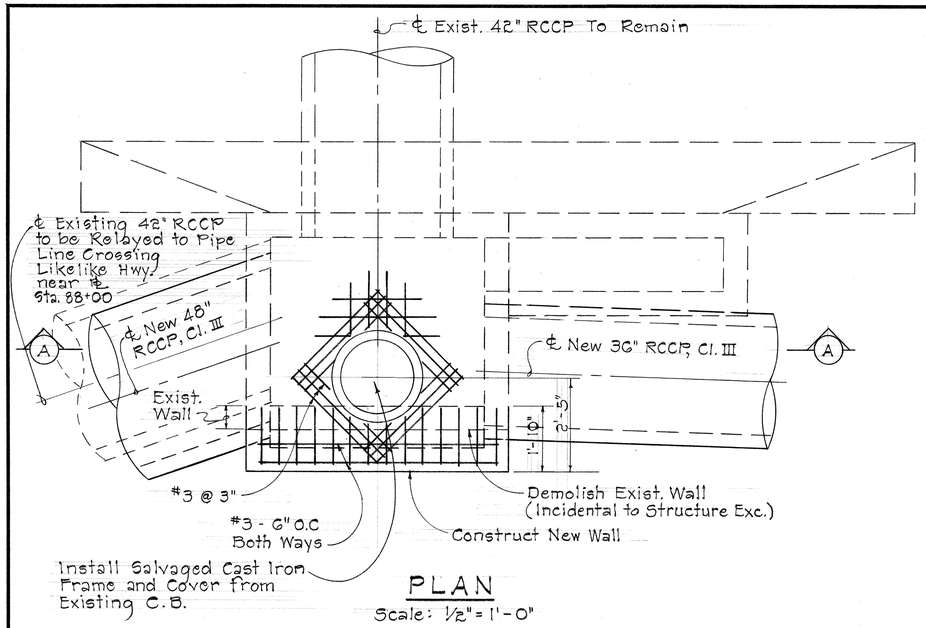
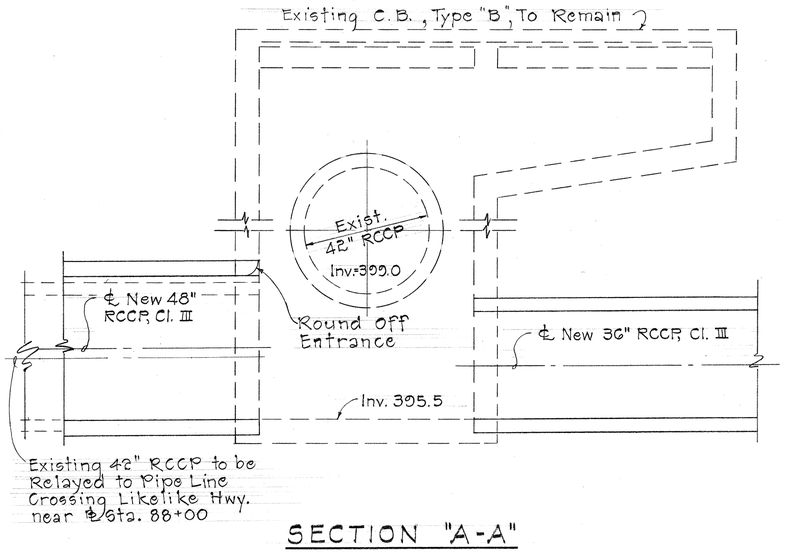


PLAN

Scale: ½" = 1'-0"



SECTION "A-A"

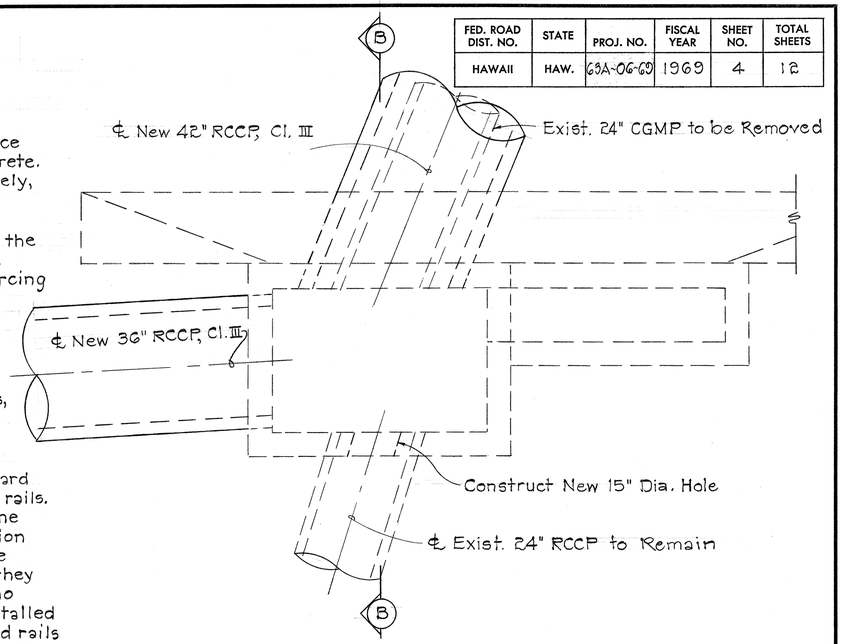
Scale: ½" = 1'-0"

TYPE "B" C.B.

℄ STA. 85+50

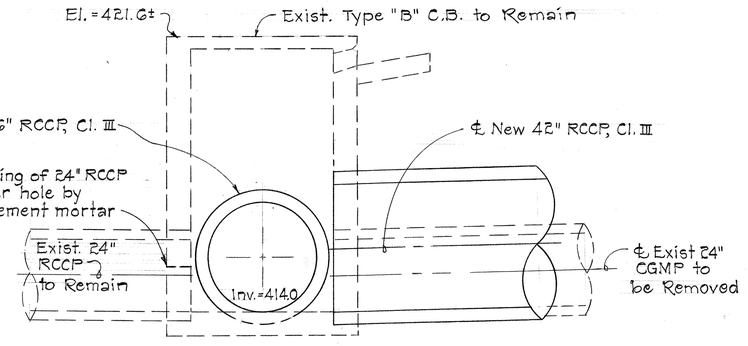
GENERAL NOTES

1. Where new reinforcing steel is needed for additions to existing structures and relocation of manholes, new bars, which are in line with existing bars, shall be lapped 6 inches over the existing bars. The bars shall be placed in contact and wired in such a manner as to maintain a clearance of not less than the minimum clear distance between bars and the minimum distance to the surface of the concrete. Splicing of new bars to existing bars shall not be paid for separately, but shall be incidental to payment for "Reinforcing Steel Other Than In Bridges."
2. Where modifications are made to existing drainage structures, the contractor shall be responsible for demolition of portions of the existing structure where necessary for installation of new reinforcing steel. Payment for demolition shall be incidental to "Structure Excavation." Extreme caution shall be taken to prevent damage to existing reinforcing steel. All existing reinforcing steel shall remain except at locations that will be completely demolished.
3. At connections of new pipe culverts to existing drainage structures, sealing of holes made for installation of new pipes shall not be paid for separately, but shall be incidental to payment for the new pipe culvert.
4. Where new pipe culvert construction crosses or nears the existing guard rails, the contractor shall see that no damage occurs to the guard rails. Where an existing guard rail interferes with a new installation, the contractor shall remove the guard rail temporarily. After completion of the new installation, the guard rail shall be re-installed. If the existing guard rail posts interfere with the new installed pipe, they may be relocated. In any event the contractor shall see that no damage occurs to either the re-installed guard rail or the new installed pipe. Payment for adjustment or relocation of the existing guard rails shall not be paid for separately, but shall be considered incidental to the items of work in the general vicinity.
5. Backfill for "Structure Excavation" from Sta. 80+20 to Sta. 84+40 shall be of the same quality as material required for fill in the remainder of the section and shall be measured and paid for under the item for "Structure Excavation".
6. At Sta. 80+50± after installation of the new 48" RCCP, the existing pavement for the existing access road to the H.E.Co. Substation shall be restored and paid for under item 131.01, "Restoring Highway Pavement."
7. The existing Signal Corps cables and other lines shown on the plans are approximate only. The depth of the existing Signal Corps cable is approximately 30 inches. One week before excavation work starts in the vicinity of any existing Signal Corps cable, the contractor shall notify the H.T. Co's. West Division Construction Supervisor, Mr. G. Stender at 898-225, so that the cable can be toned out for its exact location. H.T. Co. will assign an inspector to this project during the excavation and backfilling phase to see that proper measures are taken at all times to prevent damages to this highly important cable. The contractor shall provide adequate shoring and temporary support for the exposed Signal Corps cable in the open trench area. The contractor shall replace the Signal Corps cable to its original position after the installation of the proposed drain pipe. All expenses incurred by the contractor in supporting, protecting, and replacing the cable shall not be paid for separately, but shall be considered incidental to the items of work in the immediate vicinity.
8. In the 42" Drain Line crossing Likelike Highway, the contractor has the option of relaying the existing 42" RCCP, salvaged from Sta. 84+40 to Sta. 85+50 and Sta. 80+50, and installing the pipe in the new location; or installing entirely new 42" RCCP. If the contractor elects to use the option of relaying existing RCCP, he will find that the number of linear feet of salvaged pipe will not be sufficient for the entire drain line. He shall install the relayed pipe in the two lower sections first. Any new pipe required shall be installed in the upper section leading from the new CD1 to the new Type "F" CB. In order to differentiate the quantity for this new 42" pipe in the upper section from the quantity for new 42" pipe in the other option, it shall be measured and paid for under Item No. 58.124A2 while the other option of installing entirely new 42" RCCP shall be measured and paid for under Item No. 58.124A1. Although there are two separate items for new 42" RCCP, the Standard Specifications and Special Provisions apply equally to each item. Restoration of the existing pavement shall be paid for under Item No. 131.01, "Restoring Highway Pavement."



PLAN

Scale: ½" = 1'-0"



SECTION "B-B"

Scale: ½"=1'-0"

TYPE "B" C.B.

