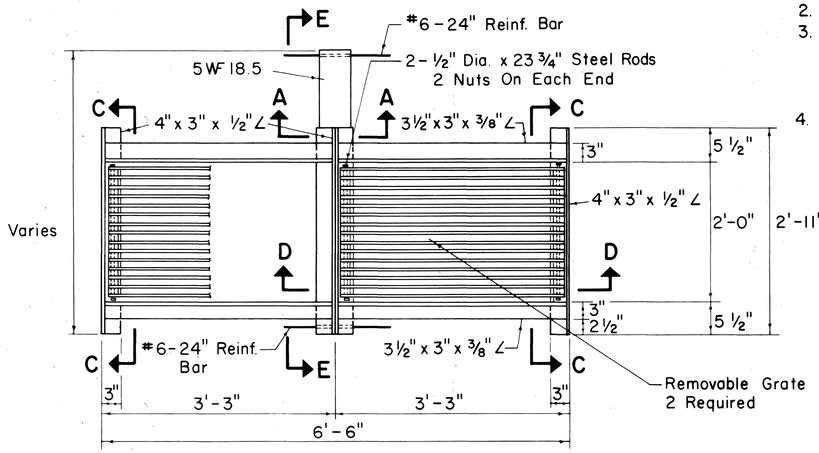
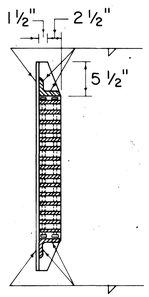
FED. ROAD DIST. NO.	STATE	FED. AID. PROJECT	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII		1968	44	95

Revised: Jan. 25, 1967
PROJECT NO. B-900-01-64 UNIT II

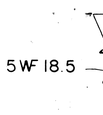
NOTE:
1. All welds 3/8" unless otherwise noted.
2. All steel shall be structural grade.
3. Grates and Frame shall be hot dip galvanized after fabrication in accordance with Section 44(H) of the Standard Specifications.
4. Detail of Types "A-1" and "A-2" Steel Frame and Grates are identical except for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



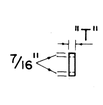
PLAN



SECTION C-C



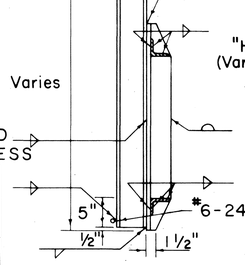
SECTION A-A



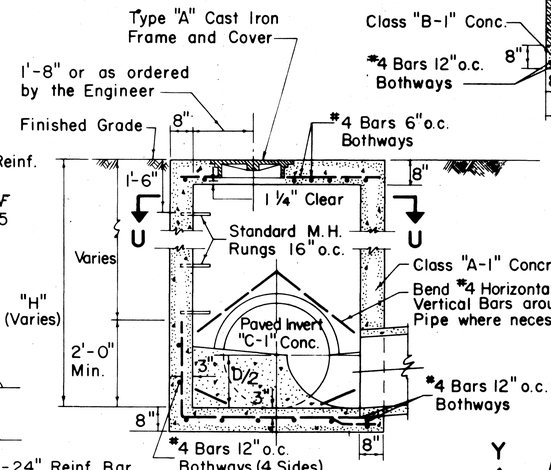
END SPACER

TABLE OF END SPACER THICKNESS

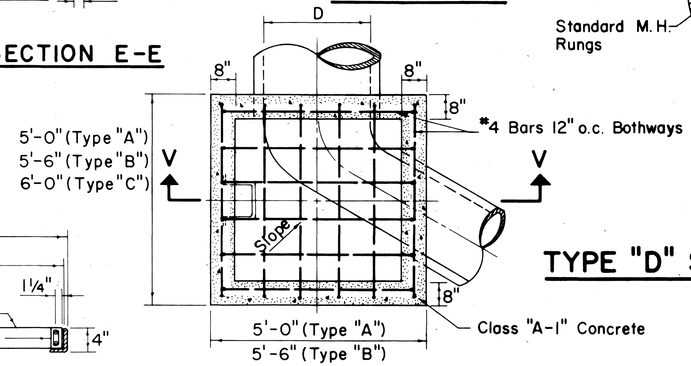
TYPE FRAME & GRATES	"T" (in.)
A-1	1
A-2	1 3/8



