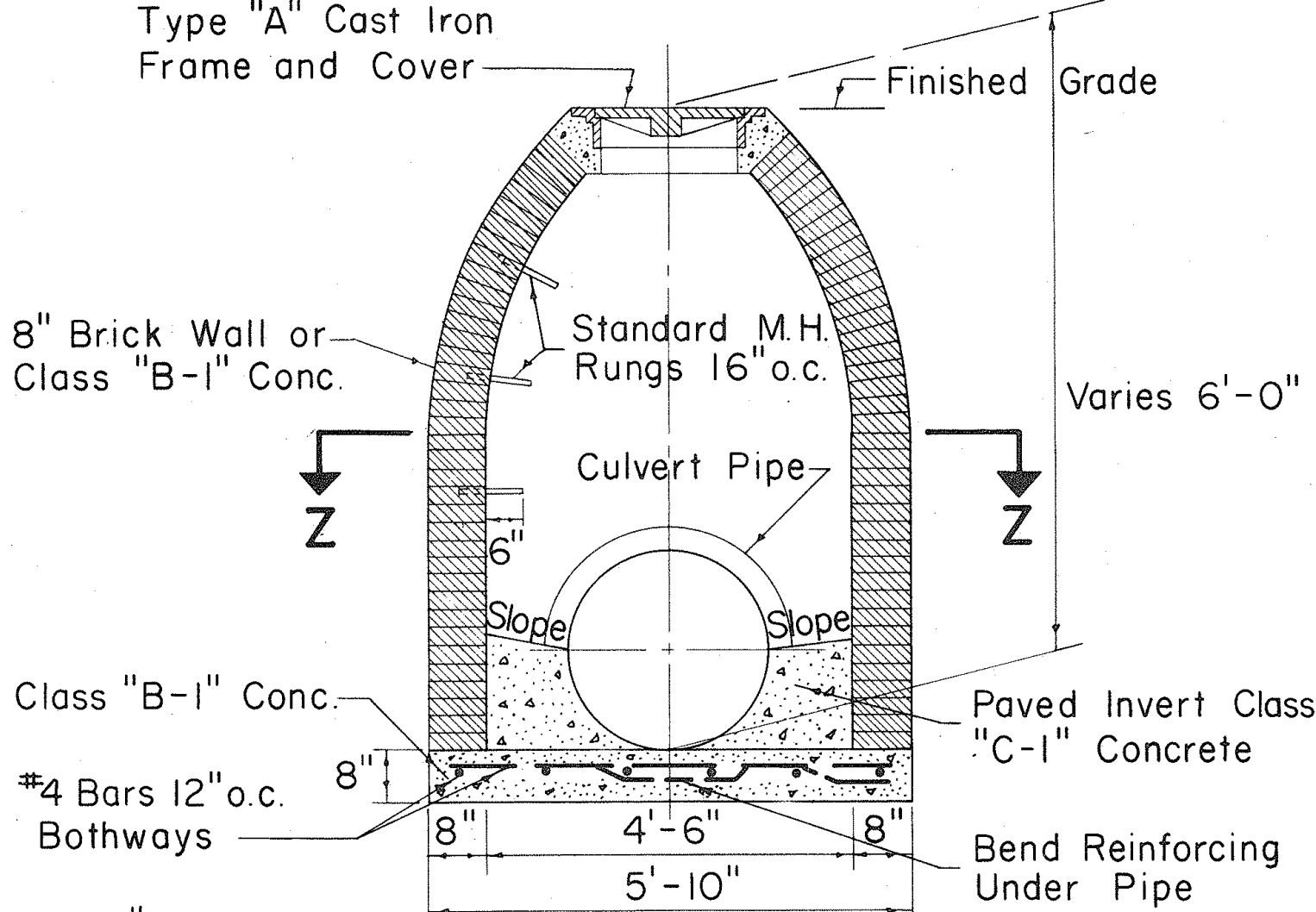


SECTION U-U