℄ STA. 87+70

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	63A-06-69	1969	4	18

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

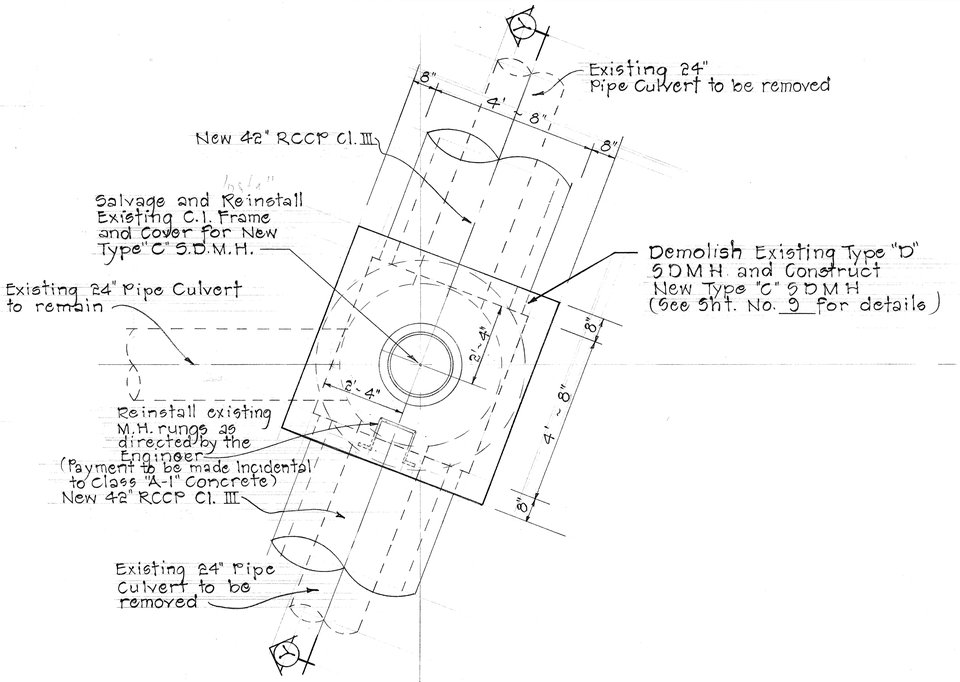
DRAINAGE DETAILS

LIKELIKE HIGHWAY
PROJ. NO. 63A-06-69

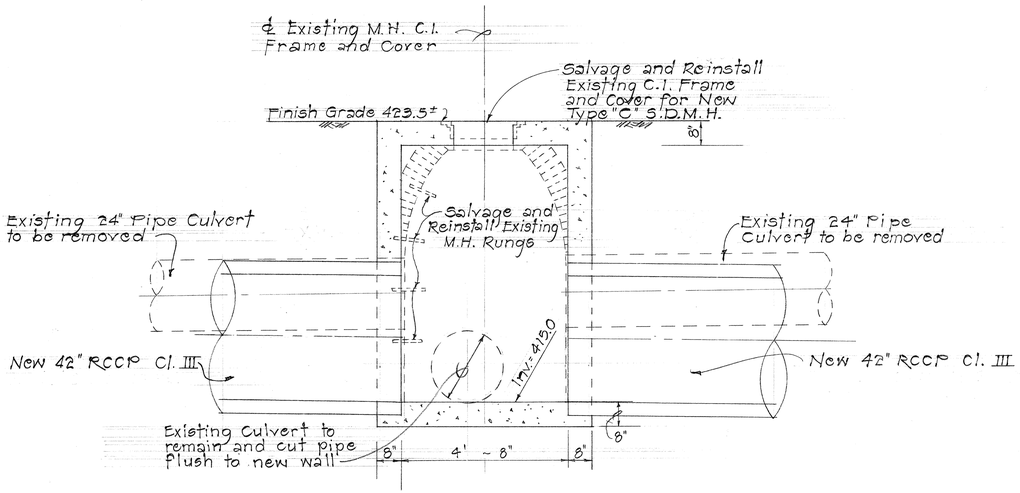
Scale: ½"=1'-0" Date: Oct. 1968

SHEET No. 4 OF 18 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY F. WONG	10-2-68
NOTE BOOK	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	



PLAN



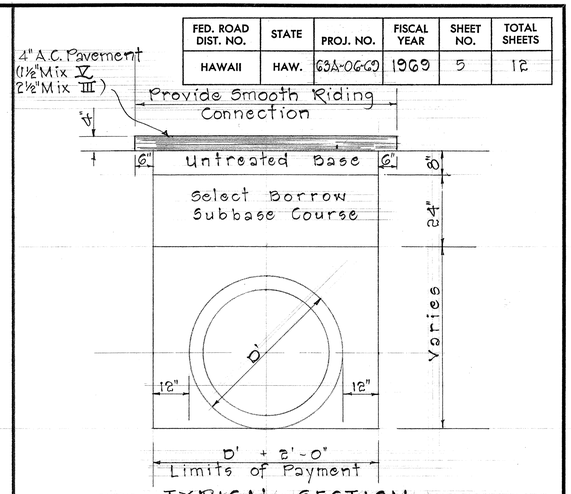
SECTION "Y-Y"

DETAIL OF NEW TYPE "C" SDMH @ ℄ STA. 87+84

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

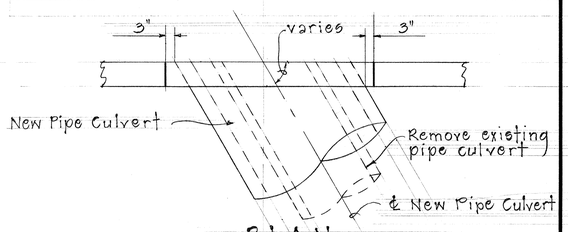
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
No.	QUANTITIES BY	
	CHECKED BY	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	63A-0663	1969	5	12

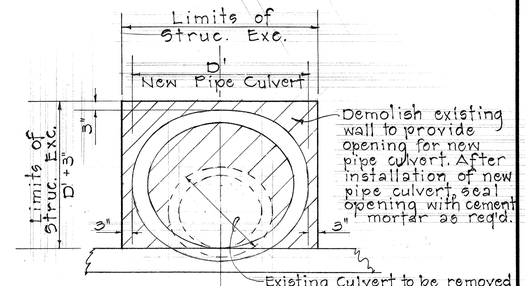


TYPICAL SECTION
NEW PIPE CULVERT CROSSING ~ LIKELIKE

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



PLAN



ELEVATION

TYPICAL SECTION
CONNECTION OF NEW PIPE CULVERT TO EXISTING DRAINAGE STRUCTURES

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

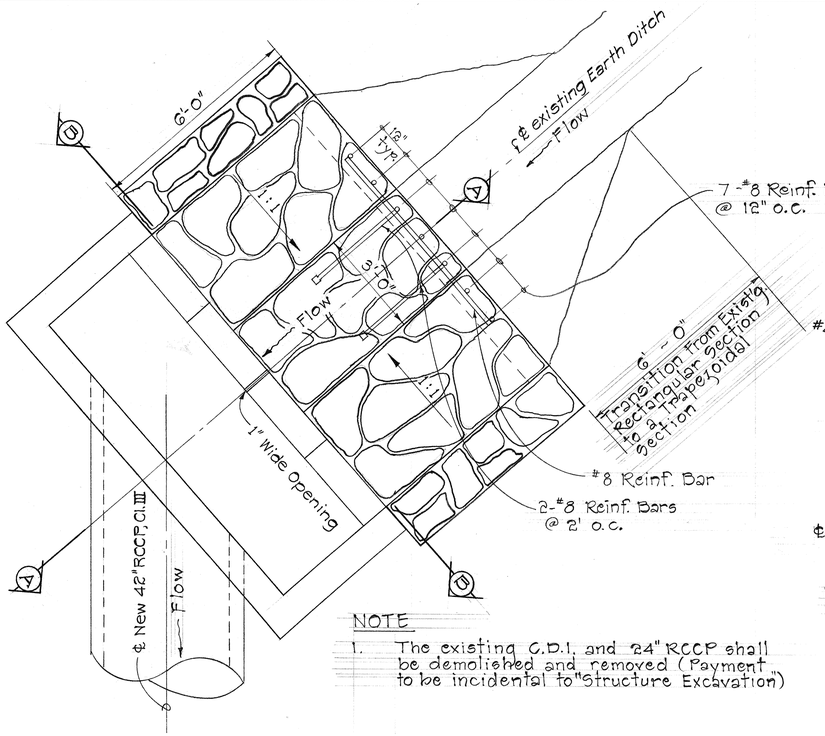
DRAINAGE DETAILS

LIKELIKE HIGHWAY
PROJ. NO. 63A-06-69

Scale: 1/2" = 1'-0" Date: Oct. 1968

SHEET No. 5 OF 12 SHEETS

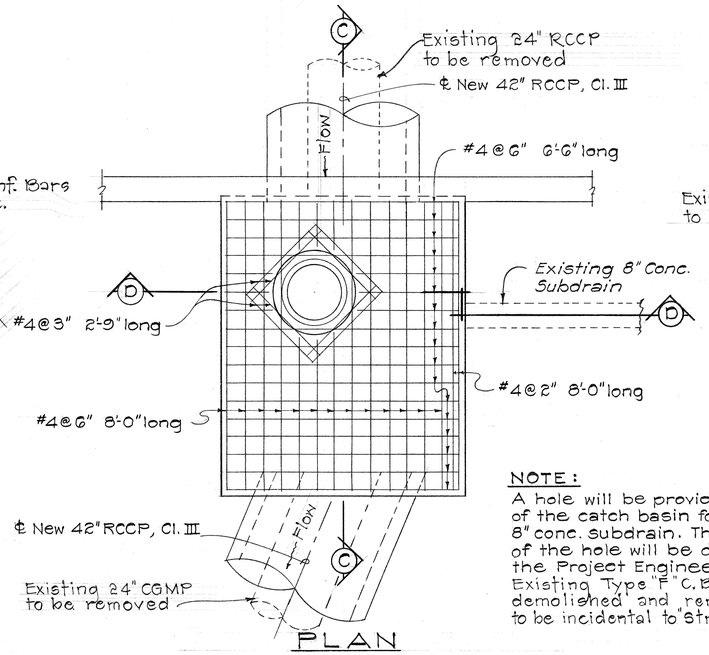
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	63A-06-69	1969	6	12