SECTION E-E



SECTION V-V

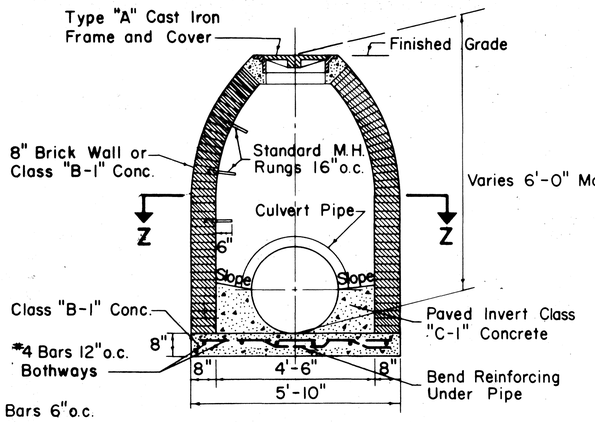


SECTION U-U

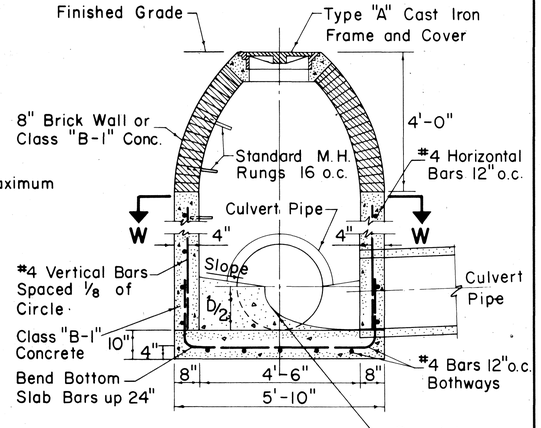
TYPE "A", "B", & "C"

S.D.M.H.

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

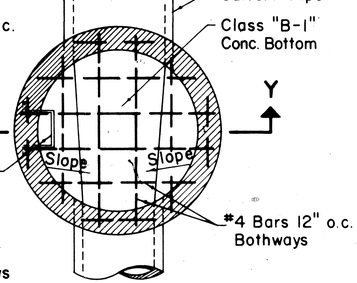


SECTION Y-Y



SECTION X-X

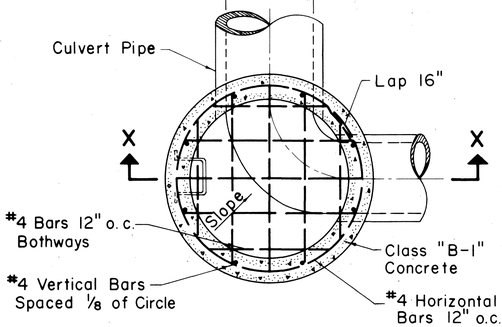
NOTE:
1. Exterior surface of brick wall shall be plastered with 1" thickness of 1:2 Cement Mortar.
2. Number size and direction of culvert pipes at manhole to be as shown on plans.
3. Paved invert not required at drop manholes.
4. All Class "C-1" Concrete to be incidental to Class "B-1" Concrete.