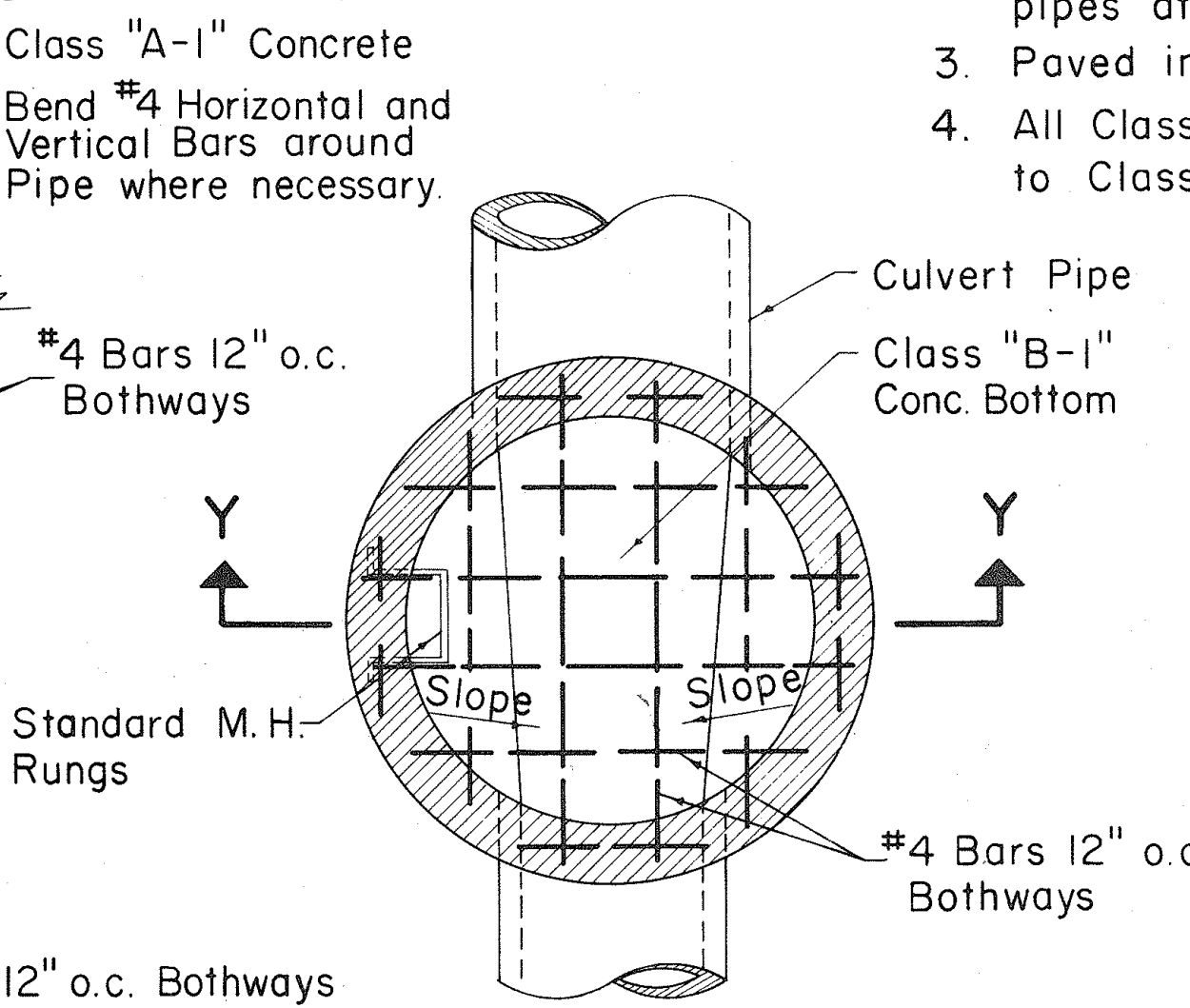
TYPE "A", "B", & "C"

S.D.M.H.

Scale: 1/2" = 1'-0"