PLAN

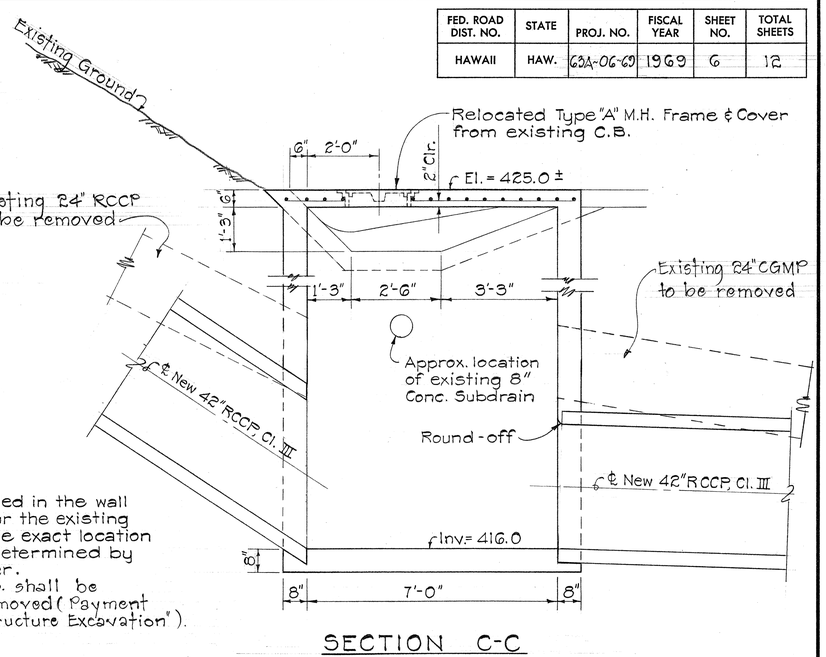
NOTE

1. The existing C.D.I. and 24" RCCP shall be demolished and removed (Payment to be incidental to "Structure Excavation")



PLAN

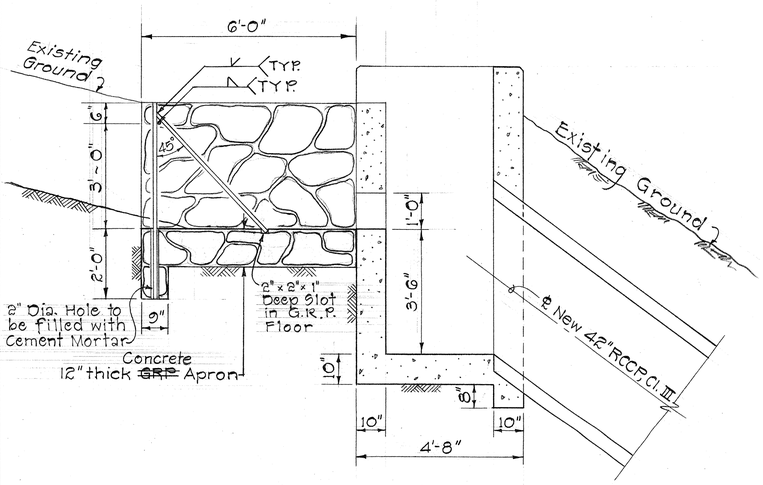
NOTE:
A hole will be provided in the wall of the catch basin for the existing 8" conc. subdrain. The exact location of the hole will be determined by the Project Engineer.
Existing Type "F" C.B. shall be demolished and removed (Payment to be incidental to "Structure Excavation").



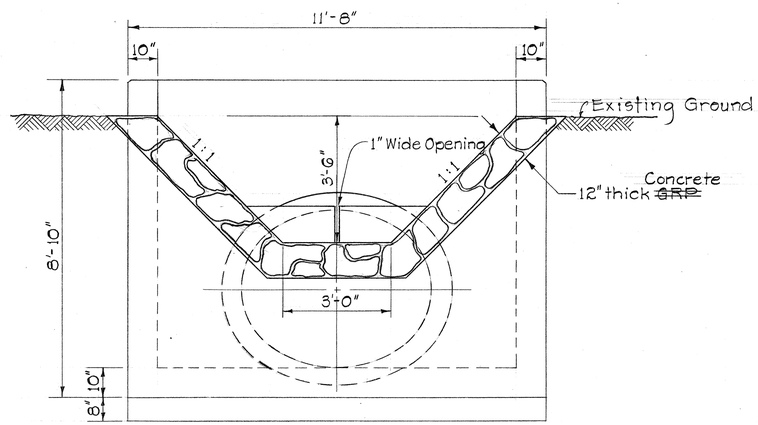
SECTION C-C

NEW TYPE "F" CATCH BASIN ℄ STA. 88+00, 45'%LT.

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



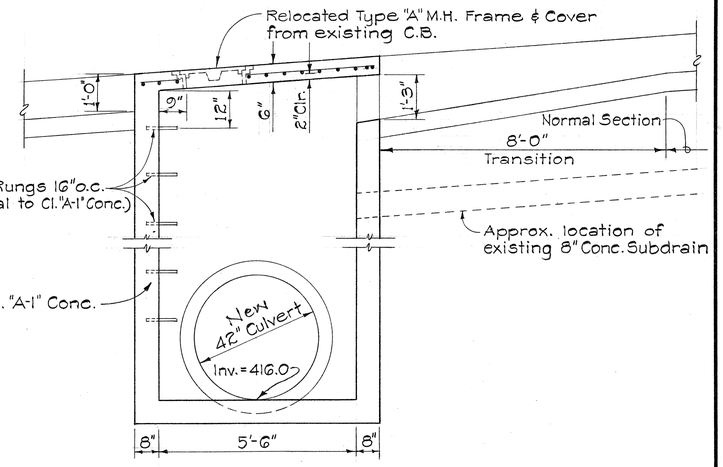
SECTION A-A



SECTION B-B

A-1 Concrete CONC. DROP INTAKE WITH GRP APRON ℄ STA. 88+00, 80'%LT.

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



SECTION D-D

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

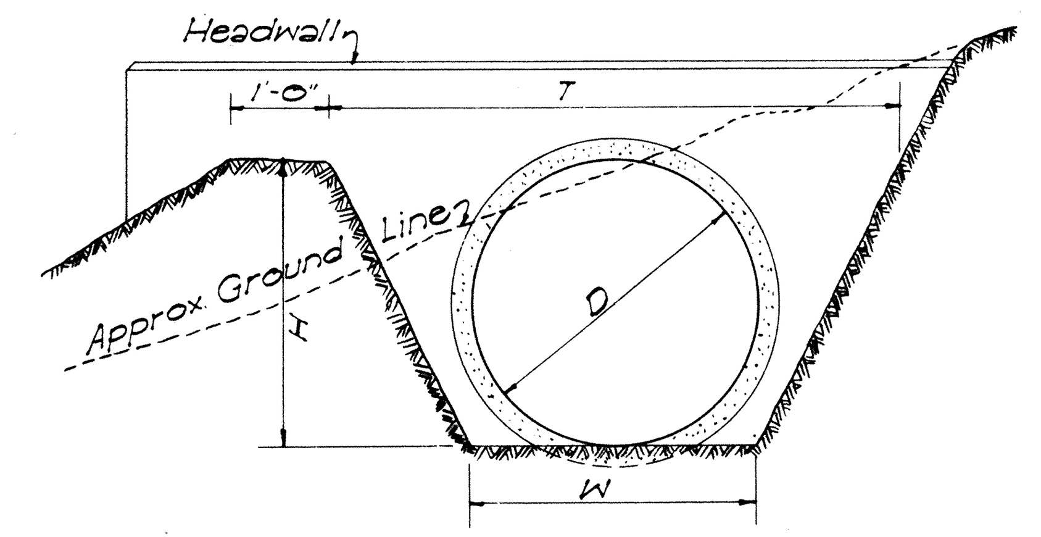
LIKELIKE HIGHWAY
PROJ. NO. 63A-06-69

Scale: 1/2" = 1'-0" Date: Oct. 1968

SHEET No. 6 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO	TOTAL SHEETS
HAWAII	HAW.	63A-06-69	1969	7	12

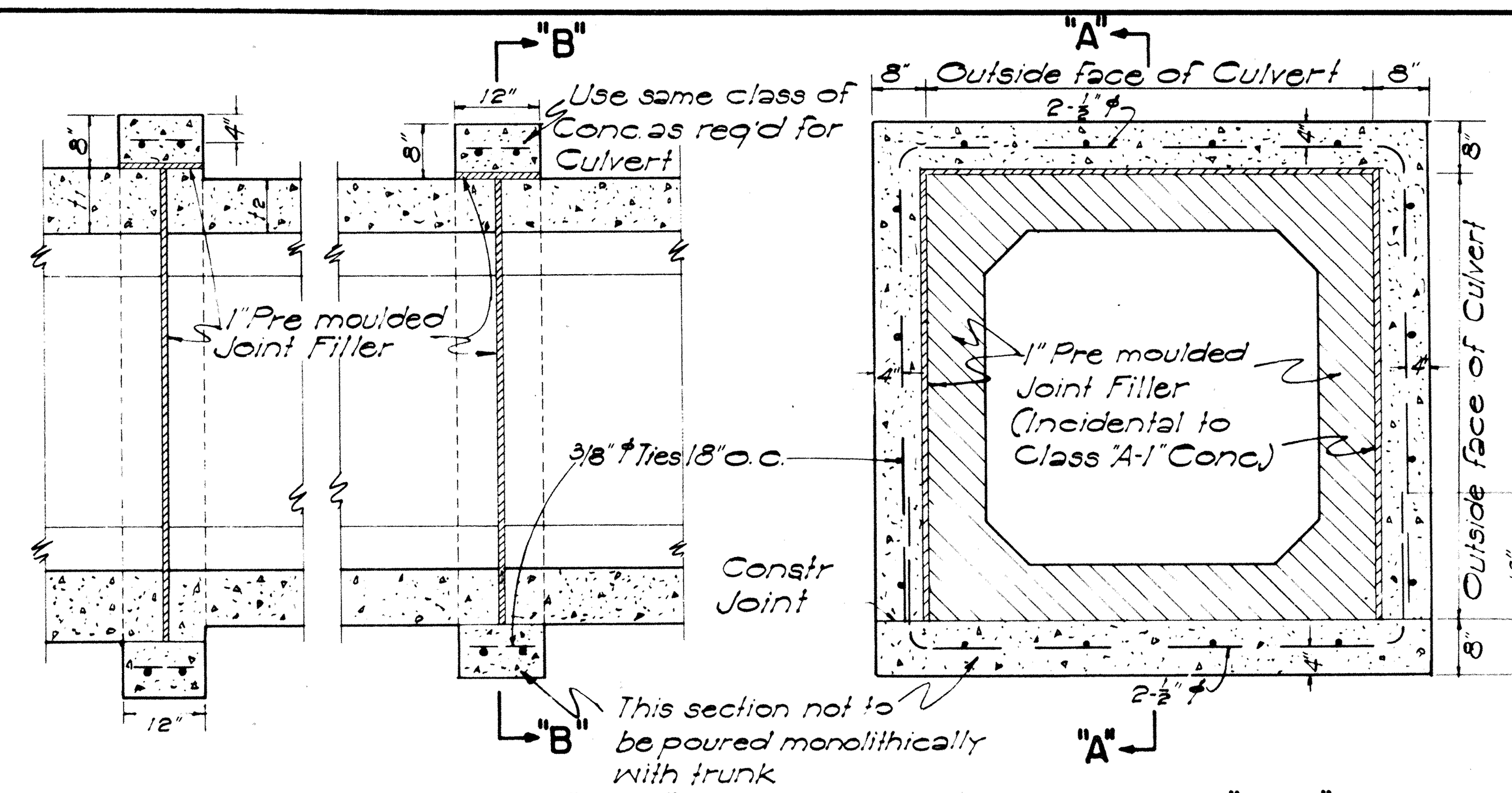
Revised: June 1965
Revised: August 1967



DATA FOR OUTLET DITCH			
D	W	H	T=W+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"