SECTION Z-Z

TYPE "D" STORM DRAIN MANHOLE

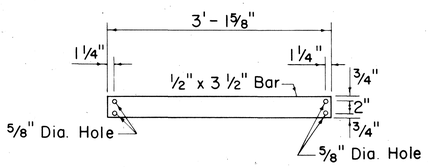
Scale: 1/2" = 1'-0"



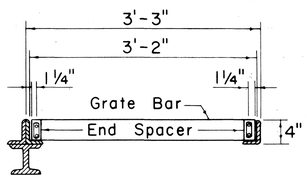
SECTION W-W

TYPE "E" STORM DRAIN MANHOLE

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



GRATE BARS



SECTION D-D

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

Scale: 1" = 1'-0"

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. 1 OF 3 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO	TOTAL SHEETS
HAWAII	HAW.		1968	45	95

PROJECT NO. B-900-01(64) UNIT II

Revised: June 1965

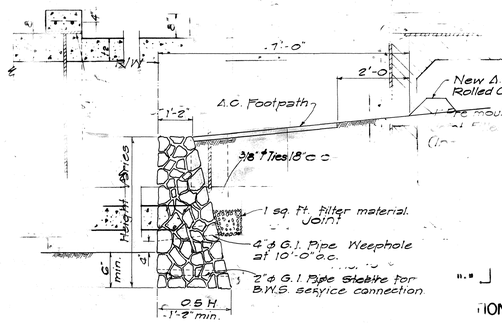
Revised: August 1967

NOTES:

1. For location of CRM walls, see Plan & Profile sheets.
2. Install galvanized iron pipe (2 inch minimum diameter) thru CRM wall for B.W.S. service connections. Size of sleeves and locations in CRM wall shall be approved by the Engineer.
3. Filter material, 4" ϕ G.I. pipe weepholes and G.I. pipe sleeve shall not be paid for separately but shall be considered incidental to Cement Rubble Masonry.

DETAIL OF OUTLET

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



TYPICAL CRM WALL SECTION

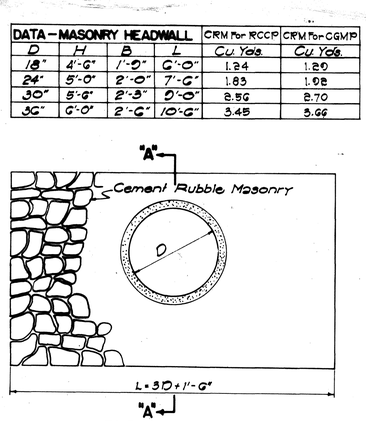
Not to Scale 1/2

MAUKA CRM WALL ELEVATION SCHEDULE

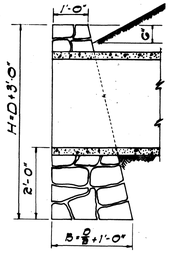
Not to Scale

BEGIN WALL			POINT ALONG WALL			END WALL		
STA.	TOP ELEVATION	BOTTOM ELEVATION	STA.	TOP ELEVATION	BOTTOM ELEVATION	STA.	TOP ELEVATION	BOTTOM ELEVATION
113+90	7.0	5.5	114+50	7.0	5.5	114+75	7.5	6.5
121+26	7.8	5.6	121+50	8.0	5.0	121+86	7.8	5.4
121+98	7.7	5.7				122+08	8.0	6.0
122+23	8.0	6.5				122+40	8.0	7.0
136+86	8.3	7.0	137+50	8.0	6.0			
			138+00	8.3	5.5			
			138+50	8.0	5.0	139+18	8.5	7.2
140+25	9.0	8.0	140+50	9.0	7.5	140+75	9.0	8.0
141+75	10.0	9.0				142+10	10.0	8.2
142+35	9.5	7.6				142+65	9.2	7.4
142+80	9.3	7.1	143+00	9.4	6.7	143+08	9.0	7.0
145+61	11.0	9.0	146+00	10.7	7.0	146+40	10.5	9.0
146+90	10.5	9.5				147+10	10.5	9.5
147+46	11.0	9.5	148+00	11.50	9.0	148+35	12.0	10.0
148+75	12.0	9.5	149+00	11.5	8.5			
			149+50	11.5	9.5	149+85	11.5	10.0
152+69	12.5	10.5	153+50	13.5	12.0	154+00	13.5	12.5
155+80	14.0	10.0	156+00	13.5	10.5	156+25	14.0	12.0
179+06	12.5	10.5	179+50	12.0	9.0	180+00	12.0	10.2
180+88	11.5	10.2	181+00	11.5	10.2			
			181+50	11.5	8.0	181+90	11.0	9.0
182+95	11.0	9.5	182+50	11.2	7.0			
			183+00	11.5	7.0			
			183+50	11.5	4.5	183+86	11.0	4.0