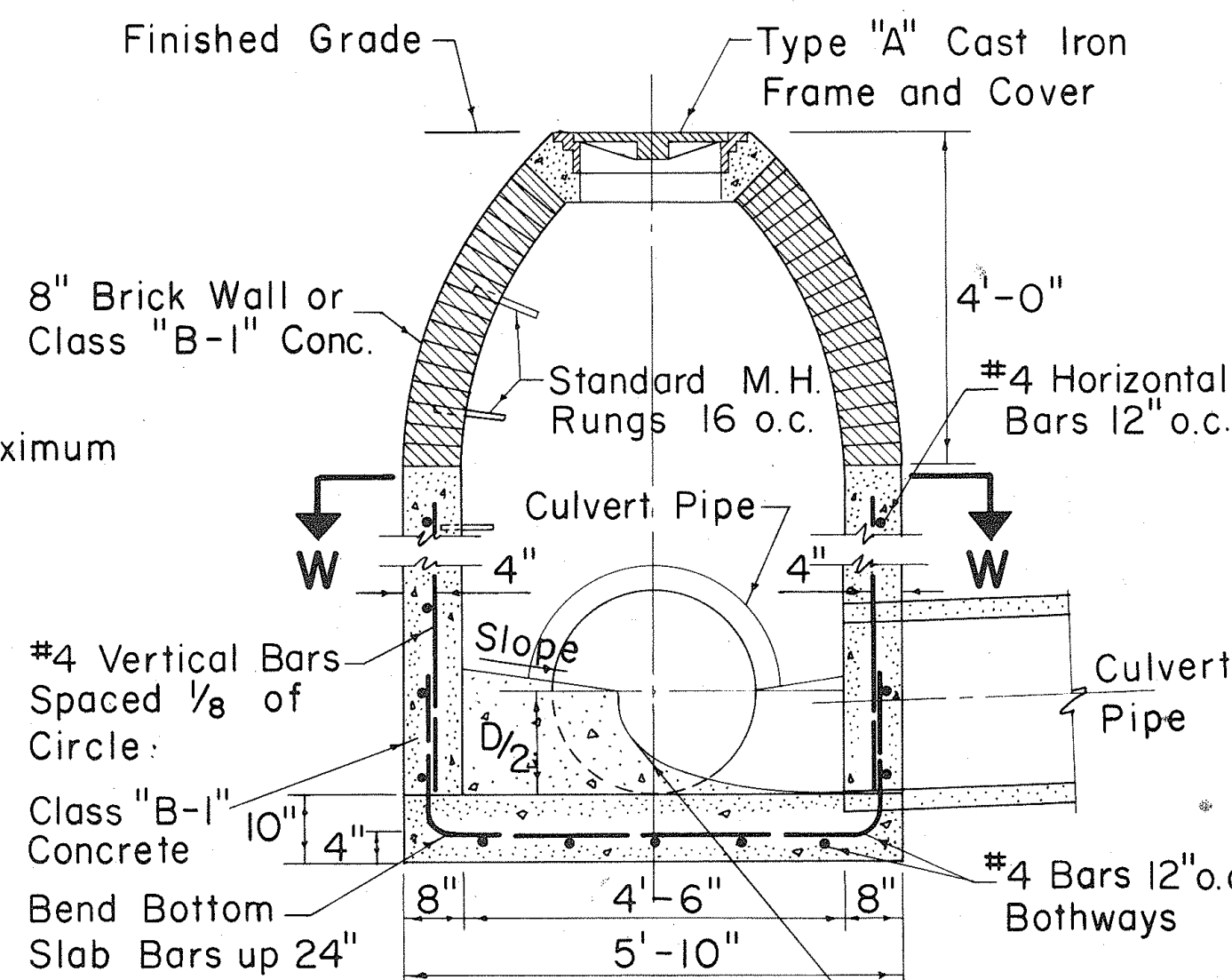
SECTION Y-Y



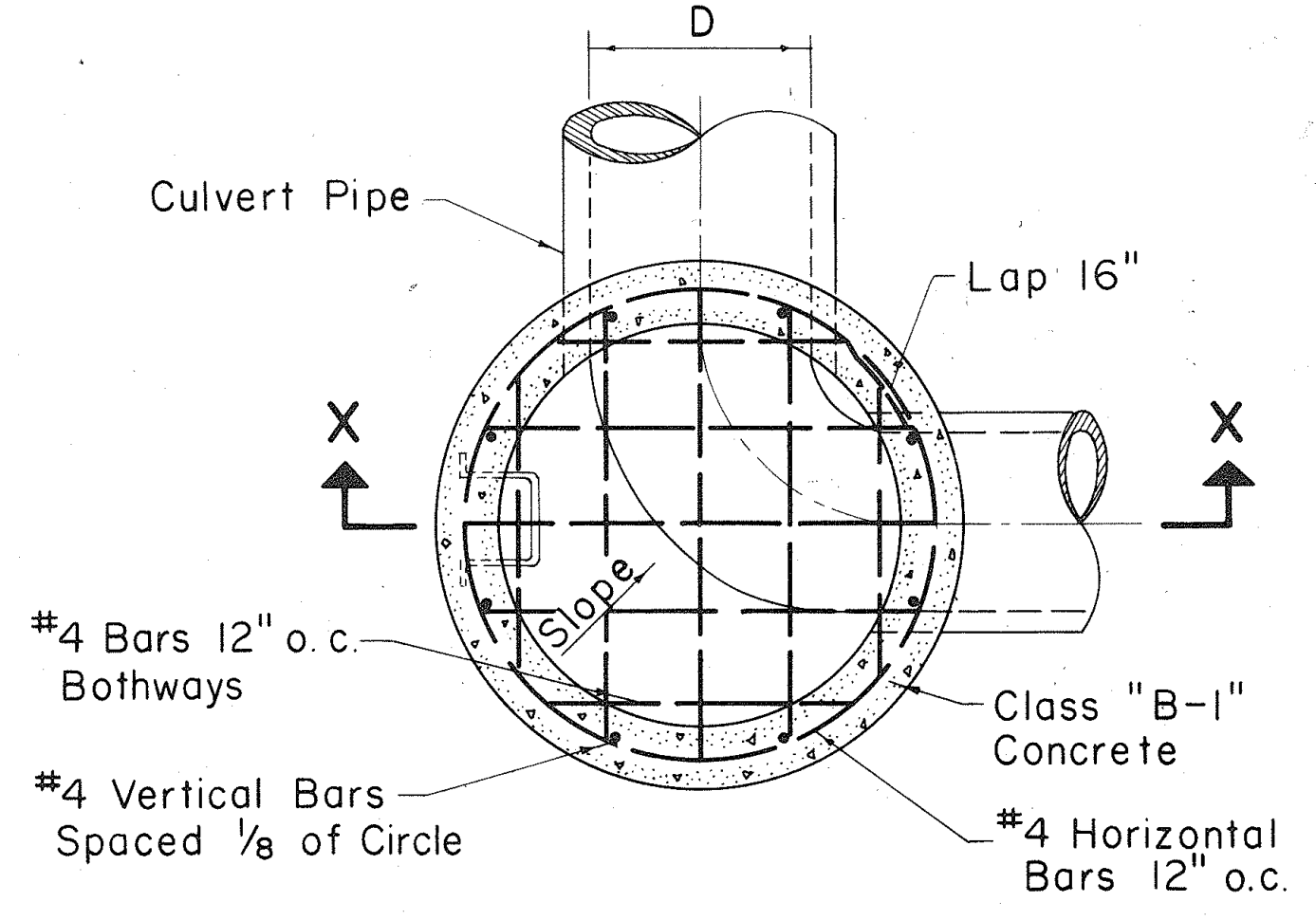
SECTION Z-Z

TYPE "D" STORM DRAIN MANHOLE

Scale: 1/2" = 1'-0"



SECTION X-X



SECTION W-W

TYPE "E" STORM DRAIN MANHOLE

Scale: 1/2" = 1'-0"

- NOTE:
- Exterior surface of brick wall shall be plastered with 1" thickness of 1:2 Cement Mortar.
 - Number size and direction of culvert pipes at manhole to be as shown on plans.
 - Paved invert not required at drop manholes.
 - All Class "C-1" Concrete to be incidental to Class "B-1" Concrete.

APPROVED:

DIRECTOR OF TRANSPORTATION DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
STEEL FRAME AND GRATES
AND STORM DRAIN MANHOLES

Scales: As Noted Date

SHEET NO. OF SHEETS

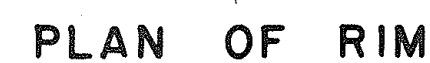