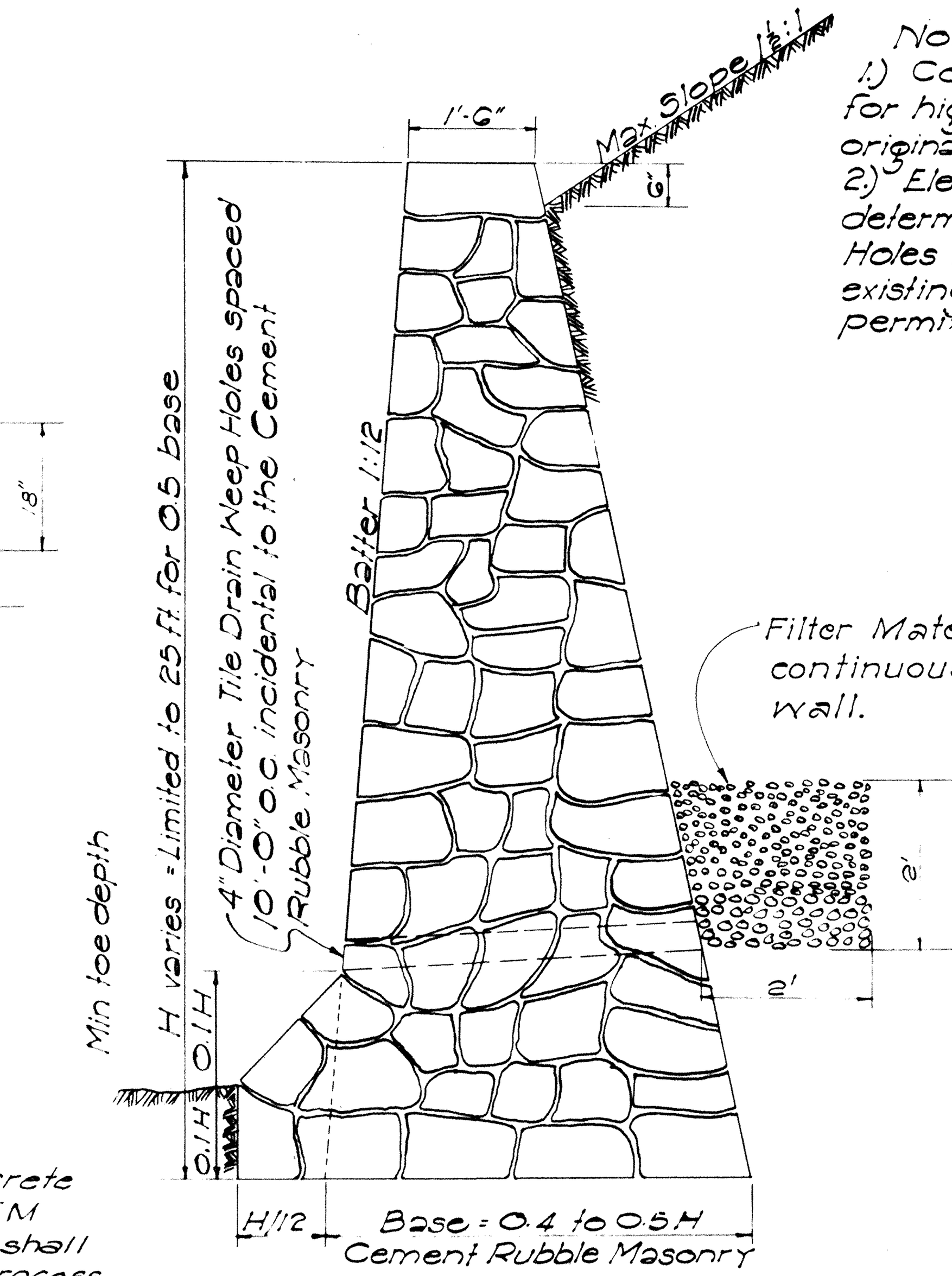


SECTION "A-A" SECTION "B-B"

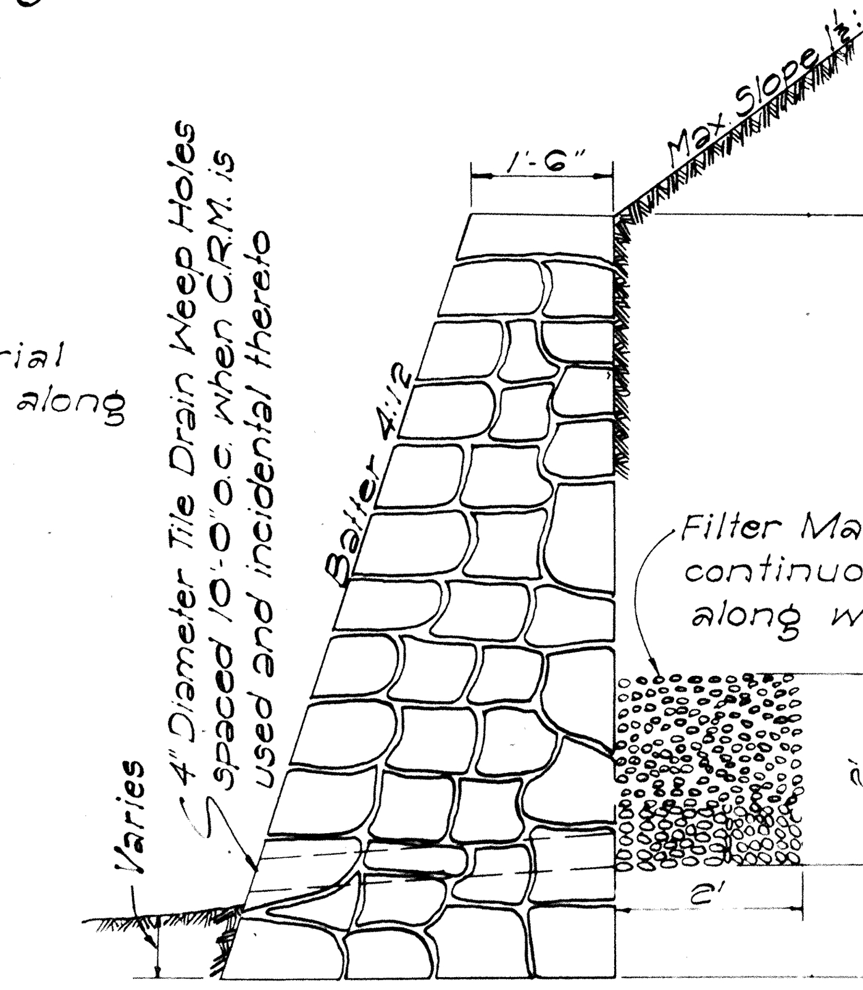
CONC. COLLAR FOR CONC. BOX CULVERT

Scale: 1/2" = 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.



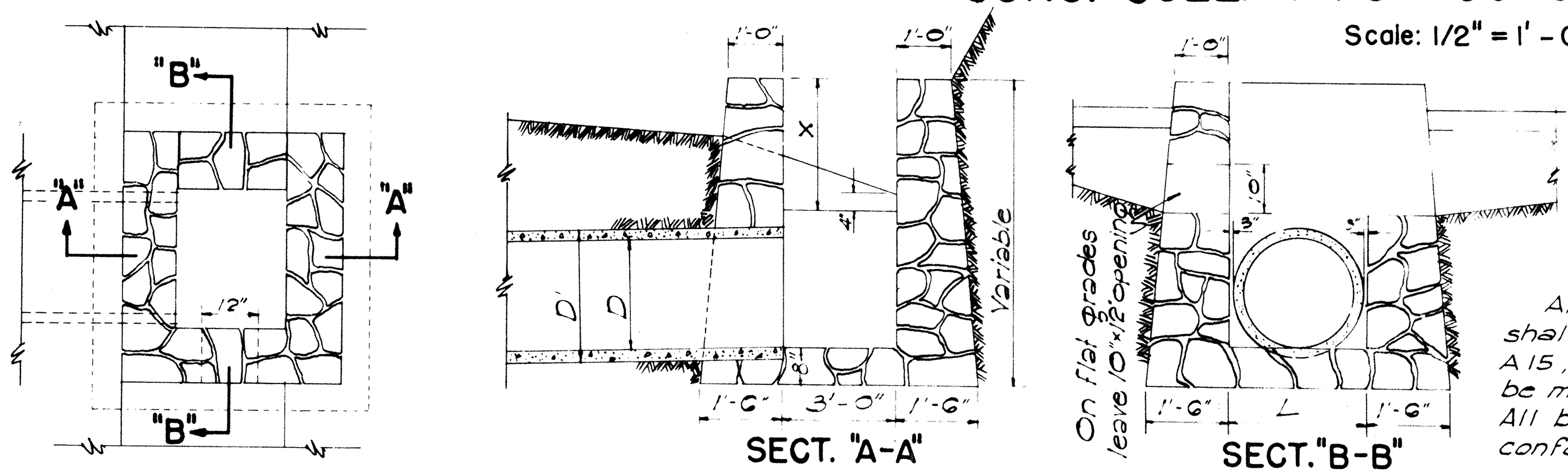
SECTION OF HIGH CEMENT RUBBLE MASONRY RETAINING WALL OR SEAWALL



SECTION OF LOW MASONRY RETAINING WALL OR SEAWALL

DATA FOR MASONRY DROP INTAKE				Where Variables Equal
D'	D	L=D'+6"	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.



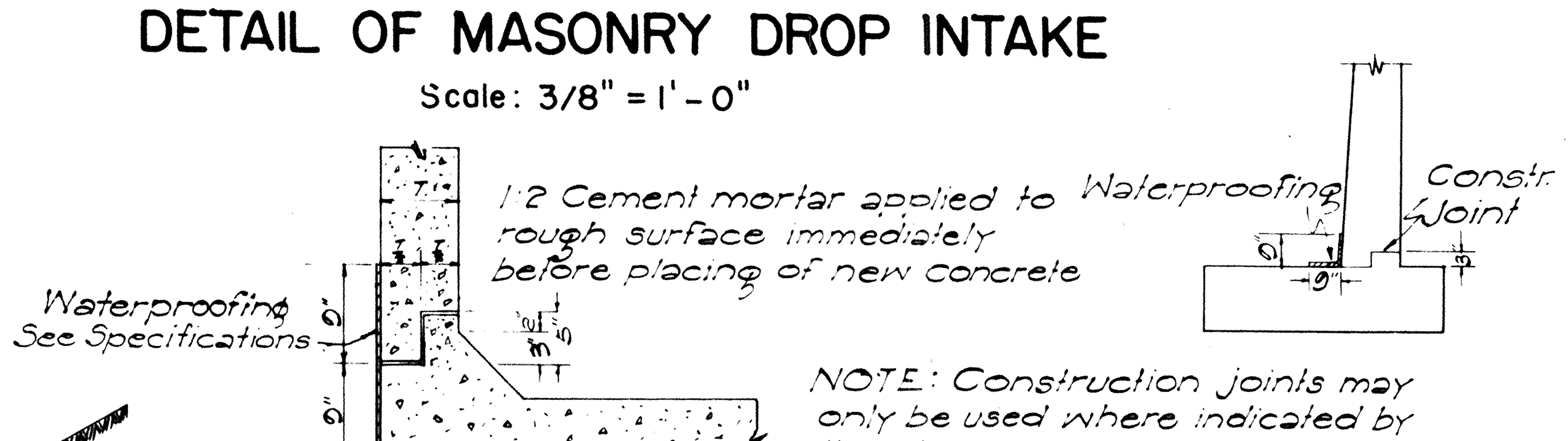
SECT. "A-A" SECT. "B-B"

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.