DATA — MASONRY HEADWALL				CRM for RCCP	CRM for CGMP
D	H	B	L	Cu. Yds.	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'-3"	9'-0"	2.56	2.70
36"	6'-0"	2'-6"	10'-6"	3.45	3.66



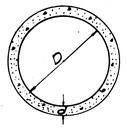
ELEVATION



SECT. "A-A"

DETAIL OF MASONRY HEADWALL

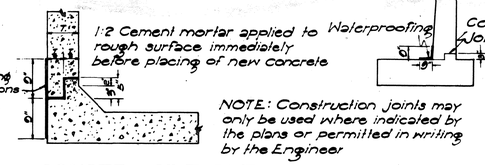
Scale: 1/2" = 1'-0"



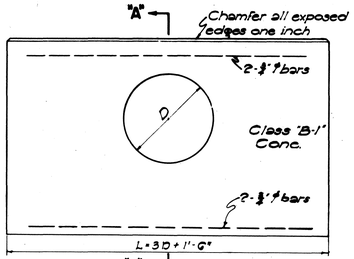
SECTION

CONC. PIPE CULVERT

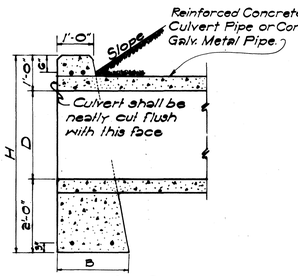
NOTE:
Thickness 'd', reinforcing, and Concrete used, are to conform with the approved design as provided by the Specifications.



CONSTR. JOINT DETAILS



ELEVATION

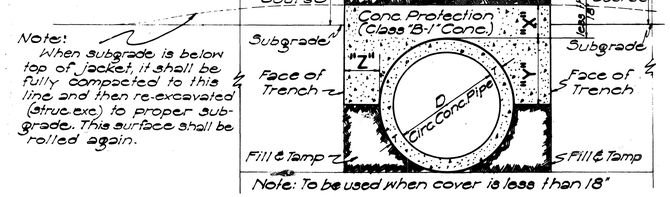


SECTION "A-A"

DATA FOR CONC. HEADWALL				Cl. "B-1" Conc. For RCCP	Cl. "B-1" Conc. For CGMP	Steel For One Headwall			
D	B	L	H	Cu. Yd.	Cu. Yd.	No. of Bars	Size	Length	Lbs.
18"	1'-6"	6'-0"	4'-6"	1.12	1.17	4	¾" ϕ	5'-6"	33
24"	1'-6"	7'-6"	5'-0"	1.52	1.60	4	¾" ϕ	7'-0"	42
30"	2'-0"	9'-0"	5'-6"	2.36	2.40	4	¾" ϕ	8'-6"	51
36"	2'-0"	10'-6"	6'-0"	2.84	3.13	4	¾" ϕ	10'-0"	60
42"	2'-6"	12'-0"	6'-6"	4.10	4.47	4	¾" ϕ	11'-6"	69
48"	2'-6"	13'-6"	7'-0"	5.01	5.36	4	¾" ϕ	13'-0"	78

DETAIL OF CONCRETE HEADWALL

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



Note: When subgrade is below top of jacket, it shall be fully compacted to this line and then re-excavated (struc. exc) to proper subgrade. This surface shall be rolled again.