DETAIL OF TYPE "A-1" & "A-2" STEEL FRAME AND GRATES

Scale: 1" = 1'-0"

ORIGINAL PLAN	SURVEY PLOTTED BY.....	DATE.....
NOTE BOOK	DESIGNED BY.....	" "
	DRAWN BY.....	" "
	TRACED BY.....	" "
	QUANTITIES BY.....	" "
No.	CHECKED BY.....	" "



DETAILS OF TYPE "S" CAST IRON FRAME AND COVER



DETAILS OF TYPE "B"
CAST IRON FRAME AND COVER

SCALE: 1-1/2" = 1'-0"



DETAILS OF TYPE "A"

CAST IRON FRAME AND COVER

SCALE: 1-1/2" = 1'-0"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
			1967	6	6

August 1957

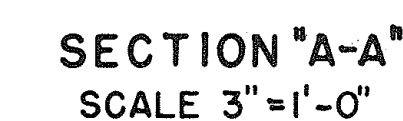


TOP VIEW

TOP VIEW

TYPE C C.I. FRAME AND GRATING

SCALE: 3/4" = 1'-0"



DETAILS OF TYPE "W" CAST IRON FRAME AND COVER

SCALE: 1-1/2" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS CATCH BASIN AND MANHOLE CASTINGS

SCALES AS NOTED

SHEET NO OF SHEETS

(