DETAIL OF MASONRY DROP INTAKE

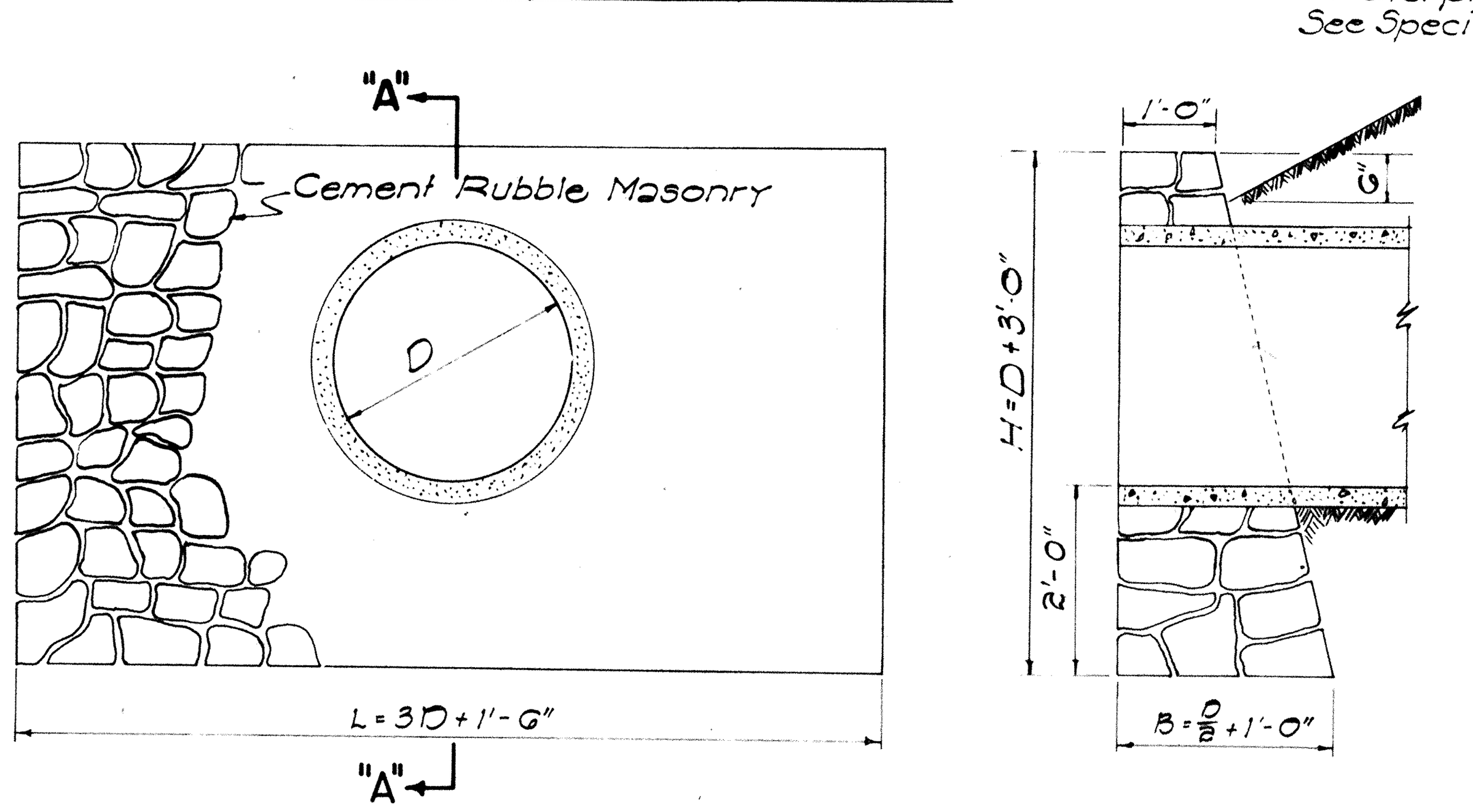
Scale: 3/8" = 1'-0"

DATA-MASONRY HEADWALL				CRM For RCCP	CRM For CGMP
D	H	B	L	Cu. Yds.	Cu. Yds.
18"	4'-6"	1'-9"	6'-0"	1.24	1.29
24"	5'-0"	2'-0"	7'-6"	1.83	1.92
30"	5'-6"	2'-3"	9'-0"	2.56	2.70
36"	6'-0"	2'-6"	10'-6"	3.45	3.66



NOTE: Construction joints may only be used where indicated by the plans or permitted in writing by the Engineer.

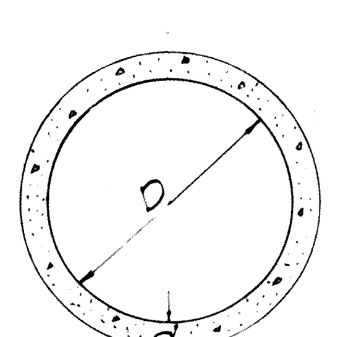
CONSTR. JOINT DETAILS



ELEVATION SECT. "A-A"

DETAIL OF MASONRY HEADWALL

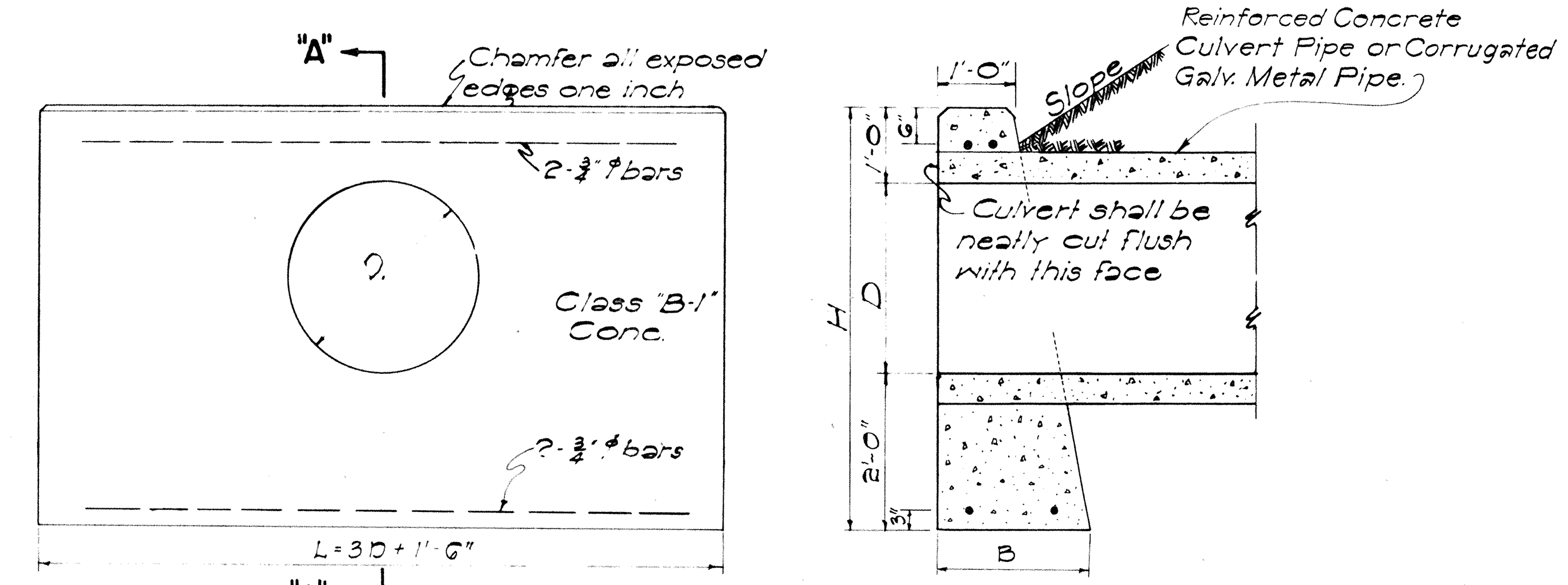
Scale: 1/2" = 1'-0"



SECTION

CONC. PIPE CULVERT

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



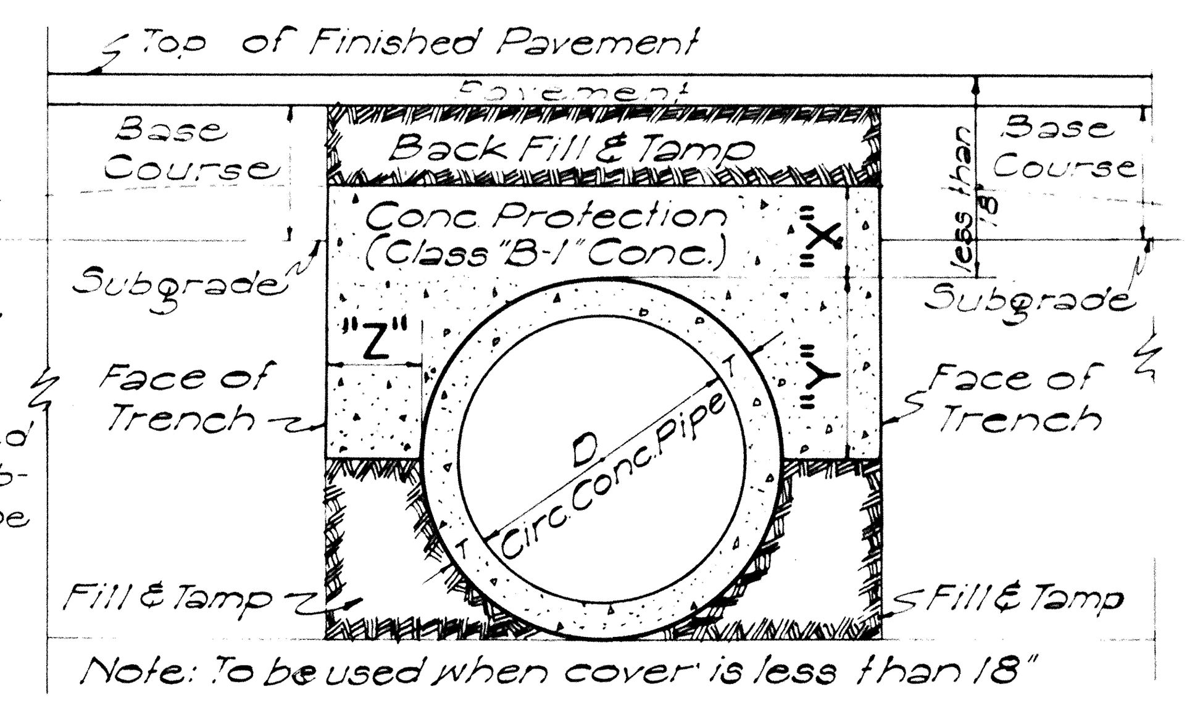
ELEVATION SECTION "A-A"