Note: To be used when cover is less than 18"

DATA FOR CONCRETE PROTECTION OVER CULVERTS		
X	Y	Z
6" for 18" D	$\frac{D}{2}+T$	Z must be from pipe to face of trench. Minimum = X. Maximum pay quantity will be Z = 12".
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"

ORIGINAL PLAN — SURVEY PLOTTED BY — DESIGNED BY — DRAWN BY J. Calisto — TRACED BY — QUANTITIES BY — CHECKED BY — DATE

NOTE BOOK — QUANTITIES CHECKED BY — No.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

DROP INTAKES, RETAINING WALLS, HEADWALLS, CONSTRUCTION JOINTS

SCALES AS NOTED

SHEET № 2 OF 3 SHEETS

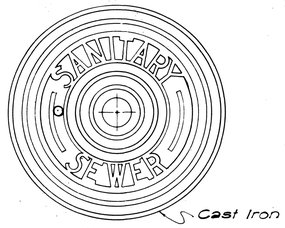
45

2/17/59
3/17/59

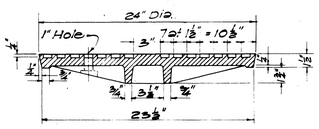
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	HAW		1968	46	95

August 1957

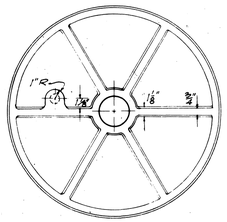
PROJECT NO. B-900-01-64 UNIT II



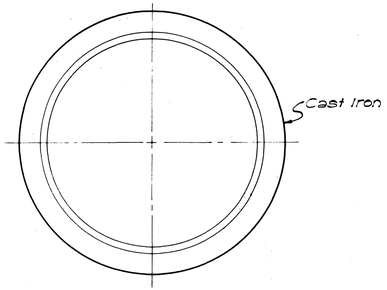
TOP VIEW OF COVER



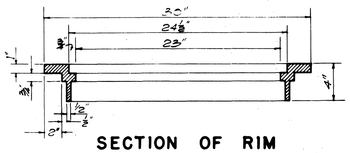
SECTION



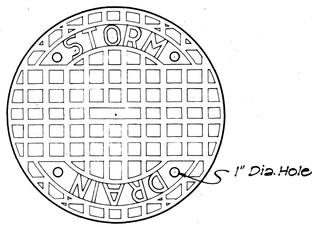
BOTTOM VIEW OF COVER



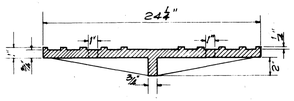
PLAN OF RIM



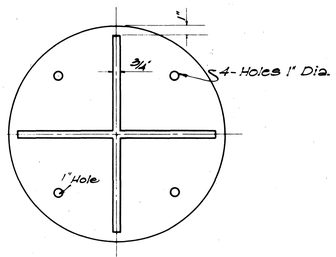
SECTION OF RIM



TOP VIEW OF COVER



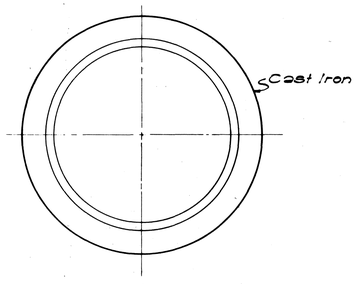
SECTION



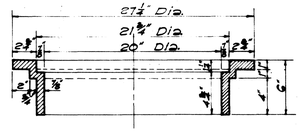
BOTTOM VIEW OF COVER

DETAILS OF TYPE "B" CAST IRON FRAME AND COVER

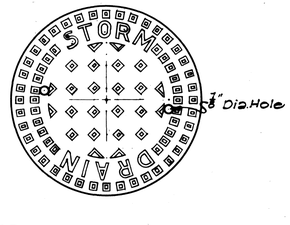
SCALE: 1-1/2" = 1'-0"