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	3/4"φ	5'-6"	33
24"	1'-6"	7'-6"	5'-0"	1.52	1.60	4	3/4"φ	7'-0"	42
30"	2'-0"	9'-0"	5'-6"	2.36	2.49	4	3/4"φ	8'-6"	51
36"	2'-0"	10'-6"	6'-0"	2.94	3.13	4	3/4"φ	10'-0"	60
42"	2'-6"	12'-0"	6'-6"	4.19	4.47	4	3/4"φ	11'-6"	69
48"	2'-6"	13'-6"	7'-0"	5.01	5.36	4	3/4"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	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		

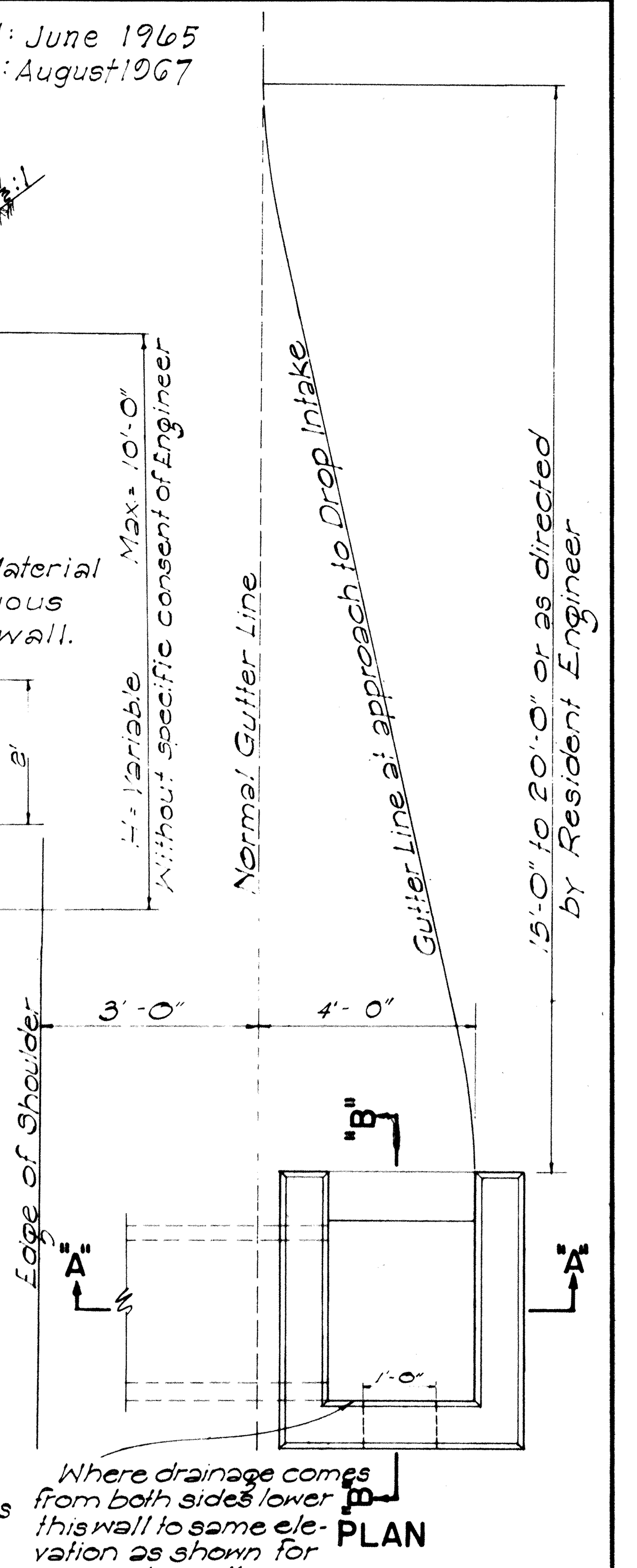
SECT. OF CULVERT WITH CONC. PROTECTION

Scale: 1" = 1'-0"

DATA - CONC. DROP INTAKE					Where Variable Equals
D'	D	L=D'+6"	S	Cu. Yds.	
23"	18"	2'-5"	8"	1.41	4'-6"
30"	24"	3'-0"	8"	1.72	5'-0"
37"	30"	3'-7"	9"	2.32	5'-6"
44"	36"	4'-2"	9"	2.73	6'-0"
51"	42"	4'-9"	10"	3.54	6'-6"
58"	48"	5'-4"	10"	4.01	7'-0"

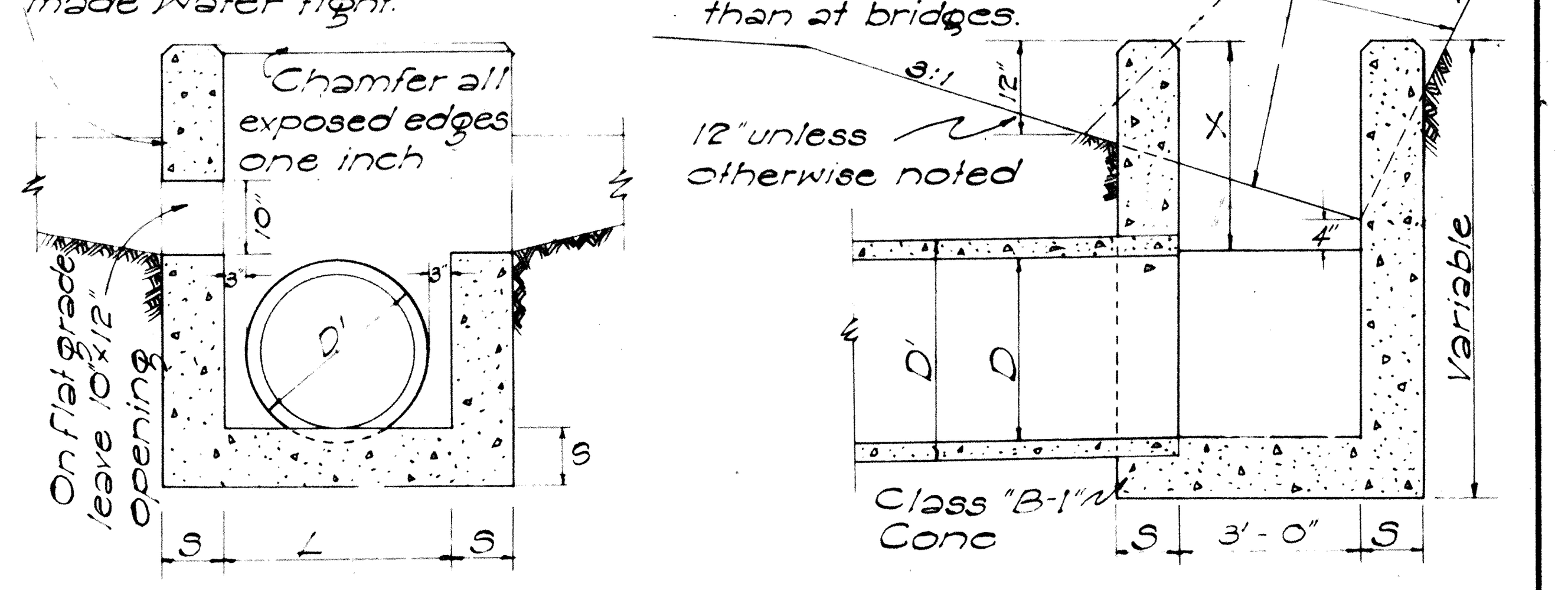
Note: Dimension "X" is assumed as 2'-4" in figuring the above quantities

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.



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

Top limits of structure excavation other than at bridges.



SECTION "B-B" SECTION "A-A"