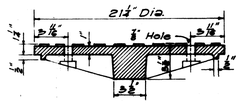
PLAN OF RIM



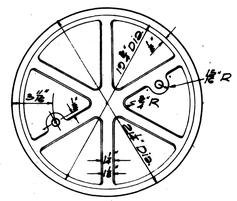
SECTION OF RIM



TOP VIEW OF COVER



SECTION

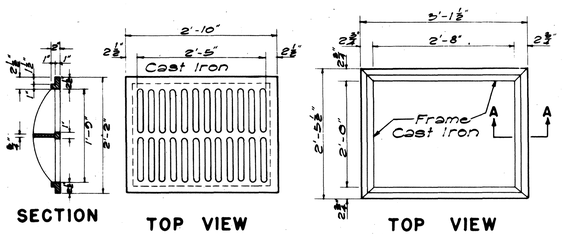


BOTTOM VIEW OF COVER

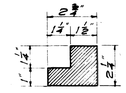
DETAILS OF TYPE "A" CAST IRON FRAME AND COVER

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

NOTE: Stock Pattern From Novelty Foundry ~ Honolulu



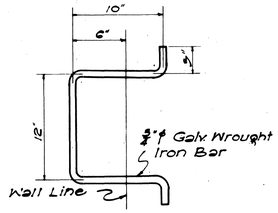
SECTION TOP VIEW TOP VIEW



SECTION "A-A"
SCALE 3" = 1'-0"

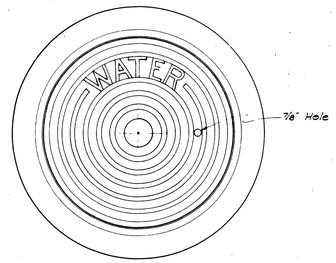
TYPE C C.I. FRAME AND GRATING

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

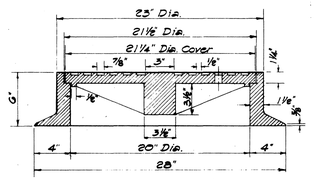


MANHOLE RUNG

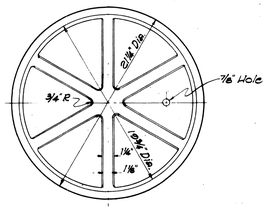
SCALE: 1-1/2" = 1'-0"



PLAN OF FRAME AND COVER



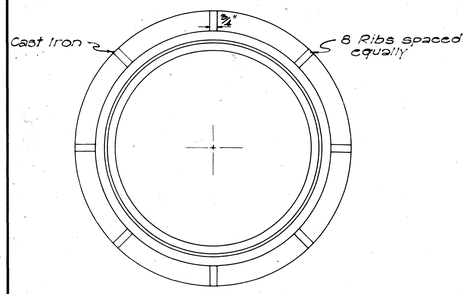
SECTION OF FRAME AND COVER



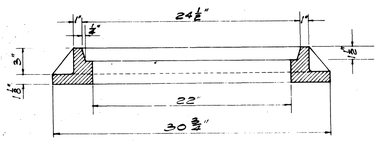
BOTTOM VIEW OF COVER

DETAILS OF TYPE "W" CAST IRON FRAME AND COVER

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



PLAN OF RIM



SECTION OF RIM

DETAILS OF TYPE "S" CAST IRON FRAME AND COVER

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

NOTE:

THE TYPE "S" CAST IRON FRAME AND COVER SHOWN ON THIS SHEET IS EQUIVALENT TO THE CITY AND COUNTY OF HONOLULU, DIVISION OF SEWERS' TYPE "A" CAST IRON MANHOLE FRAME AND COVER.

THE TYPE "W" CAST IRON FRAME AND COVER SHOWN ON THIS SHEET IS EQUIVALENT TO THE CITY AND COUNTY OF HONOLULU, BOARD OF WATER SUPPLY'S CAST IRON MANHOLE FRAME AND COVER, 20" SIZE.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

CATCH BASIN AND MANHOLE CASTINGS

SCALES AS NOTED

SHEET Nº 8 OF 8 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY:	DATE:
	DESIGNED BY:	
NOTE BOOK	DRAWN BY:	
	TRACED BY: J. Calistro	
No.	QUANTITIES BY:	
	CHECKED BY:	