DETAIL OF CONCRETE DROP INTAKE

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

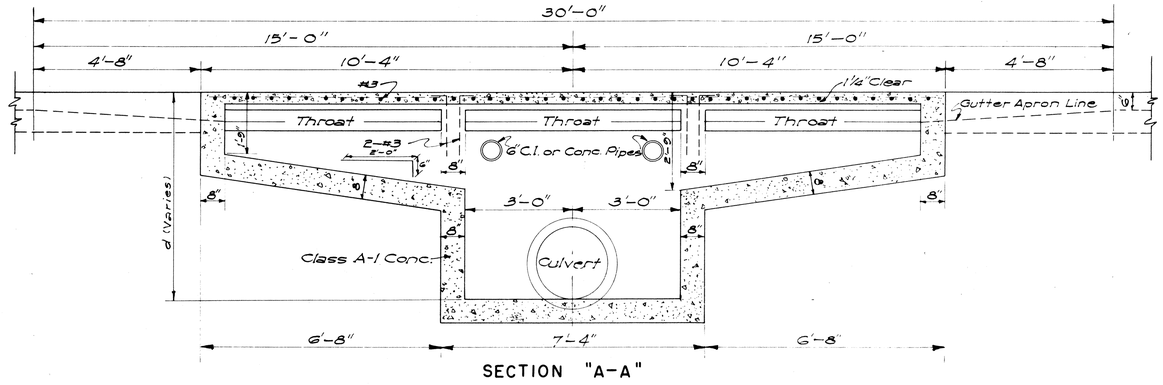
STANDARD DETAILS

DROP INTAKES, RETAINING WALLS, HEADWALLS, CONSTRUCTION JOINTS

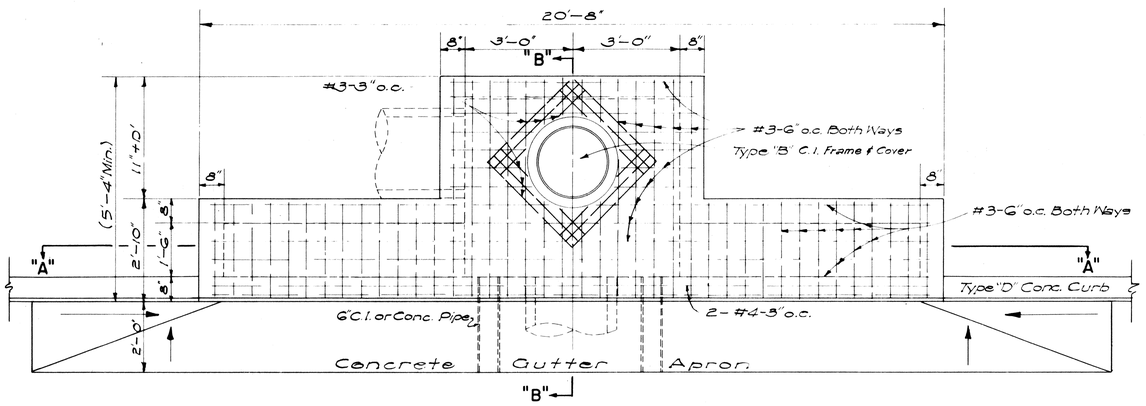
SCALES AS NOTED

2/17/59

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	63A-06-69	1969	8	12



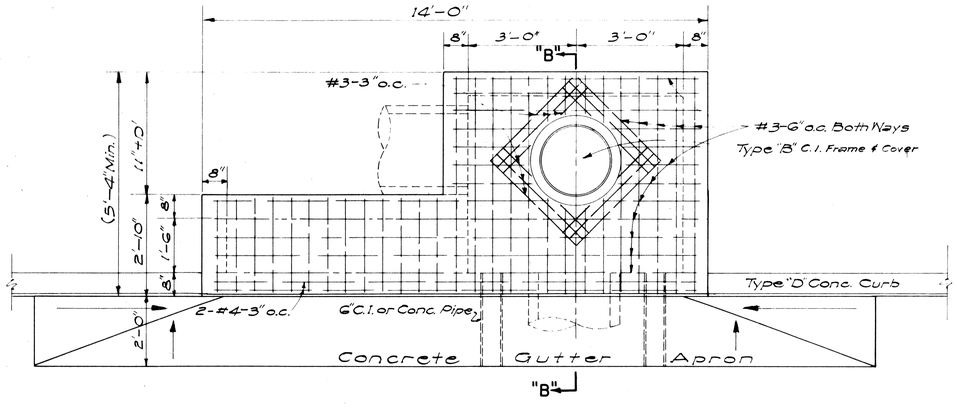
SECTION "A-A"



PLAN

DETAIL OF TYPE "A" CATCH BASIN

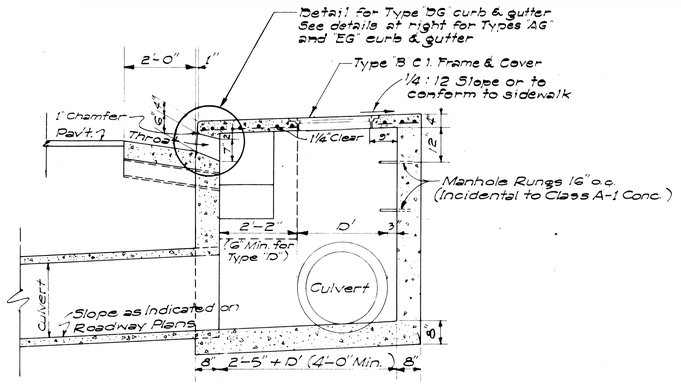
SCALE: 1/2" = 1'-0"



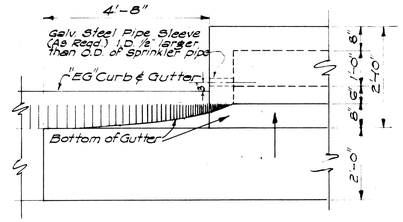
DETAIL OF TYPE "B" CATCH BASIN

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

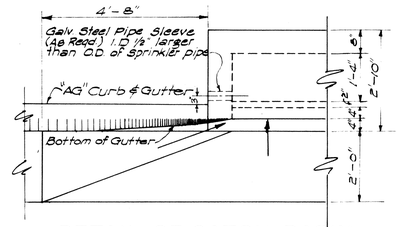
NOTE: TYPE "C" C.B. SIMILAR BUT OPPOSITE HAND



SECTION "B-B"

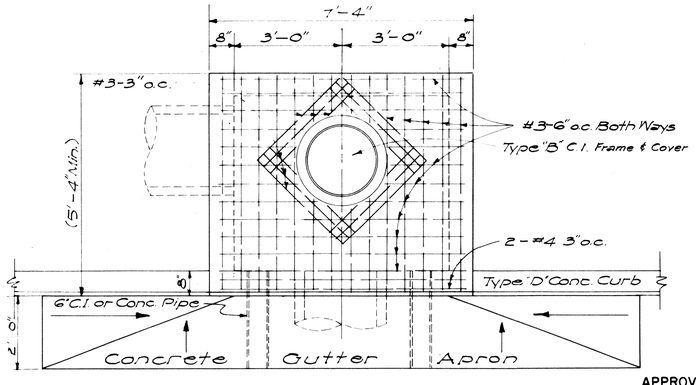


DETAIL OF CATCH BASIN WITH TYPE "EG" CURB & GUTTER



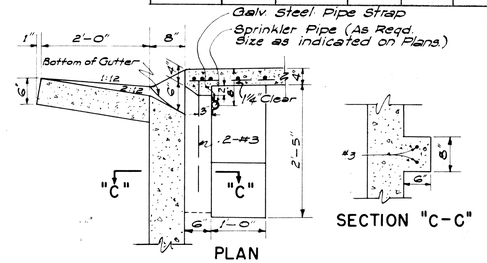
DETAIL OF CATCH BASIN WITH TYPE "AG" CURB & GUTTER

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



DETAIL OF TYPE "D" CATCH BASIN

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

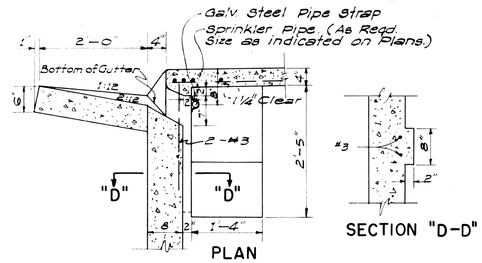


PLAN

SECTION "C-C"

THROAT DETAIL FOR TYPE "EG" CURB & GUTTER

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



PLAN

SECTION "D-D"

THROAT DETAIL FOR TYPE "AG" CURB & GUTTER

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

ESTIMATED QUANTITIES

Type	Class A-1 Conc.	Struct. Exc.	Reinf. Steel	Gutter Length
"A"	7.5 c.y.	24.7 c.y.	145 lb.	30'-0"
"B"	6.0 c.y.	21.5 c.y.	108 lb.	23'-4"
"C"	6.0 c.y.	21.5 c.y.	108 lb.	23'-4"
"D"	4.9 c.y.	16.5 c.y.	77 lb.	16'-8"

NOTES:

1. Quantities based on d = 5.75' and D' = 3.0"
2. Quantities do not include concrete for Gutter Apron.
3. The Contractor shall install two 6" Cast Iron or Concrete Pipes as incidental to Class A-1 Concrete for Construction Drainage.
4. Culvert shall leave C.B. from any position and any direction indicated by plans or ordered by the Engineer. Culvert may both enter and leave C.B. so that C.B. will also act as Manhole.
5. The Contractor shall install Galvanized Steel Pipe Sleeves and Straps as incidental to Sprinkler System.

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

APPROVED: DATE Aug. 26, 1959

STATE HIGHWAY ENGINEER

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS

CATCH BASINS

SCALES AS NOTED

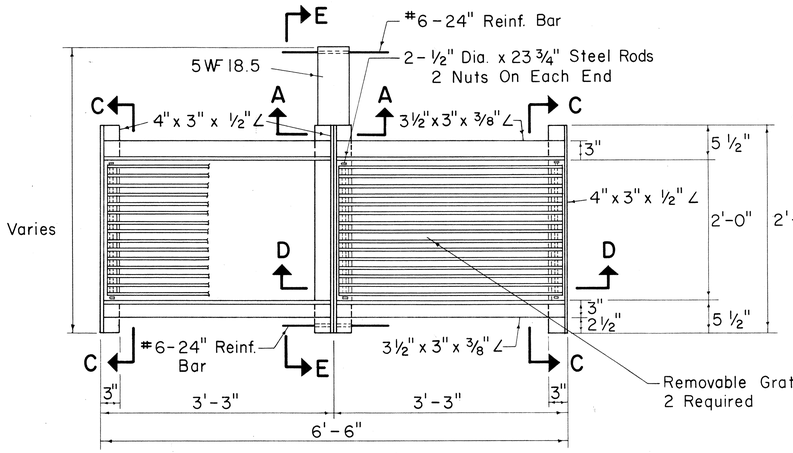
SHEET Nº 8 OF 12 SHEETS

3

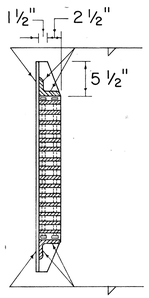
FED. ROAD DIST. NO.	STATE	PROJECT	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	63A-06-69	1969	9	12

Revised: Jan. 25, 1967

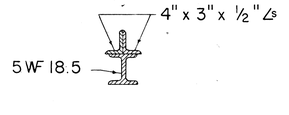
NOTE:
1. All welds $\frac{3}{8}$" unless otherwise noted.
2. All steel shall be structural grade.
3. Grates and Frame shall be hot dip galvanized after fabrication in accordance with Section 44(H) of the Standard Specifications.
4. Detail of Types "A-1" and "A-2" Steel Frame and Grates are identical 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

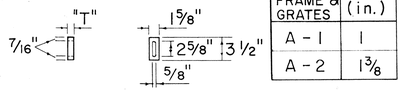
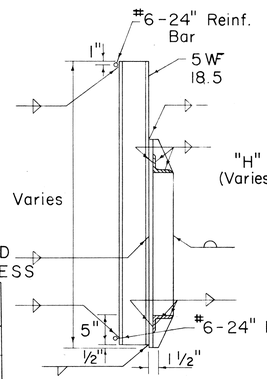


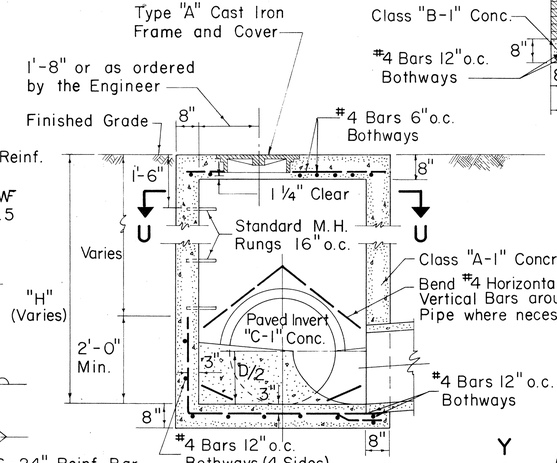
TABLE OF END SPACER THICKNESS

TYPE FRAME & GRATES	"T" (in.)
A-1	1
A-2	1⅜

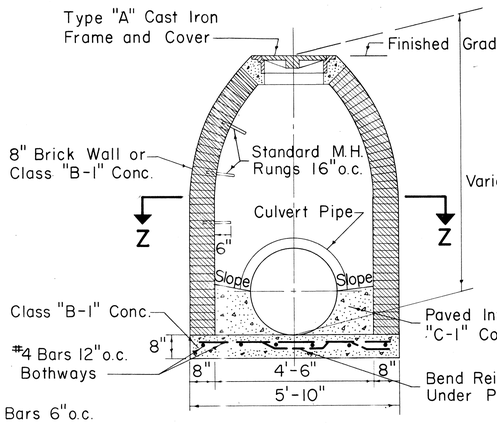
END SPACER



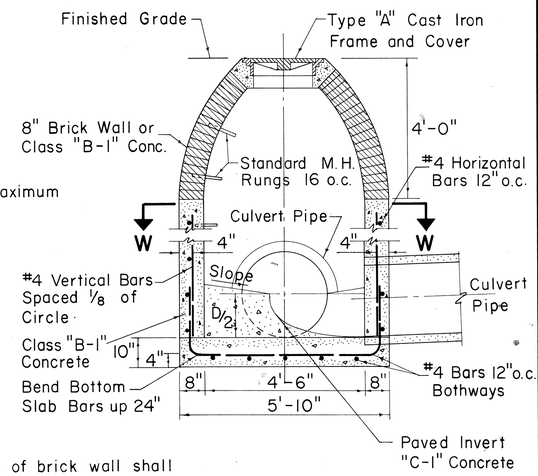
SECTION E-E



SECTION V-V

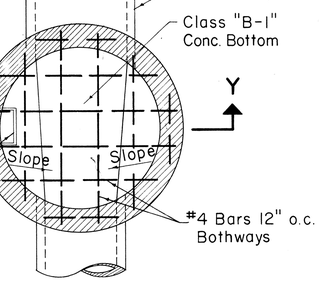


SECTION Y-Y

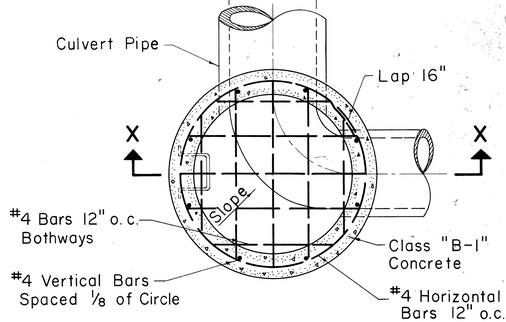


NOTE:
1. Exterior surface of brick wall shall be plastered with 1" thickness of 1:2 Cement Mortar.
2. Number size and direction of culvert pipes at manhole to be as shown on plans.
3. Paved invert not required at drop manholes.
4. All Class "C-1" Concrete to be incidental to Class "B-1" Concrete.

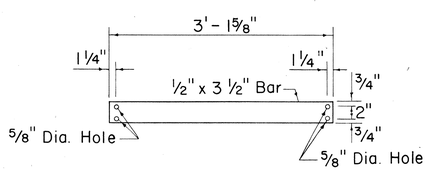
SECTION X-X



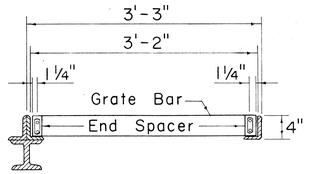
SECTION Z-Z



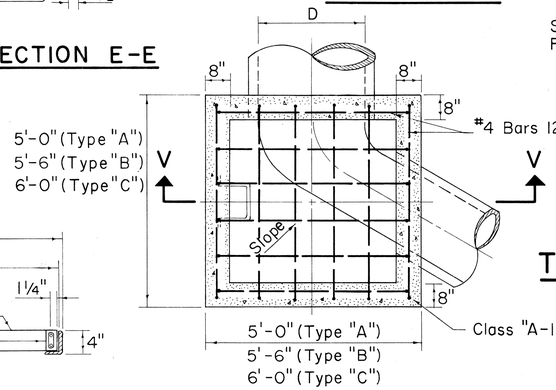
SECTION W-W



GRATE BARS



SECTION D-D



SECTION U-U

TYPE "A", "B", & "C" S.D.M.H.

Scale: ½"= 1'-0"

TYPE "D" STORM DRAIN MANHOLE

Scale: ½"= 1'-0"

TYPE "E" STORM DRAIN MANHOLE

Scale: ½"= 1'-0"

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

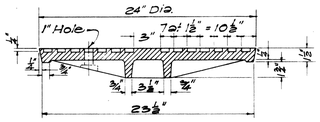
Scales: As Noted Date

SHEET NO. 9 OF 12 SHEETS

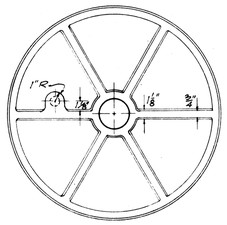
2/17/59
2/24/59

FED.ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	63A-06-69	1969	10	12

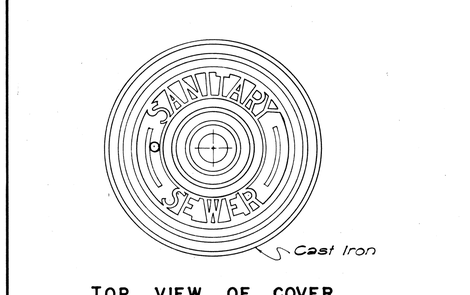
TOP VIEW OF COVER



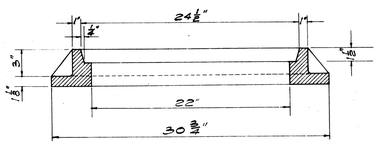
SECTION



BOTTOM VIEW OF COVER



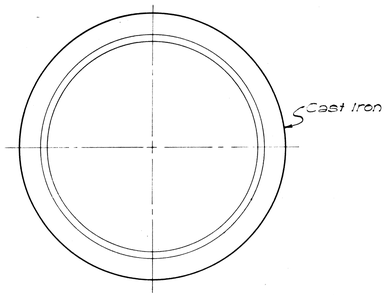
PLAN OF RIM



SECTION OF RIM

DETAILS OF TYPE "S" CAST IRON FRAME AND COVER

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



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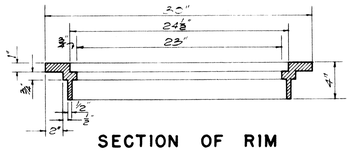

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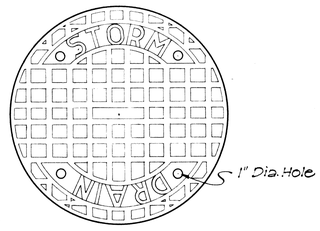
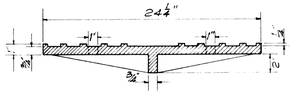


TOP VIEW OF COVER



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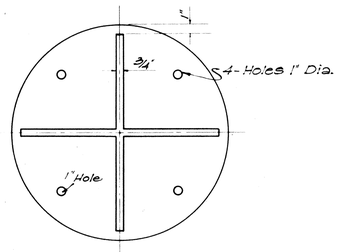
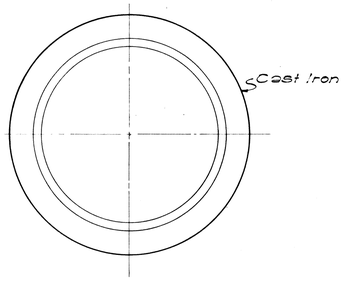


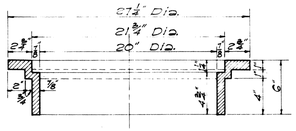
BOTTOM VIEW OF COVER

DETAILS OF TYPE "B" CAST IRON FRAME AND COVER

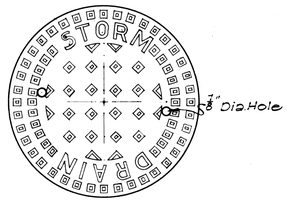
SCALE: 1-1/2" = 1'-0"



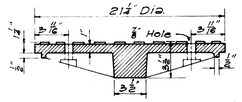
PLAN OF RIM



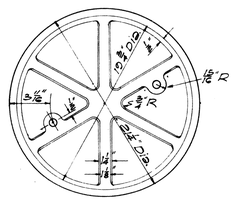
SECTION OF RIM



TOP VIEW OF COVER



SECTION

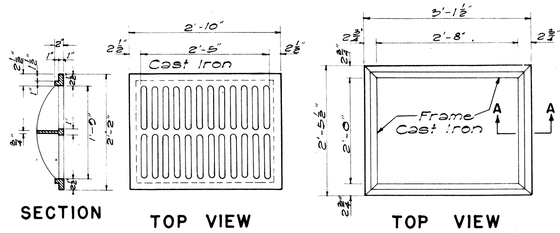


BOTTOM VIEW OF COVER

DETAILS OF TYPE "A" CAST IRON FRAME AND COVER

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

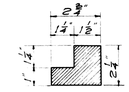
NOTE: Stock Pattern From Novelty Foundry



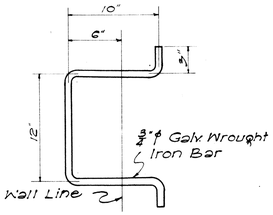
SECTION TOP VIEW TOP VIEW

TYPE C C.I. FRAME AND GRATING

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

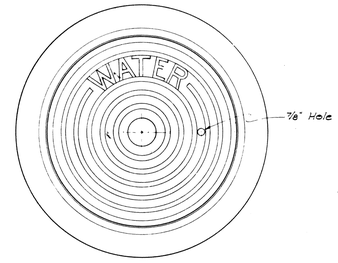


SECTION "A-A"
SCALE 3" = 1'-0"

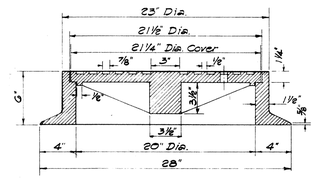


MANHOLE RUNG

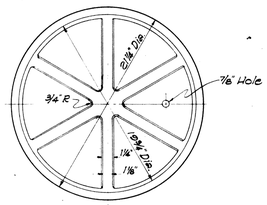
SCALE: 1-1/2" = 1'-0"



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"

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 "SA" 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.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

CATCH BASIN AND MANHOLE CASTINGS

SCALES AS NOTED

SHEET Nº 10 OF 12 SHEETS

11" TRACING CLOTH 884
E. CO., N. Y.

10